

(No Model.)

3 Sheets—Sheet 1.

F. M. J. GRENIER.
STOP MECHANISM FOR LOOMS,

No. 593,205.

Patented Nov. 9, 1897.

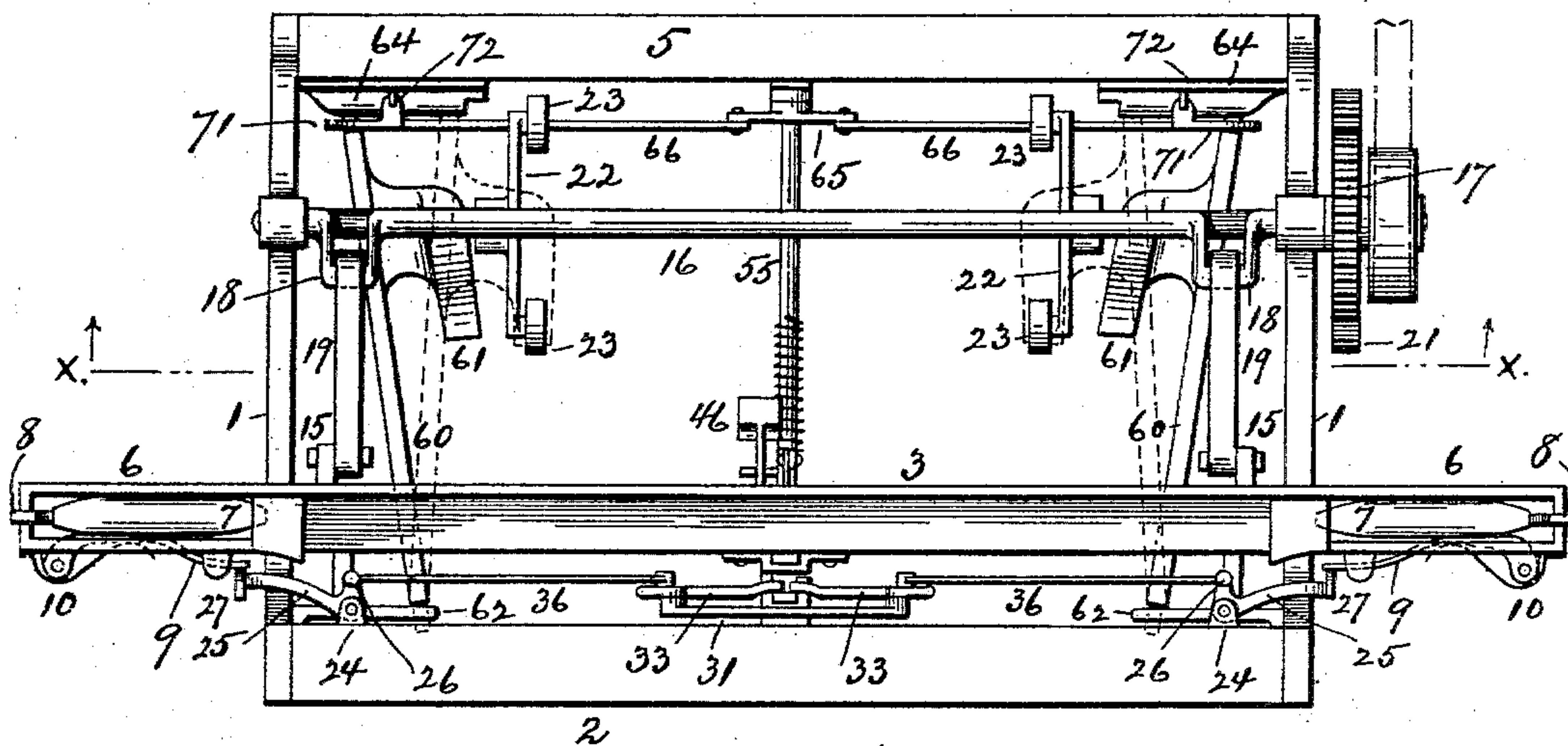


FIG. 1.

