

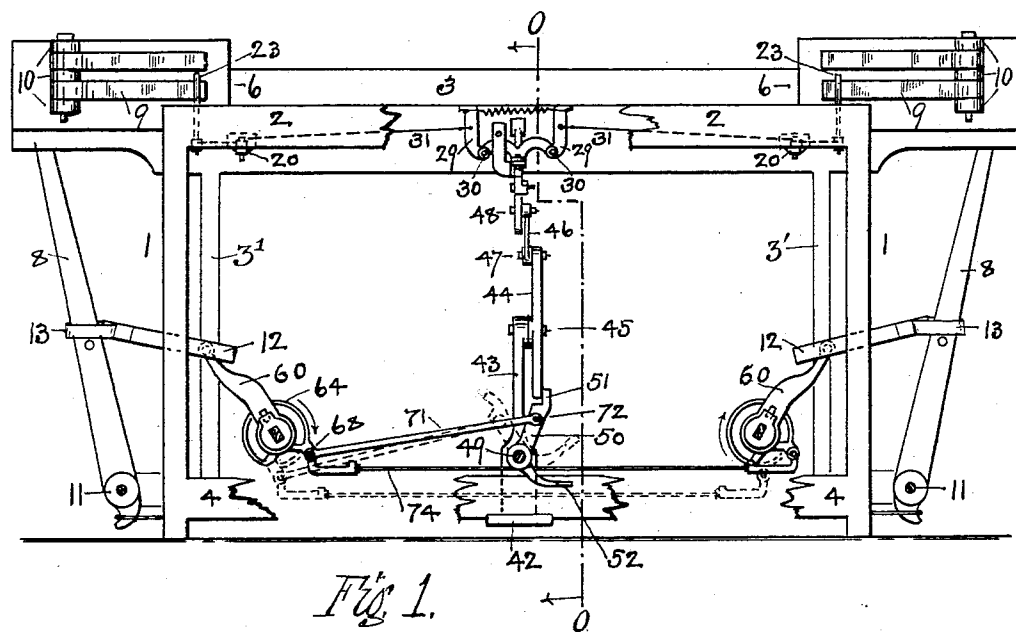
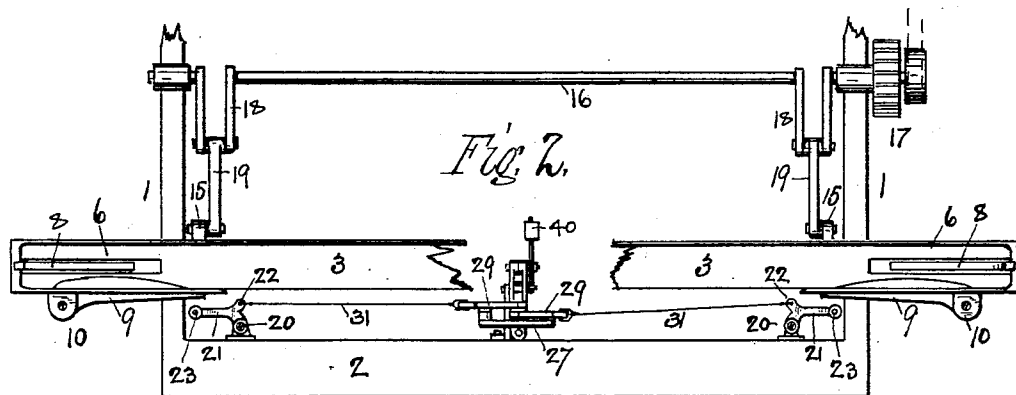
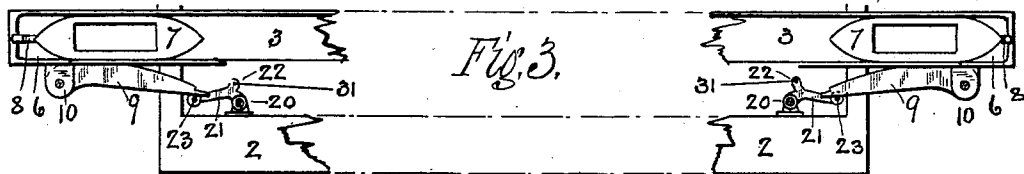
(No Model.)

