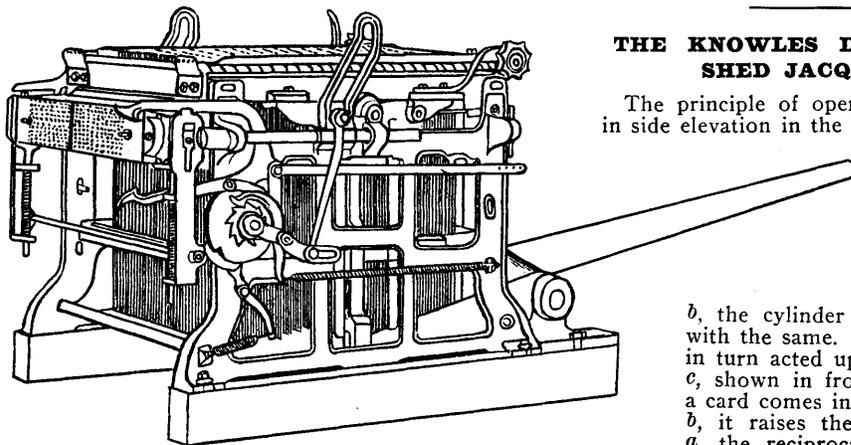


and necessarily half of all the warp threads operated by it. And putting in another fine pick, it again falls, and on this movement a figure card is again presented to the needles, and a figure lift produced to remain up as before. During this action of the Jacquard the plain harnesses are working, weaving plain, as follows: First pick, all face warp in the upper shed; second pick, half of face warp descends to the lower shed or bottom; third pick, bottom shed rises and top descends; and on the fourth pick, all face warp is again raised to the upper shed and then repeats. The action of the filling during these movements is two picks of fine on face, and one each of fine and coarse to the back. There are other methods of Marseilles weave; however that quoted is the one most generally used.

Before the introduction of the plain card attachment shown, it was customary to use a card with perforations for every alternate needle, by this means operating one-half of all the hooks in the machine. The use of this card necessitated that the cylinder be presented to the needles on the third and fourth pick, whereas, by the use of the new attachment, the cylinder is so presented only on the fourth pick, hence a large saving in cards accomplished, and the wear and tear on the mechanism greatly reduced. (*Crompton and Knowles Loom Works.*)

THE KNOWLES TWILL JACQUARD.

The object in the construction of this Jacquard machine is, to admit of the weaving of twills without any action of the cylinder or cards. The machine in its construction resembles an ordinary Jac-



quard machine, and is made either straight-lift or rise-and-drop.

The upright hooks rest upon round wires on the bottom griff of the machine. These wires which pass from side to side of the machine pass through a round eye in hooks that are somewhat heavier than the ordinary hook; one of these hooks being placed at each side of the Jacquard machine. These hooks pass through a slotted plate at the top to serve as a guide, but are not acted upon by the ordinary needles of the Jacquard.

In weaving an 8-harness twill there are 24 rows of hooks in the machine, dividing by 3 gives an 8-harness movement, and thus three griffs would be operated in producing an 8-harness twill at each pick.

The griffs are so made that they oscillate or swing upon a pivot. Over the top of the griffs is passed

a series of bars having notches in them, each bar coming in contact with a certain number of griffs in the machine, and there are as many bars so arranged as there may be changes in the ground weave that is desired to be produced.

These bars are acted upon by a peg-cylinder which is equivalent to a ball-chain on a box-motion. When the griff rises, one movement of the shaft having these peg-cylinders takes place, moving certain of the cross-bars and with them their respective griffs; they then descend, and on their next forward movement the griffs so moved engage with the larger hooks mentioned before at each side of the machine, thus lifting them and carrying with them one of the round rods before alluded to, on which the regular upright hooks are at rest thus carrying with them an entire row of the usual uprights.

This sufficiently explains the action, and it naturally follows that the number of rows so lifted determines the amount of twill or the nature of a twill that is being woven. If a 5-harness twill were desired there would be 25 rows of hooks in the machine, and the division would be made by 5 instead of 3, and in such case one row of the needles would of necessity have three uprights passing through each needle instead of two as is the case usually.

These machines are largely used on fine damask where a large figure is desired. The designer in painting the design simply paints the figure; no twill or ground weave is painted on the design or cut in the cards; hence, a 600-hook machine will produce a figure at least twice as large as an ordinary 600-hook for the reason that all the hooks are used in figuring and are not required to be used in the ground as is usually the case. (*Crompton and Knowles Loom Works.*)

THE KNOWLES DOUBLE-ACTING OPEN-SHED JACQUARD MACHINE.

The principle of operating this Jacquard is shown in side elevation in the accompanying illustration Fig.

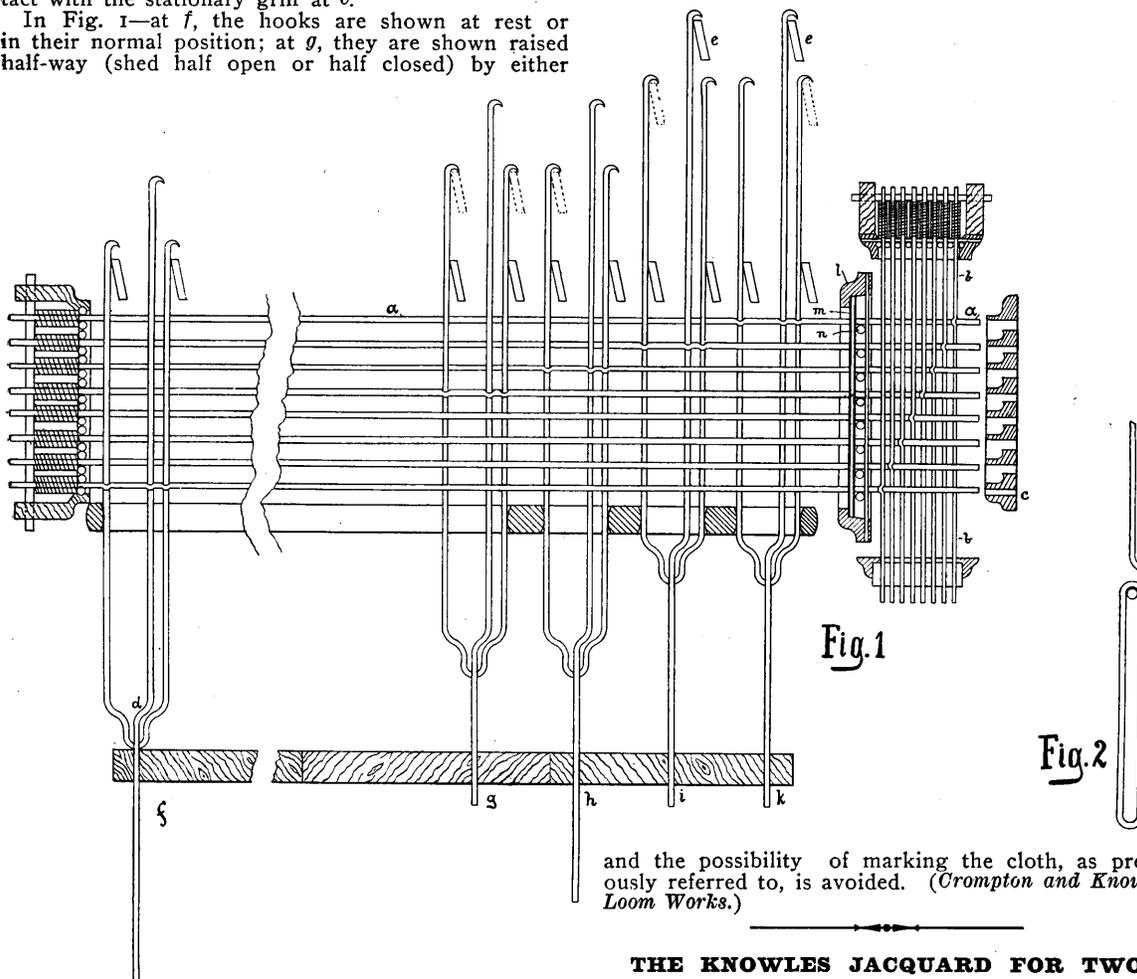
1. It will be observed that there are practically three hooks combined in one. Needles *a*, have three hooks passing through each needle, and the means of indicating from the card are through the vertical needles *b*, the cylinder falling and rising in contact with the same. The horizontal needles *a*, are in turn acted upon by the reciprocating plate *c*, shown in front of the needles, thus when a card comes in contact with a vertical needle *b*, it raises the respective horizontal needle *a*, the reciprocating plate *c* passes forward,

the needle rising upon the same, and the reciprocating plate *c* depressing the needle, throwing back the hook so that the same will not engage with the griff (shown in section in illustration); this action taking place when either one of the two sets of griffs of the double acting Jacquard is at its lowest or normal position. The hooks engaging with the (vertical moving) griffs are made in one piece, and the third hook to which the harness is attached is made with a loop at its bottom end as shown at Fig. 2, and hooks onto the double upright hook as acted upon by the vertical moving griffs. When it is desired that the shed remains open, the hook engaged to rise by action of the griff, raises at the same time its long hook (on account of bend *d*, on long hook) and which is carried up to a point above a stationary griff. If the reciprocating plate *c* indicates, and its harness or hook is to remain lifted,

the crook of the long hook comes in contact with the griff *d*, and remains suspended thereon until such time as the action of the card and reciprocating griff determine that said hook shall again descend into the lower shed. This action applies to both of the vertical moving griffs, making no difference which one of the hooks engages in the moving griffs, the action is the same on the longer hook, and it will remain up if indicated to come in contact with the stationary griff at *e*.

In Fig. 1—at *f*, the hooks are shown at rest or in their normal position; at *g*, they are shown raised half-way (shed half open or half closed) by either

is practically half closed at the time when the filling beats up, this being made necessary by the peculiar action of such construction; in fact at the moment when one hook starts to rise, its corresponding hook starts to descend, thus closing the shed half way. In many classes of goods this makes a defect in the figure and is particularly marked in the beat up of the filling in the goods. By the use of the new device an absolutely full open shed is maintained



and the possibility of marking the cloth, as previously referred to, is avoided. (*Crompton and Knowles Loom Works.*)

THE KNOWLES JACQUARD FOR TWO WEAVE FABRICS.

one of the respective vertical griffs; at *h*, the hooks are shown raised in the same position as at *e* by one of the griffs only; at *i*, the hooks are shown raised to the highest position (top of shed) by one of the vertical moving griffs (the long hook being in contact with stationary griff *e*); and at *k*, the hooks are placed in the same position as that shown at *i*, by means of the other vertical moving griff (*i. e.*, that griff having its first bar nearest to needle-board).

In the needle-board *l*, carrying the horizontal needles, *m* indicates a vertical wire (one of these wires for each vertical row of needles) for dividing said needle-board into spaces and for guiding needles; *n* indicates the sections of horizontal wires for needles *a* to rest upon.

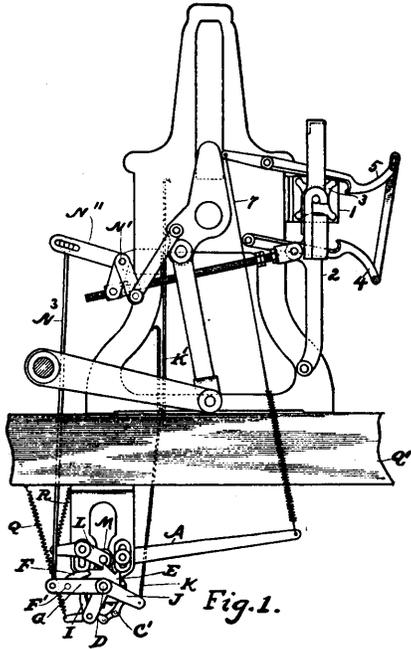
The particular object of the machine is to avoid the difficulties encountered in many cases by the use of the ordinary double-lift Jacquard in that the shed

Certain classes of woven goods—such, for example, as table covers and the like—are characterized by having cross-borders at the opposite ends thereof, and an intermediate body portion having some suitable pattern, there being usually a number of repeats of the said pattern of the body between the two cross-borders pertaining to a table cover or the like article.

For the weaving of goods of such classes it is required that the Jacquard mechanism of the loom in which the weaving is effected should be equipped with cards that are punched in accordance with the pattern in the body of the goods intermediate the cross-borders and also with cards that are punched in accordance with the pattern of the cross-borders. In the case of ordinary Jacquard mechanisms, it is necessary to employ a great number of cards, one card for every pick in the entire length of a table cover. This renders the set of cards very expensive,

and adds very much to the cost of weaving the goods.

The object of this Jacquard mechanism is to reduce greatly the number of cards which it is neces-



sary to employ, and thereby to lessen the expense as well as to obviate the various disadvantages and inconveniences which are incident to the employment, handling, and storing of an extended series of cards.

The novelty of the new mechanism consists in the combination, with the feeding devices for the cards of a Jacquard mechanism, of certain devices whereby the working of the said feeding devices is controlled automatically, with the result that the direction of rotation of the said devices is reversed from time to time as often as a repeat of either the pattern or the cross-border or that of the body should occur.

In the accompanying drawings, Fig. 1 shows in side elevation the said embodiment of the improvement. Fig. 2 is a view looking from the left in Fig. 1, and showing the auxiliary pattern devices, detached, but only a portion of the pattern-chain.

A description of this ingenious and labor-saving mechanism is best given by quoting letters and numerals of references in our illustrations, and of which 1 indicates the prism of the Jacquard machine, and 2 is the support for this prism.

3 is the lantern and 4, 5 are the catches for turning the prism. 7 is a connection to catches 4, and 5, and which is joined to the outer end of the operating-lever A, for the pawls. The inner end of the said lever is arranged to project over a cylinder C, around which latter is passed a pattern-chain C', having balls B, applied thereto, the sequence of balls and empty spaces on the said pattern-chain being, as prearranged, in order to conform with the exigencies of the weaving.

A ball on the pattern-chain coming under the inner end of lever A, acts to move the said lever, with the effect of placing catch 4, in position to engage the lantern 3, so as to cause the prism to be rotated in one direction, while when an empty space on the pattern-chain presents itself beneath the inner end of lever A, the catch 5 comes into position to cause

the prism to be rotated in the opposite direction. The cylinder C is fast upon the shaft D, which latter has fast thereupon also the ratchet E, and the notched detent-wheel N. The ratchet E is engaged for the purpose of rotating the shaft D, and parts fast thereon by pawl F, the latter being pivoted on a pin F', projecting from an arm G, which is mounted loosely upon the shaft D, the said pawl being pressed toward the teeth of the ratchet E, by a spring G'.

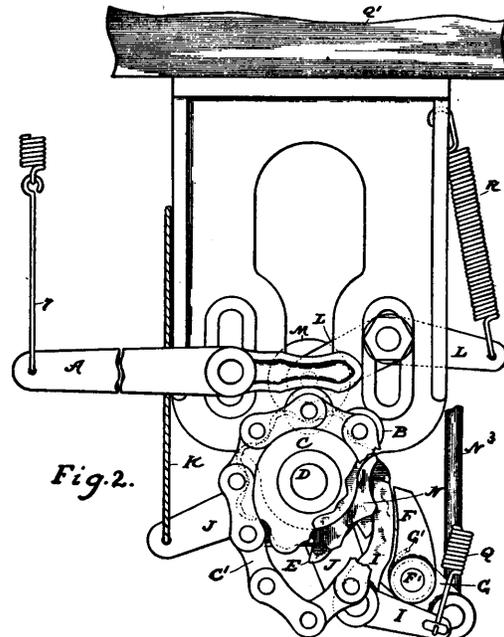
The notches of the detent-wheel N are entered to prevent overrunning of shaft D, and the parts that are fastened thereon by a detent consisting of a roll M, mounted on a lever L, that is acted upon by a spring R.

For the purpose of actuating the arm G and pawl F carried thereby, the said arm is connected by the rod N^s to the arm N'' on the moving shaft N' pertaining to the Jacquard mechanism.

In order to enable the length of the pattern-chain to be reduced, the pawl F, is combined with devices whereby to determine the times at which the same shall be permitted to engage with the ratchet C. Upon shaft D, is mounted loosely a bent lever or bell-crank J, one arm of which is connected by a cord with one of the hooks K' of the Jacquard mechanism. To the other arm of lever J, is pivoted the pawl-lifter I, the end of which is caused to bear against the face of the ratchet E, below pawl F, by means of spring Q, one end of which latter is connected with the timber Q', while the other end thereof is connected with the projecting tail of the pawl-lifter I.

The spring Q causes the pawl-lifter I to occupy normally a position which keeps the actuating-pawl F raised from engagement with the adjacent tooth of ratchet E, so that ordinarily the pawl F, in its movements fails to actuate the said ratchet, the shaft D, the cylinder C, and the pattern-chain C'.

When, however, a forward shift of the said pattern-chain should take place, the hook K' is caused



to be raised in the working of the Jacquard mechanism, and thereby the bent lever J is moved so as to draw the pawl-lifter I out of the way and permit pawl F to engage with a tooth of ratchet E.

In the use of this Jacquard there are employed as many cards as are necessary for a cross-border and one repeat of the pattern in the body of the goods. For instance, if one repeat of the pattern in the body of the goods should be eight inches long, and if the goods should contain fifty picks to the inch, there would need to be used four hundred cards for this repeat in addition to the number of cards which might be required for one cross-border. It may be assumed that the weaving has been proceeded with up to the completion of the body portion of a table cover, also that at this stage the devices act to present No. 1 card of the cross-border and then continue presenting the cards of the cross-border in regular succession, the pawl-lifter I meanwhile holding pawl F out of action. The last of the said cards of the cross-border is perforated so as to cause hook K' to be raised, whereby pawl-lifter I is retracted and pawl F is allowed to engage ratchet E, and cause pattern-chain C', to be advanced one step. On the descent of hook K', the pawl-lifter I is caused by spring Q to move again into position to hold pawl F from acting upon ratchet E. A new indicator upon the pattern-chain C' having by the advance of the latter been presented to lever A, the catches 4, 5 are shifted in position, so as to cause the direction of rotation of the prism to be reversed, so as to feed in the reverse direction the cards of the cross-border.

This provides for weaving a second cross-border, namely, the first one pertaining to the next table cover or other article. On the completion of this second cross-border the last card pertaining to the cross-border is presented to the needles. This card is perforated to occasion retraction of the pawl-lifter I, in the manner set forth hereinabove, but inasmuch as the indicator that is presented at this time to lever A, is of the same character as that last presented thereto no change occurs in the action of the pawls. The continued feeding of the cards without change of direction causes those pertaining to the body-pattern to be presented successively to the needles until one repeat of the body-pattern has been woven. The last card which is used at this time in the production of the said repeat is perforated to occasion the withdrawal of pawl-lifter I. The action of pawl F, now brings a different kind of indicator beneath lever A, and causes the pawls to be shifted so as to feed the cards of the body-pattern in the reverse direction. The reversal of the direction of the feed of the said cards is effected in the foregoing manner as many times as may be required for the production of the desired length of body, whereupon the pattern-chain causes the cards of the cross-border to be presented to the needles, and so on, in the manner which has been described. (*Crompton and Knowles Loom Works.*)

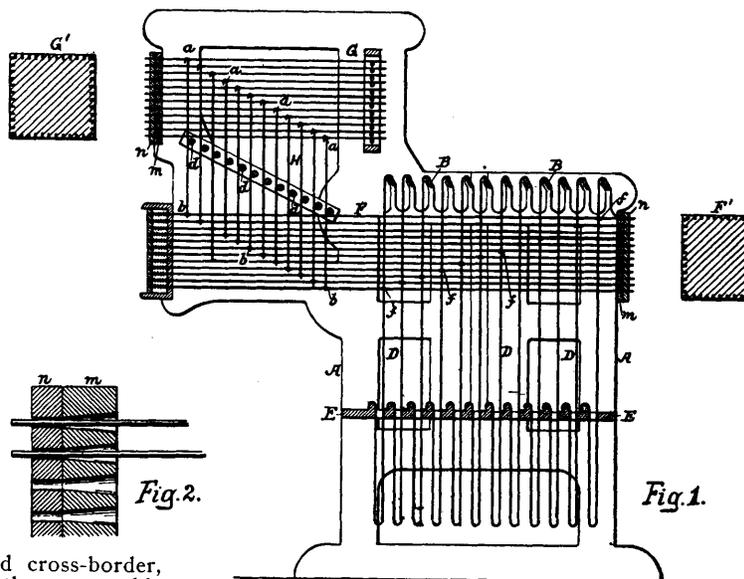
HALTON'S JACQUARD FOR TWO-WEAVE FABRICS.

The object of the construction of this jacquard (similar to the foregoing jacquard mechanism) is to permit changing it from one pattern to another, as for instance in weaving fabrics with borders, where the body of the fabric requires the use of one set

of cards, and the border demands the employment of another and different set.

Fig. 1 is a diagram illustrating such a Jacquard machine. Fig. 2 is an enlarged section illustrating the special construction of the needle guide-board.

A, represents one of the side frames of the Jacquard; B, the griff-bars; D, the lifters or hooks; and E, the rest or supporting bar. Two sets of needles F and G are used, the former being acted upon by the cards upon a needle cylinder F', while the needles G are acted upon by the cards upon a needle cylinder G', said card-cylinders being located



respectively at the right and left-hand sides, or rather at the front and rear of the machine. The two sets of needles are connected for joint operation by means of levers H, which consist of wires having hooked upper ends engaging with eyes *a*, upon the needles G, the lower ends of the wires engaging with eyes *b*, upon the needles F, said levers having their fulcrums upon transverse rods *d*, suitably mounted upon the fixed frame of the machine.

The needles F, have eyes *f*, which engage with the lifters D, hence it will be seen that these lifters can be operated either when the needles F are acted upon directly by the cards upon the cylinder F', or indirectly through the medium of the needles G and levers H, by the cards upon the cylinder G', hence all that is necessary in order to change from one pattern to another, is to throw one needle cylinder out of action and the other into action, it being understood that one cylinder carries the cards for the pattern of one part of the fabric, and the other cylinder the cards for the pattern of the other part of the fabric, each cylinder being allowed to remain in action as long as the pattern for which its cards are designed is to be produced.

In machines of this class it is advisable that the needles shall be accurately guided, hence, the openings in the guide-board through which the needles pass should be but little larger than the needles themselves but when such small openings are used they soon become clogged with lint or dirt so as to interfere with the free movement of the needles, and the sticking of the needles prevents proper operation of the lifters and spoils the pattern. Frequent cleaning of the openings in the guide-board, therefore, becomes necessary, and in order that this may be done without risk of disarranging the needles or per-

for the reception of the rear edges of the vertical guide-bars *d*, for the needles, the vertical position of said retainer-bar *G*, being about midway of the length of said bars *d*, so as to firmly brace the same at the point where deflection is otherwise most likely to occur. (Thomas Halton, Philadelphia.)

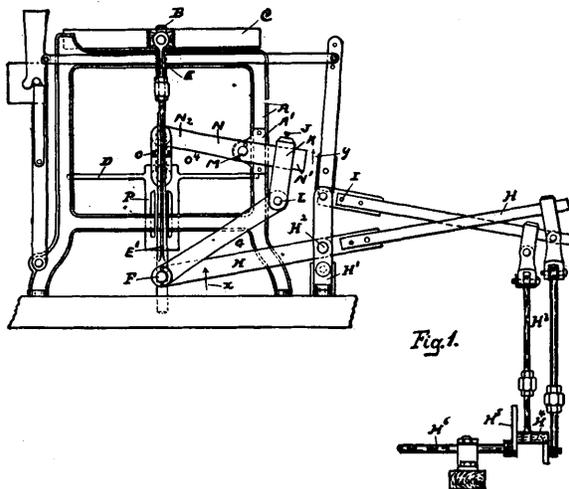
JACKSON'S JACQUARD MECHANISM.

The novelty of this mechanism relates to improvements in the means for moving the upper and lower grates in a Jacquard mechanism to and from each other, resulting in a device simple and durable in its construction.

Fig. 1 shows a side view of a Jacquard mechanism with the improved elements attached, with all the inner working parts—such as the hooks, needles, etc., omitted. Fig. 2 shows an end view of the Jacquard with the guide-bars *B* of the upper grate and the elements that elevate said upper grate, and also the guide *P*, attached to the lower grate, to which are attached some of the improved elements.

A, indicates one of the side frames in a Jacquard mechanism; *C*, the upper grate; *D*, the lower grate. *B*, is the guiding-bar, attached firmly to the upper grate in the arm *B'* and is otherwise guided in the apertures for that purpose provided in the frame *A*. *E*, is a connecting-rod attached at one end to a pin in the upper grate arm *B'* and at its other end furnished with a screw-cut hole screw-cut so as to receive the upper similarly screw-cut part of the connecting-rod *E'*, whose lower part is attached to a bolt or pin *F*, which in addition to connecting-rod *E'* supports the link *G* and attaches them both to the grate-elevating lever *H*, consequently also supporting this latter.

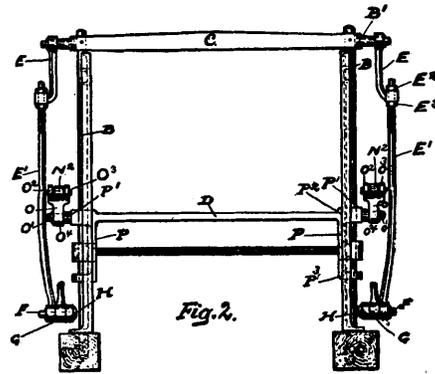
The two connecting-rods *E* and *E'*, the rod *E'* being secured to rod *E* by lock-nuts *E²* and *E³*, thus form the element that raises and lowers the upper grate *C* when said elevating-lever *H*, which has its fulcrum *H²* in two standards, of which *H¹* is one, is given the necessary motion by means of connecting-rod *H³*, connecting lever *H* with the eccentric arm *H⁴*, which with the eccentric arm *H⁵* gives, (arm *H⁴* being secured to arm *H⁵* and arm *H⁵* secured to shaft *H⁶*) when shaft *H⁶* is revolved, the



requisite movement to their respective motion-levers *H* and *I*.

The pin *F*, which, as previously described, carries the connecting-rod *E'*, having attached at its other

end *E*, which, attached to the upper-cradle arms *B'* thus elevates and lowers the said upper-cradle. Pivoted on this said pin *F* is a lever-arm *G*, whose other



end is pivoted on a pin *L* between two prongs and of a knuckle-joint *K*. Pivoted to a bearing *A'*, secured to the main frame *A* by means of a pin *M*, secured in said support or bearing, is a fulcrumed lever *N*, one arm *N¹* of which is rectangular-shaped and fits in a similarly rectangular aperture in the knuckle-joint *K*. The other arm *N²* is by a hole attached to the pin *O'*, secured in the two prongs *O²* and *O³* of the knuckle-joint *O*. The lower prong *O⁴* of knuckle-joint *O* is secured to an arm *P¹* of a guide *P*, part of or firmly secured to the lower grate *D*. This guide *P* is furnished with an upper projection *P²* and a lower projection *P³*, both furnished with holes through which the guide-rod *B* slides, giving said guide-rod a steady support. The other motion-lever *I* appertains to the in-and-out movement of the cradles to and from the needles.

Method of operation:—The upward motion of the upper grate *C* is transmitted direct, inasmuch as when the motion-lever *H* is caused to move around its fulcrum *H²* in the standard *H¹* in the direction of arrow-head *x* the combination of the connecting-rods *E* and *E'* will lift the grate *C* by the two arms, of which *B'* is one. At the same time the lower grate ought to be moved in the opposite direction, consequently downward, and doing this by means of the same movement administered by the same motion-lever *H*, is the object of the new mechanism. To this effect a fulcrum is created in the pin *M*, attached to the support *A'*, located between the upper and lower grates, nearest to the lower grate and attached to the part of the frame adjacent to the operating-levers. On the pin *M*, representing said fulcrum, is pivoted a double-armed lever *N*, the obvious result of this being that an upward movement of the arm *N¹* of lever *N* in the direction of arrow-head *y*, would result in a downward movement on the part of *N²* and consequently be transmitted to the lower grate *D*, to which said lever-arm *N²* is attached, by means of the knuckle-joint *O*, being pivoted on the pin *O'*, of the arm *P¹*, on grate *D*. The connection of the different elements with each other will thus be seen to be the following:—To each prong of motion-lever *H*, there is attached by the pins *F* the two levers *G*, both of which levers at their other ends are secured by pins *L* between the prongs of knuckle-joints *K*. Passing through an aperture in said knuckle-joints are the square arms *N¹* of the two fulcrumed levers *N*. Said levers *N* are each pivoted in its respective support, and the other arms *N²* of the levers *N* are each secured between the prongs of the knuckle-

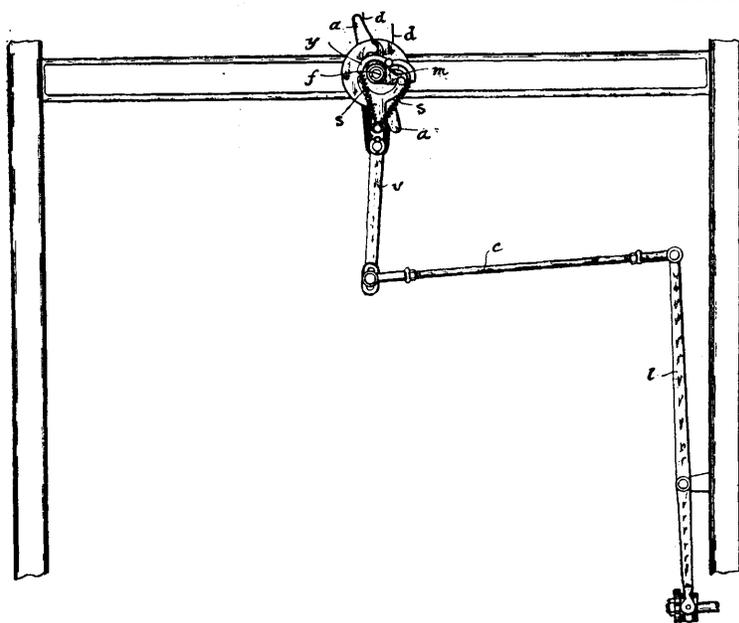
joints O, and pivoted to the arms P' of the guides P, attached to or part of the lower grate D, thus completing the combination.

It will be observed that the knuckle-joint K is secured to the arm N' by the screw J and can be slid back and forth, and in being thus adjustable can lengthen or shorten the rise of the lower grate. This same adjustability relates also to the upper and lower connecting-rods E and E' of the upper grate, inasmuch as the end of rod E' being screw-cut, so as to fit the similarly screw-cut hole in rod E, it will be apparent that rod E' can be screwed up and down in rod E and thus shorten or lengthen the rise and fall of the upper grate at the operator's will and in exact proportion to the rise and fall of the lower grate. (*James Jackson and Sons, Paterson, N. J.*)

THE KNOWLES JACQUARD BOX CHAIN INDICATOR MECHANISM.

When required the Jacquard can be made to do the duty of the pattern-chain multiplier. The action of this multiplier was shown in the article on the "Knowles Mechanism for Operating Shedding and Drop-box Pattern-indicators." The new mechanism is shown in detail by the accompanying drawing.

The upright lever *l*, slides into and out of engagement with its star-wheel the pin-wheel which turns



the box pattern-cylinder. Upright lever *l*, is actuated through connector *c*, from lever *v*, which is moved by cam *m*, integral with arms *a*, which are pulled up alternately as indicated by the punching of the Jacquard cards, by means of the cords *d*, which lead to lifter needles in the Jacquard.

The cards can be punched to indicate the box-pattern-chain to rest or move as desired. The springs *s*, acting through the yoke of the fulcrum *f* and prevent the jar of the loom getting it out of place. (*Crompton and Knowles Loom Works.*)

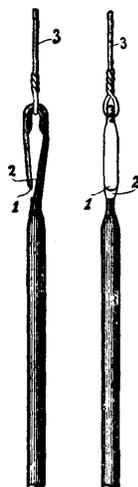
STAFFORD'S LINGO.

The object is to produce a lingo having a spring-head which shall permit the loop of a heddle to be connected therewith without any difficulty, which shall not tend to cut such loop, and which shall not exceed in its proportions in cross-section the proportions of the body or lower portion of the lingo to thereby take up room laterally or interfere with the vertical movements of the lingo when grouped with a number of others in a Jacquard harness.

The accompanying illustrations are views from different sides of the finished lingo with a wire heddle applied thereto.

This lingo presents a spring-head in which the wire is swaged to a smaller diameter than the body, it having a flattened tongue 1, an opposing flattened back portion 2, and a neck portion of circular cross-section extending throughout the bend of the neck. The neck portion is wholly free from any projection or edge such as would tend to cut the loop of a heddle.

At 3, is shown part of a heddle which is connected with the lingo. (*Crompton and Knowles Loom Works.*)



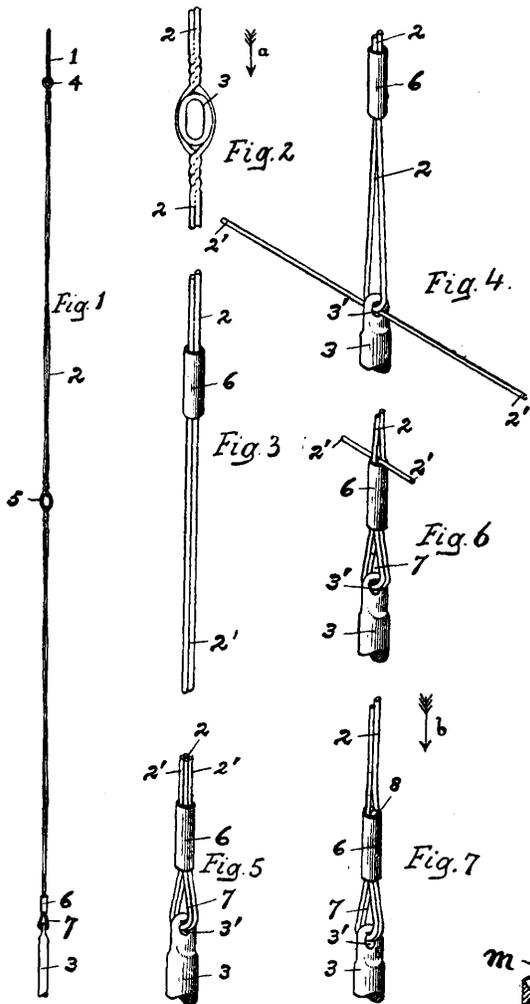
BUTCHER'S JACQUARD HEDDLE.

The object in the manufacture of this heddle is, to provide a two-strand wire heddle with an eye therein intermediate its end for the thread to pass through, said eye consisting of an oval-shaped metal eye-let secured between the two strands; the lower end of the wire heddle to be attached to the lingo by means of a tube without twisting the ends of the wire.

Fig. 1, shows this wire heddle attached at its upper end to the lower end of the cord leading to the Jacquard machine and at its lower end to the upper end of a lingo. Fig. 2, is a detached view of a heddle-eye. Fig. 3, shows the lower end of the wire heddle with the tube thereon preparatory to attaching the lingo thereto. Fig. 4, shows the next step in attaching the lingo, the ends of the wire have been bent up and passed through the eye in the upper end of the lingo from opposite sides. Fig. 5, shows the next step, the ends of the wire having been bent up again against the main wires and inserted in the lower end of the tube, which is then drawn down on the four strands of wire as shown. Fig. 6, shows the next step, the two free ends of the wire having been bent outwardly in opposite directions to extend over the top edge of the tube. Fig. 7, shows the next step, the projecting ends of the wires being cut off close to the tube, leaving the hooked ends extending over the upper edge of the tube. Figs. 2 to 7 inclusive, are shown on an enlarged scale compared to Fig. 1.

Numerals of references indicate thus:—1, the lower end of a cord leading to the Jacquard machine, to which is attached the upper end of the wire heddle 2. The lingo 3 (only the upper part of which is

shown) has an eye 3' at its upper end, by which it is attached to the lower end of the heddle-wire 2.



The heddle-wire 2 is made from a single piece or length of wire, which is bent upon itself at its middle portion intermediate its ends and then the bent or loop portion twisted to form an eye 4, through which the cord 1, is passed to attach the heddle-wire thereto.

At a point in the heddle-wire about midway between its upper and lower ends the eyelet 5, having its outer edge grooved or recessed, is placed between the two strands of the heddle which extend in the grooved edge of the eyelet 5, and the two strands are twisted together just above and just below the eyelet 5, to secure it in place. (See Fig. 2.)

The eyelet portion of the heddle-wire 2 is tinned or coated with metal to fill any opening or joint and make a smooth and even surface which will not catch on or chafe or rub the threads as the heddle-wires are raised and lowered.

Upon the lower free ends 2' of the heddle-wire 2, is strung a tube 6, (see Fig. 3,) which has an internal diameter just large enough to receive four thicknesses of the single wire or strand from which the heddle is made. After the tube 6 is placed on the lower end of the wire heddle, the free ends 2' of

two wires are bent up and passed through the eye 3' of the lingo 3, from opposite sides, as shown in Fig. 4. The ends 2' are then bent up against the body or main portion of the heddle-wire 2, and the tube 6 drawn down over the four strands of wire (see Fig. 5) as far as it can be to form the loop 7 in the lower end of the heddle-wire for the lingo 3.

The ends 2', which extend upon opposite sides of the main wires of the heddle, are then bent outwardly in opposite directions to extend over the top edge of the tube 6, (see Fig. 6,) and the projecting ends are then cut off close to the tube, as shown in Fig. 7, leaving hooked ends extending over the top edge of the tube 6, which prevents the tube from slipping or moving up on the wires.

The tube 6 remains in its place on the lower end of the heddle-wire and cannot work loose, because it cannot move down by reason of the divergence of the wires to form the loop 7, and it cannot move up by reason of the hooks 8 extending over its upper edge, and by means of the tube the free ends of the wire are secured to the body or main part of the heddle to form the loop 7 for the lingo 3, without any twisting of the ends or any soldering, etc. (Edwin Butcher, Worcester, Mass.)

COMBERBOARD TO PERMIT CHANGE OF TEXTURE.

One of the greatest inconveniences to manufacturers of Jacquard fabrics is the fact of being always more or less restricted to a certain texture after the loom is once tied up. To overcome this inconveni-

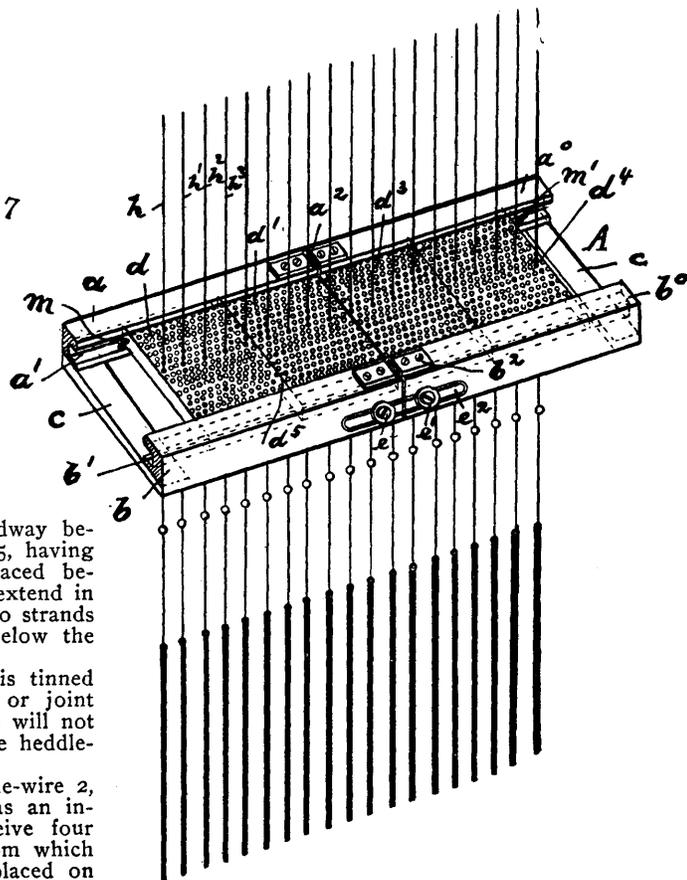


Fig. 1.

ence is the object of the new comberboard, the inventor providing an adjustable sectional comberboard by means of which the same patterns can be woven in different widths without the necessity of changing the harness and the comberboard, and thus greatly simplifying the work and reducing the time.

