mechanism to be disconnected from said upright driving shaft, so that it may rotate in either direction, independently of said shaft.

The construction and operation of the mechanism will be readily understood by consulting the accompanying four illustrations, of which Fig. 1 is a side view of the lower end of the upright driving shaft; the inner end of the take-up driving shaft; the intermediate gearing; the clutch mechanism; the bevel driving gears, and the mechanisms designed for operating them as the case may require; showing the upright driving shaft unclutched from its driving bevel gears. Fig. 2 is a side view of the front end of the take-up driving shaft, showing the handle and worm thereon, and the gear fast on the shaft of the take-up roll. Fig. 3 corresponds to Fig. 1, but shows the parts shown in Fig. 1 in their opposite position, with the upright shaft clutched to its driving bevel gears. Fig. 4 corresponds to Fig. 3, but shows the sleeve and the gears thereon, intermediate the upright shaft and the take-up driving shaft, in their intermediate position and the clutch mechanism partially broken away.

When the loom is running normally, the several parts will be in the position shown in Fig. 3.

When it is desired to reverse the pattern chain (not shown) for picking out, etc., the hand lever 1 is moved outwardly into the position shown in Fig. 1 and locked in said position and through link 2, lever 3, rock shaft 4, lever 5, link 6 and lever 7, the sleeve 8 is thus moved upwardly on the shaft 9, carrying the disk 10 up with it, and causing the pin 11 to be moved out of engagement with the hub 12 of the bevel gear 13, to unclutch the disk 10, sleeve 8 and the shaft 9 from said bevel gear 13. At the same time the bevel gear 14 is moved into engagement with the double bevel gear 15, and the bevel gear 16 moved out of engagement with said gear 15.

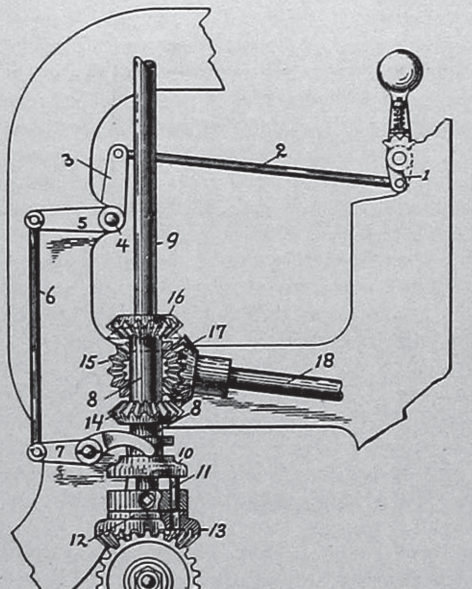


Fig. 4

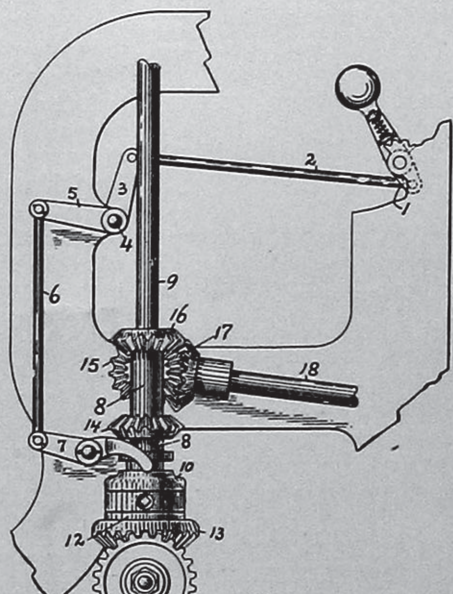


Fig. 3

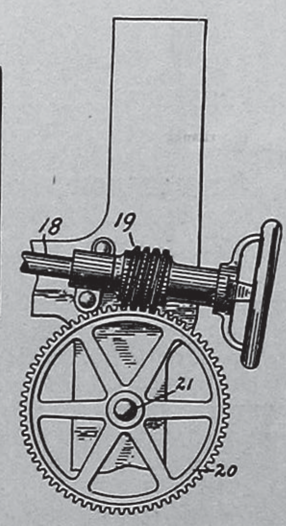


Fig. 2

The rotation of the upright shaft 9, through the hand operated mechanism of the head motion for reversing the pattern chain, in the ordinary way, will then through bevel gear 14, bevel gear 15 and bevel gear 17 rotate the shaft 18 in a reverse direction, and through worm 19, gear 20 and shaft 21, reverse the cloth take-up roll (not shown).

When it is desired to turn the shaft 18 to rotate the gear 20 and the shaft 21 and turn the take-up roll in either direction, independent of the upright shaft 9, the lever 1 is moved to its intermediate position, shown in Fig. 4, and locked there. This movement of the lever 1, through the intermediate connections to the sleeve 8, will move said sleeve to its intermediate position, and leave the bevel gear 15 out of engagement with either of the bevel gears 14 and 16, so that the shaft 18 is free to be rotated in either direction, independently of the gears 14 and 16.

RIBBONS, TRIMMINGS, EDGINGS, ETC.

A Treatise on Narrow Ware Manufacture.

(*Continued from page 314.*)

Shaded Weaves.

In the construction of these weaves, first paint all over the repeat of the shaded weave to be produced, either the required *twill* or *satin*, filling effect, to be used for foundation of the shaded twill or satin. Next divide the number of the threads of foundation weave laid out into sections to suit the character of the shading desired and which more or less depends upon the repeat of our foundation weave; by what is meant that for example an 8-harness twill or satin can be shaded more delicate than a 5-harness twill or satin.

Having divided your plan for your shaded weave, to be produced upon, into the required sections, then leave your first section with your plain foundation weave; in the next section, add, either warp or filling ways, one point to each original foundation point of the interlacing; in the third section add two of these additional points, in the fourth section add three points, and so on until you change the filling effect of the foundation weave to its mate warp effect; that is provided you care to shade the weave from one extreme to its other extreme effect. In the same way it may occur that sometimes the shading is done more abrupt, adding then two points to each section.

Weave Fig. 41 shows such a shaded weave, having the 5-harness satin for its foundation weave. 5-ends, or one repeat of this foundation weave, are used for each section, viz:

Number 1 = foundation weave (filling effect)
" 2 = add one point to foundation
" 3 = " two points to "
" 4 = " three " " " (warp effect)
" 5 = " two " " "
" 6 = " one " " "

Repeat: 30 warp threads and 5 picks; 20-harness fancy draw.

Two Systems Warp.

In this case, a Face Warp, a Back Warp, and one system of filling are used in the construction of the fabric; the latter interlacing with both systems of warp threads. These weaves find use in connection with double faced ribbons, coat and shoe straps, etc. Any one of our warp effect satins, twills, etc., may be use for face, its mate filling effects being used for interlacing the back warp.

The points of interlacing of the two systems of warp with the one system filling must be so arranged that they are not noticeable on either side; it would spoil the appearance of any fabric if they would show. For this reason, place your sinkers of the face warp so every one comes between two sinkers of the back warp and vice versa, place your risers of the back warp so every one comes between two risers of the face warp. In all three diagrams of weaves, Figs. 42, 43 and 44, the face warp is shown by *black* type and the back warp by *cross* type.

Fig. 42 shows us a weave where each side of the fabric will show 5-harness satin warp face. Diagram *a* shows the weave used for interlacing the face warp threads and Diagram *b* the weave used for interlacing the back warp threads. Diagram *c* shows a section of the fabric, the latter being cut warp ways,

F indicating the face warp
B indicating the back warp, and
Black circles=sections of the filling.

Fig. 43 shows a weave in which the face warp interlaces with the 4-harness even sided twill, and the back warp with the 8-harness satin.

The arrangement of Face warp: Back warp, in the two weaves just quoted, is 1:1, or balanced. This, however, is not always the case, sometimes a different proportion being used, Fig. 44 giving us an example where said proportion is 2 ends Face warp to alternate with 1 end Back warp. The weave used for the face is the 5-harness satin, warp effect, and that for the back the *1 up 4 down*, 5-harness twill.

In both weaves, Figs. 43 and 44, letters of reference as well as kind of crochet type used, correspond to those used and explained in connection with weave Fig. 42, hence no special reference required.

Face, Interior and Back Warp.

In fabrics constructed with these 3 systems of warp (and one system of filling), the face and back warps only show, the interior warp (as its name indicates) resting in most cases in the interior, *i. e.*, the centre of the fabric; although in some instances it may be also used for figuring, either on the face or the back of the structure. One set of filling only is used, the same interlacing with all three systems of threads. When planning these weaves, remember that the interlacing of face warp threads (sinkers) is done between two interior warp threads which tie down (sinkers) on the same pick; again the rising of the back warp threads must be done between two interior warp threads raised on the same pick. The weaves most suitable for the interlacing of the interior warp threads are even sided weaves. Previously to laying out a weave of this kind, put your interior weave on a piece of point paper and ascertain whether the sinkers of the face warp and the risers of the back warp suit, *i. e.*, will combine after rule previously referred to with said interior warp. If such is the case, care must be exercised when planning the final 3-warp weave, that the positioning (relation) of the face and back warp threads to that of the interior warp threads remains the same as in the single cloth plan previously experimented with.

Fig. 45 shows such a weave with 8-harness satin for face and back warp and 4-harness even sided twill for the interior warp. In the experimental plan shown, at the left of weave,

cross on the line, means sinker for face warp, and
circle on the line, means riser for back warp.

At the right hand side of the weave, the interlacing of one end each, of face, interior and back warp, is given in connection with eight picks. *F* in said fabric section indicates the face warp, *I* the interior and *B* the back warp threads.

Two Systems Filling.

In connection with weaves constructed with a face and a back filling (in connection with one system of warp) neither system of filling should show on its reverse side.

In constructing these weaves, observe the following rule:

In the back pick only such warp threads can be lowered which are down in the preceding and the following face pick.

In the face picks only such warp threads can be raised which are also raised, on the preceding and the next following back pick.

Fig. 46 shows such a weave with 5-harness satin for the interlacing of face and back filling.

Fig. 47 shows a weave with 4-harness even sided twill for the interlacing of the face filling, and 8-harness satin for the interlacing of the back filling.

Above weaves Figs. 46 and 47, a section of each respective fabric structure is given, showing face and back filling marked respectively *F* and *B*, the section of the warp threads (one repeat of weave) being shown by full black circles.

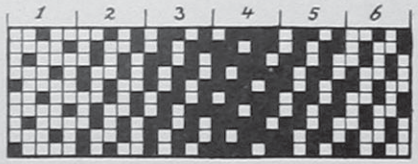


Fig. 41

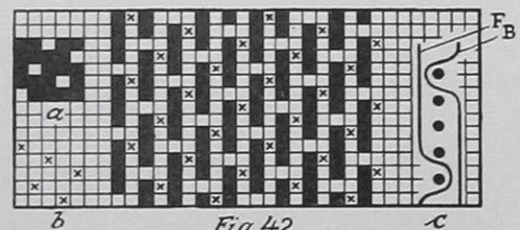


Fig. 42

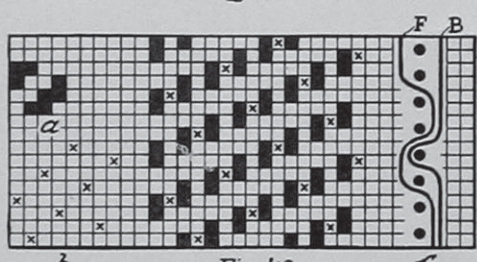


Fig. 43

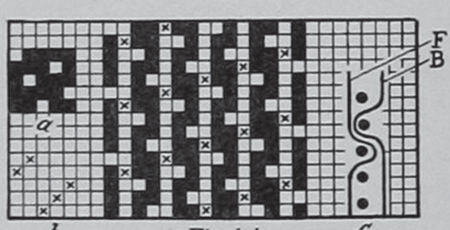


Fig. 44

Fig. 45

Face, Interior and Back Picks.

