carpet, velvet, &c., which we are assured is produced with the most surprising velocity. "*It is truly astonishing to see the march of science.*"

Mr. Thompson's ingenious loom is described in the London Journal of Arts and Sciences, conjoined series No. CL. vol. XXIV, and may be procured on application to Messrs. Newton & Son 66 Chancery Lane, London.

As we intend to give a complete description of this machine, in our work on carpet weaving by power, no farther notice need be taken of it in this place.

Miles Berry, (of the firm of Newton and Berry, patent agents, 66 Chancery-lane, London,) obtained a patent in August, 1838, for certain improvements in looms for producing metallic tissues, and also improvements in such tissues, applicable to the making of buttons, epaulettes, tassels, and other purposes, for which gold and silver lace or braiding is commonly employed, and to the making of imitations of jewellery and other fancy articles.

These improvements consist, in weaving or producing ornamental metallic tissues or fabrics of wire applicable to various useful purposes, for which gold and silver lace is commonly used; as for instance, in the making of different articles of ornamental dress, epaulettes, bands, sashes, bindings, trimmings, tassels, buttons, and various other purposes where gold and silver lace is now applied, also to the covering of boxes, books, card cases, and covering or forming various imitations of jewellery, and other fancy articles; and consist in weaving, making, or forming, such ornamental metallic tissues, entirely of strands of wire, either of gold, silver, silver-gilt, copper-gilt or other metal, or mixtures of metal, which wires are woven into a tissue or fabric, having patterns or ornamental devices thereon, by any suitable figuring machinery, such ornamental metallic tissues being composed entirely of metal, in contradistinction to the ordinary gold and silver lace, and have all the variety of design or pattern, and brilliancy of appearance of the finest figured or brocaded silk, or other fabric, without their *perishable* qualities; and are capable of being cleaned by boiling or washing with water, or immersing in acid solution, and gilded or silvered or even soldered together after they have been woven,—which cannot be done with tissues having silk, cotton, or other threads, interwoven in the fabric.

The improvements in the looms for weaving such tissue or fabrics, being the application and adaptation of the well known Jacquard

mechanism or apparatus for acting upon the warp threads or wires, to produce the figure or design, together with suitable mechanism, whereby the same is made or rendered more applicable to the loom for this purpose; for when the Jacquard apparatus is applied in the ordinary manner (in hand looms) the abrupt or sudden action caused by the treadles through the Jacquard upon the warps, and also their great extent of opening or separating to allow the shuttle to pass, is liable to break the metallic strands, they not being so elastic or capable of yielding longitudinally as warps of silk or twisted fibrous material, and therefore a means of remedying this evil is adapted with the Jacquard to the loom; the rising motion of the head-board or top of the Jacquard apparatus, being first met by an elastic resistance, and then stayed at the proper distance by an adjustable stop-piece.

It should be here remarked, that solid gold and silver, and gilt wire, has been heretofore applied in the making of gold and silver lace; but it has only been used as weft threads, interwoven with warps, consisting of threads of silk or fibrous material, such warps being covered, or nearly so, by the picks of metal weft, and having a small or finer binding warp thread of silk or fibrous material to secure such metal weft in parts where it floats over several threads to produce the figure or design on the face of the fabric; and such combination of metal, and silk or fibrous material, has heretofore, only been woven in an ordinary figuring loom without the Jacquard apparatus; such lace has all the disadvantages of the common gold and silver lace, composed entirely of silk or fibrous material, both warp and weft being covered by a thin coating of metal wound or coiled around them. It should also be observed, that a description of metallic tissue has heretofore been woven in ordinary looms of the simplest construction, that is, without the means of producing figures or designs: but this has been done only in broad-pieces of plain fabric, the warp and weft regularly interweaving with one another at each pick of the weft or change of the pattern or figure; which woven *wire work* or fabric is applicable to the making of window-blinds, paper strainers, sieves, screens, fire guards, and other purposes, where the same may be used.

In order to apply this invention with good effect, and produce the ornamental tissues with the best advantage, the metallic strands or wire should be carefully annealed by heating the same, and allowing it to cool gradually, in order to destroy the brittleness caused in the drawing of the wire, and to render it as pliant as possible, so that the metallic strands may work well with the Jacquard appara-

tus. The following means or method of effecting this object should be pursued:—

The wire is first wound upon hollow metal bobbins; into the hollow part or centre of these bobbins are to be placed red hot pieces of metal, whereby the wire will be heated on the bobbins, and then allowed gradually to get cold. In order to preserve the polish of the wire, and not to injure its colour, the bobbins should be of different metals, according to the different metal wire to be operated upon; for instance, when copper wire is to be used, the bobbin should be formed of copper; if the wire is silver, or silver gilt, or copper gilt, the bobbin should be formed of *silver*, and if the wire is gold, the bobbins should of course also be of *gold*.* This process of annealing, as well as the means employed, may be varied according to circumstances, and the kind of metal to be operated upon; or the wire or metallic strands may be annealed in any other convenient way; but the above described process prevents the wire being injured by heat, and gives it all the pliancy desired.

First, begin by warping the annealed metallic strands or wires, by six at a time, on the ordinary warping mill, each wire being supplied from a bobbin, placed on a creel in the same manner as in the ordinary method of warping cotton, silk, or other threads, (see Figs. 3, 4 and 5.) These metallic strands are to be fastened, by packs of 25 together, on the warp beam of the loom, taking care they are all equally distended. When this is done, the beam is to be turned round, and all the warp threads wound evenly thereon. It is requisite, at each revolution of the roller, to place a strip of cardboard, or piece of stiff paper or other material, upon the metallic strands, wound upon the beam, in order to prevent them from getting entangled one with the other; or a continuous sheet of cardboard, paper, or cloth, may be wound on with the strands for this purpose. This precaution is very necessary, as otherwise the threads would bind one with another, and prevent them unwinding or drawing off regularly, during the operation of weaving, and thereby become broken. A sufficient length of the metallic warp must be left unwound, to allow of their being passed through the headles and the reed:—this is done in the same way as with cotton or silk warps: the workman, however, must be careful not to let any of the strands escape; for, if he does so, the wire springing back would coil up on itself, and loop into a kind of knot,—and consequently

* None but workmen of the best character are employed in this manufacture, strict honesty being indispensable.

be injured. When this is the case, the injured wire must be replaced by another, to be taken from an extra spool or bobbin placed at the back of the loom; and every time a metallic strand breaks, during the weaving of the tissue, it must be replaced by a fresh one, taken from an extra bobbin, and the part of the broken strand remaining on the warp beam conducted out of the way by passing it over a small pulley, and kept, by means of a weight attached to it, from intermixing with the other or perfect threads. When all the threads are passed through the headles and the reed, they are to be collected, in packs of 25, and fastened to the cloth roller, the strands being distended equally thereon. These preliminary operations being performed, the loom is ready for working.

The shuttle employed is similar to that used in the weaving of silk, and is supplied with a bobbin containing the metallic weft strands. The shuttle should, however, be rather heavy, as instead of governing the delivery of the weft, it would then be governed by it, and would spring back and cause injury to the work. The first few courses of the shuttle serve to regulate the position of the threads, as in ordinary weaving, and for that purpose any kind of weft may be used instead of metallic wires.

The operation of weaving is effected in precisely the same way as when working with silk or other material: care should, however, be taken that the weft strands of wire be finer than those of the warp.

Tissues, composed of copper wire, may be woven in their natural colour, and afterwards gilded or silvered; or this may be done previous to the weaving, as thought desirable.

Silver tissue requires much less care in the course of fabrication than wire gilt or silvered, as with the latter, care must be taken not to injure the surface; the tissue, as it is woven, should be covered with a cloth.

These metallic tissues may be applied to a great variety of articles and purposes, and, by their being composed entirely of metal, may be cut into any number of parts or forms, and attached to each other, or to other metal pieces, by soldering, or by the usual mode of joining various articles of jewellery and fancy work. They may be used for the top parts and binding of epaulettes, where gold and silver lace is now employed; for covering the heads of tassels; covering buttons; and various fancy articles; and when woven in narrow breadths, after the manner of gold and silver lace, galloons, or binding, they may be used for hat and other bands, bindings, and trimmings for various purposes.

The metallic tissues, composed of silver wire, are very readily cleaned with a solution of water and sulphuric acid—the strength or portion of acid is regulated according to the degree of oxidation of the metallic tissues; or they may be cleaned in any other way that delicate metal articles are usually cleaned. Those articles which have become discoloured by exposure to the atmosphere, the effect of smoke, or other causes, may be dipped in acid solution, and their primitive freshness restored.

Glass Weaving.—M. Dubus Bonnel, of Lille, has discovered a method of making a cloth of glass, which is perfectly flexible, and may be applied to the hanging of rooms and other purposes. This cloth is extremely beautiful; and from the manner in which it reflects the light, it surpasses in brilliancy every thing that has ever been attempted with silk, even when combined with gold and silver. Some specimens of this new manufacture have been exhibited in the Passage de l'Opera, in Paris; and the Queen of the French was so pleased with them, that she ordered a gold medal to be sent to the inventor. The following passage is extracted from a French paper:—"When we figure to ourselves an apartment decorated with cloth of glass, and resplendent with lights, we must be convinced that it will equal in brilliancy all that it is possible for the imagination to conceive; it will realize, in a word, the wonders of the enchanted palaces of the *Arabian Tales*. The lights flashing from the polished surface of the glass, to which any colours or shade may be given, will make the room have the appearance of an apartment of pearls, mother-of-pearl, or diamonds, or composed of garnets, sapphires, topazes, rubies, emeralds, amethysts, &c., or, in short, of all those precious stones united and combined in a thousand ways, and formed into stars, rosettes, boquets, garlands, festoons, and graceful undulations, varied almost to infinity."—*L'Echo du Monde Savant, &c. No.* 58, *Feb.* 15, 1837.)

The warp is composed of silk, and forms the body and groundwork, on which the pattern in glass appears, as effected by the weft. The requisite flexibility of glass thread for manufacturing purposes is to be ascribed to its extreme fineness, as not less than 50 or 60 of the original threads (produced by steam-engine power) are required to form one thread of the weft. The process is slow; as not more than a yard can be manufactured in 12 hours. The work, however, as already observed, is extremely beautiful, and comparatively cheap, inasmuch as no similar stuff where bullion is really introduced can be purchased for any thing like the price at which this is sold; added to this, it is, as far as the glass is concerned, im-

perishable. Glass is more durable than either gold or silver, and, besides, possesses the advantage of never tarnishing. Some admirable specimens of this kind of cloth may also be seen at the Polytechnic Institution, Regent street, London, especially two patterns of silver on a blue and red ground, and another of gold on crimson.* The Jacquard by which it is woven may also be seen at the same establishment;—this Jacquard is *exactly* like that represented at Figs. 93 to 98, and described at page 192.

The inventor of this manufacture (M. Bonnel) entered into an arrangement with Colonel Calvert, of London, for the purpose of securing patents in Great Britain, for the method of rendering the glass thread pliable, as well as of giving it any shade of colour required. The Colonel obtained patents accordingly in the year 1837, and soon after applied to us for an introduction to a person likely to purchase them, and also to construct a few looms, for the purpose of exhibiting the new manufacture on a small scale in the first instance, to show the advantages of it. We immediately introduced him to Mr. William Webb (of the firm of James Jacquier & Co., loom-builders, No. 1, Wood street, cor. of Church, Spitalfields.) This gentleman, having the entire confidence of the English manufacturers, both as regards strict integrity of character and as possessing a thorough practical knowledge of every species of figured weaving, was, in a short time, enabled to meet the Colonel's wishes. Mr. Williams offered to purchase the patents, provided that Mr. Webb would undertake to fit up suitable looms for weaving the stuff, which the last named gentleman agreed to do; and accordingly the patents were purchased from the Colonel for 5000*l.* For our trouble in this affair, and many other services besides, we have never received from the Colonel so much as a polite acknowledgement. Had we not signed the "temperance pledge" we might have insisted on something to drink. Mr. Webb, for his services, obtained the sum of 5*l.*; while his lost time was at least worth 100*l.*

Letters patent were granted to us in England, Ireland, Scotland, France, Belgium, Prussia and the United States of America, for a loom for weaving figured goods of almost every description, on the full harness principle without either headles or treadles. The English patent bears date 12th May, 1839, and was enrolled in Her Majesty's High Court of Chancery, Chancery lane, London, 12th

* Some beautiful specimens of this kind of cloth have lately been presented to the Commissioner of Patents at Washington, for public exhibition in the Patent Office in that city.

November, in the same year. The English, Irish, and Scotch patents are in the name of Moses Poole, Esq., (of the firm of Poole and Carpmael, of the Patent Office, London;) the French in the name of Charles Cunningham, Esq. (father-in-law of Charles Lafitte, of the firm of Lafitte, Blount & Co., bankers, Paris;) the Belgian in the name of Henry Truffaut; the Prussian in the name of Platzhoff and Haenal, silk manufacturers, Bruggen, near Crefeld; and the American in the name of Jeremiah Wilbur, Esq.* (of the firm of Masters, Markoe & Co., merchants, New York.) The last named patent is dated March 12th, 1842, but has only 14 years to run from the date of the English one above named.

Fig. 218, represents a front elevation of this improved loom.

Fig. 219, a side elevation.

Fig. 220, a longitudinal vertical section.

Fig. 221, a plan of a part of the loom.

Fig. 222, a front view of the Jacquard cylinder and frame which carries it, showing the card protectors.

Fig. 223, is a detached section of the lay, &c., showing a front and side view of the weft puller or tightener.

Fig. 224, shuttle.

Fig. 225, the slide of the stop motion detached.

On the different Figs. of these drawings, the letters of reference are the same.

a a, the frame of the loom; *b*, the lay; *c*, (Fig. 218) the reed. The take-up motion rollers *d d*, placed one above the other just under the breast-beam, are geared together by the cog wheels d^1, (Fig. 218;) the upper take-up roller is pressed down by a lever and weight d^3, (Figs. 219, 220 and 221;) on the axis of the lower one is a pulley d^2, (Fig. 219) from which a band or belt e^3, passes down to a simliar pulley e^2, on the cloth roller *e*, (Fig. 220;) this band is tightened with more or less force by the pressure of the pulley e^1, (Fig. 219) attached by a stud to a bent lever e^5, governed by a moveable weight. *f*, (Figs. 220 and 221) is a horizontal shaft on the outside of the frame, placed at right angles to, and on a level with the cam shaft, on the end of which is a bevel wheel f^1, (Figs. 218 and 221) meshing into the bevel wheel f^2, on the shaft *f*, (it will be perceived that by changing the relative size of these wheels different relative velocities will be given to the shafts;) on the for-

* George D. Baldwin, merchant, 35 Spruce-street, New York, has the sole management of our patents in the United States of America; to whom *all communications* on the subject must be addressed.

ward end of the shaft f, is a worm wheel f^2, (Fig. 221) working into a stud-wheel g, on which is a pinion g^1, meshing into a cog-wheel g^2, on the axis of the lower take-up roller d. i i, are picker sticks; j, (Fig. 219) are the shuttle-levers or treadles, by which the picker-sticks i i, are moved; k, are the cams to put the shuttle-levers in motion (one at each side of the loom;) m, fast and loose pulleys driven by a belt in the usual way; n, warp beam; o. whip-roller—this roller is suspended on the top of two levers o^1, having their fulcra at o^2, (Figs. 219 and 220) and extending down nearly perpendicular; the ends of these levers rest against tops o^3, and are held there by springs o^4; this allows the warp to give way at every beat of the lay, recovering its first position when the lay retires from the cloth. The warp-beam n, is surrounded at each end by the usual friction strap, to each of which is appended a lever p, having its fulcrum at p^1, and running under the warp-beam towards the front of the loom; on this lever is a sliding weight p^2, to which is attached a connecting rod p^3; these rods have eyes in their forward ends, in which the journals of a horizontal roller q, turn; p^5, (see Fig. 221) are springs attached to the rods p^3, which draw them forward and bring the roller q, against the cloth roller e, and the weight p^2, to the extreme end of the lever. The warp yarn runs from the beam n, over the roller o, through the harness and reed over the breast-beam (which in this loom is a roller, as shown in the Figs;) the cloth then passes down inside and under the rollers d d, and round the lower one, up between, then over the upper one and down to the cloth roller e, (this roller is clearly shown in Fig. 220.) As the cloth roller increases in size by the winding on of the cloth, the roller q, is pushed back, carrying along with it the rod p^2, and weight p^2, thereby lessening the tension on the warp-beam, as the roll diminishes; on taking a "cut" from the cloth roller the rod p^3, is lengthened by means of the coupling at p^4, (Fig. 220) so as to retain the weight in the same position when the cloth is taken from the roller; the cloth is regularly drawn forward as it is woven, by means of the take-up rollers, connected as above described, with the cam shaft; the cloth is wound on the cloth roller e, with any required degree of tension, as fast as it is delivered from the take-up rollers d d, by means of the band or belt e^3, and tightening or friction pulley e^1, the revolutions of this roller being regulated by the quantity of cloth given out. On the driving shaft r, (Fig. 221) is placed an eccentric b^2, surrounded by a collar to which an inflexible rod b^3, is attached, having a governing screw b^4 (Fig. 218) to regulate its length; the upper end of this rod is

Fig.218.

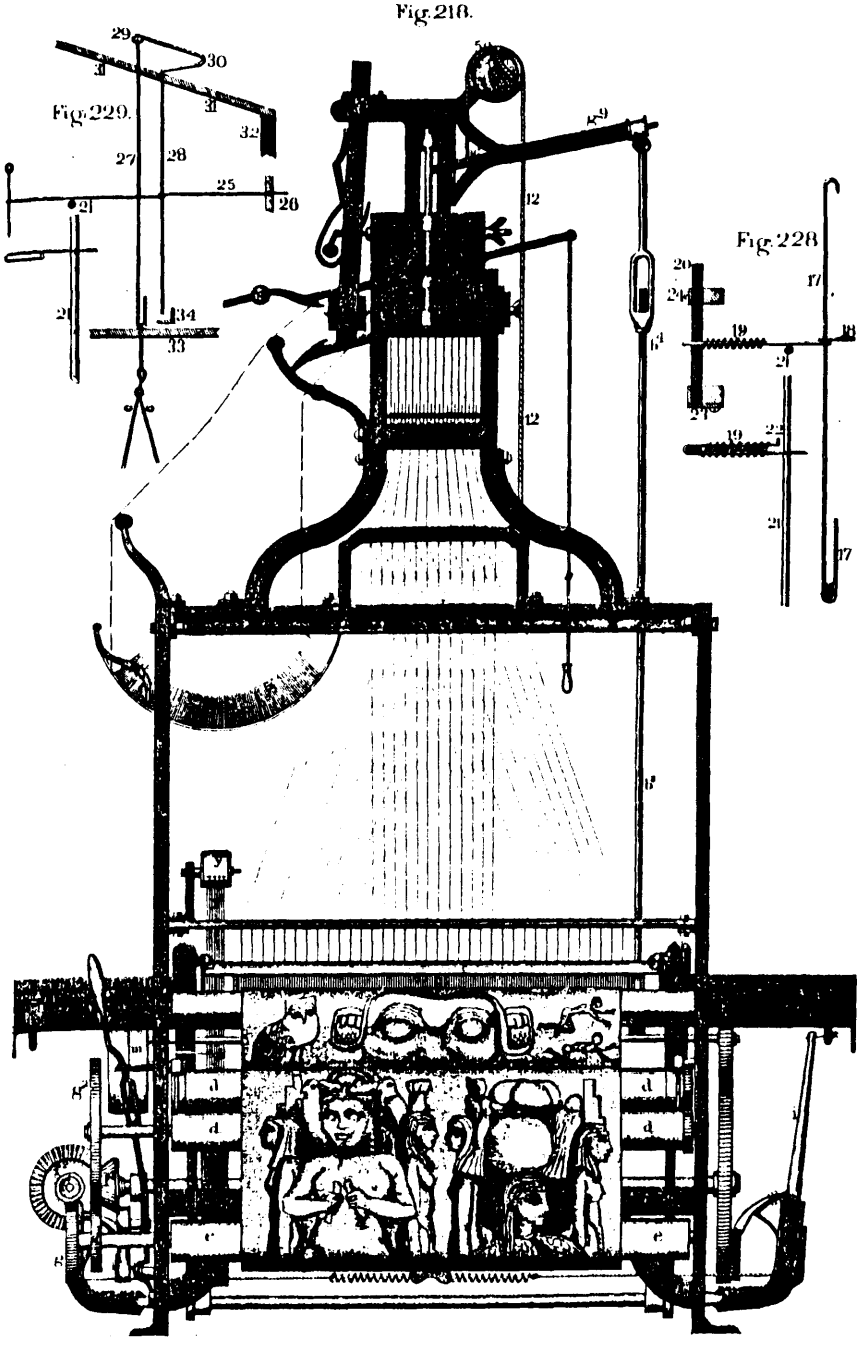


Fig 219.

Fig 224.

Fig 226.

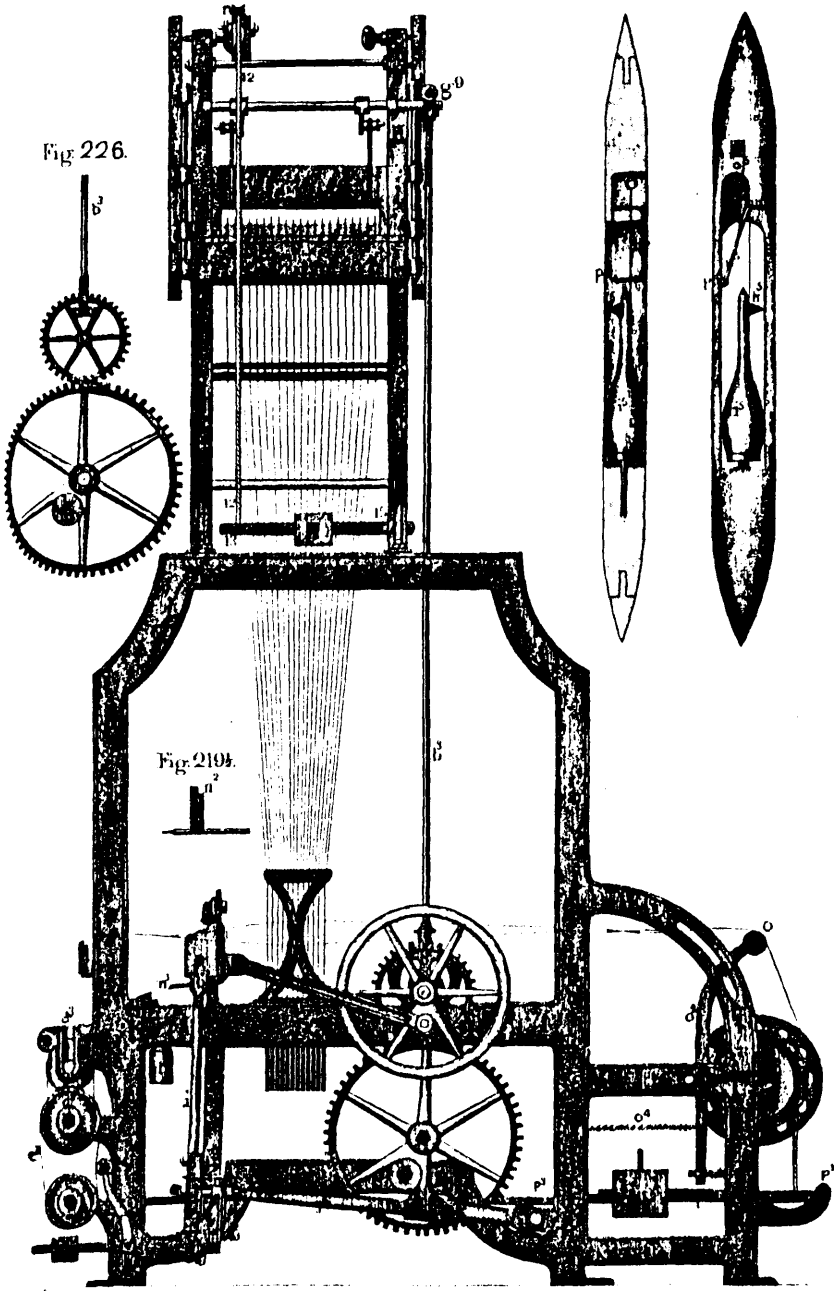


Fig 219A.

Fig 220.

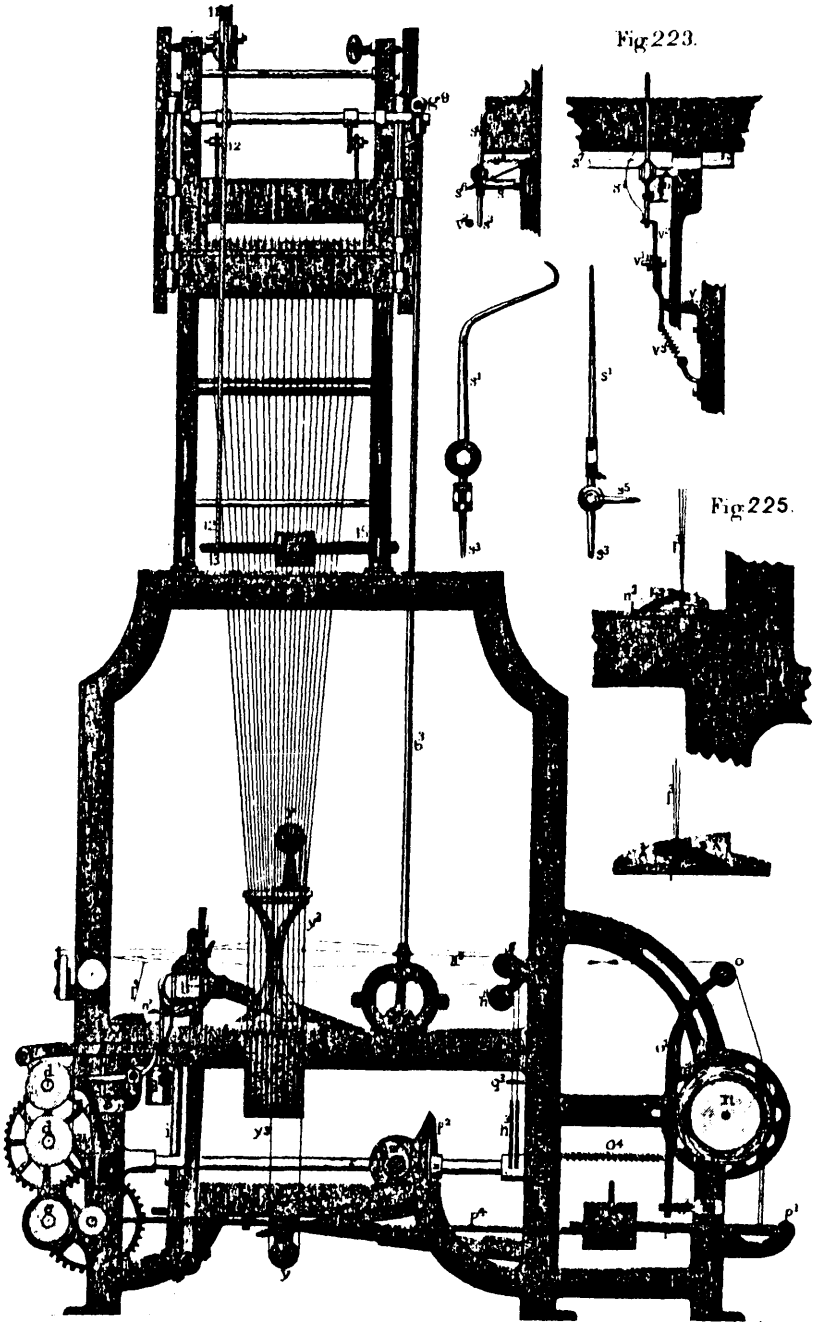


Fig 223.

Fig 225.

Fig 222.

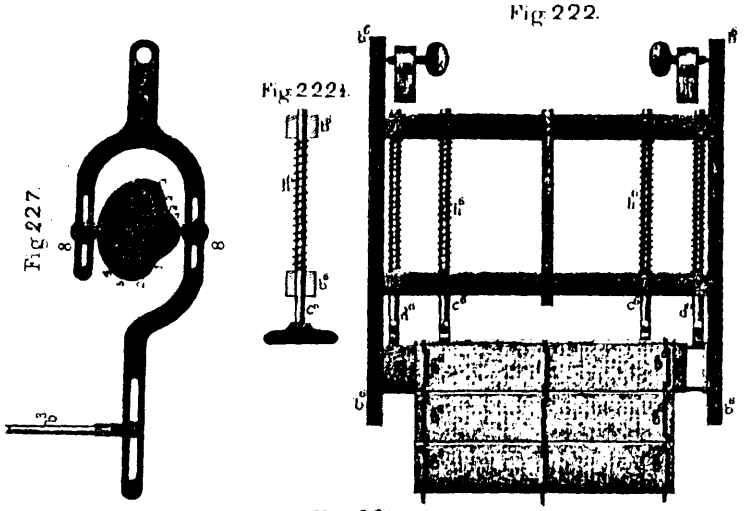
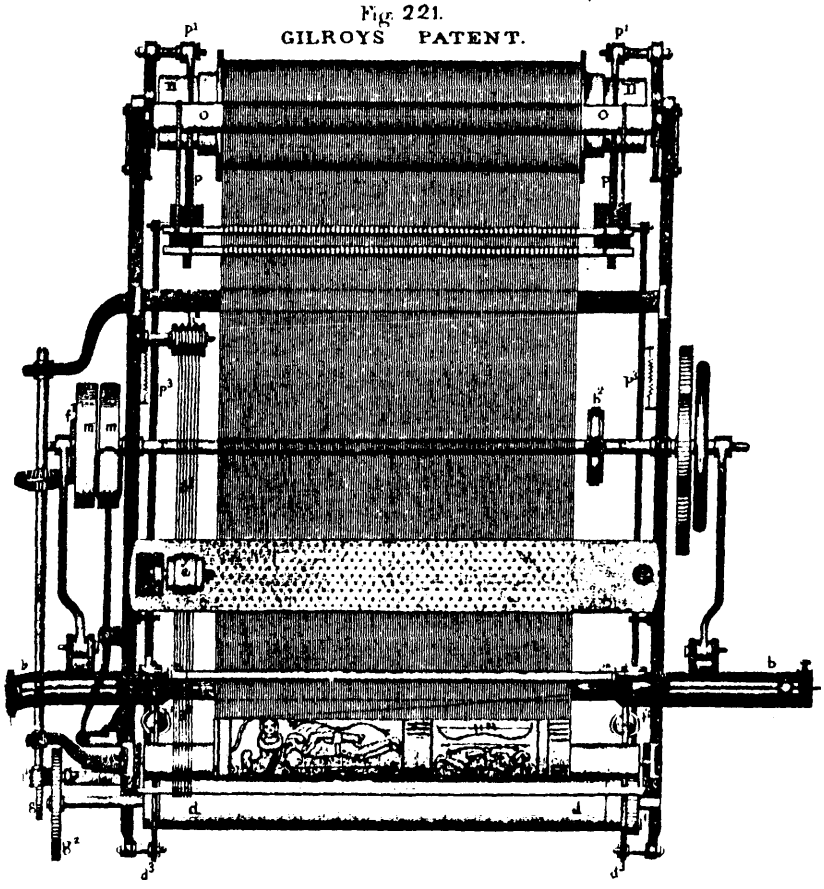


Fig 227.

Fig 222A.

Fig. 221.

GILROYS PATENT.



connected with the Jacquard lever g^9. It will be perceived by this arrangement that the harness leads, weights, &c., are worked with the greatest precision and without shock; but, as the shed in this case closes down, when the lay has been brought forward half the beat, the eccentric above described could not be used on some kinds of textures to advantage, particularly on silk goods, but for another invention which we call the "weft puller" or "tightener," constructed in the following manner:—To the under side of the lay is attached an iron s, (Fig. 223) which projects forward and is formed into a fulcrum, on which turns a finger or lever s^1; this finger runs up in front of the lay, and curves back lying in a channel cut across the race-board, (one channel outside of each selvage) the extreme end curving up, at or behind the reed; the finger is held in this position by a spring s^2, (Fig. 223) attached thereto above the fulcrum, and passing under the lay; the end of the finger below the fulcrum is flattened out, and a short rod s^3, is joined to it (forming a hinge) so as to vibrate sideways parallel to the lay; this is kept in a vertical position by the spring s^4; from the opposite side projects a stud s^5 on which an arm s^6, from the protector s^7, of the stop motion rests (this is connected with the shuttle-box and is of the common construction, as shown in Figs. 219 and 220;) from the front upright of the loom is extended out an arm v, (Figs. 220; and 223) under the breast beam, the end of which forms a fulcrum at v^1, for the lever catch v^2 (Fig. 223;) this lever, at its lower and forward end, is bent so as to rest on the arm v, and is held down to it by the spring v^3; the other end of this lever is bent up so as to come in contact with the rod s^3, when the lay is thrown forward, carrying the finger or lever s^1, forward of the lay, and pushing the weft thread up to the cloth and straightening it before the shed descends; as soon as the rod passes over the catch, the spring s^2, (Fig. 223) brings it into place again, as the lay returns, the lever v^2, is depressed by the rod s^3, till it clears it:—if the shuttle does not pass entirely into the box, the rod s^6 (which is secured in the protector s^7,) bears down on the stud s^5, and turns the rod s^3, to one side, so that it does not strike the lever catch v^2, and the finger s^1, remains at rest till the loom stops, thereby preventing the damage that might be caused by forcing it forward.

The Jacquard in its general construction is similar to that represented at Figs. 93 to 98, and described at page 192, except in the following particulars: The first part of the improvements consist in what we call "card protectors." Fig. 222 shows a front view of the cylinder z, with its pattern cards, (these cards are like those re-

presented at Fig. 97,) and the frame b^4, which supports it. The card protectors (one at each end of the pattern card) are marked c^6, and are similar to the press d^6; they are placed $\frac{1}{4}$ of an inch inside the studs or knobs a^6; the feet of these protectors have a smooth wire on their under edge, (see detached part, Fig. 222½) to prevent the cards from catching: the rods of these protectors run up through the cross braces b^6, of the cylinder frame, passing through spiral springs h^6 between the braces which help to press them down on the pattern-card. It will be seen that by this simple method the cards are prevented from being misplaced or injured when the loom is in the most rapid motion.

The second improvement in the Jacquard consists, in a method of counterbalancing the leads, so that a great saving of power is obtained in working the loom; this improvement is shown in Figs. 218, 219 and 220. 11, is a throated pulley which revolves on its axis in a suitable stand, bolted to the frame of the machine at the top; 12, is a strong rope made fast to this pulley 11, and passing out at one side of it, where a knot is made upon the rope; this knot is represented at 50, Fig. 218; one end of the rope is then connected to the Jacquard lifting arm at 16, the other end being made fast to a lever 13, (Figs. 219 and 220;) this lever has its fulcrum or axis at 15, and is governed by the counterpoise 14, which may be regulated to any required position by means of a set screw, as shown in Figs. 219 and 220: the operation of this apparatus is as follows: When the loom is put in action, the rod b^3, Fig. 218, will cause the end 16, of the Jacquard lifting arm to be elevated and thus allow the lever 13, to be depressed by the counterpoise 14; this takes place at each vibration of the lay, while the shed is opening; and while the shed is closing, this lever will again recover its first position, as shown in the Figs. While the shed is opening, the weight 14, on the lever 13, will aid the belt or strap, which communicates motion to the machinery (in the usual way) in lifting the leads, because it will act as a counterpoise upon them. By a proper adjustment of the weight 14, according to the weight of lead required to be lifted, the belt for running the loom on light goods, such as merinoes, gros de Naples, &c., need not be over 1¾ inches wide; we have never used a broader one on such goods; any sudden jerking, caused by the leads in their descent, will be entirely prevented by the counterpoise 14. By means of this contrivance, it will be perceived, that the power required to drive the loom is but small, not more than one-third as much as in ordinary power looms. To some *very learned* gentlemen, this apparatus may appear, from

its extreme simplicity, as unworthy of notice; but if they cannot see through it *theoretically* they would do well to try its effects in *practice.*

The third improvement in the Jacquard is shown at Fig. 228, and consists in placing the spring 19, *on* the needle, instead of at the back of it, (as at c^2, Fig. 98.) In Fig. 228, 17, 17, represents the common lifting hook; 18, the needle; 19, the spring; 20, a wire or reed dent, inserted in the double of the needle, outside the spring; 21, the horizontal wire which supports the row of needles (as at G^2 G^2, Fig. 95;) 22, a turned-up lip on the needle against which one end of the spring 19, bears, the other end bearing against the dent 20; 23, a small triangular piece, screwed against the bottom of the needle frame, to support the dents 20, and keep them from dropping through; this piece may either be made of wood or iron; there is also a small straight edge 24, screwed against the frame above, for the purpose of keeping the dents 20, in their proper place; these dents are let into small notches or cuts, made with a saw in the back of the frame, which notches should be rather larger than the thickness of the dent, in order that the dent may be easily drawn out when required. Now, it is evident, that by pressing back the point 18, of the needle, the spring 19, will be compressed between the dent 20, and turned-up lip 22, and when the pressure is removed, the needle will instantly recover its former position, as shown in Fig. 228. By this improvement, the pattern produced on the cloth will be more perfect than in looms where a spring-box is used, such, for instance, as that shown at Z′ Z′, Fig. 96; because, when the springs are placed on the needle, they do not require to be of more than half the strength of those used in a wooden box, for the following reasons: Firstly, when the spring is placed on the needle, as in Fig. 228, changes in the atmosphere will have no detrimental effect upon it such as they have on the springs A^2, placed in the box Z′, Fig. 96, these being liable, when compressed, to stick or catch on the fibres of the wood in the holes of the spring-box, in which case the needles would not be driven up against the card, and the warp threads which the needles governed would not be lifted; consequently the pattern would be produced imperfectly upon the cloth. In working with the spring-box, it often occurs that as many as five or six springs stick in their holes at once, particularly in damp weather; secondly, when the springs are placed on the needles as shown at Fig. 228, they may be made of brass wire as fine as No. 28, whereas, with the spring-box they must be of No. 23 or 24, and even then their action is not near so

certain as in the former instance. We have worked a power loom like that shown at Figs. 218 to 221, upwards of six years, on *silk* goods, at a speed of from 110 to 120 picks of weft per minute, with springs of the description shown at Fig. 228, and we can truly say, that we never observed a single instance of a needle sticking back, or of a thread being misplaced in the pattern occasioned by any fault in the operation of the springs; these springs should be two inches long and $\frac{3}{4}$ of an inch in diameter. When the spring is placed at the back of the needle, (as shown at Figs. 96 and 98,) it sometimes expands so as to become larger than the doubled end of the needle; and when this occurs, it will partly slip on the needle at every change of the pattern, and thereby prevent the proper operation of the needle. We think it will now be seen, that our improvements on the Jacquard, just described, obviate several very serious defects.

In a shuttle of the ordinary construction (see Fig. 224) is attached a brush, or tuft of hair, or similar fibrous material h^5, on one side just under the bobbin, or quill i^5; which brush, pressing against the bobbin, prevents the thread from coming off in loops or kinks. There is also affixed a small pin m^5, in the side of the shuttle against which the bent wire n^5, is pressed by the spring o^5, the pivot or axis being at p^6; the weft thread, after unwinding from the bobbin, passes between the bent wire n^5, and pin m^5, giving it the tension required, which may be regulated by the curve of the spring o^5; it then passes out of the shuttle through the eye in the usual way.

Near the axis of the picker-sticks, is attached to the journal of the lay an adjustable iron i^7, (Fig. 219) with bolts, so as to allow its position to be changed, the upper end being bent horizontal; this rises above the fulcrum of the picker stick, which strikes against it, and stops the picker at any desired distance from the end of the shuttle-box, which prevents the rebounding of the shuttle and stopping the loom.

The manner of stopping the loom when the weft thread breaks is as follows:—Two pulleys y, (see Figs. 218 and 220) are affixed, one over the harness-board, the other just below the lower cross-bar of the loom; around each of these pulleys is passed a short leather strap, and their ends are connected together by the headles or strings y^3; to the front of the lower strap is fastened one end of a bent lever w, (Fig. 220) the fulcrum of which is nearly under the lower or cam shaft, the other end extends up above the cam shaft, on which and in contact with the lever, is placed a tappet z^1. a^8,

(Figs. 220 and 221) is a series of strings fastened into an iron screwed to the guard-board in front of the breast beam (Fig. 220;) these pass through suitable dents in the reed and over the race-board, which is here cut out (see detached parts of lay, &c., Fig. 223) so that the shuttle will pass over the strings without rubbing them, thence through the mails in the headles y^3, one half going into the front or lower mails and the other half into the back ones, as in drawing the warp of a plain web with two leaves of headles; they are then extended over two grooved pulleys h^5, (Figs. 220 and 221,) placed one above the other, so that all the strings which are kept separate by the grooves on the pulleys shall be entirely clear from each other, and passing down through a plate q^3, (Fig. 220) are each attached to a separate lead weight h^3; they are thus prevented from twisting and entangling.

On the protector n^1, of the common stop motion, is formed a notch n^2, (see detached part, Fig. 219½,) and to the slide n^3, (Fig. 225,) constructed in the usual way, for throwing off the shipper, is attached a button l, so as to vibrate easily; from this button is extended an arm l^1, under the strings a^3, having an eye in its end; to each of the lower strings is connected a small thread or wire l^3, the lower ends of which are fastened into the eye of the arm l^1; over the button l, is a sweep l^2, (Fig. 225) made in the slide-piece n^3, which prevents the button from being lifted too high when in action. It will be perceived, that as the cam z^1, (Fig. 220) revolves, it throws back the upper end of the bent lever w, and raises the other end, which is united at the bottom to the strap connecting the headles y^3, causing the front ones to ascend and the rear ones to descend, thus reversing the position of the strings. By this action the button l, will be raised above the slide n^3, (see detached part of protector, Fig. 219½,) so as to be struck by the protector n^1, and throw off the shipper: but while the weft thread is unexpended, or unbroken, it will lie across the lower strings, intercept their rising above the upper ones, and thus prevent the button l, from coming in contact with the protector.

Fig. 227, represents an improved method of working the Jacquard, which we have found very advantageous in weaving heavy goods with warps of a sticky nature, whether of silk or wool. The object of this contrivance is, to hold open the shed until the reed comes in contact with the fell of the cloth. The cam 9, is placed on the crank shaft (instead of the eccentric b^3, as in Fig. 221;) and it is surrounded by a fork-piece 7, 7, carrying two small rollers or pulleys 8, 8; this fork-piece has its fulcrum at 10, where it works on

an axis-pin, fixed on the framing of the loom (Fig. 219;) the cam 9, is divided off by lines, as shown in Fig. 227, and is so arranged that the distance between the points 11, is exactly the same as that between the points 22, 33, 44, &c. From this it is evident, that although the cam 9, is longer one way than another, yet it will work freely between the rollers 8, 8, and in contact with them: for example, the width of the cam on the perpendicular line (drawn across the centre of the rollers 8, 8,) is precisely the same as that between the points 11, 22, and so forth. Supposing, for example, the cam were turned round until the one point 4, came directly under the upper roller, the opposite point 4, on the same line, would be brought directly above the centre of the other roller. Now, had not the cam this shape, the rollers 8, 8, would not bear uniformly upon its circumference, but would allow the under roller to fall away from it at intervals until a fuller part came into action against the roller; the the result of which would be an imperfect shed, and a continual clitter-clatter. It is unnecessary to say more on this subject, as any practical manufacturer or loom builder will easily understand the improved mechanism, and its mode of operation.

The improvements just described, and which are claimed in the patents are as follow:—

Firstly, the combination formed by the rollers *d d*, (as shown clearly in Figs. 218 and 220) and the cloth roller *e*, having the pulleys d^2, and e^2, and their axes (see Fig. 219,) connected by the belt e^3, in combination with the bent lever e^5, having the governing weight, for the purpose described.

Secondly, the roller *q*, and rods p^3, connected to and in combination with the weigths p^2, sliding on the lever *p*, of the drag or friction strap, for the purpose of regulating the tension on the warp beam as set forth.

Thirdly, the weft pullers or tighteners, for drawing forward and straightening the thread or threads of weft, whereby the slack or loose part of each thread of weft is tightened or pulled up immediately after the shuttle passes through the shed, and the bad effect arising from the diagonal line of each weft thread, after the shuttle is propelled through the shed, is prevented; and in combination therewith the eccentric b^2, connected with the Jacquard by an inflexible rod b^3, for the purpose described.

Fourthly, the application and arrangement called card protectors, shown in Fig. 222, for preventing the cards from being torn or damaged during the working of the loom.

Fifthly, in the shuttle, the bent wire n^5, acted on by the spring

o^4, in combination with the brush, or tuft of hair h^5, for regulating the delivery of the weft thread from the shuttle.

Sixthly, the regulating iron i^7, (Fig. 219) in combination with the picker-sticks $i\ i$, for the purpose described.

Seventhly, the placing of the springs 19 (Fig. 228,) on the needles of the Jacquard, as described, instead of in a box at the back of the needles, as in Fig. 96.

Eighthly, in the motion to stop the loom when the weft thread breaks or becomes expended in the shuttle, the button l, attached to the slide n^8, with its sweep l^2, and arm l', to and combined with the lower strings a^3, as described, and set forth in the Figs.

Lastly, the arrangement of mechanism for working the Jacquard, as herein above set forth, and as shown at Fig. 227.

M M. Dohmme and Romagney, of Paris, obtained patents in France and Great Britain in the year 1837, for what they call, an improvement in the Jacquard, the object of which is to supersede the springs, spring-box, &c., at the back of the needles. In order to accomplish this, the patentees construct the vertical or lifting wires of two pieces, as in Fig. 229; that marked 28, passes through the eye of the horizontal needle, and has a bend or hip 30, at its upper end by which it is supported on the top board 31. On the end of this bent part 30, an eye 29 is formed, into which the piece or leg 27, is linked, which thence descends to the bottom board 33, where it is connected to the harness. 25, represents a needle, which is of the common form; and 26, the needle-board, against which the cylinder plays. The bend 30, constitutes a spring-lever, and is a substitute for the spring at the back of the needle shown at Fig. 98; the weight of the leads below, pulling down the eye of the bend 30, on the leg 28, serves to keep the needle 25, pressed against the pattern card. 32, represents part of the Jacquard framing to which the top board 31, is bolted, at each corner of the machine; 21, the horizontal wire which supports the row of needles at the back in the usual way—only one needle, with its lifting apparatus, is shown in the Fig. It will now be evident, that if the triangular lifter 34, is elevated, the leg 28, will also be raised, carrying up with it the leg 27; and by the action of the pattern-card against the point of the needle 25, the lower extremity of the leg 28, will be thrown off the lifter 34, and the needle will be missed. The under lip of the lifter is about $\frac{1}{2}$ inch in width, and is a little elevated at its edge, to prevent the legs 28, from slipping off while being raised; the back or vertical part of the lifter is about an inch in depth. The lifters are made of strong sheet-iron, and are riveted at their ex-

tremities into suitable end pieces, forming a frame or griff. When the loom is at rest, as in the Fig., the lifters should be § of an inch below the points of the legs 28. The board 21, is inclined to suit the height of each row of needles, in order to prevent the vertical wires or legs 28, which pass through the upper needles, from being thrown farther back at the bottom than those which pass through the under needles.

A committee of the "Société d' Encouragement pour l'Industrie Nationale," including M. le Baron Seguier, waited on the patentees of the above invention at their machine shop, Faub. Poissonniére, Paris, for the purpose of examining four Jacquards on this principle, in operation on vesting stuffs; and the result of the examination was, the presentation, by the wise-heads of the Société, of their large gold medal to MM. Dohmme and Romagney. The committee also drew up a long account, showing forth the advantages of the invention, not only to individuals, but in a national point of view; they likewise set forth its applicability to power-looms, showing that the manufacturer might by this means be enabled to produce figured goods of the most beautiful descriptions imaginable, either of silk, wool, cotton, or linen, and with as much facility as the common brown sheeting which costs only $8\frac{3}{4}$ sous a yard. The committee thought that a power-loom having a Jacquard filled with these double or two-legged lifting wires, might be driven at a speed of from 300 to 569 picks of weft per minute; and they were also of opinion that a little girl of 19 years of age, or any inexperienced individual, could easily tend 20 or 30 of such looms, each giving out the splendid textures like *water falling from a mountain torrent!** The report of the committee formed a pamphlet of some 60 pages, independent of the drawings accompanying it, the whole being, perhaps, one of the clearest expositions ever given to the world of so obscure a subject, and well calculated to show the unfathomable depth to which human wisdom can dive.

Immediately after Messrs. Dohmme and Romagney obtained their gold medal, and the Report of the committee, M. Dohmme

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* The committee further observed that such was the perfection of this machine, that the pattern-cards might be made of common writing paper, instead of pasteboard. We have tried a card of the description recommended, but only to see it torn in tatters the first rap of the needles against it. We have also tried two thicknesses with no better success; and, for anything we know to the contrary, might have continued to the present time, adding ply after ply, without being able effectually to withstand the shock of the said improved apparatus.

waited upon us, at the establishment of Messrs. Pihet & Co., Avenue Parmentier, Paris, when he insisted upon the immense value of the machine, and wanted us to apply it to our looms, which we there had in operation with Jacquards constructed by M. Dioudonnat, (precisely like that described at page 192.) We disapproved of his views upon the subject, and to show us beyond the possibility of a doubt that *our opinion was erroneous*, he instantly held up before our enraptured eyes the said voluminous Report and the glittering gold medal. Shortly after this we received a visit from M. Alexandre Andelle (member of the Legion of Honor) and several other gentlemen, inviting us to see a few looms in operation with the two-legged lifting wires; with which invitation we readily complied. On our arrival at the manufactory, in the Rue Petrel, we saw eight looms at work on fancy vestings, all mounted with Jacquards upon this plan. After examining these looms, we told the patentees, in the presence of Mr. Andelle and the other gentlemen who accompanied him, that the two-legged lifters would in a short time be numbered among the things that were; and at the same time we pointed out the defects of the plan. All this, however, did not seem to damp Mr. Dohmme's ardour, until we passed our hand along the under side of the cloth, bringing the nails (which were at the time of considerable length) in contact with it, and drawing the hand gently forward; by which means we soon collected a tolerable handful of warp threads which had been missed altoge her by the machine. Mr. D. observed that this evil might be easily remedied by using heavier leads to the harness below; which we remarked would only be substituting one evil for another; and, finally, he got into a passion, and called us a *prejudiced foreigner* who was unwilling to render honour where honour was due, and particularly so to Frenchmen!

MM. Dohmme and Romagney entered into an arrangement with Sharp, Roberts & Co., of Manchester, we believe through their agent, M. Molinard, by which patents were secured in Great Britain, and these gentlemen constructed a considerable number of the machines; all of which were sold to manufacturers on guarantee. About this time we addressed a letter to Messrs. Sharp, Roberts & Co., through our friend, M. Alexandre Andelle (who had frequently transacted business with them since they started their establishment) offering them the construction of an improved Jacquard of ours. In answer to this letter they informed us, that they had in their possession at the time (1837) as good a Jacquard as ours or any other, either in Great Britain or elsewhere, namely, the said Dohmme and

Romagney's machine. About six months after this, Mr. Roberts informed Mr. Andelle, that all the Jacquards sold by him on guarantee had been returned, and that he had lost 360*l.* by the d—d Frenchman! About 5000 of the machines were constructed in Paris, by the original patentees, most of which were sold on guarantee and returned or thrown aside as worthless, nobody continuing to use them except a few poor persons who obtained them for a mere trifle, and could not afford to pay for good machines.

At the earnest solicitation of M. Dohmme, we applied one of his machines to a power-loom; but in a short time were obliged to discard it for the following reasons:—

Firstly, the friction of the legs 27 and 28, in the holes through which they pass in the top or rest board, soon wears these holes much larger than they should be; which will be evident on referring to the Fig. It is clear that when the lifter 34, is raised, all the strain of the shed, and of the lead weights connected to the harness below, must be borne by the leg 28, and mostly by the bent part of it or hip 30.

Secondly, the leads must be much heavier in this machine than in those where springs are used; because the pressure of the needles against the card entirely depends on the leads; and should these not be of an uniform weight, the needles will be, in the same proportion pressed against the card with different degrees of force; or should two warp threads stick together in the shed, neither of the lifting wires to which they belong will act at all.

Thirdly, in order to bear the strain of the shed and weight of lead attached to each lifting hook, (which weight depends on the number of repeats in the breadth of the web,) the lifters or legs 28, must be made of strong wire, say No. 10, and this, of course increases the diameter of the eye of the needle 25; so that the needles occupy more room than with single hooks arranged in the old way (as in Fig. 96,) where it is customary to make both needles and lifting hooks of No. 14 wire.

In concluding this subject, we cannot but regret that so much money should have been wasted to no purpose, and such praise foolishly lavished on men who really deserved no praise at all, and this too by a committee of the celebrated "Société d' Encouragement pour l' Industrie Nationale." There is in our opinion no surer way of bringing such laudable institutions into utter disgrace in the eyes of the practical manufacturer, not only in France but elsewhere, than circumstances of this nature. Nobody will deny, that had either Messrs. Dohmme and Romagney, the committee of the

Société, or Mr. Roberts, been acquainted *practically* with the construction of machines for weaving figured goods in general, these ridiculous blunders might have been avoided, and the sum of 80,000 francs saved.

A patent was obtained in England, 23d May, 1842, by Frederick Goos, machine maker, Manchester, for improvements in the Jacquard; and, according to the patentee, the features of novelty consist, in the first place, in introducing a "*press-board*," pierced with holes, and removing the cylinder from its usual situation; by this contrivance, he informs us, the cards are presented to the needles with *more certainty*, and any accidental breakage prevented, should the cylinder not be turned entirely round as the card advances; the cylinder is made plain, or not pierced, and employed merely for the purpose of advancing the cards, the press-board carrying them forward to act upon the needles. Upon the needle-board as well as on the cylinder, pegs or knobs are placed, in order to ensure the more certain presentation of the cards to the needles; the position of the pressers is also *reversed* upon the cylinder head, and the rods and springs are employed to act upon it from *below;* the bottom of the presser is beveled, which further (the patentee says) secures the correct position of the cylinder; an independent cylinder-head is employed outside the framing, with a flange to guide the catches; these catches being in *one* piece instead of *two*. Another peculiarity in this part of the apparatus, is made by having the cylinder-frame so constructed that the cylinder and press-board, with their carriage, may be readily removed, to permit the changing of the set of cards. The bottom rail of the cylinder frame is made adjustable by bolts and slots, that the guide may be always kept true; and the carriage and slide of the cylinder are kept firm by a cross-rod. By this arrangement, the slide may be placed *inside* the guide-rails, instead of *outside*, as heretofore. *Additional pressers* are placed at the top of the cards, to press them on the cylinder, their guide-rods sliding in holes in the cross-rails of the cylinder-frame; which arrangement is highly valuable, as it will prevent the cards from being damaged. Two rods with springs attached, having flat heads or discs counter-sunk in the needle-board, are used for the purpose of jerking *the card off the needles*. Another peculiarity in this machine (says Mr. G.) consists in having the lower bend of the lifting hooks extending above the top row of needles, and placing horizontal wires, one for each row, between the two plies or legs of the needles; this, Mr. Goos informs us, en-

ables him to dispense with the use of the ordinary springs, to press the needle forward, as used heretofore in *all* Jacquards.