The improvement consists in an adjustable sectional comberboard, its adjusting and locking or tightening mechanism.

Fig. 1 is a perspective view of the improved comberboard in connection with a series of harness threads and Fig. 2, a front elevation of Fig. 1, and illustrating the comberboard adjusted to a different position.

A, represents a rectangular frame consisting of the parallel sectional side bars a , a^b , and b , b^b , hinged together at a^2 , and b^2 , respectively, and of the connecting braces c , c , arranged at or near the outer ends of said sectional side bars, which latter are provided on their inner sides with longitudinally extending grooves a' , and b' , as clearly shown in Fig. 1.

One of the side bars in the drawings b , b^b , is provided on its outside and at or near its hinge with the headed studs or screws e , e' , which latter penetrate and are engaged by and in frictional contact with the elongated spring-wire loop e^2 , by means of which latter the sections of the frame are held in adjusted and normal position.

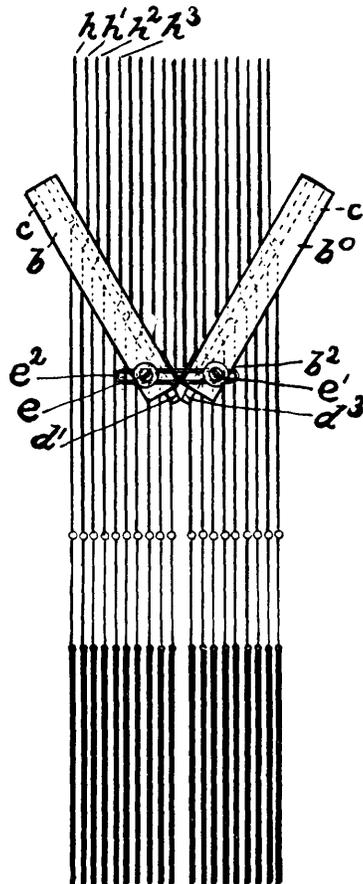


Fig. 2.

In the grooves a' , and b' , is arranged the comberboard proper, consisting of a series of two or more sections d , d' , d^b , and d^c , connected together by threads

d^b , and which boards are held in a fixed position by pins m , m' .

The harness threads h , h' , h'' , h''' , pass through the openings in the comberboard in the usual manner.

As shown in the drawings, the centre line of the hinge is above the face of the comberboard, but it may be placed in the plane of the face of the said comberboard, so as to avoid the sliding of the said board within the groove of the frame during the adjustment. In this case the frame may also be dispensed with and the hinge directly arranged upon the central sections of the comberboard.

Whenever a certain pattern is completed and a different pattern is desired, calling for a different number of harness threads to the inch, the frame containing the comberboard, or the latter one, if no frame is used, is swung upon its pivot until the proper adjustment is obtained. The spring-loop e^2 , being in frictional contact with the headed pins e , e' , will hold the sections in adjusted positions.

A further improvement in the construction of this comberboard is the manner of boring the holes by means of which the friction on the harness cords, which would appear by using a comberboard with straight bored holes, is overcome.

By means of boring angular holes in the comberboard, friction to the harness cords is impossible; the comberboard may be placed in any position whatever required by texture and width of fabric.

These harnesses will give a one-third spread of their width in the narrow position, for instance, a harness 21" wide can be spread to 28" or any width between the two; a 24" harness to 32" and so on; a harness say 300 ends per inch can be spread $\frac{1}{3}$ and make a harness 200 ends per inch or any count between. (Cleave and Leather, Paterson, N. J.)

JACQUARD LOOM WITH SHAFT-HARNESS ATTACHED.

The object of the construction of this Jacquard loom is to produce damask or figured fabrics without the use of special mountings for the ground-binding.

The ground-binding in this instance is produced by means of a special device, operating directly on the harness heddles.

The accompanying drawing shows in perspective so much of the loom as is necessary to explain the procedure.

In the drawing it is assumed that the ground-binding is that of eight-leaf satin.

1 to 8 indicate a row of hooks of a Jacquard machine.

a , are harness cords. c' , to c^8 , are the shafts. d , and f , are the harness boards.

e' to e^8 , is an additional harness board divided into eight parts or rods with projections o' to o^8 , and r' , to r^8 . At the right-hand side of these harness board parts, there are arranged springs s' , to s^8 , having a tendency to draw these rods to the right.

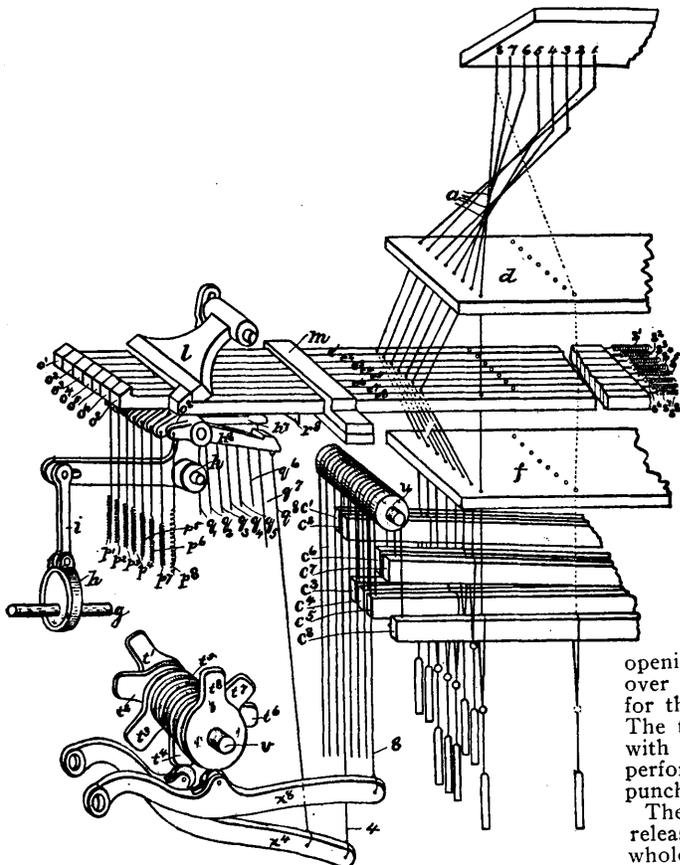
g , is a crank-shaft. h , is an eccentric with a connecting-rod i .

k , is a bell-crank lever. One of the arms of this lever is connected with the eccentric; the other with the reciprocating knife l .

m , is a guide for the divided harness board. n' , to n^8 , are locking-pawls held against the divided harness board by springs p' to p^8 , and engaging with the projections r' , to r^8 . The pawls n' , to n^8 , are connected by cords q' , to q^8 , with treadles or levers x' , to x^8 , suitably arranged in the loom and serving for lifting out of engagement the said pawls. This lifting mechanism for actuating the shafts c' , to c^8 , and

pawls n' , to n^s , consists of levers x' , to x^s , pivoted in the frame and actuated by cams t' , to t^s , set at equal angles on the shaft v .

Each of these levers is connected by a cord passing round a drum u with one of the shafts c' , to c^s , and by other cords q' , to q^s , with the pawls n' , to n^s , acting on the bars e' , to e^s , of the divided harness board. The parts are as shown so arranged, that when one of the levers x' , to x^s , for instance x^4 , is depressed by the corresponding cam of the group t' , to t^s , the corresponding shaft c^4 , will be raised, while at the same time a pawl not corresponding to the raised shaft, for instance n^3 , is caused to release its portion e^3 , of the divided harness board, such pawl being connected with the said lever x^4 , by a cord q^4 .



There are as many lifting levers as eccentrics t' , to t^s , but only two are shown for the sake of clearness in the drawing.

It will be assumed that the Jacquard has raised the lifting-wires 1, 2, 6, 7, and 8, for forming the pattern, but as the cord attached to lifting-wire 8, is straightened by shifting the corresponding portion e^8 , of the divided harness board to the right, the corresponding shaft c^8 , is allowed to remain in the lower shed for binding purposes, whereas the shafts c' , c^2 , c^6 and c^7 , are raised in the upper shed, as required by the pattern. The return of the divisions of the harness board is effected by the parts h , i , k , l .

On pulling down one of the pawls n' , to n^s , for instance, the pawl n^3 , and thereby releasing the projection r^3 , the division or rod e^3 , is pulled by its spring to the right, following the movement of the knife l , which at this moment recedes by its projection o^3 ,

abutting against the edge of the knife. When the knife l returns, the pawl n^3 again engages with the projection r^3 , and the division e^3 , is held in position by the pawl n^3 , until it is again released by the cord q^3 . (E. V. Oberleithner, *Machrisch-Schoenberg, Austria.*)

ROYLE'S PIANO-MACHINE FOR PUNCHING JACQUARD CARDS.

The advantage of the new mechanism in piano-machines for punching Jacquard cards, is, that banks of punches are placed under the control of locking-levers operated by keys to hold any desired number of them in operative adjustment with relation to the card to be punched.

Since the improvement is confined to the means for mounting, locking, and releasing the punches, there is only shown, in our illustrations so much of the piano-machine as necessary to afford a clear understanding of the parts referred to, it being understood that the means for bringing the cards into engagement with the punches are of well-known form.

In the accompanying drawings, Fig. 1, is a top plan view, partly in section, of that part of a machine embodying the improvement. Fig. 2, is a vertical transverse section along line $x-x$, of Fig. 1. Fig. 3, is a vertical section from front to rear along line $y-y$, of Fig. 1. Fig. 4, is a partial vertical section from front to rear along the line $z-z$, of Fig. 1. Fig. 5, is a partial transverse vertical section along the line $w-w$, of Fig. 1, and Fig. 6, is a view of a portion of one of the pattern-cards.

The table or bed for supporting the pattern-cards to be punched is denoted by A, and it is provided at a point beneath the punches with an opening a, having a perforated plate a' , supported over the top of the opening and forming a bearing for the card at the point where the punches operate. The table A, is surmounted by a guide B, provided with a series of perforations b , corresponding to the perforations in the plate a' , and intended to guide the punches to their work.

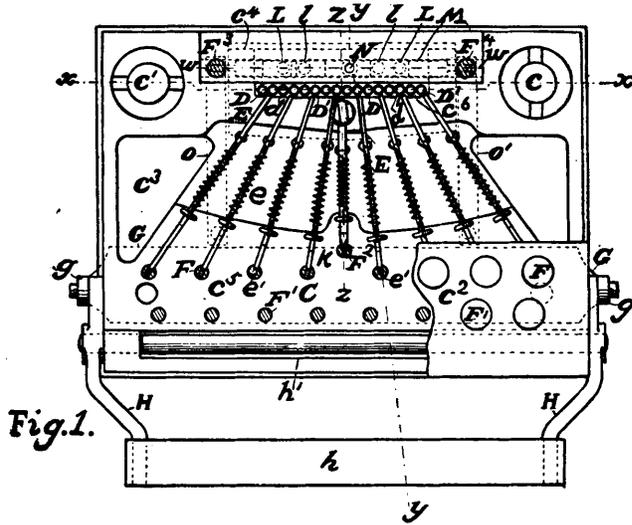
The punches and the mechanism for locking and releasing them are carried in a head (denoted as a whole by C) supported upon a pair of rods c , c' , which extend down through the guide-piece B and table A to a suitable connection with an operating-treadle (not shown in illustrations). The head C is composed of an upper plate c^2 , and a lower plate c^1 , the latter having a punch-supporting section c^4 , in which the banks of punches are mounted, and an intermediate spacing portion c^3 , between the upper and lower plates for the reception of the sliding locking-bars.

In the present instance there are shown sixteen punches arranged in a line and composed of two banks, a punch of the shorter bank alternating with a punch of the longer bank.

The punches of the shorter bank are denoted by D, and have collars d , for preventing them from dropping downward out of their support c^4 .

The punches of the longer bank are denoted by D', and in like manner are provided with collars d' , to prevent them from dropping downwardly out of their support c^4 . Each individual punch of both

banks D, D' is provided with a light spring d^2 , which has a tendency to keep the punch at the limit of its downward movement. The lower end of the spring



rests against a shoulder d^2 , formed by reducing the body of the punch.

There is a recess or chamber c^6 , provided in the spacing portion c^5 , and in the plane of the line of punches for the extension of the bank of punches D', upwardly toward the upper plate c^2 , of the head, leaving a space between the plate c^2 , and the tops of the punches D', for the passage of the locking-bars.

Each individual punch D' has its horizontally-sliding locking-bar adapted to move into the space between the top of the punch and the upper plate c^2 , to lock the punch and back out of said space to release the punch. In like manner each of the punches D, of the shorter bank has a similar horizontally-sliding locking-bar adapted to be slid over the top of the punch to lock it and back out of the way to leave the punch free to move. The sliding locking-bars for the punches D', are denoted by E, and are held normally out of engagement with the punches D, by means of a retracting-spring e . The locking-bars E, gradually diverge from one another as they extend toward the front of the machine from the punches as shown in Fig. 1, and at their forward ends they are beveled, as shown at e' , to engage a corresponding bevel f , on one of a bank of operating keys F. The keys F, are mounted in the head C, in such a manner as to have a limited vertical movement, their movement downward being limited by the contact of the under side of their heads with the top plate c^2 , and their upward movement being limited by the engagement of a pin or stud f' coming in engagement with the under side of the locking-bar E.

The locking-bars for the lower or shorter bank of punches are denoted by E', and like those already described for the longer bank of punches, are provided with retracting-springs and have their ends in like manner beveled to engage a corresponding bevel on the bank of keys F', mounted in the present instance farther toward the front than the bank F, as shown in Fig. 1.

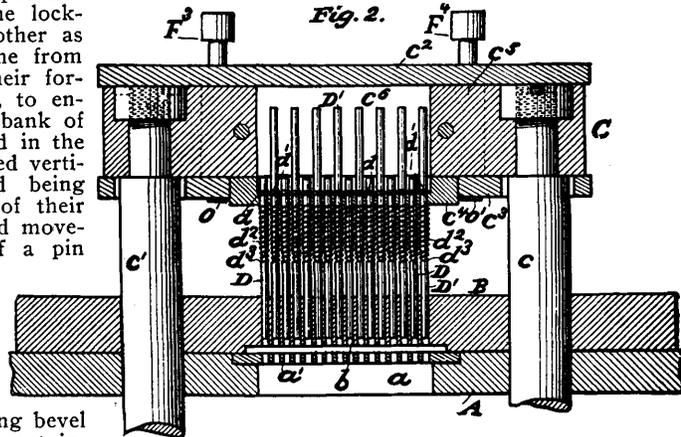
Provision is made for simultaneously returning all the keys F, or F', which may have been depressed as follows: A plate or flat bar G, extends transversely

across the machine beneath the head C, in such position as to engage the lower ends of the depressed keys F, F', when the bar or plate is raised and said plate G, is connected by end extensions g , with the arms of a pair of operating-levers H, connected at their free ends by an operating-bar h , and pivoted on a rod h' , at the front of the head C. By depressing the bar h , the key-returning plate or bar G is elevated, and any keys which project below the head are returned to their normal position, thereby permitting the locking-bars E, E', to spring back away from over the punches into position to be again forced forward by the depression of the keys.

The punches thus far described are for the purpose of making the pattern-holes i , in the card I. In addition to these it is desirable to make, during the passage of the card through the machine, lacing-holes of greater diameter than the pattern-holes and also a peg-hole. The lacing holes are denoted in Fig. 6, by i' , and the peg-hole by i'' .

The peg-hole i'' , is made centrally near the end of the card, and the punch K, for making it, is locked by a sliding locking-bar k , similar in all essential respects to the bars E, E', before referred to, and operated by a centrally-located key F², quite like the keys F, and F', referred to, and in position to be returned to its elevated adjustment by the upward movement of the bar or plate G.

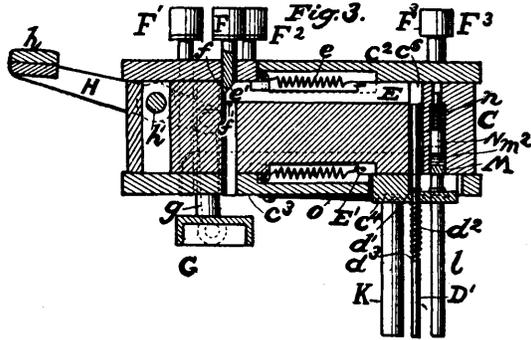
The lacing-holes i' , in some instances are required to be the distance apart shown by the holes represented in full lines in Fig. 6, and in other instances the distance apart shown by the holes represented by dotted lines in Fig. 6. To provide for punching them at either of these distances apart as pleasure, a bank of four punches is located in groups of two, as represented in Fig. 5, the punches for punching the holes the farthest apart being denoted by L, and those for punching the holes nearer together being denoted by l . These punches L, and l , are located to be operated by means of a sliding-bar M, provided with beveled ends m, m' , the one, m , adapted to engage a vertically-movable key F³, to slide the bar in one direction, and the other, m' , adapted to engage a vertically-movable key F⁴, to slide the bar in the opposite direction. A central plunger N, provided with an actuating-spring n , and working in the V-shaped groove m^2 , in the top of the bar M, serves to return the bar M, to its normal position to release all the punches L, l . The under side of bar



M, is provided with recesses, one of them, m^3 , being of sufficient length to receive one group L, l , of the punches when the bar is in its normal position, and with recesses m^3 , and m^3 , separated by a partition m^4 , which is normally located between the

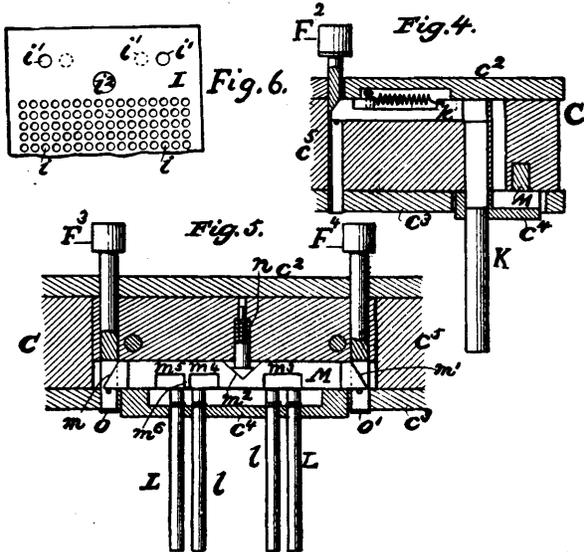
other group L, *l*, of punches, leaving the punches L, *l*, of that group free to lift one of them, L, into the recess *m*^s, and the other, *l*, into the recess *m*^t.

When one of the keys is depressed, for example



F³, it will slide the bar M toward the right as Fig. 5 presents itself to the observer, carrying the partition *m*^s over the punch *l*, of one of the groups, and the bottom of the bar itself over the punch *l*, of the other group, so that the two punches *l*, will be brought into action, and will punch the lacing-holes in the position shown in dotted lines in Fig. 6. When, on the other hand, the key F⁴ is depressed, it will force the bar M to the left and will bring the partition *m*^s over the punch L, of one of the groups, and the bar itself over the punch L of the other group, leaving the remaining punches *l* free to pass into the recess in the bar M, and bringing the punches L, into action to punch lacing-holes in the position shown in full lines in Fig. 6. The keys F³ and F⁴, are returned to their normal position, when released from the hand of the operator, by means of springs O and O' (shown in section in Fig. 5), one of them being shown in edge elevation in Fig. 3.

In operation as the card to be punched is fed beneath the punches more or fewer of the punches—according to the pattern to be punched—are locked



in operative adjustment by the depression of the proper keys F, F', and the head C, with the punches locked, is then depressed, forcing the punches through the card as it rests upon the perforated plate *a*'. As soon as the head C, is returned to the upper limit

of its stroke, the punches may all be released by the depression of the finger-bar *h*, in case the pattern is to be changed at the next step, and such other combination of punches may be locked in operative adjustment by the depression of the proper keys ready for the next downward stroke of the head C. The pattern may thus be wrought out upon the card as it is fed beneath the punches, and the desired peg-hole and lacing-holes may be punched at each end of the card in the proper positions. (John Royle & Sons, Paterson, N. J.)

ROYLE'S MACHINE FOR PUNCHING AND STACKING JACQUARD CARDS.

Fig. 1 is a view of the machine in side elevation. Fig. 2 is a top plan view. Fig. 3 is a view in rear elevation, and Fig. 4 is an enlarged view in detail.

The supporting-frame of the machine consists of a head A and a backbone A', projecting at an angle to the head, the whole being supported upon three legs, two of them, *a*, *a'*, located at or near the extremities of the head A and the third, *a*², located at or near the extreme end of the backbone. This particular form of frame is light and at the same time affords a rigid stable support for the movable parts of the machine. The head A is surmounted by a table B, from which uprises a pair of end guides C, C', for holding the supply-stack of blank cards to be fed to the punches.

The punching mechanism is located immediately to the rear of the stack-guides C, C', and is denoted as a whole by D. As the present invention does not relate to the punching mechanism in detail, it will suffice for the purpose of understanding the present invention to say that the cards as they are fed rearwardly from the supply-stack are received upon a punch-bed *d*, and that the punches are forced through them by means of connecting-rods *d*', connected with the punch-carrying head *d*² and actuated by eccentrics *d*³, *d*⁴, on the shaft E, driven by the main drive-shaft F, through the intermeshing gear *f* and *e*.

The means for accomplishing the feed is effected by a flat plate *g*, (see Fig. 3,) fixed to a pair of rack-bars *g*¹, *g*², mounted in suitable dovetailed grooves in the top of the table B and actuated by a pair of sector-bars G, G', fixed to a rock-shaft H. The rock-shaft H, is mounted on a spindle *h*, supported in suitable forwardly-extending portions *h*¹ and *h*², of the head-frame A and provided with collars, one of them *h*³, being interposed between the bearing *h*¹, and the end of the sleeve H' and the other, *h*⁴, being interposed between the bearing *h*² and the opposite end of the sleeve H', and provided with an extended neck *h*⁵, which extends through the bearing *h*² into position to engage the nut *h*⁶, screwed onto the projecting end of the spindle *h*.

By tightening on the nut *h*⁶, the washers *h*³ and *h*⁴ are forced into closer frictional contact with the opposite end of the sleeve H', so as to at all times prevent the pitching forward of the sleeve H' under the momentum of its throw. This is an important feature, inasmuch as the slightest pitch beyond the predetermined point will tend to advance the card slightly beyond the position where it should rest to be punched, and the holes in it are thereby made more or less out of adjustment, a feature which becomes objectionable when the cards are employed for determining the pattern.

For purposes of lifting the supply-stack of cards, whenever from any cause an imperfect card becomes curled, split, or broken during the operation of feed, the end standards C, C', are provided with vertical

slides *c*, one on the inner face of each, the said slides being provided at their lower ends with offsets *c'*, adapted to take under the ends of the lowermost card

gated slot *m*, through which the clamping-bolt *m'*, extends for locking the cam to the wheel *e*, in the desired rotary adjustment relative thereto, in order to rock the shaft *i*, and hence the rest *I*, at the proper moment during the rotation of the wheel *e*. The vibrating lever pivoted at *L*, is operated in a direction to return the rest *I*, by means of a spring *v*, connected at one end with the arm *l*, and at its opposite end with the supporting-frame.

After the punched card has fallen upon the rest *I*, the shaft *i* is operated and the card is thrown over into an upright position, resting on its edge and supported against a traveling stop *N*, mounted to slide along a groove *o*, in the upper face of a support *O*, mounted on the supporting-frame *A'*. It is intended that the stop *N* shall be sufficiently weighted or otherwise retarded by friction, so as to afford the necessary resistance to hold the stack of cards in an edgewise upright position against it, and yet, so that it will yield step by step the distance of the thickness of a card under the pressure of each succeeding card which is forced by the rest *I* against it, or the cards which have already been pressed against it.

As the cards approach their edgewise upright position to form the stack *P*, their ends are caused to slip past a pair of spring-actuated retaining-hooks

and lift it, together with those above it, upwardly from the table. The slides *c*, are provided with operating-handles *c'*, which extend through elongated slots *c''*, in the standards *C, C'*, and bracket outwardly from the outer faces of the standards. Retaining-hooks *c'* are pivoted to the outer faces of the standard *C* with their operating ends in position to hook under the handles *c'*, when the lifting-slides are elevated and retaining the supply-stack in the desired elevation while the defective card is being removed. As soon as the trouble is remedied, the supply-stack may be again lowered by simply tripping the retaining-hooks *c'*. Offsets *c'* at the lower ends of the slides *c*, are adapted to rest normally within recesses *c''*, formed in the table, so as to form no obstacle to the free passage of the cards along the surface of the table.

As the punched card is pushed forward by the next succeeding card from the bottom of the supply-stack, it is received upon a skeleton rest *I*, consisting of arms fixed to and radiating from a rock-shaft *i*, mounted in lugs *k*, projecting rearwardly from a pair of brackets *K, K'*, fixed in vertical adjustment at the rear of the head-frame *A*. The shaft *i*, is rocked by means of a crank-arm *v*, connected by a rod *v'*, with the arm *l*, of a vibrating lever pivoted at *L*, to the bracket *K*, the opposite arm *l'*, of said lever being in engagement with a cam *M*, secured to rotate with the gear-wheel *e*. The cam *M* is provided with an elon-

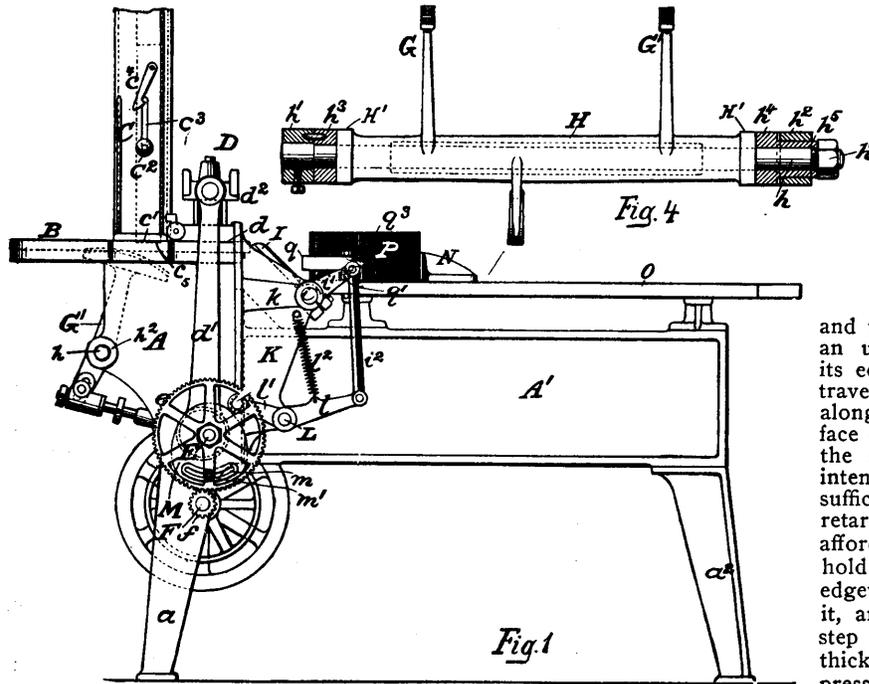


Fig. 1

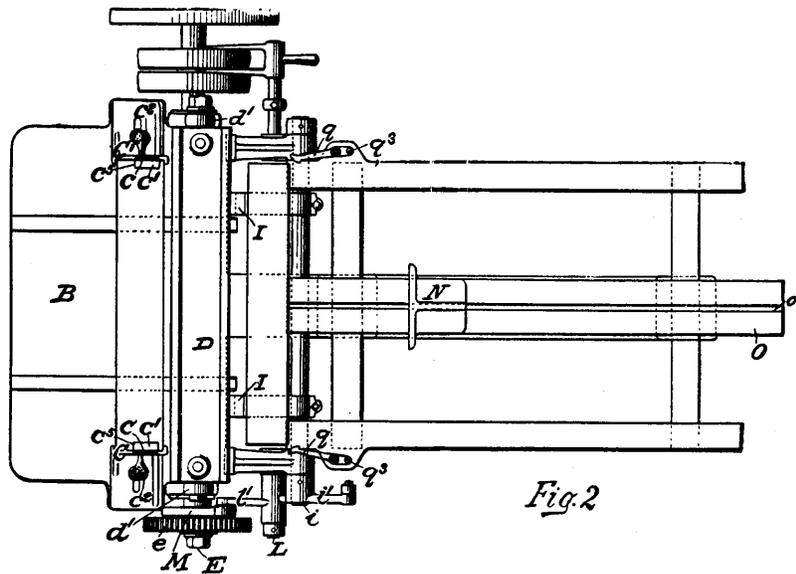
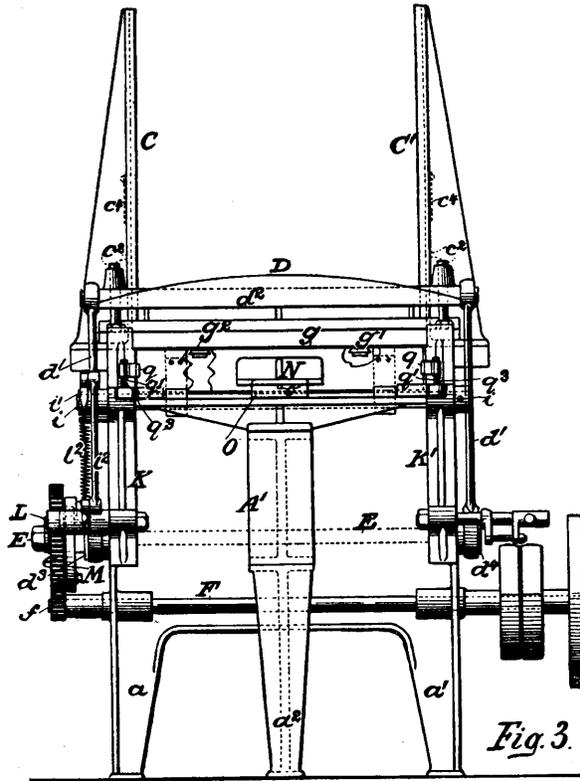


Fig. 2

q, which swing outwardly as the card is pressed between them, and immediately the card has reached its upright position swing forwardly toward one another under the tension of light actuating springs *q'*. Stops *q''*, are employed to limit the throw of the retaining-hooks *q*.

The operation as a whole may be briefly described as follows:—The cards are fed one by one from the



supply-stack beneath the punches and after having been punched are fed forward by the action of the next succeeding card, so that when one card is pushed forward from the bottom of the supply-stack in position to be punched, it at the same time pushes a punched card onto the rest I. While the card is being punched, the rest I is operated and the punched card thereon is forced rearwardly against the end of the stack P, between the retaining-hooks q and is there held, while the rest I is returned to receive the next succeeding card from the punches.

The stack P, may be continued to any desired length by simply extending the support O. (*John Royle, & Sons, Paterson, N. J.*)

WIRE ROD FOR JACQUARD CARDS.

This Jacquard card wire will not slip in the working of the cards or shift its position as the cards pass around the card-cylinder. It is secured by a staple and hook-eyes to the card-laces or by a string or wax end.

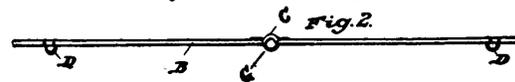
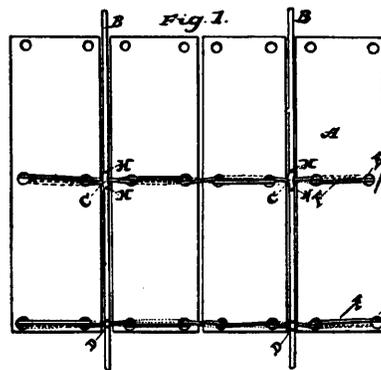
Of the wires in use, some have two wire rings soldered on the middle portion, between which the tying-strings are secured, and the wire can only slip the distance between said wire rings, whereas others have plain straight wires, again others have, in lieu of the two rings soldered on, two flat places where the wire has been flattened, this making two stops,

between which the string is tied, and in these the wire may slip the distance between the flat places.

The new wire rod consists of a wire provided with one or more curves adapted to fit over the card-lacing, permitting the main stem of wire to go between the two adjoining cards, and provided with a small hole on each side of said curves adapted to permit a cord or fine wire staple to pass through the wire for the purpose of securing it to the card-lacing; two or more wire loops are used and which pass around the card-laces and which are provided each with two eyes or rings formed at right angles to the main loop portion, which passes around said laces, said eyes being adapted to permit the card wires to pass through them.

Fig. 1 is an illustration of the improved wire and some Jacquard cards laced together, showing the position of the wire between the cards, the curve that fits over the laces, and the holes on each side of the curve, and the loop-eyes through which the wires pass. Fig. 2 is a view showing the card wire provided with the curve and a hole passing through the wire on each side of the curve, a staple passing through said holes and adapted to hold the card wire and laces together to prevent the slipping of the wire and showing the wire loop adapted to hold the card wire and laces together, the card wire passing through the eyes or rings on wire loop.

A, is the card; B, the card wire; C, the curve which fits over the lacing between the cards, as many of which may be provided as desired; D, the loops provided with eyes or rings, the loop portion going under the laces and the eyes or rings onto the card wire, thus locking the wire and lacing together; E, the holes in card through which laces pass; F, is the lacing, and G, are the staples, consisting of very fine wire. Although string, or cord, waxed or otherwise, might be used, yet the use of staples is more advantageous. If cord is used it is not necessary to pass it through the holes H, H, the curves being tied to the lacing, virtually accomplishing the



desired object. (*J. Cleary and T. M. Miller, Paterson, N. J.*)

The Royle "Repeater," for punching Jacquard cards from a set previously punched on a piano machine, is not explained in this chapter, this machine having been illustrated and explained in "Posselt's Jacquard Machine Analyzed and Explained."

SPOOLING, WINDING, WARPING AND REELING MACHINERY.

THE FURBUSH AUTOMATIC STOP-MOTION FOR SPOOLING MACHINERY.

This stop-motion consists of a series of iron trap-guides equipoised on a rod extending the full length of the machine, and having a thread or screw its entire length. The trap-guides are fitted loosely on this long-threaded rod, so that they can be quickly adjusted to any gauge, and they have each a wire

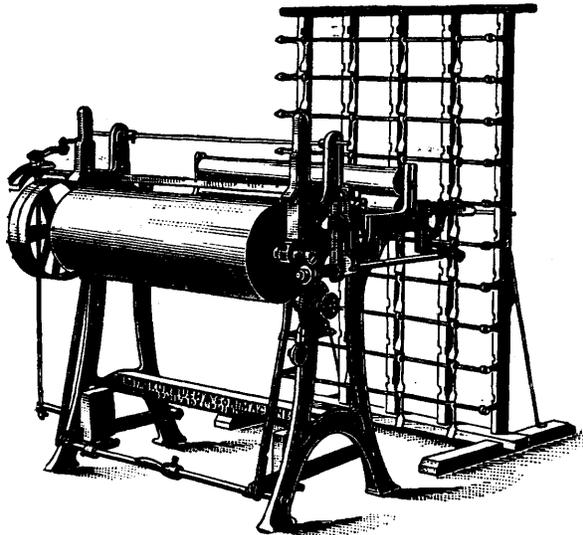


Fig. 1.

hook made of hardened and tempered steel, fastened to them by means of a small screw. These wire hooks are reversible, so that as the yarn cuts and wears them at one end, they can be turned and the other end used, or being merely fastened by a small screw, they can be easily and cheaply replaced with new ones. When an end breaks, the trap-guide falls and comes in contact with a constantly vibrating bar, and the machine is immediately stopped.

Another feature of the spooler is the tension-rolls on the back of the machine. These rolls keep a constant and equal tension on the yarn when the machine is running or stopped, and when the spooler stops on account of a broken end, the rolls are connected positively with the driving pulleys by means of a belt and a clutch, and reversed with the machine and spool in turning back to find and piece up the broken end. By these means, the trap-guides, with the exception of the one on the broken thread, are all kept up in place and the tension on the yarn preserved.

A description of the construction of the new device is best given by means of the accompanying illustrations. Fig. 1, is a perspective view of this well-known Furbush Spooler, and to which the present invention more in particular refers to; Fig. 2, is an

enlarged diagrammatic view illustrating in side elevation and vertical section the latch, a rocking-arm, the spooling mechanism, the thread, and the feeding mechanism for the thread, and Fig. 3, is an enlarged perspective view of the latch and its supporting-shaft or screw detached from the machine, and illustrating a preferred method of securing the latch on its shaft.

Examining our illustrations, we find spool B, and drum B'. Both are to be situated in the frame work of a regular spooling machine and driven by pulley and belt in the common manner. At the other end of the machine and in the frame, the two tension-rolls D and D', are supported, and over these tension-rolls the threads E to be spooled are passed. The threads E are passed or guided through a reed F', which is longitudinally movable back and forth across the machine to properly wind each thread upon the spool B.

Secured in the frame of the machine parallel with and below the guide-rod F', is a fixed shaft or rod a, upon which is loosely supported a series of latches b, corresponding in number to the number of threads E, and each latch is provided at one end with a hook b', by means of which the latch is hung upon a thread E. The hook end of the latch b, is also provided with a projection, or shoulder b², and the other end of the latch is cut out or recessed, as at b³. Through the recesses of the latches is passed a rod b⁴, serving as a stop to limit the movement of the latches upon the shaft a. The hook end of the latch b is weighted, so as to be heavier than the recessed end, the object being to permit the latch normally to be depressed at its hook end.

The latch is held with its hook end elevated by means of the thread E, but should the thread break, the weighted hook end carrying the shoulder b², will immediately drop by gravity (and thus automatically, by means of proper connection and arrangements, arrest the motion of the machine).