In this instance, on the face of the fabric, the face pick only shall be seen, and on the back of the fabric the back pick only, the interior pick being introduced into the structure solely to increase the bulk of the latter and is neither visible on its face nor its back.

For warp threads to be raised at the face pick, select such threads as are up on the interior pick preceding and following said face pick, whereas in connection with the back pick sinkers of the warp then used must be down on the interior picks preceding and following said back pick.

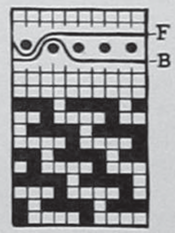


Fig. 46

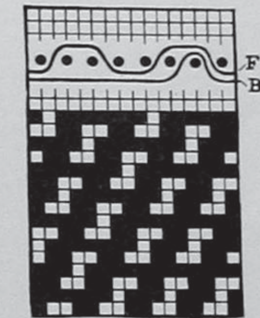


Fig. 47

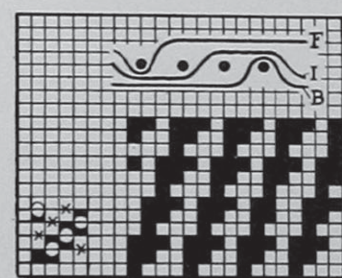


Fig. 48

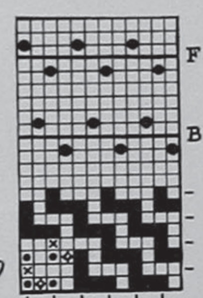


Fig. 49

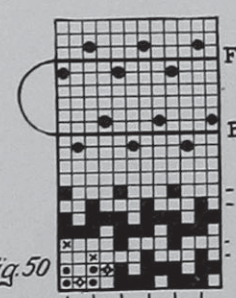


Fig. 50

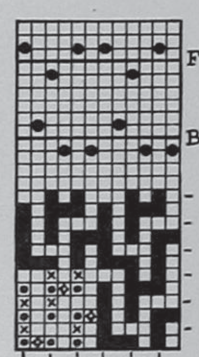


Fig. 51

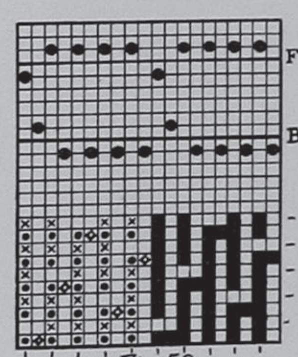


Fig. 52

Fig. 48 shows us such a weave, having the *1 up 3 down,* 4-harness twill for face picks, the 4-harness even sided twill for the interior picks and the *3 up 1 down,* 4-harness twill for the back picks. Above the weave a section of the fabric structure as interlaced with this weave is given, showing one pick each of face (*F*) back (*B*) and interior (*I*) filling.

In the experimental plan given at the left of the weave, a *cross* indicates warp threads down at back picks and *circle* warp threads up at face picks.

Tubular and Double Cloth Weaves.

By means of these weaves two independent fabrics, one above the other, are constructed. According to the system of entering the filling in the upper or the lower fabric, the latter are either not connected with each other, or are connected either at only one selvage or at both selvages. Two fabrics, minus connections, are obtained if using a separate shuttle for each ply fabric. Such an arrangement, however, is seldom if ever used in connection with narrow ware fabrics.

Using only one shuttle in connection with double cloth, arranged one pick face one pick back, the result will be that both plies are connected at their selvages, *i. e.*, a hollow, tubular fabric is the result.

Using only one shuttle in connection with double cloth, arranged two picks face, two picks back, and introducing the filling in this way, will result in a fabric connected only at one selvage, the other selvage showing the two independent plies (double edge gallons, double edge velour edgings). The warp threads are in connection with these weaves divided into such as will only interlace in the face or in the back ply.

When planning these weaves, be sure all back warp threads are down when interlacing the face ply, since if threads of the lower ply would then be raised, both plies would be united into one fabric. On the face picks (light picks, since then the least warp threads are raised) only such risers, *i. e.*, face warp threads up, are marked, as refer only to the weave of the face ply, such of the face warp threads as not raised resting inside of the tubular fabric. At the same time all warp threads of the back ply are down on these face picks.

On the back picks (heavy picks, since then the greater portion of the warp threads is raised) raise every face warp thread, since otherwise the face ply would interlace into the back ply. Next indicate the risers of the back weave for said pick, *i. e.*, such of the warp threads as in the structure rest in the inside of the tubular fabric. It will be seen that the raised face ply warp threads and the lowered back ply warp threads form the outside of the tubular fabric.

If constructing a tubular or double cloth weave which shall show on its outside (on face and back) the *3 up 1 down*, 4-harness twill, the face warp threads must then be raised on three successive face picks and lowered on one, whereas the back warp threads must be lowered on three successive back picks and raised on the next back pick.

When planning tubular or double cloth weaves, after indicating which are face and which are back threads, accordingly whether constructing a tubular or a double ribbon or two separate ribbons (one above the other), next indicate on your weave plan which are the face and which the back picks, after which:

(1) raise all face warp threads on all back picks.

(2) paint weave for the face fabric on face picks, considering face warp threads only—all back warp threads being left down.

(3) paint weave for back ply on the back picks, considering back warp threads only—all face warp threads being raised.

If using a stuffer or interior warp, for the interior of a tubular structure, the same must be raised on all backing picks and lowered on all face picks.

We now give a few weaves. No reference to the connection of the selvages is taken into consideration, proper execution of such being taken under consideration when dealing with tubular selvages and tubular cords.

In connection with weaves Figs. 49, 50, 51 and 52, the face warp threads and the face picks are indicated respectively at the bottom and at the side of the weave by means of a *dash*. In the weave plan *cross* type represents the interlacing of the face warp (up) in the face pick. *Diamond* type in the weave indicates the interlacing of the back warp (up) in the back picks. *Dot* type in the weave indicates the raising of all the face warp on every back pick.

Weave Fig. 49 shows the placing of two plain woven fabrics, one above the other. Above said weave is given a diagram of the positioning of the warp threads in connection with one face (*F*) and one back (*B*) pick.

Fig. 50 shows us a double plain weave, arranged 2 picks face to alternate with 2 picks back, showing in the section of the fabric, as given above the weave, the connection of the two fabrics on one side; *i. e.*, the filling, after interlacing with the plain weave for 2 picks in one of the plies then passing for 2 picks, plain weave, in the other ply.

Fig. 51 shows us a tubular fabric showing 3-harness twill on the outside, and Fig. 52 a tubular fabric with 5-harness satin on the outside.

(*To be continued.*)

THE MANUFACTURE OF PLUSHES, CARPETS, ETC.

(*Continued from page 274.*)

True Moquettes.

Previously to going in detail with reference to the fabric structure of these fabrics, it will be advisable to define the definition of the words *Repeat* and *Sections*. The first word means a Duplication, the other word the sum of similar or similar acting Units.

If, for example, the jacquard harness is tied up in four units, each directing different colored yarns or being differently interlaced, such a tie up is designated as a four section tie up.

If, however, a fabric shows four similar figures in its width, it then shows four repeats of the one figure, without reference to the number of colors used.

In the same way is the repeat filling ways a duplication of the pattern lengthways in a fabric.

A four section pile fabric contains in each dent four different colored pile threads, each of which belonging respectively either to the 1st, 2nd, 3rd or 4th section. Only one of these four threads (according to the pattern) is raised over the wire at the pile pick, the other three pile threads resting as a stuffer or lining in the fabric structure.

In a similar manner, one of the sections of such a tie up of the jacquard harness may direct binder warp threads, another pile threads, a case which will be fully dealt with in a later article on this subject.

After fashion demanded the covering of floors and in some cases that of walls with colored carpets, it followed the practice to cover furniture with somewhat similar fabric structures.

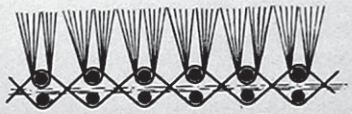


Fig. 11

In this way originated, in the Orient, coverlets used either for covering divans, saddle or camel pouches, giving to us in turn later on fabric structures collectively known as moquette piece goods. The best grade of these fabrics is the threepick moquette, weave and mounting of loom for same corresponding to that of the tournai carpet, only that the stuffer warp is omitted. Originally these fabrics were made 65 cm. (25.59") wide, whereas now they are mostly made 130 cm. (51.18") wide. In connection with the latter width fabrics, from 750 to 880 dents are used, laying them 136 cm. (53.54") wide in the loom and inserting from 55 to 70 wires, @ 3 picks, to every 10 cm. (3.937"). Similar to its mate carpets, no selvage is used, or if such is required, one from 7 to 8 mm. (about 1/3") is used.

With reference to the material for these fabrics, for the binder warp 3/24's hard twisted cotton yarn is used; for the pile warp a 2 fold 2/32's worsted yarn. The heighth of the pile is about 3 mm. (0.1181"), using wires of a section of 3 mm. (0.1181") by 1 mm. (0.03937"). For the filling use from 6's to 8's cotton yarn. Binder warp and filling are dyed either gray or black. The pile warp is arranged for four sections. Formerly 800 hook machines were used, weaving four repeats in the width of the loom, whereas now the

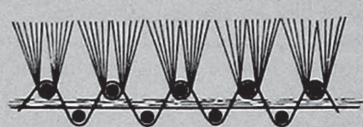


Fig. 12

most often used jacquard machines met with are 1760 hook, fine index machines, using lately two of these machines on the loom in connection with one repeat (division) in the width of the loom. As will be readily understood, with such a wide tie up, smaller patterns, repeating two or more times in the width of the fabric on the loom can be woven; however, if assured that only smaller patterns will be required, it will be advisable to use smaller jacquard machines, tied up with two or more divisions, and thus save in jacquard cards, time for cutting them, etc.

If weaving two narrow fabrics on a broad loom, it will be advisable to use one separate machine for each fabric, since then different patterns can be simultaneously woven on this loom.

Besides piece goods, pouches and seats are woven in this way, respectively in sizes of 45 by 45 cm. (17.71 by 17.71") for chair seats, 56 by 56 cm. (22.04 by 22.04") for covering the arms and backs of ottomans, and 70 by 140 cm. (27.55 by 55.11") for covering the seats of the latter. These threepick structures, however, are little more used, and if so mostly only for the so-called tournai pouches, which in texture and material closely resemble the tournai carpet. The binder warp is not sized and the stuffer warp only sized sufficient so that perfect weaving will result. The filling is used not sized. For pile warp a 2/24's worsted is used, threaded three or four ends to the mail. The fabric produced receives a heavy rib like appearance, well suited for covering heavy furniture.