The placing of the cylinder above the needles, as described, with the press-board below it, to carry the card forward against their points, is, in our opinion, one of the most ridiculous contrivances ever brought forth by way of improvement on the Jacquard. The constructing of the lifting hooks or wires with two legs, so that the bent or turned-up shank shall extend above the top row of needles, is quite old; indeed, it is even in common use among damask manufacturers in the town of Lurgan, Ireland; and we believe, if our memory serves us right, that Peter O'Flanagan, Esq. and Mr. Henry Kelly, of that place constructed some with as many as *three* legs, each of which was much longer than *goose's* legs. The additional card pressers, to keep the cards against the cylinder and prevent their being jerked off the knobs while the loom is in operation, is the only thing of value mentioned by Mr. Goos; but, unfortunately for him, this improvement is included in Poole's patent of May 12th, 1839, and represented in this work at Fig. 222.

The following Figs. represent an improved loom of our invention, for weaving damask table-cloths, piano-forte covers, furniture and window-curtain stuffs, &c., &c., &c., whether of silk, cotton, wool, hemp, flax, or other fibre, or parts of any of these combined; as, for instance, cotton and linen, wool and silk, wool and cotton, &c. Our American patent for this loom is dated April 12th, 1843.

Fig. 230, is a front elevation of the loom.

Fig. 231, left hand side elevation.

Fig. 232, right hand side elevation.

Fig. 233, plan of some parts of the loom.

Fig. 234, vertical section of parts enlarged.

Fig. 235, plan of double shifting cams.

Fig. 236, two views of button of double shifting cams.

Fig. 237, perspective of double shifting cams.

Fig. 238, perspective of the improved stop thread motion, for throwing the loom out of action when the weft thread, or threads, break or become exhausted in the shuttle, or shuttles.

Figs. 239 and 240, motion for taking up the cloth.

The frame of the loom is constructed nearly like those of our other looms, already described.

The Jacquard A, is placed upon the top of the frame of the loom. On the cylinder journal of the Jacquard there is a grooved pulley *b*, (Figs. 230 and 232) over which an endless cord or

band *c*, passes down to a similar pulley *d*, below it; this pulley is suspended on the end of a horizontal lever *e*, which has its fulcrum attached to the frame of the loom, as shown in Fig. 230, or the pulley may be attached to the slide, which moves up and down in guides, fastened to the frame, or may be otherwise fixed to obtain substantially the same effect without departing from the principal feature of the improvement. The cord or band *c*, is for turning the cylinder to the right or to the left (as the nature of the case may require,) when the wrong card is presented to the needles, without the weaver being necessitated to climb up to the machine for that purpose; the lever *e*, being free on its axis-pin *h*, (Fig. 230) will allow of its other extremity rising and falling according to the vibratory motion of the cylinder-carriage or frame *i*, and thus the cord or band *c*, will be kept of uniform tension during the operation of the loom; this cord or band revolves continually with the cylinder while the loom is in action.

It will now be seen, that by taking hold of the cord or band *c*, at the point *j*, (Fig. 230) and pulling down thereon, a new card will be brought to the face of the needles. When the cylinder is being turned to the right the catch *k*, (Fig. 230) is to be lifted up, by means of the usual contrivance for that purpose, a view of which will be had in the Fig. The catch-cord may be so arranged as to lift up with the cord or band *c*, each time the misplaced card is recovered, by simply letting the bob cord *l*, (Fig. 230) hang down parallel with that part of the cord or band *c*, and then hold it with the cord or band *c*, when a card is to be recovered. This improvement is very useful where only one thread of weft is given to each change of pattern, because the loom will always run one card over after the weft thread breaks or becomes exhausted, before the shipper can fairly get the belt from off the tight pulley, on to the loose one; but in no case will the machine pass more than one card, without stopping, after the thread of weft breaks or becomes exhausted in the shuttle.

The second improvement consists in the mode of working the Jacquard machinery, and governing the shuttle motion, in order to obtain eight picks of weft to the card or change of pattern, and lose one pick, so as to procure sufficient time to change the pattern and thereby enable us to obtain a more smooth and uniform action for all the figuring parts of the machinery, and consequently making a more perfect piece of goods than where any sudden jerking of the warp yarn was caused; by this arrangement we are enabled

to obtain on the power-loom a mode of action *similar* to that obtained by the hand loom weaver.

The mode of operation on the hand damask loom is this:—The workman first depresses the pattern treadle, and thereby forms the shed of one change of the pattern, which treadle he keeps down until he has, with his right foot, worked over the eight ground leaves of headles, by means of the eight treadles, throwing in one pick of weft to each; he then lifts his foot from off the cylinder treadle, whereupon a new card is brought into contact with the needles of the Jacquard; he again depresses the same treadle, thus lifting the second change of pattern so transferred to the figuring machinery, and throws in eight picks as before, working over the ground treadles in the same manner, &c. Thus it will be seen, that there are two motions of the cylinder or pattern treadle to each card; and a more sudden action on this treadle in the power-loom than in the hand loom, where ground headles are used, would prove very injurious to the quality of the goods produced; besides, the liability of the warp threads to break would be greatly increased, as well as many other evils, well understood by every *competent manufacturer of figured goods*. Having thus described the nature of the operation on a hand damask loom, we proceed to explain the manner by which the same is obtained in the power loom, that is to say:

The inflexible connecting rod *m*, (Figs. 230, 231, 234 and 237) of the Jacquard, descends below the crank shaft *n*, and its lower end is connected with a horizontal lever *o*, (Figs. 231, 233, 234, 235 and 237) that extends back and is joined to the back part of the frame of the loom, working on the axis *p*; there is a stud projecting from this lever, behind the point of its junction with the vertical lever, on which is a friction roller *q*, (Figs. 233, 234 and 235) that plays in a groove in the face of a wheel *r*, more particularly described hereafter; the driving or crank shaft is furnished with a fast and loose pulley *s s*, (Figs. 230, 231 and 233) in the usual way; the cranks by which the lay is worked are inside the frame of the loom (see Figs. 231, 232 and 233,) and on the end opposite the pulleys there are two pinions affixed; the inner one *t*, (Fig. 232) is half the diameter of the spur wheel *u*, on the second or cam shaft v; the outer pinion is *one ninth* the diameter of the wheel w, (Fig. 232) into which it works; this wheel being on the third shaft x, which is placed forward of the cam shaft v, (as shown in the Figs.) and on a level with it; the third shaft (which works the Jacquard) does not extend from side to side of the loom, but

terminates a little beyond a brace a^2, which extends from front to back of the loom frame near the centre, and supports one of the journals of the Jacquard shaft. On the cam shaft v, are two double grooved cams b^2, which receive motion as hereinafter described; the two arms of each of the cams b^2, project radially, from opposite sides of the shaft, and are so placed with reference to each other, that when one is in action on the treadle c^2, the other revolves without striking it; the hub which joins the two arms is connected with the shaft by a feather upon the shaft v, so that the cam can slide sideways and put either of the arms in contact with the treadle c^2. There are two of these treadles which are attached to the common picker stick d^2, (see Figs. 230 and 231) in the usual way; these treadles are depressed alternately by the double shifting cams b^2, for eight picks of the shuttle or weft; the cams are then made to slide sideways and miss *one* pick; the other arms are then brought into contact with the treadles, and eight picks more are thrown; at every *ninth* beat of the lay, the shuttle *remains in the box*, for a purpose hereinafter described. On the Jacquard shaft which revolves once for every nine beats of the lay, there are two wheels or drums e^2, affixed opposite to the double shifting cams b^2, which wheels have two parallel grooves in their periphery, near each edge, around *eight ninths* of their circumference, from which point are oblique grooves crossing over to the other side, and forming a × at their point of junction; these grooves guide the ends of the two levers f^2, which project backwards over the double shifting cams b^2, to the back of the loom frame, where they have their axes on stud-pins g^2, the forward end of each of these levers f^2, which is in the groove, has a follower or oval button h^2, on it (see Fig. 236, where this button is shown of the full working size) which is made to turn and follow the grooves as required; around the hubs of each of the double shifting cams b^2, under the lever f^2, a groove is turned into which a pointed set-screw from the levers f^2, projects (one from each lever;) one of the wheels e^2, is placed with the oblique groove *one ninth* of the circumference of the wheel behind the other, so that first one of the cams b^2, will be shifted and then the other. The change takes place just before the acting arm would strike the treadle, which brings the other arm on the same cam in contact with the treadle at the next semi-revolution, and prevents the loom from losing more than one pick to the change of pattern of the Jacquard.

The Jacquard shaft x, also carries a wheel r, on its end, in

the face of which a concentric groove j^2, (see Fig. 237) is cut eight-ninths of its circumference; the other ninth the groove curves outward, so as to form a cam which will act on the connecting rod m, of the Jacquard, as above described; and while the shuttle misses one pick, (by remaining at rest in the lay box,) the pattern has time to change, even although the loom be in the most rapid operation.

Suppose, for example, that a change of pattern is lifted by means of the wheel r, which is keyed on the third shaft x, as above described, then we begin to throw the shuttle from the right hand side of the lay to the left, which will be accomplished by the off-side shuttle treadle, marked 1, (see Fig. 237;) the next pick will be treadle 2; the third pick 1; the fourth pick 2; the fifth pick 1; the sixth pick 2; the seventh pick 1; and the eighth pick will be treadle 2. The shuttle now being at the right hand side of the lay, as before, must not be thrown until the cylinder brings a new card into contact with the pattern needles, and thereby transferring a new change of pattern to the warp yarn; this requiring an extra motion of the driving shaft to effect, could not be accomplished to advantage while the eighth or last pick of the change of pattern was being given, as above, and as no pattern warp would be raised in time for the semi-revolution of the crank-shaft, and there not being sufficient time to lift the pattern shed, before the crank arrived at its proper point to give the shuttle impulse; if the shuttle treadle 1, was acted upon, it would cause the shuttle to be thrown over the entire body of the warp yarn. Now, to avoid this, as soon as the eighth pick was thrown to the right by treadle 2, then the cam which works the treadle 1, is shot out sideways to the right by means of the cross groove × in the double grooved wheel e^2, bringing the next striking arm of the cam inside (towards the right hand) of its treadle, thereby moving the lever f^2, (see Fig. 237) with its follower or oval button h^2, (Fig. 236) from the groove q^2, to that of p^2, thus throwing off the arm of treadle 1, and bringing in its place the other arm of the same cam, preventing the shuttle from being thrown the ninth motion, the treadle 1, not being then acted upon.

Secondly, it is now evident that treadle 2, must not be acted upon the tenth motion, because that treadle throws the shuttle to the right hand side, where it already is. The next thing to be accomplished, is to slide the other cam, which works treadle 2, sideways, so as to throw the acting arm to the right hand side of treadle 2; which is effected by means of the lever f^2, and its follower or oval

Fig. 230.

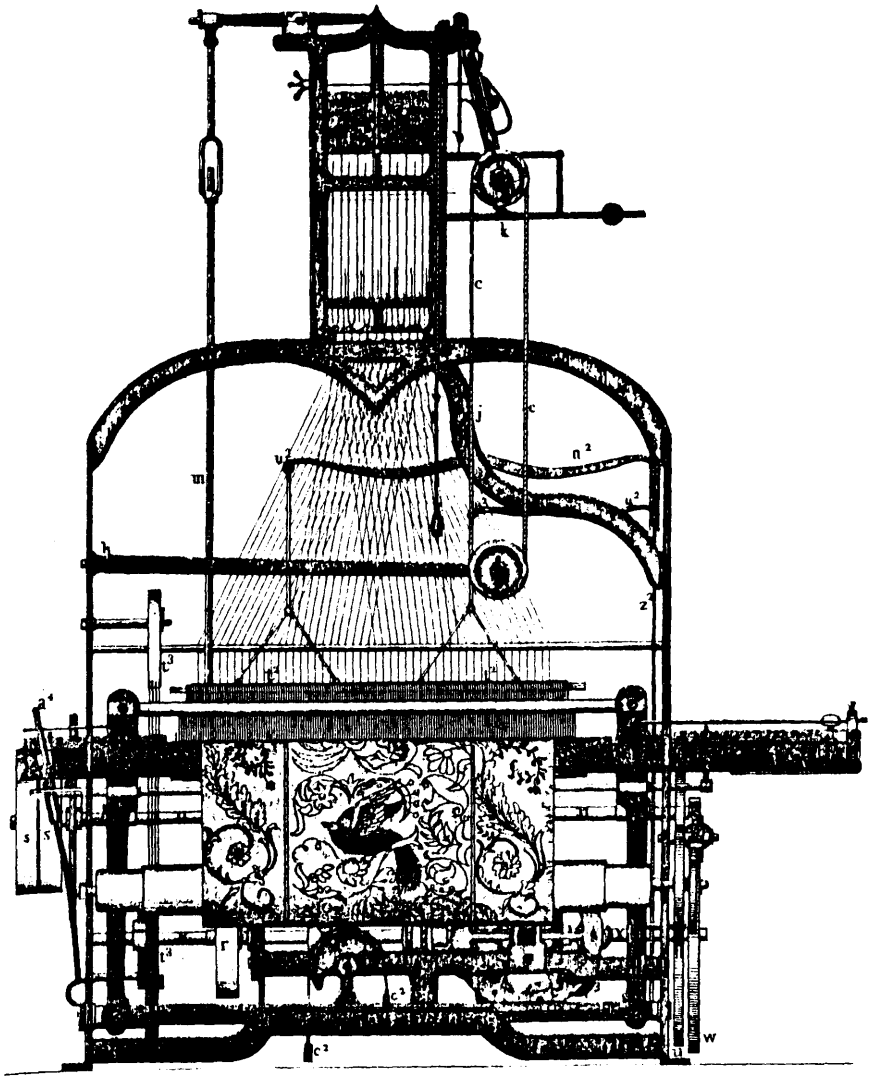


Fig. 231.

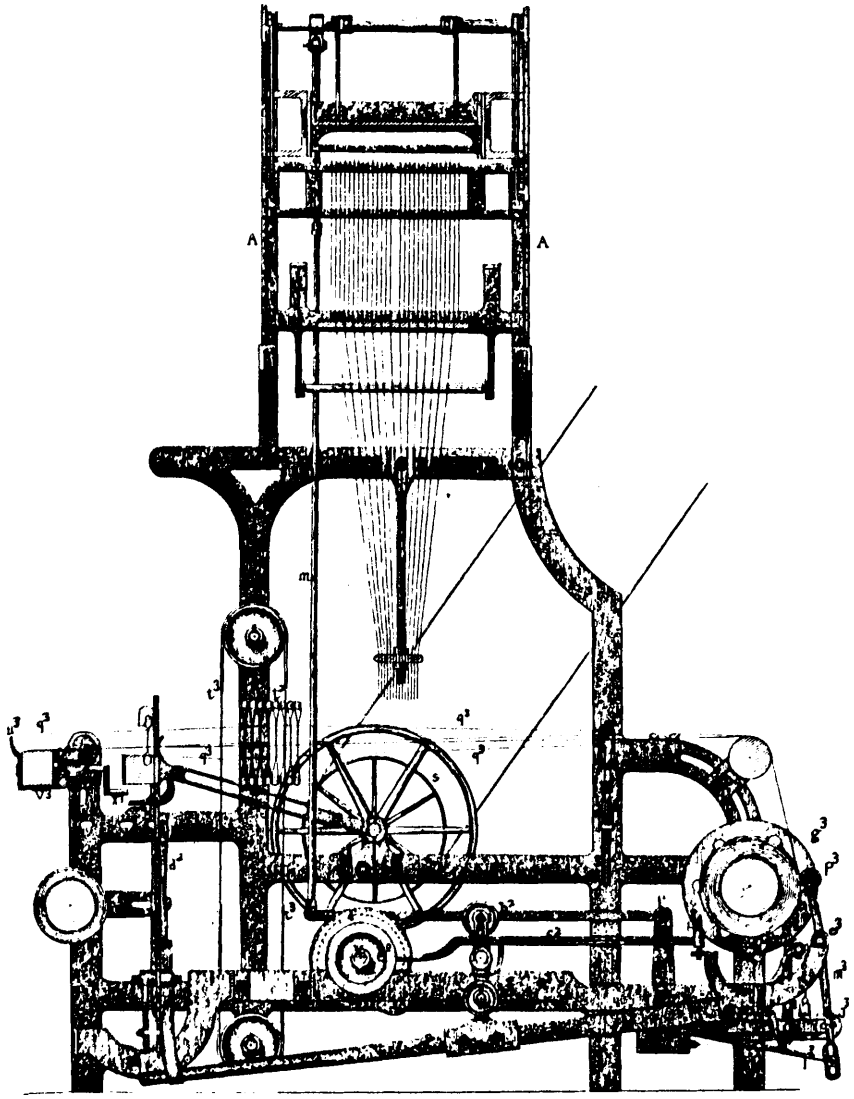


Fig. 232.

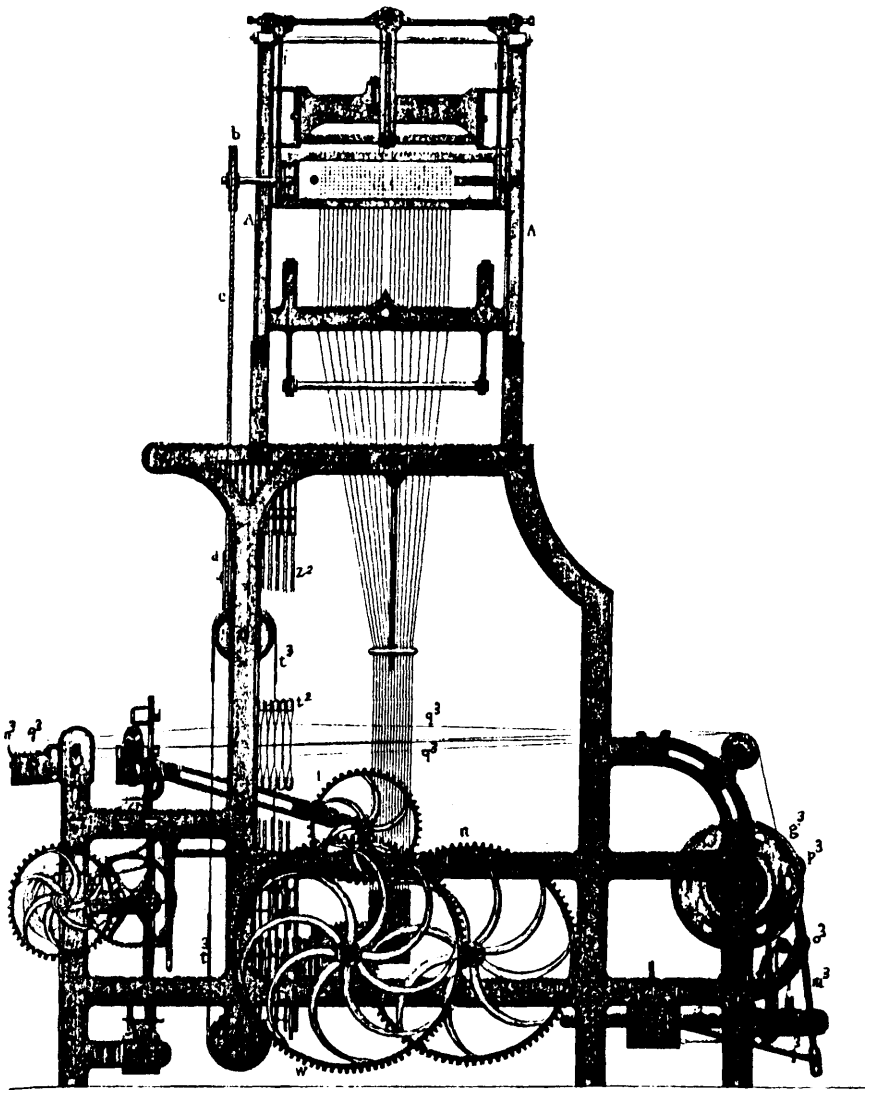


Fig 233.

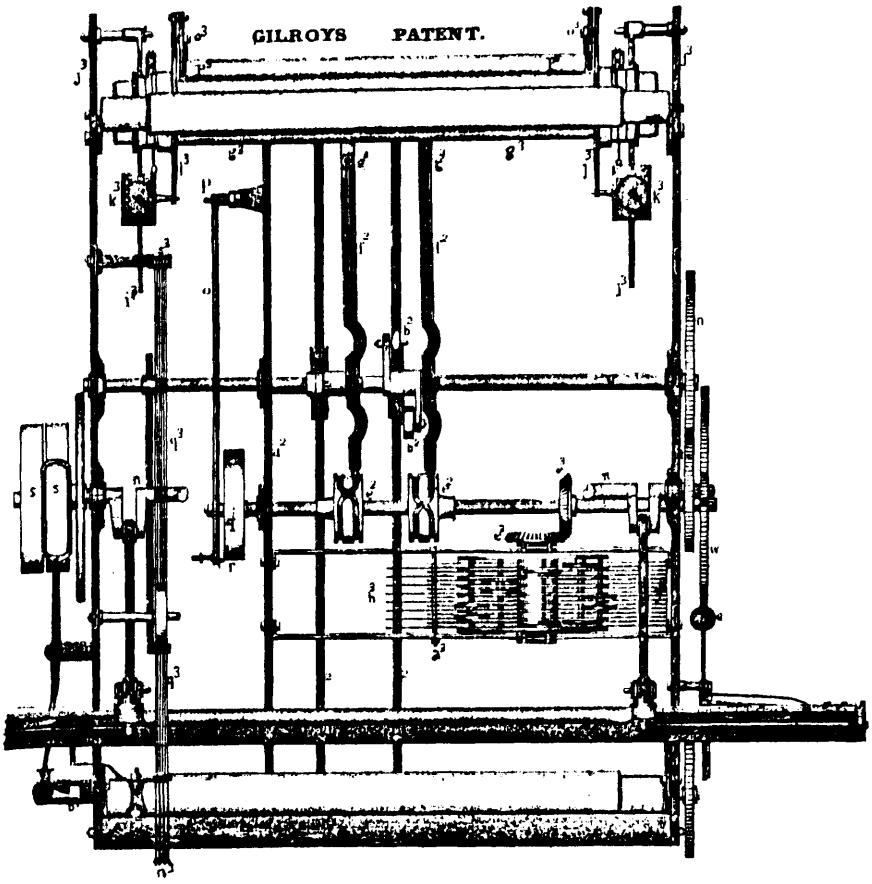


Fig 234.

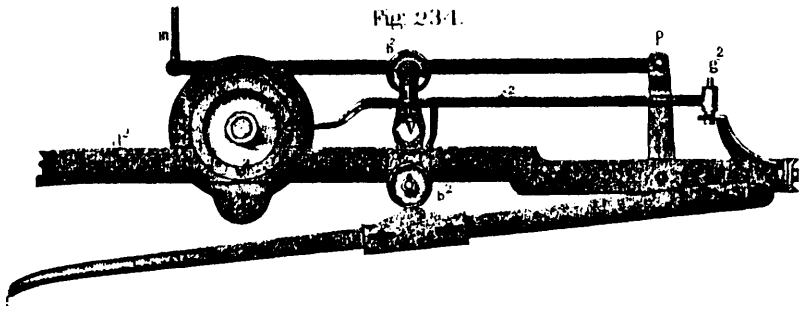


Fig. 235.

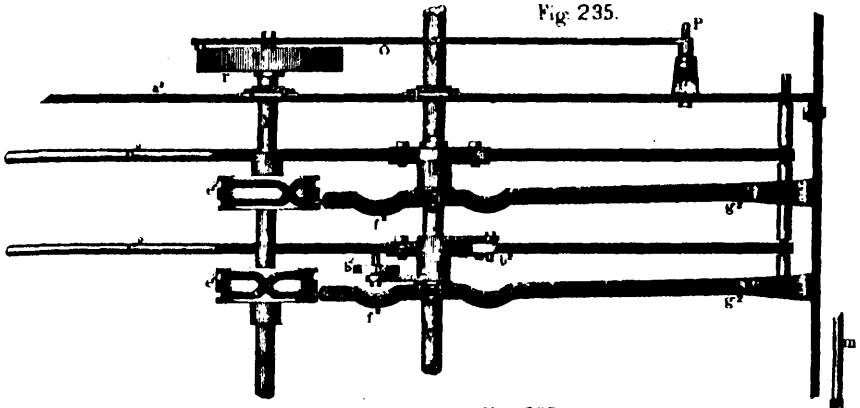


Fig. 237.

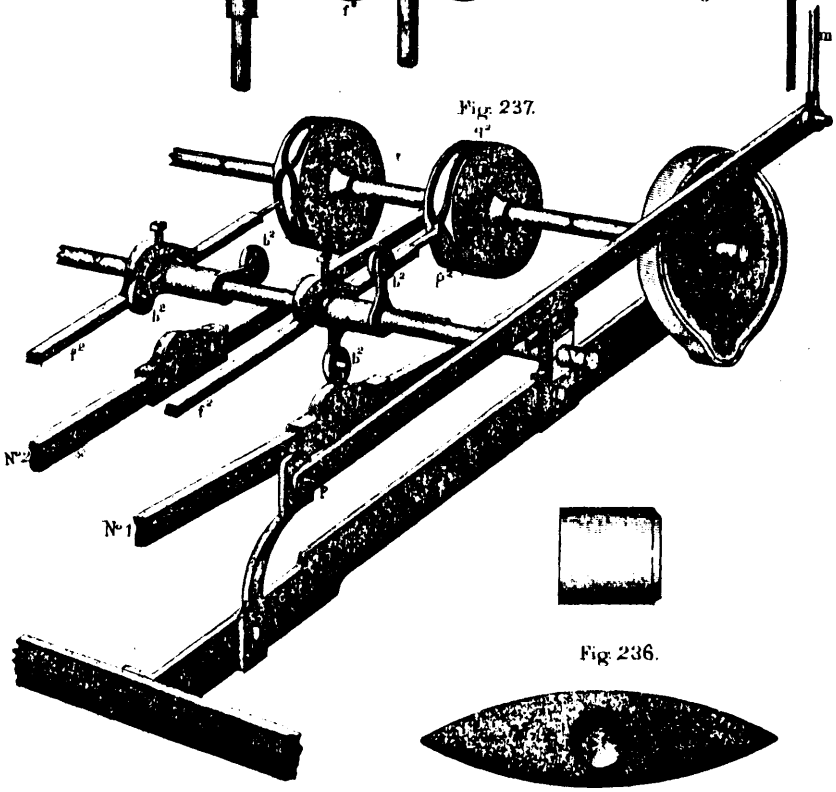


Fig. 236.

Fig. 239.

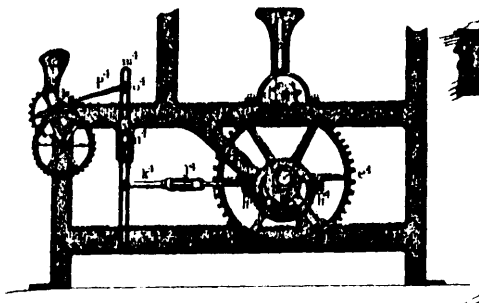


Fig. 238

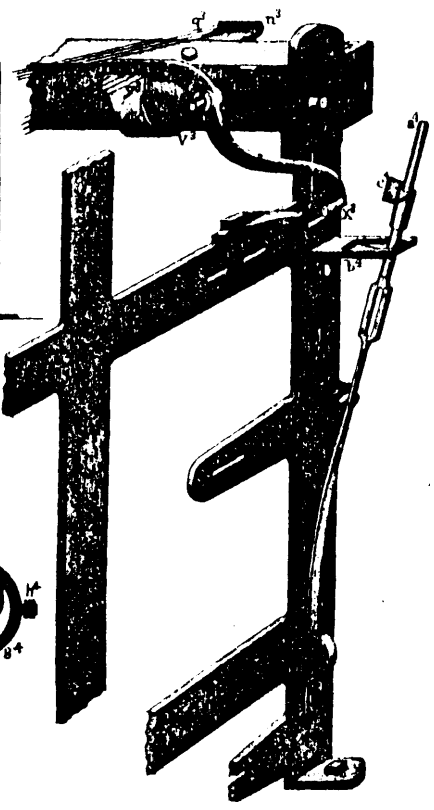
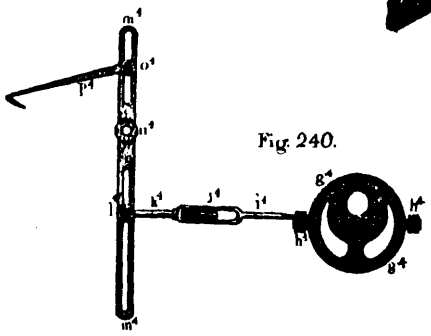


Fig. 240.



button h^3, being carried from the groove k^3, (see Fig. 237) to that of the groove l, in the same order as the first.

Thirdly, the two acting arms of the double shifting cams b^3, will now give in eight regular picks of weft to the change of pattern, the first pick throwing the shuttle from right to left, and so on, until eight are given; whereupon, the action of the apparatus will be reversed, and will continue to work right and left every other eight threads of weft, missing one pick, or beat of the lay, only, to each change of pattern.

The third part of the invention is for working the front mounting, which consists of eight leaves of headles, marked l^3, (Figs. 230, 231 and 232,) forming a satin or tweeled ground; these leaves are connected above with double lifting coupers a^3, (Fig. 230) the outer ends of which are connected by a shackle. The shackles on the coupers above named, are connected with a set of lifting marches y^3, (Fig. 233) near the bottom of the frame, by rods or wires z^3, (Figs. 230 and 232); these marches are parallel with the Jacquard shaft x, and have their fulcrums near the centre at a^3, (Fig. 233;) between these marches there is another set b^3, called sinking marches, the fulcrums of which are at the side of the frame; the opposite ends being connected to the headles underneath; nearly over the centre of the raising and sinking marches, a cylinder or drum c^3, (Fig. 230) is placed, the journals of which are on a level with, and at right angels to, the Jacquard shaft x; they are geared together by bevel wheels e^3, (Figs. 230 and 233) and make the same number of revolutions. The cylinder c^3, has *eight* grooves or divisions turned in its periphery, each of which is wide enough to extend over two of the marches, (a raising and a sinking one;) the projections or rollers f^3, (shown clearly in Fig. 230) in the cylinder occupy the space between the second and third, fourth and fifth, &c., throughout the series. In the cylinder are inserted eight iron spindles, near its periphery and parallel with its axis; these spindles pass through each of the sinking and raising rollers f^3, between the grooves or divisions, and serve for their axes, which are just half the thickness of the grooves or divisions above named, and have a hub projecting from one side to fill their respective grooves or divisions and keep them in place; two pulleys thus constructed are placed beside each other in the two first grooves or divisions, and a steel spindle is passed through them, their hubs being towards each other; consequently, when the cylinder c^3, is turned so that these rollers come in contact with the projections on the marches directly under the cylinder, one depresses the first raising march in the series, the

other the first sinking march. If the hubs of the rollers f^3, were placed the other way (reversed), the first sinking march and the second raising one would be acted on, these being placed under the first roller, and so on. The others are placed in proper order for an eight leaf satin tweel, and need no further illustration. The rollers f^3, can be turned on either side, so as to sink or raise the headles, as required; and by drawing out the spindles, the rollers can be so arranged in the cylinder as to form different kinds of tweels, &c.

From the foregoing description it will be evident, that variations may be made; as, for instance, the giving off a less or greater number than eight picks of the weft per change of pattern; and although, in the foregoing description and drawings eight picks of weft per card, only, are mentioned, the machinery is not confined to that number; the Jacquard shaft may turn once to five beats of the lay, or once to seven, &c.; which will give four or six picks of weft to the card or change of pattern, and four or six leaves of ground headles will be used instead of eight, as in the present instance; all of which any experienced manufacturer or power loom maker will at once perceive.

For very wide textures, two of the cylinders c^3, may be used instead of one set, and also two sets of the coupers u^2, the lifting marches y^2, and the sinking ones b^3, one complete set at each side of the loom. The reason of this is obvious, because the headles being very wide, say three yards or more, the strain on one set alone would be very great. We therefore prefer the use of two sets instead of one, on very wide fabrics, and particularly so for the manufacture of linen table cloths, both sets being geared to correspond and to act at the same time on their respective marches, &c. But on the narrower fabrics, say under forty inches wide, one set alone, as herein above specified, will be quite sufficient.

The fourth part of the improvements consists, in a new mode of regulating the warp beam. The warp beam g^3, (Figs. 231, 232 and 233) is surrounded at its ends by friction straps h^3, each of which descends to a horizontal lever i^3; the fulcrum of this lever is supported outside the frame by a projecting iron j^3; on the other end of this lever, the friction weight k^3, is suspended, one weight to each side of the loom, (as in Fig. 233,) to which a connecting rod l^3, is attached, that connects it with an upright lever m^3, (Fig. 231 and 232;) this lever is made with a slot in its lower end to regulate the distance from the fulcrum o^3, of the lever, at which the connecting rod l^3, is attached; the fulcrum is about one third its length from the

top. The upper ends of the levers m^3, support the journals of a small roller p^3, which bear against the warp beam g^3. When the weaving commences, and the beam is full, the roller p^3, is very far from its centre, and the weight k^3, is near the end of the lever i^3; as the size of the warp beam decreases, the roller p^3, approaches nearer to the centre of it, and the weight k^3, is moved towards the friction strap h^3, thus gradually decreasing the friction on the warp beam and regulating the tension of the warp; the weights k^3, will be drawn backwards as fast as the warp beam decreases in size; the friction weights may be drawn back by springs, or by some other suitable contrivance, as, for instance, by weights and cords passing over pulleys, &c. as in Figs. 231, 232 and 233; any required degree of tension may be given to the warp yarn, by simply adding cast-iron quoits on the perpendicular spindles, which are screwed into the weights k^3, for the purpose, as shown in the Figs.

The fifth part of the improvements consists, in a method of stopping the loom directly when the thread of weft breaks or becomes expended in the shuttle. This contrivance is applicable to what is called the stop thread motion; for which motion patents were granted several years since to Charles Cunningham, Esq., of Paris; and in England, to Messrs. Wells and Eccles, of Manchester, for another modification thereof, bearing date 5th Jan. 1838; and for another modification still, to Moses Poole, Esq., of the Patent Office, bearing date 12th May, 1839. Now, in order that the nature of this invention or improvement may be more clearly understood, it is necessary for us to describe so much of the methods employed heretofore, and just referred to, as will enable the reader to see the peculiar advantages of the present modification. Several of the parts of this mechanism are the same as in Poole and Cunningham's patents. In the patent granted to Wells and Eccles (which is described in vol. 13, new series, of London Journal of Arts and Sciences) there are two double acting levers, marked T, and U, being connected together with a small string or wire; these levers vibrate on two stud pins, which serve as their axes, and are riveted or bolted to a plate, secured or made fast to the side of the loom, directly over the threads or cords P, q; the top set of which cords is connected to that end of one of the double acting levers, marked T, which projects over them; to the opposite end of the other double acting lever, there is made fast a small knob W, which plays up and down between a piece of iron on the belt shipper, and the front of the lay: all of which will be seen in the account of Wells and Eccles' patent just alluded to. It will at once be perceived, that in this modification, the double act-

ing levers T, and U, will be kept on the continual wibble-wabble (shaking-quaker fashion) when the loom is in operation, and thus the knob W, will sometimes pop itself between the shipper and the lay when the weft is not broken, or expended on the bobbin. And, if only one of the double levers T, and W, is used, and is at all connected with either the top or the bottom set of threads P, q, by means of the other small connecting threads, as in the foregoing, then, the motion will be quite as uncertain. Now, to remedy this evil, Poole's patent, of 12th May, 1839, has, instead of the double acting levers, above referred to, a small jogged piece of iron, resting on the girth of the loom and connected to the side of the shipper slide (see Fig. 225); to this jogged piece of iron is attached a set of small cords, which are connected to the under tier of the stop motion strings; by this improvement the double acting levers T, and U, (in Wells and Eccles' patent,) are done away with altogether. Poole's method is thus rendered far more certain than the other, because the jogged piece of iron, resting on the side of the loom, renders the motion more steady.

There is a series of cords q^3, (see Figs. 231, 232 and 238) attached to the weights r^3, (Fig. 231) and passing over the pulleys s^3, through the headles or endless band t^3, (Figs. 230 and 231) under the cumber-board, the headles being worked by the cam shaft—all as described in the patent granted to Moses Poole. The cords q^3, after passing over the shuttle-race, instead of being all tied to one iron on the breast-beam or front board, are, as shown, half of them, or those passing through the mails in the back headle, affixed to an iron u^3, that projects up in front of the breast-beam or front guard board; this iron extends down to the bottom edge of the breast-beam or front board, to which it is attached, and then turns at right angles under it, as at v^3, (Figs. 231 and 238,) the end terminating in a vertical pin or turned-up part y^3, (see Fig. 238) a little shorter than the part u^3; to the top of this turned-up part y^3, which has a number of holes for the purpose, the ends of the cords or cat-guts are attached. On the breast-beam, there is a strong piece of sheet-iron w^3, screwed or otherwise made fast, that extends inward to the iron just described, and is attached to the breast-beam. On that end of the iron u^3, next to the lay, a stud-pin projects, forming a fulcrum for a lever z^3, (see Fig. 238;) this lever curves up from one side of the fulcrum slightly, and thence projects under the upper set of cords q^3, which cords are attached to the front end of the iron u^3; on the other side of the fulcrum the lever z^3, extends out beyond the framing and curves down, its end bearing a knob (Figs. 231 and 238). The

belt shipper a^4, and its catch b^4, (Fig. 238) are of the usual construction. On the handle of the shipper is a projecting piece c^4, that reaches beyond the upright of the frame. In Fig. 238, the shipper a^4, is represented off, and consequently the loom stopped. The shuttle at each pick passes between the upper and under cords q^3, and when it enters the box it leaves the weft thread, if not broken or exhausted, across the under set; the lower set of cords are then raised, and the upper ones depressed till they meet in the centre of the shed, and are prevented from going farther by the thread of the weft; but if there is no thread left across between the sets of cords q^3, they pass each other and the upper ones are brought down low enough to depress the end of the bent lever v^4, which is under them; this elevates the knob x^3, on the other end, and brings it between the lay and the projection c^4, on the shipper, and throws it off, and consequently causes the loom to stop.

Fig. 239, shows as much of a power loom as will enable us to explain an improved method of taking-up the cloth; and Fig. 240 represents the apparatus detached from the loom. d^4, is the driving wheel, on the end of the crank shaft, taking into the wheel e^4, on the cam shaft; on this shaft we place an eccentric f^4, surrounded by a collar g^4, made in two parts and held together by bolts h^4; to one side of the collar is connected a rod i^4, having a screw joint j^4, for receiving the end of a rod k^4, which works on the axis pin l^4; this pin may be raised or lowered in the slot m^4, of the vertical lever which has its fulcrum at n^4, to suit the number of picks of weft required per inch of the goods to be produced; the upper end of this lever has also a slot in it, carrying a stud-pin o^4, and this stud-pin forms the axis of the click or drag p^4, which draws round the cloth roller as usual. Now, suppose that the loom is put into action, the eccentric f^4, will cause the lever m^3, to oscillate, and thus a continuous rotary motion will be communicated to the cloth roller, through the medium of the click or drag p^4.

Having now described the nature of the improvements, and the manner in which the same may be performed, it is to be understood that we do not limit ourself to the particular arrangement of machinery required for a loom to weave figured fabrics, as we are quite aware that different forms and arrangements will be found necessary for effecting the same objects in looms for weaving other fabrics, and to which some of these our improvements may be applied, but they will be such as any experienced workman may at once understand from the description here given, and will be governed by the nature of the loom or looms to which they are to be applied, as well as the

goods to be produced; as, for instance, the improved method of stopping the loom when the weft thread breaks, may be applied with advantage to any power loom. Nor do we mean to limit the said improvements to looms with Jacquard machinery, as they are also applicable to various other kinds of figured looms; for instance, cylinder or barrel looms, (like that described at page 182,) where a cylinder is used instead of Jacquard machinery.

Firstly, what we more particularly claim as the inventions or improvements, is the combination of the third shaft x, with the crank shaft n, and cam shaft v, the Jacquard and cam shafts being driven by separate pinions on the crank shaft, in the manner and for the purpose above specified.

Secondly, we claim the combination of the double sliding cams b^2, one for each of the shuttle motion treadles c^2; which cams slide independently of each other from right to left, and from left to right, in order to give *eight* regular motions on the right and *miss one*, then change positions; and in connexion therewith, the two double grooved wheels or drums e^2, on the Jacquard shaft x, and the two regulating levers or rods f^2, by which the shifting or sliding motion is communicated to the double shifting cams b^2, constructed and arranged substantially in the manner and for the purpose herein set forth.

Thirdly, we claim the combination of the cylinder c^3, with the concentric cam wheel r, working the Jacquard, for acting on the marches of the headles, in the manner and for the purpose above described; but we do not claim the cylinder c^3, as new in itself, the same having been used for other purposes heretofore.

Fourthly, we claim the combination of the endless cord or band c, with the Jacquard cylinder, pulleys b, and d, and horizontal lever e, in the manner and for the purpose set forth.

Fifthly, we claim the apparatus for decreasing the tension on the friction strap, on the warp roller, as the warp unwinds; that is to say, the combination of the roller p^3, and connecting rods l^3, with the weights k^3, in the manner and for the purpose herein described.

Sixthly, we claim the improvement in the motion to stop the loom when the weft thread or threads break or become exhausted in the shuttle, as above specified, viz: the combination of the iron u^3, on the breast-beam or front-board of the loom, the turned-up end y^3, and lever z^3, constructed and arranged as herein made known.

The improved method of taking up the cloth represented in Figs. 239 and 240, was invented by us in the year 1831, and which we first applied to a muslin loom at the establishment of Messrs. Claude Girdwin & Co. Glasgow, Scotland.

The foregoing improvements do not constitute over one-third of our inventions in looms. We have obtained patents in the names of Poole, Cunningham, Truffaut, and others, for 25 or 30 other improvements, in the manufacture of plain, tweeled and figured goods by hand and by power, which we cannot describe in this work; indeed, these improvements are mostly applicable to power looms for weaving Carpets, Coach-lace, &c. &c; but we intend laying them before the public, along with other interesting matter, at no very distant period.

On application to the Hon. H. L. Ellsworth, Commissioner of Patents at Washington, D. C., he furnished us with the following statement of claims of the patents granted to Erastus B. Bigelow, Esq., of Lowell, Mass. Patent, dated May 16, 1812:—

"*First*, I claim the placing and working of the journals t', u', v', and w', as shown in figures 1, and 3, of the accompanying drawings, above the Jacquard machine, for the purpose of keeping the *knot cords straight*, and thereby securing their proper action *on the trap boards g', and h'*, when said trap boards are raised; and also the *raising of one* of said *trap boards whilst the other descends* in order to equalize the *powers* required to drive the loom; and in *combination* with this arrangement, I likewise claim the working of the *card prism or polygon*, by means of a cam, or other *analogous* device operating on, and working said card prism or polygon, *when the trap boards are at rest;* the respective operations herein referred to, being carried on or effected, substantially in the manner herein fully made known.

"*Secondly*, I claim the *combination formed by the two rollers* d^4, *and* e^4, *as shown in the drawings, through which rollers the cloth passes, with the vibrating or tension roller* i^4, which is employed to give tension to the warp, substantially as described.

"*Thirdly*, I claim the *connecting*, the vibrating or tension roller i^4, with the machinery *employed to turn the warp beam, for the purpose of regulating the action of said machinery on said warp beam*, and thereby determining the quantity of warp delivered out, in the manner set forth.

"*Fourthly*, I claim the manner in which I *construct my shuttle boxes*, as described under the head of my third improvement, and represented in the respective figures therein referred to, together with the modifications thereof herein made known; the said shuttle box *consisting* of a *table*, with *springs* and *catches*, and having a *projecting pin on each end, which is to be received and operated upon by the reciprocating arms* as described.

"*Fifthly*, I have *represented* and *described* my shuttle boxes as *disconnected* with the *lathe* (lay, we suppose,) but I do not now claim the mere disconnecting of these parts, this having been the subject of a claim in the specification of a patent for a loom for weaving coach lace granted to me on the 20th day of April, 1837—But I do claim as an improvement thereon, the working of a series of shuttle boxes, so disconnected, and supported by the frame of the loom, or other stationary part of the structure adapted thereto in the manner set forth, that is to say, having the said shuttle boxes to *turn or slide in stationary fixtures attached to the frame of the loom*, or in any other manner which is substantially the same. A series of shuttle boxes so disconnected may be applied, and I intend to apply them to looms in which the fly shuttle is used, and I do not limit my claim, therefore, to their employment in looms of the kind herein described (the above claim is a 'cute one.)

"*Sixthly*, I claim the manner of arranging and combining the machinery employed to cause the above mentioned reciprocating arms, rods or bars, to receive, retain or discharge the shuttles, when they are *handed through the warp!*

"*Seventhly*, I claim the manner of constructing and arranging the apparatus herein described, for preventing the selvage of the cloth from being drawn in, and of stopping the loom when the *filling breaks*, or is exhausted on the bobbin.

"*Eighthly*, I claim the manner of throwing the loom out of gear, when a change of colour is required in the filling, by means of the *connection formed* for that purpose between the *Jacquard machine* and the *shipper*, whether such connection be made precisely in the manner described, or in any other which is substantially the same."

Patent, dated May 26, 1842; antedated, May 1, 1842.

"*First*, I claim the application of the *measuring roller i*, to the cloth or yarn, for the purpose of regulating the action of the machinery employed to deliver out the chain or warp, or to take up the finished cloth in the manner above described, or under such modifications thereof as shall produce the same end by similar means.

"*Secondly*, I claim the combination formed by the *tension roller b*, and the measuring roller *i*, co-operating together in the manner and for the purpose herein set forth.

"*Thirdly*, I claim the mode of giving an uniform tension to each thread of woof or filling as above described, that is to say, I claim the *grasping of the thread of woof or filling, at a point between the shuttle and selvage of the cloth*, by the bars *e'*, *e'*, and *q'*, *q'*, or by a pair of pliers operating in a similar manner as set forth, to-

gether with the mode of giving tension to the filling as above set forth, or in any other manner which is substantially the same.

"*Fourthly*, I claim the manner in which I have connected the shipper and the rotating shaft *x'*, with the apparatus employed to give tension to the woof or filling, for the purpose of throwing the loom out of gear when the woof or filling breaks, or is exhausted on the bobbin."

Patent, granted May 30, 1842; antedated May 1, 1842.

"Having thus fully described the nature of my improvements, in the loom for weaving counterpanes, and other figured articles, and having, also, set forth several different modifications thereof, and particularly in the manner of forming and arranging the *cams* on the *cam shafts*, by which the required motion is given to the respective treadles, so as to correspond in their action with the arrangements made in the other parts of the loom, it is to be understood that I do *not* claim, nor do I intend to *limit* myself to the *particular* arrangement of the cams and treadles, these *not* constituting a distinguishing or an *essential* feature of my improvements; these consisting, mainly, in the mounting of the loom and of tying up the harness, so as to admit of the employment of *one* or *more moveable harness-boards*, and of *one* or *more leaves of headles*, and of the *Jacquard Machine* in the *power loom*. By this arrangement I am enabled to produce a free and open shed of the warp, and to allow one part, or shed, thereof to *descend whilst the other is rising*. What I claim, therefore, as constituting *my inventions*, and which I *desire* to *secure* by Letters Patent, is the within described manners or modes of mounting the loom, and tying up the harness, and of working the same, in which, under its *various* modifications, I *combine a moveable harness-board, or boards, with one, or more, leaves of headles, or harness, and with the Jacquard Machine in the power loom, such arrangement and combination being substantially the same with that herein described.*"

We have given above Mr. Bigelow's claims, exactly as received from the Commissioner of Patents; and we shall now offer a few remarks upon them, beginning with his patent of 16th May, 1842.

The first claim, regarding the action of the knot-cords and trap-boards, contains no new feature, as has been already stated. See pages 446 to 448. The working of the card prism or polygon, (Jacquard cylinder), by means of a cam, when the trap boards are at rest (or even in motion) has been done long since. Mr. J. Kyle, of Glasgow, M. Eug. Lefebre, of Lyons, and M. R. Dubois, of Paris, used cams and other contrivances for that purpose many years

ago, on looms for weaving some kinds of vestings and furniture stuffs; and we ourself effected the same thing as far back as the year 1831, on a loom for weaving quilted vesting stuffs, but owing to improvements which we afterwards made in the mode of tying up the harness, we were enabled to dispense with the cam altogether.

Both the second and third claims are comprised in Poole's, Cunningham's, Truffaut's, and Wilbur's patents. See page 462, and Figs. 218, 219 and 220.

The fourth claim contains nothing worthy of notice.

The fifth claim, for disconnecting the shuttle boxes from the lay, making the boxes to turn or slide on stationary fixtures attached to the frame of the loom, is ingenious, and, if simplified in its mechanism, might be found advantageous in the manufacture of many kinds of fancy goods; but, besides Mr. Fletcher (see page 394) there are five other different claimants to the honour of this invention. It remains to be seen, therefore, to whom this contrivance *justly* belongs; which our forthcoming treatise on carpeting will clearly set to rights.

The sixth claim merits no attention.

The seventh claim, for preventing the selvage of the cloth from being drawn in, and of stopping the loom when the weft thread breaks, is illustrated at pages 403, 416 to 421, 443, 454 to 463, and at 468 to 478.

The eighth claim is, for throwing the loom out of gear by means of a connection between the shipper and the Jacquard machine. If by this Mr. Bigelow means the connection of the shipper with a few spare Jacquard needles, one for each colour employed, these needles being acted upon by the card when a new colour is to commence in the cloth; we say, if he means this, he claims that which *truly belongs to us.* Besides, we have adapted Jacquard needles, (with lifting hooks, made of No. 10 wire,) for working a *series of shuttle boxes*, either in hand or power looms; and for which we obtained patents, in the name of Mr. Poole, and others, several years before the date of Mr. Bigelow's patent. A modification of our plan for working the shuttle boxes with the Jacquard, is specified in Poole's patent of May 12, 1839; and any person who feels interested on the subject may obtain a copy of the specification and drawings of this patent, from Messrs. Poole and Carpmael, of the Patent Office, 4 Lincoln's Inn, Old Square, London, on payment of 22*l.* 10*s.* (about $108,00.)

In Mr. Bigelow's patent of 26th May, 1842, his first claim is, the measuring roller *i*, &c., for regulating the giving-out of the warp

and the taking-up of the cloth. Our apparatus for this purpose is described at page 352, and represented at Figs. 161 to 164, where a measuring roller is shown, marked Q.

The second claim is only a modification of the first.

The third claim is, for the mode of giving uniform tension to each thread of weft or filling, by means of a finger or pusher at each selvage of the cloth, working in a groove cut in the lay; which fingers draw or push the weft thread toward the cloth at each pick of the shuttle. Mr. B. also claims the grasping of the weft thread at a point between the shuttle and the selvage of the cloth, by bars, or by a pair of pliers, in connection with the fingers for tightening up the weft, as already described. Both of these inventions are ours, and are included in our patents. In the beginning of the year 1834 we laboured under great difficulty in weaving heavy silk and woollen goods, the warps being of a sticky nature, and it was then that we applied these motions for obviating the difficulty. Some of the most competent manufacturers in France, who saw these inventions in operation, were highly delighted with them; and from the testimonials at the end of this work, it will be seen, that they were acquainted with these motions, in connection with several of our other improvements, for upwards of nine years previous to our leaving France, in 1841. See also Enoch Burt's patent of 19th August, 1828, page 403.

The fourth claim is comprised in our patents already referred to, and we need not, therefore, make any observations upon it here.

We have already made some remarks on Mr. Bigelow's counterpane loom (see pages 446 to 449), the patent for which is dated 30th May, 1842; and we would just state in this place, what we before hinted, that without the motions taken from Tompkins and Gilroy's loom, and from "Cross's counterpoise harness," the counterpane loom would be no loom at all; as it is, however, it answers the purpose very well.

We make the following extract from the specification of a patent, bearing date May, 1839, granted to us in the name of Moses Poole, of the Patent Office, London:—

"The *tenth* part of the invention consists, in drawing up or tightening the weft thread or threads at each and every throw of the shuttle, so as to prevent any loose threads or loops, or any other unevenness in the cloth woven, or being wove in the loom to which this new mechanism is applied, which, it must be acknowledged, is a matter of no small importance to the manufacturer; for it is well known that even in hand looms there is often the greatest possible

difficulty to the weaver, or person who tends looms, to keep the weft thread always straight, that is to say, that when the shuttle receives its motion from one side of the loom to the other opposite side, that the weft thread in the opening of the warp yarn will have the appearance of a crooked line, or zig-zag, in and out, or similar to a thread of woollen yarn ravelled or taken out of an old stocking; this has always been a source of the very greatest embarrassment to the weaving community, and more particularly so to the manufacturers of silk, woollen and such like sticky or gummy yarns; for, as I have before observed, the weft thread must be woven into the cloth in a very loose and imperfect manner, unless something is done to remedy that evil, and this is the case more particularly in looms worked by power. And I would further remark, that it is well known to all manufacturers and weavers in general, that there never has, up to this present time, been any effectual remedy found out to do away with the above mentioned evil, and particularly so in power looms; for it must at once be perceived by the most inexperienced manufacturer or weaver, that unless the surface or texture of the cloth or fabric woven is perfectly smooth and of a glossy appearance, something like the surface of a mirror, then the cloth or fabric will not be so good either in appearance or in substance. But by means of this invention or improvement, all these above mentioned evils will be annihilated, and done away with; the construction and adaption of which will be readily understood by every experienced manufacturer or mechanic who is acquainted with looms and machinery in general; neither is it subject to derangement in any way whatever, when once adopted to any loom or looms, whether such loom or looms are worked by steam or other power."