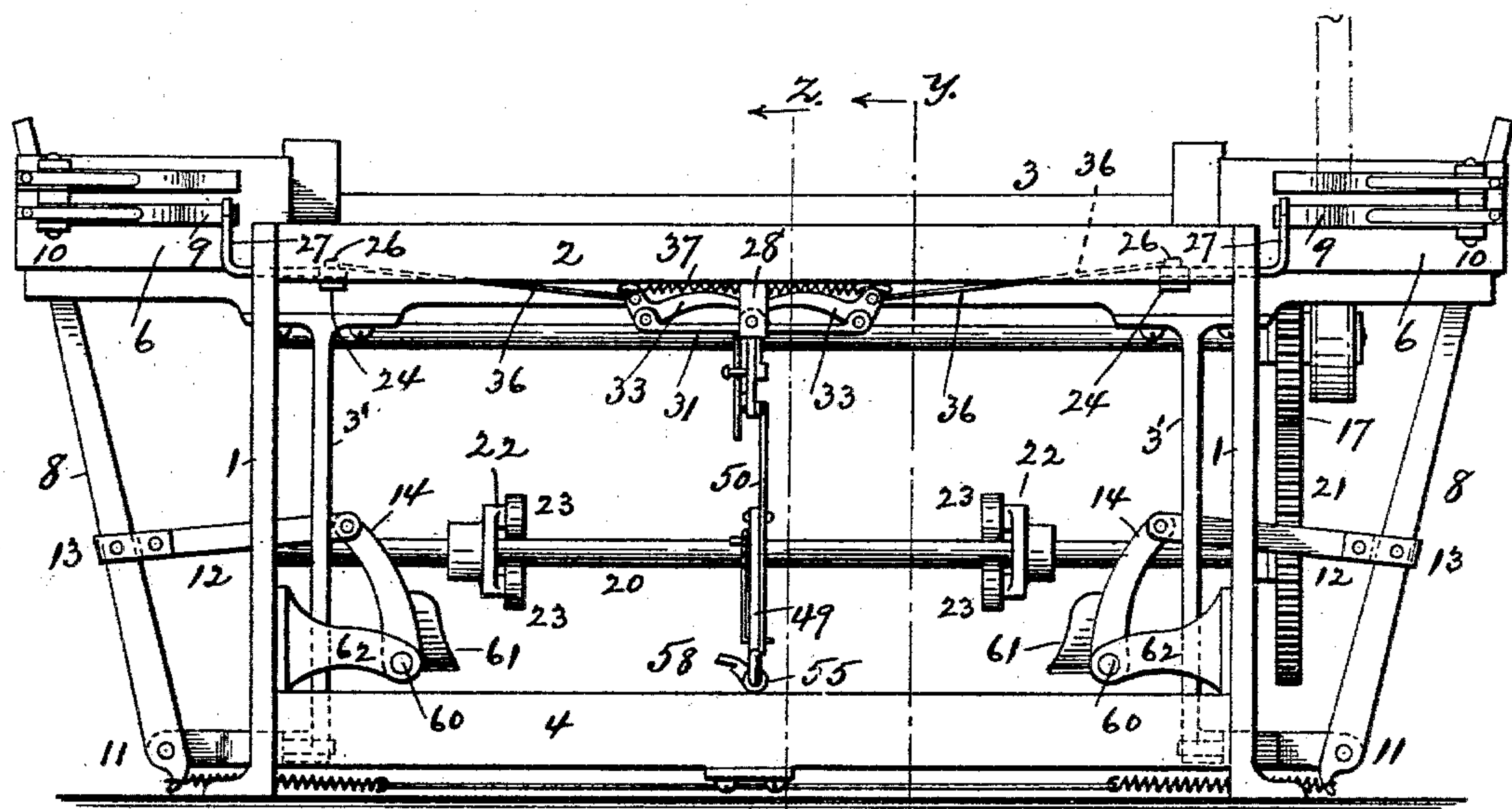


FIG. 2.

Witnesses.

Inventor.

Charles H. Harrigan *Francis Maximilian Joseph Grenier*
Annie E. Perce *Ezra Warren R. Perce*
Atty

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FIG. 3.