2 Sheets—Sheet 1.

F. M. J. GRENIER.
STOPPING MECHANISM FOR LOOMS.

No. 573,648.

Patented Dec. 22, 1896.



Witnesses,
M. Foster
A. E. Perce

Inventor
Francis Maximilian Joseph Grenier
by Warren R. Perce
Att'y.

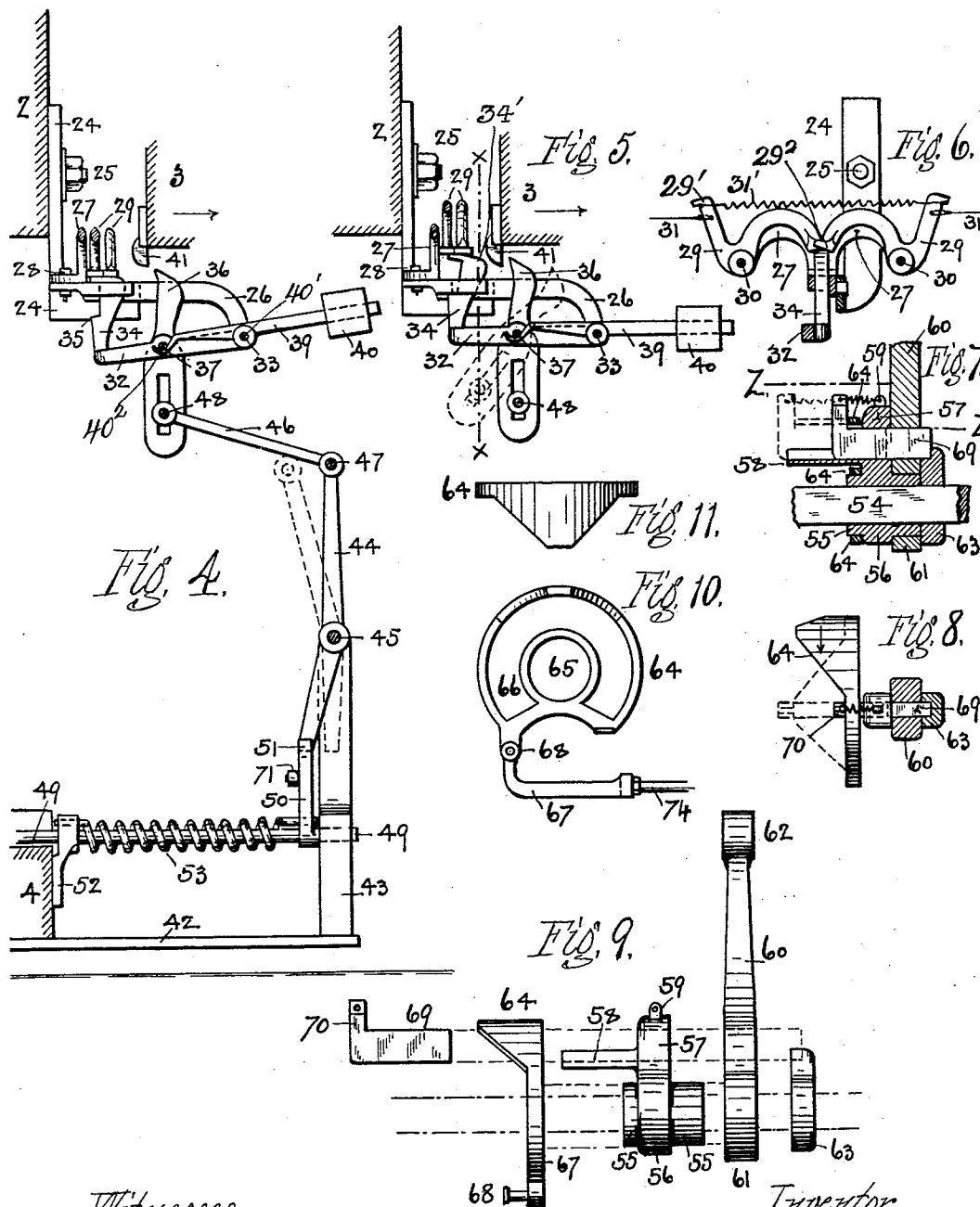
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UNITED STATES PATENT OFFICE.

