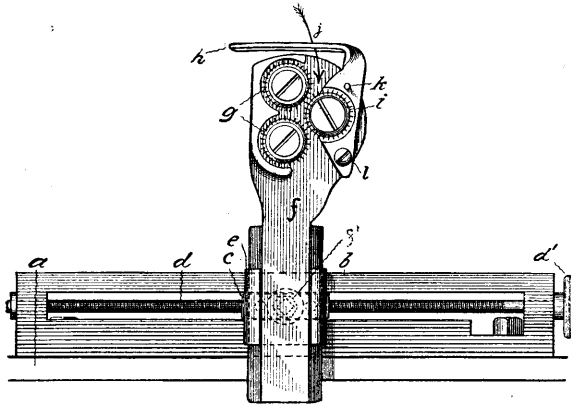


The temple is shown in its plan view in the illustration.

a denotes the breast beam of a loom, *b* a ways block bolted to the breast beam, the attachment between the two being one that gives the ways block and the parts it carries vertical adjustability, *c* denotes a nut



hung in the ways block upon the screw *d*, which is provided with the operating wheel *d'* for adjusting the temple to the width of the cloth to be woven. The nut *c* carries a smaller ways block *e*, in which the temple base *f* is carried and held in place by a set screw *f'*, so that said temple base can be moved from or toward the fell of the cloth, as the case may require. *g* denotes two spur surfaced wheels rotarily attached to the loom temple base and set to revolve in a plane parallel to the plane of the cloth under retention when the loom temple is in use. *h* is a cloth guard pivotally attached at *l* on the upper face of the temple base and bearing thereon the spur surface cloth retaining wheel *i*.

When the temple is adjusted for use the inner edge of the spur surfaced wheel *i* intersects an imaginary line drawn through the outer edges of the spur surfaced wheels *g*, the outer edge of the selvage of the cloth (being turned down vertically) passing between the two spur surfaced wheels on the inside and the single spur surfaced wheel on the outside (the latter being held to place at such time by the pin *k*) receives the spurs projecting beyond the edges of all these wheels. Arrow *j* indicates the direction of run of selvage (and cloth) as passing from the fell of the cloth under cloth guard *h* into action of spur surfaced wheels *g* and *i*, as before described. (Alfred G. Held and Edward Pochmert, Rockville, Conn.)

SYKES' TEMPLE.

The object is to provide a temple permitting ready removal of its shank and spring.

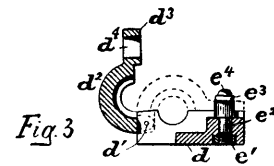
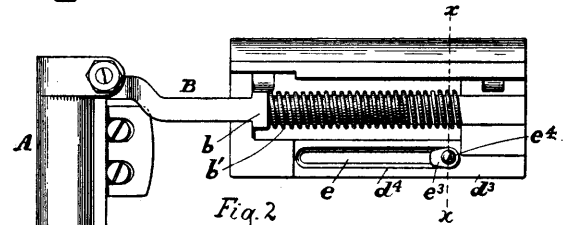
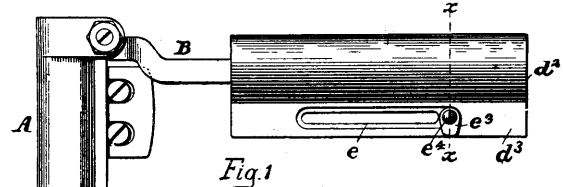
Fig. 1 shows the temple, closed, in working position, Fig. 2 shows the temple, the cap of the stand opened, and Fig. 3 shows by full lines, the stand cap open.

The temple head *A* contains the toothed roller (not shown) and the shank *B* having a shoulder *b* surrounded by a spiral spring *b'*.

The stand is secured to the breast beam by a bolt inserted through slot *e*, and is composed of a bottom plate *d*, to which is pivoted or hinged by pins *d'*, a cap *d''*, the latter being so shaped as to overlap the spring *b'*, and leave along one edge of the cap a foot *d'''*, which is slotted for a part of its length at *d''*, the

said slot being shown as wider than the slot *e*, in the bottom plate *d*.

In one end of the slot *e*, is secured by a nut *e'* through slot *d'*, a stud *e''*, in the upper end of which is mounted a turn button *e'''*, having a stud screw *e''''*. When this turn button is in the position Fig. 1, the



cap will be held closed, but when the turn button occupies the position shown in Fig. 2, the cap may be raised and the bar and its spring may be removed. (Draper Co.)

PAINCHAUD'S TEMPLE.

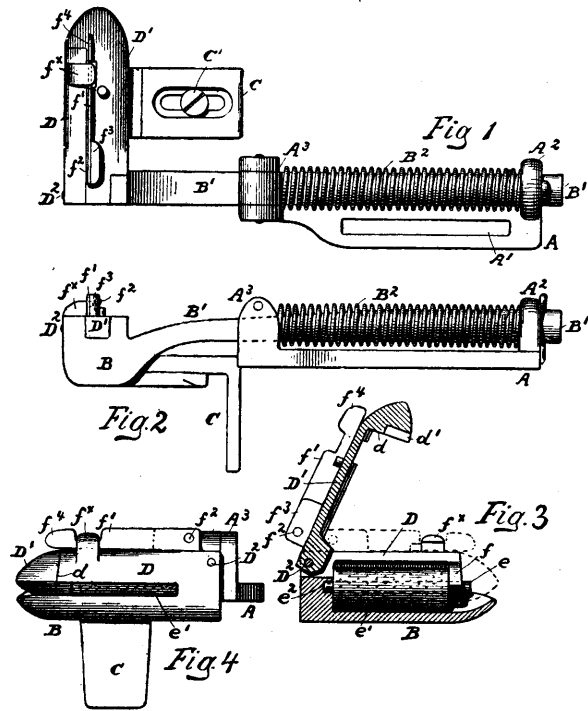
The object is to produce means so that the cap of the temple may be lifted as desired.

Fig. 1 is a top plan view of this temple, Fig. 2 is a side elevation thereof, Fig. 3 a sectional detail longitudinally of the pod and cap, with the movable part of the cap elevated, and Fig. 4 is a front end view of the temple in working position.

A is the stand having a slot *A'* for the screws for confining the stand in place on the breast beam, the said stand having guides *A''* *A'''*, and the shank *B'*, having the pod *B*, and the spring *B''*, surrounding the shank between the lugs *A''* and *A'''*, and the heel plate *C*, attached to an extension of the pod by screw *C'*. The cap is composed of a stationary portion *D* being integral with the pod, and a movable portion *D'*, the movable portion being mounted upon a pin *D''* and having at its outer end a depending ear *d*, which is slotted at *d'*, (see Fig. 3,) said slot when the cap is closed, as in Fig. 1, fitting over the end *e* of the pin, on which turns the temple roll *e'*, said pin being longitudinally movable in a right angled extension or bearing lug *f* of the stationary part *D* of the cap, the inner end *e''* of said pin entering loosely a hole in a portion of the pod. (See Fig. 3.)

When the cap part *D'* is elevated, as in Fig. 3, the operator may, with pincers or otherwise, grab the end *e* of the pin and withdraw it to the right, viewing Fig. 3, thus removing the roll *e'*, if desired.

The stationary part D of the cap has a lug f^x , under which passes a spring f^1 , attached by a rivet f^2 to a lug f^3 , rising from the top of the movable part D'



of the cap, said spring when in engagement with said projection f^x , serving to lock and retain the movable part of the cap in operative position; but the operator may, by pressing upon the end f^4 of the spring, disengage it from the said projection f^x , thereby leaving the movable part D' of the cap free to be elevated. (Draper Co.)

PEARSON'S TEMPLE.

The object is the production of a temple, which when a pick out is to be made may be pushed back into its stand on the breast beam and its shank be turned one fourth about, so as to put the temple head entirely out of the way.

Fig. 1 in top or plan view represents a temple and stand and part of a breast beam, Fig. 2 a sectional detail in the line x Fig. 1, and Fig. 3 a sectional detail in the line x' Fig. 1.

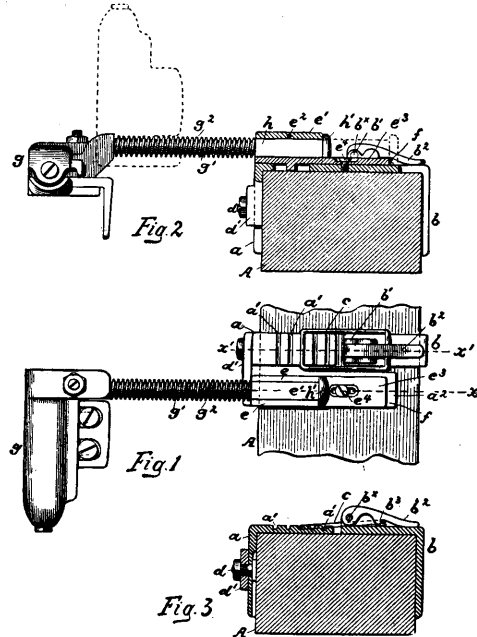
The breast beam A is embraced by a two part clamp composed of angle bars a b , the part a having a series of notches a' , while the part b has two ears b' , between which is pivoted at b^x a locking lever b^2 , having a lip b^3 , which engages one end of a clamping loop or link c , the opposite end of said loop engaging one or the other of said notches a' when the lever b^2 stands upright, so that turning the said lever over to the right, will effectually bind the clamping parts onto the breast beam, and by putting said loop into one or the other of the said notches a' the clamp may be made to cooperate with any sized beam, the part a having an extension a^2 .

The right angled bar or part a of the clamp has connected to it by a clamping bolt d an arm d' , having rising from it two short side walls e , between which is a removable top plate e' , held in place, but removably, by a pin e^2 , a tailpiece e^3 of said arm having a slot

to receive a set screw e^4 , by which to keep the tail-piece seated on the extension a^2 , the head of the said screw being sunk flush into the tailpiece, the said walls and top plate e' forming a guide or stand for the temple shank. The tailpiece terminates a little short of the extension a^2 to leave a shoulder f .

The temple head g , containing the toothed roll (not shown), has connected with it a shank g' h , the part h being flattened for the length of the walls e of the stand and being fitted to slide therein, the remaining part g' of the shank of the temple being reduced in size in cross section and rounded, the part so reduced being surrounded by a spring g^2 . This squared shank slides in the box made between the side walls e , e and the top e' , and the action of the spring g^2 normally keeps the said squared part between said walls, as shown by full lines in Figs. 1 and 2.

When, however, a mispick is to be taken out of the cloth, and it is desired to move the temple out of its working position, the head and bar may be pushed back until the squared part h is removed from between the walls e , e and the part g' , of reduced diameter, enters between said walls, and then the bar may be turned partially around, as shown by dotted lines, Fig. 2, and the edge of the stop h when the temple shank or bar is turned one fourth around will catch



behind the shoulder f and the temple will be held out of operation automatically. (Draper Co.)

CUNNIFF AND KERRIGAN'S TEMPLE.

The object is to provide means for maintaining the temple head yieldingly in operative position or retracted when it is desired to hold the temple head back in inoperative position, while leaving the hands of the weaver free.

Fig. 1 is a longitudinal section of the temple, the end of the cap or pod being shown in elevation. Fig. 2 is an end view of the temple roll, showing the removable toothed blades, the retaining means therefor being omitted; and Fig. 3 is a side elevation of one of the toothed blades of the roll.

The stand A of the temple is provided with longitudinal internal guides A^1 formed in the upper portions of depending cheeks A^2 , connected at their rear ends by a cross piece A^3 , apertured at 5. The cheeks A^2 have at their lower edges ribs 6 to enter an undercut groove in a block a , the stand being adjustably held in the block by a set screw bearing against a thin plate interposed between one of the ribs 6 and the adjacent wall of the undercut groove in the block a . The under face of the block a has an undercut transverse groove o to receive a correspondingly shaped supporting plate A^x , on which the stand as a whole is adjustable in a lateral direction, a set screw 1 and bearing plate 2 holding the stand adjusted.

The shank B^1 of the temple head enters and is longitudinally movable in the guides A^1 of the stand, the rear end of the shank being increased in width to form shoulders, bearing against shoulders at the rear ends of the guides A^1 to limit the outward movement of the shank.

The top of the stand is longitudinally slotted at a^1 , to receive the depending arm c^1 of a bent lever, the other arm c extending above the stand, the arm c^1 constituting a controller for the shank fulcrumed at c^x in ears a^2 on the stand.

The arm c passes through a longitudinal slot b^x in the stand, and has attached to it one end of a coiled spring S, the other end of the spring being fastened to a depending lug b at the rear end of the shank B^1 , the length of the spring being such that when the controller is in normal position (see full lines in illustration) the spring will be under sufficient tension to

troller, which immediately rises above the notched portion of the latch by reason of the tension of the spring S, and then the weaver swings the controller over into dotted line position shown in the illustration, retracting the shank and temple head, as described, and maintaining it back. When the carrier is returned to normal position, the latch yields as the arm c passes over the cam face d^3 and into the notch of the latch d , when the controller is locked.

The pod B, having a depending leg b^1 to be struck by the lay as it beats up, forms a part of the outer end of the shank B^1 , and it has a recess to receive a rounded shoulder f of the cap F, which latter is mounted to rock on a pivot forming a support for the cylindrical toothed roll R.

In the illustration the cap is shown as provided at its inner side with a rearwardly extended ear f^x , between which and the top of the adjacent part of the shank is interposed a spring s , which lifts the ear and tips the cap on its fulcrum to depress the outer edge of the cap F. A headed screw threaded stud 4, passed loosely through the ear and into the stand, acts as a stop to limit the spring induced movement of the cap F.

The cloth passes between the edges of the cap and pod, over the toothed roll, a d out beneath the edge of the cap, the lifting tendency of the cloth to separate from the teeth being yieldingly counteracted by the spring s .

The pivot of the cap F extends from one to the other end of the pod and is threaded at b^1 to enter a threaded hole in the upturned end b^2 of the pod, the roll R being rotatably mounted on said pivot and comprises a body portion, a plurality of detachable toothed blades, and means to retain the blades in place on the body portion, the latter being a cylinder (see Fig. 2), longitudinally bored to receive the pivot of the cap F and having its ends reduced, as at r^1 , and exteriorly threaded.

Longitudinal grooves or seats are made in the body of the roll R to receive each a toothed metal blade r^2 , the blades having their ends notched as at r^3 (see Fig. 3), the blades being substantially as long as the body, exclusive of its reduced ends r^1 . Retaining collars having on their inner faces annular ribs, are slipped onto the extensions r^1 of the body portion and against the ends of the blades, the ribs

entering the notches r^3 of the latter to hold the blades in position on the body, and to prevent removal of the rings or collars, nuts are screwed upon the extensions r^1 up snugly against the rings, thereby firmly holding the blades in place, yet permitting of their ready removal should one or more teeth of a blade or blades become bent or broken. (*Draper Co.*)

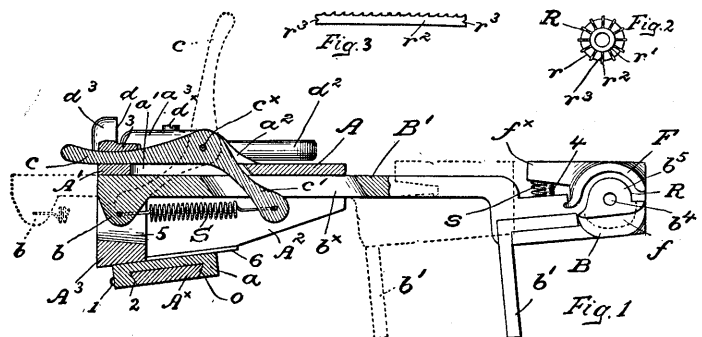
ALLEN'S TEMPLE.

The object is to provide a temple which can be readily removed from its stand when required.

Fig. 1 is a top view and Fig. 2 a side elevation of this temple, the head and shank being shown in Fig. 2 in dotted line position as ready to be removed from or inserted into operative position on the stand.

The stand A is provided with a slot a which receives a bolt for securing said stand to the breast beam and has at its rear end an upturned ear a^1 having a hole a^x , the bottom of which is beveled rearwardly and downward, thus permitting tipping of the temple shank B, giving it a chance to be readily removed from the ear a^1 .

At its front end the stand is provided with two up-



maintain the shank and temple head in operative position. When, however, the controller is thrown into position, as shown by dotted lines in the illustration, the spring will be compressed sufficiently to act upon the lug b and retract the shank into this position, the controller being past dead center, the lug b moving through the opening 5 of the cross piece A^3 of the stand. The controller c thus operates through the spring to maintain the temple head in operative position or retracted, as may be desired.

In order to keep the controller in normal position, so that the shank will be projected by the spring, a locking device is provided, being a latch d , notched to overhang and receive the arm c and being pivoted at d^x on a lateral projection a^3 of one of the ears a^2 of the stand, the latch d being prolonged to form an operating handle d^3 and reduced as shown at 3, to pass under the projection a^3 . The face of the upturned end of the latch above its notch, is convexed, as at d^2 , in order to act as a cam when engaged by the arm c as the controller is moved into normal position, a spring (not shown) pressing the latch inward toward the controller.

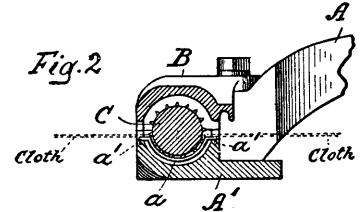
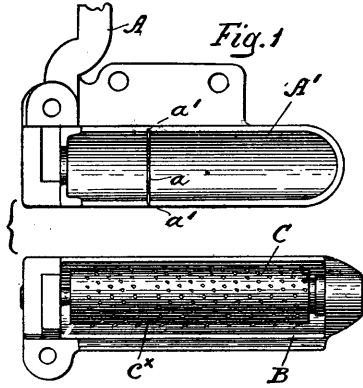
When it is desired to retract the temple head, the latch d is retracted, releasing the arm c of the con-

turned ears a^2 , having undercut grooves or guideways a^3 extended from the rear ends of the ears towards the front of the stand where they form stops a^4 . The temple shank B, which is adapted to slide on the stand A, has attached to it two projections b which slide in the guideways a^3 . The rear ends of the ears a^2 are notched as at a^5 , so that when it is desired to maintain the temple retracted without removing it altogether from the stand, the head is simply pushed back until the projections b rest against notches a^5 . Spring S is coiled around the shank and maintains the temple head D pressed outward, with the projections b against the shoulders a^4 .

The guideways a^3 prevent the shank from lifting when the loom is weaving, but when it is desired to remove the temple for picking out purposes, etc., the shank is simply pushed back until the projections b are free of the guideways, when the shank is tipped into the position shown in dotted lines in Fig. 2, the beveled bottom of the hole a^x , as previously mentioned, permitting such tipping of the temple shank, which thus can be withdrawn bodily from the ear a^1 . In order to put the temple back the operation is reversed.

The pod of the temple is provided with a yielding

A indicates the slide bar, A' the rod attached thereto, B the cap and C the rotatable toothed roll. The concave bottom of the pod has added a transverse rib or projection a , formed of a piece of wire bent to follow the curvature of the roll and partially encircle it and



is secured in place by having its downturned ends a' inserted in holes in the side walls of the pod. In order to prevent interference of the rib with the teeth of the roll C one spiral or row of teeth on the roll is omitted, thereby leaving a clear or smooth band c^x around the roll opposite the rib or projection a .

As the cloth passes through the temple and over the rib the latter raises it and causes it to approach the roll very closely, so that the teeth are absolutely sure to engage the cloth.

The directing rib or projection as made of wire, will yield by reason of its elasticity, which is an advantageous feature, particularly should the cloth vary in thickness. (Draper Co.)

THREAD CUTTING ATTACHMENT FOR TEMPLES.

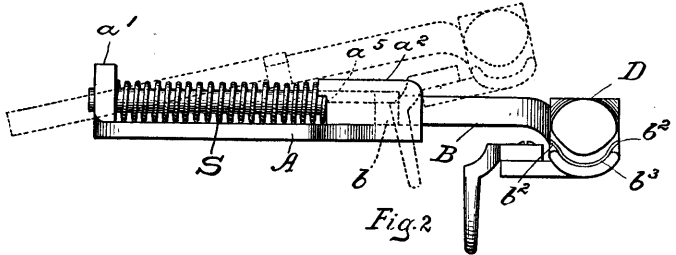
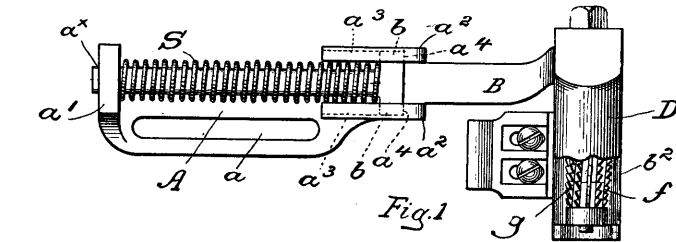
The purpose of this attachment to temples is to provide a positive action to cut the ends of filling which are left hanging from the selvage of the cloth in the weaving of the same. This temple is similar to the one described on page 116 of "Textile Machinery Part I," being provided in this instance with a thread cutter.

Fig. 1 is a plan of the temple provided with the attachment, Fig. 2 is an outside elevation of the same, and a vertical section of the race board of the lay, and Fig. 3 is a similar elevation of this thread cutting device detached.

A indicates the case having an attached slotted plate a , B the temple provided with a collar b , and carrying the spring C. b' is the pod, D the temple roll with its spindle d , which is supported by the arm b^2 as attached to the temple shank. E is the heel, d' the teeth of the roll and H the lay.

In former constructions of thread cutting devices a stationary washer having a cutting edge was secured to the cover used above the temple roll, while another blade was secured to the temple roll.

In the present construction we find secured to the outer face or side of the pod b' a stationary vertical blade F, the cutting edge of which is curved to the shape approximately of the upper surface or trough of said pod. The other or movable blade F' of the device is pivoted at f' on the temple head and is provided with an upwardly extending arm f^2 , having a lateral projection or stud f^3 , adapted to be engaged by a hook g on one end of a link G, the other end of said link



rib b^2 , made of a piece of flattened wire, bent transversely as at b^3 , and which rib keeps the cloth firmly pressed against the burr, which consists of detachable toothed blades g held in grooves cut on the roll, said blades being held at their ends by collars f , which arrangement permits the ready removal of any blade becoming bent or broken for one or the other reason. (Draper Co.)

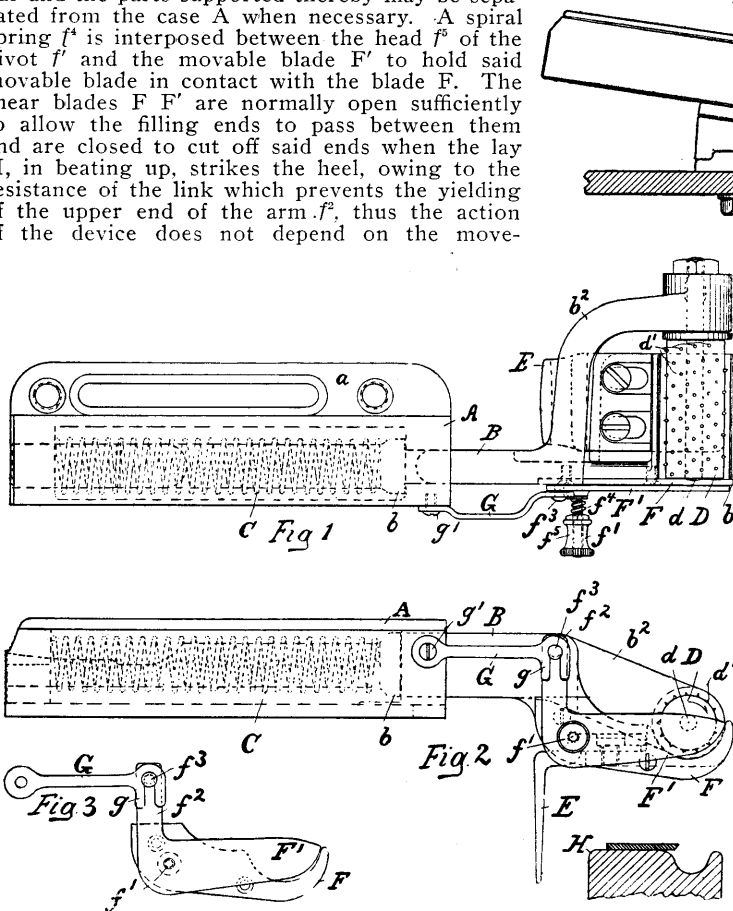
STIMPSON'S ATTACHMENT TO TEMPLES.

The object of the attachment consists in pressing the cloth by means of a wire rib positive against the toothed roll in order to insure the engagement of the teeth with the cloth.

Fig. 1 shows the temple pod and the cap opened out. Fig. 2 is a transverse sectional view of the temple.

being pivoted at *g'* on the case A in such a manner that by raising the hook *g* of said link the temple bar and the parts supported thereby may be separated from the case A when necessary. A spiral spring *f*⁴ is interposed between the head *f*³ of the pivot *f*¹ and the movable blade *F'* to hold said movable blade in contact with the blade *F*. The shear blades *F F'* are normally open sufficiently to allow the filling ends to pass between them and are closed to cut off said ends when the lay *H*, in beating up, strikes the heel, owing to the resistance of the link which prevents the yielding of the upper end of the arm *f*², thus the action of the device does not depend on the move-

Fig. 1 is a top or plan view of this temple, Fig. 2 a side elevation and Fig. 3 a front end elevation thereof.



A indicates the stand which is secured to the breast beam of the loom, B the slide bar having pod *B*¹, *B*² the cap, *B*³ the heel attached to the pod and *B*⁴ the toothed roller for grasping the cloth.

a is the blade in the slotted pod, *b* is the slotted ear on the bar B to receive the body *c* of the thread cutter C, (shown as slotted to leave two hooked arms *c*¹ *c*², and straddling the blade *a*), and *d* is the spring, one end of which engages the heel *c*⁴ of the cutter to retain the same in its normal forward position, with its cutting end out of the plane of the filling end.

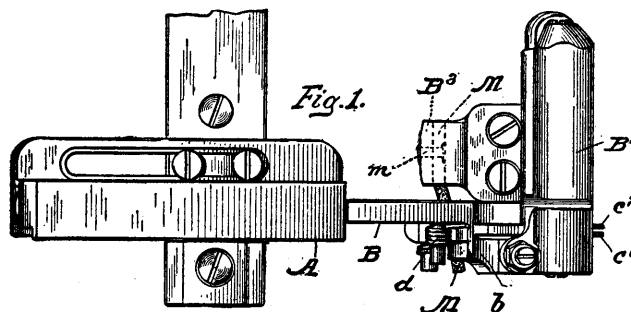
Upon the heel *B*³ of the temple there is attached a leather cushion *M*, held in place by a rivet *m*, the cushion passing across the front of the heel and extending laterally in front of the heel *c*⁴ of the cutter,

ment of the temple roll, but is entirely independent thereof, and therefore cannot injuriously affect the operation of said roll on the cloth. (Draper Co.)

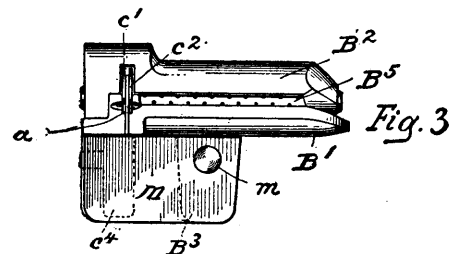
but unattached thereto. This cushion is thus interposed between the two heels and the lay and breaks

THREAD CUTTING TEMPLE FOR NORTH-ROP LOOMS.

This temple is of similar construction to the one described on pages 114-115 of "Textile Machinery Part



I" and has for its object to provide a cushion to break the force of the blow of the lay on the temple.



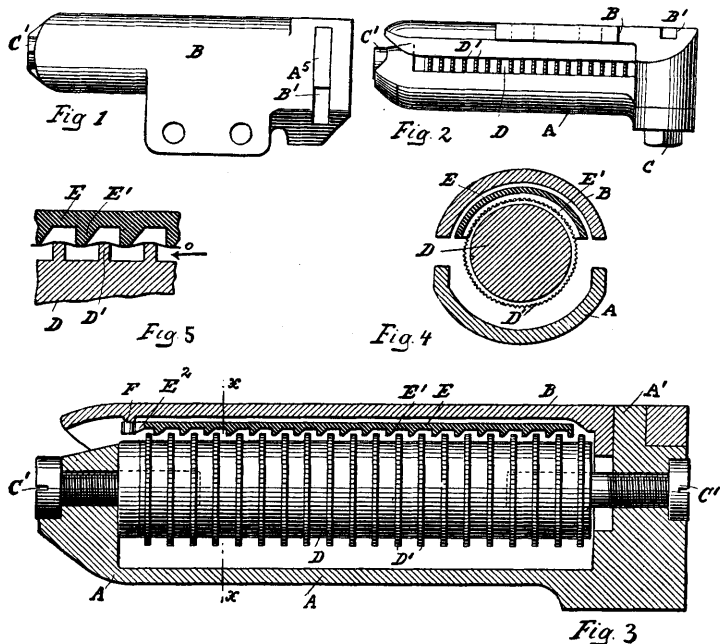
or relieves the force of the blow. Whatever the adjustment of the temple, the cushion is always in proper position. It is in plain sight of the weaver and can be readily renewed when worn and being small in extent is readily secured in place. (Draper Co.)

DUFFY'S TEMPLE.

The object of this temple is to permit of drawing the cloth longitudinally and to keep the same properly extended in a transverse direction at all times to allow

of properly beating in the filling by the lay without injury to the cloth and to relieve the selvage from all chafing.

Fig. 1 is a plan view of the temple, Fig. 2 a side elevation of the same, Fig. 3 an enlarged sectional side elevation of the same, Fig. 4 a transverse section



will turn the roller D, owing to the impact of the cloth on the teeth of the ribs D', and a binding action of the cover is completely prevented.

When a transverse pull comes on the cloth, the cover will adjust itself as close to the ribs of the roll as the angle formed at the bends of the cloth will permit—that is, the angle of the cloth between the ribs of the roll and cover, where the angles at the bends of the cloth are obtuse; but they cannot come quite in contact, for if the angle in front of the ribs became more acute than the angle behind, the tendency would then be more to force them apart longitudinally of the roller D than to draw them together irrespective of the strength of the pull. The reason for this is because the teeth are on the roll and not on the cover, so that when the pull comes on the cloth the pull is on the roll to the same degree. It is evident that when the pull on the cloth is in the direction of the arrow θ , Fig. 5, then the cover can readily slide in the direction of the arrow to quite a distance without its ribs E' coming in contact with the ribs D' of the roll D. As the cover moves in the direction indicated the angle of the cloth between adjacent ribs D' becomes acute relative to the said ribs D' and prevents the ribs E' and D' from positively clamping the cloth between the same, but presses the cloth sufficiently to prevent it from slipping in the direction indicated, but allows the cloth to move longitudinally or at right angles to the axis of the roll D when the cloth is wound up on the cloth roll or otherwise moved forward.

on the line $x-x$ of Fig. 3, and Fig. 5 an enlarged sectional side elevation of part of the roll and cover with the cloth in position.

This temple is provided with a bottom jaw A and a top jaw B, both secured together at one end by a bolt C, the bottom jaw being provided with a tongue A', fitting into a correspondingly shaped groove B', in the top jaw B, so as to hold the jaws in proper position relatively to each other. In the ends of the lower jaw A are secured the trunnions C', on which is mounted to turn loosely a roller D, held against sliding on the trunnions and provided with spaced annular ribs D', formed with fine teeth at their peripheral surfaces.

In the concave under side of the jaw B is held loosely a cover E, made segmental in cross section, (see Fig. 4), and formed at its under concave face with spaced ribs E', adapted to extend between the ribs D' of the roller D, as shown in Fig. 3. The front edge of each of the ribs E' is disposed in a vertical direction, while the back of each rib is inclined so as to come close to the next following rib D' of the roller D. A pin F in the forward end of the jaw B engages an elongated slot E², formed in the cover E, to prevent the latter from turning in the jaw B and to allow free longitudinal movement thereof relatively to the roller D.

When the cloth extends between the jaws A and B and between the roller D and its cover E, then the ribs E' press on the top of the cloth, so as to press the latter down between adjacent ribs D' of the rollers D, and when a pull is exerted on the cloth in a lateral direction, then the cover E with its ribs E' tightly holds the cloth against the ribs D' to prevent such movement of the cloth. When a longitudinal pull is exerted on the cloth it readily passes through the temple, as the cloth in its longitudinal movement

wise moved forward.

The function of the cover ribs is mainly to press the cloth firmly between the ribs D' and the roll D to hold the cloth in firm contact with the fine teeth thereof, so that the roll readily turns on moving the cloth forward. By this arrangement the cloth can be readily pulled through the temple in a longitudinal direction without injury to its selvage or side threads, but transverse movement is completely prevented, as the cloth is securely gripped and held between the ribs of the rollers D and the cover E. Thus when the lay beats up the filling, the cloth is securely held in a properly stretched position, so that the filling can easily pass to its position and be beaten in by the lay without producing a slack in the cloth. (Patrick Duffy and James F. Powers, New Bedford, Mass.)

WILLEMMAIN'S TEMPLE.

The object aimed at in its construction is to produce a temple which can be used on delicate fabrics without injuring it.

Figs. 1 and 2 are two different sectional views of this temple and Fig. 3 is a perspective view of the cam plate.

A represents an annular case having an arm B for securing it to the loom in a proper position, said arm lying in a plane below the top of said case A to give free passage to the fabric C across the top of said case. A lug A' extends outward from the side of the case A at right angles to arm B. Ring D receives the parts of the temple coacting with those parts contained in the case A and is bolted to lug A' by bolt 2, being provided with a lug B', similar to the lug A', for that purpose. The bolt 2 passes through both lugs and is provided with a head 3, countersunk in the

under side of the lug A' and with a nut 4, bearing on the upper surface of the lug B'. The upper end of bolt 2 is slotted transversely, whereby it may be turned with a screw driver when the nut 4 is loosened, and the head 3 of the bolt is provided with a pin 5, located near the edge of said head. Lugs A' and B' are so constructed that when they are bolted together the contiguous edges of the ring D and the case A will be separated by the space *a*, through which the fabric C passes.

In the lowest part of case A is a circular cam plate 6, provided with groove 7, the two diameters of the cam plate forming a shoulder 8. The base of the groove 7 is inclined upward as at 9 over which is cut a slot 10 projecting over said incline. On the edge of the cam plate is a tongue 12 extending through a slot in the case A and by which means the incline 9 may be swung at right angles to the line of movement of the fabric. The case A is provided with a central boss *b* which fits the center of the cam plate, permitting rotation of the same, with its edges free from the sides of case A.

A circular plunger plate 13 fits the case A on top of the cam plate 6 and is provided with a row of holes 14, extending through at right angles to the plane of rotation of said plate, and coincides with the center of slot 10. The holes 14 receive the plungers 15 provided with heads which bear on the cam plate 6, around which, when put in place, a number of steel balls 16 are inserted through the slot 10, and the plunger plate

is so rotated without hindrance and that when said plate is so rotated the bases of the plungers 15 are successively caused to ride up on the balls lying on the incline 9, thus forcing the upper ends of said plungers outward above the surface of said plunger plate. The upper ends of these plungers 15 as they are forced upward impinge when near the summit of the incline 9 against the surface of a circular plate 17, supported to rotate freely in the ring D, and said plate is concentric with and parallel with the contiguous face of the plunger plate 13. A rubber ring 17^a, is applied to said plate 17 and covers that part of it extending from the edge thereof inward for a distance a little greater than the diameter of the plungers 15. Said circular plate 17 is held in proper position by screws 18, entering the hub of a shell 19, which is screw threaded to enter the threaded interior of the ring D, and said shell is made to project far enough out of said ring to permit of locating a check nut 20 thereon, the position of which will determine the distance between the faces of said circular plate 17 and said plunger plate 13.

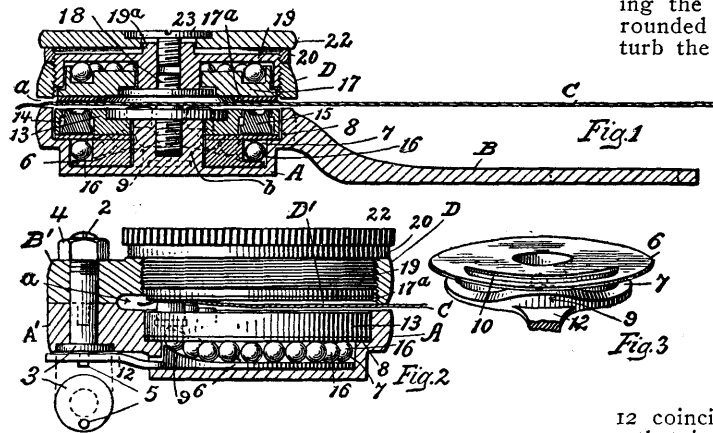
To obviate the possibility of disturbing the adjustment of the check nut 20, a part 19^a of the hub of the shell 19 on the outside of said shell is made square and a plate 22, having a slightly larger diameter than said check nut, has a square perforation through it which fits over the square end 19^a of the hub of the shell 19, and after said check nut 20 has been set, the said plate 22 is placed in position and fixed there, as shown in Fig. 1, by a screw 23, and the shell 19 can then be screwed into or out of said ring D by grasping the said plate 22, whose edge is knurled and rounded for the purpose, without being liable to disturb the adjustment of the check nut 20. The edge

of the ring D is made to extend somewhat below the surface of the plate 17, as at D', to prevent contact between the face of plate 17 and the fabric, which when gripped between the two plates can be drawn freely through the temple, but any attempt to draw the fabric transversely to said direction is impossible.

The fabric is gripped before the plunger arrives at the highest point of the incline 9, and this grip is maintained on the fabric for an equal distance each side of a line drawn through the center of the temple and through the bolt 2 if the center of the slot in the tongue

12 coincides with the above mentioned center line—that is to say, said fabric is gripped at a point on one side of said line equidistant from said line with the point on the other side at which said grip is released. Thus by moving said tongue 12 right or left the point of gripping engagement of said fabric may be varied relative to the point of release, and thus more or less transverse draft may be given to the temple, as may be desired.