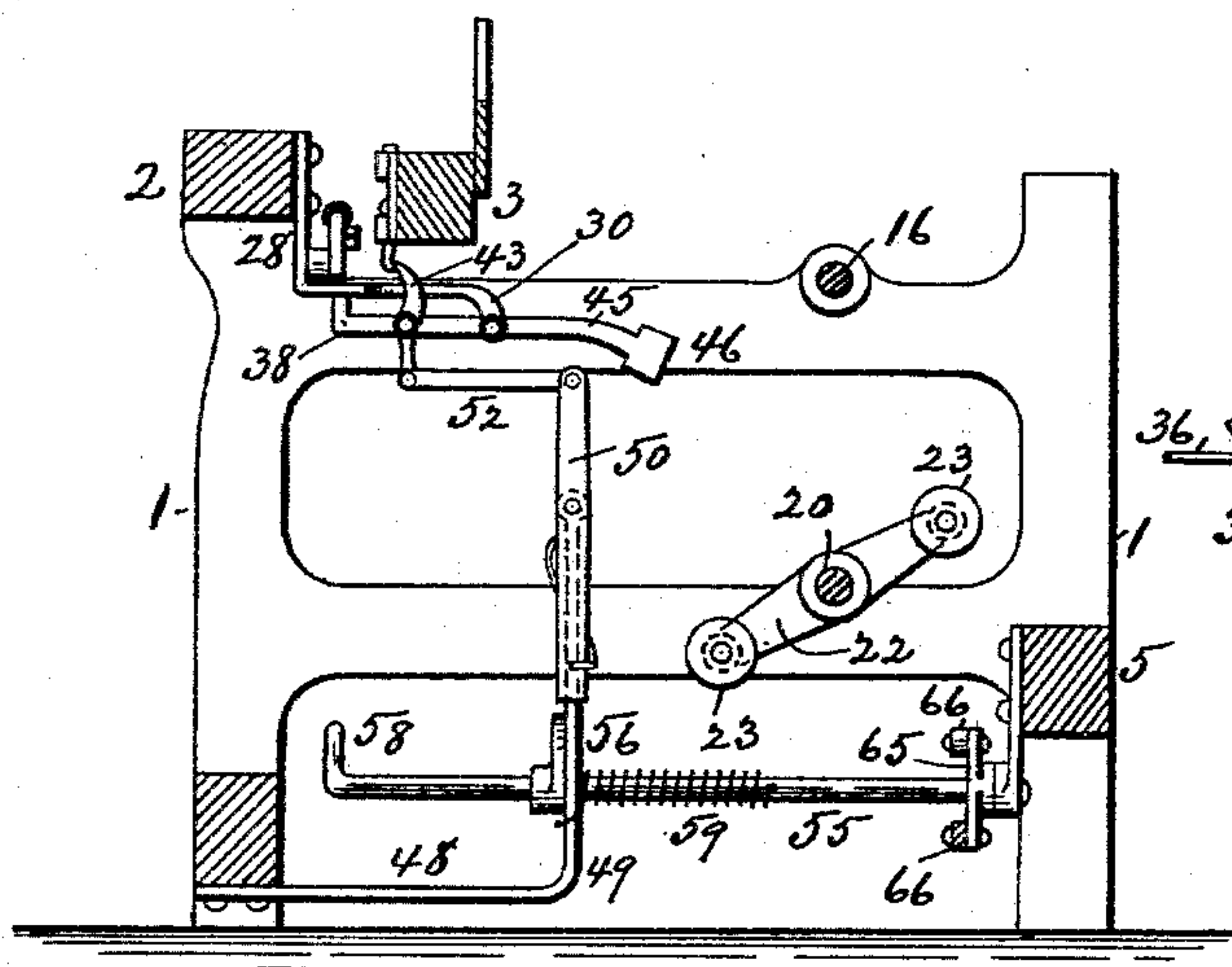
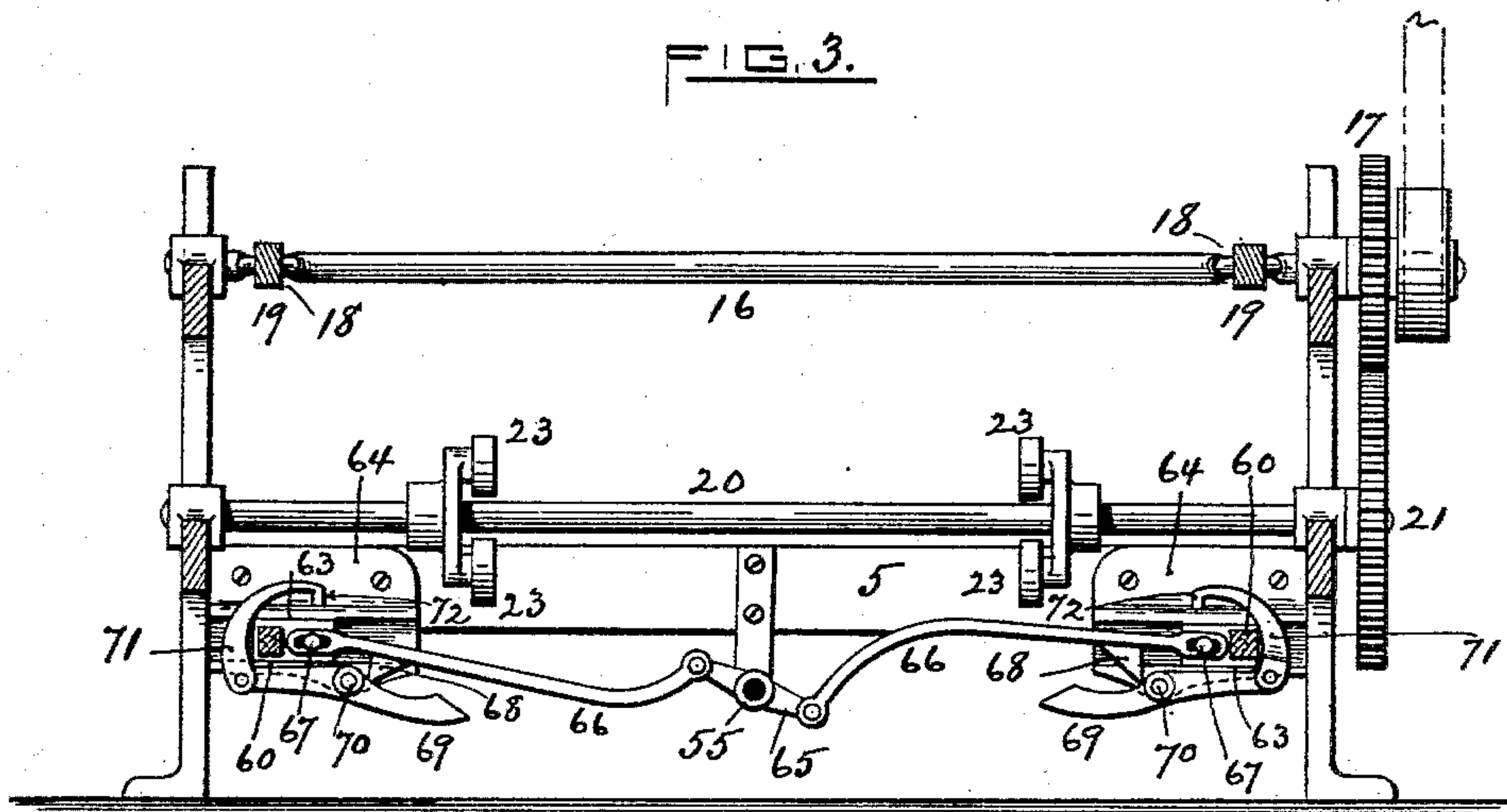