Below the supporting-shaft a, and parallel there-

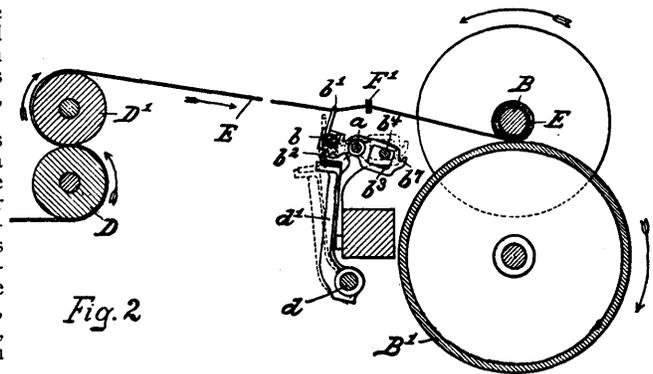
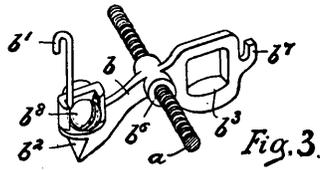


Fig. 2.

with is placed a rocking shaft d, rocking in suitable bearings in the frame of the machine. To this rocking shaft d, is secured at either side of the machine a vertically disposed rocking arm d', the two arms d'

being connected at their upper free ends by means of a cross-bar. As the arms d' are rocked by the shaft a , this cross-bar oscillates in a path directly below the elevated hook end of the latches b' , and particu-



larly below the shoulder b^2 , thereof. When, however, the hook end of one or more of said latches drops by gravity, the shoulder or shoulders b^2 thereof, will drop into the path of said oscillating cross-bar, and thereby prevent its further oscillation and thus stop the machine by means of connecting with the shipping device.

During the passage of the threads E, over and through the tension-rolls D and D', these rolls are caused to rotate and by their momentum will ordinarily continue to rotate for some time, even when the machine is stopped, and the threads E, no longer wound upon the spool. The threads would, therefore, sag and tangle in the machine between the tension-rolls and the spool, and this would especially occur should, for any reason, the spool and winding-drum B be suddenly stopped. To obviate this difficulty, a special mechanism is devised, by means of which one of the tension-rolls is connected with and driven positively by the driving-pulley at the moment the belt is shifted or transferred from the fast to the loose pulley, but before the belt has completely left the fast or driving pulley. The tension-rolls are thus brought directly under control of the driving-pulley of the winding or spooling drum B, and when this pulley and drum cease to rotate the rolls are stopped.

In Fig. 3, there is illustrated a preferred way of mounting the latch b , upon the fixed shaft or screw a , so as to permit of an adjustment of the latch on the shaft toward the sides of the machine. This is accomplished by threading the shaft a and the opening b^1 of the latch b , through which the shaft a extends. The threaded connection between the latch b and shaft a , is sufficiently loose to permit the fall of the hook end of the latch, as previously described.

When each latch is turned on the threaded shaft independently of the others, the grouping of the latches into required position can be effected, and this position will be determined by the number and arrangement of the threads E. The latch b is also provided with a hook b' , at its recessed end, upon which hook a weight may be suspended to hold the latch with its hook end b' elevated, out of the path of the cross-bar when the latch is not required to be suspended from a thread E.

The hook b' , is a double hook and constructed so that either end may be used to suspend the latch from the thread. Thus the lower hook is secured, by a nut or screw b^3 , to the latch, and should the upper hook wear through, or nearly through, the hook may be reversed, so that the lower hook can be used to suspend and the upper hook secured to the latch by the screw b^3 .

Although the new device is explained in connection with a spooling-machine, it is to be understood that with proper changes or modifications as will readily suggest itself, this device can be applied to spinning, doubling, winding machinery, looms and, in fact, any textile machine wherein upon the breaking of a manipulated thread, it is desirable to automatically stop the machine. (M. A. Furbush & Son Machine Company, Philadelphia.)

DRAPER'S SPOOLING MACHINE.

In the use of spooling machines intended to wind the yarn off from a plurality of cops or bobbins onto a large spool, the end of yarn on a fresh bobbin must be united to that of the preceding bobbin. The spooler-tender ties a knot joining the two threads, and as the spool-supports are continuously rotated the tender, while tying a knot must keep the spool from rotating with its spindle, by holding it from rotation with her hand. This interferes seriously with the tying of a proper knot, and, in fact, becomes a positive disadvantage when it is expected or required that the operator shall tie a "weaver's knot," which requires the free use of both hands, and is much the best knot as regards the effect upon the future weaving operation.

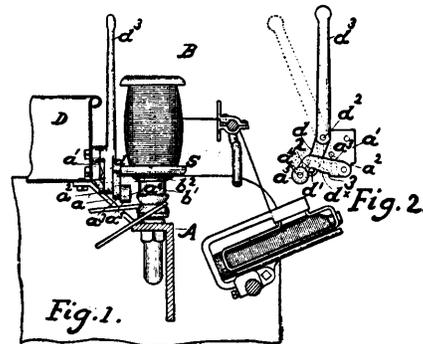
The object of the new mechanism is the production of simple and convenient means for positively raising the spool from its friction-seat on the spindle when a knot is to be tied, the spool being held out of contact with its rotating mechanism while the operative has the free use of both hands to tie the knot, means being provided for permitting free retrograde rotation of the spool while so held.

Fig. 1 is a sectional view of the new mechanism, and Fig. 2 is a detached detail view of the spool-controlling device.

The spindles B, have secured at their bases hubs or collars b^1 , provided with disk-like flanges or tops b^2 , upon which the spools S, rest, and are rotated by friction, the spindles extending through the barrels of the spools.

Brackets a , attached, as herein shown, to the spindle-rail A, support a box D at the rear of the spools, and stands a^1 are bolted to the front of the box D, one for each spool. To a depending ear a^2 on the stand is pivoted a lifter-bar a^3 , bent downward at its outer end and having mounted thereon at a^4 a friction roll a^5 , normally below and out of engagement with the base of the adjacent spool.

On its under side the bar is cut away to present a cam-surface a^6 , and leave shoulders 2, 3, which form limiting-stops for a pin or stud d' , on the outer side of the lower arm of a lever d , pivoted to the stand at d^2 , and extended upwardly



above the top of the spool to form a handle d^1 . Normally the handle d^1 , occupies a substantially vertical position, as shown in full lines, Fig. 2, the pin or stud d' then resting against the shoulder 2 of the lifter-bar a^3 , the shoulder being concaved as shown in Fig. 2, to form a species of lock, the roll a^5 , being at such time held away from the spool-base.

When it is necessary to stop the rotation of a spool for any purpose, as to tie a knot in the yarn, the operative moves to the left, Fig. 2, the handle of the actuating-lever d' of the particular spool into dotted-line position. This moves the stud d' along the cam-

surface d^x of the lifter-bar a^s , raising the outer end of the latter until its roll a^b bears against and lifts the base of the spools S from the actuating-disk b^2 , acting as a brake to stop the rotation of the spool and maintaining it lifted and stationary as the stud d' bears against the shoulder 3, and the adjacent portion of the cam-surface d^x , the weight of the handle d^b then serving as a counterbalance to the weight of the spool and maintaining it raised.

Any number of spools can thus be rendered inoperative and brought to a standstill until the operative has tied the knots or performed any other necessary act, when by a slight push on the handle d^b , the spool-lifting mechanism is rendered inoperative and the spool lowered upon its driving-disk b^2 . (*Draper Co.*)

LORD'S SPOOLING MACHINE.

The object of this spooler is to enhance the value of spooling machines by improving the stop-motion devices, so that they will act to take up the usual slack without stopping the machine, yet, when the yarn breaks or becomes snarled the said devices will be moved to stop the winding of the yarn.

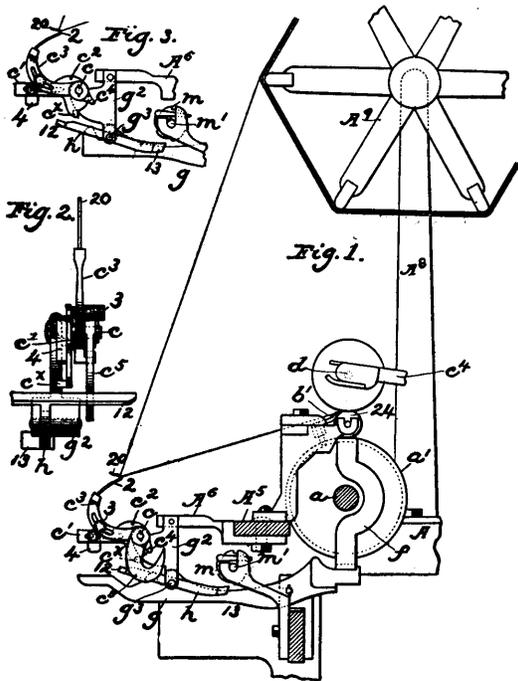


Fig. 1, in side elevation represents a sufficient portion of a spooling machine with the improvements added to enable its construction to be understood. Fig. 2, is a partial view of Fig. 1, looking from the left; and Fig. 3, is a detail with the snarling stop-lever shown omitted in the other figures.

Letters of references indicate thus:—A, the frame; A', upright; A'', reel; a', grooved drum; 24, winding-roll; a, the spindle on which is mounted a conical or other shell to enable the yarn to be wound in a conical or other mass; c', the support for the spindle; v', the traversing yarn-guide, reciprocated by the usual groove in the face of the drum; g', the lever; f', the lifting device to elevate the roll 24 from the drum to stop the winding operation; m, the rotating ratchet-wheel on the shaft m'; A'', the stringer; A', the arm; g', the leg, pivoted to it and having a pivot g', on which is mounted a leg-lever h, the inner end 13 of

which is adapted to be lifted at times to be struck by the teeth of the ratchet m, and cause the leg or a part carried by it to strike and turn the lever g, and elevate the lifters f, one at each end of the roll 24, and remove it from contact with the drum to stop the winding of the yarn.

The leg g', or its equivalent, is provided with a stud c, on which several independent devices are mounted, viz., a two-armed lever c', having a pin or projection c', and a heel c^x, a take-up lever c^t, having at one end an open thread-receiving eye 2, and at its other end a toe c^t, and a snarling stop-lever c^s.

The eye 2, of the take-up lever, hangs on the yarn between the usual traversing guide and the reel, and the lever is provided with a suitable weight 3, for regulating the tension on the yarn, and in case the yarn breaks, the take-up lever drops and meeting the broad outer end 12, of the leg-lever, lifts its inner end 13, so that it is struck by the usual rotating stop-wheel to stop the winding operation.

The snarling stop-lever c^s, normally hangs near but not in contact with the broad end 12 of the leg-lever, but when said snarling-lever is struck by the toe c^t, of the take-up lever, the snarling-lever is swung forward and strikes the said end 12, of the leg-lever and depresses it, lifting the inner end 13, to be caught by the stop-wheel to stop the winding operation.

The extremity of the take-up lever beyond its eye 2, is bent outwardly to form a cast-off portion 20, which, when the yarn has turned the said lever far enough on the stud c to cause the toe c^t to meet and actuate the snarling-lever, which, owing to its peculiar shape, will discharge itself from the thread, and thereafter the take-up lever will drop, as hereinbefore provided for.

The heel c^x, of the lever c', rests against the leg g', and said lever c' has attached to it, in an adjustable manner, a weight 4, said weight controlling the amount of strain which shall be exerted on the yarn after the take-up lever (it being raised by a snarl in the yarn) meets the pin c', for before the said take-up lever can be moved far enough to cause its toe to meet and move the snarling-lever, the take-up lever must meet the pin c', and lift the lever c'.

By adjusting the weight 3, the tension can be either increased or decreased, according to the requirements of the yarn being wound. By the adjustment of the weight 4, the operator is enabled to determine the amount of strain to be put on the yarn, to take out if possible, a snarl before the snarl-lever will be actuated. These adjustments, therefore, constitute very important features of the new spooler, they controlling the winding of the yarn absolutely to the wants of the operator. (*C. S. Lord, Winooski, Vt.*)

DRAPER'S SPOOLER-GUIDE.

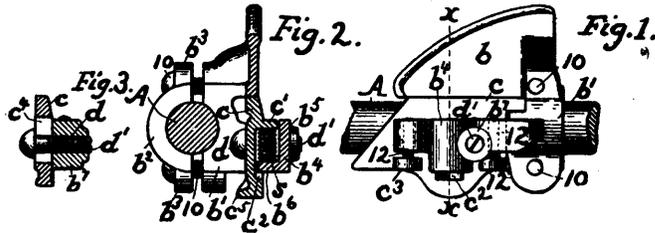
In this new guide the blades may be readily separated to temporarily widen the slot or space between the blades, whereby, if the guide becomes clogged, as frequently happens, the obstruction can be readily removed by the attendant.

One of the blades is mounted to tip and is yieldingly held in normal position relatively to the other blade, and means are provided for adjusting the distance between the edges of the blades.

The mounting of the movable plate in such a manner that it will tip, prevents the tampering with the guide in such manner as to leave the opening wide enough at all times to permit a bunch on the yarn to pass through without breakage of the yarn. If an attempt is made to wedge apart the blades, the movable one will tip on its support, closing the outer end and becoming inoperative.

Fig. 1, is an enlarged rear side view of this spooler-guide. Fig. 2, is a vertical section thereof on the line $x-x$, Fig. 1, looking toward the right; and Fig. 3, is a sectional detail of the pivotal sliding-connection between the blades.

The new guide comprises, essentially, two blades b , c , the upper blade b , having a lateral offset-portion or base b' , in which is a recess to partially embrace the supporting shaft or rod A , and forming one member of a clamp, the other member of the clamp consisting of a plate b^2 , recessed to embrace the shaft



A , and having ears b^3 , through which clamp-screws 10 are extended into threaded holes in the member b' .

By tightening or loosening the screws the guide as a whole is firmly adjusted or moved upon the supporting-shaft.

The blade b , has a foot b^4 , extended from the base b' below and behind the blade, provided on its inner side with a socket b^5 , open at its top and inner side, as shown in Fig. 2, the foot having a threaded hole at each side of the socket to receive adjusting-screws 12, the lower ends of which project more or less below the foot, as shown in Fig. 1.

The blade c , has on its rear face and about midway between its ends a lug c' , to enter loosely the socket b^5 , and bear upon a spring s therein, Fig. 2, said spring resting on the bottom b^6 of the socket, the said bottom projecting into a vertical groove or depression c^2 in the face of the blade c . Ears c^3 extend from the said blade and are held against the adjusting-screws 12 by the expansive force of the spring s , the position of the screws thus determining the distance between the edges of the two blades b and c .

The blade c is vertically slotted at c^4 , to receive the shank of a screw d , (see Fig. 3) which is firmly screwed into a boss b^7 on the foot b^4 , thereby connecting the two blades, yet permitting bodily movement of the blade c toward and away from the blade b , and also movement of blade c on d as a pivot, a separate screw d' in the boss acting as a check to prevent loosening of screw d by jarring.

A lip on the blade c , engages the foot b^4 , and limits the downward movement of the movable blade, which latter on its front side near its lower edge is provided with a finger-piece c^5 .

If the guide becomes clogged, as it frequently does, the attendant grasps the finger-piece c^5 and draws the blade c down, compressing the spring s and separating the blade edges, so that with the free hand the attendant can remove the obstruction from between the blades.

When the finger-piece is released, the spring expands and automatically returns the movable blade to operative position, controlled by the adjustment of the screws 12, without any further attention.

If a wedge be inserted between the blades at their inner ends, so as to be unnoticed, the movable blade will tip on its yielding support, closing its outer end, so that the guide will be inoperative, and such tipping of the movable blade prevents tampering with the guide in the manner described. (Draper Co.)

DRAPER'S BOBBIN-HOLDER FOR SPOOLERS.

The object of the new holder is to adapt the same for the use of short and long bobbins. The accompanying illustration is a side elevation of this bobbin-holder.

The upper arm A of the holder rises from a clamp A' , (shown as forked, as at A^2), and provided with a set-screw to aid in confining the said arm in place.

Extended from the clamp is a bracket b , having a plurality of bolt holes 2, one of which is entered by the bolt c , employed to hold the rest or pan d on which the bobbin e is laid, said bracket also, as shown, having at one side of each of said holes a notch, in which enters a teat or tongue at the inner end of said rest or pan.

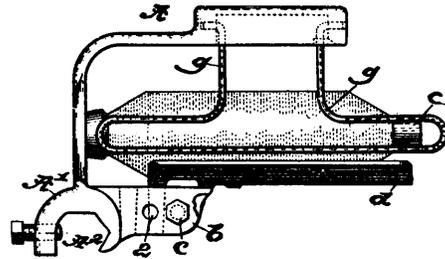
By taking out the bolt c , the rest or pan d may be adjusted in the bracket, and the bolt may then be put back into whichever of the holes 2 desired, that depending upon whether a long or short bobbin is to be held, the parts

being shown in the illustrations adjusted for the longer bobbins.

The enlarged free outer end of the arm A is chambered at its under side, and one end of said chamber is provided with an extension entering said chamber, made by sawing slots out of the solid casting on each side, and the end walls of the chamber are provided with holes to receive the bent ends of the arms of the guards g , said extension acting as a separator for the guards, so that they will remain separated for a short distance when the bobbin is not in place between the arms.

The rest or pan d , upon which the bobbin is placed, has a central cavity and side wings extended therefrom, leaving corners between the said cavities and the wings.

A full bobbin resting upon the pan, is maintained central with relation to the pan, and when the bobbin is being unwound it grows smaller in diameter and enters the cavity, and when nearly unwound in jumping about in the cavity the corners act to

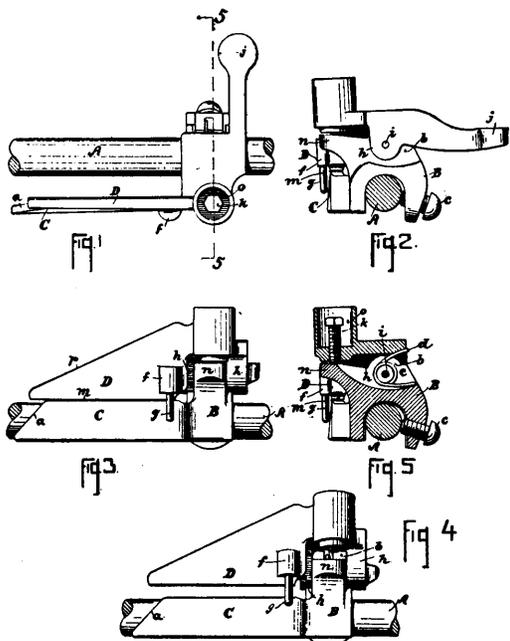


check the movement of the bobbin, and should the bobbin escape over the corners it will rest upon the wings, and under the action of the guards will be pushed back again into the cavity. In this way the wings prevent the escape of the bobbin from the pan. (Draper Co.)

BUNCH-ARRESTING YARN-GUIDE FOR SPOOLING MACHINES.

This mechanism relates to means for preventing the winding of imperfect yarn onto the spool, and it consists in the improved construction of a bunch-arresting yarn-guide, attached to the traverse-rod and adapted to receive the yarn from the traverse-rod and guide it onto the spool. The guide can be changed to suit any size of yarn.

Fig. 1, represents a top view of the yarn-guide. Fig. 2, represents an end view of the same. Fig. 3, represents a side view showing the jaws in their closed



condition. Fig. 4, represents the same view with the jaws in their opened condition. Fig. 5, represents a vertical section taken in the line 5-5, of Fig. 1.

Letters of reference indicate thus: A, represents the traverse-rod of a spooling-machine, to which the bunch-arresting yarn-guides are attached, the said yarn-guides consisting of a holder B, provided with a set-screw c, for attachment to the rod A; the said holder being provided at one side with an elongation which forms the stationary jaw C, which is provided with the inclined edge a at its outer-end and with the ear b, to which is pivoted the movable upper jaw D, the said jaw being actuated to close upon the stationary jaw C, by means of the spring a, which is held in a recess e, made in the middle portion of the ear b. At the base of the jaw D is formed the boss f, to which is attached the pin g, which serves to limit the lateral movement of the yarn as it is being run onto the spool.

The movable jaw D is provided with the opposite ears h, which embrace the opposite sides of the ear b of the holder, and are secured thereto by means of the pivot i. The movable jaw D is also provided with the projecting arm j, by means of which it may be raised from its normal closed position with the jaw C, against the closing action of the spring a, as shown in Fig. 4, and with an adjusting-screw k, by means of which the width of the elongated opening m, between the parallel jaws C and D, may be adjusted to adapt the device for spooling different grades or sizes of yarn, the projecting lug n, upon the holder B, forming a bearing-seat for the lower end of the screw k.

In order to prevent the operator of the machine from readily tampering with the adjustment of the yarn-guide, as they are liable to do in order to avoid the trouble of piecing the broken ends, the head of the adjusting screw k, is placed in a chamber o, which upon the proper adjustment of the opening m, may be sealed, thus providing a check against the dishonesty of the operator. The movable jaw D, is also provided with the downwardly-inclined

edge p, which serves to assist in the rapid threading of the guide.

The yarn to be wound upon the spool first passes over the surface of the traverse-rod A, and then through the opening m, between the horizontal jaws C and D, and thence passes to the spool; and when a bunch or enlargement of the yarn arrives at the opening m, the said bunch or enlargement will be arrested, and the thread will be broken between the said jaws and the spool, so that the imperfect yarn will not be wound thereon. The operator of the machine can then, by raising the jaw D, as shown in Fig. 4, release the yarn from the opening m, and readily remove therefrom an impediment to the subsequent proper passage of the yarn therein. (Frederic W. Easton, Pawtucket, R. I.)

SHELL-HOLDER FOR SPOOLING MACHINES.

The object is to manufacture a spindle that can be thrown to one side when a shell is to be changed from a full one to an empty one.

The accompanying illustration shows in elevation such an improved holder mounted in a yoke; the dotted lines showing the yoke turned out to enable a shell to be removed or applied, as desired.

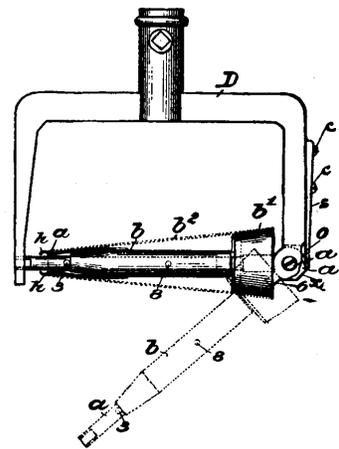
This holder consists of a dead spindle a, or a spindle on which is mounted to rotate a sleeve b, having an attached base or enlargement b', said enlargement being adapted to receive the inner or enlarged end of a shell b², supposed to be of paper or thin light weight material, the shell being shown as of cone shape, and as being held in position by dogs pivoted on the base and having pins extended through holes in the base; a suitable cam or device, acting on said pins to throw the dogs out, to engage and hold the shell, or to draw them in to release the shell.

The dead spindle has at one end an eye through which is extended a pivot bolt a' to thus pivot the dead spindle to one arm of the yoke D, the opposite arm of the yoke having a shoulder and spring to cooperate with the free end of the dead spindle and hold it steadily when in the position shown by the full lines, but enabling the spindle to be turned out, as shown by the dotted lines. The sleeve b is kept on the dead spindle between a shoulder and a pin 3.

At the rear side of the base b' and within it and surrounding the dead spindle loosely, there is provided a cam-plate having two pins, one of which pins will strike a stop 6, carried by the yoke, when the spindle is turned out, as shown by dotted lines, one or the other of said pins striking said stop according to which direction the sleeve and base are turned about the spindle, and as soon as the cam-plate is arrested by the stop 6, the further movement of the sleeve and base causes the pins of the dogs to ride over the edge of the cam-plate and throw the dogs in or out, as desired.

The sleeve b, is provided with an oil hole 8, for the introduction of oil between it and the dead spindle.

The head or pivoted end of the spindle a is shown as flattened at x, o, and the yoke has connected to it:

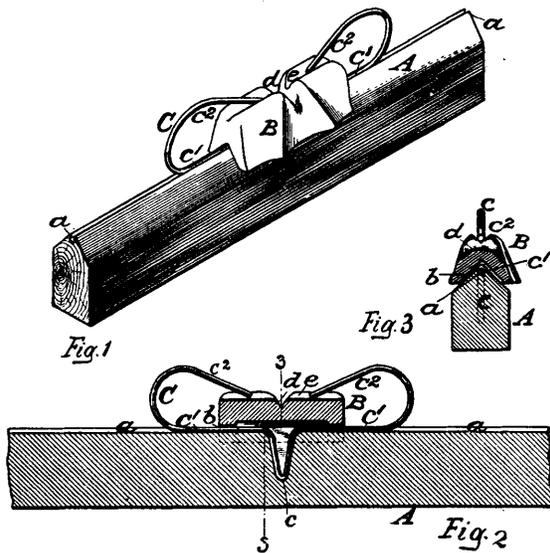


by screws c a spring s , the latter acting on said flattened faces x or o to keep the spindle in one or the other of its two positions. The hollow sleeve b , is also provided with shell-holding springs h , which engage the interior of the small end of the shell or cone b' , and aid in keeping it steadily in place. (*Poster Machine Co., Westfield, Mass.*)

THREAD GUIDE FOR SPOOLING AND WINDING MACHINES.

The object of this invention is to provide greater facility for the adjustment of the guides sidewise along the traverse-bar, to bring them in exactly proper relation to the bobbins or spools of the machine.

Fig. 1 is a perspective view of a portion of the traverse-bar of a winding machine on which there



is placed such an improved thread-guide. Fig. 2 is a longitudinal sectional view of a portion of the bar and of the thread-guide; Fig. 3 is a transverse section in the lines 3-3 of Fig. 2.

A, is the traverse-bar. B, is the guide proper, of glass or other material, and C, the spring or elastic holder for holding the guide B to the bar.

The bar A is represented as having its upper surface formed with a ridge along which there is a narrow groove a , extending the whole length of the bar, and which is just wide enough to receive within it the thickness of the wire of which the holder C is composed.

The guide B has in its back or under side a transversely-angular recess b , fitting to the ridged top of the bar in such manner as to permit the adjustment of the guide lengthwise of the bar, and the said guide has in its crown a transverse groove d to receive the thread, and a longitudinal groove e , for the reception of the ends of the holder.

The spring or elastic holder C for each guide B is formed of a single piece of wire, bent at the middle of its length to form a taper double shank e , which is driven tightly into a hole provided for it in the bar in the bottom of the groove a , and from the so-formed taper double shank, straight portions c' , project in opposite directions to be received lengthwise within the groove a in the bar, and the terminal portions beyond these straight portions are turned back toward each other to form springs c'' ,

the ends of which enter the groove e in the crown of the guide. These springs c'' yield easily to permit the placing of the guide between them and the straight portions c' of the holder, and over the bar, and when the guide is so placed it is held by the springs firmly enough to retain it in its proper place, yet permitting the easy adjustment of the guide lengthwise on the bar, the holder being firmly seated in the bar by its straight portions being sunk into the groove a .

There is a separate and distinct holder complete in itself for each guide. (*Atwood Machine Co., Stonington, Conn.*)

THE ALTEMUS FILLING WINDER.

This filling winder belongs to that class of winding machines in which the nose of the bobbin is contained in a fixed cup or between rollers on the frame of the machine, the spindle moving rearward as the yarn is wound upon the bobbin.

The spindle in this winder is so driven that a uniform rotating movement of high speed may be imparted thereto, which movement can be readily stopped when necessary.

Another point in favor of this winder is to be able to effect the automatic stoppage of rotation of the spindle when the latter is full, and a still further good feature is to prevent overrunning of the reels carrying the skein when the yarn is being wound upon that portion of the nose of the bobbin which is smallest in diameter, the formation of slack yarn being thus avoided, and the danger of breakage, due to the sudden jerk when the slack is taken up, being effectually overcome.

Fig. 1, is a front view of sufficient of a winding-frame to illustrate the improvements. Fig. 2, is a transverse section of the same on the line 1-2, of Fig. 1; Figs. 3 to 4, are detached views, on a larger scale, of parts of the machine.

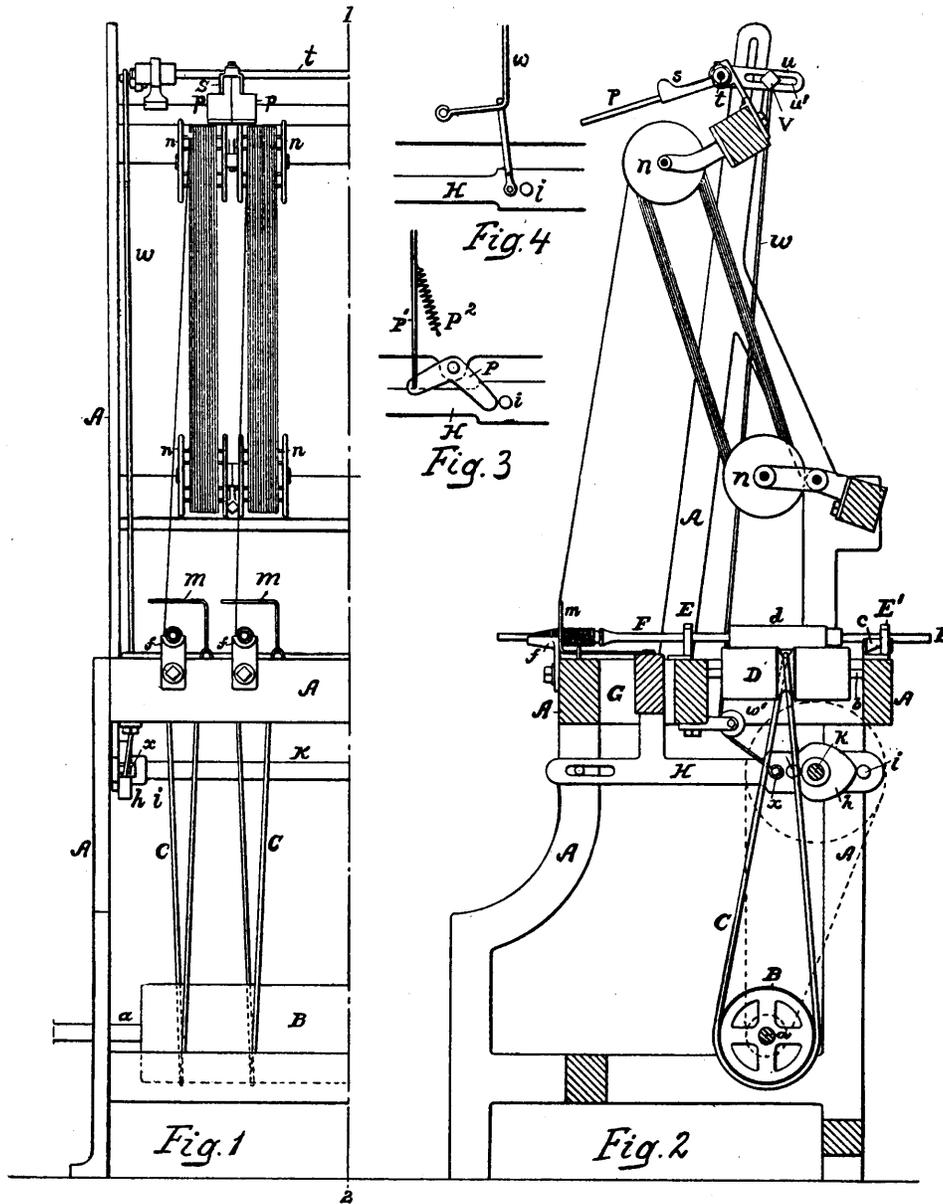
A, represents part of the frame of the machine, in which are bearings for the shaft a , of the longitudinal drum B, and for a series of short transverse shafts b , each of which has a drum D, centrally grooved for the reception of a driving-belt C, from the drum B. Upon each of these drums D rests a cylinder d , carried by the winding-spindle F, which is adapted to bearings E, E', on the frame A, in front and rear of the drum D, the front end of the spindle carrying the bobbin, and the front bar of the frame A being provided with cups f , for the reception of the tapering end or nose of the body of yarn which is being wound upon the bobbin, the spindle being gradually forced rearward as the successive courses of yarn are wound upon the bobbin.

As a general rule, in winding machines, the belt C is applied directly to the cylinder d of the winding-spindle—a plan which is objectionable, because the necessary tension of the belt causes such a downward pull upon the spindle that the nose of the bobbin will be pressed firmly in the cup, thus causing the yarn to heat and glaze or burn, owing to the friction. Attempts have been made by some machine-builders to overcome this objection by the use of a longitudinal driving band or belt, upon which the cylinder d rests, and by frictional contact with which it is driven; but this necessitates the use of means for confining the spindle vertically and keeping the cylinder in frictional contact with the belt, the cylinder in the absence of such confining device having a tendency to jump upon the belt, and thus interfere with the application of a proper uniform high-speed movement of rotation to the spindle.

In the present winder for each spindle, a single driving drum D is used, and upon which the cylin-

der *d* of the spindle rests, the front end of the spindle being supported by the forming-cup *f*, and the spindle being unconfined vertically so that there is nothing but the weight of the spindle and the yarn wound thereon to cause friction in the cup, and any desired portion of this weight can be thrown upon the drum by adjusting the axis of the spindle nearer to the vertical line drawn through the axis of the drum, so that the friction on the yarn can be varied as circumstances may suggest.

ings *E'*, has a sliding block *c*, to a concave recess in the upper face of which the spindle *F* is adapted, the under face of each block being beveled and having a bearing upon the beveled base of the deep slot previously referred to, the length of the bearing-block being considerably in excess of that of the stud, so that, when, on the rearward movement of the spindle, the rear end of the cylinder *d* strikes the front end of the block *c*, the latter will also be moved rearward, and, owing to the beveled faces of the



The rotation of the spindle can be instantly arrested by lifting the front end of the bobbin, so that the cylinder is free from contact with the drum; and for the purpose of supporting the spindle in the elevated position each of the bearings *E*, *E'*, has a shallow slot, in addition to a deep slot, the latter of which receives the spindle when the cylinder is in contact with the driving-drum. Each of the rear bear-

ing-block and bearing, will be caused to rise, so as to lift the cylinder *d* free from contact with the drum *D* and stop the rotation of the spindle *F*.

G, is a traverse-bar to which a lateral reciprocating motion is imparted by the action of a cam *h*, upon pins *i*, on a guided frame *H* secured to the traverse-bar, said cam *h* being carried by a shaft *K*, driven from the shaft *a*, by means of the belt and

pulleys shown by dotted lines in Fig. 2. The traverse-bar has bent wires *m*, one for each bobbin, the yarn passing over the horizontal portion of this wire in its course from the skein to the bobbin, so that there is no lateral confinement of the yarn, and the passage of the latter to the bobbin is permitted with very little friction; hence fine and tender yarns can be wound without difficulty.

When the yarn is being wound upon that portion of the bobbin which is of large diameter, it is drawn from the skein with considerable rapidity, the speed of draft rapidly decreasing as the yarn is directed to that portion of the bobbin at and near the end of the nose, where the diameter is much less. If the speed of the skein-reels *n*, is not checked, there is a tendency of the yarn to overrun and form slack yarn while winding at and near the end of the nose of the bobbin, and when this slack yarn is taken up as the yarn is directed toward that portion of the bobbin which is of larger diameter, there is a sudden jerk upon the yarn which has a tendency to break the same. To overcome this trouble an automatic brake is provided for the upper skein-reel, consisting of a plate *p*, loosely hung to an arm *s*, on a rock-shaft *t*, adapted to bearings in the upper portion of the frame of the machine, said shaft having another arm *u*, with a slot *w*, in which is adjusted a pin or bolt *v*, connected to the upper end of the cord or wire *w*, the lower portion of which passes around a pulley *w'* on the frame, the lower end of the cord being connected to a pin *x* on the frame H, of the traverse-bar G.

As said frame moves outward, therefore, in order to carry the yarn toward the end of the nose of the bobbin, the cord *w* is slackened and the plate *p* is allowed to fall, so as to rest upon the periphery of the head of the upper skein-reel and serve as a brake therefor, the plate being lifted and the brake removed as tension is imparted to the cord *w*, on the rearward movement of the frame H.

Generally each of the arms *s* is constructed so as to carry a pair of brake-plates *p*, for the adjacent rims of adjoining reels, although each plate may have an independent arm, if desired, and in some cases the arms *s* may serve as brakes, the pivoted plates being dispensed with.

The means shown in Fig. 2 for operating the brakes for the skein-reels in unison with the movement of the traverse-bar, may be modified in various ways, for instance, in Fig. 3 is shown a modification in which a bell-crank lever P is used, one arm of which has a rod *P'*, acted upon by a spring *P''*, and intended to be connected to the arm *u* of the rock-shaft *t*, while the other arm of the lever is acted upon by a pin *i*, of the traverse-bar frame H; and in Fig. 4 is shown a cord *w*, connected at the lower end to a fixed stud on the frame A and acted upon by a pin projecting from the frame H, so as to be alternately tightened and slackened as said frame is reciprocated. (W. W. Altemus & Son.)

BOWMAN'S BOBBIN HOLDER OR CLAMP FOR HORIZONTAL BOBBIN WINDERS.

The principle objects of this holder are, first, to provide a simple, durable, efficient, reliable, and comparatively inexpensive device, for not only preventing endwise play or wobbling movements of the bobbin in respect to its spindle, whereby waste of yarn is obviated and accuracy and uniformity of winding insured, but also permitting of the ready, convenient, and rapid removal and application of the bobbin to and from the spindle, and, second, to so construct, arrange, and combine the various parts of the clamp, device, or holder as that it may be conveniently applied to such bobbins and spindles as are com-

monly employed without requiring any addition to or alterations or changes in such standard spindles and bobbins.

Of the accompanying illustrations Fig. 1 is an elevational view illustrating this bobbin clamp or holder in application to a spindle or bobbin. Fig. 2 is a perspective view illustrating the bobbin holder or clamp shown in Fig. 1, and Fig. 3 is a sectional view showing the parts detached.

Letters of references indicate thus:—D and *d* are the respective parts of a spindle, which are adapted for connection by means of a screw *d'*.

H is a pulley or wheel by means of which rotary motion is imparted to the spindle.

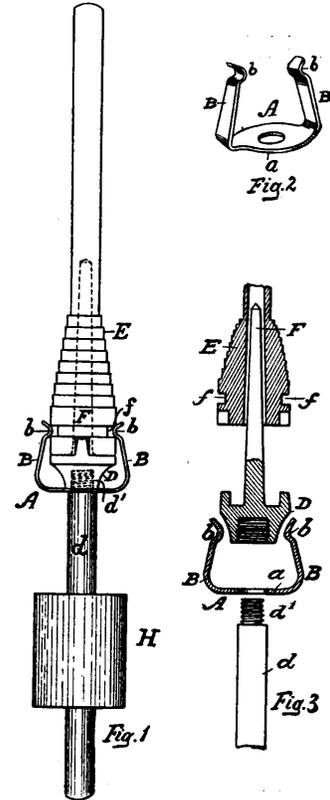
D is a spindle-head provided with one or more projections or lugs adapted to take into corresponding recesses in the base of the bobbin E in order to impart rotary motion from the spindle thereto.

f is an annular groove cut around the base of all bobbins for use in mounting them in shuttles.

A, is a clamp or holder comprising a base *a*, perforated, as shown in Fig. 2, for the accommodation of the portion *d'* of the spindle. This base *a* is adapted to be held between the parts *d* and D of the spindle and is provided with integral upwardly and inwardly extending spring-arms B, adapted to engage the base of the bobbin E. For this purpose each of the arms B is provided with a shoulder *b*, formed thereon and adapted to take into the groove *f* of the bobbin E.

