

(No Model.)

3 Sheets—Sheet 1.

F. M. J. GRENIER.
STOP MOTION FOR LOOMS.

No. 462,924.

Patented Nov. 10, 1891.

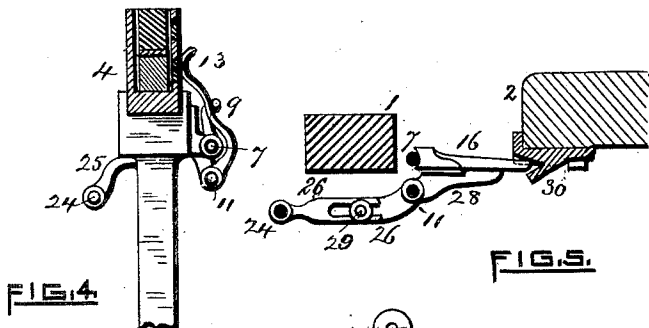
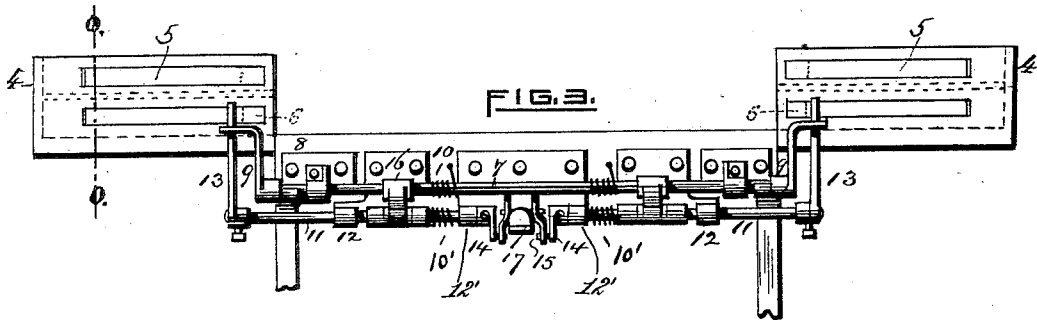
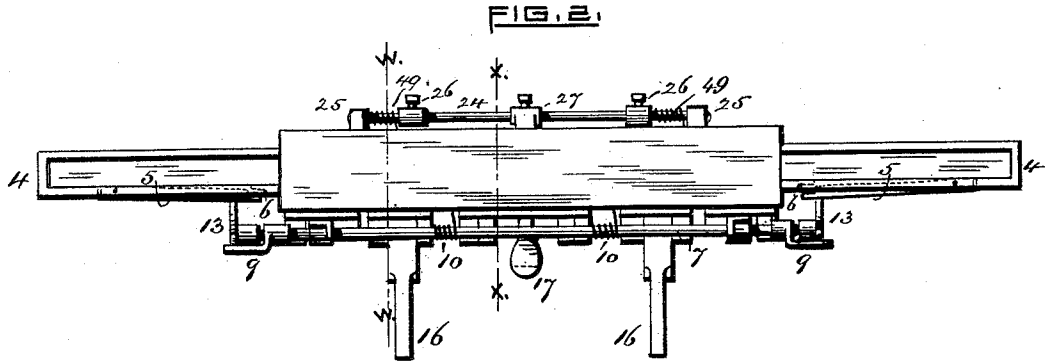
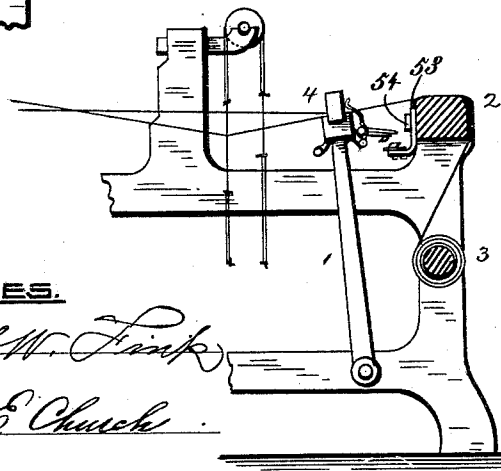
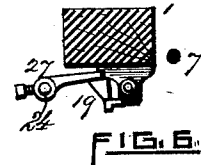


FIG. 5.



WITNESSES.