The most important part in the production of true moquettes belongs to what is known as the twopick moquette and of which a section of the fabric is given in connection with Fig. 11. The mounting of the

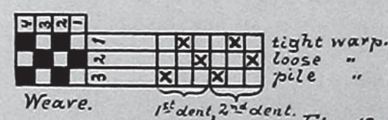


Fig. 13

loom, tie up of harness and material used is identical to that of the threepick moquette, respectively tournai carpets. Lately, in place of using two ends of 2/32's worsted for the pile warp, one end of 2/16's worsted is used. Using the right kind of material, *i. e.*, staple of wool, a satisfactory fabric will be the result in connection with this change, and which as will be readily understood greatly reduces the cost of production of these fabrics to the manufacturer. As the name indicates, in place of inserting three picks to each wire, as is the case with threepick moquette, in connection with the present fabrics only two picks are used to each wire, viz: an upper and a lower pick, the pile thread consequently only binding around one pick, *i. e.*, what we technically called before, *pile up*. The pile thus formed would be of little wear, if it was not for the fact that the pile threads not called for to interlace over the wire and thus rest as a lining in the structure, actually act in this instance as a cover warp for the pile loop formed, covering the body structure completely on the back, preventing the pushing through or pulling out of the loops on the back, actually holding them, by means of friction exerted, in the fabric. Another reason why these pile threads as are not used in the formation of the pile assist in holding the loops in the fabric, is the fact that they will lay themselves more or less in a short bow around the body portion of the loop, assisting in this way considerably the formation of an irregular standing pile. The weave has a repeat of four picks, with two picks

Fig. 14

to a shed. This feature has the disadvantage, that provided the harnesses are not raised equally high or pass each other on one pick different than on the other, or provided the binder warp occasionally comes off loose, it will result in a displacement of the ground picks, throwing the loops in pairs together. Since this trouble has been met with more or less in connection with looms of older construction, working on the double beating-up principle, it occurs so much more frequently on the modern high speed loom constructed with a single beating-up of the lay. For this reason lately weave shown in connection with section of fabric structure Fig. 12 is used, and where the shed changes after every pick. Diagram 13 shows the drafting for the same.

If we would draft similar to the betweenpickmoquette, the warp thread interlacing with the pile thread would slide away under the pile thread, as was explained in the April issue. For this reason the warp threads are drawn side by side in the dent, the most satisfactory plan being to draw them to the right of the pile thread, having the harnesses raised so that the warp thread nearest to the pile thread crosses with the latter, *i. e.,* is in the lower shed when the pile thread is in the upper shed. This arrangement not only prevents pairing of the loops, but at the same time gives to the fabric a better handle. However, the weave also has its disadvantages, since on account of the closer interlacing of warp and filling less space is provided for the latter, in consequence of which a finer count of yarn must be used for the filling. To prevent this, use in place of one binder warp, two, taking one thread alternately from one and then from the other beam, both beams to receive a uniform tension. The pile threads will push the back pick down and consequently against the warp working against the pile warp, with the consequent result that this warp will take up somewhat more than the other. Provided too little tension is put on this warp, the wires are apt to turn at the weaving; again, if putting too much tension on the warp as working against the pile, although obtaining a solid seat for the wire in the fabric, the amount of material of this warp yarn used would be increased, a feature readily seen by consulting diagram Fig. 14, where the pile threads will go under the lower placed and over the higher placed picks. At the same time the solidness of the fabric, warp ways, would be somewhat less.

After the fabric is woven, the same is mended, steamed and the pile evened on a shear. In some instances a preparatory shearing is given first to the fabric previous to examining it and mending imperfections, since in this instance bad places in the fabric are easier detected than if the fuzz caused by cutting of the pile during weaving, etc., is present when examining the fabric with reference to imperfections. As a rule, no other finish is given to the fabrics.

An Improved Picker Check for Crompton & Knowles Looms.

The same consists in

(1) a movable tension arm adapted to receive at its free end the impact of the picker,

(2) means for yieldingly holding said arm, and

(3) returning it to its normal position, after it has been engaged by the picker.

The accompanying three illustrations clearly show the construction and operation of the new check. Of the same Fig. 1 is a rear view of a drop shuttle box guide frame (partially broken away) at one end of a loom, and four drop shuttle boxes, showing the new picker check combined therewith, the picker being shown in section. Fig. 2 is (enlarged) a section on the line *x-x,* Fig. 1, looking in the direction of arrow *a,* same figure, and Fig. 3 is (enlarged) a section on line *z-z,* Fig. 1, looking in the direction of arrow *b,* same figure.

Examining our illustrations, we find on the pro-

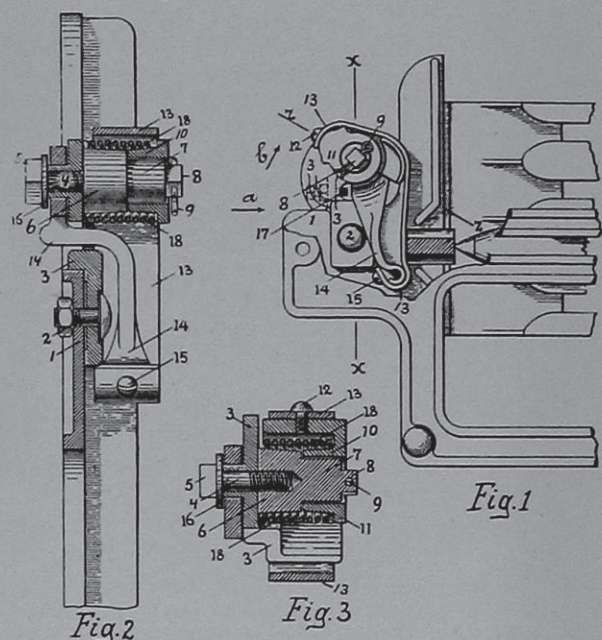


Fig. 1

Fig. 2

Fig. 3

jecting end 1, of the shuttle box guide frame, secured by bolt 2 the lower end of a picker check bracket 3. The upper end of this bracket has an opening therethrough to loosely receive bolt 4, having an enlarged squared shaped engaging end 5, its inner end being screw threaded and screwed into a threaded hole in the boss 6 (see Fig. 3), which has a reduced portion 7 and a square shaped end 8, through an opening in which a split pin 9 extends. Loosely mounted on the reduced portion 7 of the boss 6 is the hub 10 of collar 11, which has an extension thereon, (of circular shape in cross section) to which is attached, by a screw 12, one end of belt 13, which in turn is made to pass over the curved shaped guide plate (see Fig. 1) on the stand 3, and around the curved shaped lower end of the movable tension arm 14, being secured thereto by screw 15. Belt 13 forms a facing for the arm 14, and also a connection between the spring actuated collar 11, and the end of the tension arm 14. The upper part of the latter (see Fig. 2) has a vertically extending upper end, loosely mounted on a boss on the stand 3, and held in place thereon by a washer 16 on the headed end of the bolt 4. Set screw 17, turning in a threaded hole in a lug on the stand 3, engages the arm 14, and acts as a stop to limit the outward movement thereof. A projection on the arm 14 engages the lower edge of the guide plate on the stand 3, and acts as a stop to limit the inward movement of the arm 14, which, having the belt 13 thereon, is so located relatively to the picker that its lower free end is substantially in line with the latter.

Surrounding the enlarged portion of the boss 6 and the hub 10 of the collar 11, is a helically coiled tension spring 18, one end of which is attached to the enlarged portion of the boss 6, and the other end to the hub 10 of the collar 11. This spring acts through the collar 11 and strap 13 to yieldingly hold the tension arm 14 and to return it to its normal position, after it has been moved outwardly by the impact of the picker.

The tension of the spring 18 can be varied by turning out the bolt 4 and rotating the boss 6 in either direction and then turning in the bolt 4 to secure the boss 6 rigidly to the upper end of the stand 3.

A NEW CONSTRUCTION OF WARP (VELVET) PILE FABRICS.

The same is a late German invention and has for its object to produce a figured pile fabric minus the use of wires. The pile warp threads are for this reason arranged to form floats at such portions of the design, where in the finished fabric a velvet pile is desired; whereas in those portions of the design where figure effect has to appear, these pile warp threads are interlaced by a pick of a fine count of yarn, as regularly introduced into the structure every time between two picks of the heavy count. If then cutting the pile of such a fabric structure by means of a trevette (velvet pile cutting knife) between every two heavy picks, the warp floats previously referred to are cut, whereas the

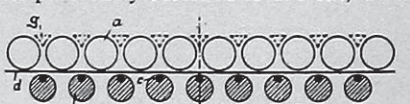


Fig. 1

tightly bound figure places (rib effect) remain undisturbed. The accompanying Diagrams Fig. 1 to 4 show four sections of the fabric, taken warp ways, at different parts of the fabric structure; selected so as to clearly show the new construction of the fabric to the reader. The left half of these diagrams of fabric structure show the interlacing of the pile warp, as required for producing velvet pile; whereas the right hand half of each diagram shows the interlacing of pile warp for producing figure effects (rib effect). In these diagrams

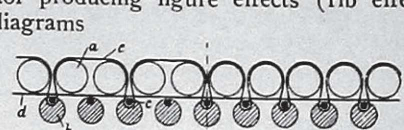


Fig. 2

a denotes the heavy pick.
b " " lining pick.
c " " fine pick.
d " " ground warp.
e " " pile warp and
f " " fine binder warp.

g in Fig. 1 indicates the points of the trevette, for cutting the pile warp, in order to produce the velvet pile.

Figs. 1 to 3 show successively the principle of the new fabric structure, viz.:

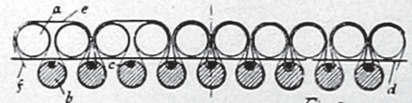


Fig. 3

Fig. 1 shows the interlacing of the ground warp, with indications where the pile warp is to be severed.

Fig. 2 shows the interlacing of the ground warp and that of the uneven numbered ends of the pile warp.

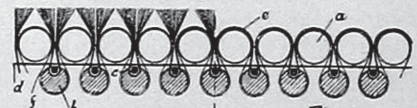
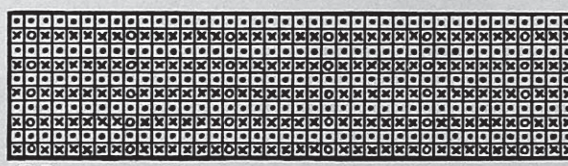
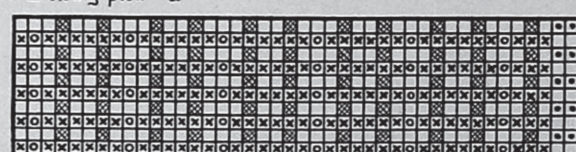


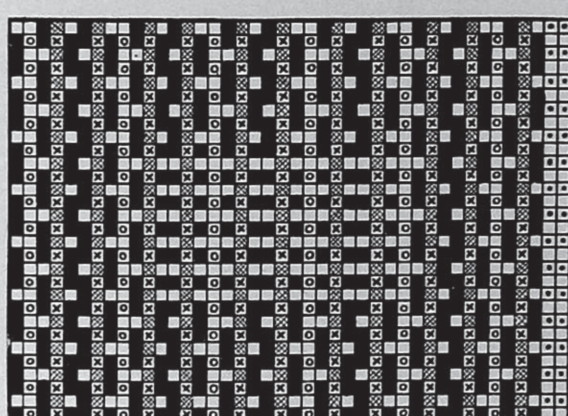
Fig. 4

Fig. 3 shows the interlacing of the ground warp, that of the even numbered ends of the pile warp, as well as that of the fine binder warp.

