No. 730,945. PATENTED JUNE 16, 1903.

J. M. MERROW.

SEWING MACHINE FEED.

APPLICATION FILED FEB. 14, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

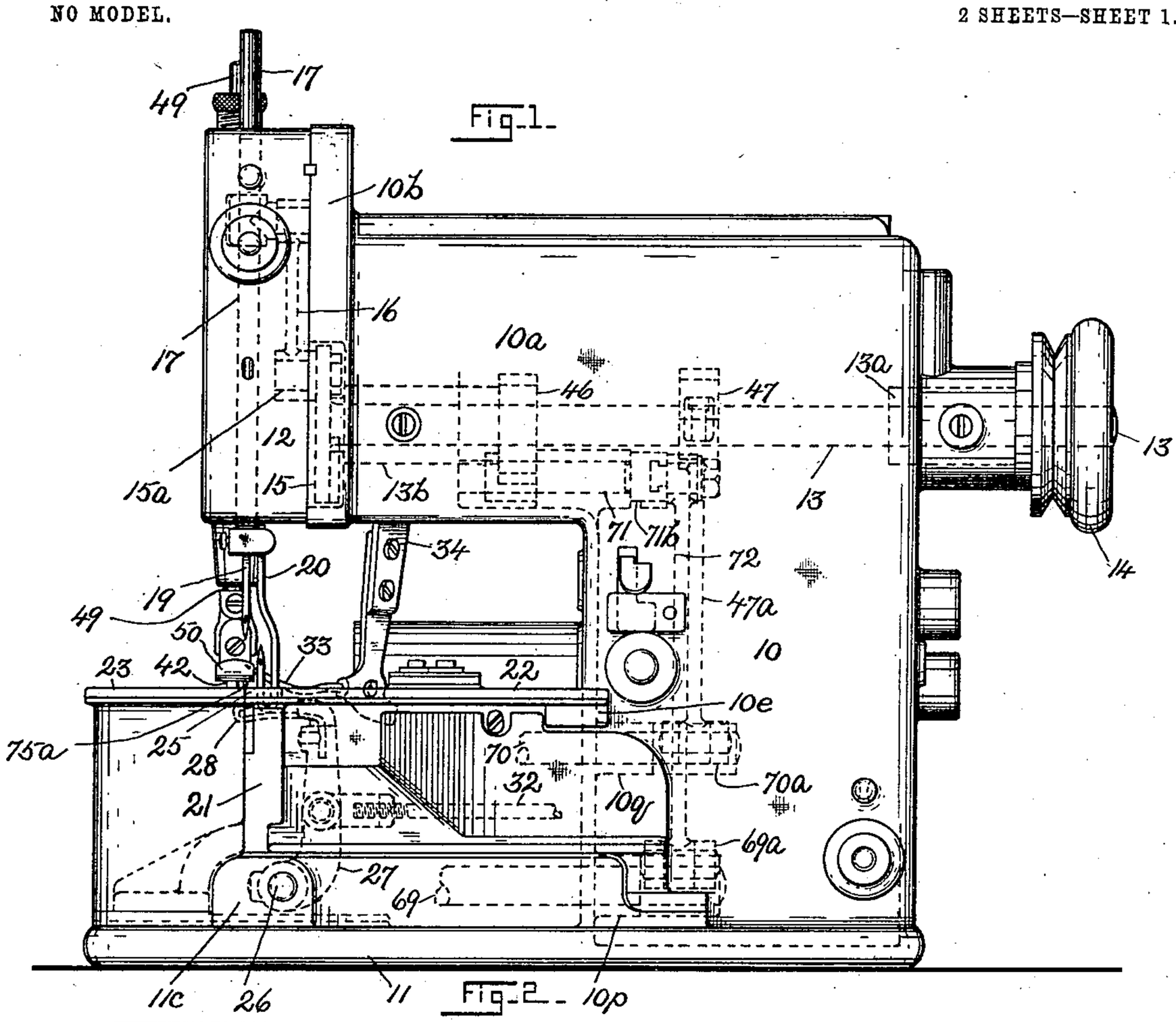
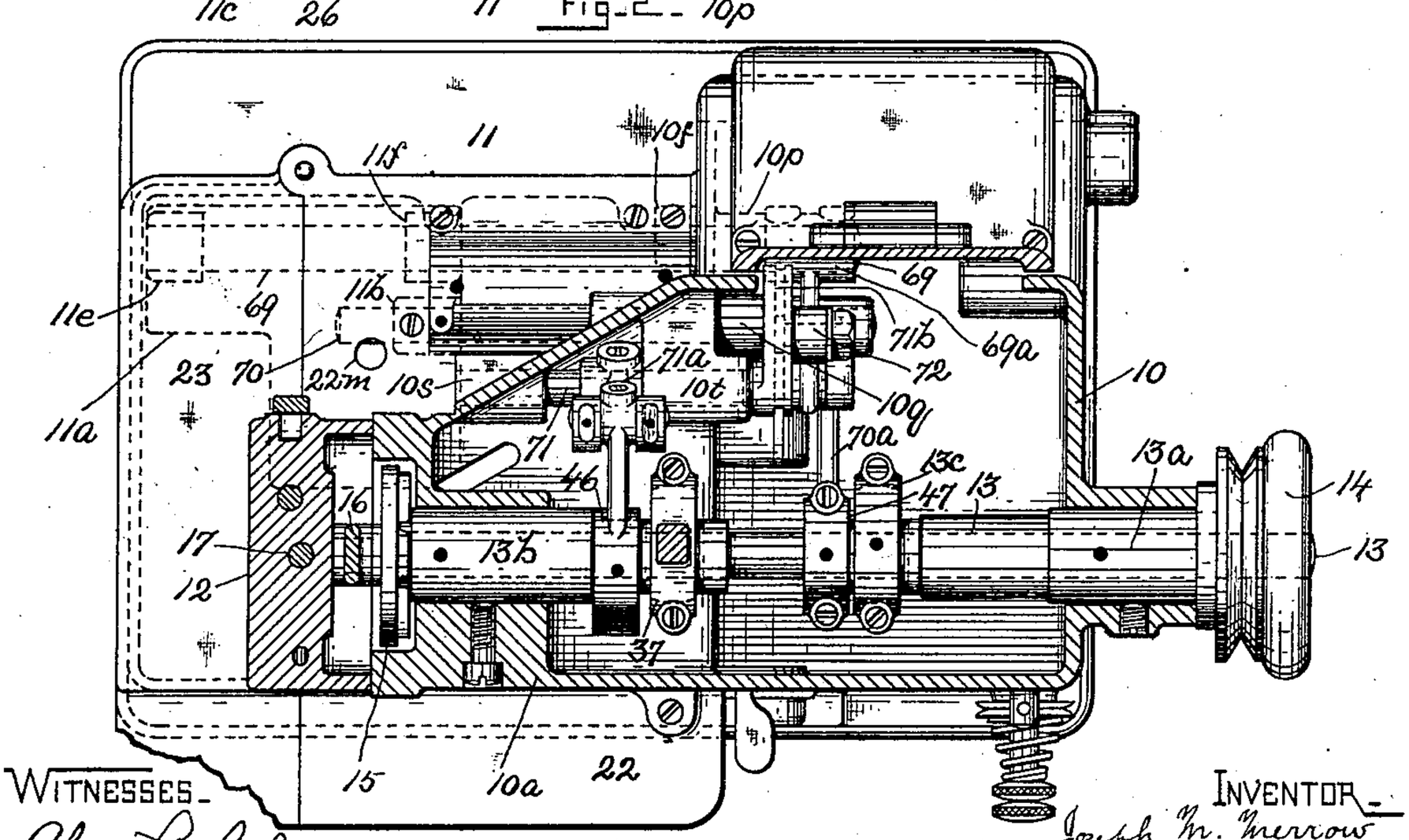


