Vol. IV FEBRUARY, 1909 No. 2

Posselt's Textile Journal

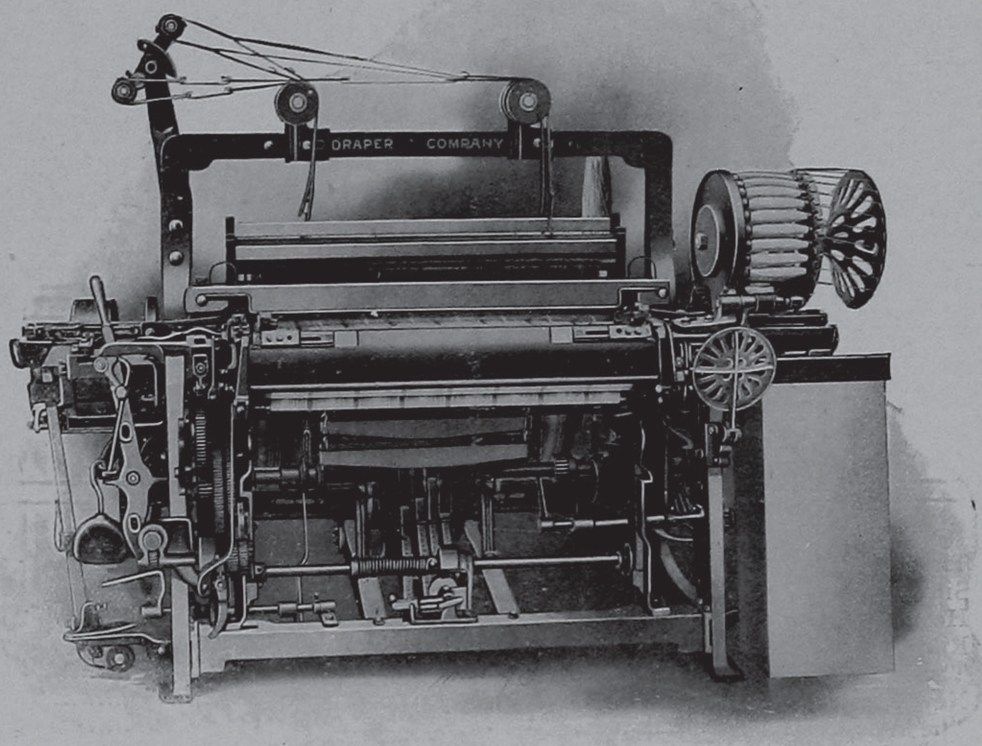
A Monthly Journal of the Textile Industries

Table of Contents

Entered as second-class matter February 10, 1908, at the post office at Philadelphia, Pa., under the Act of Congress of March 3, 1879.

E. A. Posselt, Publisher, 2028 Berks St., Philadelphia, Pa.

European Agents: Sampson Low, Marston & Co., Ltd., 100 Southwark Street, London, S. E.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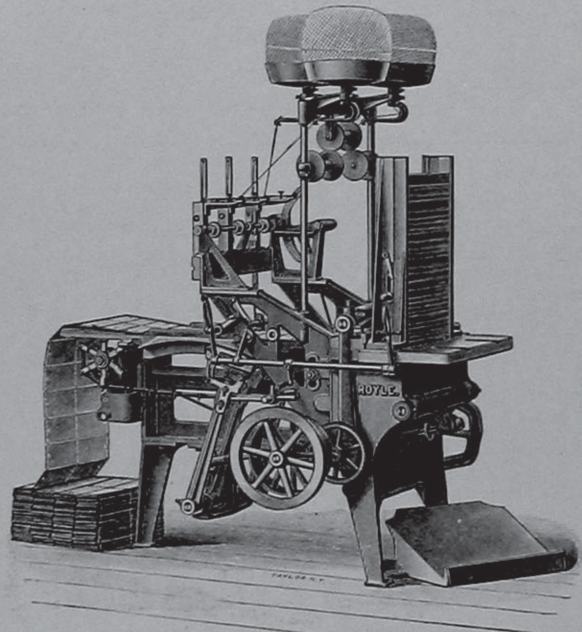

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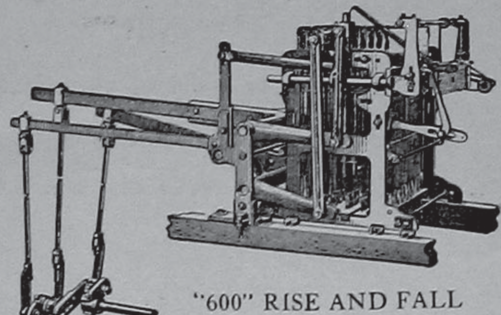


"600" RISE AND FALL

"The HALTON JACQUARD"

For Fabrics of Every Description

HARNESS BUILDING

THOMAS HALTON'S SONS

Allegheny Avenue and C Street, Philadelphia

Posselt's Textile Journal

Vol. IV. **February, 1909.** **No. 2.**

DESIGNING AND FABRIC STRUCTURE FOR HARNESS WORK.

70° STEEP TWILLS OR DIAGONALS.

The same are a subdivision of our regular (45°) twills, obtained from the latter by means of drafting from the same every third warp thread for the new successive warp thread of the resulting new steep twill, and which in turn will produce a more oblique twill line or twill effect than our 63° steep twills, explained in the July issue of the Journal.

This drafting, *i. e.,* using only every third warp thread of the regular twill for the new weave, will indicate to us that in connection with any foundation weave which is evenly divisible by 3 ($1 +$ miss $2 = 3$) only one-third of the number of its harnesses are required for the steep twill.

For example: A 12-harness regular twill, taken as foundation weave, only requires ($12 \div 3 =$) 4-harness for its mate 70° steep twill. In the same way an 18-harness regular twill results in a 6-harness steep twill, etc.

Regular twills, as used for foundation, of a repeat which is not divisible by 3, will not reduce the number of harnesses in this way for its mate 70° steep twill, for which reason a 17-harness regular twill produces a 70° steep twill, repeating on 17-harness, etc.

We will now explain the subject by means of a few practical examples:

Fig. 1 is the $\frac{3}{1}\frac{2}{3}\frac{2}{1}$ 12-harness, 45° twill.

Fig. 2 is the same weave shown in two kinds of crochet type, *i. e.,* every third warp thread is shown in *full* type, the other warp threads (not used) being shown in *dot* type.

Fig. 3 shows the 70° steep twill, obtained from diagram Fig. 2, by using only the warp threads shown there in *full* type, *i. e.,* warp threads 1, 4, 7 and 10; the steep twill thus obtained repeating on 4 warp threads and 12 picks.

