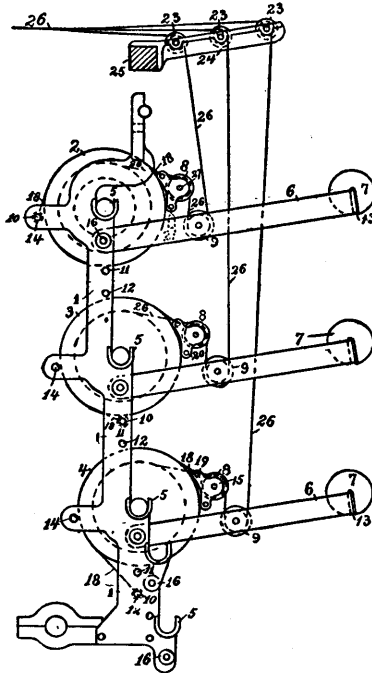


upright stands 1, which are provided at intervals with supporting sockets 5 for the shafts of these warp beams. Projecting from the stands 1 are pins 16, for receiving and supporting the perforated end of the tension frames 6, which are made in a general U-shape having spring arms connected by a cross piece on which weights 7 are placed.

An extra pin 16 is shown near the bottom of stands 1, for the purpose of changing the position of the



tension frames when desired, such extra pins being also present in connection with the beams 2 and 3, but purposely omitted from the illustration in order to avoid confusion. Between the spring arms of each of the tension frames 6 are supported, to freely rotate, the rollers 9.

Grouped around the bearings or sockets 5 for each warp beam in the stands 1 is a series of holes 11, 12, and 14, adapted to receive the ends of and support a rod 10, which is of uniform dimensions from end to end and extends across the entire loom frame, being readily interchangeable in the holes 11, 12 and 14.

Each warp beam is provided with a head formed with a groove in which rides a roller plate 15. Carried on a pin 27 which is free to rotate in bearings in this roller plate 15, is a roller 8, turning loosely on said pin, the ends of the pin being turned down, forming a shoulder to prevent accidental removal. To one end of the roller plate 15 is connected the strap 18 by means of the hole 19 in the plate, which is engaged by a link which is itself engaged by a hook on the end of the strap 18. The opposite end of the strap is provided with a hook adapted to engage the rod 10.

The adjustment of rod 10 into the different holes 11, 12 and 14, in the stands 1, will cause the strap 18 to engage more or less surface of the beam head and will to that extent vary the frictional energy with which the strap will tend to retard rotation of the beam.

In the end of the roller plate opposite the hole 19 there is provided another hole 20, to which may be connected a tension weight 21, if greater friction is desired upon the beam heads. (See dotted weight in connection with warp beam 2).

Mounted above the stands 1 and in position to guide the warp threads 26, as they are delivered from the beams are a series of rollers 23, having loose bearings in brackets 24, secured to the loom frame 25.

The warp threads from the beams are passed over the rollers 8, carried by the roller plates 15, then down and under the rollers 9 on the tension frames 6, and thence up over guide rollers 23. The effect of this is that the warps coming from rollers 8 tend to press the roller plate 15 and friction strap 18 upon the beam head, and being directly acted on by the tension

frame 6 as they pass beneath the rollers 9, they tend to regulate their own tension. Should the frictional tendency of strap 18 and plate 15 become too great, however, the tension frame 6 will be raised by the warps as they pass to rollers 23, and the side arms of the tension frame coming in contact with the projecting ends of the pin 27 will tend to raise said pin and thus the plate 15, to thereby relieve the excessive friction of strap 18 and plate 15, to permit the beam to more freely rotate, and as the tension is thus relieved the tension frame 6 will descend and restore the frictional engagement of the roller plate 15 and strap with the beam head.

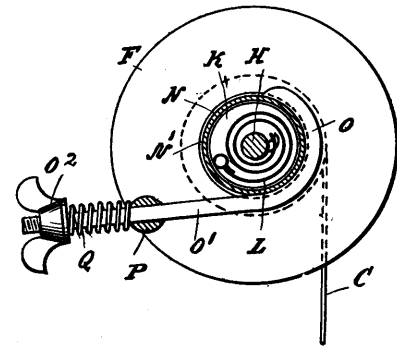
The advantages of the new tension device are that it causes a more steady and uniform movement of the warp 26 as it passes to the loom from the rolls 23 and obviates the pulls and jerks incident to the let off of former construction. (Wm. E. Fischer, Geo. F. Kuett and Chas. Fischer, Paterson, N. J.)

FRICTION WARP RACK FOR NARROW WARE LOOMS.

The object is to provide a warp rack arranged so as to be able to regulate the tension of the warp for each individual spool by means of a friction device adjusted to each spool, at the same time reducing the distance the warp has to travel from the rack to the lay.

The illustration is a sectional side elevation of one of the warp spools and its friction device.

The warp spools F are set two, three or more rows high in an oblique rack situated in the rear of the loom. In the bottom of this rack there are placed as many



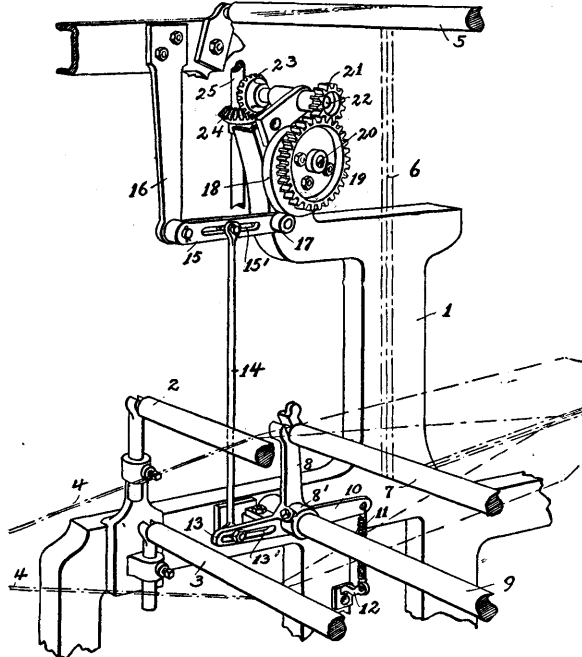
glass rods as there are tiers of spools. One side of each warp spool is formed with a number of apertures engaged by pins projecting from a disk K, mounted to rotate loosely on the shaft H, and on said disk is secured the outer end of a helical spring L, secured at its inner end to the shaft H, the disk and spring being inclosed in a barrel N, secured to the shaft H. On the peripheral surface of the barrel N is formed an annular groove N¹, engaged by a hook O, formed on a shank O¹, mounted to slide longitudinally in a bearing P, held to turn on the rack frame as situated in rear of loom. On the outer threaded end of said shank O¹ screws a wing nut O², against which presses one end of a spring Q, coiled on the shank O¹ and resting with its other end on the bearing P.

When the shank O¹ is pressed on by the spring Q the hook O is held with more or less force in frictional contact with the barrel N, thus by screwing the wing nut O² inward or outward the frictional contact of the hook O with the barrel N is correspondingly increased or diminished.

The power of the spring is somewhat less than that of the friction device to allow the spring to hold the warp taut; but when the pull on the warp exceeds the tension of the spring L then said spring will exert a pull on the shaft H and turn the latter at the time the warp is sufficient to overcome the power of the friction device. (Wm. J. Irwin, New York.)

REGULATING THE TENSION OF THE PILE WARPS FOR DOUBLE PLUSH,

woven in looms where two shuttles are thrown across the loom simultaneously.



The illustration shows a portion of a loom frame or arch and the rods over which the body and pile warps pass, having the mechanism for positively moving the pile warp tension regulating rod combined therewith.

1 indicates a portion of the arch at one side of the loom. 2 and 3 are the rods over which the two sets of warp threads 4, forming the body of the two fabrics, pass. 5 is the rod over which the pile warp threads 6 pass from the pile warp beam. Said pile warps pass under the tension regulating rod 7, which is supported at each end in a slot in the upper end of the arm 8, having a hub 8', which is fast on a rock shaft 9. Extending out from the hub 8' toward the front of the loom is an arm 10, which is connected at its end by a spring 11 with a stationary arm 12, secured to the loom frame. Extending in an opposite direction to the arm 10 from the hub 8' is an arm 13, provided with a longitudinal slot 13', connected through rod 14 with arm 15, having a longitudinal slot 15'. This arm 15 is pivoted on the lower end of bracket 16, secured at its upper end on the loom frame. By means of the slots 13' and 15' in the arms 13 and 15, respectively, the point of connection of the rod 14 with each of said arms may be varied, to thus either increase or decrease the extent of the movement of the tension rod 7.

On the free end of the arm 15 is mounted a roll 17, which engages with the periphery of an eccentric cam 18, bolted to the inner face of a stud 20. The gear 19 meshes with a pinion 21, fast on a shaft 22, which carries at its opposite end a beveled gear 23, meshing with another beveled gear 24, fast on the upright driven shaft 25. The revolution of the shaft 25 through beveled gears 24 and 23, pinion 21, and gear 19, communicates motion to the cam 18, and through roll 17, arm 15, connector 14, arm 13, and arm 8 the tension rod 7 will be moved inwardly and outwardly, the spring 11 acting to keep the roll 17 in contact with the cam 18.

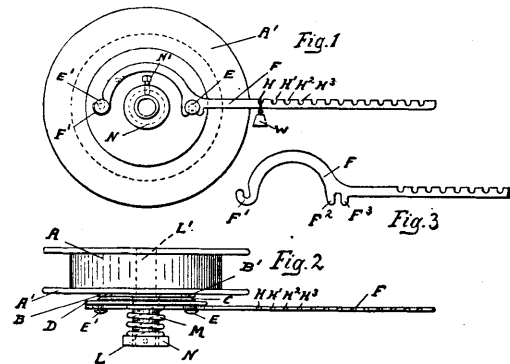
When the pile warps 6 are at the middle position intermediate the bottom and top shed, as shown in the illustration, the tension rod 7 will be at its rearward position, brought there and held there by the cam 18 acting on the roll 17, and when the pile warp threads 6 are in the top and bottom sheds the tension rod 7 will be at its forward position, the shape and revolution of the cam 18 being regulated to bring the roll 17 on the lowest part of the cam at this time.

On the cam 18 there is one high portion and one low portion, therefore, a single revolution of said cam will cause the tension regulating rod 7 to be moved once into its forward position and once into its rear position. The revolution of the cam 18 is so timed as to cause one revolution of said cam for every two picks of the loom. (Geo. F. Hutchins, Worcester, Mass.)

TENSION REGULATOR FOR WARP BEAMS FOR NARROW WARE LOOMS.

Fig. 1 is a side view of this tension regulator, Fig. 2 a top view of it and Fig. 3 a side view of the brake lever.

A indicates the warp beam or spool. Cast on the flange A' of said warp beam is a ring B, having a cone shaped surface B'. Fitting into this is a similar cone shaped surface C cast on a disk D, having on the side opposite to said cone shaped surface two pins E and E', secured to it, and attached to these is a brake lever F, constructed at one end according to a semicircle; one end of which semicircle has a hook F', fitting around the pin E', the other end of the semicircle having a seat formed by two prongs F² and F³, which prongs embrace the pin E. The other end of the brake lever F is notched with notches H H' H² H³, etc., in order to support a weight W, which according to the weight being placed in the notch, nearest to the warp beam or farthest away from it, will



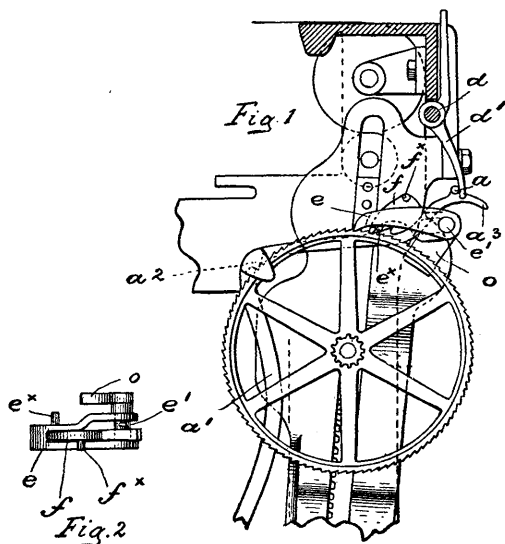
form one means of correspondingly decreasing or increasing the tension administered to the warps.

On the side of the warp beam A having the flange A' is the hollow projection L, having a hole L', through which the pin that carries the warp beam passes. Said projection is screw cut externally at the end and has coiled around it a spring M, one end of which bears against the disk D, whereas the other is pressed against a stop bush N, provided with a set screw N'. Inside of this bush N is a split nut, screw cut, to match the screw cut end of projection L, and thus adjusted to the said projection can be screwed in and out, thus allowing the spring M to be contracted or expanded, which presses the disk D, having conical surface C, in the similar conical surface B' on flange A' with greater or less force, thus producing a greater or smaller amount of friction, which is the desired object of the spring's action. (Alfred and Herman Schiffer, Paterson, N. J.)

TAKE UP MECHANISMS.

CLEMENT'S TAKE UP MECHANISM.

This mechanism has for its object, the production of means whereby the weaver can readily liberate the take up ratchet wheel from its various cooperating de-



vices—i. e., the actuating and let back paws—so that the said wheel may be freely turned by hand, in order that the weaver may repair defects.

Fig. 1 is a vertical section of part of the loom, showing this take up, and Fig. 2 is a top or plan view of the let back paws.

In the illustration two paws, *e* and *f*, are shown, bracket *o* on the loom frame has a stud *e'*, which serves as a fulcrum upon which the longer pawl *e* rocks, while the shorter pawl *f* is slotted longitudinally to embrace and slide on said stud *e'* when the pawl *e* is raised sufficiently to disengage it from the ratchet wheel.

Referring to Fig. 2, the pawl *e* is shown as bifurcated, while the pawl *f* is mounted between the branches, a lateral lug *f^x* on the pawl *f* extending over one of the branches of the pawl *e*.

In order that the ratchet wheel may be simultaneously liberated from all of its connections, the upper end of the pawl carrier *a'* is extended toward the front of the loom to form a handpiece *a³*, which can be readily grasped by the weaver. A locking shoulder (not shown) is formed on the pawl carrier to at times cooperate with a projection *e^x*, extended from the let back pawl *e*.

One tooth of the ratchet wheel is taken up by the pawl *a²* at each beat of the lay, and the let back pawl *e* prevents retrograde movement of the ratchet wheel except when the rod or shaft *d* is rocked by failure of the filling, at which time the pawl carrier will be disengaged, by the arm *d'* acting on the lug *a* on said pawl carrier, the pawl *e* will be lifted, and the pawl *f* will permit the wheel to let back as many teeth as are advisable, so as to prevent thin places in the cloth.

Normally the projection *e^x* of the pawl *e* extends over the pawl carrier back of the locking shoulder

(previously referred to); but if the weaver wishes to liberate the ratchet wheel he grasps the hand piece *a³* and pushes the pawl carrier backward. This movement disengages the actuating pawl *a²*, and at the same time the paws *e* and *f* are lifted until the projection *e^x* on the former drops in front of the locking shoulder (previously referred to), whereupon the parts will be locked in inoperative position and the ratchet wheel can be turned in either direction, the parts remaining locked until the pawl *e* is lifted sufficiently to withdraw the projection *e^x* from the shoulder, whereupon the pawl carrier will return to normal operative position. (Draper Co.)

THE CROMPTON TAKE UP MECHANISM FOR SILK LOOMS.

Fig. 1 is a front view of the take up mechanism, looking in the direction of arrow *a*, Fig. 2. Fig. 2 is a section on line 2-2 Fig. 1, looking in the direction of arrow *b*, same figure. Fig. 3 is a section on line 3-3

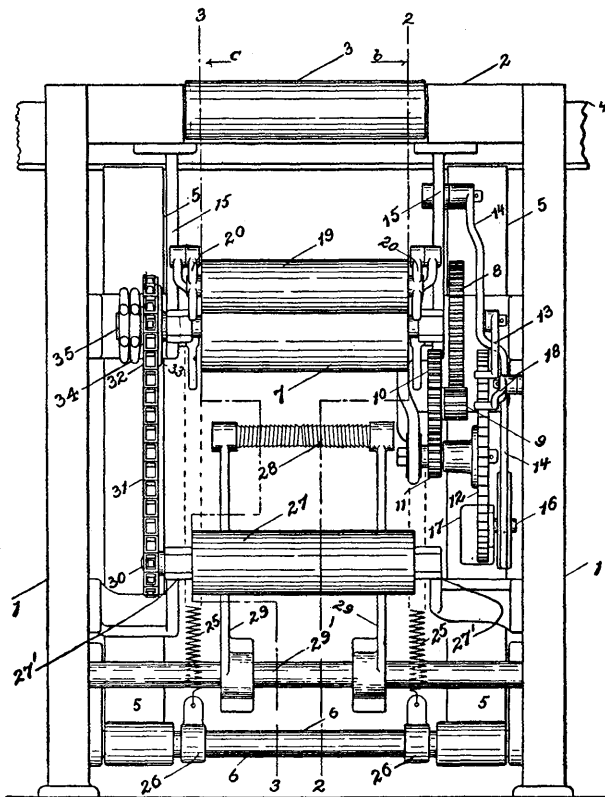


Fig. 1

Fig. 1, looking in the direction of arrow *c*, same figure; and Fig. 4 is a sectional detail of the friction mechanism for the take up roll.

In these looms owing to the delicate nature of the material a filling stop motion cannot be used successfully.

1 indicates the loom sides, 2 the breast beam, having a roller 3 located at its front side, over which the woven fabric 3' passes; 4 indicates the lay, 5 the lay swords secured at their lower ends on the rocker shaft 6.

7 is the take up roll, revolved through gears 8, 9, 10 and 11, driven by ratchet wheel 12, which is moved at every stroke of the lay by pawl 13, pivoted at its

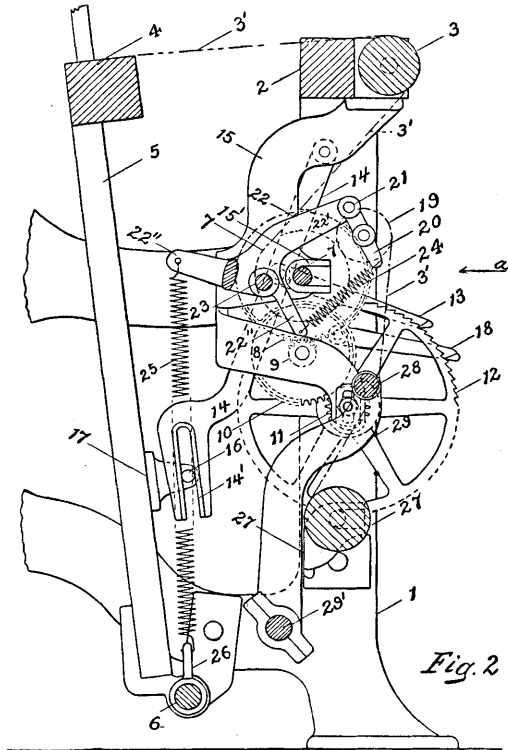


Fig. 2

inner end on arm 14, pivoted at its upper end on take up stand 15, and provided at its lower end with slot 14' into which extends and travels roll 16 on stand 17, secured to the front side of one of the lay swords 5. (See Fig. 2.) A second pawl 18, pivoted on the frame, engages the ratchet wheel 12 to hold the same after it has been turned by the pawl 13.

The carrier roll 19 extends on the outside of the take up roll 7 and is supported at each end in an arm or lever 20, which is pivotally supported at its upper end by pins 21 upon arms 22' of the swinging frame 22, mounted upon the pins 23, supported in the take up roll stand 15.

A spiral spring 24 is attached at one end to the lower end of the lever 20 and at its other end to the downwardly extending arm 22'' on the swinging frame 22, and acts to press the carrier roll 19 against the take up roll 7.

To the rearwardly extending arm 22''' of the swinging frame 22 is secured one end of a spiral spring 25. The other end of said spring is secured to a collar 26 on the lay shaft 6.

Springs 25 (there is a spring at each end of the swinging frame 22) rock the frame and raise the carrier roll 19 if the fabric 3' passing over the roll 19 is not drawn down by the action of the lower winding up roll 27, to which winding up roll 27 the fabric 3' passes from the carrier roll 19 after it has passed over the spreading roller 28, supported in the upper ends

of stands or arms 29, secured upon the cross rod 29'. The spreader roller 28 is provided with right and left hand grooves to spread the fabric as it passes over said roller.

The winding up roll 27 is mounted in bearings 27' on the loom frame and has secured on one end thereof a sprocket wheel 30, around which a chain 31 passes to a sprocket 32, loose on the hub 33' of the disk or

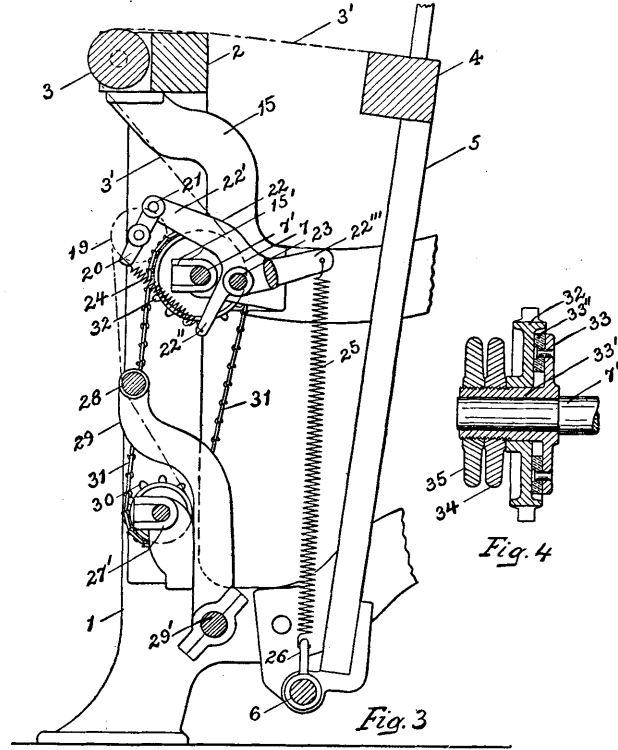


Fig. 3

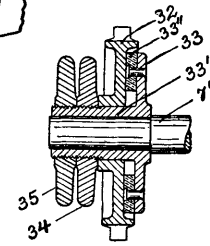


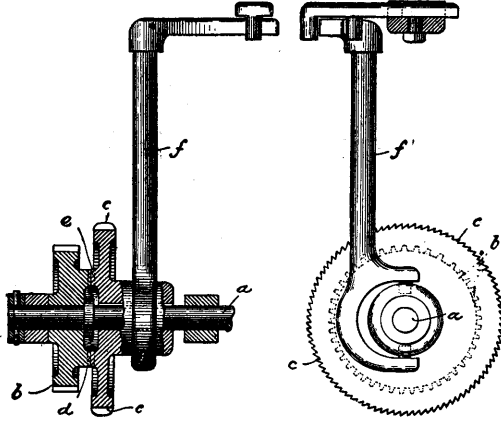
Fig. 4

plate 33, fast on the end of the shaft 7' of the take up roll 7. A friction collar or surface 33'' is secured upon the outer surface of the plate 33, as shown in Fig. 4. The sprocket wheel 32 is pressed against the friction collar 33'' on the plate 33 and is held in frictional engagement to turn therewith by a nut 34, turning on the screw threaded hub 33' of the plate 33. A check nut 35 is used to hold the nut 34 after it is adjusted.

The sprocket wheel 32 of the take up roll 7 is of greater diameter and has a greater number of sprocket teeth than the sprocket wheel 30 of the winding up roll 27, so that the winding up roll 27 may revolve at greater speed to wind up the fabric and take up any slack in the fabric between the take up roll and winding up roll; but as soon as the slack is taken up, then the tension of the fabric passing over the carrier roll 19 will draw down said roll until the arms 22' of the oscillating frame 22 come in contact with projecting flanges 15' on the take up roll stands 15, which act as stops to prevent any further downward movement of the carrier roller 19. The winding up roll 27 cannot now wind up the fabric any faster than it is delivered from the take up roll, and the speed of said winding up roll as the wound up cloth increases in diameter thereon must decrease, and through the friction driven sprocket wheel 32 and the sprocket chain 31 this is provided for, the sprocket wheel 32 turning independently of the take up roll shaft 7'. (Crompton and Knowles Loom Works.)

THE MASON TAKE UP FOR COTTON LOOMS.

The prominent feature of this mechanism is that by means of it the weaver cannot speed the take up abnormally without at once stopping the loom, the take up mechanism being so connected with stopping



means for the loom that the former cannot be thrown out of gear without affecting the operation of the latter.

The new device is explained by means of the accompanying illustrations, being views partially in section, and in side elevation, respectively, of the clutch, forming a part of the connections between the take up and stopping means of the loom.

a is a shaft driven at *d* from a spiral gear of another shaft which in turn meshes with a gear on the picker shaft.

c is a ratchet wheel for holding the cloth beam in position (by means of a pawl) when the clutch *d e* is thrown out of gear. *f* is the shaft connecting clutch gear with the shipper and stop motion.

The gist of the improvement consists in that the ratchet wheel *c* of the cloth beam cannot be pushed ahead without throwing clutch *d e* out of gear, in turn turning shaft *f* in its bearings, in turn throwing shipper handle out of its keeper notch and thus stopping the loom. (*Mason Machine Works.*)

OWEN'S TAKE UP MECHANISM.

The object of the device is to secure close winding of the cloth and the proper stretch of same by holding the cloth roll firmly against the sand roll and gradually increasing the pressure with the diameter of the cloth roll.

At the same time the sand roll and the cloth roll are placed so as to project but little beyond the front of the breast beam, thus affording little obstruction—if any—to the weaver.

The illustration is a front view of a loom, the central portion being broken out to more clearly show, on a larger scale, the operative parts of the mechanism, the cloth roll being shown in the position when the cloth is wound on the same, as indicated in broken lines.

A indicates the two side frames of a loom, B the breast beam, C the girth connecting the side frames A, and also carry-

ing the standards D, having guideways E. F is the sand roll, G the gearing for operating said sand roll, and H the cloth roll.

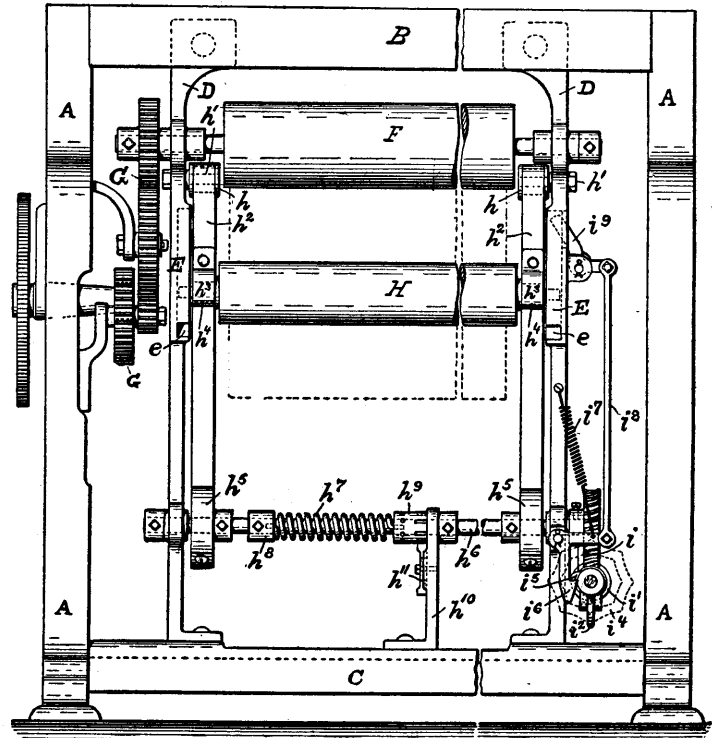
The sand roll F is journaled in the standards D, and below the shaft of the sand roll two collars *h* are supported on two studs *h¹*. Over the collars *h* extend the straps *h²*, having at one end the loop *h³* surrounding the collars *h⁴* in which the ends of the cloth roll are supported and extend beyond these collars into the guideways E. The other end of these straps *h³* are secured to disks *h⁵*, secured on the torsion shaft *h⁶*, which is supported in bearings on the lower end of the standards D.

The spring *h⁷* surrounds the torsion shaft, one end of which is secured in the collar *h⁸*, which turns with the shaft. The other end is secured to the sleeve *h⁹*, which is loose on the torsion shaft and is provided with locking notches. One end of the sleeve *h⁹* bears against the bracket *h¹⁰*, through which the shaft *h⁶* extends, and which bracket is secured to the girth C. A pawl *h¹¹* is pivoted to the bracket *h¹⁰* and engages the notches on the sleeve *h⁹* so that the tension of the spring *h⁷* may be adjusted and act to rotate the torsion shaft.

A worm wheel *i* is secured on the end of the shaft *h⁶* and a worm *i¹* is journaled in the bracket *i²* connected by a stud to one of the standards D, and is provided with the hand wheel *i⁴*.

The portion of the bracket *i²* forming the journal bearing for the worm *i¹* is provided with the cam pawl *i³*. The bracket *i²*, with the worm *i¹*, and the hand wheel *i⁴* may be swung into engagement with the worm wheel *i* or allowed to drop out of engagement with the same. When engaged, the cam pawl *i³* rests on the shoulder of the bell crank lever *i⁵* and is supported by the coiled spring *i⁷*, one end of which is secured to the bell crank and the other end to the standard D.

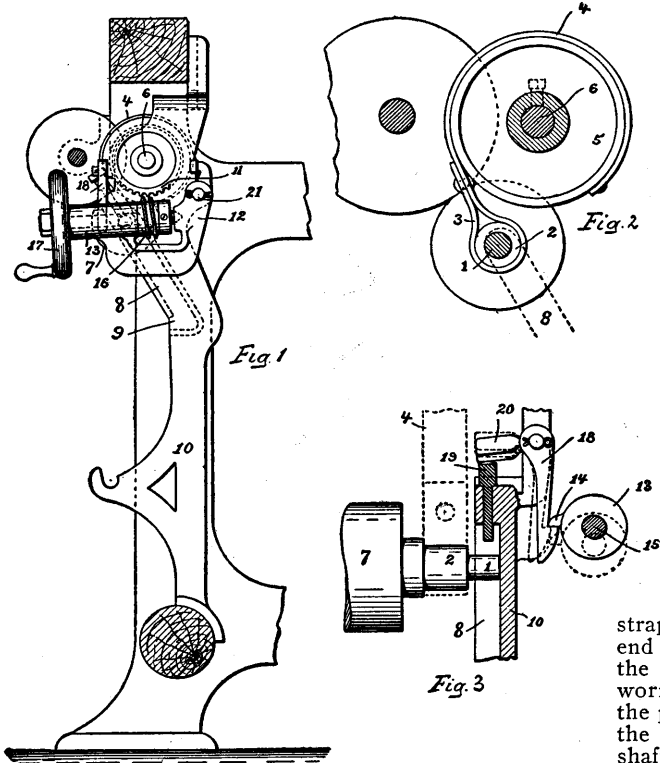
The rod *i⁸* connects the bell crank lever *i⁵* with the pawl *i³*, pivotally secured to the standard D, so that the pawl enters the guideway E.



When a cloth roll is to be inserted, the collars h^4 are placed over the shaft of the cloth roll H. The projecting ends of the shaft are then passed into the openings e of the guideways E. The worm i^1 is now turned to operate the worm wheel i , and by it the torsion shaft h^5 , and with the same the disks h^5 , so as to wind up the straps h^2 and raise the cloth roll nearly up to the sand roll. The end of the cloth is now passed around the cloth roll H, and by again turning the worm i^1 the cloth roll is forced against the sand roll and one end of the shaft of the cloth roll comes in contact with the pawl i^2 , moving the pawl outward and disengaging the hook of the bell crank lever i^3 from the cam pawl i^5 , which allows the bracket i^2 , carrying the worm, to drop out of engagement with the worm. The loom being now running operates through the gears G and the sand roll F, and, continuing to weave the cloth, winds the same, by the surface contact of the sand roll with the cloth, onto the cloth roll. The coiled spring h^7 on the torsion shaft h^6 acts, through the disks h^5 and the straps h^2 , to hold the cloth roll against the sand roll until the desired cut of cloth is completed, when the cloth roll, with the cloth, is removed and another cloth roll substituted. (*Whitins Machine Works.*)

OWEN'S ARRANGEMENT FOR OPERATING CLOTH ROLL IN CONNECTION WITH THE TAKE UP FOR COTTON LOOMS.

In this construction the cloth roll is held against the sand roll by straps connected with pulleys secured



to a shaft acting against the torsional resistance of a coiled spring.

Fig. 1 is a vertical sectional view of the front end of a loom provided with the new mechanism. Fig. 2

is a skeleton view showing the ends of the sand roll, the cloth roll, and the strap pulley, in their relative positions. Fig. 3 is a front view, partly in section, of one end of the cloth roll showing the stop and knock off device controlling the torsional spring shaft.

The illustrations show placed on the shaft 1 of the cloth roll, near the ends, the rings 2 and around these, the loops 3 of the leather straps 4. The other ends of the straps are secured to the strap pulleys 5, which in turn are secured to the shaft 6, journaled in bearings supported by the standards 10. A torsional spring (not shown) is coiled around the shaft 6, one end of which spring is secured to one of the strap pulleys 5 and the other end is secured in a sleeve loose on the shaft 6 and is provided with pawl seats, in which a pawl enters to hold the sleeve against rotation. This pawl is supported on a bracket, and the sleeve as previously referred to, is provided with holes for the insertion of a rod, so that this sleeve can be turned on the shaft 6 to adjust the tension of the coiled spring and be held in the adjusted position by the pawl.

As the cloth roll 7 is built up and increases in diameter by the winding on of the cloth, the ends of the shaft 1 move down in the ways 8 until, when the cloth roll is completed, the ends of the shaft 1 are at or near the openings 9, while the tension of the spring as coiled around shaft 6, has been increased with the increase of the diameter and the weight of the cloth roll.

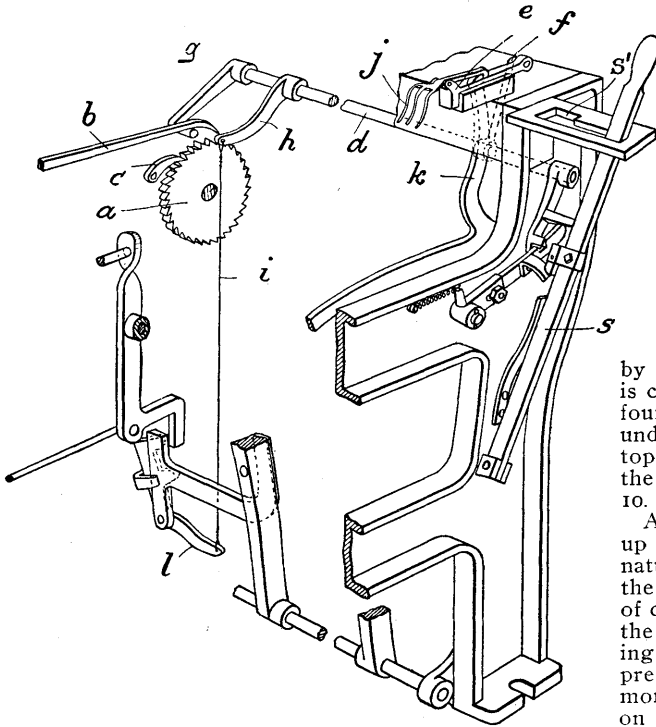
To remove the cloth roll and replace it with an empty one, there is placed on the shaft 6 the worm wheel 11 and the swinging bracket 12 is pivotally supported on the stud 21, secured to the standard 10. The front part of the swinging bracket 12 has the shaft bearing 13 formed integral therewith, being provided on one side with the projecting pawl 14. The shaft 15 is journaled in the bearing 13, the worm 16 is secured to the shaft 15, and the crank disk 17 is secured on the outer end of the shaft 15. The bell crank pawl lever 18 is pivoted to the standard 10, in which at the upper end of the way 8, is supported the headed pin 19.

When the cloth roll is completed and a new roll is to be substituted, the front of the bracket 12 is raised until the pawl 14 bears on the projection of the bell crank pawl lever 18, the weighted arm 20 of which insures the engagement. The worm 16 is now in engagement with the worm wheel 11. By turning the crank disk 17 the worm will turn the worm wheel, the shaft 6 and the strap pulleys 5, to allow the cloth roll to descend and the ends of the shaft 1 to pass down and out of the openings 9 of the ways 8. The ends of the shaft 1 of the cloth roll are now drawn out of the rings 2. The ends of the shaft of the new cloth roll are inserted into the rings 2 and into the ways 8. The crank disk 17 is now turned in the opposite direction, turning through the worm and worm wheel the shaft 6 and the strap pulleys 5, to wind on the

straps 4, thereby raising the cloth roll up when the end of the cloth is secured against the sand roll. As the shaft 6 is locked and cannot turn as long as the worm 16 is engaged with the worm wheel 11, to secure the prompt release of the worm from the worm wheel, the pin 19 is arranged to be lifted by the end of the shaft 1 and acting on the arm 20 of the bell crank pawl lever, to disengage the front of the swinging bracket 12 by swinging the bell crank pawl lever 18 into the position shown in broken lines in Fig. 3, thereby releasing the worm 16 from engagement with the worm wheel. (*Oscar L. Owen, Whitinsville, Mass.*)

PELTIER'S TAKE UP ATTACHMENT FOR COTTON LOOMS.

This attachment relates mostly to looms running on low texture fabrics, where there is a liability of a thin place being made in the cloth by the loom taking up a few notches after the filling has run out or broken. When the shipper is knocked off by reason of the filling running out or breaking, the loom usually runs for a short time before coming to a full stop because of the momentum acquired by its parts. The take up and let off mechanisms if allowed to operate until the lay comes to rest will therefore advance the warps a short distance without any filling, and it becomes difficult on starting the loom again to lay the next pick close up to the one which was last beat in. It is therefore desirable to stop both the take up and let off mechanisms the instant the shipper is knocked off in order to prevent the advance of the warps and also to maintain them at their proper tension. This is accomplished by the attachment, it working in conjunction with the stop motion so as to automatically



stop the take up and let off motion when the shipper handle is knocked off and is held from action until said shipper handle is replaced again in its keeper notch.

The illustration is a perspective view of the new attachment, shown in connection with that part of a loom to which it is applied.

a indicates the take up ratchet wheel operated by take up pawl *b*. *c* is the catch finger acting on the ratchet wheel *a*. *d* is the stop motion rod connected with slide *e* by means of lever *f* and carries at its end the

arm *g*, which engages the take up pawl *b* and shipper lever *s*. *h* is an arm also adjusted to the stop motion rod and connected to the let off motion by wire *i*.

When the filling runs out or breaks, the hook on the filling fork *j* is engaged by the feeler *k* so as to move the slide *e* and rock the rod *d*, which engages the shipper lever *s*, throwing it out of its keeper notch *s'*, thus causing the belt to be shifted and the loom stops. The rocking of the rod *d* by means of arm *g* lifts pawl *b*, throwing it out of reach of the ratchet *a*. The arm *h* is at the same time raised, in turn raising lever *l* and disengaging the let off motion. (Joseph Peltier and Francis X. Gravel, Lowell, Mass.)

CLOTH TAKE UP ROLL FOR LOOMS.

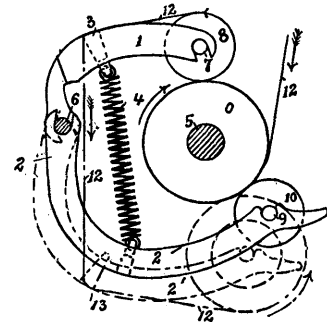
The mechanism has for its object, to wind the cloth after being woven, evenly and under pressure onto its cloth roll.

The illustration shows a side view of the mechanism, showing in solid lines, position of brackets and cloth roll when starting to wind on the cloth; the dotted lines showing the change in position of the lower brackets (one on each side) and cloth roll when the latter is filled with cloth.

O indicates a centre roll and 5 its shaft, suitably mounted in the side frames of the loom. Secured to a rail as placed on the loom frame is a stand which supports a rod 6 which forms supports for brackets 1 and 2. The outer end of brackets 1 (only one of which can be seen) is provided with a notch in which is held a roller 8, and the outer end of brackets 2 is provided with a notch 9 in which is held the cloth roll 10. These two rolls are kept firmly pressed against the centre roll *O* by spring 4. The cloth is indicated by 12 and moves in the direction of the arrow, as it is coming from the loom, passes around nearly three-fourths of the surface of centre roll *O*, then from the under side over roll 8, over the cross piece 3 of the top bracket 1, to and under the cross piece 13 of the lower brackets 2 and in turn onto the cloth roll 10.

As the cloth winds up onto this roll it naturally increases the size of the roll of cloth thus wound; the spring 4 exerting in turn more pressure, hence the more cloth wound on the cloth roll, the more pressure exerted.

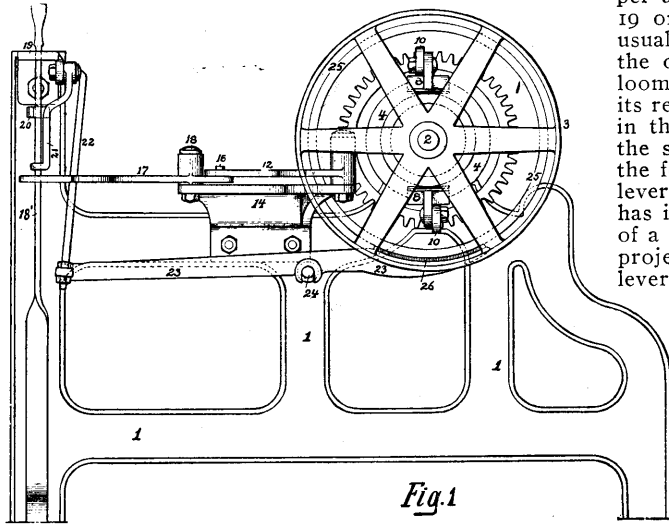
When it is desired to remove the cloth roll the lower brackets 2 are pressed down, the roll of cloth removed, the cloth severed, a new roll placed on the brackets and the cloth again started to wind on it. A roll of any width may be used according to the width of cloth woven. (Chas. and Wm. E. Fischer and Geo. F. Kuett, Paterson, N. J.)