Then follows a description of the invention, including several different modifications of it, applicable to various kinds of looms; and the patentee further observes:—

"Having described the various parts of the invention or improvements in looms, the manner of their working is as follows, namely: as soon as the shuttle has entered the lay box, after having been driven through the shed as in other looms, and when the lay is about half its full course or distance forward towards the fell of the cloth, then the said finger or curved lever-piece will push forward the weft thread or threads before the warp threads descend or close together, and also before the reed comes into contact with the cloth."

The patentee next refers to the figures contained in the patent, and afterwards claims as follows:—

"Having now described the invention or improvement in looms, and the manner of carrying the same into effect, I would remark, that of course I place one motion at each selvage of the cloth, so that the weft thread will be drawn from each side of the cloth being woven; and I would further remark, that I do claim as the invention the arrangement of apparatus for the purpose above described of *drawing* or *tightening* the weft thread or threads of a fabric or fabrics, in whatever way the same may be applied, so long as the principle of the invention is retained, that of *pushing or carrying forward whatever part of the weft thread may remain loose, slack or kinked in the warp opening after the shuttle has received its impulse* as aforesaid, and I do also claim the application of the same to all looms, whether such looms are worked by steam or other power."

Although in all Mr. Bigelow's claims just referred to, we have, we regret to say, not been able to discover any new feature, yet this gentleman is the patentee of another loom, for weaving coach-lace by power, with Jacquard machinery, of which we have formed a very favourable opinion. We think this loom evinces much ingenuity in its construction, and is decidedly the best machine for weaving coach-lace yet introduced.*

The importance of the fine arts in connection with manufactures, has been so much felt in Great Britain, that the subject was investigated by a Select Committee of the House of Commons, in 1835; and the evidence then brought forward is highly valuable, being derived from the experience of some of the most eminent British artists and manufacturers. We have carefully examined the information thus furnished, and as it is well worthy the attention of all manufacturers of figured goods, we think it may very properly be introduced into this work. We accordingly proceed to quote the evidence of the late M. Claude Guillotte, and shall follow with that of other distinguished gentlemen.

M. Claude Guillotte, examined: I am a maker of Jacquard looms, and of all sorts of looms for silk manufacture, and of French bar looms, by Premaillerre, upon which (the bar looms) from ten to thirty ribbons at a time may be manufactured, and the whole of the machinery conducted by a young man. Of those, I manufactured 150, at several times, and for several parties; and they were the very first ever introduced to this country, and for which machinery I took

* A correct copy of the specification and drawings of this loom will be given in our promised work on carpeting.

out a patent. Jacquard machinery adapts itself to all sorts of tissue. I made three years ago the most complicated machine ever produced in England, with 4,600 threads, at a cost of 50*l.*, and before it was put in order and set to work, it cost 100*l.* ($500,00); it was for weaving napkins and table-cloths, and was worked by one man. I also made many of the Jacquard machines, with 1,600 to 1,700 threads for smaller table linen. Of late, I am making Jacquard machines, by hundreds, for all parts of England, where they had not been introduced before. For Yorkshire, I am particularly engaged at present making them for merinos and damasks, and the same for Bolton and Manchester; I have agents at Manchester and Bolton; and I have been engaged in making them at Coventry for ribbons. There are from 7,000 to 8,000 Jacquard looms in operation in the country, and there has been an extraordinary increase in the demand; for the silk manufacture, I received in London orders for six, eight, and ten at a time; in Yorkshire, I received orders for from sixty to eighty at a time; and for worsted manufactures, the demand is also considerable.* The demand commenced about eleven years ago, and has become much more active of late in Yorkshire: and yet, I was four years ago in Yorkshire, at Halifax, Huddersfield, and the surrounding country, with an interpreter, taking with me half a dozen, and there was no individual willing to purchase one; and after my return, I received an order for one machine, in order to make an experiment; it succeeded, and the consequence was, an order from the same individual, a Mr. Gill, to manufacture more than 100 such machines, and there was a demand at any price from every body. These were to re-place the old mechanism, which was employed in producing small patterns; those are principally used for waistcoats. The demand could not of course continue so great as it was; but there is still a demand, principally for merinos and damasks. In Scotland I have an agent, but I do not do much, the price of the cards for the manufacture of Scotch shawls being *too high*. The difficulty of applying these cards to shawl-making is, that for the production of a beautiful pattern, 5,000 or 6,000 are required, which makes the machinery too expensive.† At Norwich, a good many were sold one or two years ago, but they are *expensive*, and it has prevented its being much applied to the *silk* manufacture. In Scotland, they use a draw-boy instead of a Jac-

* There are probably at this time (1844) 30,000 Jacquard machines in operation in Great Britain.

† For some of the finer species of shawls, now produced in Europe, as many as from 12,000 to 20,000 cards are used.

quard; in Scotland and Norwich, the number of cards which are necessary for the production of a figure make the employment of Jacquard machines much more expensive. Sometimes I employ foreign workmen in the manufacture of my machines, but they *leave me when they can better their condition;* and a good workman, such as I employ, will get thirty shillings ($7,50) a week. I think the price is lower here than it is in France, and I account for it thus: because I *carry on the whole of the manufacture in my own workshops;* while in France the production of a Jacquard machine is divided among the workshops of several persons.* There are only two principal makers here, but the competition between those two is so great that the prices are kept low. Many *inexperienced persons have made attempts to make the machines,* but have not been able to *compete with those who had more experience,* and they have failed in producing the article as cheaply as we do. I employ from thirty to forty workmen in Spitalfields. The operation of adapting the design to the loom is this:—First, the design or pattern to be produced on the cloth is drawn on paper, and exhibited for approbation; it shows on paper what it is intended to be on the cloth; as the threads are very minute, they are then as it were extended on another paper, design-paper, of a larger size, which shows the pattern as it were magnified, in order to place so many threads to the inch, perhaps twenty, that every square may represent a thread. This is what the French call "*mise en carte,*" and in English, "put upon rule-paper."† The next process the rule-paper undergoes is, to be read in, which transfers the pattern from the rule-paper, and prepares it fully for the stamping or cutting of the cards. The rest of the process is mechanical, consisting of punching holes in the cards, according to the number required, and applying the card to the machine. I have seen 200 boys employed in weaving the richest figures in the loom. To so simple a process is the principle of weaving now reduced, that even boys of *sixteen* years of age are set to weave the figures of so complicated a nature, as formerly would have required men of *thirty years' experience.* In some departments of this process, the manufacture is superior in *England,* in others in *France.* Plain silks, if manufactured with the same materials, the production will be

* This is not the case in France now, as every Jacquard maker of any note completes his machines in his own workshops.

† The term *designing* means in France, drawing the first outline of the pattern, answering to what we call *sketching;* and the term *mise en carte* answers to our term *designing,* or transferring the pattern to the design-paper.

equal in England as in France; figured silks are equal, as respects the mere manufacture; and there are two points of inferiority, the designing and the *mise en carte*. One particular reason for inferiority in England, which has much struck me, is, the exorbitant *price of cards*. In the woollen manufacture, the cards which have been used for woollen goods have been returned to the Excise. A return of duty has been obtained. I think that, if the same thing were done with the Jacquard cards, it would have a tendency to diminish the price. Though, generally speaking, the price is about equal in the two countries; yet in the reading the designs there is this enormous difference; the average price in France is *three francs*, or half-a-crown sterling; in England, the price was a long time 15*s.*; it came down to 10*s.*, and I now charge 8*s.* per hundred I attribute that to two causes, the presence of silk manufacturers, which has created a greater competition and a greater necessity for activity. This activity commenced in the year 1823, but since 1826 the activity and competition has greatly increased. The consequence of this competition has been also the introduction of a great many French designers to settle here. The French designer understands the *mise en carte* (putting on rule paper) *better than the English designer;* and the French *metteur en carte*, understands design better than the English *metteur en carte*. The reason that occasions this great difference between the *metteur en cartes* and designers of England and France, is, that the designers themselves are *obliged* to put it on the rule-paper, and *previous* to that go through *every branch* of the business (including the *weaving*), and this is undoubtedly the cause that they are more perfect. I do not mean to say that they design *better* in France than here; but there is a much greater number of designers of the same capabilities in France than here. In consequence of the *encouragement* the French designers receive, they are both more numerous and more talented, although there are individuals in England equally as clever, and with a profound knowledge of their art. The artist who draws the designs at Lyons is the artist generally employed to transfer them to the rule-paper. This person, whom I consider the *metteur en carte*, is only employed in that; he is inferior here. In Lyons, in a great number of instances, there is never a design drawn at all; but the first production of the design is on the rule-paper. The *metteur en carte* is himself an artist. It is in the *connexion* between the arts and the manufactures that we are inferior. In France a manufacturer employs from three to four artists, and in England one artist supplies from eight to ten manufacturers. An indifferent artist em-

ployed in painting the patterns on the ruled paper may be obtained for 50*l.* ($250,00) a-year, but there are men whose services are worth 400*l.* a-year, or even a share of the manufacture. The sale of the fancy trade entirely depends upon the *taste* and *abilities* of the *designer*. In France there are often only one or two artists who are paid, and who get from 180*l.* to 200*l.* a-year, but there are several who give their services for the instruction they receive. The ***metteur en carte*** should be well instructed in designing. He should also be acquainted with manufactures in theory and in principle. They are so at Lyons, but they are not so in Great Britain. The Jacquard loom was ***first adopted at Lyons after the Revolution.*** Before the invention of the Jacquard machine, eight or ten years were required to make a good workman; afterwards six months were sufficient. For ten years after the discovery, the machinery remained with very little influence, but designers increased with the introduction of the machine. From the year 1808 to 1810 the machine was brought into activity, but at that period it was very ***imperfect.*** In 1814 it was *much improved*, and in 1815 it was fairly established. When France possessed the *monopoly* of the Jacquard machine, it gave her great advantage in other countries. France has only by great exertions produced better and cheaper than they. There is a school of design at Lyons. The young artists have since the discovery of M. Jacquard particularly turned their attention to the *mise en carte.* There has been a great augmentation of such young artists; indeed, there were no such artists before; for it was found requisite to set up Jacquard machines in the school of design. This lasted two or three years only; they now obtain the required knowledge of the loom out of the school. The discovery of the Jacquard loom infinitely multiplied the number of young artists, who devoted themselves to the *mise en carte.* The great advantage of Jacquard machinery, is this, that it enables that to be done in a few weeks, which before occupied months; and that the change of a pattern formerly was a long, laborious, and costly affair, and now it is a very simple one, and may be done in a few minutes after the completion of the reading and the stamping or cutting of the cards. In France, in ordinary cases, our artists receive ***six months'*** instruction in the theory of the manufacture before they are called into the field of practice, after they have been instructed in the school of design at Lyons; or artists, during their instruction, must pass two hours a day to understand the theory of the application of the design relative to the machine. There are ***private instructors*** who give those lessons in the *school of design* at

Lyons; they also give instructions in the *mise en carte*, making their talent practical. The English copy the good French patterns and the French copy the good English patterns. The best English designs are those on cotton goods; but the English do *not understand* the *mise en carte*. We sometimes make good copies from English patterns for the Spitalfields looms from the English printed muslins, but it requires taste and knowledge to arrange them. The French manufacturer can come with patterns every year to England, bringing with him samples of them on the cloth, whilst the English manufacturer only brings it on the paper; the cause of that is, the French manufacturer employs weavers who are *solely* engaged in the production of patterns, and as the pattern on the cloth shows more distinctly the effect than the drawing on paper, it gives them an *advantage* in the *market*. There are individuals who are engaged, and who collect at Paris the patterns in vogue there, which they bring and dispose of in England, and they also carry to the continent such patterns as they can collect here for the purpose of sale. These only serve as mere ideas; in the execution of the working drawings the French *improve upon us*. If there were a school of design established in London, its effects in three years would be so to equalize the manufactures of the two countries, that the country in which they were produced would not be *recognisable*.* The principal difficulties in the way of improvement in the *silk* manufacture are, first, *the high duty on paper*. The high price of paper has this injurious effect, that the manufacturer is very unwilling to change his patterns. There is a difference between the cost in France and England; it is as *one* to *four*. The English card is superior to the French; but that makes little difference, because it is never worn out, a new pattern being always introduced before the cards are damaged or worn. The two disadvantages I consider are these, *the higher price of the cards*, and *the inferiority of the metteur en carte*. With respect to colours, I think, in a great many cases, where there is an apparently greater beauty in the French dyes, they are *much less permanent* than those of England, and I have seen many examples where, after a few weeks' wearing, the French colours have *wholly faded*.

"I take the liberty of making the following remarks about designing and *mise en carte;* for as this is the very head part of all that

* French patterns have still the ascendancy in Great Britain (1844).

belongs to the weaving department, and, at the same time, is the very *least* cultivated in this country, it is *before any thing else the most worthy of your attention and consideration.* For as long as this branch of the business is not highly improved, and proper schools for design and *mise en carte* erected, and children, who already have acquired the practical and theoretical part of weaving, are engaged and trained up in this art, France will *always* have to boast over England of the honour of sending *more fancy patterns, and finer and more beautiful workmanship*, and, in fact, brought to the *highest state of perfection.* But, on the contrary, if it should meet with your Honourable Committee's approbation, and get encouragement to bring it into fulfilment, and to get such schools erected in some quarter of Spitalfields, or its arrondissement, there is no doubt whatever, that the English manufacturers will soon rival, if not altogether equal, the French manufacture, and thus throw off the *shame* of seeing foreign manufactures surpass the English in quality and workmanship.

"Your very humble servant,

"CLAUDE GUILLOTTE."

Mr. Robert Harrison, examined: In designs and patterns in the silk trade we are very inferior to the French; and that is the principal difficulty under which we labour at the present time. We have not been able to find persons in this country who are capable of giving proper designs; the principal difficulty arises from the circumstance of men not having been brought up in this country to design for silk; *it is very different to designing for printers, from the circumstance that it is necessary a man should be conversant with the principle of weaving before he can make a proper design for silk.* If we could only get designs in this country, we should be able to find parties that could put them on ruled paper for weaving. There is nothing but what we could make, provided we had a proper designer for the purpose of drawing patterns for weaving; and I think the principal difficulty arises from the circumstance of not having any school of arts in this country, where young men would be enabled to pursue their studies for the purpose of perfecting themselves in drawing for that particular branch of the manufacture. There is no want of talent in the country, because there are a great many persons engaged exclusively in the production of designs for printed cottons, challies, and bandannas; *we have in the trade individuals who can draw patterns, but are not conversant with the principle of weaving*, and therefore we

have been *unable to put those patterns to work.* We have now many patterns by us which are perfectly useless, because the drawing is not adapted to weaving. We would *willingly, at the present time, engage a man at a handsome salary, conversant with the principle of weaving, as a designer, and also able to put the pattern upon paper.* Foreigners are not superior to us in their colours; there is a brightness in their colours we certainly do not possess, but I think our colours are more permanent. The dyeing of colours has certainly improved within the last few years, and in many cases, the permanency of colours decidedly is more than the French. It is necessary to have a perfect chemical knowledge before a man can be a good dyer. I understand the peculiar brilliancy of the French colours arises from the climate more than any thing else, and the water has something to do with it as well. It has occurred to me, if we had a school of arts established in this country, that a great many young men would be willing to make themselves conversant with the principle of weaving, for the purpose of procuring that particular study, and ultimately to become designers and drawers upon ruled paper for the silk trade. It would be a *lucrative* profession.

Mr. John Howell, (of the firm of Howell and James, Regent street), examined: The manner of choosing our patterns or goods is as follows: it is usual for the Lyons manufacturers to come twice a year to England, that is, in the spring for the autumn, and the autumn for the spring, and they produce perhaps 200 or 300 patterns, not paper patterns, but silk patterns or gauze patterns, or whatever it may be, and from these patterns we make our selection; and it sometimes happens that we have so good an opinion of certain patterns, that we say, "You must withdraw that, it must be made for us only," and for 20 or 30 pieces they will do that. Now the English manufacturers never give us that advantage, they think it very expensive to put to work a pattern to show us the effect of it, for it looks so different on paper to what it is in reality, that we cannot decide whether we shall have it or not, and we often urge them to bring us a little piece ready, to see the effect of it; sometimes we want colour, sometimes we want a little change in the disposition; but there has always been an objection to the expense incurred, and therefore we are obliged to bear the expense if we are content to order from a paper pattern; we have sometimes found it necessary to ask for a pattern-drawer or designer; not a pattern-drawer because they are distinct businesses. *I never found a good designer in England;* a pattern-drawer is a different thing altogether; he

is the man who puts the thing comparatively to work, as an architect designs the building of a house. *Neither have I found a good pattern-drawer;* the designer gives us a small pattern, and the pattern-drawer is the person who prepares the work; as an architect gives a drawing to the builder, so does the designer to the pattern-drawer. I think that there are not so many persons capable of doing it in this country as in France; the pattern-drawer is the medium between the designer and the weaver. After the Peace with France, I found the manufactures of that country were superior to those of England; I mean in regard to silks of all descriptions; but I think a great deal of that arose out of having made use of better material; the natural silk of France has been considered better than any other country, but now we have an importation of that natural silk, and it is manufactured here. The importation of raw silk from France, by reason of its superior quality, has beneficially acted upon the English manufacture; I found their silks better the moment I had an opportunity to go and see them; but I have found them declining every day since; every time I go to France, I find the French silks are not so good as they used to be in point of material and workmanship; they appear to be desirous of a large trade rather than a small good trade; the English manufacture has improved in a greater ratio perhaps since then. France is superior to us in design; but it is confined to very few houses; there is only one house at Lyons we can deal with largely, because their taste is always superior; I am speaking of design. We keep all our patterns; *patterns fifty years old are very useful to us at this present moment.* The French pay great attention to pattern shawls; they will give three or four hundred pounds for a Cashmere shawl, or India shawl, *for the sake of the pattern.* The shawls that were exhibited at the Exposition in France were superior to the India shawls; the patterns more perfect.* Their patterns are superior in the manufacture, as well as combination of colours and design. It is all superior. I believe they have a superiority of machinery in the manufacture, and execution as well. Will the Committee allow me to exhibit some pieces of paper, to elucidate the connexion between silk and other materials, the manufactures of this country? It shows how the introduction of good patterns will give a taste or style to other materials; it is intended for rooms in lieu of silks; and instead of costing two guineas and a half, a yard would only cost 2*s.* 6*d.* The inventors are De la Rue and Com-

* See Cashmere Shawls, pages 268 to 275.

pany, Bunhill-row.—(*Mr. Howell then produced to the Committee patterns of various colours.*)

Mr. Thomas Field Gibson, examined: I am a silk manufacturer in Spitalfields. The description of figured silks which we are now making in Spitalfields are of a very small and insignificant kind; they are not of the large class of patterns. That is the general class of patterns that are now making. They are almost entirely *copies* or *variations* from French patterns; there is but a very small degree of talent employed in Spitalfields in the production of patterns. *We are almost destitute of original taste* in that particular department. The French patterns are generally given to the pattern-makers by the manufacturers, and they either copy precisely, or make variations as the manufacturers, or their own taste may suggest. I am not acquainted with any drawer of patterns who is an educated artist. A good pattern-drawer may obtain from 100*l.* to 200*l.* a-year; but the remuneration varies with the description of pattern. It is also mixed up with a remuneration given for reducing the design to the mould, or cutting the card, which is necessary for the weaving it in the looms. I think that the two difficulties under which we labour at present, are, first, *that we have no protection for patterns*, so that if I make an outlay of from 20*l.* to 100*l.* upon a pattern it may be pirated to-morrow by my neighbour, and I should have no compensation for it; and the second difficulty is, *that we have no national taste in this department of art, that we have no originality in design of drawing of patterns*, that we are *compelled* to make copies from French patterns in order to supply the demands of our customers. I think a school of arts open to persons connected with the manufacture of this country would be of high value and importance, coupled with the protection of patterns; but without a protection of patterns, no school of design would be of any advantage to us. It is not to be expected that the master-manufacturers would undertake any part of the expense of such an establishment. The utmost that could be expected from them would be to give their time and attention to the arrangement and working of the system; and I believe the fact is, that in France the Government, or the municipal authorities, or both together, do pay for the whole cost of the establishment. If the *general taste of the nation was improved*, it would be beneficial to our manufactures; and I would add that ours is a manufacture which is capable of such extreme variety in shades of colour, in the blending of shades, and in producing various forms of pattern, that there is hardly any one to which the exhibition of all works of art

in which colours are concerned would be more beneficial. A protection for patterns should be for not less than twelve months. I can give a reason why a season or six months would not be a sufficient time. I was manufacturing a pattern in silk during the spring, to the order of a large house of business in London. I received orders from them to continue the manufacture of the same pattern in autumn colours; but in the last month this pattern was taken to Manchester and manufactured there. The order which I had received for the winter article was immediately countermanded, because it was produced at Manchester at a much less price. A HEAVY FINE SHOULD BE INFLICTED FOR PIRACY. Sometimes there are more than 100 pieces of the same pattern. It more often happens that there are less than 100; more often than not. According to the average returns from the Chamber of Commerce at Lyons, the number of pieces made of fancy goods of particular patterns does not exceed 20 from the loom; what is the average production of England of the same manufacture, I have no precise knowledge of—but I should say double, at least 40 pieces. In French silks, in some cases, a very large profit is paid to manufacturers on condition that they shall produce a small number, and then destroy the design. A pattern should be protected by registering the actual pattern. With regard to printed goods, the custom is for the parties to print on the end, "engaged for three months," and after that period it may be copied by any body; that would be a sufficient protection if it was extended, as I said before to *twelve months*—whatever registration took place should be a public and authentic one. The registration and location of patterns, representing the state of perfection in the particular trade, would be in itself a great means of advancing and improving the manufacture. There are no superior weavers solely employed in weaving patterns, and there is a good reason why this is so; a weaver could not himself produce the pattern to the manufacturer in the same way as he does at Lyons, because in London he is not possessed of machinery by which he could do it; the machinery belongs to the master-manufacturer here, but in Lyons it belongs to the weaver. I have heard that in France after the design has been produced, the weaver introduces a considerable modification into the pattern itself.

James Skene, Esq., Secretary to the Board of Trustees for the Encouragement of Manufactures in Scotland; also, Secretary to the Royal Institution for the Encouragement of the Fine Arts in Scotland, examined: My opportunities of acquiring information with regard to the advantage which manufacturers may derive

from an increased knowledge of the arts of design, have been during the greater period of my life; I was educated abroad, and stayed in one of the foreign academies for three years, when a young man, and since that period I have been about ten years in different countries, and being fond of art myself, I have paid considerable attention to the subject. The Board of Trustees was instituted at the time of the Union of England and Scotland; in consequence of some alteration that took place in the customs and duties connected with the two countries, a sum of money became due by England to Scotland, payable to different establishments and different individuals. The surplus of that sum was appointed by Government by the 15th article of the Treaty of Union to be employed in all time coming for the encouragement of manufactures in Scotland. That was the origin of the Board of Trustees in the year 1707; at that time an annuity of 2,000*l.* was appointed to be paid for seven years to the Board. That was the first grant. The Board, nevertheless, was not established till the year 1727; there came to be accordingly arrears of that 2,000*l.* for seven years, which made 14,000*l.*, which was then paid to the Board, as also a sum of 6,000*l.* of farther arrears after the annuity had been made permanent, and laid the foundation of their funded property. The grant of the 2,000*l.* was then rendered perpetual, and they have ever since received that sum. Various alterations have taken place in their proceedings, and their funds have been considerably augmented; some of their funds being in the public securities during the war, and exceedingly well managed, considerable savings were obtained by that means; so that now their funds consist, in the first place, of the annuity of 2,000*l.* payable by government; they have the sum of 30,000*l.* at present in the hands of the Water Company of Edinburgh, for which they receive the interest; they have 15,000*l.* in the hands of Mr. Innis, of Lochalsh, also yielding interest; they have a sum of 1,000*l.* in the hands of the town of Edinburgh, which at present yields no interest, as the town is *bankrupt*. They built the Royal Institution, a large building in Edinburgh, for the purpose of accommodating various learned bodies there; the Royal Society, the Royal Institution for the Encouragement of Arts, and the Institution for Antiquities (the Antiquarian Society, as they call it), and also for the accommodation of the Board itself; they receive rents from those other societies which amount to the annual rent of 740*l.*: that constitutes the fund. The principal means which the Board have followed for extending the knowledge of the arts among the people of Scotland, has now been in operation for about seventy years: about

seventy years ago they established a school for drawing, being aware of the advantage which *foreigners* possessed over this country as teachers of design *at that period*, they got a person of the name of De La Croix, a Frenchman of considerable skill, who set that institution a going; it was for the accommodation of forty pupils taught by one master, and the pupils are admitted gratis. They offer specimens of their capacity, and certificates as to character to the Board of Trustees, and they judge of those who are to be admitted, giving the preference to those who seem the most deserving of it. It is an establishment which very soon rose into great repute in the country, and has continued exceedingly successful ever since. The number of pupils has remained stationary, with only one master. It has been managed since its first establishment by a series of very eminent teachers. The person who now holds it, Mr. William Allen, is the first artist in Scotland. The Board contemplates extending it, and they are at present taking measures for that purpose. Hitherto it remains on the same footing, only forty pupils, but so great is the demand of the public for the extension of it, and so high it stands in their estimation, that although there are about four or five elections in the course of the year, there generally are at least ten candidates for every single vacancy that occurs, and it comes to be a matter of very disagreeable administration to the Board to reject so many young men from having instruction in the art of design, when they seem desirous to obtain it. The pupils are principally engravers and statuaries, also artists, coach-painters, house-painters, and manufacturers; persons of that kind. Mr. Wilkie, (Sir David) was educated there, Mr. Barnet, Mr. Wilson, Mr. Allen himself. I believe there is not an eminent name in the history of art connected with Scotland where the individual has not been educated at that academy. It has produced the most eminent men, either as artists, engravers, or as connected with any of the corresponding professions; *in fact, it has done a world of good to the country.* The candidates produce specimens of their talents for drawing; they produce certificates of their good character; the Board is very particular upon that subject: also if they are apprentices they produce certificates from their masters that they will give them the means of attending, and then all these are examined by the Board of Trustees; and that young man whose name perhaps they are ignorant of, but that young man whose qualifications seem best, is the person elected. The only preference they seem disposed to give is to the younger classes of them in preference to older ones. The Board of Trustees also established a

branch school for the express purpose of teaching the pattern drawing for *table-cloths, diaper,* and matters of that description, at the town of *Dumfermline;* it was upon a particular system, and the Board engaged to give 50*l.* a-year to a master, provided the manufacturers of Dumfermline would contribute an equal sum. They did so, and that school was in operation for a good many years; I do not exactly recollect the number of years, but for a good many years and was exceedingly beneficial, and, in fact, was one of the great causes, in conjunction with the encouragement of premiums for the best articles of manufacture given annually by the Board, of raising the establishment of linen manufactures in the town of Dumfermline. Last year the manufacturers declined contributing any further to it, because it had been reduced to a few only, who contributed their proportion, and these few, two or three of the manufacturers, said the burthen was too hard upon them, and they could not contribute any longer, wishing the Board to advance the whole sum of 100*l.* That was incompatable with the idea the Board had of ensuring the establishment which they fostered, being one beneficial to the manufacturers themselves, that they should give the whole sum, and therefore they declined giving it, *and that school has accordingly fallen.* They found it advantageous, but the whole body of them were disinclined to contribute to it. There were two or three who continued to contribute to the last, but they found 50*l.* a year was more than they were disposed to give. The master could not undertake it under 100*l.*, and the Board was not inclined to give above 50*l.*, which they originally proposed. The designs of French shawls are almost confined to the Indian patterns; but I believe it is the general opinion, that the French have *exceeded even in that respect the English in their patterns; because they have turned their attention to it in a more efficient manner.* There is a school at this moment in Paris, where about seventy pupils are instructed expressly in that particular branch of shawl patterns, taught by a person *who has written a pamphlet on the subject;* and I believe the price of their shawls is under that of this country. I am not aware whether the Mechanics' Institutions there give any instructions of the kind; but the Board of Trustees being aware of the deficiency in that respect, has now sent an exceeding clever artist to Paris, for the purpose of gaining information upon that subject, whom they mean to introduce to the Academy at Edinburgh, and to establish a class for that especial purpose, not for teaching shawl patterns alone, *but patterns in general connected with manufactures.* It appears to me that the best footing to

establish those would be to have a system of instruction; a centrical establishment upon a regular system, which should not be deviated from in any respect; I have not any doubt that in a very short time a number of students would be raised in that centrical establishment, who might then be sent to the different parts of the country where they might be required, and establish branches in communication with the centrical establishment, and under the same regulations and the same superintendence. That at the same time would serve not only as a school for instruction, but also a kind of *haut ton* for the most recent improvements in all the different combinations of art connected with manufactures.* I should be disposed to extend it pretty far in that respect, particularly to make it an establishment of different classes. One of the great defects in the mode of instruction in this country, is, that the first branch of art, namely the fundamental one, is that which is neglected; that is, what is called *drawing from the round;* it is, in fact, the rudiments of design, the *most indispensable*, although the *most neglected;* except the Royal Academy and that Academy of the Board of Trustees, I am not aware any other teacher of drawing does really adhere to that system, which I know in French academies to be the only system that is taught, because they conceive; and it has been the opinion, I believe, of artists for many generations, as well as the old masters, that this is the only species of study which is requisite to form an artist. If he has once acquired a knowledge of drawing from the round, or drawing from objects of beautiful outline, and containing means of light and shade, that he is enabled then to turn his talent to any of the branches that he may require without any further instruction. In this country we seem to take a secondary part of it; to take instruction in a more advanced part, and neglect the rudimental part. In correctness of drawing the human figure, and in the knowledge of proportions, we are very deficient; and on

* An establishment on this principle has been erected at St. Petersburg, in Russia, under the especial protection of the Emperor Nicholas, where all the new improvements connected with manufactures, introduced from Great Britain, France, Belgium and America are tested by actual operation; and as soon as any improvement gives satisfaction, it is forwarded to those parts of the country where it is considered likely to prove most advantageous to the national interest. Our friends, Messrs. Sanford and Varrell, machine-makers, Paris, (France) informed us, that they had examined this establishment when in Russia in the year 1840; and in their opinion, the plan is a most excellent one for advancing the manufactures. These gentlemen further informed us, that the concern was conducted by the most talented mechanics and manufacturers, from Great Britain, France, Belgium and America. See page 424.

that account I would make it a rule of that establishment, that the first class should be that one in which instruction is given in chalk drawing on a large scale from the round, having a series of second classes where the different branches connected with the useful arts were taught, which covers very many; architecture and all other branches connected with the useful arts, ornamenting, decorative, house-painters, and so on. I would not only make the fundamental principle (correctness of design) the object, but also what may be termed the perspective in botany, and those parts which are connected with certain sciences which may be called positive parts of art. It appears to me, a very little instruction, perhaps a few lectures, on this, as far as it is applicable to the useful arts, would be sufficient, that is, on anatomy, chemistry, optics, with reference to colours and botany. It appears to me there is a very great defect in general in our patterns, in botanical accuracy, where flowers are introduced; *the foreign pattern-drawers are uniformly correct; our pattern-drawers very seldom so.* I would have a third class for the higher branches, and for the purpose of artists; but that confined alone to men whose object in life was to be artists. I would have a certain subdivision of instruction, so that pupils coming there, and wishing to devote themselves to the study of casting in bronze or in iron, or studying modelling silver, or turning themselves towards pattern-drawing on cotton or on silk fabrics, might have the means, after a certain time, of devoting their undivided attention to any particular branch of that kind, comprehending the requisite acquaintance with the manufacture itself; so that they might go out from the institution, having chosen that division of the subject most suited to their capabilities; they might go out as manufacturing artists, to accomplish the particular object which they felt themselves most particularly qualified for. And the purpose I should have in dividing it into classes, would be this, to, in fact, repress an error which those academies are exceedingly liable to fall into, and which the academy of the Board of Trustees in Scotland has already fallen into; that is, *of neglecting those parts of the study which apply to the useful arts*, and dedicating their attention alone to the higher branches; in fact, making all the pupils study as artists, and not as men to pursue useful branches of occupation. It is an exceedingly dangerous thing to pursue, in such institutions, those portions of art which may be said to be connected with individual taste or individual genius, since the tendency of so pursuing them *must be to neglect those portions of art which are positive and true*, and founded upon invariable principles of art. I consider that the division

into classes might prevent this tendency; because, if the first class is imperative that no pupil could enter the academy without going through a course of the first class, then he would be enabled to turn his talent to any branch of design he might choose; he may then quit the academy. If he chooses to follow out the pursuit to the highest branches by the recommendation of the master, he may be permitted to do so; but it has been experienced in those academies in Scotland, that many pupils who come there with a view towards the useful arts, have quitted it and become artists themselves. At the Academy in Edinburgh, where forty pupils are taught, the master receives 150*l.* a-year, and there is an officer receiving 50*l.* a-year; and with taxes and lighting the fire, and so on, there are some other expenses, but of no great importance, and that is the whole amount of it; and supposing subordinate schools were established at Glasgow, Paisley, Kilmarnock, and other manufacturing towns in Scotland, I should conceive that a sufficient master would be found at 100*l.* a-year to carry on the establishment. It would not do for a master, at certain times, to make circuits through the manufacturing districts, and give instructions for three months, or some such period. Drawing requires a little time; and although it does not require very great labour on the part of the master, it still requires a certain degree of superintendance; that he sees what the pupils are doing; but it appears to me, the more numerous an academy is, the more advantage the pupil derives from it, because he improves *by what he sees his neighbours doing;* it does not require much labour on the part of the master, but it requires a person to be able to correct where errors occur. In that school of forty pupils I have not any doubt, that, at any period, six or eight might be drawn from it perfectly capable of teaching the art of design. On the supposition that these establishments were formed and connected so with the mother establishment in Edinburgh, publicity should be an essential ingredient of all their proceedings, and the state of the school, the number of pupils, and accounts of the funds, should be annually laid before Parliament. It would interest the public on the subject, *and the interest of the public is very much wanted.* Reports of our academy are made to the King, that is to say, to the Treasury. They are not made to Parliament at present, but they might easily be extended to Parliament. The Board established prizes for pattern-drawing in their academy, and a good many very creditable specimens have been, within two or three years, produced; but there is one deficiency there, which shows the necessity of teaching for that matter, which is this; *that many of those patterns which were*

exceedingly beautiful, were not altogether adapted to the operative part of the manufacture; the persons were not conversant with looms, not conversant with manufactures in fact, and therefore they require the means to be provided of having recourse to a master, who can instruct them in the working of the fabric, whatever it may be, to which their pattern has been employed. *In France*, the workmen is *more an artist than in this country.* The system in France is very different, *because there the artists of the first eminence employ themselves, and make it the most profitable part of their time in pattern-drawing, and they are paid a very high price by the manufacturers.* There is a legislative protection to their work, which in this country we have not, and yet it is of great importance; so that for a year (I believe that is the period) both the manufacturer and the artist is quite sure of his pattern not being pirated. It appears to me, that some legislative interference in that matter would be almost necessary to go hand in hand with any establishment for encouraging the art of design amongst the middle class of society in this country, that they may be protected in the production of their genius; otherwise neither the manufacturer can afford to risk the loss of the pattern, or to pay a large sum for the pattern which he may lose, nor can the artist risk it. On general principles it would be exceedingly desirable that a speedy and cheap remedy should be given to the inventor of a design; a small sum to be paid for the right of proprietorship. It appears to me that one thing in which the British manufacturer is most deficient, is that of a knowledge of colours; at present, as far as my acquaintance with manufacturers goes, I believe *they copy entirely their patterns from France;* in doing so, *if they introduce any alteration into them they often spoil them;* and it is a matter which is not a very difficult one to obtain a knowledge of, the theory of colour; but it is one which appears to me a very singular circumstance that it is not sufficiently attended to, because we know quite well that any deviation from the regular established and fixed rules of harmony of colours, produces the same effect to the eye as any deviation in music from the harmony of notes. It produces an equally bad effect; and in placing our manufactures or fancy goods along with French fancy goods, it has often struck me as a remarkable circumstance to see how very little those rules which are exceedingly simple, are attended to in the English copies. That was my reason for suggesting a lecture on that part of the subject, on optics, in fact, on colours, at those schools; for the rules are simple, but quite necessary to be known to any person who has occasion to place colours in juxtapo-

sition. The funds of the Board have been very much reduced this last year; they are now exceedingly small, but they are at present engaged in measures for the extension of that very object, because it appeared to the members of the Board that that was the most essential requisite for the improvement of our manufactures, because it is obvious to every one that in point of excellency of workmanship the British manufacturers have risen to the highest pitch; *it is only in the taste of design in which they are deficient;* therefore the Board of Trustees have particularly directed their attention to that subject, as their funds have been so much reduced that they do not see they have the means of doing much else. In the course of this ensuing winter I expect that a good deal will be done on the subject. The French pattern-drawers have the flowers before them. I believe, in this country, when they do make patterns, which is not very often, they take any book of travels, containing flowers, which may or may not be correct; but I know the French artists copy from the flower itself, and that, being in the hands of skilful persons, *it is always botanically correct.* Academies might not only be connected with botanic gardens, but also, to a certain degree, with institutions in surgery; for instance, anatomy and other branches connected more particularly with science and art; how it might be brought about, I am not quite aware, except by employing persons; there are only professors; I am perfectly persuaded of the advantage that would arise from it: I think the improvement in matters of taste in general has been very remarkable in Scotland within a few years, and in dyes there has been a very great improvement; since the Board of Trustees have given premiums for that special purpose, there has been a very conspicuous improvement. In patterns the improvement has also been obvious, but not so very great as yet, because there is no instruction given in it; the young men who present these specimens of drawing are left to themselves, and they frequently go wrong in many particulars; it appears to me there is a great deficiency in the want of instruction. The Board of Trustees give 24*l.* a-year to be divided into prizes for the young men. There are six prizes for ornamental drawings, and six prizes for drawings from the round. The young men produce the first and the last of their performances during the season, in order that the Board may be able to compare their progress; and these are kept in the possession of the Board, not returned to the young men. They are also exhibited to the public. The prizes given by the Board of Trustees for improving manufacturers' patterns, are very numerous, and vary from year to year, according as the state of manufactures and the

state of the demand for manufactures seem to require, also according as it appears to the Board that there are particular branches of manufacture which might be conveniently and advantageously introduced into this country; therefore the premiums which they have offered have varied from year to year. Their principle is that they shall not continue to give premiums for a longer period for the same purpose than what is quite sufficient to introduce it; when once it is introduced they suspend the premium, *because they consider that if it cannot maintain itself after that, it is not worth encouraging.* Formerly there were a great many premiums given for the purpose of the linen manufacture; these have now been suspended. There are many premiums given for the woollen manufacture; for all the branches of that manufacture. Within these two or three years the Board have particularly turned their attention to matters connected with woollen manufactures, to the branch of carpet manufacture; and they have been the means of very much extending that branch in Scotland by the introduction of three or four new descriptions in the branches of manufacture which never were known in the country before, never practised in Scotland at least, and which have been most successfully introduced, and are now rising into great reputation. They have also turned their attention particularly to the subject of the *shawl manufacture;* a number of their premiums were dedicated to the shawl manufacturers, and amongst others, being aware of the disadvantage which the shawl manufacturers were exposed to from drawing the yarn used in that manufacture from France, and from France alone, because it was only there where it could be spun, the Board of Trustees offered a high premium for the introduction of the art, and have succeeded in introducing it; and it is now established in Glasgow and Leeds to an extent which I believe supplies the market as quickly as the French agents did, who do not come now to this country for that purpose. The amount of the premium was 300*l.*; it was the largest premium which the Board ever offered for any subject, and they consider they have done a very great benefit to the country in having succeeded in that scheme. They have introduced the system of making *carpets* in imitation of *Turkey carpets*, because they are made of coarse wool, which is more suitable. Their view was the consumption of Scotch wool, which is coarse wool compared with the wool of England, Saxony, and other countries; the view of the Board was to extend the market for the Scotch wool, and therefore they introduced the manufacture of Turkey carpets, which has been exceedingly successful, and has very much increased the consumption of that staple of Scotland.

They then extended it to the *Persian carpet*, which is a different fabric also, *and that has also been successful;* there are a great many looms now employed solely upon these branches. I cannot altogether say, but I believe the carpet manufacture has very much increased in consequence of the introduction of all those different branches. They introduced also the *tapestry mode of making carpets in imitation of French carpets;* they also introduced the making of carpets from *cow-hair*, which is an article that formerly was not used in any shape but in that of mixing lime; in fact, it was of no use; the premium was offered about three years ago; the yarn was spun generally in the gaols and correction-houses, and those sort of places, by the people who were there; and carpets have been produced of *exceedingly good workmanship*, and very useful for many purposes, particularly for shops and for lobbies, and purposes of that kind. It is a coarse manufacture, but a very useful one; *it is altogether peculiar to Scotland;* the idea, in fact, occurred to myself; I had seen the use of cow-hair in making rugs and things of that kind in Flanders; and I suggested that improvement, and it has been adopted. This improvement applies to the texture; the design is that of the Turkey and Persian carpets, but that has improved the art of design a great deal, because being a new subject, the artist has bestowed a good deal of attention on the subject. The French design is what is called "tapestry carpets," which has also been introduced into Scotland. The Scotch have now imitated that French pattern, I think with very considerable success. Those require *botanical accuracy* above all things, because they generally are groups of flowers thrown on a dark ground; and there is a much greater variety of shades of colours. Formerly in the Scotch manufacture, and I believe in the English also, they could not introduce above *four* colours, except by mixing the threads; *except by mixing a thread of two different colours.* I know that from a circumstance that was mentioned to me by a colour manufacturer in Scotland; he had arrived to the extent of introducing *fourteen* colours, or tints, which was conceived to be impossible; however, he is a very ingenious man; his name is Whytock,* and he set himself to work, and he has very much augmented the number of colours now introduced into patterns. In that respect, and in the circumstance of design and the beauty of execu-

* A description of Mr. Whytock's inventions in this manufacture is given at pages 215 to 239; which see. Samples of this gentleman's beautiful carpeting may be seen in New York, on application to George D. Baldwin, 35 Spruce-st., or at the carpet warehouse of Mr. William Sloane, 245 Broadway.

tion, I think he stands pre-eminent. He has obtained a patent for the velvet carpet. The Royal Institution is now connected with the Board of Trustees, in consequence of an arrangement which took place about four years ago. Therefore the Board of Trustees have obtained access for their pupils to the library containing works on the fine arts, and every thing connected with that subject; they also have the privilege, for the pupils of the academy, of attending their gallery of pictures, and copying pictures there and studying as they choose. The institution have no casts; it is merely confined to pictures; it is a private institution supported by private subscription, and they have expended the whole of their funds in the purchase of the pictures of the old masters, of a collection, not a very large one, but an exceedingly good one, of paintings, which is now open to the pupils of the academy of the Board of Trustees. The gallery of casts consists of about one hundred excellent casts of the finest works of antiquity; they have also the Elgin Marbles, and have received a number of presents and legacies of different works of the same character. They obtained the originals from Lord Elgin; a great many of the casts which he had taken at Greece of different buildings, which are now in the collection of the Board of Trustees, are open to the public; to the artists always; to the public on certain days, but always to the artists, and always to the pupils of the Academy at all times. Exhibitions of works of art, such as ingenious patterns and manufactures, or ingenious specimens of weaving, were, at one time, contemplated, but never put in practice. I understand that there exists an indisposition on the part of persons who have made inventions or improvements to exhibit them, from the circumstance that they are aware that they have no protection; that their invention and the property of their improvement is *not protected*. The Trustees for the encouragement of the manufactures of Scotland, offer annually a series of premiums for improvements in different manufactures, also for inventions, should any take place. Those are annually exhibited to the public, and judges are appointed from among the manufacturers, who examine the goods and award the premiums. The circumstance that induces the manufacturers to attend very much to that is, that by obtaining the premium for their manufacture, they may obtain the means of publishing, very much to their own advantage, the species of trade that they carry on; otherwise the premium is a very small one, and scarcely worth the while of manufacturers to work for it. The French Exposition is highly advantageous. Where it enjoys a very great advantage over any attempt in this

country, is, that the improvements of the year, and the inventions of the year, are by the French manufacturers expressly reserved for that exhibition, because they know that they are safe in producing their new design, whatever it may be.

Although the evidence above quoted was given before the House of Commons about nine years ago, we do not think it has lost much of its value. We are not aware that any considerable change has taken place since then on the subject of which it treats. It furnishes a clear exposition of the state of European manufactures; which could not be done by any but men of liberal and enlightened views. There is no narrow-minded boasting about *native* talent; no depreciation of *foreign* ingenuity. Facts are truly stated; and honour is justly awarded where honour is deserved. We admire such sentiments, and wish that all could admire them: but we regret that national prejudices and national animosities have taken such a deep root in the public mind, that probably ages will elapse before they can be thoroughly eradicated.

DESIGN PAPER.

It is our object here to afford the manufacturer and pattern-drawer a *guide* in the selection of proper paper for his designs, as much depends upon the paper used, the due proportioning of the pattern, the nature of the fabric, the arrangement of the harness, &c.

The first thing to be considered is the fineness of the reed and the description of harness to be used, whether a full or one-thread harness, a split or two-thread, or a four-thread, or any coarse description of harness, such as damask, &c.

The second thing to be considered is, the thickness of the cloth or number of picks or weft threads per inch, and what proportion that bears to the number of harness-twines or mails per inch; and the paper must be selected according to that proportion, always bearing in mind whether the work be *once*, *twice*, *or oftener drawn*—that is one, two, or more picks or weft threads given to *the same card or lash.*

In damask work where only one colour of weft is used, the harness is of course drawn and retained in its lifted position until the required number of picks (from 4 to 12) are given; the cloth being formed by presser leaves, acting upwards on the undrawn warp and downwards (see Fig. 65) on the raised warp, at each pick, till the proper number of picks are thrown in, when the card or lash is changed for another card or lash, and the operation of the headles is again repeated (see also damask weaving, page 468).

In the more elaborate patterns of shawls, vestings and similar goods, where more than one colour of weft is used, it is called "*covered work*," each colour constituting a cover, *if used in the same line*, and all the colours in one line forming *only one pick of actual cloth*. This description of goods is often twice or thrice drawn; but not like the damask; for the colours must be repeated individually, the headle shed being changed *only at a new repetition of the colours*. For once-drawn patterns in full harnesses, where any variety of work may be introduced into the design, such as various kinds of tweeling, flushing, satin, plain, or taffeta, &c.,* but little depends upon the selection of design paper farther than the proportioning of the thicknesses of the warp and weft, which is an easy matter when due attention is paid to the reed-scale; and the number of picks per inch is known, as, for example, an 1,800 harness stands 97 threads per inch :—

8	by	8	paper gives	97	picks per inch
8	by	9	"	"	109	"	"	"
8	by	10	"	"	121	"	"	"

For split or two-thread harnesses the best description of paper is the French tweeling paper; this paper is calculated for work to be *twice* drawn, and worked with *four* leaves of headles, *one thread being pressed out of each two mails lifted when the weft pick is thrown*, forming, without anything like break or error in the tweel lines, a beautiful *three-and-one tweel* (see Figs. 16 and 17, Section First).

This kind of harness, unlike damask, forms no square or blunt points in the figure, as will be seen by inspecting one of the better description of French shawls; the theory of its action is very simple and beautifully correct.

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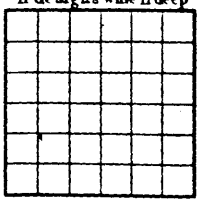
* The loom represented at Figs. 218 to 229 is of this description.

SAMPLES OF DESIGN PAPER

6 by 6 N°1.
11 designs wide 11 deep



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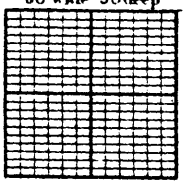

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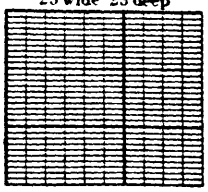

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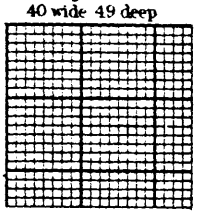

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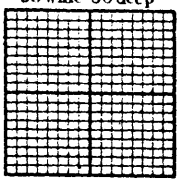

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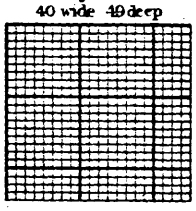

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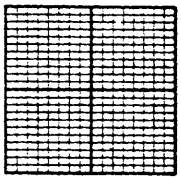

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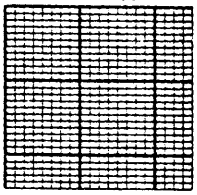

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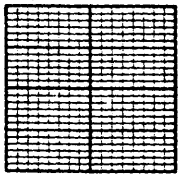

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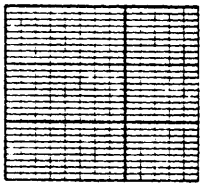

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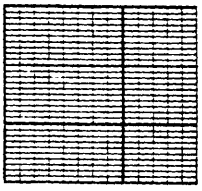

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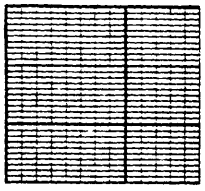

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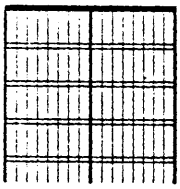

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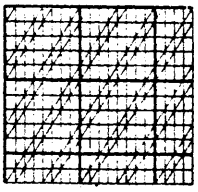

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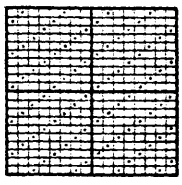

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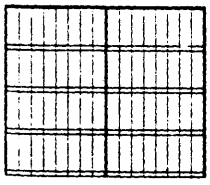

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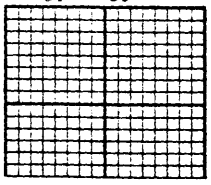

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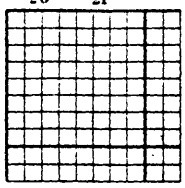

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SAMPLES OF DESIGN PAPER

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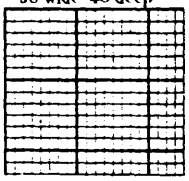

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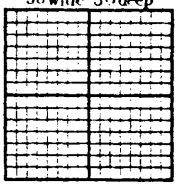

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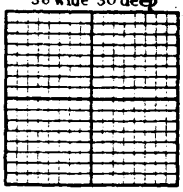

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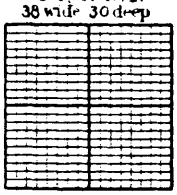

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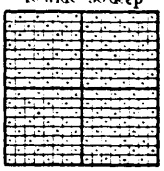

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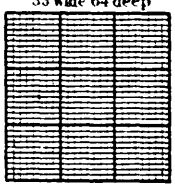

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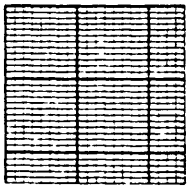

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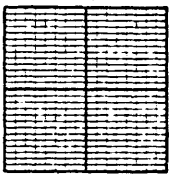

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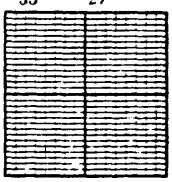

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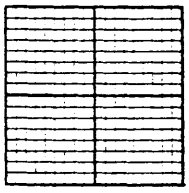

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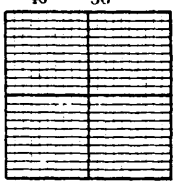

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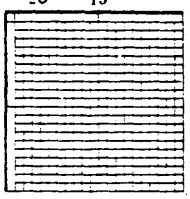

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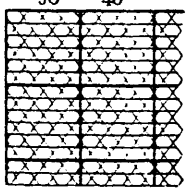

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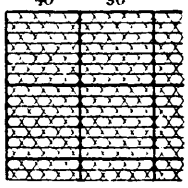

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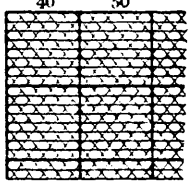

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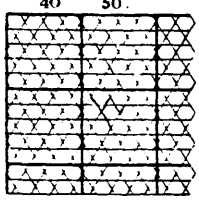

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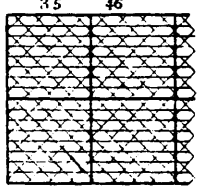

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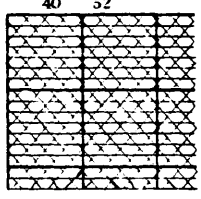

SAMPLES OF DESIGN PAPER

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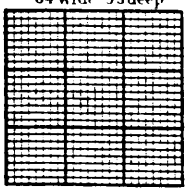

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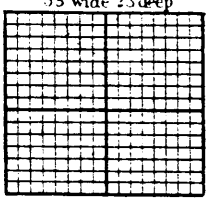

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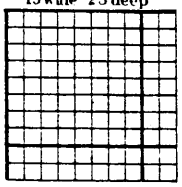

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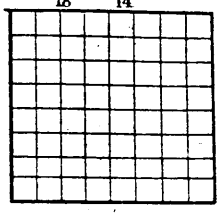

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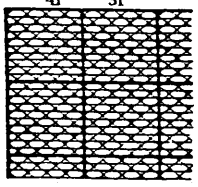

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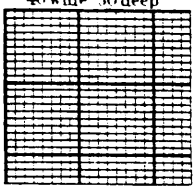

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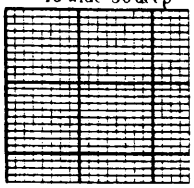

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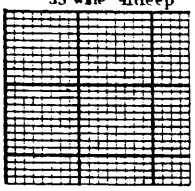

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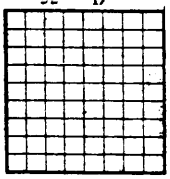

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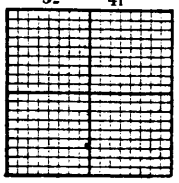

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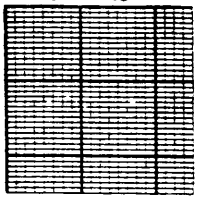

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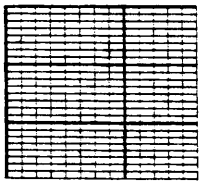

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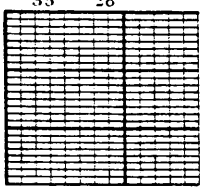

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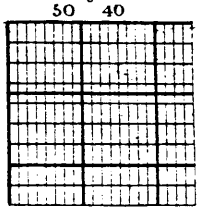

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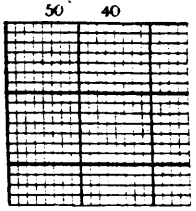
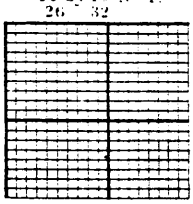
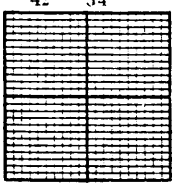


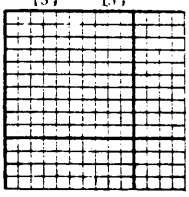
10 by 10 N°4.
26 32



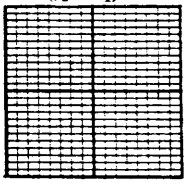
10 by 12
42 34



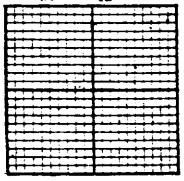
10 by 10 N°3
13½ 13½



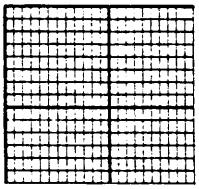
8 by 12 N°3.
32 41



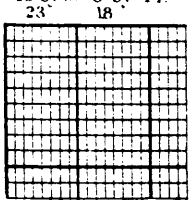
10 by 10 N°7
55 42



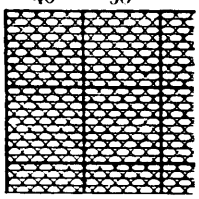
12 by 8.
35 28



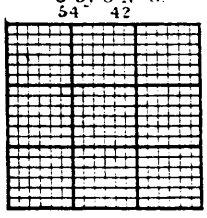
16 by 9 - 8 by 4½.
23 18



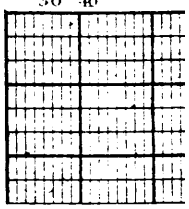
10 by 10 N° 5.
40 50



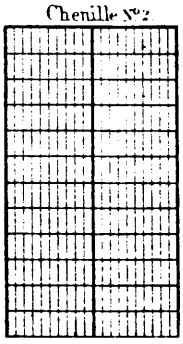
6 by 6 N°3.
54 42



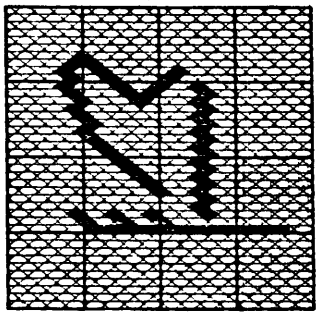
8 by 3
30 40



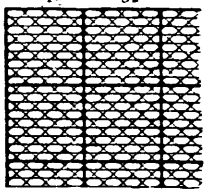
Chenille N°2



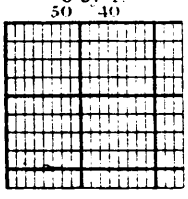
A



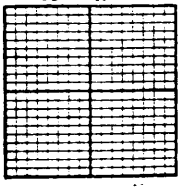
8 by 9 N° 5.
40 52



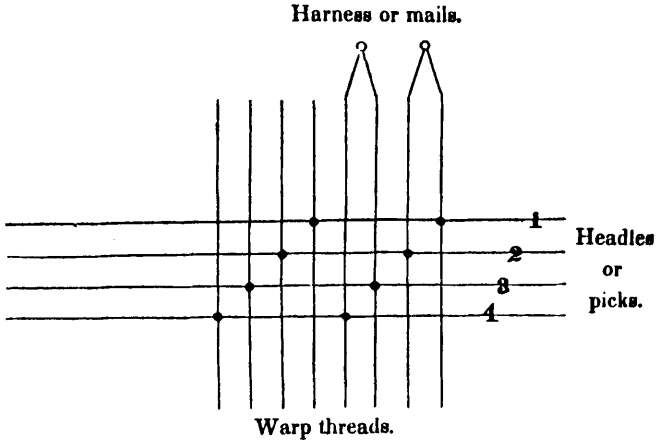
8 by 4.
50 40



8 by 10 N°9.
52 41



PRINCIPLE OF THE "TWO THREAD" OR "SPLIT HARNESS."