FIG. 4.

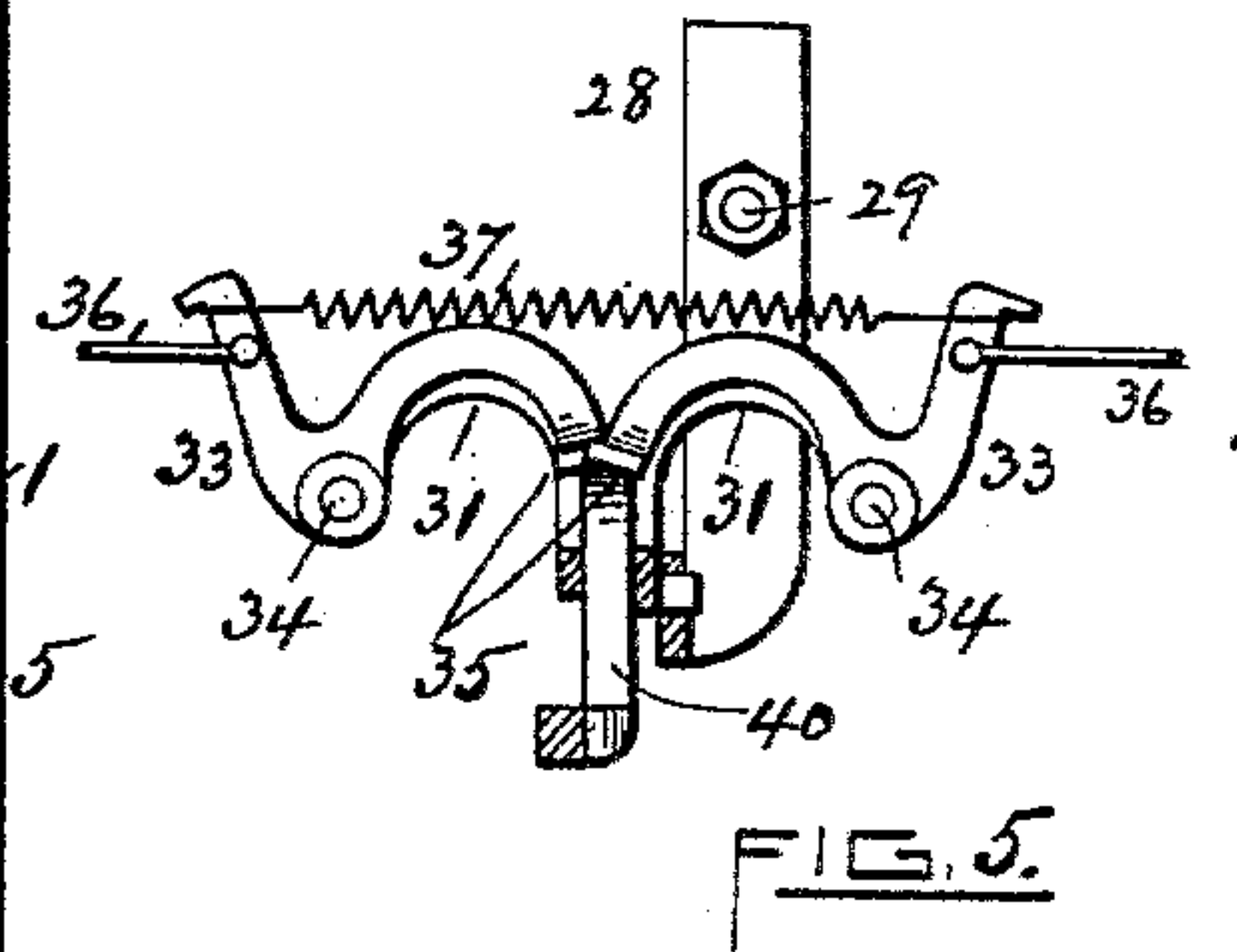


FIG. 5.