STOP MOTIONS.

THE FAIRMOUNT CLUTCH AND BRAKE MECHANISM.

The object of the mechanism is to stop the loom "on the pick" when necessary, permitting the brake to be removed without throwing the clutch into action, in order to permit the loom to be readily turned



backward by hand for the removal of defective picks or for other purposes.

Fig. 1 is a side view of sufficient of a loom to illustrate this clutch and brake therefor. Fig. 2 is a plan view of the same. Fig. 3 is a front view with the loom frame shown in section, and Fig. 4 is a section through the clutch.

One of the side frames of the loom is represented at 1, and to bearings in said side frame is adapted the driving shaft 2 of the loom, said shaft having mounted upon its outer end, so as to turn freely thereon, a pulley 3 for receiving the driving belt. This pulley has secured to it a flaring clutch rim 4, having its outer flat face covered with leather 5, this face of the clutch rim being opposed to the similarly covered face of a disk or collar 6, which is rigidly secured to the shaft 2.

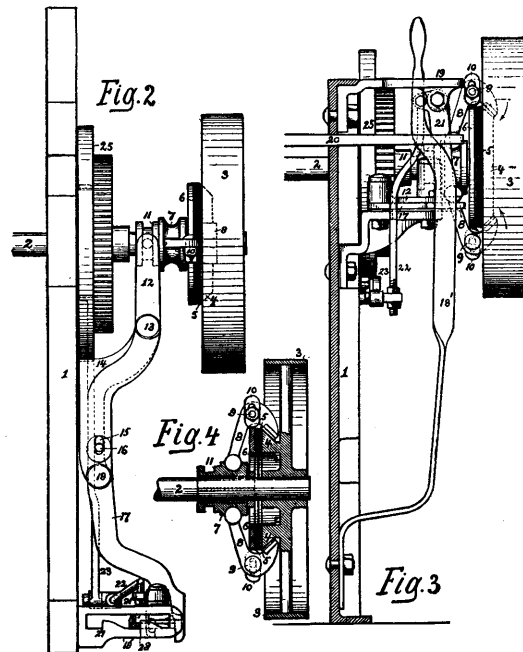
On the hub of the disk 6 is adapted to slide a grooved collar 7, engaging with the inwardly extending arms of levers 8, which are hung by means of bolts 9 to slotted brackets 10, projecting from the periphery of the disk 6.

The outwardly extending arms of the levers 8 overhang the clutch rim 4 and are shod with frictional material, so that when the grooved collar 7 is moved away from the disk 6 it will effect movement of the levers 8 in the direction of the arrows, Fig. 3, so as to press the outer arms of the same firmly against the clutch rim 4 and at the same time press the latter toward the disk 6, so that there is a double frictional hold, the first being a direct frictional contact between the adjoining faces of the clutch rim and disk and the second a frictional contact between the clutch rim and the shoes of the levers 8.

Secured to or forming part of the grooved collar 7 is another grooved collar 11, with which engage pins

carried by a lever 12, hung to a stud 13 on a bracket 14, projecting from the side frame of the loom, said lever having a slot 15 for receiving a pin 16, carried by the short arm of a lever 17, hung to another stud 18 on the bracket 14, the long arm of said lever 17 being forked so as to embrace the usual spring shipper arm 18', which engages with a notched bracket 19 on the loom frame and is under control of the usual knock off lever 20, the latter being actuated by the ordinary shuttle and filling stop motions of the loom in order to press the shipper arm 18', out of its retaining notch in the bracket 19 whenever a defect in the operation of the loom requires a stoppage of the same. The shipper arm 18' is also embraced by the forked lower end of the long arm of a bell crank lever 21, which is hung to a lug on the bracket 19 and has its short arm connected by a rod 22 to one arm of a lever 23, the latter being pivoted upon a stud 24, projecting from the bracket 14. The other arm of the lever 23 is curved concentrically with the periphery of a wheel or disk 25, which is secured to the shaft 2, said curved arm of the lever 23 being provided with a leather shoe 26.

The bracket 19 has two notches 27 and 28, the latter being located outwardly beyond the notch 27, and when the loom is running the shipper arm 18' rests in the notch 27, the effect of which is to release the brake shoe 26 from contact with the periphery of the brake disk 25 and to draw the grooved collar 7 inwardly on the hub of the disk 6, so as to press the shoes of the levers 8 onto the clutch rim 4, and the latter into contact with the clutch disk 6, thereby clutching the driving pulley 3 of the shaft 2. When, however,



the knock off bar 20 is operated, it pushes the shipper arm 18' out of the notch 27, and the spring of the arm thereupon immediately carries it to the outer end of the slot in the bracket 19, thus imparting such movement to the levers 17, 12, and 23 as to release the clutch rim 4 from the action of the levers 8 and apply the brake shoe 26 firmly to the periphery of the brake disk 25, thereby quickly stopping the loom.

If it is desired to turn the loom by hand for any purpose, the shipper arm 18' is drawn inward until it rests in the outer notch 28 of the bracket 19, this movement being sufficient to withdraw the brake shoe 26 from contact with the brake disk 25, but not being enough to cause action of the levers 8 upon the clutch rim 4. Hence the loom will be free from the influence of the brake, but will not be clutched to the driving pulley, the latter operation requiring the movement of the shipper arm 18' to its full inward position, where it rests in the inner notch 27 of the bracket 19.

If the driving pulley occupies a fixed longitudinal position on the shaft 2, the clutching operation can be effected by the simple engagement of the clutch rim of the pulley and the clutch levers 8, but it is more satisfactory to bring into action the additional clutching surface presented by the disk 6. (*Fairmount Machine Co.*)

CONNECTING THE DWELL STAND TO THE LAY SWORD.

In looms, to which the improved device is to be applied, the "dwell stand" is rigidly attached at its lower end to the lay sword and pivotally attached at its upper end to the crank connector and the lay sword. When the lay protects to stop the loom, the crank shaft does not stop immediately, but pushes by means of the crank connector upon the dwell stand in an upward direction, and the dwell stand being rigidly attached to the lay sword at its lower end cannot yield, and consequently the dwell stand is now and then broken and sometimes even the lay sword.

The object of the new device is to provide relief (yielding or moving) for the lower end of the dwell stand, so that the upper end of the stand may swing or move on the pivot pin connecting it with the lay sword when the lay protects, and thus prevent the breaking of the dwell stand or of the lay sword.

The illustration is a sectional elevation of portions of a loom with the improvements applied thereto.

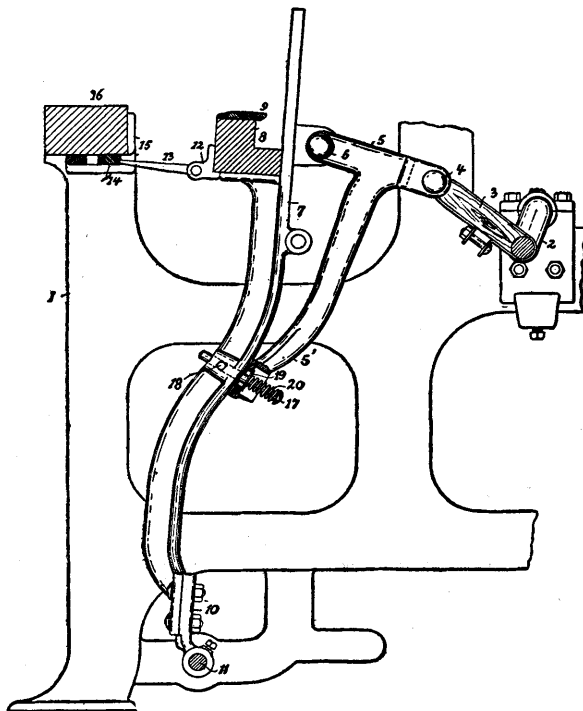
1 is the loom side, 2 the crank shaft, 3 the crank connector and 4 the crank connector pin connecting the crank connector 3 with the rear upper end of the dwell stand 5, the front upper end of which is pivotally connected with the rear of the lay sword 7 by the pin 6. The lay sword 7 carries the lay 8, on which is the race plate 9, and the lay foot 10 is mounted on the rock shaft 11.

The protector rod stand 12 is secured to the lay 8 and carries the protector finger 13, which engages the bunter lever 14 on the bunter stand 15, secured to the breast beam 16 when the lay protects.

In the ordinary construction of the dwell stand 5, the lower end 5' is made a part of or rigidly secured to the lay sword 7, but in the improved construction the lower end 5' of the dwell stand 5 is not rigidly secured to the lay sword, but is connected therewith so as to have a movement independent of the lay sword to allow the upper forward end of the dwell stand 5 to swing or move on its pivot pin 6 when the lay protects. For this purpose the lower end 5' of the dwell stand 5 of the lay sword 7 is yieldingly connected by means of a pin 17, which extends loosely through a hole in the lower end 5' of the dwell stand

5 and through a hole in the lay sword and is secured to the lay sword by a set screw 18. A washer 19 is loosely mounted on the pin 17 and bears against the inner surface of the opening in the lower end 5' of the dwell stand 5. A spiral compression spring 20 encircles the pin 17 intermediate the washer 19 and the head of the pin 17.

The spring 20 acts to hold the lower end 5' of the dwell stand 5 against the lay sword 7 to move with said lay sword, but also allows the lower end 5' of the



dwell stand 5 to yield and move away from the lay sword, so that the upper front end of the dwell stand 5 can swing or move on its pivot pin 6.

When the lay protects, the protector finger 13 strikes the bunter lever 14, which falls back against the stand 15. The movement of the bunter lever 14 throws off the power; but the crank shaft 2 does not stop immediately, but pushes by means of the crank connector 3 upon the dwell stand 5 in an upward direction, which causes the upper end of said dwell stand to swing or move on the pivot pin 6 and the lower end 5' of said dwell stand to move away from the lay sword and compress the spring 20, thus relieving the sword and dwell stand from the strain which might break the sword or dwell stand. (*Crompton and Knowles Loom Works.*)

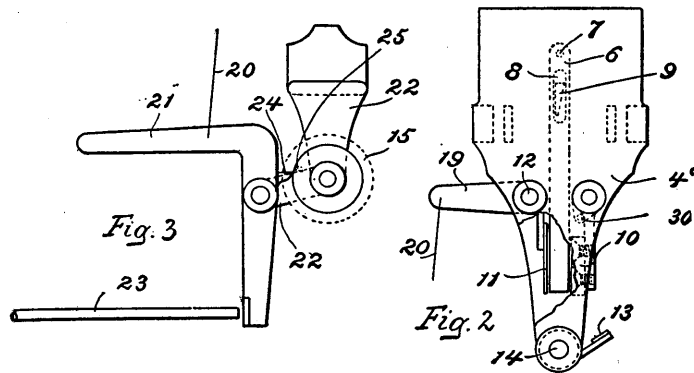
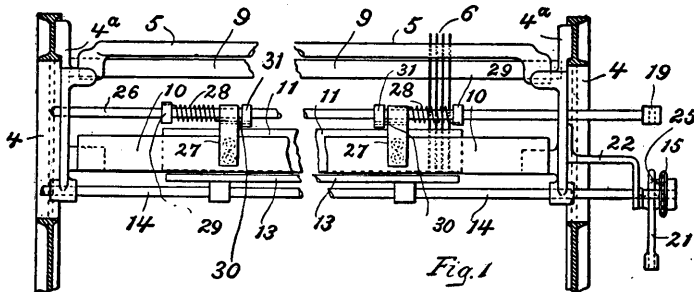
BARDSLEY'S WARP STOP MOTION FOR COTTON LOOMS.

Fig. 1 is a view in vertical section of the frame work of part of a loom, having this stop motion applied thereto, showing only a few detectors. Figs. 2 and 3 are detailed views of parts of the motion, in side or end elevation, on an enlarged scale, showing certain of the parts, part of bracket 4^a Fig. 2 being represented as broken away in order to show more clearly certain parts.

This warp stop motion is introduced in the loom between the whip roll and the lease rods.

4 designates the loom frame, 5 the warp rests, being rods extending transversely across the loom parallel to each other at a short distance apart and carried by brackets 4^a placed between the whip roll and the lease rods. Between the warp rests 5 is arranged a series of detectors 6, composed of a flat metallic strip which is formed with an eye 7, for the passage of a warp thread and with a vertically elongated slot 8, to enable the detectors to be threaded side by side upon a sustaining rod 9, which latter extends transversely across the loom between the warp rests 5 and like the latter has its opposite ends applied to supports 4^a.

10 designates a guiding strip employed at the rear of the series of detectors for holding their lower ends



in proper alignment. At the front of the series of detectors is located a plate 11 which is fast with the transversely extending shaft 12, the latter being mounted to turn in the brackets 4^a. For coaction with the lower ends of the detectors 6 a feeler 13 is provided, consisting of a wing fixedly connected with shaft 14, extending transversely across the loom and mounted to turn in its supports. To the shaft 14 movement is communicated to cause the feeler 13 to feel for the lower end of any detector which may have been permitted by the breakage or slackening of the corresponding warp thread to descend into the path of movement of the said feeler. The feeler shaft 14 is arranged to be rotated by means of sprocket wheel 15, fast thereon and receiving a chain, actuated by means of a sprocket wheel on the cam shaft of the loom. When the feeler 13 in its movement encounters the lower end of a dropped detector, it presses the said end forward, carrying with it the movable plate 11.

In order to permit of the detectors being pressed forward at their lower ends, the rear side of the supporting strip 9 is beveled off from the upper edge thereof downwardly.

The movement which is communicated to the movable plate 11, in the manner which has been described, is utilized for effecting the stoppage of the

loom thus: An arm 19 is connected operatively with the movable plate 11, the said arm being made fast upon shaft 12, which carries plate 11. The arm 19 is connected by a coupling 20 with lever 21, hung to arm 22, that is applied to the support 4^a for one end of the shaft 14. The lower end of the said lever 21 is disposed in line with one end of a horizontally movable knocking off rod 23, its forward end acting on the shipper rod to stop the loom. The movement which is given to the lever 21 when the plate 11 is actuated, brings the lever 21 within the range of action, of a moving device, termed a "striker," in order that the said lever 21 may be actuated positively by the said striker in such manner as to occasion an endwise movement of the knocking off rod 23, and thus

stop the loom. The mechanism to accomplish this is clearly shown in Fig. 3, the lever 21 being provided with a toe 24, to be engaged by the striker, and the latter being a pin 25, projecting from the side of the sprocket wheel 15, upon the feeler shaft 14. When, therefore, the lever 21 is turned upon its pivot in consequence of a detector in its fallen position being pressed laterally by the feeler 13 against the plate 11, the toe 24 on the lever 21 is brought into the range of movement of the striker 25 and is thereupon encountered by the said striker, with the result that the lever 21 is turned positively about its pivot, so as to push the knocking off rod 23 endwise and effect the stopping of the loom.

The back blade or strip 10 at the rear of the detectors is mounted in a manner which enables the same to yield in case the loom is turned backward by hand at a time when a detector is occupying its lowest position. Thus when the feeler 13 is carried backwardly against said depressed detector, so that it bears the latter rearwardly against the guiding strip 10, the latter yields and thereby avoids breakage of parts and other trouble. The guiding strip 10 is hung loosely on the shaft 26, by means of plates 27, which are made fast to the said guiding strip and formed with holes therethrough to enable them to be fitted loosely on said rod or shaft

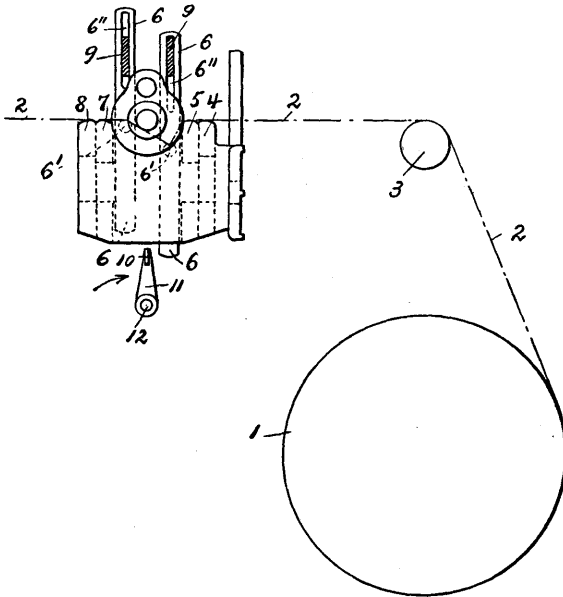
26. A spring 28, surrounding shaft 26 and having one end thereof engaged with a collar 29, fixed on the shaft, and the other end thereof engaged with one of the plates 27, operates to press the guiding strip 10 forward into its normal working position, the latter being determined by means of a stop pin 30, projecting from a collar 31, fast on shaft 26. (*Crompton and Knowles Loom Works.*)

ARTHUR'S WARP STOP MOTION FOR COTTON LOOMS.

In these warp stop motions as located back of the harnesses and in which the detectors are operated independent of the shedding mechanism, dirt and lint will more or less collect upon the guide bars and in the slots of the detectors through which the guide bars pass so as to encumber the operation of the motion and require the loom to be occasionally stopped and the dirt and lint removed from the slots of the detectors.

To overcome this difficulty, the guide bars are placed in the new motion above the warp and out of the way of the falling dirt, the detectors having an elongated slot near their upper ends for the guide bar

to pass through and support the detectors in position, and an opening below the slot for the passage of the warp threads, with an elongated portion below the opening. The guide bars are flat so as to support and guide the detectors in position, and are supported by stands carried on the frame of the loom. Below the guide bars, at each side of the detectors is placed a supporting bar for the warp threads to rest upon,



holding all of the detectors supported normally approximately in the plane of the warp. These warp supporting bars are adjacent to the sides of the detectors, but with a free space between them to allow of the ready removal of dirt and lint which may collect during the process of weaving. By this arrangement of guide bar, detectors and warp supporting bar an uninterrupted space is left between the detectors and the warp supporting bar.

1 indicates the warp beam, 2 the warp threads passing from said beam over the back roll 3 and over the supporting bars 4 and 5, upon which the warp threads rest, and through openings 6' in the detectors 6, and then over the front supporting bars 7 and 8 to the harnesses. The edges of the detectors 6 are not contiguous to the edges or sides of the supporting bars 5 and 7, but are parallel and adjacent thereto, and a space of more or less width is left between the adjacent edges.

The detectors 6, for which there is one for each warp thread, have at their upper ends, elongated slots 6'' through which the stationary transverse flattened guide bars 9 extend over the warp threads and from one side of the warp to the other.

The stationary transverse bars 9 are flattened and about half the width in a vertical plane of the length of the slots 6'' in the detectors 6, in turn of which said bars 9 will guide and direct the movement in a vertical plane of each of the detectors and hold them in their proper positions at their lower ends, so that they will be engaged by the knife 10. At the same time the bars 9 support the detectors when the warp threads break and limit their downward movement.

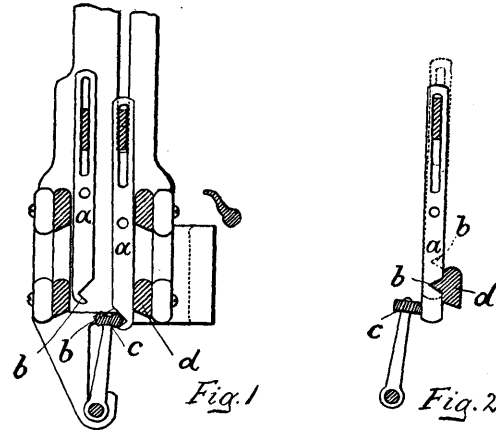
The normal position of the detectors 6, is that shown at the left in the illustration, the detectors being held up by the warp threads passing through the holes 6' therein.

In case of the breaking of a warp thread the detector with which the warp thread is connected drops down by gravity to the position shown at the right in the illustration, guided by the bar 9, and the lower end of the detector extends in the path of the knife 10, which extends transversely across the loom from one side of the warp to the other and is supported on arms 11, fast on rock shaft 12 connected with the shipper device of the loom to stop the loom in case the blade 10 engages with the detector 6.

An improvement on the thus described device consists in providing a different construction of the detector, the object being to prevent any chance of bending or twisting of the same.

Two constructions of this new detector are shown. Referring to the construction shown in Fig. 1, *a* indicates two detectors, one of each series, said detectors being notched, as at *b* to be engaged by the feeler *c* which is of substantially the same shape and size as the notch in the detector, but of a rather more obtuse angle than that of said notch, so that the engaging surface of the feeler will wedge into the notch and act to firmly hold the lower end of the detector in the direction of its width without any downward pressure thereon. In the illustration one of the detectors is shown in its dropped position, its notch being in engagement with the feeler, the detector thus being firmly held or wedged against its supporting bar *d* thus preventing any bending or twisting of the detector.

Referring to the construction shown in Fig. 2, the detector *a* is made with a straight edge where it is engaged by feeler *c*, having at its opposite edge next to the supporting bar *d*, an angular notch *b* therein, to receive a projection on the inner side of the supporting bar *d*, as shown, when the detector *a* is in its lowered position and engaged by the feeler *c*. This projection on the supporting bar *d* is angular, with a more obtuse angle than the angle of the notch in the detector *a*, as shown, so that the engagement of the feeler *c* with the detector *a* will crowd the notch in the detector onto the projection on the supporting



bar and cause the detector to be firmly held or wedged and thus prevented from bending or twisting. (Crompton and Knowles Loom Works.)

STOP MECHANISM FOR DRAPER COTTON LOOMS.

The object is to automatically stop the loom when the shuttle is not properly boxed, the shuttle box being provided with a front binder operating with the frog device of the protector mechanism.

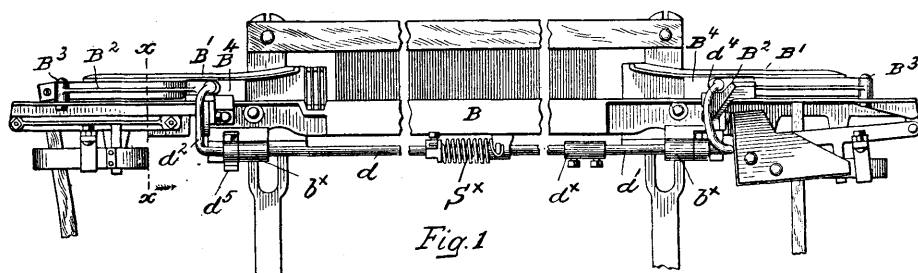
Fig. 1 is a front elevation, centrally broken out, of a lay and the parts carried thereby to illustrate the new mechanism; and Fig. 2 is a transverse sectional view thereof on the line *x-x*, the breast beam, protector mechanism, and a portion of the loom frame being shown.

A indicates one of the sides of the loom, A' the

being thus utilized to apply the brake whenever the protector mechanism operates.

The spring *S^x* presses the front binders inward, and the hook *d⁵* is then in position to engage and move the block *a³* as the lay beats up; but if the shuttle is properly boxed the binder will be pressed outward, rocking the shaft *d, d'* and lifting the hook into the dotted

line inoperative position shown in Fig. 2. If the shuttle is improperly boxed, the binder will not be moved outward and the hook *d⁵* will operate the protector mechanism and stop the loom. (Draper Co.)



FILLING STOP MOTION FOR NORTHROP LOOMS.

breast beam, having the notched holding plate *A^x* for the shipper handle *S*, and the knock off arm *a*, fulcrumed at *a'* and having a depending finger *a²*, actuated by the slide block or frog carrier *a³*.

The main crank shaft *C* has fast thereon a fly wheel *C'*, adjacent to which is mounted a brake shoe *C²*, pivoted on the loom side, the shoe having a projection *D*, to which is secured a brake rod *C³*, slotted at its front end at *C⁴* to embrace a stud *e* on the slide block *a³*.

B indicates the lay having shuttle box backs *B'*, and being provided with front binders *B²*, pivotally mounted on the lay at *B³*. *B⁴* are stops, attached to the lay at the entrance of the shuttle boxes, limiting the inward movement of the binders. Bearings *b^x* are secured to the lay to receive a two part rock shaft *d, d'*, connected by a coupling *d^x*, the outer ends of the parts being bent up to form binder fingers *d², d⁴*, which are held against the binders *B²* by a spring *S^x*, attached at one end to the rock shaft and at its other end to the lay. Near one end of the lay, at the side of the loom adjacent the shipper lever, attached to the rock shaft is a hook like dagger *d⁵*, extended rearwardly below the lay and adapted at times to engage the notched part or frog *a³* of the slide block *a³*, to thereby move the latter forward as the lay beats up and effect the release of the shipper lever from its holding notch, bringing the protector mechanism into

The mechanism has for its objects the production of means for controlling the filling supplying mechanism on plain work through two different and independent sets of devices, the one operative upon failure of the filling and the other operative upon the exhaustion of the filling in the shuttle to a predetermined extent.

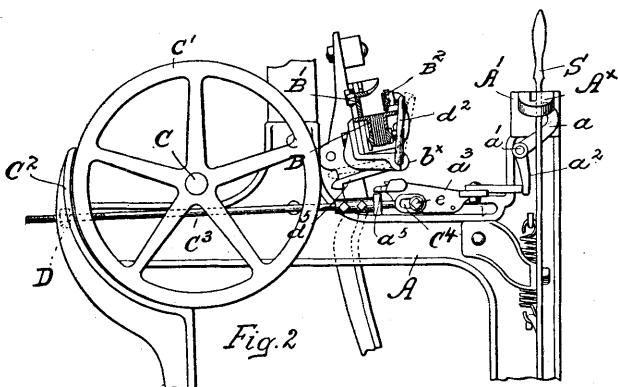
Stopping means are provided which are automatically operated upon a second failure of filling to thereby stop the loom, whereas if the filling supplying mechanism is actuated upon the exhaustion of the filling to a predetermined extent said stopping means being held inoperative unless a mispick should occur.

The illustration is a perspective view of the left hand end of the breast beam and the lay of a loom, having the new mechanism applied thereto, the lay being shown as having nearly reached its rearmost position.

The front plate *A²* of the shuttle box at the left hand end of the lay *A³* is provided with an upturned bracket *b*, on which is pivotally mounted a feeler carrier, shown as an arm *b'*, extended longitudinally in the direction of the length of the lay and weighted at its outer end at *b²*, the opposite or inner end of the arm being bent to form a dog *b³*, while the weighted end of the feeler carrier has attached thereto the filling feeler *b^x*, shown as a substantially \cap -shaped member, the free end of which is enlarged to rest upon the filling *f* in the shuttle *S* when the latter is in the shuttle box. As the diameter of the mass of filling decreases the filling feeler will at each beat up of the lay extend further in toward the longitudinal center of the shuttle due to the weighted end *b²* of the feeler carrier, and thereby the opposite end or dog *b³* is elevated.

To remove the filling feeler from the path of the shuttle as the latter is thrown, a lifter is provided, shown as a cam *b⁴*, formed on the outer end of an arm *b⁵*, rigidly secured to the frame *A* of the loom and extended forwardly in such position that as the lay goes back, the lifter *b⁴* passes beneath the weighted end of the feeler carrier, and the inclined face of the cam will lift said arm and the feeler as the lay reaches its rearmost position, so that the feeler is entirely out of the way of the shuttle.

The shipper handle *S^x* moves in the notched holding plate *a*, and a knock off lever *b⁶*, which normally rests against or adjacent the shipper handle, is pivoted to the breast beam at *b¹²*, the free end of the lever being acted upon by the filling fork mechanism when it is desired to release the shipper handle and thereby stop the loom.



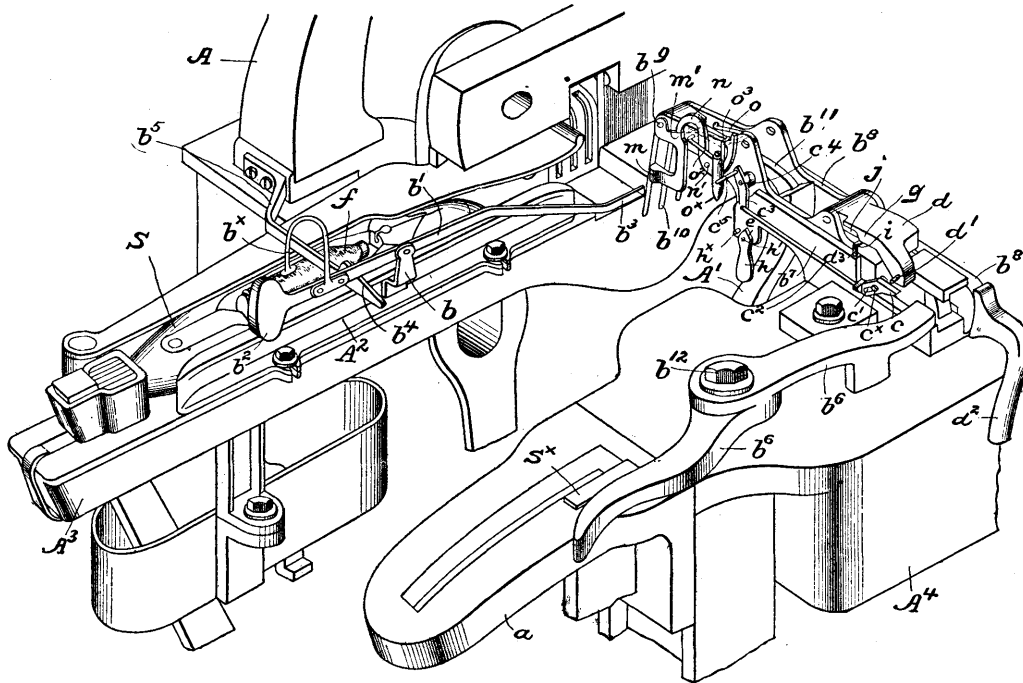
operation. Such movement of the slide block acts through the rod *C³* to move the brake shoe *C²* into engagement with the fly wheel to effect the stoppage of the crank shaft, the momentum of the lay

The filling fork mechanism comprises a stand b^7 , mounted on the breast beam A^4 and provided with a guideway, in which a slide b^8 is adapted to reciprocate, said slide having pivoted at b^9 a filling fork b^{10} , the fork having a rearwardly projecting tail, adapted to be engaged by a hook b^{11} , pivotally mounted on the upper end of the slide actuator or filling hammer A^1 when the filling is absent as the lay beats up. A latch d is pivoted on the slide b^8 , said latch having on its under side a cam g , the free downturned end of the latch being adapted to at times operate the knock off lever b^6 , a pin or stud d^2 , mounted on the stand b^7 , having its upper end inturned, as at i to extend beneath and cooperate with the latch cam g . Back of the cam g the latch is recessed in its side, as at j , to receive the inturned end i of the pin d^2 when the slide b^8 has been moved outwardly.

On the outer side of the slide b^8 is mounted a rocking bunter m , pivoted on the filling fork pivot b^9 , said

engagement of the end of said arm and the detent by the jarring of the loom or other accidental cause.

The lower extremity of the bunter m is normally above the path of movement of the dog b^3 as the latter comes forward when the lay beats up; but as the filling in the shuttle diminishes the dog is gradually elevated until when the filling has been exhausted to a predetermined amount the said dog will be elevated sufficiently to engage the depending end of the bunter on the forward movement of the lay, swinging the bunter to the right, and thereby rocking the S-shaped detent n to withdraw its shoulder from the overhanging part o^2 of the catch o . This disengagement permits the weight o^x to drop, and thereby turns the catch o on its pivot into position to be engaged by the hook of the filling hammer or actuator, so that on the next outward movement of the latter the slide b^8 will be moved outwardly, and its outer end will at such time engage an upturned arm d^2 , fast on a rock shaft, turn-



bunter having a forwardly extended finger m' , which is normally held by the weight of the depending bunter against one end of an S-shaped arm or detent n , pivoted at n' on the slide, the other upturned end of the detent being notched or recessed to form a shoulder.

The tail of the filling fork forms one connection between the filling hammer A^1 and the slide b^8 , the position of said tail or connection being determined by the presence or absence of filling in the shed as the lay comes forward. In addition to this connection an independent connection between the slide and the filling fork is provided, shown as an outwardly extended loop like catch o of stout wire, with its ends outturned to form pivots, which enter holes in the slide, the catch o being made wide enough to prevent interference with the tail of the filling fork. One pivot end of the catch is extended beyond the side of the slide and is bent forward to form an arm o^2 outside of the S-shaped detent n , said arm at its free end being upturned and bent inward, as at o^3 , to be normally engaged by the shoulder of the detent. A weight o^x is secured to the arm o^2 near its free end to prevent dis-

ing the latter sufficiently to operate the filling supplying mechanism to thereby insert a fresh supply of filling into the shuttle before complete exhaustion of the filling then in the shuttle.

When the shuttle enters the box at the right hand end of the lay, the feeler will dip down in the empty shuttle box sufficiently to raise the dog above the depending end of the bunter m , the said bunter being rearwardly curved to leave a clear space between its pivotal point and its depending end, so that when the dog is elevated by the descent of the filling feeler into the empty shuttle box said dog will enter the clear space between the ends of the bunter and will not engage the latter.

When the filling fails, however, the fork b^{10} will not be tilted, and its tail will be engaged by the hook of the actuator A^1 to thereby move the fork slide outwardly, such outward movement of the slide disengaging the cam g of the latch d from the end i of the stud or pin d^2 , and the latch will drop behind the knock off lever b^6 and stop the loom before there has been a thin place or streak made in the cloth. On the inward movement of the slide the cam g rides up over

the end i of the pin, and thus raises the latch into normal position.

When the filling feeler is made operative to effect a change of filling, the loom must not be stopped unless there be a mispick, and in the latter case the filling will not be laid in the shed, and the filling fork will then operate as before described, and the loom will be stopped before the formation of a thin place in the cloth. It is thus necessary to prevent stopping of the loom on the outward movement of the slide b^s when the filling supplying mechanism is operated by or through the feeler governed mechanism, and to prevent such stoppage a trip is provided to engage and prevent movement of the latch d into operative position, so that instead of stopping the loom on the outward movement of the fork slide the filling supplying mechanism will be operated.

The latch d is provided with a laterally extended pin d' , adapted to be engaged by the trip e , being a plate mounted on the side of the slide b^s by means of a headed pin e^x , extending through an inclined slot e' in the plate, so that when the latter is moved it will also move upwardly and into position to engage the stud d' , to thereby prevent the outer end of the latch from descending sufficiently to engage the knock off lever b^s . The trip e is connected by a link e^2 with a bell crank lever e^3 , pivoted at e^4 on the slide b^s , the opposite arm of said lever being connected by a link e^5 with the depending weight e^x on the arm o^2 of the catch. When the catch o is released, as has been described, and swings downward, the bell crank lever is swung on its pivot to move the link e^2 in a direction so as to thereby move the trip into the operative position described. Means are provided to automatically set the catch o after it has been released by the detent, said setting device being a weighted arm h , pivoted at h' to the slide stand b^s , and having its upper end oppositely beveled as at e .

Supposing the catch to have been released, the weight e^x will wipe over the upper end of the arm h on the outward movement of the slide, rocking said arm to permit such passage; but on the return or inward movement of the slide the rocking of the arm h is limited by a pin h^x , so that the weight must ride up over the beveled end of the arm, and as it is so lifted it restores the part o^2 of the catch to its position on the shoulder of the detent.

If the fresh supply of filling is placed in the shuttle upon the exhaustion of the previous supply of filling to a predetermined extent the filling fork will operate should there be a mispick, and the loom will be stopped by the outward movement of the slide, as the trip e is then in normal position, just as is the case when a filling fails.

Neither set of devices for governing the controlling means for the filling supplying mechanism interferes with the other, but each operates properly within its own bounds. (*Draper Co.*)

STOP MOTION FOR NORTHROP LOOMS FOR WEAVING BLANKETS, ETC.

The object of the motion is to stop the loom, in weaving blankets or other goods having one or more stripes inserted by hand, at certain intervals at the proper time without depending upon the weaver, since he has a number of looms to attend to and thus may fail to properly note the appearance of the cut mark in the cloth. This motion also prevents the starting up of the loom after a stoppage unless the weaver fully understands the cause of the stoppage, since in looms provided with warp stop motion mechanism, which acts to stop the loom upon breakage of a warp thread, it is desirable for the weaver to know at once what

caused the stoppage. Another object is to automatically stop the loom at the end of each cut of a certain number of yards, so that the weaver can insert the "heading."

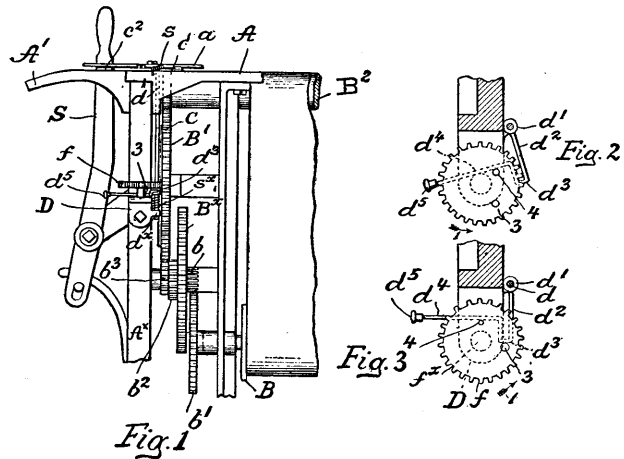
Fig. 1 is a front elevation of a portion of a loom, with the motion applied thereto. Figs. 2 and 3 are enlarged plan views compared to Fig. 1 of the controlling means for the stopping mechanism.

A indicates the breast beam, A^1 the holding plate notched for the shipper handle S . a is the knock off arm which is connected with the stopping means for the loom, filling or warp controlled, or both.

The take up mechanism shown in illustrations includes the ratchet wheel B^x , the shaft of which is connected by a pinion b with the gear b^1 of the cloth winding roll B and by the intermediate gears b^2 , b^3 , with the large gear B^1 , which drives the breast roll B^2 . A knock off lever c is pivoted to the breast beam, said knock off lever having one end c^2 adapted to be at times moved against the shipper handle S by a spring s .

When the loom is running the knock off lever is normally held in inoperative position by a detent d , formed by the upper end of a slide rod, which is supported by the breast beam and by a bearing d^x for its lower end. (Shown as an ear on a bracket D , attached to the loom side A^x .)

A spring s^x , surrounding the detent rod d between the bearing d^x and a collar d^1 on the rod, acts normally to elevate the latter, and maintain its upper end in the path of the lever c , preventing operation thereof.



The collar d^1 has fast upon it a laterally extended arm d^2 , bent back upon itself at d^3 , and then down and outward at d^4 at right angles to the part d^2 , and provided with a knob or handle d^5 . This bent arm is extended beneath the lower face of a controlling gear f , mounted to rotate on a stud f^x on the bracket D , and the teeth of this gear are engaged by a cam C (herein shown as attached to the adjacent side of the large gear B^1), and herein said cam is arranged to rotate the controlling gear f step by step one tooth at a time for every revolution of the large gear B^1 . Depending from said controlling gear two pins 3 and 4 are arranged, the former having a beveled end and moves in such a circular path as will cause it to engage the bend d^3 of the arm d^2 when the latter is in the position shown in Fig. 3, the controlling gear f rotating in the direction of the arrow 1. The other stud or pin 4 is nearer the center of the gear f , and serves to engage the extension d^4 of the arm d^2 in the rotation of said gear, as shown in Fig.

when engaged by the feeler and the shelf g^2 is inclined, to aid in directing the lower end of a released detector toward the toothed edge of the shelf to enter between two of the teeth thereof.

Under normal conditions the lower ends of the detectors project below the shoulder g' , the shoulder thus serving at all times as a guide for the detectors.

The feeler is moved toward the detectors in such manner that arrest of the feeler is permitted without strain or any tendency of the parts to breakage, the reverse swing of the feeler being effected positively.

The rock shaft a is provided with an arm a^2 , extending oppositely to the feeler, and having pivotally connected to it a bent arm a^3 , provided with a bunter a^5 and a toe a^4 , the latter cooperating with the cam D on the cam shaft C of the loom, the bunter a^5 being thereby moved into and out of the path of one or more tappets f of a cam F, also fast on the shaft C.

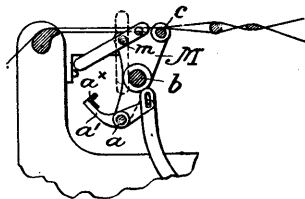
Upon arrest of the feeler the bunter a^5 will be held up in the path of a tappet, engagement therewith acting to swing the arm a^3 to the rear. The arm a^3 is slotted at a^6 to receive a stud d^6 on a short lever d^{10} , pivoted at its upper end to a link d^8 , hooked around the cam shaft at d^9 , while the other end of the link is jointed to the arm e of a rock shaft e^x . This rock shaft is provided with a knock off arm e' for the shipper lever, the lower end of the lever d^{10} and the arm e being connected by a rod e^2 , the joint e^3 of which acts as the fulcrum for the lever d^{10} when the bunter a^5 is acted upon by the tappet cam F, the swing of the upper end of said lever at such time moving the link d^8 longitudinally to operate the knock off arm and release the shipper handle S. (Draper Co.)

DRAPER'S DETECTOR FOR WARP STOP MOTIONS.

This detector refers to warp stop motions for Draper looms and has for its object to indicate to the weaver the location of a broken warp thread, at the same time providing a detector more readily accessible for rethreading to the weaver.

The illustration clearly explains the construction and working of this detector, showing the same in both positions, viz.: full lines show normal position, dotted lines show operative position of said detector.

The device consists of brackets M, (one on each side of the loom) attached to the loom frame, and which support a rod m which extends across the loom, said



rod forming a support for the detectors which swing on the rod m . The bracket also supports a rod o which forms a warp rest, a rod b which forms a back stop for the detectors, and a rock shaft a , to which the arm a' carrying the feeler a^x is attached.

When a detector is released its warp engaging end swings up above the plane of the warp threads, as is clearly shown by dotted line position of detector in the illustration, thus indicating the location of the broken end to the weaver.

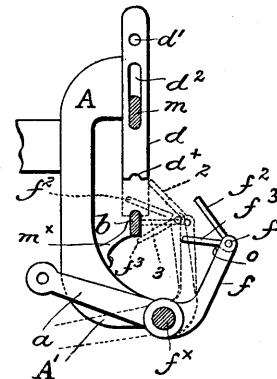
The mechanism for stopping the loom is the same as explained in the preceding article. (Draper Co.)