It will be observed that this harness, though a *two-thread*, and though the same card be *twice* drawn, yet *each pick of weft produces a different effect*, and the correct action of the harness is secured by the use of the tweeling paper; besides which, this paper wonderfully assists the pattern-drawer in accomplishing his work, both in speed of execution and graceful freedom of design; objects which could not be obtained by any other means.

For *four-thread* and damask harnesses the design paper should be chosen of a large scale, as near as possible to the *size of the cloth to be produced*, and the designer should be more guarded in this than any other work against errors, as each will be *magnified* upon the cloth, whereas in fine fabrics they are *diminished*.

For coloured patterns, a rough sketch is commonly drawn out on coarse paper, which, after all the necessary corrections are made, is traced on clean drawing paper, when it is ready for colouring. The method of tracing these sketches is as follows: prepare a sheet of wove writing paper by rubbing it over on one side, first with sweet oil, and afterwards with ground verditure; when it is dry, lay it on the clean drawing paper, and over it the rough sketch. Then with a blunted steel point trace over all the outlines, and a very fine delineation of the pattern will be produced. This done, the different colours are laid on with camel's hair pencils, agreeably to the taste of the manufacturer, or to the style of work to which the patterns are to be applied. It is necessary to observe, however that, as in many kinds of patterns, particularly those intended for low priced goods, the greatest economy is frequently necessary in introducing

the colours, the pattern-drawer's chief study should be to produce as much effect as possible with few colours.

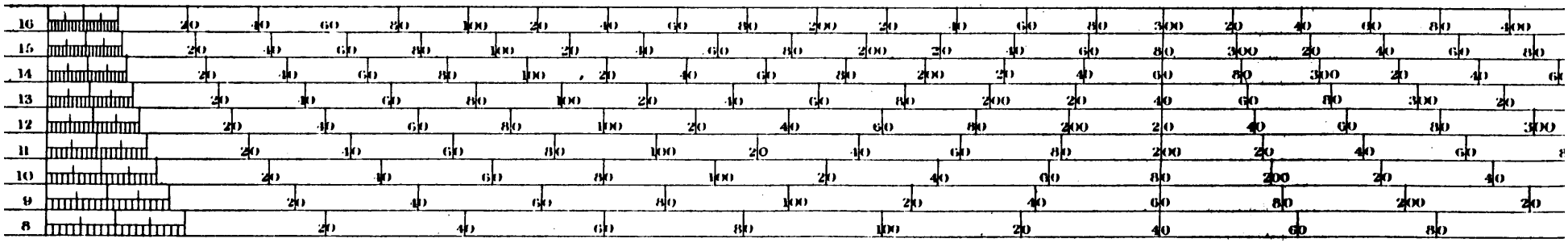
The pigments used by pattern-drawers and designers, are, in general, the same as those which are made up into cakes, and sold in the shops under the name of water colours

A table showing the various purposes to which the accompanying samples of design-paper may be applied; or otherwise, the various qualities of goods which require these papers, is a thing much needed by many of our manufacturing friends at the present time, and we accordingly submit the following.

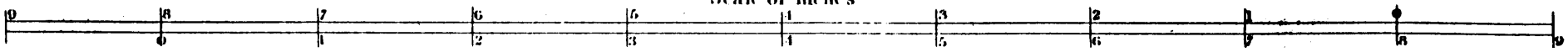
DESCRIPTION OF PAPER.	Number of picks per inch once drawn, full or one thread, and on twice drawn, split or two thread harnesses.				Number of picks per inch on twice drawn four thread harnesses.			
	1400 Reed	1600 Reed	1800 Reed	2000 Reed	1400 Reed	1600 Reed	1800 Reed	2000 Reed
8 by 3	28½	32¼	36	40½	14¼	16	18	20¼
8 " 3½	33¼	37½	42½	47¼	16½	18¾	21¼	23½
8 " 4	38	43	48½	54	19	21½	24¼	27
8 " 5	47½	53¾	60½	67½	24	27	30¼	33¾
8 " 6	57	64½	72¾	81	28½	32¼	36	40½
8 " 7	66½	75¼	84¾	94½	33¼	37½	42¾	47¼
8 " 8	76	86	97	108	38	43	48½	54
8 " 9	85½	97	109	121½	43	48½	54½	60¾
8 " 10	95	108	121	135	47½	54	60½	67½
8 " 11	104½	118¾	133	148½	52¼	59	66½	74¼
8 " 12	114	129½	145	162	57	65	72½	81
8 " 13	123½	140	157½	175½	62	70	78¾	87¾
8 " 14	133½	151	169½	189	67¼	75½	84½	94½
8 " 16	154	172½	194	216	76	86	97	108
8 " 18	171	194	218	243	85½	97	109	121½
8 " 20	190	215½	242	270	95	107¾	121	135
6 " 6	76	86	97	108	38	43	48½	54
6 " 10	126½	143	161½	180	63¼	71½	81	90
6 " 20	253	286	323	360	126½	143	161½	180
16 " 9	42½	48	54	60¾	21¼	24	27	30¼
12 " 8	50½	57	64	72	25¼	28½	32	36
10 " 10	76	86	97	108	38	43	48½	54
10 " 12	91	103	116	130	45½	52½	58	65

The sample of paper marked A, shows the method of using the tweeling paper. An upright line or warp cord runs zig-zag, embracing two tweel lines; a cross line or weft thread runs straight, and a diagonal line follows the tweel so far as the nature of the figure requires in that direction, and then returns to another tweeling line; the arrangement of the cords is shown in the two squares to the left hand, each diamond shape having two cords laid on it; that is, the card-cutter never cuts less than two holes for each dot in the design paper painted, and one of these is always repeated in the next card or lash, two lines across twice drawn forming once over the tweel.

R E E D S C A L E



Scale of Inches



The principle of chenille paper is, to give the required number of picks or threads of weft to the pattern by measurement, the paper being cut into slips, each representing a stripe of the pattern, making allowance for the amount of twist to be given to the weft after being cut out of the loom and previous to its being re-woven or *set*, as it is called. See chenille, page 259; and see also description of Whytock's carpet, page 232.

Paper for hearth-rugs and oil-cloth should be as large as the pattern is intended to be on the goods when finished.

In making the foregoing table we have been as concise as possible, bearing in mind that a work of this description is neither fitted for amusement, nor intended to beguile the *ennui* of a tedious hour, but solely for facilitating the operations of the manufacturer and for the dispatch of business.

FRENCH CARD-CUTTING MACHINE.

In order to lay before our readers the most perfect method of cutting cards hitherto discovered, we made drawings while in France, of this splendid card-cutting machine (to which we alluded at page 209); and we trust that from the following description and the accompanying plates, which have all been very carefully executed, the whole will be clearly understood.

The card-cutting machine, with Jacquard attached, is shown in Figs. 241, 242 and 243.

Fig. 241, represents a side elevation of the machine, and front of the Jacquard.

Fig. 242, a front elevation of the machine (on an enlarged scale) showing a full view of the pulley-box, through the Jacquard.

Fig. 243, sections of the machine and Jacquard, with pulley-box, needles, springs, punches, weights, &c., one side of the framing being removed, to show the whole arrangement.

Fig. 244, back upright section, showing the simple or reading-on cords.

Fig. 245, side view, in section of the same. This may be either a separate frame, called the "lashing frame," or the lashing may be done on the simple attached to the cutting machine, without removing the simple.

Figs. 246 and 247, front and side elevations of an ordinary fly-press, with a three-thread screw, and a lead follower or platen, extending the full length of the card to be cut.

The same letters refer to similar parts in all the Figs.

It will not be necessary to explain the arrangement and operation of the Jacquard, as that has been done elsewhere (see page 192); besides, it is only an auxiliary to the machine under consideration.

A, is a case or frame containing a series of needles, similar to those used in the Jacquard machine; B, C, D, (Fig. 243) three thin brass perforated plates, corresponding to the front needle-board and

Fig 241.

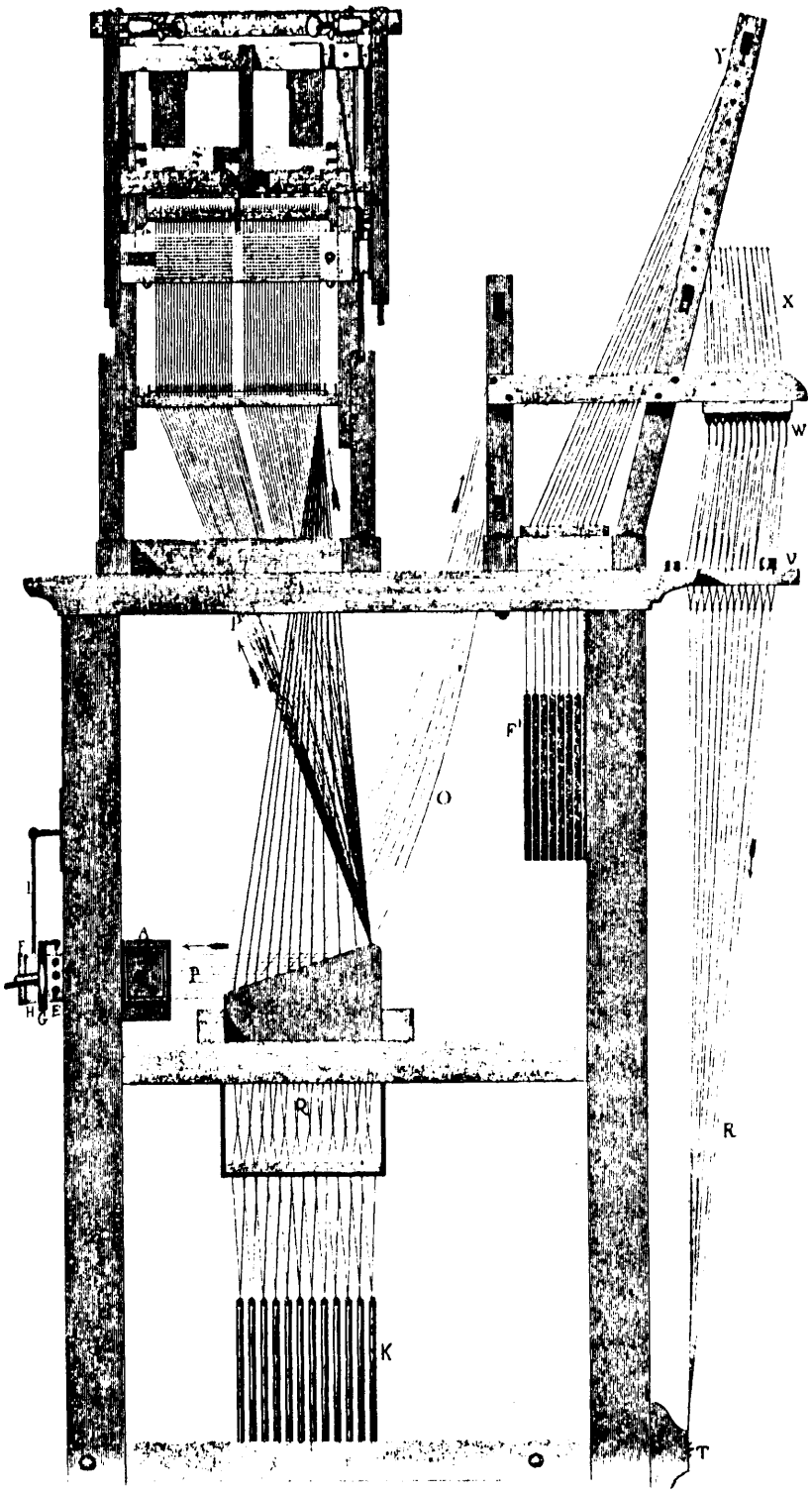


Fig. 242.

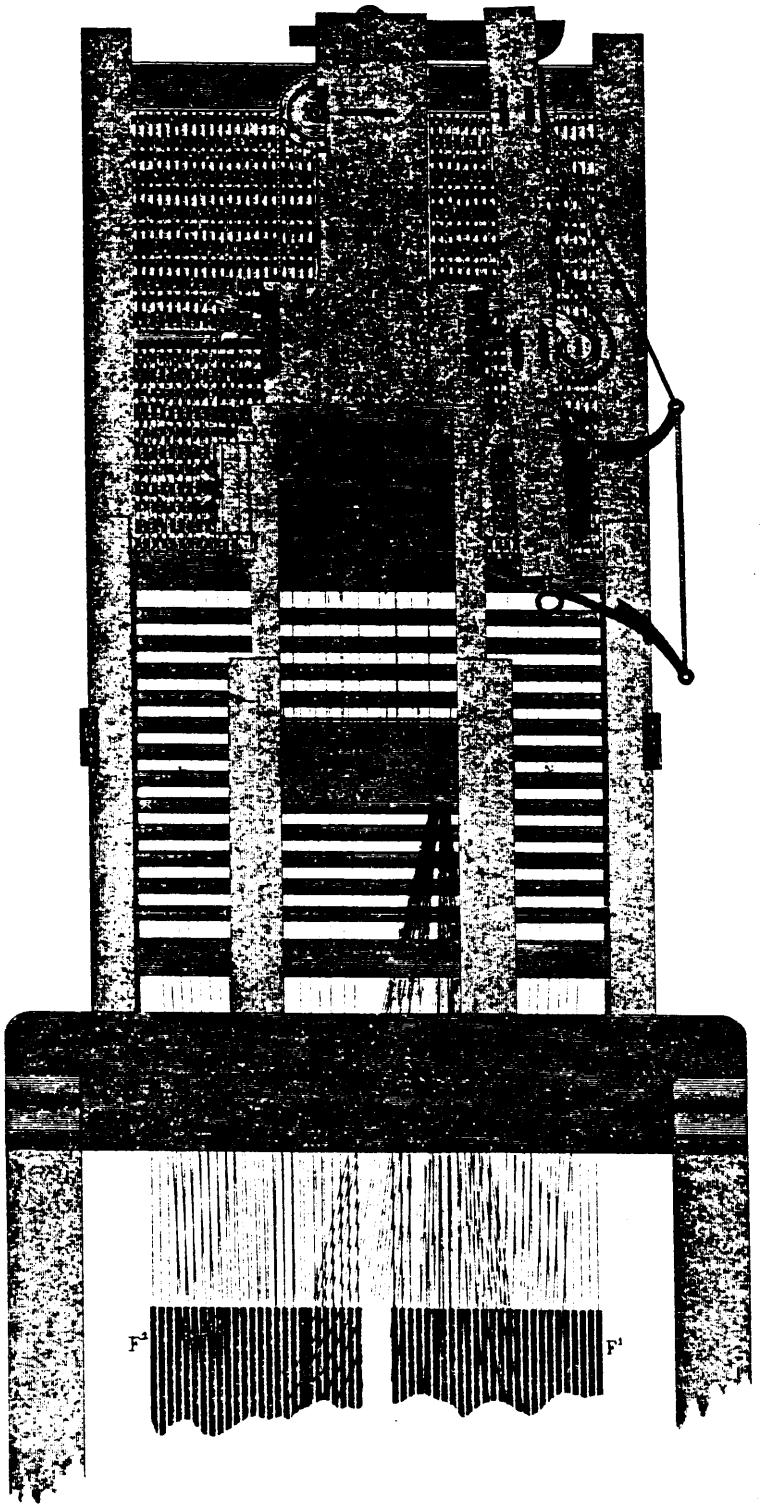


Fig 242.

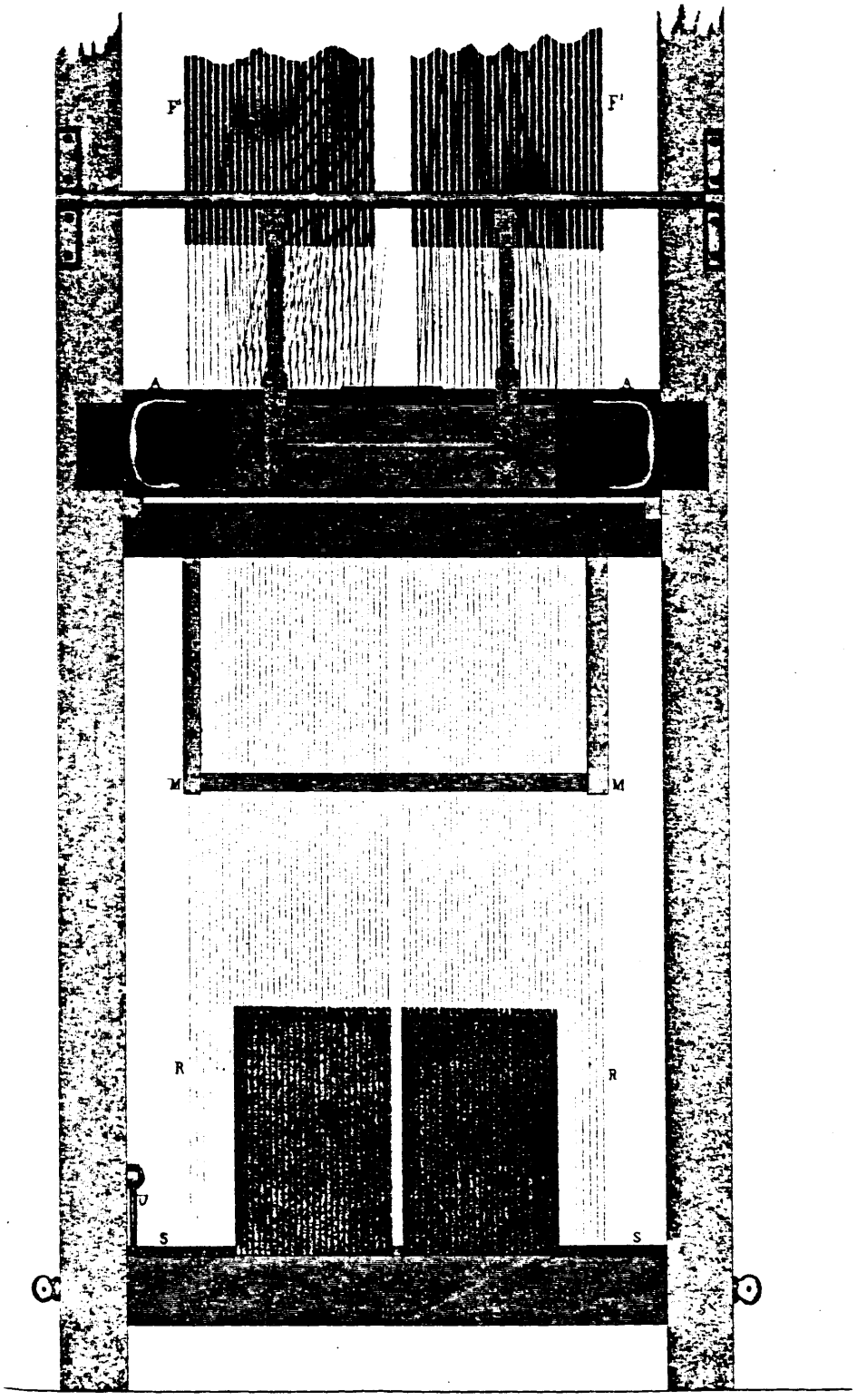


Fig 243.

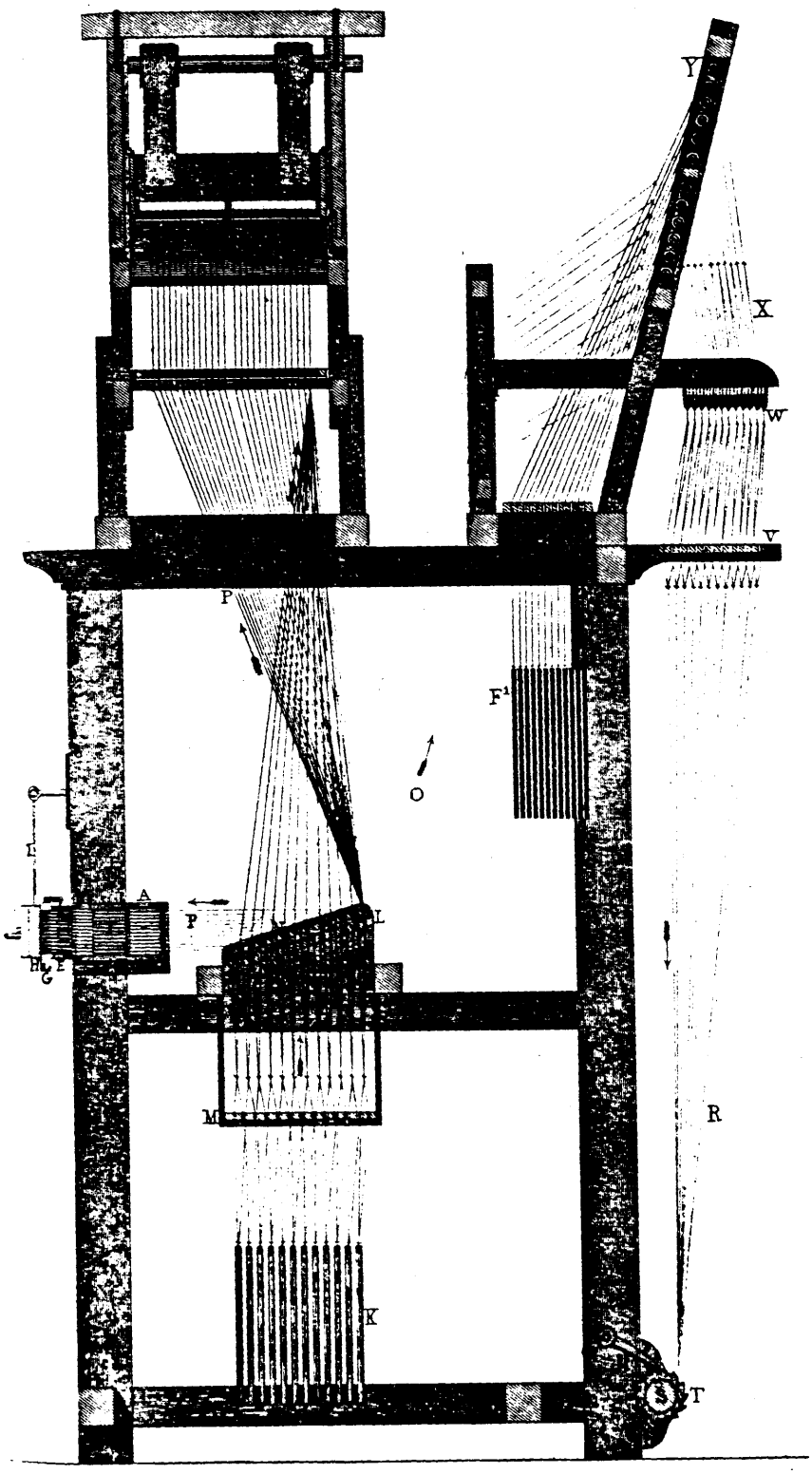


Fig 244.

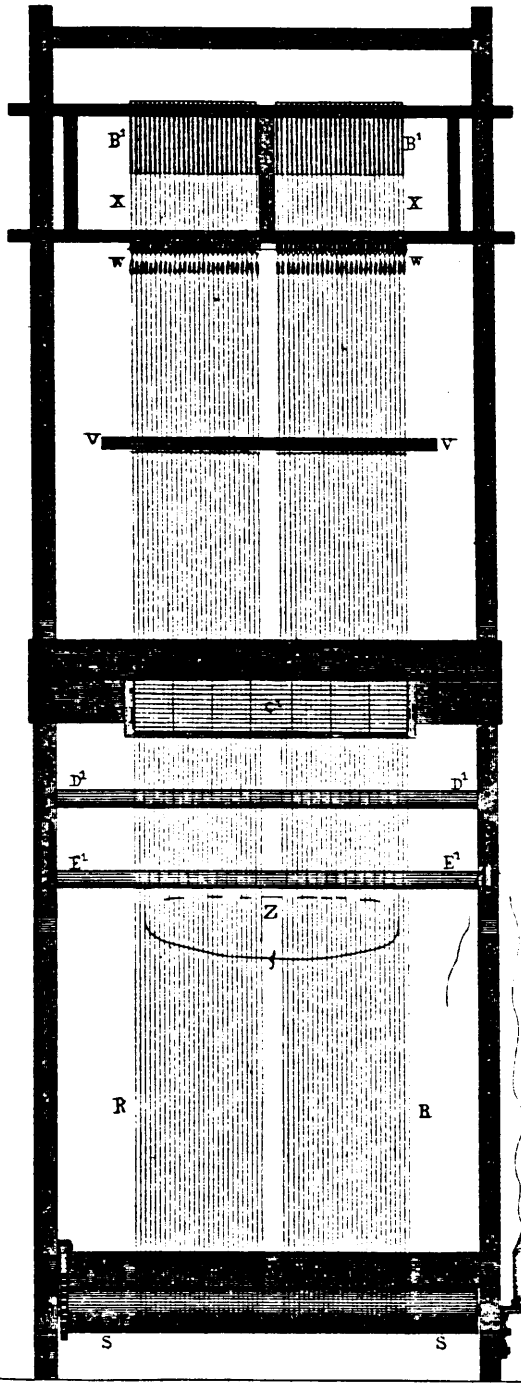
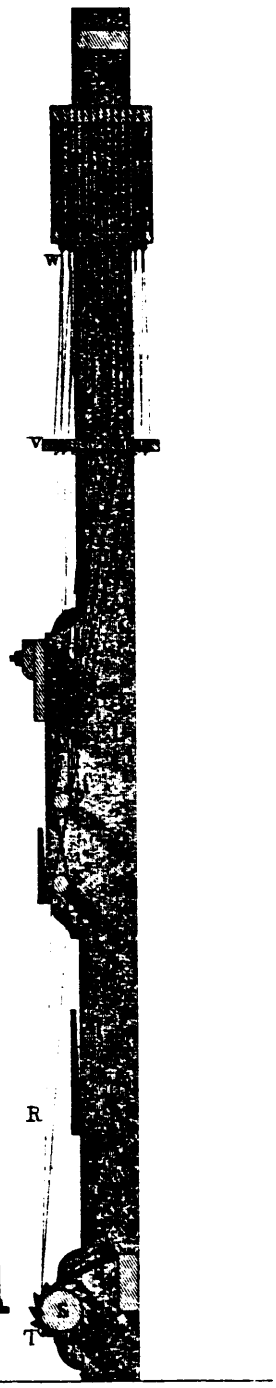
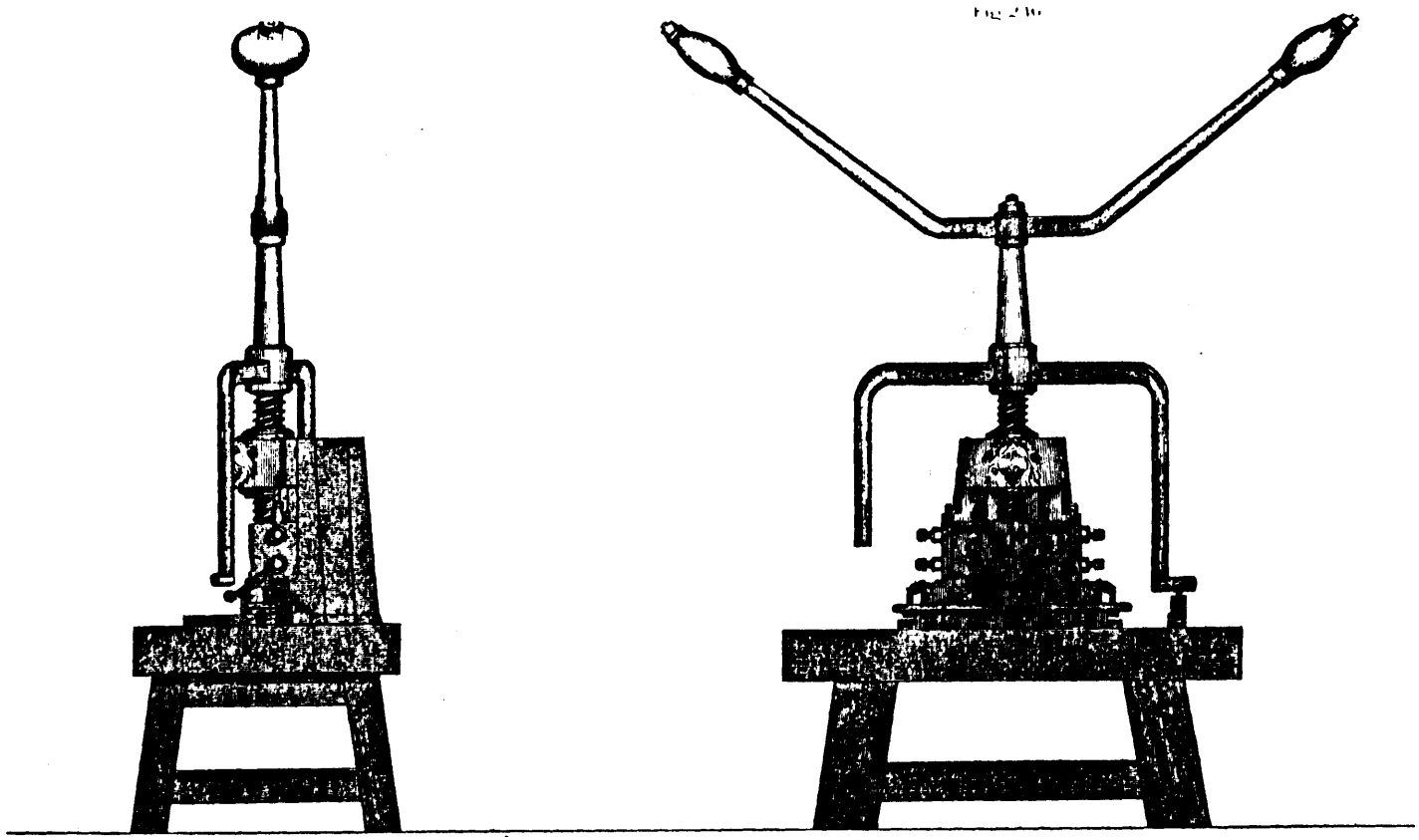


Fig 245.





cylinder of the Jacquard; E, (Figs. 241 and 243) a thick brass or cast-iron plate, full the thickness of the length of the punches, fixed close to the cutting plate G, the cutting plate in its position, with the *form* or stud plate H, closed down and the punches forced into the brass plate E; H, the stud plate (made generally of wood), with small wire studs driven or screwed into it, and corresponding to the scale of the needle board; this stud plate has a board F, screwed to it, to prevent the studs or pins, which drive home the punches, being forced back; I, the folding joint to which the stud plate H, is attached, for the purpose of being easily thrown up when the operative is about to remove the cutting plate G; J, (Fig. 243) brass spiral springs, operating between the centre plate C, and a barb upon the needles, round which they are coiled, and forcing the needles toward the front; K, balance weights, rather more than sufficient to keep the springs J, (Fig. 243) from acting on the needles, to which the weights are attached by cords; L, and M, guide or hole boards, through which the cords pass, dividing at M, into two, for the purpose of keeping the leads clear and from twisting or entangling one another; N, (Fig. 243) twelve smooth glass rods or rollers, corresponding to each row or line of holes to be punched; O, (Figs. 241 and 243) cords connecting the punch needles with the reading-on simple; P, cords connecting the Jacquard with the punch needles; Q, a continuation of the cords O, and P, both being attached above the hole board M, and either acting as it may be required upon the weights K, thereby allowing the springs J, to force the needles outward, and, consequently, the loose punches that may be necessary for the particular card from the plate E, into the cutting plate G; when this is done, the stud plate H, is thrown up on its joint, thereby allowing the punches free access into the plate G; R, the reading-on cords or simple, on which the pattern is lashed or read; it is attached to a roller S, at the bottom of the machine; this roller works in two brackets, and has a ratchet T, and click U, whereby the simple can be tightened as the pattern comes to an end, the removing of the lashing or reading threads slackening the simple gradually as they are taken off. The attachment of the simple to double cords at the harness board V, is to prevent the cords losing any of their twist and thereby becoming unequal in length in the course of the working; W, a series of wire hooks for conveniently attaching the simple after coming from the reading frame—a number of readers or lashers being employed for one machine, each having a simple made to suit and ready to be attached as soon as the lashing upon the simple in operation is exhausted; X, double cords

attached to the upper part of the hooks W, to prevent the hooks turning round, and connected over the pulley-box Y, to counterpoise weights P'; Y, the ordinary draw-loom pulley-box, containing 624 small pulleys, or any number, of course, according to the size of the Jacquard.

After removing the simple from the lashing frame (Figs. 244 and 245) and attaching it to the hooks W, the train of operations is as follows:—The draw-boy seizes the lash Z, (Fig. 244) which separates the required quantity of cords from the others, and he either pulls those with his hand or a rod for the purpose, thrusting it into the shed made by the lash Z, and pulling it forward; the cords pulled glide over the pulleys of the box Y, the glass rods A', and N, (Fig. 243) raise the weights K, in the direction of the arrows, thereby relieving the springs J, which force the punches forward into the cutting plate G. The operative now seizes the plate by the handles in front, dexterously turns it on its flat, and carries it with its necessary number of punches to the fly-press (Fig. 246.)

The press-boy has a blank card ready placed upon a sole plate, with the usual steady pins or guides fitting exactly to slots or holes in the plate G, which with the punches the workman places above the sole plate, shoves both under the press platen or lead follower, the boy gives a half turn of the press-arms above, and the card is perforated. Should more than one set of cards of the same pattern be wanted, the press operation is repeated according to the required number: or, when the paper is light, two cards may be cut together. The workman now seizes his plate, thrusts it into its place in front of the plate E, closes down the stud plate H, which he raises, while the draw-boy pulls the simple so as again to force out the required number of punches, and so on till the pattern is completed.

The punches are prevented from falling through the plate G, by a small ruff or collar, turned upon the inner end of them.

The Jacquard operates similarly to the simple, being also attached to the weights K, the springs J, and cords P'; the draw-boy working the Jacquard instead of the lashes; it is used to advantage in renewing a pattern, or in making duplicates after testing the merits of a design upon cloth.

Fig. 244, represents the lashing-frame; V, the hole-board (same as in Figs. 241 and 243), which is removed along with the simple into the machine and secured by bolts, seen in Fig. 241; B', springs for giving elasticity to the simple-cords in the operation of lashing.

The lasher reads over the design C', (missing those cords not re-

quired,) between the round rods D', and E',* and if there be *more colours than one*, as in covered-work, such as shawls, he reads on a separate lash for each colour, which lashes are generally all attached to what is called a *bridle*, (see lashing for draw-loom, page 157) forming one line across the design or pattern; such as red, blue, green, yellow, white and black, which would constitute work of six covers, unless the ground (say black) was repeated twice, when it would be seven covers; and seven lashes would be necessary to complete one pick or shot of cloth.

The lasher after completing one line (if for damask, only one lash is required) proceeds with the next, until he has the whole pattern read or registered on the simple, when it is ready to be removed to the cutting machine.

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* It is customary in England and Scotland for lashers to use a reed, corresponding in fineness to the design paper, and into this reed they pass all the simple cords. (See reading or lashing, page 157, and Fig. 70.) In France, however, the reed is not used, rods like those represented at D', and E', (Figs. 244 and 245) being preferred, and the simple cords are passed under and over each of them alternately, forming a lease. The operator works over the cords between the rods with her right hand, commencing at the left side (females only are employed in this operation in France), and taking those cords which are indicated by the design placed above. As soon as the line of pattern has been gone over, she draws the cords thus selected towards her, with her left hand, immediately below the rod E', and instantly inserts the lashing twine, and so on for each successive lash, until the pattern is completed.

WEFT CALCULATION TABLE.

The following tables are drawn up with a view to enable the practical manufacturer to ascertain the amount of material required in making various kinds of goods.

There is no mode of ascertaining the expense of the manufacture of a shawl, or similar stuff, but by *calculation;* the clumsy system of *weight* is inadmissible, for the most heavy part, and generally the most expensive, is always shorn off previous to the finishing of the fabric. Thus, if the goods contain eight or ten regular colours, they will not weigh when finished above a seventh or an eighth of their original weight.

To afford the manufacturer an exact idea of the quantity of material used, is our present motive; but that he may not go blindly by our direction, we shall place the rule before him, and he may if he choose, work out his own problems. For those, however, who are not expert in figures, the following tables, embracing almost every width of goods and quantity of picks, will likely be of *some* benefit.

It is well known to manufacturers of any experience, that the standard length of cotton yarn is 54 inches once round the reel, 80 threads of this length forming a skein, and 7 skeins a number; so that yarn sold as No. 20s, or 30s, should contain 20, or 30, of these numbers per pound, and anything short of this is an infringement on the established rules of trade, affording strong evidence that the spinner is *dishonest.*

54 inches, length of reel.
80 threads per skein.

4320 inches in each skein.
7 skeins per number or hank.

36)30240 inches in each number.

840 yards of thread per number.

If a different material than cotton is used, such as wool or silk, ascertain the length in inches which it will run per pound and apply the same rule: in all respectable factories this can be known exactly, as spun silk is put up the same as cotton, trame silk is of a known length and sold as such, and wool and worsted are of known lengths also; but more allowance must be given for waste in using the last named materials than the former.

To ascertain the exact amount of weft contained in any particular length of cloth, multiply the number of inches in the width of the cloth by the number of picks of weft and divide by 54 (the number of inches in the length of the reel), by 80 (the number of threads per skein), and by 7 (the number of skeins per number); the quotient may be divided by 18 (the Nos. per spyndle), or by the Nos. of yarn per pound, and this will show the exact expense—as for example,

45 inches, width of cloth.
6,000 number of picks.

54)270,000

80)5000

7)62 $\frac{40}{80}$

8 $\frac{4}{7}$ $\frac{40}{80}$.

Thus we have 8 Nos. 6$\frac{1}{2}$ skeins, for 6,000 picks, on cloth 45 inches in width; but 8 or 10 per cent must be added for waste, &c., and with 8 per cent it would stand thus:

45 inches
6,000 picks

50+80=4,000)270,000

7)67 $\frac{10}{80}$

9 $\frac{4}{7}$ $\frac{10}{80}$.

We next take cloth 57 inches wide, 8 per cent added for waste, with 95,673 picks:

95,673 picks.
57 inches.

669711
478365

50)5453361

80)109067 $\frac{11}{50}$

7)1363 $\frac{27}{80}$

18)194 $\frac{5}{7}$

10 $\frac{14}{18}$ $\frac{5}{7}$ $\frac{27}{80}$ $\frac{11}{50}$.

We have no desire to use algebra in this matter, or it would be very easy to render the above a little more scientific in appearance; but we know the above mode of working the calculation to be correct, and have no doubt that it will prove *more satisfactory* to the *real weaver* than all the logarithms and algebra in the world; thus we have 10 spyndles, 14 numbers, 5 skeins, 27 threads and 11 inches, used in working the above number of picks, on cloth 57 inches wide.

The following tables, running from 42 to 72 inches width of cloth, with the various numbers of dents contained in the different widths, and fineness of reeds running from 1200 to 2000 per 37 inches, have 10 per cent deducted as allowance for waste. Each page is headed by the particular breadth of cloth and the different reeds, with the number of dents contained in that particular breadth, so that the manufacturer has a double check, the amount of warp as well as the measurement, indicating the width. The first column to the left contains the number of picks, the next two, the quantity of cloth in yards, inches, and at the rates of 100 and 120 picks per inch, and the fourth, the quantity of weft required in spyndles, hanks, skeins and threads.

We begin as low as 50 picks and rise to one million, which we think sufficiently various for any purpose; and the tables are equally applicable to plain and figured goods. For plain fabrics, ascertain the number of picks per inch and the number of inches in the width of the cloth; say 36 inches wide goods, 50 picks per inch and 36 inches of cloth:

36 inches.
50 picks.

1800
36 inches.

10800
5400

50)64800

80)1296

7)16 $\frac{16}{80}$

$2\frac{2}{7}\frac{16}{80}$.

Here we have 1 yard of 36 inch cloth, with 50 picks per inch, which takes 2 numbers, 2 skeins and $\frac{16}{80}$.

We would here also submit a short rule for the calculation of warps, which may be useful, as it comes under the daily practice of every manufacturer:—Ascertain the number of dents and length of warp; divide the dents by 20 (the beers); multiply by ells, (45 inches, or one and a quarter yards); divide the quotient by 16; and the result will be the quantity of numbers which the warp requires.

EXAMPLES.

20)1270 warp or 2540 threads.

63½ beers.
80 ells, or 100 yards.

16)5080

317½ numbers of yarn required.

20)1760 warp.

88 beers.
100 ells, or 125 yards.

16)8800

550 numbers of yarn required.

20)1130 warp.

56½ beers.
60 ells, or 75 yards

16)3390

211 $\frac{14}{16}$ numbers of yarn required.

The above rule gives an allowance of 5 per cent waste in winding and warping

For the sake of conciseness, these tables advance by two inches at a time; but for the purpose of rendering them applicable to breadths of any intermediate inch, a table of one inch is introduced in page 551.

1200 Reed 1362 Dents. / 1300 ..... 1475 ..... } 42 INCHES WIDE. { 1400 Reed 1590 Dents. / 1500 ..... 1705 .....

Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks. per inch.	120 picks. per inch.	WEFT REQUIRED.	Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks. per inch.	120 picks. per inch.	WEFT REQUIRED.
	Yds. In.	Yds. In. 6ths.	No. Sk. Thd.		Yds. In.	Yds. In. 6ths.	Spy. No. Sk.
50	½	2½	0 43	5000	1 14	1 5 4	7 4½
100	1	5	1 6	5100	1 15	1 6 3	7 5½
200	2	1 4	2 11	5200	1 16	1 7 2	7 6½
300	3	2 3	3 17	5300	1 17	1 8 1	8 1
400	4	3 2	4 22	5400	1 18	1 9 0	8 2
500	5	4 1	5 28	5500	1 19	1 9 5	8 3
600	6	5 0	6 33	5600	1 20	1 10 4	8 4
700	7	5 5	1 0 39	5700	1 21	1 11 3	8 5
800	8	6 4	1 1 44	5800	1 22	1 12 2	8 6
900	9	7 3	1 2 50	5900	1 23	1 13 1	9 0
1000	10	8 2	1 3 56	6000	1 24	1 14 0	9 1
1100	11	9 1	1 4 61	6100	1 25	1 14 5	9 2½
1200	12	10 0	1 5 67	6200	1 26	1 15 4	9 3½
1300	13	10 5	1 6 72	6300	1 27	1 16 3	9 4½
1400	14	11 4	2 0 78	6400	1 28	1 17 2	9 5½
1500	15	12 3	2 2 3	6500	1 29	1 18 1	9 6½
1600	16	13 2	2 3 9	6600	1 30	1 19 0	10 1
1700	17	14 1	2 4 14	6700	1 31	1 19 5	10 1½
1800	18	15 0	2 5 20	6800	1 32	1 20 4	10 2½
1900	19	15 5	2 6 26	6900	1 33	1 21 3	10 3½
2000	20	16 4	3 0 31	7000	1 34	1 22 2	10 4½
2100	21	17 3	3 1 37	7100	1 35	1 23 1	10 6
2200	22	18 2	3 2 42	7200	2 0	1 24 0	11 0
2300	23	19 1	3 3 48	7300	2 1	1 24 5	11 1
2400	24	20 0	3 4 53	7400	2 2	1 25 4	11 2
2500	25	20 5	3 5 59	7500	2 3	1 26 3	11 3½
2600	26	21 4	3 6 64	7600	2 4	1 27 2	11 4½
2700	27	22 3	4 0 70	7700	2 5	1 28 1	11 5½
2800	28	23 2	4 1 76	7800	2 6	1 29 0	11 6½
2900	29	24 1	4 3 1	7900	2 7	1 29 5	12 0½
3000	30	25 0	4 4 7	8000	2 8	1 30 4	12 1½
3100	31	25 5	4 5 12	8100	2 9	1 31 3	12 2½
3200	32	26 4	4 6 18	8200	2 10	1 32 2	12 3½
3300	33	27 3	5 0 23	8300	2 11	1 33 1	12 4½
3400	34	28 2	5 1 29	8400	2 12	1 34 0	12 5½
3500	35	29 1	5 2 34	8500	2 13	1 34 5	13 0
3600	1 0	30 0	5 3 40	8600	2 14	1 35 4	13 1
3700	1 1	30 5	5 4 46	8700	2 15	2 0 3	13 2
3800	1 2	31 4	5 5 51	8800	2 16	2 1 2	13 3
3900	1 3	32 3	5 6 57	8900	2 17	2 2 1	13 4½
4000	1 4	33 2	6 0 62	9000	2 18	2 3 0	13 5½
4100	1 5	34 1	6 1 68	9100	2 19	2 3 5	13 6½
4200	1 6	35 0	6 2 75	9200	2 20	2 4 4	14 0½
4300	1 7	35 5	6 3 79	9300	2 21	2 5 3	14 1½
4400	1 8	1 0 4	6 5 4	9400	2 22	2 6 2	14 2½
4500	1 9	1 1 3	6 6 10	9500	2 23	2 7 1	14 3½
4600	1 10	1 2 2	7 0 16	9600	2 24	2 8 0	14 4½
4700	1 11	1 3 1	7 1 21	9700	2 25	2 8 5	14 5½
4800	1 12	1 4 0	7 2 27	9800	2 26	2 9 4	14 6½
4900	1 13	1 4 5	7 3 32	9900	2 27	2 10 3	15 1

1600 Reed 1815 Dents. / 1700 ..... 1930 ..... — 42 INCHES WIDE. — 1800 Reed 2015 Dents. / 2000 ..... 2270 .....

Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.	QUANTITY OF CLOTH AT THE RATES OF 120 picks per inch.	WEFT REQUIRED.	Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.	QUANTITY OF CLOTH AT THE RATES OF 120 picks per inch.	WEFT REQUIRED.
Thsds.	Yds. In.	Yds. In. 6ths.	Spy. No. Sk.	Thsds.	Yds. In.	Yds. In. 6ths	Spy. No. Sk.
10	2 28	2 11 2	0 15 2	510	141 24	118 2 0	43 5 1
20	5 20	4 22 4	1 12 4	520	144 16	120 13 2	44 2 3
30	8 12	6 34 0	2 9 5⅓	530	147 8	122 24 4	44 17 5
40	11 4	9 9 2	3 7 0⅔	540	150 0	125 0 0	45 15 0
50	13 32	11 20 4	4 4 2⅔	550	152 28	127 11 2	46 12 2
60	16 24	13 32 0	5 1 4⅓	560	155 20	129 22 4	47 9 4
70	19 16	16 7 2	5 16 6⅓	570	158 12	131 34 0	48 6 5⅓
80	22 8	18 18 4	6 14 1⅓	580	161 4	134 9 2	49 4 0⅔
90	25 0	20 30 0	7 11 3⅓	590	163 32	136 20 4	50 2 2⅔
100	27 28	23 5 2	8 8 5⅓	600	166 24	138 32 0	50 16 4⅔
110	30 20	25 16 4	9 6 0⅓	610	169 16	141 7 2	51 13 6⅓
120	33 12	27 28 0	10 3 2⅓	620	172 8	143 18 4	52 11 1⅓
130	36 4	30 3 2	11 0 4⅓	630	175 0	145 30 0	53 8 3⅓
140	38 32	32 14 4	11 15 6⅓	640	177 28	148 5 2	54 5 5⅓
150	41 24	34 26 0	12 13 1⅓	650	180 20	150 16 4	55 3 0⅔
160	44 16	37 1 2	13 10 3	660	183 12	152 28 0	56 0 2⅔
170	47 8	39 12 4	14 7 5	670	186 4	155 3 2	56 15 4⅔
180	50 0	41 24 0	15 5 0	680	188 32	157 14 4	57 12 6⅔
190	52 28	43 35 2	16 2 2	690	191 24	159 26 0	58 10 1⅓
200	55 20	46 10 4	16 17 4	700	194 16	162 1 2	59 7 3
210	58 12	48 22 0	17 14 5⅓	710	197 8	164 12 4	60 4 5
220	61 4	50 33 2	18 12 0⅓	720	200 0	166 24 0	61 2 0
230	63 32	53 8 4	19 9 2⅓	730	202 28	168 35 2	61 17 2
240	66 24	55 20 0	20 6 4⅓	740	205 20	171 10 4	62 14 4
250	69 16	57 31 2	21 3 6⅓	750	208 12	173 22 0	63 11 5⅓
260	72 8	60 6 4	22 1 1⅓	760	211 4	175 33 2	64 9 0⅔
270	75 0	62 18 0	22 16 3⅓	770	213 32	178 8 4	65 6 2⅔
280	77 28	64 29 2	23 13 5⅓	780	216 24	180 20 0	66 3 4⅔
290	80 20	67 4 4	24 11 0⅓	790	219 16	182 31 2	67 0 6⅔
300	83 12	69 16 0	25 8 2⅓	800	222 8	185 6 4	67 16 1⅓
310	86 4	71 27 2	26 5 4⅓	810	225 0	187 18 0	68 13 3⅓
320	88 32	74 2 4	27 2 6⅓	820	227 28	189 29 2	69 10 5⅓
330	91 24	76 14 0	28 0 1	830	230 20	192 4 4	70 8 0⅔
340	94 16	78 25 2	28 15 3	840	233 12	194 16 0	71 5 2⅔
350	97 8	81 0 4	29 12 5	850	236 4	196 27 2	72 2 4⅔
360	100 0	83 12 0	30 10 0	860	238 32	199 2 4	72 17 6⅔
370	102 28	85 23 2	31 7 2	870	241 24	201 14 0	73 15 1
380	105 20	87 34 4	32 4 4	880	244 16	203 25 2	74 12 3
390	108 12	90 10 0	33 1 5⅓	890	247 8	206 0 4	75 9 5
400	111 4	92 21 2	33 17 0⅔	900	250 0	208 12 0	76 7 0
410	113 32	94 32 4	34 14 2⅓	910	252 28	210 23 2	77 4 2
420	116 24	97 8 0	35 11 4⅓	920	255 20	212 34 4	78 1 4
430	119 16	99 19 2	36 8 6⅓	930	258 12	215 10 0	78 16 5⅓
440	122 8	101 30 4	37 6 1⅓	940	261 4	217 21 2	79 14 0⅔
450	125 0	104 6 0	38 3 3⅓	950	263 32	219 32 4	80 11 2⅔
460	127 28	106 17 2	39 0 5⅓	960	266 24	222 8 0	81 8 4⅔
470	130 20	108 28 4	39 16 0⅓	970	269 16	224 19 2	82 5 6⅔
480	133 12	111 4 0	40 13 2⅓	980	272 8	226 30 4	83 3 1⅓
490	136 4	113 15 2	41 10 4⅓	990	275 0	229 6 0	84 0 3⅓
500	138 32	115 26 4	42 7 6⅓	1Mill.	277 28	231 17 2	84 15 5⅓