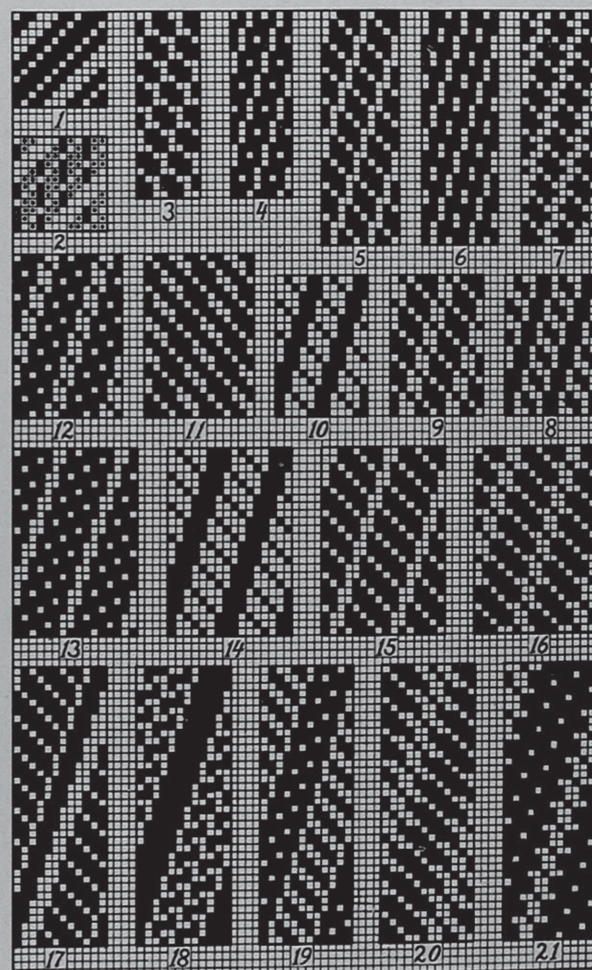
Remember that no reduction in the repeat of the weave, filling ways, takes place and that in this respect regular and steep twills have a uniform repeat.

Fig. 4 shows us the 70° steep twill, obtained from the $\frac{4}{3}\frac{4}{1}$ 12-harness regular twill, repeating on 4-harness and 12 picks.

Figs. 5, 6 and 7 show us in this manner the execution of three 70° steep twills, repeating on 5-harness and 15 picks, having for their foundation 15-harness regular twills. Two repeats, warp and filling ways, of the steep twills are given. Reading off the interlacing of the first warp thread of any steep twill, for one repeat, will always give us the repeat of the foundation twill, and when, for example, in connection with weave Fig. 5, the same reads $\frac{3}{1}\frac{3}{1}\frac{3}{4}$ 15-harness regular twill — the foundation weave.

Figs. 8, 9 and 10 show three examples of 70° twills, repeating on 6 by 18, *i. e.,* having 18-harness regular twills, respectively for their foundation. One repeat warp ways and two repeats filling ways, of the steep twills are given.

Figs. 11 and 12 show two examples of 70° twills, repeating on 7 by 21, with 21-harness regular twills, respectively for their foundation. We have shown again one repeat warp ways and two repeats filling ways, of the steep twills.



Figs. 13, 14, 15 and 16 show four examples of 70° twills, repeating on 8 by 24, and calling for 24-harness regular twills for their foundation. One repeat of filling and two repeats of warp threads are given.

Figs. 17, 18, 19, 20 and 21 show five examples of 70° twills repeating on 12 by 36;

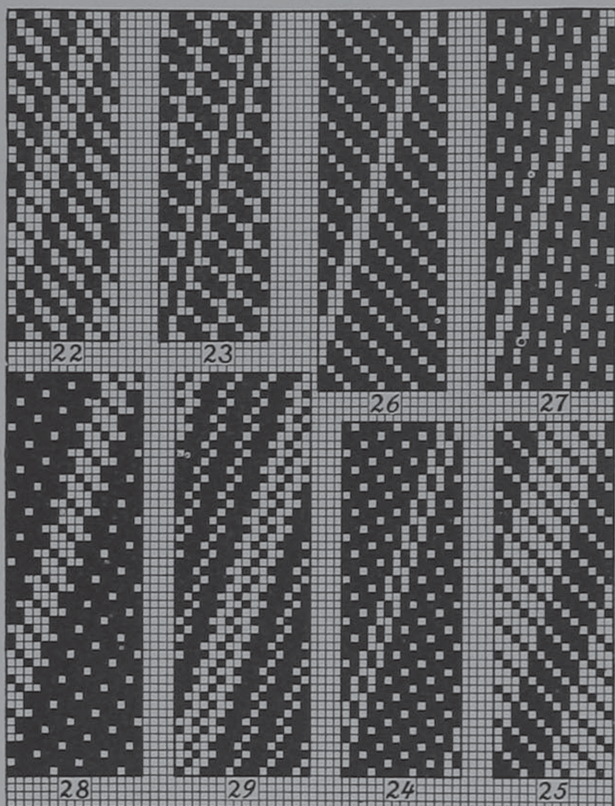
Figs. 22 and 23, two examples of 70° twills repeating on 13 by 39;

Figs. 24 and 25, two examples of 70° twills repeating on 14 by 42;

Figs. 26 and 27, two examples of 70° twills repeating on 15 by 45; and

Figs. 28 and 29, two examples of 70° twills repeating on 16 by 48.

Only one repeat each way is shown in connection with weaves Figs. 17 and inclusive 29, on account of the large repeat of these weaves.



Questions:

Construct 70° steep twills from the following five regular twills:

$\frac{3}{1}\frac{4}{1}\frac{3}{3}$ 15-harness,

$3\frac{\ }{2}\frac{1}{1}\frac{1}{2}\frac{3}{2}$ 15-harness,

$3\frac{\ }{1}\frac{4}{1}\frac{3}{6}$ 18-harness,

$\frac{4}{1}\frac{3}{1}\frac{4}{3}\frac{1}{3}\frac{1}{3}$ 24-harness,

$\frac{4}{1}\frac{3}{1}\frac{3}{1}\frac{3}{1}\frac{4}{3}\frac{1}{3}\frac{1}{3}\frac{1}{3}$ 36-harness.

RIBBONS, TRIMMINGS, EDGINGS, ETC.

(Continued from page 8.)

Piquè Weaves.