A thin rubber ring, similar to the ring 17^a of the plate 17 is provided; this ring has short projections adapted to enter depressions in the tops of the plungers 15 when said ring is placed on the plunger plate in a position opposite the ring 17^a on plate 17. The purpose of this ring is to protect a very thin material from being injured by the ends of the plungers being forced against it. In case of weaving extra heavy fabrics, more than one row of plungers 15 may be employed. (Louis Willemain, Westfield, Mass.)



13, having the plungers 15 thereon, is then laid in said case on the top of said cam plate 6. When the balls 16 are placed in the groove 7, those that rest on the upwardly inclined part 9 of said groove will project through the slot of the tongue 12 and above the surface of the said cam plate 6 and therefore when the plunger plate is placed in position on said cam plate the plungers 15, lying over said slot, will be forced upward, so that their upper ends will project above the upper surface of the plunger plate 13 to practically the same extent that the balls 16 project above the surface of the plate 6.

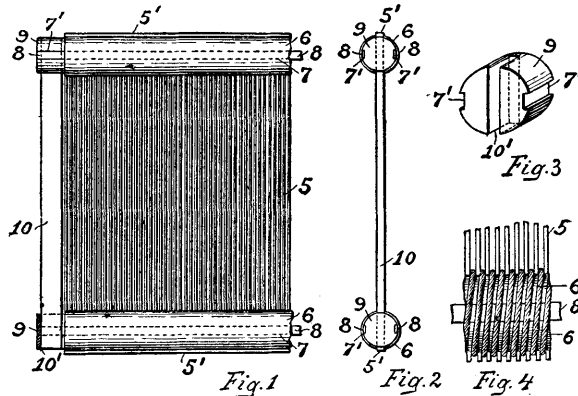
As the walls between the holes 14 in the plunger plate have been cut away, by the groove in the plunger plate 13, which groove has a depth somewhat in excess of the distance which the balls 16 project above the cam plate 6, it follows that said plunger plate may

REEDS, HEDDLES, HARNESSSES AND SUPPLIES.

THE EXCELSIOR REED.

Fig. 1 is a side view of part of this reed. Fig. 2 is an end view of the same. Fig. 3 is a perspective view of one of the end pieces by which the end bars are secured to the ends of the ribs. Fig. 4 shows the method of securing the ribs, the dents, and the metallic strips together.

5 indicates the series of dents, and 6 the upper and lower ribs, made of two semi cylindrical halves. The dents 5, near their ends, are placed between the two halves of the ribs 6. They are each provided with a longitudinal groove 7, in which is embedded a metallic strip 8. The ribs 6, with the longitudinal strips 8, are secured to the dents by twine wound spirally around the two halves of the ribs 6, over the longitudinal strips 8, and between the dents. The projecting ends of the dents 5' are covered with solder. Heretofore the ribs 6 were made to extend beyond the dents, so as to receive the end bars 10 between them, and were secured to the end bars 10 by winding twine around the ends of the ribs and passing the twine through holes in the end bars 10. These twines



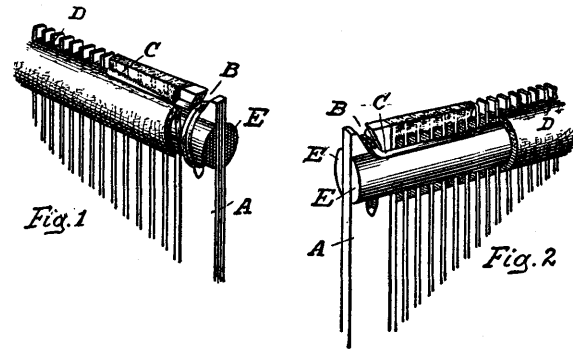
were soon worn by the constant use of the reed and the end bars loosened.

In the new reed the metallic strips 8 are secured in the grooves 7 of the ribs 6 by the twine 6', which is wound spirally around the two halves of the ribs 6, over the metallic strips 8 and between the dents 5. The ends of the longitudinal strips 8 extend beyond the ends of the ribs 6, and after securing the end bar 10 in the slots 10' of the metallic end block 9 by solder, one of the end bars 10, provided with one of the metallized blocks 9 is placed at each end, so that the projecting ends of the metallic strips 8 will enter the grooves 7' of the end blocks 9 and bring the end blocks up close to the ribs 6, and then secure the strips 8 to the metallic blocks 9 by solder, whereby the metallic blocks 9 firmly secure the end bars 10 and thus materially strengthen the ends of the reed. (*Excelsior Loom Reed Works, Pawtucket, R. I.*)

WOOD'S REED.

In this reed means are provided for securely holding the end bars in position.

Fig. 1 is a detail perspective view of one end of this reed. Fig. 2 is a similar view of the reverse side of the reed.



A designates the end bars of the reed, which are provided at their respective ends with the inclined slots B, the slots of the opposite bars being reversely inclined. C are the wires or cords, one wire or cord being placed at each longitudinal edge of the reed with one of its ends soldered thereto, as illustrated by Fig. 1. The wire or cord is then passed through the inclined slot of the bar and then along the reed beneath the band D thereof to the opposite bar, where it is passed through the inclined slot thereof, with its end soldered to the opposite side of the reed at that end. The side bar E of the reed is formed to receive said wire. (*Byron Wood, Danielson, Conn.*)

REED FOR PRODUCING FIGURED EFFECTS.

In this reed the wires are pivoted at one end to the framing of the reed, and adapted to swing at the upper end thereof, in the direction of the plane thereof, between the side walls of the framing of the reed, the dents being properly spaced apart at the lower ends by a coiled spring, each convolution of which projects between two of the reed wires. In addition to the coiled spacing spring, side bars are employed between the spring and the edges of the dents of the reed. The reed wires are spaced apart at the upper ends thereof by spacing strips, each of which projects between two of the reed wires, the spacing strips in themselves forming a reed like construction which separates the upper dents in the reed proper.

A pattern cylinder is mounted interchangeable on the batten of the loom, said pattern cylinder having the design to be produced on the cloth engraved on its surface and is arranged to revolve slowly during the operation of the loom, thus regulates, *i. e.*, moves forwards or backwards such dents of the reed as required for forming the pattern in the cloth, which in this case is produced by the filling, in place of running straight across the loom from selvage to selvage as in regular weaving, following the contour of the reed, and which contour is thus continually determined by the pattern cylinder. After each pick, said pattern cylinder automatically slightly revolves, presenting a different part of its pattern. Inserting fill-

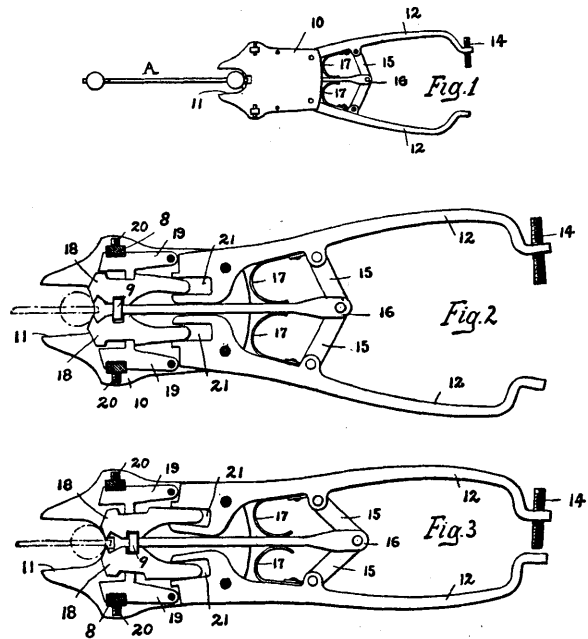
ing and motion of pattern cylinder continues until repeat of pattern is obtained and so right along over and over again. (*Jacob Walder, Paterson, N. J.*)

REED PLIERS.

The object is to provide a strong, simple and efficient tool for drawing back into place and straightening imperfect reed wires.

Fig. 1 is a side view illustrating the manner in which this plier is used for straightening the wires of a reed. Fig. 2 is an enlarged view with one of the side plates removed, and Fig. 3 is a similar view showing the parts in a different relative position.

The body portion of the plier is formed by side plates 10, having a recess or opening 11, and their front ends formed to receive the side bar of a loom reed A, as illustrated in Fig. 1. Pivotaly mounted in the side plates 10 are operating handles 12. Threaded into one of the operating handles 12 is a set screw 14. 18 represents movable jaws made of hardened steel. The retracting connections comprise the toggle links 15, which connect the operating handles 12 to a link 16 which in turn is provided at its end with a T-shaped head 9 for engaging notches in the movable jaws 18. Springs 17 are secured to the operating handles 12 and engage the link 16 to normally keep the handles 12 open. The fulcrum plates 19 are pivotally mounted in the side plates 10 and can be adjusted to vary the width of the opening between the movable jaws 18 by means of screws 20, tapped



into removable pieces or keys 8. The tailpieces of the jaws 18 are arranged to engage notches 21 in the ends of the operating handles 12.

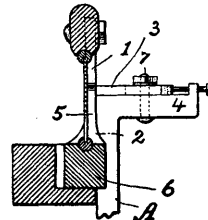
By means of this construction it will be seen that when the operating handles 12 are moved toward each other, as illustrated in Fig. 3, the jaws 18 may be closed upon the wires of a reed and the toggle retracting connections will exert a heavy tension or pull on said reed wires, so that the wires will be efficiently straightened and brought back to proper position.

The stroke of the movable jaws 18 or the distance which the same can be retracted can be adjusted by means of the set screw 14. (*Leanderi Autio, Fitchburg, Mass.*)

DEVICE FOR ADJUSTING REED AND BOX PLATE.

The object is to provide means for adjusting the box plate on the lay, so that the backs of the shuttle boxes will always be in alignment, the reed being connected to the box plate, both of which are thus adjusted in unison.

The illustration is a transverse sectional view of the device, showing one side of the lay.



As is usual, the lay swords A project above the lay, at the rear side thereof, and the end stands 1 rest against them, the inner upright edges of the stands being enlarged to form integral shoulders 2, which abut against the inner sides of the lay swords. Each stand 1 is provided with an integral rearwardly extended ear 3, which rests on the bent over top 4 of the adjacent lay sword and is adjustably secured there-

to by a clamping bolt 7, extended through the top of the sword and through a slot in the ear.

The adjustment of the box plates 5 is effected by loosening the bolts 7 and moving the stands forward or back, as may be necessary, and as the box plates are rigidly connected by the end stands and girth 6 they must always be in absolute alignment. It is thus impossible to leave one of the box plates projecting out of line with the other or with the reed, so that there is no tendency to deflect the shuttle from its proper path as it is shot across the lay. (*Timothy Mooney and Clement Renaud, Fall River, Mass.*)

PATERSON'S DOUP HEDDLE.

The object is to produce a very fine wire doup, yet strong enough to stand the wear it is subjected to during weaving.

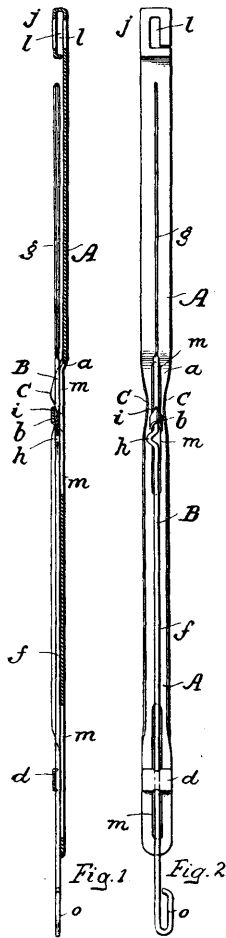
Fig. 1 is a longitudinal vertical sectional view of a heddle strip and its doup needle, and Fig. 2 is a plan view of the same.

A indicates a flat strip of metal bent over at its end into a loop *l*, forming an opening *l* for attaching this heddle strip to the bar of the harness frame. This heddle strip A is bent slightly in the middle as at *a*, and is provided below this bend with a guide eye *b* in which the wire doup *g*, as well as that part of the doup needle B as extending above the bend *h*, slides. The sides of the heddle strip adjacent the eye *b* are bent forward to provide thread guiding wings C which guide the standard thread over the outside of the eye *b* during weaving. Near its lower end the heddle strip A is provided with a guide eye *d* (formed by bending the heddle strip) for holding the lower end of the doup needle in position.

The doup needle consists of a shank *f* to which is attached the doup *g*, made of fine steel wire, the shank *f* being also provided with a bend *h* which limits the drop of the doup needle, said bend abutting against the guide *d* of the heddle strip.

On account of the doup *g* (especially its eye) being very easily bent, the heddle strip is provided with a thread guard *i* (shown as a point on the eye *b*) which

catches the doup thread when douping, thus preventing any lateral strain to the eye of the doup, at the same time not interfering, or catching, with the standard warp threads.



needle B being connected with the bar of the harness frame. For this purpose the ends of the doup needles B are extended beyond the ends of the heddle strips A and are provided with loops or eyes *o*. (James B. Paterson, Philadelphia, Pa.)

WHARTON'S DOUP HEDDLE.

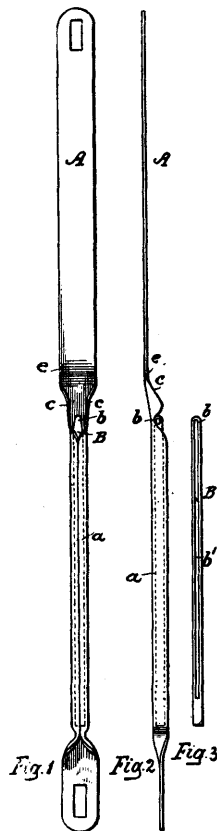
The mechanism consists in combining a heddle strip or member with a doup needle which controls one or more doup threads so constructed and operated that during the formation of the sheds the doup needle warps and free warps are crossed.

Fig. 1 is a front view of the doup heddle, Fig. 2 a side view of the same, Fig. 3 a modification of the

The heddle strip A is provided with the two slots *m*, one near the eye *b*, the other near the eye *d*, to permit the removal of the doup needle which for this purpose is moved downward until the bend *h* reaches the upper portion of the slot *m*, then the doup needle is turned to bring the bend *h* into the slot *m*, thus permitting ready withdrawal from its heddle strip.

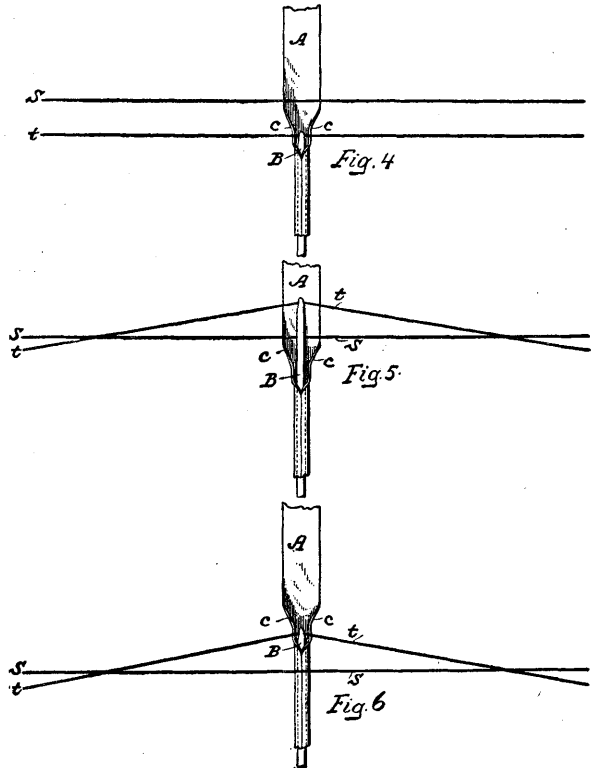
For the purpose of threading the doup needle to its heddle strip the procedure, previously explained, is reversed.

The arrangement of the heddle strips and doup needles to be lifted by the bar of the harness frame, and the doup needles to be returned by gravity as explained, may be reversed, (if required by the fabric woven) and in which case the heddle strip and its doup needle are turned about or reversed, the doup



doup needle, and Figs. 4, 5 and 6 are diagrams illustrating the operation of the doup heddle strips in crossing the warps.

A is the heddle strip or member, composed of a thin continuous strip of metal, or a longitudinally slotted



strip or of wire. B is the doup needle, which is supported by the heddle strip or member A and guided upon it. The doup needle extends up to about the middle of the heddle strip A and is provided on its end with an eye *b*, through which the warp thread passes.

The doup needle consists of a round needle, guided in a longitudinal socket *a* on the heddle strip, formed by bending the metal of which the strip is composed. The heddle strip A, immediately above the eye of the doup needle when in its lowest position, is provided with a projection, guide, or extension *c*, made by swaging up the sides of the metal strip A on each side immediately above the eye of the needle, so as to form two projecting wings or extensions, between which the doup needle moves when it rises and falls. These guides *c* serve to guide the warp thread which is not operated by the doup needle over the needle and doup needle thread when the heddle strip A is lifted. This operation will be readily understood from Figs. 4, 5 and 6, in which *s* and *t* are respectively the free warp and doup needle warp. What is meant by the "free" warp is merely the free warp so far as this particular heddle member is concerned. That warp may be the doup needle warp of another heddle, just as the doup needle warp of this particular heddle may be the free warp of another heddle.

When the heddle and doup needle are at rest, as in Fig. 4, the free warp *s* lies above the eye *b* of the doup needle. When now the doup needle thread is lifted, the needle B is lifted also and passes above and outside of the free warp *s*, as shown in Fig. 5. To permit the doup needle to pass outside of the

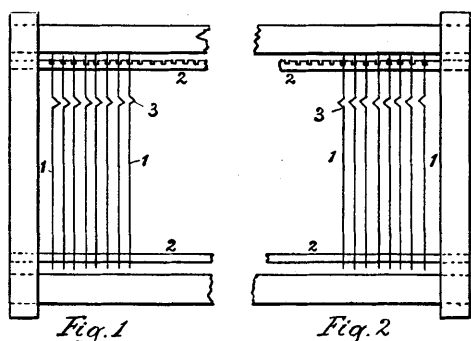
warp *s*, the heddle strip or member is bent back slightly above the guides *c*, as at *e*, so that the warp *s* will lie inside of the line of movement of doup needle. When the warp *t* is released, the doup needle falls back into its former position, carrying the warp *t* with it. The lowering of the doup needles is done by gravity. When now the heddle strip or member A is lifted, the doup needle and warp *t* are lifted also and pass above the free warp *s*; but as the heddle strip rises, the guides *c* acting on the warp *s*, push it outward outside of the needle B, which passes behind the thread *t*, so that the thread *s* is crossed outside of the thread *t*, as shown in Fig. 6.

The doup needle may be provided with a longitudinal slot *b'*, as shown in Fig. 3, forming an elongated eye adapted to receive two or more doup needle threads which may be successively operated, thus producing variations in the cross weaving. (Richard Wharton, Philadelphia, Pa.)

SHINN'S SWITCH HEDDLE.

The object of this heddle, is to switch and guide one warp thread over another warp thread in weaving gauze fabrics, chenille, and other cross woven fabrics.

Figs. 1 and 2 are front sectional elevations of two heddle frames, which work in unison. Figs. 3 and 4 show a series of switch heddles, needles, and a section of the needle supporting bar. Fig. 5 is a face view of one of the needles and a sectional end view of the needle supporting bar.

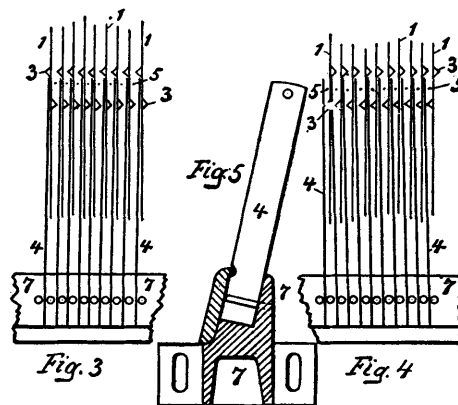


1 represents the switch heddle, made of cold rolled flat strips of steel or iron, No. 26 wire gauge, three eighths of an inch wide and about 12 inches long. At each end are punched holes for the stringing bars 2. In this flat strip is "swaged" the full width, a projecting cam 3. The projecting distance of the cam 3 is governed by the number of switch heddles to be used in the inch space. This cam is placed near one end, say about 2 inches from the end. These switch heddles are strung on the bars 2 in the heddle frames, which frames are of ordinary construction except the stringing bars 2, which are round, the top one being spaced with shallow notches.

In mounting the switch heddles, Fig. 1, the cams all project to the right, those in Fig. 2 to the left hand. 4 represents the needle, made of strips of spring steel, about No. 23 wire gauge thick, three fourths of an inch wide and about ten inches long. These needles are set in a supporting bar 7, which bar is divided by pins, as shown in Figs. 3 and 4, to receive the number of needles used per inch. This needle bar is fixed in the loom, so as to bring the points of the needles between each pair of switch heddles, as shown in Figs. 3 and 4.

Fig. 1 is supposed to be the front heddle frame and Fig. 2 the second heddle frame. The third or back heddle frame in the loom (not shown) carries ordinary "wire heddles" and operates the crossing warp-

thread. These heddle frames can be operated by the ordinary treadles or cams or may be operated by a pattern chain controlled heddle motion. In order to



have the switch heddle work well, the same should be given an up and down movement of about one half of an inch and work one pick up and one pick down alternately.

The third or back heddle frame carries the crossing warp thread 5 and works up and down every pick.

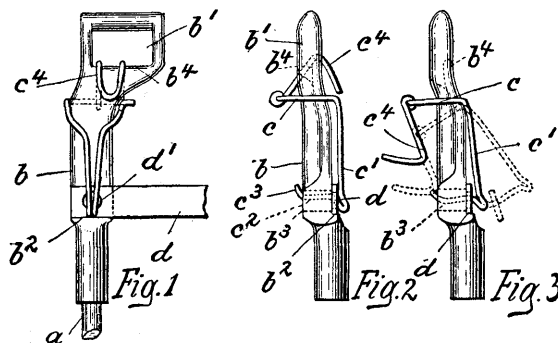
Referring to Fig. 3, the front heddle is down. The cams 3 of these heddles push the needles to the right and under the cams above, which opens a passage for the crossing warp thread 5 on the left of the needle. Fig. 4 represents the second heddle as down. This pushes the needles to the left and the thread 5 is switched and guided to the right hand side of the needle.

The switch heddle with its needle 4, can be used also as a "selvage motion" to cross weave a selvage where two breadths of the cloth are woven in one loom and a selvage is desired at the point of separation. (John Shinn, Philadelphia, Pa.)

CLAMP FOR HEDDLE BARS FOR NORTHROP LOOMS.

The object is to produce a clamp for the heddle bars which cannot work loose by the jarring of the loom, and which can be instantly locked or unlocked by the use of the fingers only.

Fig. 1 is an enlarged view of the upper end of one of the side bars with the clamp in locked position. Fig. 2 is a left hand end elevation thereof. Fig. 3 is



a like view, but with the locking latch released to permit removal of the heddle bar.

The side bars *a* of the harness frame are provided at their upper ends with extensions *b*, forming stirrups *b'* at their tops for the overhead connections. Each extension is flattened on its front face and pro-

vided with a transverse shoulder b^2 to form a supporting seat for the transverse heddle bar d , the latter passing through elongated slots in the heddles or detectors.

The heddle bar has holes d' therein near its ends, which register with apertures b^3 in the extensions b adjacent and just above the stirrups b' , the heddle bar resting on its lower edge on the said stirrups.

Each side bar a is provided with a clamp to retain the heddle bar d in place, the clamp being made of stout spring wire, bent to form an open body portion c , which loosely embraces the extension b . The ends of the wire are then brought together and bent down at c' , and then bent rearwardly to form a retaining tongue c^2 , having an upturned tip c^3 . The tongue is adapted to enter the hole of the heddle bar and the aperture in the extension b , the tip of the tongue resting against the back of the extension, as shown in Fig. 2, when the clamp is locked.

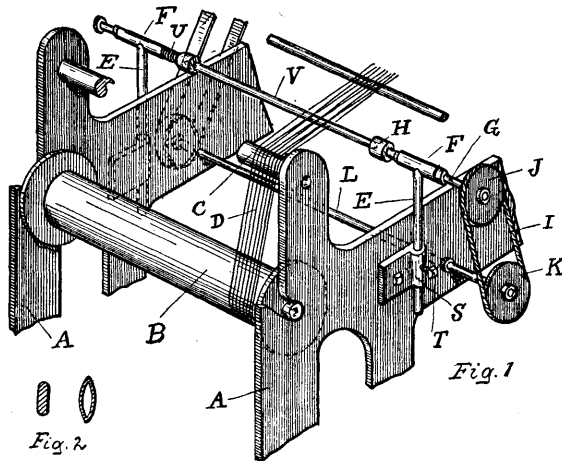
A hook shaped latch c^4 is pivotally mounted on the body, the curved end of the latch entering the opening of the stirrup b' and engaging its edge b^4 nearest the heddle bar and acting to draw the tongue tightly into place, Fig. 2, while the shape of the latch prevents its release by accident.

To release the clamp, the attendant pushes the latch c^4 out of operative position, as in Fig. 3, and thereupon the depending part c' of the body can be moved into dotted line position Fig. 3, withdrawing the tongue c^2 from the aperture b^3 , so that the heddle bar can be lifted from the tongue. (*Draper Co.*)

A ROTATING LEASE ROD.

This construction refers to that lease rod as situated nearest to the whip roll in a loom, and consists in the oval shape of said rod as well as in the providing of means for rotating said rod automatically during the running of the loom, thus greatly assisting in the separation of warp threads stuck together by reason of the sizing or interlocking of fibres or knots in the thread. At the same time means are adapted to render the rod quickly and easily mounted and dismounted from its supports.

Fig. 1 is a perspective view of so much of a loom



as necessary to show the application of this lease rod thereto. Fig. 2 shows in section, two specimens of the oval shape of said lease rod, *i. e.*, showing that the rods have unequal diameters.

A represents the frame of a loom, B the beam, C the whip roll, and D the warp. Standards E, having

horizontal bearings F at the top, are secured to either side of the loom frames A. Mounted in said horizontal bearings F are shafts G, having on the ends thereof socketed holders H, adapted to receive and support the ends of the lease rod V. The rotating of this rod is accomplished by belt I, passing over pulley J on shaft G and a pulley K on shaft L.

For the purpose of quickly and easily inserting and removing the lease rod from the warp, one of the supporting shafts is made capable of longitudinal movement sufficient to release the end of the rod from the socket in the holder by means of a coil spring U, interposed between the bearing F and the head H of the rotary shaft G which supports the rod V. The supports which carry the rotatable holders can be adjusted vertically by moving the standards up or down in tubular brackets S, secured to the sides of the frame, and may be held in any desired position by set screws T, thus increasing or diminishing the tension on the warp. (*Harold Kelly, Biddeford, and John P. Kelly, Saco, Maine.*)

MOVABLE LEASE ROD.

The object of this lease rod is to prevent the breaking of the threads at their point of separation by the lease rods, the adjacent warp threads sticking frequently together by sizing or by interlocking of fibres, or by projections or knots in the threads.

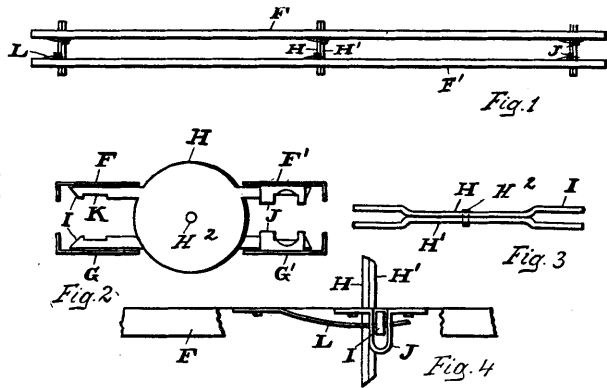


Fig. 1 is a plan view of the lease rod. Fig. 2 is an end elevation of the same. Fig. 3 is an edge view of the pivotally connected supports with their projecting tongues, on which are mounted the bars which form the rod; and Fig. 4 is a side elevation, with parts broken out, showing a means of securing the bars to the tongues of the supports.

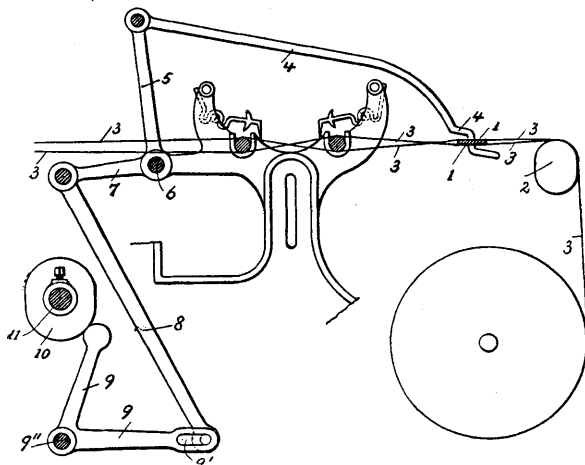
The lease rod consists of two pairs of bars, *viz.*, the upper pair of bars F F' and the lower pair of bars G G'. These bars are mounted on supports H H' F F' on H and G G' on H' the supports H H' lying side by side and connected by a pivot bar H², extending transversely through supports H H', bars F F' being some distance vertically from bars G G'. Projecting tongues I, are provided, being integral with the body parts of the supports, extending in opposite directions and on the same side of the pivot point, and adapted to enter loops or staples J in the under sides of the bars. To insure their not being accidentally displaced, small recesses K are made in the tongues I and secure to the bars, springs L, adapted to engage said recesses in said tongues and prevent them from being withdrawn from the loops or staples, and yet at the same time by lifting the springs allowing the bars to be freely removed from the connecting links, which is necessary in inserting and removing the lease rods.

When the shed is open, the tension of the warp threads on the side of the lease rod nearest the whip roll is sufficient to force the bars on that side of the lease rod together, but when the shed closes, the tension on the harness side becomes greater than the tension on the other side, and consequently the bars on the harness side of the lease rod are forced together, thus causing the bars on the opposite side to separate, thus separating the alternate threads at the point when they separate to receive the rods by a more gradual force than would be the case if they were drawn against an ordinary lease rod. The rocking of the lease rod is continuous and regular, being caused by the harnesses in the operation of shedding. (Frank L. Hammond, Biddeford, Maine.)

DEVICE TO PREVENT WARP THREADS FROM ADHERING.

This device is used in connection with warp stop motions and has for its object to prevent this trouble, the device consisting in a movable rod placed between the stop motion and the back roll. Said rod has alternate warp threads pass above and below it. A back and forth motion is given to said rod at intervals, which motion separates adhering warp threads from each other, which then pass to the detectors comparatively free one from another.

In the illustration the device is shown in connection with that portion of a warp stop motion as necessary to explain its operation. The movable rod 1 is located between the back roll 2, and the warp stop motion mechanism and extends transversely across the warp threads 3, which pass above and below it alternately. A back and forth motion is automatically given at intervals to the rod 1 thus:—Each end of the rod 1 is connected by a rod 4 to an arm or lever 5, fast on a rock shaft 6. A rocking motion is given to the rock shaft 6 through an arm 7, fast thereon, and a link 8, connected with said arm and

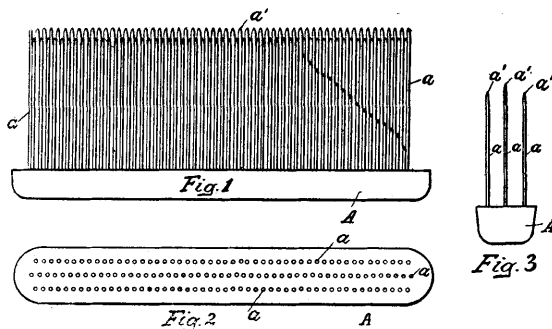


also with the slotted end 9' of one arm of the angle lever 9, pivoted at 9". The other arm of said angle lever 9 engages a cam 10 on a driven shaft 11. The revolution of the cam 10, through angle lever 9; link 8, arm 7, lever 5, rod 4, communicates a back and forth motion to rod 1 and causes it to separate adhering warp threads from each other. (Crompton and Knowles Loom Works.)

OGDEN'S PICK OUT COMB.

Fig. 1 is a side view, Fig. 2 a plan view of the side having the teeth, and Fig. 3 an end view of this comb. A indicates the back or base portion of the comb,

from which the teeth project. Three rows of teeth *a* are provided, arranged in longitudinal and parallel position, and the outer ends *a'* or points of the middle row of pins project a slight distance beyond the ends or points of the pins of the outer or side rows, the ends or points of the pins of said outer or side rows being on a corresponding plane with relation to each other. The extent of projection of the points of the pins of the middle row beyond the points of the pins of the side rows is about one twentieth of an inch. When scratching up or picking out with this comb, it is held so that the points of two of the rows



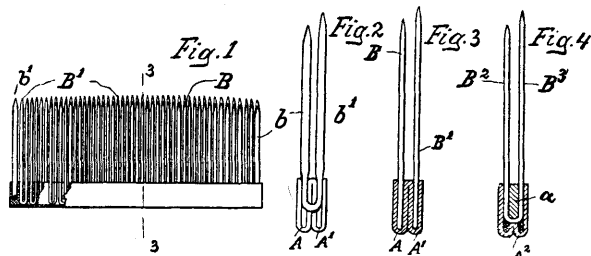
of pins will bear upon the cloth, thus accomplishing about a double quantity of work at each stroke of the hand, compared to common combs. Three rows of pins are inserted in the comb (although two rows only can be used), in order to permit ready use of said comb no matter in which position the operator takes hold of it. (Washington Ogden, Fall River, Mass.)

CARR'S PICK OUT COMB.

Fig. 1 is an elevation, partly in section, of the comb, Fig. 2 an end view, and Fig. 3 a section on line 3-3 of Fig. 1. Fig. 4 is a section of such a comb showing a modification in its construction.

The teeth of the comb are formed in pairs, by bending a single piece of wire, which pairs are firmly secured in sets as B or B', in trough shaped backs A or A' as in Figs. 1, 2, and 3, or so that each tooth in one set, as B², shall be integral with the corresponding tooth of the other set B³ as shown in Fig. 4, where the strip *a* is separate from the back A² but when in place forms part of the back and reduces the quantity of solder which would be necessary if the strip *a* was not used.

The two backs A and A' are held from spreading by two pairs of special end teeth *b b'*, one at each end of the comb, the pairs being formed of a single piece of wire bent near its middle, but placed in the comb with one tooth of each pair in trough A and the



other tooth in trough A'. These end teeth *b b'* are made of heavier wire than the intermediate teeth B B', thus making the comb strong and durable, the teeth being held in such a manner that they cannot work loose. (James A. Carr, Fall River, Mass.)

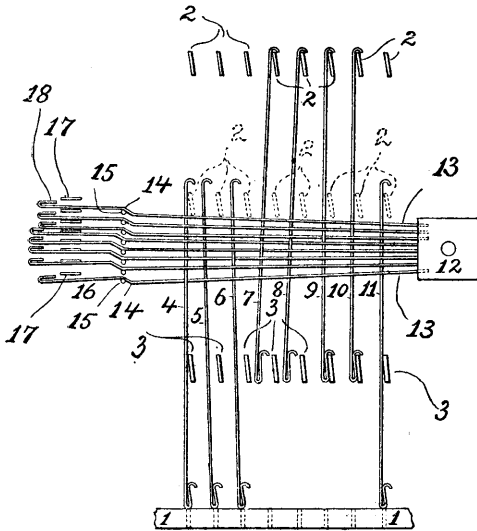
JACQUARDS AND CARD CUTTING MACHINERY.

THE KNOWLES FULL OPEN SHED JACQUARD.

The object is to form an open shed by means of only one beat of the cylinder for each pick or card.

The illustration is a vertical section of the working plan of this machine.

1 indicates the bottom board, 2 the bars of the raising and falling griff, shown in full lines at their highest point, and in dotted at their lowest point, *i. e.*,



when at rest. 3 are the bars of the stationary griff of the machine. 4, 5, 6, 7, 8, 9, 10 and 11 are the hooks of an eight row Jacquard machine shown in various positions in order to explain their method of working. 12 is the card cylinder or prism, which, by means of holes or no holes cut in the cards, operates needles 13.

These needles 13 are of a new and peculiar shape, having a short bend 14, sliding up or down (as regulated by hole or no hole for respective needle in card) on pins 15, in turn either raising or lowering their rear portion 16, bringing them (their respective hooked or projecting part) either in contact or out of contact of the knives 17 of a horizontal back and forth moving griff. In the illustration the three top needles and the bottom needle are shown for holes cut in card, thus their hooks or projections in the rear end of the needles are out of reach of the knives 17; the other needles being shown operated the opposite, hence hook or projecting parts in the rear end of needles are in line for being acted on by knives 17.

After a card has indicated which of the hooks are to rise, the moving griff starts on its upward journey, the cylinder at the same time moves outward, turns, and returns to the needle board with the next card for action, at the same time the raising griff reaches its highest point, followed by a slight outward movement of the horizontally moving griff and its knives 17, which movement is sufficient to place the knives of this griff in engagement with the hooks or projections 18 on those needles 13 which have been uplifted in

consequence of the action of their bent portions 14 upon the rods 15.

As this griff containing the knives 17 moves outward, it carries with it all those needles with which it thus came in contact, thus drawing the bottom crooks of the respective hooks back and out of contact with the stationary griff bars 3, allowing them to be lowered on the downward movement of the griff bars 2 as is shown by hooks 7 and 8 in the illustration.

By means of the stationary griff for keeping the top shed in position with the attachment in the rear for disengaging the bottom crooks of the hooks from the stationary griff 3, when they have to be lowered in the process of weaving, a full open shed is maintained with one beat of the cylinder for every card and pick. (*Crompton and Knowles Loom Works.*)

THE CROMPTON AND KNOWLES DOUBLE ACTION JACQUARD MACHINE.