FRANÇOIS MAXIMILIAN JOSEPH GRENIER, OF PROVIDENCE, RHODE ISLAND.

STOPPING MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 573,648, dated December 22, 1896.

Application filed February 1, 1896. Serial No. 577,671. (No model.)

To all whom it may concern:

Be it known that I, FRANÇOIS MAXIMILIAN JOSEPH GRENIER, of the city and county of Providence, in the State of Rhode Island, have
5 invented a certain new and useful Improvement in Stopping Mechanism for Looms; and I declare the following to be a specification thereof, reference being had to the accompanying drawings.

10 Like numerals indicate like parts.

Figure 1 is a front elevation of my invention and of so much of a loom as is necessary to explain its operation, parts being broken away. Fig. 2 is a top plan of the same as seen
15 when the loom is in proper operative condition. Fig. 3 is a top plan of the breast-beam, lay, shuttles, and swells when the loom is not in proper working condition, and it illustrates how my improved stop mechanism is set in
20 operation. Fig. 4 is a view of my invention in sectional side elevation as seen on line *o o* of Fig. 1 when the loom is in proper working order. Fig. 5 is a side elevation showing the position of the actuating parts of the mechanism when the loom is about to be stopped
25 thereby. Fig. 6 is a front elevation of said parts as seen on line *x x* of Fig. 5. Fig. 7 is a view in side elevation of the sliding key and shoe-shaft and a central longitudinal section of the picker-arm and the hub on which said
30 arm is mounted. Fig. 8 is a top plan of the sliding key and of the cam to operate the same, the picker-arm being shown in cross-section on line *z* of Fig. 7. Fig. 9 is a view in
35 elevation of the several separate parts which are shown as assembled in Fig. 7. Fig. 10 is a side elevation of the cam which operates the sliding key. Fig. 11 is a top plan of said cam.

My invention is a stop mechanism for power-
40 looms for fancy weaving and is adapted to automatically stop the loom whenever, by reason of the improper positions of the shuttles upon the lay, they are liable to be thrown by the picker-sticks into collision with each other
45 upon the lay and thereby to break the warps.

My invention consists of the novel construction and combination of the several parts, as hereinafter specified, and set forth in the claims.

50 In the drawings, 1 is the frame of the loom.
2 is the breast-beam.

3 is the lay, having the usual side bars 3', and 4 and 5 are the front and rear cross-bars.

The shuttle-boxes are shown at 6 and are arranged in vertical rows, (see Fig. 1,) as usual
55 in looms for fancy weaving. The shuttle-boxes are raised and lowered by the common Jacquard mechanism, which is so well known that it is deemed unnecessary to show or describe it here particularly.

60 The shuttle is indicated at 7 and is driven, as usual, by the picker-sticks 8. On each shuttle-box 6 there is the swell or shuttle-binder 9, pivotally mounted upon earpieces
10. The swells are normally pressed inwardly
65 by springs (not shown) in the usual manner.

The picker-sticks 8 are pivotally mounted at the bottom thereof, as seen at 11, and are moved by the swift sticks 12, connected at one end to the picker-stick by a strap or loop 13
70 and at the other end to the picker-arm.

The lay 3 is supported by side bars 3', pivotally mounted at their bottom ends, and is provided with earpieces 15 on the rear thereof. A shaft 16, rotated by a gear 17, which derives
75 power from a gear upon the main shaft of the loom, has the crank-arms 18 18 and link-bars 19 19, extending from said crank-arms to the earpieces 15 on the back of the lay, said link-bars being pivotally connected at their ends 80
80 to the crank-arms and earpieces, as shown.

All the parts thus far described are of the usual construction and operate in the well-known manner.