Fig. 2.



WITNESSES.

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 3.

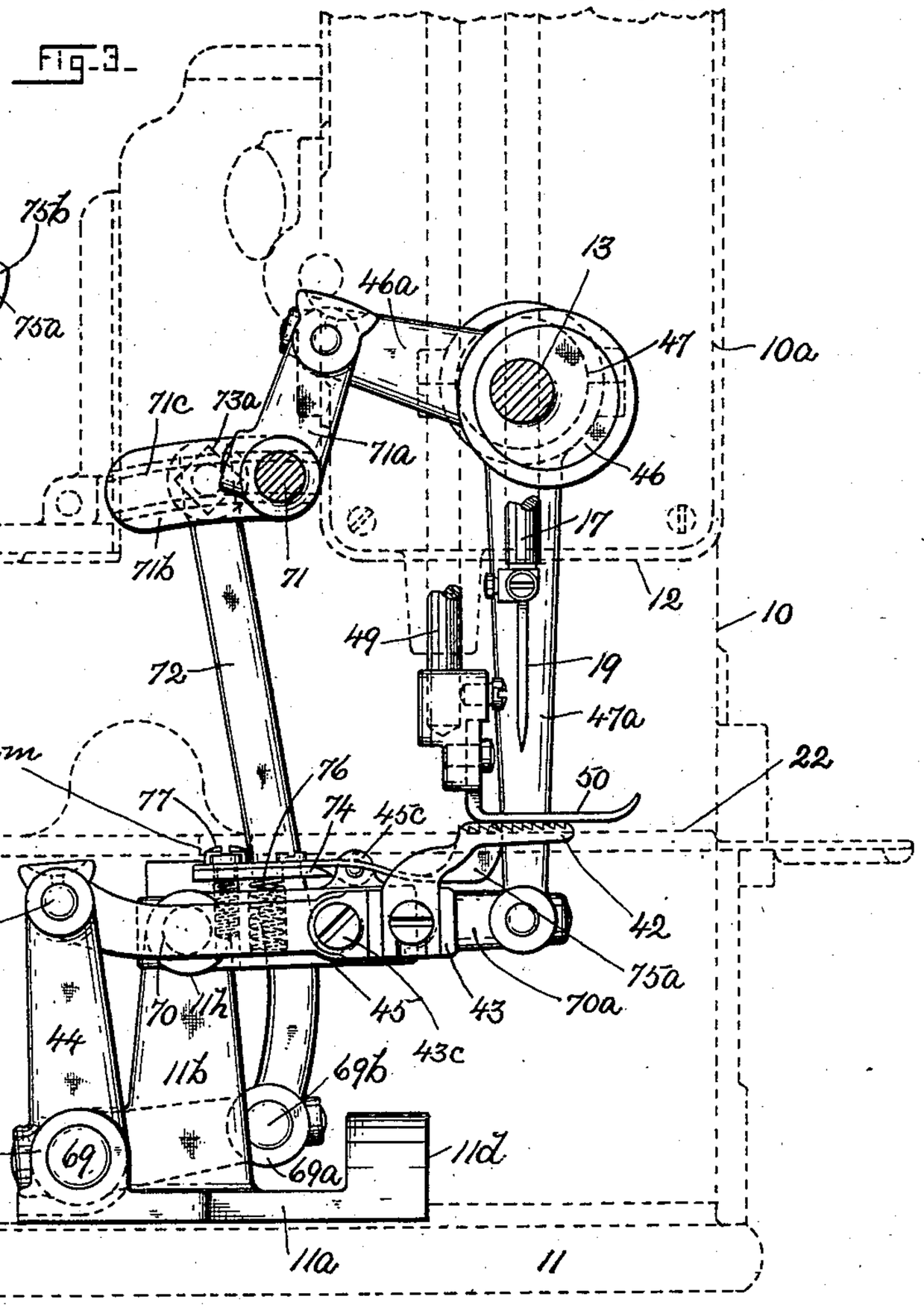


Fig. 6.

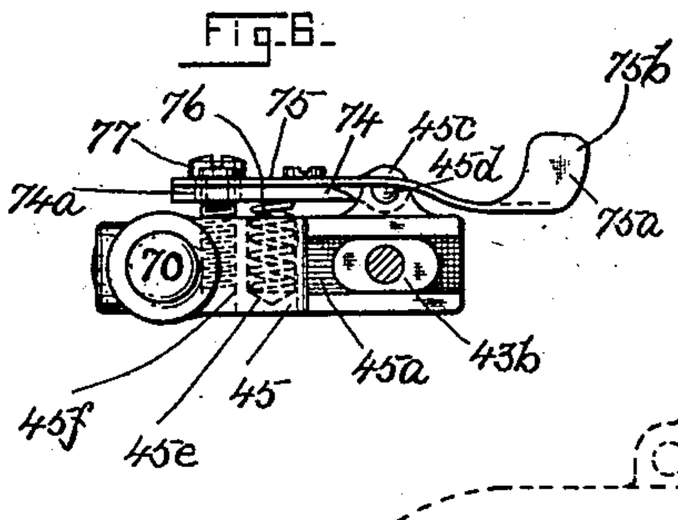


Fig. 7.

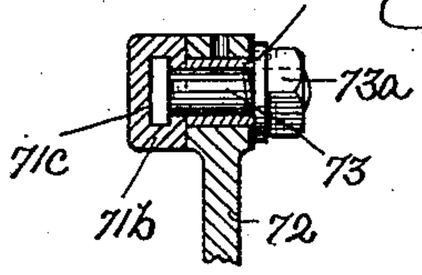


Fig. 4.