The object is to prevent engagement of a descending hook by the ascending griff which obviates the necessity of making a second or extra beat of the card cylinder for the same purpose, thus permitting a great increase in speed. When it is undertaken to prevent improper engagement of a descending hook by the ascending griff at the time when the two griffs are passing each other by causing an additional movement of the card cylinder to present again to the needles the same card which was last presented thereto, a slowing down of the operation of the loom below the speed that otherwise would be attainable is necessitated, since such additional movement of the card cylinder renders it necessary to occasion two complete beats or movements of the cylinder for each pick.

Fig. 1 shows in side elevation certain portions of a double action Jacquard machine having one embodiment of the mechanism applied thereto. Fig. 2 is a view in transverse vertical section of the parts which are represented in Fig. 1. Fig. 3 is a view in vertical section corresponding with a part of Fig. 2, but showing a modification.

1 indicates the frame, 2 the bottom board, 3 the hooks, 4 the needles cooperating therewith, 5 the springs and 6 the card cylinder; 7 and 8 respectively designate the two moving griff frames, mounted, respectively, on the slide rods 9 and 10, fitted to move in guides 11 on the fixed framework of the machine.

The hooks 3 are each provided with two crooks 31, for engagement with the respective moving griffs, the said hooks 3, being double, as shown, each limb of each hook having a crook 31, one of which is designed for cooperation with a griff blade 27, and the other for cooperation with the adjacent griff blade 22, one of such griff blades being designed to be uplifted for one shed and the other for the succeeding shed.

12 designates the blades of a stationary griff such as sometimes is employed (that is to say, in full open shed Jacquard machines) when it is desired that an upraised hook shall remain in its elevated position for several picks in succession without being caused to descend meanwhile. 29 designates crooks formed on the hooks 3 for engagement with the said griff blades 12.

In this Jacquard, means are provided whereby as

each of the moving griffs in turn descends the disengaged crooks 31 of the hooks which are engaged and descending therewith are pressed back, so that

under the pressure which is exerted against them by the needles 13. For the purpose of operating the press bar 14 at the proper times there is provided an arm 15 turning on a rock shaft 16. This rock shaft is provided with a cam shaped arm 17, against which latter acts a roller 18, carried by a projection 19 from the moving griff frame 8. The roller 18 acts against the cam shaped portion of the arm 17 in both the upward movement and the downward movement of the griff frame 8, so that the needles 13 are operated in proper season every time the respective griff blades 27 and 22 pass each other.

The arrangement that is shown in Fig. 3 is intended to press back all the limbs of the double hooks at every action of such bar. In some cases it may be desired to press back only one half of the said limbs at a time in order to reduce the strain on the parts which operate the press back devices as well as in order to lessen the danger of accidental dislodgment of the crook of a hook from the griff blade with which such hook is descending. To this end the needles 13 are divided into two sets, and the operating devices so contrived as to operate the said sets alternately, so that at each action of the parts only those needles are pressed back which correspond with the limbs that normally cooperate with the particular griff which for the time being is rising. In Figs. 1 and 2, the press bar 14 is arranged to operate only a part of the needles 13 at each movement

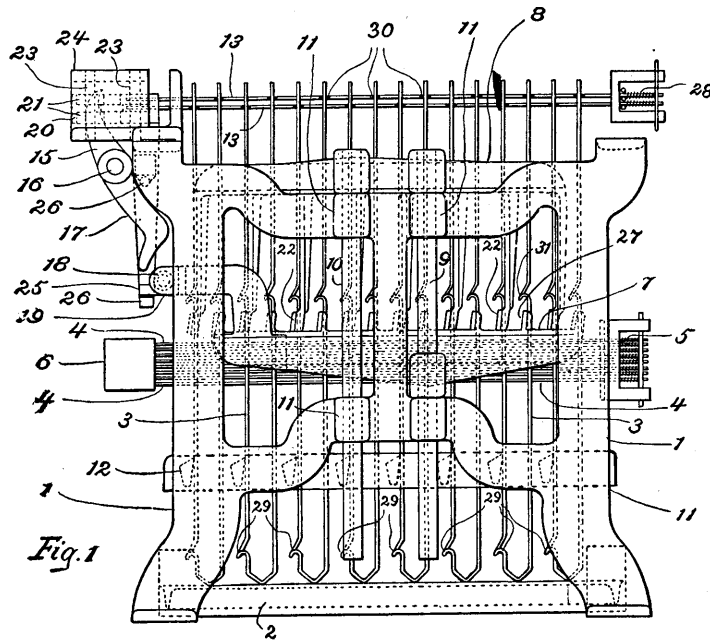


Fig. 1

the said crooks thereof shall be out of the path of the ascending griff. Thereby the ascending griff is prevented from picking up a descending hook and raising it at a time when it should be lowered into a depressed position. Wires are arranged to engage with the hooks 3 and they are moved transversely with relation to the griffs at the proper moment in the working of the Jacquard machine, so as to press the disengaged crooks on the said hooks out of the path of the ascending griff blades. These wires are shown in the illustrations as a set of supplemental needles 13, having eyes where they engage with the hooks 3 as at 30. Springs 28 press the needles 13 toward the left, in the illustrations, but when these needles 13 are moved toward the right, they press the limbs of the hooks to the right also, thereby carrying laterally clear of the ascending griff blades those crooks 31 which are not in engagement with either the ascending griff blades or the descending griff blades. The mode of operating the needles 13 and of arranging and connecting the same with their actuating devices can be done in different ways.

of the same, toward the right, the remaining part of such needles being operated at the next movement of the press bar to the right, and so on. In this instance

In Fig. 3 a press bar 14 is shown arranged to act against the ends of all the needles 13, so that when movement is given to the said press bar 14 toward the right in the said figure all the limbs of all the hooks 3 shall be pressed in the same direction. This will operate to carry toward the right clear of the ascending griff blades all the crooks which are not in engagement with moving griff blades. The movement will not be sufficient to disengage from the moving griff blades the crooks which are in engagement therewith, and the limbs on which such crooks are formed will simply bend

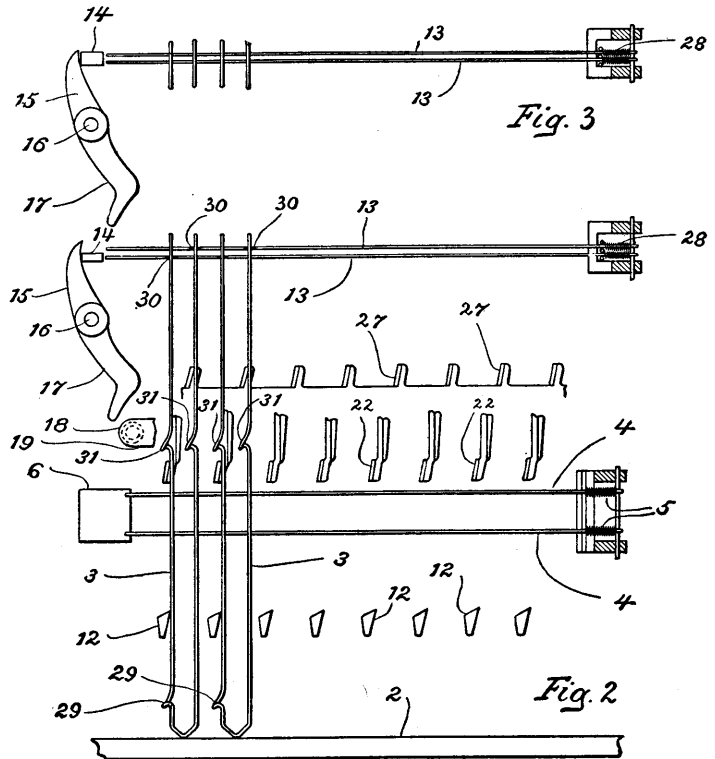


Fig. 3

Fig. 2

the needles are arranged in two sets, one above the other, and means are combined with the press bar 14 for shifting the same vertically, so that when in one position it shall act against the upper set of needles 13, and when in the other position it shall act to move the other set of needles 13. Each end of the said press bar is supported by a carrier 20, having therein a horizontal slot which receives the said end of the press bar and along which the said end is free to be moved toward and from the ends of the needles 13 by means of the actuating devices previously described.

The upper part of the carrier 20 is formed with lugs 21, having holes therethrough, the said holes receiving guide pins 23, which are applied to a stand 24, which is connected with a fixed part of the frame work. A pin 25 projecting from the arm or bracket 19, operates the carrier 20 by striking against the lugs 26, respectively, as the griff frame 8 with which such projection 25 is connected nears the respective ends of its vertical reciprocation, thereby shifting the said carrier and with it the press bar, so that the said press bar shall be placed in position to operate one set of the needles 13 during the descent of the griff frame 8, and then placed in position to operate the other set of needles during the rise of griff frame 8. Sufficient friction between the carrier 20 and the guide pins 23 is provided for, in order to enable the carrier to remain in its elevated position after being raised by contact of projection 25 with the upper lug 26 in the ascent of griff frame 8 until it is depressed positively by the engagement of the pin 25 with the lower lug 26 in the descent of the griff frame 8.

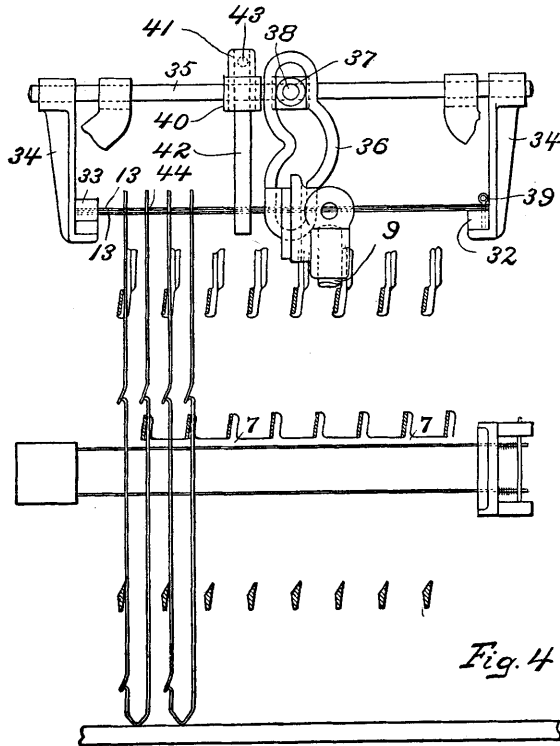


Fig. 4

In place of using the arrangement of press back needles 13 as previously illustrated and explained, the arrangement as shown in Figs. 4 and 5 can be employed.

Fig. 4 is a view, mainly in transverse vertical section, of portions of a double action Jacquard machine,

showing a different mode of operating the press back needles 13. Fig. 5 is a view in detail, showing more especially the form of the press back needles and the manner of engagement with the hooks.

In this arrangement the press back needles 13 are mounted in a movable carrier, consisting of cross bars 32, 33, to which the opposite ends of the needles 13 are applied, supporting arms 34, by which the said cross bars are upheld, and slide rods 35, to which the supporting arms 34 are attached.

With the carrier for the press back needles is combined means for reciprocating the said carrier horizontally in proper timing with reference to the movements of the two moving griffs, whereby each time the said moving griffs pass each other the carrier and press back needles are operated to bear the hooks laterally in order to move the crooks of the disengaged descending hooks laterally clear of the blades of the ascending griff, and thereby prevent the engagement of such crooks with the said blades. The carrier is operated from one of the moving griffs or a part connected, and moves in unison therewith.

Examining illustration Fig. 4 we find a cam in engagement with a pin or roller, one of the said parts being connected to move with one of the moving griffs and the other being connected with the carrier. The cam 36 is attached to the slide rod 9 of the griff frame 7, while the roller 37, which is engaged by the said cam is mounted on a pin 38, which is attached to slide rod 35. The cam 36 is a slotted cam so as to move the carrier positively in both directions horizontally, and is shaped to occasion a complete reciprocation of the said carrier in each complete vertical movement of the cam up or down. Thereby each time the moving griffs pass each other at an intermediate point in their vertical traverse, the carrier, with the press back needles mounted therein, is moved toward the right, so as to carry the disengaged crooks of the hooks out of the path of movement of the ascending griff blades.

The ends of the press back needles 13 at the left in Fig. 4 are inserted into horizontal holes in the cross bar 33. The right hand ends of the said needles 13 are bent to form eyes, through which are passed the stems of pins 39, entering vertical holes that are provided in the said cross bar. This manner and means of applying and connecting the press back needles 13 to the cross bars 32, 33, provides conveniently for the support and retention of the said needles in the carrier and facilitates the application and removal thereof.

To each slide rod 35 of the carrier is made fast a collar 40, being located at or near mid length of the said slide rod. This collar is provided with an arm or lug, as 41, and to the said collar and arm or lug a vertical strip 42 is affixed by means of bolt 43. To the depending portions of the strips 42 are secured the opposite ends of a bar extending crosswise of the machine immediately below the press back needles 13 and parallel with the cross bars 32, 33.

There is a brace running through the center of the press back needles 13 to separate the latter from one another and restrain them from transverse or side movement. This brace reciprocates horizontally in unison with the carrier and the press back needles, it being a part of the carrier.

The press back needles 13 are formed as shown in illustration Fig. 5, which shows two rows thereof, one row being located immediately above the other. Each needle 13 is formed with a succession of half eyes therein, as at 44, for the reception of the prolonga-

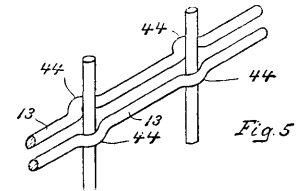
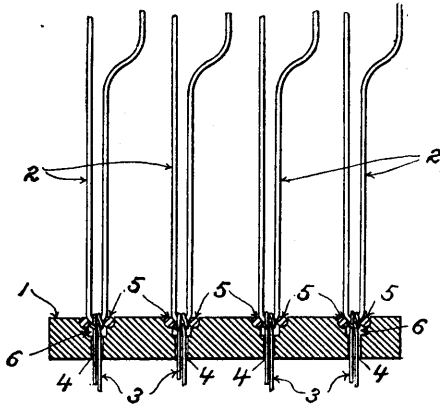


Fig. 5

tions of the hooks above the upper crooks 31 of the latter, these half eyes being of a semicircular shape. Two needles are used in conjunction, one being located immediately above the other, the said needles being turned so that their half eyes face in opposite directions, as shown, whereby each of such needles serves to retain the limbs of the corresponding series of hooks in the half eyes of the other of such needles. This use of needles in pairs and formed with half eyes, permits the discarding of needles having round eyes, the needles with half eyes being cheaper to make and much more easily and conveniently put into the machine and taken out. (*Crompton and Knowles Loom Works.*)

BOTTOM BOARD FOR JACQUARD MACHINES.

The purpose of this bottom board is to obviate wear from contact of the bottom ends of the hooks



therewith and cutting or wear of the neck cords where they are connected with the hooks.

The illustration is a vertical transverse sectional view of the board, showing also portions of four hooks of the Jacquard machine, together with portions of the neck cords connected therewith.

1 designates the bottom board, 2 the hooks and 3 the neck cords as passing through holes 4, of the bottom board.

The novelty of the new board consists in laying parallel with each other, wire strips 5 on opposite sides of each line of holes 4 and on which wire strips 5, rest the bottom ends of the hooks when the latter are in their lowest position. These wires or strips protect the bottom board from wear resulting from the contact of the bottom ends of the hooks therewith.

The wear of the wires or strips 5 is very slight, and takes place very slowly, and since the said wires or strips prevent the bottom ends of the hooks from cutting into the material of the bottom board and thereby descending sufficiently far to bring the portions of the neck cords, which pass around the said ends of the hooks into contact with the material of the bottom board around the upper ends of the holes 4, it follows that the wear and cutting of the said neck cords heretofore (in the use of common bottom boards) arising from such contact are prevented.

For the reception of the portions of the neck cords

which pass around the bottom ends of the hooks parallel grooves 6 are formed along the upper face of the bottom board 1, each of such grooves intersecting the upper ends of the holes 4 of one line or series of the said holes, at the same time the grooves 6 exceed in width the diameter of the holes 4. The wires or strips 5 are located at opposite sides of each of the grooves 6, and are held in place by means of screws driven at intervals between the pair of wires or strips 5. The head of each screw is arranged to overlap and engage with both wires or strips 5, thereby serving to secure both of the latter in place. (*Crompton and Knowles Loom Works.*)

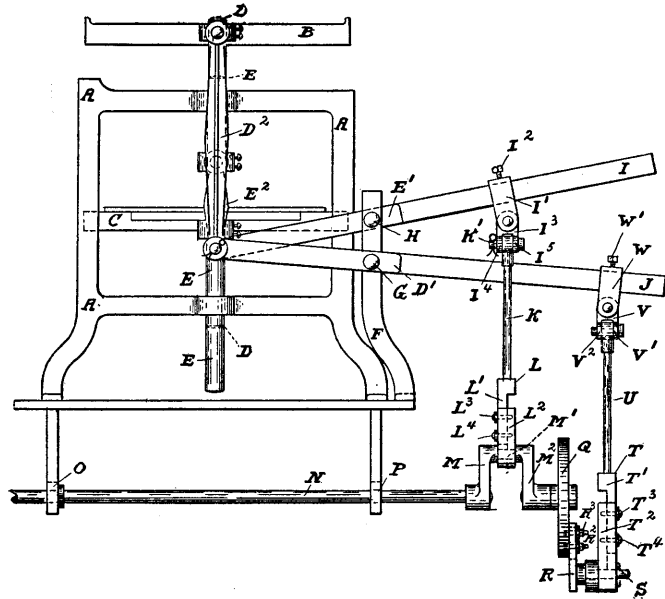
METHOD OF OPERATING THE GRIFFS IN JACQUARD MACHINES.

The device relates to means for moving the upper and lower griffs in a rise and fall Jacquard to and from each other. In order to accomplish this, the well known eccentric principle, as it is used in any double acting engine, is applied, and where a simultaneous up and down motion is required and created by having two double cranks, making the second double crank a single crank, inasmuch as in this instance there are only two levers requiring motion.

The illustration shows a side view of a Jacquard machine with only the necessary elements shown as required to explain the new mechanism.

A indicates the frame of the Jacquard, B the upper griff, C the lower griff, D one of the upper griff vertical elevating bars, E one of the lower griff vertical elevating bars, D¹ the upper griff motion lever, D² one of the upper griff connecting rods, E¹ the lower griff motion lever, and E² one of the lower griff connecting rods, each of which pairs of connecting rods D² and E² is connected, respectively, with the motion levers and the upper and lower griffs. The motion levers D¹ and E¹ are pivoted in the standard F at the fulcrums G and H.

Attached to the arm I of the motion lever E¹ is an



adjustable clamp I¹, secured to the arm by a set screw I². Pivoted to this clamp is a knuckle joint I³, which,

between its two arms I⁴ and I⁵, has a connecting rod K, pivoted on the pin K¹. Said connecting rod K is furnished at its other end with a strap L that connects the rod K with the crank pin M¹ of the crank M on the shaft N. The strap L is formed of two parts L¹ and L², of which L¹ has a connecting rod K attached to it and is constructed so as to be able to perform a telescopic movement in combination with L²—that is, slide up and down in a guideway cut out in L², to which part it is attached by screws L³ and L⁴.

This telescopic adjustment will easily be recognized as permitting a shortening or lengthening of the up and down movement of the arm I, and consequently also of the lower griff C. The shaft N, mounted in bearings at O and P, has secured to it, as stated before, the double crank M (having a crank pin M¹) of which the arm M² has a disk Q secured to it. Attached to said disk is an arm R, having a slot through which pass bolts R² and R³, which bolts, passing through any of the desired holes in the disk secure the arm R to the disk Q. By means of the slot in the arm R and the holes in the disk Q the eccentricity of a pin S, attached to the arm R, can be increased or decreased, as required. Pin S represents the free pin of the second crank, and virtually represents, in connection with the arm R and the disk Q, an adjustable eccentric motion. This motion is transmitted to the arm J of the motion lever D¹ in the same manner as the motion from the crank M is transmitted to the arm I of the motion lever E¹.

The strap T regulates the length of the up and down movement of the arm J of the motion lever D¹ and is composed of two pieces, T¹ and T², the piece T¹ being able to slide in the piece T² and being secured to it by screws T³ and T⁴, the same as in the instance of the strap L. The connecting rod U has one end attached to the part T¹ and the other end pivoted between the arms V¹ and V² of the knuckle joint V, which is pivoted to the clamp W, attached to the arm J by the set screw W¹. (*James Jackson and Sons, Paterson, N. J.*)

DEAN'S DRIVING MECHANISM FOR RISE AND FALL JACQUARDS.

Fig. 1 is a side elevation of a Jacquard machine, showing the mechanism for operating the griffs and batten. Fig. 2 is a detail view of one eccentric on back of top gear wheel.

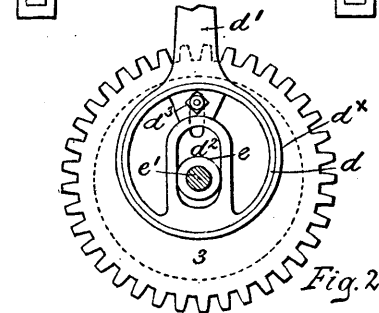
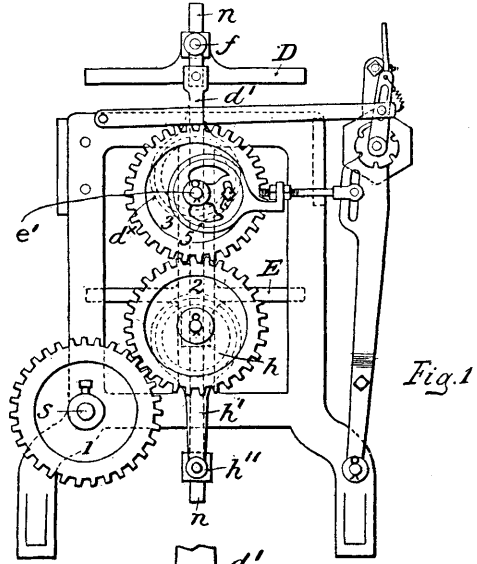
The upper griff D is operated, or caused to rise and fall, by means of the upper eccentric *d*, having a rod *d*¹ and the strap *d*^x. The gear wheel 3 is mounted on stud *e*¹, the eccentric 5 being secured to its outer face and the upper eccentric *d* being secured to its inner face, the long collar *e* of the wheel 3 passing through said eccentrics, the eccentric *d* having an elongated slot *d*² to permit adjustment as required. The eccentric *d* is secured to gear 3 by a bolt *d*³, passing through a radial slot in gear 3. The rod *d*¹ is connected to the griff D at the joint *f*.

The lower griff E is operated by the lower eccentric *h*, which, like the upper eccentric *d*, is secured on the gear wheel 2.

Both the upper and lower eccentrics which operate the griffs are located inside of the gear wheels 2 and 3. The lower eccentric *h* has the rod *h*¹, which is secured at the joint *h*² to the rod *n*, to which is secured the lower griff E, and the upper griff D slides on the rods *n*.

The driving mechanism operates as follows: Power being communicated to the shaft S the gear wheels 1 on the ends thereof revolve, causing the upper gear wheels 2 and 3 also to revolve, and the batten holding the card cylinder is caused to oscillate by

means of an eccentric on the outer face of the upper gear wheels 3. The upper griff D is caused to rise and fall by means of the upper eccentric *d* on the inner face of the gear wheel 3, said eccentric having a rod



*d*¹ and the strap *d*^x, and the lower griff E is operated by the lower eccentric *h*, which is secured on the inside of the gear wheel 2. (*J. Dean, J. F. Kerr and G. Simpson, Paterson, N. J.*)

SHELDON'S RISE AND FALL JACQUARD.

The object is to produce an increase of speed and overcome the jarring of the harness cords, thereby preventing the same from becoming tangled.

Fig. 1 is a front elevation of a loom in connection with the improvements attached to the Jacquard machine, parts of the loom being broken away to better show the main shaft in connection with the sprocket wheel and chain to impart motion to the Jacquard machine. Fig. 2 is an enlarged end section of the Jacquard machine. Fig. 3 is an enlarged cross section of one of the gear wheels, showing the construction of the slot.

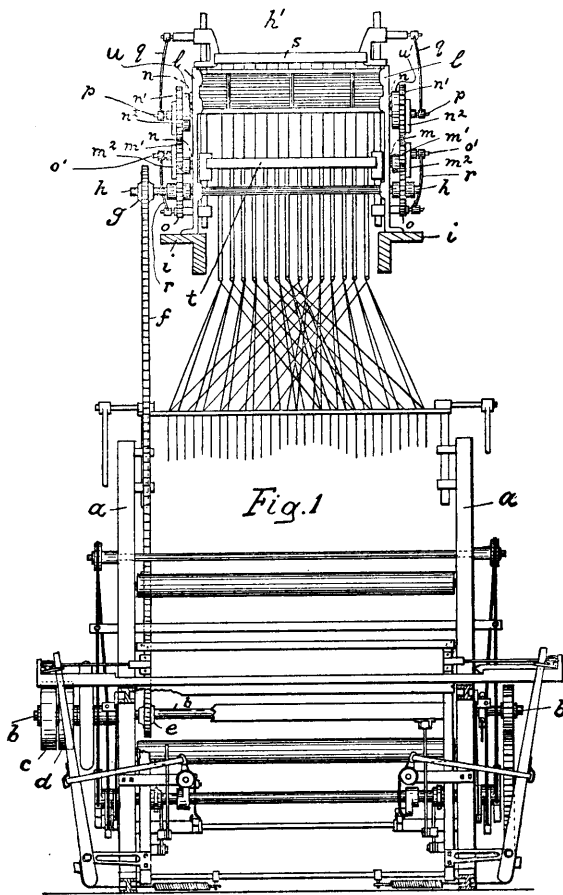
a represents the main frame of the loom, having a main driving shaft *b*, on which is secured a fast and loose pulley *c* and *d*, connected by belt connection to the main driving shaft (not shown). On this main shaft *b* is secured a sprocket wheel *e*, having a chain *f* engaging with a corresponding sprocket wheel *g* on the main driving shaft *h* of the Jacquard machine *h*¹. *i* indicates the cross beams to which the

Jacquard machine is secured. *j* represents the cylinder and *k* the series of pattern cards. The frame *l* of the Jacquard machine *h'* is provided with studs *m* and *n*, on which are secured gear wheels *m'* and *n'*, meshing into each other. The gear wheel *m'* also meshes with a gear wheel *o* on the main driving shaft *h* of the Jacquard machine.

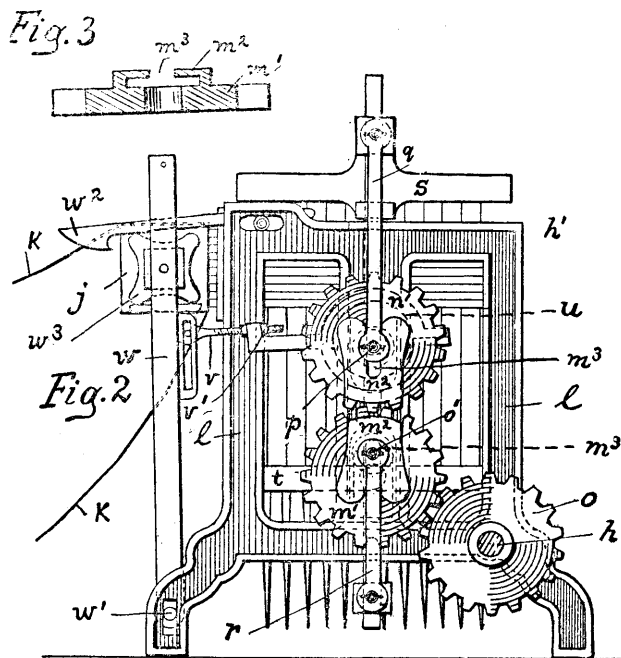
On the gear wheels *m'* and *n'* are formed integral therewith raised projections *m²* and *n²*, each having an opening *m³* for the reception of the shaft *o'* and *p* for connecting the vertical arms *q* and *r*, secured to the griffs *s* and *t*, operating the hooks. Said vertical arm *q* is secured at its upper end to the griff *s*, and the vertical arm *r* is secured at its lower end to the griff *t*, as shown in Fig. 2. These shafts *o'* and *p* can be adjusted in said openings *m³* to suit the operator and can be so arranged as to increase the speed of the rise and fall of the griffs, as will be understood upon referring to Fig. 2.

To the hub *u* of the gear wheel *n* is secured an eccentric *w'*, connected by the arm or lever *v* to the lever *w*, having the roller or cylinder *j* secured thereto. Said lever *w* is fulcrumed at *w'* on the frame *l* of the Jacquard machine. Arm or lever *v* is so constructed as to allow for adjustment by the nut *v'*, as

by each revolution of said main driving shaft. The weight of the wheels *m'* *n'* being placed upon studs upon the frame, the operator is enabled to get a high



shown in Fig. 2. The object of this arm or lever *v*, connected to the eccentric hub *u* of the gear wheel *n*, is to give said lever *w* a backward and forward motion, so that the catch *w²* will come into engagement with the wheel *w³*, so that the cards are moved



speed from this machine. (Samuel Sheldon, Paterson, N. J.)

HALTON'S LINGO FOR WIRE HEDDLES.

The object of this lingo is to produce a weight for wire heddles that will prevent it from swinging on the heddle, and thus constitute a substantially rigid continuation of the same, thereby overcoming that liability to entanglement which is an objection to ordinary lingo loosely hung upon the heddles.

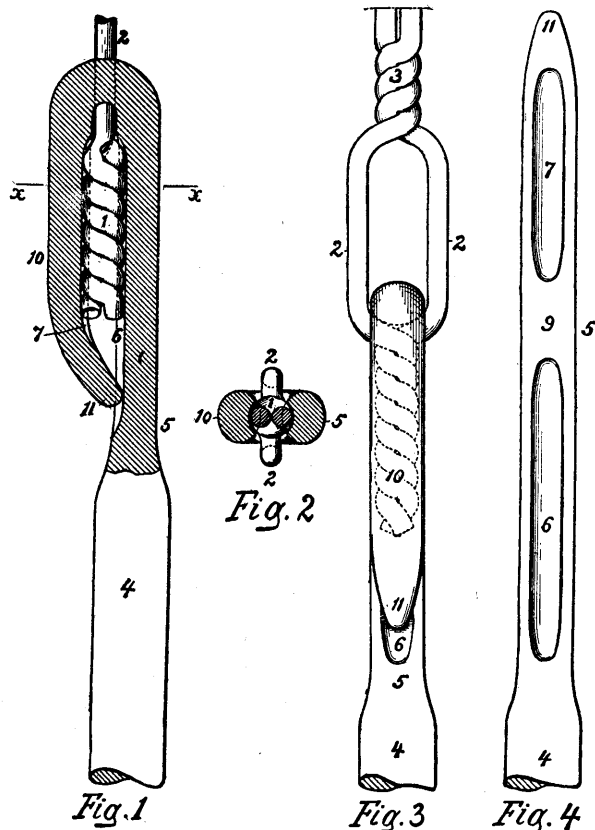
Fig. 1 is a view, partly in vertical section and partly in elevation, of the upper end of this lingo, showing the lower portion of the heddle to which said lingo is hung. Fig. 2 is a transverse section on the line x-x, Fig. 1. Fig. 3 is a front view of the upper portion of the lingo and of the hooked lower end of the heddle to which it is hung, and Fig. 4 is a view, illustrating the preparation of the blank for the lingo before the head of the same is bent.

An ordinary wire heddle is composed of a pair of wires which at the lower end are twisted together, as shown at 1, then separated so as to form an eye or loop 2, and then again twisted above the latter, as shown at 3, the eye or loop 2 being intended for adaptation to the hooked upper end of the lingo with which the heddle is usually furnished. If, however, this lingo is loosely hung to the eye 2 of the heddle, said lingo is free to swing laterally and entanglement of and injury to both lingo and heddles frequently results.

In order to overcome this objection the new lingo is made in the following manner: a piece of wire 4 of proper dimensions is slightly reduced at the upper end, as shown at 5, in Fig. 4, this reduced portion of the wire being oval in cross section, as shown in Fig. 2. In one side of this reduced portion of the wire are then formed concave recesses 6 and 7, separated from each other by a portion 9, and the reduced por-

tion 5 of the wire is then bent at the center of this portion 9, so as to form the hook of the lingo and bring the recess 7 opposite to the upper portion of the recess 6, the point 11 of the tongue 10 of the hook being reduced in thickness, as shown in Fig. 3, and depressed, as shown in Fig. 1, so as to enter the lower portion of the recess 6.

The tongue 10 of the hook possesses such resiliency that its point can be readily raised, so as to permit of the slipping of one of the wires of the eye 2 of the heddle beneath the same, and when the lingo is turned around into a position in line with the heddle the lower twist 1 of said heddle will enter between the shank and tongue of the hook and will find



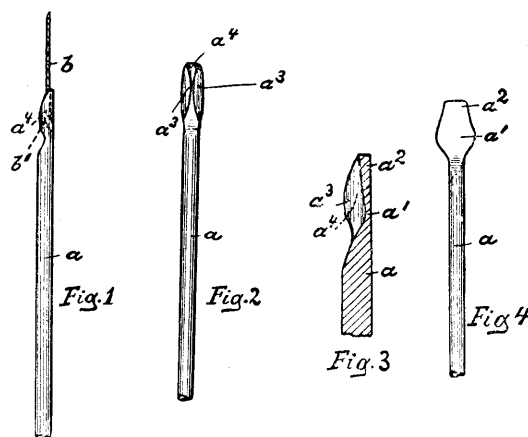
a bearing in the opposite recesses 6 and 7 of said shank and tongue. Hence any tendency of the lingo to swing on the heddle is arrested by the engagement of the twisted portion of the heddle with the lingo and entanglement of and injury to lingo or heddles is prevented, at the same time precluding the possibility of the unhooking of the lingo from the heddle. (Thomas Halton's Sons, Philadelphia, Pa.)

RIGBY'S LINGO.

The object is to provide a lingo which permits a ready and quick connection.

Fig. 1 is a side elevation of this lingo and of a portion of a heddle connected therewith, Fig. 2 is a front elevation of Fig. 1, Fig. 3 an enlarged transverse section through the upper portion of Fig. 1, and Fig. 4 a front elevation of the lingo with the head flattened out.

a is the body of the lingo, the upper portion of which is flattened out, as at *a'* and *a²*, and the ears or flaps *a³* thus produced are bent to form a conical



shaped channel *a⁴*, which shape is produced or obtained by diminishing the thickness of the head in its central portion *a'* and leaving the top portion *a²* thicker than said central portion. By this arrangement not only a seat for the knot *b'* of the heddle *b* is formed within the conical channel *a⁴*, but the wall constituting said channel is greatly strengthened, the thicker portion *a²* on one side and the body *a* on the other side strengthening and protecting the thin portion *a'*, and thus preventing its splitting.

As the flaps *a³* *a³* do not come in close contact with each other, a slot is formed between them, of a size sufficient to permit the quick and ready connecting with the heddle. (Holden Rigby, Paterson, N. J.)

ROYLE'S FOOT POWER PIANO CARD STAMPING MACHINE.

In this machine provision is made for placing a plurality of punches under the control of a single key. The feed mechanism and the mechanisms for controlling the locking and releasing of the punches, are also improved, compared to other machines, so that the said mechanisms may be actuated by the punch operating mechanism or by hand at the will of the operator.

Fig. 1 is a view of the machine in side elevation, certain of the smaller parts being omitted. Fig. 2 is a horizontal section through the punch and key supporting head, Fig. 3 is a vertical section through the head, Fig. 4 is another vertical section through the head, Fig. 5 is an enlarged view in end elevation showing the operating mechanism at the end of the key and punch supporting head, Fig. 6 is an enlarged partial top plan view of the feed mechanism, and Fig. 7 is a view of the same in side elevation.

The frame work of the machine consists of a bed plate A, supported upon legs A'. The treadles, one for depressing the bank of punches and the other for elevating or returning the bank of punches, are denoted, respectively, by B B'. The former, B, is connected by a rod *b* with the end of a lever *b'*, supported upon a vertically adjustable fulcrum *b²*, attached to a fixed portion *a* of the frame. The lever *b'* is connected intermediate of its fulcrum and its free end, as at *b³*, with the guide rods C C', which support the punch and key carrying head, so that when the lever B is depressed, as shown in Fig. 1, the bank of

punches will be brought down into engagement with the card to be punched. The lever b' is also connected by a rod b^4 with one arm of a vibrating lever b^5 , pivoted to a hanger a' , the opposite arm of said lever b^5 being connected by a rod b^6 with the treadle B' , so that when the treadle B is depressed, as shown in Fig. 1, to bring the punches into engagement with the card it will at the same time elevate the treadle B' into the position shown in Fig. 1, and when the treadle B' is depressed, it will in turn, through the connecting rods b^4 and the vibrating lever b^5 , lift the free end of the lever b' , and thereby raise the punches from the card and at the same time raise the treadle B ready for a repetition of the punching operation. The reciprocating movement of the treadle B' operates the feed and controls the effect of the punch locking keys.

One of the prominent features of this machine is the structure and arrangement of the punch locking keys and the parts which cooperate therewith, by which one or more of the keys—in the present instance, each key—is made to control the locking of a plurality of punches. The punch and key carrying head for the purpose of assembling the several parts, gaining ready access thereto, and keeping them in order is made of three longitudinal sections c c' c^2 , the rear section c being of a depth or thickness substantially equal to the combined thicknesses of the two front sections c' c^2 , the front of the rear section c and the rear portions of the front sections c' c^2 being cut away to form a central opening c^3 , extending vertically through the head, in which opening the parts for directing the tips of the keys and for returning the locking bars to their normal position are made to operate. The several sections of the head are firmly secured together and are finally surmounted by a cap piece c^4 , which serves as a hand rest for the operator when manipulating the keys.