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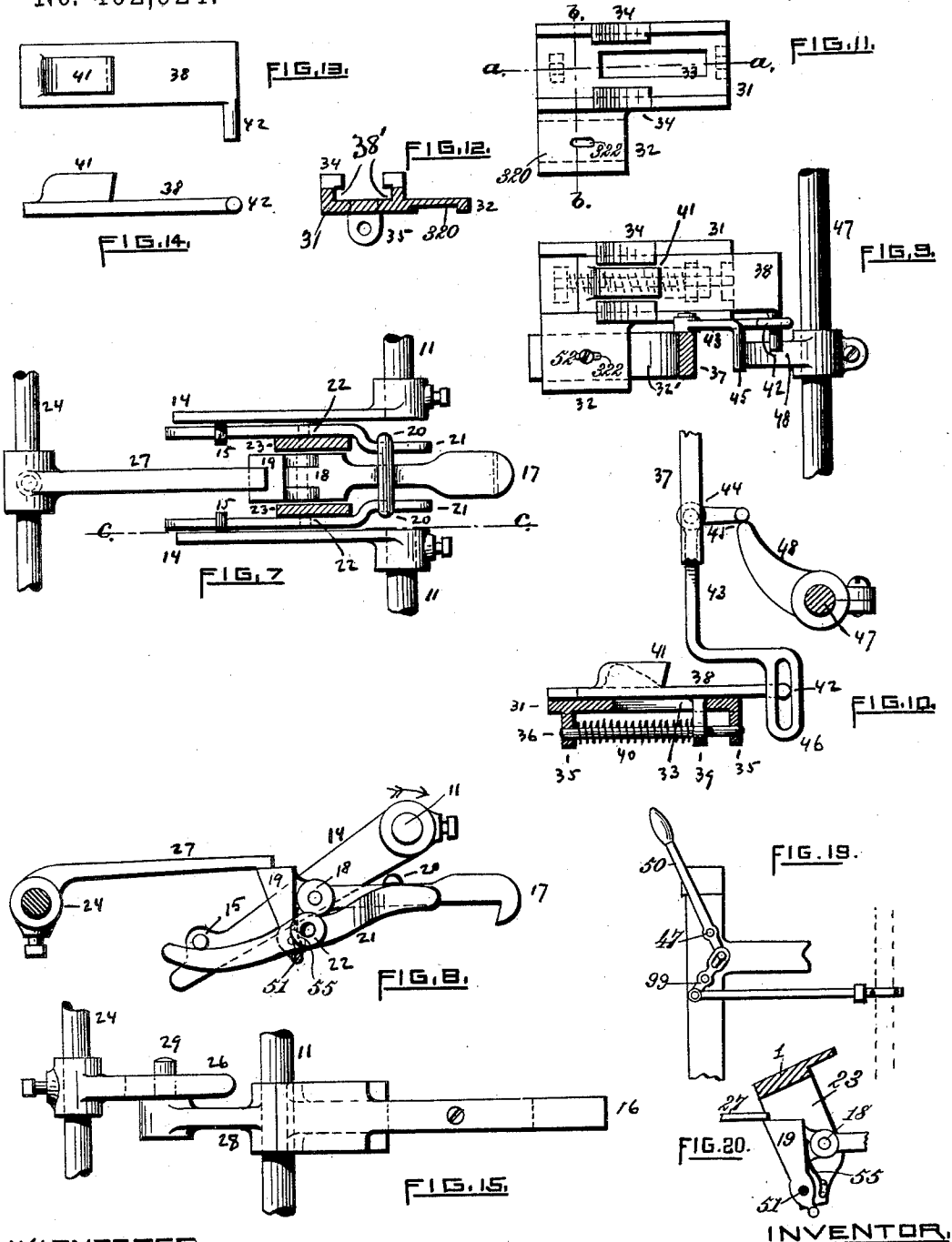
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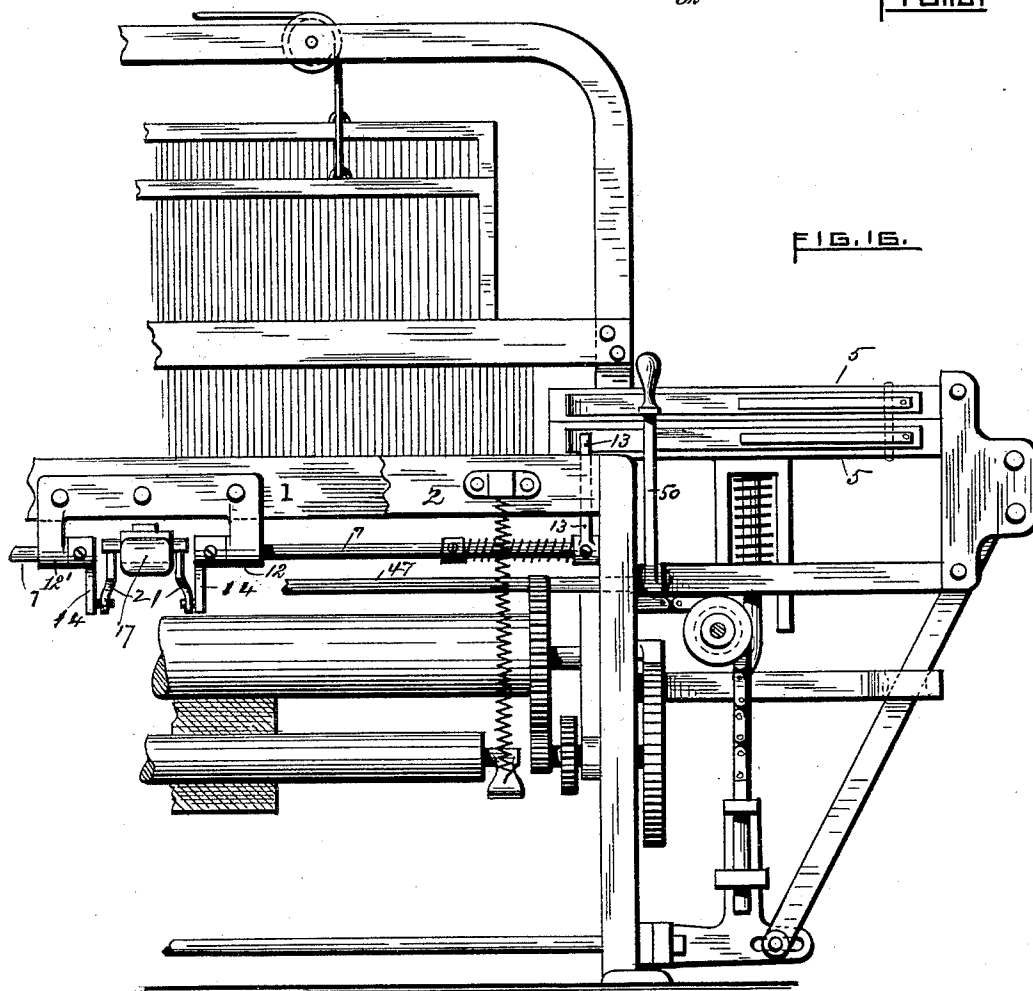
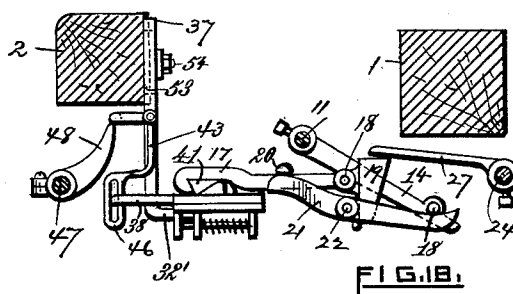
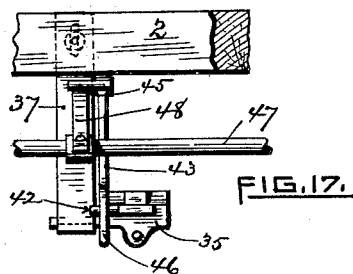
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3 Sheets—Sheet 3.