Inventor.

Charles T. Hamigau.
Anne E. Perce.

Francis Maximilian Joseph Grimes
By Warren R. Perce
D. Atty.

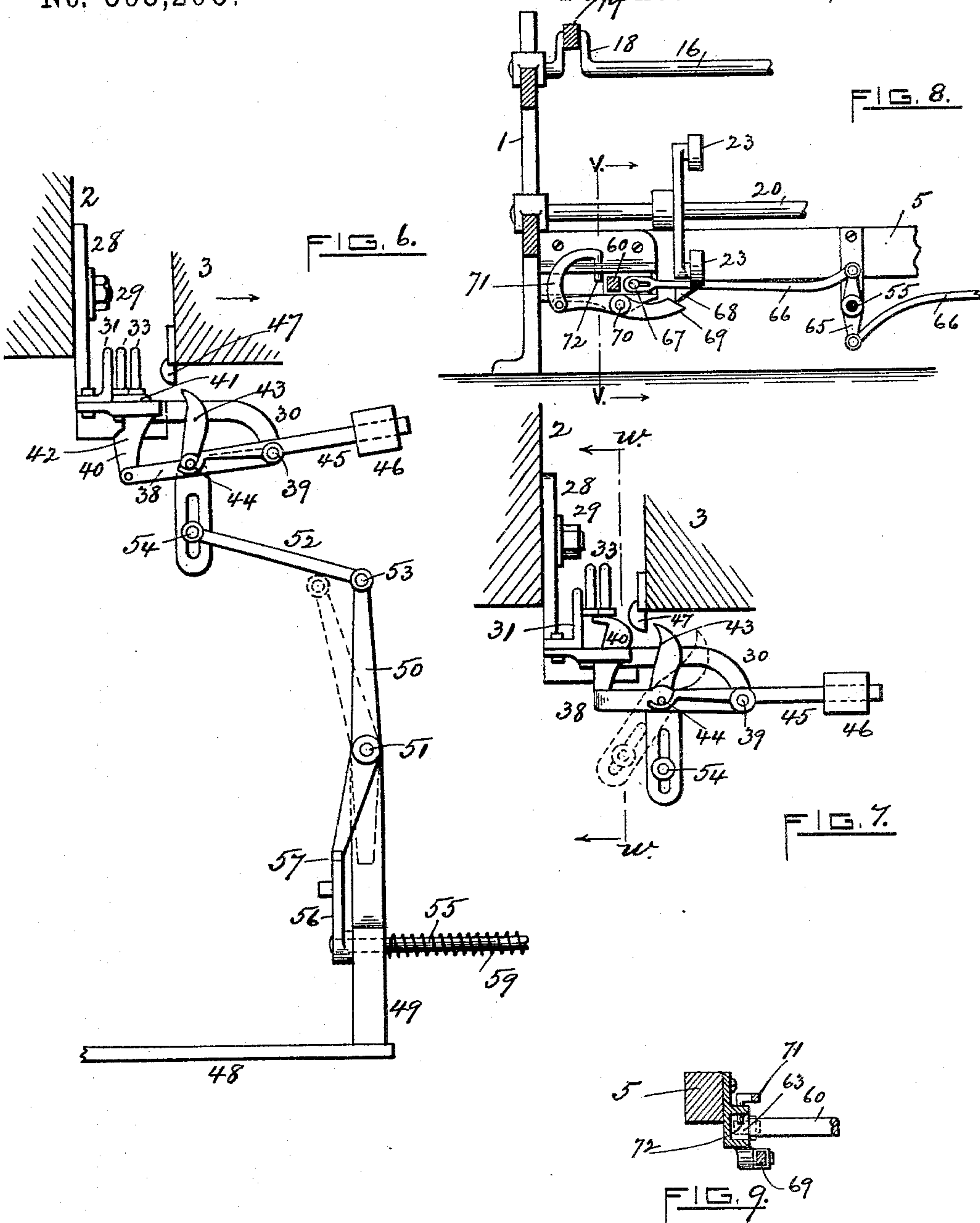
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Charles T. Hamigan Franois Maximilian Joseph Grenier
Annie E. Perce by Warren R. Perce
Atty.

Inventor.

UNITED STATES PATENT OFFICE.

FRANCOIS MAXIMILIEN JOSEPH GRENIER, OF PROVIDENCE, RHODE ISLAND.

STOP MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 593,205, dated November 9, 1897.

Application filed June 22, 1896. Serial No. 596,498. (No model.)

To all whom it may concern:

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

Like numerals indicate like parts.