ALLEN'S FEELER FOR WARP STOP MOTIONS.

This feeler, when the detector assumes its operative position, directs a bunter against a stop and by suitable connections arrests the running of the loom.

A is one of the stands (one for each side of the loom) which carry the new detectors, stop, feeler, bunter and its cooperating parts, and which stand A by means of a bracket (shown broken away) is fastened to the rear stand of the loom frame.

This stand A has a depending arm A^1 , to which is pivoted on the shaft f^x the upturned arm a , which, at its upturned end f , receives the journals f^1 of a light



but strong sheet metal plate f^2 , called the feeler, extending upwardly from the arms f and toward the detectors d , bunters f^3 being secured to the plate f^2 at an acute angle thereto, stop shoulders o on the arms f engaging the bunters and maintaining them and the feeler member f^2 normally in the position shown in full lines in our illustration, relatively to the rocker arms f .

The stand A^1 also has attached to it below the detector d a bracket m^x , on which is mounted a stop b .

The detectors d are made of thin flat strips of strong sheet metal, having two apertures, one d^1 for receiving the warp thread, the other d^2 for receiving the guide bar m . The detectors are also notched at d^x , said notch resting on the stop b when the detector is in operation, i. e., dropped.

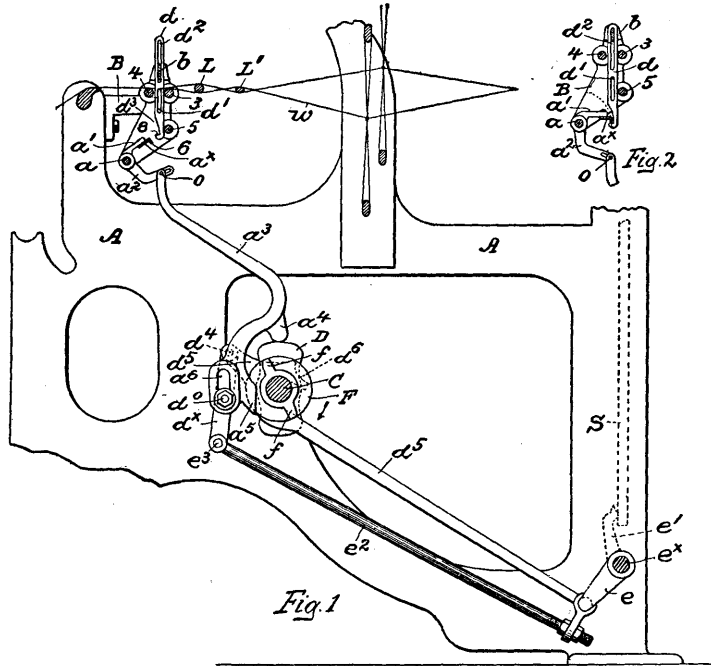
The stop o on the bent arm f holds the feeler and bunter in the position shown in full lines in the illustration; thus, when the arm f moves toward the stop b the bunter will pass below said stop, as shown in dotted lines f^2 , and the feeler will pass above it, as shown in dotted lines f^2 , but when a detector assumes its operative position the feeler f^2 will, on its rearward stroke, engage the edge of the detector and will be tipped on its journals f^1 into the position shown in dotted lines at 2, thus bringing the bunter in the position shown at 3, and thus engaging the stop b , in turn directing the stopping of the loom.

The only strain brought upon the detector is that sufficient to tip the feeler member and bring the bunter into operative position to engage the stop b , the stop and the bunter thus bearing all of the strain required to arrest the movement of the arms f and the connected parts. (Draper Co.)

NORTHROP'S WARP STOP MOTION.

Fig. 1 is a longitudinal sectional view of a part of a loom having the mechanism applied thereto. Fig. 2 is a detail showing an abnormally positioned detector. Examining illustration Fig. 1 we find a series of

warp stop motion controlling or actuating detectors d located back of the lease rods $L L'$. Each detector d is provided with a thread receiving opening d' and an elongated slot d^2 near its upper end; a flat bar b , set on edge, being extended through the slots d^2 and



rigidly secured to stands B , attached to the loom frame A . Two rods $3, 4$, extend across the loom in front of and back of the detectors and serve as warp rests for the warp threads w , while a guide rod and back stop 5 extend in front of the detectors, near their lower ends. The brackets B have bearings for a rock shaft a , provided with arms a' , to which a feeler a^x is attached, shown as an angle iron having a continuous edge 6 toward the detectors, the path of movement of the feeler being normally below the lower ends of the detectors, which are held by unbroken and taut warp threads in the position shown in Fig. 1.

Each detector is notched at one edge, as at d^3 , near its lower end, the notches of the detectors being located at the edges toward the feeler, and when a thread fails or becomes unduly slack its detector moves into the position shown in Fig. 2, being supported by the bar b . When in such abnormal position, the forward and downward movement of the feeler causes it to enter the notch of and engage the detector on the shoulder formed by the transverse bottom or stop portion 8 of the notch, the feeler being stopped in its movement by such engagement. As the forward and downward movement of the feeler is due to gravity, the strain of the stoppage is brought upon the detector through the stop 8 ; such strain is tensile, being resisted by the supporting bar b , extended through the said detectors, inasmuch as the strain is substantially in the direction of a tangent to the arc described by the feeler at the point at which it contacts with the detector, and by reference to Fig. 2, it will be seen that such tangent is parallel to the length of the detector, a portion of the arc described by the feeler being indicated by dotted lines. Inasmuch as there is thus a pull on the detector in the direction of its length, it has no tendency to twist or be bent when engaged by the feeler.

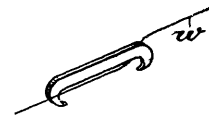
The rock shaft a has a slotted arm a^2 , to which is pivotally connected by a stud o a depending bent arm a^3 , provided with a bunter a^b and a toe a^4 , which travels on the edge of a cam D , fast on the cam shaft C of the loom, the bunter a^b being moved by said cam into and out of the path of one or more tappets f of a tappet cam F , fast on shaft C .

If the feeler is stopped by a dropped detector, the bunter a^b is held up in the path of the tappets, and engagement with one of them swings the arm a^3 to the rear. A slot a^5 in the arm receives a stud d^6 of a short lever d^x pivoted at its upper end at d^4 to a link d^5 , hooked around the cam shaft, as at d^6 and jointed at its other end to an arm e of a rock shaft e^x , having a knock off arm e' to engage and release the shipper lever S from its usual holding notch. A rod e^2 connects the lower end of lever d^x and the arm e , the connection e^3 acting as the fulcrum for the lever when the bunter a^b is acted upon by the tappet cam F , the swing of the upper end of said lever moving the link d^5 longitudinally to operate the knock off arm e' and release the shipper handle S . The weight of the arm a^3 and its connected parts serves to swing the feeler towards the detectors and to keep the toe a^4 on the cam D , the reverse swing of the feeler being controlled by said cam. (Draper Co.)

EDWARD'S DETECTOR FOR WARP STOP MOTIONS.

The object of this detector is to do away with the threading of the warp in the detectors (of other construction) previous to drawing the warp in the harness.

The new detector is clearly shown in the accompanying illustration, also its method of attaching it to the warp (one detector for each warp thread w). The detector has two hooks, one of which is adjusted to a supporting rod located near the whip roll which keeps the detector in its proper place in the loom and around which supporting rod the detector turns. The other end of the detector straddles the warp thread w , the detector resting on it in a horizontal position as long as the warp thread is in normal condition. But



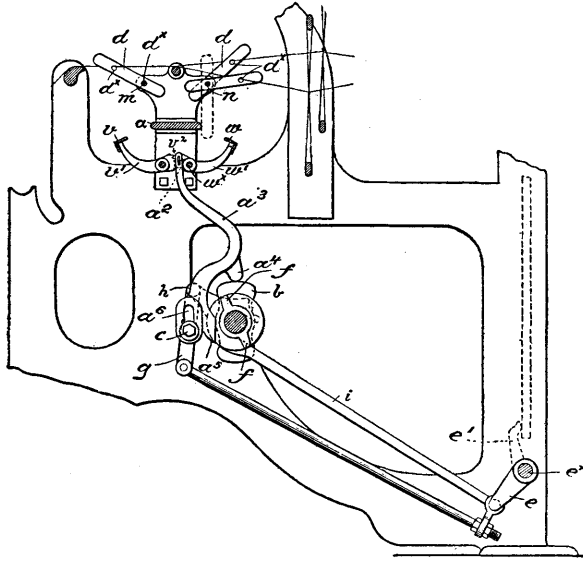
when the thread breaks or becomes excessively slack, the detector drops by its own weight, the rear hook turning around the supporting rod previously referred to, and the front hook coming in contact with the feeler of the stop motion, thus stopping the loom by the same mechanism as described in the articles on the Draper and the Northrop warp stop motions preceding this article.

The detector is shown as being made of thin sheet metal, but may be made of strong wire bent at each end, answering the same purpose; again the sheet metal detector shown can have its rear hook changed into a solid extension with a hole through which the supporting rod is passed. (Draper Co.)

DRAPER'S WARP STOP MOTION, USING TWO SERIES OF DETECTORS.

The motion is clearly shown in the illustration, in connection with that portion of a loom (longitudinal sectional view) to which it refers.

Two sets of detectors d are used, and which are made of thin flat strips of sheet metal, much longer than wide, and provided with two holes d^x , one for their mounting on to rods m and n , respectively, the other hole being for the warp thread to pass through



and keep them out of reach of their respective feelers v, w .

In the illustration three detectors are shown in full outlines (there is to be one detector for each warp thread) representing their position when the warp is in normal condition (the action of the upper and lower shed being shown), *i. e.*, the warp thread not broken; thus holding the detectors out of reach of the feelers v and w .

The moment a warp thread breaks (or gets sufficiently slack) its detector drops into the position shown in dotted line, being stopped by and resting against bar a ; thus when the feeler w (and what also refers to feeler v if a detector should have dropped on the rear set), makes its inward movement, it is arrested by this detector, and the stop motion brought in action thus: An arm a^2 on the rock shaft w^x has connected to it a bent arm a^3 provided with a toe a^4 and a bunter a^5 , working with a cam b ; said bunter being moved into and out of the path of one or more tappets f made fast to the cam b .

The two feeler arms w^1 and v^1 are connected as shown at v^2 and act in unison. When either feeler is arrested by one of the detectors, it throws the bunter against the tappets, thereby causing the arm a^2 to swing to the rear. This arm is slotted at a^6 to receive a stud c on a short lever g , pivoted at h , to a link i , hooked around the cam shaft, and jointed at its other end to the arm e on the shaft e^x , which carries the knock off lever e^1 . When the bunter is operated by the tappets f the swing of the arm moves the link i longitudinally and so operates the knock off arm and releases the shipper rod.

The two feelers v and w are moved toward the detectors by the weight of arm a^3 , the outward movement being effected by cam b . (*Draper Co.*)

ANOTHER WARP STOP MOTION FOR DRAPER LOOMS.

When the loom is running the detectors receive little or no movement, so that lint gathering on them, in some constructions of detectors, more or less clogs their warp eyes, thus preventing the free passage of the warp thread and also the action of the detector.

In the new detector this objection is overcome by forming its thread guiding portion as an elongated slot, open at its lower end so that the lint will not accumulate on the detector but will drop down and out of the slot. The parts of the detector at each side of the slot are made of unequal length, so that the blow of the feeler is received by the edge of the longer leg, thereby greatly reducing the tendency of the detector to twist.

Two series of detectors are used and which are obliquely positioned, to permit the use of one feeler only, the vibratory movement of which forms an arc as shown in dotted lines, Fig. 2.

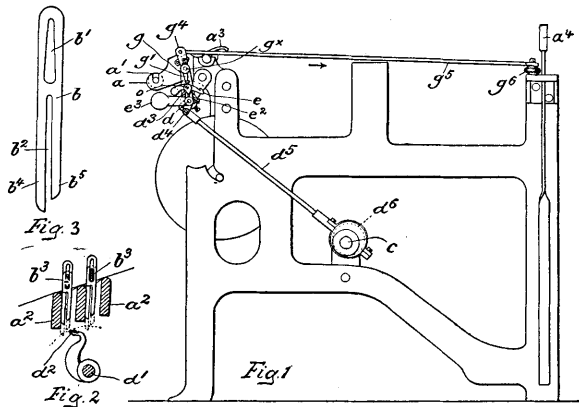
Fig. 1 shows in side elevation a part of a loom showing the stop motion applied thereto. Fig. 2 is a sectional view (enlarged compared to Fig. 1) of the detectors, taken parallel to the warp threads, showing in dotted lines the position of a dropped detector, and Fig. 3 is an enlarged side elevation, compared to Figs. 1 and 2, of one of the new detectors.

The stands a support a warp roll a^1 , between which and the whip roll a^2 are located three supporting bars a^2 , the detectors b being placed in series between these three bars a^2 .

One of these detectors is used for each warp thread, and has at its upper end an elongated slot b^1 , which receives a flattened guide bar b^2 . The lower portion of the detector is longitudinally slotted at b^2 to form a warp receiving opening, open at its lower end and forming two separate legs b^4, b^5 of unequal length.

The supporting bars a^2 are flattened and give a firm support to the detectors b and cooperate with the guide bars b^2 to firmly hold a released detector, the supporting bars a^2 forming a solid back for a detector when engaged by the feeler d^2 .

Within the arm g is a bearing hub, in which is mounted loosely a short rock shaft g^x , provided at its outer end with a catch g^1 , the inner end of the rock shaft having an arm g^4 , to which is loosely jointed one end of a rod g^5 , which in turn is jointed loosely to a pin on the knock off lever g^6 , which is fulcrumed on the notched holding plate for the shipper lever a^4 . The lever d^2 is also mounted loosely upon the rock



shaft d , said lever having a hole at one end for the reception of a pin d^4 , by which it is joined loosely to a connecting rod d^5 , having at its other end an eccentric strap surrounding the eccentric d^6 on the cam

shaft *c*. The overbalanced latch *e* is pivoted on a stud *o* and is provided with a hook, while the outer end of the part *d* of the rock shaft has fixed to it a weighted arm *e*³, provided with a toe *e*². The feeler *d*² is vibrated by means of the cam *d*⁶ acting through the rod *d*⁵; but if the feeler meets a detector *b* and the movement of the rock shaft *d*¹ or the shaft *d* is obstructed, the movement of the weighted lever *e*³ is also obstructed, while the lever *d*³ continues to move, and in its movement the overbalanced latch *e* is released to turn upon the stud *o* far enough to cause the hook of the latch *e* to rise and engage the catch *g*¹, said latch, during its further movement by or through the eccentric *d*⁶, turning the rock shaft *g*^x, and thereby moving the connecting rod *g*⁶ in the direction of the arrow, thus stopping the loom. (*Draper Co.*)

MOVABLE WARP STOP MOTION.

The object of this stop motion is to provide, in cotton looms, means to be able to move the mechanism and its supports toward the harnesses in order to have easy access for the removal of the warp beam, at the same time using the feeler rock shaft as a warp rest.

Fig. 1 shows a vertical sectional view of the mechanism with one of the detectors in normal, the other in dropped position.

Brackets *C*³ secured to the inner side of the end stands of the loom by the bolts *o*, being bifurcated at their lower ends to straddle the rock shaft *F*, and bent to form hook like supports *C*⁴, which hold the rods *d* for forming rests for the warp *w*.

Two feelers *F*^x are attached to two arms *f*³ secured to the rock shaft *F*, so that as the latter is rocked the feelers will be vibrated.

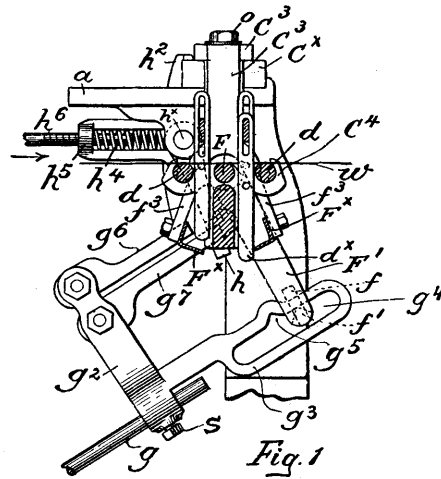
Rock shaft *F* is actuated by rod *g* which is connected at its lower end (not shown) to one of the lay swords, its upper end being connected to the L-shaped frame *g*² by set screw *s*. The arm *g*³ is slotted at *g*¹, the upper side of said slot being notched as at *g*⁵. The slotted portion of the arm *g*³ travels between the arm *F*¹ and the upturned guide *f* in such manner that when the loom is running properly the toe *f*¹ will rest in its seat *g*⁵ by the weight of the actuating member *g* and the parts carried thereby, so that the reciprocatory motion given to said actuating member by the lay sword will rock the arm *F*¹, and thereby vibrate the feelers.

When either feeler is engaged by a dropped detector *d*^x the arm *F*¹ is held stationary, the beveled sides of the seat *g*⁵ and toe *f*¹ cooperate to lift the slotted arm *g*³, and thereby unseat the toe *f*¹, as shown in illustration, so that the longitudinal movement of the actuating member *g* can continue, the toe and its seat forming a slip connection between the arm *g*³ or actuator and the feeler. The upturned arm *g*² of the frame has rigidly bolted thereto two oppositely acting bunters *g*⁶ and *g*⁷, the latter and longer of the two bunters being upturned at its outer end to form a shoulder (see dotted lines). These bunters move in unison with the actuator of the feeler vibrating mechanism and normally are out of the path of a controlling dog *h*, mounted on a short rock shaft *h*^x. The lower end of the dog *h* is cut away to leave a depending guide finger extending adjacent the sides of the bunters. A double wiper cam *h*² is secured by a set screw to the short shaft *h*^x, the oppositely extended toes of the cam normally resting against the offset ends of a T-casting, slotted, as at *h*¹, to receive the shaft *h*^x. The foot *h*⁵ of the casting has screwed thereto a link *h*⁶, extended forward and pivotally connected to the knock off lever which operates the shipper rod.

When the shaft *h*^x is rocked in one or the other

direction the wiper cam *h*² will engage either the upper or lower portion of the T-shaped casting previously referred to, and will move the latter rearwardly to draw the link *h*⁶ in the direction of the arrow, thereby operating the knock off lever, thus releasing the shipper handle from its holding notch.

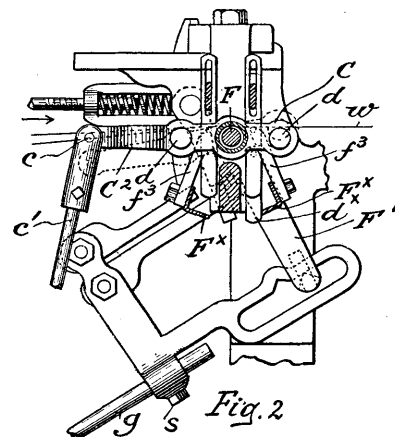
A spring *s* is interposed between the shaft *h*^x and the threaded end *h*³ of the T-shaped casting previously referred to, said spring returning the casting and link *h*⁶ to normal or inoperative position when the wiper cam *h*² is in normal or inoperative position.



To move the mechanism in order to permit ready access for removal of the warp beam, bolts (not shown in the illustration), situated behind the bolts *o*, are provided and which secure the plates *C*^x to the supports *a*. These bolts are simply removed, and the mechanism can be slid forward on the supports *a*. When a new beam in turn has been inserted and the loom ready for weaving the mechanism is slid back and the bolts as previously removed replaced.

ANOTHER IMPROVEMENT.

Fig. 2 is identical to Fig. 1 in the general plan, but has an additional device applied thereto, to prevent



lint from gathering on the detectors. For this purpose the bracket *C*, holding the rods *d*, is mounted on the shaft *F*, one end of said bracket being extended as at *C*², and is pivotally connected at *o* with a rod *d*¹, which is downturned and bent, being connected at its

free end to the lay sword, the movement of the latter causing the rods, *i. e.*, the warp rests *d*, to be rocked. The warp threads as passing through the eyes of the detectors thus impart to the latter a slight vibratory motion, sufficient, however, to keep them free from lint. (*Draper Co.*)

LOCATING THE DETECTORS OF THE WARP STOP MOTION NEARER TO THE HARNESSES.

In this manner the use of lease rods is obviated, the detectors performing two functions: first, act as detectors when a thread breaks or becomes unduly slack; second, act as a lease rod in the proper position in the loom so as to produce the best results with reference to the face of the cloth woven, since cotton manufacturers claim that in order to secure the best results the leasing devices should be so located as to bring the crossing of the warp threads about as far from the harness on the one side as is the fell of the cloth on the other, in order to relieve the yarn from strain as much as possible by making the angles of the warps on each side of the harness as nearly alike as possible.

Using two series of detectors: To explain the change in the position of the detectors in the loom, illustration Fig. 1 is given, being a sectional view of a sufficient portion of a loom showing the various parts in their proper positions. Detectors *d* are of the usual construction, two series being used, the only new feature consisting that in place of being located near the whip roll *W* they are placed nearer to the harness, being adjusted to the bracket *A* as fastened to the loom frame.

The general arrangement and operating of said detectors has been described in several articles before under the heading of Warp Stop Motions referring to

of using the detector in one series and in the same position as shown in Fig. 1 and for the same two purposes explained at the beginning of the article (*i. e.*, for detectors and lease rods combined) illustration Fig. 2 is given, which clearly explains the threading of said detectors thus: *h* the detector, *h'* the slot for carrying guide rod *g*, *b* the back stop for the detectors. Warp threads *w* and *w'* are threaded both into the lower slot *h²* of the detector, but in a reversed direction compared to each other as clearly shown in the illustration, thus forming the characteristic lease. This using of one series of detectors refers to plain work only, its general arrangement and working having been described in "Textile Machinery, Part I" page 78. (*Draper Co.*)

NORTHROP'S WARP STOP MOTION IN WHICH THE HEDDLES ARE USED TO ACT AS DETECTORS.

Fig. 1 is a vertical sectional view, taken at right angles to the crank shaft, of a portion of a loom having the new mechanism applied thereto. Fig. 2 is a sectional detail similar to Fig. 1, but shows one of the actuating detector heddles in abnormal position and the operation of the loom stopping means, by or through the stoppage of the feeler. Fig. 3 is a detail view of a part of a feeler actuating means.

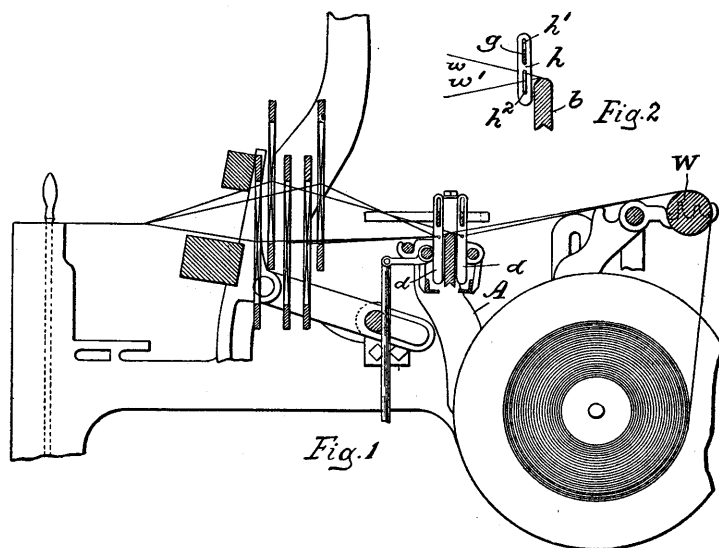
The stop motion actuating detector heddles have a limited vertical movement relative to their normal position given them for weaving. Rocking shafts *d* and *e* are located below and at the front and rear of separator *A*. The feelers *d^x* and *e^x* are attached to their respective rocking shafts, and are vibratable toward and from the separator below the two series of detector heddles *h*, by the intermeshing segment gears *d'* and *e'* Fig. 1, this insuring vibration of the feelers in unison.

Eccentric *C* is secured to the crank shaft *B* between one of the cranks *B'* and the shaft journal box. The actuator *C^x* will be reciprocated by the rotation of the eccentric, and it can also be rocked or tipped about the latter as a center, the reciprocatory movement being utilized to normally vibrate the feeler which is connected with the actuator *C^x*.

Referring to Fig. 3, an irregular slot *e* is made in the actuator *C^x*, extending from the lower rear corner upward and forward, the inner end of the slot being rounded, as at *e'*, with its upper edge *e²* convexed to form a cam surface, the said slot receiving a pin or projection 2, extended laterally from a bent arm *e³*, securely attached to one of the rock shafts, as *e*, by a set screw 6. The actuator *C^x*, the actuating means for the feeler and the feeler being thus connected by a slot and pin connection.

Under normal conditions the weight of the actuator *C^x* will cause it to be supported by the projection 2 in the rounded end *e'* of the slot, as in Fig. 1, the action of gravity being thus utilized to a certain extent to effect the movement of the feelers toward the detector heddles.

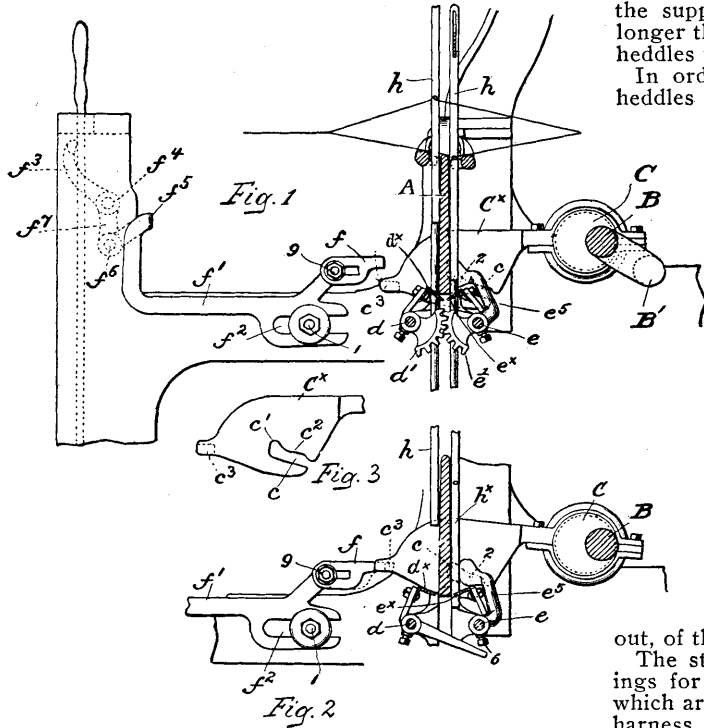
In Fig. 1 the actuator is shown as fully forward, and rotation of the crank shaft will cause the actuator to be moved to the right or rearwardly to thereby draw back the arm *e³* and rock the shafts *d* and *e* to move the feelers away from the detector heddles.



the Draper Co., hence no special explanation is required. This using of two series of detectors can be applied with equal advantage to any number of harnesses used.

Using one series of detectors only: Although the before mentioned arrangement of using two series of detectors is the best (on account of not crowding them) yet now and then said detectors may be used arranged in one series. To explain this arrangement

Supposing that a detector heddle is abnormally positioned by the breakage or undue slackness of its warp thread, as at h^x , Fig. 2 the cooperating feeler, as e^x , will be stopped and the projection 2 held stationary, so that in the forward stroke of the actuator C^x the cam surface c^2 will ride over the projection, lifting or rocking the actuator out of its normal reciprocatory path. At its front end the actuator is enlarged laterally by a lump or projection c^3 , (see dotted lines),



and when the actuator is reciprocated in its normal path the projection c^3 will not engage a bunter f , forming a part of the stopping mechanism of the loom. When moving in abnormal path, however, as described, due to stoppage of the feeler by engagement with an abnormally positioned detector heddle, the actuator will engage and move the bunter f from dotted to full line position, as in Fig. 2, said bunter being adjustably attached by a bolt 9 to a link f' , slotted at f^2 to travel on a guide stud 1 on the loom frame. A knock off lever f^3 is fulcrumed at f^4 on the loom frame to bear against the shipper lever and throw it out of its holding notch when the loom is to be stopped and the link f' is bent at f^5 , Fig. 1, and carried outside of the loom side and pivotally connected at f^6 with the arm f^7 of the knock off lever, to operate the latter when the link f' is moved to the left by the actuator C^x . (Draper Co.)

DEVICE FOR SECURING THE PROPER ACTING OF DETECTOR HEDDLES.

The object of the device is to insure a uniform and proper operation of the heddles (also serving as actuating detectors for the stop motion mechanism) and maintaining the heddles in a more nearly vertical position, when weaving goods with a heavy strain on the warp threads. In practice these heddles frequently become mag-

netized and tend to stick together, and some will lag behind others of the series during the reciprocation of the frames as required for the change of the shed, this irregular and improper operation of the heddles resulting in impaired quality of the cloth being woven.

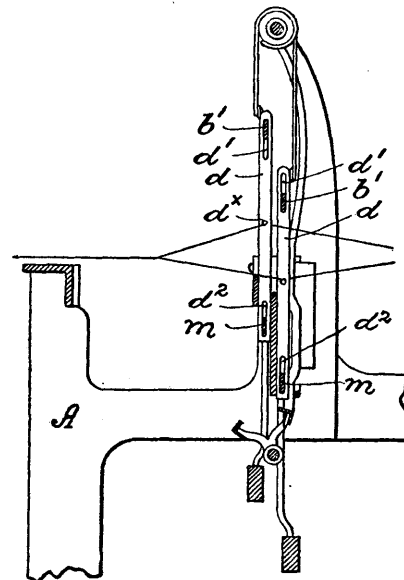
The illustration is a cross sectional view of part of a loom, having the device attached thereto.

A is the loom frame, d are the metallic detector heddles, having warp eyes d^x and being provided near their upper ends with longitudinal slots d' to receive the supporting bar b' of the frame, the slots being longer than the depth of the bar in order to permit the heddles to act as detectors.

In order to effect the movement of said detector heddles in unison, there is applied an evening device thereto, below the warp threads, being a rod m , passed loosely through longitudinal slots d^2 , located near the lower ends of the heddles, said rod being supported by the series of heddles. The weight of this evener rod is sufficient to overcome any tendency of some of the heddles to stick up higher than the others, for on the downward stroke of the frame the weight of this evener rod would come upon any one or more of the heddles which lagged behind the others, thus positively depressing them with the others.

Another way of depressing lagging detector heddles is shown by means of these three illustrations and of which Fig. 1 represents in front elevation, and centrally broken out that portion of a loom as necessary to be shown in connection with the new device to explain the action of the latter. Fig. 2 is a cross sectional view of Fig. 1, taken on the line $x-x$ looking toward the left; and Fig. 3 is an enlarged perspective view, centrally broken out, of the evening device detached.

The stands A' on the loom frame A provide bearings for the overhead shaft a , having sheaves a' , to which are attached flexible connections a^2 between the harness frames, the latter comprising upright side bars b and top and bottom cross bars $b' b^2$, the bot-



tom bars being connected to the actuating treadles (not shown). f^x are the normally vibrating feelers

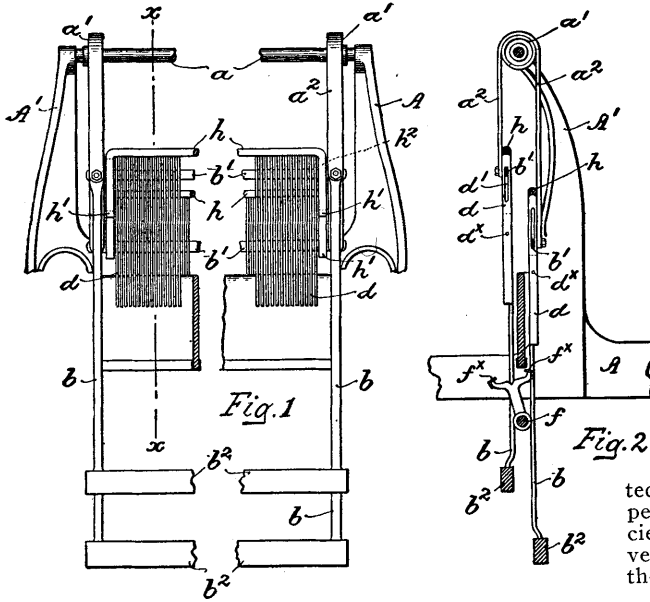
mounted on the rock shaft *f*, Fig. 2, stoppage of a feeler by engagement with an abnormally positioned detector heddle operating to stop the loom upon breakage or undue slackness of a warp thread.

The detector heddles *d* have warp eyes *d^x* and longitudinal slots *d'* at or near their upper ends to receive the supporting bar *b'* of the frame, the slots *d'* being longer than the depth of the bar to permit detecting operation of the heddle.

To insure the normal movement of the detector heddles in unison, an evening device is applied, the

With reference to Fig. 1 it will be seen that the evener straddles the series of detector heddles, the inner faces *h^s* of the ends *h'* extending outside of and adjacent the flat faces of the endmost heddles of the series, so that said ends act as side stops to limit lateral play or movement of the heddles, and thereby preserve the series in proper upright position. (Draper Co.)

SUPPORTING ROD FOR DETECTOR HEDDLES.



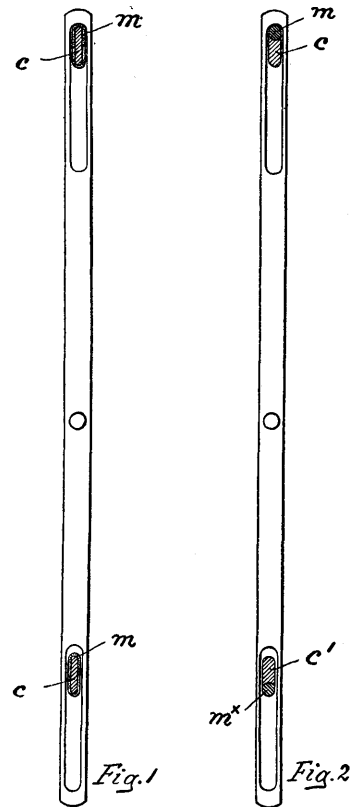
The constant and quick tapping of the transverse bar upon the detector heddles, at the ends of the slots therein, causes magnetization of said detector heddles, the disadvantage of which has been referred to in the preceding two articles.

To overcome this magnetization of the detector heddles is the object of the new construction of the supporting bar, the accompanying illustration Fig. 1 showing the same in side elevation.

These supporting bars *c* are covered with a buffer *m*, made of felt and which buffer is so interposed between the bar and the detector heddles that the impact of metal with metal is prevented, the force of the blow also softened and magnetization of the detector heddles stopped, the buffer also acting as a yielding cushion when a bunch or knot on the warp thread engages the eyes of the de-

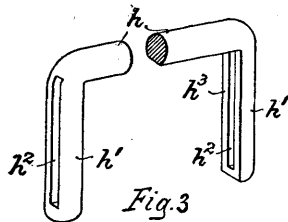
detector heddle, permitting sufficient give to prevent breakage of the thread.

Although it is more advantageous to surround or incase the supporting bar with the buffer as thus explained, especially when it is desired to obviate magnetization of the detectors; yet when it is desired more particularly to use the buffer to prevent yarn breakage it may be constructed as shown in Fig. 2 the buffer *m* being applied to the upper edge of the bar *c*, and if two bars are used, the lower edge of the bar *c'* is also provided with a yielding felt buffer *m^x*. (Draper Co.)



weight of which is sustained wholly by the heddles. Said device consists of a rod or bar *h*, bent at its ends *h'* at right angles to its main or body portion, said ends being longitudinally slotted at *h^s*, Fig. 3, and with their inner faces *h^s* flattened or planed and in parallelism with each other. The supporting bar *b'* for the heddles is extended through the slots *h^s* of the evening device to guide the latter merely, the slots being of much greater length than the depth of the heddle support *b'* so that the evening device *h* has a vertical movement independent of the heddle support.

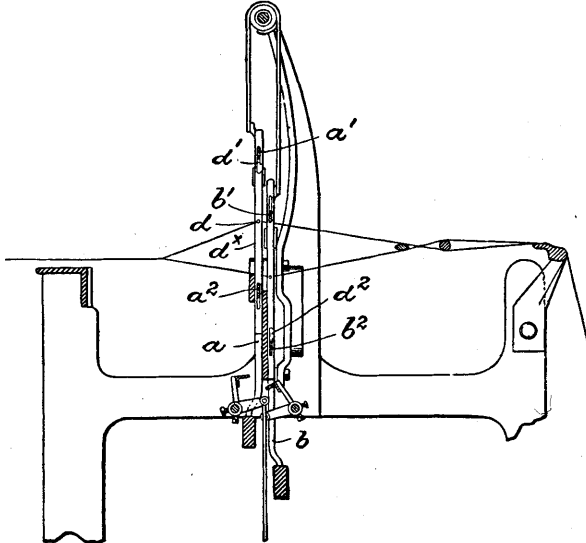
Between its ends the under side of the evening bar *h* rests upon the upper ends of the detector heddles and is sustained vertically wholly thereby, its weight being sufficient to overcome any tendency of some of the heddles to stick up higher than the others, as on the down stroke of the heddle frame the weight of the evener would come more fully upon and would depress any lagging heddles, so that all will be moved in unison.



The evener does not in any way interfere with the dropping of a heddle upon failure or undue slackness of its warp thread, as the other heddles at such time will sustain the evener.

REMOVABLE DETECTOR HEDDLE.

The construction of the new detector heddle permits its application to or removal from the supporting bar at any point with the greatest ease without any disarrangement of either the bar or the other detector heddles of the series.



The illustration represents in longitudinal section a sufficient portion of a loom having the new detector heddle applied thereto. Examining the illustration we find the side bars *a b* of the harness frame rigidly connected by transverse bars *a' a'' b' b''*. Vibrating feelers cooperate with the detector heddles *d^x*, which are stamped from thin sheet steel in tape like form, of any width desired, the completed detector heddle having parallel longitudinal edges, and a warp receiving eye *d*.

The detector heddle shown in the illustration can be applied to either one or a pair of supporting bars, and in order to secure such adaptation the detector heddle is provided at or near each end with an open slot *d'*, extending in the direction of the length of the detector heddle and having its entrance *d''* at one of the longitudinal edges thereof. The entrance *d''* to the slot is shown as located between the ends of the slot, and adjacent the inner ends, forming an open supporting hook, the tongue of which lies within the boundaries of the detector heddle.

In order that the detector heddle may be used with a single supporting bar, the slots are made to extend beyond each end of the entrance thereof, so that the bar will have a bearing when depressing the detector heddle, as when the harness frame is in the lower part of the shed, and to prevent accidental disengagement of the detector and its bar.

The entrance *d''* is made narrower than the depth of the supporting bar, to prevent accidental displacement of the detector heddle when in position on the bar.

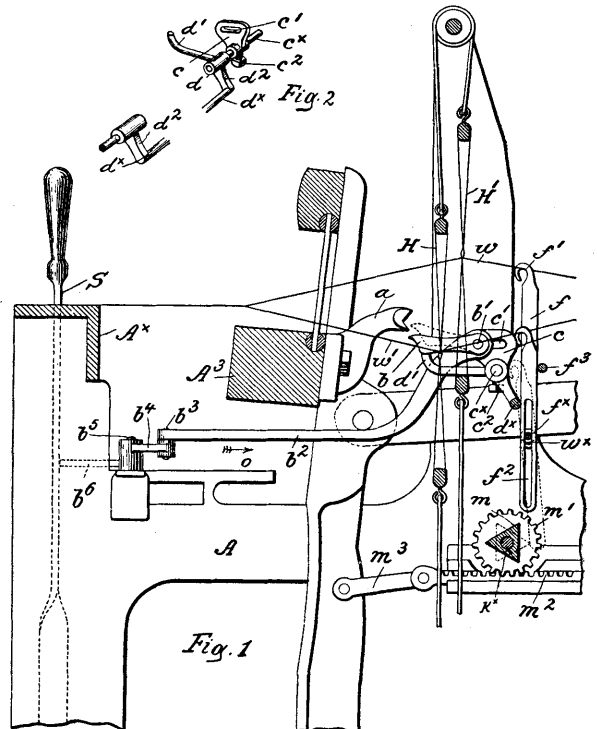
To apply a detector heddle to a single bar, the former is tipped to slide the hook over the bar, and when the bar is in the slot, the detector heddle is moved back into vertical position, as shown in illustration, removal of the detector heddle being effected by a reversal of the movements above set forth. Consequently a detector heddle may be applied to a bar at any point without in any way disarranging or changing the position of the bar or detaching it from its supports.

When a detector heddle is to be applied to two bars, as to a harness frame such as shown in illustration, the detector heddle is applied to one bar, as described, and then the tongue of the hook at the other end of the detector heddle is deflected sufficiently to permit entrance of the other bar into the slot forming the hook, the flexibility and resiliency of the material of the detector heddle permitting such deflection without injury. (*Draper Co.*)

ALLEN'S DETECTOR MECHANISM FOR COTTON LOOMS.

Fig. 1, in vertical longitudinal section, represents portion of a loom, having this mechanism applied thereto. Fig. 2 is a perspective detail of a portion of the mechanism shown in Fig. 1.

A indicates the loom frame, *A^x* the breast beam, *A^s* the lay, *S* the shipper lever, and *H H¹* the heddle frames. The lay is provided at its rear side with a bunter *a*, adapted at times to engage a dog *b*, pivotally mounted at *b¹* on a link *b²*, jointed at *b³* to a rocker arm *b⁴*, mounted to rock on fulcrum stud *b⁵*; the hub of the rocker arm having a knock off arm *b⁶* to throw the shipper lever out of its holding notch when the link *b²* is moved in the direction of arrow *o* by engagement of the dog *b* and bunter *a*. The upper end of the link *b²* is supported by the fulcrum stud *b¹*, which is extended into a slot *c¹* of a guide plate *c*, the hub of which is secured by a set screw *c²* rigidly to a stud *c^x*, extended from the inner face of the loom side, and said stud has also loosely mounted thereon a second hub *d*, provided with an upturned arm or finger *d¹*, extended beneath the dog *b*, and with a second depend-



ing arm *d²*, to which is secured a light rod or shaft *d^x*, extended across the loom back of the harness mechanism, and having at its other end a second arm *d²* (see Fig. 2), journaled in the opposite loom side.

The warp stop motion actuating detectors, are thin,

flat metallic plates f , hooked at f^1 to embrace the warp threads w and having longitudinal slots f^2 therein, through which slots is extended across the loom a fixed bar f^x , forming a guide to prevent displacement of the detectors, said guide being assisted in this function by an auxiliary bar f^3 , extended across the backs of the detectors and the rod d^x , which extends across their front.