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WITNESSES.

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STOP-MOTION FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 462,924, dated November 10, 1891.

Application filed September 20, 1887. Serial No. 250,262. (No model.)

To all whom it may concern:

Be it known that I, FRANÇOIS MAXIMILIAN JOSEPH GRENIER, a citizen of the Dominion of Canada, and a resident of the city and county of Providence, in the State of Rhode Island, have invented a new and useful Improvement in Stop-Motions for Looms; and I declare the following to be a specification thereof, reference being had to the accompanying drawings.

Like numbers indicate like parts.

Figure 1 is a view, partly in side elevation and partly in section, of enough of a power-loom to show the position of my improved attachment. Fig. 2 is a top plan of the lay and the portions of my device which are attached thereto. Fig. 3 is a front elevation of the same. Fig. 4 is an end view of the same, the shuttle-boxes being shown in vertical cross-section on line *o o* of Fig. 3. Fig. 5 is a view in cross-section on line *w w* of Fig. 2. Fig. 6 is a view in cross-section on line *x x* of Fig. 2. Fig. 7 is a plan of the latch apparatus and its connections. Fig. 8 is a view, partly in side elevation and partly in cross-section, on line *c c* of Fig. 7. Fig. 9 is a plan of the catch-slide and its connected parts. Fig. 10 is a side elevation of the same. Fig. 11 is a plan of the bed-piece of Fig. 9. Fig. 12 is a cross-section of the same on line *b b* of Fig. 11. Fig. 13 is a plan of the slide. Fig. 14 is a side elevation of the same. Fig. 15 is a plan of the dagger and connections. Fig. 16 is a front elevation of a modified form of my invention and is shown partly broken away and partly in section. Figs. 17 and 18 are respectively front and side elevations of the devices adapted to partially rotate the shaft of the belt-shipper. Fig. 19 is a detail view illustrating how the rotation of the shipping-shaft shifts the belt from the fast to the loose pulley. Fig. 20 is a detail view of a portion of the latch mechanism.

My invention relates to looms for fancy weaving in which two or more shuttles are used. It is a common accident in the use of such looms for the shuttles to come into collision, and when such a collision occurs the shuttles fly off and break the yarn, or are forced by the lay so as to break the warp, and thereby damage the fabric and occasion great loss. My invention is intended to pre-

vent such an accident and to automatically stop the loom when such danger is imminent.

It consists of a combination of devices which derive power from the swells of the shuttle-boxes. A spring-pressed lever lies in contact with each of said swells and partially; when actuated by the outward movement of the swell, rotates a rod on which it is mounted, which rod by an arm and pin acts upon a latch-upholding lever. When both swells open at the same time, as a result of the pressure of shuttles in opposite boxes in line with the shuttle-race of the lay, the latch is no longer supported and falls by its gravity upon the projection of the sliding plate, which is connected movably with the breast-beam of the loom, and the slide-plate, when drawn by the latch, operates a rod by which the driving-belt of the loom is shifted from the fast to the loose pulley. At the same time the draft on the latch, which is hinged to a holding-block, causes said block to be drawn out from under a lever of another rod in operative connection with daggers, and thus causes the daggers to rise into position to prevent the lay of the loom from moving completely forward to the breast-beam in the succeeding beat of the lay. These parts and their respective operations I will now describe, and specifically set forth my invention in the claims.

In Fig. 1 I show a portion of a common power-loom in side elevation and section. The swinging frame, called the "lay," is shown at 1 and the breast-beam at 2. The warps are seen passing over the beam 2 to the cloth-roll 3. The shuttle-boxes 4 are at the ends of the lay 1 and have swells or binders 5, as usual, hinged at the outer ends of the boxes, respectively, as seen in Figs. 2 and 3, and also lips 6 at the inner ends, as shown in Fig. 2. On the front side of the lay 1 is a rock-shaft or rod 7, which is mounted and rotatable in hangers 8. Presser-fingers 9 are fixed upon the rod 7 and by the normal action of spiral springs 10, surrounding said rod, are forced toward the lay. The parts thus far described are old and common, except that heretofore the fingers 9 have been in direct contact with the swells 5. On each side of the lay a rod 11 is mounted and has partial rotation in hangers 12 12' on the front of the

lay 1. A spiral spring 10' surrounds each rod 11 and is attached, one end being inserted in the lay and the other end in said rod, as seen in Fig. 3. At the outer end of the rod 11 is a
 5 presser 13. The end of each of the fingers 9 is bent at a right angle and lies against one of the pressers 13 to force it against the swell 5 of the adjacent shuttle-box in line with the shuttle-race. At the inner end of each rod 11
 10 is attached an arm 14, from the end of which a pin 15 extends at a right angle. The dagger 16 is carried by the lever 28, which is loosely mounted upon the rod 11; but the parts co-operating with the dagger I will describe later on.