My improved stop mechanism is as follows: 85
On the back of the breast-beam 2, near the ends thereof, are brackets 20 20, in each of which there is mounted a bell-crank or bent lever 21 upon a suitable pin or pivot. On
90 each lever 21 is a projection 22, and at the end of the long arm of the lever 21 is a finger or rod 23, adjustably mounted by a screw-thread in said lever 21. The finger or rod 23 is so located that the swell of the shuttle-box
6, which is in line with the race of the lay, 95 comes in contact with said finger or rod whenever said swell is forced outwardly by the presence of the shuttle 7 in the shuttle-box. The finger or rod may, if desired, be bent in
100 an inward curve or angle to provide a bearing-surface against the swell of the shuttle-box.

On the back of the breast-beam 2, at the center thereof, is a bracket 24, secured in place by a bolt 25. The bracket 24 has a rearwardly-extending fixed arm or support 26, and on said bracket 24 is also a double curved standard 27, fastened to the bracket by a bolt 28. On each arm of the standard 27 a bent or curved lever-arm 29 is mounted, pivotally, as shown at 30. The outer end of the lever-arm 29 has a flange or lip 29', Fig. 6, and its inner end has an enlargement or foot 29², with a plane surface. Wires 31 31 connect the levers 29 with the projections 22 of levers 21, and a spiral spring 31' of weak tension is stretched from the outer ends of the levers 29 from one to the other, Fig. 6.

At the end of the fixed arm or support 26 a lifting-arm 32 is pivotally mounted, as seen at 33. The lifting-arm 32 extends forward, and at its forward end it has a post 34, having a square or plane end 34' and provided with a shoulder 35. On the arm 32 a latch-piece 36 is pivotally supported on a pin 37, so as to normally hang in a perpendicular position, Fig. 4. The lower part of the latch-piece 36, extending below the pivot 37, is enlarged and has a longitudinal slot. A bar 39, having a weight or block 40, movable and adjustable thereon, at one end is pivotally mounted by a hub 40' on the pivot 33, Fig. 4, upon the rearwardly-extending fixed arm or support 26 of the bracket 24, and its other end is formed into a bent finger 40², which lies under and bears up against the pin 37. Thus the pivot 33 forms the fulcrum for both the weighted arm 39 and the lifting-arm 32.

On the front side of the lay 3 is a projection or catch 41, extending below the bottom edge thereof; but when the loom is in proper working order said catch 41 moves over the top of the latch-piece 36 without touching it, being in a higher plane.

From the bottom of the loom-frame a bar 42 extends inwardly, being properly fastened and supported, and at its inner end is a standard or post 43. At the top of the standard 43 a lever 44, which is slightly bent at its center, is centrally pivoted thereto, as shown at 45. A link-bar 46 is pivotally mounted at 47 to the top of the lever 44 and at its opposite end has a stud 48, which is adjustably mounted in the slot of the latch-piece 36. By reason of the bend in the lever 44 its lower end projects slightly in front of the standard 43 when the upper half of said lever 44 is perpendicular, as in Fig. 4.

A shaft 49 is mounted in the standard 43 and front cross-bar 4 (see Fig. 4) and has fastened thereto at its inner end an arm 50, extending upwardly and having its top end notched or provided with a shoulder, as shown at 51. At its forward end the shaft 49 has a treadle 52, extending to one side, Fig. 1. The notched end 51 of the arm 50 is held in the position shown in Figs. 1 and 4 by the lower end of the lever 44 against the action

of a spiral spring 53, which surrounds the shaft 49 and has its ends bearing, respectively, in said arm 50 and treadle 52.

The shoe-shaft 54, Fig. 7, has a hub 55 fastened thereon. The hub 55 has integral there-with a collar 56 and an arm 57, and the arm 57 has a grooved bracket 58, extending at a right angle at one side, Fig. 9. On the top of the arm 57 is an earpiece 59.

The picker-arm 60 has a collar 61, by which it is loosely mounted on the hub 55, so that the collar 61 abuts the collar 56 of said hub. The picker-arm has an enlarged head 62 at its top, through which is an opening or eye to receive a stud or pin from the swift stick 12.

A collar 63 is fastened on the shoe-shaft 54 by a set-screw (not shown) or in any well-known manner and lies in snug contact with the end of the hub 55 and picker-arm 60, as seen in Figs. 7 and 8. The collar 63 has an extension and a socket therein. (Shown in Figs. 7 and 8.)