In the construction of fabrics interlaced with these weaves we use a face and a back warp. The first, as a rule, interlaces with *taffeta* (plain weave) and comes with a light tension from a separate warp beam, whereas the back warp comes heavily weighted from its mate warp beam and rests in the fabric structure for several picks minus interlacing with the filling. The same interlaces at certain spots only with the face structure, for which reason the latter, on account of the less tension on its warp, forms itself arch-like (raised) over the back warp.

Weave Fig. 82 shows such a piquè weave; in the same the back warp is stitched onto the face cloth in the shape of an oblique square.

Weave Fig. 83 shows us a piquè weave in which the stitching of the back warp onto the face cloth forms cross stripes, it being a weave frequently met with in the manufacture of ribbons.

Crochet type used in the one repeat showing construction of weave Fig. 82 indicates thus:

Full type = the weave for the face structure,

Dot type = raise every face warp thread on every backing pick,

Cross type = the weave for the back structure, and

Circle type = stitching of back warp into face filling.

In weave Fig. 83 (in the one repeat, showing construction) the face warp threads are shown by *cross* type and the back warp threads by *circle* type.

Hollow and Double Cloth Weaves with Stuffer Picks.

Stuffer picks are used to fill out, raise or emboss, in hollow or double cloth weaves, the empty space between the stitchings whereby the two fabrics are united. This procedure in turn imparts to the design a prominent, raised, *i. e.*, embossed effect.

If using the stuffer pick only for the purpose of a *wadding;* face warp threads then must interlace above, and back warp threads below, said stuffer pick.

If however using the same also in the formation of the effect or design, said stuffer pick then rests off and on, as directed by the design, either above the face structure or below the back structure.

Weave Fig. 84 is constructed with three kinds of filling, *viz:* Face Back and Stuffer. The face structure is interlaced with 4-harness twill, warp effect; the back structure with plain. The stuffer pick rests between face and back structure.

In the diagram Fig. 84^a the section of the fabric is given, showing respectively the interlacing of a face, a back and a stuffer pick.

Weave Fig. 85 is constructed with two kinds of filling, *viz:* a ground pick and a stuffer pick. The back structure interlaces with taffeta weave. The face warp, and which is used minus a face filling, produces a design (a square) on this taffeta ground work. The stuffer pick in turn raises, *i. e.*, embosses this square, producing inside this large square a second small square, resting on all other portions of the repeat of the weave below the fabric structure.

In diagram 85^a we have shown a sketch of the pattern, and in diagram Fig. 85^b a section of the fabric structure, *viz:* a ground and a stuffer pick, the latter resting part the time below the structure, part the time between figure and taffeta warp and part the time above the figure warp.

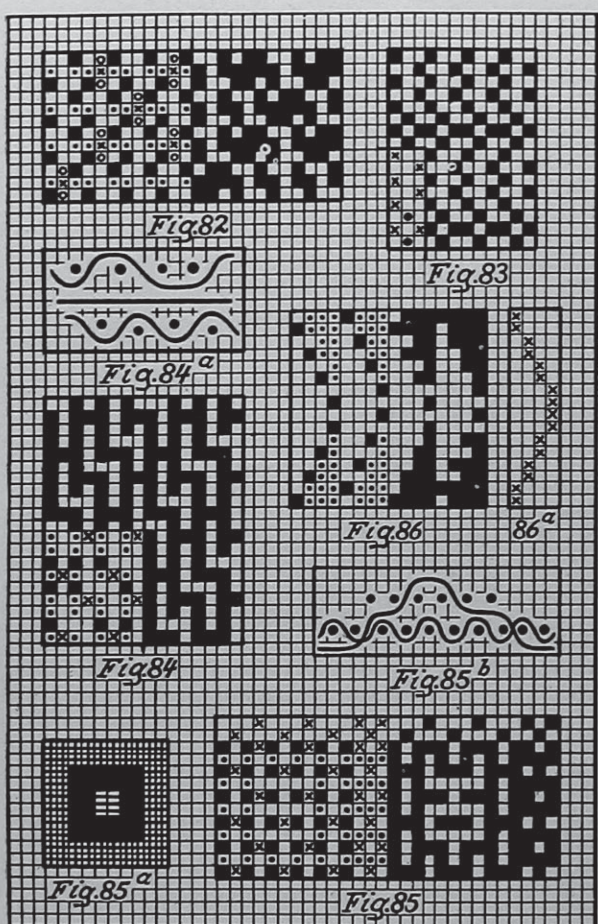
Three and More-Ply Fabrics.

Rules observed in constructing these fabrics are identical with those observed in constructing two-ply structures.

For this reason; for example, if constructing a four-ply fabric:

1st. Plan for lowermost situated structure, considering only warp threads and picks belonging to it, at the same time raising all the warp threads belonging to the three structures that are to rest above it.

2nd. Introduce the weave into the warp threads and the picks of the structure as is to rest above the



first, leaving all the warp threads of the latter down, raising at the same time all the warp threads of the two structures as are to rest above it.

in structures 1, 2, 3 and 4, returning back again to structures 3, 2 and 1.

The various structures may be united into one compact fabric, either by using a separate binder warp, or by stitching one structure into the other, using either risers or sinkers for the purpose.

Fig. 86 shows the weave for a 4-ply fabric, each ply interlacing with taffeta (plain).

The introduction of the filling into the various plies is shown at the right hand side in diagram Fig. 86[a], *viz:*

2 picks in *first* ply (bottom)
2 " " *second* ply
2 " " *third* ply
4 " " *fourth* ply (top)
2 " " *third* ply
2 " " *second* ply and
2 " " *first* ply (bottom).

(To be continued.)

JACQUARD DESIGNING.

(Continued from page 164, Vol. III.)

TWO SYSTEMS WARP AND ONE SYSTEM FILLING, *the Warp to Form the Face of the Fabric, the Filling Resting Embedded, in the Body of the Structure.*

For explaining this system of designing, we selected a *Drapery, i. e.,* a *Damask Curtain* fabric, presenting a prominent twill effect over ground and figure. Besides this twill effect, and the filling not being seen on face or back, another feature, characteristic to these fabrics is that they are reversible, *i. e.,* the fabric has a double face, each side of the fabric presenting a counterpart of the pattern of the other side, the two systems of warp exchanging positions (face or back, or vice versa) in order to produce either ground or figure, the weave (exchange) for both systems of warp being arranged to occur on the same pick, so as to hide the filling on both sides of the fabric structure.