In the illustrations are shown a bank of eight keys, each of which is represented by D , for locking the punches which are to punch the holes in the cards. The punches for punching the holes in the cards are twice as many in number as the number of keys D , one group of eight of said punches being denoted by E and the other group of eight being denoted by E' . The keys D are spring actuated and are made to reciprocate horizontally through the rear section c of the head, and each is provided with a movable tip d , pivoted to the shank of the key D , so as to be swung into a higher or lower plane as may be desired. The locking bars for locking the bank of punches are arranged in two banks in different vertical planes, the one bank being under the control of the keys D when their tips d are raised and the other bank, being under the control of the keys when the tips d are lowered. The several locking bars e e' are each provided with a shoulder e^2 , by means of which they are engaged by a retracting plate F through a slot f , in which the banks of locking bars project into the opening c^3 in the head. The retracting plate F is made to reciprocate away from and toward the front wall of the opening c^3 by means of arms g g' on a rock shaft G mounted in bearings beneath the punch and key supporting head and subject to a rocking movement by means of a cam H on the hub of a lantern pinion h , which cam engages operating arm g^2 , fixed on the rock shaft G . At each depression of the pedal B' the lantern pinion h is actuated through the action of a connecting rod b^7 , leading from the pedal B' to an arm i on the rock shaft I , journaled in supporting brackets a^2 on the bed plate A , and provided with an arm i' carrying a hook pawl i^2 , which extends from the arm

i' into engagement with the pins on the lantern pinion h .

The bank of locking bars e is arranged to lock the group of punches E , and the bank of locking bars e' is arranged to lock the group of punches E' , while both banks of locking bars e and e' , or one or more individual members of the banks which may have been advanced by the keys, are returned from their locking positions by the rearward movement of the plate F at each depression of the treadle B' . The cam H for operating the shaft G , and hence the retracting plate F , is provided with four operating projections at equal

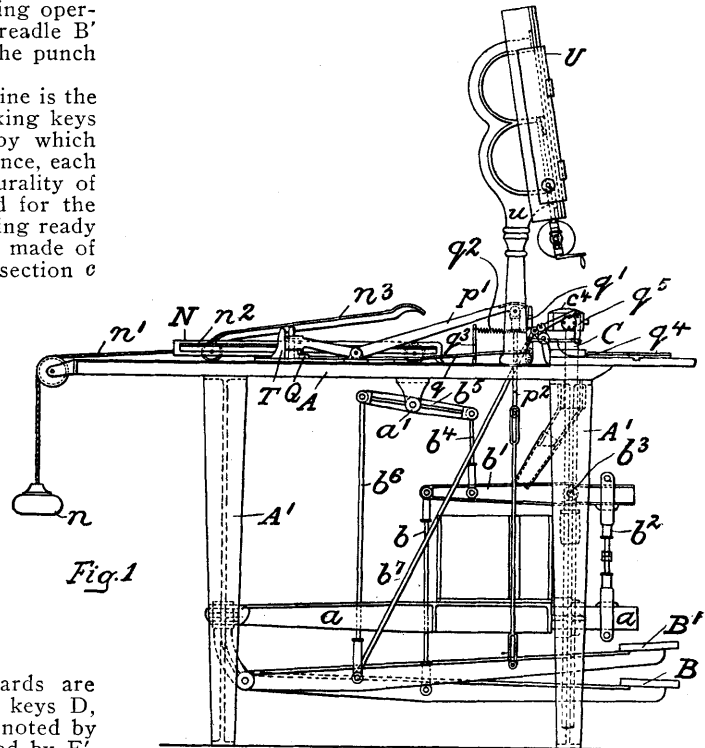


Fig. 1

distances apart and is turned a quarter revolution by the pawl i^2 at each depression of the treadle B' to rock the shaft in a direction to throw the retracting plate F rearwardly and then permit the shaft G to rock back into position, and with it the retracting plate F , to leave the locking bars free to be operated by the keys.

In connection with the swinging tips d at the ends of the keys D there is provided a vertically movable tip adjusting plate K , through which the tips d extend, the said plate K being pivoted, by means of arms k and k' at its ends, to the rear section of the head, as shown at k^2 k^3 . When the plate K is in its lowermost position, the tips are in position to engage the bank of locking bars e , and provision is made for lifting the said plate, K , and with it the tips d , to bring them into position to engage the bank of locking bars e' . This is accomplished by means of the bevel faced nose k^4 on the end of a sliding pin k^5 , which pin is provided with a retracting spring k^6 and has its head projecting from the front of the punch and key carrying head, in position to be operated by the thumb of the operator when so desired. The pin k^5 , and with it the adjustable plate K , is operated automatically from the treadle B' by means of the rock shaft I , which carries at its end opposite that where the hook pawl i^2 is attached an arm i' , having pivoted thereto a hook pawl

is seated in a socket in the head O and the head of which is held in an elongated open slot in the rear end of the arm p. This admits of the vertically reciprocating movement of the escapement head by the

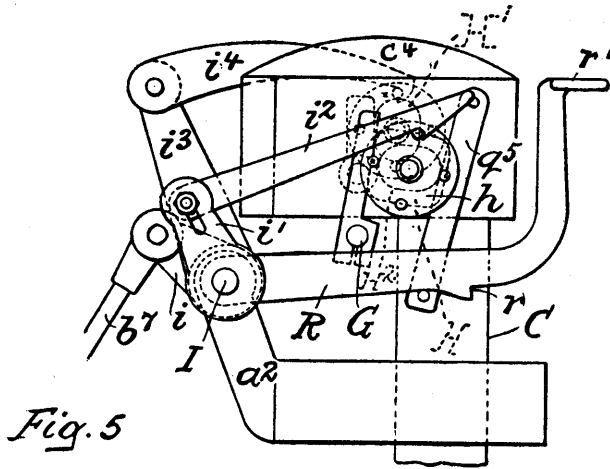


Fig. 5

swinging movement of the rear arm p of the operating lever without any tendency to bind.

As thus far described, the carriage N, and hence the card which may be attached thereto, would be fed rearwardly one step at each operation of the punch head down and return—that is, with each depression of the treadle B'. This feed would take place as follows:—When the treadle B' is elevated, as shown in Fig. 1, and the punches depressed into position to engage the card, the carriage N will be held stationary by the fixed tooth o² of the escapement in engagement with the rack bar n², as shown clearly in Fig. 7. When the treadle B' is depressed to return the treadle B to its normal position to lift the punches out of engagement with the card, the escapement operating lever will be rocked by a downward pull upon its forward arm p and a consequent lifting of its rear arm p', which action will lift the stationary tooth o² of the escapement out of engagement with the rack bar n² and at the same time engage the movable tooth o³ with the rack bar. The moment the stationary tooth o² is lifted out of engagement with the rack bar, the strain upon the carriage by the weight n will draw the carriage and the movable tooth o³ therewith rearwardly against the tension of the spring on the stem of the movable tooth until the plate of the movable tooth engages the rear wall of the slot in the escapement head—that is, a distance equal to the distance between two successive teeth upon the rack bar n². As the treadle B is again depressed to operate the punches, it will by elevating the treadle B', permit the arm p' of the escapement operating lever to lift under the downward pull of the spring p³ and the fixed tooth o² of the escapement will be lowered into engagement with the rack bar n², occupying the same position from which the movable tooth o³ is withdrawn by the downward movement of the escapement head. As soon as the escapement head has reached a downward movement sufficient to free the movable tooth o³ from the rack bar n², the said tooth o³ will spring forwardly under the impulse of

its actuating spring in position to enter into engagement with a succeeding tooth on the rack bar n², when the escapement head O shall be again elevated by the return movement of the punches and the consequent downward movement of the treadle B'.

For the purpose of preventing the feed of the carriage, and hence of the card that may be attached thereto, at each successive operation of the punches to enable the punch head to be depressed several times—in the present instance twice—intermediate of successive steps of feed, a sliding block Q is provided in position to be slid beneath the escapement head when the latter is elevated to prevent it from moving downwardly a distance sufficient to free the movable tooth o³ from the rack bar n². The sliding block Q is connected by a rod q with a lever q', fulcrumed at and uprising from the bed plate A a short distance to the rear of the punch carrying head, which lever q' is normally drawn rearwardly into position to insert the sliding block Q beneath the escapement head by means of a spring q², fastened at one end to the lever q' and at its opposite end to a pin q³, uprising from the bed plate. The lever q' has a removable connection with a hanging arm q⁵, carried by the punch head in position to engage a cam H², fixed to rotate with the cam H and of the same general form as the cam H', to which attention has heretofore been called. The cam H² is, however, set at an angle of ninety degrees to the cam H', so that the effect of the cam H² in rocking the arm q⁵ forwardly and hence, through the lever q' and connecting rod q, drawing the block Q forwardly, where it will not interfere with the depression of the escapement head, will take place at such time as the cam H' is in position to permit the keys D to operate the bank of locking bars which control the group of punches E; but when the cam H' is in position to permit the keys D to operate the bank of locking bars which control the group of punches E'—the cam H² will be in position to permit the arm q⁵ to swing rearwardly, and thereby permit the block Q to rest beneath the escapement head and so prevent the feed of the carriage during the operation of that group of punches.

The operator by pulling forward upon the lever q'

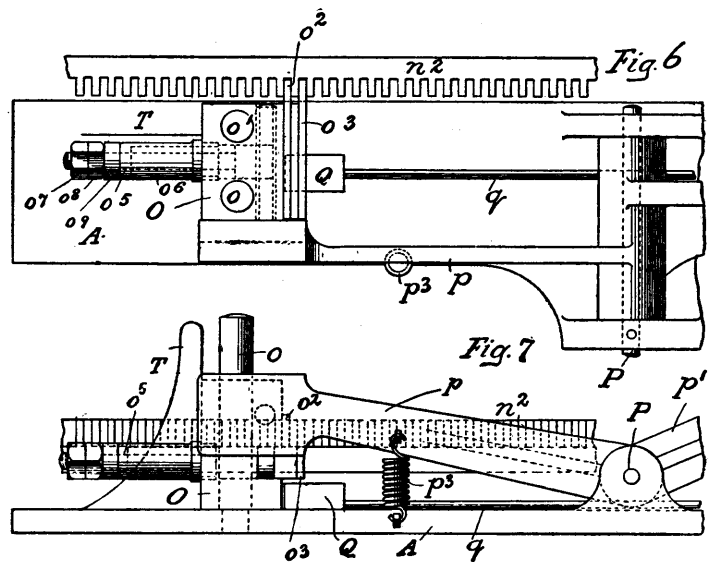


Fig. 6

Fig. 7

may at his pleasure withdraw the block Q from its position to arrest the feed, and whenever so desired, the said lever q' may be locked in its forward position with the block Q removed from beneath the escape-

ment head, by hooking the forward end of the connecting rod q^1 over a shoulder r on a swinging retaining bar R, pivoted on the shaft I and provided with a handle r^1 within convenient reach of the operator.

The carriage N is provided with a handle n^2 for convenience in drawing it forward for engaging a new card to be punched, and when such movement of the carriage takes place the arm p^1 of the escapement operating lever is depressed sufficiently to throw both of the teeth o^2 o^3 out of engagement with the rack bar n^2 . The connecting rod p^2 , which connects the arm p^1 with the treadle B' has lost motion in its connection with the treadle B' conveniently by means of a slot and pin connection with the treadle which will permit the arm p^1 of the lever to be depressed without affecting the treadle while the depression of the treadle B' will at the same time serve to depress the arm p^1 .

An abutment T is located in position to form a bearing for the rear face of the escapement head as it reciprocates upon its guides o o' and serves to prevent the displacement of the escapement head and the teeth o^2 , o^3 , carried thereby, by relieving the guides o o' from the concussion due to the abrupt stopping of the carriage at the end of each step of its feed movement. U indicates the reading board for holding the pattern in position before the operator and is supported upon a bracket u , uprising from the table A. (*John Royle and Sons, Paterson, N. J.*)



THE ROYLE POWER PIANO MACHINE.

Cutting Jacquard cards by power is more conveniently and expeditiously than if done on a machine driven by an operator.

In the ordinary foot driven machines, the power necessary to force the die to perforate the card, is supplied by the operator. This demands considerable exertion of physical force and necessarily tends to limit the production of cards. Aside from this, there is very little to correct in the action and arrangement of the foot driven machine and it has therefore been kept in view to retain in the power machine, the salient features of the foot driven machine, the chief change being the introduction of mechanical power in the room of man power. This modification adds very sensibly to the value of the piano machine as a device for cutting Jacquard cards, as it entirely relieves the operator of the most fatiguing part of his duties.

The illustration clearly shows the construction and operation of this power piano card stamper.

A represents the cutter head, carrying a set of punches and keys of the usual pattern. This head is supported by a pair of guide rods B and B', which extend down through the table and into sockets formed in the lug C at the base of the pedestal. These guide rods are connected with an eccentric D, on the drive shaft E, through which a reciprocating movement is imparted to the cutter head when the shaft is rotated. This shaft engages with the continuously driven pulley F through a clutch, which operates as follows: Fixed to rotate with the shaft E are two clutch shoes attached to supporting wings which permit the shoes to slide radially toward or away from the inner curved surface of the rim of the pulley F. These shoes are connected with a hub which rocks independently of the wings by means of toggle joints. Arms radiate from the hub and have their free ends connected by springs, the tension of which, when free to act, tends to press the shoes towards the rim of the pulley. The rotation of the hub, which is a positive and continuous movement, operates to release the clutch, suitable mechanism being provided for this purpose. Both

movements, the fixing and releasing of the clutch, are effected by sliding a sleeve G, along the shaft. This sleeve is connected with the pedals H and H' by shafts and levers so as to be instantaneously controllable by the operator. It will accordingly be apparent that when the pedal H' is depressed, the clutch will be thrown into engagement with the pulley, which will, in turn, cause the main driving shaft to revolve, this motion being eventually transmitted through the cam D to the guide rod B, the reciprocating movement of which will cause the cutter head to rise and fall, thus cutting a row of holes in any card which may be in the die. By depressing the pedal H, the sleeve will be drawn back, the clutch released and the movement of the cutter head instantly stopped.

This application of power is the distinctive feature of this machine and constitutes its most important element of superiority over machines heretofore designed for cutting cards by hand. The action of the power is entirely independent of the punches; it is positively applied and cannot fail; and as both the setting and releasing of the clutch are independently controlled by pedals, the power can be interrupted after each row of holes has been cut or can be allowed to run continuously to the end of the card, the operator simply depressing the proper keys in unison with the movement of the cutter head.

Aside from the application of power, there are other features of this machine which are worthy of mention. The feed carriage for the cards is of improved design, positive in its action and very carefully made. Its construction is as follows: A guide bar I, forms a support for the feed carriage J. This guide bar is of cylindrical shape and has a rack bar attached to its under side. The body of the carriage is connected with a rock shaft Q which moves in unison with the movement of the cutter head. On this rock shaft are fixed two sleeves, K and K', which are provided with teeth fixed to engage with the rack bar, but so adjusted that when one is swung into position with the rack bar, the other will be out of engagement. A spring actuated pulley L, tends continually to draw the feed carriage backward, the movement only being interrupted by the action of the toothed sleeves above referred to. In action, the sidewise movement of the rock shaft throws first one and then the other sleeve into engagement with the rack bar, permitting the carriage to slip back one space with each movement. The rack bar is of milled steel, made perfectly true and accurate, and the action is absolutely positive and cannot fail or slip.

The carriage is provided with a suitable gripping dog for holding the cards, a quick and easy return action and is simple and reliable in every respect. The tension springs are adjustable so that the "pull" on the carriage can be lessened or renewed at will of the operator.

A number of improvements have been made in the reading board M. The rules N and N' have two actions, a slow, step by step motion and a quick return movement. This saves time as it enables the operator to shift the rules over broad spaces in an inconsiderable space of time. The board can be moved horizontally forward along the line O or tilted forward or back by the arm P. A step by step index pointer is fixed on the board to operate in harmony with the feed mechanism, which serves to direct the eye of the operator to the place on the pattern which corresponds to the particular row in the card then being cut.

The chief aim, in designing this machine, has been to bring to the aid of the individual card cutter mechanical resources heretofore unavailable. The result of the successful introduction of this machine has been

that the value of the card cutter, individually, has been increased by enhancing his power of production, while

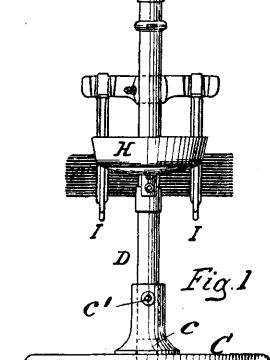
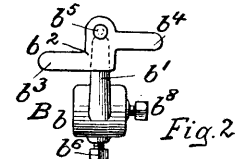
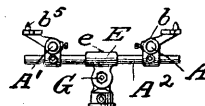
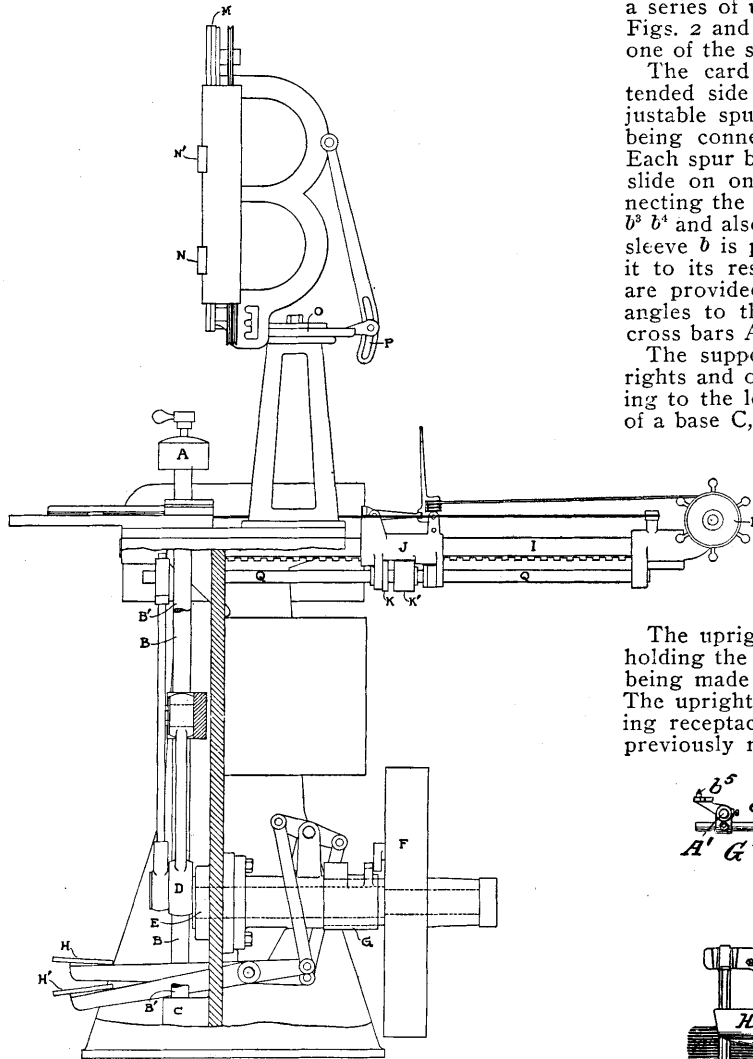
adjustment of the two lines of spur brackets in either direction, to fit different sizes of cards.

Fig. 1 is an end view of the frame showing one of a series of uprights which support the card rack; and Figs. 2 and 3 are top and side views, respectively, of one of the spur brackets.

The card rack consists of two longitudinally extended side bars A, A', each having a series of adjustable spur brackets B mounted thereon, said bars being connected at intervals to the cross bars A². Each spur bracket B comprises a sleeve b, adapted to slide on one of the side bars A, A', a web b' connecting the sleeve with a plate b², provided with arms b³ b⁴ and also with a peg b⁵ for holding the cards. The sleeve b is provided with a set screw b⁶ for clamping it to its respective side bar. Some of the brackets are provided with a supplemental sleeve b⁷, at right angles to the sleeve b for receiving one end of the cross bars A², being held in position by a set screw b⁸.

The support for the card rack comprises end uprights and one or more intermediate uprights according to the length of the rack. Each upright consists of a base C, having a socket c adjustably secured to a post D, which can be adjusted to any height desired by the set screw c' in the socket c. The rack is hinged to the uprights, so that it will remain level, by a sleeve E secured on the cross bar A² by means of a set screw e, a bolt G fastening it to the upright by means of a lug projecting from said hinge.

The uprights are provided with a receptacle I, for holding the surplus of the pile of cards, said receptacles being made adjustable to suit the size of cards used. The uprights are also provided with a bracket carrying receptacles H for holding the lacing twine. As previously mentioned the rods A, A', can be moved



at the same time, the cost of sets of pattern cards has been sensibly reduced. (John Royle and Sons, Paterson, N. J.)

ROYLE'S CARD LACING FRAME.

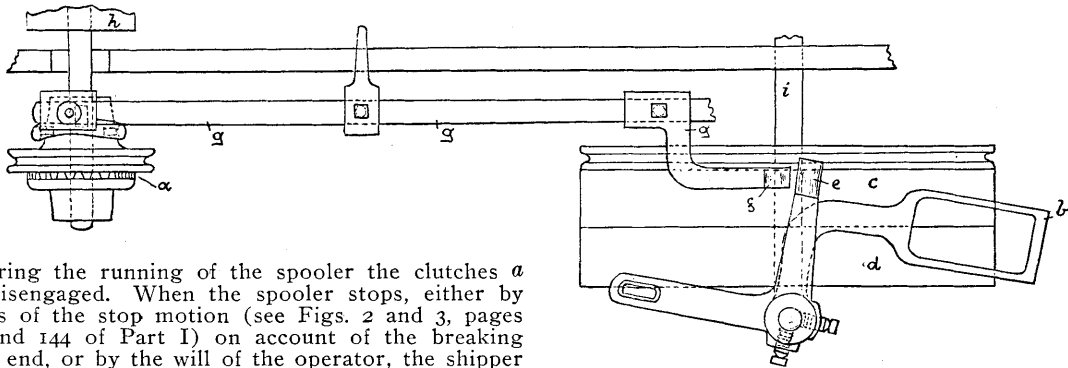
The objects are to provide a strong and durable lacing frame for Jacquard cards, in which the card rack can be adjusted to any height; also permitting

on the cross bars A² and the spur brackets B adjusted on said rods A, A', thus permitting adjustment of all the parts to suit any size of card to be laced. (John Royle and Sons, Paterson, N. J.)

SPOOLING, WINDING, WARPING AND BEAMING MACHINERY.

CHECK MOTION FOR THE FURBUSH SPOOLER.

On pages 143-144 of "Textile Machinery Part I" a description of this spooler is given. Since then this check motion, as shown in the illustration in its top plan view, has been applied thereto; the advantages being the providing of a constant uniform tension to the yarn, no matter if spooler is running or stopped.



During the running of the spooler the clutches *a* are disengaged. When the spooler stops, either by means of the stop motion (see Figs. 2 and 3, pages 143 and 144 of Part I) on account of the breaking of an end, or by the will of the operator, the shipper fork *b* moves the driving belt from the fast pulley *c* onto the loose pulley *d*, the upper end of arm *e* as fast on the shipper lever moving at the same time away off an incline *f* which in turn by means of lever arrangement *g* operates the engagement of clutches *a*; the advantages being that the tension roll *h*, as running at a high speed (240 revolutions per minute) is stopped from overrunning the yarn, which would result in causing slack yarn between the tension roll *h* and the spool (not shown) on shaft *i*. This disadvantage is positively prevented by the engagement of said clutches *a*, as previously referred to, positively preventing overrunning of the tension roll *h*, thereby keeping a perfect even tension on the yarn.

This motion is also of advantage in starting the spooler, since the clutches remain engaged until the spool and tension roll have obtained their normal speed; the clutches by this time being disengaged, allow the tension roll to act, thus properly governing the tension of the yarn to be wound.

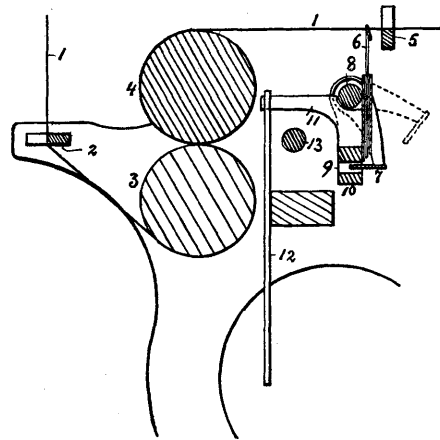
This motion can be used either with or without the stop motion previously referred to, and is of especial advantage when dealing with hard twisted yarn, in this instance positively preventing the snarling of the yarn. (*M. A. Furbush and Son Machine Co., Philadelphia, Pa., and Camden, N. J.*)

of the machine, the stop motion mechanism being shown in its normal position.

The yarn 1 passes through the outer guide bar 2, under the lower roller 3, between the rollers 3 and 4, over the upper roller 4 and through the inner guide bar 5, onto the receiving roller. Upon each end of yarn between the roller 4 and guide bar 5 is located a detector 6, having its upper end in open eye form, the lower end being extended downward through a

shield, and as long as the ends of the yarn remain intact, the detectors are held in elevated position.

When the machine is set in motion a toothed wheel (not shown) on the side frame is thrown in mesh with another toothed gear wheel on the shaft of the pulleys, the rotary movement of the same imparting an oscillatory movement to the blade 7 as secured to shaft 8. This movement will cause the forward end



STOP MOTION FOR THE ALTEMUS SPOOLER.

The object is to provide a stop motion which acts to immediately stop the spooler on breakage of a thread.

The illustration is a vertical section through a part

of the blade 7 to enter the opening 9 in the latch frame 10 at each oscillation.

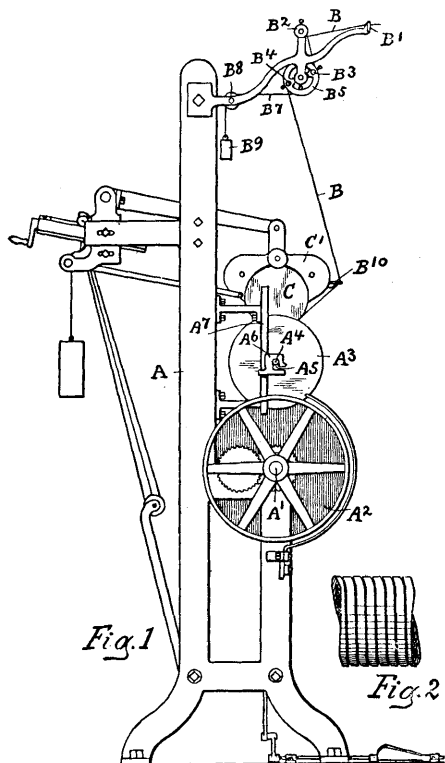
When a thread breaks, the detector 6 drops across the opening 9 and the blade 7 will come in contact with said detector, the continued forward movement

of the blade causing the frame 10 to tip on its support 8, thereby raising the latch 11 from engagement with the arm 12, said arm moving against a collar on the shaft 13, which moves said shaft endwise, in turn stopping the machine.

When it is necessary to lift the spool from contact with the winding drum (not shown in illustration), a spider wheel is rotated, which, through a train of gears secured on the side frame, operates to raise a cam which raises a lever connected to the standards of the spool, thus raising said spool from contact with its winding drum. (*W. W. Altemus and Son, Philadelphia, Pa.*)

McTAGGART'S SPOOLER.

The object is to provide means for controlling the tension upon the threads so that any undue strain to a thread will cause it to break nearer the bobbin than to the spool, at the same time providing means for



taking up a limited amount of slack of the yarn when so required; also winding the spool under pressure whereby the threads are wound more tightly and solidly upon said spool, thereby increasing the amount of yarn possible to be put on the spool, rendering its tension uniform during the process of dressing the warp.

Fig. 1 represents a side elevation of this spooler, and Fig. 2 a section of a portion of the pressure and guide roll showing the wavy grooves in which the threads run.

A denotes the frame of the machine in which the shaft A¹ is journaled and which carries a drum A², upon which the spool A³ rests, being held in place by inserting its ends A⁴ in the slot A⁵ on the block A⁶, which slides on the rod A⁷ attached to the frame A. The threads B, as taken from the bobbins, are

conducted through an overhead guide plate B¹ and carried once around the roll B², which is journaled to rotate freely so that the movement of the threads cause it to rotate with but little increase in tension to the yarn. The surface of this roll is roughened to resist the slipping of the threads, thus when any undue strain is placed on any of the threads the strain will come upon that part of said thread situated between the roll and the bobbins, thus causing it to break between the same, being a handier place for piecing the broken ends than when the break would have occurred nearer to the spool. The roughening of the surface of the roll B² also insures a most uniform feed for the yarn to the spool.

From roll B² the threads pass between two parallel rods B³, B⁴, held at their ends by disks B⁵ (only one of which can be shown in illustration), one of which has attached to it the cord B⁷, wound partially around the disk and carried over a roll B⁸, having attached to it a weight B⁹. While the threads are winding on the spool A³ they exert sufficient tension to the rods B³, B⁴ to counterbalance the weight B⁹, but in case the tension is released from the threads the weight will rotate the rods B³, B⁴, thus winding the slack of the threads on these rods, and which slack is taken up again at the starting of the machine.

Resting upon the yarn as wound on the beam is a metallic guide and pressure roll C, inserted between the heads of the spool and held by the claws C¹ in such manner that this roll C can be readily lifted from the spool when filled and a new spool has to be inserted, when the guide and pressure roll C is lowered again in operative position by devices clearly shown in the illustration.

The guiding of the threads is done by means of wavy grooves cut into this metallic pressure roll C, as clearly shown in illustration, Fig. 2; the threads after passing rods B³, B⁴ being threaded through eyes B¹⁰ (one eye for each thread) and guided into the grooves in roller C, which lay said threads most uniform and compact on the spool. (*David McTaggart, Worcester, Mass.*)

THE ALTEMUS UPRIGHT HOSIERY BOBBIN WINDING MACHINE.

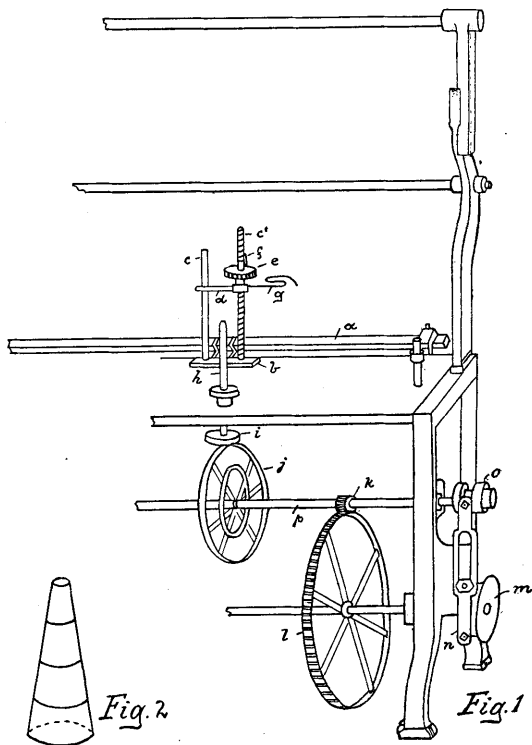
In this machine the spindles are driven by friction, permitting a variable motion to be given to said spindles.

Fig. 1 is a perspective view of one end of this machine, and Fig. 2 is a front elevation, drawn on a larger scale compared to Fig. 1, of a new style of bobbin as used with advantage on this machine.

On a bar *a*, as mounted on the machine, is carried a bracket provided with a base plate *b*. Extending up from each end of this base plate *b* are two uprights *c*, *c'*, one being a guide for an arm *d*, the other being screw threaded, fitting into the other end of arm *d*. One end of the arm *d* supports, *i. e.*, guides, a whirl *e*, provided with a steel blade *f* which fits into the screw thread of the upright *c'*. This whirl *e* travels up and builds up the cop and when the latter is built, the spring plate *f* is released by the operator and the whirl allowed to drop. If by accident the whirl is allowed to drop too far, it simply turns on the base of the bobbin until it reaches its proper position to start winding again. A wire thread guide *g* is provided on the arm *d*, the former being bent down at its end, thus preventing the thread from slipping out of said eye.

The bottom of the spindle *h* is provided with a friction disk *i* which bears on a friction wheel *j*, the same being driven through gear *k* and gear wheel *l*, the shaft *p* of said gear wheel being provided at one

end with the fast and loose pulleys, and at the other end with a grooved cam *m*, in which fits a stud on one end of an adjustable arm *n*, the other end of said arm being provided with a stud which fits into a



grooved collar *o*, fast onto the friction wheel shaft *p*. By this arrangement it will be seen that the friction wheel *j* will constantly change its position with relation to the friction disk *i* and thus produce the characteristic variable motion to the spindle as the cop is built.

The bobbin used on this machine (see Fig. 2) is of a new construction, being hollow, conical in shape and made of stiff paper, which makes a cheap, light, and durable bobbin, being superior over the wooden bobbins as formerly used. A yarn stripper is also used with this machine. (W. W. Attemus and Son, Philadelphia, Pa.)

HUSE'S BOBBIN WINDING MACHINE.

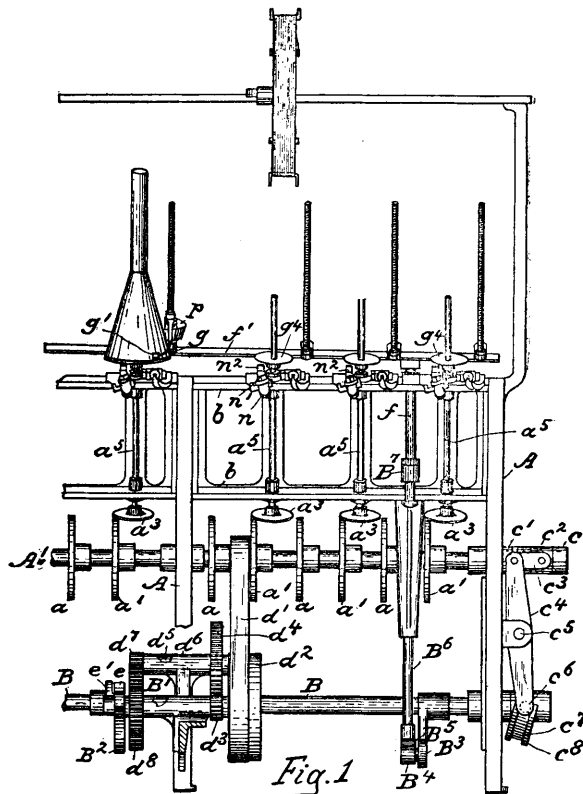
This machine is more especially adapted to wind bobbins having a tapering base, taking the yarn either from a skein or a spindle.

Fig. 1 is a front elevation, and Fig. 2 a left hand end elevation of (part) of this machine.

A indicates the framework, A' the main shaft which is provided with a series of friction devices *a a'*, arranged side by side, those *a'* engaging friction disks *a²* at the lower ends of spindles *a³*, while those marked *a* engage friction disks *a²* at the lower ends of spindles *a⁴*. These spindles have their bearings in like yokes *b*, secured in the framework, the said spindles occupying reversely inclined positions and lying side by side as shown in Fig. 2, so as to be rotated by the series of drivers *a a'* on one and the same shaft.

The shaft A' has mounted loosely upon it, between collars *c c'*, a collar *c²*, having attached to it a link *c³*, connected with a lever *c⁴*, pivoted at *c⁵* and having at its lower end a stud (shown by dotted lines at *c⁶*)

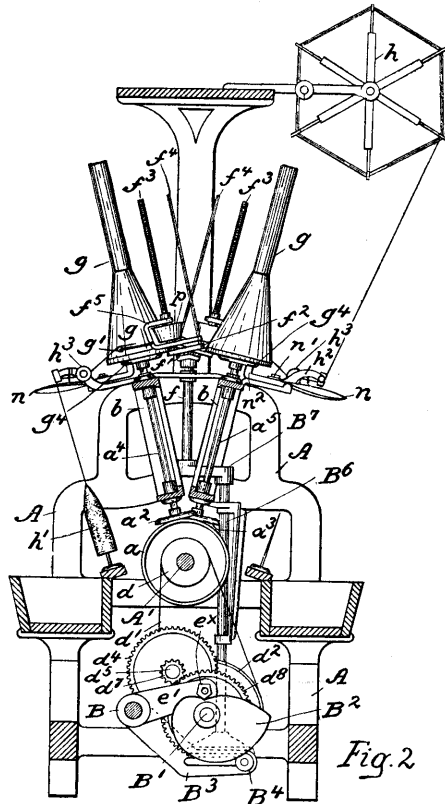
which enters a diagonal or inclined groove *c⁷* in one end of an arm *c⁸*, fixed to a rock shaft B, the motion of said shaft turning the lever *c⁴* and sliding the drivers under the disks to rotate them at a slower or faster speed—the nearer the drivers to the center of the disk the faster the speed, and *vice versa*. The main shaft has a belt pulley *d*, provided with a belt *d'*, which is extended over a pulley *d²*, loose on a short shaft B' and having at its hub a pinion *d³*, which engages a toothed gear *d⁴*, fast on a short shaft *d⁵* in a stand *d⁶*, said shaft having at its opposite end a pinion *d⁷*, which in turn engages a toothed gear *d⁸*, fast on the shaft B', thus rotating said shaft and its attached gear cam B² at a slow speed, causing it to act on a roller *e* on a stud *e^x* of a lever *e'*, fast on the rock shaft B, causing the said rock shaft in its movement to also operate the arm B³, having adjustably attached to it a roller B⁴, which acts on and rolls over the shoe B⁵, attached to lifting rods B⁶, having at their upper ends an arm B⁷, which carries an upright rod *f*, two or more such rods carrying at their upper ends a bar *f'*, which latter carries the blocks *f²*, on which are erected a screw *f³* and a guide *f⁴*. The screws are surrounded by a yoke *f⁵*, and one end of the yoke is extended to embrace the guide *f⁴* loosely, and between the arms of the said yoke the said screw is surrounded by a tapering pressure roller *p*, having its hub adapted to engage the threads of the screw to gradually raise it on the screw as the bobbin is being filled. The yoke also supports an arm *g*, having a yarn supporting roll



g'. The yarn to be wound may be taken from a reel *h* or from a cop *h'*.

The yarn when taken from the reel passes through a slotted porcelain guide eye held in a fork attached to an arm *h²* by a screw, the slot of the guide being directed downwardly and thence the yarn is led be-

tween metal clearer plates confined adjustably by set screws entering a projection from the arm h^2 , and thence the yarn goes to and about a tension device or wheel h^3 , regulated by a suitable spring and nut, said



arm being attached to the yoke b . From the tension device the yarn goes over roller g' connected with the yoke f^5 , and is connected with the bobbin g , the latter resting on the friction plate g' .