1200 Reed 1426 Dents. } 44 INCHES WIDE. { 1400 Reed 1666 Dents.
1300 ..... 1545 ..... } { 1500 ..... 1787 .....

Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF						WEFT REQUIRED.			Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF						WEFT REQUIRED.		
	100 picks per inch.			120 picks per inch.							100 picks per inch.			120 picks per inch.					
	Yds.	In.		Yds.	In.	6ths.	No.	Sk.	Thd.		Yds.	In.		Yds.	In.	6ths.	Spy.	No.	Sk.
50	0	½		0	0	2½	0	0	45	5000	1	14		1	5	4	0	8	0½
100	0	1		0	0	5	0	1	10	5100	1	15		1	6	3	0	8	1¼
200	0	2		0	1	4	0	2	19	5200	1	16		1	7	2	0	8	2¼
300	0	3		0	2	3	0	3	29	5300	1	17		1	8	1	0	8	3½
400	0	4		0	3	2	0	4	39	5400	1	18		1	9	0	0	8	4½
500	0	5		0	4	1	0	5	48	5500	1	19		1	9	5	0	8	5½
600	0	6		0	5	0	0	6	58	5600	1	20		1	10	4	0	8	6¾
700	0	7		0	5	5	1	0	67	5700	1	21		1	11	3	0	9	1
800	0	8		0	6	4	1	1	77	5800	1	22		1	12	2	0	9	2
900	0	9		0	7	3	1	3	7	5900	1	23		1	13	1	0	9	3
1000	0	10		0	8	2	1	4	16	6000	1	24		1	14	0	0	9	4¼
1100	0	11		0	9	1	1	5	26	6100	1	25		1	14	5	0	9	5¼
1200	0	12		0	10	0	1	6	36	6200	1	26		1	15	4	0	9	6¼
1300	0	13		0	10	5	2	0	45	6300	1	27		1	16	3	0	10	0½
1400	0	14		0	11	4	2	1	55	6400	1	28		1	17	2	0	10	1¾
1500	0	15		0	12	3	2	2	64	6500	1	29		1	18	1	0	10	3
1600	0	16		0	13	2	2	3	74	6600	1	30		1	19	0	0	10	4
1700	0	17		0	14	1	2	5	4	6700	1	31		1	19	5	0	10	5
1800	0	18		0	15	0	2	6	13	6800	1	32		1	20	4	0	10	6½
1900	0	19		0	15	5	3	0	23	6900	1	33		1	21	3	0	11	0¼
2000	0	20		0	16	4	3	1	33	7000	1	34		1	22	2	0	11	1½
2100	0	21		0	17	3	3	2	42	7100	1	35		1	23	1	0	11	2½
2200	0	22		0	18	2	3	3	52	7200	2	0		1	24	0	0	11	3¾
2300	0	23		0	19	1	3	4	62	7300	2	1		1	24	5	0	11	4¾
2400	0	24		0	20	0	3	5	71	7400	2	2		1	25	4	0	11	6
2500	0	25		0	20	5	4	0	1	7500	2	3		1	26	3	0	12	0
2600	0	26		0	21	4	4	1	10	7600	2	4		1	27	2	0	12	1
2700	0	27		0	22	3	4	2	20	7700	2	5		1	28	1	0	12	2¼
2800	0	28		0	23	2	4	3	30	7800	2	6		1	29	0	0	12	3¼
2900	0	29		0	24	1	4	4	39	7900	2	7		1	29	5	0	12	4½
3000	0	30		0	25	0	4	5	49	8000	2	8		1	30	4	0	12	5½
3100	0	31		0	25	5	4	6	59	8100	2	9		1	31	3	0	12	6¾
3200	0	32		0	26	4	5	0	68	8200	2	10		1	32	2	0	13	1
3300	0	33		0	27	3	5	1	78	8300	2	11		1	33	1	0	13	2
3400	0	34		0	28	2	5	3	7	8400	2	12		1	34	0	0	13	3
3500	0	35		0	29	1	5	4	17	8500	2	13		1	34	5	0	13	4¼
3600	1	0		0	30	0	5	5	27	8600	2	14		1	35	4	0	13	5¼
3700	1	1		0	30	5	5	6	36	8700	2	15		2	0	3	0	13	6½
3800	1	2		0	31	4	6	0	48	8800	2	16		2	1	2	0	14	0½
3900	1	3		0	32	3	6	1	56	8900	2	17		2	2	1	0	14	1¾
4000	1	4		0	33	2	6	2	65	9000	2	18		2	3	0	0	14	2¾
4100	1	5		0	34	1	6	3	75	9100	2	19		2	3	5	0	14	4
4200	1	6		0	35	0	6	5	4	9200	2	20		2	4	4	0	14	5
4300	1	7		0	35	5	6	6	14	9300	2	21		2	5	3	0	14	6¼
4400	1	8		1	0	4	7	0	24	9400	2	22		2	6	2	0	15	0¼
4500	1	9		1	1	3	7	1	33	9500	2	23		2	7	1	0	15	1½
4600	1	10		1	2	2	7	2	43	9600	2	24		2	8	0	0	15	2½
4700	1	11		1	3	1	7	3	53	9700	2	25		2	8	5	0	15	3¾
4800	1	12		1	4	0	7	4	62	9800	2	26		2	9	4	0	15	4¾
4900	1	13		1	4	5	7	5	72	9900	2	27		2	10	3	0	15	6

1600 Reed 1901 Dents. / 1700 ..... 2022 ..... } 44 INCHES WIDE. { 1800 Reed 2143 Dents. / 2000 ..... 2378 .....

Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF				WEFT				Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF				WEFT			
	100 picks per inch.		120 picks per inch.		REQUIRED.					100 picks per inch.		120 picks per inch.		REQUIRED.			
Thsds.	Yds.	In.	Yds.	In. 6ths.	Spy.	No.	Sk.		Thsds.	Yds.	In.	Yds.	In. 6ths.	Spy.	No.	Sk.	
10	2	28	2	11 2	0	16	0		510	141	24	118	2 0	45	6	2	
20	5	20	4	22 4	1	14	0		520	144	16	120	13 2	46	4	2	
30	8	12	6	34 0	2	12	0		530	147	8	122	24 4	47	2	2	
40	11	4	9	9 2	3	10	0	1/4	540	150	0	125	0 0	48	0	2	
50	13	32	11	20 4	4	8	0	1/4	550	152	28	127	11 2	48	16	2	
60	16	24	13	32 0	5	6	0	1/4	560	155	20	129	22 4	49	14	2	
70	19	16	16	7 2	6	4	0	1/4	570	158	12	131	34 0	50	12	2	
80	22	8	18	18 4	7	2	0	1/4	580	161	4	134	9 2	51	10	2	
90	25	0	20	30 0	8	0	0	1/4	590	163	32	136	20 4	52	8	2	
100	27	28	23	5 2	8	16	0	1/4	600	166	24	138	32 0	53	6	2	1/4
110	30	20	25	16 4	9	14	0	1/3	610	169	16	141	7 2	54	4	2	1/4
120	33	12	27	28 0	10	12	0	1/3	620	172	8	143	18 4	55	2	2	1/4
130	36	4	30	3 2	11	10	0	1/3	630	175	0	145	30 0	56	0	2	1/4
140	38	32	32	14 4	12	8	0	1/3	640	177	28	148	5 2	56	16	2	1/4
150	41	24	34	26 0	13	6	0	1/3	650	180	20	150	16 4	57	14	2	1/4
160	44	16	37	1 2	14	4	0	1/2	660	183	12	152	28 0	58	12	2	1/4
170	47	8	39	12 4	15	2	0	1/2	670	186	4	155	3 2	59	10	2	1/4
180	50	0	41	24 0	16	0	0	1/2	680	188	32	157	14 4	60	8	2	1/2
190	52	28	43	35 2	16	16	0	1/2	690	191	24	159	26 0	61	6	2	1/2
200	55	20	46	10 4	17	14	0	1/2	700	194	16	162	1 2	62	4	2	1/2
210	58	12	48	22 0	18	12	0	3/4	710	197	8	164	12 4	63	2	2	1/2
220	61	4	50	33 2	19	10	0	3/4	720	200	0	166	24 0	64	0	2	1/2
230	63	32	53	8 4	20	8	0	3/4	730	202	28	168	35 2	64	16	2	1/2
240	66	24	55	20 0	21	6	1		740	205	20	171	10 4	65	14	2	3/4
250	69	16	57	31 2	22	4	1		750	208	12	173	22 0	66	12	2	3/4
260	72	8	60	6 4	23	2	1		760	211	4	175	33 2	67	10	2	3/4
270	75	0	62	18 0	24	0	1		770	213	32	178	8 4	68	8	2	3/4
280	77	28	64	29 2	24	16	1		780	216	24	180	20 0	69	6	2	3/4
290	80	20	67	4 4	25	14	1		790	219	16	182	31 2	70	4	3	
300	83	12	69	16 0	26	12	1		800	222	8	185	6 4	71	2	3	
310	86	4	71	27 2	27	10	1		810	225	0	187	18 0	72	0	3	
320	88	32	74	2 4	28	8	1		820	227	28	189	29 2	72	16	3	
330	91	24	76	14 0	29	6	1	1/4	830	230	20	192	4 4	73	14	3	
340	94	16	78	25 2	30	4	1	1/4	840	233	12	194	16 0	74	12	3	
350	97	8	81	0 4	31	2	1	1/4	850	236	4	196	27 2	75	10	3	
360	100	0	83	12 0	32	0	1	1/4	860	238	32	199	2 4	76	8	3	
370	102	28	85	23 2	32	16	1	1/4	870	241	24	201	14 0	77	6	3	1/4
380	105	20	87	34 4	33	14	1	1/4	880	244	16	203	25 2	78	4	3	1/4
390	108	12	90	10 0	34	12	1	1/3	890	247	8	206	0 4	79	2	3	1/4
400	111	4	92	21 2	35	10	1	1/3	900	250	0	208	12 0	80	0	3	1/4
410	113	32	94	32 4	36	8	1	1/3	910	252	28	210	23 2	80	16	3	1/4
420	116	24	97	8 0	37	6	1	1/3	920	255	20	212	34 4	81	14	3	1/3
430	119	16	99	19 2	38	4	1	1/2	930	258	12	215	10 0	82	12	3	1/3
440	122	8	101	30 4	39	2	1	1/2	940	261	4	217	21 2	83	10	3	1/3
450	125	0	104	6 0	40	0	1	1/2	950	263	32	219	32 4	84	8	3	1/3
460	127	28	106	17 2	40	16	1	3/4	960	266	24	222	8 0	85	6	3	1/2
470	130	20	108	28 4	41	14	1	3/4	970	269	16	224	19 2	86	4	3	1/2
480	133	12	111	4 0	42	12	1	3/4	980	272	8	226	30 4	87	2	3	1/2
490	136	4	113	15 2	43	10	1	3/4	990	275	0	229	6 0	88	0	3	1/2
500	138	32	115	26 4	44	8	1	3/4	1Mill.	277	28	231	17 2	88	16	3	1/2

1200 Reed 1490 Dents. / 1300 ..... 1615 ..... } 46 INCHES WIDE. { 1400 Reed 1742 Dents. / 1500 ..... 1871 .....

Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.		120 picks per inch.			WEFT REQUIRED.			Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.		120 picks per inch.			WEFT REQUIRED.		
	Yds.	In.	Yds.	In.	6ths.	No.	Sk.	Thd.		Yds.	In.	Yds.	In.	6ths.	Spy.	No.	Sk.
50	0	½	0	0	2½	0	0	47	5000	1	14	1	5	4	0	8	2½
100	0	1	0	0	5	0	1	14	5100	1	15	1	6	3	0	8	3¼
200	0	2	0	1	4	0	2	27	5200	1	16	1	7	2	0	8	5
300	0	3	0	2	3	0	3	41	5300	1	17	1	8	1	0	8	6
400	0	4	0	3	2	0	4	55	5400	1	18	1	9	0	0	9	0¼
500	0	5	0	4	1	0	5	68	5500	1	19	1	9	5	0	9	1½
600	0	6	0	5	0	1	0	2	5600	1	20	1	10	4	0	9	2½
700	0	7	0	5	5	1	1	16	5700	1	21	1	11	3	0	9	3¾
800	0	8	0	6	4	1	2	30	5800	1	22	1	12	2	0	9	5
900	0	9	0	7	3	1	3	43	5900	1	23	1	13	1	0	9	6
1000	0	10	0	8	2	1	4	57	6000	1	24	1	14	0	0	10	0¼
1100	0	11	0	9	1	1	5	71	6100	1	25	1	14	5	0	10	1½
1200	0	12	0	10	0	2	0	4	6200	1	26	1	15	4	0	10	2½
1300	0	13	0	10	5	2	1	18	6300	1	27	1	16	3	0	10	3¾
1400	0	14	0	11	4	2	2	32	6400	1	28	1	17	2	0	10	5
1500	0	15	0	12	3	2	3	46	6500	1	29	1	18	1	0	10	6
1600	0	16	0	13	2	2	4	59	6600	1	30	1	19	0	0	11	0¼
1700	0	17	0	14	1	2	5	73	6700	1	31	1	19	5	0	11	1½
1800	0	18	0	15	0	3	0	7	6800	1	32	1	20	4	0	11	2½
1900	0	19	0	15	5	3	1	20	6900	1	33	1	21	3	0	11	3¾
2000	0	20	0	16	4	3	2	34	7000	1	34	1	22	2	0	11	5
2100	0	21	0	17	3	3	3	48	7100	1	35	1	23	1	0	11	6
2200	0	22	0	18	2	3	4	62	7200	2	0	1	24	0	0	12	0¼
2300	0	23	0	19	1	3	5	75	7300	2	1	1	24	5	0	12	1½
2400	0	24	0	20	0	4	0	9	7400	2	2	1	25	4	0	12	2½
2500	0	25	0	20	5	4	1	23	7500	2	3	1	26	3	0	12	3¾
2600	0	26	0	21	4	4	2	36	7600	2	4	1	27	2	0	12	5
2700	0	27	0	22	3	4	3	50	7700	2	5	1	28	1	0	12	6¼
2800	0	28	0	23	2	4	4	64	7800	2	6	1	29	0	0	13	0¼
2900	0	29	0	24	1	4	5	77	7900	2	7	1	29	5	0	13	1½
3000	0	30	0	25	0	5	0	11	8000	2	8	1	30	4	0	13	2½
3100	0	31	0	25	5	5	1	25	8100	2	9	1	31	3	0	13	3¼
3200	0	32	0	26	4	5	2	39	8200	2	10	1	32	2	0	13	5
3300	0	33	0	27	3	5	3	52	8300	2	11	1	33	1	0	13	6¼
3400	0	34	0	28	2	5	4	66	8400	2	12	1	34	0	0	14	0¼
3500	0	35	0	29	1	5	6	0	8500	2	13	1	34	5	0	14	1½
3600	1	0	0	30	0	6	0	13	8600	2	14	1	35	4	0	14	2½
3700	1	1	0	30	5	6	1	27	8700	2	15	2	0	3	0	14	3¾
3800	1	2	0	31	4	6	2	41	8800	2	16	2	1	2	0	14	5
3900	1	3	0	32	3	6	3	64	8900	2	17	2	2	1	0	14	6¼
4000	1	4	0	33	2	6	4	68	9000	2	18	2	3	0	0	15	0½
4100	1	5	0	34	1	6	6	2	9100	2	19	2	3	5	0	15	1½
4200	1	6	0	35	0	7	0	16	9200	2	20	2	4	4	0	15	2¾
4300	1	7	0	35	5	7	1	29	9300	2	21	2	5	3	0	15	3¾
4400	1	8	1	0	4	7	2	43	9400	2	22	2	6	2	0	15	5
4500	1	9	1	1	3	7	3	57	9500	2	23	2	7	1	0	15	6¼
4600	1	10	1	2	2	7	4	70	9600	2	24	2	8	0	0	16	0½
4700	1	11	1	3	1	7	6	4	9700	2	25	2	8	5	0	16	1½
4800	1	12	1	4	0	8	0	18	9800	2	26	2	9	4	0	16	2¾
4900	1	13	1	4	5	8	1	32	9900	2	27	2	10	3	0	16	4

1600 Reed 1987 Dents. / 1700 ..... 2114 ..... } 46 INCHES WIDE. { 1800 Reed 2241 Dents. / 2000 ..... 2186 .....

Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.	QUANTITY OF CLOTH AT THE RATES OF 120 picks per inch.	WEFT REQUIRED.	Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.	QUANTITY OF CLOTH AT THE RATES OF 120 picks per inch.	WEFT REQUIRED.
Thsds.	Yds. In.	Yds. In. 6ths.	Spy. No. Sk.	Thsds.	Yds. In.	Yds. In. 6ths.	Spy. No. Sk.
10	2 28	2 11 2	0 16 5	510	141 24	118 2 0	47 7 2½
20	5 20	4 22 4	1 15 3¾	520	144 16	120 13 2	48 6 0¾
30	8 12	6 34 0	2 14 2¼	530	147 8	122 24 4	49 4 5¾
40	11 4	9 9 2	3 12 0½	540	150 0	125 0 0	50 3 4
50	13 32	11 20 4	4 11 4½	550	152 28	127 11 2	51 2 2
60	16 24	13 32 0	5 10 2¾	560	155 20	129 22 4	52 1 0¾
70	19 16	16 7 2	6 9 1	570	158 12	131 34 0	52 17 5¼
80	22 8	18 18 4	7 7 6	580	161 4	134 9 2	53 16 3½
90	25 0	20 30 0	8 6 4¼	590	163 32	136 20 4	54 15 1½
100	27 28	23 5 2	9 5 2¼	600	166 24	138 32 0	55 13 6¾
110	30 20	25 16 4	10 4 0¼	610	169 16	141 7 2	56 12 5
120	33 12	27 28 0	11 2 5½	620	172 8	143 18 4	57 11 3
130	36 4	30 3 2	12 1 3½	630	175 0	145 30 0	58 10 1
140	38 32	32 14 4	13 0 1¾	640	177 28	148 5 2	59 8 6¼
150	41 24	34 26 0	13 17 0	650	180 20	150 16 4	60 7 4¼
160	44 16	37 1 2	14 15 5	660	183 12	152 28 0	61 6 2½
170	47 8	39 12 4	15 14 3¼	670	186 4	155 3 2	62 5 0½
180	50 0	41 24 0	16 13 1½	680	188 32	157 14 4	63 3 5¾
190	52 28	43 35 2	17 11 6½	690	191 24	159 26 0	64 2 4
200	55 20	46 10 4	18 10 4½	700	194 16	162 1 2	65 1 2
210	58 12	48 22 0	19 9 2¾	710	197 8	164 12 4	66 0 0¾
220	61 4	50 33 2	20 8 0¾	720	200 0	166 24 0	66 16 5¼
230	63 32	53 8 4	21 6 6	730	202 28	168 35 2	67 15 3¼
240	66 24	55 20 0	22 5 4	740	205 20	171 10 4	68 14 1½
250	69 16	57 31 2	23 4 2¼	750	208 12	173 22 0	69 12 6½
260	72 8	60 6 4	24 3 0¼	760	211 4	175 33 2	70 11 4¾
270	75 0	62 18 0	25 1 5½	770	213 32	178 8 4	71 10 3
280	77 28	64 29 2	25 17 3½	780	216 24	180 20 0	72 9 1
290	80 20	67 4 4	26 16 3½	790	219 16	182 31 2	73 7 6¼
300	83 12	69 16 0	27 15 1¾	800	222 8	185 6 4	74 6 4¼
310	86 4	71 27 2	28 14 5	810	225 0	187 18 0	75 5 2½
320	88 32	74 2 4	29 13 3	820	227 28	189 29 2	76 4 0½
330	91 24	76 14 0	30 12 1¼	830	230 20	192 4 4	77 2 5¾
340	94 16	78 25 2	31 10 6¼	840	233 12	194 16 0	78 1 3¾
350	97 8	81 0 4	32 9 4½	850	236 4	196 27 2	79 0 2
360	100 0	83 12 0	33 8 2¾	860	238 32	199 2 4	79 17 0
370	102 28	85 23 2	34 7 0¾	870	241 24	201 14 0	80 15 5½
380	105 20	87 34 4	35 5 6	880	244 16	203 25 2	81 14 3¼
390	108 12	90 10 0	36 4 4	890	247 8	206 0 4	82 13 1½
400	111 4	92 21 2	37 3 2¼	900	250 0	208 12 0	83 11 6½
410	113 32	94 32 4	38 2 0¼	910	252 28	210 23 2	84 10 4¾
420	116 24	97 8 0	39 0 5½	920	255 20	212 34 4	85 9 2¾
430	119 16	99 19 2	39 17 3½	930	258 12	215 10 0	86 8 1
440	122 8	101 30 4	40 16 1¾	940	261 4	217 21 2	87 6 6
450	125 0	104 6 0	41 14 6¾	950	263 32	219 32 4	88 5 4¾
460	127 28	106 17 2	42 13 5	960	266 24	222 8 0	89 4 2¾
470	130 20	108 28 4	43 12 3	970	269 16	224 19 2	90 3 0½
480	133 12	111 4 0	44 11 1¼	980	272 8	226 30 4	91 1 5½
490	136 4	113 15 2	45 9 6¼	990	275 0	229 6 0	92 0 3¼
500	138 32	115 26 4	46 8 4½	1Mill.	277 28	231 17 2	92 17 2

1200 Reed 1564 Dents. / 1300 ..... 1685 ..... } 48 INCHES WIDE. { 1400 Reed 1818 Dents. / 1500 ..... 1953 .....

Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF					WEFT REQUIRED.			Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF					WEFT REQUIRED.		
	100 picks per inch.		120 picks per inch.							100 picks per inch.		120 picks per inch.					
	Yds.	In.	Yds.	In.	6ths.	No.	Sk.	Thd.		Yds.	In.	Yds.	In.	6ths.	Spy.	No.	Sk.
50	0	½	0	0	2½	0	0	48	5000	1	14	1	5	4	0	8	5
100	0	1	0	0	5	0	1	18	5100	1	15	1	6	3	0	8	6¼
200	0	2	0	1	4	0	2	36	5200	1	16	1	7	2	0	9	0½
300	0	3	0	2	3	0	3	53	5300	1	17	1	8	1	0	9	1¾
400	0	4	0	3	2	0	4	71	5400	1	18	1	9	0	0	9	3
500	0	5	0	4	1	0	6	9	5500	1	19	1	9	5	0	9	4¼
600	0	6	0	5	0	1	0	27	5600	1	20	1	10	4	0	9	5½
700	0	7	0	5	5	1	1	44	5700	1	21	1	11	3	0	9	6¾
800	0	8	0	6	4	1	2	62	5800	1	22	1	12	2	0	10	0¾
900	0	9	0	7	3	1	4	0	5900	1	23	1	13	1	0	10	2
1000	0	10	0	8	2	1	5	18	6000	1	24	1	14	0	0	10	3¼
1100	0	11	0	9	1	1	6	36	6100	1	25	1	14	5	0	10	4½
1200	0	12	0	10	0	2	0	53	6200	1	26	1	15	4	0	10	5¾
1300	0	13	0	10	5	2	1	71	6300	1	27	1	16	3	0	11	0
1400	0	14	0	11	4	2	3	9	6400	1	28	1	17	2	0	11	1¼
1500	0	15	0	12	3	2	4	27	6500	1	29	1	18	1	0	11	2½
1600	0	16	0	13	2	2	5	44	6600	1	30	1	19	0	0	11	3¾
1700	0	17	0	14	1	2	6	62	6700	1	31	1	19	5	0	11	5
1800	0	18	0	15	0	3	1	0	6800	1	32	1	20	4	0	11	6
1900	0	19	0	15	5	3	2	18	6900	1	33	1	21	3	0	12	0¼
2000	0	20	0	16	4	3	3	36	7000	1	34	1	22	2	0	12	1½
2100	0	21	0	17	3	3	4	53	7100	1	35	1	23	1	0	12	2¾
2200	0	22	0	18	2	3	5	71	7200	2	0	1	24	0	0	12	4
2300	0	23	0	19	1	4	0	9	7300	2	1	1	24	5	0	12	5¼
2400	0	24	0	20	0	4	1	27	7400	2	2	1	25	4	0	12	6½
2500	0	25	0	20	5	4	2	44	7500	2	3	1	26	3	0	13	0½
2600	0	26	0	21	4	4	3	62	7600	2	4	1	27	2	0	13	2
2700	0	27	0	22	3	4	5	0	7700	2	5	1	28	1	0	13	3
2800	0	28	0	23	2	4	6	18	7800	2	6	1	29	0	0	13	4¼
2900	0	29	0	24	1	5	0	36	7900	2	7	1	29	5	0	13	5½
3000	0	30	0	25	0	5	1	53	8000	2	8	1	30	4	0	13	6¾
3100	0	31	0	25	5	5	2	71	8100	2	9	1	31	3	0	14	1
3200	0	32	0	26	4	5	4	9	8200	2	10	1	32	2	0	14	2¼
3300	0	33	0	27	3	5	5	27	8300	2	11	1	33	1	0	14	3½
3400	0	34	0	28	2	5	6	44	8400	2	12	1	34	0	0	14	4½
3500	0	35	0	29	1	6	0	62	8500	2	13	1	34	5	0	14	6
3600	1	0	0	30	0	6	2	0	8600	2	14	1	35	4	0	15	0
3700	1	1	0	30	5	6	3	18	8700	2	15	2	0	3	0	15	1¼
3800	1	2	0	31	4	6	4	36	8800	2	16	2	1	2	0	15	2½
3900	1	3	0	32	3	6	5	53	8900	2	17	2	2	1	0	15	3¾
4000	1	4	0	33	2	6	6	71	9000	2	18	2	3	0	0	15	5
4100	1	5	0	34	1	7	1	9	9100	2	19	2	3	5	0	15	6¼
4200	1	6	0	35	0	7	2	27	9200	2	20	2	4	4	0	16	0½
4300	1	7	0	35	5	7	3	44	9300	2	21	2	5	3	0	16	1½
4400	1	8	1	0	4	7	4	62	9400	2	22	2	6	2	0	16	2¾
4500	1	9	1	1	3	7	6	0	9500	2	23	2	7	1	0	16	4
4600	1	10	1	2	2	8	0	18	9600	2	24	2	8	0	0	16	5¼
4700	1	11	1	3	1	8	1	36	9700	2	25	2	8	5	0	16	6½
4800	1	12	1	4	0	8	2	53	9800	2	26	2	9	4	0	17	0¾
4900	1	13	1	4	5	8	3	71	9900	2	27	2	10	3	0	17	2

1600 Reed 2073 Dents. / 1700 ..... 2206 ..... — 48 INCHES WIDE. — 1800 Reed 2339 Dents. / 2000 ..... 2594 .....

Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF			WEFT REQUIRED.			Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF			WEFT REQUIRED.		
	100 picks per inch.	120 picks per inch.						100 picks per inch.	120 picks per inch.				
Thds.	Yds. In.	Yds. In.	6ths.	Spy.	No.	Sk.	Thds.	Yds. In.	Yds. In.	6ths.	Spy.	No.	Sk.
10	2 28	2 11	2	0	17	3¼	510	141 24	118 2	0	49	8	3¼
20	5 20	4 22	4	1	16	6½	520	144 16	120 13	2	50	7	6½
30	8 12	6 34	0	2	16	2¾	530	147 8	122 24	4	51	7	2¾
40	11 4	9 9	2	3	15	6	540	150 0	125 0	0	52	6	6
50	13 32	11 20	4	4	15	2	550	152 28	127 11	2	53	6	2¼
60	16 24	13 32	0	5	14	5½	560	155 20	129 22	4	54	5	5¾
70	19 16	16 7	2	6	14	1½	570	158 12	131 34	0	55	5	1¾
80	22 8	18 18	4	7	13	4¾	580	161 4	134 9	2	56	4	5
90	25 0	20 30	0	8	13	1	590	163 32	136 20	4	57	4	1
100	27 28	23 5	2	9	12	1¼	600	166 24	138 32	0	58	3	4½
110	30 20	25 16	4	10	12	0½	610	169 16	141 7	2	59	3	0½
120	33 12	27 28	0	11	11	3¾	620	172 8	143 18	4	60	2	3¾
130	36 4	30 3	2	12	11	0	630	175 0	145 30	0	61	2	0
140	38 32	32 14	4	13	10	3	640	177 28	148 5	2	62	1	3¼
150	41 24	34 26	0	14	9	6¼	650	180 20	150 16	4	63	0	6½
160	44 16	37 1	2	15	9	2½	660	183 12	152 28	0	64	0	2¾
170	47 8	39 12	4	16	8	5¼	670	186 4	155 3	2	64	17	6
180	50 0	41 24	0	17	8	2	680	188 32	157 14	4	65	17	2
190	52 28	43 35	2	18	7	5¼	690	191 24	159 26	0	66	16	5¼
200	55 20	46 10	4	19	7	1½	700	194 16	162 1	2	67	16	1½
210	58 12	48 22	0	20	6	4½	710	197 8	164 12	4	68	15	4¾
220	61 4	50 33	2	21	6	1	720	200 0	166 24	0	69	15	1
230	63 32	53 8	4	22	5	4	730	202 28	168 35	2	70	14	4¼
240	66 24	55 20	0	23	5	0½	740	205 20	171 10	4	71	14	0½
250	69 16	57 31	2	24	4	3½	750	208 12	173 22	0	72	13	3¾
260	72 8	60 6	4	25	3	6¾	760	211 4	175 33	2	73	13	0
270	75 0	62 18	0	26	3	3	770	213 32	178 8	4	74	12	3
280	77 28	64 29	2	27	2	6¼	780	216 24	180 20	0	75	11	6¼
290	80 20	67 4	4	28	2	2½	790	219 16	182 31	2	76	11	2½
300	83 12	69 16	0	29	1	5½	800	222 8	185 6	4	77	10	5¾
310	86 4	71 27	2	30	1	2½	810	225 0	187 18	0	78	10	1
320	88 32	74 2	4	31	0	5	820	227 28	189 29	2	79	9	4¼
330	91 24	76 14	0	32	0	2¼	830	230 20	192 4	4	80	9	0½
340	94 16	78 25	2	32	17	5½	840	233 12	194 16	0	81	8	3½
350	97 8	81 0	4	33	17	1¾	850	236 4	196 27	2	82	8	0
360	100 0	83 12	0	34	16	5	860	238 32	199 2	4	83	7	3
370	102 28	85 23	2	35	16	1¼	870	241 24	201 14	0	84	6	6¼
380	105 20	87 34	4	36	15	4½	880	244 16	203 25	2	85	6	2½
390	108 12	90 10	0	37	15	0½	890	247 8	206 0	4	86	5	5¼
400	111 4	92 21	2	38	14	3	900	250 0	208 12	0	87	5	3
410	113 32	94 32	4	39	13	6	910	252 28	210 23	2	88	4	6¼
420	116 24	97 8	0	40	12	2¼	920	255 20	212 34	4	89	4	2½
430	119 16	99 19	2	41	11	5½	930	258 12	215 10	0	90	3	5¾
440	122 8	101 30	4	42	11	1¾	940	261 4	217 21	2	91	3	2
450	125 0	104 6	0	43	11	5	950	263 32	219 32	4	92	2	5
460	127 28	106 17	2	44	11	1¼	960	266 24	222 8	0	93	2	1¼
470	130 20	108 28	4	45	10	4½	970	269 16	224 19	2	94	1	4½
480	133 12	111 4	0	46	10	0½	980	272 8	226 30	4	95	1	0¾
490	136 4	113 15	2	47	9	4	990	275 0	229 6	0	96	0	4¼
500	138 32	115 26	4	48	9	0	1Mill.	277 28	231 17	2	97	0	0

1200 Reed 1618 Dents. / 1300 ..... 1755 ..... } 50 INCHES WIDE. { 1400 Reed 1894 Dents. / 1500 ..... 2035 .....

Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.		QUANTITY OF CLOTH AT THE RATES OF 120 picks per inch.			WEFT REQUIRED.			Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.		QUANTITY OF CLOTH AT THE RATES OF 120 picks per inch.			WEFT REQUIRED.		
	Yds.	In.	Yds.	In.	6ths.	No.	Sk.	Thd.		Yds.	In.	Yds.	In.	6ths.	Spy.	No.	Sk.
50	0	½	0	0	2½	0	0	51	5000	1	14	1	5	4	0	9	0¾
100	0	1	0	0	5	0	1	22	5100	1	15	1	6	3	0	9	2
200	0	2	0	1	4	0	2	44	5200	1	16	1	7	2	0	9	3¼
300	0	3	0	2	3	0	3	66	5300	1	17	1	8	1	0	9	4½
400	0	4	0	3	2	0	5	8	5400	1	18	1	9	0	0	9	5¾
500	0	5	0	4	1	0	6	30	5500	1	19	1	9	5	0	10	0
600	0	6	0	5	0	1	0	52	5600	1	20	1	10	4	0	10	1¼
700	0	7	0	5	5	1	1	73	5700	1	21	1	11	3	0	10	2½
800	0	8	0	6	4	1	3	15	5800	1	22	1	12	2	0	10	3¾
900	0	9	0	7	3	1	4	37	5900	1	23	1	13	1	0	10	5
1000	0	10	0	8	2	1	5	59	6000	1	24	1	14	0	0	10	6½
1100	0	11	0	9	1	2	0	0	6100	1	25	1	14	5	0	11	0¾
1200	0	12	0	10	0	2	1	22	6200	1	26	1	15	4	0	11	2
1300	0	13	0	10	5	2	2	44	6300	1	27	1	16	3	0	11	3¼
1400	0	14	0	11	4	2	3	66	6400	1	28	1	17	2	0	11	4½
1500	0	15	0	12	3	2	5	8	6500	1	29	1	18	1	0	11	5¾
1600	0	16	0	13	2	2	6	30	6600	1	30	1	19	0	0	12	0
1700	0	17	0	14	1	3	0	52	6700	1	31	1	19	5	0	12	1¼
1800	0	18	0	15	0	3	1	73	6800	1	32	1	20	4	0	12	2½
1900	0	19	0	15	5	3	3	15	6900	1	33	1	21	3	0	12	3¾
2000	0	20	0	16	4	3	4	37	7000	1	34	1	22	2	0	12	5
2100	0	21	0	17	3	3	5	59	7100	1	35	1	23	1	0	12	6½
2200	0	22	0	18	2	4	0	0	7200	2	0	1	24	0	0	13	0¾
2300	0	23	0	19	1	4	1	22	7300	2	1	1	24	5	0	13	2
2400	0	24	0	20	0	4	2	44	7400	2	2	1	25	4	0	13	3¼
2500	0	25	0	20	5	4	3	66	7500	2	3	1	26	3	0	13	4½
2600	0	26	0	21	4	4	5	8	7600	2	4	1	27	2	0	13	5¾
2700	0	27	0	22	3	4	6	30	7700	2	5	1	28	1	0	14	0
2800	0	28	0	23	2	5	0	52	7800	2	6	1	29	0	0	14	1¼
2900	0	29	0	24	1	5	1	73	7900	2	7	1	29	5	0	14	2½
3000	0	30	0	25	0	5	3	15	8000	2	8	1	30	4	0	14	3¾
3100	0	31	0	25	5	5	4	37	8100	2	9	1	31	3	0	14	5
3200	0	32	0	26	4	5	5	59	8200	2	10	1	32	2	0	14	6¼
3300	0	33	0	27	3	6	0	0	8300	2	11	1	33	1	0	15	0¾
3400	0	34	0	28	2	6	1	22	8400	2	12	1	34	0	0	15	2
3500	0	35	0	29	1	6	2	44	8500	2	13	1	34	5	0	15	3¼
3600	1	0	0	30	0	6	3	66	8600	2	14	1	35	4	0	15	4½
3700	1	1	0	30	5	6	5	8	8700	2	15	2	0	3	0	15	5¾
3800	1	2	0	31	4	6	6	30	8800	2	16	2	1	2	0	16	0
3900	1	3	0	32	3	7	0	52	8900	2	17	2	2	1	0	16	1¼
4000	1	4	0	33	2	7	1	73	9000	2	18	2	3	0	0	16	2½
4100	1	5	0	34	1	7	3	15	9100	2	19	2	3	5	0	16	3¾
4200	1	6	0	35	0	7	4	37	9200	2	20	2	4	4	0	16	5
4300	1	7	0	35	5	7	5	59	9300	2	21	2	5	3	0	16	6½
4400	1	8	1	0	4	8	0	0	9400	2	22	2	6	2	0	17	0¾
4500	1	9	1	1	3	8	1	22	9500	2	23	2	7	1	0	17	2
4600	1	10	1	2	2	8	2	44	9600	2	24	2	8	0	0	17	3¼
4700	1	11	1	3	1	8	3	66	9700	2	25	2	8	5	0	17	4½
4800	1	12	1	4	0	8	5	8	9800	2	26	2	9	4	0	17	5¾
4900	1	13	1	4	5	8	6	30	9900	2	27	2	10	3	1	0	0

1600 Reed 2159 Dents. / 1700 ..... 2298 ..... } 50 INCHES WIDE. { 1800 Reed 2437 Dents. / 2000 ..... 2702 .....

Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.	QUANTITY OF CLOTH AT THE RATES OF 120 picks per inch.	WEFT REQUIRED.	Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.	QUANTITY OF CLOTH AT THE RATES OF 120 picks per inch.	WEFT REQUIRED.
Thrds.	Yds. In.	Yds. In. 6ths.	Spy. No. Sk.	Thrds.	Yds. In.	Yds. In. 6ths	Spy. No Sk.
10	2 28	2 11 2	1 0 1¼	510	141 24	118 2 0	51 9 4
20	5 20	4 22 4	2 0 2½	520	144 16	120 13 2	52 9 5¼
30	8 12	6 34 0	3 0 4	530	147 8	122 24 4	53 9 6½
40	11 4	9 9 2	4 0 5¼	540	150 0	125 0 0	54 10 1
50	13 32	11 20 4	5 0 6½	550	152 28	127 11 2	55 10 2¼
60	16 24	13 32 0	6 1 1	560	155 20	129 22 4	56 10 3½
70	19 16	16 7 2	7 1 2¼	570	158 12	131 34 0	57 10 5
80	22 8	18 18 4	8 1 3½	580	161 4	134 9 2	58 10 6¼
90	25 0	20 30 0	9 1 4¾	590	163 32	136 20 4	59 11 0½
100	27 28	23 5 2	10 1 6	600	166 24	138 32 0	60 11 2
110	30 20	25 16 4	11 2 0½	610	169 16	141 7 2	61 11 3¼
120	33 12	27 28 0	12 2 1¾	620	172 8	143 18 4	62 11 4½
130	36 4	30 3 2	13 2 3	630	175 0	145 30 0	63 11 5¾
140	38 32	32 14 4	14 2 4½	640	177 28	148 5 2	64 12 0
150	41 24	34 26 0	15 2 5¾	650	180 20	150 16 4	65 12 1½
160	44 16	37 1 2	16 3 0	660	183 12	152 28 0	66 12 2¾
170	47 8	39 12 4	17 3 1½	670	186 4	155 3 2	67 12 4
180	50 0	41 24 0	18 3 2½	680	188 32	157 14 4	68 12 5½
190	52 28	43 35 2	19 3 4	690	191 24	159 26 0	69 12 6¾
200	55 20	46 10 4	20 3 5¼	700	194 16	162 1 2	70 13 1
210	58 12	48 22 0	21 3 6½	710	197 8	164 12 4	71 13 2¼
220	61 4	50 33 2	22 4 1	720	200 0	166 24 0	72 13 3½
230	63 32	53 8 4	23 4 2¼	730	202 28	168 35 2	73 13 5
240	66 24	55 20 0	24 4 3½	740	205 20	171 10 4	74 13 6¼
250	69 16	57 31 2	25 4 4¾	750	208 12	173 22 0	75 14 0½
260	72 8	60 6 4	26 4 6¼	760	211 4	175 33 2	76 14 2
270	75 0	62 18 0	27 5 0½	770	213 32	178 8 4	77 14 3¼
280	77 28	64 29 2	28 5 1¾	780	216 24	180 20 0	78 14 4½
290	80 20	67 4 4	29 5 3	790	219 16	182 31 2	79 14 5¾
300	83 12	69 16 0	30 5 4½	800	222 8	185 6 4	80 15 0
310	86 4	71 27 2	31 5 5¾	810	225 0	187 18 0	81 15 1½
320	88 32	74 2 4	32 6 0	820	227 28	189 29 2	82 15 2¾
330	91 24	76 14 0	33 6 1¼	830	230 20	192 4 4	83 15 4
340	94 16	78 25 2	34 6 2¾	840	233 12	194 16 0	84 15 5½
350	97 8	81 0 4	35 6 4	850	236 4	196 27 2	85 15 6¾
360	100 0	83 12 0	36 6 5¼	860	238 32	199 2 4	86 16 1
370	102 28	85 23 2	37 6 6½	870	241 24	201 14 0	87 16 2¼
380	105 20	87 34 4	38 7 1	880	244 16	203 25 2	88 16 3½
390	108 12	90 10 0	39 7 2¼	890	247 8	206 0 4	89 16 5
400	111 4	92 21 2	40 7 3½	900	250 0	208 12 0	90 16 6¼
410	113 32	94 32 4	41 7 5	910	252 28	210 23 2	91 17 0½
420	116 24	97 8 0	42 7 6¼	920	255 20	212 34 4	92 17 2
430	119 16	99 19 2	43 8 0½	930	258 12	215 10 0	93 17 3¼
440	122 8	101 30 4	44 8 1¾	940	261 4	217 21 2	94 17 4½
450	125 0	104 6 0	45 8 3	950	263 32	219 32 4	95 17 6
460	127 28	106 17 2	46 8 4½	960	266 24	222 8 0	97 0 0¼
470	130 20	108 28 4	47 8 5¾	970	269 16	224 19 2	98 0 1½
480	133 12	111 4 0	48 9 0	980	272 8	226 30 4	99 0 3
490	136 4	113 15 2	49 9 1½	990	275 0	229 6 0	100 0 4
500	138 32	115 26 4	50 9 2¾	1Mill.	277 28	231 17 2	101 0 5½

1200 Reed 1682 Dents. } 52 INCHES WIDE. { 1400 Reed 1970 Dents.
1300 ..... 1825 ..... } { 1500 ..... 2117 .....

Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF						WEFT REQUIRED.			Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF						WEFT REQUIRED.		
	100 picks per inch.		120 picks per inch.								100 picks per inch.		120 picks per inch.						
	Yds.	In.	Yds.	In.	6ths.		No.	Sk.	Thd.		Yds.	In.	Yds.	In.	6ths.		Spy.	No.	Sk.
50	0	½	0	0	2½		0	0	53	5000	1	14	1	5	4		0	9	3¾
100	0	1	0	0	5		0	1	26	5100	1	15	1	6	3		0	9	4½
200	0	2	0	1	4		0	2	52	5200	1	16	1	7	2		0	9	5¾
300	0	3	0	2	3		0	3	78	5300	1	17	1	8	1		0	10	0
400	0	4	0	3	2		0	5	24	5400	1	18	1	9	0		0	10	1½
500	0	5	0	4	1		0	6	50	5500	1	19	1	9	5		0	10	2¾
600	0	6	0	5	0		1	0	76	5600	1	20	1	10	4		0	10	4
700	0	7	0	5	5		1	2	22	5700	1	21	1	11	3		0	10	5½
800	0	8	0	6	4		1	3	47	5800	1	22	1	12	2		0	10	6¾
900	0	9	0	7	3		1	4	73	5900	1	23	1	13	1		0	11	1
1000	0	10	0	8	2		1	6	19	6000	1	24	1	14	0		0	11	2½
1100	0	11	0	9	1		2	0	45	6100	1	25	1	14	5		0	11	3¾
1200	0	12	0	10	0		2	1	71	6200	1	26	1	15	4		0	11	5
1300	0	13	0	10	5		2	3	17	6300	1	27	1	16	3		0	11	6½
1400	0	14	0	11	4		2	4	43	6400	1	28	1	17	2		0	12	0¾
1500	0	15	0	12	3		2	5	69	6500	1	29	1	18	1		0	12	2
1600	0	16	0	13	2		3	0	15	6600	1	30	1	19	0		0	12	3
1700	0	17	0	14	1		3	1	41	6700	1	31	1	19	5		0	12	4¾
1800	0	18	0	15	0		3	2	67	6800	1	32	1	20	4		0	12	6
1900	0	19	0	15	5		3	4	13	6900	1	33	1	21	3		0	13	0¼
2000	0	20	0	16	4		3	5	39	7000	1	34	1	22	2		0	13	1¾
2100	0	21	0	17	3		3	6	64	7100	1	35	1	23	1		0	13	3
2200	0	22	0	18	2		4	1	10	7200	2	0	1	24	0		0	13	4¼
2300	0	23	0	19	1		4	2	36	7300	2	1	1	24	5		0	13	5½
2400	0	24	0	20	0		4	3	62	7400	2	2	1	25	4		0	14	0
2500	0	25	0	20	5		4	5	8	7500	2	3	1	26	3		0	14	1¼
2600	0	26	0	21	4		4	6	34	7600	2	4	1	27	2		0	14	2½
2700	0	27	0	22	3		5	0	60	7700	2	5	1	28	1		0	14	4
2800	0	28	0	23	2		5	2	6	7800	2	6	1	29	0		0	14	5¼
2900	0	29	0	24	1		5	3	32	7900	2	7	1	29	5		0	14	6½
3000	0	30	0	25	0		5	4	57	8000	2	8	1	30	4		0	15	1
3100	0	31	0	25	5		5	6	4	8100	2	9	1	31	3		0	15	2¼
3200	0	32	0	26	4		6	0	30	8200	2	10	1	32	2		0	15	3½
3300	0	33	0	27	3		6	1	56	8300	2	11	1	33	1		0	15	5
3400	0	34	0	28	2		6	3	2	8400	2	12	1	34	0		0	15	6¼
3500	0	35	0	29	1		6	4	27	8500	2	13	1	34	5		0	16	0½
3600	1	0	0	30	0		6	5	53	8600	2	14	1	35	4		0	16	1¾
3700	1	1	0	30	5		6	6	79	8700	2	15	2	0	3		0	16	3¼
3800	1	2	0	31	4		7	1	25	8800	2	16	2	1	2		0	16	4½
3900	1	3	0	32	3		7	2	51	8900	2	17	2	2	1		0	16	5¾
4000	1	4	0	33	2		7	3	77	9000	2	18	2	3	0		0	17	0
4100	1	5	0	34	1		7	5	23	9100	2	19	2	3	5		0	17	1½
4200	1	6	0	35	0		7	6	49	9200	2	20	2	4	4		0	17	2¾
4300	1	7	0	35	5		8	0	75	9300	2	21	2	5	3		0	17	4
4400	1	8	1	0	4		8	2	21	9400	2	22	2	6	2		0	17	5½
4500	1	9	1	1	3		8	3	47	9500	2	23	2	7	1		0	17	6¾
4600	1	10	1	2	2		8	4	73	9600	2	24	2	8	0		1	0	1
4700	1	11	1	3	1		8	6	19	9700	2	25	2	8	5		1	0	2
4800	1	12	1	4	0		9	0	44	9800	2	26	2	9	4		1	0	3¾
4900	1	13	1	4	5		9	1	70	9900	2	27	2	10	3		1	0	5

1600 Reed 2245 Dents. / 1700 ..... 2390 ..... } 52 INCHES WIDE. } 1800 Reed 2535 Dents. / 2000 ..... 2810 .....

Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.	120 picks per inch.	WEFT REQUIRED.	Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.	120 picks per inch.	WEFT REQUIRED.
Thads.	Yds. In.	Yds. In. 6ths.	Spy. No. Sk.	Thads	Yds. In.	Yds. In. 6ths	Spy. No. Sk.
10	2 28	2 11 2	1 0 6¼	510	141 24	118 2 0	53 10 4½
20	5 20	4 22 4	2 1 5½	520	144 16	120 13 2	54 11 4
30	8 12	6 34 0	3 2 5¼	530	147 8	122 24 4	55 12 3½
40	11 4	9 9 2	4 3 4½	540	150 0	125 0 0	55 13 2¾
50	13 32	11 20 4	5 4 4	550	152 26	127 11 2	57 14 2¼
60	16 24	13 32 0	6 5 3½	560	155 20	129 22 4	58 15 1
70	19 16	16 7 2	7 6 2¾	570	158 12	131 34 0	59 16 1½
80	22 8	18 18 4	8 7 2	580	161 4	134 9 2	60 17 0½
90	25 0	20 30 0	9 8 1½	590	163 32	136 20 4	61 17 0¾
100	27 28	23 5 2	10 9 1	600	166 24	138 32 0	63 0 0¼
110	30 20	25 16 4	11 10 0½	610	169 16	141 7 2	64 1 5½
120	33 12	27 28 0	12 10 6¾	620	172 8	143 18 4	65 2 5
130	36 4	30 3 2	13 11 6¼	630	175 0	145 30 0	66 3 4½
140	38 32	32 14 4	14 12 5½	640	177 28	148 5 2	67 4 3¾
150	41 24	34 26 0	15 13 5	650	180 20	150 16 4	68 5 3¼
160	44 16	37 1 2	16 14 4½	660	183 12	152 28 0	69 6 2½
170	47 8	39 12 4	17 15 3¾	670	186 4	155 3 2	70 7 2
180	50 0	41 24 0	18 16 3¼	680	188 32	157 14 4	71 8 1½
190	52 28	43 35 2	19 17 2½	690	191 24	159 26 0	72 9 0¼
200	55 20	46 10 4	21 0 2	700	194 16	162 1 2	73 10 0
210	58 12	48 22 0	22 1 1½	710	197 8	164 12 4	74 10 0½
220	61 4	50 33 2	23 2 1	720	200 0	166 24 0	75 11 0
230	63 32	53 8 4	24 3 0¼	730	202 28	168 35 2	76 12 5¼
240	66 24	55 20 0	25 3 6½	740	205 20	171 10 4	77 13 4¾
250	69 16	57 31 2	26 4 6	750	208 12	173 22 0	78 14 4¼
260	72 8	60 6 4	27 5 5½	760	211 4	175 33 2	79 15 3½
270	75 0	62 18 0	28 6 5	770	213 32	178 8 4	80 16 3
280	77 28	64 29 2	29 7 4¾	780	216 24	180 20 0	81 17 2½
290	80 20	67 4 4	30 8 3½	790	219 16	182 31 2	83 0 1¾
300	83 12	69 16 0	31 9 3	800	222 8	185 6 4	84 1 1
310	86 4	71 27 2	32 10 2½	810	225 0	187 18 0	85 2 0½
320	88 32	74 2 4	33 11 1¾	820	227 28	189 29 2	86 3 0
330	91 24	76 14 0	34 12 1¼	830	230 20	192 4 4	87 3 6½
340	94 16	78 25 2	35 13 0¾	840	233 12	194 16 0	88 4 5¾
350	97 8	81 0 4	36 14 0	850	236 4	196 27 2	89 5 5
360	100 0	83 12 0	37 14 6½	860	238 32	199 2 4	90 6 4½
370	102 28	85 23 2	38 15 5¾	870	241 24	201 14 0	91 7 4
380	105 20	87 34 4	39 16 5	880	244 16	203 25 2	92 8 3½
390	108 12	90 10 0	40 17 4	890	247 8	206 0 4	93 9 2¾
400	111 4	92 21 2	42 0 4	900	250 0	208 12 0	94 10 2¼
410	113 32	94 32 4	43 1 3½	910	252 28	210 23 2	95 11 1½
420	116 24	97 8 0	44 2 2¾	920	255 20	212 34 4	96 12 1
430	119 16	99 19 2	45 3 2¼	930	258 12	215 10 0	97 13 0½
440	122 8	101 30 4	46 4 1½	940	261 4	217 21 2	98 13 6½
450	125 0	104 6 0	47 5 1	950	263 32	219 32 4	99 14 6¼
460	127 28	106 17 2	48 6 0¼	960	266 24	222 8 0	100 15 5½
470	130 20	108 28 4	49 6 6¾	970	269 16	224 19 2	101 16 5
480	133 12	111 4 0	50 7 6¼	980	272 8	226 30 4	102 17 4½
490	136 4	113 15 2	51 8 5½	990	275 0	229 6 0	104 0 3¾
500	138 32	115 26 4	52 9 5	1Mill.	277 28	231 17 2	105 1 3¼

1200 Reed 1746 Dents. 1300 ..... 1896 ..... } 54 INCHES WIDE. { 1400 Reed 2046 Dents. 1500 ..... 2199 .....

Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF						WEFT REQUIRED.			Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF						WEFT REQUIRED.		
	100 picks per inch.		120 picks per inch.								100 picks per inch.		120 picks per inch.						
	Yds.	In.	Yds.	In.	6ths.		No. Sk.	Thd.			Yds.	In.	Yds.	In.	6ths.		Spy. No.	Sk.	
50	0	½	0	0	2½		0 0	55		5000	1	14	1	5	4		0 9	5¾	
100	0	1	0	0	5		0 1	30		5100	1	15	1	6	3		0 10	0	
200	0	2	0	1	4		0 2	60		5200	1	16	1	7	2		0 10	1½	
300	0	3	0	2	3		0 4	10		5300	1	17	1	8	1		0 10	2¾	
400	0	4	0	3	2		0 5	40		5400	1	18	1	9	0		0 10	4¼	
500	0	5	0	4	1		0 6	70		5500	1	19	1	9	5		0 10	5½	
600	0	6	0	5	0		1 1	20		5600	1	20	1	10	4		0 11	0	
700	0	7	0	5	5		1 2	50		5700	1	21	1	11	3		0 11	1¼	
800	0	8	0	6	4		1 4	0		5800	1	22	1	12	2		0 11	2¾	
900	0	9	0	7	3		1 5	30		5900	1	23	1	13	1		0 11	4	
1000	0	10	0	8	2		1 6	60		6000	1	24	1	14	0		0 11	5½	
1100	0	11	0	9	1		2 1	10		6100	1	25	1	14	5		0 11	6¼	
1200	0	12	0	10	0		2 2	40		6200	1	26	1	15	4		0 12	1¼	
1300	0	13	0	10	5		2 3	70		6300	1	27	1	16	3		0 12	2½	
1400	0	14	0	11	4		2 5	20		6400	1	28	1	17	2		0 12	4	
1500	0	15	0	12	3		2 6	50		6500	1	29	1	18	1		0 12	5¼	
1600	0	16	0	13	2		3 1	0		6600	1	30	1	19	0		0 12	6¾	
1700	0	17	0	14	1		3 2	30		6700	1	31	1	19	5		0 13	1	
1800	0	18	0	15	0		3 3	60		6800	1	32	1	20	4		0 13	2½	
1900	0	19	0	15	5		3 5	10		6900	1	33	1	21	3		0 13	4	
2000	0	20	0	16	4		3 6	40		7000	1	34	1	22	2		0 13	5¼	
2100	0	21	0	17	3		4 0	70		7100	1	35	1	23	1		0 13	6½	
2200	0	22	0	18	2		4 2	20		7200	2	0	1	24	0		0 14	1	
2300	0	23	0	19	1		4 3	50		7300	2	1	1	24	5		0 14	2½	
2400	0	24	0	20	0		4 5	0		7400	2	2	1	25	4		0 14	3¼	
2500	0	25	0	20	5		4 6	30		7500	2	3	1	26	3		0 14	5	
2600	0	26	0	21	4		5 0	60		7600	2	4	1	27	2		0 14	6½	
2700	0	27	0	22	3		5 2	10		7700	2	5	1	28	1		0 15	1	
2800	0	28	0	23	2		5 3	40		7800	2	6	1	29	0		0 15	2¼	
2900	0	29	0	24	1		5 4	70		7900	2	7	1	29	5		0 15	3½	
3000	0	30	0	25	0		5 6	20		8000	2	8	1	30	4		0 15	5	
3100	0	31	0	25	5		6 0	50		8100	2	9	1	31	3		0 15	6½	
3200	0	32	0	26	4		6 2	0		8200	2	10	1	32	2		0 16	0¾	
3300	0	33	0	27	3		6 3	30		8300	2	11	1	33	1		0 16	2	
3400	0	34	0	28	2		6 4	60		8400	2	12	1	34	0		0 16	3½	
3500	0	35	0	29	1		6 6	10		8500	2	13	1	34	5		0 16	5	
3600	1	0	0	30	0		7 0	40		8600	2	14	1	35	4		0 16	6¼	
3700	1	1	0	30	5		7 1	70		8700	2	15	2	0	3		0 17	0½	
3800	1	2	0	31	4		7 3	20		8800	2	16	2	1	2		0 17	2	
3900	1	3	0	32	3		7 4	50		8900	2	17	2	2	1		0 17	3½	
4000	1	4	0	33	2		7 6	0		9000	2	18	2	3	0		0 17	4¾	
4100	1	5	0	34	1		8 0	30		9100	2	19	2	3	5		0 17	6	
4200	1	6	0	35	0		8 1	60		9200	2	20	2	4	4		1 0	0½	
4300	1	7	0	35	5		8 3	10		9300	2	21	2	5	3		1 0	2	
4400	1	8	1	0	4		8 4	40		9400	2	22	2	6	2		1 0	3¾	
4500	1	9	1	1	3		8 5	70		9500	2	23	2	7	1		1 0	4½	
4600	1	10	1	2	2		9 0	20		9600	2	24	2	8	0		1 0	6	
4700	1	11	1	3	1		9 1	50		9700	2	25	2	8	5		1 1	0½	
4800	1	12	1	4	0		9 3	0		9800	2	26	2	9	4		1 1	1¾	
4900	1	13	1	4	5		9 4	30		9900	2	27	2	10	3		1 1	3	