The latch mechanism is shown enlarged in Figs. 7 and 8 and consists of a latch or faller 17, loosely hinged, as seen at 18, to a block 19. This block is supported on each side at its
 20 bottom by a pin or pivot 51, (see Figs. 8 and 20,) which passes into the supports or hangers 23. The latch 17 has a cross-pin 20 attached on top, and it thereby rests upon levers 21 on each side. The levers 21 are pivoted at 22 to
 25 the supports or hangers 23. The pins 15 of the arms 14 are in contact with the rear upper surfaces of the levers 21, respectively. A rod 24 is mounted and has partial rotation in the hangers 25 in the lay. It has attached thereto
 30 the slotted or forked arms 26 and the let-off arm 27. The free end of the arm 27 rests upon the top of the block 19. These various arms are attached to the rods by proper clamps and set-screws.

35 The dagger mechanism is shown in Figs. 5 and 15 and consists of a dagger 16, the upper and forward end of which is preferably made of steel. It is fastened upon a lever 28, which turns upon the rod 11, said lever 28 being
 40 loosely mounted upon said rod 11. At the rear end of the lever 28 is a pin 29, extending at a right angle, (see Fig. 15,) and which passes through the slot of the forked arm 26. On the rear of the breast-beam 2 and beneath
 45 the same are the dagger-stops 30, one of which is shown in central section in Fig. 5.

The belt-shifting mechanism is shown in Figs. 9 to 14, and consists of a bed-piece 31, which, by means of a projecting piece 32 upon
 50 its side, is held upon a bracket 32' and is adjustable horizontally thereon. This projecting portion 32 of the bed-piece 31 has a guideway 320, (shown in cross-section in Fig. 12 and in dotted lines in Fig. 11,) along which
 55 it is movable upon the bracket 32', as indicated in dotted lines in Figs. 9 and 11, and when adjusted by such movement in the proper position is held there immovably by the set-screw 52, which passes through a slot
 60 322 in said projection 32 and is adapted to engage the bracket 32' in such a manner as to prevent displacement. The bed-piece 31 has a longitudinal central slot 33 and on each side a fixed cam 34.

65 Fig. 12 shows the construction as seen on section-line *b b* of Fig. 11, and Fig. 10 shows the bed-piece 31 as seen on section-line *a a* of

Fig. 11. The bed-piece 31 has also ear-pieces 35, extending downward from its under side on each end, (see Fig. 10,) and a rod 36 extends from one end to the other. The bracket 32' has an upright portion 37, which is vertically adjustable upon the back of the breast-beam 2. (See Figs. 1 and 18.) The slide 38, being longitudinally slotted and secured in
 75 the proper position in a guideway 53 by a set-screw 54, is adapted to work in guideways 38', formed in the bed-piece 31, Fig. 12, and has an ear-piece 39 on its under side, (see Fig. 10,) which passes through the slot 33 of the bed-piece 31. A spiral spring 40, surrounding the rod 36, has its ends bearing against the front ear-piece 35 of the bed-piece 31 and against the ear-piece 39 of the slide 38. The slide 38 also has on its top surface a catch 41 and at
 85 one side a stem 42. A bell-crank lever 43 is pivoted at 44 to the upright portion 37 of the bracket and is bent at its upper end, as seen at 45, Fig. 9, and has an elongated loop 46 at its lower end, Fig. 10. The stem 42 of the
 90 slide 38 enters said loop.

The shaft 47 is the usual shaft for shifting the driving-belt from the fast to the loose pulley, and vice versa. It has attached to it the lever-arm 48. Spiral springs 49, Fig. 2, en-
 95 gage with the rod 24 to depress when free the slotted arms 26, as hereinafter specified. The handle of the belt-shipper is shown at 50 in Fig. 19.

Having thus described all the parts of the
 100 device, I will now explain their operation. The shuttle-boxes are arranged above each other at each end of the lay in the usual manner and rise and fall as hitherto. All the power for operating my device is derived from
 105 the swells or shuttle-binders 5 of the shuttle-boxes 4. As the shuttle is driven in or out of the box by the action of the picker it crowds outwardly the shuttle-binder of said box. The pressure of the springs 10 10' nor-
 110 mally keeps the binders closed by means of the pressers 9 13. When the binder or swell is pressed outwardly by the passage of the shuttle, it moves the presser 13 toward the front, and thus partially rotates the rod 11.
 115 The arm 14 is thus raised (see Figs. 7 and 8) and the pin 15 rises with it. So long as the swells operate alternately, as they ought, there is no effect produced other than that just described, and the arms 14 alternately rise and
 120 fall. The latch 17 remains in the same relative position, because it is always supported by one or the other of the pins 15 of the arms 14, and when the lay swings to the beam 2 the latch passes over the catch 41 of the slide
 125 38 without engaging therewith. While the shuttles are thus thrown in regular alternation no accident can occur, as the right swell and the left swell open in their proper turn.