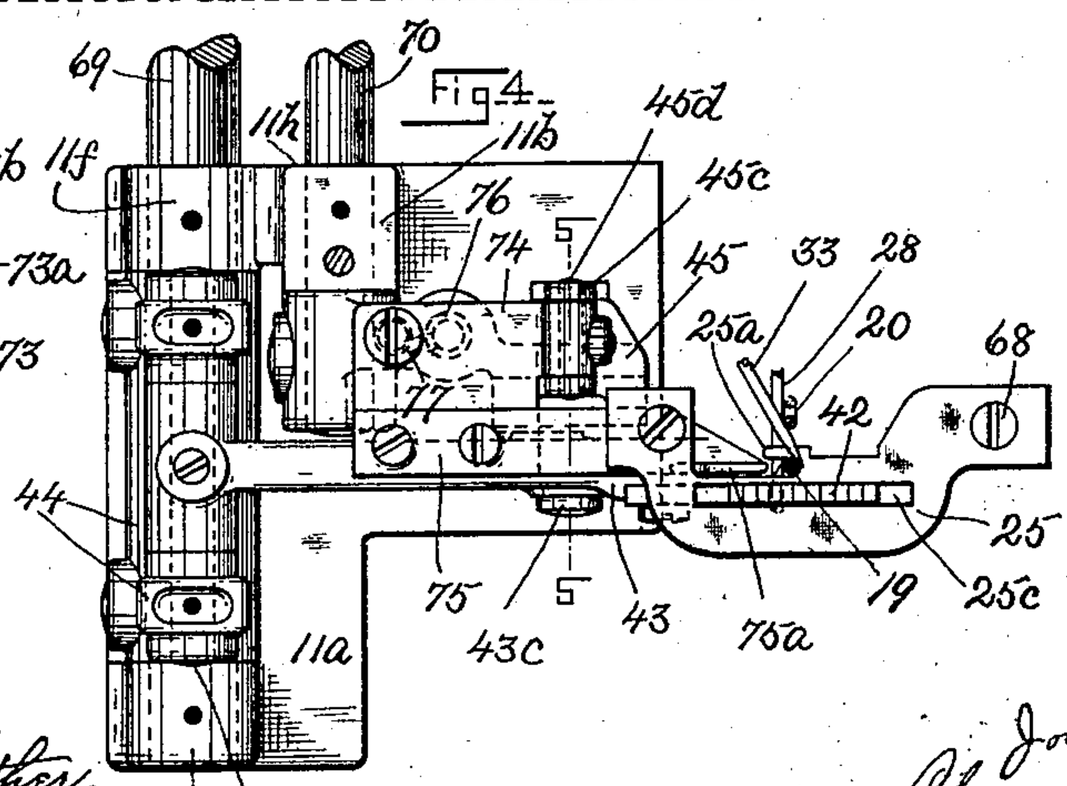
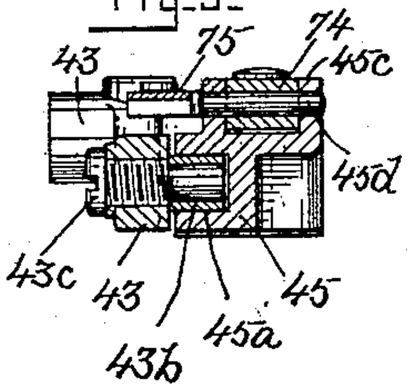


Fig. 5.



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No. 730,945. Patented June 16, 1903.

UNITED STATES PATENT OFFICE.

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SEWING-MACHINE FEED.

SPECIFICATION forming part of Letters Patent No. 730,945, dated June 16, 1903.

Application filed February 14, 1902. Serial No. 94,113. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH M. MERROW, a citizen of the United States, residing at Merrow, in the county of Tolland, State of Connecticut, have invented certain new and useful Improvements in Sewing-Machine Feeds; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the figures of reference marked thereon.

This invention pertains to the work-feeding and controlling devices of sewing-machines, and has for its object the improvement of the general construction and operation of the portions of the machine for performing this operation.

The work-feeding and edge-controlling mechanisms forming the subject of this invention, while applicable to other styles of sewing-machines than that shown in the drawings, are particularly designed for use with the said machine and are therefore described in connection therewith.