When the yarn is to be taken from a cop, as indicated by h' in Fig. 2, the position of the guide eye is reversed.

To stop the rotation of the spindles when desired there are provided a series of brake levers n , mounted on a stud screw n' , tipped a little from true vertical position, so that the upturned end n^2 of said lever in its movement by hand in one direction acts as a brake on the disk g^4 , carried by the spindle; its movement in the opposite direction releases the disk and leaves the spindle free to be rotated.

The pressure roller p in operation rises and falls, and at the same time by contact with the yarn being wound it is gradually fed upward on the screw as required to properly shape the base of the wound mass of yarn. The advantages of this winder are positive, uniform tension for the yarn when wound onto the bobbin and the cleaning of the yarn of all bunches before arriving at the tension devices. (Warren D. Huse, Laconia, N. H.)

THREAD TENSION DEVICE FOR BOBBIN WINDERS.

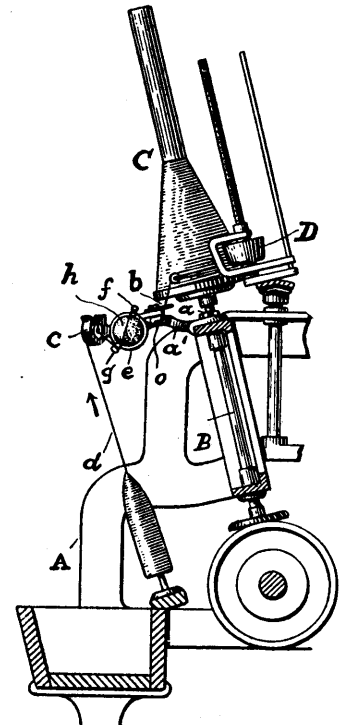
The illustration shows part of a bobbin winding machine having this tension device applied.

A indicates the framework, B the bobbin carrying spindle, C the bobbin carried thereby, and D the roller

bearing on the thread wound on the bobbin, it being raised automatically as the bobbin is filled with thread.

The fixed frame A has attached to it by a screw a an arm a' , which has connected to it by a screw a thread clearer b , composed of two adjustable plates or blades, and the arm also has attached to it by a screw a thread guide c , open at one side for the reception of the thread d . The thread previously passing through the clearer passes under an antifriction roll o .

Between the thread guide and the clearer, the arm a' is provided with a hole in which is inserted the threaded shank of a thumb screw, said shank receiving upon it at one side of said arm an annular base e , having attached to it thread guides f, g . This base e has a concavity at one side, in which is placed a metallic button covered with a jacket h , composed of some woven or fibrous material, to exert friction upon the thread, said button being placed into the concaved side of the base, a threaded portion at the center of the button receiving the threaded shank of the thumb screw, the rotation of which forces the covered button closely into the concaved face of the base, and when the thumb screw is turned up tight, holds the base and button firmly in any desired position, so that the thread guides f and g may be held normally in any position with relation to the opening in the thread guide and to the surface of the thread guide o , rotation of said base and its thread guides f, g , causing the thread to be thrown out of line with relation to the thread guides c, o , thus wrapping the



thread more or less about the guides f, g , the greater the angle in the thread passing between the thread guide c to the clearer and thread guide o , the greater the tension on the thread, and *vice versa*. This tension device also acts as a clearer to the thread. (Warren D. Huse, Laconia, N. H.)

MCCAUSLAND'S COP WINDER.

The objects of this winder are to avoid slipping of the yarn upon the surface of the tube, also preventing the entangling of the yarn, by the outer layers sinking into or forcing the inner layers of the yarn out of proper position.

Fig. 1 shows an elevation of the driving mechanism made in one form in which a conical roller is used for the propelling mechanism. Fig. 2 shows in elevation another form in which a cylindrical roller is employed. Fig. 3 shows in plan another form in which a flat surface is employed. Fig. 4 shows a partially sectional view in which a hollow conical propelling

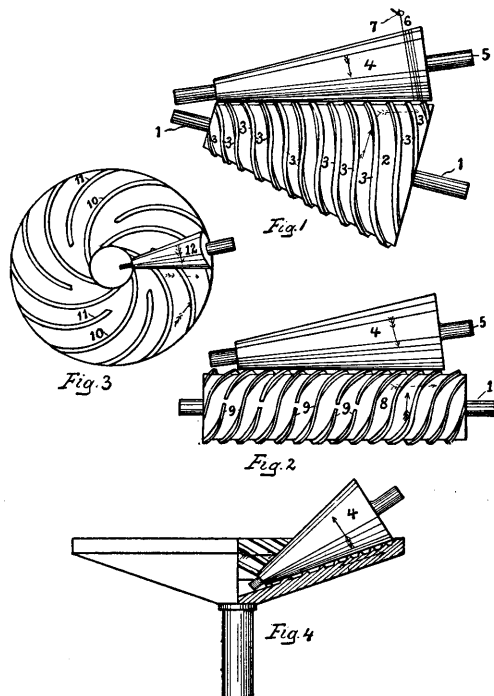
surface is employed, and Figs. 5, 6, 7, and 8 show the helical ridges as applied to winding cops upon cylindrical or slightly tapering bobbins in a conical cup, respectively in elevation in lengthwise section and of a cup shown separately in section and in end view.

1 represents the arbor of the driving surface. In Fig. 1 this is a cone marked 2, the surface of which is threaded or formed with ridges 3 in helical direction, which ridges 3, contacting with the surface of the yarn 6 on the cop tube 4, propel it in rotation, and as they propel it, press the yarn 6 toward the greater end of the cop tube. The direction of the rotation is indicated in the illustrations by arrows drawn in full lines and the direction of the resultant thrust is indicated by arrows in dotted lines. The cop tube 4 is directed by spindle 5 so that as the yarn increases the diameter of the cop it raises the cop, and the yarn 6 is guided to the cop tube by traversing eye 7, which reciprocates so as to place the yarn in the desired circles or layers.

As shown in Fig. 2, instead of a conical surface, a cylinder 8 is used to propel it, having threads or segments of threads 9 formed upon it, which act in like manner as explained in relation to the form shown in Fig. 1.

In Fig. 3 the propelling surface is a disk which has spiral ridges formed in evolute curves, which may be either continuous or interrupted, as shown at 10 and 11, the pitch or inclination being such as to throw outwardly toward the greater end of the cop tube 12.

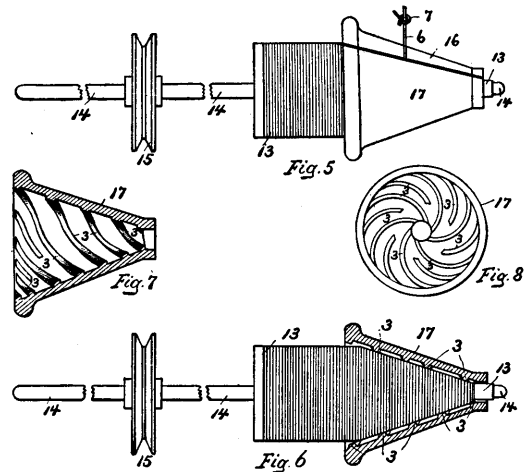
In Fig. 4 the propelling surface is a dished or hollow one and has similar threaded ridges directed in



helical and evolute curves, so as to press the yarn toward the greater end of the cop tube.

In the form shown in Figs. 5, 6, 7, and 8, the bobbin 13 is placed on and rotated by a spindle 14, driven by a whirl 15. The bobbin 13 is cylindrical in form or but very slightly tapering, and the yarn 6 is guided by a reciprocating eye 7 through a slit 16 in a conical cup 17. In the interior of the cup 17 are helical ridges

3, which press the yarn 6 as it winds in the bobbin 13 toward the greater end of the cup 17 and insures the laying of the several layers of yarn firmly upon each other. The spindle 14 is susceptible of endwise motion, and as the yarn winds upon the bobbin 13 in



conical layers it presses the cop and bobbin outward from the cup 17. In this form the spiral or helical ridges, although not propelling the yarn or cop as it forms on the bobbin, act as guides to smooth and press the several layers of yarn upon each other, as the ridges in the forms shown in Figs. 1, 2, 3, and 4. (William J. McCausland, Camden, N. J.)

A COMBINED TWISTER AND COP WINDER.

The purpose of the machine is to do the doubling and twisting of the yarn and the winding of the latter into cops, ready for the shuttle, in one operation. It more particularly refers to ingrain carpet yarns.

The illustration shows a partial side elevation and partial vertical section of this machine, the operation of which is as follows:—Power is transmitted by means of belt L, from the shaft N, and its pulley M to the pulley B, and thus in turn to spindle E, which is squared at that portion which, during the operation of the machine, comes in contact with the inside (and which is correspondingly squared) of the pulley B. This construction of spindle and inside of pulley permits a twofold operation to the spindle, viz.: Its turning by means of the pulley, at the same time permitting longitudinal sliding in the pulley as the cop builds itself, and thus pushes the spindle gradually more and more to the rear.

G designates a hand lever, which is connected with the carriage C and is provided with the yoke C', which freely embraces the pulley B, said lever having near its handle end the depending shoulder H, which is adapted to be engaged at the proper time by the collar J on the spindle E for stopping the rotation of the spindle by pushing belt L from the large diameter to the smaller diameter on pulley B, *i. e.*, the belt stops to transmit power.

The rear end of the spindle E is journaled in the movable bearings E', supported on the frame A, and has connected to it the cord E², which is passed around the guide pulley E², the lower end of the cord having attached to it the weight F, which exercises a constant pressure to the bearing E' and in turn to the spindle towards the front of the machine. Pulley B is of a tube shape, having two diameters, *i. e.*, a

the under side of a pin or stop h^{10} , projecting from a lug h^{11} on the frame a , but is adapted to clear said pin whenever the crank shaft h^2 is operated. The free end of the arm h^x is curved eccentric to its fulcrum (crank shaft h^2), so that when the arm h^x is thrown out of engagement with the pin h^{10} the said eccentric or curved portion h^{12} bears against the outer periphery of the sleeve e^4 and creates sufficient friction to almost instantly stop the rotation of said sleeve and accordingly of the thread guide carrier.

A spiral spring h^{13} , normally under compression, is arranged on the crank shaft h^2 and bears with one end against the lug h^4 and with its other end against the said horizontal arm h^x , thereby keeping said arm in contact or engagement with the projecting pin h^{10} .

The sleeve whirl e is operated through the endless belt i , passing over the grooved pulley i^1 , mounted on an auxiliary shaft i^2 , secured to a horizontal bracket a^3 , projecting from the frame a . With the grooved pulley i^1 is connected a smaller grooved pulley i^3 , operated through the endless belt i^4 , passing over a grooved pulley i^5 , which latter is secured on a revolving shaft i^6 in the loom A.

To the upwardly projecting bracket a^4 of the frame a is secured an auxiliary bracket a^5 , furnishing bearings for a horizontal spindle a^6 , adapted to receive the filling delivery bobbin, and is provided with a grooved pulley a^7 in frictional contact with the weighted fulcrumed lever a^8 . When a new cop or quill is placed on the spindle d , the crank shaft h^2 is returned to its normal position.

To insure a good frictional contact between the disk carrying sleeve e^4 and sleeve whirl e , the teeth on the gear f and the thread on the worm e^5 are cut left handed, thus exerting a downward pressure upon the said worm and accordingly on the sleeve e^4 . The raising and lowering of the spindle d is accomplished by the fulcrumed angle lever f^1 , which in turn is operated by the three point cam f^2 . (Robert Atherton, Paterson, N. J.)

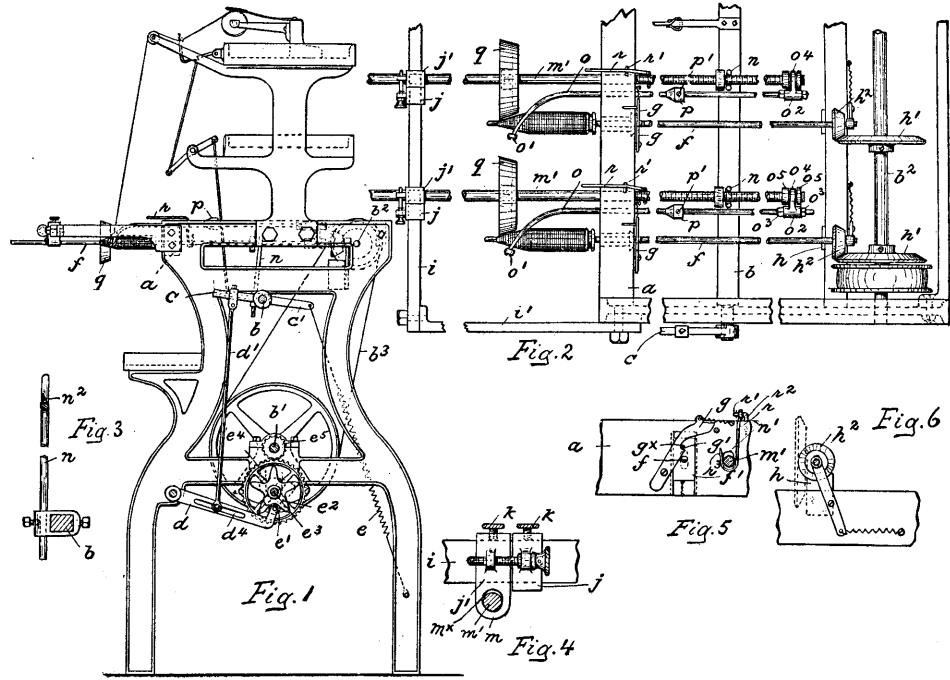
ASHLEY'S QUILLING MACHINE.

The construction refers more particularly to machines known as "horizontal" or "French" winders.

Fig. 1 is a view in side elevation of this winding machine, Fig. 2 is a top plan view, slightly enlarged, (compared to Fig. 1,) of a portion of one end of this winding machine; and Figs. 3, 4, 5 and 6 are views in detail required to be shown to more clearly understand the construction and operation of this machine.

The shaft b^1 is the main driving shaft and rotates the shaft b^2 by belt b^3 and thus through two friction

cones h^1 h^2 the spindles f , one set of friction cones being used for each spindle. The shaft b^1 also rocks the squared shaft b through rod d^1 , attached at one end to the arm e and at the other end to an arm d by means of a slot d^2 , said arm d having an upturned end carrying a roller e^1 , which engages a star cam e^2 , journaled on a stub shaft e^3 , and is rigidly connected to a gear e^4 which engages a pinion gear e^5 mounted on the shaft b^1 . Spring e as connected to arm e^1 of the lever e holds the roller e^1 securely against the star wheel.



i designates a horizontal bar extended across the front of the frame, being supported by two arms i^1 bolted to the frame. This bar i penetrates blocks j j^1 each of which carries a set screw k which is adapted to act against said bar. The block j^1 is provided with a downwardly extending projection m in an opening m^x , in which a worm shaft m^1 has bearings, said opening being slightly larger than said worm shaft and the threaded portion of said shaft being received by the bifurcated part of a fork n , projecting upwardly from the squared shaft b . A knife edge n^2 is set in this bifurcated portion which engages the threaded portion of the worm shaft m^1 .

The rocking movement imparted to the shaft b produces vibrations of the fork n , and thus imparts longitudinal reciprocation of the worm shaft m^1 and the thread guides connected thereto, thus forming the layers of the cop. The thread guide consists of an arm o , which penetrates a rail a and is connected at its rear end to the shaft m^1 , its front end being curved over the spindle f , and is provided with an eyelet o^1 . The connection between the worm shaft m^1 and the arm o consists of a sleeve o^2 , secured on said arm by nuts o^3 , an integral projection o^4 being disposed between two collars o^5 on the worm shaft. The arm o carries a cone p , mounted thereon by means of a set screw p^1 , said cone being adapted to engage the free end of a spring actuated dog q so as to move the latter and throw it out of engagement with the pin q^x .

The worm shaft m^1 carries a beveled wheel q which bears against the cone of the cop being formed thus producing firm winding, also turning of the worm

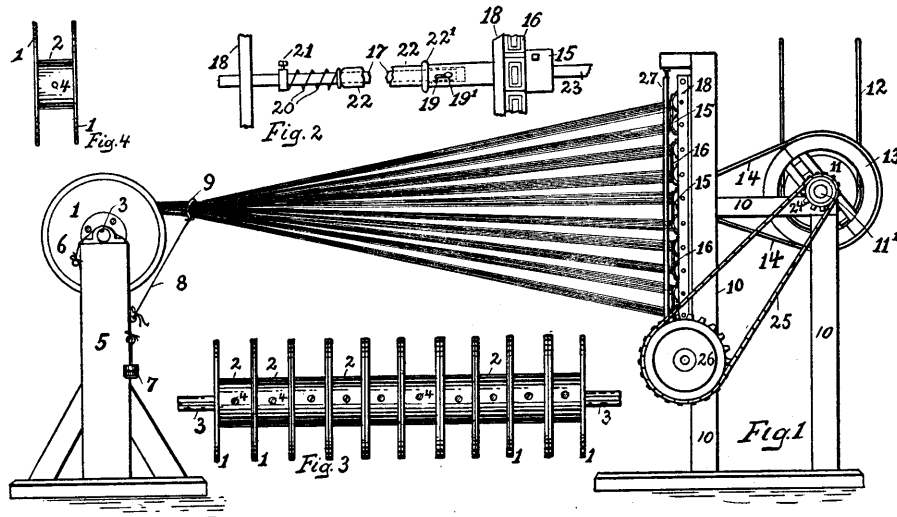
shaft *m'*, feeding the latter forwardly in the fork *n*. When a cop has been formed the cone *p* will act against the spring actuated dog *g*, so as to disengage the same from the plate *f*, thus permitting the latter and the spindle it carries to drop, the spindle acting against the inclined edge of a plate *h*, thereby causing its rear end to move laterally thus destroying the contact of the friction cones *h' h''*, in turn stopping the rotation of the spindles.

In order to reset this portion of the machine the free end of the spindle *f* is raised until the pin *g'* engages the recess *g'*; and in order to reset the thread guiding mechanism a lever *r*, fulcrumed upon a pintle *r'* projecting laterally from a screw *r''* whose rear ends project downwardly being formed into a hook *r'''* extending beneath the shaft *m'* is depressed, thereby raising the worm shaft out of engagement with the fork *n*, permitting the pushing back of the worm shaft in position for starting to wind a new cop. (*Sipp Electric and Machine Co., Paterson, N. J.*)

RAISTRICK'S SPOOLING MACHINE.

The object is to do away with dyeing worsted or cotton yarn "in the hank" by dyeing it "in the warp." After dyeing the yarn "in the warp" the same is wound on a sectional yarn beam, each section (and each of which can hold a different colored yarn) in turn being subjected for rewinding to the spooling machine.

Fig. 1 is a side view of the machine and Fig. 2 a



detail view of connection of spindle and holder or driving mechanism, with the center of the spindle broken out in order to show both ends of spindle; Fig. 3 is a detail view of the sectional yarn beam, showing divisions and set screws, and Fig. 4 shows one of the divisions constituting the sectional yarn beam.

This sectional yarn beam may consist of any number (as the case or work may require) of individual small yarn beams as shown in Fig. 4, having two flanges 1, and the barrel 2, which is hollow to permit shaft 3 to be run through, and is fastened to said shaft by means of countersunk set screws 4. 5 is the yarn beam stand, having a friction strap fastened to it at 6 and weighted at 7. 8 is a cord attached to the

stand and holding guide ring 9 for keeping the warp yarn from rubbing against the flanges of the yarn beams.

From the sectional yarn beam the yarn passes to the spooling machine consisting of a frame 10 carrying driving shaft 11' having driving pulley 11 driven by belt 12 from any convenient motor. 13 and 14 are respectively pulley and belt which transmit power to the sprocket wheels 15 and which are connected by sprocket chains 16 and turn the spindles which carry the bobbins or spools. 24 is a sprocket wheel driving by means of sprocket chain 25 sprocket wheel 26, which in turn operates the bobbin building device. Short ends of shaft 23 extend out each side of sprocket wheels 15 (see to the right in Fig. 2), having their bearings in the metal projections 18 which bolt onto frame 10. The short ends 23 are hollow, as shown in Fig. 2, to receive the points of the spindles 17, and the keys 19 pass through these holders and the points of the spindles through opening 19' in spindle and holder, which opening 19' is enlarged at one end, and spring 20 presses bobbins 22 against the end of holder 22', drawing key 19 into the narrow part of opening 19'. Compression of spring 20 by pressing the bobbins toward it makes it easy to withdraw key 19 and remove the spindle with its load of bobbins.

Set clamp 21 allows of the adjustment of spring 20, so that the right amount of friction is maintained between the spools in order that they will turn with the spindles when there is no impediment, but will turn on the spindle when a thread is blocked, and thus save the breaking of the thread.

27 is a movable frame in front of the bobbins, to which are adjusted several pairs of guide rods for guiding the threads and building the bobbins. This frame is vibrated to and fro by means of a cam placed below it, and as the bobbins gradually fill up, the frame gradually moves more and more towards the point end of the bobbin and away from the bottom of said bobbin. This motion gradually builds up the bobbin and is produced by means of a spiral screw attachment, which can be changed to suit any count of yarn or size of

bobbin wanted. (*John Raistrick, Jamestown, N. Y.*)

KINK PREVENTER AND SIGNAL FOR SILK TWISTERS.

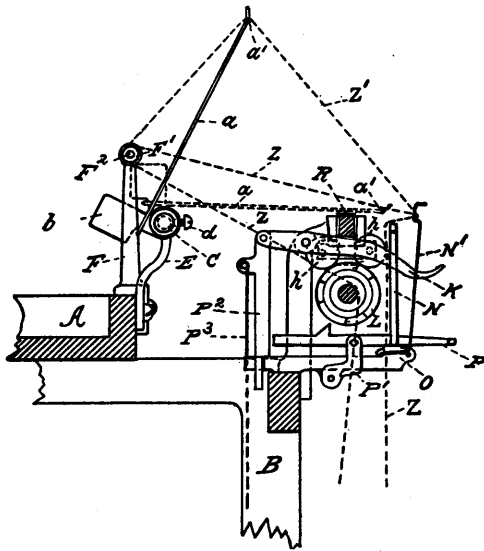
The illustration is a vertical cross section of a portion of a twisting machine, showing this kink preventer and signal applied thereto.

B is the frame of a twisting machine. A is a bobbin supply box, and F a stand mounted on this box, having a guide F' mounted thereon at F². E is another stand mounted on the box and having a pin C held by the screw *d*, said pin having a screw thread

on a portion of its surface, upon which is mounted (loosely connected to it) the weight *b*, having a screw threaded hole. When the weight turns upon the pin, it is caused to move laterally by means of its thread meshing in the thread on the pin. Secured to the weight *b* is the lever *a*, made of wire, and bent as shown at *a'*.

O indicates the faller stand, and P the rock lever, upon which the faller *N'* falls upon the breakage of a thread; said rock lever P swings in a swing yoke *P'*, mounted on the faller stand. L is a driving roller having mortises to engage with the tooth on the rock lever and operate the stop motion on the breakage of a thread. *P²* is a latch that is automatically released on the breakage of a thread and falls, with the link *P³*, to operate to stop mechanism. N is an upright, mounted on the faller stand, for the fallers to rest against when they are held up by the thread, and K is a starting lever, the pressing of the outer end of which will start the mechanism after the threads have been repaired. R is a cross section of a bar carrying the feed rollers *h*.

When the parts are in operation, the lever *a* is placed in the position shown by dotted lines in illustration and the center of gravity of the weight *b* is about over the center of the pin C. As a result the weight of the lever *a* is sufficient to keep it in the position shown by the dotted lines. The threads pass around the fallers *N'*, over the guides *F'*, and down to the feed rollers. A thread passing in this course is shown at Z. The part *a'* of the lever *a* rests beneath the threads at the point where they leave the fallers to travel toward the guide *F'*. Lever *a* is an idle lever, which performs no function when the parts are running, but is ready to do its work when the stop



motion acts. The lever is out of contact with the threads when the parts are in motion, the forward end of it being made to rest upon the bar R.

In stopping the mechanism for doffing, the operator puts the stop motion in operation by pressing down the rock lever with his hand. When the stop motion operates, the outer end of the lever *K* rises and the bar *R* is thrown upward and thrusts the lever *a*, causing the weight *b* to overbalance and throw the lever *a* upward to the position shown in full lines in illustration, the threads being carried upward by the wire, as shown at *Z'*.

When a thread breaks or one of the supply bobbins becomes empty, the stop motion operates, and the lever *a* rises in the same manner and acts as a signal to the operator. In machines where the lever is to be used as a signal only the part *a'* of the lever can be dispensed with.

When the parts are in a running position, there is a space between the weight *b* and the hub on the stand *E*. When the weight *b* becomes overbalanced and turns on the screw thread part of pin *C*, the weight travels laterally on the pin *C* until there is no space between weight *b* and the hub on the stand *E*, *i. e.*, the weight has come in contact with said hub on the stand *E*. By means of such contact the upward motion of the wire is arrested, while the weight wedges against the surface of the hub on the stand *E* in such a manner that there is no rebound when the upward stroke of the wire is ended. The width of the space between weight *b* and the hub on the stand *E* can be regulated by loosening the screw *d* and moving the pin *C* to such position as is desired.

In twisting silk threads, in which a large amount of twist has to be put into the threads, if for any cause the twisting operation is interrupted, the threads become slack, and the twist in the threads usually causes them to form into kinks, which if not removed form serious imperfections in the finished thread. Through the lever *a* being thrown upward and the part *a'* carrying the threads upward, as shown, a considerable quantity of untwisted thread is drawn from the supply bobbins. The twist in the thread is thereby allowed to spread through this untwisted thread, and the twist through spreading becomes too weak to form kinks. If the lever *a* rebounded when it had reached the end of its upward stroke kinks would sometimes form in the threads; but through the weight *b* traveling laterally and wedging against the stand *E*, as before described, this rebound is prevented and the threads between the fallers and the part *a'* of the wire are held taut, not being allowed to become slack for an instant, and through there being no slackness, kinks cannot form. The lever *a* on becoming elevated, as shown in the illustration, can be seen from a considerable distance, and thereby acts as a signal to the operator that a thread has broken or that a bobbin has become empty. (Joseph E. Tynan, Paterson, N. J.)

THE SMITH WARP DRESSER.

The construction of this machine permits a variable speed, *i. e.*, that the speed of the same can be readily decreased, so that piecing of a broken thread or threads can be effected without actually stopping the machine. The extent of immersion of the lower sizing roll in the sizing composition can be regulated and the caking or hardening of the sizing composition upon said lower sizing roll prevented when the machine is not in operation.

Fig. 1 is a perspective view of this dresser; Fig. 2 a sectional plan view, on an enlarged scale, (compared to Fig. 1) of part of the driving mechanism; Fig. 3 a longitudinal section of part of the machine illustrating the sizing rolls, the size trough, and part of the mechanism for raising and lowering the latter; and Fig. 4 is a perspective view of part of the shipping mechanism for the driving belt and transmitting clutch.

A A' represent the hollow steam heated drying rolls, having hollow journals adapted to bearings on the main frame and which are driven by suitable gearing; B B' are the sizing rolls, the lower roll being mounted in bearings on the fixed frame and the upper roll having bearings acted upon by weighted levers *a*, so that it is pressed firmly against the lower roll.

D is the trough, containing the sizing liquid, this trough, when the machine is in operation, being so disposed in respect to the lower sizing roll B' that the

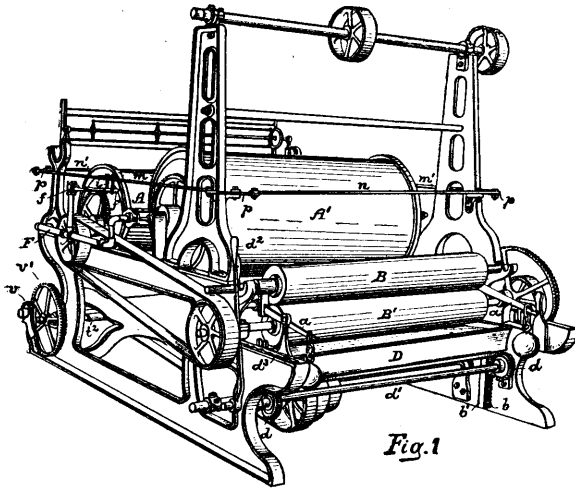


Fig. 1

latter is partially submerged in the sizing liquid and conveys the same to the threads passing between the two sizing rolls, the sized threads then passing over the drying rolls A A.

When the size trough occupies a fixed position, the sizing forms a thick coating upon the submerged portion of the lower sizing roll when the machine is not in operation. Hence when the machine is again started, an excess of the sizing composition is thus more or less applied to the warp threads, thereby detracting from the uniformity of appearance of the latter and frequently causing the breaking of the warps in weaving, owing to the catching of the hard lumps or knots of size in the harness or when coming in contact with the reed. To overcome this disadvantage the sizing trough is mounted in such manner that it can be readily raised or lowered, so that when the machine is stopped the sizing trough may be lowered to such an extent as to carry the level of the sizing liquid below the bottom of the lower sizing roll, as shown in Fig. 3. The means employed for this purpose are a pair of racks *b*, one near each end of the sizing trough; these racks are guided in boxes or ways *b'* upon the opposite side frames of the machine and are adapted to engage with pinions *d* upon a transverse shaft *d'*, which is adapted to suitable bearings on the side frames of the machine and has at one end an operating lever *d²*, which is adapted to engage with a notched bar *d³*, on one of the side frames, so that it can be readily retained in any desired position of adjustment, the lever having sufficient elasticity to permit it to be sprung laterally out of engagement with the notched retaining bar when it is desired to lower the size trough. This construction also provides for the gradually raising of the size trough as the amount of sizing composition in the same diminishes, so as to maintain a uniform degree of submergence of the lower size roller in the composition.

The size trough has a hollow steam heated bottom, to which steam is conveyed from a pipe *c* by means of a pair of pipes *c'*, jointed together where they meet, the lower pipe *c'*, being jointed to the pipe *c* and the upper pipe *c'* being similarly jointed to the branch pipe *c²* of the hollow bottom, so that the size trough can rise and fall without affecting the steam supply

for heating the same. A similar system of pipes provides for the discharge of the water of condensation from the hollow bottom of the trough.

The hollow journals of the rolls A A' are provided with stuffing boxes for the reception of branches of the steam supply pipe F, the inlet branch of said pipe being provided with a valve *f*, whereby the flow of steam may be permitted or cut off, as desired. The stem of this valve is connected to a lever *f'*, which is engaged by pins *i*, projecting from a rod or bar *m*, extending along one side of the machine. Another rod or bar, *m'*, extends along the other side of the machine, and these side bars *m m'* are connected to bars *n n'* at the front and rear of the machine by means of bell crank levers *p*, mounted upon brackets secured to the side frames of the machine at the four corners of the same. By this means a rod is provided extending entirely around the machine and having connection with the valve governing the flow of steam to the drying cylinders A A', so that the flow of steam to said cylinders can be governed by an attendant standing at any part of the machine.

This rod structure thus explained is also connected to the slowing down and stopping devices of the machine, so that steam may be partially or wholly cut off from the cylinders simultaneously with the slowing down or stopping of the machine and may be permitted to enter the cylinders again simultaneously with the speeding or starting of the machine. This is effected by connecting one of the rear bell crank levers *p* to the upper end of an arm *r* on the belt shipper, and also to a bar *r'*, which has a pin adapted to slide in a slot in a lever *s*, which operates a clutch sleeve *s'* and serves to throw the latter into or out of engagement with a clutch hub formed upon a spur wheel *s²*, the latter turning loosely upon a shaft *s³*, and meshing with a pinion *t*, which is secured to the hub of a pulley *t'*, turning loosely on a shaft *t²*, the latter also having a fast pulley *t³*. The pin of the bar *r'* is free to turn therein and has a nut whereby it can

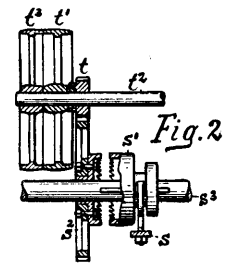


Fig. 2

be secured in any desired position in the slot of the lever *s*, so that the position of the lever in respect to the shipper arm *r* can be altered in order to effect the shifting of the clutch sleeve *s'* toward or from the clutch hub on the wheel *s²*, and thus provide for any desired amount of lost motion of said clutch sleeve. The shaft *s³* is geared by a pinion *v* and spur wheel *v'* to the shaft *t²*, and the latter is provided with pulleys, whereby, the various other parts of the machine are driven.

When the driving belt is applied to the pulley *t³*, power is transmitted directly to the shaft *t²*, and the machine is driven at high speed. When, however, the belt is shifted onto the loose pulley *t'*, the power is transmitted through the reducing gear described, and the speed of the machine is very much decreased. When the belt is moved from the pulley *t³* onto the

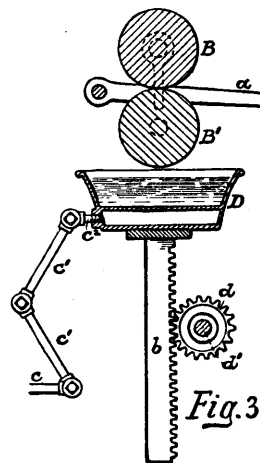
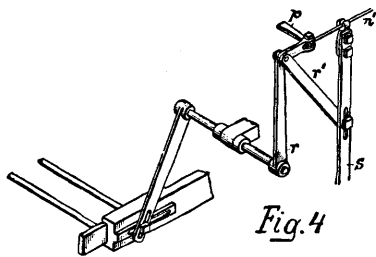


Fig. 3

pulley *t*, the clutch sleeve *s'* is thrown into engagement with the clutch on the spur wheel *s*², so that the shaft *s*² will be driven by the latter. In order to stop the machine, the belt is moved backward on the pulley *t* until the clutch *s'* is withdrawn from engagement with that on the spur wheel *s*², the pulley *t* being wider than the pulley *p*, in order to permit this backward movement of the belt thereon.

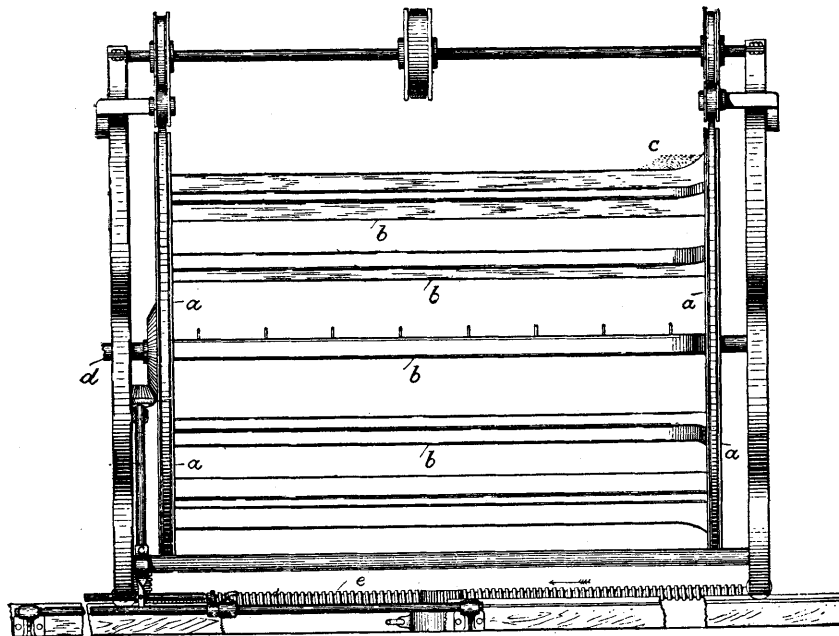
By being able to slow down the speed of the machine, provision is afforded for piecing broken threads without arresting the travel of the warp over the drying cylinders, thus preventing the formation of stripes of size across the warp, which is likely to result when portions of the sized warps are subjected to the action of the drying cylinders for a much longer time than other portions. By cutting off steam from the drying cylinders *A A'* simultaneously with the slowing down or stopping of the machine is also prevented the possibility of burning or scorching the sized threads, which might result if hot cylinders remained in contact therewith for a considerable time. (*The James Smith Woolen Machinery Co., Philadelphia, Pa.*)



tion of the drying cylinders for a much longer time than other portions. By cutting off steam from the drying cylinders *A A'* simultaneously with the slowing down or stopping of the machine is also prevented the possibility of burning or scorching the sized threads, which might result if hot cylinders remained in contact therewith for a considerable time. (*The James Smith Woolen Machinery Co., Philadelphia, Pa.*)

EASTWOOD'S SELF BUILDING WARPING REEL.

The illustration is a front elevation of this warping reel. *a* are the two flanges of the reel, *b* its bars, *c* in-



dicates the manner in which the warp sections are built, showing that one section uses the preceding section for building upon; the oblique shape to the outside edge of the first section being produced by

means of an incline on the right hand ends of the reel bars.

This method of building sections obliquely is accomplished by means of a spiral gear attachment placed underneath the warping machine, and is driven from the shaft *d* of the reel as shown at the left hand side in the illustration. As the reel rotates, motion is transmitted to the said gear attachment which in turn moves the reel on the spiral shaft *e* slowly towards the right hand side, thus causing each section in its turn to build to one side (the right in this instance) gradually as it fills up. (*John E. Eastwood, The Springville Mfg. Co., Rockville, Conn.*)

THE DENN SECTION BEAM WARMER.

The special features of this machine are the improved doffing, measuring and driving devices.

Fig. 1 is a sectional side elevation of the warper, Fig. 2 is a front elevation of the driving mechanism and Fig. 3 is an end view of the ratchet wheel which drives the slow motion of the winding drum.

Referring to the sectional side elevation Fig. 1 we find a chain *a*, engaging a sprocket *b*, said sprocket being controlled by a worm gear *c* meshing with a worm *d*, operated by hand wheel *e*. The ends of the chains *a* (one on each side of the warper) are provided with rings *a'*, which, when the beam is to be doffed, are slipped over its ends. The hand wheel *e* is then turned a few revolutions, releasing the levers *f* from the beam, said levers being then raised and held in such position by a spring actuated stud *g* as fast on the frame. The hand wheel *e* is then turned and the beam is easily lowered on to the truck. When a new beam is to be put in place, the rings are slipped on and the operation described, reversed.