A cam 64 has a central opening 65, by which it is mounted on the hub 55. It has the arc-shaped opening 66. (Seen best in Fig. 10.) The shape of its cam edge is illustrated in Figs. 8 and 11. The cam 64 has a stud or pin 68, projecting therefrom, on which a bent extension or arm 67 is pivotally mounted.

A key 69 is movable longitudinally upon the grooved bracket 58 and through an angular opening in the arm 57 of the hub 55, as seen in Figs. 7, 8, and 9. The key 69 has the upward projection 70 and an earpiece on the top of the same. The picker-arm 60 also has an angular aperture, so that the key 69 passes through the opening 66 of the cam 64 and through the openings of the arm 57 and picker-arm 60 and into the socket of the collar 63, as shown in Fig. 7. A spiral spring extends from the earpiece of the projection 70 of the sliding key 69 to the earpiece 59 of the arm 57. The cam edge of the cam 64 bears against the inner edge of the projection 70 of the sliding key 69.

A link bar or rod 71 is pivoted at 72 to the arm 50 at one end and at the other end is pivotally mounted on the stud or pin 68 of the cam 64.

A rod or bar 74 connects the ends of the extension 67 67 from side to side, said extension being pivoted to pins or studs 68 of the cams 64, Fig. 1.

The operation of my improved stop mechanism is as follows: The tension of the spiral spring between the outer ends of the curved levers 29 29 normally overcomes the weight of the counterpoise 40 on the bar 39. As long as there is only one shuttle on the race of the lay, it is not intended that my stop-mechanism shall work to stop the loom. It is true that the swell of whichever shuttle-box the shuttle may be in will be pressed outwardly by the shuttle while in the shuttle-box, and that such outward movement of that swell will press against the finger or rod 23, adjacent

thereto, and so cause the bent lever 21 to turn and to draw its connected wire 31 and thus to raise the foot of one of the curved levers 29; but as at that time there is no shuttle in the shuttle-box at the opposite end of the lay the swell of that shuttle-box is not moved, and as a consequence the foot of the other curved lever 29 is not raised, but remains in its normal position, with a pressure downward, increased by the tension of said spiral spring, which has been drawn by the movement of the curved lever 29 first mentioned. Either one of said levers 29 is sufficient, by the aid of said spiral spring, to keep the post or upright portion 34 of the arm 32 in the position shown in Fig. 4 and to overcome the weight of the counterpoise 40 of the arm 39, which, by its connection with the pivots or pins 33 37, tends to elevate the arm 36 with its connected parts. While only one shuttle is moving on the lay and enters alternately first the shuttle-box on one end of the lay and then the shuttle-box on the other end of the lay (as is the case as long as the loom is working properly) one or the other of the levers 29 alternately will be in forcible downward contact against the top of the upright portion 34 of the arm 36; but whenever there is a shuttle in each of the two shuttle-boxes on the lay in line of the race the loom is not in a proper working condition and should be stopped; otherwise a collision of those two shuttles upon the lay when either one is struck by a picker-stick is inevitable. Such a collision will occasion great damage unless seasonably prevented. It is the purpose of my invention to automatically accomplish that result. Under such conditions as shown in Fig. 3 both swells 9 of the shuttle-boxes 6 at the ends of the lay in line with the race will be pressed outwardly by the shuttles 7 7 in said shuttle-boxes. This outward movement of both the swells 9 9 causes them to press against the finger-rods 23 23 of the two bent levers 21 21, which levers draw the two wires 31 31 and thereby raise the feet of the two curved levers 29 29, bringing them into the position shown in Figs. 5 and 6. The weight 40 being now free to act brings down the arm 39 on which it is supported and elevates the forward end of the arm 32 and its connected upright portion 34. The position of these parts at that time is shown in Fig. 5, where it is seen that the catch 41 of the lay 3, as the lay 3 moves in the direction of the arrow, will strike against the latch 36, which is pivotally hung on the arm 32. The continued movement of the lay 3 in that direction moves the latch-piece 36 from the position shown in solid lines in Fig. 5 to the position shown in dotted lines in said figure. This movement of the latch-piece 36 draws the link or bar 46 and so moves the lever 44 from the position shown in solid lines in Fig. 4 to the position shown in dotted lines in said figure.