In use the part D of the spindle is detached from the part *d* thereof. The base *a* is mounted upon the part *d* of the spindle F by passing the threaded portion *d'* through the aperture of the base *a*, whereupon the part D is secured to place, as shown in Fig. 1. Under these circumstances the clamp or holder A is firmly attached to the spindle in such manner that the shoulders *b* of its arms B are adapted to take into the groove *f* of the bobbin E.

The mode of operation of the holder is as follows: Let it be assumed that the spindle *d* is rotated about a horizontal axis through the intervention of the pulley or wheel H. The empty bobbin E may be readily applied to the portion F of the spindle by the simple operation of pushing the bobbin onto the latter until the lugs on the part D enter their corresponding recesses and until the shoulders *b* take into the annular recess *f*. Under these circumstances the arms B hold the bobbin E firmly up against the face of the spindle-head D, so that the bobbin E is not only held against movement in the direction of its length, but



is also prevented from wobbling at its free end in respect to its axis of rotation.

The absence of endwise play and freedom from wobbling movements is important for many reasons, among which the following may be mentioned: If the bobbin were afforded endwise play, it would become detached from the projections upon the spindle-head D and consequently would cease to rotate. In fact it has hitherto been customary in starting the bobbin to manually wind the thread or yarn not only onto the bobbin but also downward onto the spindle-head D in order to tie the bobbin to the spindle-head and thus prevent endwise play of the former. However, this resulted in the waste of considerable yarn or thread. Moreover, under such circumstances the free end of the bobbin wobbles slightly in respect to its axis of rotation because the thread did not tie the bobbin firmly to the spindle-head D, and this wobbling motion of the bobbin resulted in uneven or, as it is sometimes called, "lumpy" winding, which in the subsequent use of the thread or yarn, for example, in a shuttle, resulted in breakage and waste. (*George T. Bowman, Phila.*)

MACHINE FOR WINDING YARN FROM CHAINS ONTO FILLING BOBBINS.

The object of this machine is to dispense with the spooling of the yarn.

In winding yarn after the same has been dyed or bleached directly from the chain onto the filling-bobbin, the individual threads of the chain have to be separated and connected each to its respective spindle. The machines for winding the yarn on the cop or bobbin have usually eight banks of spindles and contain as many spindles as there are threads in the chain.

As the cops or bobbins must be wound in conical layers to the very end of the same, and must form a well-wound nose at the end to make the cops or bobbins perfect and prevent stripping when used in the shuttle in weaving, it is essential to the practical and successful use of these machines that the tension on all the threads of the chain shall be uniform, and all soft places in the cops or bobbins avoided.

The yarn, during the process of doubling, dyeing and splitting becomes more or less entangled, and broken ends frequently occur in the chain. To successfully wind this yarn directly on filling-bobbins, the operation of separating the yarn strands of the chain requires to be under the constant control of the operative, so as to prevent imperfect yarn passing through the machine. In these machines the successful operation of all the spindles receiving the yarn from one common source (the chain) requires mechanical refinements and automatic self-adjustments that in the ordinary spinning, twisting, or winding machines, in which each spindle is supplied from an independent source, are either unnecessary or not of such importance as would make the machine useless without them. In machines for winding the thread directly from the chain on the cop or bobbin, the great saving in time, labor and mill-room, has been made possible by close attention to the details of the machines, by which the uniform speed of the spindles, the accurate adjustment of the tension of the yarn, the accessibility of the spindles in doffing, the starting of the machine to wind on the new bobbins after doffing, the uniform and regular laying of the yarn on the cops or bobbins, the protection of the yarn from floss and fibre, and other advantages are secured.

The accompanying illustration is a view of the end of the improved winding machine and the chain-tension machine which delivers the yarn under the required tension to the winder. This illustration will readily explain the machine to the reader.

The machine is provided with eight lines of spindles secured to bolster-rails extending from one end to the opposite end of the machine and placed so that the second bolster-rail is behind the first and above the same, and all the other bolster-rails (whether four, six, eight or more are used), are each placed in the rear of the rail in front and above the same, so that the spindles form an inclined bank or slope and can each be readily reached by the attendant for the purpose of doffing or piecing.

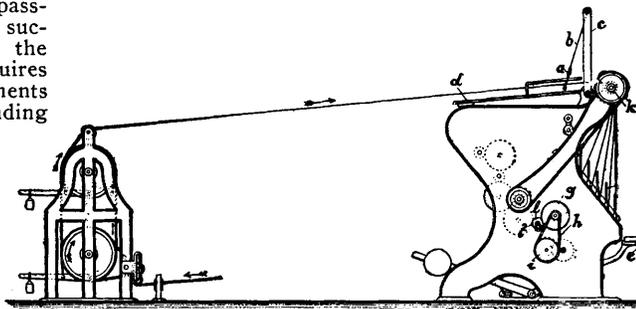
The large number of spindles require to be so closely grouped together, since the driving-cylinders can be only of limited diameter, and therefore require a central support.

On the top of the machine is suspended the reed *a*, by the rods *b*, connected with the upper end of the posts *c*, secured one to each end of the machine, or, when convenient, from the ceiling of the room in which the machine is located. This movable suspended reed *a*, is specially made for this work and is equally spaced over its entire length to conform to the space of the spindles.

It can be moved backward and forward by the operative to facilitate the separation of the threads of the chain, and when the strain on the reed is excessive, the operative stops the machine. When the operative releases the reed, it swings toward the top rolls until it rests on the table *d*. A bench is usually placed in front of the foot-treadle *e*, on which the operative stands, so that when the operative, whose hand is on the swinging-reed, feels that excessive strain is exerted on the reed, he can stop the machine with his foot.

When the threads require to be bunched to facilitate doffing, the reed *a* is moved back to facilitate the bunching of the threads. The point at which the rods *b*, are pivotally connected with the posts *c*, is in practice much higher above the machine, and the reed swings through an arc of greater radius than that shown in the drawings. The rods *b*, are connected to eyes on the upper bar of the reed, so that the reed may swing independently of the rods.

On the projecting end of the shaft of the lowest driving-cylinder, the pinion *f*, provided with a groove, is connected with the shaft which has a spline and turns with the same while in the normal geared position, and is held in that position by the stop-link



g, which rests on the shaft between the nut on the end of the shaft and the pinion *f*, so that when the stop-link is removed, the pinion *f*, can be drawn outward, and the pinion disconnected from the gear *l*, thereby disconnecting the spindle-driving mechanism from the cop-building mechanism and permitting

the winding back and independent adjustment of the cop-building mechanism.

The chain *h*, connects the sprocket-wheel on the shaft of the gear *l*, with the sprocket-wheel *i*, from which motion is imparted by means of gearing to the cop-forming mechanism by which reciprocating guide-wires are operated.

To secure the most economic results, the machines require to be of such lengths that the greatest number of spindles that can be attended to by one attendant are massed in one machine. To lay the yarn on all the quills, or bobbins, uniformly, the guide-wires must all move together.

Practical experience has demonstrated that the reed *a*, requires to be placed near the top rolls so as to accurately guide the yarn onto the delivery-roll *k*, and from the same to the spindles; but in bunching the yarn in doffing, this close proximity of the reed to the top rolls interferes with the bunching. Therefore the reed *a* is suspended by the rods *b*, at each end from the vertical posts *c*, extending at each end above the end frames of the machine, so that the operator on preparing for doffing, before he stops the machine, simply pushes the reed *a* backward.

In a machine for winding yarn from the chain onto filling-bobbins, such a very large number of threads have to be separated from each other and guided to the bobbins that it becomes difficult for one operative to overlook the separation of the threads and the winding on the bobbins. The vibrating threads passing through the swinging reed cannot be readily seen without a suitable background. The table *d* forms such a background and is used for this purpose, as also to prevent the loose ends separated by the reed from falling on the threads passing from the top rolls to the bobbins. In these machines, where as many as three hundred and seventy-six (376) spindles are used, it is impracticable to connect all the ends after doffing with the new bobbins. Some arrangement is therefore required by which all the ends are automatically connected with the new bobbins. This arrangement consists in a bobbin-holder and the arrangement for disconnecting the spindle-driving mechanism from the cop-building mechanism.

When the new or empty bobbins have been placed on the spindles, the driving mechanism is started to drive the spindles, the frame supporting the guide-eye is raised, and the threads connected with the bobbin-holders are guided onto the bottom of the cone of the bobbins, the machine is stopped, the gear *f* is pushed in to connect it with the gear *g*, so as to connect the cop-forming mechanism with the spindle-driving mechanism; the machine is started, and a new set of bobbins is wound. By this arrangement the operation of the machine is practically continuous, the saving effected is large, as by reason of the improvements incorporated in the machine the operative has a complete oversight and control of the large number of threads as the yarn is delivered to the top rolls, as well as over the whole bank of spindles, being able to stop and start the machine while his eyes are on the yarn coming from the chain as well as on the yarn being wound on the spindles. (H. L. Pratt, Lewiston, Me., and C. T. Upton, of Lowell, Mass.)

THE UNIVERSAL METHOD OF WINDING.

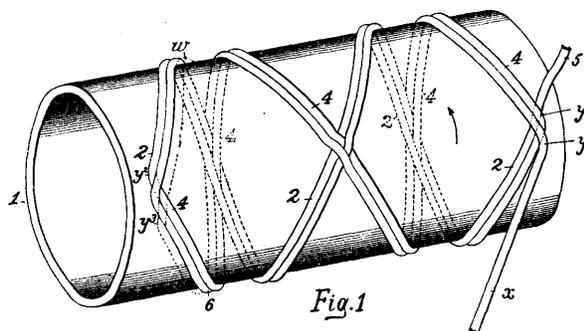
In the ordinary winding of balls or cops of yarn or thread, it is common to take a spool, spindle, or hollow tube and wind the thread in spirals upon the tube, without an attempt to place the successive coils of thread in contact with each other upon the tube at the first winding nor thereafter, nor to arrange them with any precision so as to preserve their paral-

lelism throughout the winding, and when the winding, as is usually the case, is effected mechanically the thread is carried in coils along the length of the tube during its revolution in such a manner that the number of coils to each revolution decreases as the diameter of the cop increases. As a consequence, the winding is more or less irregular, the threads are not parallel in the successive coils, the cop is open or loose and lacks firmness and solidity, the thread is not evenly laid, etc., etc.

The accompanying illustrations are given to show the "Universal-winding" process. Fig. 1 is a diagrammatical view illustrating this winding; Fig. 2 is a perspective view of a complete cop.

Numeral 1 in Fig. 1 indicates a tube, spindle or cylinder upon which the thread *x* is to be wound thereon with any suitable number of turns or coils to the length of the tube (two turns of the thread to the length of tube are shown wound on in illustration).

In winding mechanically, the thread is applied to the tube by means of a guide having such a reciprocating lateral motion in respect to the tube that the same number of coils or turns are applied upon the tube and upon each layer of the cop, whatever may be the diameter that the latter attains. Instead, however, of reversing the traverse or motion of the guide at each lay as soon as the cop completes its revolution, in the new process either the tube or the guide is so operated that the thread of each coil as it is laid at the extreme end of the cop is carried across and to the outside of



the preceding thread upon that end and laid against or parallel to the outer or inner side of that thread, and is then reversed in its winding and carried toward the opposite end. Thus, as shown in Fig. 1, 2 represents the first coil of thread *x* applied to the tube 1, and 4 represents the succeeding coil. Assuming the cylinder to be turning in the direction of the arrow, the thread *x* before it reaches the turn *y* will be laid upon the inside of one of the coils 4, which holds down the loose end 5, and will then cross the said thread at a point back of the bend *y* of the latter, and will then be bent back at the point *y'*, and upon the further revolution of the tube will be laid on the outside of the thread of the coil 4, and will follow the said thread throughout its convolutions to the opposite end of the tube, and will finally be laid on the inside of the said thread 4 at the left-hand, as indicated by the dotted lines *w*, and will then cross the coil to the outside of the same, and will be bent back at *y''* and laid upon the outside of the thread 6. This is the course of each coil of thread in each layer of the cop, so that each coil in each layer lies throughout its length parallel to coils previously laid upon the spool. While it is not absolutely necessary, it is preferable in many cases that each coil of thread shall be laid in actual contact with that of one of the preceding coils, so as to bring the windings into as close proximity as possible and secure a ball of

minimum size and maximum density. As a consequence of this construction the threads are laid at each edge of the cop, each thread reversing its direction at a point $y, y', y'', y''',$ etc., in the plane of the side or end of the cop, and the succeeding coil of thread is carried over the preceding coil to such an extent as is necessary to bring such thread to the outside of the

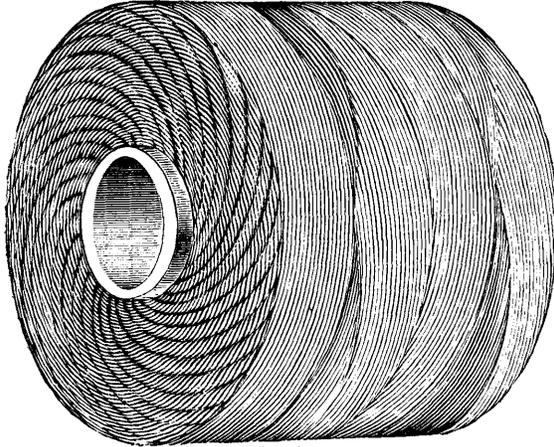


Fig. 2.

preceding thread and to the extreme end of the cop, and then the winding of the succeeding thread is reversed at its point $y, y', y'', y''',$ etc., beyond the preceding point $y, y', y'', y''',$ etc., and so on. The threads, therefore, are laid uniformly, evenly, and regularly at each end or edge of the cop and in each of the successive layers or windings upon the cop, and as each coil starts at the edge of the cop at a point beyond that where the underlying thread started from the said edge it is laid alongside of and, if desired, in close contact with the preceding coil throughout the whole extent of the surface of the cop.

At the points where the different windings of successive layers cross each other the thread last laid is of course carried above that previously laid, so that at each point of intersection they overlap first in one direction and then in the other, as will be understood from Fig. 2.

It will be seen that in order to effect the result thus described it is necessary either to continue each revolution of the cop a little farther than the preceding revolution before reversing the direction of the guide or to delay the beginning of the reverse motion of the guide.

The advantages of a ball or cop wound by the "Universal Method of Winding" are as follows:—In the first place, the same amount of thread may be condensed into a much smaller space, thus securing economy in packing, storage, and transportation. Again, in consequence of the regularity of winding the thread may be unwound from the cop without danger of entanglement, and loss is thus prevented. In consequence of the density and firmness of the cop it will maintain its shape and integrity until the thread is completely wound off, and in shipping the cops do not get crushed out of shape and the coils of thread tangled together. In consequence of the regularity and solidity of the cop, it is practicable to apply the tension directly to the cop itself. In consequence of the close winding, the thread retains the moisture absorbed during the process of manufacture, which is a matter of much importance.

In the case of linen thread and fine cotton, the open winding causes each thread to have isolated supports upon the coils beneath, and any pressure tends to force

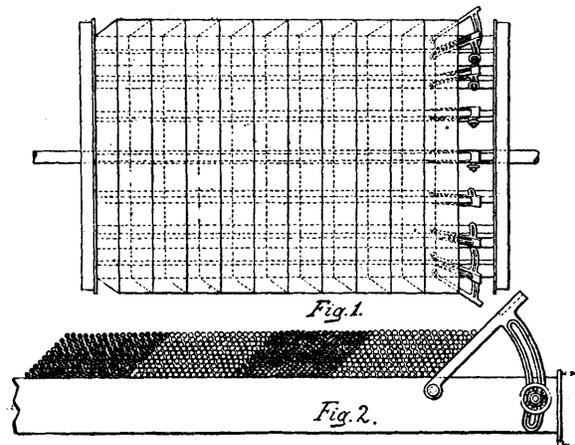
these supports into the threads above and to indent or abrade the same to a very detrimental extent. The improved winding in which the coils are all brought close together affords such a multiplicity and close juxtaposition of supports that no such abrading or cutting can result, and the same pressure that would mar the thread of an ordinarily-wound cop has no detrimental effect upon one wound in the improved way. As distinguished from ordinary cops each portion of the thread extends from one end to the other of the improved cop in each layer and has the same number of turns in each layer throughout the entire cop. No slipping of the threads at the ends of cop can occur by this method of winding, inasmuch as each thread the moment it reaches the edge or end of the cop takes another direction across the face of the cop to throw it back, so that it cannot under any circumstances fall down or under and across the end of the cop and become entangled or afford any additional friction.

The neat appearance of the new cop is also a matter which is commercially of great importance. (*Universal Winding Co., Boston, Mass.*)

FURBUSH'S DRESSING, WARPING OR REELING MACHINE.

Hitherto, in the reeling of the yarn or thread to constitute the warp for the weaving operation, it has been customary to conduct or lead the ends of the yarn or thread from spools or bobbins mounted in a creel or frame, through a supported heck or lease and sectional reed to a reel to cause the thread or yarn to be wound in sections onto the cross-arms thereof, within range of detachable pins mounted in and projecting from the arms until the spools or bobbins of the creel or frame were depleted and the cross-arms of the reel were provided with their full quota of said material, when it was wound off of the reel onto a warp beam.

The use of detachable pins in connection with the cross-arms of the reel has long been regarded as exceedingly objectionable, because in the winding of the yarn onto the reel at a high rate of speed there is a constant tendency for the material to become entangled with the pins, and thus for the thread or yarn to break



short or the pins to kink the same in such manner as to deteriorate the strength thereof in the one instance, or to necessitate in the other the stopping of the reel to take up and unite broken ends.

Another trouble is the intermeshing and hugging of the individual threads to the neighboring threads thereof, and the lack of regularity in tension, so that there is abnormal stretching of some of the threads

and slackening or sagging of others, whereby in unwinding from the reel onto a beam, due to such lack of tension and the use of detachable pins, it has been found in extended practice that the material is very apt to be so deteriorated as to give a warp unfit for subsequent use.

The principal objects of the Furbush method of dressing, warping or reeling, are:—*First*, To overcome the previously mentioned objections and disadvantageous features in the winding or reeling of yarn. *Second*, To provide a warping-reel with attachments or devices adjustably connected with the cross-arms thereof, and so arranged as that the thread or yarn in the reeling operation is built up in regular lays onto one another into substantially truncated cones and in such manner as that in the formation of one of such figures or forms, it will become a form or guide for the building or laying up in regular sequence of a series of cone-shaped deposits of the yarn or fibrous material onto the respective cross-arms of the reel in the rotation thereof until the spools or bobbins of the creel or frame have been depleted, or until the cross-arms of the reel have been completely covered and in such manner as to present a smooth cylindrical surface, when the same is transferred, in such state or condition, to a beam to constitute warp for use in the weaving operation. *Third*, To provide a warping-reel adapted to cone the yarn or thread thereon, and provided with mechanism adapted to move automatically, step-by-step, in one direction in the laying or building up of the thread or yarn into cone-shaped figures or forms thereon. *Fourth*, To provide a warping-reel adapted to improve the winding of the yarn or thread, and with the absence of broken threads, or of having to stop the reel to take up and unite broken ends in the unwinding of the same onto a beam to become warp; and *Fifth*, To provide a reel or frame and an adjustably supported heck or lease and sectional reel for employment in connection with a rotatable coning-reel and mechanism for detachably supporting and rotating a beam for the reception of the thread or yarn from the reel in a reverse step-by-step movement of the same, and the said mechanism so constructed and arranged as that the warping and beaming operations are appreciably improved and a superior quality of warp for weaving is obtained, due to the uniformity of tension maintained throughout the winding or reeling of the yarn or fibrous material.

The improvement, stated in general terms, consists of a warping-reel provided with attachments adjustably connected therewith and so arranged as that the yarn is formed in regular and united sequence thereby into cones presenting a smooth cylindrical surface for transfer therefrom to a beam to become warp.

To more clearly explain the invention, the accompanying two illustrations are given, and of which Fig. 1 is a front elevational view of the reel detached from its standards with the adjustable coning attachments of the invention in application thereto and showing also the mode of building or laying up the yarn or fibrous material onto the reel according to the principle involved in and by the process. Fig. 2 is a side elevational view partly in section of one of the cross-arms of the warping-reel and also a longitudinal section through the yarn or threads wound thereon, serving to illustrate the general appearance of the respective groups and overlapping layers of thread or yarn comprising the series of united conical figures or forms thereof constituted by the winding in the rotation of the reel.

The beaming of the yarn, it will be understood, is carried out with due regard to required tension of the reel with respect to the beam in order to insure uniformity in the transfer of the fibrous material from the reel, in entirety onto the warp-beam. It may,

however, be here remarked that in the beaming operation the rotation of the reel is reversed and also that the same is allowed to travel in an opposite direction to that required for the reeling of the material until the point at which the reeling of one section of yarn onto the same is reached, when the entire contents of the reel will have been wound off onto the warp-beam. (*M. A. Furbush & Son Machine Co., Phila.*)

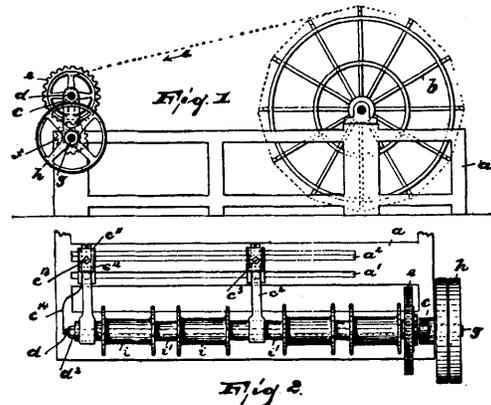
ATHERTON'S WARP BEAMING MACHINE.

The object of the invention is an improvement on the beaming frame shaft for holding a number of narrow-ware beams to their place.

Fig. 1 is an end elevation of a winder and of a portion of a beaming attachment provided with the improvements; Fig. 2, an enlarged top plan view of the beaming attachment proper.

Letters of reference indicate thus:—*a*, represents the frame and *b* the winder, from which the warp is to be wound upon a series of beams *i*, arranged on shaft *d*. The shaft *d* is arranged with one end in the stationary bracket *c*, and is provided with a gear-wheel *e*, meshing with pinion *f*, secured on shaft *g*, which latter receives its motion through the driving pulley *h*. The outer end of the shaft *d* is screw-threaded, adapted to be engaged by a tightening nut *d*², and is also provided with a socket.

The frame *a* is traversed by a slot *a*¹, and a guide groove or recess *a*², adapted to be engaged, respect-



ively, by the tightening and adjusting bolt and nut and the projecting portion of the bracket *c*¹¹. The upper portion of said bracket forms the guide and bearing for the forked arm *c*¹², adapted to support the outer end of the shaft *d*. Arm *c*¹² is provided with a stop-pin on its outer end, and is securely fastened in said bracket *c*¹¹ by means of a set-screw *c*¹³. A spring, *c*¹⁴, is secured on one side of said arm and is provided at its free end with a centering-block, adapted to engage the socket of the shaft *d*. To allow the said arm *c*¹², and its spring *c*¹⁴, to be withdrawn out of the path of the shaft *d* and beams *i*, respectively, the bracket *c*¹¹ is provided with a longitudinal slot.

On the shaft *d* the beams are arranged alternately with a series of sleeves *i*¹, the end one of which is adapted to be engaged by the tightening nut *d*², whereby all the beams are securely fastened to said shaft and are bound to rotate with the same.

In operation when the warp has been wound on the beams and the latter are to be replaced by empty ones, the arms *c*¹² and *c*¹² are withdrawn after the tightening-nuts *c*¹³ and *c*¹³ have been loosened.

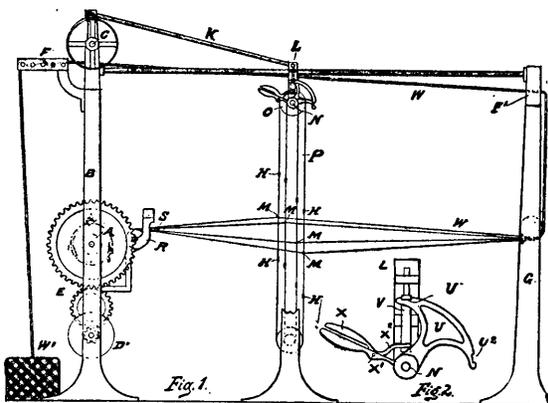
The tightening-nut *d*² is unscrewed from the shaft *d*, and the sleeves *i*¹ and the beams *i*, are easily slid

off the said shaft. Others are now put in their respective places and the arms c^2 and c^2 returned to their normal positions, when the machine is again ready for operation.

From the foregoing it can be seen that the beams $\frac{1}{2}$ can be readily put on and taken off the shaft, whereby a good deal of time and labor are saved. By inserting sleeves of different lengths various-sized beams can be used on the same shaft without changing the construction and relative arrangements of the various parts of the machine. (*A. Scheid, of Harrison, and Robert Atherton, of Paterson, N. J.*)

MACHINE FOR DRESSING OR BEAMING COTTON WARPS.

This machine has for its object the dividing or dressing of warp-threads prior to weaving by means of healds in place of using brushes and other rubbing instruments as heretofore used for the purpose of divid-



ing the warp-threads and thus by the use of this machine retain the major portion of the size deposited on the warp-threads, thereby preserving the strength and weaving qualities of the warp.

In describing this machine in detail, reference is made to the accompanying drawings, in which Fig. 1 represents a side view of which a portion of the center upright is cut away to more clearly show the action of the apparatus. Fig. 2 is a detail illustration.

The beam A, upon which the dressed warp-threads W are wound, is mounted between the uprights W, and driven from the shaft C, through pulleys (not shown), and spur gearing E. The ball W' of warp-threads is formed and sized in the usual manner and the warp-threads W, conducted over the bars F, F', and roller G, and pass through mails or loops M, in the healds H, reciprocated in a continuous and suitable manner, so that a "shed" is repeatedly formed by one portion of the warp-threads reciprocating upward and the other portion downward, by which operation the said threads are divided or separated. The reciprocation of the healds H, and the warp-threads W, is accomplished by securing to the rotating shaft C, a crank J, and coupling same by a rod K, to an arm L, mounted loosely upon a shaft N, upon which are secured pulleys O. To the circumference of each is respectively attached a flexible strap P, the ends of which are connected to the healds H, and both kept in tension at the bottom by a similar arrangement of pulleys mounted on a cross rail. Upon the shaft N, is secured a quadrant U, shown by detail Fig. 2, and is prepared with two recesses U' and U^2, with either of which a sliding V, mounted in the arm L, may engage, so that by the oscillation of the arm L, the quadrant U, is operated and shaft N, rocked in its bearings, thus giv-

ing a reciprocating motion to the healds H, and the warp-threads W, by which motion the said warp-threads are automatically and repeatedly divided or separated as they are traveling between roller G, and fixed reed R, through which they pass to the rotating beam A, the warp-threads being by preference kept divided close to the fixed reed R, by a rod S, passing between the threads for the entire width of the warp.

The projection on the bar V, engaging in one of the recesses in quadrant U, may be changed from one recess U' or U^2 to the other by pressing the lever X hinged at X' toward the arm of said quadrant. An extension of the lever X^2 being engaged between projections on the said bar, causes the projecting piece on the bar to be raised clear of the notch. Then the said shaft may be turned by the said quadrant until the projection on the bar engages with the recess.

By changing the position of the projection on the bar V in the quadrant U, the motion transmitted to the healds is reversed, that is to say, those warp-threads that formed the top portion of the "shed," now form the bottom, and the bottom threads, the top of the shed, the reciprocating warp-threads meeting in the centre and not crossing each other.

The rising and falling motion imparted to the healds H, is continuous so long as the beam A, rotates, thereby dividing or separating the warp-threads from each other without the intervention of a brush or other rubbing instrument, as now in common use, and which, in addition to separating the threads, more or less removes the size therefrom, thereby reducing the strength and weaving qualities of the warp. (*J. and R. Lister, Keigley, England.*)

THE DENN ELECTRIC STOP-MOTION FOR WARPING MACHINES.

The object of the device is to provide improvements in electric stop-motions for warping machines, whereby a positive action of the circuit-closer is insured at all times and the thread-guides permit slack in the thread without closing the circuit and stopping the machine.

The improvement consists of a conducting strip forming one terminal of the electric circuit, and on which the thread-guides are pivoted, the pivoted ends of the guides having a sliding connection with the strip, and a contacting strip forming the other terminal of the circuit, and provided with an inclined contact surface adapted to be engaged by lower bent ends of guide.

Fig. 1 is a sectional elevation showing the general arrangement of the circuit-closer and the stop mechanism. Fig. 2 is a sectional plan view of one of the guide rails. The spool-frame A, carries the spools B; in front of each vertical row of spools is arranged a rail C, in front of which pass the threads B', from the spools B, through the eyes D', and E, of which the latter are rigidly secured in the rail C, while the eyes D', are each formed on the free end of a thread-guide D, having its pivot end D^2 formed with an elongated

slot engaging the pivot H, passing through or secured to a conducting strip I, secured to the rail C, the said conducting strip I forming part of an electric circuit by being connected by a wire J, with a battery F, or other source of electricity; the other wire J', of the electric circuit connecting with a contact strip K, likewise secured on the rail C, as is plainly shown in Fig. 2.

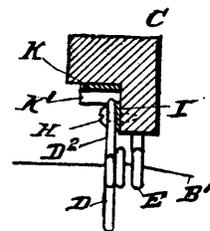


Fig. 1.

This contact strip K, is in the path of the pivoted thread-guide D.

On each contact strip K, are formed or secured inclined surfaces K', each adapted to be engaged by the bent lower end of the next adjacent thread-guide D, so as to close the circuit, the electric connection

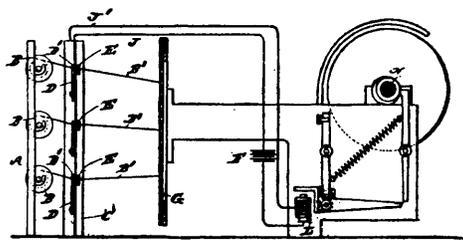


Fig. 2.

being then made between the strips K and I, by the thread-guide D, and the pivot H, together with the wires J and J', and the battery F. The threads B', after leaving the spools B, pass through the eyes D' and E, to the gatherer G, which holds the thread-guides D, in an uppermost position, so that the lower bent end of each thread-guide is a considerable distance away from the surface K' and the strip K, whereby the circuit remains open.

Now when a slack occurs in one of the threads, then the thread-guide D by its own weight can swing downward to take up the slack, without making contact between the bent end and the spring K. When, however, one of the threads B' breaks, then the support for holding the corresponding thread-guide in an uppermost position is removed, and consequently, the thread-guide swings downward and moves, with bent end, in contact with inclined surface K', to close circuit as previously explained, and to cause the machine to stop in usual manner. Now it will be seen when thread-guide D, swings downward, and its bent end moves in contact with the inclined surface K', then the force of downward swinging of thread-guide D, causes a sliding of the bent end in an oblique direction, it being understood that the elongated slot in the pivot end D^1, of the thread-guide, permits such motion. The bent end does not contact only at one point of the strip K, but comes in contact with a considerable surface of the strip, owing to the sliding connection, so that a closing of the circuit positively takes place, as the contact parts do not oxidize to such an extent as to interfere with the closing of the circuit, owing to the rubbing of the bent end on the inclined surface K'. L, is the electro-magnet, and N, the shaft of the warping machine. (*Globe Machine Works, Frankford, Phila.*)

SELF REGISTERING STOP-MOTION MECHANISM FOR WARPERS.

In the operation of warping, stoppages are made from time to time to correct faults or breakage of the yarn, and thus the proper performance of the warper is very largely controlled by the prior treatment of the warps in the operations of carding, spinning, etc., and when these operations are not properly carried out, the threads will break more frequently in the warping, necessitating stoppages of the machines. To give a record of these stoppages of the warper to the overseer is the object of this device. He, in turn, will thus know the quality of the yarn, and also if the warp-tender is doing a full day's work.

Warpers are usually provided with tight and loose

pulleys and a slow speed pulley, the latter being used to start the machine slowly, or to run it at slow speed for a short time in order that the attendant may conveniently repair breakages.

Inasmuch as the slow speed of the warper is not a proper indication of the work, a register is provided in the new warper, operated only when the warper is started at full speed.

Of the accompanying illustrations Fig. 1 is a front elevation of the device as applied to a warper, a sufficient portion of the warper being shown so the device will be understood. Fig. 2 is a right-hand elevation of the apparatus shown in Fig. 1.

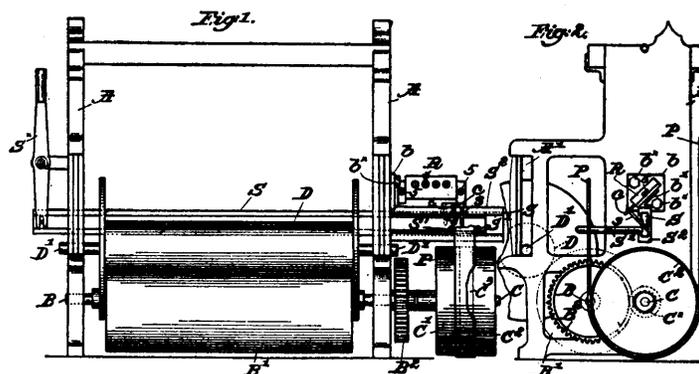
The warper which is chosen for illustration comprises end frames A, of suitable shape to form bearings for a shaft B, provided with a driving roll or drum B', and a gear B^2, in mesh with a pinion C^x (see dotted lines Fig. 2), on a short shaft C, having thereon fast and loose pulleys C^1, and C^2, and a slow speed pulley C^3.

The warp-roll D, rests on drum B', and its journals D^1, are vertically movable in slots or guideways A^1, in the main frame.

The end frames A, are slotted to form bearings for a shipper-bar S, movable longitudinally therethrough by means of a shipper-lever S^x, and provided with a belt-fork S', to engage the power-transmitting belt P, and move it from one to the other of the pulleys, a laterally extended guide or support S^2, for the bar being secured to the frame at the belt end.

Stand b, is secured to the end frame by bolts dx, provided with a laterally extended arm b', having an inclined face as shown in Fig. 2, to which is secured by screws 5, a registering device R.

As shown in Fig. 1, the face of the register has a



series of openings therein, beneath each of which is located a disk, each disk provided with the digits and zero in well-known manner, the complete rotation of one dial turning the next succeeding one through one step.

The spring-controlled actuator for the right-hand or units dial projects at c, from the slotted bottom of the casing and is extended in the path of a pin or projection s, on the shipper-bar S, the said pin being so located herein that it will engage and move the actuator c, into dotted line position, Fig. 1, when the belt P, is moved onto the fast pulley C^1, thereby moving the right-hand dial one step or unit.

When the belt is for any reason thrown off the fast pulley, the actuator c, returns to full-line position, ready to be again moved when the apparatus is started at full speed.

It will thus be seen that a complete register is kept of the number of times the apparatus has been started at full speed, and also that the belt P, can be moved from the slow-speed to the loose pulley, and vice versa, any number of times without registering. (*Draper Co.*)

TENSION REGULATOR FOR YARN-BEAMS.

This device relates to machines for dressing yarn preparatory to weaving, and more especially to regulating the tension of the yarn as it is drawn from the yarn-beams in making up the full beam for the loom.

Fig. 1, represents a side elevation of one of the yarn-beams with the tension-regulating mechanism in position. Fig. 2, is a top view of the same parts shown in Fig. 1. Fig. 3, shows a vertical section of the mechanism, taken on line *x-x*, in Fig. 2. Fig. 4, is a front view of one of the frame-weights used in the machine.

One great trouble in weaving cloth is the thin or light places that occur and produce different shades in dyeing and also otherwise injure the goods. This variation in the cloth is mainly caused by lack of uniform tension on the yarn when it is transferred in the dresser from the beam filled on the warper to the full beam for the loom. When the beam from which the yarn is drawn is full, the yarn turns the beam much easier than it does when the beam is nearly empty, by reason of the change of leverage.

To overcome this trouble is the object of the new device, which consists in applying a friction to the yarn on the beam that shall be reduced automatically as the size of the beam is reduced in unwinding.

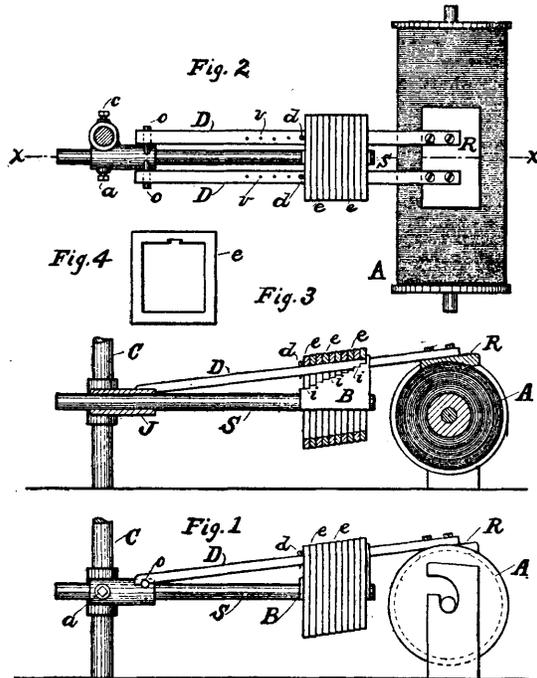
Its construction is as follows:—A, represents a yarn-beam in position to be unwound. C, is a standard secured to the floor at a suitable distance from the beam. A socket J, has a hole made through it vertically to slide on the standard C, and a set-screw *c* is tapped in one side of the socket to hold it at any desired height on the standard. Another opening is made through the socket horizontally to receive a bar S, and a set-screw *a* is put in the opposite side of the socket to bear against the bar and hold it firmly. Two

beam A. The object of the pad R is to make a friction on the yarn and to increase that friction and make it capable of variation.

Weights *e*, in the shape of frames, (see Fig. 4,) of cast metal, are placed close together on the double bar D, and held from sliding back by means of pins *d*, put in holes in the bar. A number of these weights *e*, (represented in the drawings as being ten) are used on the bar at one time, and when the full beam A starts to unwind, all the weights *e* will rest on the bar and cause the full amount of friction; but, as the yarn unwinds and lets the bar D and pad R down, its leverage in turning the beam decreases and it is necessary to lessen the weight on the bar D. This is accomplished by means of a block B, held on the bar S, which has its upper side cut into a stepped form, (see Fig. 3,) arranged to catch the weights *e*, one after another on the successive steps *i*, as the bar S, sinks down by the unwinding of the yarn from the beam and thus relieves the bar of the pressure of the weights gradually.

As it requires more tension on the yarn to turn the beam as it grows smaller, the weight on the friction-pad will be gradually removed and the friction of the pad on the yarn reduced, so that the same tension on the yarn required to turn the full beam will turn the same when nearly empty. A series of holes *v*, are made in both parts of the bar D, to receive the pins *d*, so that the weights *e*, can be held farther in or out on the bar to lessen or increase the pressure on the pad R, on the yarn-beam, and by loosening the set-screw *a* the bar S can be pushed in or out to bring the block B in proper position with regard to the weights.

When it is necessary to remove an empty beam to put in a full one, the weights *e* can be removed back onto the socket and the bar D taken out, and by loosening the set-screw *a* the bar S can be slid back out of the way. (Hugo J. Trost, Olneyville, R. I.)



horizontal trunnions *o*, are placed one on each side of the horizontal barrel of the socket J, to receive the rear ends of a double bar D, on the under side of which notches are made to fit on the trunnions *o*. The front ends of the bar D, are secured by bolts to a friction-pad R, that rests on the surface of the yarn on the

WARP-COMPRESSOR.