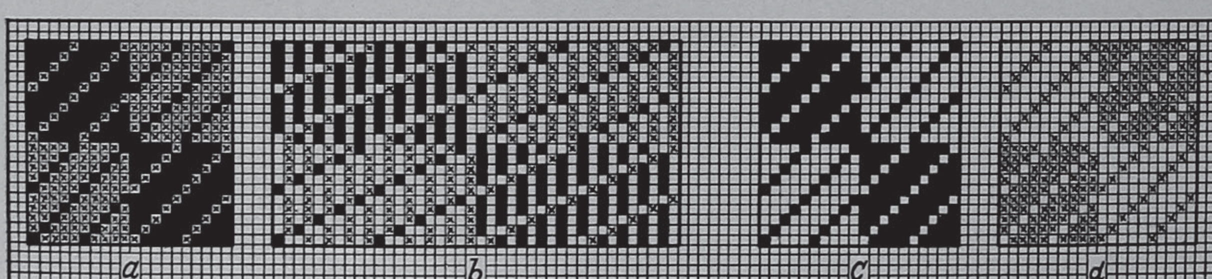


Fig. 54.

3rd. In connection with the picks destined for the third structure, consider then only the warp thread and picks belonging to the latter when inserting the weave, raising all the warp threads of the face structure, lowering at the same time all the warp threads belonging to fabric structures one and two.

4th. Insert the weave into the face structure, leaving then all the warp threads of the other three structures down.

As a rule, arrange the successive picks to interlace

In order to illustrate the formation of the design in the fabric, to the reader, the accompanying four diagrams Fig. 54, *a, b, c* and *d* are given. Of the same:

Diagram *a* shows the design executed on point paper in two colors, viz: *black* and *cross* type, each type standing for one color of the warp, the filling not being visible on face and back.

For weave we selected the 1 *up* 4 *down* and the

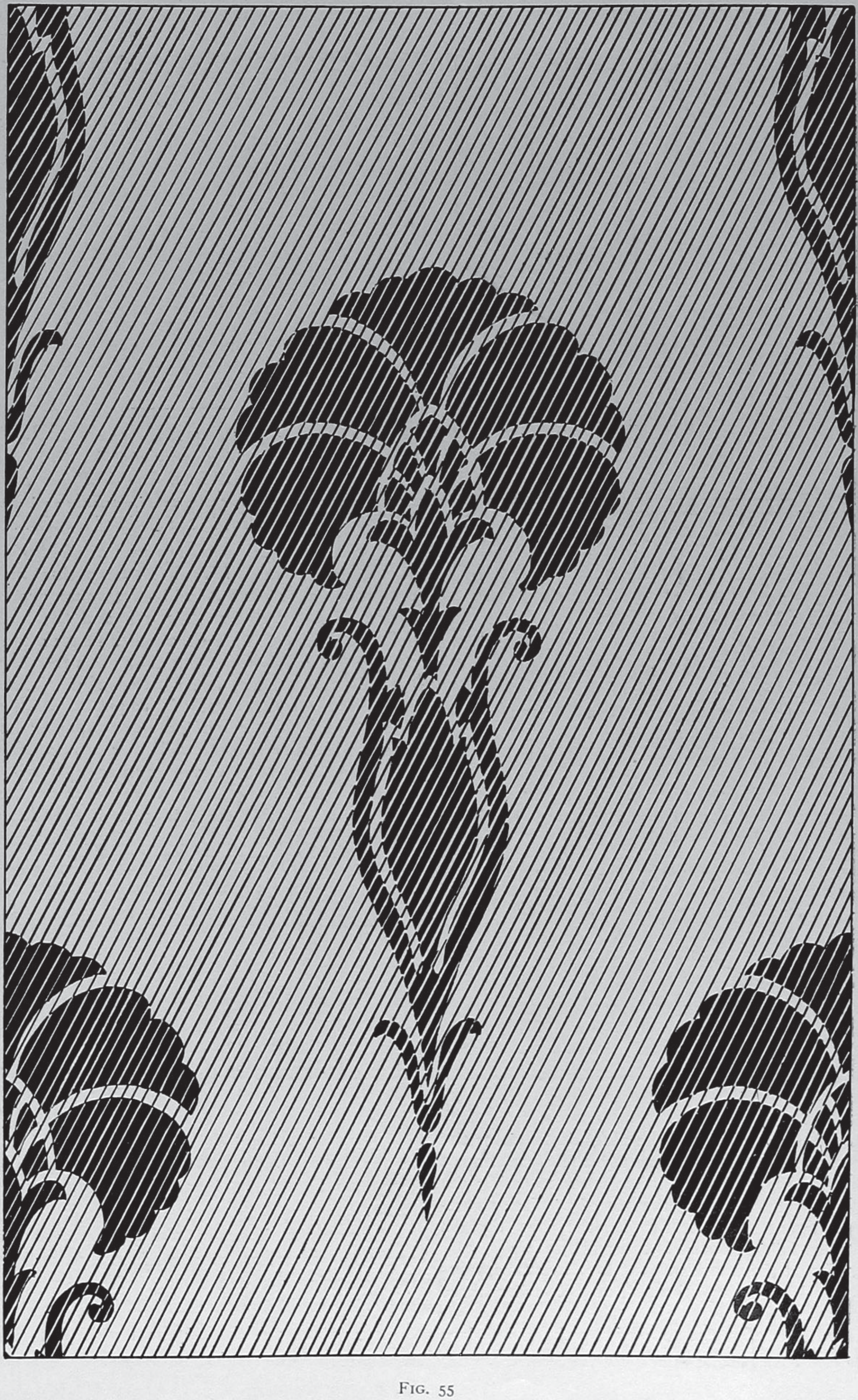


Fig. 55

1 *down* 4 *up* 5-harness twill—one twill line running into the other.

Diagram *b* shows the analysis, *i. e.*, how the fabric interlaces, 2 threads in said analysis representing one