1600 Reed 2331 Dents. 1700 ..... 2432 ..... } 54 INCHES WIDE. { 1800 Reed 2633 Dents. 2000 ..... 2918 .....

Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF		WEFT	Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF		WEFT
	100 picks per inch.	120 picks per inch.	REQUIRED.		100 picks per inch.	120 picks per inch.	REQUIRED.
Thads.	Yds. In.	Yds. In. 6ths.	Spy. No. Sk.	Thads.	Yds. In.	Yds. In. ths	Spy. No Sk.
10	2 28	2 11 2	1 1 4½	510	141 24	118 2 0	55 11 5½
20	5 20	4 22 4	2 3 2	520	144 16	120 13 2	56 13 3
30	8 12	6 34 0	3 4 6½	530	147 8	122 24 4	57 15 0½
40	11 4	9 9 2	4 6 4	540	150 0	125 0 0	58 16 5
50	13 32	11 20 4	5 8 1½	550	152 28	127 11 2	60 0 2½
60	16 24	13 32 0	6 9 6	560	155 20	129 22 4	61 2 0
70	19 16	16 7 2	7 11 3½	570	158 12	131 34 0	62 3 4½
80	22 8	18 18 4	8 13 1	580	161 4	134 9 2	63 5 2
90	25 0	20 30 0	9 14 5½	590	163 32	136 20 4	64 6 6½
100	27 28	23 5 2	10 16 3	600	166 24	138 32 0	65 8 4
110	30 20	25 16 4	12 0 0½	610	169 16	141 7 2	66 10 1½
120	33 12	27 28 0	13 1 5	620	172 8	143 18 4	67 11 6
130	36 4	30 3 2	14 3 2½	630	175 0	145 30 0	68 13 3½
140	38 32	32 14 4	15 5 0	640	177 28	148 5 2	69 15 1
150	41 24	34 26 0	16 6 4½	650	180 20	150 16 4	70 16 5½
160	44 16	37 1 2	17 8 2	660	183 12	152 28 0	72 0 3
170	47 8	39 12 4	18 9 6½	670	186 4	155 3 2	73 2 0½
180	50 0	41 24 0	19 11 4	680	188 32	157 14 4	74 3 5
190	52 28	43 35 2	20 13 1½	690	191 24	159 26 0	75 5 2½
200	55 20	46 10 4	21 14 6	700	194 16	162 1 2	76 7 0
210	58 12	48 22 0	22 16 3½	710	197 8	164 12 4	77 8 4½
220	61 4	50 33 2	24 0 1	720	200 0	166 24 0	78 10 2
230	63 32	53 8 4	25 1 5½	730	202 28	168 35 2	79 11 6½
240	66 24	55 20 0	26 3 3	740	205 20	171 10 4	80 13 4
250	69 16	57 31 2	27 5 0½	750	208 12	173 22 0	81 15 1½
260	72 8	60 6 4	28 6 5	760	211 4	175 33 2	82 16 6
270	75 0	62 18 0	29 8 2½	770	213 32	178 8 4	84 0 3½
280	77 28	64 29 2	30 10 0	780	216 24	180 20 0	85 2 1
290	80 20	67 4 4	31 11 4½	790	219 16	182 31 2	86 3 5½
300	83 12	69 16 0	32 13 2	800	222 8	185 6 4	87 5 3
310	86 4	71 27 2	33 14 6½	810	225 0	187 18 0	88 7 0½
320	88 32	74 2 4	34 16 4	820	227 28	189 29 2	89 8 5
330	91 24	76 14 0	36 0 1½	830	230 20	192 4 4	90 10 2½
340	94 16	78 25 2	37 1 6	840	233 12	194 16 0	91 12 0
350	97 8	81 0 4	38 3 3½	850	236 4	196 27 2	92 13 4½
360	100 0	83 12 0	39 5 1	860	238 32	199 2 4	93 15 2
370	102 28	85 23 2	40 6 5½	870	241 24	201 14 0	94 16 6½
380	105 20	87 34 4	41 8 3	880	244 16	203 25 2	96 0 4
390	108 12	90 10 0	42 10 0½	890	247 8	206 0 4	97 2 1½
400	111 4	92 21 2	43 11 5	900	250 0	208 12 0	98 3 6
410	113 32	94 32 4	44 13 2½	910	252 28	210 23 2	99 5 3½
420	116 24	97 8 0	45 15 0	920	255 20	212 34 4	100 7 1
430	119 16	99 19 2	46 16 4½	930	258 12	215 10 0	101 8 5½
440	122 8	101 30 4	48 0 2	940	261 4	217 21 2	102 10 3
450	125 0	104 6 0	49 1 6½	950	263 32	219 32 4	103 12 0½
460	127 28	106 17 2	50 3 4	960	266 24	222 8 0	104 13 5
470	130 20	108 28 4	51 5 1½	970	269 16	224 19 2	105 15 2½
480	133 12	111 4 0	52 6 6	980	272 8	226 30 4	106 17 0
490	136 4	113 15 2	53 8 3½	990	275 0	229 6 0	108 0 4½
500	138 32	115 26 4	54 10 1	1Mill.	277 28	231 17 2	109 2 2

1200 Reed 1810 Dents. / 1300 ..... 1965 ..... } 56 INCHES WIDE. { 1400 Reed 2122 Dents. / 1500 ..... 2281 .....

Picks or Shots of Weft.	Quantity of Cloth at the rates of						Weft required.			Picks or Shots of Weft.	Quantity of Cloth at the rates of						Weft required.		
	100 picks per inch.		120 picks per inch.								100 picks per inch.		120 picks per inch.						
	Yds.	In.	Yds.	In.	6ths.		No.	Sk.	Thd.		Yds.	In.	Yds.	In.	6ths.		Spy.	No.	Sk.
50	0	½	0	0	2½		0	0	57	5000	1	14	1	5	4		0	10	1¼
100	0	1	0	0	5		0	1	34	5100	1	15	1	6	3		0	10	2¼
200	0	2	0	1	4		0	2	68	5200	1	16	1	7	2		0	10	4
300	0	3	0	2	3		0	4	22	5300	1	17	1	8	1		0	10	5½
400	0	4	0	3	2		0	5	56	5400	1	18	1	9	0		0	11	0
500	0	5	0	4	1		1	0	10	5500	1	19	1	9	5		0	11	1¼
600	0	6	0	5	0		1	1	44	5600	1	20	1	10	4		0	11	2¾
700	0	7	0	5	5		1	2	79	5700	1	21	1	11	3		0	11	4¼
800	0	8	0	6	4		1	4	33	5800	1	22	1	12	2		0	11	5½
900	0	9	0	7	3		1	5	67	5900	1	23	1	13	1		0	12	0
1000	0	10	0	8	2		2	0	21	6000	1	24	1	14	0		0	12	1¼
1100	0	11	0	9	1		2	1	55	6100	1	25	1	14	5		0	12	3
1200	0	12	0	10	0		2	3	9	6200	1	26	1	15	4		0	12	4¼
1300	0	13	0	10	5		2	4	43	6300	1	27	1	16	3		0	12	5¾
1400	0	14	0	11	4		2	5	77	6400	1	28	1	17	2		0	13	0¼
1500	0	15	0	12	3		3	0	31	6500	1	29	1	18	1		0	13	1¾
1600	0	16	0	13	2		3	1	65	6600	1	30	1	19	0		0	13	3
1700	0	17	0	14	1		3	3	19	6700	1	31	1	19	5		0	13	4½
1800	0	18	0	15	0		3	4	53	6800	1	32	1	20	4		0	13	6
1900	0	19	0	15	5		3	6	7	6900	1	33	1	21	3		0	14	0½
2000	0	20	0	16	4		4	0	41	7000	1	34	1	22	2		0	14	1¾
2100	0	21	0	17	3		4	1	76	7100	1	35	1	23	1		0	14	3¼
2200	0	22	0	18	2		4	3	30	7200	2	0	1	24	0		0	14	4½
2300	0	23	0	19	1		4	4	64	7300	2	1	1	24	5		0	14	6
2400	0	24	0	20	0		4	6	18	7400	2	2	1	25	4		0	15	0½
2500	0	25	0	20	5		5	0	52	7500	2	3	1	26	3		0	15	2
2600	0	26	0	21	4		5	2	6	7600	2	4	1	27	2		0	15	3¼
2700	0	27	0	22	3		5	3	40	7700	2	5	1	28	1		0	15	4¾
2800	0	28	0	23	2		5	4	74	7800	2	6	1	29	0		0	15	6¼
2900	0	29	0	24	1		5	6	28	7900	2	7	1	29	5		0	16	0½
3000	0	30	0	25	0		6	0	62	8000	2	8	1	30	4		0	16	2
3100	0	31	0	25	5		6	2	16	8100	2	9	1	31	3		0	16	3½
3200	0	32	0	26	4		6	3	50	8200	2	10	1	32	2		0	16	5
3300	0	33	0	27	3		6	5	4	8300	2	11	1	33	1		0	16	6¼
3400	0	34	0	28	2		6	6	39	8400	2	12	1	34	0		0	17	0¾
3500	0	35	0	29	1		7	0	73	8500	2	13	1	34	5		0	17	2¼
3600	1	0	0	30	0		7	2	27	8600	2	14	1	35	4		0	17	3½
3700	1	1	0	30	5		7	3	61	8700	2	15	2	0	3		0	17	5
3800	1	2	0	31	4		7	5	15	8800	2	16	2	1	2		0	17	6½
3900	1	3	0	32	3		7	6	49	8900	2	17	2	2	1		1	0	1
4000	1	4	0	33	2		8	1	3	9000	2	18	2	3	0		1	0	2¼
4100	1	5	0	34	1		8	2	37	9100	2	19	2	3	5		1	0	3¾
4200	1	6	0	35	0		8	3	71	9200	2	20	2	4	4		1	0	5¼
4300	1	7	0	35	5		8	5	25	9300	2	21	2	5	3		1	0	6½
4400	1	8	1	0	4		8	6	59	9400	2	22	2	6	2		1	1	1
4500	1	9	1	1	3		9	1	13	9500	2	23	2	7	1		1	1	2½
4600	1	10	1	2	2		9	2	47	9600	2	24	2	8	0		1	1	4
4700	1	11	1	3	1		9	4	2	9700	2	25	2	8	5		1	1	5¼
4800	1	12	1	4	0		9	5	36	9800	2	26	2	9	4		1	1	6¾
4900	1	13	1	4	5		9	6	70	9900	2	27	2	10	3		1	2	1

1600 Reed 2420 Dents. 1700 ..... 2575	56 INCHES WIDE.	1800 Reed 2730 Dents. 2000 ..... 3025 .....

Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF			WEFT REQUIRED.			Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF				WEFT REQUIRED.		
	100 picks per inch.		120 picks per inch.					100 picks per inch.		120 picks per inch.				
Thads.	Yds.	In.	Yds.	In.	6ths.	Spy. No. Sk.	Thads.	Yds.	In.	Yds.	In.	ths.	Spy. No. Sk.	
10	2	28	2	11	2	1 2 2½	510	141	24	118	2	0	57 12 0¼	
20	5	20	4	22	4	2 4 5¼	520	144	16	120	13	2	58 15 1½	
30	8	12	6	34	0	3 7 0¾	530	147	8	122	24	4	59 17 4½	
40	11	4	9	9	2	4 9 3¼	540	150	0	125	0	0	61 2 0	
50	13	32	11	20	4	5 11 6	550	152	28	127	11	2	62 4 2½	
60	16	24	13	32	0	6 14 1½	560	155	20	129	22	4	63 6 5¼	
70	19	16	16	7	2	7 16 4	570	158	12	131	34	0	64 9 0¾	
80	22	8	18	18	4	9 0 6¾	580	161	4	134	9	2	65 11 3¼	
90	25	0	20	30	0	10 3 2¾	590	163	32	136	20	4	66 13 6	
100	27	28	23	5	2	11 5 5	600	166	24	138	32	0	67 16 1½	
110	30	20	25	16	4	12 8 0½	610	169	16	141	7	2	69 0 4	
120	33	12	27	28	0	13 10 3	620	172	8	143	18	4	70 2 6¾	
130	36	4	30	3	2	14 12 5¼	630	175	0	145	30	0	71 5 2¼	
140	38	32	32	14	4	15 5 1¾	640	177	28	148	5	2	72 7 5	
150	41	24	34	26	0	16 17 4	650	180	20	150	16	4	73 10 0½	
160	44	16	37	1	2	18 1 6½	660	183	12	152	28	0	74 12 3	
170	47	8	39	12	4	19 4 2	670	186	4	155	3	2	75 14 5¾	
180	50	0	41	24	0	20 6 4½	680	188	32	157	14	4	76 17 1¼	
190	52	28	43	35	2	21 9 0¼	690	191	24	159	26	0	78 1 4	
200	55	20	46	10	4	22 11 3	700	194	16	162	1	2	79 3 6½	
210	58	12	48	22	0	23 13 5½	710	197	8	164	12	4	80 6 2	
220	61	4	50	33	2	24 16 1	720	200	0	166	24	0	81 8 4½	
230	63	32	53	8	4	26 0 3½	730	202	28	168	35	2	82 11 0¼	
240	66	24	55	20	0	27 2 6¼	740	205	20	171	10	4	83 13 3	
250	69	16	57	31	2	28 5 1¾	750	208	12	173	22	0	84 15 5½	
260	72	8	60	6	4	29 7 4½	760	211	4	175	33	2	86 0 1	
270	75	0	62	18	0	30 10 0	770	213	32	178	8	4	87 2 3¼	
280	77	28	64	29	2	31 12 2½	780	216	24	180	20	0	88 4 6¼	
290	80	20	67	4	4	32 14 5¼	790	219	16	182	31	2	89 7 1¾	
300	83	12	69	16	0	33 17 0¾	800	222	8	185	6	4	90 9 4½	
310	86	4	71	27	2	35 1 3¼	810	225	0	187	18	0	91 12 0	
320	88	32	74	2	4	36 3 6	820	227	28	189	29	2	92 14 2½	
330	91	24	76	14	0	37 6 1½	830	230	20	192	4	4	93 16 5¼	
340	94	16	78	25	2	38 8 4	840	233	12	194	16	0	95 1 0¾	
350	97	8	81	0	4	39 10 6¾	850	236	4	196	27	2	96 3 3¼	
360	100	0	83	12	0	40 13 2¼	860	238	32	199	2	4	97 5 6	
370	102	28	85	23	2	41 15 5	870	241	24	201	14	0	98 8 1½	
380	105	20	87	34	4	43 0 0½	880	244	16	203	25	2	99 10 4	
390	108	12	90	10	0	44 2 3	890	247	8	206	0	4	100 12 6¾	
400	111	4	92	21	2	45 4 5¼	900	250	0	208	12	0	101 15 2¼	
410	113	32	94	32	4	46 7 1¼	910	252	28	210	23	2	102 17 5	
420	116	24	97	8	0	47 9 4	920	255	20	212	34	4	104 2 0¼	
430	119	16	99	19	2	48 11 6½	930	258	12	215	10	0	105 4 3	
440	122	8	101	30	4	49 14 2	940	261	4	217	21	2	106 6 5¾	
450	125	0	104	6	0	50 16 4¾	950	263	32	219	32	4	107 9 1¼	
460	127	28	106	17	2	52 1 0¼	960	266	24	222	8	0	108 11 4	
470	130	20	108	28	4	53 3 2¾	970	269	16	224	19	2	109 13 6½	
480	133	12	111	4	0	54 5 5½	980	272	8	226	30	4	110 16 2	
490	136	4	113	15	2	55 8 1	990	275	0	229	6	0	112 0 4¼	
500	138	32	115	26	4	56 10 3½	1Mill.	277	28	231	17	2	113 3 0¼	

1200 Reed 1880 Dents. } 58 INCHES WIDE. { 1400 Reed 2195 Dents.
1300 ..... 2035 ..... } { 1500 ..... 2355 .....

Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF						WEFT REQUIRED.			Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF						WEFT REQUIRED.		
	100 picks per inch.		120 picks per inch.								100 picks per inch.		120 picks per inch.						
	Yds.	In.	Yds.	In.	6ths.		No.	Sk.	Thd.		Yds.	In.	Yds.	In.	6ths.		Spy.	No.	Sk.
50	0	½	0	0	2½		0	0	59	5000	1	14	1	5	4		0	10	3¾
100	0	1	0	0	5		0	1	38	5100	1	15	1	6	3		0	10	5¼
200	0	2	0	1	4		0	2	76	5200	1	16	1	7	2		0	10	6¾
300	0	3	0	2	3		0	4	34	5300	1	17	1	8	1		0	11	1¾
400	0	4	0	3	2		0	5	73	5400	1	18	1	9	0		0	11	2¾
500	0	5	0	4	1		1	0	31	5500	1	19	1	9	5		0	11	4¼
600	0	6	0	5	0		1	1	69	5600	1	20	1	10	4		0	11	5¾
700	0	7	0	5	5		1	3	27	5700	1	21	1	11	3		0	12	0¼
800	0	8	0	6	4		1	4	65	5800	1	22	1	12	2		0	12	1¾
900	0	9	0	7	3		1	6	23	5900	1	23	1	13	1		0	12	3
1000	0	10	0	8	2		2	0	61	6000	1	24	1	14	0		0	12	4½
1100	0	11	0	9	1		2	2	20	6100	1	25	1	14	5		0	12	6
1200	0	12	0	10	0		2	3	58	6200	1	26	1	15	4		0	13	0½
1300	0	13	0	10	5		2	5	16	6300	1	27	1	16	3		0	13	2
1400	0	14	0	11	4		2	6	54	6400	1	28	1	17	2		0	13	3½
1500	0	15	0	12	3		3	1	12	6500	1	29	1	18	1		0	13	5
1600	0	16	0	13	2		3	2	50	6600	1	30	1	19	0		0	13	6½
1700	0	17	0	14	1		3	4	9	6700	1	31	1	19	5		0	14	1
1800	0	18	0	15	0		3	5	47	6800	1	32	1	20	4		0	14	2½
1900	0	19	0	15	5		4	0	5	6900	1	33	1	21	3		0	14	4
2000	0	20	0	16	4		4	1	43	7000	1	34	1	22	2		0	14	5½
2100	0	21	0	17	3		4	3	1	7100	1	35	1	23	1		0	14	7
2200	0	22	0	18	2		4	4	39	7200	2	0	1	24	0		0	15	1¼
2300	0	23	0	19	1		4	5	78	7300	2	1	1	24	5		0	15	2¾
2400	0	24	0	20	0		5	0	36	7400	2	2	1	25	4		0	15	4¼
2500	0	25	0	20	5		5	1	74	7500	2	3	1	26	3		0	15	5¾
2600	0	26	0	21	4		5	3	32	7600	2	4	1	27	2		0	16	0¼
2700	0	27	0	22	3		5	4	71	7700	2	5	1	28	1		0	16	1¾
2800	0	28	0	23	2		5	6	28	7800	2	6	1	29	0		0	16	3¼
2900	0	29	0	24	1		6	0	66	7900	2	7	1	29	5		0	16	4¾
3000	0	30	0	25	0		6	2	24	8000	2	8	1	30	4		0	16	6
3100	0	31	0	25	5		6	3	33	8100	2	9	1	31	3		0	17	0½
3200	0	32	0	26	4		6	5	21	8200	2	10	1	32	2		0	17	2
3300	0	33	0	27	3		6	6	59	8300	2	11	1	33	1		0	17	3½
3400	0	34	0	28	2		7	1	17	8400	2	12	1	34	0		0	17	5
3500	0	35	0	29	1		7	2	55	8500	2	13	1	34	5		0	17	6½
3600	1	0	0	30	0		7	4	13	8600	2	14	1	35	4		1	0	1
3700	1	1	0	30	5		7	5	51	8700	2	15	2	0	3		1	0	2½
3800	1	2	0	31	4		8	0	10	8800	2	16	2	1	2		1	0	4
3900	1	3	0	32	3		8	1	48	8900	2	17	2	2	1		1	0	5½
4000	1	4	0	33	2		8	3	6	9000	2	18	2	3	0		1	1	0
4100	1	5	0	34	1		8	4	44	9100	2	19	2	3	5		1	1	1½
4200	1	6	0	35	0		8	6	2	9200	2	20	2	4	4		1	1	3
4300	1	7	0	35	5		9	0	40	9300	2	21	2	5	3		1	1	4¼
4400	1	8	1	0	4		9	1	79	9400	2	22	2	6	2		1	1	5¾
4500	1	9	1	1	3		9	3	37	9500	2	23	2	7	1		1	2	0¼
4600	1	10	1	2	2		9	4	75	9600	2	24	2	8	0		1	2	1¾
4700	1	11	1	3	1		9	6	33	9700	2	25	2	8	5		1	2	3¼
4800	1	12	1	4	0		10	0	71	9800	2	26	2	9	4		1	2	4¾
4900	1	13	1	4	5		10	2	29	9900	2	27	2	10	3		1	2	6¼

1600 Reed 2505 Dents. / 1700 ..... 2665 ..... — 58 INCHES WIDE. — 1800 Reed 2825 Dents. / 2000 ..... 3135 .....

Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.	QUANTITY OF CLOTH AT THE RATES OF 120 picks per inch.	WEFT REQUIRED.	Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.	QUANTITY OF CLOTH AT THE RATES OF 120 picks per inch.	WEFT REQUIRED.
Thsds.	Yds. In.	Yds. In. 6ths.	Spy. No. Sk.	Thsds.	Yds. In.	Yds. In. ths.	Spy. No. Sk.
10	2 28	2 11 2	1 3 0¾	510	141 24	118 2 0	59 13 7
20	5 20	4 22 4	2 6 1½	520	144 16	120 13 2	60 17 0½
30	8 12	6 34 0	3 9 2	530	147 8	122 24 4	62 2 1¼
40	11 4	9 9 2	4 12 2¾	540	150 0	125 0 0	63 5 2
50	13 32	11 20 4	5 15 3½	550	152 28	127 11 2	64 8 2½
60	16 24	13 32 0	7 0 4	560	155 20	129 22 4	65 11 3¼
70	19 16	16 7 2	8 3 4¾	570	158 12	131 34 0	66 14 4
80	22 8	18 18 4	9 6 5½	580	161 4	134 9 2	67 17 4¾
90	25 0	20 30 0	10 9 6¼	590	163 32	136 20 4	69 2 5½
100	27 28	23 5 2	11 13 0	600	166 24	138 32 0	70 5 6
110	30 20	25 16 4	12 16 0½	610	169 16	141 7 2	71 8 6¾
120	33 12	27 28 0	14 1 1¼	620	172 8	143 18 4	72 12 0½
130	36 4	30 3 2	15 4 2	630	175 0	145 30 0	73 15 1
140	38 32	32 14 4	16 7 2½	640	177 28	148 5 2	75 0 1¾
150	41 24	34 26 0	17 10 3¼	650	180 20	150 16 4	76 3 2½
160	44 16	37 1 2	18 13 4	660	183 12	152 28 0	77 6 3¼
170	47 8	39 12 4	19 16 4¼	670	186 4	155 3 2	78 9 4
180	50 0	41 24 0	21 1 5¼	680	188 32	157 14 4	79 12 4½
190	52 28	43 35 2	22 4 6	690	191 24	159 26 0	80 15 5¼
200	55 20	46 10 4	23 7 6½	700	194 16	162 1 2	82 0 6
210	58 12	48 22 0	24 11 0¾	710	197 8	164 12 4	83 3 6¾
220	61 4	50 33 2	25 14 1	720	200 0	166 24 0	84 7 0¼
230	63 32	53 8 4	26 17 1¾	730	202 28	168 35 2	85 10 1
240	66 24	55 20 0	28 2 2½	740	205 20	171 10 4	86 13 1½
250	69 16	57 31 2	29 5 3	750	208 12	173 22 0	87 16 2¼
260	72 8	60 6 4	30 8 3¾	760	211 4	175 33 2	89 1 3
270	75 0	62 18 0	31 11 4½	770	213 32	178 8 4	90 4 3¼
280	77 28	64 29 2	32 14 5¼	780	216 24	180 20 0	91 7 4½
290	80 20	67 4 4	33 17 6	790	219 16	182 31 2	92 10 5
300	83 12	69 16 0	35 2 6½	800	222 8	185 6 4	93 13 5¾
310	86 4	71 27 2	36 6 0¾	810	225 0	187 18 0	94 16 6½
320	88 32	74 2 4	37 9 1	820	227 28	189 29 2	96 2 0¼
330	91 24	76 14 0	38 12 1½	830	230 20	192 4 4	97 5 1
340	94 16	78 25 2	39 15 2¼	840	233 12	194 16 0	98 8 1½
350	97 8	81 0 4	41 0 3	850	236 4	196 27 2	99 11 2¾
360	100 0	83 12 0	42 3 3½	860	238 32	199 2 4	100 14 3
370	102 28	85 23 2	43 6 4¼	870	241 24	201 14 0	101 17 3½
380	105 20	87 34 4	44 9 5	880	244 16	203 25 2	103 2 4¼
390	108 12	90 10 0	45 12 5¾	890	247 8	206 0 4	104 5 5
400	111 4	92 21 2	46 15 6½	900	250 0	208 12 0	105 8 5¾
410	113 32	94 32 4	48 1 0	910	252 28	210 23 2	106 11 6¼
420	116 24	97 8 0	49 4 0¾	920	255 20	212 34 4	107 15 0¾
430	119 16	99 19 2	50 7 1½	930	258 12	215 10 0	109 0 1¼
440	122 8	101 30 4	51 10 2	940	261 4	217 21 2	110 3 2
450	125 0	104 6 0	52 13 2¾	950	263 32	219 32 4	111 6 2¾
460	127 28	106 17 2	53 16 3½	960	266 24	222 8 0	112 9 3¼
470	130 20	108 28 4	55 1 4¼	970	269 16	224 19 2	113 12 4
480	133 12	111 4 0	56 4 5	980	272 8	226 30 4	114 15 4¾
490	136 4	113 15 2	57 7 5½	990	275 0	229 6 0	116 0 5½
500	138 32	115 26 4	58 10 6¼	1Mill.	277 28	231 17 2	117 3 6

1200 Reed 1945 Dents. / 1300 ..... 2105 ..... } 60 INCHES WIDE. { 1400 Reed 2270 Dents. / 1500 ..... 2440 .....

Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.		QUANTITY OF CLOTH AT THE RATES OF 120 picks per inch.			WEFT REQUIRED.			Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.		QUANTITY OF CLOTH AT THE RATES OF 120 picks per inch.			WEFT REQUIRED.		
	Yds.	In.	Yds.	In.	6ths.	No.	Sk.	Thd.		Yds.	In.	Yds.	In.	6ths.	Spy.	No.	Sk.
50	0	½	0	0	2½	0	0	61	5000	1	14	1	5	4	0	10	6½
100	0	1	0	0	5	0	1	42	5100	1	15	1	6	3	0	11	1
200	0	2	0	1	4	0	3	4	5200	1	16	1	7	2	0	11	2½
300	0	3	0	2	3	0	4	47	5300	1	17	1	8	1	0	11	4
400	0	4	0	3	2	0	6	9	5400	1	18	1	9	0	0	11	5½
500	0	5	0	4	1	1	0	51	5500	1	19	1	9	5	0	12	0
600	0	6	0	5	0	1	2	13	5600	1	20	1	10	4	0	12	1½
700	0	7	0	5	5	1	3	56	5700	1	21	1	11	3	0	12	3
800	0	8	0	6	4	1	5	18	5800	1	22	1	12	2	0	12	4½
900	0	9	0	7	3	1	6	60	5900	1	23	1	13	1	0	12	6
1000	0	10	0	8	2	2	1	22	6000	1	24	1	14	0	0	13	0½
1100	0	11	0	9	1	2	2	64	6100	1	25	1	14	5	0	13	2
1200	0	12	0	10	0	2	4	27	6200	1	26	1	15	4	0	13	3½
1300	0	13	0	10	5	2	5	69	6300	1	27	1	16	3	0	13	5½
1400	0	14	0	11	4	3	0	31	6400	1	28	1	17	2	0	13	6½
1500	0	15	0	12	3	3	1	73	6500	1	29	1	18	1	0	14	1½
1600	0	16	0	13	2	3	3	35	6600	1	30	1	19	0	0	14	2½
1700	0	17	0	14	1	3	4	78	6700	1	31	1	19	5	0	14	4½
1800	0	18	0	15	0	3	6	40	6800	1	32	1	20	4	0	14	6
1900	0	19	0	15	5	4	1	2	6900	1	33	1	21	3	0	15	0½
2000	0	20	0	16	4	4	2	44	7000	1	34	1	22	2	0	15	2
2100	0	21	0	17	3	4	4	7	7100	1	35	1	23	1	0	15	3½
2200	0	22	0	18	2	4	5	49	7200	2	0	1	24	0	0	15	5
2300	0	23	0	19	1	5	0	11	7300	2	1	1	24	5	0	15	6½
2400	0	24	0	20	0	5	1	53	7400	2	2	1	25	4	0	16	1
2500	0	25	0	20	5	5	3	16	7500	2	3	1	26	3	0	16	2½
2600	0	26	0	21	4	5	4	58	7600	2	4	1	27	2	0	16	4
2700	0	27	0	22	3	5	6	20	7700	2	5	1	28	1	0	16	5½
2800	0	28	0	23	2	6	0	62	7800	2	6	1	29	0	0	17	0
2900	0	29	0	24	1	6	2	24	7900	2	7	1	29	5	0	17	1½
3000	0	30	0	25	0	6	3	67	8000	2	8	1	30	4	0	17	3½
3100	0	31	0	25	5	6	5	29	8100	2	9	1	31	3	0	17	4½
3200	0	32	0	26	4	6	6	71	8200	2	10	1	32	2	0	17	6½
3300	0	33	0	27	3	7	1	33	8300	2	11	1	33	1	1	0	0½
3400	0	34	0	28	2	7	2	76	8400	2	12	1	34	0	1	0	2½
3500	0	35	0	29	1	7	4	38	8500	2	13	1	34	5	1	0	3½
3600	1	0	0	30	0	7	6	0	8600	2	14	1	35	4	1	0	5½
3700	1	1	0	30	5	8	0	42	8700	2	15	2	0	3	1	1	0
3800	1	2	0	31	4	8	2	4	8800	2	16	2	1	2	1	1	1½
3900	1	3	0	32	3	8	3	47	8900	2	17	2	2	1	1	1	3
4000	1	4	0	33	2	8	5	9	9000	2	18	2	3	0	1	1	4½
4100	1	5	0	34	1	8	6	51	9100	2	19	2	3	5	1	1	6
4200	1	6	0	35	0	9	1	13	9200	2	20	2	4	4	1	2	0½
4300	1	7	0	35	5	9	2	56	9300	2	21	2	5	3	1	2	2
4400	1	8	1	0	4	9	4	18	9400	2	22	2	6	2	1	2	3½
4500	1	9	1	1	3	9	5	60	9500	2	23	2	7	1	1	2	5
4600	1	10	1	2	2	10	0	22	9600	2	24	2	8	0	1	2	6½
4700	1	11	1	3	1	10	1	64	9700	2	25	2	8	5	1	3	1½
4800	1	12	1	4	0	10	3	27	9800	2	26	2	9	4	1	3	2½
4900	1	13	1	4	5	10	4	69	9900	2	27	2	10	3	1	3	4½

1600 Reed 2595 Dents. / 1700 ..... 2750 ..... } 60 INCHES WIDE. { 1800 Reed 3245 Dents. / 2000 ..... 2920 .....

Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.	120 picks per inch.	WEFT REQUIRED.	Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.	120 picks per inch.	WEFT REQUIRED.
Thsds.	Yds. In.	Yds. In. 6ths.	Spy. No. Sk.	Thsds.	Yds. In.	Yds. In. ths.	Spy. No. Sk.
10	2 28	2 11 2	1 3 5¼	510	141 24	118 2 0	61 15 0½
20	5 20	4 22 4	2 7 4½	520	144 16	120 13 2	63 0 6½
30	8 12	6 34 0	3 11 3¾	530	147 8	122 24 4	64 4 5¼
40	11 4	9 9 2	4 15 2	540	150 0	125 0 0	65 8 4
50	13 32	11 20 4	6 1 1	550	152 28	127 11 2	66 12 2¾
60	16 24	13 32 0	7 4 6¾	560	155 20	129 22 4	67 16 1½
70	19 16	16 7 2	8 8 5½	570	158 12	131 34 0	69 2 0¼
80	22 8	18 18 4	9 12 4¼	580	161 4	134 9 2	70 5 6
90	25 0	20 30 0	10 16 3	590	163 32	136 20 4	71 9 5
100	27 28	23 5 2	12 2 1¾	600	166 24	138 32 0	72 13 3¾
110	30 20	25 16 4	13 6 0½	610	169 16	141 7 2	73 17 2½
120	33 12	27 28 0	14 9 6¾	620	172 8	143 18 4	75 3 1¼
130	36 4	30 3 2	15 13 5	630	175 0	145 30 0	76 7 0
140	38 32	32 14 4	16 17 4	640	177 28	148 5 2	77 10 5¾
150	41 24	34 26 0	18 3 2¾	650	180 20	150 16 4	78 14 4½
160	44 16	37 1 2	19 7 1½	660	183 12	152 28 0	80 0 3¼
170	47 8	39 12 4	20 11 0¼	670	186 4	155 3 2	81 4 2
180	50 0	41 24 0	21 14 6	680	188 32	157 14 4	82 8 1
190	52 28	43 35 2	23 0 4¾	690	191 24	159 26 0	83 11 6¾
200	55 20	46 10 4	24 4 3½	700	194 16	162 1 2	84 15 5½
210	58 12	48 22 0	25 8 2¼	710	197 8	164 12 4	86 1 4¼
220	61 4	50 33 2	26 12 1	720	200 0	166 24 0	87 5 3
230	63 32	53 8 4	27 16 0	730	202 28	168 35 2	88 9 1¾
240	66 24	55 20 0	29 1 5¾	740	205 20	171 10 4	89 13 0½
250	69 16	57 31 2	30 5 4½	750	208 12	173 22 0	90 16 0¼
260	72 8	60 6 4	31 9 3¼	760	211 4	175 33 2	92 2 5
270	75 0	62 18 0	32 13 2	770	213 32	178 8 4	93 6 4
280	77 28	64 29 2	33 17 0¾	780	216 24	180 20 0	94 10 2¾
290	80 20	67 4 4	35 2 6½	790	219 16	182 31 2	95 14 1½
300	83 12	69 16 0	36 6 5¼	800	222 8	185 6 4	97 0 0¼
310	86 4	71 27 2	37 10 4	810	225 0	187 18 0	98 3 6
320	88 32	74 2 4	38 14 3	820	227 28	189 29 2	99 7 4¾
330	91 24	76 14 0	40 0 1¾	830	230 20	192 4 4	100 11 3½
340	94 16	78 25 2	41 4 0½	840	233 12	194 16 0	101 15 2¼
350	97 8	81 0 4	42 7 6¼	850	236 4	196 27 2	103 1 1
360	100 0	83 12 0	43 11 5	860	238 32	199 2 4	104 5 0
370	102 28	85 23 2	44 15 3¾	870	241 24	201 14 0	105 8 5½
380	105 20	87 34 4	46 1 2½	880	244 16	203 25 2	106 12 4¾
390	108 12	90 10 0	47 5 1¼	890	247 8	206 0 4	107 16 3¼
400	111 4	92 21 2	48 9 0	900	250 0	208 12 0	109 2 2
410	113 32	94 32 4	49 2 6	910	252 28	210 23 2	110 6 0¾
420	116 24	97 8 0	50 16 4½	920	255 20	213 34 4	111 9 6½
430	119 16	99 19 2	52 2 3½	930	258 12	215 10 0	112 13 5¼
440	122 8	101 30 4	53 6 2¼	940	261 4	217 21 2	112 17 4
450	125 0	104 6 0	54 10 1	950	263 32	219 32 4	115 3 3
460	127 28	106 17 2	55 13 6¾	960	266 24	222 8 0	116 7 1¾
470	130 20	108 28 4	56 17 5½	970	269 16	224 19 2	117 11 0½
480	133 12	111 4 0	58 3 4¼	980	272 8	226 30 4	118 14 0¼
490	136 4	113 15 2	59 7 3	990	275 0	229 6 0	120 0 5
500	138 32	115 26 4	60 11 2	1Mill.	277 28	231 17 2	121 4 3¾

1200 Reed 2010 Dents. } 62 INCHES WIDE. { 1400 Reed 2345 Dents.
1300 ..... 2180 ..... } { 1500 ..... 2520 .....

Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF						WEFT REQUIRED.			Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF						WEFT REQUIRED.		
	100 picks per inch.		120 picks per inch.								100 picks per inch.		120 picks per inch.						
	Yds.	In.	Yds.	In.	6ths.		No.	Sk.	Thd.		Yds.	In.	Yds.	In.	6ths.		Spy.	No.	Sk.
50	0	½	0	0	2½		0	0	63	5000	1	14	1	5	4		0	11	2
100	0	1	0	0	5		0	1	46	5100	1	15	1	6	3		0	11	3½
200	0	2	0	1	4		0	3	13	5200	1	16	1	7	2		0	11	5
300	0	3	0	2	3		0	4	57	5300	1	17	1	8	1		0	11	6¾
400	0	4	0	3	2		0	6	25	5400	1	18	1	9	0		0	12	1¼
500	0	5	0	4	1		1	0	1	5500	1	19	1	9	5		0	12	2¾
600	0	6	0	5	0		1	2	38	5600	1	20	1	10	4		0	12	4½
700	0	7	0	5	5		1	4	4	5700	1	21	1	11	3		0	12	6
800	0	8	0	6	4		1	5	50	5800	1	22	1	12	2		0	13	0½
900	0	9	0	7	3		2	0	17	5900	1	23	1	13	1		0	13	2
1000	0	10	0	8	2		2	1	63	6000	1	24	1	14	0		0	13	3¾
1100	0	11	0	9	1		2	3	29	6100	1	25	1	14	5		0	13	5¼
1200	0	12	0	10	0		2	4	1	6200	1	26	1	15	4		0	14	0
1300	0	13	0	10	5		2	6	42	6300	1	27	1	16	3		0	14	1½
1450	0	14	0	11	4		3	1	8	6400	1	28	1	17	2		0	14	3
1500	0	15	0	12	3		3	2	54	6500	1	29	1	18	1		0	14	4½
1600	0	16	0	13	2		3	4	21	6600	1	30	1	19	0		0	14	6¼
1700	0	17	0	14	1		3	5	67	6700	1	31	1	19	5		0	15	0¾
1800	0	18	0	15	0		4	0	33	6800	1	32	1	20	4		0	15	2¼
1900	0	19	0	15	5		4	2	0	6900	1	33	1	21	3		0	15	4
2000	0	20	0	16	4		4	3	46	7000	1	34	1	22	2		0	15	5½
2100	0	21	0	17	3		4	5	12	7100	1	35	1	23	1		0	16	0
2200	0	22	0	18	2		4	6	59	7200	2	0	1	24	0		0	16	1¾
2300	0	23	0	19	1		5	1	25	7300	2	1	1	24	5		0	16	3¼
2400	0	24	0	20	0		5	2	71	7400	2	2	1	25	4		0	16	4¾
2500	0	25	0	20	5		5	4	37	7500	2	3	1	26	3		0	16	6½
2600	0	26	0	21	4		5	6	4	7600	2	4	1	27	2		0	17	1
2700	0	27	0	22	3		6	0	50	7700	2	5	1	28	1		0	17	2½
2800	0	28	0	23	2		6	2	16	7800	2	6	1	29	0		0	17	4
2900	0	29	0	24	1		6	3	63	7900	2	7	1	29	5		0	17	5¾
3000	0	30	0	25	0		6	5	29	8000	2	8	1	30	4		1	0	0½
3100	0	31	0	25	5		6	6	75	8100	2	9	1	31	3		1	0	2
3200	0	32	0	26	4		7	0	57	8200	2	10	1	32	2		1	0	3½
3300	0	33	0	27	3		7	3	8	8300	2	11	1	33	1		1	0	5
3400	0	34	0	28	2		7	4	14	8400	2	12	1	34	0		1	0	6½
3500	0	35	0	29	1		7	6	20	8500	2	13	1	34	5		1	1	1¼
3600	1	0	0	30	0		8	0	67	8600	2	14	1	35	4		1	1	3
3700	1	1	0	30	5		8	2	33	8700	2	15	2	0	3		1	1	4¼
3800	1	2	0	31	4		8	4	0	8800	2	16	2	1	2		1	1	6
3900	1	3	0	32	3		8	5	46	8900	2	17	2	2	1		1	2	0½
4000	1	4	0	33	2		9	0	12	9000	2	18	2	3	0		1	2	2
4100	1	5	0	34	1		9	1	58	9100	2	19	2	3	5		1	2	3½
4200	1	6	0	35	0		9	3	24	9200	2	20	2	4	4		1	2	5¼
4300	1	7	0	35	5		9	4	71	9300	2	21	2	5	3		1	2	6¾
4400	1	8	1	0	4		9	6	35	9400	2	22	2	6	2		1	3	1½
4500	1	9	1	1	3		10	1	0	9500	2	23	2	7	1		1	3	3
4600	1	10	1	2	2		10	2	50	9600	2	24	2	8	0		1	3	4½
4700	1	11	1	3	1		10	4	16	9700	2	25	2	8	5		1	3	6
4800	1	12	1	4	0		10	5	62	9800	2	26	2	9	4		1	4	0¾
4900	1	13	1	4	5		11	0	29	9900	2	27	2	10	3		1	4	2¼

1600 Reed 2680 Dents. 1700 ..... 2850 ..... } 62 INCHES WIDE. } 1800 Reed 3020 Dents. 2000 ..... 3350 .....

Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.	QUANTITY OF CLOTH AT THE RATES OF 120 picks per inch.	WEFT REQUIRED.	Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.	QUANTITY OF CLOTH AT THE RATES OF 120 picks per inch.	WEFT REQUIRED.
Thds.	Yds. In.	Yds. In. 6ths.	Spy. No. Sk.	Thds.	Yds. In.	Yds. In. ths	Spy. No. Sk.
10	2 28	2 11 2	1 4 4	510	141 24	118 2 0	63 16 1½
20	5 20	4 22 4	2 9 0¾	520	144 16	120 13 2	65 2 5¼
30	8 12	6 34 0	3 13 4½	530	147 8	122 24 4	66 7 2
40	11 4	9 9 2	5 0 1½	540	150 0	125 0 0	67 11 6
50	13 32	11 20 4	6 4 5¼	550	152 28	127 11 2	68 16 2¾
60	16 24	13 32 0	7 9 2¼	560	155 20	129 22 4	70 2 6¾
70	19 16	16 7 2	8 13 6	570	158 12	131 34 0	71 7 3½
80	22 8	18 18 4	10 0 3	580	161 4	134 9 2	72 12 0½
90	25 0	20 30 0	11 4 6¾	590	163 32	136 20 4	73 16 4¼
100	27 28	23 5 2	12 9 3¾	600	166 24	138 32 0	75 3 1¼
110	30 20	25 16 4	13 14 0½	610	169 16	141 7 2	76 7 5
120	33 12	27 28 0	15 0 4½	620	172 8	143 18 4	77 12 2
130	36 4	30 3 2	16 5 1¼	630	175 0	145 30 0	78 16 5¾
140	38 32	32 14 4	17 9 5¼	640	177 28	148 5 2	80 3 2¾
150	41 24	34 26 0	18 14 2	650	180 20	150 16 4	81 7 6½
160	44 16	37 1 2	20 0 6	660	183 12	152 28 0	82 12 3½
170	47 8	39 12 4	21 5 2¾	670	186 4	155 3 2	83 17 0¼
180	50 0	41 24 0	22 9 6¾	680	188 32	157 14 4	85 3 4
190	52 28	43 35 2	23 14 3½	690	191 24	159 26 0	86 8 1
200	55 20	46 10 4	25 1 0½	700	194 16	162 1 2	87 12 5
210	58 12	48 22 0	26 5 4¼	710	197 8	164 12 4	88 17 1¾
220	61 4	50 33 2	27 10 1	720	200 0	166 24 0	90 3 5¾
230	63 32	53 8 4	28 14 5	730	202 28	168 35 2	91 8 2½
240	66 24	55 20 0	30 1 2	740	205 20	171 10 4	92 12 6½
250	69 16	57 31 2	31 5 5¾	750	208 12	173 22 0	93 17 3¼
260	72 8	60 6 4	32 10 2½	760	211 4	175 33 2	95 4 0
270	75 0	62 18 0	33 14 6½	770	213 32	178 8 4	96 8 4
280	77 28	64 29 2	35 1 3¼	780	216 24	180 20 0	97 13 1
290	80 20	67 4 4	36 6 0¼	790	219 16	182 31 2	98 17 4½
300	83 12	69 16 0	37 10 4	800	222 8	185 6 4	100 4 1½
310	86 4	71 27 2	38 15 1	810	225 0	187 18 0	101 8 5½
320	88 32	74 2 4	40 1 4¾	820	227 28	189 29 2	102 13 2¼
330	91 24	76 14 0	41 6 1¾	830	230 20	192 4 4	103 17 6¼
340	94 16	78 25 2	42 10 5½	840	233 12	194 16 0	105 4 3
350	97 8	81 0 4	43 15 2½	850	236 4	196 27 2	106 9 0
360	100 0	83 12 0	45 1 6¼	860	238 32	199 2 4	107 13 4
370	102 28	85 23 2	46 6 3¼	870	241 24	201 14 0	109 0 0½
380	105 20	87 34 4	47 11 0	880	244 16	203 25 2	110 4 4½
390	108 12	90 10 0	48 15 4	890	247 8	206 0 4	111 9 1½
400	111 4	92 21 2	50 2 0¾	900	250 0	208 12 0	112 13 5¼
410	113 32	94 32 4	51 6 4¾	910	252 28	210 23 2	114 0 2¼
420	116 24	97 8 0	52 11 1½	920	255 20	212 34 4	115 4 6
430	119 16	99 19 2	53 15 5½	930	258 12	215 10 0	116 9 3
440	122 8	101 30 4	55 2 2¼	940	261 4	217 21 2	117 13 6¾
450	125 0	104 6 0	56 6 6¼	950	263 32	219 32 4	119 0 3½
460	127 28	106 17 2	57 11 3	960	266 24	222 8 0	120 5 0½
470	130 20	108 28 4	58 16 0	970	269 16	224 19 2	121 9 4½
480	133 12	111 4 0	60 2 2¾	980	272 8	226 30 4	122 14 1¼
490	136 4	113 15 2	61 7 0¾	990	275 0	229 6 0	124 0 5
500	138 32	115 26 4	62 11 0½	1Mill.	277 28	231 17 2	125 5 2

1200 Reed 2075 Dents. / 1300 ..... 2250 ..... } 64 INCHES WIDE. { 1400 Reed 2425 Dents. / 1500 ..... 2600 .....

Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.		120 picks per inch.			WEFT REQUIRED.			Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.		120 picks per inch.			WEFT REQUIRED.		
	Yds.	In.	Yds.	In.	6ths.	No.	Sk.	Thd.		Yds.	In.	Yds.	In.	6ths.	Spy.	No.	Sk.
50	0	½	0	0	2½	0	0	65	5000	1	14	1	5	4	0	11	4½
100	0	1	0	0	5	0	1	50	5100	1	15	1	6	3	0	11	6
200	0	2	0	1	4	0	3	21	5200	1	16	1	7	2	0	12	0¾
300	0	3	0	2	3	0	4	69	5300	1	17	1	8	1	0	12	2¼
400	0	4	0	3	2	0	6	41	5400	1	18	1	9	0	0	12	4
500	0	5	0	4	1	1	1	12	5500	1	19	1	9	5	0	12	5½
600	0	6	0	5	0	1	2	62	5600	1	20	1	10	4	0	13	0¾
700	0	7	0	5	5	1	4	33	5700	1	21	1	11	3	0	13	2
800	0	8	0	6	4	1	6	3	5800	1	22	1	12	2	0	13	3½
900	0	9	0	7	3	2	0	53	5900	1	23	1	13	1	0	13	5
1000	0	10	0	8	2	2	2	24	6000	1	24	1	14	0	0	13	6¾
1100	0	11	0	9	1	2	4	0	6100	1	25	1	14	5	0	14	1½
1200	0	12	0	10	0	2	5	44	6200	1	26	1	15	4	0	14	3
1300	0	13	0	10	5	3	0	15	6300	1	27	1	16	3	0	14	4¾
1400	0	14	0	11	4	3	1	65	6400	1	28	1	17	2	0	14	6¼
1500	0	15	0	12	3	3	3	36	6500	1	29	1	18	1	0	15	1
1600	0	16	0	13	2	3	5	6	6600	1	30	1	19	0	0	15	2½
1700	0	17	0	14	1	3	6	56	6700	1	31	1	19	5	0	15	4¼
1800	0	18	0	15	0	4	1	27	6800	1	32	1	20	4	0	15	5¾
1900	0	19	0	15	5	4	2	77	6900	1	33	1	21	3	0	16	0½
2000	0	20	0	16	4	4	4	47	7000	1	34	1	22	2	0	16	2
2100	0	21	0	17	3	4	6	18	7100	1	35	1	23	1	0	16	3¾
2200	0	22	0	18	2	5	0	68	7200	2	0	1	24	0	0	16	5¼
2300	0	23	0	19	1	5	2	38	7300	2	1	1	24	5	0	17	0
2400	0	24	0	20	0	5	4	9	7400	2	2	1	25	4	0	17	1½
2500	0	25	0	20	5	5	5	59	7500	2	3	1	26	3	0	17	3¼
2600	0	26	0	21	4	6	0	30	7600	2	4	1	27	2	0	17	4¾
2700	0	27	0	22	3	6	2	0	7700	2	5	1	28	1	0	17	6½
2800	0	28	0	23	2	6	3	50	7800	2	6	1	29	0	1	0	1
2900	0	29	0	24	1	6	5	21	7900	2	7	1	29	5	1	0	2¾
3000	0	30	0	25	0	6	6	71	8000	2	8	1	30	4	1	0	4½
3100	0	31	0	25	5	7	1	41	8100	2	9	1	31	3	1	0	6
3200	0	32	0	26	4	7	2	28	8200	2	10	1	32	2	1	1	0½
3300	0	33	0	27	3	7	4	62	8300	2	11	1	33	1	1	1	2¼
3400	0	34	0	28	2	7	5	73	8400	2	12	1	34	0	1	1	4
3500	0	35	0	29	1	8	1	3	8500	2	13	1	34	5	1	1	5½
3600	1	0	0	30	0	8	2	53	8600	2	14	1	35	4	1	2	0¼
3700	1	1	0	30	5	8	4	24	8700	2	15	2	0	3	1	2	1¾
3800	1	2	0	31	4	8	5	74	8800	2	16	2	1	2	1	2	3½
3900	1	3	0	32	3	9	0	44	8900	2	17	2	2	1	1	2	5
4000	1	4	0	33	2	9	2	15	9000	2	18	2	3	0	1	2	6¾
4100	1	5	0	34	1	9	3	65	9100	2	19	2	3	5	1	3	1¼
4200	1	6	0	35	0	9	5	36	9200	2	20	2	4	4	1	3	3
4300	1	7	0	35	5	10	0	6	9300	2	21	2	5	3	1	3	4½
4400	1	8	1	0	4	10	1	59	9400	2	22	2	6	2	1	3	6¼
4500	1	9	1	1	3	10	3	26	9500	2	23	2	7	1	1	4	0¾
4600	1	10	1	2	2	10	4	77	9600	2	24	2	8	0	1	4	2½
4700	1	11	1	3	1	10	6	47	9700	2	25	2	8	5	1	4	4
4800	1	12	1	4	0	11	1	18	9800	2	26	2	9	4	1	4	5¾
4900	1	13	1	4	5	11	2	68	9900	2	27	2	10	3	1	5	0¼