The machine shown in the drawings is illustrated as fitted up with one type and arrangement of implements and mechanisms for the production of overedge-sewing; but it is also adapted to be fitted up with a variety of stitch-forming implements and mechanisms and combinations thereof, whereby a very wide range of work upon material of widely-varied character may be produced. Further, the machine illustrated is adapted to be fitted up with trimming devices and means for the removal of the clippings or waste caused thereby; but as these features, as well as the peculiarly-constructed frame adapted to receive them and the various stitch-forming implements and their mechanisms, already mentioned, form the subjects of separate applications for patents the same are omitted or not made prominent herein or in the drawings, excepting as they may relate to this present invention.

Briefly describing this invention, the feeding mechanism is of the "four-motion" type, and the several movements thereof are accomplished through positively-acting mechanism, which includes means of adjustment whereby the horizontal movements of the feed may be varied from zero to the greatest length within its limits and whereby the feed is caused to travel to a point common to all adjustments. The edge-controller mechanism is operated simultaneously with the raising and lowering of the feed and is capable of adjustment to regulate its frictional pressure against the fabric.

Through the provision of the mechanisms mentioned a positively-acting four-motion feed is provided, which is capable of adjustment for the production of stitches of varying lengths, while the edge-controller, operating in connection with the feed to retard and control the feeding of the fabric near its edge, prevents any pouting or stretching of the fabric, such as is liable to occur when overseaming thin or stretchy material, and thus the appearance of the work is greatly improved.

In the drawings, Figure 1 is a front elevation of a machine fitted up with the feed and edge-controller mechanisms. Fig. 2 shows the machine largely in plan, but with the upper portion of its frame in section to better disclose the interior mechanism. Fig. 3 is an elevation, on an enlarged scale, of the feeding and edge-controlling mechanisms, the general outline of the machine as seen in end view being indicated in dotted lines. Fig. 4 is a plan view of the feeding and edge-controlling mechanisms proper. Fig. 5 is a view in cross-section of portions of said mechanisms, taken on the line 5 5 of Fig. 4. Fig. 6 is an elevation of an arm which raises and lowers the feed and carries the edge-controller. Fig. 7 is a cross-sectional view illustrating in detail the feed-adjusting joint.

Like reference-numerals of reference refer to the same parts in all the drawings.

Referring to the drawings, the number 10 denotes the frame of the machine, usually located at one end of a base-plate 11, of which it is preferably an integral part.

The number 10^a denotes the overhanging arm of the frame, 10^b the head, and 12 a cap secured to the said head.

The main shaft is denoted by the number

13 and is located in the upper portion of the frame and is journaled in bushings 13^a 13^b, secured in the frame. The shaft 13 extends through the arm 10^a and is provided at one end, outside the frame 10, with the driving-pulley 14 and at the other end, within the head 10^b, with a disk 15, having a crank or wrist pin 15^a. A link 16 connects the crank 15^a with the needle-bar 17 in order that the rotation of the shaft 13 through the medium of the said crank-pin and link shall reciprocate the needle-bar 17 in its bearings in the cap 12. The needle 19 is secured to the needle-bar 17, as is also the looper 20.

The number 22 denotes the work-plate; 23 a hinged extension of the same, and 10^e 10^f denote lugs formed on the frame 10 and on which the work-plate is supported and secured. Other supports for the work-plate are provided, one of which, 11^b, extends upward from a plate 11^a, on which it is formed, and another of which is the top of a chute-frame 21, to which the work-plate is secured by a screw 68, the latter also serving to hold in place one end of the needle-plate 25, having the usual finger 25^a.

The numbers 28 and 33 denote loopers beneath and above the work-plate, carried, respectively, on arms 27 and 34. The arm 27 is mounted on a shaft 26, located near the base 11, and is supported in bearings 11^c 11^d, provided, respectively, on the base 11 and the plate 11^a.

The number 32 denotes a rod connecting the arm 27 with mechanism (not shown) actuated by an eccentric 13^c on the main shaft 13 for oscillating the arm 27 to cause the looper 28 to coact with the needle 19 and looper 20. The arm 34 is supported in the overhanging arm 10^a and is arranged to oscillate diagonally to the needle 19 and the looper 20, oscillatory movement being imparted by an eccentric 37 on the main shaft 13 and connecting mechanism (not shown) between the said eccentric and the arm 34; but as the stitch-forming implements 19, 20, 28, and 33 and the manner in which they coöperate and are driven form no part of this invention and the feed and edge-controller mechanisms will work equally well with other known forms of stitch-forming mechanisms more detailed description and illustration herein are not deemed necessary.

The number 49 denotes the presser-bar, mounted to slide vertically in the head 12 and provided at the bottom with the presser-foot 50, suitable lifting mechanism for the presser bar and foot being provided.