Under normal conditions the detectors will rise and fall as the shed is formed, and there will be no change in the position of the dog b from its full line position, Fig. 1.

Below the lower ends of the detectors a feeler is mounted, said feeler being a triangular bar m , rotatably mounted on a shaft k^x , held in supports on the loom frame and rotated by a pinion m^1 in mesh with a rack m^2 , connected by a link m^3 with the lay, and to be moved back and forth thereby to turn the feeler first in one direction and then in the other.

When the loom is running properly the detectors supported by the warps, as w^1 , in the lower plane of the shed will be held thereby above or out of range of the longitudinal edges of the feeler; but if a warp thread breaks, whether in the upper or the lower plane of the shed, or unduly slackens, the detector will drop and its lower end will be brought into position to be engaged by one of the edges of the feeler, and the detector will be swung thereby out of its vertical plane, turning on the guide bar f^x as a fulcrum. Such a condition is shown in dotted lines, and such feeler induced movement of a detector will act upon the transverse bar d^x , pushing the same forward and thereby elevating the finger or arm d^1 to lift the dog b , into position to be engaged by the bunter as the lay moves back. The completion of the backward stroke of the lay will move the link b^2 in the direction of the arrow o releasing in turn the shipper lever from its notch in its holding plate, thereby stopping the loom.

The detectors are separated by means of thin washers w^x , mounted on the guide rod f^x between each two detectors. (*Draper Co.*)

NORTHROP'S WARP STOP MOTION, ACTING DIRECTLY ON THE SHIPPER HANDLE.

The controlling means of this stop motion are located above the warp, thus easily set and adjusted and practically free from deposits of lint. The operation of the feeler, which forms a part of the controlling means, is effected by the reciprocating motion of the harness frames, but is not connected directly therewith, so that it is easy to adjust the feeler and cooperating devices.

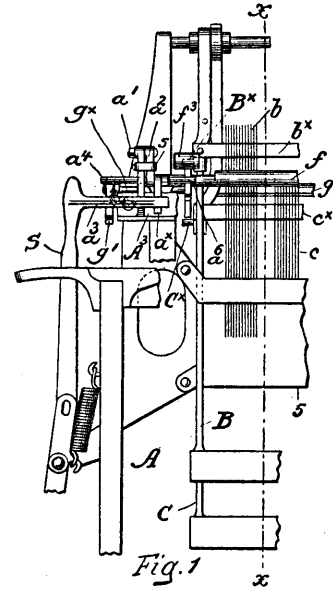
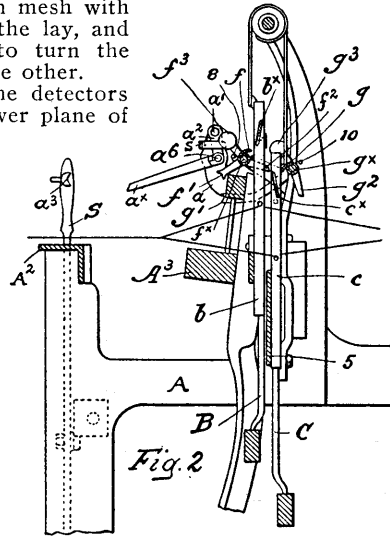
Fig. 1 is a partial front elevation of a loom with the new stop motion applied thereto. Fig. 2 is a vertical sectional view thereof on the line $x-x$, Fig. 1, looking toward the left.

A indicates the loom frame, A^2 the lay, S the shipper, and A^1 the breast beam. The lay has mounted thereon at the end adjacent the shipper a bracket a , on which is pivoted at a^1 an arm a^2 , having an attached dagger a^x , adapted to be moved into position to engage a lateral (concave on its inner face) extension a^3 on the shipper. A spring s on the bracket bears frictionally on the arm a^2 and retains the dagger either in operative or inoperative position, while a stud or pin a^4 on the arm passes through a slot in the bracket, said stud extending laterally beyond the outer side of the arm at a^5 .

The detectors serve as heddles, two series of such detectors b, c , being shown as thin, flat sheet metal strips having warp receiving eyes and inclined slots and correspondingly inclined supporting bars b^x, c^x , extending through the slots and being secured to the frames B, C.

The lower ends of the detectors are free, and the two series are separated by a transverse plate 5, attached to the loom frame.

The slots in the detectors are longer than the width of the cross bars extended therethrough, so that the detectors have a limited vertical movement relative to the bars, and by virtue of the inclination of the latter



the detectors have also a horizontal movement edgewise or in the direction of the length of the warp. The slots in the detectors b are inclined oppositely to those in the detectors c . Transverse rock shafts f^x, g^x , are mounted on the loom back and front of the detectors and adjacent thereto, and the feelers f and g are attached to said shafts, the feelers being plates of metal bent around the shafts and carried beyond them in a curve toward the adjacent edges of the detectors. The feelers are normally moved back and forth or rocked and if the warp threads are intact the detectors will not be moved into the path of movement of the adjacent feeler. Now when the detector supporting bar descends the inclination of the slots in the detectors, and the inclination of the bar will cause the detectors to move edgewise away from the adjacent feeler shaft.

If a warp thread breaks or unduly slackens, however, its detector will drop in advance of the descent of the supporting bar and will move edgewise toward the path of the feeler, so that the edge of the latter will engage the extreme end of and be stopped by the thus abnormally positioned detector, the support resisting the pressure on the detector in the direction of its length. A finger f^1 , having a notched end, is vibratable with the feeler f , and when the movement of the latter is stopped, the finger is brought into position to engage the projecting end a^5 of the pin as the lay moves back and thereby swing the dagger a^x into operative position to release the shipper at the next forward stroke of the lay.

The spring s acts as a detent to hold the dagger in

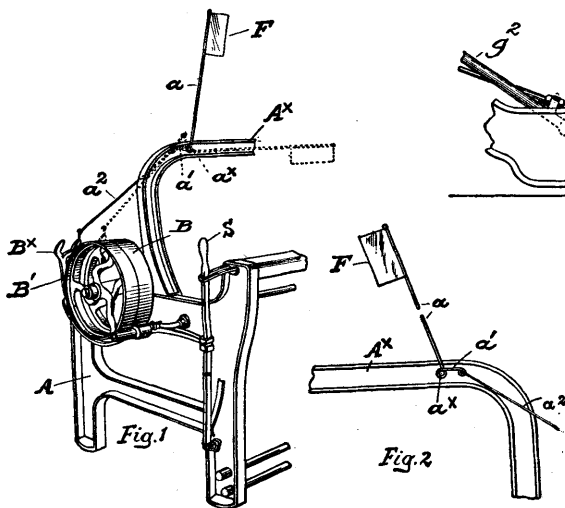
position when set, and when the dagger engages the extension a^2 the dagger will be moved by the impact into normal position before the final movement of the lay releases the shipper, so that the dagger is automatically reset after each operation thereof.

Finger g' , movable with the feeler g , is located to operate on the projecting end of the pin a^1 when said feeler is stopped to set the dagger.

The vibration of the feelers is effected initially in a positive manner, the movement being completed by momentum of the feeler, rocker arms f^2, g^2 , being movable with the feelers and projecting into the paths of projections B^x, C^x , on the two harness frames. Each feeler is also provided with an upturned arm carrying a weight, as f^3, g^3 , this weight tending to carry the feeler to its extreme position when it has been moved past the center in either direction. In Fig. 2, the feeler f is shown in one extreme position, and as the frame B descends the projection B^x hits the rocker arm f^2 and throws the weight f^3 over the center, so that the movement of the feeler to its other extreme position or toward the detectors is completed by gravity after the harness has reached its lowest position. The upstroke of the harness frame causes the projection B^x to hit the weight f^3 , throwing the feeler in the direction away from the detectors, and the operation of feeler g is similarly effected through the projection C^x . The parts are so timed that an abnormally positioned detector will present its end into the path of the feeler on its inward stroke, so that the movement of the feeler will be stopped with the finger in position to effect the operation of the dagger ax . Stops 8 and 10 are provided to limit the outward throw or movement of the feelers f and g , respectively. (Draper Co.)

STOP INDICATOR FOR LOOMS.

This stop indicator has for its object to indicate instantly to the



weaver that the loom to which it is attached has stopped, being of advantage where a weaver tends to sixteen or more looms.

Fig. 1 is a perspective view of a sufficient portion of

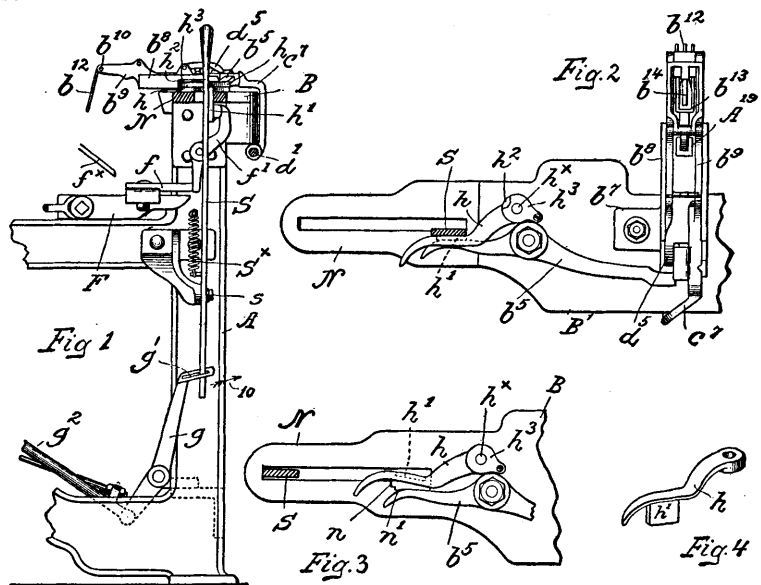
a loom having the indicator applied thereto, and Fig. 2 is a detail in elevation of the indicator.

A indicates the loom frame, S the shipper lever; B, B' the fast and loose pulleys, and B^x the belt shifter.

On the rear side of arch A^x of the loom frame, is mounted a rod a, pivoted at its lower end on a pin or stud ax, Fig. 2, and carrying at its free end a visual indicator F. The rod a is provided at its lower end, adjacent its fulcrum ax, with a rocker arm a', and this arm is pivotally connected by a link a² with the belt shifter B^x, so that when the latter moves the driving belt (not shown) onto the loose pulley the indicator F will be moved up into full line position, Fig. 1, above the arch and in full view of the weaver. When the loom is started, the movement of the shifter into dotted line position will depress the indicator back of the arch A^x, and thus while the loom is running the indicator will be maintained in such position. (Draper Co.)

DEVICE FOR INDICATING THE REASON FOR THE STOPPING OF LOOM.

The object of the new mechanism is to indicate to the weaver when running a number of looms the cause of the stoppage of a loom, i. e., whether the



warp stop motion, the filling stop motion, or the protector mechanism has operated.

Fig. 1 is a left side elevation of a portion of a loom having the new device embodied therein, the notched holding plate for the shipper lever being shown in section. Fig. 2 is an enlarged top or plan view thereof, (compared to Fig. 1) the shipper handle being shown in section. Fig. 3 is a similar view of the holding plate, the knock off lever controlled by the filling, and the stop indicator, the shipper having been released by the operation of the protector mechanism, and Fig. 4 is a perspective view of the stop indicator.

A indicates the loom frame, B the breast beam, provided with the notched holding plate N for the shipper lever S; b² is the knock off lever, operated upon failure of the filling, to release the shipper handle. F is the frog holder, f^x the actuating dagger, f the frog, and f' the cooperating knock off lever, constituting

the usual protector mechanism, operative when the shuttle is not properly boxed to release the shipper lever. b^7 is the stand and b^8 the guide for the filling fork slide b^9 , the filling fork b^{12} being pivoted on the stand at b^{10} . The tail of the fork, b^{13} , is adapted at times to be engaged by a hook b^{14} as pivoted on the filling hammer A^{15} (Fig. 2). The latch d^6 engages and moves the knock off lever b^5 upon a second successive failure of the filling to tip the fork. The operating shaft d^7 for the filling supplying mechanism (not shown), and the arm c^2 , are connected with and rock shaft d^7 by the outward movement of the filling fork slide b^9 .

The holding notch n in the plate N is increased in width for a part of its length, as at n' (Fig. 3) to receive a depending fin or lug h' , forming a part of the stop indicator, shown as an arm h , pivoted at h^x on the breast beam, and acted upon by a washer h^z (Fig. 2) held in place by cap h^y , attached to the breast beam.

When the shipper handle is in the notch n , the finger h' of the stop indicator rests in the depression n' of the notch against the shipper lever, and the outer end of the knock off lever b^5 abuts against the outer face of the finger, as in Figs. 1 and 2, so that the latter is interposed between the shipper lever and the lever b^5 . At the same time the protector knock off lever f' rests against the finger which projects below the plate N sufficiently for the purpose, as clearly shown in Fig. 1, and when the loom is running properly, the parts will be in the position shown in Figs. 1 and 2.

If now the protector mechanism is operated, the lever f' will be turned to push inwardly against the finger h' , turning the stop indicator into the position shown in Fig. 3, and thereby forcing the shipper lever out of the holding notch n to move into stopping position by the action of its spring S^x , Fig. 1. The knock off lever b^5 has not been moved, and the weaver by glancing at the stop indicator sees that it alone has been moved, and he at once knows that the protector mechanism has operated and that the fault is in the shuttle. On the other hand, if the filling fork mechanism had operated, due to failure of the filling, the latch d^6 would have swung the knock off lever b^5 , and the latter would then act through the finger h' to release the shipper handle, and both the knock off lever b^5 and the stop indicator h would be in abnormal position, showing the weaver that the fault was with the filling.

The lower end of the shipper lever extends below the pivot s , Fig. 1, on which it is loosely mounted and enters an incline slot g' in the upper end of a rocker arm g , controlled as to its movement by the warp stop motion mechanism, a link g^2 , forming a part thereof, serving to at times move the rocker arm g . Should a warp thread break or become unduly slack, the warp stop motion mechanism will operate to swing the upper end of the rocker arm g in the direction of arrow 10, Fig. 1, and the inclined edge of the slot g' will act on the shipper lever below its fulcrum to move the upper end of said lever inward or out of its holding notch, and the loom will be stopped. Under such circumstances the stop indicator remains in normal position, and consequently the weaver knows at once that neither the protector mechanism nor the filling fork mechanism has operated to release the shipper lever, and that the fault must consequently be in the warp.

Thus by the position of the stop indicator the particular fault which has caused the loom to stop is at

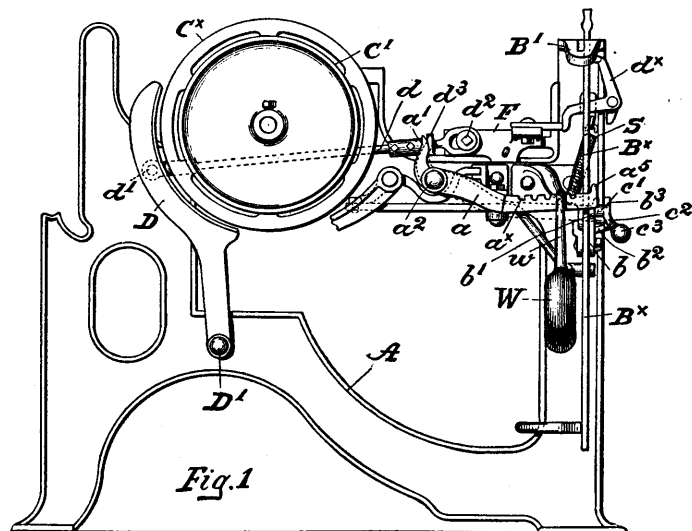
once made plain to the weaver and the particular fault can be remedied without necessitating an examination of the various parts of the loom. (*Draper Co.*)

BRAKE MECHANISM FOR NORTHROP LOOMS.

The object of this brake is to stop the loom "on the pick" when required, the controlling member by which release of the brake is effected during stoppage of the loom being attached to the shipper lever and so constructed that movement of the shipper into running position will throw it out of operation automatically.

Fig. 1, in elevation, represents a sufficient portion of a loom having this brake mechanism applied thereto, the parts being shown in the position assumed when the loom is running. Fig. 2 is a partial front elevation of the brake mechanism the parts being shown in position considering the loom running. Fig. 3 is a like view, the parts being shown in position to apply the brake and stop the loom.

A indicates the loom side, B the breast beam having the notched holding plate B' for the shipper lever B^x , C and C' are respectively the fast and loose pulleys,



C^x the brake wheel secured to, or to rotate with the fast pulley, and B^2 is the belt shipper.

The brake shoe D is a suitably shaped arm pivoted at D' to the loom side (see Fig. 1) and jointed at d' to a rod d , slotted at its forward end to receive a stud d^2 on the frog F , the latter when operated by a dagger, (not shown) upon absence of the shuttle, acting through an elbow lever d^x to knock off the shipper lever B^x , the operation of the frog applying the brake through the rod d .

A collar d^3 on the brake rod (see Fig. 1) is adapted to be engaged by the upturned short arm a' of a lever a , pivotally mounted at a^2 on a stud secured to the loom side, the lever a supporting a weight W , the hooked stem w thereof being adapted to engage one of a series of notches a^x in the lever arm a to adjust the weight toward or from the fulcrum a^2 . The weight when free to act moves the lever a , a' into dotted line position, Fig. 1, and through the rod d applied the brake, the lever and weight constituting a brake actuator.

A bracket or stand b , having an extended toe b' and an outwardly bent upturned ear b^2 , is rigidly secured to the side of the shipper lever B^x adjacent its fulcrum b^x , the toe b' being of sufficient length to extend beneath the lever arm a , maintaining it raised in full line position, Fig. 1, and as also shown in Fig. 2, when the shipper lever is in running position, with the brake released.

When the shipper lever is moved to stopping position, Fig. 3, the toe b' is lowered to release the brake actuator, thereby permitting the latter, acting by virtue of the weight W , to apply the brake automatically, whether the movement of the shipper lever is effected automatically or by hand.

It is very desirable that the brake may be released while the loom is stopped in order that the weaver

controlling member returns by gravity to normal position.

Spring S , attached at one end to the loom frame and at the other end to the shipper lever, acts to throw the latter when released from its holding notch.

The slot and stud connection between the brake rod d and the frog F permits the brake actuator to apply the brake when the shipper lever is knocked off by reason of failure of the filling or by hand without operating the frog. Stop b^3 limits the movement of the manual controlling member when operated to release the brake while the loom is stopped. (*Draper Co.*)

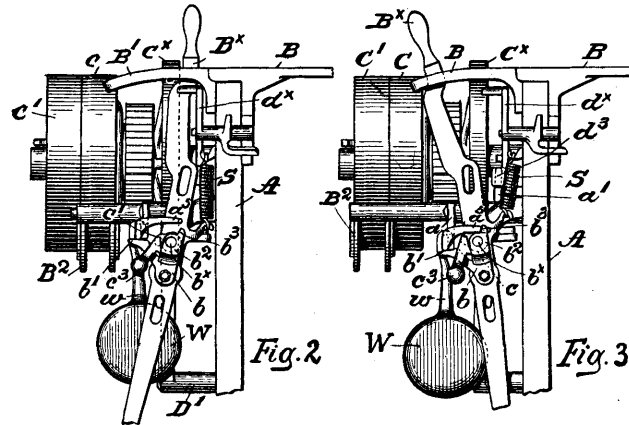
PROTECTOR MECHANISM FOR DRAPER LOOMS.

The protector mechanism usual on back binder looms includes a frog lift mounted on a sliding frog adapted to travel on the loom side, the dagger engaging the frog lift when the shuttle is improperly boxed to thereby stop the loom. Engagement of the frog lift by the dagger causes a great strain on all the parts, and as it is highly desirable to preserve absolute alignment in the travel of the frog and also prevent tipping thereof, the new mechanism has been designed.

The illustration is a left hand side view of a loom with the new mechanism applied thereto.

A is the loom frame, A^2 the breast beam, having the holding plate N for the shipper lever L to actuate the belt shifting devices, (not shown), and the knock off lever b^x for the shipper lever, adapted to be operated by an arm f' , fast on an offset of the frog F , mounted to slide on the loom side.

f^x is the frog lift as mounted on the frog and to be engaged at times by the dagger d , (only partially shown in illustration). The forward end of the frog F is provided at the sides with two separated projections f^2 , extended forward beneath two opposite and laterally extended lugs a^x , formed on the upright

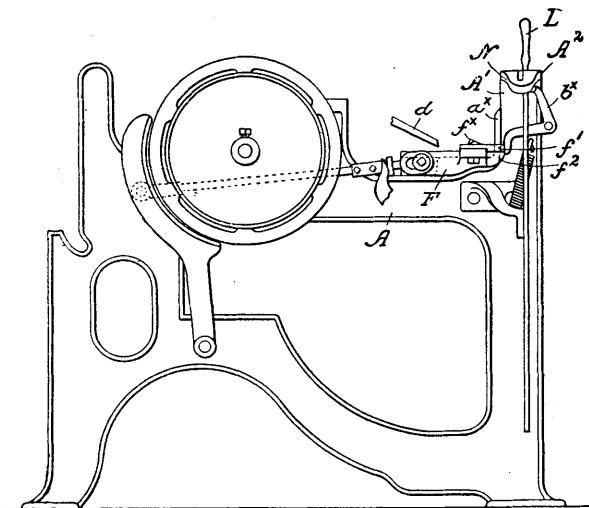


may move the operative parts of the loom by hand, and for this purpose there is provided a disk like hub c , having a cam c' on its periphery and a non-radial arm c^2 , secured to or forming a part of the cam, the outer end of the arm being enlarged to increase the weight, as at c^3 , and serve as a handle. The hub is mounted to rock freely on the shipper lever fulcrum b^x between the said lever and the ear b^2 of the stand b , said ear having thereon a stop b^3 to cooperate with the face on the inner end of the arm c^2 , limiting its movement in one direction. Movement of the controlling member in the other direction is limited by engagement of the face of the arm c^2 with the straight edge of the ear b^2 as shown in Figs. 2 and 3.

The lever arm a has a laterally extended finger a^5 , which projects above and in the plane of the hub c and its cam c' , and when the loom is running the toe b' holds up the arm a , the finger a^5 being out of engagement with the manual controlling member, as shown in Fig. 2. When the shipper is in stopping position, Fig. 3, however, the release of the brake actuator by the toe b' permits the finger a^5 to rest upon the hub c , the normal position of the controlling member relative to the shipper lever being shown in Figs. 2 and 3.

If now it is desired to release the brake without starting the loom the weaver grasps the handle c^3 of the controlling member and turns it up, thereby bringing the cam c' up over for a little past the dead center—viz:—the fulcrum b^x —the cam acting on the finger a^5 and raising the lever arm a to release the brake.

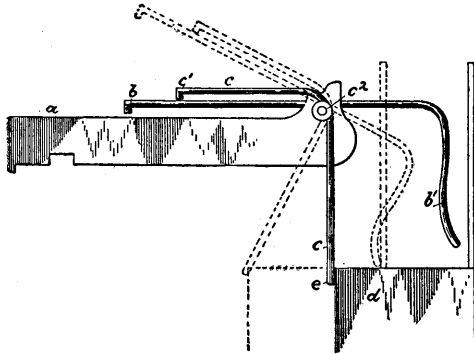
The position of the cam above center and the pressure of the brake actuator thereupon retains the controlling member in such position until the shipper lever is returned to running position, whereupon the cam c is withdrawn from the finger a^5 , the actuator is engaged and held inoperative by the toe b' , and the



corner portion A' of the loom frame. As the frog slides on its support the fixed lugs above the projections f^2 prevent tipping of the frog, and, passing at opposite sides of the part A' of the frame, insure the movement of the frog in proper alignment without any opportunity to twist. (*Draper Co.*)

CATTERALL'S LOOM FORK.

The object is to produce a very sensitive loom fork, and which is shown in the illustration in connection with a portion of the lay of a loom.

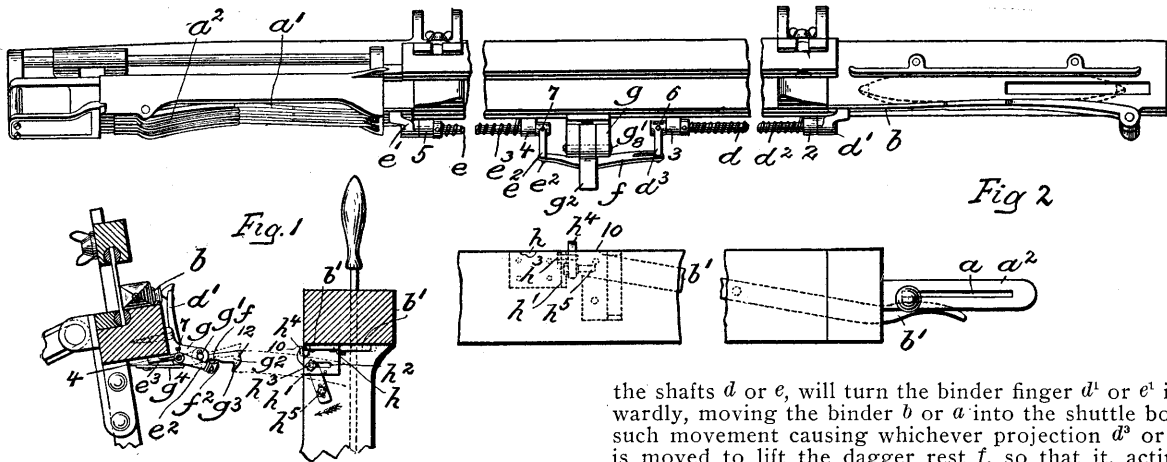


a represents the body of the loom fork and in which is pivoted the fork *b*. On the side of the body *a* of the loom fork is pivoted at *c* the wire *c*, having a weighted end *c'* which end extends at a right angle over the back end of the fork *b*. *d* represents the lay of the loom.

Just before the tines *b'* of the fork *b* engage the "filling" the lay *d* of the loom strikes the end *e* of the wire *c* and forces it to the rear, thus raising the weighted end *c'* from contact with the rear end of the fork *b*, and thus allows the rear end of the fork to rise by the exertion of the least possible force of its tines *b'* on the filling. (John Catterall, New Bedford, Mass.)

SCHAEFER AND HINKEL'S STOP MOTION FOR COTTON LOOMS.

The mechanism refers to looms having two or more boxes on one side and a single box on the other side; providing means whereby whenever the shuttle is absent from the box in which it should be at either end of the lay the loom will be stopped, and so, also,



should two boxes occupying a position at the level of the race of the opposite ends of the lay each have a shuttle then the loom will be automatically stopped.

Fig. 1 shows the lay and breast beam of a loom in

section, with the mechanism added; Fig. 2 is a top view of the lay with the mechanism applied thereto, also showing a part of the lay.

The lay is provided at its under side with ears 2, 3, 4, 5, of which 2 and 3 contain a binder shaft *d*, having at one end a binder finger *d'*, which is kept against the binder *b* of the single box by the spring *d^2*. The opposite end of the shaft *d* has a projection *d^3*, having a hook which is fixed to the shaft by a set screw 6. At the opposite end of the lay the ears 4 and 5 receive a second shaft *e*, which has attached at one end a binder finger *e'*, being held in position against any box *a'* which is used, by a spring *e^3*, and at its other end has a projection *e^2*, held in place by a set screw 7.

These two shafts are connected by a dagger rest *f*, which is pivotally mounted on one end of the projection *e^2*, and at the other end has a slot 8, which is entered by the projection *d^3*.

The lay has attached to it a casting *g*, having a pivot or stud *g^1*, upon which is mounted a double acting bunter composed of an arm *g^2*, having a hook *g^3* projecting from its under side. This bunter is acted upon near its pivot by a spring *g^4*, which normally serves to depress the acting front end of the bunter.

To the under side of the breast beam, stand *h* is attached, having a depending apron *h^1*, slotted at *h^2*, said slot receiving in it an adjustable stud *h^3*, upon which is mounted a lever *h^4*, having adjustably connected at its lower end, and extended therefrom, a stud *h^5*. The upper end of this lever *h^4* stands normally close to and bears against the end 10 of the knock off lever *b^1*, and the head 10 of the said knock off lever is notched, as shown in Fig. 1, where it will be seen that there is a space between the grooved edge of the knock off lever and the projecting stud *h^5*.

When the shuttle is in its proper position in one of the shuttle boxes opposite the level of the race of the lay, whichever box the shuttle is in will cause the binder of the box having the shuttle to turn the rock shaft *d* or *e* and depress the projection *d^3* or *e^2*, such depression of either one of said projections singly lowering the dagger rest *f*, so that the double acting binder moves backward and forward in the space between the end 10 of the knock off lever and the projection *h^5*, and subsequently the knock off lever is not moved. Should, however, the shuttle be absent from either box, then the spring *d^2* or *e^3*, acting upon

the shafts *d* or *e*, will turn the binder finger *d'* or *e'* inwardly, moving the binder *b* or *a* into the shuttle box, such movement causing whichever projection *d^3* or *e^2* is moved to lift the dagger rest *f*, so that it, acting by its projection *f^2* against the under side of the bunter, will lift the same, so that in case a shuttle be absent from both boxes the end 10 of the upper part of the bunter will meet the end 10 of the knock off

lever and turn it to release the shipper handle from its usual notch in the holding plate u^2 and thus stop the loom.

Should the shuttle boxes opposite the level of the race of the lay have a shuttle in them, then the binders of both of said boxes, held out by the shuttles in them, will act to turn the binder fingers outwardly, lowering both the projections d^2 and e^2 , which move downwardly the rest f , permitting the spring g^4 , acting with the gravity of the bunter, to lower the bunter so that its hooked part g^3 in the back stroke of the lay will catch the projection h^2 , turn the lever h^4 in the direction of the arrow just below it, Fig. 1, causing the upper end of said lever to meet the end 10 of the knock off lever and release the shipper handle from the loom and thus also stop the loom. (*Gustave Schaefer and Fred'k Hinkel, Clinton, Mass.*)



LAHUE'S PROTECTOR STOP MECHANISM.

This mechanism relates to the protector rod stands, and may be applied to looms that have otherwise the ordinary lay mechanism.

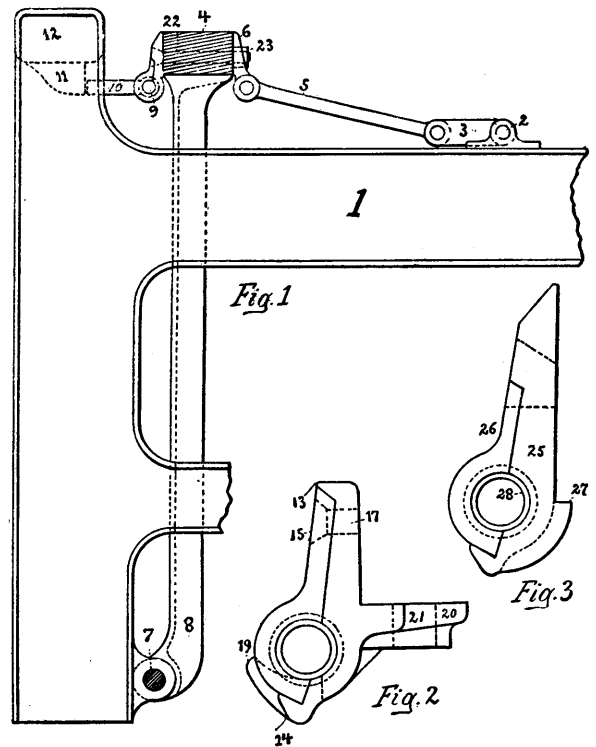
Fig. 1 is an end view of the lay part of a loom, so much being shown as to explain the mechanism. Fig. 2 is an end elevation of the middle stand, and Fig. 3 an end elevation of the end protector rod stand.

1 indicates the loom frame supporting the bearing 2 for the crank 3 that drives the lay sill 4 through the medium of the pitman 5 journaled to the bracket 6 attached to the sill.

The frame 1 also supports the bearing 7 of the lay sword 8, on which the sill is mounted. Along the front of the sill runs the protector rod 9, having the dagger 10, which normally swings idle with the beat of the lay, but which upon the shuttle failing to enter its box is automatically elevated and strikes the shoulder 11 on the breast beam 12, stopping the beat till the fault can be remedied.

A great deal of wear comes on the protector rod 9, because it is rocked at each beat, and therefore it soon wears loose in its stands. When this has occurred, it is also found that the thrust of the dagger when it strikes the shoulder 11, is apt to spring up the center of the rod and buckle it. Thus from various causes it is frequently necessary to remove and replace the rod; necessitating the removal of the stands, at least the end stands, and the loom remains idle for some time, again all the stands must be removed when they become much worn. To prevent not only the destruction of the stands by wear, but also the ruining of the rod by buckling, and to facilitate the replacing of the worn rods, are the purposes of the new mechanism. The middle stand of the device has two bearings, with a space between for the play of the dagger. Instead of resting the rod in channels in the stand, thereby causing wear upon the stand itself, bushings are slipped upon the rod and the stand is provided with sockets, in which the bushings rest. A cap 15 interlocks with the socket by fitting at the lower edge into a channel in the stand, a lip adjacent to said channel being formed to overlap the said lower edge and retain the latter in place. Through the upper part of the cap and stand is a screw hole 17, through which a screw is turned into the lay sill. Above this screw hole 17 the stand has an offset 13, which projects over the upper edge of the cap 15. The offset 13 and lip 14 cooperate to secure the cap 15 from movement, and therefore assist in retaining the protector rod in place. In applying the cap 15 to the stand its lower edge is inserted behind the lip 14, then its upper edge is swung in under the offset 13 and

finally the screw is applied in the screw hole 17, clamping the parts. In its constant vibration the protector rod exerts force outward and upward. The outward strain is taken and neutralized by the lip 14, while the upward strain is similarly taken and neutralized by the offset 13. Thus no racking action comes on the screw and the cap cannot work loose. The bushing is held securely in the stand, but may be instantly released by loosening the screw and disengaging the cap. To prevent longitudinal sliding of the bushing the cap and socket are cast with a rim at each end of the space in which the bushing will lie. Two horns 19 are cast upon the stand and between these the dagger plays. The stand opposite the base of the dagger is concave, so that when the dagger comes against the shoulder on the breast beam there is a solid backing to receive the thrust in whatever direction the thrust may act, whether exactly horizontal or glancing up or down. Therefore no buckling can take place. A flange 20 projects beneath the lay sill, and a bolt passes up through a hole 21 therein to secure the same to the sill. This bolt need not be loosened or disturbed in replacing the bushings or rod. All that need be done is to loosen the cap screws sufficiently to disengage the caps, when the rod and the bushings thereon may be lifted out, changed and replaced with but a brief delay of stopping the loom.



The end stand is made up of substantially the same parts, but holds a single bushing instead of two. This stand has no flange under the sill, but is secured by a single bolt 22 and nut 23, passing through a wedge shaped hole in the stand proper 25 and cap 26. A mere shoulder 27 projects under the sill. The bushing 28 lies in the socket of the stand and is clamped by the cap exactly as the bushings of the middle stand. To remove the bushing, all that is necessary is to loosen the nut 23, when the cap may be disengaged. (*Moses M. Lahue, Lowell, Mass.*)

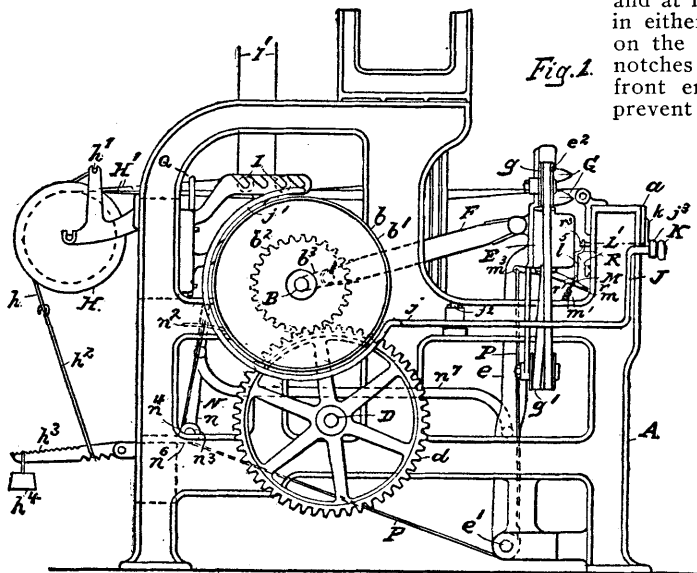
HARRIMAN'S SLACK ALARM AND STOP MOTION.

The motion relates to looms for weaving elastic goods, and has for its object to give an audible alarm when any of the rubber warp threads become slack and to stop the loom when such a rubber warp thread is broken.

In elastic goods the rubber threads in requisite numbers must be introduced under tension in order that the finished fabric may not be sleazy and inelastic. Each narrow ware loom may be considered as a number (about twenty) of looms, each weaving a separate web and all having a mainshaft, cam shaft and lay in common, and the number of elastic threads in such a loom is so great that it is almost impossible for the weaver to watch them all.

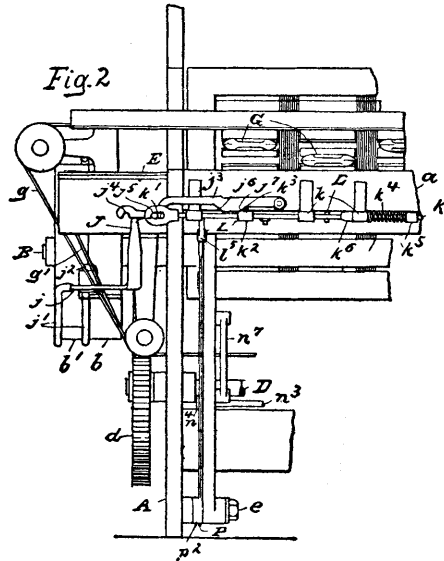
Fig. 1 is a left side elevation of part of a loom embodying the new mechanism, Fig. 2 is a front elevation of a part of the same near the left side thereof; Fig. 3 is a front elevation of parts of the rear cross girths and vibrator and showing three drop wires, one in its normal raised position, another in position to operate the slack alarm, and a third in position to operate the stop motion; Fig. 4 is a plan of the parts shown in Fig. 3; Fig. 5 is a plan of a part of the loom frame, breast beam and lay, said breast beam and lay being broken away to show parts of the stop motion; Fig. 6 is a vertical section on the line 6-6, in Fig. 3 of the vibrator and stop cord; Fig. 7 is a front elevation of a part of the lay, showing the retaining lever, the lever engaged thereby, and the stud which disengages said levers; Fig. 8 is an isometric perspective view of an elastic warp thread and the upper part of a drop wire.

A indicates the frame, B the main or crank shaft, *b* the fast pulley and *b'* the loose pulley on said shaft B; D is the cam shaft having a gear *d* engaged by a pinion *b²* on the crank shaft B; E indicates the lay as pivoted at *e'* on the frame A and connected by pitman



F to a crank *b³*; G are the shuttles running on the lay beam *e²* of said lay and which are driven by the rack and pinion device operated by reciprocating belts *g g'*; H is a warp beam on which the rubber threads H' are wound, *h* is the tension apron secured to the tension apron roll *h'*, *h²* is the tension link, *h³* the notched tension lever, *h⁴* is the tension weight adjust-

able on said lever *h³*, and I are the idle rolls which change the direction of the cotton warps I'. The loom is also provided with a belt shipping fork *j*, between the tines *j'* of which the main driving belt (not shown) runs, said fork being a part of or rigidly secured to the rear end of the belt shipping lever J, which lever

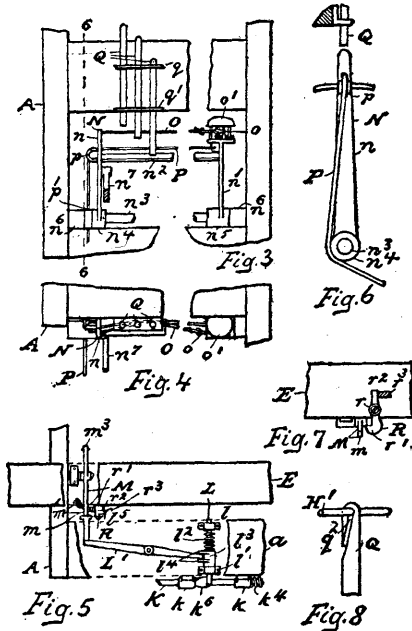


J is pivoted on a stud *j²*, rigidly supported on the loom frame A and extends to the front of the loom where it can be operated by hand to throw said driving belt from one to the other of the pulleys *b, b'* in order to start or stop the loom.

The front end of the shipping lever J is horizontal and at right angles to the breast beam *a*, and is held in either of its positions by a latch lever *j³*, pivoted on the front of said breast beam *a* and having two notches *j⁴, j⁵*, Fig. 2, each adapted to drop over the front end portion of said shipping lever and thus prevent an accidental movement of said lever. A long rod K, which slides in brackets or loops *k* is secured to the front of the breast beam; this rod has a loop or slot *k'* surrounding the front end portion of the shipping lever and has also a collar *k²* fixed on said rod K and is provided with a finger *k³*, adapted when the rod is pushed endwise to strike at the beginning of its movement on the under side of one of the inclines *j³, j⁴* with which the latch *j³* is provided and to raise the corresponding notches *j⁴, j⁵*, out of engagement with said shipping lever, said slot *k'* being long enough to allow of said latch being thus raised before the corresponding end of said slot *k'* strikes said shipping lever.