The lower end of the lever 44 is thus drawn backward, as shown in dotted lines in Fig. 4, and out of its engagement with the notched end 51 of the arm 50 of the shaft 49. Said shaft 49, being now free to act, turns by the force of the spiral spring 53, surrounding it. The turning of the shaft 49 so caused carries the arm 50 from the position shown in solid lines in Fig. 1 to the position shown in dotted lines in said figure, and that movement is communicated from the arm 50 to the cam 64 and partially turns said cam on the hub 55 of the picker-arm 60. This partial rotation of the cam 64 draws out the sliding key 69 from the position shown in solid lines in Fig. 7 to the position shown in dotted lines in said figure, or, in other words, out of its locking position in the collar 63, picker-arm 60, and hub-arm 57. The picker-arm 60, being thus disconnected from the shoe-shaft 54, can no longer act to draw the swift stick and so to throw the picker-stick. This movement of the cam 64 is communicated by the rod 74 to the cam 64 on the opposite side of the loom, as indicated by dotted lines in Fig. 1. Therefore both picker-arms are disconnected from their respective shoe-shafts at the same time and the pick motion is stopped, although the lay 3 still continues to beat or vibrate. As the picker-sticks do not operate, the shuttles are not thrown and no damage is done. The weaver then removes the shuttle which is out of its proper position and places it where it should properly be, and by simply depressing the treadle 52 returns the stop mechanism to its first position. This return movement is as follows: As soon as the shuttle which is out of its proper place is removed, then the swell on that side returns automatically to its normal position by its spring, and the bent lever 21 also returns to its normal position, Fig. 2, by the force of the spiral spring on the curved levers 29 29. The curved lever 29 on that side is now in a position with its foot pressing downward on the upright portion 34 of the arm 32, and so the weight 40 is raised to the position again shown in Fig. 4. The latch-piece 36, by this movement of the arm 32, is carried down out of the path of the catch 41 of the lay 3. The downward movement of the latch-piece 36 causes, by the link 46, the lever 44 to move from its position shown by dotted lines in Fig. 4 to the position shown in solid lines in said figure. In the meanwhile the downward pressure on the treadle 52, given by the weaver's foot, turns back the shaft 49, brings the arm 50 into engagement with the lever 44, draws the rods 71 74, and causes the cams 64 64 to move back to their former position. The sliding keys 69 then being free to act are drawn by their spiral springs back into the locking position, and the picker-arms 60 being now connected with the respective shoe-shafts again operate the picker-sticks by the swift sticks, as before.

A characteristic feature of my invention,

distinguishing it from others of the same class, is that the fingers 23 project from bent levers 21, mounted on the breast-beam, instead of being mounted on protector-rods on the lay, as hitherto. In the old construction the stop mechanism (or a considerable part of it) was carried as a load upon the lay and was operated by the shuttle-binders during the whole movement of the lay toward the breast-beam against the pressure of spiral or other springs on said protector-rods. The consequence was that the lay was moved less rapidly because of its increased weight, and the loom, because of said attachment, made a less number of picks a minute with a given power, while if the quantity of work must be maintained a greater amount of power was required. Moreover, the movement of the lay and the jar and strain upon it in beating was liable to loosen the attachment of the stop mechanism screwed upon it and also to injure or destroy the nice adjustment of the device. By my improved construction the lay is not loaded with the stop mechanism, (which, as already described, is supported by the breast-beam and a suitable standard from the loom-frame,) the stop mechanism is relieved from jar and strain, being fastened to fixed rigid supports, and so is not liable to become loose or out of order, and the fingers 23 are only instantaneously touched at the very end of the movement of the lay to the beam, and therefore no additional power is required to operate my device nor is the capacity of the loom in the least impaired.