The collision of the shuttles, which it is the
 130 purpose of my invention to prevent, is caused whenever either box into which a shuttle is to be thrown is already occupied by a shuttle, as when a box charged with a shuttle is

brought into line with the race at the end to which a shuttle is to be thrown, there then being shuttles in both boxes at the same time in the line of the race. When both swells are thus opened, both pressers 13 are pushed, both rods 11 are partially rotated, and both arms 14 with their pins 15 are elevated. The weight of the hook or latch 17 then causes it to drop by means of its loose hinge 18, and the latch engages with the catch 41 of the slide 38 as the lay 1 moves to the beam 2. Now as the lay 1 swings back, the catch 41 of the slide 38 is drawn by the latch 17. As the latch 17 draws back, it rides up the cams 34 until it clears the catch 41 by arriving at the top of the cams 34. This draft of the slide 38 compresses the spring 40, and at the same time, by its stem 42, which is within the loop 46 of the lever 43, causes said lever to turn on its pivot 44. The upper bent portion 45 of the lever 43 is thus depressed and bears down upon the arm 48 of the shaft 47, thereby rotating said shaft and shifting the belt from the fast to the loose pulley, as usual, thus disconnecting the motive power of the loom. Simultaneous with this movement is the operation by which the daggers 16 are raised into position to engage with the stops 30. This is effected in the following manner: When the shuttle-binders 5 of the shuttle-boxes 4, in line with the shuttle-race, are open on both ends of the lay 1 at the same time, they press outwardly the levers 13 on both sides and thereby partially rotate both the rods 11 and cause both the arms 14 and their pins 15 to rise. The latch 17 is now no longer supported as before by said arms 14 and pins 15; but it falls by its own gravity and comes into engagement with the catch 41 of the slide 38, as hereinbefore described. The latch 17, which moves with the lay 1, to which it is immediately connected, (see Figs. 2, 3, and 7,) after falling into engagement with the catch 41 of the slide 38, draws said catch and thereby pulls forward the swinging block 19, to which said latch is hinged at 18. The let-off arm 27, which until now has been supported upon the block 19, slips off. This movement of the let-off arm is aided and made more powerful by the action of the spiral springs 49, Fig. 2, which are attached to and surround the rod 24, on which the let-off arm 27 is mounted. The springs 49 thus partially rotate the rod 24, and the slotted arms 26, mounted on the rod 24, (see Figs. 5 and 15,) are carried downward. The slotted arms 26 by this movement crowd down the pins 29 of the levers 28. The daggers 16, which are rigidly attached to the levers 28, are thus raised and enter the stops 30 of the beam 2 as the lay 1 moves toward the beam, thus stopping the loom. No such result can occur as long as the binders of the shuttle-boxes are opened first on one side and then on the other, alternately, as they are when the loom is working properly, because while thus alternating that one of the binders which is closed allows the arm 14

on the same side to sustain the latch 17 by means of the connected mechanism, and the latch 17 passes over the catch 41 without engagement, as the lay beats back and forth; but when both binders are opened at the same time both pressers 13 are crowded outwardly, both rods 11 are partially rotated, both arms 14 with their pins 15 are raised, both levers 21 turn to let the latch 17 drop into engagement with the catch 41 of the slide 38, with the consequent results hereinbefore fully specified. To start the loom again the let-off arm 27 is raised by hand (which movement causes the daggers 16 to descend out of engagement with the stops 30) and the block 19 and latch 17 are returned to their first position by a spring 55 (shown in Fig. 8) on the front side of said block, and the arm 27 is brought to its former support on said block. The shaft 47 is operated by the handle 50 to shift the belt from the loose to the fast pulley, as usual, and the loom starts again. It will be apparent from this explanation that the daggers 16 while the loom is in proper operation are depressed and pass under the beam 2 without engaging with the stops 30; but when they rise they engage with said stops in front.