Figure 1 is a top plan of my invention and of so much of a loom as is necessary to explain its operation. Fig. 2 is a front elevation of the same. Fig. 3 is a view in elevation as seen on line *xx* of Fig. 1. Fig. 4 is a view in elevation as seen on line *yy* of Fig. 2. Fig. 5 is a front elevation of the central levers and connected parts as seen on line *ww* of Fig. 7. Fig. 6 is a view in side elevation of the stop mechanism mounted on the breast-beam, the catch on the lay, the spring-actuated shaft, and the levers which release said shaft for operation when said stop mechanism is in working position. In said figure the stop mechanism is in the position when the loom is working properly. Fig. 7 shows in side elevation said stop mechanism when the loom is improperly working and should be stopped. Fig. 8 is the same as a half of Fig. 3, with the parts therein shown in position when the loom is working properly. Fig. 9 is a sectional view on line *vv* of Fig. 8.

My invention is a stop mechanism for power-loom 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 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 specifically set forth in the claims.

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

3 is the lay, and 4 and 5 are the front and rear cross-bars.

The shuttle-boxes are shown at 6 and are arranged in vertical rows, Fig. 2, as usual in looms for fancy weaving. The shuttle-boxes are raised and lowered by the common jac-

quard mechanism, which is so well known that it is deemed unnecessary to show or describe it here particularly.

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 ear-pieces 10. The swells are normally pressed inwardly 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-sticks by loops or straps 13 and at the other end to the picker-arms 14.

The lay 3 is supported by side bars 3', pivotally mounted at their bottom ends and is provided with ear-pieces 15 on the rear thereof. A shaft 16, rotated by a gear 17, which derives 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 ear-pieces 15 on the back of the lay, said link-bars being pivotally connected at their ends to the crank-arms and ear-pieces, as shown.

The shaft 20 is rotated by the gear 21, which engages with the gear 17. Said shaft 20 has the usual arms 22, with the rollers 23 23 at the ends thereof.

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

My improved mechanism is as follows: On the back of the breast-beam 2, near the ends thereof, are brackets 24 24, in each of which there is mounted a bell-crank or bent lever 25 upon a suitable pin or pivot. On each lever 25 is a projection 26 and at the end of the long arm of the lever 25 is a finger or rod 27. The finger or rod 27 is so located that the swell of the shuttle-box 6, which is in line with the race of the lay, comes in contact with said finger or rod whenever said swell is forced outwardly by the pressure of the shuttle 7 in the shuttle-box.

On the back of the breast-beam 2, at the center thereof, is a bracket 28, secured in place by a bolt 29. The bracket 28 has a rearwardly-extending fixed arm or support 30, and on said bracket 28 is also a fixed arm 31, fastened to the bracket by a bolt. On each end of the fixed arm 31 a bent or curved

lever-arm 33 is mounted pivotally, as shown at 34. The outer end of the lever-arm 33 has a flange or lip, Fig. 5, and its inner end has an enlargement or foot 35 with a plane surface. Wires 36 36 connect the levers 33 with the levers 25 and a spiral spring 37 is stretched from the outer ends of the levers 33 from one to the other, Fig. 5.

At the end of the fixed arm or support 30 a lifting-arm 38 is pivotally mounted, as seen at 39. The lifting-arm 38 extends forward, and at its forward end it has a post 40, having a square or plane end 41 and is provided with a shoulder 42. On the arm 38 a latch-piece 43 is pivotally supported on a pin 44, so as to normally hang in a perpendicular position, Fig. 6. The lower part of the latch-piece 43, extending below the pivot 44, is enlarged and has a longitudinal slot. A bar 45, having a weight or block 46 movable and adjustable thereon, at one end is pivotally mounted by a hub on the pivot 39, Fig. 6, upon the rearwardly-extending fixed arm or support 30 and at its other end is formed into a bent finger which lies under and bears up against the pin 44. Thus the pivot 39 forms the fulcrum both for the weighted arm 45 and the lifting-arm 38.

On the front side of the lay 3 is a projection or catch 47, extending below the bottom edge thereof, but when the loom is in proper working order said catch 47 moves over the top of the latch-piece 43 without touching it, being in a higher plane.

From the bottom of the loom-frame, Fig. 6, a bar 48 extends inwardly, being properly fastened and supported, and at its inner end is a standard or post 49. At the top of the standard 49 a lever 50, which is slightly bent at its center, is centrally pivoted thereto, as shown at 51. A link-bar 52 is pivotally mounted at 53 to the top of the lever 50 and at its opposite end has a stud 54, which is adjustably mounted in the slot of the latch-piece 43. By reason of the bend in the lever 50 its lower end projects slightly in front of the standard 49 when the upper half of said lever 50 is perpendicular, as in Fig. 6.

A shaft 55 is mounted in the standard 49 and in a bracket of the rear cross-beam 5, Fig. 4, and has fastened thereto, at its inner end, an arm 56, extending upwardly and having its top end notched or provided with a shoulder, as shown at 57. At its forward end the shaft 55 has a treadle 58 extending to one side, Figs. 2 and 7. The notched end 57 of the arm 56 is held in the position shown in Figs. 2 and 6 by the lower end of the lever 50 against the action of a spiral spring 59, which surrounds the shaft 55 and has its ends bearing, respectively, in said arm 56 and shaft 55.