Describing now the feeding and edge-controlling mechanisms, the feed-dog 42, which is adapted to engage the fabric through a slot 25^c in the needle-plate 25, is secured to the forward end of a horizontally-extending bar or carrier 43, the opposite or rear end of said bar being pivoted or hinged between the upper ends of the arms of a frame 44 on a pin 43^a. The frame 44 is mounted upon a rock-shaft 69, which is in turn supported in bearings 11^e 11^f, formed on the plate 11^a, and in a third bearing 10^p, provided in the machine-frame 10. The rock-shaft 69 extends parallel with the main shaft 13 and is adapted to be actuated to impart, through the frame 44, horizontal reciprocatory motion to the feed-bar 43 and the feed-dog 42.

To support the forward end of the feed-bar 43 and effect the raising and lowering thereof, a shaft 70 is provided, extending parallel with the main shaft 13 and rock-shaft 69, but located in advance of and above the latter. The rock-shaft 70 is supported near one end in a bearing 11^h in the work-plate support 11^b and near its other end in a bearing 10^q in the machine-frame 10. This shaft 70 projects through its bearing 11^h and has mounted upon its end a horizontally-extending arm 45, Fig. 6, adjacent to and substantially parallel with the feed-bar 43. The feed-bar 43 and the arm 45 both extend forward or toward the path of the needle 19, and that side of the arm 45 confronting the feed-bar has a groove or channel 45^a formed therein and adapted to receive a block 43^b, carried on a pin or screw 43^c, Fig. 5, located in the feed-bar 43 and near the forward end thereof. The block 43^b of the feed-bar 43, located in the groove 45^a of the arm 45, thus carries or supports the outer end of the feed-bar, and upon the rocking of the shaft 70 to raise and lower the same the block 43^b slides in the groove 45^a to permit the horizontal and vertical movements of the feed-bar 43.

To effect the rocking of the shaft 69, and thereby the horizontal motions of the feed-bar, the shaft 13 is provided with an eccentric 46, which through the medium of the following-described train of mechanism imparts the desired motion to the rock-shaft 69: Located in bearings 10^s 10^t in the overhanging arm 10^a is a short shaft 71, extending parallel with the shaft 69 and having secured thereto between its bearings an arm 71^a, having its outer end secured to the end of the eccentric-rod 46^a of the eccentric 46. The shaft 71 at its end adjacent the bearing 10^t carries an arc-shaped T-slotted arm 71^b, to which is adjustably secured the upper end of a link 72 by a bolt 73, Fig. 7. The lower end of the link is secured to the end of an arm 69^a by a bolt 69^b, the said arm being carried by the shaft 69 within the frame 10. Upon the rotation of the eccentric 46 the shaft 71 is (through its arm 71^a, secured to the eccentric-rod 46^a of the said eccentric) caused to rock, and the rocking motion of the shaft 71 is carried therefrom through its arm 71^b, the link 72, and the arm 69^a to the shaft 69, and from the latter horizontal reciprocatory motion is imparted to the feed in the manner already described.

To rock the shaft 70, and thereby effect the raising and lowering of the feed, the shaft 13 is provided with an eccentric 47, having a strap and rod 47^a, Fig. 3, the end of which

rod is secured to the end of an arm 70^a, carried on the shaft 70 within the frame 10. Upon the rotation of the eccentric 47 its rod 47^a through the arm 70^a causes the shaft 70 to rock, and thus effect the raising and lowering of the feed, as hereinabove described.

The eccentrics 46 and 47 are so timed that the feed-dog 42 will be carried backward while its teeth project above the upper surface of the needle-plate to feed the material.

The arm 71^b is arc-shaped, as already stated, and in the machine as illustrated is so constructed that the feeding operation may always end or stop at a given point common to all adjustments of the length of the feed. To accomplish this, the radius of the said arc is equal in length to the distance between the axial center of the shaft 71 and the axial center of the connection 69^b when the arm 69^a is in the position assumed upon having moved the feed-dog 42 to the limit of its rearward travel. The arm 71^b is so positioned on the shaft 71 that when the eccentric 46 has rocked the said shaft into the position calculated to carry the feed to the extreme end of its rearward travel and the arm 69^a is in the position just mentioned the said arc can be described from the center of the connection 69^b, as shown in Fig. 3. When the various parts under consideration are in their respective positions just mentioned, it will be seen that the adjustment of the link 72 will effect no change in the position of the arm 69^a, so that the feed-dog must of necessity always assume the position shown at the end of its travel regardless of the length of such travel.