A spring *k⁴* surrounds the rod K and is compressed between a collar *k²*, fast on said rod, and one of the brackets *k*, in which said rod slides, the expansion of said spring shifting the main driving belt onto the loose pulley *b'* from said fast pulley. A tapering collar *k⁵* is also secured on rod K, which when said rod is moved to shift said belt onto the fast pulley to start the loom, crowds back and passes a catch or bolt L, Figs. 2 and 5, which slides in bearings *l v'*, bolted to the under side of the breast beam, said bolt being then thrown forward by the expansion of a

spring l^2 surrounding said bolt L and compressed between the bearing l and a collar l^3 , fixed on said bolt in such a manner as to prevent a return movement of said collar l^3 and rod K. A lever L' is pivoted on the under side of the breast beam, one end of said lever L' entering between ears l^4 , with which the collar l^3 is provided, and the other end l^5 of said lever L' being bent downward into a position to be struck by the front end m of another lever M, pivoted on the lay,



when said front end m is raised sufficiently for that purpose, said front end m being normally held down by a spring m' (shown in Fig. 1 as a spiral spring), connecting the front arm of said lever M and the sword e of the lay E. A vibrator N, consisting of two parallel arms n , n' , connected by a cross bar n^2 , is provided at the lower ends of said arms with hubs n^3 , n^3 , which loosely surround a horizontal shaft n^3 , supported in brackets n^6 on the frame A, said vibrator being connected to the lay by the rod n^7 and therefore oscillated by the movement of said lay. Above the vibrator N are as many drop wires Q as there are rubber warp threads H' , each being supported on one of said threads H' and held in position indicated, at the left, in Fig. 3. Each drop wire Q is represented as a straight wire sliding in horizontal guides q , q' (see Fig. 3) secured to the frame of the machine, and each drop wire having at its upper end a hook q^2 to reach over a rubber warp thread H' . (See Fig. 8.) An inextensible cord O is attached at one end to one arm n of the vibrator and at the other end to the operating lever o of a mechanical bell of such a construction that the pulling of said cord will ring the bell o' .

Upon the breaking of a rubber warp the corresponding drop wire falls still lower into the path of cord P, which is arranged below the cord O, and is fastened at one end to the arm n^1 of the vibrator N, from which arm n^1 said cord P passes over an idle pulley p , journaled on the opposite side of said vibrator, then under another idle pulley p^1 journaled on the shaft n^3 of said vibrator, then under another idle pulley p^2 , journaled on the lay stud or center e , the other end of said cord P being attached to the rear end m^3 of the lever M.

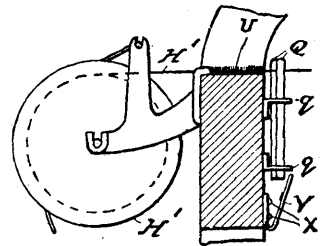
The part of the cord P between the arm n^1 and the

pulley p is normally horizontal, straight, and of uniform tension, so that said cord P causes no movement of the lever M, except when the proper movement of said cord P with the vibrator is interrupted by a fallen drop wire Q, (see at the right in Fig. 3), when said cord is bent between the arm n^1 and the pulley p , causing the rear end of the lever M to be depressed and the front end m of said lever M to strike the end l^5 of the lever L' in such a manner as to draw the bolt L backward out of engagement with the tapering collar K^6 and to allow the rod K to be moved by the spring K^4 to shift the belt onto the loose pulley as before described.

The stopping of the loom would then take place if the drop wire Q fell in front of the cord P; but to prevent this, a retaining lever or latch R is used, which is pivoted at r on the lay beam E and is provided at its lower end with a hook r^1 beveled on its under surface, which hook is pushed aside by and engages the front arm of said lever M (when said arm is raised) and holds said arm in a raised position until the upper arm r^2 of said lever R, just at the end of the forward movement of said lay, strikes the beveled rear end of a backwardly projecting stud r^3 , secured to the lay beam, and is thereby thrown out of engagement with said lever M.

An improvement on this warp stop motion is shown in the accompanying illustration, representing an elevation of the rear part of the loom (see also Fig. 1 of the preceding article), the frame being partly removed to show the push or pile fabric over which the rubber warps are drawn, showing also some drop wires and a contact plate as used in connection with an electrical battery, so that when a drop wire touches said contact plate, the same causes the ringing of the bell.

Examining illustration we find hung on the rubber warp threads H' drop wires Q (see also Fig. 8 of the preceding article) arranged to slide vertically in horizontal metallic guides q , q' , and having hooks, which



catch over rubber threads H' and are sustained by said threads when the same are kept at the proper tension; but when any rubber thread becomes slack or breaks the corresponding drop wire Q falls low enough to touch a corresponding contact plate V and

thus closes an electric circuit in turn causing a buzz bell to sound until the tension of the slack thread is increased or a broken thread mended.

The body of each contact plate V is inclined in such a manner that the lower end of a falling drop wire scrapes thereon and cleans the surface thereof and thus makes a perfect contact therewith.

By means of slots and screws X the distance of the plates V from the lower ends of the drop wires may be adjusted to cause the alarm to sound at any predetermined amount of sag of the rubber threads H' . The pieces U of plush are supported upon a horizontal part or cross girth of the loom with the pile side up, and the rubber threads run over and in contact with said plush, pulverized chalk or equivalent material being placed on said plush and being retained thereon by the shaggy upper surface thereof, except so much of said pulverized material as adheres to the rubber threads. The action of the plush, either with or without the pulverized non-adhesive material, polishes said threads so that they do not adhere to each other. (Josiah Harriman, Lowell, Mass.)

PICKING MECHANISMS.

GOODLINE AND CLARK'S PICKING MECHANISM.

Picking shafts, as usually constructed, act as a fulcrum of a lever of the first order, the shorter end of which carries a picking roll actuated by a cam, the other end of the lever being attached to a picking lever which actuates the shuttle when the lever is moved by the cam to throw it across the warp. In order to keep the roll in contact with the lowest part of the cam after the picking takes place and preparatory to the next action of the picking, a spring is employed, one end connected to an arm of the picking shaft and the other end to some stationary part of the loom frame, so that when the cam actuates the picking shaft the spring is extended, thereby producing additional stress upon the spring.

As the picking takes place, as the spring is connected to one arm of the picking shaft and the cam which actuates the shaft is connected to another arm, it follows that considerable friction, and consequently loss of power, is expended upon the bearing of the shaft at that time, and to overcome this additional resistance the form of the cam is so shaped as to give a quicker motion to the shaft. The new mechanism is designed to obviate the additional friction upon the

figure; and Fig. 3 is a section on line 3-3, Fig. 1, looking in the direction of arrow *b*, same figure, showing the picking arm and roll.

1 indicates a portion of the loom side (in this instance the left hand side). 2 is the rocker shaft, on which is secured the lower end 3 of the lay sword, and 4 is the rocker iron, secured on the outer end of the rocker shaft 2 and having the picker stick holder, 5, pivotally supported thereon and carrying the picker stick 5, which has a swinging motion at its upper end toward and away from the loom side. 6 is the bottom shaft, having the picking cam plate 7 fast thereon and carrying the picking cam 8, adjustably secured thereto.

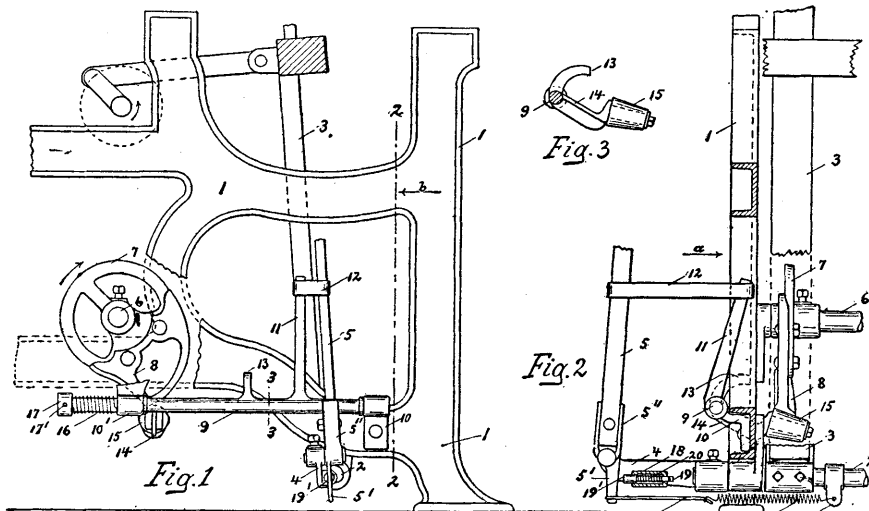
Extending on the outside of the loom side 1 is the picking shaft 9, mounted to turn or rock in bearings 10, 10', secured to the loom side. (See Fig. 1.) The picking shaft 9 has an upright arm 11 fast thereon, or integral therewith, which is connected with the picker stick 5 by a strap or connector 12. An inwardly curved arm 13, fast on the picking shaft 9, or integral therewith, acts as a stop to strike against the loom side and limit the inward rocking motion of the picker shaft.

The outer end of the arm 14 is fast on the picking shaft 9 or integral therewith, near the inner bearing

10' thereof, and extends under the lower bar of the loom side and carries on its inner end a picking roll 15, mounted to turn thereon, which is of cone shape, with the smallest end of the cone farthest from the shaft 9. The roll 15 extends under and in the path of the picking cam 8 on the cam plate 7, to be engaged on its upper surface by said picking cam 8 as the bottom shaft 6 revolves, to communicate motion to the picking shaft 9 and through arm 11 and connector 12 to the picker stick 5, to drive the shuttles through the shed.

The cone shaped roll 15 is considerably longer or wider than the thickness of the picking cam 8, as shown in Fig. 2, and the position of said roll 15 on the arm 14 relatively to the picking cam 8 is such that the first engagement of said cam 8 with the roll 15 in the operation of the loom will be with the smaller end of said roll, and the last engagement will be with the larger end of the roll—that is, the arc of the circle through which the roll 15 on the arm 14 passes is such, relatively to the picking cam 8, that in the revolution of said cam and its engagement with said roll it will pass from the smaller end of said roll to the larger end at each pick of the loom, so that there will be a gain of movement of the roll and the roll arm 14, and consequently of the picker stick 5, through connections to the picking shaft 9, corresponding to the inclination of the roll surface 15.

A coiled spring 16 encircles the inner end of the



bearing of the shaft by encircling the end of the shaft with a spring, having one end secured to it and the other end to a fixed part of the loom frame. The end of the spring which is secured to the shaft may be adjustably connected thereto, whereby the stress of the spring may be properly proportioned to the resistance to be overcome to retain the roll in contact with the cam without unnecessary expenditure of power. By this arrangement of the spring we are enabled to use a cam with an easier incline than we otherwise could do.

Fig. 1 is a side elevation of a portion of a loom side (the left hand side) and the new picking mechanism combined therewith, looking in the direction of arrow *a*, Fig. 2. Fig. 2 is a section on line 2-2, Fig. 1, looking in the direction of arrow *b*, same

picking shaft 9 beyond the bearing 10' and is secured at one end to said bearing and at its other end to a collar 17, adjustable on the shaft 9 by a set screw 17', and acts to rock said shaft and keep the picking roll 15 in contact with the cam plate 7 and picking cam 8 as the same revolves. The position of the spring 16 on the picking shaft 9 relatively to the arm 14 is such that the action of said spring on the shaft 9 is in line with or very near the point where the arm 14 is connected with said shaft, so that the action of the spring is applied directly to keep the roll 15 in contact with the cam plate 7 and picking cam 8 instead of at a distance.

The rocker iron 4 is provided with a tube 18 for holding the spring actuated pin 19, having a spiral spring 20, encircling the same, to push the outer enlarged end 19' of the pin 19 out from the outer end of the tube 18 (see Fig. 2) to be engaged by the downwardly extending end 5' of the picker stick holder 5" and act as a shuttle easer, for when the point of the shuttle thrown from the opposite side strikes the top end (not shown) of the picker stick 5, the end 5' is carried into contact with the end of the spring actuated pin 19, and thus eases the shuttle and prevents it from rebounding.

A spring 21, secured at one end to a collar 22 on the rocker shaft 2 and connected at its other end by a link or wire 23 with the lower end 5' of the picker stick holder 5", acts to draw back the picker stick 5 and keep the connector 12 taut and the picker stick 5 in its outward position.

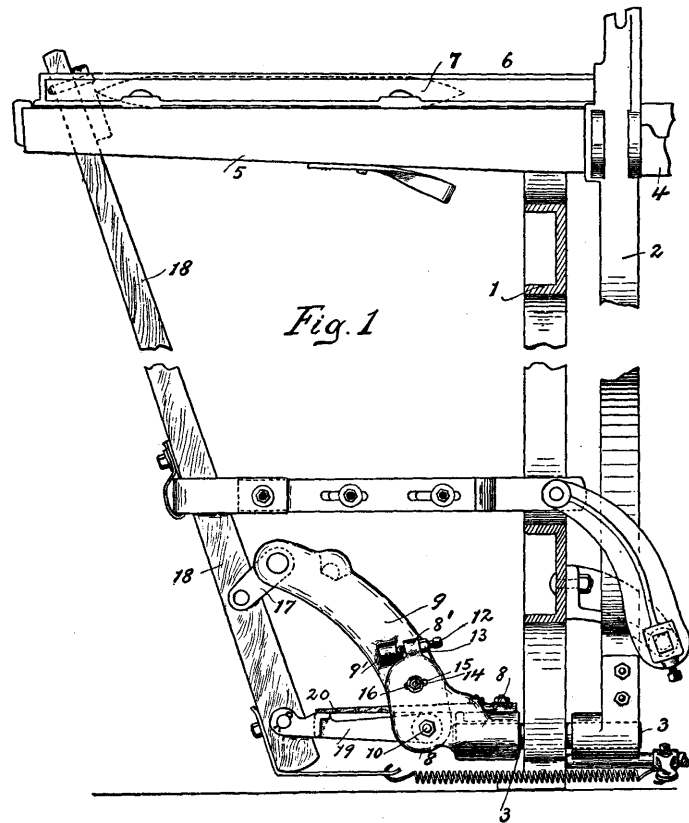
The picking shaft is supported near its back end by a bearing, and the picking roll arm is at one side of said bearing and a coiled spring at the other side, by which construction the spring acts directly upon said arm to keep the picking roll in contact with its cam without such friction in the bearings as results from applying a spring at the bottom of the picking stick in the ordinary way.

It will be noticed that the vertical arm 11 will move from a vertical position, and the inwardly curved arm 13 and the arm 14, with its picking roll 15, will move downward when the shaft 9 is moved by the picking cam 8 to throw the shuttle, and the spiral spring 16, can be so accurately adjusted by its collar 17 as to just overcome the gravity of the parts when the picking roll 15 has been moved by the picking cam 8 to return, or keep the roll in contact with the cam plate 7—that is, the spiral spring 16 will just balance the gravity of the parts and keep the picking shaft in its normal position; but when the shaft is actuated by the picking cam 8 the momentum of those parts above named will not be in any degree overcome by the spiral spring 16. Consequently this momentum is an important factor in throwing the shuttle, and permits the construction of the picking cam 8 to be made of a much easier incline to throw the shuttle properly than in looms with picking shaft as commonly constructed. In addition to this the change of diameter of the picking roll 15 from the small part of the roll when the picking shaft is first actuated to the larger diameter at the end of the movement is also of material advantage in producing a still easier incline on the picking cam 8. Either of these parts materially assists the picking, and both combined give a still better result.

The arrangement of the picking shaft on the outside of the frame with its inwardly projecting arm 14 on the inside permits of so arranging the arm 11 as to be conveniently connected by the connector 12 to the picker stick 5, and also to permit the cam plate 7 to be supported in immediate proximity to the supporting box on the cam shaft, so as to give the greatest rigidity to the cam plate 7 when the picking cam 8 is operating the picking shaft. This arrangement also permits the vertical arm 11 to be in its proper relation to the picker stick 5, so as to draw the picker stick forward at the proper time to throw the shuttle without interfering with the usual construction of the lathe sword or standard which supports the lay, as would be the case if the picking shaft was inside of the frame. (*Crompton and Knowles Loom Works.*)

THE KNOWLES SINGLE BOX PICKING MOTION.

This picking motion relates to single box looms used mostly for cotton, silk and other fabrics that require only one shuttle and where there is no picker rod to guide the picker in a horizontal direction forward and back in its course. In this class of looms the rocker shaft or pin on which the rocker iron of



the picker stick is secured must be parallel with the lay. Any slight variation in level of the rocker shaft or pin from its proper position will cause a variation in the parallel motion of the picker at the point where it engages the shuttle.

The object of this picking motion is to provide means for overcoming any variation from its proper level of the rocker shaft or pin on which the rocker

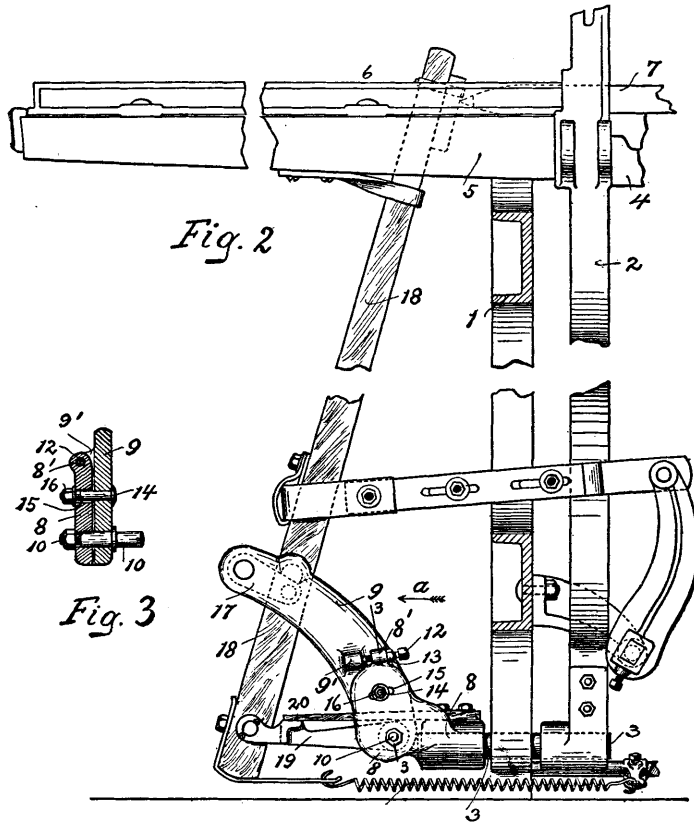
iron of the picker stick is secured and to obtain an exact horizontal or parallel movement of the picker where it engages the shuttle in case there is any such variation. Heretofore in this class of picking motions the supporting arm of the rocker iron on which the picker stick is supported, has been made integral with or rigidly attached to the rocker iron, so that the position of said supporting arm relatively to the rocker iron could not be varied.

Fig. 1 shows one end of the loom frame, having this picking motion attached, showing said motion "at rest." Fig. 2 corresponds to Fig. 1, but shows

in the rocker iron 8, and a nut 16 is screwed onto said bolt. The outer end of the arm 9 is connected by a link 17 with the picker stick 18, one end of the link being pivotally attached to the arm 9 and the other end to the picker stick 18. The lower end of the picker stick 18 is pivotally attached to the outer end of an arm 19, the inner end of which is pivotally attached to the rocker iron 8 by the pin 10.

As the picker stick is pulled forward the link 17 gives it a downward and upward curved motion which combined with the forward movement of the stick gives the picker a horizontal movement, the same as if it was running on a picker spindle.

A flat spring 20 is secured at one end to the upper end of the rocker iron 8, and at its other end bears on the outer end of the arm 19 and acts as a check to receive the shuttle and also as a check to the forward motion of the picker stick. (*Crompton and Knowles Loom Works.*)



PICKER-CAM POINT FOR CROMPTON COTTON LOOMS.

In looms of this type the picker cam is generally formed in two parts, one of which comprises a disk on a shaft, and the other consists of a casting weighing about three pounds, bolted to said disk. When the striking surface of this casting, *i. e.*, cam becomes worn, said casting must be removed and replaced by a new one; besides this, it is always more or less difficult to secure the most durable wearing surface on such a heavy casting.

The new cam is made in three parts, *viz.*, the disk on a shaft, as before, and a picker cam made of two parts which are connected together and then attached to the rotary disk previously referred to. The illustration represents an elevation of so much of the loom as is necessary to illustrate the construction, application and working of this picker cam point.

b in illustration indicates the picking shaft of the loom, said shaft being rocked in one direction on its axis by means of the cam and in the other direction by means of a spring (not shown). *c* is the picker arm for the picker roll *d*. The cam shaft *e* carries the disk *f*, which carries the cam point.

The block *h* is formed with a concave edge to rest

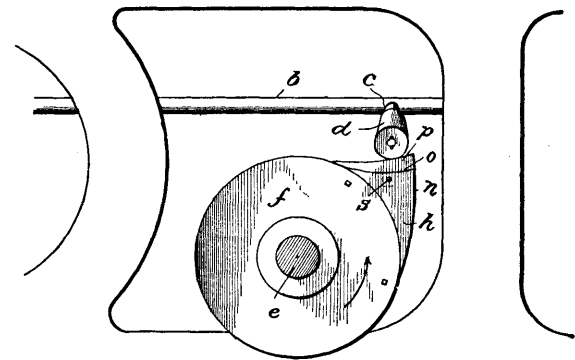
the picking stick and other parts of the mechanism in reverse position, *i. e.*, "at end of the pick." Fig. 3 is a cross section through the rocker iron on line 3-3 Fig. 2, looking in the direction of arrow *a*, same figure.

1 is the loom side, 2 the lay sword fast at its lower end on the rocker pin 3, mounted in bearings in the lower end of the loom side 1. 4 is the lay, and 5 the projecting end of the lay, carrying the shuttle box 6 for the shuttle 7. (Shown in dotted lines.)

8 is a rocker iron fast on the rocker shaft or pin 3. 9 is the supporting arm of the picker stick and which arm is made separate from the rocker iron 8 and is supported thereon on a pin 10, thus permitting its adjustment.

This adjustment is obtained by a screw 12, screwing in and out of a screw threaded lug 8', on the rocker iron 8, with its inner end bearing against a projection 9' on the arm 9. A checknut 13 holds the screw 12 in its adjusted position.

After the arm 9 has been adjusted on the rocker iron 8 it is held in its adjusted position by a bolt 14, secured to the arm 9 and passing through a hole 15



on the periphery of the disk *f*, and with a flange which overlaps the side of the disk, said flange being

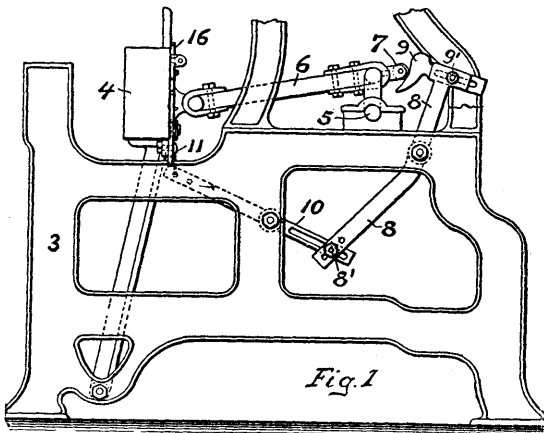
formed with a groove to receive a rib of the disk and with holes through which bolts pass to secure the block permanently to the disks. The block *h* is formed with a convex edge *n*, over which the roll *d* rides in returning from the tip of the cam, and with a concave edge *o*, against which the picker point proper or striking surface piece or facing block is held. This facing block *p* has a convex rear edge to fit and rest against the concave edge *o* of the supporting block *h*, the latter being provided with a groove in one side to receive a lug formed at the rear of the facing block. A bolt *s* passes through a hole in the lug and a hole in the supporting block to hold the two blocks together.

It will be observed that the supporting block *h* is of an approximately triangular shape and so secured to the disk *f* that when the facing block *p* is in position and the disk rotated in the direction of the arrow in illustration, the force of the blow and the wear resulting therefrom when the loom is in operation are entirely taken up by the facing block, while the latter is firmly supported by an elongated backing comprising the block *h*. It will also be observed that owing to the shape of the two blocks and their connection, the impact against the striking surface is in a direction that merely tends to press the facing block against the supporting block, without tendency to move the former in an endwise direction. Hence the single bolt *s* is sufficient to unite the two blocks, and when a new facing block is required there is but one bolt to be removed and replaced.

The block *p* being comparatively small is easily handled and is cheaper than an entire cam or picker point made in one piece. Furthermore, said block *p* can be more readily case hardened than a large casting. Practically speaking, the block *h* will last as long as the disk *f* and may be considered as a permanent part thereof although being if required removable therefrom. (*Rob. M. Holt and Peter L. Hazlewood, Burlington, N. C.*)

McMICHAEL'S PICKING MOTION.

This picking motion consists in a lever provided with a shoe, and operated by a wiper rotated by the crank shaft of the loom, and connections between the lever and the picker whereby the shuttle is thrown.

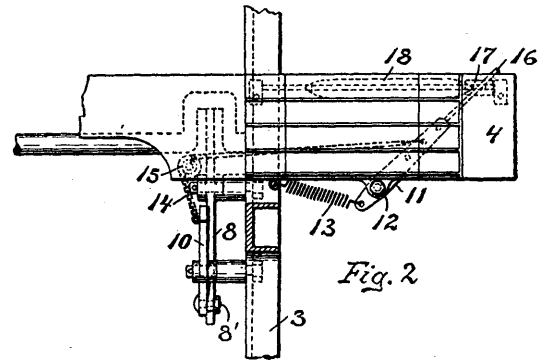


The object is to substitute a short picker stick (as indicated by 11 in Fig. 2) in place of the one of usual construction.

Fig. 1 is a side view of parts of a loom, showing the said lever operated from the crank shaft, and

connected with this short picker stick. Fig. 2 is a front view of part of a loom, partly in section, showing one end of the lay and the connections with the operating lever and the picker stick.

3 indicates one of the end frames of a loom, 4 the lay, 5 the crank shaft, and 6 the pitman connecting the lay with the crank of the crank shaft. 7 indicates a wiper, being a projection of the pitman provided with a roller; 8 is the picker lever pivoted on a stud secured to the frame 3 and provided at its upper end with a bracket to which a shoe 9 is adjustably secured by a bolt 9'. The shoe 9 has a curved face against which the wiper strikes and which it follows to move the shoe backward as the wiper rotates with the crank until it leaves the toe end of the shoe near the farthest backward movement of the wiper.



The lower end of the lever 8 is connected by a bolt 8' with the slotted end of the lever 10, pivotally supported on a stud secured to the end frame. The opposite end of the lever 10 is connected by a flexible connection with the picker stick 11, pivotally secured on a bracket 12, extending from the lay. The heel of the picker stick is connected with the lay by coiled spring 13.

The lever 10 is connected with the picker stick 11, by a cord 14 running over a roller 15, supported on the lay, and is connected with the picker stick 11 at one of its holes, the end 16 of the picker stick 11 extending through the picker 17.

It is desirable in the throwing of a shuttle to start the shuttle, and as it moves to increase the speed of the picker. This accelerated motion is secured in the new device by connecting the lever 8 with the slotted arm of the lever 10, by which the bolt 8' secured to the end of the lever 8 slides in the slot of the lever 10 toward the fulcrum of this lever, and accelerates the movement of the opposite end of the lever, and thereby the movement of the picker 17 and the shuttle 18.

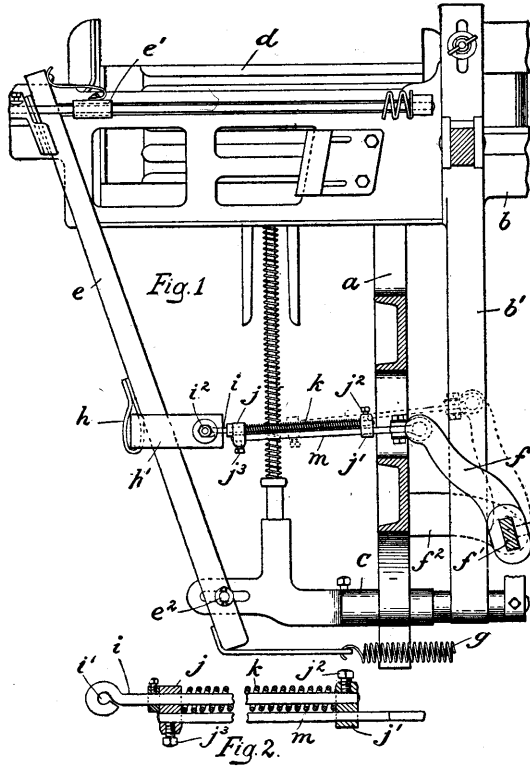
The picker mechanism thus described is located on each side of the loom, and is operated by the two cranks of the crank shaft. (*Wm. McMichael, Louis Ballou Sweatt, Woonsocket, R. I.*)

AINLEY'S PICKING MECHANISM.

In the operation of looms it sometimes happens that the shuttle becomes wedged or obstructed in the shuttle box so firmly as to resist the stroke of the picker which would throw the shuttle across the loom. When this occurs, it usually causes a breakage of the picker staff or of some of its actuating parts, because of the unyielding construction of these parts.

The object of the device is to provide a yielding operating mechanism for the picker staff by virtue

of which breakage of the parts is obviated in case of obstruction offered to the picker. A further object



is to diminish the destructive or wearing effects due to the normal operation of the picking mechanism.

Fig. 1 represents, in side elevation, this picking mechanism and the adjacent parts in a loom. Fig. 2 represents, in vertical section, on a larger scale, particular features of this picking motion.

a designates a portion of the framework of the loom; *b* the lay or batten; *b'* one of the lay swords supporting the lay *b*, and *c* the rock shaft on which the lay oscillates. *d* designates the shuttle box, *e'* the picker, and *e* the picker staff, which is pivoted at *e²* to the rock shaft *c*, is actuated by the crank arm *f*, and is retracted after its shuttle throwing stroke by a spring *g*, connected with the heel of the picker staff.

In place of the rigid connecting piece or rod as generally used to connect the oscillating crank arm *f* with the picker staff *e*, there is provided a yielding connection constructed as follows: By means of straps or loops *h* and *h'* a rod *i* is attached to the picker staff *e* at a point above its pivot *e²*, the said rod having an eye *i'*, through which passes a bolt *i²* on the strap *h'*. The rod *i* passes through apertures in two blocks or collars *j j'* and is rigidly secured to the farther block *j'* by means of a set screw *j²*. A second rod *m* is arranged below the rod *i*, passes through other apertures in the blocks *j j'*, being secured at one end to the block *j* by a set screw *j²* and at the other end to the crank arm *f* by means of a pivotal connection. A spring *k*, surrounding the bar *i*, is interposed between the blocks *j j'*, which constitute abutments therefor.

The arm *f*, is supported on a shaft *f'*, which is journaled in a bracket *f²* on the frame *a*. A cam operates to trip the arm *f* thereby swinging the picker staff *e* and throwing the shuttle. The spring *k* is of sufficient stiffness to overcome the inertia of the picker

staff and shuttle, and the whole mechanism normally operates as though there were a rigid connection between the arm *f* and the picker staff *e*, except that the spring *k* diminishes the destructive wear caused by impact of the picker staff and by the rapid changes in the direction of movement. Should the picker become obstructed through wedging of the shuttle or other cause, the spring *k* will yield and permit the full travel of the crank arm *f*, while the picker staff is restrained. In this way breakage of the parts is prevented, the loom being stopped by the knock off mechanism before the arm *f* has made its next stroke.

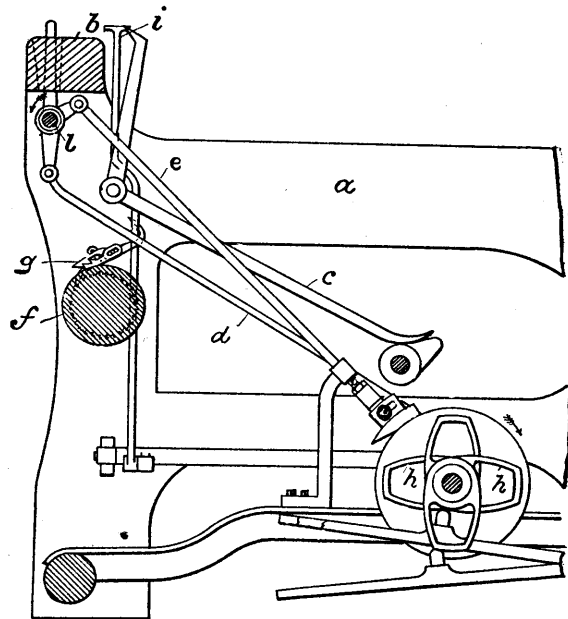
The tension of the spring *k* is regulated by changing the distance between the blocks or collars *j j'*. (Albert Ainley, H. Earl Mabbett, Plymouth, Mass.)

PICK FINDING MECHANISM FOR NORTH-ROP CAM LOOMS.

The device applies to looms running on weaves requiring more than two picks for their repeat. In plain weaving, when the filling has been exhausted or broken, the right shed opens every other beat of the lay since there are only two picks in a repeat of the pattern, the filling being replaced by the automatic filling changer on the second pick after it has run out or broken, the fresh filling carrier thus always starting on its proper pick. However in weaves that have 3, 4 or 5 picks in a repeat, there would happen a mispick each time a filling carrier runs out or breaks on starting a fresh one, unless the loom is provided with a mechanism to prevent it and what is the object of this device.

The illustration is a partial vertical longitudinal section of part of a loom, showing a general plan of the mechanism.

a is the loom frame, *b* the breast beam, *c* the filling fork lever, *d* is the arm for indicating the cam that operates the shed that the filling runs out or breaks.



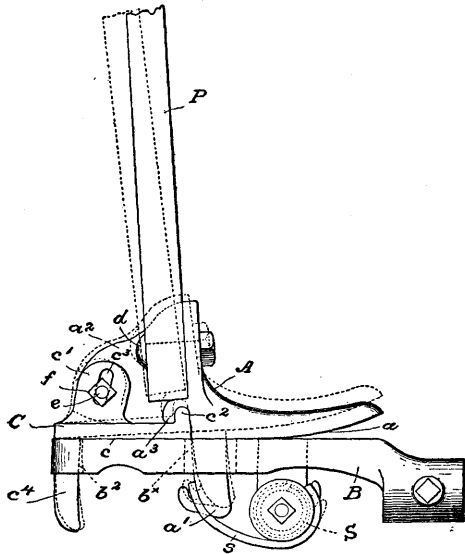
e is the arm for throwing the shuttle changing mechanism in action. *l* is the rock shaft on which is connected the filling stop motion and the pick finding device, *f* is the cloth take up roll, *g* the

ratchet pawl, *h* are the treadle cams and *i* is the lever for throwing the filling fork out of action.

The mechanism is so constructed that when the filling breaks or runs out the filling detector will indicate the same, at the same time through a connection of levers indicating the cam that operated the shed that the filling broke in, also throwing the take up and the filling motion out of action, without stopping the loom. The loom continues running without filling until the proper cam that was indicated comes around again, when the filling changing device is thrown into action by a connection of levers from the cam shaft, starting a fresh filling carrier in the proper shed. (*Draper Co.*)

SYME'S PICKER STICK MOTION.

The object of the device is to be able to vary the inclination of the picker stick at the time the blow of the shuttle is received, and thus regulate the checking of the shuttle. When the impact of the shuttle and



stick is delayed, by inclining the stick outward, the checking effect upon the shuttle will be less than when the stick is moved inward, so that impact will take place sooner.

The illustration is a partial side elevation of a portion of a picker stick and its support, having the new motion applied thereto. Examining the illustration, we find the picker stick *P* attached at its lower end to a shoe *A*, by bolt *d*, the shoe having a curved sole *a*, which rests upon and rocks on the support *B*, the latter having a slot or opening *b^x*, through which extends a hooked lug *a'*, projecting from the bottom of the shoe. A spring *S* is attached at its free end by a strap *s* to said lug, and acts to return the picker stick and shoe in its normal position, as shown in full lines in the illustration. The convex sole of the shoe does not extend beyond the bottom of the picker stick, but meets the flat face *e* of the toe *C*, the toe having an upturned ear *e'*, which rests against an upturned rearward extension or web *a²*, forming a part of the shoe, the latter having a downturned transverse lug hook *a³*, which receives a transverse upturned lug *c³* at the inner end of the toe.

A bolt *e* extended through a hole in the web *a²* of the shoe, passes through a slot *c³* in the ear *e'* and

receives a clamping nut *f*, the slot permitting adjustment of the toe on the shoe.

If the bolt is moved toward the upper end of the slot *c³*, the picker stick will be swung to the right or inward toward the center of the breast beam, meeting the shuttle sooner than it will in the full line position shown, and the checking effect on the shuttle will be greater. By moving the bolt nearer the lower end of the slot the picker stick will be moved more to the left or outwardly, and checking will be decreased, so that the checking may be regulated by varying the inclination of the picker stick when it meets the shuttle.

The dotted lines show the position assumed by the parts when the picker stick is moved outward by the shuttle blow, the outer end of the toe acting as the fulcrum as soon as the parts move from full line position.

A prong *c⁴*, depending from the plane face of the toe at its outer end, passes through an opening *b²* in the support *B* and positions the toe, preventing lateral movement thereof. (*Draper Co.*)

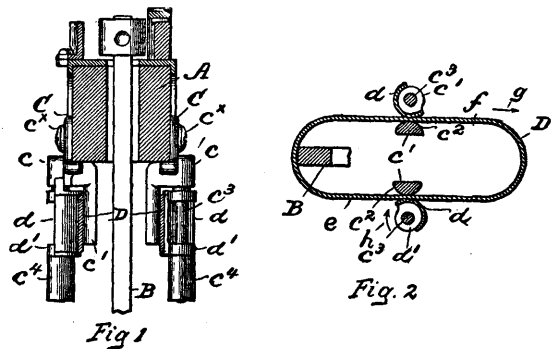
PICKER STICK CHECK FOR SINGLE BOX COTTON LOOMS.

The object of the device is to provide a "creeping" picker stick check, in turn prolonging the life thereof.

The check is made as a complete loop of leather and of a length less than the stroke of the picker stick which travels within it, means being provided to effect an intermittent longitudinal movement, or "creeping" of the strap so that the portions at the end of the loop struck by the picker stick are constantly changing.

Fig. 1 is a transverse sectional view of one end of the lay of a loom, part of the picker stick, as well as the check. Fig. 2 is a horizontal section of the check and the picker stick.

A is the lay, *B* the picker stick, *C* are stands attached in front and back to the lay, held in place by screws *c^x*, each stand having formed upon it an outwardly extended upright boss *e* and a depending guide stop *e'*, the two guide stops being located opposite each other and have their outer faces *c²* semi cylindrical, as shown in Fig. 2. A rod or pintle *c³* is rigidly held in and depends from each boss *e* to receive upon it a cam *d*, eccentric exteriorly to the pintle *c³* and having ears *d'* to receive the latter, the convex face of the cam being provided with retaining flanges between which the check strap *D* is held, the strap



passing between the convex surface of a guide stop *e'* and the cam *d* adjacent thereto. Owing to the eccentricity of the cam *d* it will be manifest from Fig. 2 that if the picker stick strikes the right hand end of the loop *D* the pull of the strap along the side

e will tend to cramp still more tightly that side of the loop between the cam *d* and the adjacent guide stop *c'*, while the pull along the opposite side, as *f* of the loop, will tend to turn a part of the cam of less radius toward the cooperating guide stop, thereby releasing that side of the loop. As the side *e* is held and side *f* released, the latter side will creep or move longitudinally in the direction of arrow *g*, Fig. 2, as the picker stick completes its inward stroke. On its outward stroke, however, the operation is exactly reversed, for the cam *d* on the side *f* of the loop then cramps the strap, while the side *e* is free to move longitudinally by the impact of the stick on the outer end of the loop, and the strap will again move longitudinally and in the direction of the arrow *g*, this creeping serving to continually present a new surface to be engaged by the picker stick, thereby making the wear much more uniform and increasing the life of the check strap very materially.

A sleeve *c'* is secured, to the end of the fulcrum pintle *c'* beneath the lower ear *d'* of the detent member to support the latter, a coiled spring within the sleeve having one end attached thereto and secured at its other end to the detent member, the spring being so wound that it tends to retain the said member in operative position, turning it in the direction of arrow *h*, Fig. 2, to clamp the check strap. The spring opposes the longitudinal movement of the check strap hereinbefore described, and thereby imposes a friction drag upon it, the force of which can be readily regulated by varying the tension of the spring in the sleeve *c'*, the adjustment being effected by withdrawing a pin and turning the sleeve *c'* in the desired direction and replacing said pin. As soon as the pull of the strap opposite to the stress of the detent spring is relaxed the spring acts to return the detent to normal position in close engagement with the check strap, and improper rotation of the detent against its spring is prevented by the part of the cam *d* of greatest radius engaging the check strap and pressing it against the guide stop *c'*.

When the picker stick is thrown against the end of the loop, a portion of the force of the blow is taken up in unclamping or releasing one side of the loop and the drag on the other side of the loop takes up the remainder, so that the picker stick is gradually checked as it reaches the end of its stroke. (*Draper Co.*)

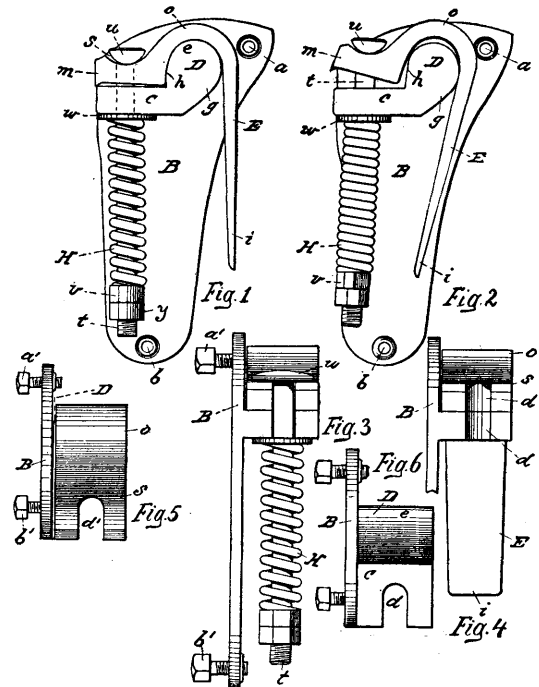
ANDREWS' PICKER CHECK.

This picker check relates to that class of looms in which a shuttle at the commencement and end of its throw is in immediate contact with a picker in place of being struck by or striking a picker staff, and in which the picker staff is relieved from the wear incident to the blow of the shuttle, the novelty of construction of the device being the checking of the shuttle in a manner insuring its perfect working, and providing for its automatic return with the picker at the end of its throw to a proper position for the stroke of the picker staff.