On each side of the loom is the shoe-shaft 60, having the usual shoe or cam 61. The shoe-shaft 60 is loosely supported at its front end by a pintle which enters an enlarged hole in the bracket 62. The rear end of the shoe-shaft 60 is loosely mounted in a sliding block

63, which is movable horizontally back and forth in ways on a grooved support 64. The shaft 55 has a cross-arm 65, and rods 66, pivotally mounted at their inner ends on the arm 65, connect said arm 65 to the sliding blocks 63 63, respectively, having their outer ends mounted by elongated slots, Fig. 3, upon pins 67, projecting from said sliding blocks 63. Each rod 66 has a triangular-shaped cam 68 on its lower edge near its outer end.

Upon each grooved support 64 an arm 69, having a beveled end, Fig. 3, is pivotally mounted, as seen at 70. A bent arm 71 at its lower end is pivotally connected with the arm 69 and at its upper end is provided with a locking-pin 72, which passes through a hole in said grooved support 64 at a point outside of the outer limit of the movement of the sliding block 63 therein, Figs. 8 and 9; but when the parts of the device are in the position shown in Figs. 1 and 3 the inner end of said pin 72 is upon the upper edge of the block 63.

The operation of my improved stop mechanism is as follows: The tension of the spiral spring 37 between the upper ends of the central levers 33 33 normally overcomes the weight of the block or counterpoise 46 on the bar 45. 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 27 adjacent thereto and so cause the bent lever 25 to turn and to draw its connected wire 36, and thus to raise the foot of one of the central levers 33; 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 central lever 33 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 central lever 33 first mentioned. Either one of said levers 33 is sufficient, by the aid of said spiral spring, to keep the post 40 of the lifting-arm 38 in the position shown in Fig. 6 and to overcome the weight of the counterpoise 46 of the arm 45, which by its connection with the pivots or pins 39 44 tends to elevate the latch-arm 43 with its connected parts. While only one shuttle at a time 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 33 alternately will be in forcible downward contact against the top of the post 40 of the lifting-arm 38; 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 proper working condition and should be stopped; otherwise a

collision of those two shuttles upon the race of the lay is inevitable when either of them is struck by a picker-stick. Such a collision will occasion great damage unless reasonably prevented. It is the purpose of my invention to automatically accomplish that result. Under such conditions, as shown in Fig. 1, 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 fingers or rods 27 27 of the two bent levers 25 25, which levers draw the two wires 36 36 and thereby raise the feet of the two central levers 33 33, bringing them into the position shown in Figs. 1 and 7. The weight 46, being now free to act, brings down the arm 45, on which it is supported, and elevates the forward end of the lifting-arm 38 and its connected upright portion 40. The position of these parts at that time is shown in Fig. 7, where it is seen that the catch 47 of the lay 3, as the lay 3 moves in the direction of the arrow in Fig. 6, will strike against the latch 43, which is pivotally hung on the arm 38. The continued movement of the lay 3 in that direction moves the latch-piece 43 from the position shown in Fig. 7 in solid lines to the position shown in dotted lines in said figure. This movement of the latch-piece 43 draws the link or bar 52, and so moves the lever 50 from the position shown in solid lines in Fig. 6 to the position shown in dotted lines in said figure. The lower end of the lever 50 is thus drawn backward, as shown in dotted lines in Fig. 6, and out of its engagement with the notched end 57 of the arm 56 of the shaft 55. Said shaft 55, being now free to act, turns by force of the spiral spring 59, surrounding it. The turning of the shaft 55 so caused carries the cross-arm 65 from the position shown in Fig. 8 to the position shown in Fig. 3, and this movement results in an outward movement of the rods 66. The cams 68 on the rods 66, striking against the beveled ends of the arms 69, elevate the outer ends of said arms 69, and thereby lift the curved arms 71 and their pins 72 out of the holes in the supports 64, and at the same time the outward movement of said rods 66 66, continuing, pushes the sliding blocks 63 63 along the ways or grooves of the supports 64 in an outward direction. As the shoe-shafts 60 60 at their rear ends have their bearings in said sliding blocks 63 63 they are brought by said movement of the blocks from the position shown in dotted lines in Fig. 1, which is their position when the loom is working properly, (where it is seen that the cams 61 are in the line of travel of the arms 22 and their rollers 23,) into the position shown in Figs. 1 and 2, where it is seen that the cams 61 are out of the line of the travel of the arms 22 and their rollers 23. Consequently the shoe-shafts 60 are no longer turned and the picker-arms and picker-sticks are not actuated thereby. When the picker