The angle of oscillation of the arm 71^b is constant because of the manner in which it is actuated; but by adjusting the connection 73 any desired angle of oscillation possible within the range of the slotted arm can be imparted to the shaft 69, such angle being increased and diminished as the said connection is moved from and toward the center of the shaft 71, and thus the time of the feeding remains the same for all adjustments of the length of feed. The shaft 69 in its movements to carry the feed rearward will always carry the dog 42 to a given point, as explained; but in its partial rotations in the opposite direction to carry the feed forward the said dog will be carried to starting-points varying with each change in position of the connection 73.

While mechanism is shown and described by which the feed will always be carried to or stopped at a given point, it will be understood that by making the length of the link 72 and the slotted arc-shaped arm 71^b of suitable proportions any other point in the stroke of the feed-dog may be chosen for the unchangeable point.

The adjustable connection between the arm 71^b and link is formed by a bolt 73, the head of which is received in the arc-shaped T-slot 71^c in the arm 71^b, which bolt passes through the link 72 and receives a nut 73^a. The bolt 73 takes its bearing within the said link end, and a sleeve 73^b, which is slightly longer than the thickness of the link, is adapted to be clamped between the arm 71^b and the nut 73^a, thus securing the bolt 73 in the slot 71^c, but preventing in no wise the free pivotal movement of the link end upon the sleeve. The bolt 73 may be readily adjusted in the proper position in the slot 71^c to give the desired throw to the feed or may be so positioned that its center alines with the center of the shaft 71, when no motion will be imparted to the link 72 or the mechanism actuated thereby.

The edge-controller mechanism, as already stated, is mounted upon the arm or carrier 45, which raises and lowers the feed and likewise the said edge-controller. Describing more particularly the said mechanism, the reference-number 74 denotes a plate located on the upper side of the arm 45 and hinged at its forward end between two lugs 45^c, formed on the arm 45, the hinge-pin being denoted by the number 45^d. The plate 74 preferably overhangs the feed-bar 43, as best shown in Figs. 4 and 5, and secured to such overhanging portion is a strip or blade 75, preferably of spring-steel, and secured to the plate 74 by screws or otherwise. The blade extends beyond the said plate and at its forward end has an upturned portion 75^a, the upper edge of which lies adjacent to and just in the rear of the path of the needle 19, as shown in Figs. 3 and 4. The arm 45 has a hole 45^e therein for the reception of a coil-spring 76, said spring being confined between the bottom of the said hole and the plate 74, the tendency of the spring being to rock the said plate upward; but such action is limited and controlled by a screw 77, located in a tapped hole 45^f in the arm 45 and passing through a hole 74^a in the plate 74 of greater diameter than the screw-shank, but smaller than the screw-head.

When the arm 45 is rocked upward to raise the feed, the edge of the upturned portion 75^a of the edge-controller is carried into engagement with the under side of the presser-foot 50, Fig. 3, or with the fabric that may be under the said presser-foot and serves to retard the edge of the fabric during the feeding thereof for the purpose already stated. Upon the completion of the feed and the lowering of the arm 45 the edge-controller is lowered from operative engagement with the fabric.

The edge-controller blade 75 while having sufficient resiliency in itself to allow its end 75^a to readily adjust itself to the fabric is also provided with additional means of adjustment, comprising the spring 76 and the screw 77. The spring 76, which seeks to rock the plate 74 upward, and thus carry the operative portion 75^a of the active end of the edge-controller downward, is limited in its action by the screw 77, as already stated, and the screw may be adjusted to lower the said end, and thereby decrease its pressure against

the fabric, or so as to raise the said end and cause it to engage the fabric with increased pressure.

The described means of adjustment for the edge-controller enables its engagement with the fabric to be very finely adjusted, as may be demanded by different grades of work, and to enable such adjustments to be readily made the work-plate 22 is provided with a hole 22^m, located therein directly over the screw 77, through which the said screw may be readily reached for adjustment with a screw-driver.

The forward edge of the plate 74 is preferably rounded or beveled beneath the blade 75 in order that the latter when forced downward shall not bend at a sharp angle and be liable to breakage, and to insure the upturned portion 75^a of the said blade from catching in or injuring the fabric the forward corner thereof is preferably rounded, as at 75^b.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a sewing-machine, the combination of the following instrumentalities, to wit, a feed-bar, means for supporting one end thereof and for imparting horizontal reciprocating motion thereto, a rock-shaft adjacent said feed-bar, a grooved arm located on the rock-shaft and extending substantially parallel with and in the direction of the feed-bar, a block carried by the feed-bar and operatively supported in the said groove and means for actuating the rock-shaft to impart rising and falling movements to the feed-bar, substantially as described.