Fig. 4 shows the pile warp cut, showing also the


Binderwarp - f
Lining pick - b
Heavy pick - a
Fig. 5


Ground warp - d
Fine pick - c
Fig 6


Pilewarp - e
Fig 7

interlacing of the latter (even and uneven ends) into the structure.

In these four diagrams, the position of picks *b* and c is shown as they are actually placed in the fabric, *i. e.*, that the fine pick c appears imbedded into the lining pick b.

Figs. 5, 6 and 7 show weave plans, viz.:

Fig. 5 shows the interlacing of the binder warp f, the lining pick b and that of the heavy pick a.

Fig. 6 shows the interlacing of the ground warp d, the fine pick c, the heavy pick a, the binder warp f and the lining pick b.

Fig. 7 shows a complete weave plan for a portion of a design or fabric, calling for all six systems of threads (a, b, c, d, e and f) previously quoted.

In every instance where velvet pile is required, the pile warp threads must always float over two adjoining heavy picks a as well as the fine pick c resting between, being in turn interlaced by the next fine pick c and this so that the uneven pile warp threads are tied in the structure by picks 1, 3, 5, and the even pile warp threads by picks 2, 4, 6 of the fine filling (Figs. 2 and 3, left).

In every instance where rib figures shall be formed, the pile warp threads must not float, but must be tied in by the even and uneven fine picks (Figs. 2 and 3, right).

Severing the pile warp by means of the trevette, (cutting knife) between every two heavy picks, will then leave the regularly interlaced portions of the design undisturbed; in this manner producing figures in a raised velvet effect upon a commonly woven rib ground, or vice versa producing sunken commonly woven rib effect figures upon a raised velvet ground. The affair, as will be readily understood, refers to specialties (novelties) in fabric structures, we come across in fabrics from abroad.

COTTON FROM FIELD TO FACTORY.

(*Continued from May issue.*)

The operation of the saw gin will be readily understood by means of illustration Fig. 9 being a sectional view through the machine. The seed cotton is fed to the hopper A, the front wall of which comprises a

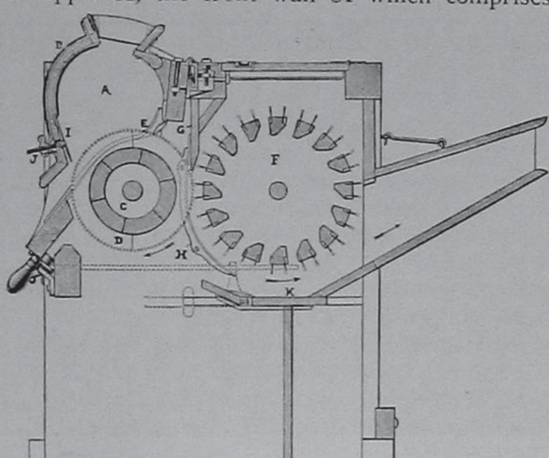


FIG. 9.

seed board B which is curved to allow free turning of the roll of cotton as formed by the rotation of the saws in the hopper. C is a cylinder carrying a series of saw blades D, each of which is working in one of a corresponding series of apertures of grate E as forming the bottom of the hopper A, and which grate E can be lifted from the saws, when necessary to clean them, by means of a lever extending outside of the machine. The bars of the grate E are placed sufficiently apart to permit the saws to rotate and pull the fibres through in tufts, (and thus break them from the seeds) but not the seed, which in turn drop out of the machine. In engagement with the saws is placed a

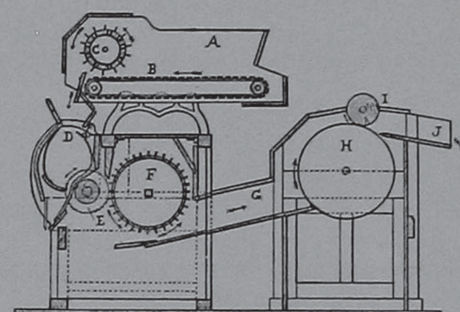


FIG. 10.

rotating brush F which doffs the cotton fibres from the teeth of the saws and by means of draft created by cylinder C and brush F, forces them out of the gin proper. A wind board G is placed between the saws and brush to prevent the fibres on the saws from being disturbed by the air current created by the revolution of the brush F, said wind board also supporting the iron brush guard H. The bottom of the seed board B has an iron plate I which can be adjusted to or from the saws by screw J in order to regulate the extent of the cleaning of the seed. Below the brush F is placed a sliding mote board K which can be so adjusted that the draft caused by brush F and cylinder C is just sufficient to carry the clean lint out of the gin proper, to a bin, a condenser or pneumatic conveyor, while heavy motes or other impurities will fall on said board K, from where they are readily removed.

Gins are either used single or arranged in what is termed batteries, the number of gins in a battery depending upon the size of the ginnery. A frequently met with battery comprises four gins, which are connected, either by a single flue for all the gins or a separate flue for each gin, with the condenser; the lint being forwarded through the flue—from the gin to the condenser—by the blast created by the rotation of the saw and brush cylinders of the gin. During its passage through the flue (made of wood or metal) the current of air straightens out the fibres crimped by the ginning, the heavier sand falls into a pocket arranged to receive it as the lint rises to the condenser, the lighter dust being blown off and escapes from the building through flues issuing from the condenser.

Fig. 10 illustrates the connection of a single saw gin with a condenser, showing also a simple arrangement of a Cleaner mounted above the gin. The seed cotton as conveyed to the hopper A is carried by the feed apron B into engagement with the picker roll C, from which it is dropped into the breast D to be in turn engaged by the saws *E*, brush *F*, and then travels in flue *G* to the condenser *H* by means of which and the bat roll *I* the lint is formed into a film, in which state it passes out of the machine through chute *J* from where it finds its way into the press.

Fig. 11 illustrates the connection of a battery of gins (4 gins in this instance, although more or less might be used) to one condenser, each gin *A* being connected by a separate flue *B*, to the condenser *C*. The hood *D* as forming the connection between each gin and its flue has its ends *E* inclined at an angle, as shown, a feature which causes the lint as coming from the gin to be deflected against the curved back *F* of said hood and thus passes readily to the flue *B*. By thus making the hood *D* with the curved back *F* and this in connection with the elbows of the flue *B*, as shown in the illustration, being bent at a very slight angle, said flue is practically shortened to a minimum, and the lint passes in the most direct line possible from the gin to the condenser, distributing the friction of the cotton over the entire length of the flue. The end walls *E* of the hoods *D* are provided with a glass covered opening at *G*, to permit of a view of the interior of the hood, said opening, when the glass is removed, serving also as a hand hole to afford access to the interior of the hood for cleaning purposes.

green seed cotton this is not the case, there remaining (more or less short) fibres still adhering to the seed after the latter has been delivered from the gin, amounting to about 10 per cent. of the total weight of the seed. After sifting and cleaning, the seed passes to what is known as the linter room, which contains a number of linting machines which are specimens of cotton gins specially adapted for removing the fibres still adhering to the seed. These linting machines have, compared to the gin, their saws set closer, the teeth being also finer set, and in order to keep the mass of seed revolving in the hopper a toothed roller is provided at the bottom of the hopper, its teeth constantly stirring up the mass of seed so that all are subjected to the action of the saws. The linting is generally completed in two operations, the result from the first being superior to that from the second, since it contains some perfect fibres not removed in the ginning of seed cotton. The fibres, short or long, thus obtained are technically known as *Linters* and are delivered by the condenser of the linting machine as a sheet or film which in turn is either pressed in bales and sold as waste to mills, for use in connection with better staples of cotton in the spinning of cheap and low counts of yarns, or by means of rough carding transferred into a sheet or film which in turn, on an automatic machine,

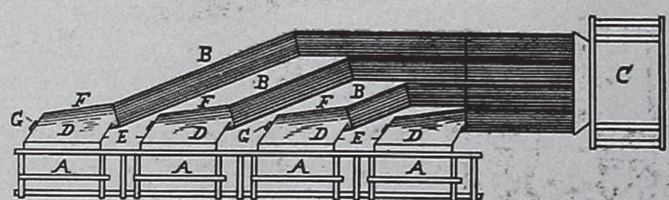


Fig. 11.

Like most other establishments engaged in manufacture, the tendency is toward the consolidation and enlargement of ginneries, however the necessity of being compelled to transport bulky seed cotton from the farms to the ginneries will always more or less restrict their growth. A modern equipped ginhouse is free from dust and lint, which, not only would be a great nuisance but also a chance for fire. Ginning being there carried on, under cover, the observer will fail to see cotton anywhere except he sees the lint sliding from the condenser into the press. Seed cotton—and there need never be as much of it as a bale in a ginnery, so quickly is the work of receiving and cleaning it dispatched—while easily ignited, merely flashes over, and the fire goes out. But it is different with lint cotton, which, when once on fire will burn and smolder indefinitely. A burning bale when thrown into the water will float and burn until all of it is destroyed. But at the ginnery the lint passes at once into the press, and should it catch fire there, the plunger that tramps in the cotton is let down on it and smothers the fire until steps are taken to remove and extinguish it.

Linting. With Sea Island or black seed cotton, the seeds are entirely freed from lint by the gin; however in connection with the ginning of our regular

is put up in one pound rolls, in which shape it comes into the market as *batting*, largely used as a lining for quilts, etc. The seeds meanwhile fall from the gin into a screw conveyor (preferably with a perforated bottom, to allow the escape of sand), and are either delivered directly to a wagon or into the seed house or dropped into a flue from the blower, which transports them wherever it is desired; being in turn delivered to the oil mill and there subjected to a hulling machine, which takes off the outside shell which it passes to one side, while the green kernels of the seeds go down a chute, filling certain receptacles placed in the oil press, and when in turn they are submitted to hydraulic pressure, thus producing the well known cotton seed oil. The remains of the green kernel are then pressed into what are termed cattle cakes, or oil cakes, for feeding cattle.

Baling. Sea Island cotton as is cleaned on the roller gin is always put up in loose round bales to avoid any injury to the delicate, high priced, staple. However this process is carried on different with the bulk of our cotton, the Main or Upland cotton, and where the lint as coming either from the condenser, or the lint room, enters the box of a cotton baling press. In connection with small ginneries using one or at the most two gins only, this may be a single press, but which would not answer (on account of necessary time required in packing the bale and thus not able to keep up to pack the lint from a battery of gins) for the average size ginnery and when a Revolving Double Box Press must be used, being a press which has two boxes placed on a revolving platform so as to bring them alternately under the action of the press, one box being filled and tramped while the other is pressed and tied.