The object of this compressor is to apply pressure upon a warp as it is being wound upon the warp-beam, whereby the warp is wound more tightly and solidly upon the beam; thereby increasing the amount of warp upon the beam, rendering its tension uniform during the process of weaving.

The accompanying illustration shows in perspective view this warp-compressor.

A, A', denote stands supporting a rock-shaft B, to which is attached the arms B¹ and B² and B³, having hooked ends B⁴, inclosing about two-thirds of the periphery of a pressure-roll C, of suitable length to enter between the heads of a warp-beam and rest upon the warp as it is being wound upon the beam.

The hooked ends B⁴, of the arm are recessed to receive friction-rolls, which rotate upon pins C², and bear against the periphery of the pressure-roll, in order to reduce the friction upon the pressure-roll, and enable it to rotate freely within the arms. To the rocking-shaft B, and opposite the central arm B², is attached a bracket, and the arm B² is provided with an upright arm, between which and the bracket before referred to, is a bar placed transversely to and above the rocking-shaft B, and provided with ways for a sliding block, which traverses along the bar by means of a rotating screw. The upper end of the sliding-block carries a rotating-scored pulley. Attached to the ceiling above the warp-compressor are an eyebolt and pulley-blocks, containing the scored pulleys.

A weight is attached to one end of a chain which passes over and around one or the other pulleys and around the pulley held in the pulley-block, which is connected by a chain with a lever pivoted upon the previously referred to bracket. From the pulley the chain extends upward, and it has its end attached to

the upper surface of the projection f^4 of the fulcrumed lever f —and in that case its lug f^2 will force the shoe e^2 upward and the hammer will strike the gong l in

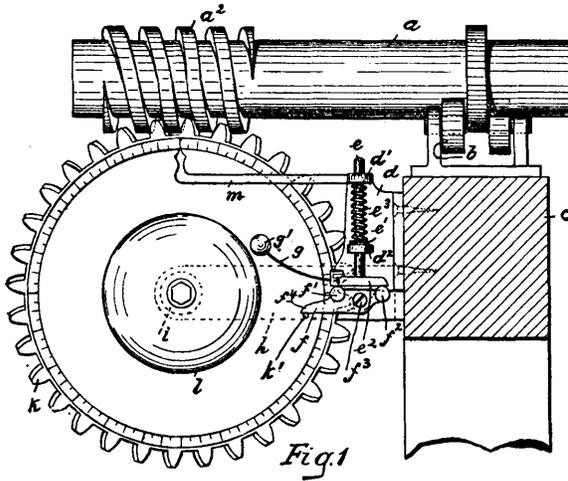


Fig. 1

its return movement. This is an important feature of the new mechanism, *i. e.*, that the striking mechanism can be operated having the reel-supporting shaft rotating in either direction, since in older mechanisms where the reel-supporting shaft is arranged to rotate only in one direction, frequent breakage is caused by reversing the rotation of said reel-supporting shaft. (B. Eastwood, Paterson, N. J.)

ATWOOD'S REEL.

The advantage claimed for this reel is that it can be readily and quickly increased or diminished in size as may be required by the size of the skein of yarn.

All of the arms are shifted together uniformly outward and inward, thus the reel is kept at all times balanced.

Fig. 1 represents a view of the swift or reel looking toward the end of its spindle or gudgeon, the several arms being shown in a position about midway between their inward and outward adjustments. Fig. 2 is a face view of one of the hub-sections, showing the position of two pairs of arms relatively thereto. Fig. 3 is a face view of the other hub-section, showing the location of the different tangential grooves therein, the arms being removed.

The reel is provided with three pairs of arms A, A', A², each arm being provided at its outer end with a laterally-extended skein-support B. The several pairs of arms are located in different planes so as to enable them to pass each other freely at the hub of the reel, the said arms being adapted to be extended and withdrawn by a rack-and-pinion connection. Each of the arms is provided with a rack a , extending from the end of the arm opposite the skein-support to a point a short distance from the skein-support, the racks of each pair of arms being upon the adjacent sides of the side arms. These sets or pairs of arms are guided in their outward and inward movement by grooves in the hub-sections C, C', which grooves are so arranged as to keep the several pairs of arms at about sixty degrees apart.

The grooves in which the pair of arms A run, are formed by the two sections C, C', and are denoted by c, c' . The arms A', pass through grooves in the hub-section C, the said grooves being denoted by c^2, c^3 . The

grooves in which the arms A² slide, are denoted by c^4, c^5 and are located in the hub-section C'.

The spindle or gudgeon of the reel is denoted by D, and the hub-section C is secured against movement thereon.

On the spindle D is loosely mounted a sleeve, having a pinion of sufficient width to extend across the plane of the three sets of arms A, A', A². Beyond the end of the hub-section C' this sleeve is provided with a suitable operating-wheel or knob F, consisting of a flat disk having its edge curled or crimped over to form a convenient hold for the hand. This operating-wheel F is also free to rotate independently of the spindle D.

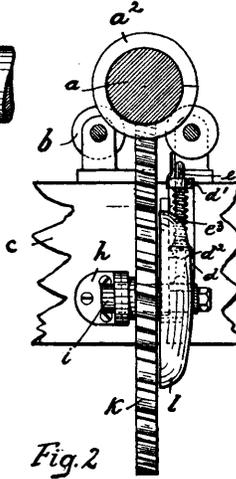


Fig. 2

The hub-section C', is held interlocked with the hub-section C by means of a flexible washer which is held in frictional engagement with the operating-wheel F by means of a nut and a jam nut, having a screw-threaded engagement with the end of said spindle D. This spring-washer serves the double function of holding the two hub-sections together and also applying friction to the operating-wheel F, whereby the arms may not be extended or contracted unless positively operated. The grooves in the hub-sections C, C', are so arranged that they will cause the adjacent racks in each set of arms to engage the pinion upon opposite sides thereof. It will be seen that the inner sides of all of the grooves are necessarily tangential to the pinion, also that the pinion turns upon a so-called "dead-spindle" when it is desired to adjust the arms outwardly or inwardly.

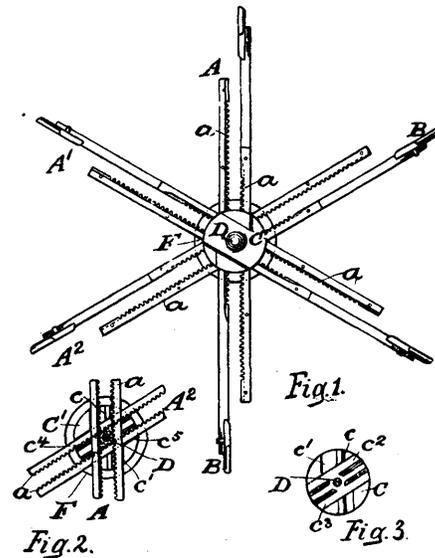


Fig. 1

Fig. 2

Fig. 3

The manner of securing the skein-supports to the ends of the arms is as follows:—The skein-support B is of metal, and a ferrule is formed by striking half out of each side of the body of the support. The arm is

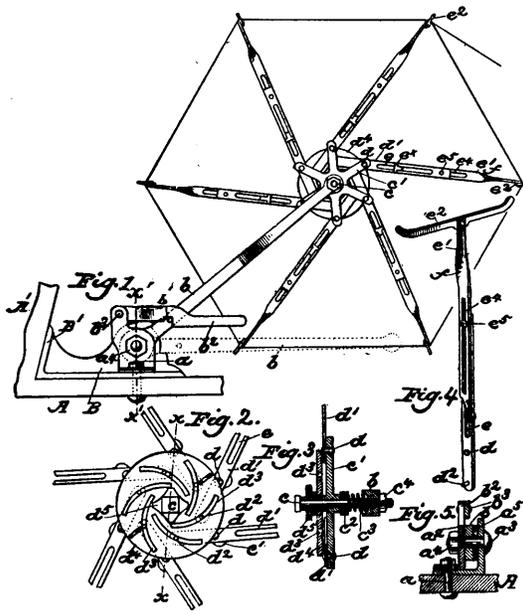
bifurcated at its end, and the skein-support is forced between the bifurcated ends of the arm, and the ferrule passes around the exterior of the bifurcated ends and holds the support snugly in position.

It will be seen by explanations given that the swift or reel may be adjusted to any required size very quickly and easily by turning the operating-wheel or knob F, and when adjusted will stay in such position until positively changed. (*Orlo Atwood, Stonington, Conn.*)

LORD'S REEL AND SUPPORT.

The object of this device is to be able to use any size or length of skeins of yarn in machines for winding the same on spools and what is accomplished by having the arms of the reel constructed so that they can be adjusted to suit the size or length of the skein of yarn required to be wound. There is also a tension added to the reel, which can be adjusted to suit the winding of any kind of yarn (either more or less tight or loose).

This reel and support consists of a series of metallic arms which are pivoted on a disk or spider having restrained rotation on a stud, and said arms each have at their inner ends and between their fulcra and the stud a pin which enters each, a separate spiral slot in a plate which may be rotated more or less on said stud at the side of the said disk or spider, the spiral slots acting on the pins of the arms to simultaneously turn the latter on their fulcra to enlarge or contract the effective diameter of the reel, and a nut



screwed upon the threaded hub of the disk or spider and acting against the slotted plate holding the same in any position in which it may be left.

The stud supporting the reel is mounted on an arm pivoted on a foot-casting adapted to be secured to a rail of the spooling machine, the said arm having combined with it means for holding it in proper working position, yet permit it to be thrown or drawn down away from adjacent reels when the yarn of that reel may need attention.

Of the accompanying illustrations, Fig. 1, in side elevation, represents such an improved reel mounted on a rail of a spooling machine; Fig. 2, an enlarged detail showing the slotted plate, disk or spider and parts of the arms pivoted thereon, and the locking-nut; Fig. 3, a section of Fig. 2, on the line $x-x$. Fig. 4, shows one of the reel-arms enlarged; and Fig. 5 is a section in the line $x'-x'$, Fig. 1.

The rail A, commonly extended from one to the other end of a spooling machine, has attached to it by a suitable bolt a , a foot-plate B, having a heel B' , to fit the back A' , of the rail.

The bolt enters a web of the foot-plate and also an ear of a stationary washer a^2 ; an upright flange of the foot-piece (see Fig. 5) holding a bolt or stud a^3 , one end of which is passed through the said washer, where it has applied to it a nut a^4 .

The bolt is surrounded by a washer a^5 , and serves as a fulcrum for the reel-carrying arm b , the setting up of the nut causing the arm to be held with a measured friction, which may be enough to hold the arm in any position in which it may be left, either up or down, as in full or dotted lines, Fig. 1. The arm b , is provided with a pin b' , which is adapted to be engaged by a latch b^2 , pivoted at b^3 , on the washer a^2 .

When the latch engages the pin, as in full lines, Fig. 1, the arm is locked in its elevated position, but when the latch is disengaged from the pin the arm may be turned down more or less to lower the reel mounted on it. The upper end of the arm b , has screwed into it the threaded end of a bolt c . The bolt enters the hub of a disk or spider c' , and a friction-washer c^2 , and a spiral spring c^3 , and is screwed into the disk, the threaded end of the bolt receiving a set-nut c^4 , to lock the bolt in place.

The bolt may be screwed into the arm b , to compress the spring c^3 , more or less, and cause it to act on the washer to make the latter exert more or less of a restraint on the hub of the disk and restrain it from rotating except after a predetermined amount of strain on the yarn. The spring and washer thus act as a tension device for the reel.

The disk has pivoted upon it at d , a series of arms d' , having at their inner ends each a like pin d^2 , which enters one of a series of spiral slots d^3 , in a plate d^4 , mounted on the extended hub of the disk c' , the said hub being threaded and receiving a locking-nut d^5 , which may be made to lock or unlock the plate, the latter when unlocked being free to be moved on the hub in one or the other direction to cause the arm to assume a more or less radial position with relation to the disk which constitutes the hub of the reel, such movement of the plate expanding or contracting the reel. The reel-arms d' have combined with them extension-arms e' , suitably connected thereto and provided at their outer ends with skein-holders e^2 . A series of these arms d' , e' , and skein-holders e^2 , make up the reel.

The rear ends of the arms e' , are shown as provided with a T-piece e^3 , and so bent as to enter the slots e , in the arms d' , and the arms e' , are shown as slotted at e^4 to receive a screw e^5 , inserted in the arms d' .

The arms may be lengthened and shortened at will by loosening the screws e^5 , and all of them may be simultaneously inclined more or less quickly to take off a skein or to adapt the arms to the size of the skein applied. The arms e' , near their outer ends, have given to them a quarter-twist, as at f , so as to turn to the proper angle the skein-holders.

The disk d^4 has ears or thumb-pieces g , which may be engaged easily when the disk is to be turned to enlarge or contract the skein-holding arm. (*C. S. Lord, Winooski, Vermont.*)

MISCELLANEOUS.

IMPROVEMENTS FOR THE MASON LOOM.

The same have for their object *first*, to provide the loom with devices by means of which the breakage of warp-threads may be reduced to the minimum, and *second*, to provide means that the loom be quickly stopped not only when the filling is broken or exhausted but also when the shuttle fails to enter the shuttle-box.

The strain upon the warp-threads is equalized and reduced by means of an improved back-bearing for the roll over which pass the warp-threads on their way to the harnesses, the said roll being free to yield whenever undue pressure is brought upon the warp-threads.

For stopping the loom quickly the same is provided with a compound brake which acts upon the brake-pulley of the loom, both when the shuttle fails to enter the shuttle-box and also when the filling breaks or is exhausted.

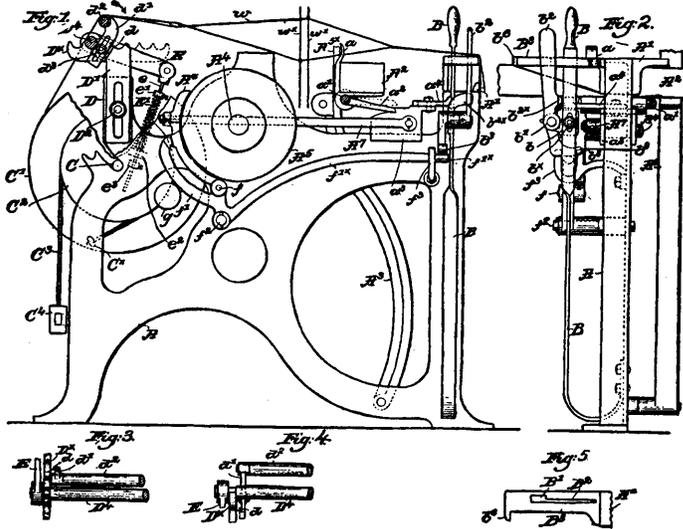


Fig. 1 represents in side elevation a sufficient portion of a loom with the improvements added to enable anybody to understand the same clearly; a portion of the loom-frame being broken out to better show some of the parts. Fig. 2 is a detail showing the left-hand front corner of the loom with the shipper-handle B, knocked off and in the act of moving from the left to the right. Fig. 3 is a detail, in plan view, of the warp-thread support; Fig. 4 a face view of the parts shown in Fig. 3, and Fig. 5 is a plan view of the shipper-handle holding-plate.

A, indicates the loom-frame, having a breast-beam A', and containing a crank-shaft A⁴, having cranks, (not shown) which are attached to the lay-swords A², having the lay-beam A³, and reed A^x, the lay having a binder-finger *a*, which acts upon the binder (not shown) of the shuttle-box, said binder-finger being connected to the rock-shaft *a'*, carried by the lay and having a dagger *a²*, adapted, when lowered into its full line position, Fig. 1, by the absence of the shuttle, to meet a notched frog *a³*, provided with a finger *a⁴*.

The warp-threads *w* are controlled by heddles *w'*, connected to harness-frames.

The crank-shaft A⁴ has upon it at one end a suitable brake-pulley A⁵, the periphery of the brake-pulley being adapted to be acted upon by a brake-shoe A⁶, connected by a rod A⁷, with and to be moved by the frog *a³*, when the latter is moved by the dagger.

The loom-frame at its rear end, has bearings to receive the journals C of the warp-beam C', which have at one end a let-off, shown as a pulley C², over which is extended a rope C³, one end of which is attached to the frame at C^x, and the other end to a weighted lever C⁴.

The loom-frame, at its rear end, is also provided at each side with guideways D, (only one of which is herein shown) in which are mounted stands D', adjusted by means of bolts D², passing through slots in said stands. The upper end of each stand is provided with a laterally extended arm D^x, having a series of open-top bearings for the reception of a shaft D⁴, extended from one to the other of said stands across the loom, and adjustable by placing it in one or the other of the bearings referred to. The stand is also made reversible, as shown by dotted lines in Fig. 1, to increase the range of adjustability.

Fast at one end on the shaft D⁴, is an arm E, supported at its outer end in a yielding manner by a rod *e*, jointed to said arm and provided with a collar *e'*, resting upon a spring E', supported by lug *e²*, on the frame work, and shown by dotted lines, Fig. 1, is an adjustable stop *e³*, secured to said rod below said projection acting to limit the upward movement of said rod and its lever. The shaft D⁴ also has attached to it, between the stands D', arms *d*, to receive the slotted carriers *d'*, between which is mounted the whip-roll *d²*, said carriers being connected to said arms by bolts *d³*, to enable the whip-roll to be adjusted up or down with relation to the shaft D⁴.

In the normal operation of the loom the let-off is such as will enable the beam C', to turn and give off the warp as the latter is taken up in the weaving of the cloth. Frequently, however, a sudden increase in the pull or tension upon the warp would break the warp before the heavy beam could rotate to relieve it.

By means of the present improved construction of the loom, however, by mounting the whip-roll *d²* on the spring-controlled or yielding carriers referred to any sudden pull or tension upon the warp will simply turn the said roll down more or less in the direction of the arrow and about the axis of the shaft D⁴, to effect a temporary relief and thereby save the warp. The tension of the spring E', or the length of the carryiny arms *d'*, may be varied for different grades or sizes of warp or fabric woven, to enable said yielding whip-roll to move when necessary to relieve sudden tension or pull on the warp.

The loom has suitably connected to it the shipper-handle B, adapted to enter a notch B', in the slot B², of the shipper-holding plate B³.

The shipper-handle has attached to it by a bolt *b^x*, a bearing-block *b*, in which is journaled a rock-shaft

b' , upon one end of which is fixed a handle b^2 , and upon its other end a toe b^3 .

The brake-shoe A^6 is jointed at f , to an auxiliary brake-mover f' pivoted at f^2 , and having an arm f^x held in a suitable guide f^3 , fixed to the frame, and in a position to be acted upon by the toe b^3 referred to.

Assuming the shipper-handle B to be in the notch B' and the loom weaving regularly, should the shuttle fail to enter the shuttle-box, the dagger a^2 will fail to be lifted and will meet the frog a^3 , and move the same, causing the finger a^4 on the frog to throw the shipper-handle B out of the holding-notch B', such movement of the frog also acting through the rod A^1 , which herein constitutes one form of main brake-actuator, to draw the brake-shoe A^6 , firmly against the brake-pulley. As soon as the shipper-handle B is disengaged from its holding-notch, as described, it springs to the right, Fig. 2, to throw off the power, such movement of said shipper-handle causing the toe b^3 carried by it to slide onto the outer end of the arm f^x referred to, and depresses said arm, causing the auxiliary brake-mover f' , to act against the brake-shoe A^6 , and increase the pressure with which the same is pressed against the brake-wheel A^5 , to more quickly stop the loom. The movement of the shipper-handle is thus utilized to supplement or assist the main brake-actuator. The toe b^3 , and the handle-lever b^2 , during the movement described are prevented from turning by contact of the handle or lever b^2 , with the stop b^2x on the bearing-block b , on the shipper-handle.

In case the filling fails, the filling-fork (not shown) will act and will release the shipper-handle, as described, letting the toe b^3 , act upon the outer end of the auxiliary brake-mover, to brake and thereby quickly stop the loom, the rod A^1 , at such times not coming into action, the brake being applied solely by the auxiliary brake-mover.

To release the brake and start the loom, the operator moves the handle-lever b^2 , to the left, Fig. 2, about its pivot b' , to move the toe b^3 to the right or from the end of the arm f^x , relieving the latter and permitting the brake-shoe to be drawn by the weight of the counter balance g away from the brake-wheel, after which the shipper-handle B is moved back to the left, and engaged and locked in the holding-notch B', in its holding-plate.

The holding-plate is shown provided with an outer projection or stop b^2x , to throw the handle-lever b^2 , into its proper vertical position against the stop b^2x , on return or outward movement of the shipper-handle, to thereby cause the toe b^3 , to assume proper position with relation to the arm f^x , after passing the latter, in order to be in readiness for a subsequent braking movement when the shipper-handle is released. (*Mason Machine Works.*)

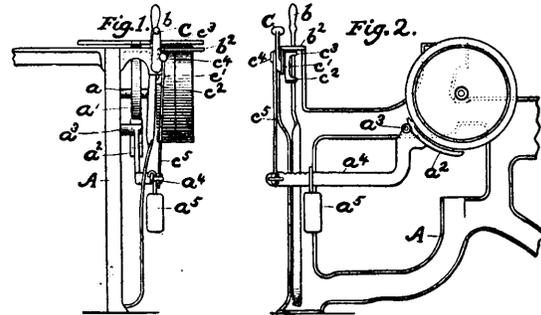
THE MASON BRAKE MECHANISM.

In the operation of looms it is necessary that the brake be automatically applied when the shipper is automatically knocked off to stop the loom for breakage of a thread. It is necessary that the brake be automatically released when the shipper is again moved to start the loom, and it is again further necessary that some means be provided for releasing the brake when the loom is stopped, in order that it may be moved more or less by hand, as is found necessary by the operator in placing the loom in condition for further operation.

Prior to the present improvement a suitable brake-controlling member has been employed which is automatically moved to apply the brake when the shipper is automatically moved to stop the loom, and which is also automatically moved to release the brake by re-

turn of the shipper to running position; but independent devices have been required for releasing the brake when the loom is stopped to permit movement of the loom by hand.

There never has been constructed a single brake-controlling member capable of automatically applying



the brake when the shipper is moved to stop the loom and capable of automatically releasing the brake when the shipper is restored to running position, and, further, having an independent movement to release the brake while the loom is stopped.

The new device comprehends in its construction a brake mechanism having a single controlling member which may be made to fulfill the three functions before enumerated.

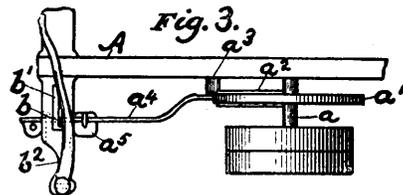
Fig. 1 is a front elevation of a part of one end of a loom, showing the mechanism necessary to enable the novelty of the new device to be understood; Fig. 2 is a right-hand end elevation of the parts shown in Fig. 1; Fig. 3 is a top or plan view of the parts shown in Fig. 2; Fig. 4 is a detail showing the controlling member, Fig. 1, on an enlarged scale; and Fig. 5 is a sectional detail to be referred to.

A, is part of one of the end frames of a loom; a, the crank-shaft; a^2 , the brake-wheel; a^3 , the brake or brake-shoe pivoted at a^4 and provided with the lever a^4 , notched to receive a suitable weight a^5 ; b, the shipper-lever, moving within the notched slot b' in the holding-plate b^2 .

Depending from the holding-plate b^2 , is shown a bracket b^3 , (see Fig. 5) recessed at its lower end to receive the short shaft c of the brake-controlling handle or member C, said shaft c being retained in its proper position in said recess by a cap b^4 and pin b^5 .

Upon the shaft c , at its end opposite the member C, is provided a yoke-like portion c' , the opposite ends of which constitute stops or lugs c^2 , c^3 , which, in the normal or running position of the shipper, are both in contact therewith at its inner edge.

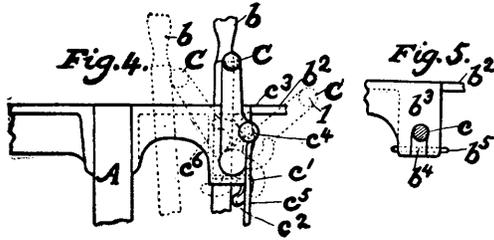
Referring to Figs. 1 and 4, the member C is shown as provided at its outer edge with an ear, to which is jointed at c^4 one end of the lifting-rod c^3 , connected at its lower end to the free end of the brake-lever a^4 ,



the point of connection c^4 , as shown, being at the right of the vertical or dead-center, so that the normal tendency of the weight a^5 , is to turn the member C to the right into its extreme dotted position 1, Fig. 4, and thereby drop the brake-lever and apply the brake,

this tendency being resisted by the stop or lug c^6 , resting upon the shipper-lever in its notch in the holding-plate.

When the shipper is knocked off either automatically or manually, to effect the stopping of the loom, it at



once springs in usual manner to the left into its dotted position shown in Fig. 4, and thereby permits the weight a^5 , to turn the controlling member C into its extreme right-hand position and quickly apply the brake and stop the loom.

If it is desired to release the brake while the loom is stopped, and with the shipper-lever b still in its extreme left or dotted position, Fig. 4, the operator, by throwing the controlling member C, from its dotted position 1 toward the shipper into its extreme left-hand or dotted position, lifts the brake-lever a^4 and its weight, and releases the brake, such movement of the controlling member carrying the point of connection c^4 , of the lifting-rod c^3 , into the position at the opposite side of the vertical or dead-center line, so that the action of the weight a^5 , is now to hold the brake released.

In the present instance there is provided a suitable stop-plate c^6 , (shown in dotted lines, Fig. 4) against which the stops or lugs c^5 , on the controlling member may contact to limit the movement of the controlling member in either direction.

But a single hand-controller is employed, which directly or immediately operates or controls the brake. That is, the brake is applied by movement of a single hand-controller, and is also released by movement of said single hand-controller.

By means of the new mechanism, it is possible to provide a single hand-controller to automatically apply the brake when the shipper is released, to automatically release the brake when the shipper is moved into supporting position, and which may be manually moved to release the brake without starting the loom, the term "shipper" as herein used including any device by which the starting and stopping of the loom is effected.

If the operator wishes to stop the loom by hand without applying the brake, he will by one movement throw the shipper and the brake-controlling member to the left into their dotted positions, Fig. 4. (*Mason Machine Works.*)

CLUTCH-OPERATING MECHANISM FOR CROMPTON LOOMS.

Heretofore two pulleys have been run on a loom, a tight and a loose pulley; but as it always takes time for a belt to shift from the tight to the loose pulley,

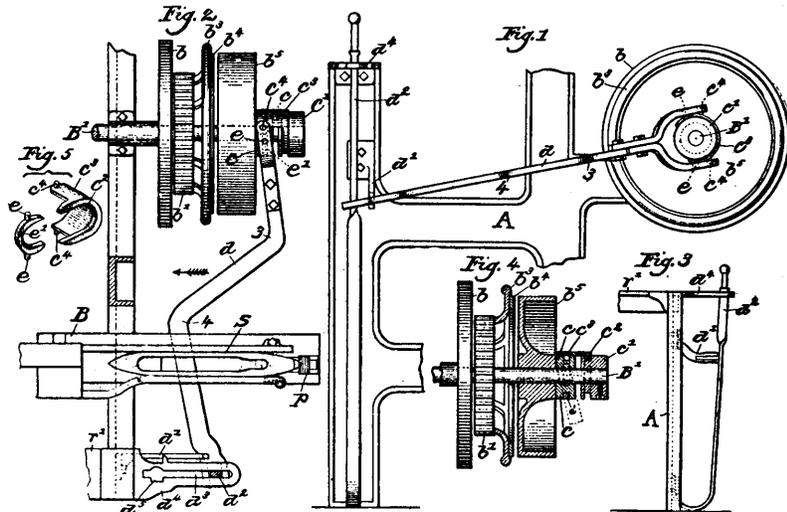
three or four picks are lost before the loom would stop, and besides, the weaver had "to pull back" for as many picks as went in after the filling broke. To overcome all this trouble is the object of this clutch-operating mechanism, since by means of it as soon as the shipper-handle is released it at once forces the pulley from its friction, stopping the loom instantly. The clutch thus to be described operates this kind of a friction pulley.

Fig. 1 shows in end elevation a sufficient portion of a loom equipped with the device to enable the latter to be understood. Fig. 2 is a top or plan view of the parts shown in Fig. 1, together with a portion of the lay, showing the shuttle and picker-stick. Fig. 3 on a reduced scale, is a partial front elevation of the parts shown in Fig. 1. Fig. 4 is an enlarged vertical section of the clutch mechanism, Figs. 1, and 2. Fig. 5 is a perspective detail showing the two cooperating expanding-yokes.

The loom-frame is indicated by A, the breast-beam by r' , the crank-shaft by B' , and the lay by B.

The shuttle S and picker-stick p , are shown only partially in Fig. 2.

Upon the crank-shaft B' is made fast a brake-wheel b , and next it a toothed gear b' , said gear having made as part of it the hand-wheel b^2 , having at one side a ring-like face b^4 , of leather or other suitable friction material, adjacent which is arranged the rim edge of the belt-pulley b^5 , loose on the said shaft. Outside the hub of the belt-pulley b^5 , is a grooved collar c' , fast on the end of said shaft. The collar c' is grooved to receive the inturned flange c^2 of the semicylindrical hood-like clutch member c^3 , provided with oppositely arranged pivots c^4 , to which is jointed the forked end of the lever d , supported near the breast-beam in a suitable forked support d' , and itself forked at its free end to straddle the shipper-lever d^2 , arranged at the end of the loom and shown as of spring material attached to the loom-frame at its lower end and by its



own resiliency tending to normally remain in its outermost positions, Figs. 2, and 3, the said shipper working in the usual slot d^3 in the catch-plate d^4 , the latter being provided with a holding-notch d^5 . (See Fig. 2.)

The forked end of the lever d , close to, but inside the pivots c^4 , is perforated to receive the oppositely arranged pivot projections e , on the yoke-like member e' , Fig. 5, arranged to travel in the groove of the extended hub c of the pulley b^5 , the said yoke-like

member e' and the member e'' , (both shown in Fig. 5,) constituting "clutch-actuating members."

When the loom is at rest, with the parts in the positions Figs. 2, 3, and 4, the pulley b^2 , travels loosely on the shaft B' .

To start the loom the operator throws the shipper-handle to the left, Fig. 2, into the holding-notch d^5 , such movement of said shipper acting to turn the lever d in the direction of the arrow, Fig. 2, about its fulcrum-pivots c^4 , on the stationary hood-like member c^3 , causing the pins e , in the member e' , to slide the said member and the pulley b^5 to the left, Figs. 2 and 4, until the edge of the pulley-rim meets the friction-face b^4 , of the hand-wheel, frictional contact of the two imparting to the hand-wheel and the crank-shaft the rotary motion of the pulley and starting the loom.

To release the clutch and stop the loom, the operator throws off the shipper, as usual, the resiliency of the latter throwing it to its extreme position at the right, Fig. 2, and returning the lever d , to its original position, withdrawing the driving-pulley from frictional contact with the face of the hand-wheel.

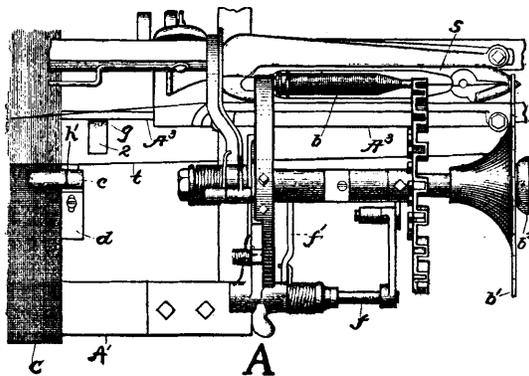
It will be noticed that the lever d , is given an angular or reversed bend at its middle to clear the vibratory movements of the usual picker-stick p , said lever, Fig. 2, being bent to the left at 3, and again back to its normal direction at 4.

The clutch-controlling lever d is supported at one end by the clutch parts and at its opposite end by the support d' , and is loosely connected with the shipper-lever. (*Crompton and Knowles Loom Works.*)

FILLING CUTTING DEVICE FOR NORTHROP LOOMS.

The object of this device is the production of simple means for cutting the filling-thread at a predetermined point close to the selvage and between it and the point of attachment of the end of the filling.

Of the accompanying illustrations Fig. A is a plan view showing a sufficient portion of the loom-frame, lay, and filling-feeder to be understood with the new device applied thereto, the lay being shown as back. Fig. B is a view, partially in section, transversely to the lay, showing the filling-cutter and guide. Fig. C

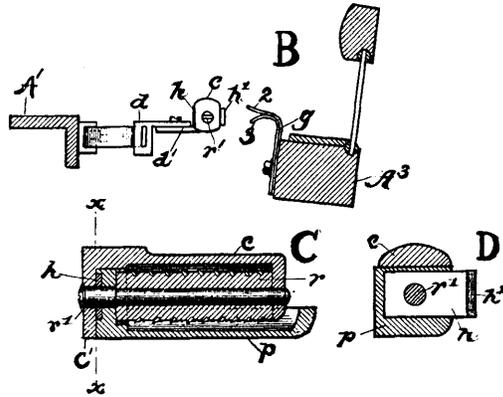


is an enlarged sectional view of the temple-head, showing the manner of attaching the filling-cutter. Fig. D is a transverse section thereof on the line $x-x$, Fig. C.

A indicates the loom-frame, A' the breast-beam, b a filling-carrier, b' the filling end supporting-plate, b'' the holder for the end, f the stud, and f' the pusher to transfer a filling-carrier from the feeder, S the self-threading shuttle, and A'' the lay, having the bottom

of its shuttle-box cut through for the discharge of the spent filling-carrier from the shuttle.

When a fresh filling-carrier is inserted in the shuttle, the latter is thrown across the lay, the filling t leading from the end holder b^2 around the supporting-plate



b' to the selvage of the cloth C , as in Fig. A. Unless the end is severed positively, it will be broken as the cloth is wound on the roll, leaving a long end.

This positively severing of the end is accomplished with the new device, providing a cutter to positively sever the filling end at a predetermined point close to the cloth-selvage, a guide or holder cooperating to bring the filling into proper position.

The breast-beam A' , has adjustably secured thereto a stand d , to which stand is connected the temple-shank d' , its head having, as herein shown, attached to it a blade h , provided with a vertical cutting edge h' .

Referring to Fig. A, it will be seen that the edge of the cutter is located adjacent the selvage and at one side of the filling end t , so that by bringing the latter against the cutter the said end will be severed close to the selvage.

Figs. C, and D, show convenient means of securing the cutting-blade h to the temple-head, comprising the cap c and pod p , the upright wall of the latter at the outer end of the roll r being recessed transversely to receive the blade. The end c' of the cap extends over the side of the blade, and the roll-stud r' is extended through a suitable hole in the blade.

In order to positively press the filling end against the edge of the blade, there is mounted on the lay a guide g , (shown in Fig. B as having its upper ends 2-3 diverging toward and to engage the filling on the side opposite the blade as the lay moves forward), so that the filling end is pressed against the upright edge h' , of the blade and severed.

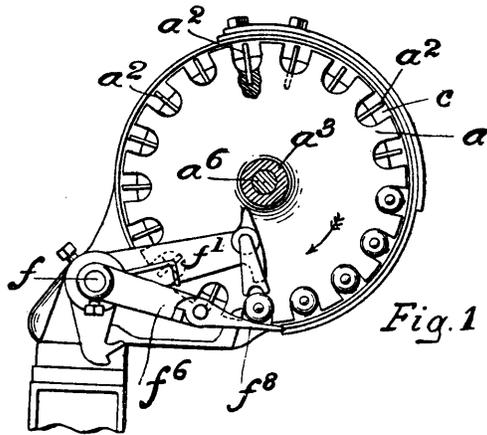
Should the filling end not be severed at the first engagement with the cutter, one or two successive engagements therewith will sever it without fail close to the selvage.

The temple makes the simplest and most effective holder or support for the cutter or blade h , as it is in the proper position with regard to the point at which it is desired to cut the filling end. (*Draper Co.*)

FILLING-CARRIERS FOR NORTHROP LOOMS.

In Northrop looms, the filling-carriers are held in a revolving filling-carrier feeder. The said filling-carriers, due to the jarring of the loom in rapid operation, are liable to rotate in the feeder and wind or unwind the filling, which is apt to be injurious to the operation of the loom. To obviate the turning of the

filling-carrier in the feeder, the Draper Co. in their latest make of "automatic" looms provide the head of the carrier with a transverse slot and the feeder with



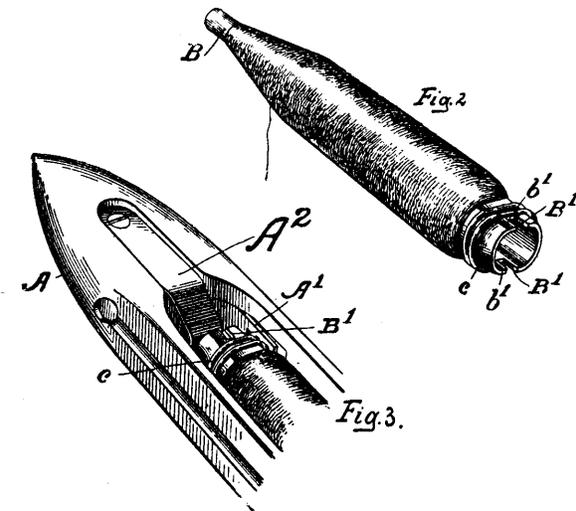
a series of radial guides which receive the slotted heads of the carriers. They also shaped the heads of the carriers so as to present two secant surfaces, which surfaces, when the carriers meet and are being pushed together, act one on the other to prevent any rotation of the carriers.

Figure 1 shows a portion of a filling-carrier feeder, together with a pusher, with the present improvements added; Fig. 2 shows the filling-carrier on a larger scale; Fig. 3 shows a part of a shuttle with part of a filling-carrier therein.

The filling-feeder has the notched head or disk *a* at one end of a sleeve *a*¹, mounted on a stud *a*², said notched head or disk running inside the stationary flanged ring or plate *c*, and the pusher *f*¹, mounted on stud *f*. Arm *f*², is connected to the hub of the pusher and carries the tip-supporting device *f*³.

The shuttle *A*, has jaws *A*¹, one of which is represented in Fig. 3, and the bridge *A*².

In the head or disk *a*, and in each one of its notches a guide *a*² is placed, said guides being so located therein that when the filling-carriers *B* are being put into the feeder the slots *B*¹ in the heads of the carriers



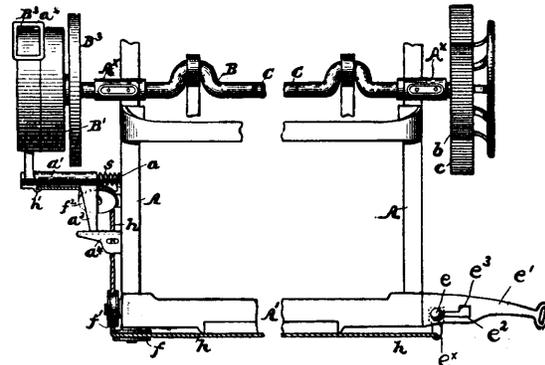
will embrace each one of said guides, thus preventing any liability of the said carriers from being rotated

while in said feeder or while being removed from said feeder by the action against it of the end of the pusher *f*¹. The head of the filling-carrier is so shaped that it presents two flat or secant surfaces *b*¹, and when a carrier is removed from the feeder one of these flat sides tends to and does contact with the flat upper side of a carrier then in the shuttle, so that the carrier as put into the shuttle cannot turn or rotate at all, due to the pressure of one carrier against another.