In Fig. 19 I have shown how the rotation of the shaft 47, which may be caused either by the above-described automatic mechanism or by the lever-handle 50, shifts the belt from the fast to the loose pulley, the said lever 50 being mounted upon the shipper-shaft 47 and having its lower end in engagement with one end of a centrally-pivoted locking-lever 99, the other end of which is connected with the belt-shipper in a well-known manner.

In Fig. 16 I show a modification of my device, which consists in dividing the rod 7 and providing it with all the attachments hereinbefore mentioned as in connection with the rod 11. In this case the fingers 13 are mounted directly on the rod 7. Such modified form is to be used in constructing new looms; but in altering old looms (which always have the rod 7 extending from side to side) I use the construction previously specified.

I claim as a novel and useful invention and desire to secure by Letters Patent—

1. The combination, with a shipping-lever, latching or holding means therefor, the lay, the shuttle-boxes at opposite ends thereof, and the shuttle-binders, of rock shafts or rods having bearings on the lay, an arm on the outer end of each of said rock shafts or rods adapted to bear against the adjacent shuttle-binders, an arm on the inner end of each of said rock shafts or rods, a faller or latch carried by the lay and upheld by the arms last mentioned, and devices intermediate the faller or latch, and the shipping-lever for disengaging the latter when the faller or latch is permitted to descend, substantially as specified.

2. The combination, with a shipping-lever and shaft, holding means therefor, the lay, the shuttle-boxes at opposite ends thereof,

and the shuttle-binders, of rock shafts or rods having bearings on the lay, an arm on the outer end of each of said rock shafts or rods adapted to bear against the shuttle-binders of the adjacent boxes as they come into line with the shuttle-race, an arm on the inner end of each of said rock shafts or rods, a faller-latch carried by the lay and upheld by the arms last mentioned, a movable slide suitably mounted and provided with a ratchet-catch, and devices intermediate said slide and the shipping-lever and shafts to disengage said shipping-lever and shaft from said holding devices when the ratchet-slide is drawn by said faller-latch, substantially as specified.

3. In stop mechanism for looms, the combination, with the lay, the shuttle-boxes, shuttle-binders, and breast-beam, of a pivoted latch, a swinging block on which said latch is mounted, rock-shafts on the lay, actuated by the binders and provided with devices to uphold said latch, a slide movable on the breast-beam and provided with a ratchet for engaging said latch when the latter is permitted to descend, daggers loosely mounted on said rock-shafts, a spring-actuated shaft carried by the lay and having arms adapted to elevate the daggers when said shaft is free to act, and also having a let-off arm, the free end of which is supported by said swinging block, but is arranged to drop therefrom by the force of the spring whenever said block is moved out of support by the engagement and movement of said slide and latch, substantially as shown.

4. The combination of the lay 1, shuttle-boxes 4, the shuttle-binders 5, the rods 7 11, the springs 10 10', the levers 9 13 14 21, mounted

as shown, the latch 17, and the pins 15 20, all arranged and operating substantially as described.

5. The combination of the beam 2, the bracket 32' 37, the bed-piece 31, having the cams 34, the slide 38, having the catch 41 and stem 42, the bell-crank lever 43, with loop 46 and bent end 45, the belt-shifting shaft 47, having the arm 48, the lay, the shuttle-boxes and shuttle-binders, the rods having bearings on the lay, an arm at the outer end of each of said rods bearing against the shuttle-binders, an arm on the inner end of each of said rods, and a latch carried by the lay and upheld by the arms last mentioned, all arranged and operating substantially as specified.

6. The combination of the lay 1, the beam 2, the shuttle-boxes 4, the shuttle-binders 5, the rods 7 11 47, the levers 9 13 14 21 43 48, mounted as shown, the springs 10 10', the latch 17, the pins 15 20, the bracket 32' 37, the bed-piece 31, having the cam 34, and the slide 38, having the catch 41 and stem 42, engageable with the loop 46 of said lever 43, substantially as specified.

7. The combination of the lay 1, the beam 2, the shuttle-boxes 4, the shuttle-binders 5, the rods 7 11 24, mounted as shown, the levers 9 13 14 21 26 27 28, the latch 17, the block 19, the pins 15 20 29, the springs 10 10' 49, the daggers 16, and the stops 30, substantially as specified.

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Witnesses:

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