After the bagging (covering) has been properly arranged in the box as not under the operation of the press, the lint cotton is entered, and the box when filled subjected to the action of a *tramper,* which presses down the cotton in order to reduce space occupied. Said tramper is automatically raised and lowered by steam power, new lint cotton being let into the box between said operations and which are continued several times until the box is packed tightly with lint, and when the platform is revolved thus bringing the other box (previously spread with bagging) under the action of the lint supply and placing the filled box over the press proper, the platform of which is moved upwards either by screw, hydraulic or direct steam power; the first mentioned power being the one most frequently used because it is the most simple and inexpensive, running up in about four minutes and down in two, in this manner easily taking care of a battery of four gins. Steam power is very quick acting but more expensive, this being the power used, provided dealing with single box presses; hydraulic power is the most powerful of all, is as quick or quicker acting than the others, but not as simple as the screw and more expensive, although when once installed it takes less steam and fuel than either of the other two powers quoted. After sufficient pressure has been put on the bale, the ties are passed around and buckled, the pressure released and the finished bale removed by throwing open the sides or doors of the box and delivered, as the case may be, either to the planter to be taken by him in turn to the market and sold, or forwarded direct to the mill or consigner. The size of the press boxes is either 27 × 54 or 24 × 54 inches, the latter being the new standard, and the bales are pressed down to 28 to 30 inches, being intended to contain nearly 500 pounds (inclusive of bagging and ties, or about 475 to 480 pounds of lint) on the average. Bales however vary considerably in size and dimension and to a still greater degree as regards the density of their contents according to what make of press has been used, the ones quoted being the acknowledged standard dimensions. Most of these box bales as not consumed by the mills in the vicinity, find their way to one or the other cotton compress establishments to have their bulk reduced in size by means of extra powerful hydraulic pressure and in this shape new ties put on, in order to permit handier storing of the bale in the hold of ships or cars as the case may be. By microscopical examinations it has been found that the great pressure, although amounting to several thousand tons over the surface of the bale, does not injure the fibre since the aggregate number of individual fibres sharing this pressure is infinite. Since a few years a heavier built revolving double box press has also been brought into the market, permitting more or less compress packing at once at the ginnery, thus saving in many cases the additional expense of a recompressing. The boxes of this revolving double box compress are 20 × 54 inches and the size of the bale after being turned out of the press and expanding about one-half inch on each side is 21 inches by 55 inches in length, and in height from about 20 inches to 26 inches, varying between these two points, according to the amount of lint that is put in—from 400 to 600 pounds.

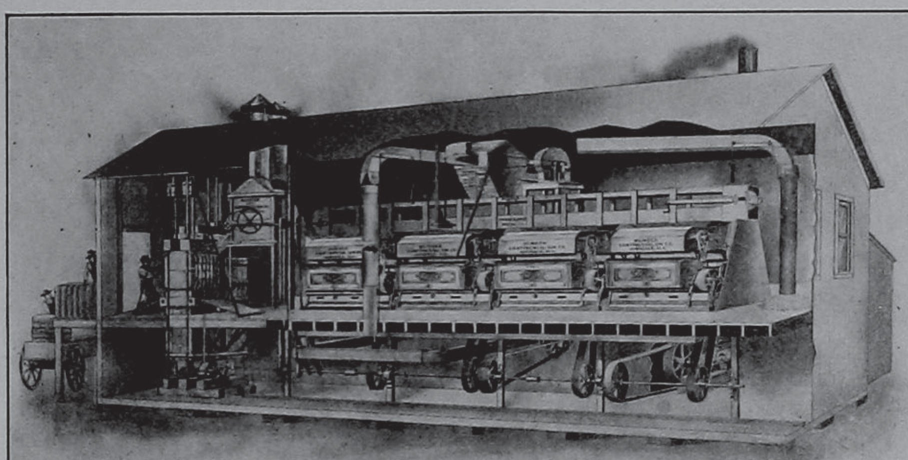


FIG. 12.

Fig. 12 shows the interior of a modern Ginnery, *i. e.,* a complete system for handling cotton from the wagon as coming from the field to the bale ready for shipment to the factory (or compress if for shipment for abroad, etc.), the illustration showing suction elevator, battery of four gins, lint flues, double box revolving press, with direct steam tramper, and seed blowing apparatus, erected by the Continental Gin Co.

THE "MASON" COILER DRAWING FRAME.

(*Continued from page 321.*)

The method of driving the Mason drawing frame is shown in Diagram Fig. 3, showing the plan of gearing for the drawing rolls separately. Power is transmitted to the bottom (main) shaft *A* of the frame, through a belt from the main line shafting of the room to the pulley *B*. On this bottom shaft is another pulley *C* which drives a pulley *D* fastened on the end of the front roll shaft *E*. *D'* is the loose pulley. Gears marked *L* are used in connection with leather top rolls and those marked *M* are used with metallic top rolls. Secured to the front roll shaft *E* is a 24 gear which drives a 51 gear on the same stud with a 54 *M* or 45 *L* gear, and this gear in turn drives the calender roll *F* through a 41 *M* or 45 *L* gear. The 24 gear on the front roll shaft *E* also drives a 27 gear on the same stud with a 30 *M* or 24 *L* gear which drives a 30 gear on the end of a horizontal shaft *G*. This horizontal shaft *G* has two other gears secured to it, one is a 20 bevel gear driving another 20 bevel gear on the same collar with a 23 gear and this in turn drives the coiler *H* through an 86 gear. The other gear 15, on the horizontal shaft *G* drives a 40 gear molded with a 16 bevel gear which in turn drives the bevel 34 secured to the vertical shaft *I* of the coiler arrangement. A change gear (11 to 15) is secured to the lower end of this shaft *I* and through an intermediate gear drives a 32 gear on the same collar with a 12 gear which in turn through an intermediate gear drives the coiler can stand *J* through an 80 gear.

The front roller shaft *E* has also a 22 gear secured to it and this drives the 90 crown gear which is on the same stud with the draft change gear (30 to 60), which in turn drives a gear on the end of the back roll *K* which may be either 24 or 48 teeth, according to whether a low or high draft is required. On the other side of the back roll *K* is a 26 *M* or 22 *L* gear, which through an intermediate gear drives an 18 gear on the end of the third roll *N*. On the end of the back roll *K* are two gears molded together, one being a 32 *M* or 22 *L* bevel and the other a 42 *M* or 37 *L* spur gear, the latter through an intermediate gear driving an 18 gear on the end of the second roll *O*. The 32 *M* or 22 *L* bevel gear on the back roll *K* drives the lifting roll *P* through the bevel 22 on a horizontal shaft *Q* having another 22 bevel gear on its other end, which drives the 24 *M* or 23 *L* gear on the end of the lifting roll *P*.

The break draft in this machine is between the front and second rolls *E* and *O* respectively.

To ascertain total draft in connection with diagram given, using leather top rolls, the same is generally figured from a draft constant, in order to easily make any changes in the draft gear when the proper draft is known. There is a slight draft between the lifting or tension roll and the back roll, and also between the calender roll and the front roll, and in order to obtain the total draft of the machine, we must figure a constant between the lifting roll and the calender roll.

From the rule given, we figure the constant in the same manner as the draft, excepting that the draft gear is omitted in the calculation.

$$\frac{3 \times 23 \times 22 \times 48 \times 90 \times 24 \times 45}{1\frac{1}{8} \times 22 \times 22 \times * \times 22 \times 51 \times 45}$$

$= 257.6$ Draft constant.

Draft constant $\div$ Draft $=$ Gear.

Draft constant $\div$ Gear $=$ Draft.

Example: We wish to produce a total draft of 6 on the drawing frame, what draft gear will we have to use?

$$257.6 \div 6 = 42.9 = 43 \text{ gear.}$$

To find the actual draft produced with a 43 gear we have, $257.6 \div 43 = 5.99$ draft.

To find the total draft of drawing rolls; the intermediate drafts between the rolls; also the drafts between the lifting roll and the back drawing roll; and between the front drawing roll and the calender roll, we have:

Draft between the front and back rolls:

$$\frac{1\frac{3}{8} \times 48 \times 90}{1\frac{1}{3} \times 43 \times 22} = 5.581 \text{ draft.}$$

Draft between the lifting roll and back roll:

$$\frac{1\frac{1}{8} \times 23 \times 22}{1\frac{1}{8} \times 22 \times 22} = 1.045 \text{ draft.}$$

Draft between the back and third rolls:

$$\frac{1\frac{1}{8} \times 22}{1\frac{1}{8} \times 18} = 1.222 \text{ draft.}$$

Draft between the third and second rolls:

$$\frac{1\frac{1}{8} \times 18 \times 37}{1\frac{1}{8} \times 22 \times 18} = 1.682 \text{ draft.}$$

Draft between the second and front rolls:

$$\frac{1\frac{3}{8} \times 18 \times 48 \times 90}{1\frac{1}{8} \times 37 \times 43 \times 22} = 2.715 \text{ draft.}$$

Draft between the front and calender rolls:

$$\frac{3 \times 24 \times 45}{1\frac{3}{8} \times 51 \times 45} = 1.026 \text{ draft.}$$

The total draft of the machine may be obtained by multiplying together all of the intermediate drafts, the draft between the lifting and back rolls, and between the front and calender rolls, but allowance must be made for dropping fractions in the multiplications.

The calculation for the coiler generally consists in finding the relative number of revolutions of the coiler to the coiler can stand, which we calculate by allowing the coiler can stand one revolution and using the proper change gear, for example 12.

$$\frac{1 \times 80 \times 32 \times 34 \times 40 \times 20 \times 23}{12 \times 12 \times 16 \times 15 \times 20 \times 86} = 26.9 \text{ revolutions}$$

of the coiler to one revolution of the coiler can stand.

The production of a single delivery is figured from the number of yards delivered by the calender rolls per minute, the weight per yard of the sliver and the time run.

Example: What is the production of a delivery of drawing for a day of 10 hours, allowing 20% loss for cleaning, oiling, etc., the sliver weighing 60 grains per yard, and the front roll makes 300 r. p. m.?

Surface speed of calender rolls is figured from the speed of the front roll as follows:

$$\frac{300 \times 24 \times 45 \times 3'' \times 3.1416}{51 \times 45 \times 36''} = 36.96 \text{ yds. delivered per minute.}$$

10 hours = 600 minutes. 600 minutes — 20% = 480 minutes.

$$\frac{36.96 \times 60 \times 480}{7000} = 152.06 \text{ pounds per day per delivery.}$$

$$\frac{3 \times 24 \times 22 \times 48 \times 90 \times 24 \times 54}{1\tfrac{1}{8} \times 22 \times 32 \times * \times 22 \times 51 \times 41} = 243.41 \text{ draft constant.}$$

Draft constant ÷ Draft = Gear.
Draft constant ÷ Gear = Draft.

Example: Suppose we put on a 40 draft change gear, what draft will it produce?

243.41 ÷ 40 = 6.085 figured draft, or
6.085 + 10% = 6.685 actual draft.