The measuring apparatus consists of a brass dial *h*, which is turned by means of intermediate gearing be-

tween it and the worm *i* on the measuring cylinder *j*, over which the warp passes. To operate the measuring apparatus, set the finger *k* to the desired number of yards as marked on the dial *h*, loosen the thumb nut *l* and turn the finger *k* back to its stop, next hold the finger firmly in place and tighten the thumb nut *l*. When the desired number of yards have passed over the measuring cylinder *j*, the finger *k* comes in contact with a circuit closer *m*, connected to an electric battery, the contact between said finger and circuit closer causing an electric bell to ring, at the same time stopping the machine.

Referring to Figs. 2 and 3 we find the driving mechanism to consist of a fast and slow motion, the power being imparted to the drum for the fast motion by the pulley *n*, fastened to driving shaft *o* by set screws *o'*. To the said driving shaft *o* is attached a pinion wheel *p* which drives the drum gear *q*. The slow motion is imparted to the drum by pulley *r*, to the hub of which is fastened the pinion *s*, and on the hub of which the loose pulley *t* runs. The pinion *s* meshes with a gear

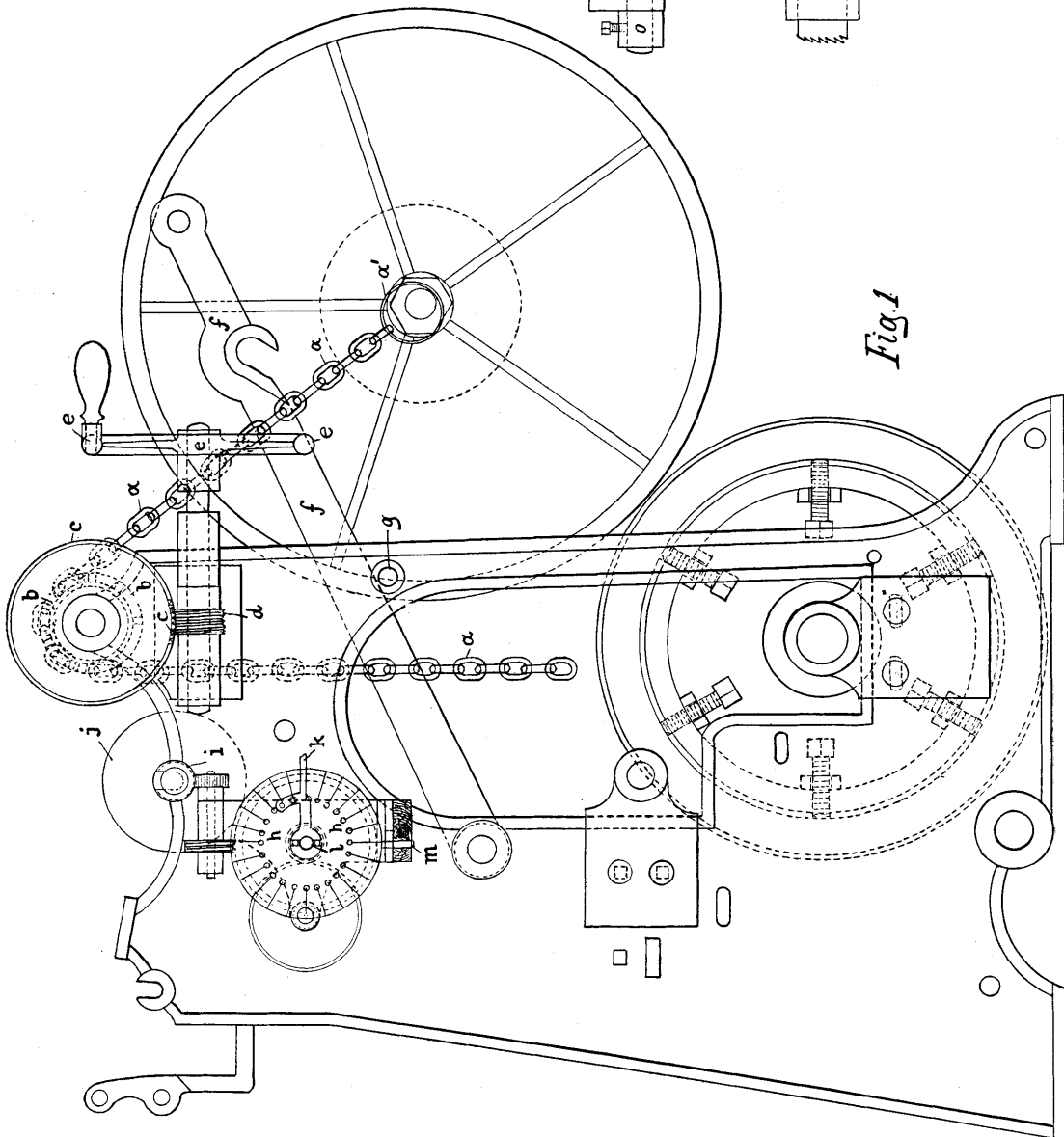


Fig. 1

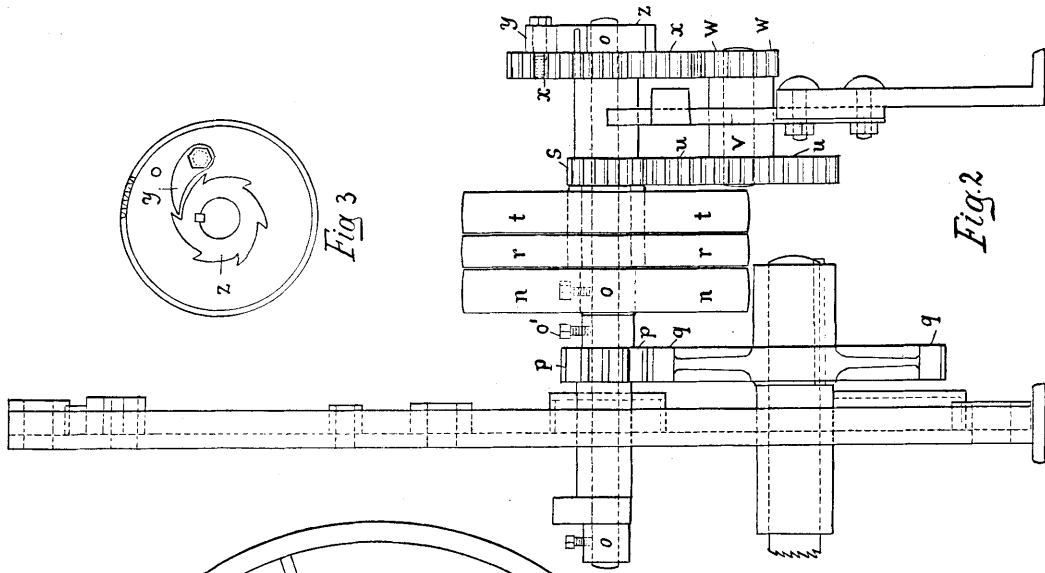


Fig. 2

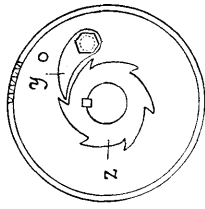


Fig. 3

wheel u , keyed on a shaft v , the other end of said shaft having a pinion w secured thereon. This pinion w drives the gear wheel x , loose on shaft o , and to which is secured a pawl y . On shaft o is keyed a ratchet z adapted to be engaged by the pawl y and turn the shaft o and thus the drum.

Thus it will be seen that this arrangement permits the belt to shift from slow to fast speed without causing a jerky motion, (as is the case in machines having a positive gearing) the ratchet wheel z leaving the pawl y as soon as the speed increases. (*Globe Machine Works, Frankford, Phila.*)

DRAPER'S WARPING MACHINE.

In this machine means are provided for stopping the warper when a predetermined length of yarn has been wound upon the beam.

Fig. 1 is an end elevation of this warping machine. Fig. 2, on a reduced scale compared to Fig. 1, is a perspective view of the main frame, the fast and loose pulleys, the belt shipper, and means for controlling the latter; and Fig. 3 is a perspective detail.

A, A' are the end frames. B B' the fast and loose pulleys, b the belt fork mounted on a sliding rod b' , b^2 the elbow lever for effecting longitudinal movement of the rod, b^3 the rock shaft having a treadle or foot board Bx (for starting the machine) and a counter-balance weight W, and the rocker arm b^4 , fast on the rock shaft and pivotally connected with and to operate the rod b' .

The winding drum D, on which the core of the beam B² rests, and is rotated to wind the yarn w upon it, has secured to its journal at one end disk D', having eccentric groove d to receive a roller d' on arm d^2 , fast on short rock shaft d^3 , mounted in the frame A', whereby the rotation of the drum D will rock the shaft d^3 . On the outer end of the said rock shaft is rigidly secured an upturned rocker arm d^4 , to which is pivotally connected at d^5 , pawl d^6 , adapted to engage and rotate, step by step, a ratchet wheel c as forming a part of the measuring mechanism.

The starting and stopping shaft b^3 has fast upon it, outside the frame A', an arm b^5 , to which is connected at b^6 the upturned shipper rod b^7 extended through notched holding plate b^8 on the frame and provided with shoulder b^9 to engage the under side of the plate and maintain the stop motion mechanism inoperative when the machine is running.

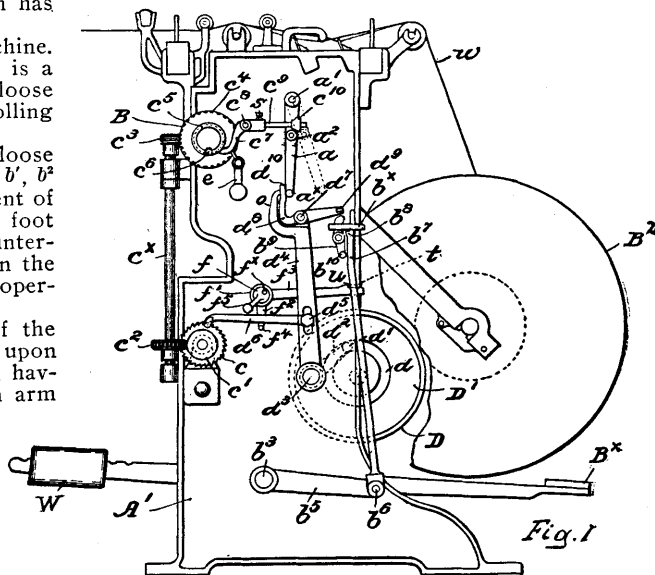
Knock off lever b^9 , pivoted on the frame adjacent the plate b^8 , is provided with lug b^{10} to at times engage the shipper rod b^7 and release the shoulder from the holding plate, the upper end of the knock off lever being slightly separated from the upper end of the shipper rod, as shown.

The upper end of the rocker arm d^4 has pivotally mounted upon it at d^7 a latch d^8 (shown separately in Fig. 3), said latch being formed as a bent lever with one arm normally extending over the top of the knock off lever b^9 and provided with a laterally extended toe d^9 , adapted to enter between the shipper rod and the knock off lever when the machine is to be stopped automatically. The other arm of the latch is upturned at d^{10} and is acted upon by a pin or stud a^x , extended laterally from a normally vibrating arm a , fulcrumed at a' .

The vibrations of said arm and the rocker arm d^4 are so timed that ordinarily the latch d^8 will be maintained in inoperative position with its toe d^9 above and out of engagement with the knock off lever as the rocker arm swings back and forth; but when the vibrator a is held from coming back the latch is re-

leased, its toe d^9 engages the upper end of the knock off lever b^9 , and as the rocker arm d^4 swings back said lever b^9 will be rocked to release the shipper rod b^7 . Extension o of the rocker arm serves as a backstop for the arm d^{10} of the latch and prevents it from being thrown too far back.

The ratchet wheel c has an attached worm c' in mesh with a worm gear c^2 , fast on an upright shaft c^x , supported in bearings on the frame and having at its upper end a worm c^3 , which drives the "warper clock" which has a worm gear c^4 in mesh with and rotated by the worm c^3 , and a worm c^5 , having a deep groove, is rotated by and with the gear c^4 , there being a slot c^6 at the end of the groove. A finger c^7 , mounted to slide on a rod c^8 , travels in the groove and is held therein by a weighted arm e bearing against the finger, the finger dropping into the slot c^6 when it reaches



the end of the groove in the worm c^5 . The upper end of the finger, beyond its fulcrum, has attached adjustably thereto by a set screw s a stop, being a rod c^9 with a shoulder or head c^{10} , normally held in the position shown in Fig. 1, above a long roll or stud a^2 , extended laterally from the vibrator a , so as not to interfere with the movement of the latter. When the finger c^7 reaches the end of the groove in the worm c^5 , it drops into the slot c^6 , turning said finger on its fulcrum and permitting the head c^{10} of the stop to drop down behind the roll a^2 as the vibrator a moves to the right, Fig. 1, into dotted line position and preventing the return movement thereof. The stud a^x is thus held away from the latch d^8 , so that on the forward swing of the rocker arm d^4 the toe d^9 of the latch engages the upper end of the knock off lever b^9 , turning the latter as the rocker arm swings back and thereby releasing the shipper rod b^7 to effect the shifting of the belt and stoppage of the machine.

Eccentric f is mounted on a pivot f^x on the frame A' engaged by a strap f' , secured to an elbow lever f^2, f^3 , the depending arm f^2 having a lateral lug f^4 beneath the pawl d^6 , the longer arm f^3 being shouldered at u and extended through a hole t in the shipper rod. A handle f^5 is secured to the eccentric f to rotate the latter on its pivot f^x and thereby move the elbow lever in one or the other direction.

It is sometimes necessary to run the drum D before

the beam is applied, and before the winding of the yarn is begun, and at such time the handle f^3 is turned to the right, Fig. 1, to move the eccentric disk f on

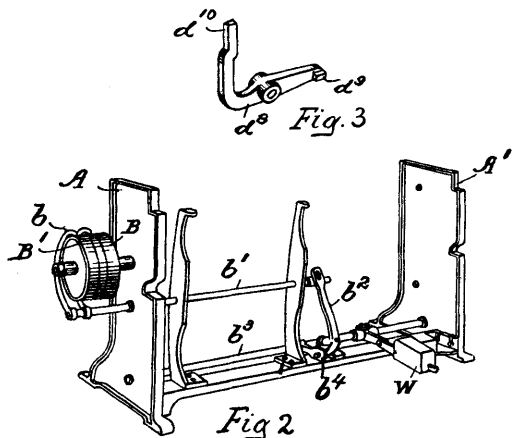
into one of a series of holes d^6 , arranged in the brace a^0 of the frame a .

The annular flange or ring d' of the reel d rests on a wheel or pulley n^4 , (from which it receives its motion,) which latter is secured on a shaft revolvably mounted in levers n^5 , pivotally secured, as at n^8 , to the frame a .

On the shaft of said wheel or pulley is also secured a double grooved pulley n^2 , connected by a chain or belt n^3 with a double grooved pulley n' , the latter being mounted on the driving shaft n , carrying the loose and fixed pulleys m , adapted to be operated by a belt. A belt shifter m' , held in normal position by a spiral spring m^2 , is slidingly arranged in close proximity with its loose and fixed pulleys m and is adapted to be controlled by the fulcrum lever m^3 , operated from the foot treadle m^5 by an intermediate cord or chain m^4 . The shaft carrying the double grooved pulley n^2 is held in frictional contact with the ring or flange d' by the free end n^7 of a lever n^6 , pivotally secured, as at n^8 , to the frame a and having its other end connected by a left and right hand screw n^{10} to a foot treadle n^{11} . The central portion of said foot treadle is also connected to the free end of said lever n^6 by means of a cord or chain n^{12} , passing over intermediate pulleys n^{13} and n^{14} , and thus providing additional means for operating the said lever.

On one end of the shaft c of the reel d are mounted two sprocket wheels e , connected by sprocket chains f and g with sprocket wheels h and h^3 , mounted, respectively, on the projecting ends of the endless screws h' and h^2 , which latter are parallel with the shaft c , and in rear and front of the reel d .

On the screw h' is mounted, by means of a pivoted lever i^{10} , the reed frame i , having additional bearings on two parallel rods i^{12} and i^{13} and carrying guide rollers i^{12} and an intermediate guide plate i^8 and in rear of roller i^2 a reed i^4 . Said reed i^4 is arranged in



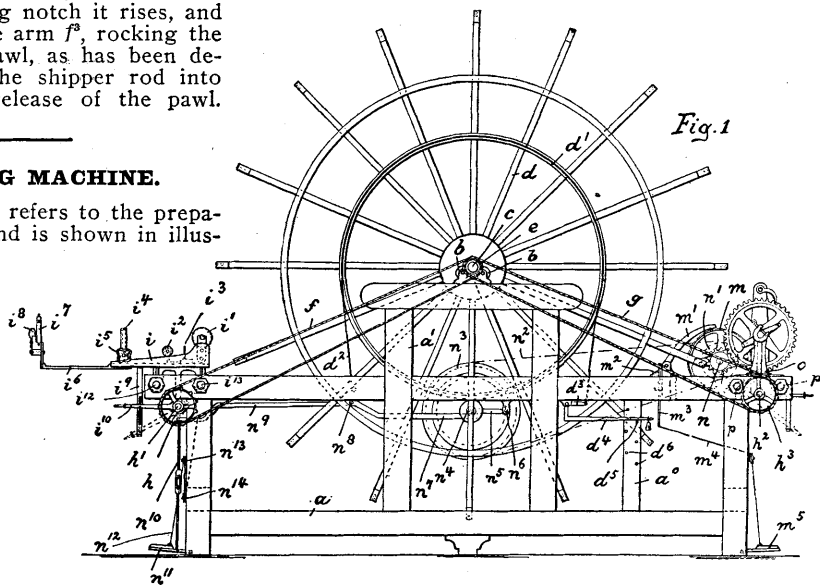
its pivot f^x , and thereby through the lug f^t lift the pawl, but at the same time the shoulder u operates to release the shipper rod b' from its holding plate. It is therefore necessary for the operator to keep the treadle B^x depressed so long as the machine is running with the clock mechanism inoperative, so that the machine cannot run while the attendant is absent unless the ratchet wheel c is turning by the action of the pawl d^6 , the return of the disk f to the position shown in Fig. 1 being necessary before the shipper rod can engage its holding plate.

When the disk f is in the position shown in Fig. 1, and if the arm f^s of the elbow lever is lifted, the arm f^2 will be swung to the right and upward to release or lift the pawl. The free end of the yarn f^3 is extended through the hole t in the shipper rod b' , and when the latter is released from its holding notch it rises, and thereby lifts the outer end of the arm f^3 , rocking the elbow lever and releasing the pawl, as has been described, so that movement of the shipper rod into operative position effects the release of the pawl. (Draper Co.)

ATHERTON'S WARPING MACHINE.

This warper more in particular refers to the preparation of warps for silk goods and is shown in illustration Fig. 1 in its side elevation. Fig. 2 is an enlarged (compared to Fig. 1) front elevation of the beam driving mechanism, Fig. 3 a transverse sectional view through the latter, Fig. 4 an enlarged end elevation of Fig. 3, the shaft supporting bracket and the gear wheel on the same not being shown.

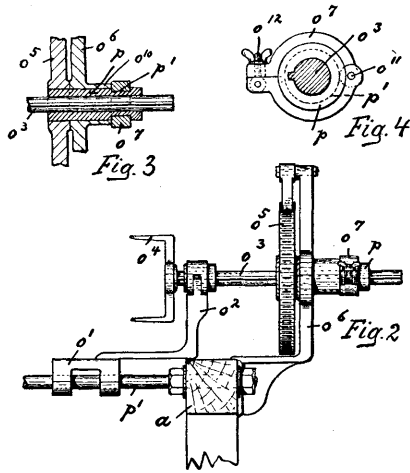
a represents the warping frame provided on each side with an upwardly projecting frame a' , on which are mounted roller bearings b , supporting the shaft c , on which is secured the reel d , provided on each with an annular ring or flange d' , engaged by a metal band d^2 , which latter is secured with one end to the frame a and with its other end to a fulcrum lever d^3 , which in turn is controlled by a weighted arm d^4 , limited in its downward movement by a pin d^5 , inserted



grooved standards slidingly arranged on the reed frame i and operated by a screw with a hand wheel i^9 , which screw has its bearings in brackets fastened to the reed frame i . On a projecting arm i^3 of the reed frame i is secured a reed i^7 and guide bar i^8 . On the screw h^2 are mounted beaming frames o and o' , having

additional bearings on the parallel rods p and p' , adapted to carry a beam.

In the upwardly projecting portion o^2 of the beaming frame o' and in an auxiliary bracket o^6 , projecting outwardly from the side piece of the frame a , as shown in Fig. 2, is mounted shaft o^3 , provided with a key and penetrating a sleeve p , journaled in the bracket frame o^6 and carrying a pawl controlled gear wheel o^5 ,



meshing with a pinion on the shaft n . The fact that the bracket o^6 projects outwardly from the side piece of the frame and supports the shaft o^3 and gear o^5 outside of said frame makes possible a greater lateral movement toward the bracket on the part of the beaming frame o' . The sleeve p is provided near its outer portion with an annular groove p' , in which is arranged a clamp o^7 , consisting of two halves pivotally connected, as at o^{11} , and having their opposite ends adjustably secured together by means of a clamping screw o^{12} . Said clamp o^7 bears against the projecting sleeve o^{10} of the auxiliary bracket o^6 and thus prevents lateral movement of the sleeve p . The shaft o^3 , which is hollowed out at its inner portion, as illustrated in dotted lines in Fig. 2 carries the clutch o^4 , for holding the beam. (Robert Atherton, Paterson, N. J.)

INDICATOR FOR WARPERS.

The object of the device is to provide a combined indicator and alarm which can be readily thrown into and out of engagement with its operating means, whereby the operation of the indicator and alarm can be arrested without the necessity of stopping the said operating means.

Fig. 1 is a front elevation of the combined alarm and indicator illustrated in connection with a portion of a warper frame and its reel shaft; Fig. 2 is an end elevation of Fig. 1.

a represents a portion of a warper frame and b roller bearings supporting the reel carrying shaft c as provided with a collar c' to thus prevent the lateral movement of said shaft. On the frame a is secured a bracket s^1 , provided with guides for the vertically arranged rod s^4 , controlled by a spiral spring s^3 , and prevented from rotation by having its lower polygonal shaped portion guided in a correspondingly shaped hole or opening in the lug s^8 .

At the lower end of said rod s^4 is mounted a shoe s^0 , carrying the gong hammer s^1 and normally resting upon the lever s^2 fulcrumed at s^6 to the bracket s^1 , and which lever is provided with an arm or projection

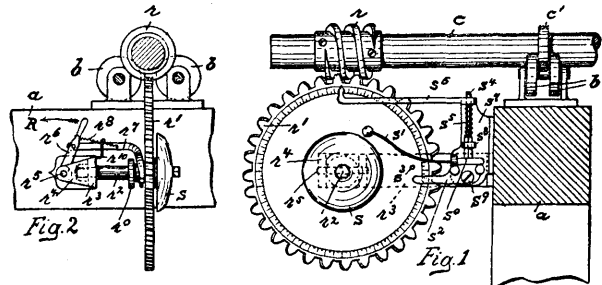
adapted to be engaged by the pin s^9 . To the frame a is also secured a bracket r^3 , parallel with the reel shaft c and carrying at or near its free end a stub shaft r^2 , on which is revolutely and slidingly arranged a gear wheel r^1 , adapted when in normal position to mesh with the worm r on the reel shaft c and to be operated thereby. On gear wheel r^1 , which is provided with graduation marks is secured the pin s^3 ; however a series of pins could be arranged on said gear wheels at specified intervals, in which case the gong hammer can be operated more frequently to correspond to shorter lengths of material to be wound on or off the reel. To the free end of the stub shaft r^2 is secured the gong s , operated by the gong hammer s^1 .

To projecting lugs r^4 on the front portion of the bracket r^3 is secured a pin or axle r^5 at right angles to the stub shaft r^2 and serving as a fulcrum for the lever r^6 , which latter is provided with a handle and is pivotally connected about midway to the outer end of the arm or link r^7 , the inner portion of which is downwardly curved and fork shaped and is in engagement with the annularly grooved collar r^8 , surrounding the stub shaft r^2 and secured to and projecting from the gear wheel r^1 . A spiral spring r^9 connects the said link or arm r^7 with the upper portion of the hand lever r^6 , and thus normally holds the gear wheel r^1 in engagement with the worm r .

A hook shaped pin r^{10} is secured to the bracket r^3 and engages the top portion of the link or arm r^7 to thus prevent its forked portion from disengaging the annular groove in the collar r^8 .

A hand or pointer s^5 is secured to the upper portion of the bracket s^7 and projects outward across and has its point directly in front of and in a convenient position near the graduations on the gear wheel r^1 .

By this arrangement the amount of material which has passed through the machine can at any time be quickly ascertained and read from the graduations, and the machine can be stopped when the desired amount of material has been thus registered. The



gear wheel r^1 can be rotated in either direction, and whenever the pin s^3 engages the projection of the lever s^2 the said lever is operated, in turn operating the shoe s^0 .

Whenever it is desired to stop the indicator and alarm, the hand lever r^6 is moved in the direction of the arrow R in Fig. 2, whereby the gear wheel r^1 is moved out of engagement with the worm r , but can be readily returned into engagement (assisted by the action of the spiral spring r^9) whenever the said hand lever r^6 is moved towards its normal position. (Robert Atherton, Paterson, N. J.)

BENTLEY'S HORIZONTAL WARPERS.

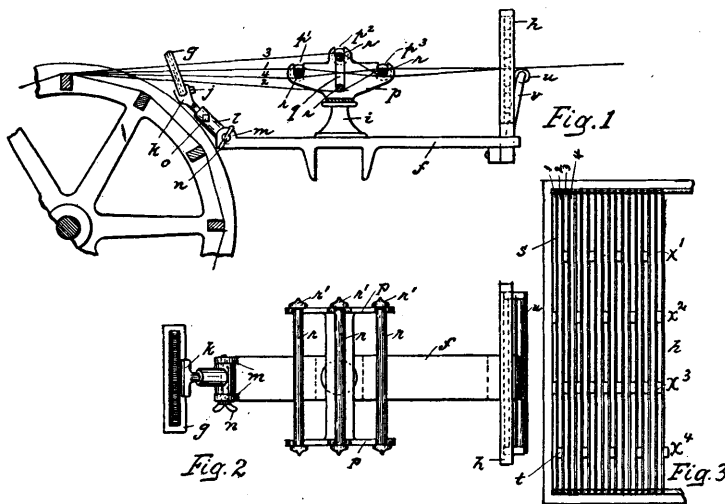
The object is to provide means between the creel and the reel whereby the threads can be readily selected by the operator and whereby after being so selected they are held distinctly separated from each

other throughout the warping operation, at the same time subjecting the threads to as uniform a tension as possible during the warping operation.

Fig. 1 is an enlarged detail view, partly in section, of so much of a warping machine as is necessary to be shown to explain the improved mechanism. Fig. 2 is a top plan view of the reed carriage, showing the reeds and the improved arrangement of the parting bars mounted thereon, and Fig. 3 is a plan view of a portion of the lease reed.

f is the carriage, which supports the reeds *g* and *h*, the former being mounted upon the end of said carriage which is the nearer to the beam and the latter being arranged upon the other end of said carriage, and a standard *i*, which carries the parting bars, said standard being disposed approximately midway the ends of said carriage.

The reed *g* is removably secured by means of a set screw or set screws *j*, in the bifurcated free end of an arm *k*, which projects into and has a telescopic



arrangement with a sleeve *l*, that is fulcrumed between two lugs *m*, formed upon the carriage, the position of said sleeve, and consequently the arm and the reed which the latter carries being controlled by a thumb screw *n*. Parts *k* and *l* are rendered adjustable by set screw *o*.

The standard *i* supports a pair of brackets *p*, having recesses *p'* *p''* *p'''* formed in their upper edges and having extending downwardly from the base of the centrally disposed recess *p''* slots *q*, formed in their adjacent faces. The recesses *p''*, since they are formed in an elevated portion of the brackets *p*, are situated in a plane slightly above that of the recesses *p'* and *p'''* and the bottoms of the slots *q* are in a plane correspondingly distant from the plane of said recesses *p'* and *p'''*.

r designates the parting bars, as mounted in the recesses and the bottoms of the slots *q*, and which are provided with heads *r'*, which take on the outside of the respective brackets, and the parting bar which is arranged in the slots is somewhat shorter than the others, so that it may be readily placed in position between said brackets. One pair of the parting bars is in a substantially horizontal plane, whereas the other pair is in a vertical plane. *u* indicates a glass rod journaled upon the upper ends of fulcrumed brackets *v*, as mounted in operative proximity to the reed *h*, said glass rod being adapted to sustain the threads when the warper is in operation.

The reed *h* is especially designed to facilitate the

operation of selecting the threads which are to be kept separated by the several parting bars. The dents *s* are spaced by blocks *t*, which are disposed in such arrangement that when the operator desires to select threads which are to be separated from each other by the several parting bars said threads can be readily identified. Fig. 3 shows the arrangement of these blocks which are secured to both the surfaces of the two dents or of a dent and the end piece of the reed frame, and are of metal and soldered in place. The arrangement of the blocks throughout the reed therefore consists of four parallel lines or series of said blocks lettered respectively as *x'*, *x''*, *x'''*, and *x''''*.

The first thread passes through the first space of the reed and above the lower one of the first pair of blocks, the second thread passes through the second space and above the second or single block, the third thread passes through the third space and above the lower one of the second pair of blocks, and the fourth thread passes through the fourth space of the reed; and repeat.

In selecting the various threads the

operator depresses the warp with his hand between the creel and the reed *h*, whereupon the line of blocks *x'''* will act to divide the threads into two sets. Having thus divided the warp into two sets of threads, upon further depression thereof a subdivision of the lower one of the two sets of threads thus formed will be effected by the series of blocks *x''*, whereupon they may be maintained in the relative positions which they have now been made to assume, by the lowermost parting bar and by the parting bar farthest from the reed *h*. Now upon lifting or raising with the hand the upper set of warp threads a subdivision of them will also be effected by the series of blocks *x'*, whereupon they may be maintained in their relative positions by the uppermost parting bar and the parting bar which is farthest from the reed *h*. In other words, the arrangement of the blocks between the dents of the

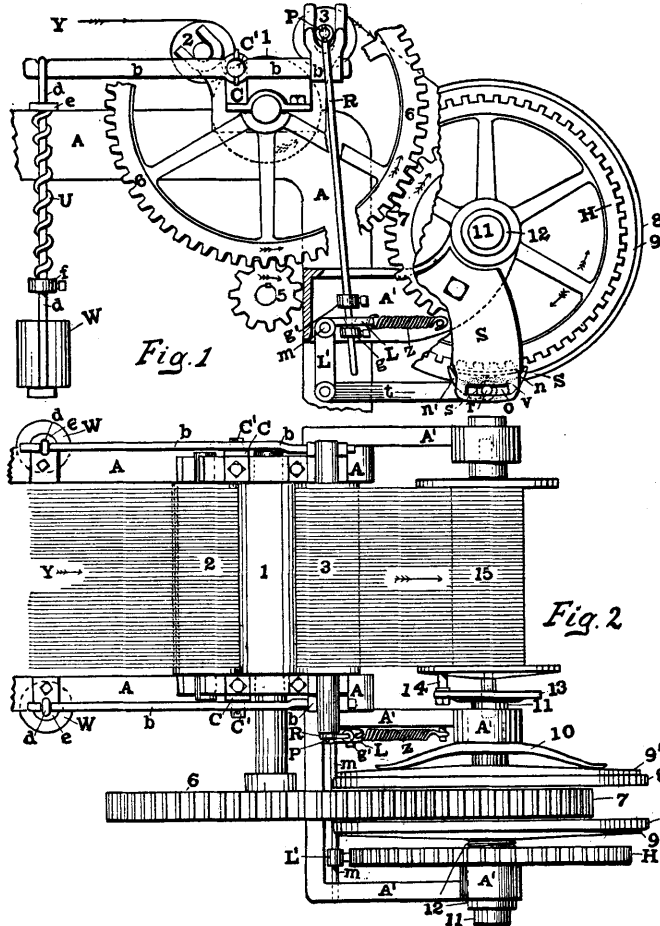
reed is such that one line or series of them is adapted to effect a division of the warp threads, while the other series are adapted to effect subdivisions of said warp threads. As a result of the arrangement of the threads which has thus been produced, threads 1 and 3 will be above, while threads 2 and 4 will be below, the parting bar which is farthest from the reed *h*, and threads 2 and 3 will be kept separated from threads 1 and 4 by the lowermost and uppermost parting bars, respectively. Having thus effected a separation of the threads and sustained them in their various relative positions by three of the parting bars, the operator has only to place the other parting bar in position with threads 2 and 4 passing over it and threads 1 and 3 under it, the threads being thus maintained in a subdivided as well as a divided disposition. (John H. Bentley, Paterson, N. J.)

AUTOMATIC TENSION GOVERNOR FOR WARP BEAMING MACHINES.

The object of this mechanism is to automatically govern the tension of the yarn during the process of beaming, producing a tension which can be mathematically figured out and maintained at all times without depending upon the judgment of the attendant and regardless of any defects in the friction disks or other causes.

Fig. 1 represents in side elevation the automatic tension devices, including the drum and the rolls over which the yarn passes and Fig. 2 is a plan view of the same.

A indicates the main frame, upon which are



mounted in bearings fixed upon it rolls 1 and 2, belonging to the series of rolls which pull the yarn Y. A third roll of this series (marked 3) is mounted in bearings upon levers b, which are pivoted on the main frame, one being provided for each end of the roll 3, as shown in Fig. 2. The levers are directly pivoted on studs C', which are on standards C.

In the winding, the yarn is drawn in the direction of the arrows, and passes over roll 2, under the roll 1, and out over the roll 3 to the warp beam 15. The roll 1 carries a gear wheel 6 and is driven by a pinion 5 on the belt shaft. The gear wheel 6 also meshes with a gear wheel 7, which is loose on the shaft of the warp beam 15. Fixed to the gear wheel 7 are the friction disks 8 and 8', all loose on the shaft 11. Fixed on the same shaft by means of splines are the disks 9 9', and when pressure is applied to the outside disk 9 the frictional contact between it and the disk 9', applied to the shaft through the wheel 7, causes the shaft to revolve and with it the beam 15. The motion from the shaft to the beam is communicated by means of a face plate 13 and stud 14, said stud engaging against any suitable projection on the head of the warp beam. The hand wheel H is mounted upon the shaft 11, its hub being internally threaded to engage with an externally threaded sleeve 12, con-

nected with the friction disk 9. The outside of the wheel H bears against the part A' of the frame, so that when the wheel H is turned it forces the disk 9 inwardly, so as to apply pressure through the disk upon the wheel 7, this causing an increase of driving force and consequently an increase of tension in the yarn that is wound upon the beam. Reverse movement of the wheel H will relax the frictional contact and thus diminish the tension. A bow spring 10 is shown in Fig. 2 as interposed between the inner block A' and the inner disk.

The automatic regulation is accomplished by motion transmitted from the movable roll 3, having its bearings in the levers b, the strain of the warp passing over this roll 3 tending to force it downward and depress the ends of the levers upon which the roll is mounted. On the outer ends of these levers are tension devices, which consist of weights W and springs U, applied to rods d, which pass through ears e on the frame and have adjustable collars f. Springs U are placed between these collars f and the ears e and tend normally to draw down the outer ends of the levers and so force the roll 3 upward against the strain of the yarn. The tension of the spring is regulated by adjustment of the collar f, or the pull may be increased by increasing the weight. The roll 3 is turned by the warp which passes over it and with greater or less force, according to the tension of the warp. On the end of the arbor of the roll 3 is placed eccentrically a wrist pin P, to which is connected a pitman R, carrying on its lower ends adjustable collars g' and g, as situated on the upper and lower sides of an arm L of the bell crank lever L', through which the pitman R passes. The bell crank lever is pivoted at m, and its upper end is connected by a spring z to a fixed pin on the frame. The lower end of the bell crank lever L' is connected by a bar t to a pawl mechanism. The end of the bar t carries a pin r, on which are pivoted the two pawls n n'. The pin r projects through a slot o in cheek pieces v on a shield S, which is bolted to the frame outside of the wheel. The slot is parallel with the periphery of the wheel H and serves to

guide the pawls, so that one or the other may operate upon the wheel. When one pawl is in position to engage with the teeth on the periphery of the wheel H, the other pawl rides on the edge of the shield S. The pawls are connected and held in place by a spring 8, and are operated by reciprocating movement of the bar t, and the position of the bell crank lever L' determines which pawl will operate, and therefore in which direction the wheel will be turned and whether the frictional contact be increased or lessened. The position of the bell crank lever is determined by the position of the roll 3. If the said roll be depressed by reason of abnormal tension upon the yarn, then the pitman rod R will be pushed down, so that the upper collar g' thereon will press on the upper side of the arm L and throw back the lower part of the bell crank lever. In this position the operation of the wrist pin P will cause reciprocation of the bar t and will pass through the pawl n', which is brought into action by this position of the bell crank lever to turn back the wheel, and thus release the screw pressure and friction, and this also determines the pull upon the warp. If, on the other hand, the strain upon the warp is abnormally light, it will permit the spring and weight to throw up the roll 3 and raise the bell crank lever L' into a position in which the pawl n is in-

gagement, the other pawl riding on the edge of the shield. The reciprocation caused, as before, by the action of the collar g and spring z will give forward motion to the wheel and turn the screw to increase the pressure on the disks and increase, therefore, the strain upon the yarn by acceleration of the winding drum. The arms L and L' , which constitute the bell crank lever, are located at different points on the shaft m , which has its bearings in the frame. An intermediate position of the roll 3 will bring both pawls out of engagement and render the device for increasing or diminishing the pressure inoperative, and the operation on either side of the extremes will be increased in proportion as the strain is greatest or least and the position of the roll 3 consequently at its lowest or highest limit. Thus the tendency of the apparatus is constantly to prevent any extremes of tension and to maintain an amount invariable, but determined by the tension of weight or spring applied to the outer end of the lever b . (*George Brown and Emil Dick, Auburn, Me.*)

BEAMING MECHANISM FOR WARPING MACHINES.