It will be noticed that the flattened sides of the head of the filling-carrier, as the latter is removed by the pusher from the feeder into position between the jaws of the shuttle, strike the flattened face of the abutment, connected with the shuttle and having its free end located between the jaws *A*¹, said flattened surface by its contact with said abutment materially aids in preventing the accidental slipping or sidewise motion of the filling-carrier. (Draper Co.)

LOCATING SHIPPER-HANDLE IN COTTON LOOMS AT THE OPPOSITE END OF BELT-PULLEY.

In looms as now most commonly used it is customary to locate the belt-fork or shipper and shipper-handle at the same end of the loom, but at times it is desirable to locate the shipper-handle at one end of the loom



and the belt-fork or shipper at the other end, and it is to this latter class of looms that the present improvement relates.

The accompanying illustration shows sufficient portions of a loom to understand the device.

A is the loom-frame; *A*¹ the breast-beam; *B* the crank-shaft for operating the lay, it being in bearings *AX*. The shaft *C* carries at one end the fast pulley *B*¹, a loose pulley *B*², and a brake-pulley *B*³, and at its other end it has a pinion *b*, which engages a toothed gear *c*, fast on the usual lower or cam-shaft. (Not shown in the illustration.)

Extended from one end of the loom is a plate *e*¹, having a notch *e*² and shoulder *e*³, said notch receiving the upper end of a shipper-handle or lever *e*, which has, as shown, a projection *e*^x, to which is secured a flexible connection *h*, extended across to the opposite end of the loom and about suitable sheaves *f*, *f*¹, *f*², the opposite end of said flexible connection being attached to an ear *h*¹ of a sleeve *a*¹, fitted loosely over a stud *a*, projecting from the loom side, a spring *s* being shown as interposed between the said sleeve and loom side, said spring normally acting to move the sleeve to the right on said stud, as shown in the drawing, and cause the belt-fork *a*², to put the usual belt controlled by it, but not shown, onto the loose pulley *B*².

When the shipper-handle is moved so that it engages the shoulder *e*³, the flexible connection draws

the sleeve in the direction to cause the belt-fork to put the belt on the fast pulley. When the weaver springs the shipper-handle out of engagement with the shoulder or when the handle is sprung out by means of any usual loom-stopping mechanism, the expansion of the cam, acting with the spring of the shipper-handle, effects the transfer of the belt to the loose pulley. (*Draper Co.*)

SCOTT'S LAPPET-LOOM.

The lappet-needles of this loom are each independently connected to one of the hooks of a jacquard.

The lappet ends are brought to the needles from a creel or bobbins, or from beams, and each end is passed over two tension-rods, one of which is carried at each end by a bell-cranked lever, and through a lingo or heddle between the rods, the said lingo being raised by the same hook which raises its corresponding lappet-needle in order to slacken the tension on the lappet end when it is raised, each end having thus a separate tension.

The bell-crank levers which carry the tension-rods are connected by cords to the slay so that as it beats up, the said tension-rod is depressed, (because all the needles pass under the woven fabric) and as soon as the slay returns and the needles rise again the tension-rod is returned by springs to its former position and takes up the slack.

The accompanying illustration is a diagram showing the independent lappet-needle and course of the lappet end thereto, and also illustrating the tension device or arrangement for tightening and slackening the lappet end.

Loom-frame and slay-frame are of ordinary construction. *e*, is the grid fixed to the slay-sword *d*, through which grid each of the lappet-needles can freely and independently rise.

This grid is dovetailed in the slay-sword *d*, so as to be capable of movement endwise and thereby impart side motion or "slue" to the points of all the lappet-needles *e*, simultaneously.

f, is the needle-bar or rail (adapted and arranged to receive endwise motion), through which the needles *e*, can freely rise.

g, is the reed. *h*, is the hand-rail. *i*, is the slay.

Means are provided for imparting to-and-fro motion to the needle-bar by means of ordinary weighted

dependent cord *n* being brought from each needle *e* to a separate and independent hook in such apparatus, or several of these cords *n* may be connected up to one hook in such apparatus.

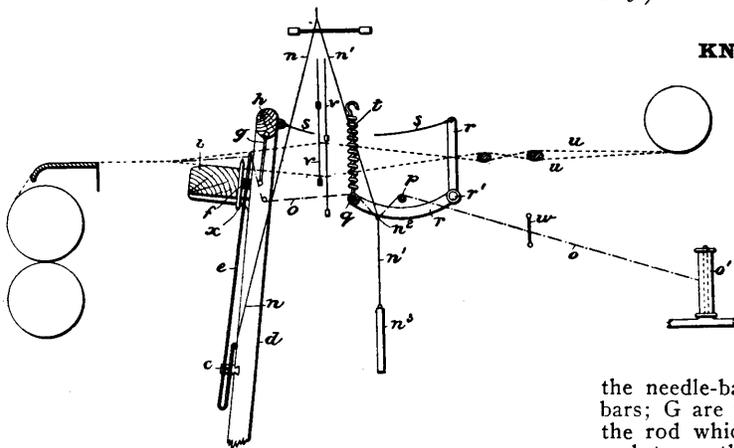
n', is a separate cord connected to the same hook as the cord *n*, and carries an eye *n''*, through which the lappet end *o* is led on its way from the reel or bobbin *o'* to the needle *e*, and this cord *n'* carries the lingo *n''*.

Thus each lappet end *o* is independently led through an eye *n''*, independently connected, together with its corresponding needle *e*, to the hook of the jacquard, and by passing this end *o*, over two bars or supports *p*, the lingo *n''* causes a depression in the end *o*, while directly the jacquard simultaneously lifts the cords *n* and *n'*, the eye *n''* is correspondingly raised with the needle to which it guides the lappet ends *o* and thus slackens the latter corresponding to the amount of rise imparted to the said needle and again simultaneously takes up the slack when the needle falls. In order to again slacken the lappet end *o*, at the moment when the needle goes under the fabric at the "beat-up," the whole of the lappet ends are passed over the bar or support *q*, which extends across the loom to include all the warp ends (and passing under all the lappet ends *o*,) and is carried at each end by the bell-crank-levers *r*, pivoted at *r'*, to the frame of the loom. *s*, is a cord from the slay-frame to the free end of said bell-crank levers *r*, at each end of said bar *q*, the length of this cord *s* being such that same only tightens just before the needles *e* pass under the fell of the cloth, and thus it will readily be seen that the bar *q* is lowered, and thereby slackens the whole of the lappet ends *o*, while on the return movement of the slay-frame the spring *t*, connected to the bar *q*, lifts the same up as the cord *s* is slackened, and thereby takes up the slack in the ends *o*, caused by the rearward movement or return of the slay as the needles come from under the fell of the cloth.

v, are the warp ends, controlled by the harness-frames *v*, to produce a plain cloth, or the warp ends may be guided or controlled in any other desired and suitable manner.

w, is a coarse reed through which the lappet ends *o* are guided and kept separate as they come from the reel *o'*, or from any other suitable device, creel, bobbin, beam, or the like.

x, is a false reed ordinarily used in lappet-weaving machines for guiding the shuttle. (*D. Scott, Manchester, Eng.*)



KNOWLES LAPPET MOTION.

The Knowles lappet motion is made to be attached to any loom and can be operated either by a head motion or by a cam on the bottom shaft. The cuts here shown represent a lappet motion operated from a head motion, and can be best understood by the following lettering.

A represents the loomside; B is the lay-wood; C is the end of the lay-sword; D is a casting which is fastened to the lay-sword and is the stand for the lappet parts; E is a brass casting which serves as a run for the ends of the needle-bars; F are the steel ends of the needle-bars; G are the needle-bars; H are the needles; I is the rod which pulls the needles down into the shed and turns the pattern-chain; J is the pattern-chain-drum and ratchet; K is the pattern-chain; L is the pawl which turns the chain-drum; M is a screw in the back of the pawl which prevents the pawl from turning the drum too far; N is a lock-lever which

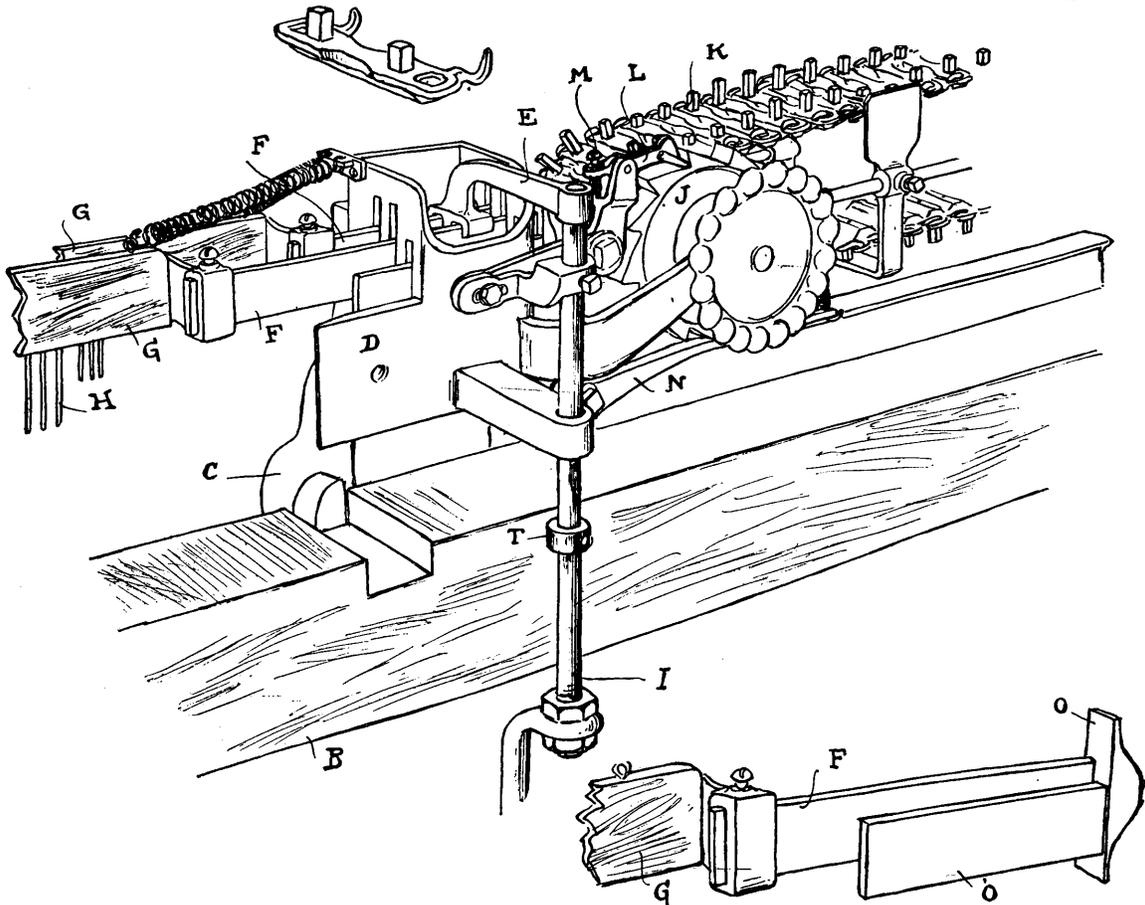
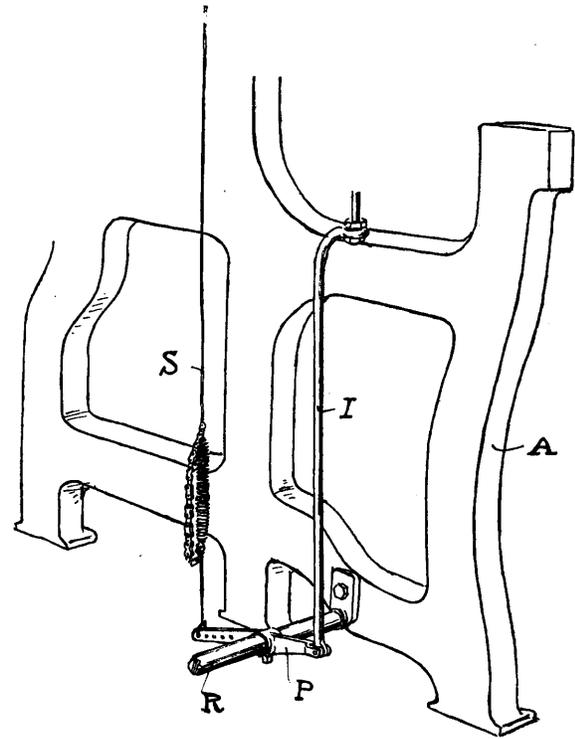
operated by two eccentrics situated on the outside of the loom.

n, is a cord or connection from each needle *e* to the hook of a jacquard machine—a separate and in-

also prevents the chain-drum from being turned too far; O is the run on which the pins in the pattern-chain slide; P is a lever on the rocker-shaft R; S indicates the wire and chain which connects the lappet motion to the head motion, and T is a collar on the rod I, which prevents the rod from having too much motion.

A lappet motion is used for putting trailing designs into cloth, the lappet yarn passing through the needles H, and the needles being pulled down into the shed by means of the head motion or cam, and being forced out by a spring on the rocker-shaft R. The length of pins required for each pick of the lappet design are screwed into the bars of lappet-chain in succession, and as the chain-drum is revolved by the pawl a new pin is brought against the run O every pick and as the needle-bars are kept against the back of the run O by springs, the needles are moved to correspond to the change in length of the pins in each successive bar.

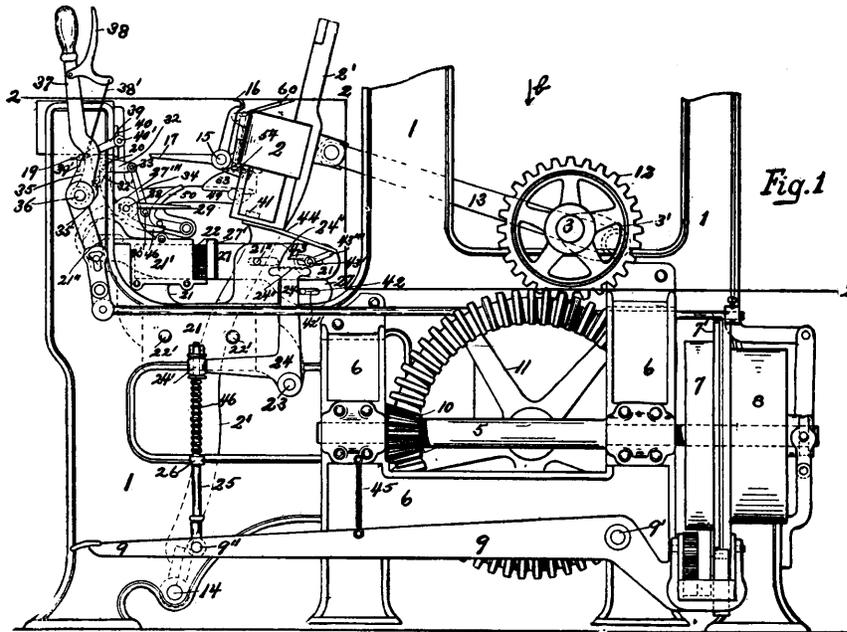
In order that the lappet-needles may not interfere with the passage of the shuttle across the race, the reed is set back and a false reed or pin-bar is used as a guide for the shuttle, the lappet-needle being between this pin-bar and the reed. The pin-bar is controlled by a cam on the breast-beam, being forced down out of the way when the lay beats up and allowed to rise into place when the lay moves toward the back center. The wire S is adjustable so as to vary the depth to which the needles are forced into the shed. (Crompton and Knowles Loom Works.)



**REVERSING MECHANISM FOR KNOWLES
CARPET LOOMS IN CONNECTION WITH
THEIR FILLING STOP-MOTION.**

In these looms considerable power is necessary to move the lay to its rear position when the loom is stopped.

Referring to the drawings, Fig. 1 is an end view, looking in the direction of arrow *a*, Fig. 2, of a loom



provided with the new mechanism. The shuttle-boxes and operating mechanism are not shown. Fig. 2 is a sectional plan view of portions of the loom shown in Fig. 1, taken on line 2-2, said figure, looking in the direction of arrow *b*. Fig. 3 is a side view of the filling stop-motion. Fig. 4 is a plan view of the parts shown in Fig. 3, looking in the direction of arrow *c*. Figs. 3 and 4 are shown on an enlarged scale; and Fig. 5 is a sectional view taken at a point indicated by line 5-5, Fig. 2, looking in the direction of arrow *d*, same figure.

Numerals of references indicate thus:—1, the loom side; 2, the lay; 3, the crank-shaft; 4, the bottom shaft; 5, the pulley-shaft; 6, the pulley-frame; 7, the friction-pulley, provided with a friction-face 7', with which the driving-pulley 8 is moved into or out of contact to start or stop the loom by the ordinary shipping mechanism.

Combined with the friction-pulley 7 and driving-pulley 8 is the reversing mechanism. The lever 9 of the reversing mechanism is hung on a stud 9' in the pulley-frame 6 and operates the reversing mechanism.

A beveled gear 10 is fast on the pulley-shaft 5, and drives large beveled gear 11 fast on the bottom shaft 4. The beveled gear 11 meshes with and drives gear 12 fast on the crank-shaft 3. Connector 13 connects the crank 3' and the crank-shaft 3 with the lay 2, the lay-sword 2' of which is pivoted at its lower end on a pin 14 in the lower part of the frame 1. In front of the lay 2, is the protector-rod 15, fast upon which at each end of the loom is the binder-finger 16 and the protector-dagger 17. The binder-finger 16 is adapted to bear against the shuttle-binder of the shuttle-box, (not shown) and if the shuttle is not properly boxed in the operation of the loom, the binder will hold the

finger 16 out and cause the dagger 17 to strike the knock-off lever 19 and stop the loom.

In Figs. 3 and 4 are shown, on an enlarged scale, a side and plan view of the filling stop-motion. Referring to said Figs. 3 and 4, 18 is the breast-beam, under which extends the knock-off rod 20, which has bearings in the ends of the loom. 46 is a finger or arm projecting from a collar 47, secured on the knock-off rod 20 by set-screw 48. Stand 49 is secured to the rear face of the breast-beam 18 and extends inwardly and has a knock-off arm or finger 50, pivoted at one end on a stud 51 at the lower end of said stand 49, and provided with a knob or projection 50', adapted to rest on the finger 46. Secured to the horizontally-projecting end of the stand 49 by a bolt 52 is a shoe or track 53, on which is adapted to rest and travel, as the lay moves, the horizontal bent end 54' of the dagger 54, which is pivoted at its inner end on a bolt 55 in the lower end of the stand 56, bolted to the lay 2. A connecting-rod 57 is pivoted at one end to the dagger 54 and its other end to the shaft 59, which has bearings in said stand 56 at the front of the lay. The shaft 59 carries the feelers 60, secured thereto by a hub 61 and set-screws 62. The feelers 60 extend over a transverse slot 63 cut in the top of the lay, and in case they are

not held up by the filling, they will drop into said slot to automatically stop the loom by means of the filling stop-motion above described, for the forward motion of the lay will cause the end 54' of the dagger 54, which is dropped by the lowered position of the feelers 60, to strike against the end of the arm or finger 50 and force down said arm and cause the stud 50' thereon to move back the finger 46 on the knock-off rod 20 and revolve said rod to stop the loom, and automatically operate the reverse mechanism.

A stand or frame 21 is secured to the loom side 1, by bolts 22', and contains the rubber-bunter pocket 21', in which is secured the rubber-bunter 22. Hung on a stud 23 in the lower part of the frame 21 (see Fig. 1) is the angle-lever 24, which is connected to the lever 9 of the reverse mechanism by the rod 25, which extends at its upper end loosely through a hub 24' on one end of said lever 24. The other end of the rod 25 is pivotally attached at 9" to the front end of the lever 9. An expansible spiral spring 46 is mounted on the rod 25 and bears at its upper end against the hub 24' of the lever 24, and at its lower end against a collar 26 on the rod 25. The spring 46 is of sufficient tension to communicate motion from the angle-lever 24 to the lever 9, and thus furnishes a yielding connection between said lever 24 and lever 9, and not a rigid connection.

Attached to the inside of the frame 21, by bolts 21", is a sliding frame 27, which is provided with a projection or lug 27', (see Fig. 2,) which extends in front of and in contact with the rubber-bunter 22. Said frame 27 at its front upper portion is provided with a hub 27", in which is mounted a shaft 28, on which a dagger 29 is loosely supported at one end, to move in-

dependently of said shaft. The hub 30, of a finger 30', is fast on the shaft 28, and said finger 30' extends under the dagger 29 and acts to raise said dagger at

disengage the pawl 43 from the teeth or notches 24" in the upper end of the lever 24, and allow said lever to return to its upright position. (Shown in Fig. 1.)

From the above description, in connection with the drawings, the automatic operation of the reverse mechanism on the breaking of the filling, and the operation of the filling stop-motion mechanism will be readily understood.

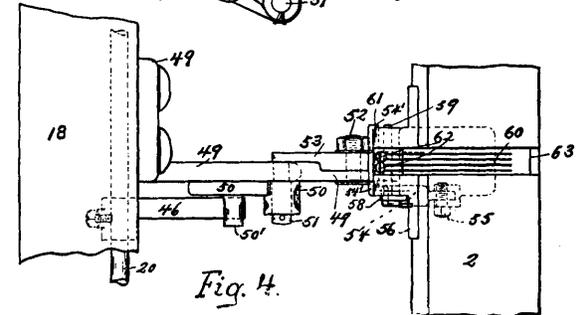
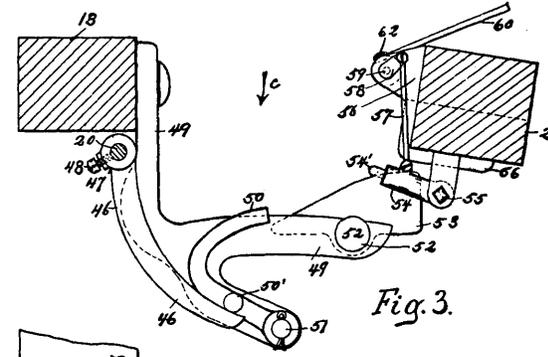
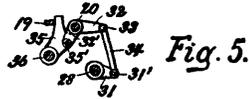
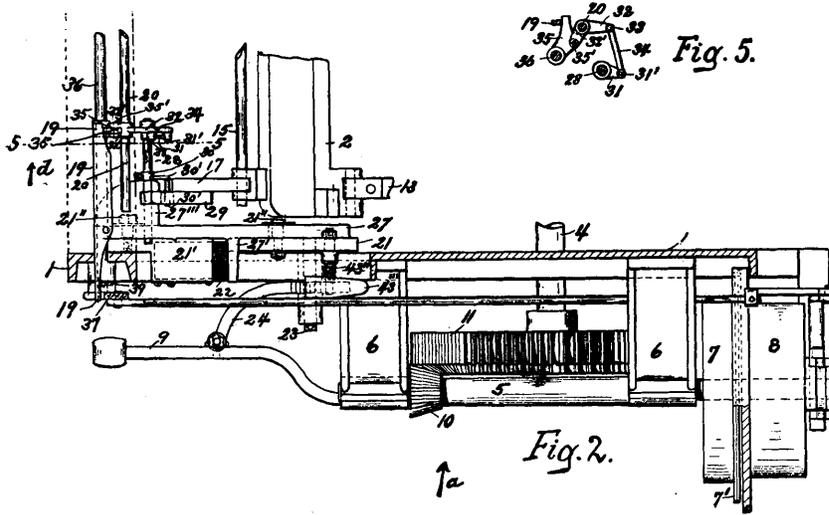
The operation of the filling stop-motion (shown in Figs 3 and 4) causes the knock-off rod 20 to rotate, and through finger 35, operated by forked arm 32', the knock-off lever 19 to operate, to move the shipper-rod 36 and stop the loom on the forward beat of the lay. The rotation of the knock-off rod 20 in the operation of stopping the loom allows the dagger 29 to drop down, the lifter-finger 30' being lowered by the rotation of the shaft 28, through connector 34 and arm 32, so that as the lay moves forward the block 41 will engage the end of the dagger 29 and cause the sliding frame 27 to move forward and compress the bunter 22, and the pin 42 on said frame 27 will engage the angle-lever 24, and rock said lever 24 on its pivot-pin 23, and through the spring 46 move down the front end of the lever 9 and bring into action the reverse mechanism mounted at the opposite end of said lever, to cause said reverse mechanism to operate, and move the lay to its rear position, as shown in Fig. 1.

The forward motion of the lay will release the pawl 43 from the arm 44 and allow said pawl to engage the

the proper time. The inner end of an arm 32 is fast on the knock-off rod 20. Said arm 32 carries a stud 33, to which one end of the connector 34 is attached. The other end of said connector 34 is attached to a stud 31' in the hub 31, which is fast on the shaft 28. The arm 32 is also provided with a rearwardly-extending forked end 32', (see dotted lines, Fig. 1, and also Fig. 5,) which is pivotally attached to a stud 35' in finger 35, loose on shipper-rod 36, which is provided with the shipper-handle 37, carrying the auxiliary handle 38 hung thereon.

A connector 38' connects the auxiliary handle 38 with the finger 39, hung on a pin 40', fast in the stand 40. The finger 39 has a face 39', which is in contact with the outer end of the knock-off lever 19, so that when the operator grasps the auxiliary handle 38, in connection with the shipper-handle 37, to start the loom, the knock-off lever 19 will swing its inner end against the finger 35, loose on a shipper-rod 36, and cause the dagger 29, through forked end 32', arm 32, and connector 34, to be raised out of the path of the block 41, which is fast on the lay 2, as the lay beats up. After the first pick of the lay, the filling will be under the feeler-wires and hold said wires up in the usual way to prevent the operation of the stop filling motion and the engagement of the dagger 29 with the block 41. A pin 42 is secured in a slot 42', in the inner end of the sliding frame 27, (see Fig. 1) and as said frame 27 moves forward, the pin 42 will engage the angle-lever 24 and move said lever forward to communicate motion, through spring 46, to the lever 9 of the reverse mechanism. The pin 42 also acts as a stop to limit the backward motion of the lever 24 when released by the pawl 43.

In the stationary frame 21 is secured a stud 43', on which is hung a pawl 43. A spring 43" (see Fig. 2) is coiled around said stud 43', and acts to cause the pawl 43 to engage the teeth or notches 24" in the upper end of the upright arm of the angle-lever 24, to hold said lever in its forward position on the return of the sliding frame 21. The pawl 43 has a rearward extension or heel 43"', which will be engaged by the end of the arm 44, secured upon the under side of the lay, upon the rearward motion of the lay, to



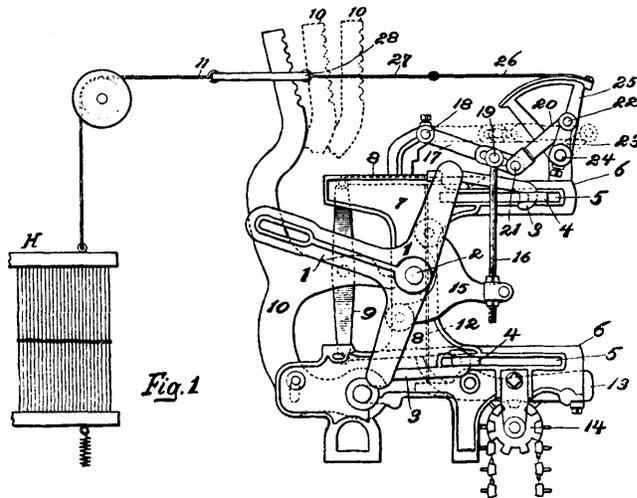
teeth 24" in the upper end of lever 24 and hold said lever in its forward position to operate the reverse mechanism, while the sliding frame 27, by the expansion of the bunter 22, will return to its rear posi-

tion immediately as the lay starts to move back. The continued backward movement of the lay causes the arm 44 to engage the heel 43 of the pawl 43, and disengage said pawl from the teeth in the lever 24, as before described, to allow said lever to return to its upright position through the action of spring 45.

It will be understood that the forward movement of the sliding frame 27 is very slight, but is still sufficient to communicate, through angle-lever 24 and spring 46 on the rod 25, sufficient movement to the front end of the lever 9 to bring into operation the reverse mechanism supported on said lever. (*Crompton and Knowles Loom Works.*)

BARDSLEY'S LENO-MOTION.

In weaving leno fabrics it is necessary, in order to facilitate the crossing of the warp-threads, that certain of the said warp-threads should be given a half-and-return movement during the cross-weaving—that is to say, during the cross-weaving it is necessary to give to certain of the harness-frames and the warp-



threads which are controlled thereby at the time of each shed formation a half-and-return motion, that is, a movement which shall carry such warp-threads from one extreme plane of the normally open shed to an intermediate or middle point and then back again to the original plane. When not concerned in cross-weaving, the same harness-frames and their warp-threads are required to be given a full motion—that is, to be moved like all the other harness-frames and their warp-threads—namely, from one extreme plane of the shed to the other extreme plane thereof.

The object of this invention is to provide devices of simple and convenient character capable of being applied readily to dobbies such as now are in extensive use and fitted to operate in connection with the parts of the said dobbies to occasion the half-and-return movement of the required warp-threads during the cross-weaving without interfering with the capacity of the usual parts of the dobbies to produce a full movement of the same warp-threads from one extreme plane of the shed to the other thereof, when the cross-weaving of the said warp-threads is to be superseded by other kinds of interweaving thereof for the time being.

Fig. 1 shows in side elevation a well-known form of dobby having applied thereto the said embodiment of the invention and certain of the harness-frames which

are operated thereby, with the intermediate connections. Fig. 2 is a view in plan of the parts which are represented in Fig. 1.

1, is the usual actuating-rocker of the dobby, it receiving movement in customary manner from the mechanism of the loom to which the dobby is applied. 2, is the rock-shaft on which the said rocker is fixed. 3, are the connectors, which transmit movement from arms of the said rocker to the lifters. 4, are the usual lifters, they moving in slots 5, in the horizontally-extending portions 6, of the frame 7, of the dobby. 8, are the hooks engaged and actuated by the lifters 4.

9, are the lever-connectors, having the hooks 8, pivotally connected with the upper and lower ends thereof, and each lever-connector being pivoted upon an outwardly-projecting portion of one of the harness-actuators or harness-levers 10. 11, are the connections or cordings which serve to transmit movement from the said harness-actuators or harness-levers 10, to the harness-frames H.

12, are the needles, and 13, the pattern-fingers or levers. 14, is the pattern-cylinder.

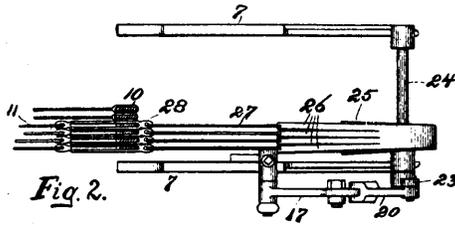
15, is an arm or extension attached in accordance with the present invention, to the rocker 1. 16, is a connecting-rod that is actuated by the said arm or extension 15. 17, is a swinging arm pivoted at 18, to the dobby-frame 7, and which has the upper end of the connecting-rod 16, pivoted thereto at 19. 20, is a second swinging-arm, one end of which is joined pivotally at 21, to the swing-arm 17, while the other end thereof is joined pivotally at 22, to the arm 23.

24, is a rock-shaft upon which the arm 23, is made fast. 25, is an arm that also is made fast upon the rock-shaft 24, the said arm 25, having a curved upper end that is concentric with the rock-shaft 24. 26, are straps which are connected at their outer ends to the said curved upper end of the arm 25, the inner ends of the said straps 26, having connected thereto wires or links 28 that are engaged with elongated loops or links 28 that are connected with and form part of the harness connections or cordings. The harness-actuators or harness-levers of those harness-frames which are required to have at times the half-and-return motion are passed through the said elongated loops or links 28.

When operated by the engagement of their connected hooks or hooked jacks with the usual lifters 4, so as to receive their full length of stroke outward, the said harness-actuators or harness-levers, in consequence of their engagement with the outer ends of the links 28, serve to transmit to their harness-frames the full-length movement that carries the warp-threads from the lower plane of the shed to the upper plane thereof. Thus, whenever an outward movement of one of the said harness-actuators or harness-levers is called for by the indicators on the pattern-cylinder, the movement of the said harness-actuator or harness-lever which results from the actuation of the latter from one of the usual lifters 4, gives to the connected harness-frame its full motion and highest position. While the harness-actuator or harness-lever remains in its outer position, it supersedes the action of the oscillating arm 25, upon the said connected harness-frame. This it does by reason of its engagement with the outer end of the elongated loop or link 28, and by reason of the further fact that the arm 25, which may be termed a "half-stroke lifter," has only half the extent of traverse that the usual lifters have.

Whenever the outward movement of one of the said harness-actuators or harness-levers is not called for, the latter remains stationary in its innermost position. The length of the opening in the elongated loop or link 28, permits the said loop or link and all of the connec-

tions intermediate the arm 25, and the harness-frame to move in unison with the said arm 25, which is fast upon a rock-shaft 24, having a second arm 23, also



made fast thereon, this latter arm having joined thereto the swinging arm 20, and the latter in turn being pivotally connected with a second swinging arm 17, from which last a connecting-rod 16, extends to an arm or extension that is provided upon the rocker 1.

As the rocker oscillates it swings the arms 17 and 20, carrying the pivot 21, by which such arms are joined together above and below the line passing through the pivots 18 and 22, by which such arms are joined to the dobby-frame and the arm 23. It follows that each swinging movement of the rocker 1, in either direction occasions a complete oscillation of the rock-shaft 24, and arm 25, and the required half-and-return movement of the harness-frames, the links 28, playing back and forth relatively to the retracted harness-actuators or harness-levers. In other words, while an ordinary lifter is occupied in making a complete traverse one way, the half-stroke lifter—i. e., arm 25—will make its complete one-way traverse and return.

The elongated links 28, permit play of the harness connections or cordings relatively to the harness-actuators or harness-levers when the latter are in their innermost or retracted position, and thus enable the said harness connections or cordings to be moved by the oscillating arm 25, and given the desired half-and-return movement without occasioning movement of the said harness-actuators or harness-levers. At the same time whenever one of the harness-actuators or harness-levers is actuated, it being moved outward by reason of the engagement of the lifters with its connected hooks or hooked jacks, the said harness-actuator or harness-lever acts upon the outer end of the corresponding loop or link and thereby operates to occasion the full movement of the harness-frame.

The invention will be employed in connection with certain only of the harness-actuators or harness-levers pertaining to a dobby. The remaining harness-actuators or harness-levers will be operated in customary manner to communicate full-length movements to their connected harness-frames. (*Crompton and Knowles Loom Works.*)

LOOM FOR WEAVING PILE FABRICS.

In this loom the body or backing of the pile fabric is woven in the ordinary manner and the threads composing the pile-surface are introduced as warps.

Use is made of distenders, in the form of thin blades passing through the reed at intervals and supported by a frame and harness similar to the heddles of a loom, and these distenders project beyond the point where the picks are knocked up to place and the cloth fabric produced, and the parts are so made and the movements so arranged that the distenders are carried downwardly and rest upon the shuttle-rail of the lay at the same time the pile-warps are elevated, so that a distending-thread is laid across the distenders between them and the pile-warps, and when the shed is changed the pile-warps are carried down, leaving loops over the distending-threads, which distending-threads

are supported by the distenders, and then a pick, is interwoven in forming the body or back of the fabric after the distenders have been raised, and as the weaving progresses, the distending-threads slip off the ends of the distenders and the fabric is complete, ready for the distending-threads to be pulled out in completing the fabric, or the pile-loops may be simultaneously cut as the distending-threads are drawn out.

Fig. 1, is a diagrammatic view showing part of the lay, breast-beam and heddles and with the distenders raised for the shuttle to pass beneath. Fig. 2, is a similar view with the distenders depressed and resting upon the shuttle-rail of the lay for the shuttle to pass over the distenders. Fig. 3, is an elevation, and Fig. 4, an end view, of the frame in which the distenders are sustained; and Fig. 5, represents the fabric by an enlarged diagrammatic section, and Fig. 6, represents a modification in the fabric.

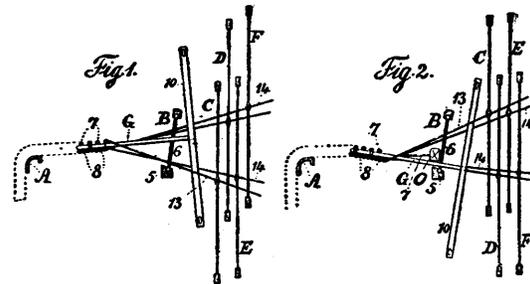
A, is the breast-beam around which the woven fabric passes and is wound upon a suitable cloth-beam. B, is the lay made with a shuttle-rail 5, and with a reed 6.

Usually two shuttles are used; one for laying in the distending-threads 7, and the other for laying in the filling-threads 8, which form the backing of the fabric. C, D, E, and F, indicate heddle-frames.

Heddles C, and D, show the raising and lowering of the warps that are used in making the pile-loops and the heddles E, and F, manipulate the warps in the weaving of the body or back of the fabric.

The distenders G are in the form of thin wires or springs, of a width to correspond to the length of loops forming the piles of the fabric, and each distender is made with a vertical bar or T-head 10, at the ends of which are slots or eyes for cords or wires by which such distenders are held within the frame H, and the vertical bars of these distenders are of sufficient length for allowing the warps to be raised or lowered by the harness, the warps passing between the vertical bars of the distenders.

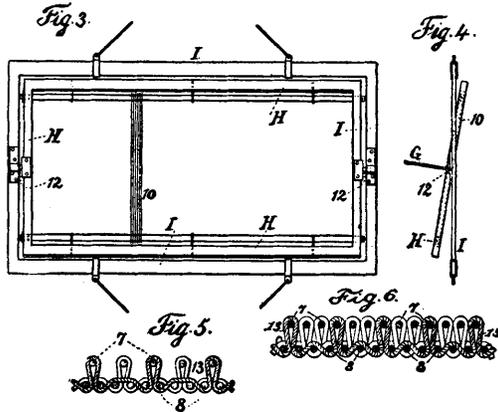
It is not necessary to have as many distenders as there are wires in the reed, as the weaving is reliably performed when there is a distender to every three or four wires in the reed, and the distenders G pass through the reed and are of sufficient length to reach beyond the cloth-making point, so as to support the desired number of pile-loops in the woven fabric before the distended pile-loops pass beyond and separate from the ends of the distenders as the weaving progresses. These distenders are raised when the shuttle or shuttles are to pass beneath them, and they are depressed and lie substantially upon the shuttle-rail when the shuttle is to pass above them. Hence they are sometimes in line with the woven fabric and sometimes at an angle to the same, and to give freedom of movement to the parts, the frame H is pivoted at its ends to the frame I, to which the ordinary straps or



cords are applied in the harness-mechanism for raising or lowering the frame I, and as this movement takes place, the frame H and the vertical bars 10 of the distenders G, swing upon the pivots 12, so as to allow the parts easily to assume the proper positions as the

distenders stand at different angles to the woven fabric.