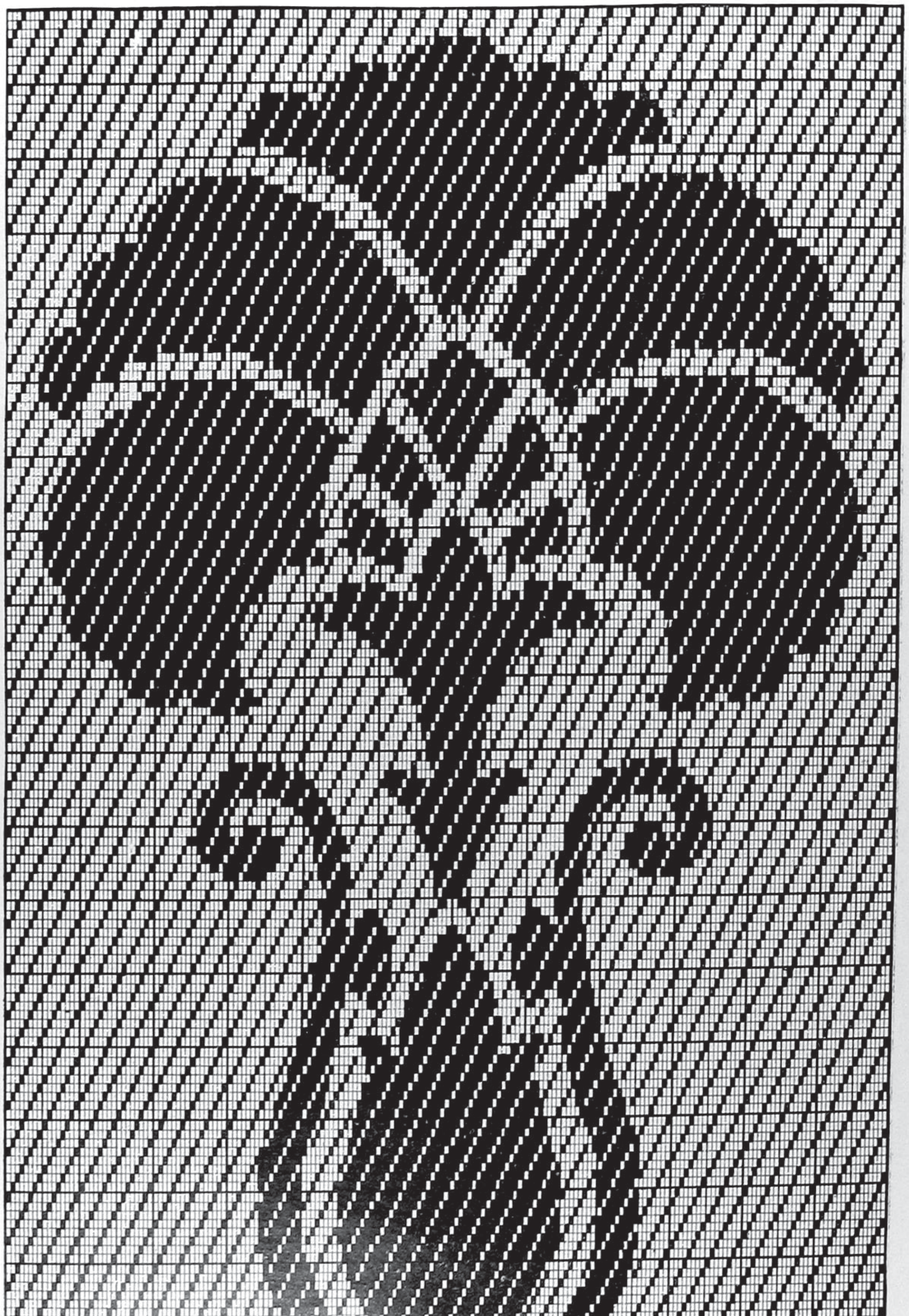


FIG. 56.

vertical row of squares in diagram Fig. *a*, *i. e.*, all the uneven number threads in diagram Fig. *b* are of one color, and all the even numbers threads of the other color, as is clearly shown by the different kind of crochet type used for this purpose in the diagram. Examining said diagram *b*, from a technical point of view, shows the manner of hiding the filling on face and back of fabric, showing that on either side of the fabric, where there is a sinker in one system of threads, there is joining it a riser of the other system of threads, the latter in turn covering the place of interlacing of the first thread referred to, and vice versa, thus hiding the filling on face and back of fabric.

Diagrams *c* and *d* show the analysis for the stamping of cards for each pick, *i. e.*, the design Fig. *a* is cut twice over on the same card, provided there is one machine used (tied up in two sections) or if two Jacquard machines are used, cut once over each pick for each machine thus:

Cut first one color for section 1, or machine 1.

Cut next the second color for section 2, or machine 2.

Diagram *c* thus refers to the card stamping for section 1, or machine 1, and

Diagram *d* to the card stamping for section 2 or machine 2, with reference to design *a*, the crochet type used for either diagram *c* and *d* corresponding to type used for design *a*, a feature which will fully explain the method of card stamping for this class of fabrics.

Fig. 55 shows one repeat, actual size, of a drapery fabric of this kind, the same, for example, to be executed with a texture of 134 warp threads and 67 picks per inch.

Fig. 56 shows a portion of the working design, *i. e.*, 192 squares of the warp and 144 squares of the filling, worked on 16 by 8 point paper, said portion of the working design representing ($192\times2=$) 384 warp threads and 144 picks, of the fabric structure.

Warp texture quoted before = 134 ends per inch = 67 ends for each system of threads.

Width of one repeat of pattern = 6 inches, thus:

$67\times6=402$, *i. e.*, 400 (on account of 402 not being a multiple of 5, the repeat of the weave) warp threads required for one repeat for each system of threads; and when for work on the loom then either two 400 Jacquard machines may be used (one for each system of threads) or 800 needles of an 800 or a 900 Jacquard machine are required, the harness of which is tied up for what is known as two sections, drawn in the comberboard one thread of one section to alternate with one thread from the other section, as is explained on pages 48, 49 and 50 of "The Jacquard Machine Analyzed and Explained."

From Paterson, N. J.

E. A. Posselt:—I congratulate you on the large number of subscriptions for the Journal, and wish you another successful year with the good work you are doing amongst the Textile Trade. I hereby enclose M. O. for one year's subscription to the Journal. A. S. 1-23-09.

REGARDING WASTE IN SILK MILLS.

By James Chittick.

The question as to how much waste should reasonably be expected in the various processes of silk manufacture is a vexed one. The proper control, assorting, and sale of such wastes as are made, is also a branch of the work requiring special attention.

Silk mill wastes, in this country, are mostly classed under the headings of *throwsters' wastes* and the *wastes of the weaving mill.*

Throwsters' Wastes include cut or damaged skeins, winding, doubling, spinning, and reeling wastes. These all are known as hard silk wastes, that is, silk from which the gum has not been discharged. The cut or damaged skeins will be raw silk, sorted from the bales as received, and which should be only a few. These skeins, being unsoaked, consequently have no soap or oil in them, whereas the other throwsters' wastes will contain a percentage of soap and oil, taken up in the soaking.

The wastes of the weaving mill include the winding, warping, quilling, twisting, and weaving wastes; also the thrums and warp ends, as well as sections or parts of warps, done up in chain or ball, that are damaged or otherwise useless. Included as a waste should also be the small remnants of warp and filling, running from odd piecing bobbins up to half a pound or more.