The illustration is a front elevation, in detail, of this mechanism as used for transferring the warp from the reel onto its beam.

d' is a standard of the beaming mechanism as placed in position near one end alongside of the main frame of the warper which carries the reel; and carried on the frame near said standard is a bracket d^2 consisting of an angular arm d^3 , projecting laterally therefrom, and a vertical arm d^4 . The arms of the bracket and the upper end of the standard provide bearings for the shaft d , carrying the pinions d^5 and d^6 of different sizes. Motion is imparted to the shaft d through a system of gearing consisting of pinions d^7 , d^8 and d^9 . (d^8 being mounted on stub shaft d^{10} .)

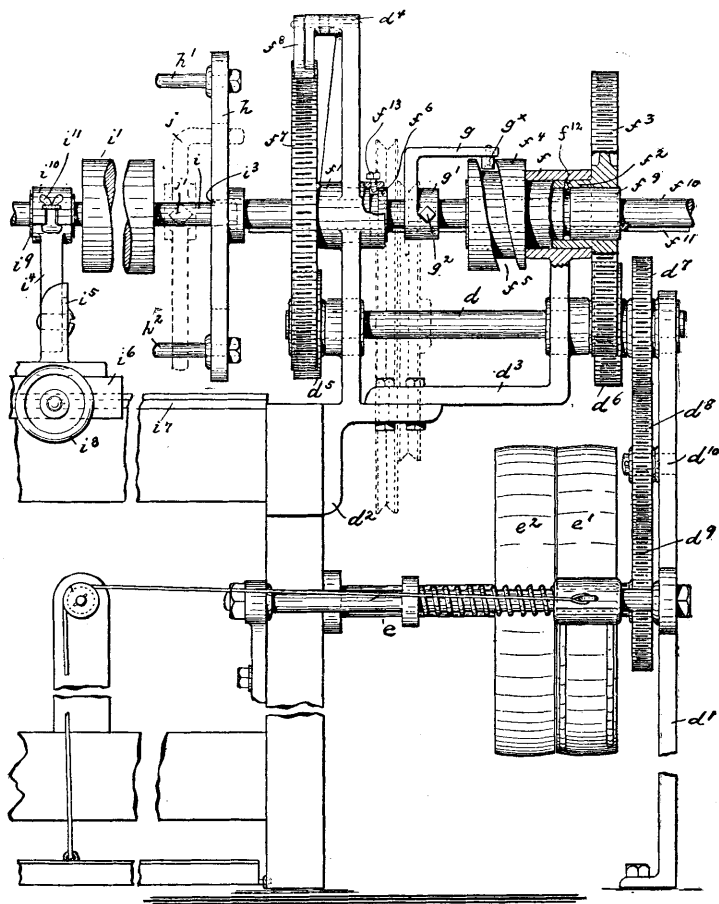
On the shaft e are mounted a loose and fast pulley e^1 and e^2 , which carry the belt for operating the machine.

Arms d^8 and d^4 are provided (the former at its upper end and the latter midway its ends) with integral sleeves f and f' . The sleeve f forms the bearings for a bushing f^2 , which carries at its outer end a gear f^3 , and at its inner end a cam f^4 , having a cam groove f^5 . The gear f^3 meshes with the pinion d^6 , carried on the shaft d . The sleeve f' forms bearings for a bushing f^6 , carrying a gear f^7 , controlled by a pair of pawls f^8 , pivoted to the vertical arm d^4 . In the bushing f^6 is contained a collar f^9 . Both the bushing f^6 and the collar f^9 are penetrated by a shaft f^{10} , having a longitudinal key f^{11} engaging a corresponding groove in the bushing and the collar, and said collar and the bushing are prevented from lateral movement by set screws f^{12} and f^{13} , the former being set in the bushing f^6 before the parts are put together and the latter being set in the sleeve f' . From the foregoing it will be seen that the shaft is susceptible of a longitudinal movement within the collar f^9 and the bushing f^6 .

The means for reciprocating the shaft consist of an angular arm g , integrally formed with an annulus g' , penetrated by and adjustably secured to the shaft f^{10}

by a set screw g^2 and carrying at its free end a roller engaging the cam groove f^5 . The shaft f^{10} carries at its inner end a clutch consisting of a cross bar h , secured at its center to the end of said shaft and carrying at its ends pins or projections h' and h^2 . Said clutch is adapted to support one end of and to operate the spindle i of the beam i' . The end of the spindle fits in a centrally situated socket i^3 in the cross bar h , and its other end is supported upon a standard consisting of members i^4 and i^5 , adjustably connected for vertical adjustment by a slot and set screw arrangement. The standard is supported on a carriage i^6 , reciprocally mounted on a substantially T-shaped rail i^7 , secured to the frame beneath the spindle, the carriage being therefore movable in the direction of the length of the spindle. The carriage is secured at any desired point on said rail by means of a hand screw i^8 , which is adapted to bind against the rail in an obvious manner. The bushing i^9 , forming bearings for the spindle, is removably secured between the top of the standard and a clamp i^{10} , held in place upon said standard by thumb screws i^{11} .

The beam spindle takes its motion from the clutch through a cross arm j , adjustably mounted upon the spindle by means of a set screw j' , one of its ends being in engagement with one of the projections h' h^2 and the other of its ends being arranged at right angles and projecting into the path of the cross bar



h . (The construction last described is shown in dotted lines in the illustration.)

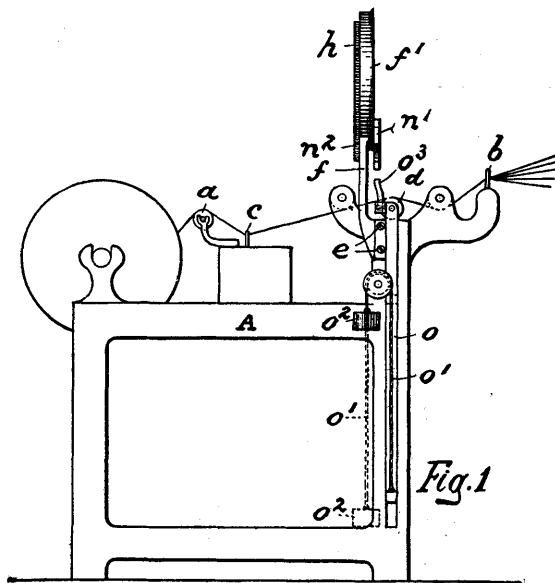
The belt for driving the machine having been put

in motion it is shifted from the loose to the fast pulley by the belt shifter and the shaft *d* is rotated by means of the system of gearing which connects said shaft with the fast pulley. Said shaft communicates its motion to the beam through the pinion *d*^b, the gear *f*^b, the shaft *f*¹⁰, and the beam spindle. The cam *f*^a being held against lateral movement and being in engagement with the shaft *f*¹⁰ through the angular arm *g* and its roller *g*^x engaging the groove in said cam thus imparts a longitudinal reciprocatory movement to said shaft, and consequently to the beam carrying spindle. At the same time the cam is caused to revolve independently of the shaft *f*¹⁰ by means of the pinion *d*^b and the gear *f*^b. Since said cam revolves independently of the shaft *f*¹⁰, and according as the gears *f*^b and *f*^a and pinions *d*^b and *d*^a are relatively larger or smaller, the number of reciprocations imparted to said shaft in a given period is susceptible of being controlled.

The reciprocations imparted to the shaft produce a winding of the warp on the beam which is similar to that of a ball or cord—that is to say, the threads of the warp are caused to wind on the beam, crossing each other in lines which are more or less oblique to the axis of the beam. The angle at which said lines cross each other depends upon the amount or reciprocatory movement given to the shaft, and this in turn obviously depends upon the pitch of the cam groove *f*^a. (Frederick L. Atherton, Paterson, N. J.)

REGISTERING MECHANISM FOR WARPING MACHINES.

The object is to provide a mechanism whereby the number of breaks in a set of yarn are automatically registered and preserved.



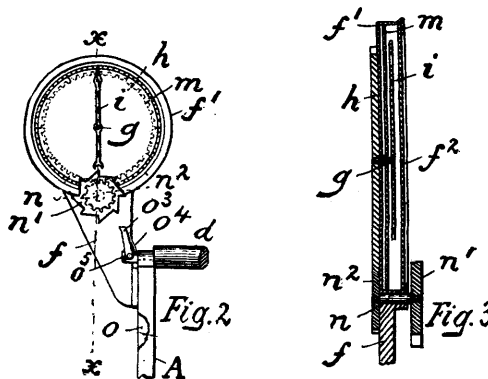
Warpers generally have what is called a "rise roll" and immediately after the breaking of a thread the falling of a drop wire which was supported by said thread effects the stopping of the warper, the rise roll rising to take up the slack in the unbroken threads of the warp and prevent them from being snarled.

Fig. 1, in side elevation, represents a sufficient por-

tion of a warper with the registering device added. Fig. 2 is a partial front elevation thereof, and Fig. 3 is a section taken through the line *x-x*, Fig. 2.

A indicates the frame work, *a* the roll over which the set of warps of yarn or thread passes on its way from the reed *b*; *c* indicates the drop wire and *d* the rise roll.

Upon a part of the frame A there is attached by screws *e*, Fig. 1, an arm *f*, having at its upper end a case *f*¹, it forming part of a registering mechanism.



This case has mounted in it a stud *g*, upon one end of which is fixed a toothed gear *h* and upon the other end a pointer *i*, the said pointer being surrounded loosely by a dial *m*, said dial being marked to designate the number of steps of movement of the hand *i*. This dial is located between the toothed gear *h* and the hand *i* and is stationary. The case *f*¹ has a glass face *f*². The part *f*¹ of the arm *f* has mounted in it a shaft *n*, provided at its front end with a ratchet toothed wheel *n*¹, and at its rear with a pinion *n*², said pinion engaging the teeth of the toothed gear *h*, before referred to.

The rise roll *d* is mounted at each end in a bar *o*, and lifted by strap and weight *o*¹ *o*². The upper end of this bar *o* carries a pawl *o*³, the inner side of which is kept pressed by a spring *o*⁴ against a lug *o*⁵, so that said pawl when the rise roll *d* rises after a yarn or thread of the set is broken will meet and move said ratchet wheel one step, causing the pinion *n*², acting on the gear *h*, to turn the hand *i* one step over the stationary dial *m*, and the number of steps that the said hand turns will be indicative of the number of times the yarn or thread of that set broke when going through the warping machine. The ratchet wheel is turned by hand when the rise roll is down in working position to thus put the pointer back into its starting position. (Draper Co.)

THE FAIRMOUNT CUT MARKER.

Fig. 1 represents a side elevation, partly broken away, of this marking apparatus, Fig. 2 represents a partial side elevation and partial vertical section of certain portions of this apparatus, Fig. 3 represents a view of the parts corresponding to those shown in Fig. 2, but in different positions, and Fig. 4 represents a partial side elevation and partial vertical section, on a reduced scale, of a portion of a beaming machine and one of the rolls seen in Fig. 1.

I designates the frame of the apparatus, in which are journaled the rollers or drums 2, 3, 4 and 5, around which is passed the warp yarn 6, it being drawn from a hank or skein 7, placed on the floor 8. Said warp yarn passes through tension device 9 before it passes

around the rollers 2, 3, 4 and 5, so that said yarn is held taut during the process of marking and beaming the same.

The warp yarn after leaving the roller 5 is wound upon a warp beam 9^x (seen in Fig. 4.) mounted in a beaming machine 10. The shaft 11 of the roller 5 is provided with a worm 12, which meshes with worm wheel 13, journaled in the frame 1 of the apparatus. Worm wheel 13 carries a stud 14, which is adapted to be brought in contact at certain times with the vertical members of bell crank levers 15 and 16, so as to rock the same and cause said levers to lift the stops 17 and 18. 19 designates a dry roller journaled in the frame 1 of the apparatus and over which passes the warp yarn 6 when the latter is being drawn through the marking apparatus by the beaming machine.

The object of the dry roller 19 is to provide a sup-

port for the warp yarn 6 when the latter is being marked by the inking roller 20, which is journaled in an arm 21 secured to a rock shaft 22 journaled in the frame 1. 23 designates an arm secured to the rock shaft 22; said arm 23 carries a roller 24, which contacts at certain times with a cam 25, carried by the dry roll or platen 19, said platen being provided with a lug 26, a groove 27, and a strip 28.

29 designates a stop loosely fitted to the frame 1 of the apparatus and adapted to be lifted at certain times by the lug 26. 30 designates a trough out of which projects the inking roller 20, which contacts with the warp yarn at the proper intervals. 31 designates a spring, one end of which is secured to the frame 1 of the apparatus, while its other extremity is attached to an arm 32, firmly secured to the rock shaft 22, the object of said spring 31 being to hold the roller 20 to come in contact with the warp yarn 6 when the cam 25 leaves the roller 24. 33 designates a pin passed through opening 34 in the frame 1, so as to engage a similar opening in the dry roll or platen 19, to lock the latter and prevent the same from rotating when so desired.

When the dry roll 19 is in its normal position, (see Fig. 2,) the lug 26 is firmly held between the stops 17 and 29, and consequently said roll

cannot rotate. When the roll 19 is in the position relatively to the roller 24 the inking or marking roller 20 is kept away from the warp yarn 6, said warp yarn is drawn over the metal strip 28 so that no wear

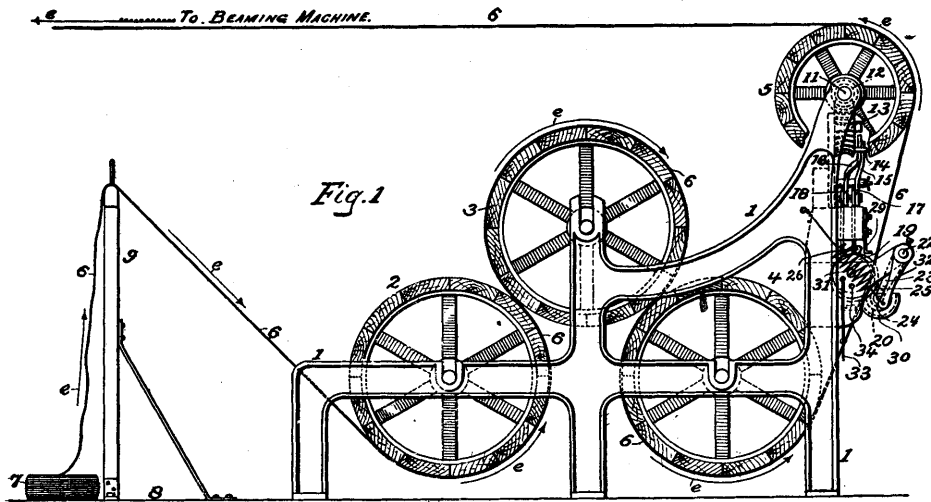


Fig. 1

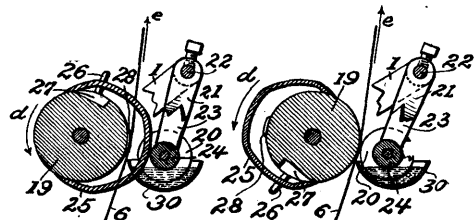


Fig. 2

Fig. 3

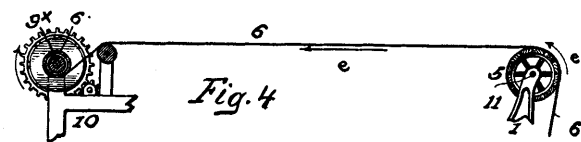


Fig. 4

One end of the warp yarn 6 is taken from the hank or skein 7 and then passed through the tension device 9, after which it is brought under the roll 2, then over the roll 3 and under the roll 4, then between the inking roller 20 and dry roll or platen 19, then over the roller 5, and finally to the warp beam 9^x. When the

cannot rotate. When the roll 19 is in the position relatively to the roller 24 the inking or marking roller 20 is kept away from the warp yarn 6, said warp yarn is drawn over the metal strip 28 so that no wear

will be produced on said roll 19. When the stop 17 is lifted, it will thereby permit the lug 26 to rotate sufficiently to come in contact with the stop 18. This partial rotation of the roll 19 causes the strip 28 to move out of the path of the inking or marking roller 20, so that when said roller 20 comes in contact with the warp yarn 6 to produce a mark thereon, the ink or color from said roll 20 will not touch said strip 28 and any superfluous ink or color from the roller 20 will be caught by the groove 27 and be prevented from smearing the warp yarn 6. When the stop 18 is lifted, it is removed from the path of the lug 26 and the dry roll is then rotated by the friction of the warp yarn, which passes over the same and is caused to revolve.

When the dry roll 19 is in the position seen in Fig. 3, the cam 25 is not in contact with the roller 24 and consequently the spring 31 becomes operative and draws the arm 32 toward the dry roll or platen 19, thereby bringing the ink roller or marker 26 in contact with the warp yarn 6, so as to mark the same.

When the lug 26 contacts with the lower portion of the stop 29 and lifts said stop, and after clearing the latter is brought against the next stop 17, this prevents the further rotation of said dry roll, thereby causing the same to remain stationary until said stop 17 is again lifted. When the lug 26 thus has cleared the stop 29, the latter drops of its own weight and is then in a position to prevent the dry roll or platen from rotating in a direction opposite to that indicated by the arrow *d* in Figs. 2 and 3, which would otherwise occur when the warp yarn 6 is drawn in a direction opposite to that indicated by the arrows *e* in Fig. 1, which is sometimes done during the process of beaming. (*The Fairmount Machine Co.*)

SECTIONAL DRUM FOR BEAM WARPING MACHINES.

The object is to provide a sectional drum for beam warping machines arranged to permit of conveniently replacing a worn out or broken drum with a new one instead of requiring an entire new drum when renovating a machine.

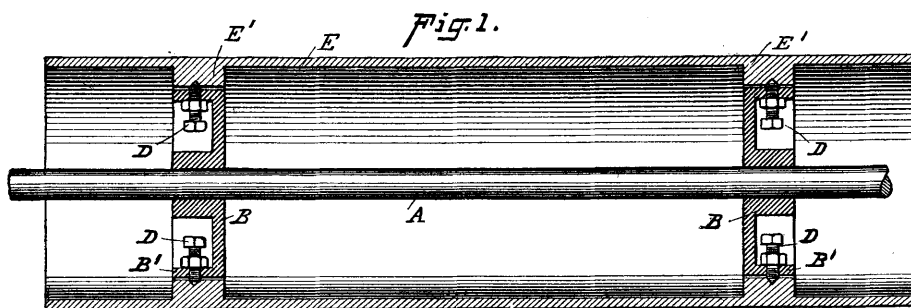
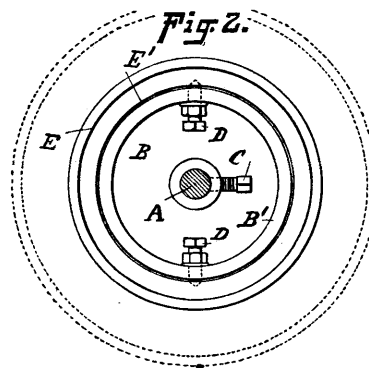


Fig. 1 is a longitudinal section, and Fig. 2 an end elevation of this drum.

The drum is provided with shaft A, rotated by gearing in unison with the other parts of the machine. On the shaft A are secured the two webs B by set screws C, screwing in the hubs of the said webs. Each of the webs B is provided with a rim B', in which, screw set screws D, engaging with their outer ends the inner faces of registering bosses or internal flanges E', formed on the under side of the rim E for the drum. By the arrangement thus described the rim E can be readily adjusted so as to bring its peripheral surface concentric to the shaft A to insure a proper running of the drum rim when the shaft A is rotated, again,

the drum rim E can be readily detached and removed from the other parts of the drum by unscrewing the set screws D to permit removal of the rim E in case the said rim is worn out or otherwise injured and a new one is necessary.

It will be seen that drum rims of different diameters may be used and placed in position by the said set screws D on the said webs for one and the same warping machine, according to the work under treatment, it being understood that in such cases the



bosses or internal flanges E' are made of greater or less thickness, according to the size or diameter of the drum rim. (See dotted lines in Fig. 2.) (*John Cocker, Philadelphia, Pa.*)

AUTOMATIC TENSION WIRE AND BOBBIN BRAKE FOR WARPERS.

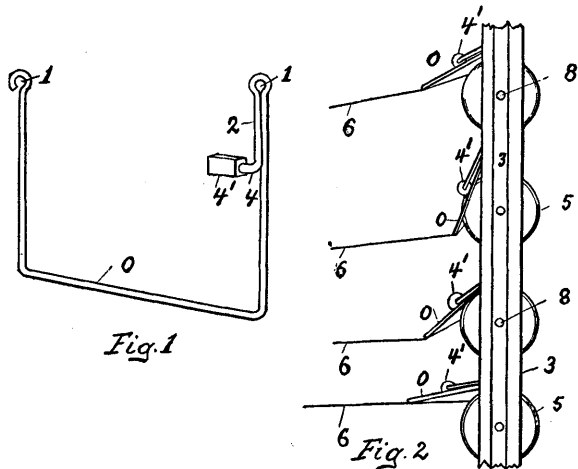
The object of the device is to regulate the tension of the yarn and prevent slack yarn from the bobbins running onto the creel; the device consisting of a bent wire bridle having a weight or brake shoe thereon hung from the creel standards at each end and in front of each bobbin and resting upon the thread or end as it runs off the bobbin.

Fig. 1 is a perspective view of the device. Fig. 2 is a side elevation of a section of a warper's creel, showing the device in different positions caused by the running of the threads.

o represents the tension wire or bridle, having eyes 1 bent at the ends to receive nails for hinging the bridle to the creel standards 3 at each end of the bobbin 5, which allows the wire o to swing loosely as it rests on thread or running end 6. Bobbins 5 run on creel pegs in holes 8 in standards 3. From one of the eyes 1 the wire is bent back in arm 2 and out at about a right angle thereto in brake finger 4, to which is attached the brake shoe 4', made of metal to give the proper amount of drag on the bobbin head on which it rides smoothly.

If the thread runs slack, the falling wire follows it and takes up the slack and prevents its running onto the warp mill or beam or from lashing into the next end and being carried thereby onto the mill or beam,

and should this slackness be more than the falling wire will take up, brake shoe 4' falls on the bobbin head and slows up the motion of the bobbin until the thread is brought to an even draw again. Imperfect winding of the bobbins and other causes vary the speeds of the bobbins, and the positions of the wires



o are constantly changing to different angles up and down, as shown in Fig. 2. The thread is taken from the upper side of the bobbin instead of from the under side, as is often done, allowing a direct weight, which can also be used as a brake shoe. (Thomas Hy. Smith, Jamestown, N. Y.)

To permit the rounded guides to be brought into close proximity and to still allow the warp threads to pass freely between them, the guides are so constructed that the upper rounded ends of the alternate guides will be staggered, as clearly shown in the illustration. This is conveniently effected by making the shank somewhat wider than the diameter of the upper end of the guide, and offset from the latter along one edge, adjacent guides having their shanks oppositely turned. By staggering the alternate guides, as described, they may be moved very closely together when necessary without interfering with the free passage of the warp threads *w*. A cap *A^x* protects the springs, and adjacent mechanism from dust and dirt, the top edges of the cap and stand leaving a clearance space through which the upright guides pass. (Draper Co.)

REED FOR WARPING MACHINES.

The objects are to reduce the size of the creel board, at the same time increasing its capacity, besides avoiding bunching, knotting, wearing and cutting of the threads.

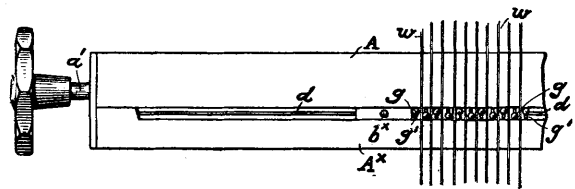
The illustration is a plan view of the front of the creel frames shown part in section and part broken away in order to see the reed, which is formed in a series of V-shaped angles for increasing the number of dents without lengthening the reed, which is provided with glass rods conforming to the shape of the reed, and over which the threads pass in going through the reed.

In being unwound from the bobbins B, which are divided into two series on the creel frame A (the

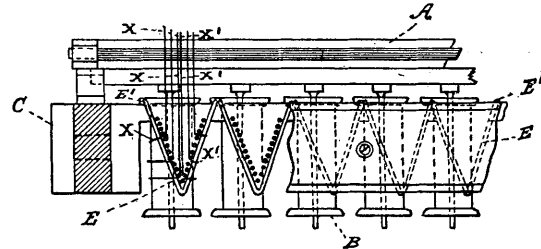
WARPERS COMB.

It is necessary in these devices to separate or bring nearer together the upright wires or guides which serve to divide the warp threads, and this is usually accomplished by means of a coiled spring, the guides being inserted between the coils, and by suitable mechanism the spring is expanded or allowed to contract.

A indicates the transverse stand or support recessed in its front face to receive adjusting collars or sleeves mounted upon a right and left screw threaded adjust-



ing shaft or rod *a'*. The pins *b^x*, secure springs (not shown) to the adjustable sleeves previously referred to. Rotating the adjusting shaft *a'* will move the sleeves toward or from each other to permit the coils of the springs to contract or expand to thereby vary the distance between the warp guides, which are upright wires *g*, rounded in cross section at their upper ends and having flattened shanks *g'* to pass between the coils of the springs, the lower ends of the shanks entering a longitudinal recess, formed in the stand A, a retaining wire *d* being extended loosely through holes in the feet of the guides.



upper and lower half) the threads *X* from the upper half are brought from the right hand side of the bobbins to the left hand side of the angles of dents and the threads *X'* of the lower half from the left hand side of the bobbins are brought to the right hand side of the angles of dents. Thus the threads pass upward and over the said rods *E* through their respective dents in the reed, their positions in passing each other being constantly changing, with the result that the threads are kept separate and disentangled.

The glass guide rods *E* are bent to form an angle, so as to fit against the dents at the bottom of the reed, and the ends of said rods are bent downwardly as at *E'* to overlap the bottom rail *C* of the reed frame, thus locking them snugly against the reed dents. (T. A. Robinson and R. L. Shaw, Paterson, N. J.)

CREEL FRAME.

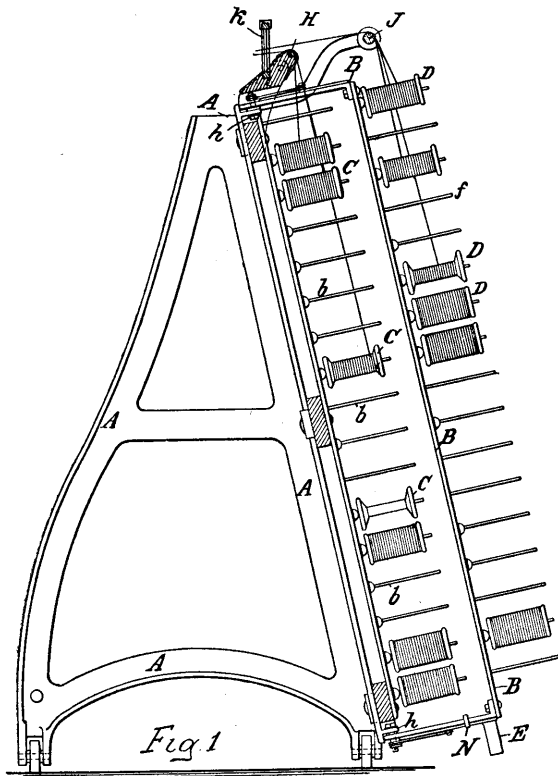
The object is to increase the capacity of the creel frame without materially increasing its size.

Fig. 1 is a side view partly in section of this creel frame. Fig. 2 is a side view of a part of this creel

frame, partly in section, showing the frame provided with two series of swinging yokes pivoted to the main body of the frame, one series of yokes rising above the other series and each yoke having mounted thereon a group of pins adapted to support bobbins thereon.

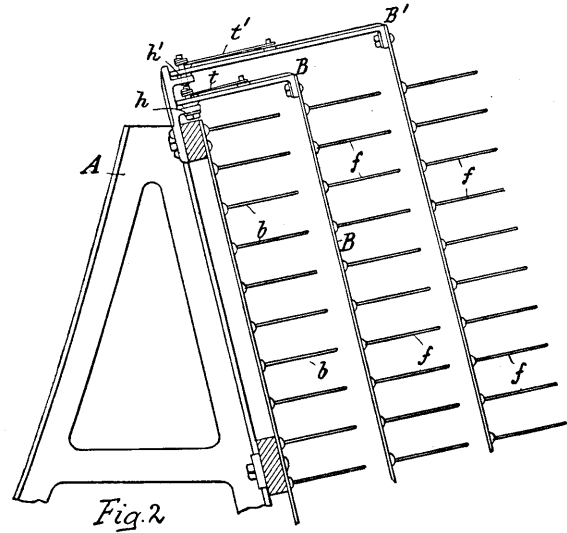
A is the main body of the creel frame to which are rigidly attached the pins *b*, which support the bobbins C.

B B' are swinging yokes, upon which are mounted the pins *f* *f*, respectively, which support the bobbins D. The yokes B B' are pivoted at each end to the frame of the creel, as shown at *h* *h'*, each of the yokes B being placed over a row of the pins *b*, as shown in Fig. 1, and each of the yokes B' being placed over a yoke B, as shown in Fig. 2.



H is a glass rod, over which pass the threads from the bobbins C. J is a similar rod, over which pass

the threads from the bobbins D. *h* are the small vertical glass rods between which the threads pass in their run to the lease reed. The pins are arranged in



oblique rows to prevent the interference of the threads from the several bobbins. The yokes can be readily turned to one side, thus permitting access to the bobbins upon the pins beneath without disturbing any of the bobbins on the yokes. The lower end of the yoke is provided with a leg E, projecting downward, against which the operator may press his foot, thus turning the yoke to one side, thereby leaving both hands of the operator free.

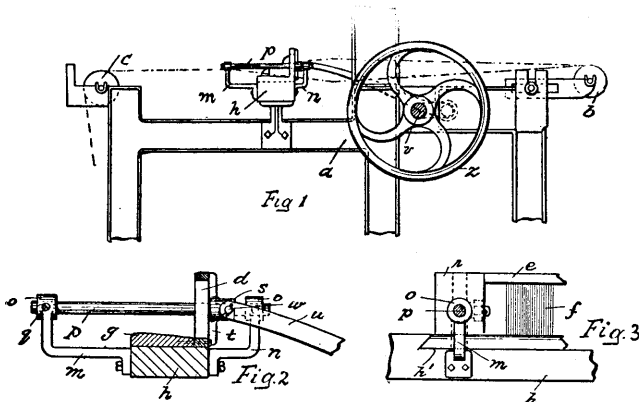
In order to economize space, by permitting the several rows of pins to be placed closer together, the lower ends of the yokes are provided with a laterally projecting arm N, of such length that as the yoke is turned to one side and before the bobbins on that yoke come into contact with the bobbins on the next yoke the end of the arm N will impinge against the latter yoke and in turn move it to one side, thus removing the bobbins thereon out of the way of the bobbins on the yoke first moved. Each yoke is provided with a spring *t t'*, against which the yoke is turned to one side, the corner of the end of the yoke being rounded, to permit of the movement, the said spring acting to return the yoke to its original position when the pressure upon it is released. (John P. Cronin, Paterson, N. J.)

MISCELLANEOUS.

EASTWOOD'S BROAD SILK LOOM.

This loom is provided with a stationary batten and with a horizontally reciprocating reed, by which arrangement the filling is beaten up by the reed without the necessity of moving the entire batten, requiring in turn less power for operating the loom, at the same time permitting a higher speed.

Fig. 1 is a side elevation of a portion of this loom, and Figs. 2 and 3 are a transverse sectional and a



front view, respectively, of the stationary batten and the reciprocating reed detached from the loom.

a represents the loom frame, supporting the warp and cloth beams *b* and *c*, and the main driving shaft *v*, carrying the hand wheel *z*. The batten *h* is secured by brackets to the sides of the loom frame *a*, and its central top portion is provided with a dove tailed groove *h'*, in which is slidingly arranged a top plate or raceway *g*, to the rear portion of which is secured the lower bar of the reed frame *e*, provided with dents *f* and constituting the reed *d*.

The batten *h* sustains two pairs of brackets *m* and *n*, projecting respectively from the front and rear portions of the batten and provided at their upper or free ends with tubular enlargements or sleeves *o*, which are connected and penetrated by a guide bar *p*, removably held in position by set screws *q*, arranged in said sleeves, and which guide bars are above and at right angles to the batten *h*. To the end or vertical bars *r* of the reed frame are secured tubular projections or sleeves *s*, strengthened by ribs *t*, projecting from the rear faces of the bars *r* and slidingly arranged upon their respective guide bars *p*.

The means for effecting reciprocation of the reed consists of pitmen *u*, each of which is pivotally connected at one of its ends to its respective sleeve *s*, as at *w*, and at its other end to the driving shaft *v*, there being no difference between the ordinary loom and the loom thus described, excepting that the batten remains stationary and the reed is horizontally reciprocated, guided upon the bars *p*, thereby effecting the

beating up of the filling. (Benjamin Eastwood, Paterson, N. J.)

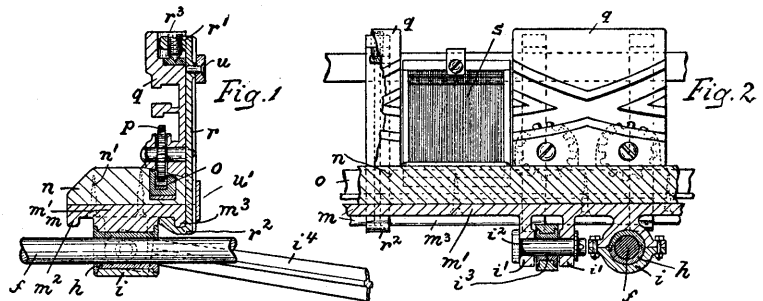
BEATING UP MOTION FOR RIBBON LOOMS.

The object is to do away with the heavy batten and the lay swords supporting the same, providing in their place a longitudinal reciprocating rail on which the shuttle blocks, the reeds, and the operating mechanism for the shuttles are mounted, arranged to slide on a guide rod towards and from the fell of the cloth for the purpose of beating up the filling, thus producing simplicity of construction, easier motion and consequently higher speed possible.

Fig. 1 is an enlarged transverse sectional view of the reciprocating rail and of the parts mounted thereon, also showing a portion of the guide rod and of the operating lever. Fig. 2 is a detail front elevation of a portion of said reciprocating rail (shown in section) and of the shuttle blocks and one of the reeds mounted thereon. *f* indicates the guide rod as mounted at right angles to the main driving shaft of the loom, in brackets fastened to the loom frame, respectively to the rear of breast beam and the front of the high arch of a ribbon loom.

Two of these guide rods *f*, one for each end of the loom are generally used, and upon each is slidingly mounted a bushing *h* arranged in a two part sleeve *i*, downwardly projecting from and one part thereof, being integral with the rail *m*, which latter is parallel with the main driving shaft and takes the place of the ordinary batten.

The rail *m* consists of a flat piece of metal *m'*, provided at its longitudinal edges with downwardly pro-



jecting strengthening ribs *m*² *m*³. On the top portion of said metallic rail *m* is secured a wooden raceway *n* by screws *n'*. On the beveled rear portion of this raceway *n* are mounted at intervals the shuttle blocks *q*, and which are adjustably secured to said raceway *n* by means of the clamps *r*, whose bent over portions *r'* are provided with set screws *r*², that engage the top portions of said shuttle blocks, and whose lower portions are hook shaped, as at *r*², and in engagement with the rail or frame *m* and its strengthening rib, respectively.

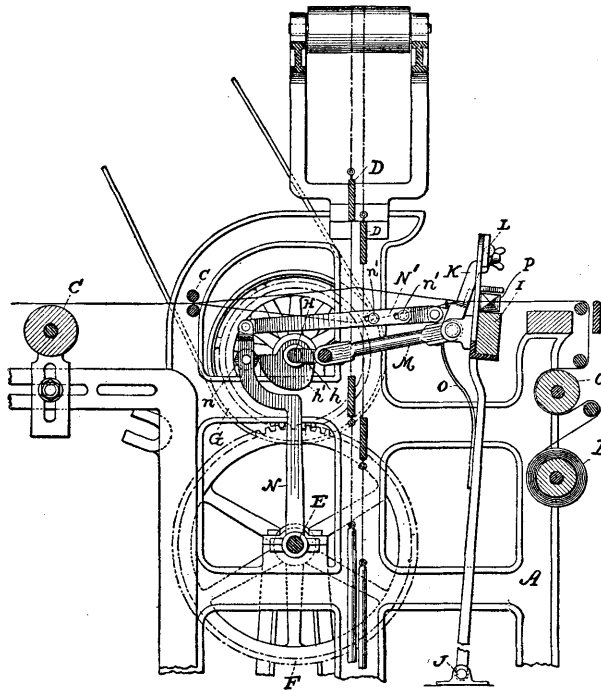
The pinions *p* are operated by the rack bar *o*, as slidingly arranged in the raceway *n*. The reeds *s* are mounted between the shuttle blocks and upon said raceway, strips *u* and *w* are provided for sustaining the reeds and of bracing the various clamps *r*.

Adjacent to each sleeve *i* are downwardly projecting lugs *v* which are penetrated by a pin *i*², on which is loosely mounted the bushing *i*³, arranged in the forward end of the pitman *i*¹, the rear portion of which is connected with the main driving shaft or crank shaft of the loom.

The operation of beating up the filling by means of the improved device is thus:—When the main driving shaft is rotating, the pitmen are being operated, and by their connection with the downwardly projecting lugs of the rail *m* they reciprocate (slide) the latter upon the guide rods *f* and the reeds accomplish the beating up of the filling in precisely the same manner as in a ribbon loom in which the batten is being oscillated. (*Schaum and Uhlinger, Philadelphia, Pa.*)

BEATING UP THE FILLING BY MEANS OF A MOVABLE REED.