Fig. 1 is a side elevation of the device detached, with the movable parts at rest. Fig. 2 is the same, with the movable parts changed by the blow of the picker and shuttle. Fig. 3 is a rear end elevation, with the movable parts in the position shown in Fig. 1. Fig. 4 is an end elevation, with a portion broken away, of a part of the device. Fig. 5 is a top plan view of the device as shown in Fig. 4. Fig. 6 is a top plan view of a part. Fig. 7 is a rear elevation of a lay box and part of a drop box with the device in position as combined with a loom; and Fig. 8 is a top plan view of a lay box and part of a shuttle box showing the device operatively combined with a loom.

In this check, while all of the advantages of absorbing the blow of the shuttle so as to preserve the filling are obtained, the picker and shuttle are placed in position for the stroke of the picker staff by the check itself.

B indicates a metal frame flat on both sides and provided with bolt holes *a b* and bolts *a' b'* adapting it to be screwed flat to the vertical wall of the lay box C, as shown in Figs. 7 and 8, where it is seen bolted on the inner side of the front wall of the lay box. Projecting at right angles to the inner face of the frame B and near its top is a lug D in the form of a polygonal block, which extends, when the frame is secured as shown in Fig. 8, nearly across the lay box. The lug D comprises a part *e*, with parallel upper and lower horizontal sides, a vertical slot *d*, centrally located in the part *e* and open to the rear, and from its front end an upwardly extending curved journal bearing *e*. All of one side of lug D is integral



with the frame B. The top of the journal bearing *e* is semicircular, which half round part is connected by a curved surface *g* with the bottom side of part *e* and by a tangential surface *h* with the top side of part *e*. The journal bearing *e*, whose base is in approximately a horizontal line, has its rear surface prolonged in an easy curve by the eccentric surface *g*, departing gradually farther from the center of bearing *e* as it approaches the bottom side of the part *e*, to which it is joined.

Seated upon the top of lug D is a rigid lever E, which corresponds in width to that of lug D, comprises a long arm *i*, a short arm *m*, and a fulcrum part *o*. When the lever E is in its normal position on the lug, its short arm *m* bears upon the top surface of part *e*, its fulcrum part *o* conforms to and bears on the semicircular part *e*, and the long arm *i*, clearing the eccentric *g*, extends down in an approximately vertical position to the path of the picker F, which it is faced to conform to, as shown in Figs. 7 and 8.

The short arm of lever E is provided with a slot *d'*, with an open mouth to the rear, as shown more particularly in Fig. 5, which slot, when the lever is in

its normal position, is a prolongation of slot d of the lug D, and above the rear end of slot d' in the short arm m and transversely thereto is a curved socket s .

Combined with lug D and lever E, to normally hold the lever in the relative position shown more particularly in Fig. 1, is a spring bolt bearing the short arm m to a bearing on part e of lug D and fulcrum part o to the part e . The spring bolt comprises a bolt t , adapted to be received in slots d and d' , and a rounded head u , adapted to straddle the short arm m above the slot d' and rest in the socket s , to which it conforms and in which it slightly rotates when the short arm m is separated from its bearing on the lug D, as shown in Fig. 2. A spring H surrounds the bolt and bears between the washer w and an adjusting nut v upon the threaded free end of the bolt t to regulate the strength of the spring. A washer w bears over slot d and receives the thrust of one end of the spring. An outside check nut y is also combined with the bolt, as shown.

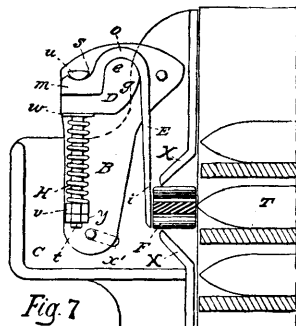


Fig. 7

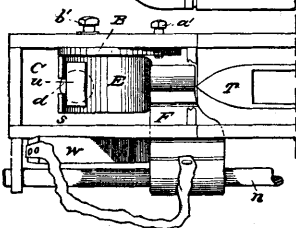


Fig. 8

The bolt hole a in frame B is in the top of the frame, near the face of long arm i of the lever E, and, as shown in Fig. 7, serves to permit the frame to be bolted to the wall of the lay box, while bolt hole b is at the bottom of frame B and coincides with a curved slot w' in the wall of the lay box. Said slot is described on a circle, having the bolt hole a as its center, and by loosening the two bolts in said holes the bottom of the frame B can be swung to bring the face of lever E to different angles to compensate for the reduction in size and change in shape of the picker from wear, and in its changed position the frame B can be secured by simply tightening up the two bolts which bind it to the lay box wall.

In Fig. 7 portions of a lay box and shuttle box are shown, with the inner walls removed and the picker in partial section between the eveners X before being impelled by the blow of the shuttle T to swing lever E from its normal resting position. In the same position the lever is shown in top plan view in Fig. 8, with the picker F upon its guide rod n and tied to the picker staff W.

In operation the blow of the picker upon first impact starts the lever to rotate upon its half round fulcrum. After the commencement of rotation the long arm of the lever begins to find a fulcrum on the eccentric surface joined to its first journal bearing, and as the lever continues to swing under pressure its fulcrum continually shifts farther and farther from the short arm, and conversely nearer to the free end of the long arm, with the result that the lever gets weaker progressively and the weight, in the shape of the spring, gets stronger out of all proportion, due to the compression of the spring. By these means

the blow of the picker and shuttle is opposed, a check yielding easily enough at first to prevent the rebound of the shuttle and rapidly increasing its resistance to absorb gradually all of the momentum of the shuttle before the limit of elasticity or setting of a spring weak enough for the initial resistance is reached, and while consequently there is always an elastic reserve to prevent a "smash."

The lever and spring bolt cannot by any operation of the shuttle or picker nor by the movement of the lay be detached from their frame and its lug; but when it is desired to remove the picker to replace it, or for any other reason, or when it is desired to tighten up the spring H, the bolt with spring can easily be withdrawn from slots d and d' and the lever E be lifted off its seat on the lug to leave an open space for removing the picker from the lay box, and to assemble the parts in operative position it is only necessary to drop the lever into its place and insert the bolt in the slots in the rear of the lug and lever.

It is evident that in place of slots d d' opening to the rear, a hole of larger diameter than the bolt through the seat of the lug and short arm of the lever to permit the bolt to be passed through and then through the coil spring before having the end nut screwed on the bolt would make the spring bolt equally effective; but the open end slots and socket s permit the withdrawal or assembling of the spring bolt with all of its parts as one piece and with the spring at an adjusted tension, so that to remove all of the downward extending parts of the device it is sufficient to pull the spring bolt from its place. When the short arm of the lever is separated from its seat on the lug as shown in Fig. 2, the socket s , by means of the bolt head resting on it, prevents the bolt from sliding out of the slots d d' . After the shuttle is checked this device becomes operative to return the picker and shuttle to the position to receive the blow of the picker staff automatically. (Robert W. Andrews, Staffordville, Conn.)

ADJUSTABLE PICKER STAFF CHECK.

This picker staff check for looms has for its object to provide an adjustable device of this character adapted for use in connection with the picker staff or lever of the loom, to provide simple and efficient means for checking and holding the picker staff to prevent the tendency of the shuttle to rebound and break the threads.

Fig. 1 is a perspective view of a portion of a loom equipped with the new check attachment. Fig. 2 is a bottom plan view of the end portion of the lay beam carrying the check attachment. Fig. 3 is a transverse sectional view on the line 3-3, of Fig. 2.

1 designates part of a loom, 2 is the lay beam, provided at its end with the longitudinal disposed slot 3, in which plays the upper end portion of the picker staff or lever 4, driving the shuttle 5^a back and forth along the race of the lay beam.

Ordinarily provision is made for checking the outward movement of the picker staff 4, to prevent rebounding thereof and a consequent rebounding of the shuttle, so that when it (the shuttle) is struck the

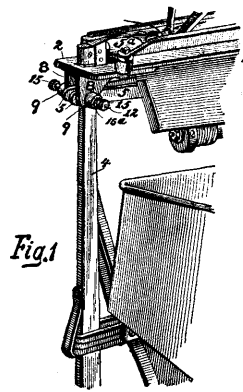


Fig. 1

next time it does not get the full force of the blow, and the result is a broken thread. To provide for this necessary checking of the picker staff, a pair of duplicate flat spring check plates 5 are used, arranged at one end of the lay beam 2, below said beam, and secured fast at their inner ends, as at 6, to opposite sides of a depending attaching block 7, secured to the under side of the lay beam in line with the longitudinally disposed slot 3 for the picker staff.

These flat spring check plates 5 are of sufficient length to permit of the requisite play for the picker staff and are disposed oppositely to each other in the same horizontal plane, so as to be arranged, respectively, at opposite sides of the picker staff 4, which is designed to play between said plates and to become frictionally gripped thereby at the outer limit of its movement.

The opposing flat faces of the check plates 5 are disposed in vertical planes, so as to flatly contact with the opposite sides of the picker staff, and the outer movable ends of the plates 5 are normally disposed closer together than the thickness or width of the

as required, while at the same time cushioning the outward movement of the said movable ends of the check plates, so as to retain the said plates in firm frictional contact with the opposite sides of the picker staff 4 when forced therebetween. By manipulating the nuts 15 the normal distance between the movable ends of the plates 5 may be varied to suit the sides of the picker staff 4 as the same become worn by use.

In operation the picker staff 4, plays between the spring plates 5 and on its upward movement is forced between and frictionally held by the movable end of the check plates until the next blow drives it back.

It will be observed that the construction insures the check plates exerting a gradual tightening pressure of the picker staff, so as not to materially interfere with its movement, while at the same time preventing any rebound and permitting of the easy release of the staff or lever. (Daniel H. Wright, Lansingburgh, N. Y.)

THACKERAY'S PICKER CHECK.

The object of this picker check is to control the throwing and the arresting of the shuttle more perfectly and thus permit increase of the speed of the loom.

Fig. 1 is a transverse sectional view of so much of a loom as is required to illustrate this picker check. Fig. 2 is an enlarged side view of the foot support of the picker stick and the lever cooperating with the rocker of the picker stick. Fig. 3 is a sectional view, on an enlarged scale, compared to Fig. 1, of the lay, showing the arm connected with the protector rod and bearing on the swell.

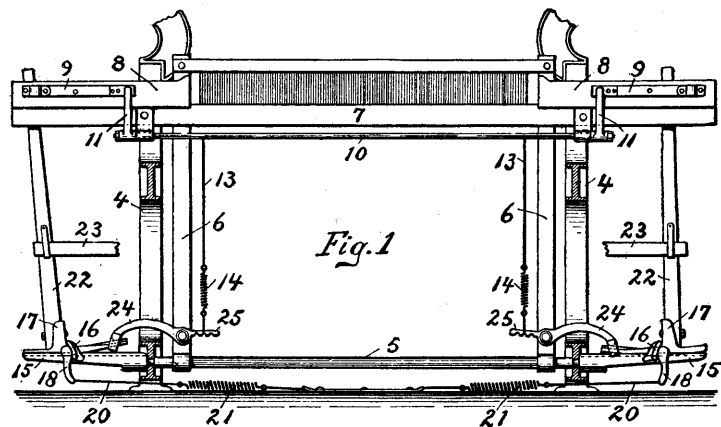
4 indicates the end frames of the loom; 5 the rock shaft, from which the arms 6 extend, which support the lay 7; 8 are the shuttle boxes; 9 the swells; 10 the protector rod; 11 the arms secured to the protector rod and bearing on the swells 9; 12 two hooked levers projecting from the rear of the protector rod, to which the wires or straps 13 are secured. The lower ends of these wires or straps are secured to the upper ends of the coiled springs 14.

To the ends of the rock shaft 5 the picker stick shoes 15, provided with the horns 16 are secured. The picker stick rocker 17 rests on and rocks on the shoe 15. The picker stick rocker is provided with the loop 18, the shanks 19 of which bear against the

picker staff 4, so that said picker staff on its outward movement must necessarily force its way in between the said outer movable ends of the check plates.

The outer movable ends of the check plates 5, are located immediately below the adjacent outer end of the lay beam 2, between a pair of parallel pendent beam ears 8, projected from the under side of the lay beam at the end thereof and located, respectively, at opposite sides of the slot 3, in which the picker staff works. The pendent beam ears 8, are provided on their outer sides with the offstanding socket projections 9, open at their inner ends and having in their outer closed ends the bolt openings 10, loosely receiving therein the outer threaded portions 11 of the adjusting bolts 12, the inner head ends 14 of which are fixedly fitted in the movable end portions of the oppositely located spring check plates 5, which check plates are made of steel spring, so as to have the requisite resiliency. The threaded portions of the adjusting bolts 12 extend through the bolt openings 10 of the socket projections 9, and receive thereon the adjusting nuts 15, working against washers 16^a, arranged on the outer ends of the said socket projections 9.

Coiled cushion springs 16 are arranged inside of the socket projections 9 and encircle the bolts 12, with their ends respectively bearing against the outer sides of the plates 5 and the outer closed ends of the socket projections 9. The springs 16 normally hold the movable ends of the plates 5, as close together

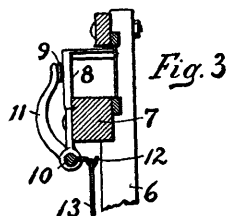
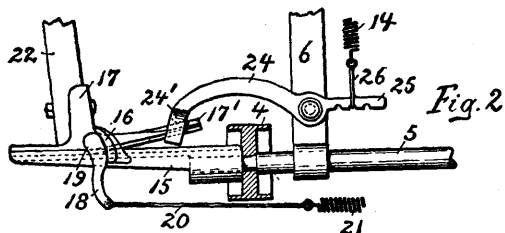


horns 16. The loop 18 is connected by the wire strap 20 with the floor spring 21. The picker stick 22 is secured to the picker stick rocker and is operated by the picker mechanism (not shown) through the lug strap 23.

On the arms 6 of the lay are pivotally supported

the levers, the short arms 25 of which are provided with notches, and a wire loop 26 connects this arm with the coiled spring 14. The bifurcated end 24' of the lever 24 straddles the end 17' of the picker stick rocker 17.

Fig. 1 illustrates the parts in the position they occupy when the shuttle is in the left hand shuttle box 8, when the greatest strain is exerted on the coiled spring 14 and the least strain on the floor spring 21



on the left hand side of the loom. The strain thus exerted on the coiled spring 14 acts through the protector rod on the swell to bind the shuttle and through the lever 24 on the end of the picker stick rocker. On the right hand side of Fig. 1 the strains on the coiled spring 14 and the floor spring 21 are practically balanced. The pressure on the swell 9 of that side is the minimum pressure.

When the shuttle in the left hand shuttle box is moved by the picker stick, the toe end 17' of the rocker descends, the bifurcated end of the lever 24 follows the toe, and the short end 25 of the lever rises and diminishes the tension on the spring 14, thereby diminishing the strain on the protector rod and the pressure on the swell 9. As the shuttle proceeds the frictional resistance decreases until the final blow is given to send the shuttle across the shed. As the shuttle enters the shuttle box on the right hand side of the loom the pressure on the swell is sufficient to retard the shuttle by the friction on the swell. When the shuttle strikes the picker stick and moves the upper end outward, the bifurcated end of the lever 24, is moved upward by the toe of the rocker 17, the tension on the spring 14 increases rapidly, and with it the pressure on the swell, while the momentum of the shuttle decreases until it is arrested. The shuttle at this point is firmly held by the swell. It is in contact with the picker stick and ready for the next throw.

By thus controlling the picker stick and shuttle and maintaining the contact between the same the speed of the loom may be increased. (Richard Thackeray, Fall River, Mass.)

BEGINS PICKER STICK.

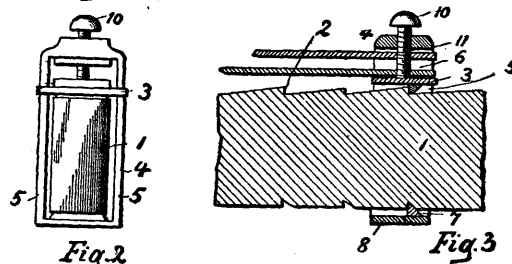
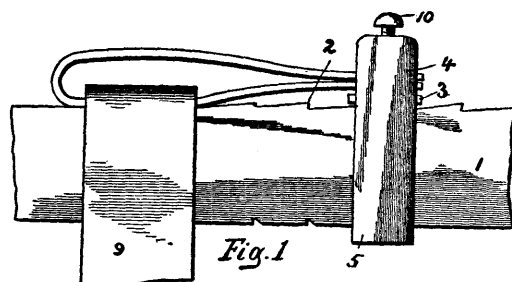
In this stick the lug strap is secured to the stick without necessitating the boring of holes in the latter and thereby weakening it.

Fig. 1 is a side elevation of a portion of this picker stick, showing the lug strap attached thereto by means of its stirrup strap. Fig. 2 is an end view thereof. Fig. 3 is a central longitudinal section.

1 indicates the picker stick, provided upon one edge with a series of shoulders 2, against which a compression plate 3 abuts. This compression plate is mounted within an elongated rectangular yoke 4, the side pieces 5 of which are received by recesses 6 in the end of the compression plate, and the yoke is in turn provided with a tooth 7 upon the inner face of its bottom piece 8, designed to bite into the edge of the picker stick opposite the shoulders 2. The lug strap

9 is passed into the loop of the stirrup strap (as shown in Fig. 1), the ends of which are passed between the compression plate and the upper end of the yoke and are firmly clamped in place by a set screw 10, screwed through the top plate of the yoke and designed to pass through an aperture 11 in one end of the stirrup strap and to bear down upon the lower end, to perform the double function of holding the stirrup strap in place and clamping the compression plate against the stick with sufficient force to cause the tooth carried upon the bottom of the yoke to bite the opposite side of the stick, and thereby prevent displacement of the parts. Ordinarily the yoke is maintained in inclined position in order to better withstand the lateral strain exerted by the pull upon the stirrup strap incident to the tightening of the lug strap. It will be seen that by this means the stirrup strap is firmly retained upon the picker

stick without the necessity for puncturing the latter and it can be readily adjusted to the desired position upon the stick by loosening the set screw and causing the yoke to be moved to bring the edge



of the compression plate against the desired shoulder, when, the set screw is caused to clamp the parts securely in the adjusted position. (Joseph Begins, Lisbon Center, Me.)

A METALLIC PICKER STICK.

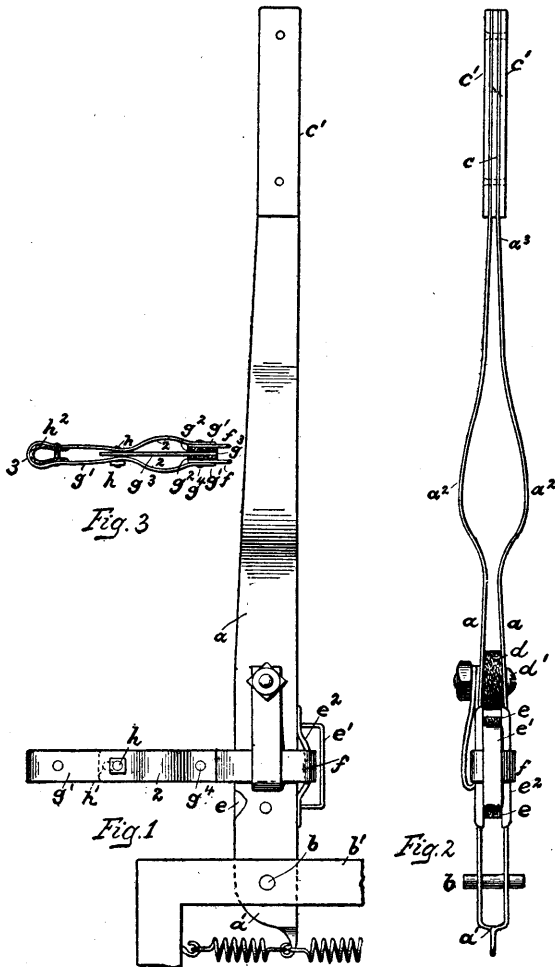
This stick is designed to take the place of the wooden sticks.

Fig. 1 is a side elevation and Fig. 2 an edge view of this picker stick. Fig. 3 is a top view of the lug strap.

The stick is composed of two thin sheet metal arms *a*, of spring steel, connected at their lower ends, as at *a*¹, below the fulcrum *b* as mounted on extension *b*¹, connected to and moving with the lay.

The arms *a* are extended upwardly above the fulcrum *b* and are bent outwardly, as at *a*², and above that point they are brought again nearer together, as at *a*³, the upper portion of the arms bearing the non-metallic material *c*, which may be rawhide, leather, wood or other suitable material, which meets the

usual metallic point or cone of the shuttle, said blades when extended into the usual slot of the lay being provided externally with non-metallic wear plates *c*,



which stiffen the picker stick at or in line with that part of it which contacts with the shuttle.

The bulge part *a*² of the arms constitutes a yielding section of such character that when the shuttle is struck to throw it from its box at one end of the lay the blow delivered will be a spring or yielding blow, it yielding sufficiently to avoid shocks, but the picker stick does not appreciably stop, for it follows sharply by its own movement the blow and impels the shuttle across the lay into the other box, where, meeting a like picker stick, the slight yielding of the picker stick again insures the checking of the shuttle in a yielding manner.

The part *c*, which directly meets the conical point of the shuttle, is broad enough to act on said point and impel the shuttle without the parts *a*³ of the arms *a*, touching the said point; but as the shuttle point wears a hole into the part *c* said hole may by such wear become so deep that the sides of the point may finally meet some part of the sides of the arms at *a*³.

The arms *a* are held pinched together below the bulged parts *a*² against a leather or other yielding washer *d*, by a bolt *d*¹, and below this washer said arms are separated by a block of wood *e*, into which is entered the legs of a staple or loop *e*¹, said loop

having inclosed inside of it a spring bridge *e*², the ends of which are forked to embrace the ends of the loop, the loop retaining the spring bridge in place.

In the space between the said spring bridge and the loop is passed a short leather strap *f*, the free ends of which (see Fig. 3) are placed between the free ends of a metallic loop *g*¹, it, with the strap *f*, constituting the lug strap; said figure also showing two leather washers *g*², placed between the ends of the strap *f*, the latter lying between the ends of the loop *g*¹, the said washers having between them a metallic link *g*³, the loop *g*¹, strap *f*, washers, and link being securely held together by bolt *g*⁴.

The part *g*¹ of the lug strap is bent at 2 (see Fig. 3) to constitute a yielding portion, so that said lug strap may be extended somewhat in the direction of its length on the occasion of any excessive strains, the degree of such strains being limited by the link *g*³, which is slotted at one end, as at *h*¹, to embrace a bolt *h*, inserted through the side walls of the loop *g*¹, the opposite end of said link being held by bolt *g*⁴.

The bent part or eye 3 of the loop *g*¹ receives in it a leather or other strap *h*², against which acts the arm operated by the loom to intermittently move the picker stick and throw the shuttle. The lower end of the picker stick is connected, as shown in Fig. 1, to springs for keeping it in normal position. (Joseph F. Benoit, George B. Goodall and Herbert J. Hope, Sanford, Me.)

WARDWELL'S PICKERS.

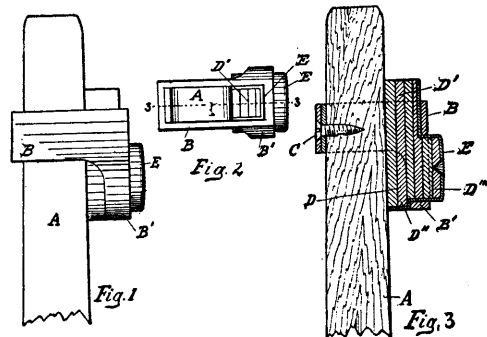
These pickers are improvements over the one described on page 95 of "Textile Machinery Part I."

Fig. 1 is a side elevation of one of these pickers, shown attached to its picker stick. Fig. 2 represents a top plan view of Fig. 1. Fig. 3 represents a longitudinal section on the line 3-3, shown in Fig. 2.

A represents the loom picker stick, which receives the metal loop B, secured to picker stick A by means of screw C.

In one piece with the loop B, is made the ring B', for holding the filling D made of leather or other material and of cylindrical or oval shape so as to fit the correspondingly shaped ring B' and provided with an upwardly projecting shank D', adapted to fit the interior of the front portion of the binder B.

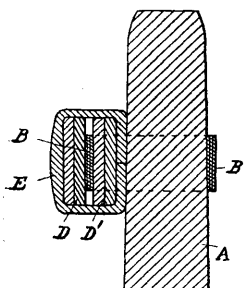
For preventing the filling D from coming to pieces, breaking apart, or working out of the ring B' by successive blows against the point of the shuttle and to hold its parts together and locked within the ring B', as well as to increase its wearing capacity, said filling is enclosed within a raw hide covering E.



The lower portion of the filling D is provided with a downwardly extending projection D'', adapted to be held in place against the picker stick by means of the lower portion of the ring B', and by such arrange-

ment the filling is caused to be firmly held in place relative to the picker stick A and the loop B. The filling D is provided with a projection D'', extending outwardly beyond the ring B', so as to prevent the point of the shuttle to come in contact with the metal loop B or ring B'.

Another construction of such a picker for single box cotton looms is herewith shown. This picker is lighter, since the metal loop and ring as used in the construction of the previously described picker are dispensed with.



The illustration represents a longitudinal section of this make of picker.

A indicates the picker stick, B the loop made from a textile or fibrous ribbon that is laminated and has its overlapping

layers secured together by means of adhesive material, which, when set and hardened, retains said loop in its proper form.

D and D' represent the filling part of the picker, being leather or other suitable yielding material.

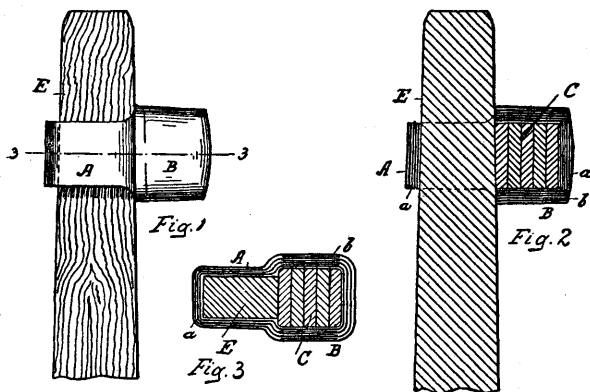
E is the casing, made from a single piece of raw hide which while in a moist or soaked condition, is moulded and compressed around the forward portion of the loop B and part of the filling (D') contained therein, and while drying, is caused to contract, thus firmly uniting loop B to the picker proper (casing E and filling D, D').

The picker is secured to the picker stick by means of a screw fastened through the loop B to the rear side of the picker stick.

Another construction of such a picker for single box cotton looms is herewith shown, the difference between it and the previously described picker consisting in the manner of forming a casing for the filling and its relation to the loop; the material which forms the loop at the same time being used in part for producing the casing.

Fig. 1 represents this picker in its side elevation shown attached to the picker stick, Fig. 2 represents a longitudinal section of the same and Fig. 3 represents a cross section on the line 3-3, Fig. 1.

A represents the loop, B the casing and C the



filling. The loop A is composed of a fibrous strip a, and the casing B is likewise composed of a fibrous strip b.

In making this picker, a picker stick dummy or

"former" of metal and of a sectional shape like the picker stick E, is employed. Against the front edge of this "former" is placed the filling C, and around the later and the "former" is wound in a horizontal plane, the strip a, saturated with cement, and which strip serves for the formation of the loop and also in part as the formation of the casing within which the filling is contained. At the same time there is wound around the filling in a vertical plane a similar strip b, likewise saturated with cement, and which strip also serves for the formation of the casing within which the filling is contained. In winding the said strips a and b around the filling C, one of the strips is alternately lapped over the other where they cross each other, so as to cause the laminated layers of the respective strips to be firmly united together by the adhesive material.

After the cemented strips have been thus wound around the "former" and filling C their ends are cemented onto the respective outer layers and thus are secured in place, after which the casing is forced into a female mold of the shape and size intended to be given to the finished casing and allowed to set and harden, after which it is removed from said mold and the dummy picker stick or "former" withdrawn from the loop A, leaving the now finished picker in shape adapted to receive the picker stick E, and to which it is secured (at its rear side) by means of a screw fastened through loop A. (Frank A. Wardwell, Methuen, Mass.)

PICKER ROD CLAMP FOR PLAIN LOOMS.

The object is to provide a clamp by which the picker rod is held in place without exposing or subjecting it to the friction and wear due to bringing the clamping screw in direct engagement with the picker rod.

Fig. 1 is a perspective view of part of a lay and a picker rod with the clamp applied thereto. Fig. 2 is an enlarged detail perspective view of the clamp by which the picker rod is attached to and held tightly on the lay. Fig. 3 is a vertical longitudinal sectional view through the clamp.

1 designates a portion of the lay, 2 the picker rod, and 3 the clamp, consisting of the two members 4, 5, an eye formed bolt 6, provided on one side of the fixed member 4, and an attaching bolt 7, projecting from the other side or face of the member 4 of said clamp. The members 4 and 5 constitute the jaws of the clamp by which the picker rod is held securely in place within the clamp, and the bolt 7 provides the means for attaching the clamp itself rigidly to the lay 1. The inner working face of the fixed member 4 of the clamp is flat, except at the central portion thereof, where it is provided with a curved groove or channel 8. The bolt 6 is straight for a part of its length, but the inner part of the bolt 6 is formed with a bifurcated part which joins with the fixed member 4 of the clamp, said forked part of the bolt 6 being coincident with the groove or channel 8 to form therewith an eye or passage for the reception of one end of the picker rod 2.

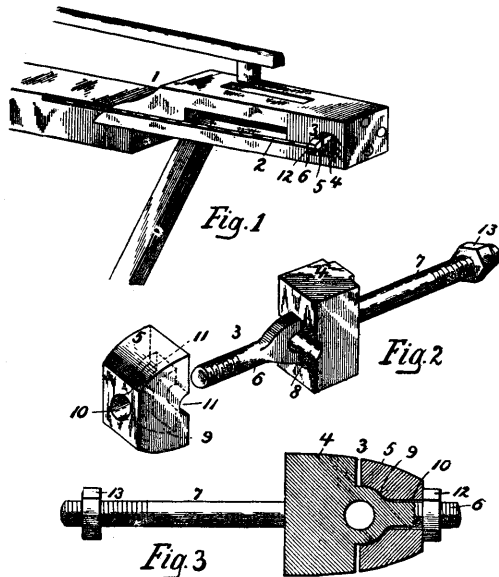
The movable member 5 of the clamp is formed with a recess 9, which terminates in an aperture 10, and the inner edge or face of said movable member has grooves 11 intersected by the recess 9.

This construction of the member 5 enables it to be fitted on the bolt 6, so as to receive within its recess 9 the forked part of the bolt and to have the straight shank of the bolt 6 pass through the aperture 10, whereby a nut 12 can be screwed on the protruding end of the bolt 6 to force the movable member 5

tightly upon the picker rod and thus clamp the picker rod between the two members 4 and 5 of the clamp.

The clamp is applied by passing the attaching bolt 7 through an opening in the lay 1 and adjusting the nut 13 to fasten the bolt 7 and the clamp securely in place on the lay. The end of the picker rod is passed through the eye formed by the fixed member 4 and the forked end of the bolt 6, and the movable member 5 is now applied to the bolt 6 and the nut 12 screwed in place to force the movable member toward the fixed member. The recessed or grooved faces of the members receive the picker rod, and said faces of the members serve to bind the picker rod tightly in position between them and hold the same securely in place. These members 4 and 5 provide broad bearing surfaces to grip the picker rod to avoid cutting or wearing into the same and to grip the picker rod securely to sustain it in position.

The movable member 5 embraces the forked part of the bolt 6, and is held thereby against rotation on the bolt 6; the two members 4 and 5 being adjusted



so that they do not abut against each other, but leave a space between them, to enable them to act efficiently in gripping the picker rod. (Wm. J. Thompson, Haw River, N. C.)

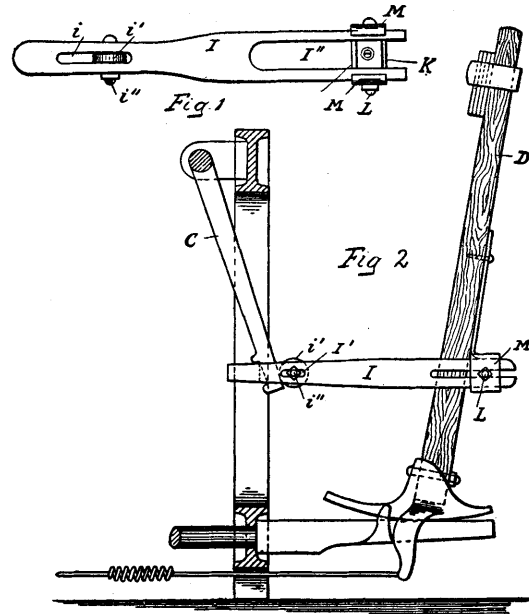
JACQUES & PAINCHAUD'S LUG STICK.

The device has for its object the making of a more rigid connection between the picker shaft arm and the picker stick by means of an integral lug stick, doing away with the lug strap.

Fig. 1 is a top plan view of this lug stick. Fig. 2 is a side elevation of it, shown applied to the picking mechanism of a loom.

I is the lug stick, having a vertical slot *i*, adapted to receive the lower end of the picker shaft arm C. In the slot *i*, is arranged a disk *i'* journaled on a bolt *i''* which is adjustable in slot *I'* so as to hold the said disk *i'* in contact with the picker shaft arm C. The picker stick D is made to pass loosely through the forked recess *I''*. In the outer end of the lug stick I is adjustably secured a block K by means of a bolt

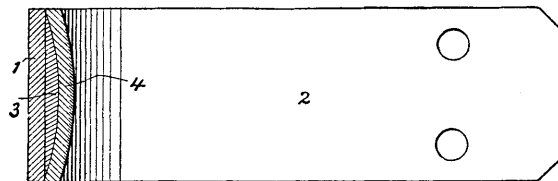
L. In connection with the adjustable block K, flanged plates or washers M are used, which embrace the



upper and lower edges of the slotted ends and prevent them from spreading. (Leopold Jacques and Ludger Painchaud, Salem, Mass.)

HOUGHTON'S LUG STRAP.

The illustration is a longitudinal section of this strap, which has for its object to present more wearing surface to the picker stick, also to divide up the strain on the strap, by taking it off its edge. To accomplish this, the strap has a pyramidal shape leather filler block 3, placed between the two strips (between their flesh sides) of leather 1 and 2, at the bend where the strap comes in contact with the picker stick, thus giving the strap a curved or convex sur-



face bearing 4, calculated to resist the wear of the stick and in consequence prolonging the life of the strap. (E. F. Houghton and Co., Phila.)

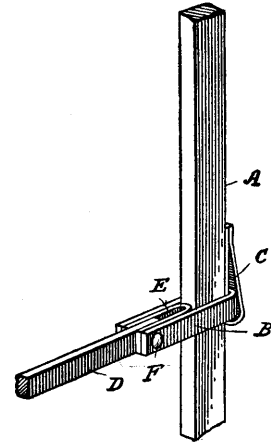
BEARING STRAP FOR THE LUG STRAP.

The object of this bearing strap is to hold the lug strap always against the picker stick.

The illustration is a perspective view, showing a portion of the picker stick, the loop strap, lug strap, and the looped bearing strap.

A is the picker stick, B the lug strap, and C the stirrup or loop strap. Within the lug strap and at-

tached also to the pitman D, is arranged a looped bearing strap E, which bears against the inner face of the picker stick and holds it tight against the lug strap, thereby preventing the lug strap from working up and down, and causing breakage. This bearing strap E also prevents any sudden jerks upon the picker stick. One end of it is sewed to one end of the lug strap while the other end is slotted longitudinally, so as to render said strap adjustable to different sizes of picker sticks. The same bolt F which secures the lug strap also secures this bearing strap E.



(Joseph Begins, Lisbon Center, Me.)

PICKER STICK ATTACHMENT.

The object of the device is to provide a picker stick attachment forming a fulcrum for the stick and a fastening for the return strap, the attachment permitting of convenient insertion and adjustment of the picker stick without weakening the stick by holes, thus lengthening the life of a picker stick.

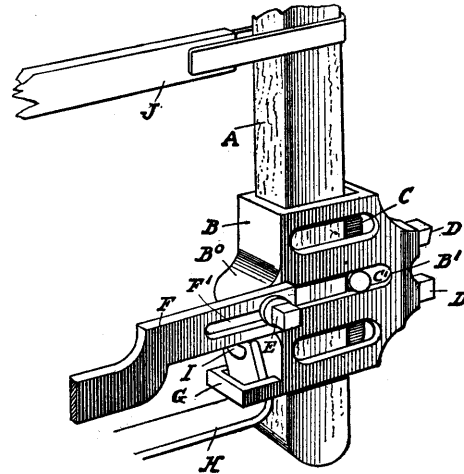
The illustration shows a perspective view of the attachment.

A indicates the picker stick, the lower end of which is adapted to pass into a casing B, open at the top and bottom, the inner end of the picker stick resting against the inner side of the casing and the outer edge being engaged by a clamping plate C, adapted to be forced against the stick by set screws D, screwing in the outer side of the casing B. The clamping plate C is provided with laterally extending trunnions C', fitting loosely in horizontally extending guide ways B', formed in the front and rear of the casing B, so as to hold the plate C from falling out of the casing and at the same time permit longitudinal movement of the plate to engage the same with the picker stick when screwing up the set screws D.

The inner face of the clamping plate C and the inner surface of the inner side of the casing B, have projections, adapted to embed themselves in the wood of the picker stick to securely hold the same in place when the clamping plate C is moved up against the stick by the set screws.

On the inner side of the casing B is formed an apertured lug B° engaged by a bolt E, held adjustable in the elongated slot F' of the rocker arm F, so that the casing B and the picker stick A are swung on the said bolt E as the fulcrum.

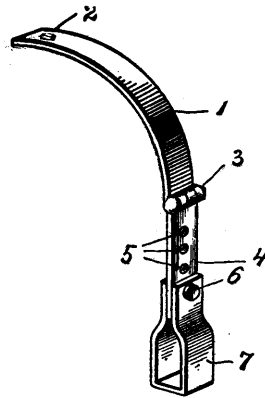
On the lower edge of the casing B and at the inside thereof is formed integrally a loop G, through which passes a return strap H, hooked upon a hook I, formed integrally on the inner side of the casing B directly above the loop G. The other or inner end of the return strap H is attached to the frame of the



loom. J is the sweep stick connected to picker stick A above the casing B. (F. M. and W. W. Hutchison and A. B. Hudspeth, Mayfield, Ky.)

DURHAM'S STIRRUP FOR PICKER STICKS.

The same is shown in its perspective view in the illustration, and consists of three parts connected together. 1 is the curved portion, which by means of hole 2 is fastened by a bolt to a disk on the picker stick. This curved portion is by means of hinge connection 3 connected to the straight portion 4, which in turn, is adjustable by holes 5, connected through a bolt 6 to the stirrup 7, which is fitted to the picking lever of the loom. The yielding movement of this stirrup is accomplished through hinge connection 3, connecting the curved portion 1 and straight portion 4. (Robert L. Durham, Burlington, N. C.)



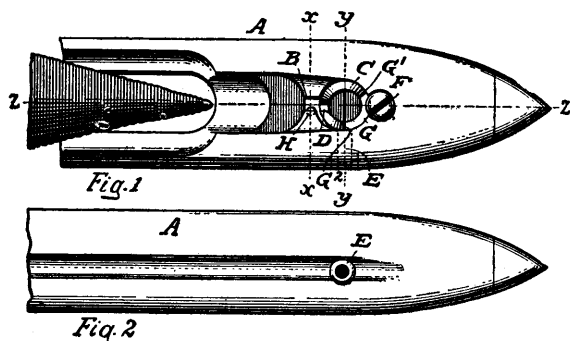
SHUTTLES.

SERGESON'S THREAD TENSION DEVICE.

Fig. 1 represents a top view of a portion of a shuttle showing this tension device, Fig. 2 a side elevation of the shuttle, Fig. 3 a section on line *x-x*, Fig. 1, Fig. 4 a section on line *y-y*, Fig. 1, Fig. 5 a section on line *z-z*, Fig. 1, and Fig. 6 another top view of the tension device.

A designates the body of the shuttle, B a passage in the body, near the front nose thereof, the same being adapted for the passage of the filling. Adjacent to said passage B is a sleeve C, which is parallel therewith and has a throat D in the side thereof, the same communicating with said passage B. The base of said sleeve is open and communicates with the eye E through which the thread is discharged, said eye extending transversely to said sleeve, both eye and sleeve occupying openings in the body A, it being noticed that the passage B, the throat D, and eye E are in communication, so that the thread may be run therethrough. The opening in which the eye E is located communicates with the opening in which the sleeve C is located below the latter, which is seated on a shouldered portion of the walls of said sleeve opening, so as to be flush with the wall of the lower portion thereof. In order to hold the sleeve in position, the screw F is employed and which screw enters the body A and has its head adapted to rest upon and tighten against the adjacent edge of the sleeve, it being noticed that said edge is cut away, as at G, so that the head of the screw may be below or within the surface of the body A.

H designates a pin which is driven into the body A and has a portion exposed and in contact with the edge of the wall of the passage B at the side toward the eye E, forming a bushing, so that the thread in its movement through said passage runs on said pin, which, being of metal or other hard material, is more durable than the adjacent portion of the body,

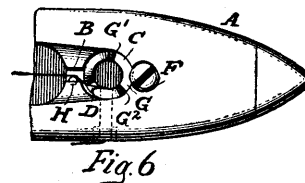
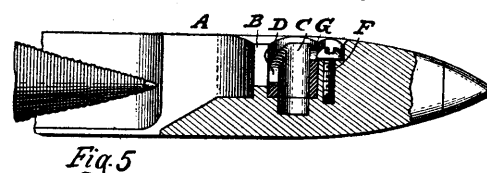
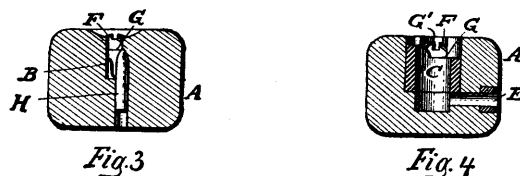


which is wood, thus preventing the thread from cutting the wall of said passage B.

The top wall of the sleeve is inclined or spiral in downward direction from the shoulder G' to the throat or opening D, so as to direct the thread or yarn to said throat when primarily contacting with said wall and drawn outwardly in threading the shuttle through said sleeve and the eye E, it being noticed that the inlet end of said throat is considerably below the upper face of the body of the shuttle.