When the loom is in operation, the picks 8 are thrown in at the proper time from a shuttle or shut-



ties passing below the distenders G, so as to weave the body or backing of the fabric, and when the picks 8 are laid in position by the shuttle the distenders G are elevated for the shuttle to pass beneath the same, and when the pile-loops are to be formed the distenders G are lowered, so as to rest upon the shuttle-rail, as seen in Fig. 2, for the shuttle O to pass over the same and lay in a thread 7 between the top edges of the distenders G and the warp-threads 13, from which the pile of the fabric is made, and when such warp-threads 13 are depressed and the distenders G raised, a pick 8 is to be laid into the body of the fabric to confine and hold the loops of the plush or pile fabric, and the pile-warps are again raised and the distenders depressed for laying in another thread 7, for distending the loops of the pile.

The distenders are substantially in the plane of the upper shed while the backing is being woven, and in substantially the plane of the lower shed when the distending-thread for the loops is laid above them.

It is advantageous to employ two or more heddles for manipulating the warps from which the pile-loops are made, so that such loops may be woven alternately between the picks forming the body of the fabric, as represented in larger size in Fig. 5, the threads of the warp forming the pile-loops passing up between one pick and the next and around the distending-thread 7, and passing beneath two picks and over two other picks in the body or backing before being again carried up to form another loop in the pile fabric.

It will be apparent, that, as the weaving progresses the distending-threads 7 pass off the ends of the distenders G progressively, and they remain in the loops of the pile fabric and they may be drawn out at any time, as desired, and where the pile-loops are to be cut any suitable blade may be drawn in for cutting such loops as the distending-threads are drawn out, the cutting-blade being connected with a distending-thread so as to be drawn into each loop in succession as the distending-thread is drawn out.

The warp-threads 14, that are interwoven with picks 8 to form the backing of the fabric, may be of any desired character and number. They are not represented in Fig. 5, to avoid confusion. Three picks may intervene between the pile-loops, as seen in Fig. 6, instead of the four shown in Fig. 5. (C. Coupland and F. Pearson, Seymour, Conn.)

McMICHAEL'S SMASH PROTECTOR.

Fig. 1 is a cross sectional view of this smash protector, showing the lay as moved forward, but with

the reed as in locked position. Fig. 2 is a cross sectional view of the lay and some of its equipments, showing the lay as moved forward, and the reed as in unlocked or released position.

Of the letters of reference in illustrations *a* designates the breast-beam, and *b* the lay of the loom. *c* is the reed, and *d* the upper, and *e* the lower bar of the same. The bar *d* is pivotally supported so that the lower bar may be swung backward and forward when permitted to do so.

The reed will be locked against swinging motion in the latter part of its forward movement, when acting to beat up the filling, and also manifestly in the first part of its backward movement; and it will be unlocked in the first part of its forward movement, and the last part of its backward movement, so that it can swing upon its pivotal support in case it meets with an obstruction, such as a lodged shuttle in the shed. *f* designates a holding-bar which can move to a limited extent backward and forward on an offset *g* formed on the lay, and when moved forward may rest with its forward side or face against the lower bar *e* of the reed, and hold the latter in place, as shown in Fig. 1; and when the said holding-bar is moved back the lower bar *e*, may be free to swing backward, as represented in Fig. 2.

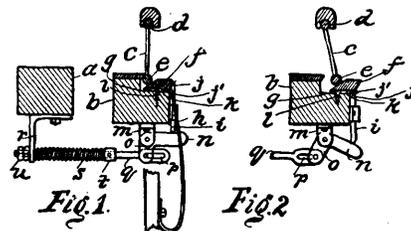
h designates springs having one of their ends secured to some convenient part of the frame of the machine, while their free ends are arranged to bear against the rear side or face of the holding-bar to maintain the same in place against other than undue pressure.

To hold the reed rigidly in place, a vertically movable locking-bar *i*, on the back side of the lay, is provided.

The upper forward edge of the locking-plate is bevelled, as at *j*, so as to provide for reeds of different size.

j' designates a plate secured to the lower side of the holding-bar, and transversely through this plate are formed slots *k*, to receive the shanks of headed screws *l*, the slots *k*, not being sufficiently large to permit the heads of the screws passing through the same. By this means the holding-bar is kept on the lay, and guided in its movements backward and forward.

To move the locking-plate vertically in proper time, elbow-levers are fulcrumed on brackets *m*, secured to the bottom of the lay. Said levers being arranged so that the lower edge of the rocking-plate may rest upon the substantially horizontal arm *n* of the said lever, whereas the other arm *o*, of the said lever is pivoted in a slot *p*, formed in the inner end of a rod *q*, which at its outer end passes through a hole formed in a bracket *r*, secured to the breast-beam. A spring *s*, surrounds the rod *q*, and is arranged between a collar *t*, on the said rod and the bracket *r*, so as to operate



normally to press the said rod inward and operate the elbow lever with a tendency to raise the rocking-plate. Nuts *u*, are turned upon the outer end of *q*, to prevent its disengagement from the bracket *r*.

In the operation of the device when the lay moves back, the rod *q* will be made to act upon said elbow, and move it from the position in which it was shown

in Fig. 1, to that in which it is represented in Fig. 2, allowing the locking-bar to drop and release the holding-bar, thus unlocking the reed. When the lay moves forward, the operation just described will be reversed and the parts will be moved from the position in which they are shown in Fig. 2, to that of Fig. 1, raising the locking-bar and locking the holding-bar and reed in place, so that the latter can act to beat up the filling. It will be understood that the reed will not be swung back, as shown in Fig. 2, unless an obstruction like a shuttle in the shed is met with as the lay moves forward, in which case the reed will be released and swing back, thus preventing a "smash." (Woonsocket Machine and Press Co.)

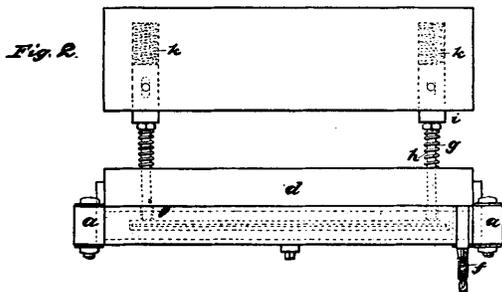
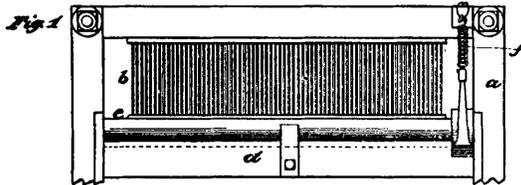
POEHNERT'S SMASH PROTECTOR.

Fig. 1, is a front view of those parts of a loom to which this protector more particularly pertains; Fig. 2, is a top view of such parts; Fig. 3, is a view of the same in vertical section.

The object and purpose of the improvement is the prevention of injury to the parts of the loom and to the cloth which is being woven therein, if a shuttle or other obstacle is caught accidentally between the reed and the warp-shed in the beating-up motion of the lay.

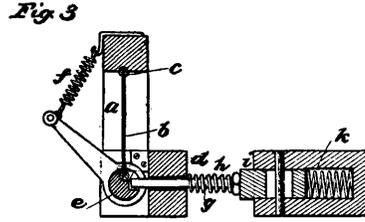
Letters of references indicate thus: *a*, denotes the lay as a whole, which has in practice the ordinary reciprocating or vibratory motion, and *b* denotes the reed which is not fast in the lay, as is the more common practice, but its upper edge is rather loosely seated in the groove *c*, formed in the underside of the cross-piece which connects the two vertical arms of the lay. The lower edge of the reed is held in place between the cross-piece *d* and the reed-confiner *e*, which is in a general sense a roll with trunnions at the ends journaled in the upright arms of the lay and having some rotary motion.

This reed-confiner is held in a position to confine the lower edge of the reed between it and the cross-piece *d*, by means of the reed-confiner spring *f*; but,



so far as the action of the spring *f* is concerned, if the reed in its beating-up motion strikes a shuttle or other obstacle in the warp-shed, the backward pressure thus put upon the reed readily overcomes the opposing pressure of this spring, the reed-confiner rolls backward, and the reed is wholly released from its seat, remaining hanging loosely upon the warp-shed; but

if the reed properly seated in its place is carried by the beating-up motion of the lay substantially beyond the point where it must meet a shuttle, if one is acci-



dentally lying in the warp-shed, then the reed is locked in place in order that it may properly beat up the filling thus:—*g* denotes reed-confiner locks, which are simply pins having some back-and-forth motion, being loosely held in openings in the cross-piece *d*, prepared for their reception, and for the most of the time held out of contact with the reed-confiner by means of the springs *h*, the said pins being allowed play between the bunter *i* and the reed-confiner *e*, the spring *h* bearing against the cross-piece *d* at one end, and the head of the pin at the other to retract the confiner-locks.

Just as the reed is about to beat up a pick into its place, as a part of the piece of cloth that is being woven, these reed-confiner locks strike the bunters *i* and are thereby forced forward into the sockets *e'* in the reed-confiner. In such position they lock the reed firmly in its place to accomplish its normal and proper beating-up function, the springs *k* permitting necessary beating-up motion of the lay, but holding the reed, nevertheless, locked in place.

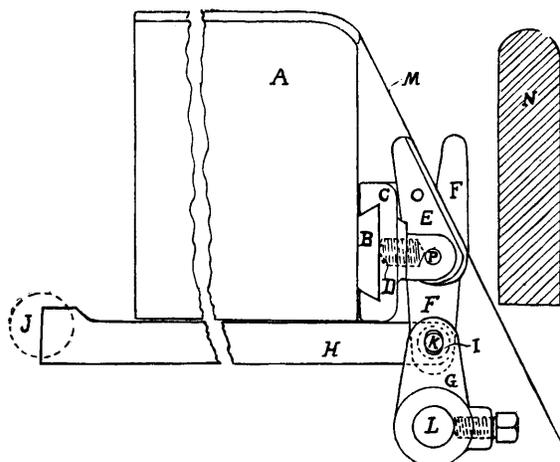
When the reed retreats in the backward motion of the lay, and the locks *g* cease to have contact with the bunters *i*, the reed-confiner is unlocked and remains unlocked until another beating-up motion of the lay again brings the locks *g* into contact with the bunters *i*, which have just been spoken of as though they were practically rigid and stationary. As a matter of fact, they rest against springs *k*, which are considerably stouter (that is, resist compression with greater degree) than the lock-springs *h*, so that the action so far described will take place if everything goes on as it should, but, if for any reason the locks *g* should not properly enter the sockets *e'* in the beating-up motion of the lay, then these springs *k* will permit the bunters *i* to retreat and so prevent breakage of the parts of the loom. (Edward Poehnert, Rockville, Conn.)

THE KNOWLES CLOTH SEPARATOR.

This cloth separator is used for cutting fringes, separating cloth when a center selvage is used and so on, while the cloth is on the loom and before it is wound upon the cloth-roll. The accompanying diagram will clearly explain its method of operation.

A indicates the breast-beam of the loom; B a way screwed onto the breast-beam and extending the length of the beam; C is a casting which slides on the way B, and can be fastened to it by means of the screw D; E is one part of the shear and is bolted fast to the casting C; F is the other part of the shear and is fastened to the part E by the screw P; G is the arm which is connected to F by the pin K, and is fast upon the shaft L; H is the rod which is fastened to the stud I, this stud being a part of an arm, similar to G but placed at the end of the rocker-shaft L; J is the protector-rod which when the lay comes forward strikes against H, rocking the shaft L and the arm G, thus

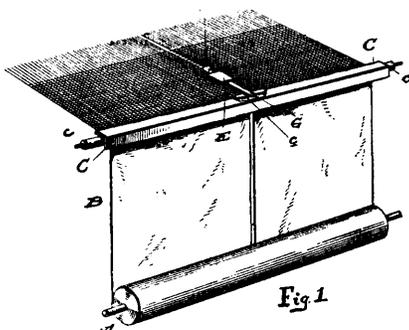
closing the shear F upon E and cutting the cloth M which is between the shear. When the lay returns to the back center the shears are opened by means of



a spring (not shown). N is a board which extends the width of the breast-beam and is held in place by a pair of brackets which are not shown in the illustration. (Crompton and Knowles Loom Works.)

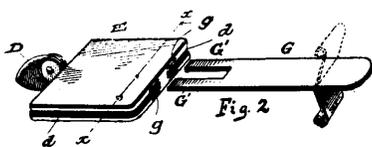
ZUPPINGER'S CLOTH SEPARATOR.

The object of its construction is to produce a cutter which will not cut into the edges of the cloth, the purpose being to produce a cutter having a wide portion provided with slits in which the adjacent edges of the strips of cloth may enter, with the cutting-edge between the widths of cloth.



Of the accompanying illustrations, Fig. 1 is a perspective view of a cloth-roll on a loom, showing the protection-rail and the cutter carried on the edges of the cloth. Fig. 2 is a perspective view of the cutter removed.

A designates a cloth-roller of a loom; B the double widths of cloth wound thereon; C the protection board covering the roller *c*; and D is the cutter which is secured to a flat metallic member E, which is provided



with the slot *d*, extending from the two side edges into the cutter.

G is a sliding member having the bifurcated end G' securely fitting the apertures *g*, and the L-shaped portion at its other end, which is designed to abut against the protection-board, or in case no protection-board is used then to bear against the roller *c*. The adjacent edges of the widths of cloth engage in the slots *d*, and support the cutter, while substantially L-shaped portion bears against the protection-board or roller. When being used in connection with the former, the portion G, has the L-shaped portion upturned, and when in use with the roller downwardly turned.

It will be readily seen that a cutter constructed in accordance with the thus given directions will prevent the sides of the cloth being cut into, in case the work does not run straight. (John Zuppinger, Phila.)

BOSWORTH'S AUTOMATIC PICK-COUNTER.

In weaving, a certain number of picks are thrown by the shuttle to produce cloth of a given weight. The number of picks are determined in a given space—say one inch of cloth—by the speed at which the fabric is fed through the loom with reference to a given speed (picks per minute).

The object of the counter is to provide a simple device, and one which is contained in small compass, by means of which the number of picks being woven into a certain fabric may be determined at any time.

To produce this result a dial is employed, having a moving hand connected to a pawl-and-ratchet device in such a manner that the hand is caused to move one space or point each time the shuttle of the loom is operated. In connection with this pawl-and-ratchet device, there is employed a trip-wheel connected with the moving fabric in such a way as to move continuously therewith and automatically start and stop the ratchet device, so that the counting shall take place at certain predetermined points and continue for a predetermined interval, so that the number of picks or threads which go into a certain length of cloth shall be accurately counted at stated intervals during the operation of weaving said fabric.

Fig. 1 is a front view of the dial; Fig. 2 is a rear view of the same showing the ratchet-wheel and trip-wheel; Fig. 3 is a side elevation, partly in section, of the same.

Letters of references indicate thus:—*a* represents the dial, which is numbered from a normal or starting point marked zero with as many numbers as desired. Supported in front of the dial, (covered with a glass) is a hand *a'*, which is mounted on the projecting end of an arbor *a''*, which passes through the dial and is supported in a frame at the rear of said dial. To this arbor there is rigidly connected a ratchet-wheel *a'''*, which has as many teeth in its periphery as there are numbers on the face of the dial, each tooth corresponding to one space or point on the dial. There is also mounted on the arbor a spiral spring, one end of which is connected to the frame and the other end connected to the ratchet-wheel or arbor, so that as the hand is moved from the zero or starting point, the spring is wound up and tends to restore the hand to its normal position when released.

Pivoted on the arbor *a''* adjacent to the ratchet-wheel is a vibrating-lever *b*, which carries a pivoted spring-actuated pawl *b'*, adapted to engage the teeth of the ratchet-wheel, the pawl being constructed with a laterally-extending pin *b''* which projects entirely through the pawl, so as to engage the ratchet-teeth at one side of the pawl and form a projection at the other end to be engaged by a trip-wheel. Adjacent to the pivoted pawl *b'*, on the lever, is a holding-pawl *b'''*, which is pivoted to the frame in such a manner as to engage the teeth in the ratchet-wheel to prevent the

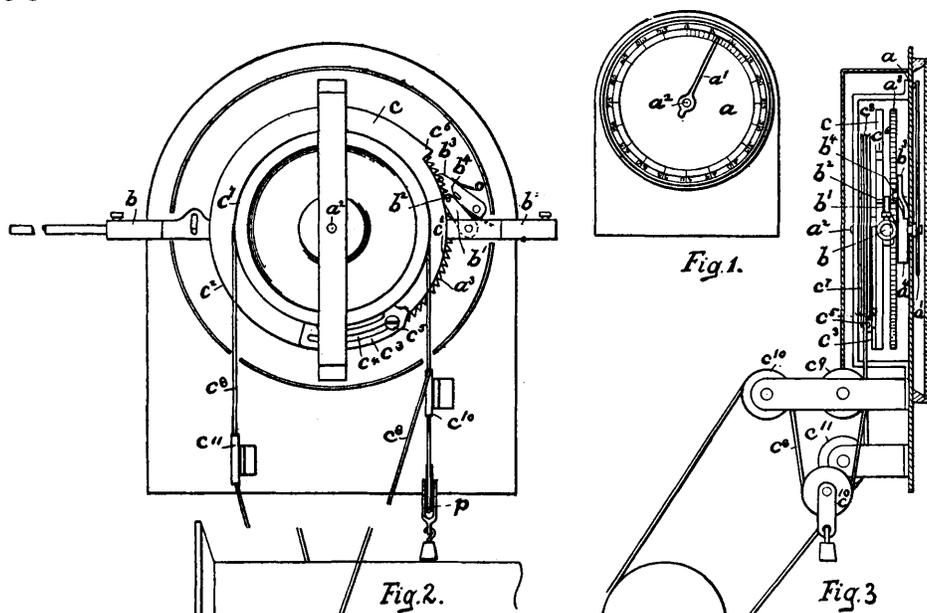
same from returning by the action of the spring a^4 . The holding-pawl b^3 is provided with a laterally-extending projection b^4 , which stands in line with the pin b^2 on the pawl b^1 , and sufficiently removed therefrom so that they will not contact in the ordinary operation of the lever-pawl in operating the ratchet-wheel.

Adjacent to the ratchet-wheel and journaled loosely on the arbor a^2 , a trip-wheel c is formed, with a portion c^1 of its periphery depressed so that it stands substantially coincident with or within the bottoms of the ratchet-teeth in the ratchet-wheel. The remaining portion c^2 of the wheel-periphery is formed coincident with or slightly larger than the outer ends or points of the teeth of the ratchet-wheel. The projection b^2 in the operating-pawl b^1 extends over the depressed portion of the periphery of the trip-wheel and is adapted to be engaged and moved outward by the portion c^2 of said wheel, which acts as a cam-projection and support for said pawl, so that, when the pawl is engaged thereby it may still vibrate with the lever, but shall not engage the teeth in the ratchet-wheel.

wardly from the enlarged periphery c^2 , and is adapted, as the wheel is rotated, to move the operating-pawl b^1 farther away from the ratchet-wheel and cause it, through the agency of the projection b^2 , to engage and move the holding-pawl b^3 so as to entirely disengage the ratchet-wheel and permit it, through the agency of the spring, to return to its normal position.

For imparting motion to the trip-wheel c , a grooved pulley c^7 is employed, which is connected rigidly to said trip-wheel and over which passes a cord or belt c^8 , said belt passing over guiding-pulleys or sheaves c^9, c^{10}, c^{11} , and thence around the beam on which the fabric or the warp is wound or unwound, a weighted pulley p being provided between two of the guiding-pulleys to take up the slack, as shown in Figs. 2 and 3.

The operation of the device is thus:—The loom being set to feed the fabric at a speed to produce a certain number of picks to the inch, is started with the hand a^1 at the normal or zero point, and the operating-pawl b^1 engaging the ratchet-wheel at the beginning of the depressed portion of the trip-wheel. When



The trip-wheel is made to revolve continuously at a speed corresponding to the speed of the fabric through the loom, while the vibrating-lever b is connected so as to vibrate each time the shuttle of the loom is operated. The depressed portion of the trip-wheel corresponds in length to a certain length of cloth, so that the number of vibrations which the shuttle makes in this space will represent the number of picks or threads which are woven into a certain length of the fabric.

To provide for adjusting the space during which the ratchet-wheel will operate, the trip-wheel is constructed with an adjustable segment c^3 , which is pivoted on the arbor and has a periphery corresponding to the enlarged periphery c^2 of the trip-wheel. The end of this segment is beveled off to form a cam-face to engage the pin or projection b^2 in the operating-pawl b^1 , and is further provided with a slotted opening c^4 , concentric with the periphery of the wheel, and a clamp-screw c^5 in the wheel passes through said slotted opening, so as to hold said segment in different positions of adjustment. The trip-wheel c is further provided with a cam-projection c^6 , which extends out-

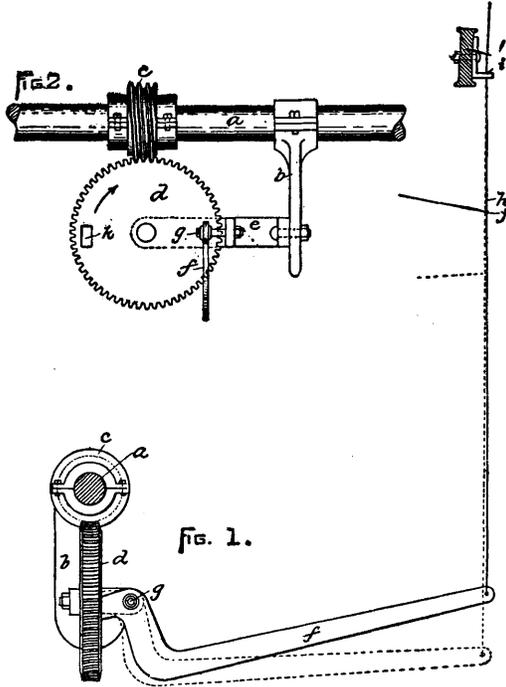
a number of points on the dial are counted off corresponding to the number of picks, the movable segment of the trip-wheel is secured by a screw c^6 in a position to disengage the pawl, the depressed portion of the periphery of the trip-wheel being thus limited to correspond to a certain length of fabric—say, one inch. Each time the trip-wheel makes one revolution, therefore, the dial-hand will be moved through the operation of the vibrating-lever, pawl and ratchet-wheel, a number of points corresponding to the number of picks woven into a given space, when it will be thrown out and remain in the position counted until the trip-wheel makes a complete revolution, when, by the cam-projection c^6 , both pawls will be disengaged from the ratchet-wheel, and the wheel and hand returned to their normal positions by the springs previously referred to. This counting of the number of picks to the inch will take place at certain predetermined intervals, depending upon the diameter of the trip-wheel, and may be made to correspond to any length of cloth desired—say, for instance, ten or twelve inches.

The operator is thus enabled to determine at any

time by the dial, just how many picks are being placed in the fabric, and if a greater or less number than the one desired, appears then the loom is regulated to secure the proper number. (*Harvey W. Bosworth, Urbana, O.*)

LANCASTER'S PICK-MEASURING DEVICE.

The object of this device is to indicate upon a glance at a piece of cloth, (whether in the loom and in the process of weaving, or after it leaves the weaver's



hands, and when undergoing inspection in the course of finishing and delivery) the number of picks it contains in a given length.

Fig. 1 is a sectional side view showing only so much of a loom as necessary to give to the reader a clear view of the construction and mode of operation of the device. Fig. 2, is a front view of the same.

A, designates the crank-shaft of a loom by which the lay is operated, and b designates the center bearing of the said shaft.

C, designates a worm on the crank-shaft a, which meshes with and operates a worm-wheel d, arranged to turn in suitable bearings connected with bracket e, supported from the centre bearing b, or other stationary part of the loom-frame.

F, designates a lever fulcrumed as at g, at a suitable point and upon a suitable part of the loom, and provided at the end of its longer arm with a wire h, which extends up in front of the harness, (not shown) and through a suitable guide i on the top of the loom-frame. The said wire is provided at the shed point with a mail or eye j, through which passes a thread contrasting in color or other visual character with the threads or yarns being woven into the goods, and which thread extends in the direction of the warps. The opposite end of the lever f bears against the face of the worm-wheel d, which, at a suitable point in the path of the end of the lever, is provided with a slot or depression k, into which the end of the lever, in contact with the worm-wheel, may fall at each revo-

lution of the said wheel, drawing the wire h and thread carried thereby down, during one or more picking operations, depending on the length or extent of the slot or depression k; the wire h, being raised by the shorter arm of the lever f, riding out of the depression k, formed in the face of the worm-wheel d upon the extreme outer face, and so raising the longer arm of said lever against the gravity thereof, and subsequently the wire. The continued revolution of the wheel causes the end of the slot to act against the lever and move it so as to elevate the wire, which so remains until the slot comes round again.

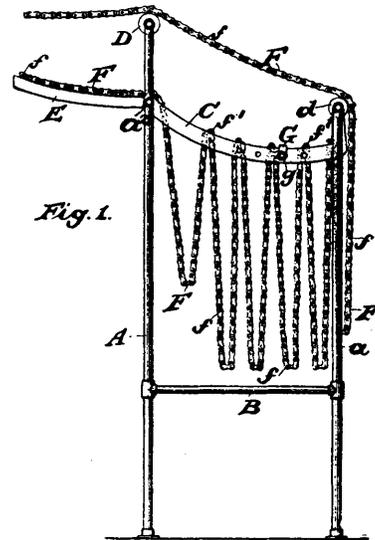
The construction and arrangement of parts as herein shown are such, that the worm-wheel d will be moved to the extent of one of its teeth at each revolution of the crank-shaft a, and while the end of the lever f, adjacent to the worm-wheel rides on the face of said wheel, the colored thread controlled by the wire h, will float on upper side of the goods as woven, and when said end of said lever drops into the slot or depression the colored thread will be drawn down and woven into the cloth for two picks and show on the back of the goods.

Calculating now, for example, that the worm-wheel has sixty teeth, and that each tooth represents a pick, the colored thread will thus float on the face of the cloth for fifty-eight picks, and on the back for two picks. From explanations thus given, it will be readily seen that any measure for any number of picks per inch required, can be readily made. The measure so obtained can be laid upon the goods along the line where the colored thread is woven in, so that the attendant can tell at a glance whether the requirements as to picks per inch are being met by the weaver. (*John Lancaster, Dover, N. H.*)

LUTTON'S PATTERN-CHAIN SUPPORT.

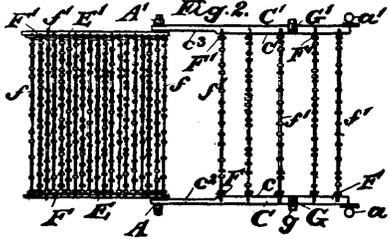
The object of this chain-support is to form a rack to hold a long pattern-chain and keep it straight.

Fig. 1 is a view of the support in side elevation showing the position of the chain thereon. Fig. 2, is a top plan view, partly in section. Fig. 3, is an enlarged view in detail, in side elevation of the supporting rails; and Fig. 4, is a top plan view of the same.



The support comprises four standards, those at the rear being denoted, respectively, by A, A', and those at the front being denoted by a, a', the standards being

connected by low-down girders B, and at their upper ends by the chain-supporting rails C, C', which extend,



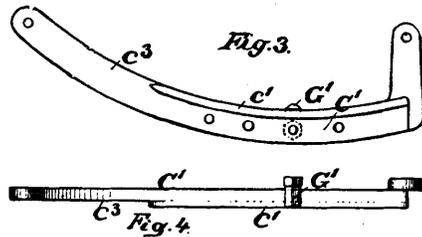
respectively, from the rear standard A, to the front standard a, and from the rear standard A', to the front standard a'.

The rear standards are taller than the front standards, and carry at their upper ends rollers D, for the reception of the links at the opposite edges of the pattern-chain. The side rails C, C', from their connection at a², with the rear standards curve downwardly and forwardly to a point between the front standards a, a', and thence extend upwardly to the tops of the standards a, a', to which they are connected, and are there provided with rollers d, for the reception of the links at the opposite edges of the pattern-chain.

The supporting-rails C, C', are each provided with inwardly-extending flanges c, c', along which the ends of certain of the cross-rods of the pattern-chain ride, the said flanges c, c', being cut away, as shown at c², c³, for a short distance from the rear standards, sufficiently to permit the cross-rods of shorter length to drop through.

To the rear of the standards A, A', and forming a continuation of the side supporting-rails C, C', at their rear ends, are supports E, E', sufficiently near together to retain the ends of the shorter, as well as the longer, cross-rods thereon during the passage of the chain from the roller or wheel (not shown) where the chain is brought into action.

The series of side links of the opposite edges of the pattern-chain are denoted, respectively, by F, F', the shorter cross-rods, which form the greater portion of the chain, by f, and the longer cross-rods, which are



inserted at intervals throughout the length of the chain by f'.

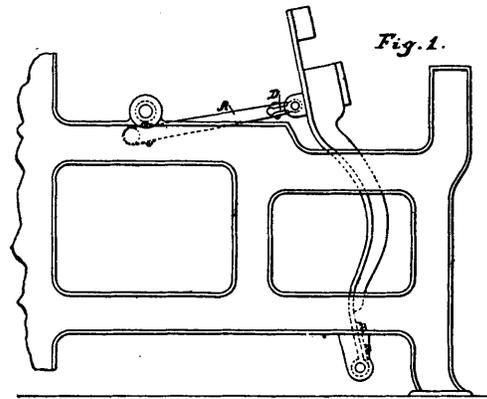
As the chain travels along down the guides E, E', to the point where the supporting side rails C, C', are located, the shorter cross-rods f, are dropped between the cut-away portions c², c³, of the flanges on the side rails, while the longer cross-rods f' are carried along the past cut-away portions c², c³, thereby holding the chain suspended at intervals and in such a manner that it will not be liable to become kinked and the cross-rods will not be liable to become displaced. As it passes off the ends of the flanges c, c', at the front, the chain is directed up and over the rollers d, thence to the rollers D, and thence to the

roller or wheel (not shown), where the chain is brought into action.

In order to retard the downward sliding of the longer rods and the consequent tendency to slip off the ends of the flanges c, c', before the previously-released loop is drawn up over the rollers d, there are provided beveled or rounded faced stops G, G', which uprise from the upper faces of the flanges c, c', in such a position that the ends of the longer cross-rods f', will be forced to ride over them during their travel. These stops G, G', are secured to the side rails by screws g, extending through depending flanges on the stops at the outside of the supporting-rings. (William J. Lutton, Paterson, N. J.)

PITMAN FOR LOOMS.

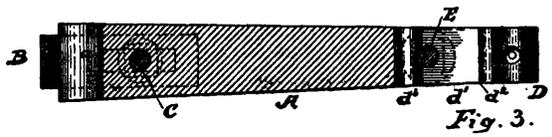
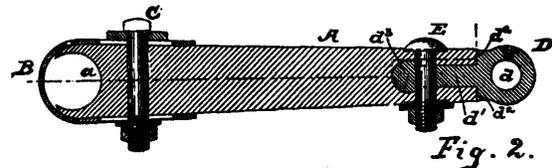
Heretofore these pitmans or connecting-rods, as used for connecting the crank-shaft with the lay, have been constructed of wood with a semi-circular notch



in each end to fit the crank-pin on the shaft and the wrist-pin on the lay, respectively, the pitmen being held to each pin by a U-shaped strap of leather or metal straddling the end of the pitman and fastened by a transverse bolt. The constant and severe shock produced by the successive thrust and pull tends to split the ends of the pitmen, necessitating frequent repairs. The new pitman aims to overcome this difficulty and expense.

Fig. 1, is an end view of so much of a loom as is necessary to illustrate the appliance of said pitman to it. Figs. 2 and 3, are side and top views of a pitman, partly in section.

A is the wooden body one end of which has the notch a, strap B, and fastening-bolt C, whereas the



other end is provided with a metallic knuckle D, having an eye d for the wrist-pin or crank-pin, and a cen-

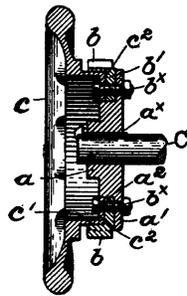
tral flat shank d' , which is received in a slot or narrow gain cut in the end of the body A. The shoulders d^2 on each side of the shank abut against the end of the body A. The shank d' is provided with an enlargement d^3 , which fits a corresponding enlargement of the gain in the body A. Bolt E passes transversely through the end of the body A, and the shank d' , and clamps these parts firmly together. A similar knuckle may also be used at the other end of the pitman. (*R. H. Livesey and W. Squire, Fall River, Mass.*)

LOOM-GEAR.

In the majority of looms as now constructed, the fast and loose pulleys are mounted on one end of the crank-shaft and the crank-shaft gear and hand-wheel at the opposite end, the hand-wheel being usually required in order to insure the safety of the operative.

Such gears are usually cast in one piece with the hand-wheel and keyed to the shaft with the gear-hub close to the shaft-bearing, the key being driven home from the outside, and when the gear has to be removed, it is effected by the aid of a forcing apparatus, the operation usually resulting in the breakage of the hub by forcing it over the key, and the whole casting must be thrown aside.

It has been proposed to make the gear and hub detachable, keying the latter to the shaft and securing hub and gear together by bolts; but when such gears have been used, they have either been applied to the crank-shaft inside the pulleys, which serve as a guard, or else the hand-wheel has been keyed to the shaft outside the gear. In the former case the pulleys must be removed to detach the gear, and in the latter case the hand-wheel has to be forced off over the key, breaking the hand-wheel.



In the at present to be explained gear all of the foregoing objections are overcome by making the hub, gear, and hand-wheel in three separate pieces or castings, securing the gear and hand-wheel together and to the hub by suitable bolts, the hub alone being keyed to the crank-shaft. In this way the hand-wheel and gear may be removed from the hub together or separately for any needed repairs,

and a guard is always present for the gear.

The accompanying illustration is a vertical sectional view of this loom-gear.

C, indicates the crank-shaft of a loom, running in proper bearings of the loom-frame.

The hub a , having a disk-like body a' , is permanently attached to the shaft beyond the loom side by key a^x , the body being annularly shouldered on its outer side at a^2 .

A ring-gear b is provided with a web b' , apertured to snugly fit over the shoulder a^2 of the hub-body to which it is detachably secured by bolts b^x .

The hand or balance-wheel c is formed on an annular body c' , having at its inner end an intumed flange c^2 , which slips over the shoulder a^2 , the flat face of the wheel-flange c^2 resting against the flange b' of the gear. The bolts b^x are extended through the adjacent flanges of the gear and wheel into the hub-body, rigidly securing the three parts together to operate as a single casting.

By the construction described a very firm and strong connection is effected between the parts, the hub by its shoulder a^2 providing a common support for the gear and wheel, while the latter effectually guards the gear and prevents accidents to the operative.

As the hub and balance-wheel will under ordinary circumstances last as long as the crank-shaft itself, it is only necessary to renew the gear when worn out, or to turn it relatively to the hub to present new teeth at the points of greatest wear. (*Andrew F. McCann, Fall River, Mass.*)

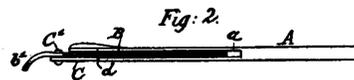
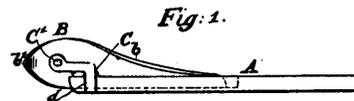
PILE-WIRE FOR LOOMS.

Fig. 1 represents a side elevation, and Fig. 2 is a top view of the same.

A, represents a pile-wire provided at its end with a longitudinal groove a , or with a longitudinal grooved holder applied to the end of the pile-wire. The grooved portion of the pile-wire or holder serves for receiving the base of the cutting-blade B, by which the pile of the fabric is cut as the pile-wire is moved transversely across the loom.

The cutting-blade B is provided with a downwardly-slanting sharpened edge b , which extends from the widest portion of blade to the innermost point of the same, the straight base of the blade being blunt, so as to firmly rest throughout its entire length in the groove of the pile-wire. The outer end of the blade is made tapering and bent up to form a guard b' , that is usually employed in pile-wires of this class, so as to produce the glancing off on the reeds and prevent injury to the same. The outer end of the pile-wire or holder is provided with a side recess d , which extends under the bottom of the grooved end, the pile-wire or holder being thickened along the opposite side, so as to reinforce it at the outer end and make up for the diminished strength caused by the recess. To the body of the cutting-blade B, at the widest part of the same, is riveted, by a rivet C' having a square shank, a flat spring C, made in shape of an L, that extends into the side recess d of the wire or holder, said spring being provided at its lowermost free end with a laterally-extending heel or shoulder that springs in below the blunt base of the cutting-blade and serves thereby to lock the cutting-blade firmly to the holder, so as to prevent the release of the blade from the pile-wire.

Owing to the square shank of the rivet C' , the position of the locking-spring C on the blade cannot be changed, and hence the locking-spring will always engage in the side recess of the pile-wire or holder. The cutting-blade can be readily inserted into the



pile-wire or holder by slightly lifting the locking-spring and inserting the blade in the groove of the pile-wire and sliding it inwardly until the locking-spring has passed over the outer end of the pile-wire and is in line with the side recess of the same so as to engage in it. For detaching the cutting-blade the locking-spring is lifted out of the recess, upon which the cutting-blade can be removed from the grooved end of the pile-wire. Instead of grooving the holder or the pile-wire after making the same, either may be cast with the groove in it.

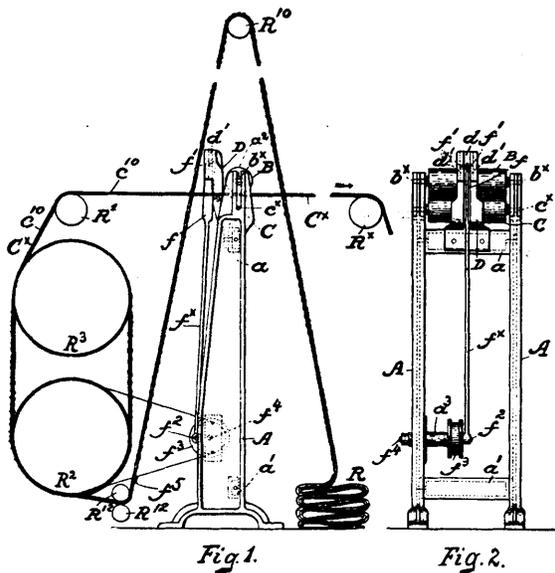
The advantages of this pile-wire for looms are, first, that a stronger cutting-blade is obtained, as the body of the same is not weakened by slits or recesses,

A suitable frame, comprising upright sides A, and cross-girths a, a' , is longitudinally slotted at its upper end at a^2 , Fig. 1, to receive the journals b^x and c^x of two rolls B and C, between which the yarn chain C^x is passed as it is drawn over a guide-roll R^x .

The wrapped chain in the form of a loose coil, as at R, Fig. 1, is passed over an over-head pulley R^{10} and then down between rolls R^{12} , near the floor, after which it is passed several times around the drums R^2, R^3 and led over a guide-roll R' to and between the presser or friction-rolls B and C.

At the front of the apparatus an upturned guide-bracket D is secured to the cross-girth a , the said bracket forming an obstacle to separate the chain, which is halved as it is drawn along with the guide in the center.