2. In a sewing-machine, the combination of the following instrumentalities, to wit, a feed-bar pivotally supported at its rear end, a rock-shaft adjacent said supported end, an arm on said rock-shaft at the side of and extending parallel with and in the direction of the feed-bar, a connection between the said arm and the feed-bar near their forward ends whereby the feed-bar is supported and is raised and lowered by the said arm, a main shaft, connecting mechanism between the main shaft and the rock-shaft comprising an arm on the latter, an eccentric on the former and an eccentric-rod between the said arm and eccentric, with means for imparting horizontal reciprocation to the feed-bar, substantially as described.

3. In a sewing-machine, the combination of the following instrumentalities, to wit, a feed-bar, an edge-controller, an oscillating arm supporting the edge-controller and one end of the feed-bar and adapted to raise and lower the said edge-controller and end of the feed-bar, means for oscillating the said arm and means for supporting the rearward end of the feed-bar and for reciprocating the same horizontally, substantially as described.

4. In a sewing-machine, the combination with a feed-bar, and an edge-controller, of an oscillating support with which one end of said feed-bar is pivotally connected and by which it is reciprocated horizontally, an oscillating arm supporting the free end of said feed-bar and edge-controller adapted to simultaneously raise and lower the feed-bar and edge-controller and means for actuating the oscillating support and arm, substantially as described.

5. In a sewing-machine, the combination with a feed-bar, an edge-controller and means for imparting horizontal reciprocation to the feed-bar, of a carrying-arm for the edge-controller and connections between the arm and feed-bar whereby said feed-bar is raised and lowered by the movement of the edge-controller carrying-arm; substantially as described.

6. In a sewing-machine, the combination with a reciprocatory feed-bar and means for reciprocating the same horizontally of a vertically-movable edge-controller and a vertically-movable carrying-arm supporting said edge-controller and feed-bar with means for moving said arm vertically whereby the edge-controller and feed-bar are simultaneously moved into engagement with the work; substantially as described.

7. In a sewing-machine, the combination with an edge-controller, a pivoted carrier therefor and means for oscillating said carrier vertically, of a feed-bar having a sliding connection with and moved vertically by said carrier and means for reciprocating the feed-bar horizontally on said carrier; substantially as described.

8. In a sewing-machine, the combination with a feed-bar, an edge-controller and an oscillating grooved arm supporting said edge-controller and adapted to support the forward end of the feed-bar, a block carried on the feed-bar and working in said groove for the purpose set forth, means for oscillating the said arm to simultaneously raise and lower the feed-bar and edge-controller, and means for supporting the rear end of the feed-bar and for imparting horizontal reciprocation to said bar; substantially as described.

9. In a sewing-machine, the combination of the following instrumentalities, to wit, a work-feeding mechanism, a rock-shaft, an arm mounted on the rock-shaft and driven thereby, an edge-controller mounted on the said arm, the said rock-shaft being supported in stationary bearings permitting vertical oscillation of the edge-controller but preventing horizontal motion thereof and positively-acting means for driving the rock-shaft on which the edge-controller arm is mounted in both directions; substantially as described.

10. In a sewing-machine, the combination of the following instrumentalities, to wit, a work-feeding mechanism, a main shaft, a rock-shaft, an arm on the rock-shaft and an edge-controller mounted on the arm, mechanism for imparting motion from the main to the rock shaft comprising an eccentric on the main shaft and an eccentric-rod secured to

an arm on the rock-shaft whereby the edge-controller is operated vertically and held against longitudinal movement, substantially as described.

11. In a sewing-machine the combination with an oscillatory arm and means for oscillating the same, of an edge-controller mounted on the arm and embodying a plate hinged to the said arm, a blade secured to the said plate and extending beyond the forward edge thereof and means of adjustment for the said plate and blade with relation to the said arm, substantially as described.

12. In a sewing-machine, the combination with an oscillatory arm and means for oscillating the same, of an edge-controller mounted on the arm and embodying a plate hinged to the said arm, a blade secured to the said plate and extending beyond the forward edge thereof and means of adjustment for the said plate on the arm embodying a spring and a screw carried in the said arm; substantially as described.

13. In a sewing-machine, the combination with a work-plate having an opening therein, of an oscillating arm beneath the work-plate carrying an edge-controller, an adjusting device for the edge-controller comprising a spring and a screw, said screw being located beneath the opening in the work-plate and means for actuating the edge-controller; as and for the purpose set forth.

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