The great bulk of the weaving mill waste is made up of skein dyed, weighted, black and colored silk, and the largest quantity is filling waste, made in the weaving. Of course many mills make only piece dyed goods, and other mills make a portion of their product on such fabrics, so the waste in these cases will be the raw or thrown silk, undyed. In the case of crepes, chiffons, mousseline de soies, etc., much hard twisted waste is produced which goes in a class by itself.

From the winding process, in both the throwing and weaving mills, there is quite an accumulation of the cotton lacings or tie bands that confine the skeins.

In the weaving mill there are, at times, accumulations of old cotton or linen harness twine, as well as quantities of obsolete sets of jacquard cards to be disposed of.

If cotton, linen, mohair or other yarns, not silk, are used, there will be wastes from them, either separate or mixed with silk.

In the dye house, silk will sometimes be damaged either by careless handling or through accident.

In the finishing room, these accumulate the headings cut from the pieces and sometimes short damaged places that have to be cut out of the piece.

In the silk printing department fag ends of grey cloths, etc., pile up quite fast, while damaged ends of goods are very common.

The burlap bags and straw mats, the ropes and cordage, and the cotton shirts, that protect the bales of silk, are generally re-used by the throwster in packing his silk for shipment to the dyer, but when finally discarded they come into this category of mill wastes.

The waste paper of the mill is always large in quantity and must be collected and sold.

The first aim, of course, is to take proper steps to minimize waste in every possible way, as it is no light thing to have silk worth five to ten dollars a pound transformed into waste worth only five or ten cents a pound on account of its being mixed with waste of inferior or doubtful nature.

The next thing is to see that the waste made is properly weighted, recorded, classified, bagged, and stored, and finally that it is sold to the best advantage.

The waste made in throwing will depend upon the quality and nature of the silk, the skill and care of the help, and the character of the management. The character of the machine is of less importance as very often most excellent work, with a minimum of waste, is made on antiquated machinery when the management is good, and, on the other hand bad work and excessive waste may be made in plants equipped in the most superb manner, when the organization is bad. The same remarks will apply to all other branches of the work.

If too great strictness is shown in the matter of waste, it will not diminish the amount made, but there will be less turned in. The remainder will be pocketed, thrown from windows, or disposed of otherwise.

Some times great exactitude is attempted in this matter. The filling given out will be weighed accurately, the cloth woven will be weighed, and the weight of the empty quills, or bobbins, and the weight of the waste will also be taken. This method is generally worthless as it takes some days to weave out a warp, and as the atmospheric moisture is constantly changing it follows that the weight of the silk, the bobbins, and the cloth is also changing. This variation will amount to two or three per cent on one side or the other, making a total probable variation of say six per cent—a far larger figure than what any difference in waste would amount to.

Then again this system requires people to carry it out and their pay amounts to a considerable sum, generally much more than any saving in waste.

It is, of course, a proper and necessary thing that the help should see care used in the collection, recording, and handling of waste, for if respect is not shown to it the working people will think little of it.

Careful and vigilant supervision is the great thing. The help should not be taken sharply to task when trouble is due rather to poor material than to any fault of theirs. Much may be done by talking to the people and getting them to understand what a large money loss—that benefits no one—can be caused by a little carelessness in this matter. Gross negligence and wilful damage should, of course, be severely dealt with.

When the warper has finished her warp, or the weaver has woven out his last cut, the waste made should be turned in to the foreman, and each operative's waste should be promptly weighed up, and if too much has been made, for which there is no good reason, the person who made it should be cautioned on the subject.

The nature of the waste should also be noted, to see that it is all legitimate. Winder girls have a habit, when a skein is pretty well run out and the end is hard to find, of clipping it right through with their scissors and so saving themselves trouble while increasing their output.

A very convenient plan for keeping the wastes separate is to have a considerable number of bins, side by side and clearly marked, into which the wastes are deposited each day. There will be bins for white, black, and colored weaving waste; for hard twist, spun silk, mixed silk and cotton, thrums, twisting waste, etc. In this manner it is practically self-assorting, and not being mixed, its value greatly increased.

In throwing good silks the waste may run from one to three per cent and if the silks are poor a wastage of five per cent, or even more, is not uncommon. Canton silk loses at least five per cent in most cases. Best tussah from three and a half to five per cent and inferior qualities much more. China silks, on account of their hard gums, will generally make about one per cent more loss than Japans. Hard twist Japans may lose three per cent or more. When calculating cost of fabrics in which really good silk is used, it may be safe to allow two per cent for waste in throwing of the organzine and three per cent for the tram.

For dyed silk work it is customary to allow four per cent for waste of warp and seven per cent for waste of filling, but much will depend on the length of warps, the diversity of product, the continuity of work, the skill of the help, etc.

The writer's experience is that on a product of say, two thirds plain work and one third ordinary fancies, when running full on good length warps, and with skilled help, the waste in warp can be kept down to about two per cent and the filling waste to about three and a half per cent, though it would be very unsafe ordinarily to figure on such a basis.

A weekly report of the amounts of the various wastes weighed up should be turned in at the office, and these reports should be regularly entered up. Any excessive amount of waste can thus be noticed and investigated, and the amount accumulated in bags awaiting sale can thus be checked off.

A good deal of dyed silk waste has of late years been used by woolen manufacturers, particularly in blacks. The long fibres of the silk assist in carrying much short stock and it costs but little money. It will also stand the ordinary tests for all wool.

Throwing waste, in good condition, will bring from fifty to sixty cents a pound. Ordinary colored waste from five to fifteen cents. Thrums and short warp ends will bring more, running say, from twenty-five to seventy-five cents a pound, while chain and ball warps and silk on bobbins will bring about from one dollar to two dollars a pound, depending on what it is.

Hard twist waste and cotton and silk, or wool and silk mixed waste, is hard to sell and brings but a trifle. Old harnesses bring very, very little and old jacquard cards it is difficult even to give away as, even for paper stock, the work of removing the wire costs as much as the value of the pasteboard.

Straw mats will bring about one and a half cents a pound and good burlap bagging about one third or one half of its new cost. Waste paper does not bring much yet there is enough in it to warrant the trouble of handling and baling it.

Headings of pieces can be sold to the rag-carpet makers, those people who run a hand loom or two in their own homes.

Instead of selling the remnant organzine on the bobbins it may be found more profitable to double it and twist it up for tram and re-dye it in black. Weighted tram stock, if re-dyed, may become unsound.

Each feature of this important waste question should be studied and followed up with care, for a saving of even one per cent means a very large sum of money on the product of a fair sized mill.