1600 Reed 2765 Dents. / 1700 ..... 2942 ..... } 64 INCHES WIDE. { 1800 Reed 3117 Dents. / 2000 ..... 3458 .....

Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF		WEFT REQUIRED.	Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF		WEFT REQUIRED.
	100 picks per inch.	120 picks per inch.			100 picks per inch.	120 picks per inch.	
Thads.	Yds. In.	Yds. In. 6ths.	Spy. No. Sk.	Thads.	Yds. In.	Yds. In. 6ths.	Spy. No. Sk.
10	2 28	2 11 2	1 5 2	510	141 24	118 2 0	65 17 2
20	5 20	4 22 4	2 5 4	520	144 16	120 13 2	67 4 4
30	8 12	6 34 0	3 15 6	530	147 8	122 24 4	68 9 6
40	11 4	9 9 2	5 3 1	540	150 0	125 0 0	69 15 1
50	13 32	11 20 4	6 8 3	550	152 28	127 11 2	71 2 3
60	16 24	13 32 0	7 13 5¼	560	155 20	129 22 4	72 7 5
70	19 16	16 7 2	9 0 6¾	570	158 12	131 34 0	73 13 0
80	22 8	18 18 4	10 6 1¾	580	161 4	134 9 2	75 1 0¾
90	25 0	20 30 0	11 11 3¾	590	163 32	136 20 4	76 5 3¾
100	27 28	23 5 2	12 16 5¾	600	166 24	138 32 0	77 10 5¾
110	30 20	25 16 4	14 4 0½	610	169 16	141 7 2	78 16 0¾
120	33 12	27 28 0	15 9 2½	620	172 8	143 18 4	80 3 2¾
130	36 4	30 3 2	16 14 4½	630	175 0	145 30 0	81 8 4¾
140	38 32	32 14 4	18 1 6½	640	177 28	148 5 2	82 13 6¾
150	41 24	34 26 0	19 7 1½	650	180 20	150 16 4	84 1 1½
160	44 16	37 1 2	20 12 3½	660	183 12	152 28 0	85 6 3½
170	47 8	39 12 4	21 17 5½	670	186 4	155 3 2	86 11 5½
180	50 0	41 24 0	23 5 0½	680	188 32	157 14 4	87 17 0½
190	52 28	43 35 2	24 10 2½	690	191 24	159 26 0	89 4 2½
200	55 20	46 10 4	25 15 4½	700	194 16	162 1 2	90 9 4½
210	58 12	48 22 0	27 2 6½	710	197 8	164 12 4	91 14 6½
220	61 4	50 33 2	28 8 1½	720	200 0	166 24 0	93 2 1½
230	63 32	53 8 4	29 13 3	730	202 28	168 35 2	94 7 3½
240	66 24	55 20 0	31 0 5	740	205 20	171 10 4	95 12 5½
250	69 16	57 31 2	32 6 0	750	208 12	173 22 0	97 0 0½
260	72 8	60 6 4	33 11 2	760	211 4	175 33 2	98 5 2½
270	75 0	62 18 0	34 16 4	770	213 32	178 8 4	99 10 4
280	77 28	64 29 2	36 3 6	780	216 24	180 20 0	100 15 6
290	80 20	67 4 4	37 9 1	790	219 16	182 31 2	102 3 1
300	83 12	69 16 0	38 14 3	800	222 8	185 6 4	103 8 3
310	86 4	71 27 2	40 1 5	810	225 0	187 18 0	104 13 5
320	88 32	74 2 4	41 7 0	820	227 28	189 29 2	106 1 0
330	91 24	76 14 0	42 12 1¾	830	230 20	192 4 4	107 6 2
340	94 16	78 25 2	43 17 3¾	840	233 12	194 16 0	108 11 4
350	97 8	81 0 4	45 4 5¾	850	236 4	196 27 2	109 16 5¾
360	100 0	83 12 0	46 10 0½	860	238 32	199 2 4	111 4 0½
370	102 28	85 23 2	47 15 2½	870	241 24	201 14 0	112 9 2½
380	105 20	87 34 4	49 2 4½	880	244 16	203 25 2	113 14 4½
390	108 12	90 10 0	50 7 6½	890	247 8	206 0 4	115 1 6½
400	111 4	92 21 2	51 13 1½	900	250 0	208 12 0	116 7 1½
410	113 32	94 32 4	53 0 3½	910	252 28	210 23 2	117 12 3½
420	116 24	97 8 0	54 5 5½	920	255 20	212 34 4	118 17 5½
430	119 16	99 19 2	55 11 0½	930	258 12	215 10 0	120 5 0½
440	122 8	101 30 4	56 16 2½	940	261 4	217 21 2	121 10 2½
450	125 0	104 6 0	58 3 4½	950	263 32	219 32 4	122 15 4½
460	127 28	106 17 2	59 8 6½	960	266 24	222 8 0	124 2 6½
470	130 20	108 28 4	60 14 1½	970	269 16	224 19 2	125 8 1½
480	133 12	111 4 0	62 1 3½	980	272 8	226 30 4	126 13 5½
490	136 4	113 15 2	63 6 5½	990	275 0	229 6 0	128 0 5½
500	138 32	115 26 4	64 12 0	1Mill.	277 28	231 17 2	129 6 0½

1200 Reed 2140 Dents. / 1300 ..... 2318 ..... } 66 INCHES WIDE. { 1400 Reed 2500 Dents. / 1500 ..... 2682 .....

Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.		QUANTITY OF CLOTH AT THE RATES OF 120 picks per inch.			WEFT REQUIRED.			Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.		QUANTITY OF CLOTH AT THE RATES OF 120 picks per inch.			WEFT REQUIRED.		
	Yds.	In.	Yds.	In.	6ths.	No.	Sk.	Thd.		Yds.	In.	Yds.	In.	6ths.	Spy.	No.	Sk.
50	0	½	0	0	2½	0	0	67	5000	1	14	1	5	4	0	12	0
100	0	1	0	0	5	0	1	54	5100	1	15	1	6	3	0	12	1¼
200	0	2	0	1	4	0	3	29	5200	1	16	1	7	2	0	12	3½
300	0	3	0	2	3	0	5	1	5300	1	17	1	8	1	0	12	5
400	0	4	0	3	2	0	6	58	5400	1	18	1	9	0	0	12	6¾
500	0	5	0	4	1	1	1	32	5500	1	19	1	9	5	0	13	1½
600	0	6	0	5	0	1	3	7	5600	1	20	1	10	4	0	13	3
700	0	7	0	5	5	1	4	61	5700	1	21	1	11	3	0	13	4¾
800	0	8	0	6	4	1	6	36	5800	1	22	1	12	2	0	13	6½
900	0	9	0	7	3	2	1	10	5900	1	23	1	13	1	0	14	1¼
1000	0	10	0	8	2	2	2	64	6000	1	24	1	14	0	0	14	2¾
1100	0	11	0	9	1	2	4	39	6100	1	25	1	14	5	0	14	4½
1200	0	12	0	10	0	2	6	13	6200	1	26	1	15	4	0	14	6¼
1300	0	13	0	10	5	3	0	68	6300	1	27	1	16	3	0	15	1
1400	0	14	0	11	4	3	2	42	6400	1	28	1	17	2	0	15	2½
1500	0	15	0	12	3	3	4	17	6500	1	29	1	18	1	0	15	4¼
1600	0	16	0	13	2	3	5	71	6600	1	30	1	19	0	0	15	6
1700	0	17	0	14	1	4	0	45	6700	1	31	1	19	5	0	16	0½
1800	0	18	0	15	0	4	2	20	6800	1	32	1	20	4	0	16	2¼
1900	0	19	0	15	5	4	3	74	6900	1	33	1	21	3	0	16	4
2000	0	20	0	16	4	4	5	49	7000	1	34	1	22	2	0	16	5½
2100	0	21	0	17	3	5	0	23	7100	1	35	1	23	1	0	17	0¼
2200	0	22	0	18	2	5	1	78	7200	2	0	1	24	0	0	17	2
2300	0	23	0	19	1	5	3	52	7300	2	1	1	24	5	0	17	3½
2400	0	24	0	20	0	5	5	27	7400	2	2	1	25	4	0	17	5¼
2500	0	25	0	20	5	6	0	1	7500	2	3	1	26	3	1	0	0
2600	0	26	0	21	4	6	1	50	7600	2	4	1	27	2	1	0	1¾
2700	0	27	0	22	3	6	3	30	7700	2	5	1	28	1	1	0	3½
2800	0	28	0	23	2	6	5	4	7800	2	6	1	29	0	1	0	5
2900	0	29	0	24	1	6	6	59	7900	2	7	1	29	5	1	0	6¾
3000	0	30	0	25	0	7	1	33	8000	2	8	1	30	4	1	1	0½
3100	0	31	0	25	5	7	3	8	8100	2	9	1	31	3	1	1	3
3200	0	32	0	26	4	7	3	78	8200	2	10	1	32	2	1	1	4¾
3300	0	33	0	27	3	7	6	36	8300	2	11	1	33	1	1	1	6½
3400	0	34	0	28	2	8	0	51	8400	2	12	1	34	0	1	2	1¼
3500	0	35	0	29	1	8	2	66	8500	2	13	1	34	5	1	2	2¼
3600	1	0	0	30	0	8	4	46	8600	2	14	1	35	4	1	2	4¼
3700	1	1	0	30	5	8	6	14	8700	2	15	2	0	3	1	2	6¼
3800	1	2	0	31	4	9	0	69	8800	2	16	2	1	2	1	3	1
3900	1	3	0	32	3	9	2	43	8900	2	17	2	2	1	1	3	2½
4000	1	4	0	33	2	9	4	18	9000	2	18	2	3	0	1	3	4¼
4100	1	5	0	34	1	9	5	72	9100	2	19	2	3	5	1	3	6
4200	1	6	0	35	0	10	0	46	9200	2	20	2	4	4	1	4	0½
4300	1	7	0	35	5	10	3	21	9300	2	21	2	5	3	1	4	2¼
4400	1	8	1	0	4	10	4	75	9400	2	22	2	6	2	1	4	4
4500	1	9	1	1	3	10	6	49	9500	2	23	2	7	1	1	4	5½
4600	1	10	1	2	2	11	0	25	9600	2	24	2	8	0	1	5	0¼
4700	1	11	1	3	1	11	1	79	9700	2	25	2	8	5	1	5	2
4800	1	12	1	4	0	11	3	53	9800	2	26	2	9	4	1	5	3¾
4900	1	13	1	4	5	11	5	28	9900	2	27	2	10	3	1	5	5½

1600 Reed 2852 Dents. / 1700 ..... 3034 ..... — 66 INCHES WIDE. — 1800 Reed 3214 Dents. / 2000 ..... 3566 .....

Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.	QUANTITY OF CLOTH AT THE RATES OF 120 picks per inch.	WEFT REQUIRED.	Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.	QUANTITY OF CLOTH AT THE RATES OF 120 picks per inch.	WEFT REQUIRED.
Thsds.	Yds. In.	Yds. In. 6ths.	Spy. No. Sk.	Thsds.	Yds. In.	Yds. In. 6ths.	Spy. No. Sk.
10	2 28	2 11 2	1 6 0	510	141 24	118 2 0	68 0 2¾
20	5 20	4 22 4	2 12 0	520	144 16	120 13 2	69 6 2¾
30	8 12	6 34 0	4 0 0	530	147 8	122 24 4	70 12 3
40	11 4	9 9 2	5 6 0¼	540	150 0	125 0 0	72 0 3
50	13 32	11 20 4	6 12 0¼	550	152 28	127 11 2	73 6 3
60	16 24	13 32 0	8 0 0¼	560	155 20	129 22 4	74 12 3
70	19 16	16 7 2	9 6 0¼	570	158 12	131 34 0	76 0 3¼
80	22 8	18 18 4	10 12 0½	580	161 4	134 9 2	77 6 3¼
90	25 0	20 30 0	12 0 0½	590	163 32	136 20 4	78 12 3¼
100	27 28	23 5 2	13 6 0½	600	166 24	138 32 0	80 0 3¼
110	30 20	25 16 4	14 12 0½	610	169 16	141 7 2	81 6 3½
120	33 12	27 28 0	16 0 0¾	620	172 8	143 18 4	82 12 3½
130	36 4	30 3 2	17 6 0¾	630	175 0	145 30 0	84 0 3½
140	38 32	32 14 4	18 12 0¾	640	177 28	148 5 2	85 6 3½
150	41 24	34 26 0	20 0 0¾	650	180 20	150 16 4	86 12 3½
160	44 16	37 1 2	21 6 1	660	183 12	152 28 0	88 0 3½
170	47 8	39 12 4	22 12 1	670	186 4	155 3 2	89 6 3¾
180	50 0	41 24 0	24 0 1	680	188 32	157 14 4	90 12 3¾
190	52 28	43 35 2	25 6 1	690	191 24	159 26 0	92 0 3¾
200	55 20	46 10 4	26 12 1	700	194 16	162 1 2	93 6 3¾
210	58 12	48 22 0	28 0 1¼	710	197 8	164 12 4	94 12 4
220	61 4	50 33 2	29 6 1¼	720	200 0	166 24 0	96 0 4
230	63 32	53 8 4	30 12 1¼	730	202 28	168 35 2	97 6 4
240	66 24	55 20 0	32 0 1¼	740	205 20	171 10 4	98 12 4
250	69 16	57 31 2	33 6 1¼	750	208 12	173 22 0	100 0 4¼
260	72 8	60 6 4	34 12 1½	760	211 4	175 33 2	101 6 4¼
270	75 0	62 18 0	36 0 1½	770	213 32	178 8 4	102 12 4¼
280	77 28	64 29 2	37 6 1½	780	216 24	180 20 0	104 0 4¼
290	80 20	67 4 4	38 12 1½	790	219 16	182 31 2	105 6 4¼
300	83 12	69 16 0	40 0 1¾	800	222 8	185 6 4	106 12 4½
310	86 4	71 27 2	41 6 1¾	810	225 0	187 18 0	108 0 4½
320	88 32	74 2 4	42 12 1¾	820	227 28	189 29 2	109 6 4½
330	91 24	76 14 0	44 0 1¾	830	230 20	192 4 4	110 12 4¾
340	94 16	78 25 2	45 6 2	840	233 12	194 16 0	112 0 4¾
350	97 8	81 0 4	46 12 2	850	236 4	196 27 2	113 6 4¾
360	100 0	83 12 0	48 0 2	860	238 32	199 2 4	114 12 4¾
370	102 28	85 23 2	49 6 2	870	241 24	201 14 0	116 0 4¾
380	105 20	87 34 4	50 12 2	880	244 16	203 25 2	117 6 5
390	108 12	90 10 0	52 0 2¼	890	247 8	206 0 4	118 12 5
400	111 4	92 21 2	53 6 2¼	900	250 0	208 12 0	120 0 5
410	113 32	94 32 4	54 12 2¼	910	252 28	210 23 2	121 6 5
420	116 24	97 8 0	56 0 2¼	920	255 20	212 34 4	122 12 5
430	119 16	99 19 2	57 6 2½	930	258 12	215 10 0	124 0 5¼
440	122 8	101 30 4	58 12 2½	940	261 4	217 21 2	125 6 5¼
450	125 0	104 6 0	60 0 2½	950	263 32	219 32 4	126 12 5¼
460	127 28	106 17 2	61 6 2½	960	266 24	222 8 0	128 0 5¼
470	130 20	108 28 4	62 12 2¾	970	269 16	224 19 2	129 6 5¼
480	133 12	111 4 0	64 0 2¾	980	272 8	226 30 4	130 12 5½
490	136 4	113 15 2	65 6 2¾	990	275 0	229 6 0	132 0 5½
500	138 32	115 26 4	66 12 2¾	1Mill.	277 28	231 17 2	133 6 5½

1200 Reed 2205 Dents. / 1300 ..... 2390 ..... } 68 INCHES WIDE. { 1400 Reed 2575 Dents. / 1500 ..... 2765 .....

Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.		QUANTITY OF CLOTH AT THE RATES OF 120 picks per inch.			WEFT REQUIRED.			Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.		QUANTITY OF CLOTH AT THE RATES OF 120 picks per inch.			WEFT REQUIRED.		
	Yds.	In.	Yds.	In.	6ths.	No.	Sk.	Thd.		Yds.	In.	Yds.	In.	6ths.	Spy.	No.	Sk.
50	0	½	0	0	2½	0	0	69	5000	1	14	1	5	4	0	12	2½
100	0	1	0	0	5	0	1	58	5100	1	15	1	6	3	0	12	4¼
200	0	2	0	1	4	0	3	37	5200	1	16	1	7	2	0	12	6
300	0	3	0	2	3	0	5	14	5300	1	17	1	8	1	0	13	0¾
400	0	4	0	3	2	0	6	74	5400	1	18	1	9	0	0	13	2½
500	0	5	0	4	1	1	1	53	5500	1	19	1	9	5	0	13	4¼
600	0	6	0	5	0	1	3	31	5600	1	20	1	10	4	0	13	6
700	0	7	0	5	5	1	5	10	5700	1	21	1	11	3	0	14	0¾
800	0	8	0	6	4	1	6	68	5800	1	22	1	12	2	0	14	2½
900	0	9	0	7	3	2	1	47	5900	1	23	1	13	1	0	14	4¼
1000	0	10	0	8	2	2	3	25	6000	1	24	1	14	0	0	14	6
1100	0	11	0	9	1	2	5	4	6100	1	25	1	14	5	0	15	0¾
1200	0	12	0	10	0	2	6	62	6200	1	26	1	15	4	0	15	2¼
1300	0	13	0	10	5	3	1	41	6300	1	27	1	16	3	0	15	4
1400	0	14	0	11	4	3	3	19	6400	1	28	1	17	2	0	15	5¾
1500	0	15	0	12	3	3	4	78	6500	1	29	1	18	1	0	16	0½
1600	0	16	0	13	2	3	6	56	6600	1	30	1	19	0	0	16	2¼
1700	0	17	0	14	1	4	1	35	6700	1	31	1	19	5	0	16	4
1800	0	18	0	15	0	4	3	13	6800	1	32	1	20	4	0	16	5¾
1900	0	19	0	15	5	4	4	72	6900	1	33	1	21	3	0	17	0½
2000	0	20	0	16	4	4	6	50	7000	1	34	1	22	2	0	17	2¼
2100	0	21	0	17	3	5	1	29	7100	1	35	1	23	1	0	17	4
2200	0	22	0	18	2	5	3	7	7200	2	0	1	24	0	0	17	5¾
2300	0	23	0	19	1	5	4	66	7300	2	1	1	24	5	1	0	0½
2400	0	24	0	20	0	5	6	44	7400	2	2	1	25	4	1	0	2
2500	0	25	0	20	5	6	1	23	7500	2	3	1	26	3	1	0	3¾
2600	0	26	0	21	4	6	3	1	7600	2	4	1	27	2	1	0	5½
2700	0	27	0	22	3	6	4	60	7700	2	5	1	28	1	1	1	0¼
2800	0	28	0	23	2	6	6	38	7800	2	6	1	29	0	1	1	2
2900	0	29	0	24	1	7	1	13	7900	2	7	1	29	5	1	1	3¾
3000	0	30	0	25	0	7	2	76	8000	2	8	1	30	4	1	1	5½
3100	0	31	0	25	5	7	4	54	8100	2	9	1	31	3	1	2	0¼
3200	0	32	0	26	4	7	5	49	8200	2	10	1	32	2	1	2	2
3300	0	33	0	27	3	8	0	11	8300	2	11	1	33	1	1	2	3¾
3400	0	34	0	28	2	8	2	30	8400	2	12	1	34	0	1	2	5½
3500	0	35	0	29	1	8	4	48	8500	2	13	1	34	5	1	3	0¼
3600	1	0	0	30	0	8	6	27	8600	2	14	1	35	4	1	3	2
3700	1	1	0	30	5	9	1	5	8700	2	15	2	0	3	1	3	3¾
3800	1	2	0	31	4	9	2	64	8800	2	16	2	1	2	1	3	5¼
3900	1	3	0	32	3	9	4	42	8900	2	17	2	2	1	1	4	0
4000	1	4	0	33	2	9	6	21	9000	2	18	2	3	0	1	4	2
4100	1	5	0	34	1	10	0	79	9100	2	19	2	3	5	1	4	3½
4200	1	6	0	35	0	10	2	58	9200	2	20	2	4	4	1	4	5¼
4300	1	7	0	35	5	10	4	36	9300	2	21	2	5	3	1	5	2
4400	1	8	1	0	4	11	1	34	9400	2	22	2	6	2	1	5	1¾
4500	1	9	1	1	3	11	3	17	9500	2	23	2	7	1	1	5	3½
4600	1	10	1	2	2	11	5	52	9600	2	24	2	8	0	1	5	0¼
4700	1	11	1	3	1	11	4	30	9700	2	25	2	8	5	1	6	0
4800	1	12	1	4	0	11	6	8	9800	2	26	2	9	4	1	6	1¾
4900	1	13	1	4	5	12	0	67	9900	2	27	2	10	3	1	6	3½

1600 Reed 2940 Dents. / 1700 ..... 3125 ..... — 68 INCHES WIDE. — 1800 Reed 3310 Dents. / 2000 ..... 3675 .....

Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.	QUANTITY OF CLOTH AT THE RATES OF 120 picks per inch.	WEFT REQUIRED.	Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.	QUANTITY OF CLOTH AT THE RATES OF 120 picks per inch.	WEFT REQUIRED.
Thsds.	Yds. In.	Yds. In. 6ths.	Spy. No. Sk.	Thsds.	Yds. In.	Yds. In. 6ths.	Spy. No. Sk.
10	2 28	2 11 2	1 6 5	510	141 24	118 2 0	70 1 3½
20	5 20	4 22 4	2 13 0	520	144 16	120 13 2	71 8 1½
30	8 12	6 34 0	4 2 1½	530	147 8	122 24 4	72 14 0½
40	11 4	9 9 2	5 8 0½	540	150 0	125 0 0	74 3 5
50	13 32	11 20 4	6 15 4½	550	152 28	127 11 2	75 10 3
60	16 24	13 32 0	8 4 3	560	155 20	129 22 4	76 17 1½
70	19 16	16 7 2	9 11 1	570	158 12	131 34 0	78 5 6½
80	22 8	18 18 4	10 17 6½	580	161 4	134 9 2	79 12 4½
90	25 0	20 30 0	12 6 4½	590	163 32	136 20 4	81 1 2½
100	27 28	23 5 2	13 13 2½	600	166 24	138 32 0	82 8 1
110	30 20	25 16 4	15 2 0½	610	169 16	141 7 2	83 14 6
120	33 12	27 28 0	16 8 5½	620	172 8	143 18 4	85 3 4½
130	36 4	30 3 2	17 14 4	630	175 0	145 30 0	86 10 2½
140	38 32	32 14 4	19 4 2	640	177 28	148 5 2	87 17 0½
150	41 24	34 26 0	20 11 0½	650	180 20	150 16 4	89 5 5½
160	44 16	37 1 2	21 17 5½	660	183 12	152 28 0	90 12 3½
170	47 8	39 12 4	23 6 3½	670	186 4	155 3 2	92 1 2
180	50 0	41 24 0	24 13 1½	680	188 32	157 14 4	93 8 0
190	52 28	43 35 2	26 1 0½	690	191 24	159 26 0	94 14 5½
200	55 20	46 10 4	27 8 5	700	194 16	162 1 2	96 3 3½
210	58 12	48 22 0	28 15 3	710	197 8	164 12 4	97 10 1½
220	61 4	50 33 2	30 4 1½	720	200 0	166 24 0	98 16 0½
230	63 32	53 8 4	31 10 0½	730	202 28	168 35 2	100 5 4½
240	66 24	55 20 0	32 17 4½	740	205 20	171 10 4	101 12 3
250	69 16	57 31 2	34 6 2½	750	208 12	173 22 0	103 1 1
260	72 8	60 6 4	35 13 0½	760	211 4	175 33 2	104 7 0½
270	75 0	62 18 0	37 1 6	770	213 32	178 8 4	105 14 4½
280	77 28	64 29 2	38 8 4	780	216 24	180 20 0	107 3 2½
290	80 20	67 4 4	39 15 2½	790	219 16	182 31 2	108 10 0½
300	83 12	69 16 0	41 4 0½	800	222 8	185 6 4	109 16 5½
310	86 4	71 27 2	42 10 5½	810	225 0	187 18 0	111 5 4
320	88 32	74 2 4	43 17 3½	820	227 28	189 29 2	112 12 2
330	91 24	76 14 0	45 6 1½	830	230 20	192 4 4	114 1 0½
340	94 16	78 25 2	46 13 0	840	233 12	194 16 0	115 7 5½
350	97 8	81 0 4	48 1 5½	850	236 4	196 27 2	116 14 3½
360	100 0	83 12 0	49 8 3½	860	238 32	199 2 4	118 3 1½
370	102 28	85 23 2	50 15 1½	870	241 24	201 14 0	119 9 6½
380	105 20	87 34 4	52 3 6½	880	244 16	203 25 2	120 16 5
390	108 12	90 10 0	53 10 4½	890	247 8	206 0 4	122 5 3½
400	111 4	92 21 2	54 17 3	900	250 0	208 12 0	123 12 1½
410	113 32	94 32 4	56 6 1	910	252 28	210 23 2	125 0 0½
420	116 24	97 8 0	57 12 6½	920	255 20	212 34 4	126 7 4½
430	119 16	99 19 2	59 1 4½	930	258 12	215 10 0	127 14 2½
440	122 8	101 30 4	60 8 2½	940	261 4	217 21 2	128 3 1
450	125 0	104 6 0	61 15 0½	950	263 32	219 32 4	130 9 6
460	127 28	106 17 2	63 3 5½	960	266 24	222 8 0	131 16 4½
470	130 20	108 28 4	64 10 4	970	269 16	224 19 2	133 5 2½
480	133 12	111 4 0	65 17 2	980	272 8	226 30 4	134 12 0½
490	136 4	113 15 2	67 6 0½	990	275 0	229 6 0	136 0 5½
500	138 32	115 26 4	68 12 5½	1Mill.	277 28	231 17 2	137 7 3½

1200 Reed 2270 Dents. / 1300 ..... 2460 ..... } 70 INCHES WIDE. { 1400 Reed 2650 Dents. / 1500 ..... 2845 .....

Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF					WEFT REQUIRED.			Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF					WEFT REQUIRED.		
	100 picks per inch.		120 picks per inch.							100 picks per inch.		120 picks per inch.					
	Yds.	In.	Yds.	In.	6ths.	No.	Sk.	Thd.		Yds.	In.	Yds.	In.	6ths.	Spy.	No.	Sk.
50	0	½	0	0	2½	0	0	73	5000	1	14	1	5	4	0	12	5
100	0	1	0	0	5	0	1	63	5100	1	15	1	6	3	0	13	0
200	0	2	0	1	4	0	3	45	5200	1	16	1	7	2	0	13	1¼
300	0	3	0	2	3	0	5	25	5300	1	17	1	8	1	0	13	3½
400	0	4	0	3	2	1	0	27	5400	1	18	1	9	0	0	13	5¼
500	0	5	0	4	1	1	2	13	5500	1	19	1	9	5	0	14	0
600	0	6	0	5	0	1	3	56	5600	1	20	1	10	4	0	14	1¾
700	0	7	0	5	5	1	5	38	5700	1	21	1	11	3	0	14	3½
800	0	8	0	6	4	2	0	31	5800	1	22	1	12	2	0	14	5¼
900	0	9	0	7	3	2	2	13	5900	1	23	1	13	1	0	15	0¼
1000	0	10	0	8	2	2	3	66	6000	1	24	1	14	0	0	15	2
1100	0	11	0	9	1	2	5	48	6100	1	25	1	14	5	0	15	3¾
1200	0	12	0	10	0	3	0	31	6200	1	26	1	15	4	0	15	5½
1300	0	13	0	10	5	3	2	14	6300	1	27	1	16	3	0	16	0¾
1400	0	14	0	11	4	3	3	76	6400	1	28	1	17	2	0	16	2
1500	0	15	0	12	3	3	5	59	6500	1	29	1	18	1	0	16	3¾
1600	0	16	0	13	2	4	0	41	6600	1	30	1	19	0	0	16	5¾
1700	0	17	0	14	1	4	2	24	6700	1	31	1	19	5	0	17	0½
1800	0	18	0	15	0	4	4	7	6800	1	32	1	20	4	0	17	2¼
1900	0	19	0	15	5	4	5	69	6900	1	33	1	21	3	0	17	4
2000	0	20	0	16	4	5	0	52	7000	1	34	1	22	2	0	17	5¾
2100	0	21	0	17	3	5	2	34	7100	1	35	1	23	1	1	0	0½
2200	0	22	0	18	2	5	4	17	7200	2	0	1	24	0	1	0	2¼
2300	0	23	0	19	1	5	6	0	7300	2	1	1	24	5	1	0	4
2400	0	24	0	20	0	6	0	62	7400	2	2	1	25	4	1	0	6
2500	0	25	0	20	5	6	2	45	7500	2	3	1	26	3	1	1	0¾
2600	0	26	0	21	4	6	4	27	7600	2	4	1	27	2	1	1	2½
2700	0	27	0	22	3	6	6	10	7700	2	5	1	28	1	1	1	4¼
2800	0	28	0	23	2	7	0	73	7800	2	6	1	29	0	1	1	6
2900	0	29	0	24	1	7	2	47	7900	2	7	1	29	5	1	2	0¾
3000	0	30	0	25	0	7	4	38	8000	2	8	1	30	4	1	2	2½
3100	0	31	0	25	5	7	6	30	8100	2	9	1	31	3	1	2	4¼
3200	0	32	0	26	4	8	0	14	8200	2	10	1	32	2	1	2	6
3300	0	33	0	27	3	8	2	66	8300	2	11	1	33	1	1	3	1
3400	0	34	0	28	2	8	4	60	8400	2	12	1	34	0	1	3	2¾
3500	0	35	0	29	1	8	6	31	8500	2	13	1	34	5	1	3	4½
3600	1	0	0	30	0	9	1	13	8600	2	14	1	35	4	1	3	6¼
3700	1	1	0	30	5	9	2	76	8700	2	15	2	0	3	1	4	1
3800	1	2	0	31	4	9	4	58	8800	2	16	2	1	2	1	4	2¾
3900	1	3	0	32	3	9	6	41	8900	2	17	2	2	1	1	4	4½
4000	1	4	0	33	2	10	1	24	9000	2	18	2	3	0	1	4	6½
4100	1	5	0	34	1	10	3	6	9100	2	19	2	3	5	1	5	1¼
4200	1	6	0	35	0	10	4	69	9200	2	20	2	4	4	1	5	3
4300	1	7	0	35	5	10	6	51	9300	2	21	2	5	3	1	5	4¾
4400	1	8	1	0	4	11	1	34	9400	2	22	2	6	2	1	5	6½
4500	1	9	1	1	3	11	3	17	9500	2	23	2	7	1	1	6	1¼
4600	1	10	1	2	2	11	4	79	9600	2	24	2	8	0	1	6	3
4700	1	11	1	3	1	11	6	62	9700	2	25	2	8	5	1	6	5
4800	1	12	1	4	0	12	1	44	9800	2	26	2	9	4	1	6	6¾
4900	1	13	1	4	5	12	3	27	9900	2	27	2	10	3	1	7	1½

1600 Reed 3025 Dents. / 1700 ..... 3220 ..... } 70 INCHES WIDE. { 1800 Reed 3410 Dents. / 2000 ..... 3780 .....

Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF				WEFT REQUIRED.			Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF				WEFT REQUIRED.		
	100 picks per inch.		120 picks per inch.						100 picks per inch.		120 picks per inch.				
Thsds.	Yds.	In.	Yds.	In. 6ths.	Spy.	No.	Sk.	Thsds.	Yds.	In.	Yds.	In. 6ths.	Spy.	No.	Sk.
10	2	28	2	11 2	1	7	3¼	510	141	24	118	2 0	72	2	4½
20	5	20	4	22 4	2	14	6½	520	144	16	120	13 2	73	10	0¼
30	8	12	6	34 0	4	4	2¾	530	147	8	122	24 4	74	17	3
40	11	4	9	9 2	5	11	6	540	150	0	125	0 0	76	7	0
50	13	32	11	20 4	7	1	2¼	550	152	28	127	11 2	77	14	3¾
60	16	24	13	32 0	8	8	5½	560	155	20	129	22 4	79	3	6¼
70	19	16	16	7 2	9	16	1¾	570	158	12	131	34 0	80	11	2½
80	22	8	18	18 4	11	5	5	580	161	4	134	9 2	82	0	0¾
90	25	0	20	30 0	12	13	1¼	590	163	32	136	20 4	83	8	2¼
100	27	28	23	5 2	14	2	4½	600	166	24	138	32 0	84	15	5¼
110	30	20	25	16 4	15	10	0¾	610	169	16	141	7 2	86	5	1¾
120	33	12	27	28 0	16	17	3¾	620	172	8	143	18 4	87	12	5
130	36	4	30	3 2	18	7	0	630	175	0	145	30 0	89	2	1
140	38	32	32	14 4	19	14	3½	640	177	28	148	5 2	90	9	4¼
150	41	24	34	26 0	21	3	6½	650	180	20	150	16 4	91	17	0½
160	44	16	37	1 2	22	11	2¾	660	183	12	152	28 0	93	6	3½
170	47	8	39	12 4	24	0	6	670	186	4	155	3 2	94	14	0
180	50	0	41	24 0	25	8	2¼	680	188	32	157	14 4	96	3	3¼
190	52	28	43	35 2	26	15	5½	690	191	24	159	26 0	97	11	6½
200	55	20	46	10 4	28	5	1¾	700	194	16	162	1 2	99	0	2¾
210	58	12	48	22 0	29	12	5	710	197	8	164	12 4	100	7	6
220	61	4	50	33 2	31	2	1¼	720	200	0	166	24 0	101	15	2¼
230	63	32	53	8 4	32	9	4½	730	202	28	168	35 2	103	4	5½
240	66	24	55	20 0	33	17	0¾	740	205	20	171	10 4	104	12	1¾
250	69	16	57	31 2	35	9	4	750	208	12	173	22 0	106	1	5
260	72	8	60	6 4	36	14	0¼	760	211	4	175	33 2	107	9	1¼
270	75	0	62	18 0	38	3	3½	770	213	32	178	8 4	108	16	4½
280	77	28	64	29 2	39	10	6¾	780	216	24	180	20 0	110	6	0¾
290	80	20	67	4 4	41	0	3	790	219	16	182	31 2	111	13	4
300	83	12	69	16 0	42	7	6¼	800	222	8	185	6 4	113	3	0¼
310	86	4	71	27 2	43	15	2½	810	225	0	187	18 0	114	10	3½
320	88	32	74	2 4	45	4	5¾	820	227	28	189	29 2	115	17	6¾
330	91	24	76	14 0	46	12	2	830	230	20	192	4 4	117	7	2¾
340	94	16	78	25 2	48	1	5¼	840	233	12	194	16 0	118	14	6
350	97	8	81	0 4	49	9	1½	850	236	4	196	27 2	120	4	2¼
360	100	0	83	12 0	50	16	4¼	860	238	32	199	2 4	121	11	5¾
370	102	28	85	23 2	52	6	1	870	241	24	201	11 0	123	1	1¾
380	105	20	87	34 4	53	13	4	880	244	16	203	25 2	124	8	5
390	108	12	90	10 0	55	3	0¼	890	247	8	206	0 4	125	16	1¾
400	111	4	92	21 2	56	10	3¾	900	250	0	208	12 0	127	5	4½
410	113	32	94	32 4	57	17	6¾	910	252	28	210	23 2	128	13	0¾
420	116	24	97	8 0	59	7	3	920	255	20	212	34 4	130	2	4
430	119	16	99	19 2	60	14	6¼	930	258	12	215	10 0	131	10	0¼
440	122	8	101	30 4	62	4	2½	940	261	4	217	21 2	132	17	3½
450	125	0	104	6 0	63	11	5¾	950	263	32	219	32 4	134	6	6¾
460	127	28	106	17 2	65	1	2	960	266	24	222	8 0	135	14	3
470	130	20	108	28 4	66	8	5¼	970	269	16	224	19 2	137	3	6¼
480	133	12	111	4 0	67	16	1½	980	272	8	226	30 4	138	11	2½
490	136	4	113	15 2	69	5	4¾	990	275	0	229	6 0	140	0	5¾
500	138	32	115	26 4	70	13	1	1Mill.	277	28	231	17 2	141	8	2

1200 Reed 2335 Dents. / 1300 ..... 2530 ..... } 72 INCHES WIDE. { 1400 Reed 2730 Dents. / 1500 ..... 2925 .....

Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.		120 picks per inch.			WEFT REQUIRED.			Picks or Shots of Weft.	QUANTITY OF CLOTH AT THE RATES OF 100 picks per inch.		120 picks per inch.			WEFT REQUIRED.		
	Yds.	In.	Yds.	In.	6ths.	No.	Sk.	Thd.		Yds.	In.	Yds.	In.	6ths.	Spy.	No.	Sk.
50	0	½	0	0	2½	0	0	73	5000	1	14	1	5	4	0	13	0¾
100	0	1	0	0	5	0	1	67	5100	1	15	1	6	3	0	13	2½
200	0	2	0	1	4	0	3	53	5200	1	16	1	7	2	0	13	4¼
300	0	3	0	2	3	0	5	38	5300	1	17	1	8	1	0	13	6¼
400	0	4	0	3	2	1	0	27	5400	1	18	1	9	0	0	14	1
500	0	5	0	4	1	1	2	13	5500	1	19	1	9	5	0	14	2¾
600	0	6	0	5	0	1	4	0	5600	1	20	1	10	4	0	14	4¾
700	0	7	0	5	5	1	5	67	5700	1	21	1	11	3	0	14	6½
800	0	8	0	6	4	2	0	53	5800	1	22	1	12	2	0	15	1¼
900	0	9	0	7	3	2	2	40	5900	1	23	1	13	1	0	15	3¼
1000	0	10	0	8	2	2	4	27	6000	1	24	1	14	0	0	15	5
1100	0	11	0	9	1	2	6	13	6100	1	25	1	14	5	0	16	0½
1200	0	12	0	10	0	3	1	0	6200	1	26	1	15	4	0	16	1¾
1300	0	13	0	10	5	3	2	67	6300	1	27	1	16	3	0	16	4½
1400	0	14	0	11	4	3	4	53	6400	1	28	1	17	2	0	16	5¼
1500	0	15	0	12	3	3	6	40	6500	1	29	1	18	1	0	17	0¼
1600	0	16	0	13	2	4	1	27	6600	1	30	1	19	0	0	17	2
1700	0	17	0	14	1	4	3	13	6700	1	31	1	19	5	0	17	3¾
1800	0	18	0	15	0	4	5	0	6800	1	32	1	20	4	0	17	5½
1900	0	19	0	15	5	4	6	67	6900	1	33	1	21	3	1	0	0½
2000	0	20	0	16	4	5	1	53	7000	1	34	1	22	2	1	0	2¼
2100	0	21	0	17	3	5	3	40	7100	1	35	1	23	1	1	0	4¼
2200	0	22	0	18	2	5	5	27	7200	2	0	1	24	0	1	0	6
2300	0	23	0	19	1	6	0	13	7300	2	1	1	24	5	1	1	0¾
2400	0	24	0	20	0	6	2	0	7400	2	2	1	25	4	1	1	2¾
2500	0	25	0	20	5	6	3	67	7500	2	3	1	26	3	1	1	4½
2600	0	26	0	21	4	6	5	53	7600	2	4	1	27	2	1	1	6¼
2700	0	27	0	22	3	7	0	40	7700	2	5	1	28	1	1	2	1
2800	0	28	0	23	2	7	2	27	7800	2	6	1	29	0	1	2	3
2900	0	29	0	24	1	7	4	1	7900	2	7	1	29	5	1	2	4¾
3000	0	30	0	25	0	7	6	0	8000	2	8	1	30	4	1	2	6¾
3100	0	31	0	25	5	8	0	67	8100	2	9	1	31	3	1	3	1½
3200	0	32	0	26	4	8	1	69	8200	2	10	1	32	2	1	3	3¼
3300	0	33	0	27	3	8	3	40	8300	2	11	1	33	1	1	3	5¼
3400	0	34	0	28	2	8	5	67	8400	2	12	1	34	0	1	4	0
3500	0	35	0	29	1	9	1	13	8500	2	13	1	34	5	1	4	1¾
3600	1	0	0	30	0	9	3	0	8600	2	14	1	35	4	1	4	3¾
3700	1	1	0	30	5	9	4	67	8700	2	15	2	0	3	1	4	5½
3800	1	2	0	31	4	9	6	53	8800	2	16	2	1	2	1	5	0¼
3900	1	3	0	32	3	10	1	40	8900	2	17	2	2	1	1	5	2¼
4000	1	4	0	33	2	10	3	27	9000	2	18	2	3	0	1	5	4
4100	1	5	0	34	1	10	5	13	9100	2	19	2	3	5	1	5	5¾
4200	1	6	0	35	0	11	0	0	9200	2	20	2	4	4	1	6	0¾
4300	1	7	0	35	5	11	1	67	9300	2	21	2	5	3	1	6	2½
4400	1	8	1	0	4	11	3	54	9400	2	22	2	6	2	1	6	4¼
4500	1	9	1	1	3	11	5	41	9500	2	23	2	7	1	1	6	6
4600	1	10	1	2	2	12	0	27	9600	2	24	2	8	0	1	7	1
4700	1	11	1	3	1	12	2	13	9700	2	25	2	8	5	1	7	2¾
4800	1	12	1	4	0	12	3	79	9800	2	26	2	9	4	1	7	4¾
4900	1	13	1	4	5	12	5	66	9900	2	27	2	10	3	1	7	6½

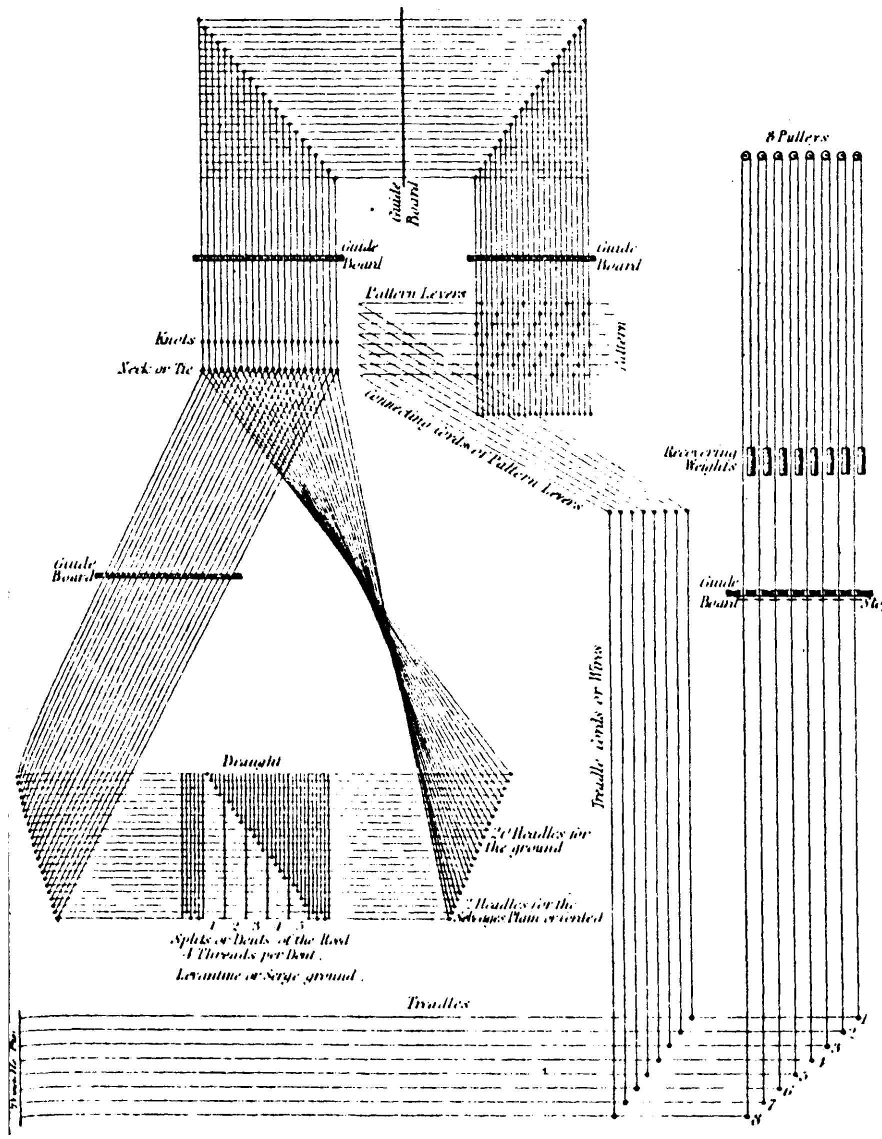
As the breadth of Cloth in the preceding pages advances by two at a time, and that at even numbers of inches, this page of *One Inch*, is intended as a link whereby the chain may be connected wherever an odd number occurs.

One Inch Wide.

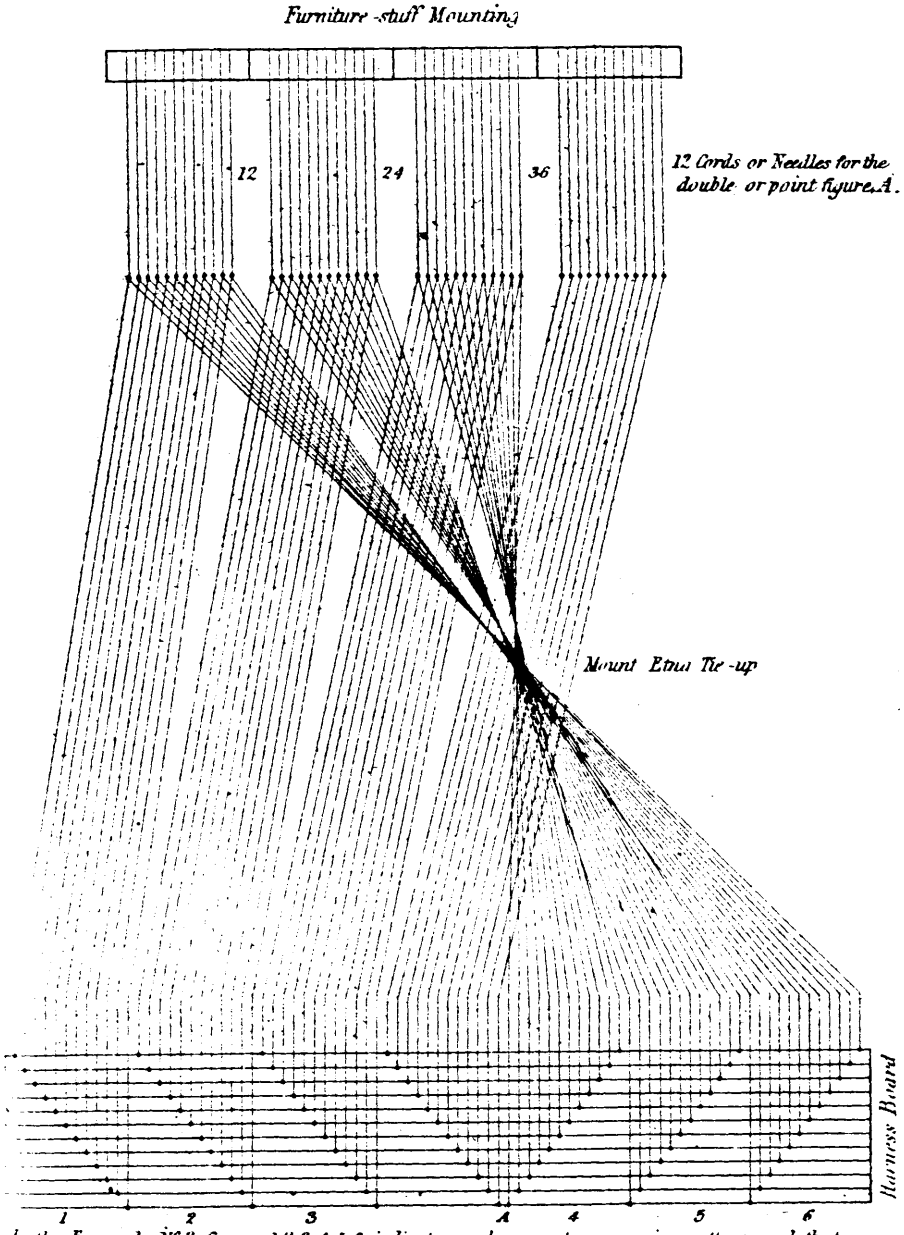
Picks	WEFT REQUIRED.		Picks	WEFT REQUIRED.		Picks.	WEFT REQUIRED.				Picks.	WEFT REQUIRED.			
	Sk.	Thd.		Sk.	Thd.	Thads.	Spy.	No.	Sk.	Thds.	Thads.	Spy.	No.	Sk.	Thds.
50	0	1	5000	1	22	10	0	0	2	44	510	1	0	3	69
100	0	2	5100	1	24	20	0	0	5	7	520	1	0	6	33
200	0	4	5200	1	26	30	0	1	0	51	530	1	1	1	76
300	0	6	5300	1	28	40	0	1	3	15	540	1	1	4	40
400	0	8	5400	1	30	50	0	1	5	59	550	1	2	0	4
500	0	10	5500	1	32	60	0	2	1	22	560	1	2	2	47
600	0	12	5600	1	34	70	0	2	3	66	570	1	2	5	11
700	0	14	5700	1	36	80	0	2	6	30	580	1	3	0	55
800	0	16	5800	1	38	90	0	3	1	73	590	1	3	3	19
900	0	18	5900	1	40	100	0	3	4	37	600	1	3	5	62
1000	0	20	6000	1	42	110	0	4	0	1	610	1	4	1	26
1100	0	22	6100	1	44	120	0	4	2	45	620	1	4	3	70
1200	0	24	6200	1	46	130	0	4	5	8	630	1	4	6	33
1300	0	26	6300	1	48	140	0	5	0	2	640	1	5	1	77
1400	0	29	6400	1	50	150	0	5	3	16	650	1	5	4	41
1500	0	31	6500	1	52	160	0	5	5	59	660	1	6	0	4
1600	0	33	6600	1	54	170	0	6	1	23	670	1	6	2	48
1700	0	35	6700	1	56	180	0	6	3	67	680	1	6	5	12
1800	0	37	6800	1	59	190	0	6	6	30	690	1	7	0	56
1900	0	39	6900	1	61	200	0	7	1	74	700	1	7	3	19
2000	0	41	7000	1	63	210	0	7	4	38	710	1	7	5	63
2100	0	43	7100	1	65	220	0	8	0	2	720	1	8	1	27
2200	0	45	7200	1	67	230	0	8	2	45	730	1	8	3	70
2300	0	47	7300	1	69	240	0	8	5	9	740	1	8	6	34
2400	0	49	7400	1	71	250	0	9	0	53	750	1	9	1	78
2500	0	51	7500	1	73	260	0	9	3	16	760	1	9	4	41
2600	0	53	7600	1	75	270	0	9	5	60	770	1	10	0	5
2700	0	55	7700	1	77	280	0	10	1	24	780	1	10	2	49
2800	0	57	7800	1	79	290	0	10	3	67	790	1	10	5	13
2900	0	59	7900	2	1	300	0	10	6	31	800	1	11	0	56
3000	0	61	8000	2	3	310	0	11	1	75	810	1	11	3	20
3100	0	63	8100	2	5	320	0	11	4	39	820	1	11	5	64
3200	0	65	8200	2	7	330	0	12	0	2	830	1	12	1	27
3300	0	67	8300	2	9	340	0	12	2	46	840	1	12	3	71
3400	0	69	8400	2	11	350	0	12	5	10	850	1	12	6	35
3500	0	71	8500	2	13	360	0	13	0	53	860	1	13	1	79
3600	0	73	8600	2	15	370	0	13	3	17	870	1	13	4	42
3700	0	75	8700	2	17	380	0	13	5	61	880	1	14	0	6
3800	0	77	8800	2	19	390	0	14	1	24	890	1	14	2	50
3900	0	79	8900	2	21	400	0	14	3	68	900	1	14	5	13
4000	1	1	9000	2	23	410	0	14	6	32	910	1	15	0	57
4100	1	4	9100	2	25	420	0	15	1	76	920	1	15	3	21
4200	1	6	9200	2	27	430	0	15	4	39	930	1	15	5	64
4300	1	8	9300	2	29	440	0	16	0	3	940	1	16	1	28
4400	1	10	9400	2	31	450	0	16	2	47	950	1	16	3	72
4500	1	12	9500	2	34	460	0	16	5	10	960	1	16	6	36
4600	1	14	9600	2	36	470	0	17	0	54	970	1	17	1	79
4700	1	16	9700	2	38	480	0	17	3	18	980	1	17	4	43
4800	1	18	9800	2	40	490	0	17	5	62	990	2	0	0	7
4900	1	20	9900	2	42	500	1	0	1	25	1 Mil.	2	0	2	50

NOTE.—As the foregoing tables are calculated only for the purpose of showing the quantity of flowering weft that is requisite for the different breadths of webs contained therein, the manufacturer must not suppose that the number of dents or splits that are there given, for the breadth of any particular reed, are sufficient for the same width of cloth to which it refers. As flowering weft is generally catched upon two cords on the outside of each selvage of the web, it may be fairly estimated that the length of a pick or shot is equal to the breadth of the web in the reed. The shawl manufacturer, therefore, who wishes his goods to stand any particular breadth when finished, will not be far from the truth, by always taking the number of dents immediately above that intended to be made. If it is wished to make a shawl in a 1400 reed, 54 inches wide, take the number of dents that a 1500 requires for the same breadth in the reed, and so on for any other reed or breadth. Only with this reservation, that in damask shawls, where the weft is put in dry, or any other of a similar kind, 80 dents of allowance, in place of 100 will be sufficient, being a deduction of one-fifth part from what is given by the above rule.