Using 16 pitch flutes for the back roll, 24 pitch for the third roll and 32 pitch flutes for the second and front rolls, the draft between the back and third rolls is thus:

$$\frac{\frac{9}{6} \times 26}{\frac{10}{6} \times 18} = 1.3 \text{ draft.}$$

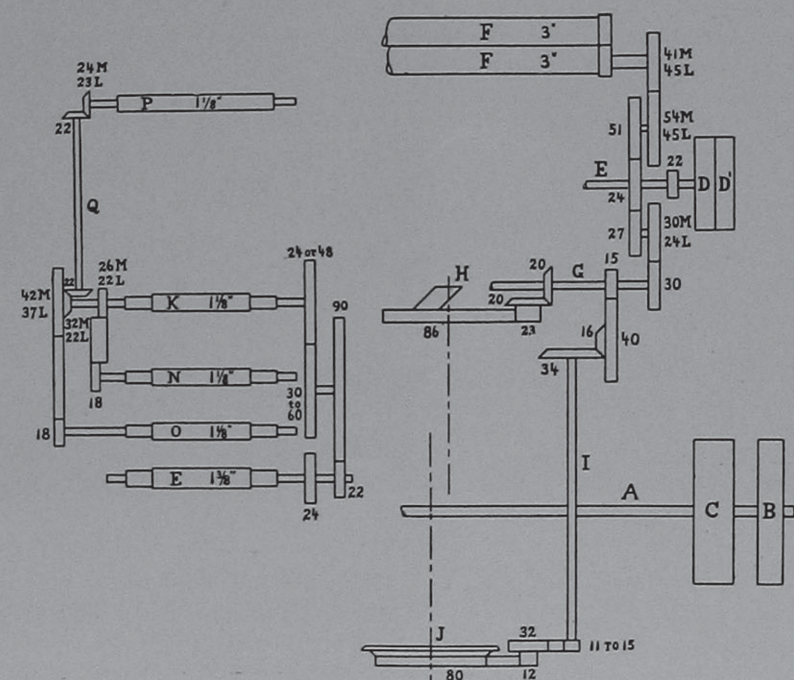


FIG. 3.

The foregoing calculations have been made for frames using leather top rolls, so that they will not apply to frames using metallic rolls, although the principle of calculation is identical.

The draft of metallic rolls is figured in the same manner as leather top rolls, but substituting the proper equivalents for the diameters of rolls, and adding a certain per cent. to get the actual draft. The per cent. added varies slightly with the bulk or weight per yard of sliver, it being generally 10% for an ordinary weight sliver and a little less when the sliver is heavy and the draft low, and correspondingly higher when the draft is high or the sliver is light. It must be understood that the per cent. is always taken on the figured draft.

The constant for the total draft is calculated thus:

Between the third and second rolls:

$$\frac{\frac{9}{6} \times 18 \times 42}{\frac{9}{6} \times 26 \times 18} = 1.615 \text{ draft.}$$

Between the second and front rolls:

$$\frac{\frac{11}{6} \times 18 \times 48 \times 90}{\frac{9}{6} \times 42 \times 40 \times 22} = 2.57 \text{ draft.}$$

The draft between the drawing rolls would then be:

1.3×1.615×2.57 = 5.4 figured draft, or
5.4+10% = 5.94 actual draft.

Draft between the lifting roll and back roll:

$$\frac{\frac{10}{6} \times 24 \times 22}{1\tfrac{1}{8} \times 22 \times 32} = 1.11 \text{ draft.}$$

Draft between the front roll and calender roll:

$$\frac{3\times24\times54}{\frac{11}{6}\times51\times41} = 1.014 \text{ draft.}$$

The total draft of the machine then would be:

$$1.11\times5.94\times1.014 = 6.685 \text{ total draft.}$$

The production for a delivery is figured in the same manner as for leather top rolls.

Example: What is the production of a delivery of drawing for a day of 10 hours, allowing 20% loss for cleaning, oiling, etc. the sliver weighing 60 grains per yard, and the front roll makes 300 r. p. m.?

Surface speed of calender rolls is figured from the speed of the front rolls as follows:

$$\frac{300\times24\times54\times3''\times3.1416}{51\times41\times36''} = 48.68 \text{ yds. delivered per minute.}$$

600 minutes — 20% = 480 minutes.

$$\frac{48.68\times60\times480}{7000} = 200.28 \text{ lbs., production per day, per delivery.}$$

SETTING THE ROLLS IN FLY FRAMES.

A New Roll Stand for Conveniently Doing this Work.

The spread of the rolls, or in other words, the distances from centre to centre of the rolls in fly frames depend on four conditions, viz: the length of staple under operation, the size of the roving to be attenuated, the quantity of twist in the roving and the amount of the draft required.

The length of the fibres is the most important point, and it is necessary to make the distance from the centre of one pair of rolls to that of the next, slightly in excess of the mean length of the staple, so as to avoid breaking or straining the fibres by having a quicker running pair of rolls grip a fibre while it is still held by the preceding pair. It is also important to keep these rolls from being set too wide apart, as this would allow the fibres too much freedom in their passage through the pairs of rolls and when consequently drafting would be difficult.

With regard to the other three points previously referred to, *i. e.,* the size of the roving, the amount of twist and draft, each of these affects the settings to a certain extent, for the fact that a thick roving requires wider spreading of the rolls than a fine roving, so will also an extra amount of twist in the roving necessitate wider setting than slack twisted roving; again, the draft affects the setting on account of the difference in speed between the successive lines of rolls, it being necessary to set closer in connection with a very large draft and in turn adopt a more open (rolls more spread) setting in connection with a very small draft.

The settings for the rolls on a slubber for short staple cotton, where the sliver is heavy and a low hank roving is being made with a high speed of front roller, should be thus: Set the centre of the second roll from the centre of the front roll $\frac{1}{8}''$ more than the length of the staple of cotton under operation and increase this distance by $\frac{1}{8}''$ to $\frac{1}{4}''$ between the second and back rolls. When dealing with long staple cotton or the sliver is light, which is usually the case with long staple cotton, and a medium speed of front roll is used with the machine making an average hank, the second roll is set $\frac{1}{16}''$ plus the length of the staple of cotton being run, from the front roll, while the back roll is set from the second roll $\frac{1}{16}''$ wider apart than the distance between the front and second rolls. For example, suppose that a $1\frac{1}{8}''$ staple was being run on a slubber, under ordinary conditions, that is, a rather low hank is being made and the speed of the front roll is high. Then set the second roll from the front roll $1\frac{1}{4}''$ from centre of each roll and set the third roll from the second roll $1\frac{3}{8}''$ to $1\frac{1}{2}''$ from centre of each roll. When dealing with Sea Island cotton of say $1\frac{3}{4}''$ staple, the sliver used being light with a rather high hank being made, the following settings should be used: Set the second roll from the front roll $1\frac{13}{16}''$ from the centre of each roll, and set the back roll from the second roll $1\frac{7}{8}''$ from centre of each roll.

The rule for setting the rolls of the intermediate frame is to set the second roll from the front roll a distance $\frac{1}{16}''$ greater than the length of the staple, and to set the third roll $\frac{1}{16}''$ farther than the distance between the front and second rolls. When running combed stock, the distance between the front and second rolls only slightly exceeds the length of the staple, and this distance is increased by $\frac{1}{16}''$ between the second and back rolls. On very coarse stock, or in connection with a coarse hank or high speed of the machine, the distance given in the first rule is increased $\frac{1}{8}''$ between second and back roll. The rule as used for the intermediate applies also to the roving frame and to the jack frame when such is used.

When the rolls in a fly frame are set too far apart, this may be detected by taking out the top, front and middle rolls, without disturbing the cotton, and then noticing at what points drawing by the rolls commences and ceases, said points being indicated by the varying number of the fibres between the two points. The distance of the point at which the lessening of fibres in the sliver commences, from the centre of the slower moving roller, represents the excess in the distance for proper setting. If the lessening of fibres commences at the centre of the slower roll, and extends to a point opposite the centre of the quicker moving roll, it is an indication that the rolls are set too closely together and the necessary change should be made.

When there is any difficulty in ascertaining whether the rolls are set too closely or not, the top front roll only may be taken out and the ends of the fibres, as are in a position opposite the centre of the bottom roll, gripped by means of a pair of light, broad tweezers, by this means ascertaining whether they are gripped by the second pair of rolls or not. If they are held by the latter, it is an indication that the setting is too close, because the grip by the tweezers was simply a substitution for the grip by the front pair of rolls.

Having given an explanation of the importance of the setting of the rolls, and since a lot of cotton may vary with reference to its length of staple any time, it is essential that the two rear rolls should be readily adjustable so that their distance apart may be regulated as well as the distance of both from the front roll.

To accomplish this result, *i. e.*, the setting of the three sets of rolls, the required distance apart from each other, conveniently for the operator, quickly and accurately with reference to results, is the object of a new roll stand designed for holding these rolls, the same being shown in Fig. 1 in its side elevation, with portions showing in section. Fig. 2 is a front elevation of the stand, and Fig. 3 is a section on the lines *x-x* of Fig. 1.

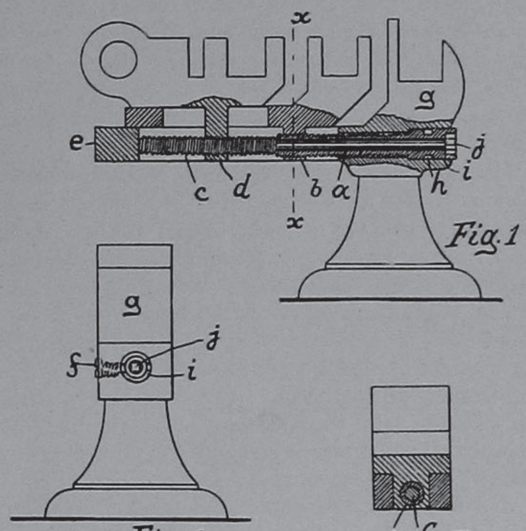


Fig. 1 Fig. 2 Fig. 3

In the new arrangement the movable rolls are held by means of screws terminating in the forward portion of the stand and at a point where they can be readily operated, without interfering with the running of the frame, each roll being provided with an independent adjustment so that it may be placed in any desired position relative to the other movable roll or to the fixed roll. This result is accomplished by a double screw extending through from the front of the stand, the outer screw being hollow and engaging the front support, the inner one extending centrally through to the rear support.

The screw *a* which engages the lug *b* of the outer support is made hollow and the screw *c* which engages the lug *d* of the rear support is formed on the rear end of a spindle which passes through the hollow screw *a*. The screw portion of the spindle *c* is larger in diameter than the forward or spindle portion and its rear end abuts against the partition *e*, the forward end of the screw forming a shoulder which bears against the rear end of the hollow screw *a*. Thus the screw *c* is prevented from moving longitudinally by these two bearings. The hollow screw *a* is prevented from moving longitudinally during the running of the frame, after proper adjustment has been made, by a set screw *f*, which enters the head *g* and terminates in an annular slot *h* formed on the outside surface of the enlarged head *i* of the screw *a*.