A thin cutting blade or knife f , having lateral ears or projections f' to slide in the guides d' , is secured to or forms a part of a carrier f^x , shown as a rod pivoted at its lower end on a crank-pin f^2 , projecting from the inner face of a sheave or pulley f^3 , fast on a shaft f^4 , rotatably mounted in a bearing a^3 on the inner face of one of the side frames A, rotation being imparted to the pulley f^3 by a belt or band f^5 , from drum R^2 . The



free end of the wrapped chain is divided and the divided parts pass along at each side of the bracket D, with the knife or cutter f between said parts, and the apparatus is set in operation.

Rotation of the sheave or pulley f^3 gives a reciprocating motion to the knife, as well as a slight back-and-forth movement in the direction of the length of the chain, the outwardly-turned edge of the knife acting upon the spiral coils of the wrapping-cord c^{10} and severing them as the chain is drawn along through the apparatus past the knife or cutter, the presser-rolls B and C preventing the unwrapped chain from spreading as it leaves the knife.

The numerous yarn ends composing the chain lie in parallelism without twisting or crossing each other, so that they will not be cut by the knife, but will divide into two parts at the knife and will pass along at each side thereof while the cord c^{10} is severed in short lengths or pieces which will drop off or be dislodged in the subsequent separation of the chain into its component yarn ends. (Draper Company.)

BOBBIN FOR SILK WEAVING.

The object in the construction of this bobbin, is to wind a wire around said bobbin, so that the silk when drawn off will have less friction compared to plain bobbins, the thread only touching the wire instead of the wooden part of the bobbin. Fig. 1 is a side view, and Fig. 2 a view of the complete bobbin and cop illustrating the delivery of the thread therefrom.

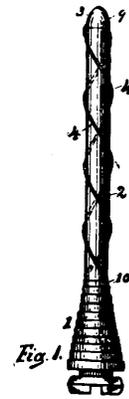


Fig. 1.

This bobbin is composed of the following parts: The head 1, having a spindle-hole through its axial centre; the tubular stem or shaft 2; the conoidal or rounded tip 3, closing the end of the tube; and the wire or strands 4, connected with said tip and head thus forming a plurality of guards or external ridges spirally about said tubular shaft.

The head 1 is provided with an end that fits the lower end of the tube 2, and a shoulder against which the end of the tube is seated, so that when said parts are glued and forced together a firm and rigid attachment is produced.

The tip 3 is made solid, and is shaped with a rounded or conoidal top and a projecting shank or tenon that fits the interior of the shaft tube 2, and a shoulder that matches the end thereof so as to present a smooth and flush exterior surface.

A transverse hole 9, is formed through the tip 3, near the base of the conoid and a small wire or smooth strand 4, is passed through said hole, the wire bent downward along the shaft and wound spirally about the cylindrical surface thereof; the two spiral strands occupying diametrically opposite positions on the circle. The ends of said spiral strands are securely fastened within the interior of the head 1, or to the end of the shaft 2, where it is connected with the head.

By constructing and combining the parts in the peculiar manner shown and described, there is thus produced a durable, efficient and highly advantageous bobbin that can be manufactured with practical facility and economy.

With the bobbin constructed as described, they can be made of much greater length than those ordinarily used for silk weaving, and are able to hold a much greater quantity of filling in a single cop, while affording a free and uniform delivery of the thread from commencement to finish of the cop, without liability of frequent stoppages of the loom or the making of waste in weaving. This bobbin is of especial utility in using double ends, or two-thread silk in the cop, the liability of the threads separating as they run off being overcome thereby, since the plurality of opposite spiral-guards raise the unwinding silk from the body and



Fig. 2.

prevents the thread from closing its coils about the cylindrical surface and creating sufficient frictional tension to break the thread as it is drawn off, by the sudden action of the shuttle when thrown across the loom. (Frank Stone, Worcester, Mass.)

FISHER'S BOBBIN.

Generally, as heretofore constructed, bobbins have been formed of wood or similar material, thus not only heavy but also liable to split and crack, so as to catch the yarn or threads and break them. These, as the in-

ventor of the new bobbin claims, are serious objections, and it is the object of the invention to provide a bobbin which shall obviate these disadvantages without adding to the cost of manufacturing the same.

Fig. 1 is a perspective view of such a bobbin in the process of construction, and showing the manner of connecting the end of the strip which forms the peripheral flange or base.

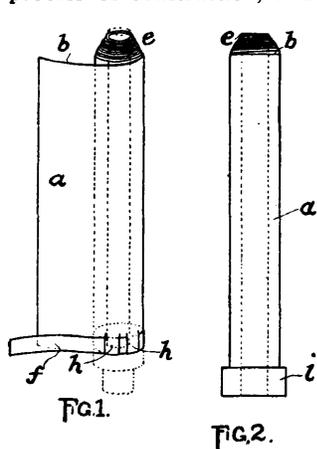


Fig. 2 is a side view of a finished bobbin.

The manufacture of these novel bobbins is done thus: A long strip (*a*) of stout Manila paper or other equivalent fibrous material suitable for the purpose is supplied. One edge of the strip is cut at a slight angle to the other edge. Both sides of the strip are coated with a proper cementing compound, such as silicate of

soda, sizing, or other desirable cement, and one edge placed upon a suitable mandrel. (Indicated by dotted lines in Fig. 1). The strip is wrapped and wound upon the latter, and each convolution of the same is pressed closely upon the preceding one, so as to form solid walls. As the body of the bobbin is being formed the edge *b*, retreats spirally from the end, so as to form, when finished, a beveled end *e*. The loose edge is then tightly cemented down so as to form a smooth tube or body, and the latter may be dried and coated with shellac varnish or its equivalent; but generally before coating the bobbin with shellac, the strip *f* is added to form a peripheral flange or base.

The inner end of the strip is secured as follows: Several cuts or incisions are formed in the last convolution of the strip *a*, extending up from the lower edge. Then under the flaps *h, h*, thus formed the end of the strip *f* is cemented, and the said strip is wound on the end of the bobbin and forms, when completed, a base or peripheral flange *i*.

After the loose end of the strip *f* has been cemented down, the whole completed bobbin may then be coated so as to provide a smooth polished surface.

A bobbin constructed in accordance with the foregoing is exceedingly tough and durable, is not liable to crack or break, and possesses the highest degree of efficiency for the purposes for which it is intended. (*James C. Fisher, Lawrence, Mass.*)

BLACKBURN'S BOBBIN.

The object of constructing this bobbin, is to so construct a bobbin of large size as to decrease the weight of the same without impairing its efficiency.

Fig. A, is a sectional view of this new bobbin. Fig. B, is a side view, on a smaller scale, of the parts of said improved bobbin; and Fig. C, is a view likewise on a smaller scale, and illustrating the bobbin with the textile covering removed from the lower portion of the same.

The bobbin is composed of a central tubular wooden stem *A*, reduced in diameter at its lower end so to form a shoulder *a*, the reduced portion of the stem being adapted to a central opening formed in the wooden base *B* of the bobbin, in which it is firmly re-

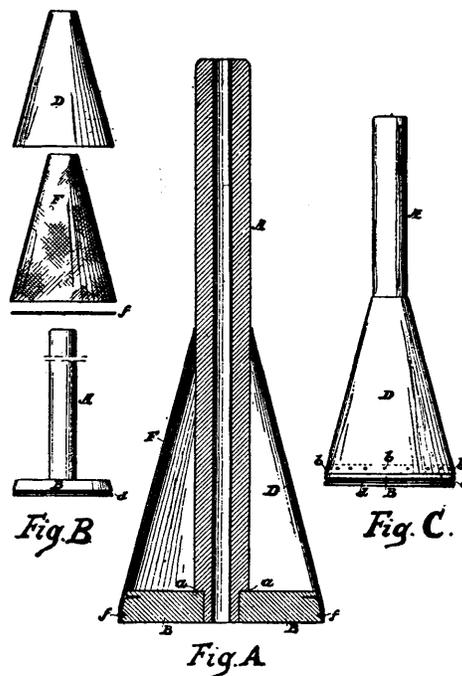
tained by glue or other cement, the shoulder *a*, resting firmly upon the top of said base.

Surrounding the lower portion of the stem *A* and fitting snugly to the periphery of the upper half of the base *B*, is a sheet-metal cone *D*, the upper end of which fits snugly against the stem *a*, while its lower portion is secured to the base *B*, by means of nails or pins *b*, as shown in Figs. A, and C.

The periphery of the base *B* is flared to accord with the flare of the cone *D*, and in the lower portion of the base, beneath the lower edge of the overlapping metal cone, is formed a peripheral groove *d*.

Surrounding the metal cone *D* and securely cemented or otherwise united thereto, is a conical textile envelop *F*, composed of an available fabric which extends both above and below the metal cone, the projecting upper portion of the envelop being united to the outer face of the central wooden stem *A* of the bobbin, while the projecting lower portion of said textile envelop *F*, is caused to enter the groove *d* in the wooden base by the pressure of a confining wire ring or wire band *f*. By this means the textile envelop is firmly secured in its place, and the sheet-metal cone is entirely inclosed, so that the yarn wound upon the bobbin can never come into contact with said sheet-metal cone, and hence cannot be stained by rust or otherwise injured by such contact.

The use of the hollow sheet-metal cone in order to form the flaring lower portion of the bobbin, renders the latter much lighter than the usual solid wooden bobbins, while the use of wood for the central stem



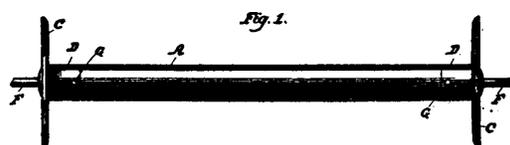
and base of the bobbin, renders said bobbin preferable to one made entirely of sheet-metal by reason of its less weight and cost, and by preventing injury to the yarn, which is likely to result from contact with said sheet-metal surface, the latter being liable to oxidize in the damp atmosphere of a mill, or by reason of the wetting of the bobbin in some of the various processes of manufacture in which it is to be used. (*R. Blackburn, Nottingham, England.*)

SPOOL HEAD.

In this spool the heads are secured upon the shaft in such manner that they cannot be removed or become loose by accident or by the wear incident to their use, thereby producing a more durable spool, which will save much of the loss in material and time which has heretofore been occasioned by the breaking down of the spool when in use.

The construction of this spool is best described by referring to the accompanying illustrations, of which Fig. 1 is a side view of this spool; Fig. 2 shows a detailed section of one end thereof, showing one of the heads and means for attaching the same to the shaft; and Fig. 3 is a section at the line *x-x*, of Fig. 2.

Referring in detail to the drawings, A represents the shaft, made of wood, and having passed through each end thereof a hard-wood plug B. The heads C are circular and slightly cup-shaped, so that their inner sides may afford guidance for the rope or yarn run upon the spool. These heads have formed therewith

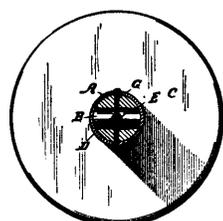
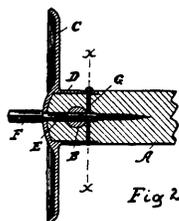


the sockets or ferrules D, the outer diameters of which are the same as the diameter of the shaft.

In securing the heads upon the shaft the ends of the latter are turned down so as to fit within the sockets, as clearly shown in Fig. 2, and when the heads are placed upon the shaft, the pin E, a portion of which is threaded, is passed through a suitable opening in each of the central openings in each of the heads and threaded into the shaft, the spindle F projecting from the head to serve as a trunnion upon which one end of the spool may turn.

To prevent the withdrawal of the pin or the head, a rivet G is passed through the ferrule or socket and through a hole in said pin just in the rear of the hardwood plug B, so that neither the pin can be turned to back it out of the shaft nor the head drawn from off the end thereof, the plug serving the two-fold purpose of adding stability to the rivet and preventing the loosening of the pin within the shaft by sidewise strains.

A spool constructed in accordance with this improvement will have little or no tendency to wear, and consequently the head and spindles cannot be withdrawn accidentally, which is of great advantage in that it prevents the loss which has heretofore been occasioned by the breaking down of spools when in use.



One of the principal advantages of the improvement is, that a perfect spool is produced at little or no increase of cost over the old method of manufacturing said spools. (*J. E. Dingman and S. Klingin, Little Falls, N. Y.*)

GRADUATED YARN TEMPLET.

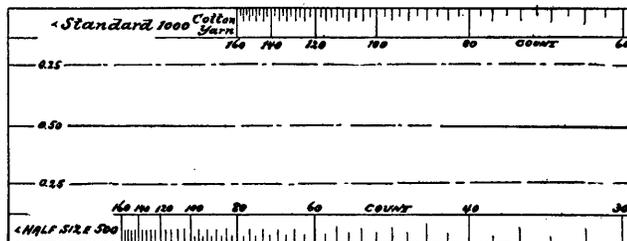
The object of this measure is to produce a graduated templet, by which the number of threads or counts of a piece of cloth per inch being ascertained, the size of a piece to be cut to weigh, to find the number of yarn of which the cloth is woven, will be plainly indicated thereon.

Referring to the accompanying illustration, the space between the divisions on the top side of the templet marked "standard," are so proportioned that a piece of cloth cut of the full width of the plate and of the length between the left end of the plate and the mark indicated by the count or number of threads per inch in the piece, will contain a given length of yarn.

For example, a piece of cloth of full width of the plate—of, say, 100 picks or counts to the inch—cut to the length of the left end of the plate to the line marked "100," will contain the same number of yards of yarn as a piece of cloth of the full width of the plate of 80 picks or counts to the inch, cut to the length between the left end of the plate and the line marked "80" will contain, and consequently either piece of cloth may be put on the scales and weighed the same as so much yarn and the number of the yarn ascertained.

In graduating the scale marked "standard," for cotton yarn or spun silk, the number taken for standard is 1,000. The length of yarn contained in each of the various samples cut as above directed is 120 yards, and if a sample cut to the measure indicated by the number of picks or counts per inch weighs 25 grains, this number divided into 1,000 equals 40, which is the number of the yarn, and if it weighs 20 grains, 1,000 divided by 20 equals 50, which is the number of the yarn in that case.

In making the templet for woolen cloth the proportional graduation of the scale is the same as that used for cotton; but the plate itself is made narrower in pro-



portion to the difference in weight of the two materials. This proportion is as 500 to 525—that is, the plate would be one-twenty-fifth narrower than the plate given for cotton, and the results would be given in "runs" instead of numbers.

For worsteds the templet can be taken just as it is for cotton, but the "standard" number, instead of being 1,000, as in cloth, will be 1,500, and this number divided by the number of grains the piece weighs, indicates the number of the yarn. For example, if a piece of worsted measured and cut to dimensions according to the count of threads to the inch, as above, weighs 75 grains, 1,500 divided by 75 equals 20, the number of the yarn in the sample.

In making the templet for raw silk, or silk in the gum, the plate is made narrower than for the cotton, in the proportion of 100 to 120, or one-sixth narrower, and the graduations are made the same as for cotton. As a sample large enough to cut full width of the plate and of the necessary length cannot always be had, there is provided an arrangement of proportional divisions on the other side of the plate marked "half-size,"

by which, if a sample is as wide as the plate, but not long enough to reach up to the line indicated by its number of threads per inch on the standard side, it can be cut by the side of the scale marked "half-size," and the number to be divided by the weight in grains will be 500 instead of 1,000; and if a sample is long enough to reach the required mark, but is too narrow to reach across the plate, it can be cut to the middle mark "0.50" length-wise of the scale and the result of the grain-weight divided into 1,000, divided by 2 or halved, will give the number of the yarn. A line marked "0.25" is for a quarter-sized sample, and the result is divided by 4. Still another line is provided for one-eighth size, the result to be divided by 8. With these lines a very small sample can be used.

In making a count of the threads per inch in the cloth to ascertain the desired size to cut a sample, as it is the area and not the mere length that counts in weighing, the warp-threads should be counted as well as the filling, and if they differ the average of the two counts should be used. For example, if the warp has 80 threads per inch and the filling 92 threads, the average, 86 threads, is the number to be used as the "count" of the goods. (A. Schaer.—Draper Co., Manuf.)

GRADUATED CLOTH-WEIGHT TEMPLET.

The object of this templet is to produce a gage so divided by lines that a sample from a roll of cloth cut to a certain dimension indicated by the division on the plate bearing the same number that the cloth is inches in width, will give the number of yards per pound of the cloth in the roll, by weighing the samples.

The templet, as seen by the accompanying illustration consists of an oblong piece of sheet metal A, cut to a given width and divided by lines into spaces on each side or edge, the spaces between the lines on the lower side *c* being equal to each other, but only one-half the width of the spaces on the upper side *a*, marked "standard," which are also equal to each other and are numbered by tens up to sixty or higher. These lines represent the width of the cloth, in inches, to which the sample belongs that is to be tested—that is, they indicate the length the sample must be cut to for weighing.

For example, a merchant receives a sample of cloth which he is informed is forty inches wide.

He takes the sample and cuts it to the width of the

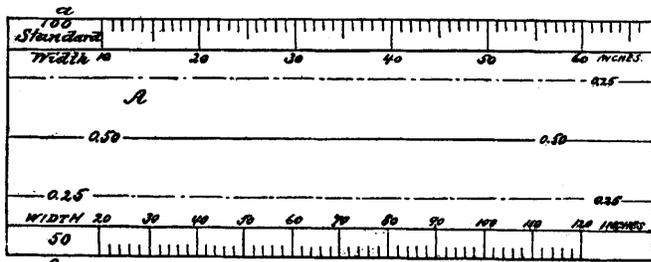


plate A and the length from the left end to the line on the *a* side of the plate marked "40." The piece cut to these dimensions is then weighed on grain-scales, and the number of grains the sample weighs—suppose it is twenty grains in this case—is divided into one hundred, the standard number, and the result, five, is the number of yards to the pound that the cloth weighs.

The standard number, one hundred, according to the width of the plate and of the spaces between the lines, has been calculated, to produce a given result.

If the templet were twice as wide, the standard number to divide the number of grains in weight into

would be two hundred, and any change in the widths of the spaces between the lines would necessitate a change in the standard number, or a second operation of dividing or multiplying of the result. This is illustrated in the lines on the *c* side of the plate and the proportional lines marked "0.50" and "0.25."

Sometimes the sample available is not large enough to cut to the "standard." Then the proportional divisions can be used. For example, if a sample is as wide as the plate, but not long enough to reach the line the width in inches of the cloth requires, it can be cut to the line of the same number on the *c* side of the plate, which are one-half the width of those on the *a* side, and when weighed the weight in grains divided into fifty.

If the sample is not so wide as the plate, but is long enough to reach the line of the width in inches on the *a* side, it can be cut to the width of the line marked "0.50" in the middle of the plate. Then the resulting weight can be divided into hundred and the result divided by two; or by means of one operation divided into fifty and the number of yards per pound found.

Other proportional lines marked "0.25," &c., are made, and it will be readily seen that by use of these lines samples of very small size and most any shape can be utilized.

Of course the full standard size of sample, when it can be had, will give a more accurate result than can be obtained with smaller samples. (A. Schaer.—Draper Co., Manuf.)

CLOTH AND YARN CALCULATING RULE.

Its object is to provide mechanical means for solving certain questions that arise in manufacturing textile fabrics, that solved in the usual way, require a great deal of figuring and calculating on the part of both the manufacturer and the dealer.

One of these questions, for instance, is:

If a dealer wants cloth of a certain width and number of yards to the pound, what number of yarn and how many picks to the inch in weaving will make the goods?

Another question is:

Having goods of a certain width and number of yards to the pound and number of picks to the inch, what is the number of the yarn?

And having yarn of a certain number, what must be the number of picks per inch to make goods of a certain width and weight?

These and many like questions that usually require elaborate calculations, with all their liability to error, are correctly solved with a single movement of the device, shown in the accompanying illustrations, of which Fig. 1 shows a top view of the calculating-rule closed. Fig. 2 represents the same open, as when it is in use.

This calculating device consists of a rule A, of any convenient length, having a dove-tailed groove made in the center of its width and extending the whole length of the rule. A strip *a* is fitted to the slide in the groove after the manner of slide-rules. This rule then has four lines of divisions made on it, designated as 1, 2, 3, 4, in the illustrations. Lines 1 and 4, are made on the rule proper at each side of the groove, and lines 2 and 3, are made on the slide *a*. The space made by the divisions on the lines 1, 2, 3, commence largest at the left hand and decrease in logarithmic propor-

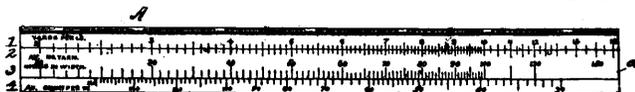


FIG. 1.

tion as they go to the right, and when the slide *a*, is closed in the rule the divisions on the lines 1, 2, 3,

exactly agree with each other; though line 1, is numbered 2, 3, 4, while the same divisions on the slide *a*, are marked 20, 30, 40, and so on, the figures in the middle of the slide serving for lines 2 and 3, on each side of them. The line 4, of divisions are also made in logarithmic proportion, but increase in

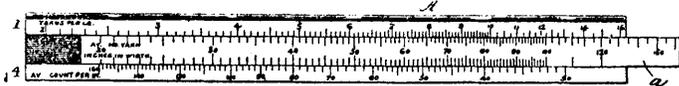


FIG. 2.

the opposite direction to the other lines, and when the slide *a*, is close in, No. 40 on the slide is opposite No. 99, on the line 4. Line 1, of the divisions is marked on the rule as "No. of yards per lb.," and line 2 is marked on the slide "Av. No. of yarn." Line 3 is also marked on the slide as "Inches wide," and line 4 is designated on the rule as "Av. count," (or average picks per inch,) which means that as the number of picks per inch of the filling may not be the same as the number of threads per inch of the warp the average of the two is taken as the average count.

If the one was eighty threads to the inch and the other eighty-six threads, eighty-three would be average count. The same remark applies to the "Av. No. of yarn" marked on line 2 of the divisions.

How to use the rule to solve the following questions: If the cloth is forty inches wide and the average count per inch eighty, move the slide *a*, so that 40 on line 3, is opposite to 80 on line 4, and opposite of yards per pound the cloth will be. If the yarn is No. 30, cloth will weigh three and seven-tenths yards per pound. If the yarn is No. 60, the cloth will run seven and four-tenths yards per pound. And the reverse process is also correct.

If the cloth weighs four and nine-tenths yards per pound and the yarn is No. 40, bring 49 on the line 1 opposite 40 on line 2, and opposite any width of cloth on line 3 will be found on line 4 the number of count per inch necessary to make the goods. If the count is 100 per inch on line 4, the width will be thirty-two inches on line 3. If the count is 75, the width will be forty-nine inches.

And if the number of the yarn is 80 on line 2 and the count is 60 on line 4 and they are placed opposite each other, then opposite any width on line 3 is the number of yards per pound on line 1.

These examples are but few of the many in which, by the use of the rule, calculations can be quickly made. (A. Schaer.—Draper Co., Manuf.)

SCALE-BEAM FOR ASCERTAINING THE COUNTS OF YARN.

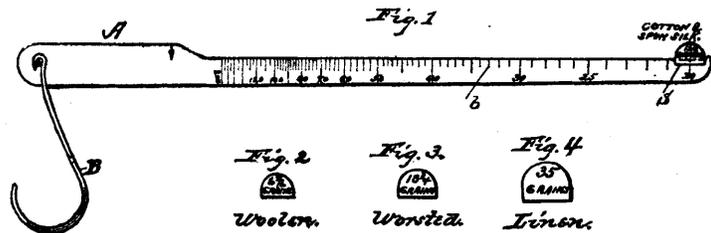
Heretofore the ordinary way of obtaining this number has been, to reel off one hundred and twenty yards of the yarn to be numbered, and then weighing this sample on a grain-scale, and, by calculations based on the number of grains the sample weighed, find out the number of the yarn.

The object of the new scale is to facilitate the operation of finding the number of the yarn and lessen the liability to make mistakes. This is accomplished by graduating the scale-beam for weighing the yarn into divisions so proportioned and numbered that the mark indicated by the sliding pea on the beam will indicate the number of the yarn, so that it can readily be seen at a glance without making any calculation, thereby saving time and avoiding the liability of making mistakes.

Fig. 1 represents the scale-beam with its proportional divisions and a pea of the right weight for cotton yarns or for spun silk.

Figs. 2, 3, and 4, represent peas of the proper weight to use on the same scale-beam for woolen, worsted, and linen yarns, respectively.

The scale-beam A is made of aluminium, as the lighter it is, the more quickly it will turn on its pivot and the more accurate the weight will be. B is the hook upon which yarn to be weighed is hung. The divisions *b*, on the scale-beam A, start from twenty, although they may go down to ten or five for very coarse yarns, and go up to two hundred or higher for very fine yarns, and are so proportioned to each other



that if a hank of one hundred and twenty yards of cotton yarn or spun silk is hung on the hook B, and balanced by the pea for those materials, the number indicated by the middle mark on the pea S, will be the number of the yarn.

Cotton and spun silk are of the same class-number that the same pea answers for weighing both.

For other yarns,—as, for example, woolen, worsted and linen—peas are provided having the same proportional weight to the pea used for cotton and to each other as the class-numbers of those materials have to cotton and each other, which proportions are closely approximated in the following weights.

For cotton, twelve and one-half grains; woolen, six and nine-sixteenths grains; worsted, eighteen and three-fourths grains; linen, thirty-five grains. These weights may all be used on the same proportionally-divided scale-beam with the same length, one hundred and twenty yards, of the different yarns and the number of each yarn will be the number that the weight or pea indicates when the scale is balanced.

By cutting a sample of cloth to a size proportioned to its count of threads or picks per inch, so as to contain one hundred and twenty yards of yarn, it can be weighed on the scale and the number of the yarn in the piece shown, the same as in the case of the yarn above described. (A. Schaer.—Draper Co., Manuf.)

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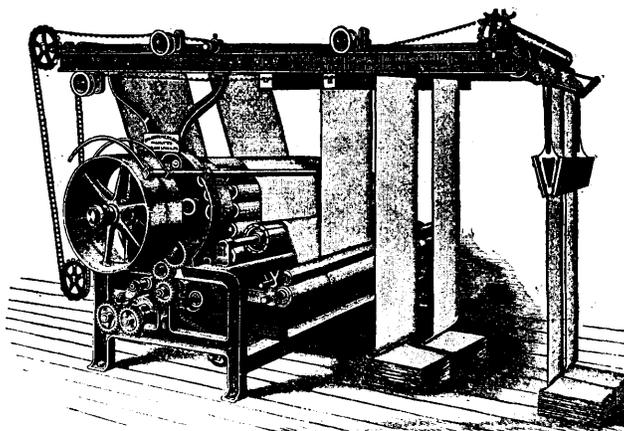
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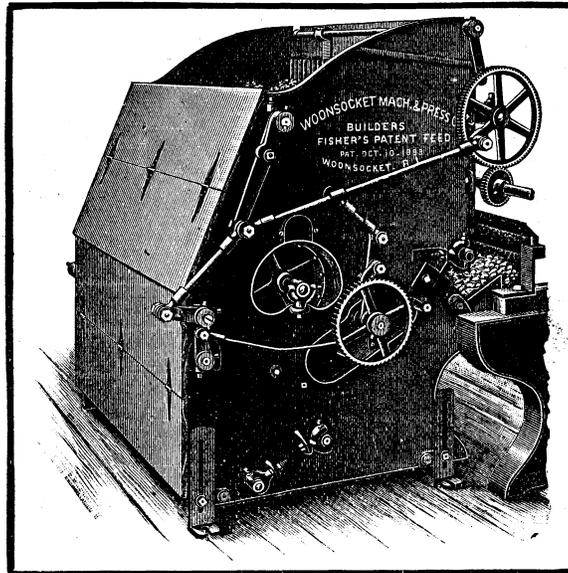
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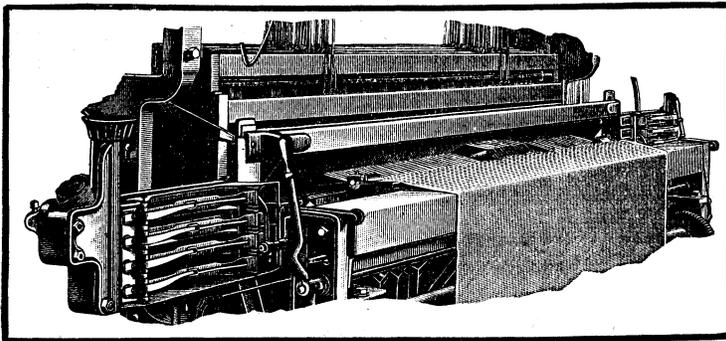
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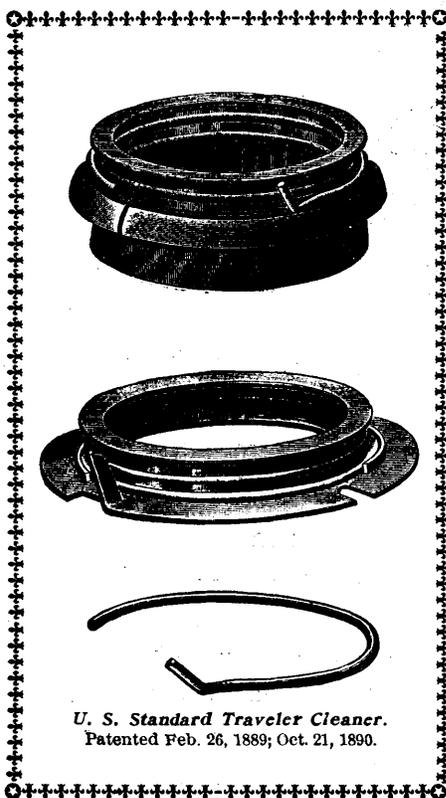
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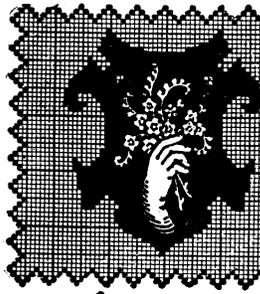
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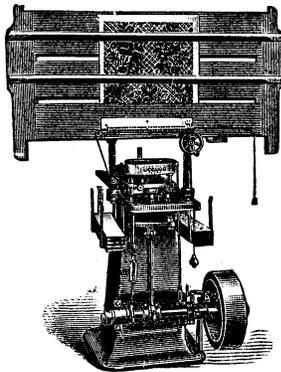


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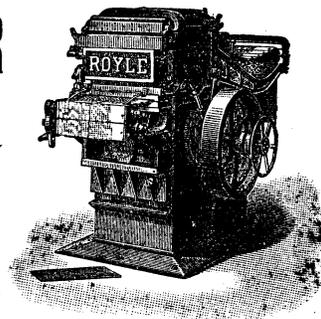
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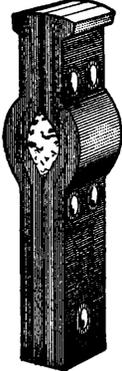
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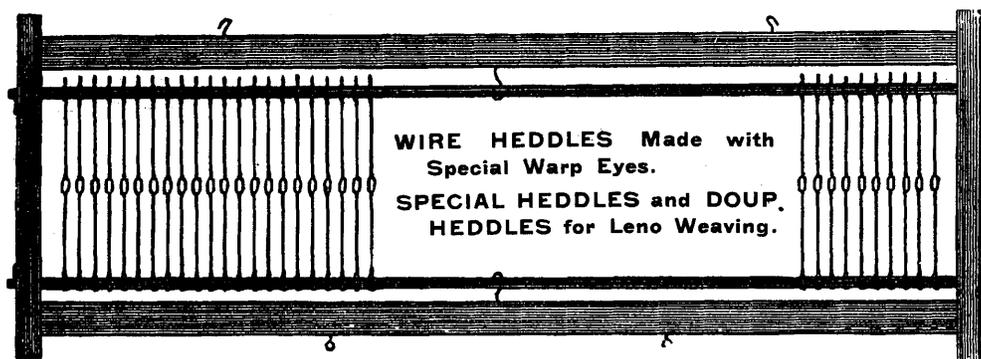
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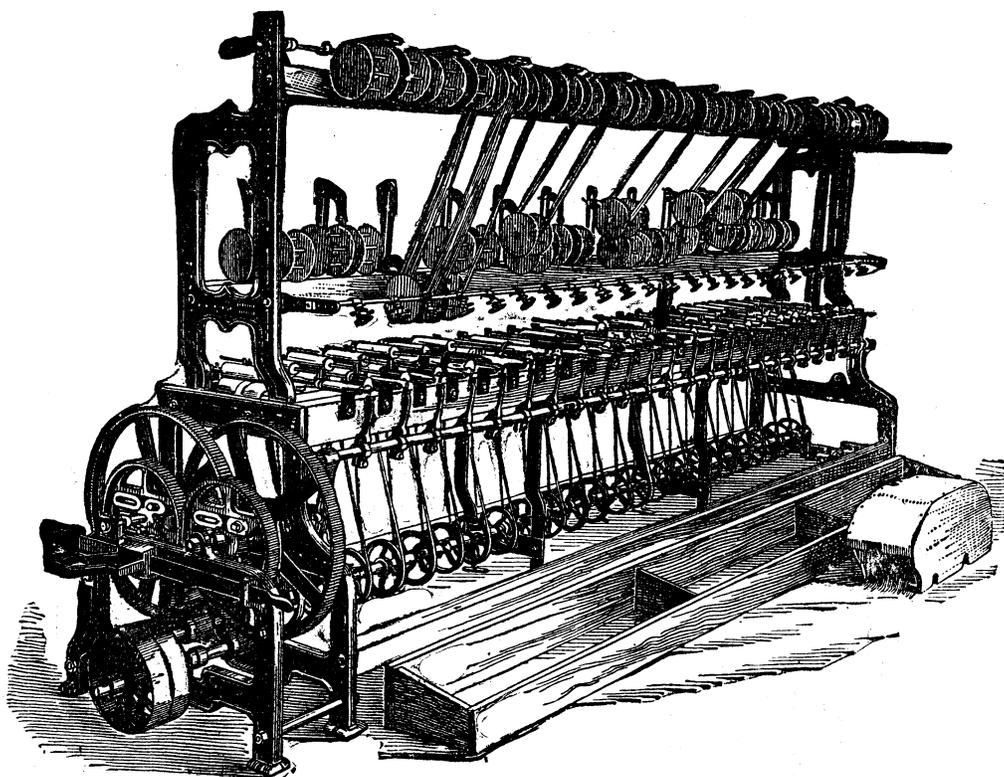
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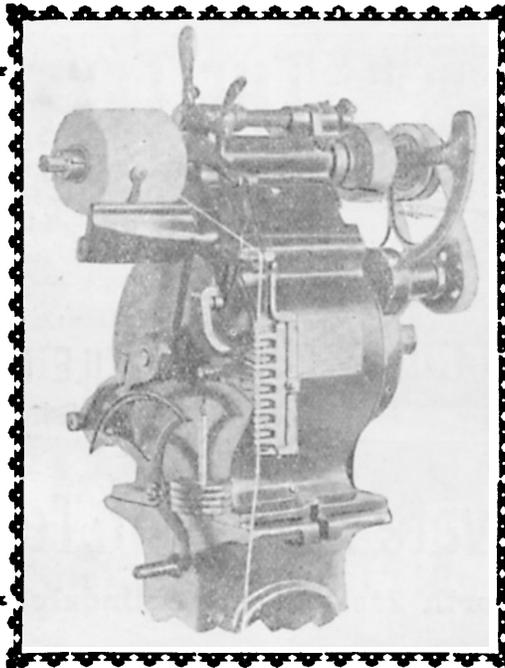
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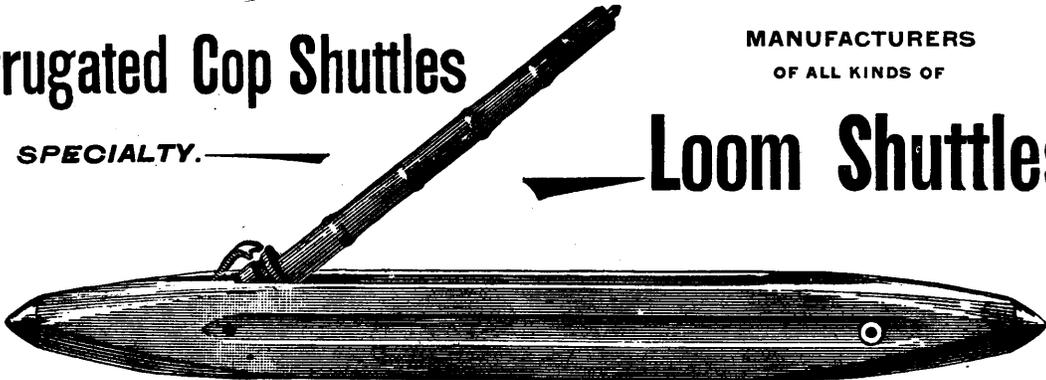
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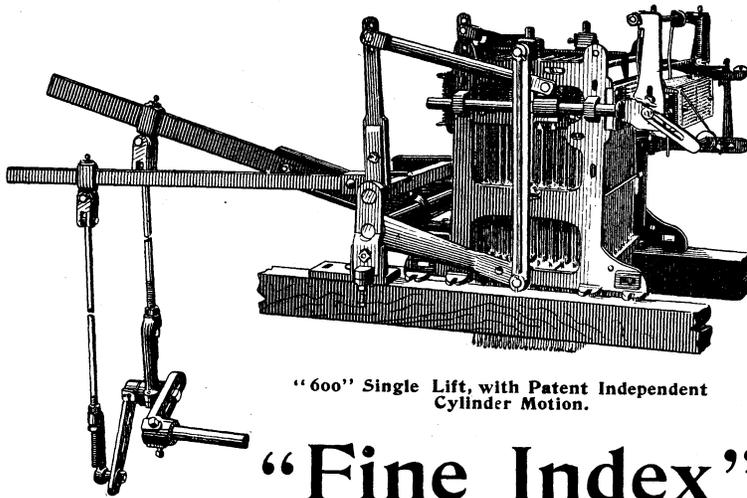
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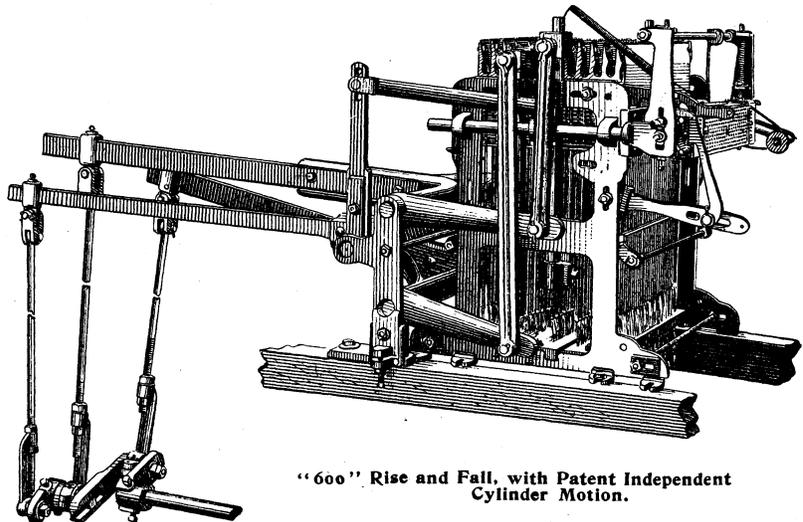
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