motion is thus stopped, the shuttles cannot be thrown as usual and the weaving ceases. The weaver then removes from the lay the shuttle, which is improperly there, and the loom is set in operation by pressing with the foot the treadle 58. This causes the shaft 55 to turn back and carries the cross-arm 65, so that it draws inwardly the two rods 66. Said rods move the sliding blocks 63 back to their former position and the shoe-shafts 60 are again brought into place. When the sliding blocks 63 have reached the limit of their inward travel, the pin 72 of the curved arm 71 falls by its gravity into locking position, as before. At the same time the removal of one of the shuttles from the lay, as above stated, causes the swell 9 on that side to return automatically to its former position by the action of its spring. The bent lever 25 on that side also resumes its normal position by the force of the spiral spring 36. The central lever 33 on that side is then pressing downward with its foot upon the top of the post 40 of the arm 38, and so the weight 46 is raised and the arm 38 depressed. This lowering of the arm 38 carries the latch 43 to the position shown in Fig. 6 out of the path of the catch 47 of the lay 3. The downward movement of the latch-piece 43 pushes the link-bar 52 to the rear, and so moves the lever 50 from the position shown in dotted lines in Fig. 6 to that shown in the solid lines in said figure, and the lower end of the lever 50 is then engageable with the notched end 57 of the arm 56 of the shaft 55, which shaft has, during these movements, been held by the weaver's foot in such position as to allow said engagement of the lever 50 with the arm 56, and when this engagement has been effected the pressure on the treadle 58 is released and the parts are held in engagement by the force of the spiral spring 59. The loom is then in proper condition to resume its operation.

The curve of the levers 33 may be long, as in Fig. 2, or short, as in Fig. 5, as may be convenient, but the mechanical principle is the same in either case.

In Fig. 4 I show the lever 45 as curved at its end, with a fixed weight 46 thereon; but in Fig. 6 the weight 46 is shown as adjustable on the lever 45, in which construction the lever 45 should be straight.

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

1. In a loom having a breast-beam and lay, picker-sticks, picker-arms, swift-sticks, shuttle-boxes and shuttle-binders, the combination of a shaft rotatable by power and provided with cross-arms having rollers at the ends thereof, shoe-shafts having cam-shoes and loosely mounted at their front ends, sliding blocks movable in ways and adapted to support the rear ends of said shoe-shafts, a cross-shaft mounted in suitable supports and surrounded by a spiral spring adapted to turn the same, an arm upon said cross-shaft, a rod connection between the arm last aforesaid

and said sliding blocks and a holding device engageable with said cross-shaft and arranged to be set in operation by the simultaneous outward movement of the shuttle-binders in two opposite shuttle-boxes on the race of the lay, and means intermediate between said shuttle-binders and holding device, substantially as described.

2. The improved stop mechanism for looms herein described, consisting of the breast-beam 2, the bent levers 25, 25, mounted on the breast-beam near the ends thereof and having each a finger-rod 27, the lay 3 and the shuttle-boxes 6 on the lay, the shuttle-binders 9 mounted on said shuttle-boxes, the catch 47 centrally projecting from the lay, the central bracket 28 on the breast-beam, the lever-support 31 upon said bracket, the levers 33, 33, mounted on said support 31, provided with feet at their inner ends, the spiral spring 37 connecting the outer ends of the levers 33, 33, wires 36, 36, connecting the bent levers 25 to the outer ends of the central levers 33, respectively, the bracket 30, the arm 38 pivoted at the rear end of said bracket and having an upright post 40, whose upper end abuts the feet of the central levers 33, 33, an arm 45 having a weight 46 and connected with the arm 38, a swinging latch 43 pivoted to the arm 38 and having its portion below said pivot slotted, the standard 49, the lever 50 mounted

on the standard 49, the link 52, pivotally connected at one end with the top of the lever 50 and having at its other end a stud adjustably mounted in the slot of the latch 43, a shaft 55 mounted in the standard 49 and in the frame of the loom and surrounded by a spiral spring 59, an arm 56 on the shaft 55 and engageable with the lower end of the lever 50, grooved supports 64, 64, suitably mounted, sliding blocks 63, 63, movable in the supports 64, 64, shoe-shafts 60, 60 having cam-shoes 61, 61 and loosely mounted at their front ends in suitable bearings and loosely mounted at their rear ends in said sliding blocks 63, 63, a cross-arm 65 on said shaft 55, the rods 66, 66, pivotally connected at their inner ends to said cross-arm 65 and at their outer ends with said sliding blocks 63, 63, respectively, and provided each with a projecting cam edge 68, an arm 69 pivotally mounted on said supports 64, 64, and each having a beveled end adapted to receive the pressure of the cam 68, a curved arm 71 pivotally connected with each arm 69 and having a pin 72, passing into a hole in the supports 64, all arranged and operating substantially as shown and for the purpose specified.

FRANCOIS MAXIMILIEN JOSEPH GRENIER.

Witnesses:

WARREN R. PERCE,
ANNIE E. PERCE.