It will be seen that when the screw F is loosened

the sleeve C may be turned so as to place the throat in register with the passage B to allow the thread to run freely through the latter, or, by further rotation of the sleeve, the throat may be removed from said passage so as to deflect the thread and cause a corresponding friction of the same with the wall of the latter, as seen in Fig. 6, the tension on the thread thus being increased, the extent of the tension being adjusted by the degree of rotation of the sleeve. When the adjustment is accomplished, the screw is



rotated, so as to have its head press against the sleeve, thus holding and controlling the latter.

The cut away portion G of the sleeve C forms shoulders G' G² on the top of said sleeve, the shoulder G', owing to its adaptability to be engaged by the head of the screw F, preventing improper rotation in backward direction of the sleeve C, while the shoulder G², limits the forward rotation of said sleeve to an extent beyond which the throat D is no longer serviceable. The upper and inner portions of the wall of the opening D in the sleeve C are rounded so as not to present any sharp edges to the thread in its passage through said opening. (James C. Sergeson, Phila.)

MORIN'S SPRING FOR SHUTTLE SPINDLES.

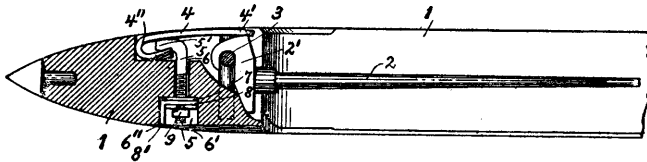
The illustration shows a central longitudinal section of a shuttle having this spindle spring attached.

1 indicates the shuttle body, 2 the spindle, the head 2' of which is pivotally attached in the body of the shuttle by a staple 3, the transverse portion of which extends into an open end slot in the spindle head.

The spindle spring 4 is of a peculiar shape, not reversible and much shorter than usual shuttle springs, therefore the slot for the spring in the shuttle body is shorter and does not extend as far toward the end of the shuttle.

The spring 4 has one end 4' secured in the shuttle body, bearing on the spindle head and holding the

spindle in its lowered or raised position. The other end 4" of the spring 4 instead of being flat, as in other makes of shuttles, is bent back upon itself toward the other end to form an open hook, and is curved upwardly in cross section to form a depression or recess to receive the head or bent end 5' of the attaching bolt 5, which extends at right angles to the plane of the spring through a transverse hole 6 in the shuttle body, which is enlarged at its outer end 6' to receive a washer 7 on the attaching bolt 5, also a second washer or ring 8, having a lock pin 8', which extends into a groove or recess 6", leading out from the enlarged end 6' of the opening 6, and prevents the turning of said washer or ring 8. A nut 9 is screwed onto the threaded end of the attaching bolt 5 and is provided with recesses in the circular part thereof to receive the pin 8', which thus acts to lock the nut 9 on the bolt 5.



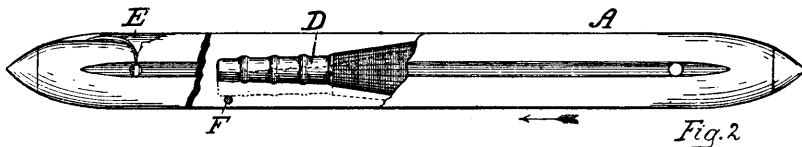
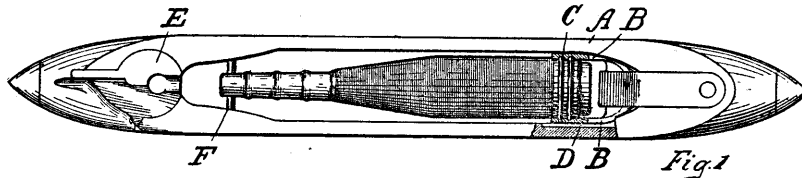
To regulate the tension of the spring 4, the nut 9 is turned on or off the bolt 5. (D. T. Dudley and Son Co., Wilkinsonville, Mass.)

THE CROMPTON & KNOWLES SHUTTLE FOR MAGAZINE LOOMS.

Fig. 1 is a top or plan view of the shuttle, partially broken out to show its jaws for holding the filling carrier; and Fig. 2 is a side elevation with one wall of the shuttle broken out to show the rest.

A indicates the body of the shuttle, B the jaws as notched or grooved at their inner sides to receive the projections C on the head of the filling carrier D. E is the self threading contrivance.

The filling carrier when exhausted, is automatically discharged through the bottom of the shuttle by the action of an incoming full filling carrier against it, the said full filling carrier being put into the top of the shuttle while the latter is in the shuttle box by a pusher, and the projections of the incoming filling carrier ought to meet and enter the notches of the jaws B. If, however, the projections on the incoming filling carrier happen to be out of line somewhat with relation to the notches in the jaws, then the tip of the incoming filling carrier is apt to descend below the under side of the shuttle, so that when the shuttle is thrown in the direction of the arrow, the tip



of the filling carrier will catch, thereby injuring the filling carrier and shuttle. The employment of the rest F

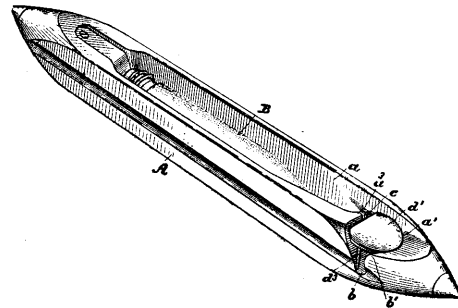
obviates this completely, and in case the projections on the incoming filling carrier are not correctly placed with relation to the notches in the jaws, the spent filling carrier will be discharged base or head first, for the reason that the tip of the filling carrier will meet the rest F and the incoming filling carrier will also, under the conditions referred to, meet the rest F and the tip will be immediately arrested, so that the continued action of the pusher enables the incoming filling carrier to slide longitudinally, so that its projections enter properly the notches of the jaws B. (Crompton and Knowles Loom Works.)

DRAPER'S SELF THREADING SHUTTLE.

The illustration shows a perspective view of this shuttle.

This shuttle has its body A longitudinally slotted from top to bottom at a to receive filling carrier B, and at the delivery end of the shuttle a concavity a' is made, communicating with a transverse slot b in the side of the shuttle, forming the thread eye. Above the said eye the material of the shuttle body is rearwardly and downwardly inclined at b' to more readily guide the filling thread to the eye in the act of threading.

The front wall of the slot or opening a is partially cut way to leave a longitudinal wall a³, forming one side of the thread receiving opening near the point of the filling carrier B. The opposite side of said opening is almost closed by a pin c depending from



the head d' of a metallic stud nearly to the bottom of the thread receiving opening in front of and slightly to one side of the point of the filling carrier B.

A counter sunk hole is bored in the shuttle body at the bottom of the concavity a' and at one side of the longitudinal center of the shuttle to receive an enlarged foot or base of the said stud, which latter is provided with a threaded hole to engage a retaining screw inserted through a hole in the shuttle body. The metallic stud previously referred to, acts as a post or pin around which the thread is led to the side eye b, being guided thereto by the mushroom or umbrella shaped top d' of the stud, around the periphery of which the thread passes and between it and the concavity a'.

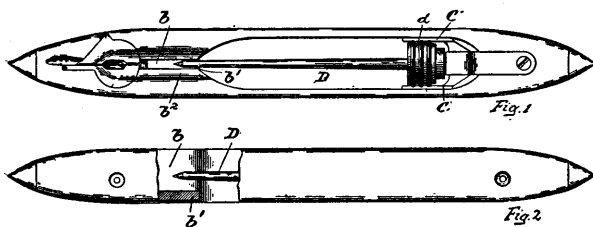
The head d' is slabbed off so as to fit against the transverse wall, extending part way across the shut-

An upright enlargement b^x on the wall b^2 enters the groove a' in the shuttle body. The forward under part of the wall b^2 is cut away for the purpose of fitting in the recess a^2 , while its upper edge inclines toward the point of the shuttle body.

The wall b^1 is forwardly extended to form a horn f , the curved lower edge of which guides the thread from the threading passage d to the slot or notch e' of the delivery eye e , said horn f having a laterally extended head or shelf f' , being bent to coincide with the slope of the top of the wall b^2 and overlapping it at f^2 across the threading passage d in front of and above the scroll eye, to prevent the removal of the thread from the passage. At its opposite side the head or shelf of the horn extends at f^3 over the entrance of the delivery eye e , forming with the wall a^x of the shuttle body a passageway for the thread to the eye. When the thread enters the flaring of the passage d , it must pass beneath the overlap f^2 to enter fully into the passage, and thence pass into the scroll eye e , the horn f and part f^3 of the head guiding the thread to the delivery eye e . (Draper Co.)

AUBÉ'S SELF THREADING SHUTTLE FOR NORTHPROP LOOMS.

The object is to provide the shuttle with a support for the tip of the filling carrier when the latter is ejected, to thus always insure the discharge of the filling carrier head downward, a narrow guide way in



the shuttle body leading to the support to conduct and guide the tip of the incoming filling carrier, the walls of the guideway preventing lateral deviation of the tip of the filling carrier when the latter is being ejected from the shuttle. Under normal conditions the tip of the filling carrier does not contact with the support, but is held a short distance above it.

Fig. 1 is a top or plan view of the shuttle (self threading) with a filling carrier in place therein, the filling on the carrier being omitted. Fig. 2 is a side view thereof, partly broken out to show the tip support and the guideway leading thereto. The shuttle is open at its top and bottom, and at its forward end is formed a longitudinal narrow slot or recess b , open at its inner end and extending from the top of the shuttle toward its under side, forming a guideway with vertical side walls, leaving a support b^1 at the bottom of the guideway in the plane of the longitudinal axis of the shuttle and at or near its under side. At its upper end or entrance, the guideway b is made slightly flaring, as at b^2 , to facilitate the entrance of the tip of the filling carrier D thereto.

When a full filling carrier is inserted in the shuttle, its tip enters the narrow guideway b and is thereby maintained in proper position to enable the head a to accurately enter and be engaged by the jaws C . Should the projections on the head of the incoming filling carrier fail to register with the grooves in the jaws then the support b^1 will engage the tip of the filling carrier and prevent it from descending below the under side of the shuttle.

When a spent filling carrier is about to be ejected from the shuttle, the tip is held by the support b^1 so that the head will descend first and at the same time the adjacent side walls of the guideway b act to position the tip and prevent its lateral deflection, so that the ejected filling carrier will pass properly and without catching through the discharge slot or opening in the bottom of the shuttle box. The support also serves to prevent the dropping of the tip of the filling carrier when the shuttle is in motion should the head become loosened in the holder. (Draper Co.)

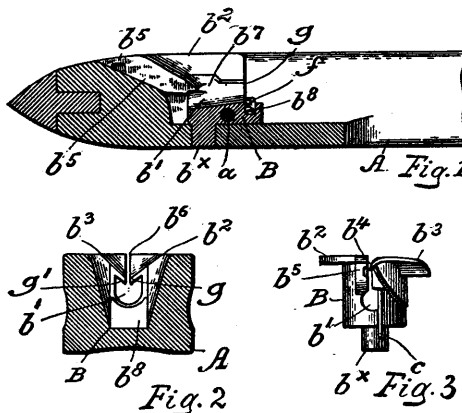
STIMPSON'S SELF THREADING SHUTTLE FOR DRAPER LOOMS.

Fig. 1 is a longitudinal sectional view of part of the shuttle; Fig. 2 is a transverse section of it, and Fig. 3 is a front elevation thereof of the thread guide block detached.

A represents the shuttle body, having the front end cut out to receive a threaded guide block B , which is provided with a longitudinal passage b^1 , through which the thread passes. The top of this block B is enlarged to form wings b^2, b^3 , of which the wing b^2 has a forward extension b^5 projecting downward, forming one wall of the thread receiving passage. The wing b^3 has at its front end a spur b^4 to guide the thread along the threading passage b^1 to the eye, said spur being bent across the slit b^6 , the part b^6 being recessed to receive it, so that the thread can pass over the spur into the slit, but being impossible for it to slip out.

The wings b^2, b^3 are inclined toward each other at the rear end of the slit b^6 , which is enlarged by an inclined passage b^7 , which intersects the large passage b^1 , and back of said enlargement the wings have secured to them two oppositely inclined guards g, g^1 , which overhang the rear end of the passage b^1 and form a slit which admits the entrance of the thread, but after it has entered the slit the guards keep it from flying out during weaving.

The block B has its rear end upturned, as at b^8 , to form a seat in which is placed a piece of felt f , to constitute a tension device for the thread, and also has an upright pin c at the front end of the passage



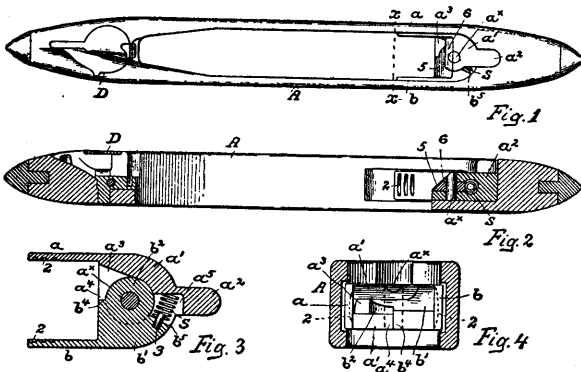
b^1 , on the side toward the thread eye which forms a rounded surface and prevents wearing of the thread.

The bottom of the block B has a stud b^x formed thereon to enter a hole in the shuttle body, and a retaining screw a , Fig. 1, passes transversely through the shuttle body and a hole in the thread guide block B , to securely hold the latter in place. (Draper Co.)

IMPROVED BOBBIN HOLDER FOR SHUTTLES FOR NORTHROP LOOMS.

This holder is an improvement over the one described on page 97 of "Textile Machinery Part I," in which construction the jaws of the holder spread or yield laterally by virtue of their inherent resiliency, and the inclined directing plate for the filling carrier is formed of a separate piece of metal secured to the shuttle body.

In the present improved construction the jaws are controlled as to their movement by a separate spring,



and the directing incline for the filling carrier forms a part of the holder itself.

Fig. 1 shows in its top or plan view, a shuttle having the new holder applied thereto. Fig. 2 is a longitudinal sectional view thereof. Fig. 3, on a larger scale, (compared to Figs. 1 and 2,) is a horizontal sectional view of the holder for the bobbin; and Fig. 4 is an enlarged transverse sectional view on the line x-x, Fig. 1, looking toward the right.

A indicates the shuttle body and D the automatic threading device.

The holder for the filling carrier comprises two jaws *a*, *b*, one of which is enlarged at *a'* and rearwardly extended to form a retaining projection *a²*, adapted to be tightly fitted into a recess in the shuttle body. The body *a'* is recessed in front at *a³*, Figs. 1, 3 and 4, between the top and bottom thereof to receive the rounded hing portion *b²* of the other jaw, mounted to swing laterally on a stud *a¹* in the body *a'*. The jaw bases are shouldered at their inner sides, as at *a⁴*, *b⁴*, serving as stops to limit the inward movement of the jaws. Spring *s*, resting in a recess *a⁵* of the body *a'*, bears at its free end on the shoulder *b⁵* of the enlarged portion *b'* of the jaw *b* back of its fulcrum *a¹*, pin 3 preventing accidental displacement of the spring.

On their upper faces the two body portions are cut concentric to the fulcrum, so that the jaw *b* may be swung laterally relatively to the jaw *a*, the latter being rigidly held in the shuttle body. Between the inner faces of the jaws the holder is inclined or beveled at 5, 6, Figs. 1 and 2, to form a directing surface for the filling carrier, when it is inserted in the shuttle, the jaws having grooves 2 therein to receive and hold the usual projections or ribs on the base of the filling carrier. (Draper Co.)

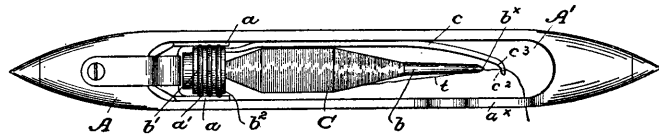
CUNNIFF'S COP HOLDER FOR SHUTTLES FOR NORTHROP LOOMS.

A indicates the body of the shuttle, having a longitudinal opening *A'*, extending completely through the

shuttle to permit the ejection of one filling carrier at one side by the entrance of a fresh filling carrier at the other side. The shuttle is provided with holding means for the cop holder, being yielding jaws *a*, grooved on their inner faces, as at *a¹*.

The cop holder consists of a blade or skewer *b* to receive the cop C, rigidly secured at one end to a head *b¹*, provided with annular ribs or projections *b²*, which, in practice, enter between and are held by the jaws *a* of the shuttle. The cop holder is thus held firmly at one end in the shuttle opening in position for the filling to be drawn off over the tip *b³* of the blade. The head *b¹* of the cop holder is longitudinally recessed and receives the foot of an arm *c*, which is attached to the head, its foot passing under the ribs *b²* to prevent interference therewith. Between its free and attached ends the arm *c* is laterally curved or offset to clear the cop or mass of filling when the latter is on the blade *b*, and at its free end this arm *c* is provided with a delivery eye *c²* a short distance beyond and substantially in alignment with the tip of the cop holder, the filling *l* passing through the eye as it is drawn off over the tip end of the blade without twisting or winding around it. This delivery eye being made a part of the cop holder it is unnecessary to have a thread eye in the shuttle, as the thread will run over the side of the shuttle body without trouble. The shuttle body is cut away at *a¹*, opposite the delivery eye of the cop holder, to permit the thread to draw off at the side of the shuttle rather than over the top.

The cop holder can be used in connection with either an eyeless shuttle, as before referred to, or a self threading shuttle. When used in connection with a self threading shuttle the new cop holder is ad-



vantageous in that the thread is positively carried down into the usual threading slot with which such shuttles are provided, thus tending to decrease the chances of a mispick occurring upon change of filling.

The delivery eye is made open—that is, with an entrance slot *c²*—in order that the thread can be passed into the eye with greater ease, the slot being on an angle, so that under ordinary conditions the thread would not get out while the shuttle was in use.

The eye carrying arm is made elastic, or resilient, so that it can be bent slightly to one side when the cop is put on the blade or skewer. (Draper Co.)

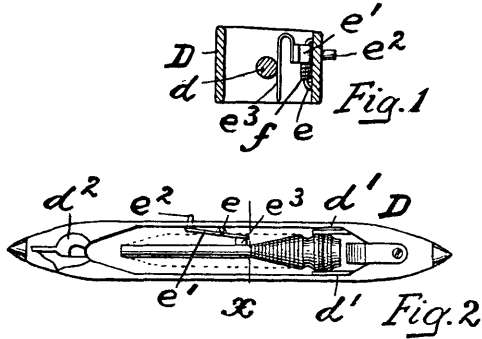
BEARDSSELL'S FILLING DETECTOR FOR NORTHROP LOOMS.

Fig. 1 is a transverse section of a shuttle and filling carrier in about the line *x*, Fig. 2, said shuttle being provided with a detector finger and spring pad. Fig. 2 is a top view of a shuttle, on a smaller scale; and the detector finger and spring pad, the latter being in the position it will occupy when the finger is to indicate that the filling has been exhausted to the predetermined point.

D indicates the shuttle, *d* the filling carrier, held frictionally between spring arms *d¹*, and *d²* refers to a self threading device.

One side wall of the shuttle has a fulcrum pin or loop *e*, on which is pivotally mounted the detector finger *e'*, provided at its outer end with a projection

e^2 and at its opposite end with a spring pad e^3 . The pivot pin e receives and supports a spiral spring f , which is connected at one end to the said finger, the said spring normally acting to press the spring pad toward the filling carrier. When the filling carrier is full of filling, the filling mass will occupy the dotted line position, Fig. 2, and the filling, acting on the spring pad, will turn the detector finger e' on its pivot e in such position as to pull the end of the projection e^2 inside the body of the shuttle, and at



the same time the spring pad will be somewhat compressed. As the filling mass is unwound during weaving, the spring pad will gradually assume its normal state, and will be thereafter pressed against the filling mass by a force due to the spring f , and by the time that the filling mass is unwound to the pre-determined point, the spring pad then bearing on the last layers wound on the carrier, the finger is moved far enough to push the projection e^2 out from the shuttle body far enough to meet a projection on the lay and by suitable arrangement permit a bunter on said lay to drop and effect the automatic removal of the carrier from the shuttle, and at the same operation put a fresh carrier in the shuttle, the free end of the spring pad being directed toward the under side of the shuttle, so as not to be struck by an incoming filling carrier. (Draper Co.)

LITTLEFIELD'S COP SKEWER FOR NORTHROP LOOMS.

This cop skewer is an improvement over the one explained on page 97 of "Textile Machinery Part I."

Figs. 1 and 2 are views of the improved cop skewer, the head being shown in longitudinal section, and Fig. 3 is a perspective view of the head detached.

The blade a of the cop skewer is shown in the illustrations as made hollow, however, if necessary a solid blade or a split spring blade could be employed with equal facility.

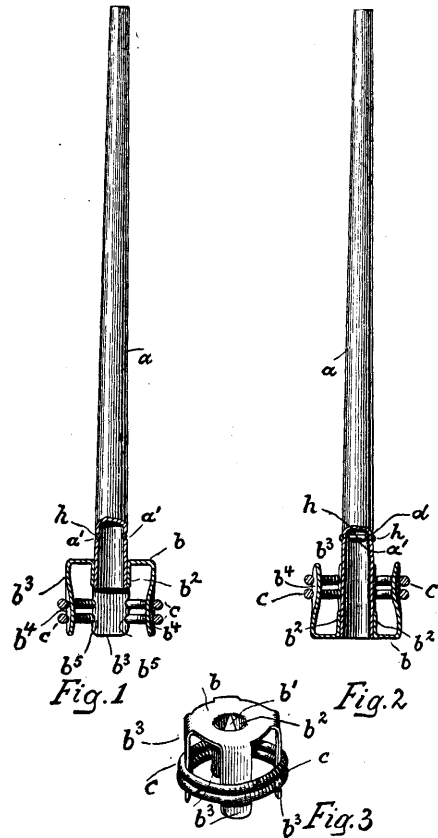
The head is made of sheet metal and comprises a base b , apertured centrally at b^2 to receive the base of the blade, inturred projections or lips b^1 at the sides of the aperture forming means to securely attach the blade and head by soldering. By bending the lips toward or away from each other the head may be adjusted to blades of different sizes. The base b at its edge is provided with several bent over resilient arms b^3 , four of such arms being shown in Fig. 3, said arms being transversely concaved as at b^4 , toward their free ends and notched at their edges as at b^5 . Annular metal ribs or split rings c surround the arms, being seated in the notches b^5 thereof, the transverse concavity of the arms permitting the rings to be firmly seated and retained in place.

When the cop skewer is forced into the shuttle

springs, the rings enter the usual grooves therein, the arms b^3 yielding slightly to the pressure, greatly reducing the wear on the shuttle springs.

In Fig. 1 the head is shown as attached to the blade a with the arms b^3 extending in the direction of and beyond the base of the blade, while in Fig. 2 the head is reversed, the arms b^3 extending in the direction of the tip of the blade.

By using hollow blades, as shown, the device may be applied directly to the mule spindle in order that the yarn may be spun directly upon the cop skewer, but as the mule spindles vary in diameter the blade a is at its lower end oppositely cut through or slotted, as at a' , and a ring of rubber h is slipped around the blade. This ring projects into the interior of the



blade at the slotted portions and acts to help grip the spindle when the blade is placed thereupon, the ring adapting itself to variations in the diameter of the spindle. If desired the exterior of the blade may have a slight annular groove d , Fig. 2, made therein to form a seat for the ring between the slots. (Draper Co.)

COP SKEWER FOR THE USE OF WORSTED YARN BOBBINS IN NORTHROP LOOMS.

The object is to provide an attachment to the skewer for holding, *i. e.*, permitting the use of the short worsted yarn bobbins in regular shuttles for Northrop looms.

Fig. 1 is a side elevation, of an empty bobbin, and the skewer. Fig. 2 is a top or plan view of the head

and connected blade of the skewer (wood) with the bobbin omitted, the attachment for holding the bobbin in place being shown on the head.

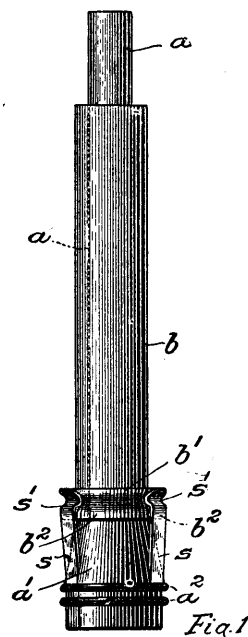


Fig. 1

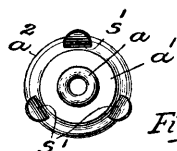


Fig. 2

b is the body of the bobbin, the base *b'* of it having an enlargement *b²* at its lower end. *a* indicates the blade of the skewer, which is rigidly attached to a head *a'*, having thereon annular ribs *a²* to engage the holding jaws of the shuttle, the blade *a* being long enough to project beyond the tip end of the bobbin *b* sufficiently to be engaged by the finger at the outer end of the transferer.

The head of the skewer is provided with three spring fingers *s*, secured at their lower end to the head and bent inward at or near their free upper ends, as at *s'*, to spring over the enlargement *b²* of the base of the bobbin *b*, thus forming a detachable connection whereby the bobbin is held in place. A longitudinal pull of the bobbin will release it from the grip of the spring fingers *s*, whereas a reverse movement pushes it against the head *a'* and causes said spring fingers *s* to spring into place, holding the bobbin to the skewer. (Draper Co.)

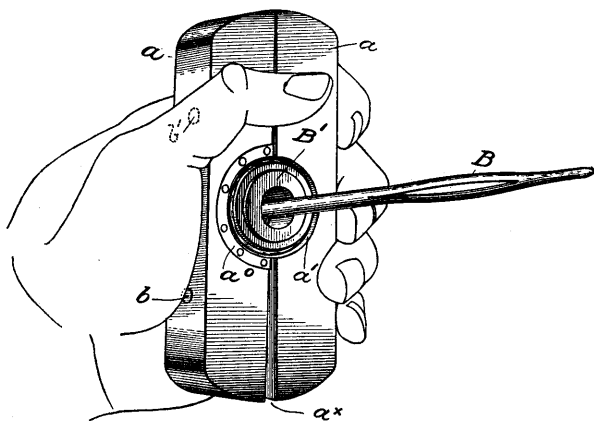
CUNNIFF'S HOLDER FOR COP SKEWERS.

In Northrop looms the cops of yarn must be put on the headed skewers by hand, the filling carriers so made being inserted automatically in self threading shuttles. While the base or head of the skewer is large enough to be firmly held in the shuttle it is not large enough to be held properly by the operative when putting a cop on the skewer. To simplify this putting on of cops to the filling carriers is the object of this holder, which is temporary used during this procedure.

The illustration is a perspective view of a skewer gripped in the new holder, which consists of a two part handpiece *a*, made of wood oblong in shape and connected at the top by a hinge. The adjacent inner faces of the parts *a* are provided with semicircular recesses *a¹*, the open sides of which register when the parts *a* are closed, forming a circular separable seat. Two studs *b b'* are rigidly secured to one of the parts *a*, projecting from its inner face at opposite sides of the recesses *a¹* and entering larger holes in the other part of the holder. Coiled springs surround the studs between the faces of the separable parts of the holder, said springs being seated in counter bored ends of the holes, the parts *a* being normally held separated at the bottom by the springs, as shown in the illustration at *a^x*. The studs *b b'* then engage the sides of the (larger) holes previously referred to in the outward situated part *a* in the holder and act as stops to limit the opening of said parts.

When the operative desires to place a cop on the

skewer *B* he grasps the holder in one hand, inserts the head *B¹* of the skewer in the open seat and then closing his hand clamps the skewer head between the parts of the holder, the latter thus serving as a temporary handpiece, and while the skewer is thus held, the operative, with his free hand, places the cop on



the skewer. Upon relaxing the pressure on the holder the springs on the studs *b b'* open it and the skewer is instantly released.

The seat, when closed, is slightly smaller than the skewer head in order to more firmly grip the latter, having a soft lining *a°*, of yielding material applied to its side. (Draper Co.)

HAMBLIN'S BOBBIN HOLDING DEVICE.

The object of the device is to provide an efficient form of bobbin holding device which shall be free from all tendency to break or otherwise injure the heads of bobbins.

A second object is to provide for securing the shuttle spindle and the bobbin retaining device in place within the body of a shuttle and dispense with all horizontally disposed pins, screws or rivets having an end or ends thereof exposed at the sides of the shuttle body and liable to cause trouble or injury.

Three different modes of applying or mounting this retainer in a shuttle are shown in the illustrations, their action however being identical.

1 indicates the shuttle body, 2 the spindle, 3 the bobbin placed on said spindle, 4 is the circumferential groove which is formed in the head of the bobbin for the purpose of receiving the engaging portion of the bobbin retaining device. 5 designates the bobbin retainer, consisting of a loop, which is curved to correspond with the curvature of the head of the bobbin and is shaped and proportioned to fit within the groove 4 of the bobbin. The said loop is provided with journals 6, applied to bearings within the shuttle body, the body of the retainer hanging freely from the said journals, so as to render itself adjusting, seating itself properly within the groove 4 of the head of the bobbin. The loop 5 clasps and encircles the lower half of the bobbin, and thus the extent of the engagement of the holding device with the bobbin head is sufficiently great to insure adequate retention of the bobbin under all circumstances.

Fig. 1 shows the loop 5 with its journals 6, mounted in bearings in bushings 7 which are screwed into holes made for their reception in the walls of the shuttle body and which are employed in order to receive the wear incident to the working of the loop 5.

Fig. 2 shows the loop 5 with its journals 6 mounted in bearings provided in the upwardly extending arms 8 of a strip or plate 9, intended to be secured by means of a screw against the under side of the shuttle body, the said arms 8 extending upwardly within the shuttle cavity.

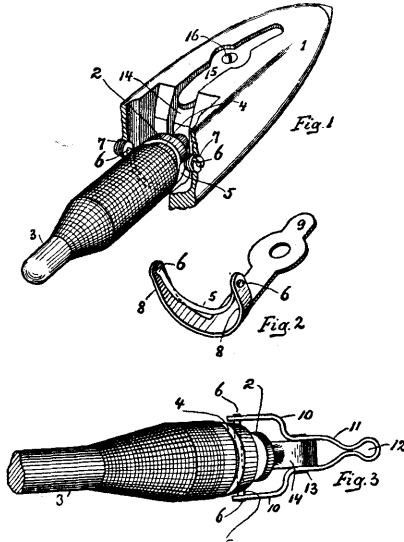


Fig. 3 shows the journals of the loop 5 fitted to bearings in the opposite arms 10 of a small yoke 11, bent at mid length, its arms being shaped to form the eye 12, then separated sufficiently to receive between them the head of the shuttle spindle, and then being more widely separated to enable them to pass on opposite sides of the head of the bobbin 3, leaving the said bobbin head free to move into and out of the shuttle cavity. The loop 5 is applied to these most widely separated portions of the yoke 11 and the shuttle spindle is connected with the yoke by means of a rivet 13 passing through the sides of the yoke and the head 14 of the shuttle spindle, the said rivet 13 thus constituting a pivot, on which the shuttle spindle is free to turn.

15 indicates a fixed spring acting against the head 14 of the shuttle spindle to retain the same in either its depressed position within the shuttle cavity, or in upraised position, for changing bobbin. For the purpose of securing the said spring 15 and the yoke 11 within the recesses which are provided for their reception in the proper end of the shuttle body, a single screw 16 is employed, the latter passing vertically through a hole in the spring 15 and also through the eye 12 of the yoke 11 and the threaded end thereof entering a nut which is located in a recess provided for its reception at the under side of the said end of the shuttle body (not shown).

When wear occurs between the head of the spindle and the sides of the yoke, such wear resulting from the turning of the spindle up and down and it giving opportunity to the spindle to play or wobble sidewise, the defect may be remedied by simply removing the parts from the shuttle body and hammering upon the rivet endwise, or otherwise compressing the sides of the small yoke more closely upon the sides of the spindle head. (Stephen M. Hamblin and Wm. H. Goldsmith, Central Falls, R. I.)

ANOTHER BOBBIN HOLDING DEVICE.

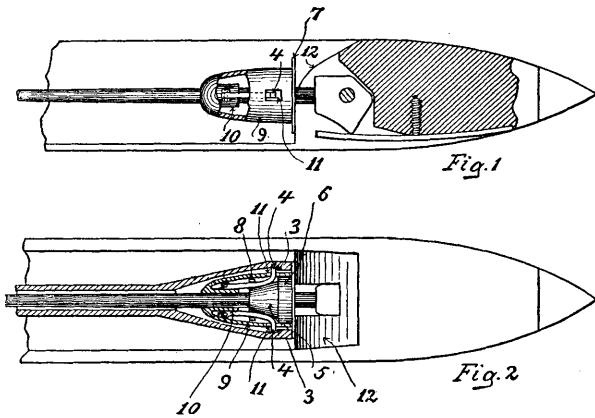
This device is combined with the spindle of a shuttle and positively locks the bobbin to the spindle when

the latter is lowered from an upraised position into its normal position.

Fig. 1 is a sectional representation of that part of a shuttle to which the device refers. Fig. 2 is a partial plan view of a shuttle (corresponding to Fig. 1) having the device applied thereto, showing also a bobbin in horizontal section.

Examining Fig. 2, we find an internal shoulder 3 formed at the head end of the bobbin for engagement by the catches 4, as mounted pivotally on the shuttle spindle. 5 indicates a cone shaped expander, mounted upon the spindle, and being free to slide a short distance along it. The catches 4 are acted upon by the inclined exterior of this expander, which is provided at its base with a circular flange 6, while to the butt end of the expander is applied the disk 7 (see Fig. 1) exceeding the said flange in diameter. The small end of the expander is furnished with a flange 8 having opposite holes or slots through which the arms of the catches 4 pass. A tapering shell 9, corresponding somewhat in exterior form with the cavity in the head end of the bobbin, is connected with the spindle by being brazed at its small end to the sleeve 10. This shell encloses the catches 4, the free ends of which work through slots 11 in the shell.

When the catches are moved outward by the action of the expander, the free or engaging ends thereof project beyond the periphery of the shell. At other times they are retracted within the shell, so that they do not constitute obstructions to interfere with the operation of applying a bobbin to the spindle. The expander moves within the large open end of the shell, the said end fitting the periphery of the flange 6 of the expander and being supported by the said flange.



The bearings 12, which are provided in the shuttle to coact with the expander are constituted by projecting portions of the material of the shuttle body adjacent to the pivot for the spindle. These projecting portions or bearings are shaped so that when the tip of the spindle is depressed from an upraised position into the shuttle cavity, the movement of the spindle will press the disk 7 carried by the expander against the said bearings, and the latter will act to crowd the expander along the spindle away from the pivot of the same, thereby expanding the catches 4. The upper portions of the bearings 12 are rounded away, so that when the shuttle tip is raised out of the shuttle cavity the expander will be relieved of pressure and will be allowed to drop by gravity slightly toward the pivot of the spindle, the slotted flange 8 acting to draw the catches 4 inward.

By the engagement of the bobbin by the catches 4 thus described, the former is held with the extreme

end of its head in contact with disk 7, and thereby endwise movement of the bobbin upon the spindle while the shuttle is in use, is prevented. (Stephen M. Hamblin and Wm. H. Goldsmith, Central Falls, R. I.)

HAMBLIN'S SELF THREADING SHUTTLE.

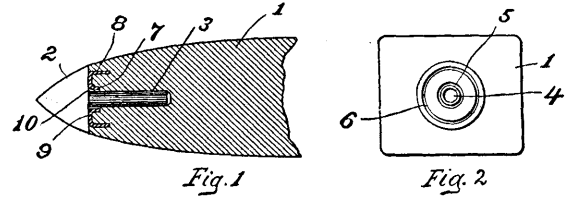
The object is to provide means whereby the shuttle is automatically threaded, at the same time preventing the thread from slipping out of the eye during weaving.

Fig. 1 is a plan of portion of a loom shuttle having the self threading device attached. Fig. 2 is a side elevation of Fig. 1.

The device, is applied to the mouth of the shuttle and consists in an educt tube 7 inserted in the delivery eye of the shuttle, its length extending transversely across the shuttle.

In threading the shuttle, the thread, as drawn from the bobbin, is made to be caught under the tip of the threading tongue 9 of the educt tube 7, the portion of the yarn which is held in the hand of the weaver being carried rearwardly along the outer edge of the

the shuttle body. In Fig. 2, 5 and 6 are the inner and outer grooves, which are formed concentric with the socket 4. The reinforcing ring is made up of the inner flange 7, the outer flange 8, and the intermediate annular connecting portion 9.



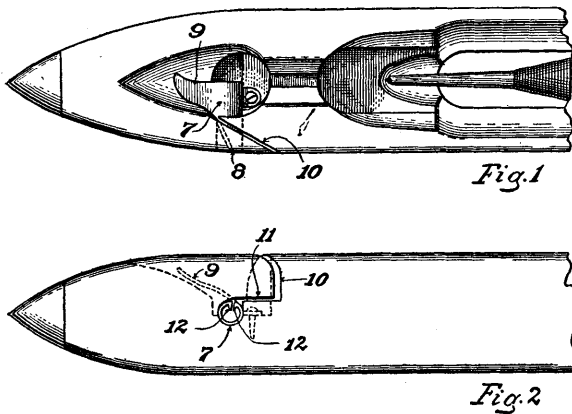
10 designates the ring or shell of wood that is left between the inner groove 5 and the axial socket 4. This reinforcing ring is made by striking the same from a blank sheet of metal, and thus it is produced cheaply, at the same time being made light and strong. (The New Shuttle Co., Pawtucket, R. I.)

NASON'S SELF THREADING SHUTTLE.

The object is to produce a shuttle automatically threaded while in motion, the shuttle being provided with a thread keeper for preventing the thread from coming out of the shuttle eye during weaving.

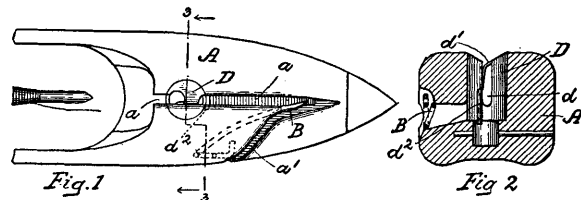
Fig. 1 is a top plan view of the shuttle, and Fig. 2 is a cross sectional view of it, taken in line 3-3 of Fig. 1 showing the thread keeper device.

A indicates the shuttle body, *d* the thread passage, *d'* the finger for keeping the filling thread in the passage. B is the feeding pin. *a* is a straight thread passage and *a'* a lateral thread passage which communicates with the delivery eye. *d²* is a piece of hard metal fixed on the side of the keeper D just at the outer side of the thread passage *d*, so that the thread in running through the delivery eye will not wear the softer metal as used for making the body of the keeper. The thread from the filling carrier is passed downwardly in passage *a* on finger *d'* over the end of the finger and into and across the thread pass-



tongue 9, and also along the rearwardly extending diagonal slit 10 in the shuttle body. It next is depressed by the weaver to carry it down in the slit 10, and in turn into the horizontal slit 11. Finally it is carried forward to draw it along the slit 11 to the slit 8 in the educt tube 7, it being depressed by the weaver to carry it through the slit 8 into the interior of the said educt tube.

12 designates inwardly extending lips which are provided at opposite sides of the outer end of the slit 8 in educt tube 7. These lips are separated from each other widely enough to permit the yarn to pass freely between the same in the operation of threading, but it is practically impossible for the yarn to find its way out between them again unless purposely aided by the hand of the weaver, thus positively insuring the thread against slipping out of the eye during weaving. (The New Shuttle Co., Pawtucket, R. I.)



age *d*, whence it is carried to the delivery eye through the lateral thread passage *a'*. (J. H. Nason, Somerville, and H. M. Hewes, Boston, Mass.)

REINFORCEMENT RING FOR SHUTTLES.

The object is to prevent the splitting of the shuttle around the tip when said tip is driven in place.

Fig. 1 is an axial section of one extremity of a shuttle showing this reinforcement applied thereto. Fig. 2 is an end view of the shuttle body, showing it prepared to receive the ring and metallic tip.

1 indicates the shuttle body. 2 the tip, having the stem 3, which fits the central socket 4 in the end of

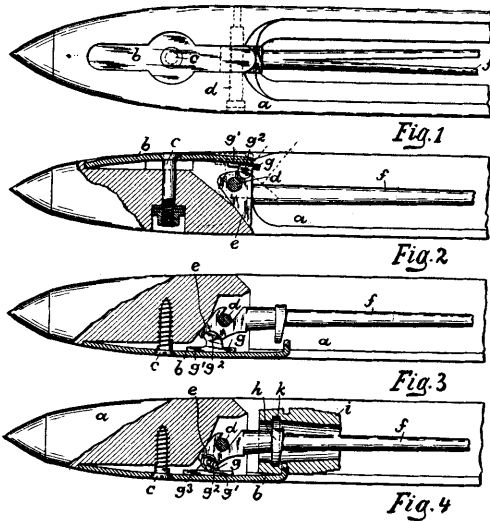
ASHBY'S SHUTTLE.

The object is to reduce the wear on the spring, to secure a better hold on the bobbin and prevent longitudinal movement of the bobbin on the skewer.

Fig. 1 is a top view of part of a shuttle provided with a skewer, adapted for the use of a quill or cop. Fig. 2 is a longitudinal sectional view of the shuttle. Fig. 3 is a sectional view of a shuttle, adapted to use a bobbin. Fig. 4 is a sectional view of a loom shuttle, showing a modified form of a spring bearing.

a indicates the body of the shuttle, *b* the spring, *c* the screw by which the spring is secured and its ten-

sion adjusted, *d* the pivot secured in the shuttle body, *e* the heel of the skewer *f*. The bolster *g* is interposed between the heel *e* of the skewer and the spring *b*, and consists of the base *g'*, which has a long flat bearing on the spring, and the bolster *g²*, which has a convex bearing in the concaved heel *e* of the skewer.



In the modification shown in Fig. 4 the bolster *g²* is provided with the roller *g³*.

When the skewer is raised at its free end to take off or renew a quill, cop or bobbin, the bolster slides on the spring, and, by reason of its extended surface, reduces the wear on the spring formerly caused by the angular edge of the heel, thereby increasing the durability of the spring.