Late Improvements to Looms.

A New Let-back Mechanism for Looms.

This improvement relates to that class of devices in which, when the take-up of the cloth is stopped by the detection of a technically thin place produced by an absence of filling, the cloth is let back in order that when the fresh filling is laid, it will, by the stopping of the take-up and the letting back of the cloth, be resumed where the old filling failed.

Diagram Fig. 1 shows in dotted lines the new let-back mechanism in the position assumed when the filling is absent, and showing in full lines the position of the parts when the device is ready to start and let back the cloth; sufficient portions of the loom to which the improvement refers to being also given. Diagram Fig. 2 is a detail of the segment rack removed.

When the loom is running, the bar *1* of the new device is somewhat lower down than shown in full lines in the illustration (the left hand lower edge of said bar being then about flush with the end of the loom frame) the holding pawl *v* then slipping over the teeth on the rachet wheel *c*, preventing said wheel from rotating in the opposite direction. The part v^1 of the holding pawl is in the notch *u* and held in position by the tooth *t*, the locking projection *w* is in engagement with the hook *o*, and the back plate is adjusted by means of a suitable nut on the bolt *p*, so as to be rigid with the bar *1* and engage by means of the hold back or stop *x* the desired tooth on the upper side of the segment rack *r*.

When the filling breaks the rock shaft *h* is rotated by the filling stop motion in the ordinary manner and lifts the let-back mechanism by means of the usual arm *k*, lifting the bar *1* with its hook *o*, the segment rack and the entire let-back mechanism into the position indicated by dotted lines in the illustration. When the parts are thus lifted, the segment rack *r* drops by gravity as far as its elongated slot *q* (see Fig. 2) will allow, out of engagement with the hold back or stop *x* (see again Fig. 1) and with its locking projection *w* and pawl *v* out of engagement with the hook *o* and recess *u*. As the greater part of the weight of the rack is at the left of the pivot *p*, the rack swings toward the right until the pawl *v* rests against the stop *y*, all as shown in the dotted lines. The back plate *s* remains rigid with the arm *1*.

When the loom is ready to start, the parts are in the position indicated in full lines in the illustration, and when the loom is started the dropping of the let-back mechanism, produced by the downward swing of the arm *k* from the position indicated in full lines in our illustration, to that it occupies when the loom is running (not shown) and to which reference was had at the beginning of the article, in turn allowing time for the segment rack *r* (which by means of the slot *q* extends considerably below the bar *1*) to let back the ratchet wheel *c* the desired number of picks, until the holdback *x* is lowered into engagement with the rack which has been rotated until the pawl $v\,v^1$ is again in engagement with the rachet wheel and the tooth *t*, the stop *w* in engagement with the hook *o*, and the stop as extending horizontally from end of the bar *z* bears against the plain or rear edge of the segment rack, thus preventing a thin place in the cloth. The device is the invention of Mr. Charles Lavallee.

An Exchangeable Loom Picker.

The object is the production of a picker so constructed that its impact member, which engages the tip of the shuttle, can be easily renewed as it becomes worn.

Of the accompanying illustrations Fig. 3 is a side elevation of this new loom picker, showing the supporting member attached to the picker stick of a loom, and with the impact member in its operative position. Fig. 4 is a longitudinal section of the picker.

The new picker comprises a sheet metal supporting member 1, adapted to be permanently attached to the picker stick 2 and an impact member 3 held seated on the supporting member, by simple and efficient automatically acting locking means.

This impact member 3 consists of scrap leather, and when one impact member becomes worn it can be instantly removed by the fixer from the supporting member, and a new one substituted.

To insert the impact member 3 into its casing, it is grasped by the fingers of the loom fixer and pushed directly into the pocket, the locking devices yielding or being retracted momentarily until the bend 4 snaps into the notch 5, and the latch 6 snaps into the notch 7, securely locking the impact member in place. The locking means engage said member below its impact surface or face, and well out of the way of the striking point of the shuttle at any time, so that the impact member can be worn as deeply as desired, without interference with the locking means.

To remove the impact member, the spring latch 6 is retracted by means of the pin 8, and the impact member can then be withdrawn by a straight outward pull, the end 9 of the leaf spring 10 yielding for this purpose.

A Lint Remover for Warp Stop Motions.

The object of this mechanism is to provide means for keeping the contact roll of electrical warp stop motions clear of any lint and thus in best of working condition, as well as precluding the possibility of lint on the roll being fired by an electric spark due to poor contact.

Diagram Fig. 5 illustrates the construction and operation of the new device, showing also those parts of a loom as are more intimately connected with it. In the same, 1 indicates a portion of the loom frame,

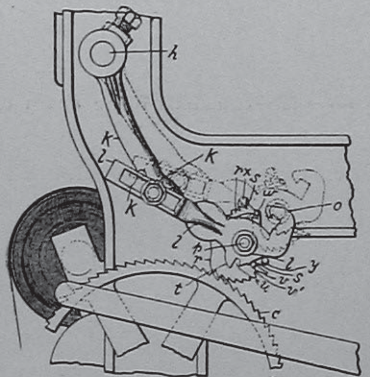


Fig. 1

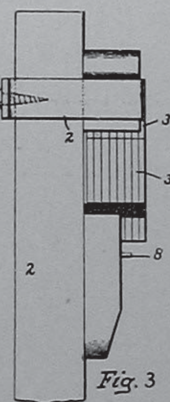


Fig. 3

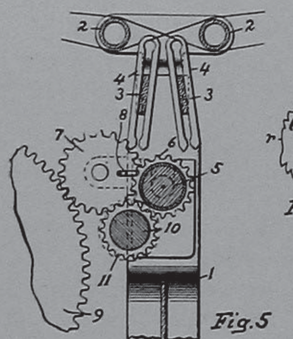


Fig. 5

Fig. 2

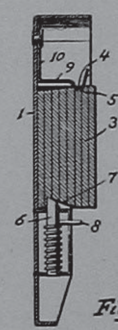


Fig. 4

2 the lease rods, 3 the two circuit bars of the stop motion and 4 a pair of detectors, which, when a warp thread breaks gravitate and touch the contact roll 5, and what in the usual way through suitable mechanisms stops the running of the loom.

To keep this contact roll free of lint, the same is provided at one end with teeth 6; a wheel 7 having a tappet 8 engaging the teeth 6 of the roll 5, and turn the same through a part of a revolution incidental to each revolution of the wheel 7, which is driven from the warp beam 9, having spur gear teeth.