The spindle of screw *c* terminates in a head *j* adapted to be worked by a wrench, and the heads *i, j* of both screws *a, c* are so formed and located that with a suitable wrench either or both screws may be turned.

If more than two movable rolls are used, as would be the case if the principle of this new roll stand is applied to drawing frames, then the screws are arranged one inside the other as in the present case.

COTTON SPINNING.

The Ring Frame.

(*Continued from page 322.*)

Top Clearers.—As mentioned before, the top clearer is the important one to be considered more in detail, for previously stated reasons, the accompanying illustration Fig. 244 showing the application of the most modern construction of such a clearer, *i. e.*, the *Mason Top Clearer*. Diagram *A* is its front elevation, showing at the same time sufficient portions of the roll stand and its drafting rolls, in order to more clearly explain the construction and operation of said clearer. Diagram *B* is a transverse section on the line *x—x* of diagram *A*, looking toward the left, the clearer being shown in full lines in its working position, dotted lines showing it thrown up so as to expose the top rolls, *i. e.*, position of clearer required for cleaning it. Diagram *C* is a rear end elevation of a portion of the clearer. Diagram *D* is an illustration in detail (somewhat enlarged as to its corresponding portion in diagram *B*) of one of the notched ears of the pedestal in which the top roll clearer is hinged.

Examining illustration, we find the three sets of drawing rolls supported in bearings carried in roller stands 1, said rolls having bosses 2, 3, as seen in diagram *A*, where one boss of each series of rolls (top and bottom front roll) is shown. Each stand 1 is provided with an upturned ear 4 (see diagram *D*) having an angular or substantially **V**-shaped notch or slot 5, 6, therein, for holding the pivot of the clearer cover. Part 5 of notch is open at its upper end, forming one leg of the **V**, the other part 6 forming the other leg, extending upwardly and rearwardly from the lower end of part 5 and being shorter than the latter, forming in turn a locking device for the clearer.

Each group of drawing rolls, as situated between two adjacent pedestals, is provided with a clearer cover 7, made of thin sheet metal, on account of its light weight and the ease with which it can be shaped, the front and rear ends of said cover being downturned and at its rear end provided with laterally-separated eyes 8, the cover being for this purpose cut out between said eyes, somewhat in excess of the width of the clearer web 10, said eyes 8 receiving a continuous transverse rod 9 which at the same time is passed through the bights of the several clearer webs (as many clearer webs being provided as there are bosses on a roll). In a similar manner as done in connection with the rear end of the cover 7, its front end is correspondingly cut out so as to provide eyes for inserting rod 11 for forming the axle for carrying the clearer webs 10, one of which is shown in its full width in dotted lines in connection with diagram *A*, showing at the same time also a portion of the adjoining web. These clearer webs 10 are endless bands of cloth, and of such width that they can be conveniently inserted in the cut out portions of the clearer cover 7, being carried by rods 9 and 11. The opposite ends of rod 9 project and form pivots 12, by which the clearer cover 7 is pivotally supported in the V-shaped notch 5-6, permitting by this the raising of the cover, (see dotted lines in diagrams *B* and *D*) when desired to

so that it will continuously travel from side to side between the stands on the machine and thus require little if any attention from the attendant.

Fig. 245 is a cross section of this clearer, Fig. 246, showing its application to the rolls. This adjunct to spinning frames is made of a double conical form, with the larger portions of the cones at the centre, and is hollow, as at *A*, having extending through it a wire rod *B* which is of greater length than the body of the clearer. This rod is free to move through the clearer and has fastened to it at the center of its length, a weight *C*, which in turn rests in either end of the clearer and holds it in one or the other tilted positions on the rollers, according to the end to which it is nearer. The weight *C* is prevented from sliding too far toward either end in the hole *A*, by means of suitable stop pins, projecting from the top and bottom into the hole *A*, and thus in the path of the weight *C*.

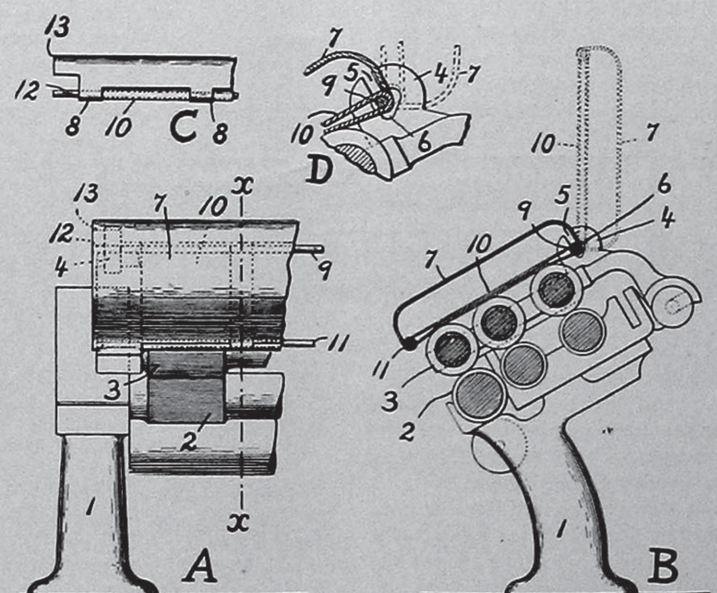


Fig. 244.

examine the top rolls of any set, or to clean the apron; said pivots 12 being at the same time the fulcrum for lowering cover back into working position. The rear end of each clearer cover 7 is cut away at each side, adjacent the endmost eyes, to leave lugs 13 and which when the clearer cover is raised, will come in contact and rest upon the backs of the upturned ears 4 of the roller stand 1, thus causing the rod 9 of the clearer cover to raise in the part 6 of the V-slot, at the same time locking the clearer cover in its open position and in which it will remain until the attendant pulls the clearer cover forward and down, the pivots then resuming the position shown in full lines in diagram *D, i. e.*, being partly raised upwards in slot 5-6, in turn keeping the clearer webs in its set more or less under tension.

Another method of cleaning the top rolls is shown in connection with illustrations Figs. 245 and 246 and which is an automatic traveling cone clearer. This clearer will automatically change its direction of travel over the rolls when it arrives at each end of the rolls,

It may be a question in some minds as to the reason why the cone shape of the clearer should cause it to travel in the direction of the small end which is in contact with the rolls, for which reason a short explanation will be given. We know that if a cylindrical roll was placed on the revolving rolls, it would receive rotation but would have no horizontal motion, because all lines, made on the surface of the cylinder by passing planes longitudinally through the centre of the cylinder, would be parallel to each other. But in the case of a cone, as used in this instance, the lines on the surface will not be parallel to each other, but since all of these lines must be parallel to the point of contact with the revolving rolls when they do come in contact, it will be easily seen that each successive line will come in contact with the rolls at a slight distance from the previous point, which distance may be measured by dropping vertical lines from the intersections of these lines on the surface with the base of the cone and measuring the horizontal distance between them.

For example, say we want to find the horizontal movement of the cone during one-half of its revolution, then considering the point of contact *D* as one point to measure from, we find the other point by dropping a vertical line from the point *E* to the roll and measuring between the point and the line. It will also be seen from this, that a greater angle on the cone will produce a correspondingly larger movement of said cone for every revolution.

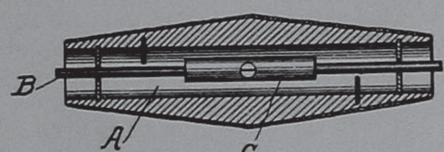


Fig. 245.

Referring again to the cleaning arrangement, when the clearer is moving across the roll, say for example, from left to right, it is held in its proper tilted position by the weight *C* with the rod *B* protruding from the right hand end of the clearer. Situated on each side of the frame is a plate *F* for reversing the travel of the clearer, said plates being provided with grooves *G* having small slots in which the bent pieces *H* rest, these being kept in place by spring attachments. Connected also to the bent pieces *H* are the circular plates *I* which are partly in the path of the travel of the clearer. As the clearer approaches one end, the wire rod *B* comes into that groove *G* and under the bent piece *H*, which holds it down while the clearer continues to approach, until it finally strikes against the plate *I* and pushes it back, which in turn moves the bent piece *H* outwardly, thus releasing the wire rod *B*; and as the weight *C* is now on the opposite of the centre of the clearer, the latter will tip over and begin to travel in the opposite direction, until it comes to the opposite end where the same reversing movement will be given to it. The object of the special arrangement for reversing is to make said reversing more positive, for in case only a plate was used for the rod to strike against, the weight is very liable to be pushed so slowly past the centre of the clearer that it will often be balanced on the centre and stop the horizontal movement of the clearer.

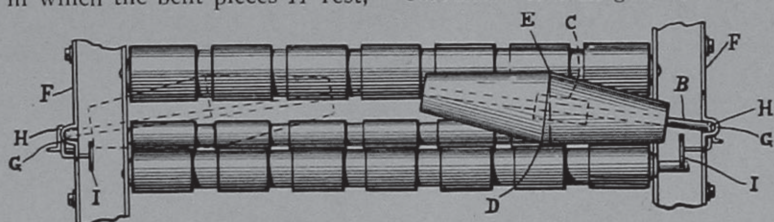


Fig. 246.

DICTIONARY OF TECHNICAL TERMS RELATING TO THE TEXTILE INDUSTRY.

(*Continued from page 318.*)

Coloring Matters:—Dyestuffs, and which are either of natural or artificial origin.

Congo Red or Congo:—A member of a class of dyestuffs known as direct or substantive cotton colors, dyeing cotton, wool and silk without the aid of other substances. Since it was the first artificial dye (discovered in 1884) known to have this property, dyes of the same kind discovered since then are frequently called congo colors. It is a red-brown powder, readily soluble in water, its solubility decreasing if salts (sodium chloride or sodium sulphate) are added, causing more of the dye to adhere to the fibres. Wool will exhaust the dye bath, whereas cotton will not, for which reason in the latter case the dye bath is used over again, always adding fresh dyestuff and salts after each dyeing.

Cop:—The cylindrical coil of yarn accumulated on the spindle of a mule, or, in the case of two-fold yarn, at the twiner.

Cop bit is that part which is spun during the first few minutes after doffing.

Chase of the cop is the length of top cone of cop.

Nose of the cop is the apex of the top cone.

Shoulder of the cop is the joining of the chase to the thickness.

Body of the cop is the distance between the top and bottom cones.

Crossing thread of the cop is that part of yarn wound upon each cop at the beginning of each run in, while the top faller wire is descending from the highest to the lowest point of the chase.

Copperas:—A name given to the commercial ferrous sulphate and also applied to the native mineral melanterite. The direct uses of copperas in dyeing have very much diminished. For dyeing blacks upon wool in conjunction with logwood it has been, to a very great extent, superseded by chrome. For blacks upon cotton, as also for saddening drabs, clarets, etc., the nitrate of iron is generally preferred.

Copper Sulphate:— Blue vitriol.

Copping Motion:—The term given to the following parts of the mule: the copping rail, the copping plates, the shaper wheel, the shaper catch and worm, and the trail lever, or part which connects the locking lever to the copping rail.

Copping Rail:—The rail on which the bobbin of a spinning machine rests. By the configuration of the rail and the peculiar action imparted to it by the copping plates upon which it rests, the cops are made of the special and necessary shape.