To hold the bobbin more securely, the skewer *f* is provided with the projection *h* on the side coacting with the spring. This projection forms a short segment of a circle and can be made either to bear on the inside of the bobbin *i* or to enter a groove *k* formed on the inside of the bobbin. When the bobbin is inserted and in place, it is firmly held between the projection *h* and the spring *b*. (P. Ashby, Valley Falls, and John Shamboe, Woonsocket, R. I.)

ISHERWOOD'S SHUTTLE.

The objects are to provide a mechanism to take the place of the usual pivot pin of the spindle, also providing an adjustable tension for the thread.

Fig. 1 is a plan view of this shuttle showing a full cop on its spindle. Fig. 2 is a central longitudinal sectional view of the shuttle, having the cop removed. Fig. 3 is a transverse sectional view of the shuttle body, the cop spindle and its supporting devices being removed. Fig. 4 is a longitudinal sectional view of one end of this shuttle constructed for using the filling spun on bobbins. Fig. 5 is a perspective view of the mechanism employed for securing the spindle in position within the shuttle body.

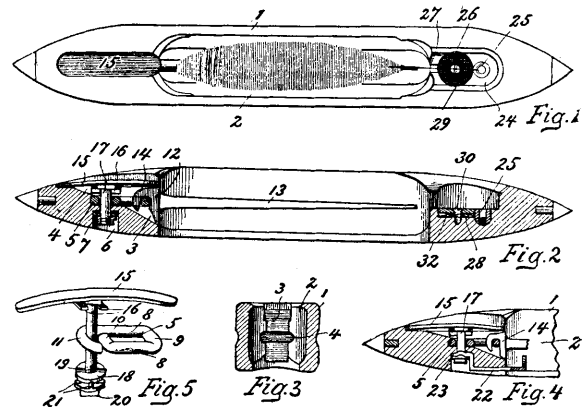
The shuttle body 1 is provided at one end of its filling opening 2 with a cavity 3, which communicates therewith and is gradually decreased in depth toward the outer or opposite end. At the longitudinal middle of the shuttle body the opposite walls, together with the intersecting bottom of the cavity 3, are provided with a groove 4, that portion thereof in the bottom forming a continuation of those in the sides. This continuous groove in cross section is slightly more

than half round, it being designed to receive the spindle supporting yoke 5.

The under side of the shuttle body at about midway the cavity 3 is provided with a cavity 6, communicating with the cavity 3 by a bolt hole 7, connecting the upper end of the cavity 6 and the bottom of the cavity 3.

The yoke 5, includes the two opposite side bars 8, the end bar 9, the intermediate bar 10, and beyond the same the extended loop 11, between which and the intermediate bar 10 a space occurs. The yoke is caused to fit most snugly within the groove 4, into which it is slid endwise, the loop 11 of the yoke being to the rear and surrounding the bolt hole 7. The head 12 of the spindle 13 is provided with hook 14 for pivotally engaging with the cross bar 9 of the yoke, said cross bar serving as the pintle of the spindle.

The slightly bowed spring 15 is provided upon its under side with a pair of spaced apart parallel and horizontally disposed lips 16, and between which and the said spring the head of the bolt 17 is interposed, the body of the bolt being embraced by the said lips. The bolt passes down through and is embraced by the loop 11 of the yoke, which is adjusted to fit the same, whereby the yoke is prevented from withdrawal or any longitudinal movement whatever, and afterward passes down through the bolt opening 7 and into the cavity 6 in the under side of the shuttle body, where it terminates. A washer 18 is applied to the bolt at this point, the under side of the washer being provided with corrugations and its upper side with one or more ribs 19, the latter being forced into the shuttle body by means of a nut 20, the upper side of which is provided with ribs 21, which engage with the grooves in the under side of the washer, so that the spring drawing the bolt and nut upward (so as to facilitate such interlocking of the parts) and the bolt and washer being incapable of turning, no amount of jarring can loosen the nut. In addition to forming a part of the nut lock the spring 15 retains the spindle either in its lowered or raised position.



In shuttles where it is desired to employ a bobbin and is therefore necessary to employ a bobbin catch, the washer is omitted and, as shown in Fig. 4, the rear end of the bobbin catch is shaped to form a crimped head, with which the ribs on the upper side of the nut interlock. In said figure, 22 represents the bobbin catch, and 23 the crimped head that takes the place of the washer 18, the remainder of the parts being the same as before described.

In the bottom of the cavity 24 is set the pot eye 25, located nearer the end of the shuttle body, a

second communicating cavity 26 being formed between it and the throat 27, which leads to the filling opening. The bottom of this latter cavity is recessed to a depth slightly in excess, as indicated at 28, of that of the tension plate 29, which is designed to fit within the recess. A countersunk opening is formed in the center of the tension plate for the reception of an adjusting and retaining screw 30. Arranged under the plate in the bottom of the cavity is a light bowed spring 32, (see Fig. 2,) the tendency of which is to elevate the plate as far as is permitted by the said screw. The under side of the plate is perfectly smooth, but the upper side is roughened, in a manner similar to a file.

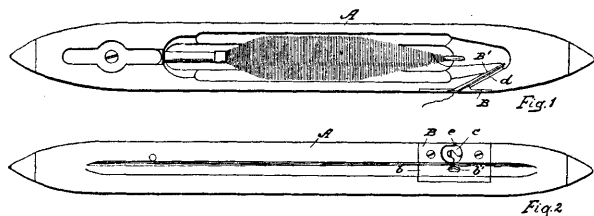
The thread passing through the throat of the pot eye will be caused to pass over this roughened surface of the tension plate and its movement will be more or less retarded in accordance with the position of the plate as adjusted and retained by the screw. With filling where no tension is desired, the plate may be reversed, so as to bring its smooth side uppermost. To increase the tension, the screw is rotated slightly, so as to raise the plate, and to decrease the tension, the screw is rotated in the reverse direction, so as to depress the plate correspondingly against the tension of the spring. (Alfred Isherwood, New Bedford, Mass.)

LEVEILLE'S THREADING DEVICE FOR SHUTTLES.

This device, applicable to shuttles of ordinary construction, has for its object to guide the thread from the cop over a plate, about which it passes and from said plate to the eye, it being retained therein by a plate, which also forms a part of the fixture.

Fig. 1 is a plan view of a shuttle with cop in place, the threader being shown attached to the shuttle. Fig. 2 is a side elevation of it.

The shuttle body A is cut away on one side to receive the outer or side plate B of the threading attachment, which is secured in the recess. This plate B is provided with a longitudinal groove b, which is similar to the groove in the side of the shuttle body, and on a line with this groove b is an eye b'. The plate B immediately above the eye has a recess, in which is secured a spring plate c, which either occupies the whole of the recess or is cut away, in



order to secure the desired amount of spring movement. This spring plate c is secured to one side of the slot e in the plate B, through which the thread is passed. From a point adjacent to the central portion of the plate B there projects at an angle a plate B', having its lower portion bent upon itself, so as to provide a tubular thread guide d, which is on a line with the eye b'. The upper portion having a prong or projection. The slot e, previously referred to extends through the attachment, excepting the spring, and connects with the eye and opening above the tubular thread guide d.

The threading attachment when completed is in a single piece, and the portion which projects within

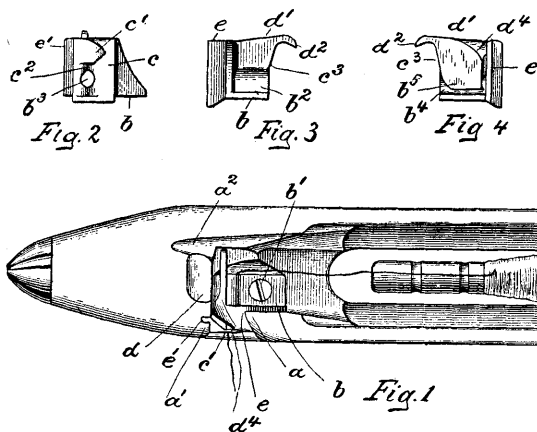
the shuttle body is of such a length that it will be practically on a line with the end of the bobbin, but is positioned at a considerable distance therefrom.

In threading the shuttle, it is only necessary to bring the thread over the prong of the plate B' and draw the thread toward the eye. The thread, following the slot e, enters the tubular thread guide and passes beneath the spring plate c. After the shuttle is threaded there is no liability of it becoming unthreaded, as the free end of the spring plate c lies over the slot e. (M. H. Leveille and John G. Smith, Worcester, Mass.)

RYON'S THREADING DEVICE FOR SHUTTLES.

The device consists in the construction of a self threading eye.

Fig. 1 shows a portion of a shuttle, provided with one of these eyes, Fig. 2 is a face view of the eye, Fig.



3 a right hand side view of the eye shown in Fig. 2, and Fig. 4 a left hand view of the eye as shown in Fig. 2.

The side wall of the shuttle is cut out for a short distance to leave a space with a V-shaped edge a, the opposite side of the space being provided with a groove a', and the top of the shuttle with a rather deep groove a'.

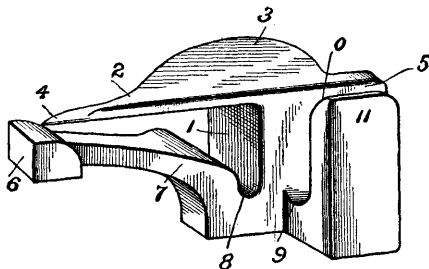
The eye is composed of a metallic block, consisting of a base b which receives a screw b', said base having a thread guiding portion b', through which is made a thread passage b', presenting at one side a slot b', one side of said passage and one edge of said slot being formed by a depending lip b', down under which the thread must pass to enter said passage out from the face e of the eye under the end of a pointed finger c', crossing a slot c', leading from the top of the eye into said passage. The lip b' faces the abutment d of the shuttle body, and the upper part d' of said lip is extended backwardly from the slot c' into the body of the shuttle, its extreme end being provided with a hook d', which forms a continuation of the edge c' of the said lip. The eye has also a notched part e, which embraces the edge a of the slot c' in the shuttle body, and it also has a projection e' to enter the notch a', and the upper part d' of the lip is rounded, as at d', to afford ready entrance of the thread into the slot c' and below the finger c'.

To insert the thread, the weaver takes hold of the end of the thread and stretches it straight from the bobbin through the slot a' until the thread descends

in said slot below the hook d^2 , when by a movement of the hand transversely of the shuttle the thread caught below the said hook is led into the space between the top d^1 and the abutment d of the shuttle and is drawn down the inclined edge below the lower edge of the lip b^2 into the passage b^1 , it, during such movement, being drawn past and below the finger c^1 and emerging from the passage b^2 at the face of the eye. (E. H. Kyon and A. M. Goodale, Waltham, Mass.)

BURGESS' THREADING DEVICE FOR SHUTTLES.

The object is to provide means for preventing the filling thread from slipping out of the thread eye during weaving, also to prevent lint from gathering in the throat of the shuttle.



The illustration is a perspective view of the device, which is applied to the slot in the front end of the shuttle.

The device consists of a guide 5 formed by a lug 11 and having a concave bottom 9, the upper portion of said lug being rounded as at 0. From the lug 11, projection 1 extends, forming a horn 2 which includes a covering web 3, being formed with a point 4. Underneath this point 4 is a guard 6, rounded on its top to permit the filling thread to slip easily between said guard 6 and the point 4. The arm 7 which carries said guard 6 is inclined toward the guiding slot 8 which directs the filling thread to the thread eye, said slot being curved on its edges to prevent the filling thread from chafing.

The filling thread as coming from the bobbin is lowered by the weaver into the guide 5, the end of the thread carrier between the point 4 and guard 6, then by the inclined arm 7 it drops into the guiding slot 8 and is carried out of the thread eye of the shuttle, said eye having at its sides two metallic studs (not shown) to prevent the thread from chafing. The illustration shows the device from the reverse side of the shuttle eye, the latter being situated in the side of the shuttle opposite slot 8. (Daniel M. Burgess, Ramseur, N. C.)

DONOVAN'S TENSION DEVICE FOR SHUTTLES.

The purpose of this device is the regulating of the tension of the thread, besides equalizing said tension irrespective of the direction in which the shuttle is traveling.

Fig. 1 illustrates a rear elevation of a shuttle provided with the device, Fig. 2 a plan of the same with a bobbin and cop, Fig. 3 a plan of the same, partly in horizontal section, on the line 3-3 in Fig. 4, Fig. 4 a front elevation of said shuttle and Fig. 5 a vertical cross section of said shuttle on the line 5-5 in Fig. 2.

A represents the shuttle body, provided with a

longitudinal guide groove a in front, B B' are the tips, C the spindle, arranged within the chamber a' , D a bobbin carrying a mass of filling E.

From the bobbin D the yarn is carried through the throat a^2 or narrow continuation of the chamber a' to the tension devices, which consist of a cylinder F, which crosses the throat a^2 horizontally at about half way between the top and the bottom of the shuttle, and is retained in the body of the shuttle and prevented from accidental turning therein by a screw thread f , cut on the inner end portion of said cylinder. A hole f' extends diametrically through said cylinder to receive the thread, which passes through said hole f' and into a cavity G, arranged below said cylinder, and between the same and the adjacent tip B' and thence through a passage H, which leads from said cavity G into the guide groove a and through the delivery eye h .

The ends of the hole or thread passage f' are rounded out, as shown at f^2 , f^3 in Fig. 5, to avoid fraying the thread, and the cylinder F may be turned by a screw driver inserted in a slot f^4 , with which the rear or outer end of said cylinder is provided, as shown in Figs. 1, 2 and 3, to increase or diminish the angles at which the thread enters and leaves said thread passage f' , thereby increasing or diminishing the tension of said thread.

The passage H is inclined to the longitudinal axis of the shuttle from the cavity G toward the middle of the shuttle to equalize the friction of the thread as the shuttle alternately moves in opposite directions,



Fig. 1



Fig. 2



Fig. 3

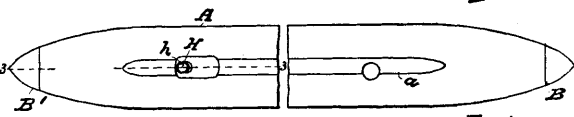


Fig. 4

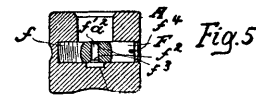


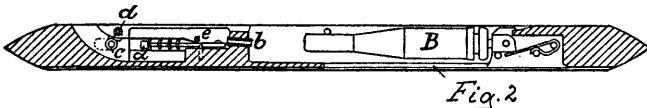
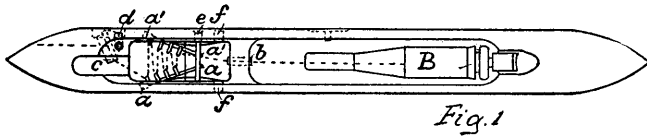
Fig. 5

the longer contact surface and consequently the greater friction of the thread on the front of the shuttle as the shuttle moves in one direction (to the right in Fig. 3) being compensated by the greater angle which the passage H makes with the face of the shuttle on the left (in said Fig. 3) of said passage, while the thread after passing the sharper angle between the opposite side of said passage H and said face has much less contact with the shuttle. (John J. Donovan, Lowell, Mass.)

HALL'S TENSION DEVICE FOR SHUTTLES FOR SILK LOOMS.

Fig. 1 is a plan and Fig. 2 a longitudinal section of a shuttle having this device applied.

The shuttle has a bridge, through the central portion of which is located the eye *b* and in the end of the



shuttle is obliquely located another eye *c* and an upwardly slanting eye *d*, for conducting the thread in a direct line from the quill *B* through the eye *b*, through the four rings of the tension fliers *a* *a'*, alternately, through the eye *c*, the entrance to which is in a direct line with the eye *b* and the quill *B*, and to the loom, for weaving, through the eye *d*.

A tension spring is secured to the swinging end of the fliers *a* on one side thereof, and on the other side of the fliers are the four rings previously referred to. The ends of the fliers are bent at right angles, so as to be pressed down in the bottom of the shuttle, as is shown in Fig. 2, thus swinging laterally, and the shuttle is provided with a recess on each side of its interior to receive the tension spring and the end of the fliers, as is shown in both illustrations.

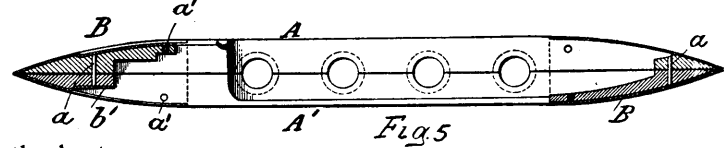
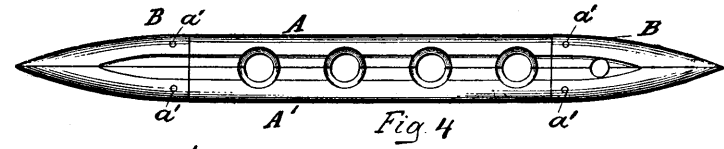
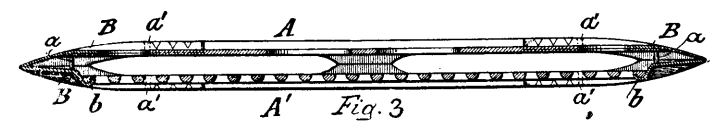
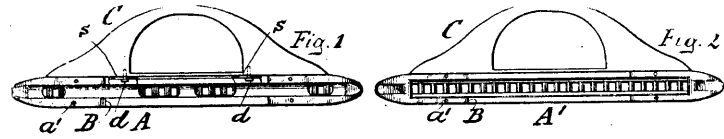
When so placed in position in the shuttle, the tension spring and fliers are prevented from rising therefrom by the screw *e*, as shown in Fig. 1. The tension spring is much longer than the arm of the fliers *a*, and is adapted to press against the side of the shuttle. Through an opening in each side of the shuttle a screw *f* passes and is screwed until it engages the tension spring, pressing it until the desired tension is obtained.

When the tension is regulated, there is the least possible danger of it being changed, because the pressure of the spring is against the rounded end of the screw, and the only way the tension may be released or lessened is by unscrewing the screw *f*. (I. A. Hall, Paterson, N. J.)

of such a shuttle for broad looms and Fig. 5 is a vertical transverse section of the same.

A *A'* are two semisections of the shuttle, for both narrow ware and broad looms, and are made of cast aluminium, so as to keep the weight of the entire shuttle equal to if not below that of wooden shuttles. These semisections *A A'* are united by rivets *a*, and the ends and lower part, which are subjected to the greatest wear, covered by a capping layer *B* of sheet steel, which is placed in the mould before casting and retained in the cast metal by means of rivets *a'* and inwardly bent prongs or portions *b b'*, which are bent around and engaged over shoulders or ribs *a'*, as shown in Fig. 3.

The bow shaped support *C* (in Figs. 1 and 2) for the spool tension device, etc., is made of wood, and connected by means of headed studs *d* with the correspondingly slotted side wall of the metallic portion of the shuttle, as shown in Fig. 1, the slots *s* for said headed studs being provided with enlargements, so as to produce the rigid connection of the metallic portion of the shuttle with the wooden portion of the same. The reinforcing layers *B* of thin sheet steel



at the wearing parts of the shuttle are stamped up by dies, each section being provided with said reinforcing layers, which prevent the discoloring, especially of light fabrics, by the aluminium. (Theodore Huster and Fred. W. Helms, Paterson, N. J.)

HUSTER'S SHUTTLE FOR NARROW WARE AND BROAD LOOMS.

The body of the shuttle instead of being made of wood is made of aluminium and reinforced at the portions that are subjected to wear by thin sheet metal strips, thus producing a light, durable shuttle.

Figs. 1 and 2 represent a top and bottom view, respectively, of the shuttle as used for ribbon looms. Fig. 3 is a sectional view of the main part or body of the shuttle, with the spool holding portion detached, drawn on a larger scale. Fig. 4 is a side elevation

SCHAUM'S SHUTTLE FOR NARROW WARE LOOMS.

The object is to provide a shuttle with an increased bearing surface, and a shuttle block for said shuttle having a race way conforming in shape to the increased bearing surface of said shuttle.

The shuttle is also provided with a runner having its grain in the direction of the edges of the runner and its nose constructed of a separate piece of wood and secured to said runner.

Fig. 1 is a top plan view of this shuttle, Fig. 2 an underneath view of Fig. 1, Fig. 3 an enlarged sectional view on the line *x-x* of Fig. 1, and Fig. 4 a

view similar to Fig. 3, illustrating the shuttle in the race way of the shuttle block, the latter being shown in section and partly broken away.

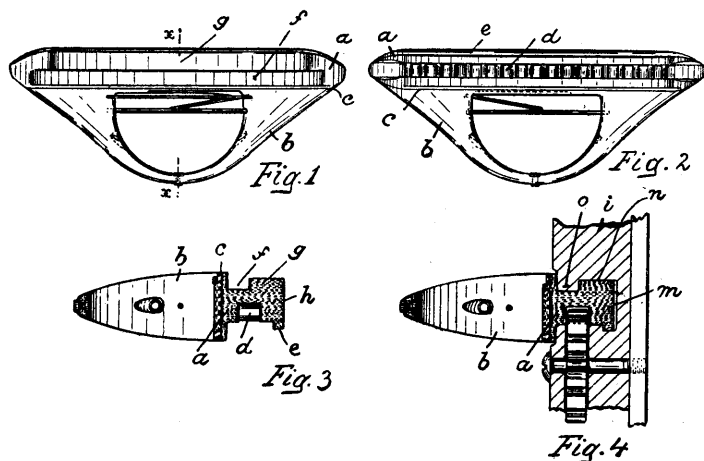
The shuttle consists of the runner *a* and the nose *b*, which are glued together, at *c*. The runner is provided at its under side with a toothed rack *d* and at

normal position to engage with its lower portion *o* the top surface of the spindle *e* to thus retain the latter within the recess *h*. A spiral spring *p* is provided for within the shuttle (in a hole or socket) and is connected with the top portion of the fulcrumed latch *n*, and is designed to hold said latch in normal position.

A collar *r* is arranged on the spindle *e* and is adapted to bear against the fulcrumed latch *n* to thus prevent undue lateral movement of the spindle.

For removing the spindle a notch *g* is furnished in the top portion of said latch *n* for conveniently turning the same on its fulcrum against the action of the spiral spring *p*, into the position shown in dotted lines in Fig. 2, whereby the lower portion *o* of said latch is moved out of the path of the spindle, which thus can then be readily lifted out of said bearings.

For reinserting the spindle into the shuttle, one end of said spindle is first inserted into the socket *f* and its opposite end thereafter slid into the recess *h*, the latch *n* being turned to one side by the spindle against the action of the spiral spring *p*, which latter as soon as said spindle has seated itself in the recess *h* returns



its outer lower portion with an elongated flange or projection *e*, rectangular in cross section. The upper portion of the runner *a* is provided at or near its inner edge with an elongated rectangular groove *f*, while the remaining top portion is flattened, as at *g*, and at right angles to the back *h* of the runner.

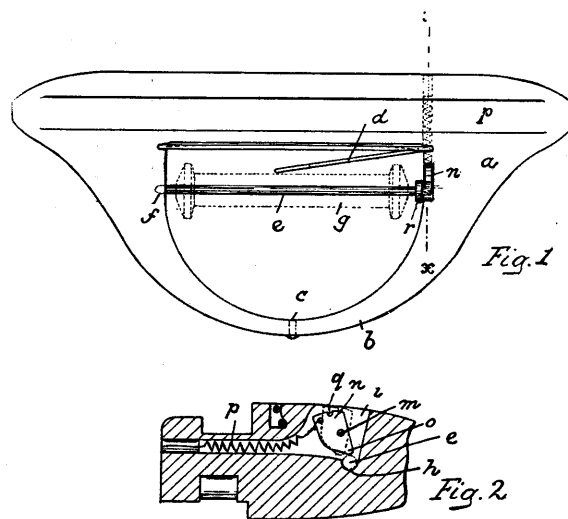
The shuttle block *i* contains the shuttle race *m*, the top *n* of which is adapted to be engaged by the bearing surface *g* of the runner, while the downwardly extending projection *o* of the shuttle block *i* conforms in shape to and is adapted to engage the rectangular channel or groove *f* in said runner. The lower portion of the shuttle race conforms in shape to the lower portion of the runner, thus the runner of the shuttle furnishes an increased bearing surface with the top portion of the shuttle race, as its flattened portion *g* is in engagement with the flattened portion *n* in said block and by which arrangement the dropping of the shuttle nose is prevented. Owing to the fact that the runner is spaced from the rear wall of the race the contact between it and the walls of the race is minimized and confined only to points where such contact is absolutely necessary. (Otto W. Schaum, Phila.)

HAMALIAN'S SHUTTLE FOR NARROW WARE LOOMS.

This shuttle is provided with bearings into which the spool supporting spindle can be readily inserted or lifted therefrom, and while in operative position is prevented from movement or accidental disengagement from said bearings.

Fig. 1 represents in its top plan view this shuttle, and Fig. 2 is a sectional view of it, on the line *x-x* of Fig. 1.

a represents the shuttle provided in its front portion *b* with an eye *c* and having a spring controlled brake *d*. The spindle *e* for the spool *g* (shown in dotted lines in Fig. 1) has its bearings in a socket *f* and in the recess *h*, respectively, which latter communicates with a groove *i*, arranged in the inner portion of the shuttle nose *b*. Within the said groove is pivotally secured at *m*, a latch *n*, adapted when in



said latch to its normal position. (Schaum and Uhlinger, Phila.)

TENSION DEVICE FOR SHUTTLES FOR NARROW WARE LOOMS.

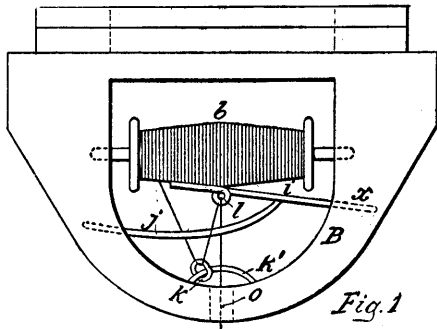
The object of the device is to provide a simple construction for retarding the spool of the shuttle more or less, according as the tension on the thread decreases or increases.

Fig. 1 is a plan of a shuttle provided with this tension device, and Fig. 2 shows another construction.

The shuttle comprises the support or body *B*, in which the spool *b*, is journaled.

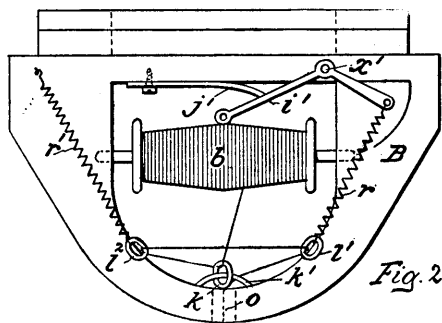
As shown in Fig. 1, the brake consists of a plate *i*, set into the body *B* at *x* and normally held against the spool *b* either by its own elasticity or by a separate spring *j*, likewise secured to the body *B* and bearing against the brake plate *i*. The thread on the spool *b*, instead of passing directly through the hole *o* of the

shuttle, passes through a ring *k*, arranged on a guide *k'* adjacent to the hole *o*, and thence through a loop *l*, formed on the brake *i*, finally passing out through the said hole *o*.



The result is that the thread itself controls the brake and that according to the greater or less tension, which will vary according to the rate of travel of the shuttle, a retarding action more or less gentle is afforded by the action of the thread on the brake plate *i*. The thread itself will throw off the brake *i* entirely, so as to do away with all retarding action when the thread is strongly drawn by an increased speed. In this case the spool unwinds without retardation. When the speed is slackened, the brake is steadily and progressively applied, so as to give the thread the tension necessary to a good feeding.

As shown in Fig. 2 the brake may be constituted by a bell crank lever *v*, pivoted at *w* and acted upon by a spring *j'*. The free arm of this lever *v* is attached to a small spiral spring *r*, secured to a ring *l'*. A similar spring *r'*, arranged on the other side of the shuttle, is connected with a ring *l''*. The thread passes first through the ring *k*, then through the rings *l''* and *l'*, finally coming out through the hole *o*. This construction produces the same effect as that shown in Fig. 1. The only advantage it possesses over the form first described resides in the keeping of the



brake behind the spool *b*, where it does not interfere with the work of the weaver. The difference between the two constructions shown, consists in causing the thread to act indirectly on the brake, as is the case in Fig. 2, instead of directly, as is the case of Fig. 1. (Francisque David, St. Etienne, France.)

TENSION DEVICE FOR SHUTTLES FOR SILK LOOMS.

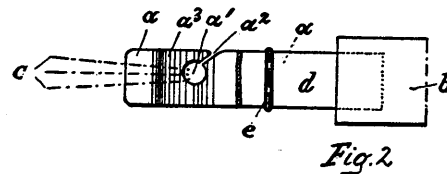
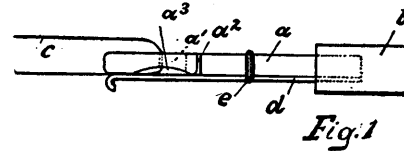
The device consists of a rigid flat bar formed with a guide eye having a gap for the introduction of the thread or threads and a feather spring adapted to exercise controllable pressure upon the said bar, the said spring affording the necessary frictional pressure

upon the threads which pass through the eye of the bar.

Fig. 1 is a side elevation of the device, and Fig. 2 a plan of the device.

a represents a rigid flat bar which serves as support as well as guide for the thread or threads. That portion of bar *a* which serves as support may be straight or curved in accordance with the character and construction of the machine, and is attached to a shank *b*. The portion of bar *a* serving as guide for the thread or threads is straight and has an eye *a'* for guiding one or more threads *c* and an open slit *a''* for admitting the thread or threads to eye *a'*. Upon the face of the flat bar *a* the flat spring *d* is secured, the bar and spring jointly serving to apply tension to the thread or threads as they pass between the bar and spring. Where more than one thread is stretched, all the threads have thus an equal degree of tension applied to them.

To increase or diminish the degree of tension, the apparatus is fitted with a regulating or controlling device, consisting of a loop or "keeper," *e*, embracing



both the bar and the spring and capable of being shifted either backward or forward to the desired extent. When the keeper *e* is shifted forward, the threads will be stretched more tightly, the reverse result ensuing when it is moved backward.

In order to prevent the thread from being broken or chafed where emerging from the eye *a'* the side of the bar *a* facing the spring is formed with a curving recess *a³* communicating with eye *a'*, so that the thread reaches the point at which the frictional tension is applied gradually instead of suddenly. The curving recess *a³* extends forward from eye *a'*, toward the free ends of spring *d* and bar *a*. The free end of said spring is bent in the form of a hook, so as to guard against the keeper *e* becoming detached after the parts have been properly assembled. (Isak Heer, Zurich, Switzerland.)

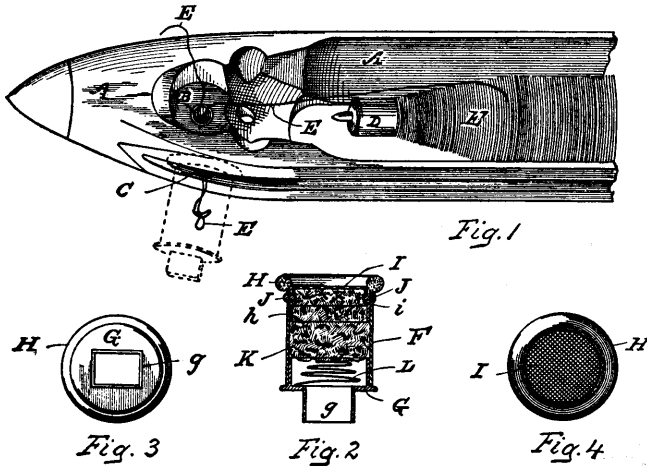
LAMOTHE'S SHUTTLE THREADER.

The object of this threader is to prevent inhaling of dust or lint by the weaver when applying his lips to the side orifice of the threading aperture of a shuttle and drawing the yarn or thread through by suction.

Fig. 1 is a broken perspective view, showing a portion of a shuttle and bobbin, and in dotted lines the suction threader in position as when having threaded the shuttle. Fig. 2 is an enlarged (compared to Fig. 1) detailed sectional view of the suction shuttle threader. Figs. 3 and 4 are end views showing, respectively, the mouthpiece and the rubber cushion and screen of the threader.

A is a shuttle, provided with the angular perforation located near one end and extending from the top

downward and out at one side of said shuttle, the top orifice being indicated at B and the side orifice at



C, said orifice constituting the threading aperture. D is the bobbin, and E is the thread or filling, the end of which filling is represented as having been somewhat snarled and drawn through the threading aperture B, C.

The threader consists of a tube or shell F, provided at one end with a cap G, having a mouthpiece g, and at the opposite end an annular rubber cushion H, provided with a sleeve h, extending within the shell F, and a perforated disk or screen I, having an annular flange i fitting within the rubber sleeve h, secured therein by rivets J. The cap G is threaded to the shell F, so that it can be readily removed for the insertion or removal of a sponge K, placed within the shell F, for the purpose of preventing the passage of lint or dust from the shuttle into the mouth of an operator. The sponge K may be kept damp, if desired, and in order to prevent said sponge from expanding into the mouthpiece g, a spiral spring L is placed against it, so as to operate expansively between said sponge and cap, as shown in Fig. 2.

The weaver places the suction threader against a shuttle, so as to cover the orifice C, and the mouthpiece between his lips then sucks the free end of the filling E through the aperture B, C, when it may be pulled out as seen in Fig. 1. The rubber cushion H, is essential, in order that the suction threader may closely fit the side of the shuttle notwithstanding any uneven surfaces—such, for example, as the groove of the shuttle. (Cyrille Lamothe, Manchester, N. H.)

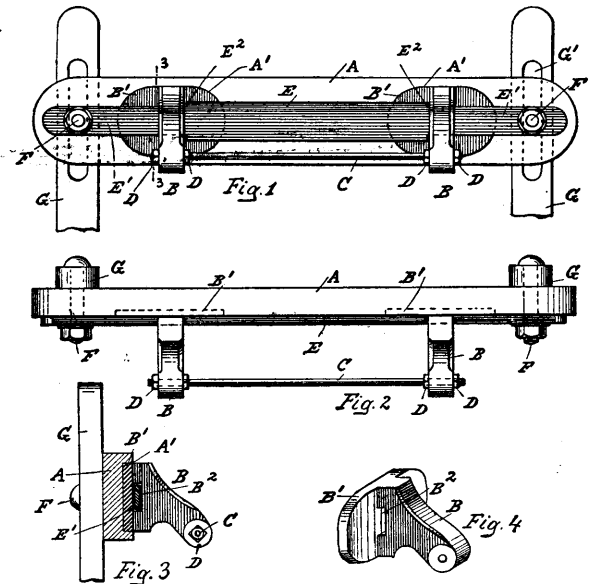
MELVIN'S SHUTTLE GUARD.

Fig. 1 is a front elevation and Fig. 2 is a plan view of this shuttle guard, shown applied to the lathe of a loom. Fig. 3 is a transverse section of the same on the line 3-3 of Fig. 1, and Fig. 4 is a perspective view of one of the brackets.

A indicates the hand rail which carries the shuttle guard, and which rail is provided with spaced recesses A', for receiving the bases B' of brackets B, extending forwardly from said rail to carry at their outer ends a rod C, secured in place by nuts D, screwing on the ends of the rod against the sides of the brackets B, both at the inside and outside thereof. The rod C extends a suitable distance from and parallel with the rail A, as is plainly indicated in Fig.

2, so that in case the shuttle leaves the shed and strikes the rod it is prevented from leaving the loom.

A connecting piece E in the form of a flat bar extends between the brackets at the bases B' thereof, said connecting piece being formed at its ends with a reduced extension E', passing through apertures B², formed in the brackets, so that the shoulders E², formed at the reduced ends, abut against the inner sides of brackets and hold the same the desired distance apart. The outer ends of the extensions E' are engaged by bolts F for fastening the piece E to the rail A and the latter to the usual uprights G, attached to the loom. The uprights G are provided with the slots G', through which extend the bolts F for adjusting the rail A up or down to bring the rod C

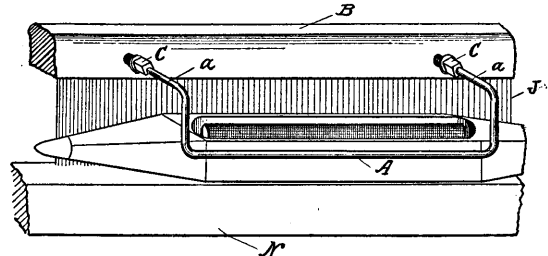


into the proper position for acting as a shuttle guard. (Major T. Melvin, Fall River, Mass.)

NEWELL'S SHUTTLE GUARD.

The illustration is a perspective view of a portion of the raceway and the cap bar of a loom with the guard attached and the shuttle passing through back of the guard.

N indicates the race way, carrying the shuttle.



Over the reed J is placed the hand rail B, of the lay, to which is attached the guard rod A, being bent as at a, and secured to the hand rail B by means of set screws C. The guard rod A extends far enough in front of the lay to permit the shuttle to pass, and is of a length of about one half of the width of the cloth woven. (Joshua E. Newell, Georgiaville, R. I.)

TEMPLES.

HUTCHINS' TEMPLE MOTION.

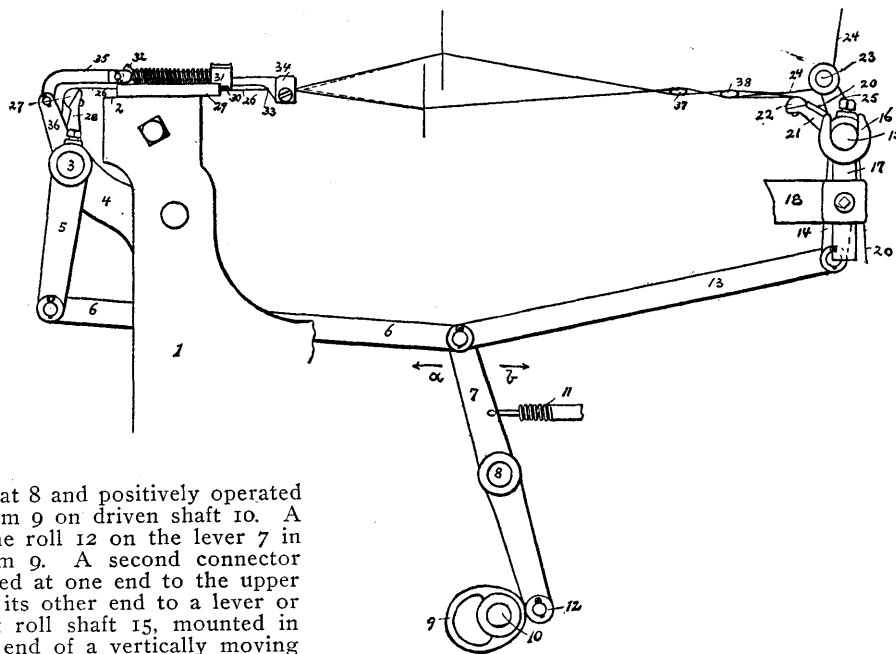
for weaving terry pile fabrics, turkish towels, bath robes and similar articles. In the weaving of these fabrics (for the manufacture of which see pages 216 to 221 of "Technology of Textile Design") generally two picks of filling are put in, and then the woven fabric is moved toward the rear of the loom to allow the warp threads to be beaten up and form the sets of loops extending transversely of the fabric. In using temples of ordinary construction when the woven fabric is moved back, the edges thereof are drawn through the temple, causing the edges of the fabric to be more or less abraded and injured. This trouble is overcome by providing a motion, as shown in the illustration, whereby the temple is moved with the fabric, at the beating up.

1 indicates a detached portion of the right hand end or side of a loom, 2 the breast beam, 3 a rock shaft extending in front of the breast beam and mounted to turn in bearings on the arms or stands 4, bolted to the loom frame. An arm 5 is fast at its upper end on the rock shaft 3 and is pivotally attached at its lower end to one end of a connector 6, the rear end of which is pivotally attached to the upper end of the lever 7, centrally pivoted at 8 and positively operated at regular intervals by cam 9 on driven shaft 10. A spring 11 acts to keep the roll 12 on the lever 7 in engagement with the cam 9. A second connector 13 is also pivotally attached at one end to the upper end of the lever 7 and at its other end to a lever or arm 14, fast on the back roll shaft 15, mounted in bearings 16 in the upper end of a vertically moving bar 17, which is adjustably supported in the side bar 18 of the loom frame.

The back roll shaft 15 carries the back roll over which the warp threads 20 from the lower warp beam (not shown) pass, and also on arms 21, fast on the back roll shaft 15, the bar or whip roll 22 over which the warp threads pass. The back roll 23 under which the warp threads 24 from the upper warp beam (not shown) pass, is supported on arms 25 fast on the back roll as carried by shaft 15. The woven fabric 26 passes over a bar 27 in front of the breast beam 2 and supported on the arms 28, fast on the rock shaft 3.

On the breast beam 2 is secured the stationary plate 29 of the temple attachment, being mounted to slide in ways thereon in the direction of the length of the fabric, a plate 30 having stands or bearings 31 and 32 thereon, in which is supported to slide the longi-

tudinally moving spring actuated rod 33 of the temple 34. The rear stand 32 of the temple plate 30 is connected by a link 35 to the upper end of an arm 36 on the rock shaft 3. The warp threads 20 and 24 are separated at the rear part of the loom by the lease rods 37 and 38, and the edge of the woven fabric in front of the fell point passes through the temple 34 and over the bar 27 in front of the breast beam to the take up roll. (Not shown.) When the lever 7 through cam 9 is moved to the left in the direction of arrow a and the woven fabric and warp threads moved back, through connectors 6 and 13, arms 5 and 14, shafts 3 and 15, and bars 22 and 27, to allow the warp threads to be beaten up to form the loop, the plate 30, carrying the temple mechanism, through link 35, connected by the arm 36 with the rock shaft 3, will, as the woven fabric is moved back toward the rear of



the loom and forward toward the front of the loom in forming the loops, cause the temple plate 30 to be moved with it instead of remaining stationary. (Crompton and Knowles Loom Works.)

HELD AND POEHNERT'S TEMPLE.

The object is to provide a temple being easy in adjustment with reference to width of cloth woven, as well as distance of temple head from the reed, at the same time providing a temple which will not injure the fabric since its stretching means only act on the outside edge of the selvage.