Example No. 1


Guide Board
Guide Board
Guide Board
Pattern Levers
Pattern
Knots
Neck or Tie
Connecting Cords of Pattern Levers
8 Pullers
Recovering Weights
Guide Board
Stops
Guide Board
Treadle Cords or Wires
Draught
Headles for the ground
Headles for the Selvages Plain or corded
1 2 3 4 5
Splits or Dents of the Reed
4 Threads per Dent.
Levantine or Serge ground.
Treadles
1
2
3
4
5
6
7
8

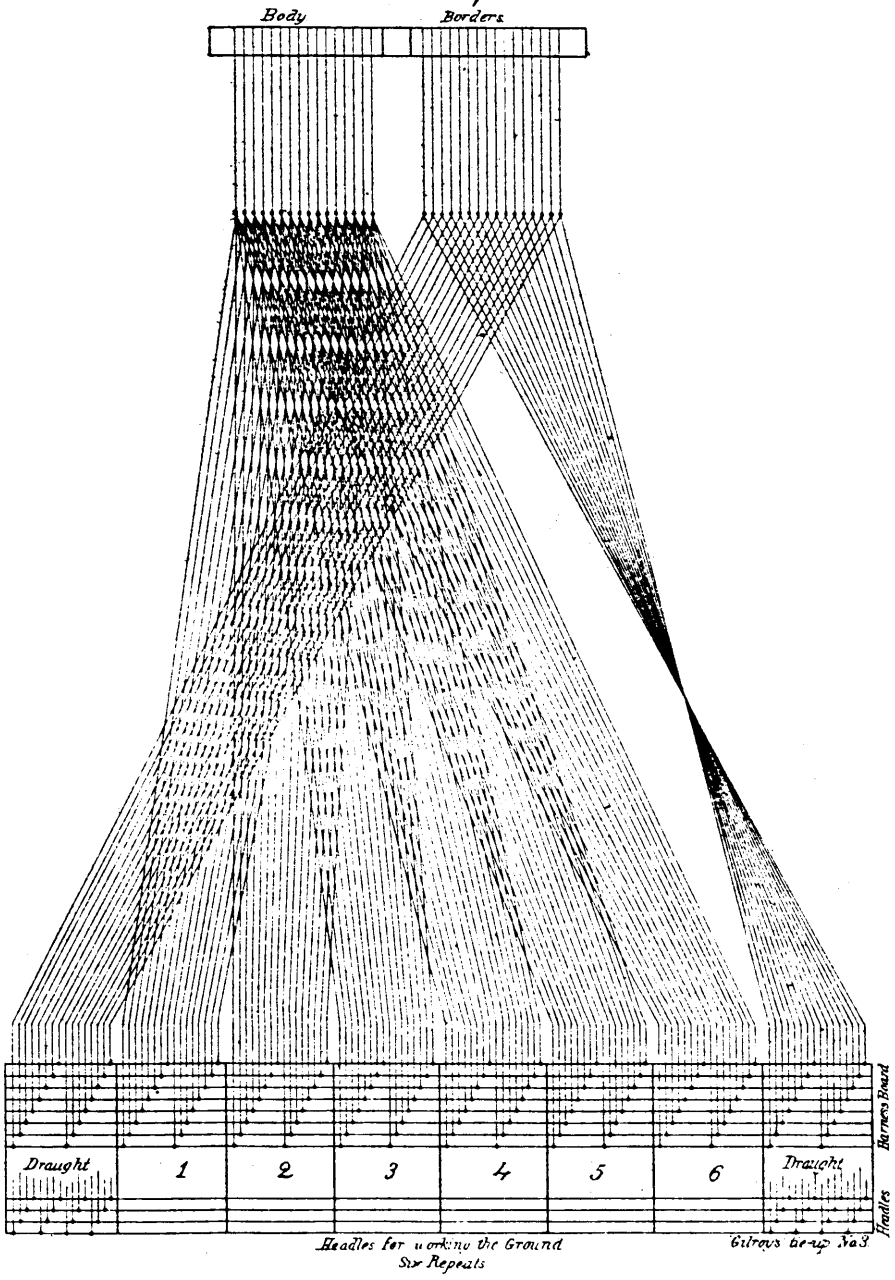
Example N.º 2.



In the Example N.º 2. figures 1.2.3.4.5.6. indicate regular repeats or running patterns, and that marked A a point pattern. When a double or point pattern is made in the middle of the web, (as in this example,) it is called a bastard or illegitimate design. All bastard goods are used for covering sofas.

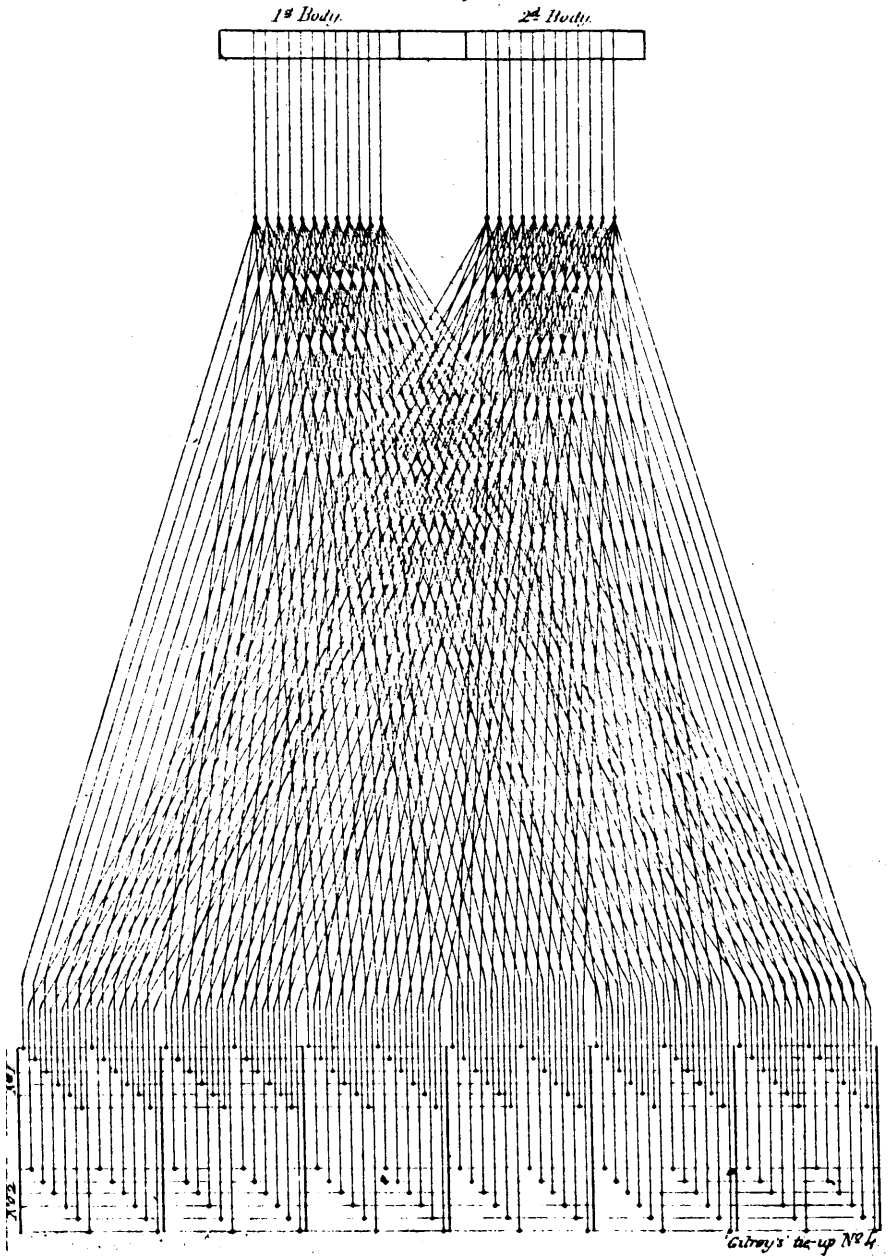
Example No 3

Handkerchief Mourning
with either one or two Jacquards

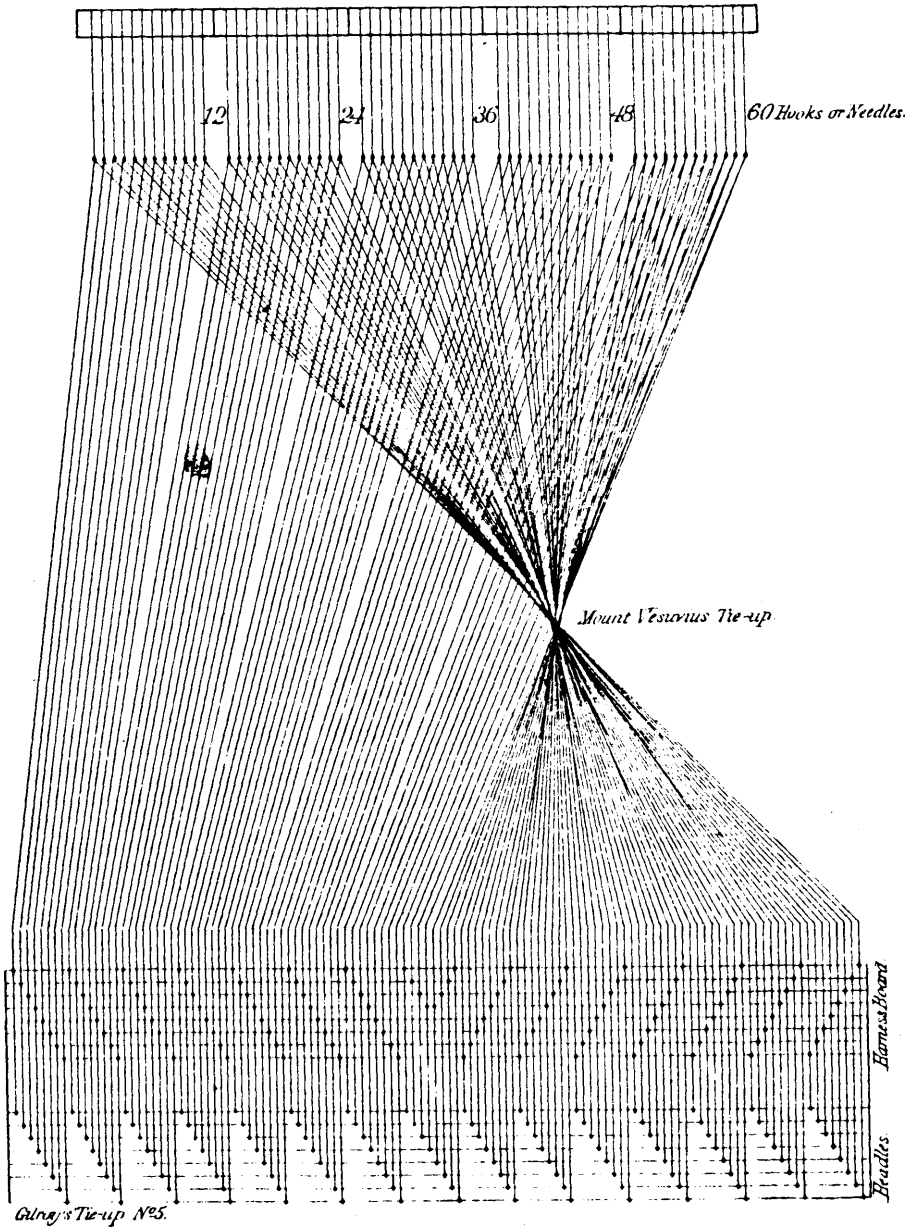


Example No 4.

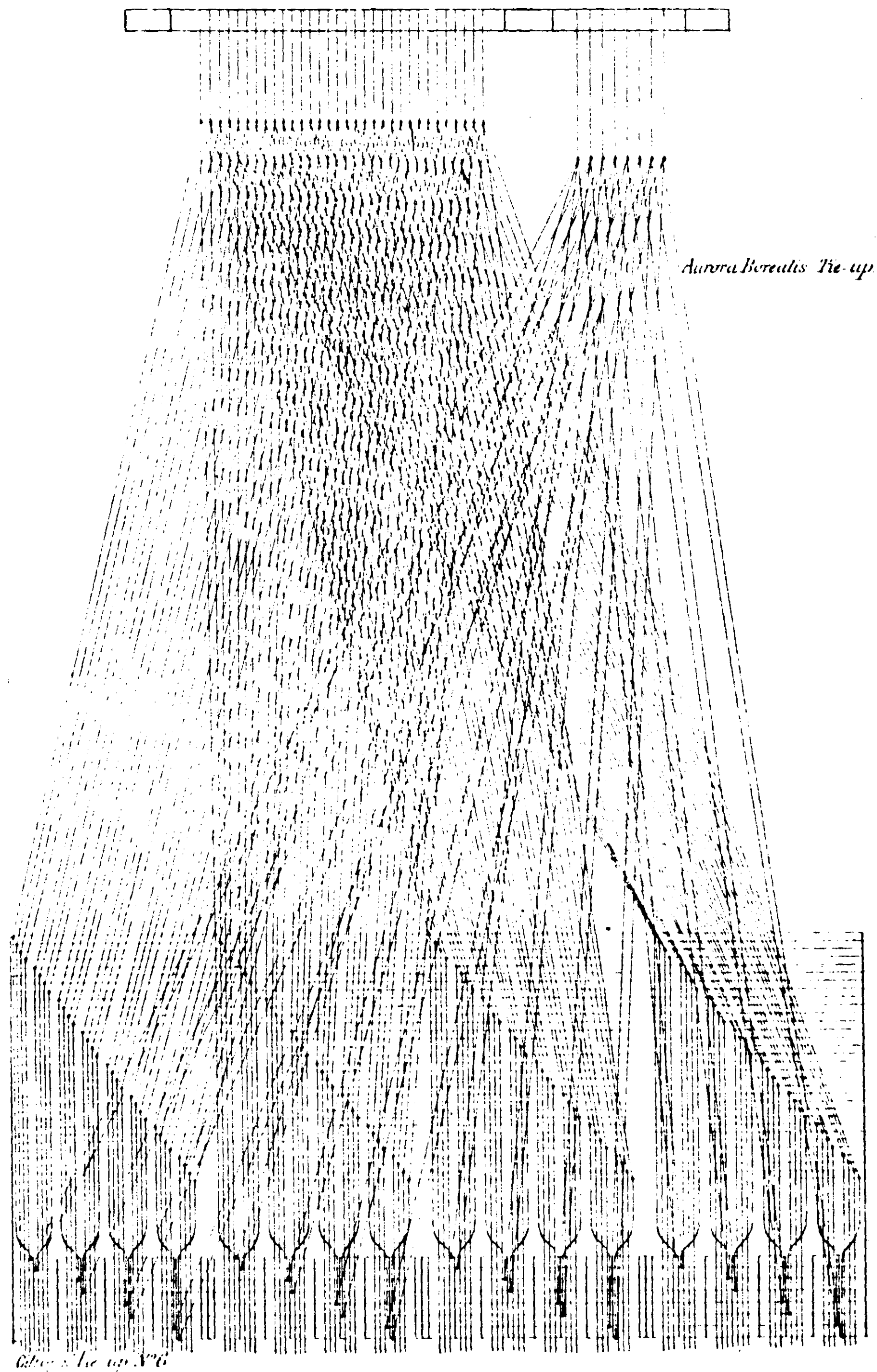
With two Jacquards.



Example N°5


12
24
36
48
60 Hooks or Needles.
Mount Vesuvius Tie-up
Barrs Front
Bradles
Gilroy's Tie-up N°5.

Example No. 6.

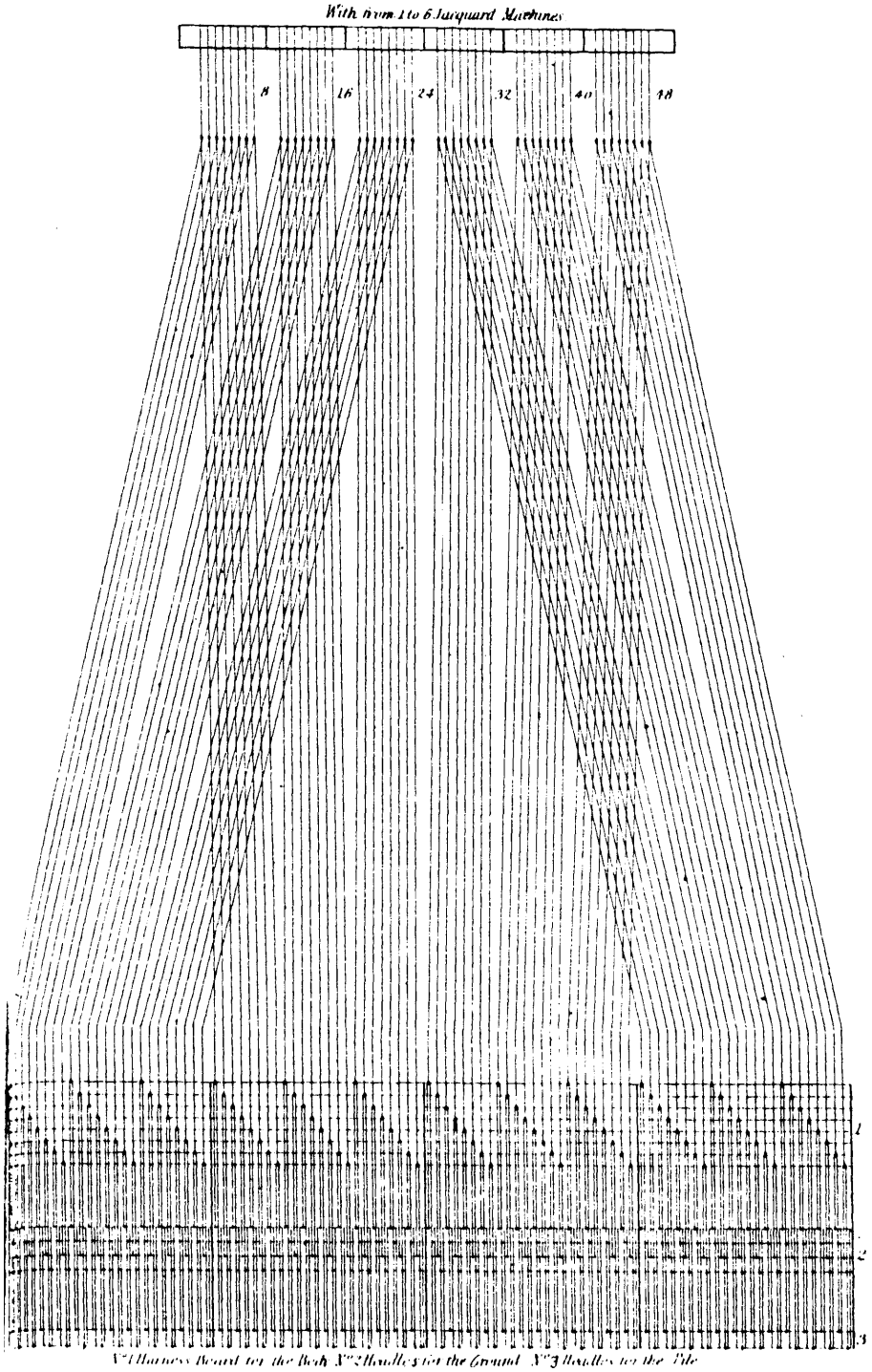


Example. N° 7.

Plush. Velvet. (Light.)

(2 Threads per Dent.)

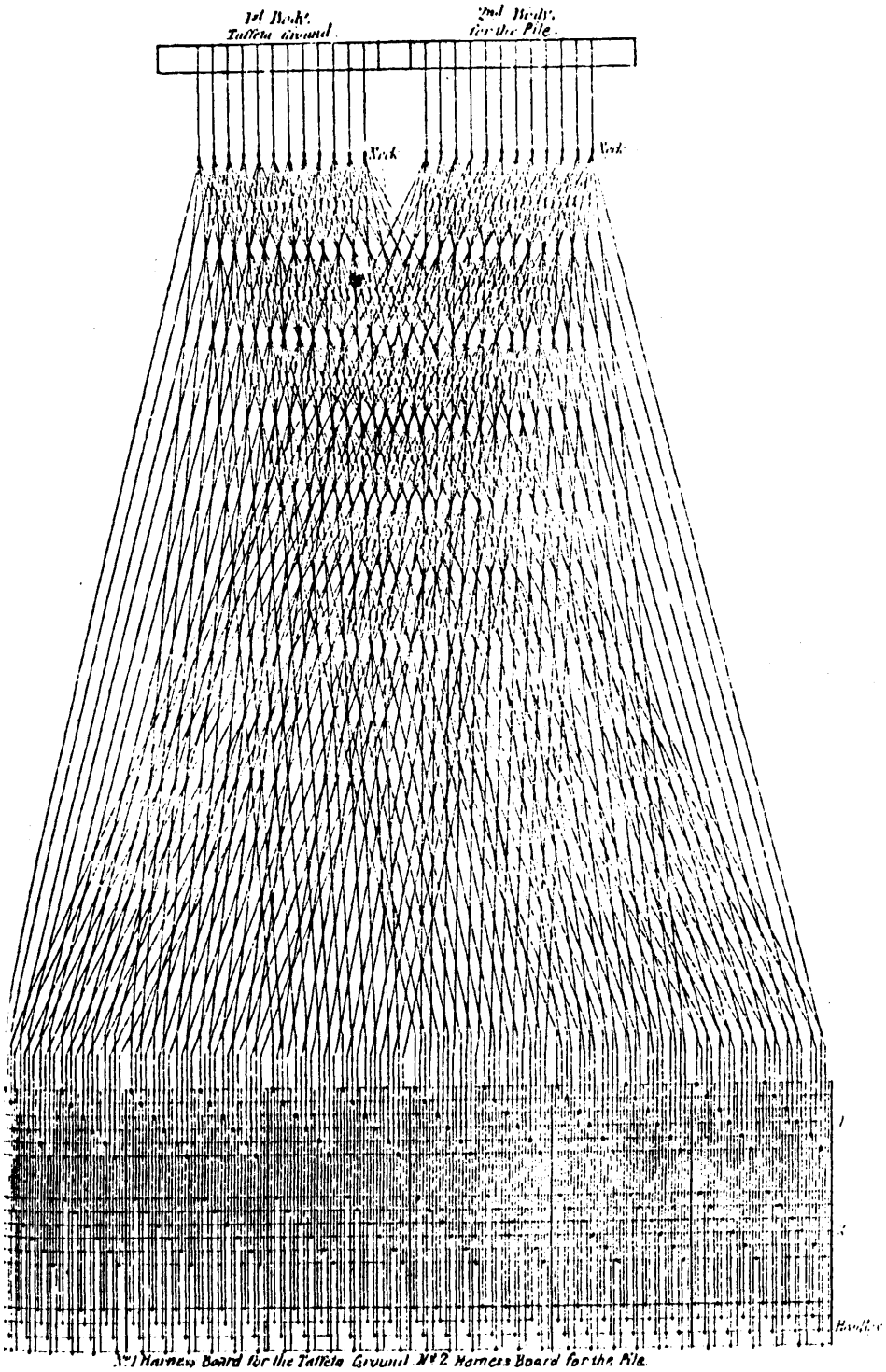
With from 1 to 6 Jacquard Machines



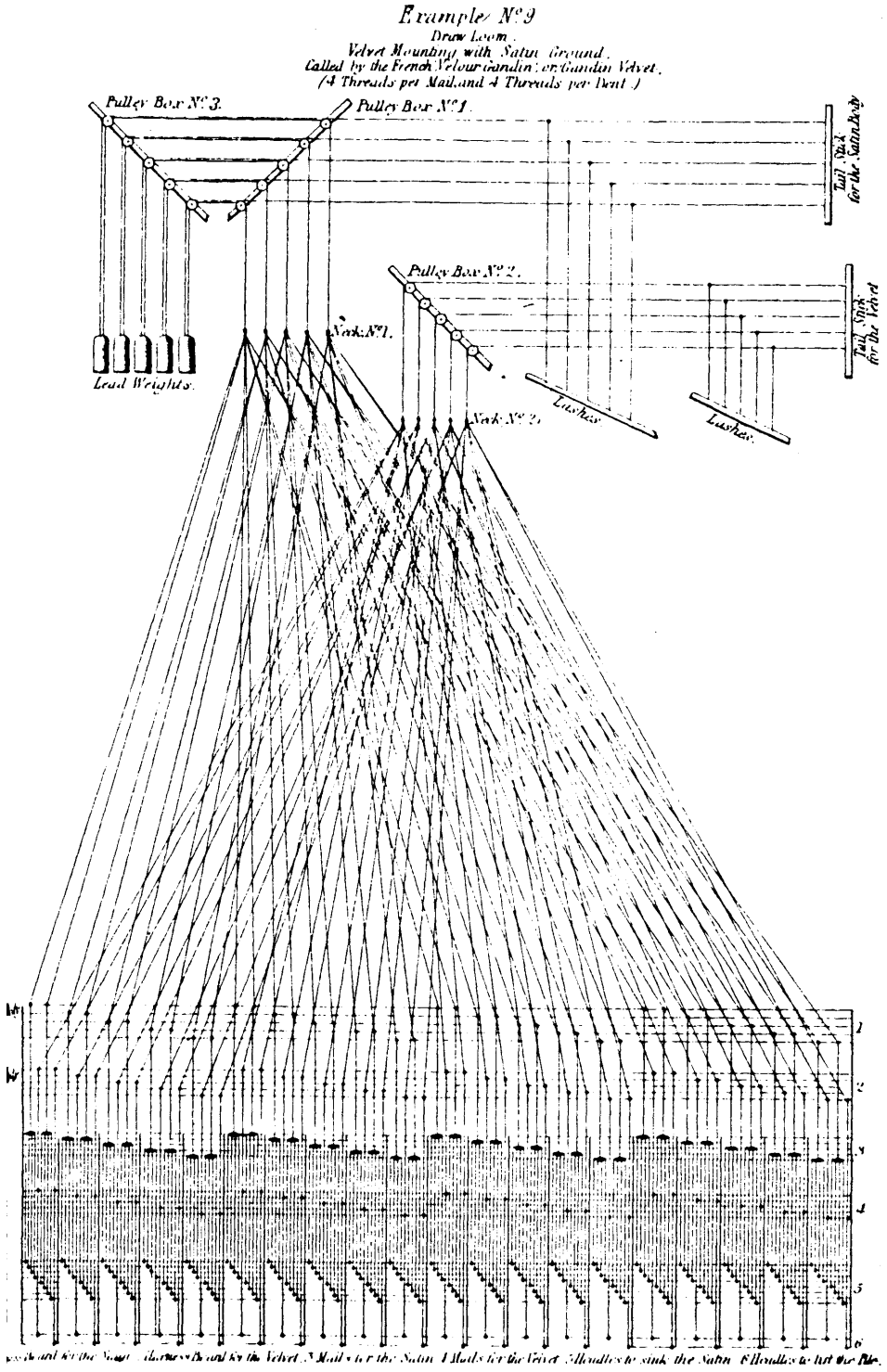
N°1 Harness Board for the Back N°2 Headles for the Ground N°3 Headles for the Pile

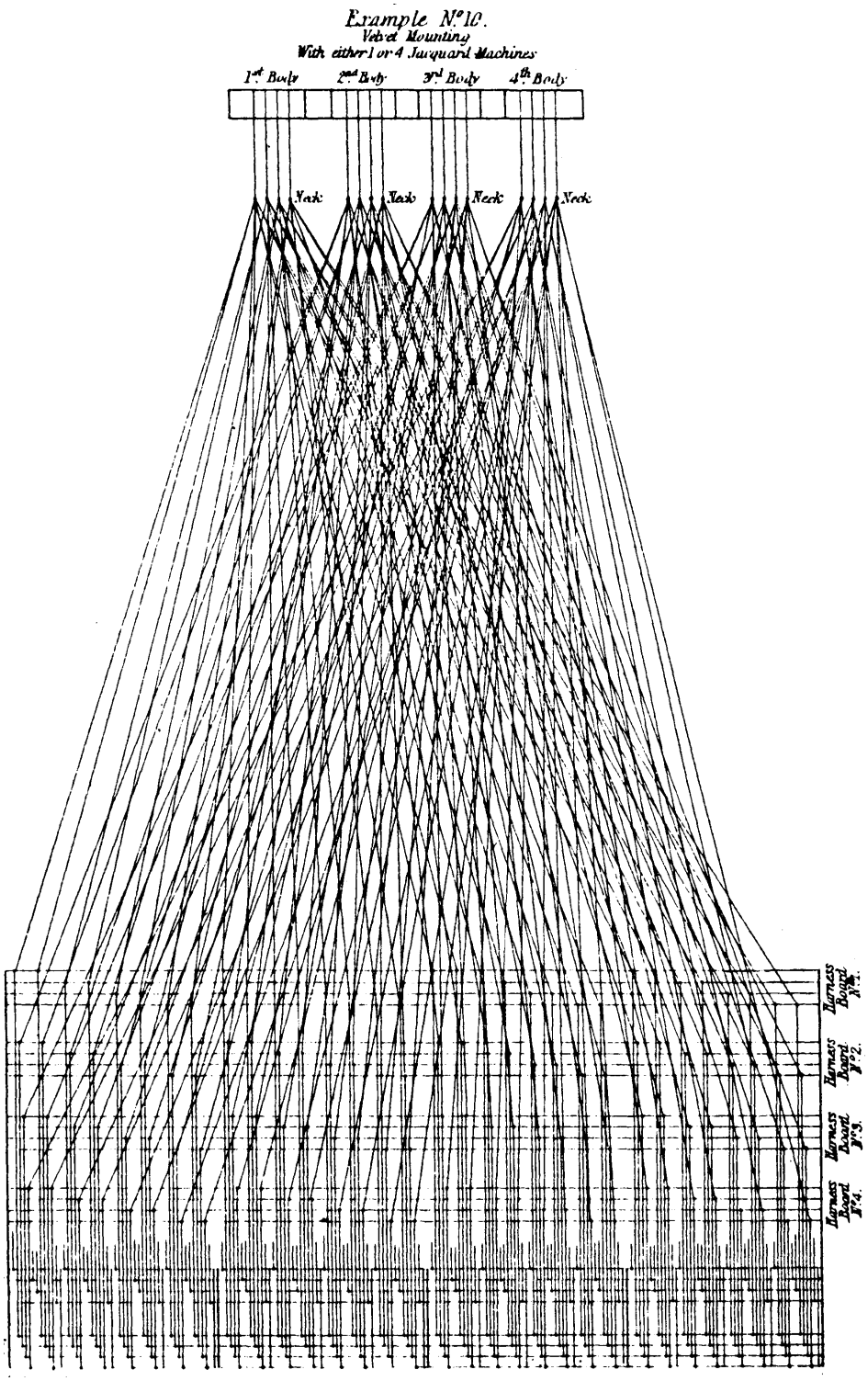
Example N°8.

Velvet Mounting.



N°1 Harness Board for the Taffeta Ground N°2 Harness Board for the Pile.


Example N°9
Draw Loom.
Velvet Mounting with Satin Ground.
Called by the French Velour Gandin: or Gandin Velvet.
(4 Threads per Mail and 4 Threads per Dent.)
Pulley Box N°3.
Pulley Box N°1.
Tail Stick for the Satin Body
Pulley Box N°2.
Tail Stick for the Velvet
Nash N°1.
Lead Weights.
Nash N°2.
Lashes
Lashes


Example N.º 10.
Velvet Mounting
With either 1 or 4 Jacquard Machines
1st Body
2nd Body
3rd Body
4th Body
Neck
Neck
Neck
Neck
Harness Board N.º 1.
Harness Board N.º 2.
Harness Board N.º 3.
Harness Board N.º 4.

TESTIMONIALS.

In order to lay before the public the opinions of some of the most eminent French, English, and other manufacturers, regarding the merits of our patent power looms, we subjoin several Testimonials, which have been received by us on the subject. We have not translated the French documents, preferring to give them exactly as received from the several parties; and, besides, it saves room: any person however, who does not understand the language, but who may feel anxious to ascertain what these documents contain, need be at no loss for a translator. The English Testimonials will, perhaps, be sufficient to satisfy most people, without any additional proof.

COPIE.

Je soussigné P. A. Pihet, constructeur Mécanicien, demeurant à Paris, avenue Parmentier, No. 3, déclare que j'ai connu M. C. G. Gilroy natif de la Grande Bretagne vers le mois de Décembre 1834, et que j'ai passé contrat avec le dit Sr. C. G. Gilroy pour la construction d'un nouveau métier de son invention et pour lequel des brevets ont été pris en France par M. Pihet pour cette même invention, qui consiste en un moyen mécanique par lequel la machine appellée Jacquart marche par un moteur quelconque, et qui permet de *supprimer entièrement les moyens à la main employés jusqu'à ce jour pour obtenir les mêmes résultats.* Le dit Sr. C. G. Gilroy ayant mis à exécution le dit métier dans mes ateliers, depuis la date ci-dessus exprimée jusqu'à ce jour a demandé et obtenu des patentes ou brevets pour l'Angleterre, l'Ecosse et l'Irlande, où il désire propager sa découverte. En conséquence, je déclare donc, dans l'intérêt de la vérité, que le métier de l'invention de M. C. G. Gilroy, et qu'il a construit chez moi, pour faire marcher sans aucun aide le mécanique Jacquart ainsi nommé, a été établi sous *tous les rapports à mon entière satisfaction, et qu'il produit des étoffes parfaites, sans etre plus sujet à se déranger qu'un simple métier mécanique pour calicot*, et qu'enfin, *toutes les étoffes façonnées et autres peuvent y etre fabriquées en changeant seulement les cartons et sans toucher* au *mécanisme.* Le métier marche à raison de 100 et même 115 coups de la navette à la minute, soit pour faire une étoffe forte ou légère, et d'excellente fabrication.

Je déclare également que je considère M. C. G. Gilroy comme un homme très industrieux et d'une grande persévérance ; qu'il est *très capable de mener à fin ce qu'il promet au sujet de ses perfectionnemens et inventions concernant les métiers à tisser.*

En foi de quoi je lui ai délivré la présente attestation pour lui servir en tant que de besoin.

Fait à Paris le quatre Mars 1838.

Approuvé l'écriture

Signé—P. Aug. Pihet.

Nous soussignés, ayant vu en pleine activité de travail dans les ateliers de M. Pihet, constructeur mécanicien à Paris, le nouveau métier Jacquart, mécanique de l'invention de M. C. G. Gilroy, métier d'ailleurs mentionné dans l'attestation ci-contre, déclarons et attestons que le dit métier marche avec toute la perfection désirable et que, non seulement il donne beaucoup plus en produit que les métiers à la main, mais que ces mêmes produits sont *supérieurs* en régularité et en perfection.

Nous déclarons en outre qu'une jeune fille peut aisément gouverner trois de ces métiers.

Fait à Paris le 5 Mars 1838.

Signé.—Dioudonnat,

Constructeur de Mécaniques Jacquart.

Vu par Nous, Maire du 8e Arrondissement de Paris pour légalisation de la signature de MM. P. A. Pihet ci-contre et Dioudonnat, apposée d'autre part.

Paris, le dix Mars 1838.

Le Maire (L. S.) Signé.—Bayvet.

Je soussigné déclare avoir vu fonctionner le métier dont il est question dans le présent certificat, mon opinion est qu'il remplit le but que l'auteur s'est proposé, et qu'il doit satisfaire à toutes les exigences du tissage en général.

Signé.—Henry, Aîné.

Nous partageons l'opinion ci-dessus énoncée par Monsieur Henry.

Signé—Couchot Rey Lebeuf Lehr.

Je soussigné déclare que le métier à tisser dont il est parlé ci-dessus me paraît pouvoir parfaitement remplir le but que s'est proposé son auteur.

Signé.—A. Diomme.

Vu par le Maire du 3e Arrondissement de Paris pour légalisation de la signature de MM. Henry aîné,

Paris, le 13 Décembre 1840.

Signé.—Decan. (L. S.)

Vu par le Maire du 5e Arrondissement de Paris pour légalisation de la signature de M. Dioudonnat.

Paris, le 13 Décembre 1840.

(L. S.) Signé. Foccard.

Je soussigné traducteur assermenté, certifie que la copie qui précède est conforme à l'original et que foi doit y être ajoutiée tant en jugement que hors.

Paris, le 13 Décembre 1840.

(L. S.) F. Gardera.

Vu par le Maire du 3e Arrondissement de Paris pour légalisation de la signature de M. Gardera, traducteur assermenté.

Paris, le 13 Décembre 1840.

Periort Trousscay. (L. S.)

Je soussigné certifie avec plaisir que les métiers a tisser les étoffes faconnée ou unie pour la soierie et le lin que j'ai construit pour M. Charles Cunningham sous la direction de M. C. G. Gilroy ont parfaitement rempli le but qu'il s'était proposé.

1° Pour l'enroulement de l'étoffe de manière à ce que la trame dans le commencement de la pièce ne soit pas plus serrée qu'à la fin. Par ce moyen l'on met autant de fil de trame qu'on désire par centimétre.

2° Pour que le fil de trame se trouvant tendu et dans une position parrallèle à l'étoffe évite tous les bouclages.

3° Pour le mécanisme nécessaire à faire marcher la Jacquart qui est tellement doux qu'il permet de donner a ces métiers la *vitesse* des métiers à calicots.

4° Pour le mouvement nécessaire à arrêter le marche du métier quand le fil de trame vient à casser; et enfin j'affirme que *tous les fabricants que j'ai vu venir dans mes atelliers pour visiter ces métiers ont été d'accord sur les avantages et la simplicité de ce système.*

En foi de quoi j'ai signé le présent pour rendre hommage a la vérité.

Paris le 21 Décembre 1840.

E. Phillippe.

Ing. mécanicien rue du Chateau Landon, No. 19, à Paris.

J'ai visité à plusieurs reprises, des métiers très bien montés et parfaitement organisés, garnir de leur piéce, pour travailler avec la mecanique Jacquart. Ces métiers appartiennent à M. Charles Cunningham, et sont construits par M. C. G. Gilroy dans l'établissement situé No. 19, rue château Landon, faubourg St. Martin.

Les avantages que j'ai appréciés sont:

1° L'application de le mécanique Jacquart, mu regulierement et agis-

sant aussi activement par un moteur, que tel métier à tisser le calicot, la soie, la toile, mu avec la plus grande vitesse.

2° Le mécanisme pour que la duite lancée, passe et se cage sans bouclage.

3° Le mécanisme qui forme de belles lizières.

4° Le mécanisme pour être certain et assuré qui vient à casser, arrête immédiatement la navette et la mécanique Jacquart.

5° L'enroulement de l'étoffe s'exécutant independamment de sa reduction.

6° Le mode de donner à toute étoffe faconnée, ou unie le dégré de reduction à volonté.

Paris, le 18 Décembre 1840.

BOSQUILLON.

Fabricant de châles et étoffes nouveaus, No. 13, rue neuve St. Eustache.

Vu par le Maire du 3e Arrondissement pour légalisation des signatures de MM. BOSQUILLON, HENRY, atné, et LEHR.

Paris, ce 24 Décembre 1840.

(L. S.) DECAN.

J'ai vu et j'ai examiné de près les métiers mécaniques brevetés, de M. Charles Cunningham construit par M. C. G. Gilroy. Je les trouve parfait tant pour leur montage que pour leur produits.

Paris, le 18 Décembre 1840.

DIOUDONNAT.

Rue St. Maur, No. 12.

J'ai vu marcher les métiers de M. Gilroy; ils m'ont paru réunir tous les avantages mentionnés ci-dessus.

Paris, 20 Décembre 1840.

LEHR.

12 faubourg Poissonière, maison Couchot Rey Lebeuf Lehr, passage des Petites Ecuries No. 12.

J'ai vu les métiers; j'ai examiné l'exactitude et l'assureté de la manœuvre, les produits qu'en résultent me paraissent ne rien laisser à désirer.

Paris, le 19 Décembre 1840

HENRY, Atné.

Fabricant, 13 rue Poissonière.

Nous soussignés certifions que nous avons vu fonctionner le métier à tisser mécanique de M. C. G. Gilroy; nous considérons cette invention comme ingénieuse et pouvant donner d'heureux resultats sur tout pour les étoffes de soie.

H. DEBERGUE & SPREAFICO.

Ingénieurs, 228 Quai de Jemmappes, Paris.

Vu à la Mairie de 5e Arrondissement pour légalisation de la signature Sr. DEBEROUE & SPREAFICO, apposée à dessus.

Paris, le 23 Mars, 1841.

Le Maire du 5e Arrondissement de Paris.

(L. S.) FOUCARD.

Nous, soussignés, certifions que pendant huit années, jusqu'à ce jour, nous avons vu et suivi, les diverses inventions et perfectionnments que le Sr. Clinton G. Gilroy a fait dans son mécanisme, pour arriver à une amélioration complète, qu'il a maintenant obtenue, et que nous manufacturiers nous avons justement appreciés. Le tems et les vielles qu'il y a consacrés, sans énumérer les énormes dépenses qu'il a faites; ont été couronnés d'une réussite complete pour ce qui est du mécanisme.

1o La machine dite Jacquard, quoique fonctionnant avec rapidité, et marchant à 110, 115, et même 125 coups de navettes à la minute, n'a aucune secousse dans ses mouvemens, elle a la douceur qu'exige la fabrication des tissus de Soirie.

2o L'ingenieuse idée d' arreter le métier au premier fil de trame qui se rompt, ou à chaque canette finie, était indispensable pour la perfection de l'étoffe.

3o La manière d'enrouler l'étoffe donne la facilité de donner, autant qu'on le désire, de coups de navettes par centimètre; c'est à dire la réduction voulue pour tel genre d'étoffe, laquelle que ce soit, et avec une régularité exacte, depuis le commencement de la chaîne jusqu'à sa fin.

4o Il restait encore un obstacle, à vaincre, le Sr. Gilroy a parfaitement su le surmonter: C'était d'éviter le rebouclage de la trame, fait sur le lisière, produit par le diagonal que fait le fil de trame par le mouvement du battant. Il fallait pour éviter cela, un moyen sûr; il a reussit parfaitement, et on peut dire que son idée est aussi simple qu'ingenieuse.

5o Il fallait empêcher les cartons de s'echapper du cilindre, ce cas arrivant quelquesfois par la vitesse de la marche du métier, et faisait faire des défauts à l'étoffe, et occasionnait la perte d'un dessin (*les cartons*) forte couteux. Ce désagrément est parfaitement évité.

6o Pour faire éxecuter un grand dessin, on ne pouvait le faire sans le concours des lisses devant le corps, ce qui devenait dispendieux par le grand entretient qu l'exige une remise, et augmentait en complication le montage des métiers. Par son procedé, il est parvenu à faire éxecuter les dessins de la plus grande dimension, sans l'emploi des lisses, ce qui en simplifiant le métier devient un grand avantage pour l'ouvrier.

7o Il fait marcher tour à tour, par son mécanisme, plusieurs navettes pour les dessins à plusieurs couleurs, etc.

Nous nous résumons en disant que le métier a tisser-mécanique, à la Jacquard, de l'invention du Sr. Clinton G. Gilroy, est celui qui offre le plus de perfection pour la fabrication de les differentes étoffes de soie et autres dans les articles les plus délicats par leur éxécution, et qu'il a fabriqué à Paris en sont la preuve.

William Webb, 26 Wood St., Spitalfields, London.
H. Sanford & Varrel. Avenue Tradaine No. 1, 2e Arrondissement.
E. Fontaine. 87 rue Hauteville, Paris.
Lehr. 12 faubourg, Poissonnière.
Henry, Aîné. 13 rue Poisonnière.
Boucher. 6 rue des fossés montmartre, Paris.
Andelle. 5 rue Hauteville, Paris.
C. Depuille. No 22 rue neuve St. Augustin.
A. Soulas. 5 rue Hauteville, Paris.
Dioudonnat. 12 rue St. Maur.
Raffard. 372 rue St. Denis.
Bosquillon. No. 13 rue neuve St. Eustache.
E. Phillippe. Ing. mécanicien, rue Château Landon, No. 19. Ayant construit les métiers relatés ci-dessus.
Eugene Vasserot. Ing. mécanicien, 19 rue Château Landon.
Cerisiaux & Co. Ing. mécanicien.
Robert Middleton. Engineer, rue Rochechouart, Paris.
Placide Caille. 94 rue St. Maur, Popincourt.
E. N. Robert.
William Sudds. Rouen.
J. Frood. Ingénieur.

Vu par nous, Maire du 6e Arrondissement de Paris, pour légalisation de la Signature du Sr. Raffard, apposée au bas du présent.
Paris, 24 Mars 1841.

(L. S.) Ch. Grondar.

Vu pour la attestation des signatures Phillippe et Vasserot.
Paris, le 23 Mars 1841.
Le Commissaire de Police du Quartier du faubourg St. Denis.

(L. S.) Baifitte Grégeart.

Vu par le Maire du 3e Arrondissement pour légalisation des signatures de MM. Henry, Lehr, Bosquillon, Andelle & Soulas et Fontaine.
Paris, ce 20 Mars 1841.

(L. S.) Decan.

Vu pour attestation de la signature de MM. Sanford & Varrall, apposée ci-dessus.

Paris, le 22 Mars 1841.

Le commissaire de Police, Quartier faubourg Montmartre.

(L. S.) Atour.

Vu à la Mairie du 8e Arrondissement de Paris légalisation de la signature de M. Dioudonnat, traînée au milieu de cette feuille.

Le 24 Mars 1841.

(L. S.) Le Maire. E. Gue.

Je soussigné certifie avoir vu fonctionner la machine de M. Gilroy à manière à ne laisser rien à désirer comme success.

A. H. Neville.
Ingénieur, 19 Passage Saulnier.

J'ai vu marcher le métier mécanique Jacquart de M. Gilroy, et en ai été fort satisfait sous tous les rapports.

Essonne (Seine-et-Oise.)

E. Feray.

Vu à la mairie d'Essonne pour légalisation de la signature de E. Feray apposée au bas du présent.

Essonne, le 25 Mars 1841.

(L. S.)

Je soussigné m'empresse de reconnaître que le Sr. Gilroy a certainement obtenu les resultats les plus parfaits que l'art mécanique puisse jusqu'à ce jour apporter au tissage.

Felix. Cordir.
42 rue Chabrol.

J'ai vu fonctionner le métier de M. Gilroy, et il m'a paru exempt de reproches.

C. Desports.
48 rue Hauteville.

Vu pour legalisation des signatures de MM. Cordir et Desports sus apposées.

Paris, le 22 Mars 1841.

Le Commissaire de police du Quartier du faubourg Poissonnière.

(L. S.) P. Arlam.

Je déclare avoir vu fonctionner le métier en question. Le but que se proposait son auteur me paraît parfaitement réussir. La substitution des excentriques aux courbes à cœur évite les chocs, la différences des rayons donne en ouvrant les chaines le temps à la navette de passer un mécanisme ingénieux, tend le fil engagé d'approcher de l'ouvrage, et depense le battent de faire autant de chemin que l'ordinaire, de l'ensemble de les dispositions il en resulte un tissage rapid et exempt de défauts ; j'atteste avec plaisir ce dont j'ai été temoins.

M. Le Baron SEGUIER.

Vu par nous, Maire du 11e Arrondissement de Paris, pour légalisation de la signature de M. le Baron SÉGUIER, apposée au bas de la présente attestation.

Fait à Paris, le 23 Mars 1841.

(L. S.) VAILLANT.

A. M. le rédacteur en chef du Commerce.

Paris, 24 avril 1841.

Monsieur,

Ayant lu dernièrement, dans un numéro supplémentaire de votre journal, sous la date du 31 mars dernier, un article relatif à un nouveau métier Jacquard, marchant à la vapeur, j'ai été fort surpris, et tout autre fabricant l'eût été à ma place, d'y trouver la description d'une prétendue découverte de MM. Malmazet aîné, Deplanque fils et compagnie pour laquelle il est dit que ces messieurs viennent de prendre un brevet qui porte la date du 4 avril 1840. Il est dit dans cet article qu'antérieurement à cette découverte " les Anglais avaient bien appliqué la vapeur aux métiers à tisser les étoffes unies, mais on n'avait pu encore parvenir à l'appliquer aux métiers à tisser les étoffes damassées à dessin ; ce problème difficile et important vient d'être résolu par MM. Malmazet aîné, Deplanque fils et Ce du Lille (Nord.)"

Tout fabricant éclairé en France, en Angleterre, ou dans tout autre pays saura reconnaître l'inexactitude de ce qui précède et cela pour raisons suivantes:

1° MM. Malmazet aîné, Deplanque fils et Ce paraissent ignorer entièrement que *dix brevets* ont été pris en France depuis 1834, pour la fabrication des étoffes croisées, satin et façonnées, par les métiers Jacquard, marchant par la vapeur, lesquelles métiers marchent admirablement bien. Deux de ces brevets ont été pris au nom de MM. Pihet et Ce, avenue Parmentier, 3, à Paris. Les huit autres ont été pris au nom de M. Charles Cunningham, et l'invention est de M. C. G. Gilroy, ingénieur et fabricant. Le brevet de MM. Malmazet aîné, Deplanque fils et Ce est compris dans ceux de M. C. G. Gilroy. Le moyen surtout employé par ces messieurs pour faire marcher le métier n'est qu'un imitation de celui de M. Pihet et de M. Cunningham. Quant à ce qui a rapport aux autres parties de la construction

du métier, il n'y a rien de neuf en aucune manière ; et tous les fabricans sont prévenu par le présent article que toute contrefaçon de l'invention du sieur Gilroy sera poursuivie selon la loi.

2° Ce sont les métiers de l'invention de M. Gilroy, qui, les *premiers*, en *Angleterre* et *en France*, ont fait marcher les *métiers Jacquard* par la *vapeur*, pour cette fabrication. M. Gilroy a formé une société à Londres pour exploiter cette invention, avec un capital de 30,000 liv. st., et il a payé à MM. Poole et Carpmael, du bureau des brevets, à Old-Square, Lincoln's Inn, à Londres, depuis 1834, la somme de 1,500 liv. st.

3° M. Gilroy, qui a fait la découverte de toute ces inventions ingénieuses et utiles a employé huit années d'un travail assidu et dépensé plus de liv. 6,000 pour arriver à ce but désirable, et aucun frais, aucun sacrifice n'ont été épargnés pour obtenir ce résultat. Les spécifications attesteront l'immense importance des résultats que doivent obtenir les fabricans par l'emploi de ces inventions.

4° La moindre vitesse des admirable métiers Jacquard par la vapeur ; de l'invention de M. Gilroy, n'est pas au dessous de 108 coups de navette par minute, et la vitesse ordinaire est de 115 coups, et sur les étoffes de gros de Naples façonnées de 18¼ jusqu'à 25 pouces ; ils ont marché avec une rapidité de 125 à 137 coups de navette par minute, sans aucun dérangement dans la machine Jacquard.

Les fabricans et les ingénieurs dont les noms suivent attesteront la vérité de ce qui a été dit à l'égard des métiers de M. C. G. Gilroy :

MM. E. Feray, fabricant de damassées, filature de lin et construction de machines à Essonnè (Seine-et-Oise) ; Le Gentil, député du 3e arrondissement, rue Poissonière ; Henry aîne, fabricant, juge au tribunal de commerce ; Bosquillon, fabricant, arbitre près le tribunal de commerce ; Ch. Dupuille, fabricant de soie, rue St-Augustin, 22 ; Desports, directeur de la société anonyme pour les filatures de lin, tissage, etc., Paris and Amiens ; Lehr, fabricant et banquier de la maison de Couchet, Rey, Le Bœuf, et Lehr, passage des Petites Ecuries, à Paris ; Dioudonnat, fabricant de machines Jacquart, rue St-Maur, 12 ; le baron Séguier, membre du comité de la Société d'encouragement pour l'industrie nationale ;

MM. les ingénieurs-mécaniciens, Henry Debergue et Spreafico, quai Jemmappes, 228, à Paris ; Sanford & Varrel, rue Rochechouart, à Paris ; E. Phillippe, rue Chateau-Landon (Faub.-St-Martin,) Paris.

Fabricans en Angleterre et en Irlande :

MM. L. et E. Wilson, neveux du dernier lord-maire de Londres, 124 Wood Street, Cheapside ; W. H. Wood, ingénieur et constructeur de machines à vapeur, etc. Renelagh Road, Thames Bank, London ; Michel Andrews, fabricant royal du linge damassé à Ardoyne, Belfast, Irlande ; M. Coulson, fabricant royal à Lisburn, Irlande ; W. Webb, chez MM. Jacquier et Ce, à Spitalfields, à Londres ; et John Dove, 4 Mape Street, Bethnal Green, Spitalfields.

Tous ces messieurs ont vu fonctionner les métiers de l'invention de M. C. G. Cilroy, et ils ont donné à l'excellence de ces métiers leur entière approbation.

W. W.

I have seen the looms at work in London and in Paris and have great pleasure in giving evidence to their excellence.

Henry Wood.

19 April, 1841.

We have seen Mr. Gilroy's machines working both silk and linen; and workmen of ours have superintended them here and in France, and we can speak of the inventions and the manner in which they work in the most favourable terms.

L. & E. Wilson.

Merchants and Silk Manufacturers, 124 Wood St. Cheapside, London.
March 11th, 1841.

From what I have seen of Mr. Gilroy's former inventions in machinery for weaving figured goods by power, I have every confidence that the present one, (alluding to Poole's patent of May 12th, 1839,) will in all respects meet the wants of manufacturers of silk and woollen textures, such as gros de Naples, vesting stuffs, &c.

Michael Andrews.

Damask Manufacturer, Ardoyne, Belfast.

January 10th, 1841.

Messrs. Editors:

A patent was obtained about a year since by Mr. C. G. Gilroy, now of New York, for improvements in the power loom for weaving figured goods of various kinds, either of silk, wool, linen or cotton, which looms are now in successful operation. The writer has seen specimens of the work executed upon them from each of these materials, some of them in a style which the manufacturers of Lyons would not be ashamed to own, and of a texture differing from every previous manufacture. Mr. Gilroy has spent a number of years in France, England, Belgium, and Prussia, in which countries he has obtained upwards of thirty patents for various improvements in the manufacture of textile substances; and he has in his possession the highest testimonials from the first manufacturers of France, and from others eminent in judgment and station, showing the estimation in which his improvements are held in that land of art and taste. Mr. G. has recently deposited in the Patent Office another model, exhibiting various new improvements in the loom, and which is intended for the weaving of table-cloths, shawls, piano-forte-covers, window curtains, and other

articles of a similar character. By the action of this loom the business of weaving will be much facilitated, as by its means he will be enabled to work at the rate of from eighty to a hundred and thirty picks per minute, and to produce perfect goods in patterns of great complexity.

Thomas P. Jones.

Daily National Intelligencer, Washington, D. C., April 6, 1843.

Patent Office, March 10, 1842

Sir:—

A very numerous collection of specimens of your silk weaving have been received for exhibition in the "National Gallery of Manufactures and Agriculture," also a sample of carpet weaving. Their extreme richness and brilliancy, entitle them to great praise, and will afford me much gratification in the display.

Respectfully Yours,
H. L. Ellsworth,
Commissioner of Patents, Washington.

Mr. C. G. Gilroy,
New York.

Wool Mosaic Cloth.—A new invention has recently been introduced into London from Berlin, and, as we learn, is soon to be introduced into our American cities, in which the brilliancy and variety of colours of Berlin wool are blended together in devices of surpassing elegance and richness. The manufacture has all the appearance of painted velvet, with the texture and lasting qualities of a woven fabric. In the process of manufacture the figures, with their various hues, are woven in a thick pile several inches long, and the fabric is then divided into laminæ and fixed on to flexible India rubber ground work, each slice of the pile producing a separate picture in wool. Some of the groups of flowers produced by this process are exquisitely beautiful, and are admirably adapted for the decoration of palatial drawing-rooms. The attempts to copy paintings and to take likenesses are comparative failures, but for ornamental designs the mosaic cloth is almost unrivalled in beauty.—[Boston Transcript.

This invention is described at page 219, to which the reader is referred.

INDEX.