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

1. In a stop mechanism for looms, the combination with shoe-shafts, picker-sticks, swift sticks, a breast-beam and a lay movable to and from the breast-beam and having shuttle-boxes at its ends provided with shuttle-binders, of bent levers pivotally mounted on the breast-beam, each having a finger extending upward and adapted to be moved by the adjacent shuttle-binder, when the latter is pressed outwardly, a bracket secured at or near the center of the breast-beam and having thereon two pivotally-mounted and spring-actuated levers, a wire connecting each of said central levers, respectively, with the nearer of the bent levers first aforesaid, fixed hubs on said shoe-shafts, picker-arms mounted loosely on said hubs and provided with means to lock said picker-arms to said hubs, respectively, and means intermediate between said central levers and picker-arms, adapted normally to receive the pressure of said central levers and to be restrained from action by the pressure of either or both of said central levers, but to operate, when relieved from the pressure of both said levers, said locking devices and to loosen the picker-arms from their engagement with said hubs, substantially as shown.

2. In a loom having a breast-beam and lay,

shoe-shafts, picker-sticks and swift sticks, shuttle-boxes and shuttle-binders the combination of a hub fastened upon each shoe-shaft and provided with a slotted arm and a bracket, a slotted collar fastened upon each shoe-shaft, a slotted picker-arm loosely mounted on each of said hubs, a cam rotatably mounted on each hub, a sliding key movable on the bracket of each hub into and out of the slots of said hub-arm, collar and picker-arm, respectively, by the revolution of said cams, a cross-shaft mounted in suitable supports and surrounded by a spiral spring adapted to turn the same, an arm mounted in said cross-shaft, a rod connection between the arm last aforesaid and said cams, and a holding device engageable with said arm of the cross-shaft and arranged to be set in operation by the simultaneous outward movement of the shuttle-binders in two shuttle-boxes on the race of the lay and means intermediate between said shuttle-binders and holding device, substantially as described.

3. The improved stop mechanism for looms herein described, consisting of the breast-beam 2 the bent levers 21, 21, mounted on the breast-beam near the ends thereof and having each a finger-rod 23, the lay 3 and shuttle-boxes 6 on said lay the shuttle-binders 9, mounted on said shuttle-boxes 6, the catch 41, centrally projecting from said lay, the central bracket 24, on the breast-beam, the lever-support 27, upon said bracket, the curved levers 29, 29, mounted on said support 27, provided with feet at their inner ends, the spiral spring connecting the outer ends of the levers 29, 29, wires 31, 31, connecting the bent levers 21, to the outer ends of the levers 29, respectively, the bracket 26 the arm 32, pivoted at the rear end of said bracket, and having an upright post 34, whose end abuts the feet of the levers 29, 29, an arm 39, having a weight 40 and connected with the arm 32, a swinging latch 36, pivoted to the arm 32 and having its portion below its pivot slotted, the standard 43 the lever 44, mounted upon said standard, a link 46, pivotally connected with the top of the lever 44, and having at its other end a stud adjustably mounted in the slot of the latch 36, a shaft 49, mounted in the standard 43 and in the frame of the loom and actuated by a spiral spring 53, which surrounds it, an arm 50, engageable with the lower end of the lever 44, and extending from the shaft 49, shoe-shafts 54, a hub 55, fastened upon each shaft 54 and having a slotted arm 57, from which extends a bracket 58, a slotted collar 63, fastened to each shaft 54, a rotatable cam 64, loosely mounted on each hub 55, and having an extension 67, a beveled cam-face as shown, mounted on a pivot 68 of each cam 64 and a rod 74 connecting said extensions, a picker-arm 60, loosely mounted on each hub 55, and having a slot, a swift stick movable by each picker-arm, a picker-stick movable by each swift stick, a sliding key 69,

movable on each bracket 58 and engageable with the slots of the hub-arm 57, the collar 63, and picker-arm 60, but which key is detachable therefrom by the sliding contact of the beveled face of said rotatable cam 64, a spring connecting said key 69 and arm 57 and a rod connection between each cam 64, and

said arm 50 of the shaft 49, all arranged and operating substantially as shown and for the purpose specified.

FRANÇOIS MAXIMILIAN JOSEPH GRENIER.

Witnesses:

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