The object is to beat up the filling by means of the reed (which is movable) at the proper moment when the beating up of the filling towards the fell of the cloth occurs.



The illustration is a side elevation, partly in section, of a silk loom having this beating up, *i. e.*, reed actuating mechanism added.

A is the frame of the loom, provided with take up rollers B, guide and tension rollers C, etc., and heddles D. E is the driving shaft of the loom, provided with gear wheel F, meshing with a gear wheel G on crank shaft H, which crank shaft moves the batten I, pivoted at its lower end J and provided with a movable reed K, pivoted at its upper end L to the upper end of the batten, which is swung by means of pitman M, pivotally connected to the batten at one end and to a crank *h* on the crank shaft H.

The mechanism consists in a lever N secured loosely upon the shaft E, and which lever N is provided with a roller *n*, adapted to be operated upon by a cam *h'* on the crank shaft H. This cam *h'* is formed with an abrupt "drop" between its highest portion

and a lower portion as clearly visible in the illustration. The lever N is connected to the lower end of reed K by a draft connection, comprising a link N' for drawing upon the reed, which link is pivoted at one end to the actuating lever N, and at the other end to the reed. The link N' is a two part link adjustable in length by means of a set screw and slot connection *n'*. O is an actuating spring for throwing the reed forward to give the beat up motion, *i. e.*, a sharp, quick stroke to the filling; P indicates the shuttle.

The crank *h* on the shaft H imparts to the swinging batten I the usual positive forward and backward motion. The reed, however, in its entirety does not fully partake of the forward motion of the batten, but as the batten moves forward is retracted by the cam *h'*, which swings the reed on its pivot L. When the crank *h* is on a dead center and the batten is in its farthest forward or normal beating up position, the bowl or roller *n* rolls or drops off the high portion of the cam onto a lower portion thereof and the reed is snapped sharply forward by the spring O, which has been put under tension by the retraction of the reed, and the batten and reed are then retracted by the crank. (*Eduard Herzig, Union Hill, N. J.*)

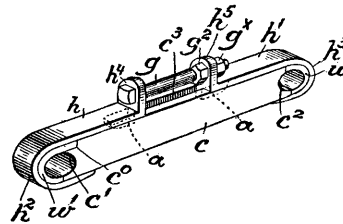
PITMAN FOR COTTON LOOMS.

The object of this pitman is to be able to get along with one dagger (at or near one end of the lay) in the protector mechanism of a loom in place of the two daggers which were used until now to prevent twisting of the lay, one dagger, if used, in connection with two common pitmen, causing too heavy a strain on the pitman as well as the other parts of the loom, and particularly on that pitman remote from the dagger, that the bearings thereof would wear loose so rapidly as to necessitate the substitution of a new pitman after a very few operations of the protector mechanism. The new pitman enables to dispense with one dagger and its cooperating frog, at the same time greatly increasing the effective life of the pitman.

The illustration is a perspective view of this pitman as used on the remote side of dagger, the other pitman, *i. e.*, the one nearest the dagger, being of the usual construction.

The pitman comprises a wooden body portion *c*, having its ends transversely recessed, as at *c*¹, *c*², a longitudinal slot *c*³ being formed in the upper face of the body portion.

Each end of said body portion has metallic shoes *h*, *h*¹, bent around its ends, as at *h*², *h*³, to form with the concave ends *c*¹, *c*², thereof substantially circular bearings for the crank pin and the pin connecting the pitman with the lay. These shoes are of a U-shaped form, the upper legs resting upon the top of the body portion *c* and are provided with depending longitudinal ribs *a*, to enter and be guided by the slot *c*³, the inner ends of the said legs being provided with upturned lugs or ears *h*⁴, *h*⁵. A headed bolt *g*, threaded at one end, is passed through holes in said ears and a nut *g*^x is screwed upon the threaded end of the bolt, at the outer side of the ear *h*⁵, a check nut *g*² being provided at the opposite side of the ear. By tightening the nut *g*^x the shoes, which form tension members for the pitman, are drawn toward each other and securely held in



place on the body portion *c*. Leather linings *w*, *w*¹, are inserted within the bends of the shoes, to form with the concaved ends of the body portion *c* non metallic wearing surfaces for the bearings. The body portion *c* is recessed at its larger end, as at *c*⁰, to receive one end of the lining *w*¹ between it and the adjacent shoe *h*.

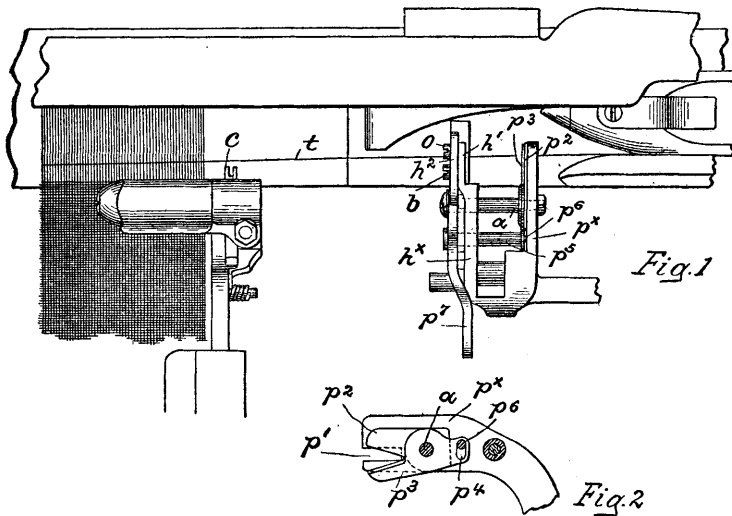
When the pitman is subjected to tensile strain it will be resisted by metallic tension members *h*, *h*¹, and transmitted from one to the other through the rigid connection *g*, so that there will be no tendency to split or shatter the body portion *c*, and the journals or pivot members within the bearings at the ends of the pitman will bear directly against the non metallic linings *w*, *w*¹ for the tension members, nor will these be any movement of the tension members relative to each other.

When the single dagger engages its frog the momentum of the lay tends to twist it, but this sudden strain upon the parts and the tendency of the lay to twist is effectually resisted by the tension members of the new pitman, and owing to its construction as described the said pitman cannot be readily disarranged or broken. (*Draper Co.*)

CLEMENT'S FILLING CUTTER FOR NORTHROP LOOMS.

This cutter works in connection with the filling supplying mechanism of Northrop looms as described in a previous article on pages 37-38; a thread cutting temple as explained on page 114 of "Textile Machinery Part I," being also employed.

The object of this cutter is to provide means to sever the filling end upon change of filling carriers so that the length of the end pulled away by the ejected filling carrier will be as short as possible, at



the present invention this arm is bifurcated, thus forming two branches *p*^x and *h*^x as shown in illustration Fig. 1, which represents a plan view of a portion of a loom showing this cutter in operative position. Fig. 2 is an inner side elevation of the cutter which consists of the rearwardly extending branch *p*^x, notched as at *p*¹, a steel blade *p*² being fixed to the inner branch while a movable blade *p*³ is mounted to rock on a stud *a*. The branch *h*^x is cut away to leave an overhanging projection *h*¹ on which is mounted a weighted jaw *h*², fulcrumed at *o*, and having a slot near its front end to receive a guide stud *b*.

By the mechanism described in the article on pages 37-38, the arm *p*¹ is raised, placing the holding and cutting mechanism in position to receive the filling thread *t*, which enters between the jaws and blades of the cutter. The lug *p*³ is next depressed and acts to close the two holding jaws before the part *p*⁶ of said lug has engaged the bottom of the slot *p*⁴ of the cutter blade *p*³, so that the filling is engaged and held by the holding device before it is severed by the cutting blades. This prevents the filling from twisting out of range of the holding device as it would be apt to do if it were severed before being held firmly. As soon as the thread is firmly held, the cutting blades then operate to sever the thread as near as possible to the shuttle, then as the mechanism resumes its normal position, it moves the jaws and the filling thread held by the same forwardly so that the thread comes in contact with the cutter blade *c* on the thread cutting temple previously referred to, thus severing the remaining portion of the thread close to the selvage, the portion of the thread thus severed being held between the jaws of the cutter, as previously described, until the operation is repeated, when the jaws open, thus releasing this portion of thread.

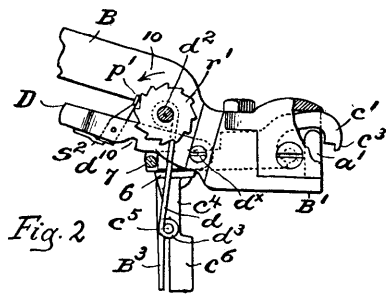
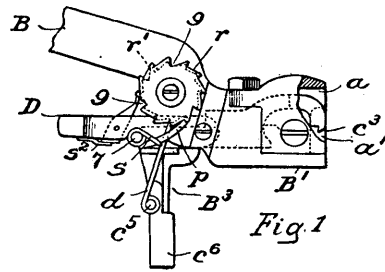
Another construction of the thus described cutting and holding mechanism is shown by illustrations Figs. 3, 4 and 5, of which Fig. 3 is an inner side elevation of the thread clamp and cutter in position to act upon the thread when the transferer is operated to effect a change of filling, the lay being shown on its forward beat. Fig. 4 is a sectional detail of the thread cutter and Fig. 5 is a side elevation of the device which operates to open the clamp and the cutter as they are moved in opposition to act upon the filling thread.

A sharpened blade *p*² is secured to the inner face of the arm *y*, with its sharp edge just above the bottom of the notch *p*¹, while a movable blade *p*³ is mounted to rock on a stud 1, fixed in and extended laterally from the inner side of the arm *y*, said blade being slotted at *p*⁴, a stud 2 being inserted in said slot, permitting rocking of the blade, said blade also having a depending heel *p*⁵ at its front end. A lug *p*⁶ extends laterally from the movable blade near its heel, and the said blade moves in a guide 3, secured to the arm *y*, said guide forming a housing for a spring detent *p*⁷, adapted when the blade is in normal open position to catch over its upper corner 4, the detent yielding when the blade is positively moved into position to cooperate with the fixed blade *p*² to sever filling between them. A pin 5 extends across the notch *p*¹ near its bottom to prevent the filling thread from passing too far toward the base portion of the jaws. The stud 1, and the stud 2 as rigidly mounted in the arm *y* and extended laterally therefrom parallel to the stud 1, serve as supports for the fixed member or jaw of the thread clamp.

the same time holding the short length of filling remaining outside of the selvage between the cutter and the edge of the cloth; this end in turn being severed by the cutting blade of the temple on the inward movement of the lay.

The construction of the filling supplying mechanism and its operating parts are the same as in the article referred to on pages 37-38, in which an upturned arm is used to form a shuttle feeler but in

the cutter (shown in dotted lines) is slotted to straddle said blade and present two arms (only one of which c^1 being shown), each having a hook c^2 , said hooks being projected through the slot a by a spring d , which tends to elevate said hooks, as is shown in Fig. 2. A stud a^1 , extended laterally from the bar B, receives the coil of the spring d , one end of which bears against a part of the bar while the other free end d^3 engages a projection c^5 on the depending heel c^4 of the cutter (shown as previously mentioned in dotted lines), the heel being thickened at its lower



end at c^6 . Stops on the cutter limit its forward movement, and a shoe 6 slides and rocks on a stud like extension 7. On one of the stops on the cutter is mounted a pawl p , held by a spring s in engagement with a ratchet wheel r , rotatable on the stud d^2 , each outward movement of the cutter rotating the ratchet r one tooth. A second ratchet r^1 is rotatably mounted on the stud d^2 , against a collar thereon, a spring acting as a friction device to prevent overrunning of the ratchets, the inner one, r^1 , having cooperating with it a holding pawl p^1 , mounted on a detent D , pivoted at d^x , and having a notch d^0 to engage the extension 7 and retain the cutter retracted against the action of the spring d , as shown in Fig. 1, a spring s^2 acting to keep the pawl p^1 in engagement with its ratchet. The ratchets r , r^1 , have the same number of teeth, but the ratchet r^1 is the smaller in diameter, as shown in Fig. 1, every fourth tooth of the ratchet r , as herein shown, being cut down to the root line of the teeth of ratchet r^1 , as shown at 9, Fig. 1, so that whenever the actuating pawl p engages a deep tooth it will also engage and rotate the ratchet r^1 one tooth in the direction of the arrow 10 (see Fig. 2), the pawl being broad enough to extend across both ratchets.

The breast beam is provided with a releasing arm which, as the lay beats up first engages the heel c^4 of the cutter, moving it rearwardly and at the same time depressing its hooked end c^2 , so that the filling end will be caught and drawn across the blade a^1 to sever it, before the heel B^3 is engaged by the lay.

When the lay moves back, the spring d returns the cutter to the position shown in Fig. 2, turning the ratchet r one tooth, the lifting of the detent D when released bringing its pawl p^1 into engagement with a tooth of ratchet r^1 to maintain the detent in-

operative until after a certain number of successive operations of the cutter, the ratchet r will have been turned far enough to permit its actuating pawl p to also engage the ratchet r^1 , and rotate it far enough to disengage the detent, so that it returns to operative position, the stud 7 entering the notch d^0 of the detent at the next back stroke of the cutter and the latter will be maintained inoperative until the releasing arm is again actuated to withdraw the detent. By permitting the cutter to operate several times whenever liberated, it has ample opportunity to engage and cut the filling end, should it fail to work properly the first time. (Draper Co.)

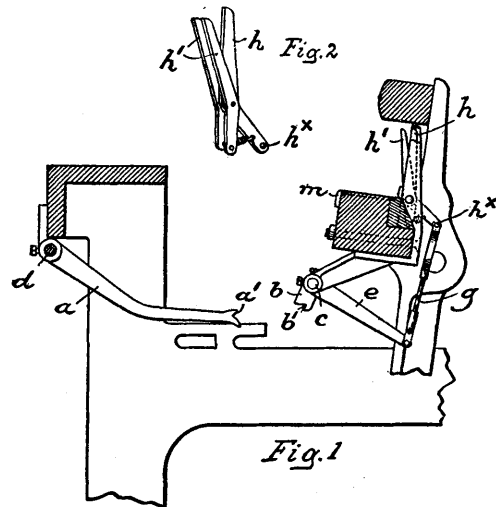
MASON'S THREAD CUTTER FOR NORTHROP LOOMS.

This cutter works on the plan of a scissor, one section of which forms a grid embedded in the lay; the other section, consisting of two depressing members and a cutter blade, being operated to move from a vertical to a horizontal position, thus severing the protruding ends of the filling.

Fig. 1 is a section of a portion of a loom taken transversely to the lay, having the cutter attached. Fig. 2 is a perspective view of part of said cutter.

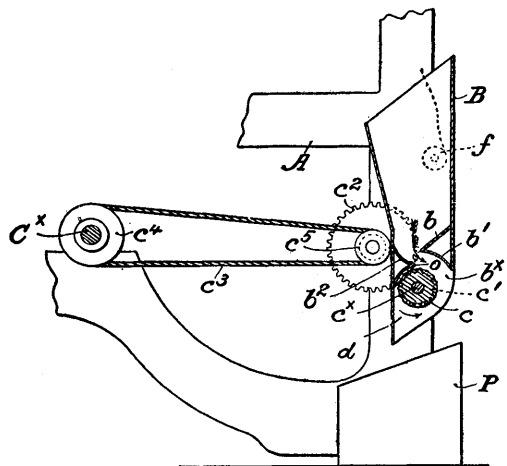
Examining Fig. 1 we find lever a being notched at one end a^1 secured at its other end to the shaft d which is fastened to the breast beam. This lever a is operated from the filling supplying mechanism. When the filling is running properly said lever a is out of action, but when called in action on account of change of filling it is raised, the notch a^1 coming, on the inward movement of the lay, in contact with the notched end b^1 of a short lever b secured to a rod c , and which in turn operates levers e and g , the latter being adjusted to the cutting knife h at h^x .

The cutter, properly speaking, consists of three parts, a grid m countersunk into the lay, and the depressing members h^1 being two blades, between which the actual cutter blade h operates. The object of the two depressing members h^1 is twofold; when the pro-



truding end of filling lays over the grid m said members sink into the two outside grooves of the grid, thus holding the end taut, the continued forward movement of the lay closing the blade h against the stretched thread, thus severing it. (Draper Co.)

b. A pinion c' on the roll c is in mesh with a gear c^2 , rotated from the continuously rotating shaft C^x



of the loom through an endless belt c^2 and sheaves c^1, c^3 .

When the ejected filling carrier f , enters the hopper, it is directed by the shelf b and guide b^2 into the throat b^x , through which it passes to a box or receptacle P . As it passes the stripper c , which is rotated in the opposite direction to the movement of the filling carrier, (see arrow d ,) the loose end of the yarn remaining on the filling carrier will be caught by and wound upon the stripper c , and consequently unwound from the filling carrier. This engagement of the yarn by the stripper refers to such filling carriers as have been ejected with loose ends. When the nearly exhausted filling carrier is ejected the end of the yarn is usually held by the cloth, so that the filling carrier will drop into the hopper and through its throat. When the yarn is severed by a thread cutter, so as to be caught by the stripper and wound upon it. In either case the device is operative, and when the stripper is full, the collected waste yarn can be readily removed, the stripper being made tapering in order to facilitate such removal of yarn therefrom.

The plate b^2 cooperates with the shelf b in guiding the filling carriers into the throat of the hopper, and it also serves as a guard to prevent passage of a filling carrier behind the stripper. (Draper Co.)

SUPPLEMENTAL MECHANISM FOR KNOWLES DUCK LOOMS.

The object of the mechanism is to prevent any bending or back spring of the lay intermediate its connections with the crank shaft when the lay is in its forward position.

Fig. 1 is a rear perspective view of portions of a loom with the mechanism applied thereto, and Fig. 2 is a plan view on an enlarged scale of the supplemental mechanism shown in Fig. 1.

1 indicates the end or side of the loom, 2 the loom center, 3 the driver shaft, 3' the driving pinion, 4 the bottom shaft, 4' the crank shaft, 5 and 6 intermediate gears, 7 the crank connector, 8 the lay, 9 one of the lay swords, secured at its lower end on a rocker shaft 10, 11 the hand rail and 12 a portion of the reed.

On the bottom shaft 4 is fast a gear 13, which meshes with a gear 14, fast on a short shaft 15, journaled in bearings 16 on the cross girth 17 and loom center 2. (See Fig. 2.) On the end of the shaft

15 is fast a crank disk or wheel 18, and on the pin or stud 19 there is loosely mounted a roll 20. A lay sword 21, located intermediate the end lay swords 9, is secured at its upper end to the rear portion of the lay 8 and secured at its lower end on the rocker shaft 10 and has a curved or cam surface 22 thereon, which is made removable and adjustable by bolts 23, and is so arranged relatively to the roll 20 on the crank disk 18, and the revolution of said disk is so timed that when the lay is very near its forward position on its forward stroke, the roll 20 will be back of and ready to engage the curved or cam surface 22 on the center lay sword 21, and if there is any bending or back spring of the lay as it beats up, the roll 20 will engage the cam surface 22 and push forward the lay and bring it into alignment when the lay is at its extreme forward movement, thus beating up the cloth in a straight line the full length of the lay.

In the ordinary weaving of the loom, in case there is no back spring of the lay, the roll 20 may be carried around with the disk 18 and pass by the cam surface 22 on the stand 21 on the forward stroke of the lay without any engagement therewith.

By the construction of the new mechanism the roll 20 is in position to engage the cam surface 22 on the

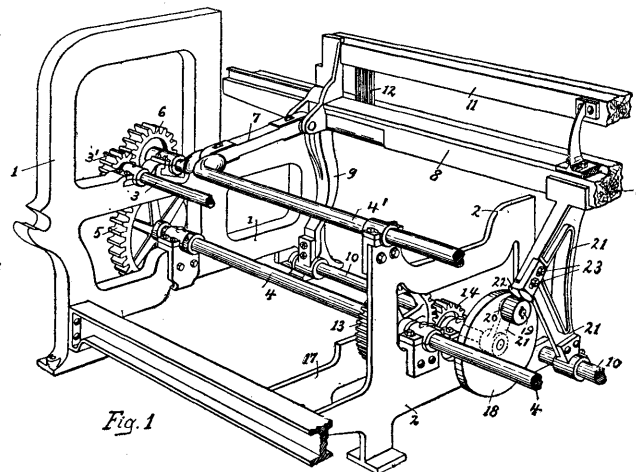


Fig. 1

stand 21 only during a portion of a revolution of the disk 18, and during the rest of the revolution of said disk there is no engagement or possibility of engagement

between the roll 20 and the cam surface 22, thus reducing friction on the parts and consequent loss of power.

Only one center lay sword 21 and one crank disk or wheel 18 and engaging roll 20 are shown in Fig. 1; but there can be one or more on the loom, according to its width.

For a change in construction a crank arm carrying the roll 20 may be used in place of the disk or wheel 18, as indicated by dotted lines 21 Fig. 1. The roll 20 may be dispensed with and only a pin or stud used. (Crompton and Knowles Loom Works.)

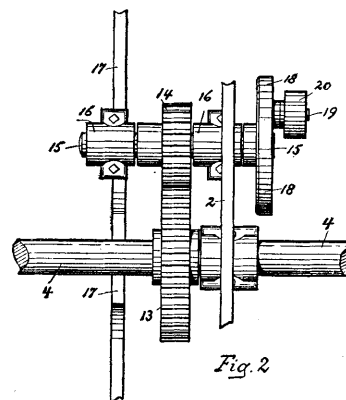
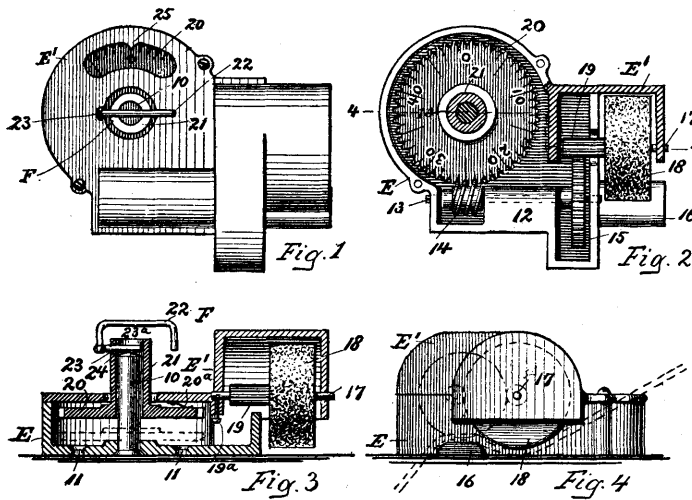


Fig. 2

When the device is to be put into service, the registering wheel 20 is drawn upwards by manipulation of

is so held that the pin *a* in the wheel B at each revolution of that wheel catches one of the teeth of wheel D and turns the shaft J a little ways. This shaft J has a worm *g* fast on it between its bearings *r* on the bracket A, which worm engages with the teeth *c* of dial wheel G, held to turn on a stud *h* fast in the bracket A. The dial wheel G has a series of numerals on its face near the edge, for indicating the number of yards of cloth woven. A hand or pointer *V* is held fast on the stud *h* in position to indicate the figures as the dial is moved.

When the sand roll of the loom (not shown in illustration) is turned to wind the cloth on the cloth roll of the loom (not shown in illustration) the friction wheel B, resting on it, will be turned, and at each revolution the pin *a* in the side of the wheel B, will enter between two of the teeth of the wheel D and will move that wheel one tooth. When the wheel D has made a full turn, the worm *g* will have moved the dial wheel one tooth or one figure on the dial, which will be indicated by the pointer *V*. The indication of the numbers of yards of cloth woven is regulated by the relative sizes of the sand roll and



the arm 22, which is moved longitudinally, so as to locate the pin 23 over and in contact with the convex upper end of the stud 10, as shown in Fig. 3.

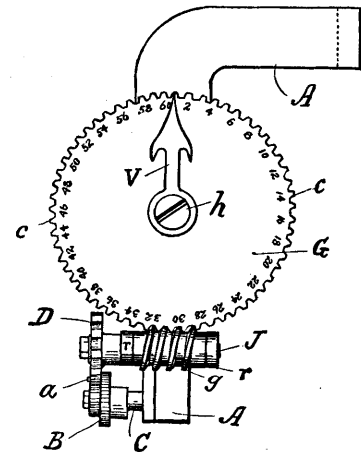
It will be seen that the resilience of the spring 20^a, coacting with the pin 23, will hold the registering wheel 20 in meshing engagement with the worm wheel 14 and produce but slight frictional resistance to rotation.

When the full number of yards in a piece of cloth has been indicated by the registering wheel 20 and a new piece of cloth is to be measured, the locking device F is moved so as to free the pin 23 from the top of the stud 10, whereupon the registering wheel will drop to the bottom of the base section E of the casing and the wheel can be turned so as to bring zero to a proper point or opposite an indicating point 25, formed in the wall of a slot made in the upper casing, as shown in Fig. 1, whereupon the locking device is again placed in position to hold the registering wheel in mesh with the worm wheel 14.

The device is placed as close as possible to the point where the selvage edge of the fabric leaves the loom. As is indicated in Fig. 4, the selvage edge of the fabric is placed in engagement with the bottom portion of the friction wheel 18 and over the foot 16, the movement of the cloth to the winding roller of the loom being the power which operates the friction wheel, and the friction wheel with the chain of gearing before described communicates movement to the registering wheel. (Alfred and John Bentley, Paterson, N. J.)

wheels B, D, G. For example: If the sand roll is one foot in circumference and the friction wheel B one third of that and has nine teeth, each tooth on the wheel G indicates one yard of cloth, which will be shown on the dial; again, if the friction wheel B is one twelfth of a yard in circumference the toothed wheel D must have twelve teeth to obtain the same result.

(Soren Jensen and John Comar, Providence, R. I.)



JENSEN AND COMAR'S MEASURING DEVICE FOR LOOMS.

The illustration shows a front elevation of the mechanism of this measuring device.

A indicates a bracket that is attached to the loom frame at its upper end by a bolt, at the lower end of which a short horizontal shaft C is held in a bearing, and a friction wheel B is made fast in the inner end of the shaft C, with a pin *a* inserted in the side of the wheel B. Another shaft J is held in bearings a little higher up on the bracket A than the shaft C, and a toothed wheel D, fast on the inner end of the shaft J,

FISCHER'S NEEDLE LOOM.

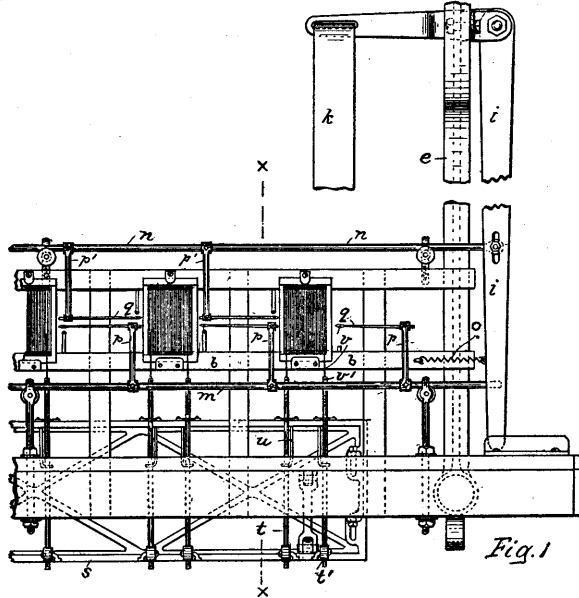
This new mechanism refers more particularly to the needles or "loopers" as used in this class of looms, and has for its object, means whereby these loopers, while reciprocated collectively to enter and quit their respective loops, are individually and independently spring yielding and movable toward and away from their respective reeds, so that each looper may adapt itself to its own particular work.

Fig. 1 is a front elevation of that portion of such a loom showing the needles and lay, only the right hand part of the loom being shown. Fig. 2 is a section, taken on line x-x Fig. 1, through the batten, showing the looper in its elevated position.

The lay swords *e* are fulcrumed at their upper ends in standards as fastened to the upper part of the loom frame, and carry the sets of reeds, filling carriers and loopers, there being one set for each piece of goods woven. The filling carriers are arranged, as horizontal needles *q*, in pairs, the needles of each pair

pointing in opposite directions, one being carried by a horizontal longitudinally reciprocating rod *m* and the other by a similar rod *n*. The needles *q* of rod *m* are secured to their rods by arms *p*, those of rod *n* being secured thereto by arms *p'*.

The filling is taken from bobbins in the rear of the loom, there being one bobbin for each needle. The needles *q* are actuated by having their rods *m*, *n*, attached to the picker sticks *i*, the said picker sticks being moved by straps *k* and the return movement being effected by springs *o*, attached to one of the bars (*b*) as connecting the lay swords. By this arrangement, first one set of needles is operated and



then the other, the shed changing at each reciprocation of either set of needles so as to hold the filling loops deposited by the needles and beaten up by the reeds.

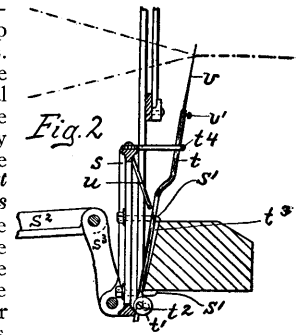
For the purpose of holding the loop carried across the warp by each needle, until said loop is beaten in by its reed, a second set of needles *v* (loopers) is provided, arranged in pairs, one on each side of each reed. They reciprocate in a plan transverse to that in which the filling carrier needles move, and are arranged and operated to enter and quit each its own filling loop at appropriate times. For this purpose these loopers are mounted on and carried by a frame *s*, situated back of the batten and adapted for vertical reciprocatory movement by guides *s'*, that project rearwardly from the top and bottom of the batten into and through vertical slots in said frame. The reciprocatory movement of the frame *s* is effected by means of levers *s²*, one at each end of the loom, and at their free ends connected to the frame *s* by links *s³*. Both levers *s²* are operated simultaneously by cams on the crank shaft of the loom, these cams operating to lift the frame *s*, the descent of the latter being due to gravity. The movement is timed so that the loopers *v*, which are down when the horizontal filling carrier needles *q* carry the filling across the warp shed, will rise and enter the filling loops before the filling carrier needles begin to move back, and will thus hold the loops until they are beaten up and the warp shed is changed, at which time they quit the loops and descend to their normal position. In this way all of the loopers are reciprocated to enter and quit their loops collectively and together.

It is, however, necessary that the loopers should be

capable of motion to and from their respective reeds, the motion toward the reed being necessary in order to properly beat up the fabric and secure the filling loop in place, and the motion from the reed being necessary in order to enable the loopers to enter their respective loops, at which time the filling carrier needles *q* are between the loopers *v* and the reeds.

In order to make the loopers to be capable of movement independently, so that they may adapt themselves to any weave, each of said loopers is made individually spring yielding and movable to and from the reed, so that while all of the loopers reciprocate collectively and as a group to enter and quit their loops, the individual members of that group are separately and independently movable in a direction to and from their respective reeds. For this purpose the needles are adjustably secured by set screws *v'* in needle bars *t*, adjustably secured by set screws *t²* in blocks *t¹*, which are pivoted to the lower part of the frame *s*. When thus pivoted, they can swing or move to and from the reed.

With each needle bar *t* is associated a spring *u*, which tends to hold the needle bar away from the reed, and each bar passes through a guide slot in a three arm guide *t³*, adjustably secured to the top of frame *s* by set screws. This guide restrains the needle bar from lateral movement and limits the extent of its vibratory movement to and from the reed. The needle bars *t* are between the frame *s* and the batten, and in the latter at points where the needle bars come are wedge shaped clearance slots *t³*, which have their wide end uppermost, so as to allow the loopers to move away from the reed as they rise far enough to permit them to enter the filling loops.



The looper needles *v* are plain and without eyes. The filling carrier needles *q* are provided with eyes, through which the filling is threaded.

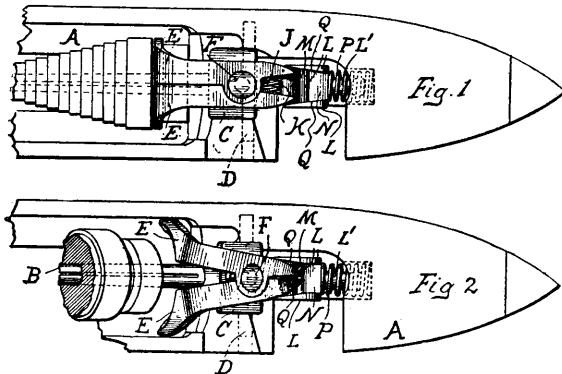
When the loom is in operation, one of the filling carrier needles *q* of each pair enters and passes across the warp shed, so as to lay a loop of filling therein, and projects enough beyond the opposite or far edge of the warp shed to bring the open loop in position to be entered by its appropriate looper needle *v*, the batten at this time being in the rear position. The frame *s* during this time rises, so that when the loops are in position, the loopers *v* will enter said loops, and as they rise will, under the influence of the springs *u*, swing forward from the reed far enough to be in position to pass up into the loops on the front side of the filling carrier needles *q*, which at this time are between the loopers and the reed. As soon as the loopers engage their loops the filling carrier needles recede and draw back out of the warp shed, the batten moving forward and the loopers still engaging and holding the loops until the filling is beaten up and the shed changes, at which time the frame *s* descends far enough to draw the loopers out of their loops. When the frame *s* descends, the needle bars *t* will, by the shallow lower ends of their clearance slots be closed up toward the reed, so that at this time the needles *v* will be substantially vertical; but in rising and before said needles reach their loops they will be permitted to swing forward away from the reed far enough to enter their loops. (American Automatic Loom Company of New Jersey, Paterson, N. J.)

BOBBIN HOLDING DEVICE FOR SHUTTLES.

In this shuttle means are provided by which the raising or lowering of the spindle, respectively, automatically engages or disengages the bobbin.

Figs. 1 and 2 represent top or plan views of this shuttle, showing the new mechanism in both positions. A designates the body of the shuttle, B the spindle, C the head thereof and D the axis of said head. E designates the jaws, which are mounted on said head C by the pivot F, whereby they are permitted to open and close in the direction of the width of the shuttle. The heel or rear ends of the jaws are tapering and have depending ears, which freely enter recesses in the head C, so as to be guided therein as the jaws open and close. Interposed between said ears in chamber K is the spring J, whose tendency is to close the jaws and hold them closed.

L designates shoes which are seated on the recess M in the head C, permitting the shoes to rock on said head. Bearing against the back of the connecting piece N of the shoes is the coiled spring P, which



encircles the stem L¹ of the shoes L, thus retaining the shoes in position on the head C. The shoes are adjacent to the heel ends of the jaws E and have their inner sides Q inclined, said heel ends being adapted to ride against said faces.

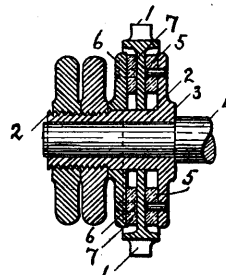
The operation is as follows: When the spindle is raised the heel ends of the jaws enter and ride against the shoes L and are brought together or closed, whereby the jaws separate and are thus open. The spring N now bears downwardly against the wall of the receptacle M, and so holds the spindle in its elevated position. The bobbin is then slipped on the spindle to its full extent, and when the spindle is lowered the heel ends of the jaws then clear the shoes L and the spring J becomes operative, separating the heel ends of the jaws, whereby the latter close on the bobbin and tightly clamp and hold the same. The spring P, which, in a measure, works with the shoes L, now presses upwardly against the wall of the recess N and so holds the spindle in closed position. This construction permits the use of bobbins having broken heads. (R. Sergeson & Co., Philadelphia.)

IMPROVEMENT TO THE TAKE UP FOR CROMPTON SILK LOOMS.

This improvement refers to the take up mechanism described on pages 56-57 and has for its object to pro-

vide an additional friction surface to the take up roll, in order to obtain a firmer grip on the sprocket wheel attached to the take up roll, at the same time preventing any slipping.

The illustration is a sectional detail of this friction mechanism on the take up roll.

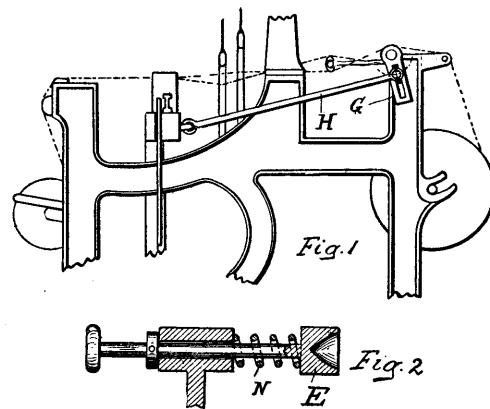


A chain as fast on a sprocket wheel on the winding up roll (not shown in illustration) passes over the sprocket wheel 1 loose on the hub 2 of a disk 3 fast on the end of a shaft 4 of the take up roll. A friction collar 5 is secured on the inner surface of the disk 3 to bear against the sprocket wheel 1. Upon the opposite side of the sprocket wheel 1 is a disk 6 having a friction collar 7 thereon to bear against the sprocket wheel 1 and rotate the winding up roll (not shown), the two frictions thus produced obtaining a more accurate grip on the sprocket wheel, preventing slipping of said sprocket wheel and take up roll. (Crompton and Knowles Loom Works.)

A NOVEL METHOD OF OPERATING LEASE ROD.

Fig. 1 is a side elevation of part of a loom showing the mechanism applied thereto, and Fig. 2 is a sectional detail view of one of the lease rod supporters, having yielding adjustability, whereby the rod may be readily removed from or inserted in the holders E (one on each side of the loom), as secured in bearings on the loom frame.

On one end of one of the holders is secured an arm G to which is attached a rod H, the same being connected to the lay; thus when the lay moves it gives



a partial rotation to the rod. By compressing the spring N the rod can be readily removed or inserted in the holders. The rod H, as shown connected to the lay, may be connected to the driving shaft, giving the same result. (John P. Kelly Manufacturing Co., Biddeford, Me.)

CROMPTON & KNOWLES LOOM WORKS

WORCESTER, MASS.
BRANCH WORKS
PROVIDENCE, R.I.



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SEE INSIDE PAGE 2