Cop Tube:—Paper tubes on which the cop of yarn is wound in spinning.

Cop Winder:—A machine for winding the yarn from hanks onto a spindle in the shape of a cop, which are then used by the weavers in the shuttles.

Corah Silk:—A light, creamy white, undyed, washable silk fabric.

Cord:—A strong ribbed fustian; corduroy.

Corded Muslin:—Muslin having in its texture thick raised cords, forming striped patterns.

Cordillas:—A variety of Kerseys.

Cordoncillos:—A kind of common calico used largely by the Indian population of Mexico, for garments of the lower class.

Cordonnet:—The somewhat raised edge in a point lace pattern.

CORDOVA WOOL:—A species of South American wool.

CORDS:—Rib effects in fabrics which run longitudinally, or in the direction of the lengths of the fabric. (The contrast to repp in which the ribs run filling ways in the cloth).

CORDURETTE:—A variety of woolen dress goods having corded effects.

CORDUROY OR FUSTIAN:—A cloth made with a filling pile (which is cut in the finishing), the bindings of the filling with the warp forming rows, or cords, lengthwise in the fabric, thus giving its surface a corded or ribbed effect, the back of the cloth being usually a twill weave. Corduroys are cotton fabrics noted for their wearing qualities. They are also used for upholstering furniture, in which case they are often finished with fancy patterns.

In connection with knit goods commonly known as two-and-two-rib, *i. e.*, two ribs alternating on face and back of children's stockings.

CORK LACE:—Formerly the older sorts of Irish lace made in the City of Cork, now Irish lace in general.

CORKSCREWS:—Corkscrews are what might be called double twills, or oblique warp-effect rib weaves. The name given to fabrics made with these weaves. Corkscrews require a high warp texture, since the warp forms (more or less) both the face and the back of the cloth, the filling resting more or less imbedded between the warp threads, being only partly visible on either the face or the back of the fabric. Corkscrews are made in plain and fancy effects.

CORPORAL CLOTH:—The cloth used to cover the altar during the communion.

CORSAGE:—The bodice or waist of a dress.

CORTICAL:—The cellulo-fibrous part of the hair structure.

COSMOS FIBRE:—The name given to an imitation of wool produced from vegetable fibre in 1880 by a Mr. A. E. Neuman, at Düsseldorf, Germany.

COT:—The leather covering of drawing rolls as used in spinning machinery.

A fleece of wool matted together; a lock of wool or hair clung together.

Wedgwood Cots:—Matted locks of wool forming a hard felt in the fleece.

COTELINE:—A variety of white corded muslin.

COTSWOLD SHEEP:—This breed originated in Gloucestershire, England, and received its name from the hills of the same name. The Cotswold sheep produces a large, white, coarse, long, lustrous wool; the average weight of the fleece being about 7 pounds.

COTTON:—The soft, woolly fibrous material which adheres to the seeds of the cotton plant.

COTTONADE:—A cotton fabric made in imitation of fancy cassimeres for men's wear.

COTTON BATTING:—The fibres still adhering to the seed after ginning are then separated by means of linting, and are known as *linters*, which then by means of a rough carding are transformed into a film, which is put up in rolls, and sold as cotton batting, used for lining quilts, etc.

COTTON DAMASK:—Figured cotton cloth used for table covers, curtains and upholstery purposes

COTTON GIN:—The machine used in separating the seeds from cotton fibres. There are two types, the saw and the roller gin.

The saw gin is the invention of Eli Whitney. In this gin the seed cotton rests upon or against a grid, into the openings of which project the teeth of a gang of saws mounted upon a rapidly revolving shaft. The teeth of the saws catch the fibres and draw (tear) them away from the seeds. The latter being too large to pass through the openings of the grid, roll downward and out of the machine. The fibres are removed from the saws by a revolving brush, and blown into the lint room. In the roller gin the fibres are drawn between rollers, guarded by blades which prevent the passage of the seeds, which are pushed from the fibres, fibre and seed being delivered in different directions.

COTTON-MOTH:—An enemy to the cotton plant; the same produces its caterpillar worm in August, and these are sometimes so numerous that in three days, by their agency, a field will be rendered almost leafless.

COTTON OPENER OR PICKER:—A machine for opening, shaking and thus loosening the baled cotton, and in turn blowing it to the breaker or first scutcher.

COTTON PICKER OR SCUTCHER:—Two or three of them are used in the preparation of cotton for the card, viz., the breaker, intermediate and the finisher picker; the intermediate being in connection with low and medium counts of yarn frequently omitted. The first completes the opening and cleansing of the cotton. The intermediate and the finisher picker, the latter sometimes called finisher lap machine, take the laps as produced by the breaker picker, and combine three, four or more of them into a new lap, thus doing away as much as possible with any irregularity in the resultant lap. The object of the finisher picker or lap machine is to produce a perfect clean and even film or laps of cotton for the card.

A machine for picking cotton in the field from the bolls of the plant; also the person who does this work by hand.

COTTON PRESS:—A press used for compressing lint cotton into bales either at the ginnery in the box bale or at the points of exportation by powerful hydraulic presses into the compressed bale for handy shipment.

COTTON PRINTS:—Cotton cloth printed in various colors and patterns.

COTTON SPINNING:—The operations included in the process of converting cotton into the yarn or thread, technically known as warp, filling, or thread, are: (1) mixing, (2) picking, (3) carding (combing), (4) drawing, (5) roving (slubbing intermediate and roving), (6) spinning (ring frame or mule), (7) twisting (gasing, polishing, winding). All these operations are in a general way included in one word, cotton spinning.

COTTON THREAD:—Its origin, according to history, dates back to 1794 when while Samuel Slater was spinning a quantity of Sea Island Cotton at South Oxford, the beauty of the thread attracted the attention of his wife, who then suggested that if such yarn were doubled and twisted, why would it not make good sewing thread. From this period Mr. Slater commenced the manufacture of thread, and it soon spread into Europe, where it is claimed to be of English origin.

COTTON TICK OR COTTON TICKING:—Plain or twilled cotton cloth, used for ticks.

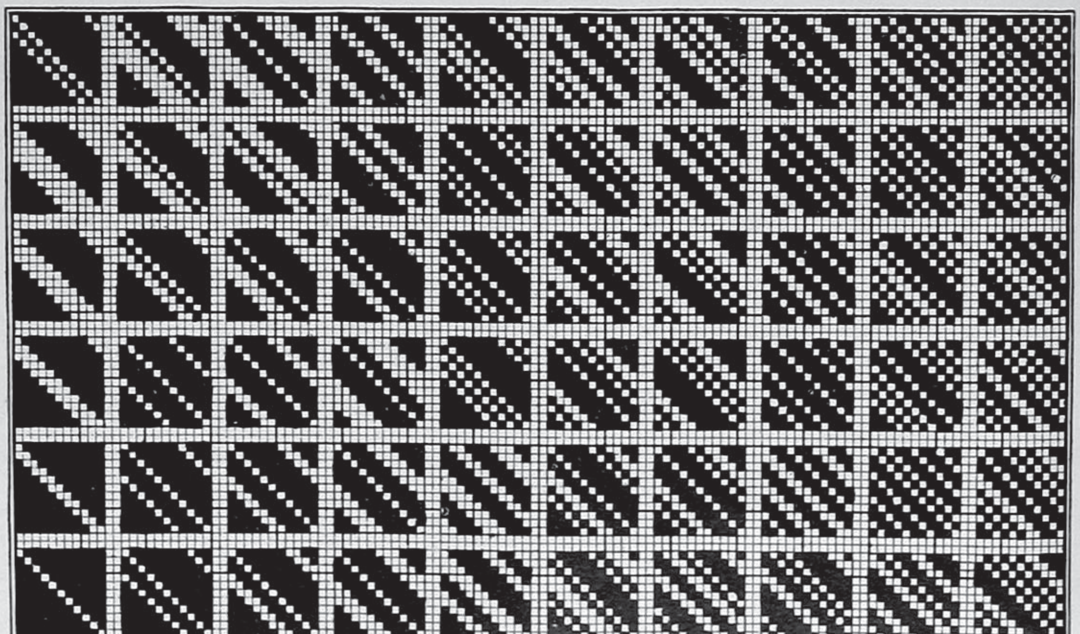
COTTON VELVET:—An imitation of silk velvet used for dresses, trimmings, etc. *Velveteen.*

COTTON WARP WORSTED:—A low grade of fancy cotton trouserings or suitings made in imitation of fancy worsted trouserings or suitings, the warp being all cotton, with in some instances a few fancy worsted threads added; the filling being either a wool spun cotton yarn, or sometimes woolen or single worsted yarn. They first appeared in the market in England, it is claimed, about 1834.

(*To be continued*)

DICTIONARY OF WEAVES.

ELEVEN HARNESS



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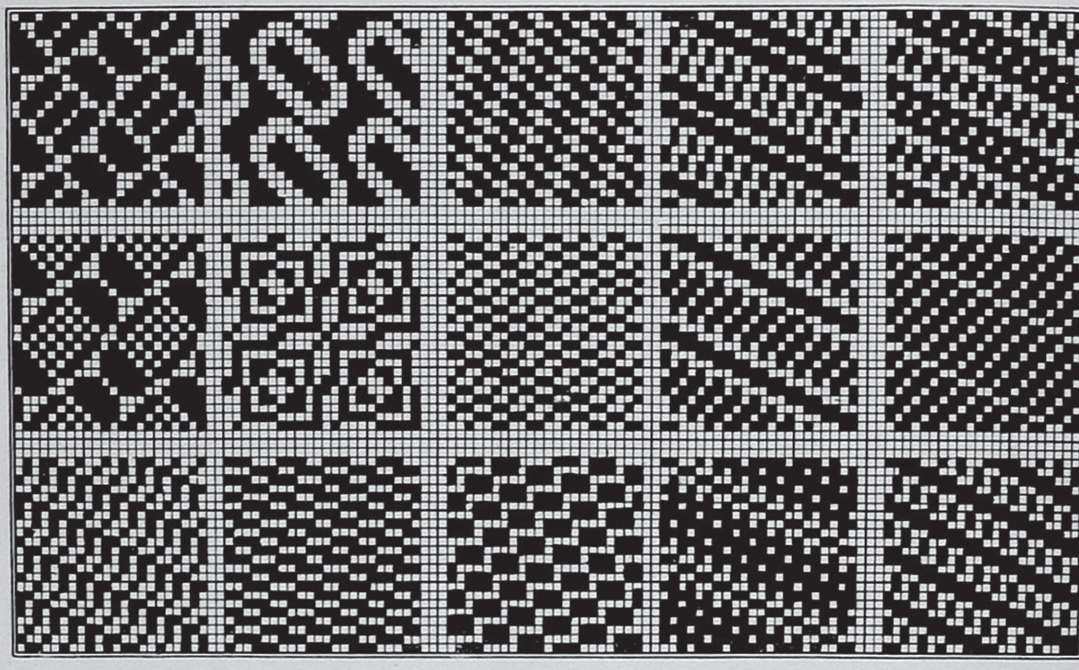
ELEVEN HARNESS



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