For keeping the surface of the contact roll 5 free from lint to settle upon it, the wiper roll 10 is provided, its surface being covered with a suitable cloth. At one end, said roll 10 is provided with teeth 11 which in turn engage with tappet 8.

It will thus be seen that during the operation of the loom, first the contact roll 5 and then the wiping roll 10 will be rotated, but in opposite directions, with the result that the latter will positively operate to remove any lint from the periphery of the contact roll. The invention is by Mr. Edmond Champagne, Jr.

A Cotton Warper.

Warper reeds of beam warpers when made stationary, will in consequence pile the threads as coming from the creel through the warper reed to the beam, directly on top upon itself in a vertical position.

To overcome this feature, Messrs. Payne & Wallace lately devised means for traversing or moving the warper reed so that the threads as they pass through the eyes thereof are piled or wound around the beam and at the same time crossed upon each other so as to effectually tie themselves together, whereby separating or splitting under pressure from within, while the beam is in the dye vat, is prevented.

A PRACTICAL TREATISE ON THE KNOWLES FANCY WORSTED LOOM.

By E. P. Woodward,

Master Weaver.

(Continued from page 142, Vol. III.)

The Compound Levers and Method of Adjusting to Level Shuttle Boxes to the Raceplate.

The use of the levers which operate the shuttle boxes should be well understood, since a clear idea of adjusting them is necessary in order to readily bring the different shelves of the shuttle boxes to their respective positions with the shuttle race.

Before leveling the boxes to the shuttle race by means of the box lifting chains and compound levers, care should be taken to first adjust the parts which help to steady and support the boxes.

These parts consist of:

1st. A lifter tube carrying a lug to which is attached the box lifting chain extension or adjusting rod.

2d. A box lifting rod which slides through the lifter tube.

3d. A box rest which is mounted on the upper end of the box lifting rod and is suitably arranged with means for holding the shuttle box in fixed relation with it.

4th. A give away spring which slides over the box lifting rod and is compressed sufficiently to carry the shuttle boxes steadily through all changes so far as the rigidy of the spring is concerned.

This spring is held in compression by means of a collar and set screw on the end of the box lifting rod (beneath the lifter tube) and is mounted on the box lifting rod between the shuttle box rest and the lifter tube through which the box lifting rod passes.

The spring is designed to act as a *give away* in case of any thing preventing the shuttle boxes from lifting, and when properly set, should allow the shuttle boxes to be moved from the fourth to the first box by the compression of the spring alone. Failing to do this, means taking a great risk of breaking some of the parts of the box motion, should any thing catch and prevent the boxes from lifting when called. In the lower end of the box lifting *give away spring*, is placed a flanged tube or thimble through which the box lifting rod slides during the compression of the give away spring. This thimble has been found necessary to prevent the *housing* of the spring's end against the box lifting rod since this housing or binding of the spring against the rod has caused the give away device to fail to work and the result has been broken compound levers and roll stands, over which the box lifting chains run.

Posselt's Textile Journal

A Monthly Journal of the Textile Industries

PUBLISHED MONTHLY BY

E. A. POSSELT, 2028 BERKS STREET, PHILADELPHIA, PA.

SUBSCRIPTION RATES:

United States and Mexico, $2.00 per year.

Canada, $2.50 per year.

Other countries in the Postal Union, $3.00 per year.

Single Copies, 25 cents.

This Journal is published on the tenth of each month.

Postage prepaid by the Publisher.

Subscriptions begin with the number following the date on which the subscription is received at this office.

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In adjusting the shuttle boxes to position, first, set the adjusting tips on the double lift levers midway of their extreme positions; also place the chain extensions on the single lift levers midway of their extreme positions in their adjusting slots. This will leave the levers where they will give to the shuttle boxes about their desired lift of $1\frac{7}{8}''$ from cell to cell.

Next, with the box lifting levers indicating the lowest position of the boxes, adjust the box lifter tubes by means of their chain extensions until the upper ends of the tubes are about $\frac{1}{8}''$ above the upper side of the rocker casting.

The box lifting levers can now be thrown to indicate their highest lifting position. With the levers in this position, the lower end of the box lifter tube should lift to about $\frac{1}{8}''$ of the lower side of the rocker casting.

From this, it will be evident that the object in setting the box lifter tube to position, is to have it move equally as near its extreme length, either up or down, and yet in neither extreme be checked by the rocker casting through which it slides.

After loosening the set screw which holds the retaining collar on the box lifting rod, adjust the rod (by means of the collar) with the bottom box flush with the raceplate.

The different shelves can now be tried as to their positions with the raceplate. It may be necessary to give the boxes a slightly different arrangement of leverage in order to bring each shelf to its true level with the shuttle race and this in turn may call for raising or lowering the boxes by means of the chain extension which fastens to the lifter tube. This will not materially affect the position of the lifter tube in its relation to the rocker casting, as the levers had already been set for the extreme positions and all which is now being done is to level the intermediate positions, *i. e.*, the second and third boxes or shelves.

The foregoing instructions have shown the method which should be taken if one wishes to work with surety and dispatch.

They have treated of things necessary to be done before the final adjusting of the single lift lever and the double lift lever. This means in the first instance, a lever which moves the boxes but one cell. In the second instance, a lever which moves the boxes two cells. These levers can be worked independently, or in combination, at any pick desired, and by means of the single and double lift levers it is possible to call any box from any previous position to any desired position at any pick. The two levers therefore are necessary to work a box and they are known as the *compound box lever*.

It may simplify matters much if the learner keeps the following facts in mind:

1st. The single lift lever moves as far as the double lift lever at the point where the chain is fastened to it by means of the chain extension.

2nd. The double lift lever gives to the shuttle boxes a two cell move, not on account of the lever traveling as far again as the single lift lever, but on account of the method employed in passing the box lifting chain around the double lift lever wheel, and coupling the chain end to the single lift lever.

The single lift lever and the double lift lever travel the same distance at the point at which they are fastened with or engage with the chain. The single lift is obtained by the box lifting chain being fastened to this lever and traveling over a roll placed on the resistance end of the double lift lever. The double lift is made by this method of passing the box lifting chain around the roll or wheel of the double lift lever. As the chain has passed around this wheel in the form of a loop (one end being fastened to the single lift lever and the other end to the box lifter tube) it is plain to see that the same amount of motion given to this lever as the single lift lever has received, will move the shuttle boxes double the distance which the same movement would when made by the single lift lever. For these reasons, when moving the adjusting tip to level the shuttle boxes, it will be found that if the tip is moved $\frac{1}{8}''$, it will give double the lift to the shuttle boxes as $\frac{1}{8}''$ change will, when made on the chain extension which is adjusted in the slot of the