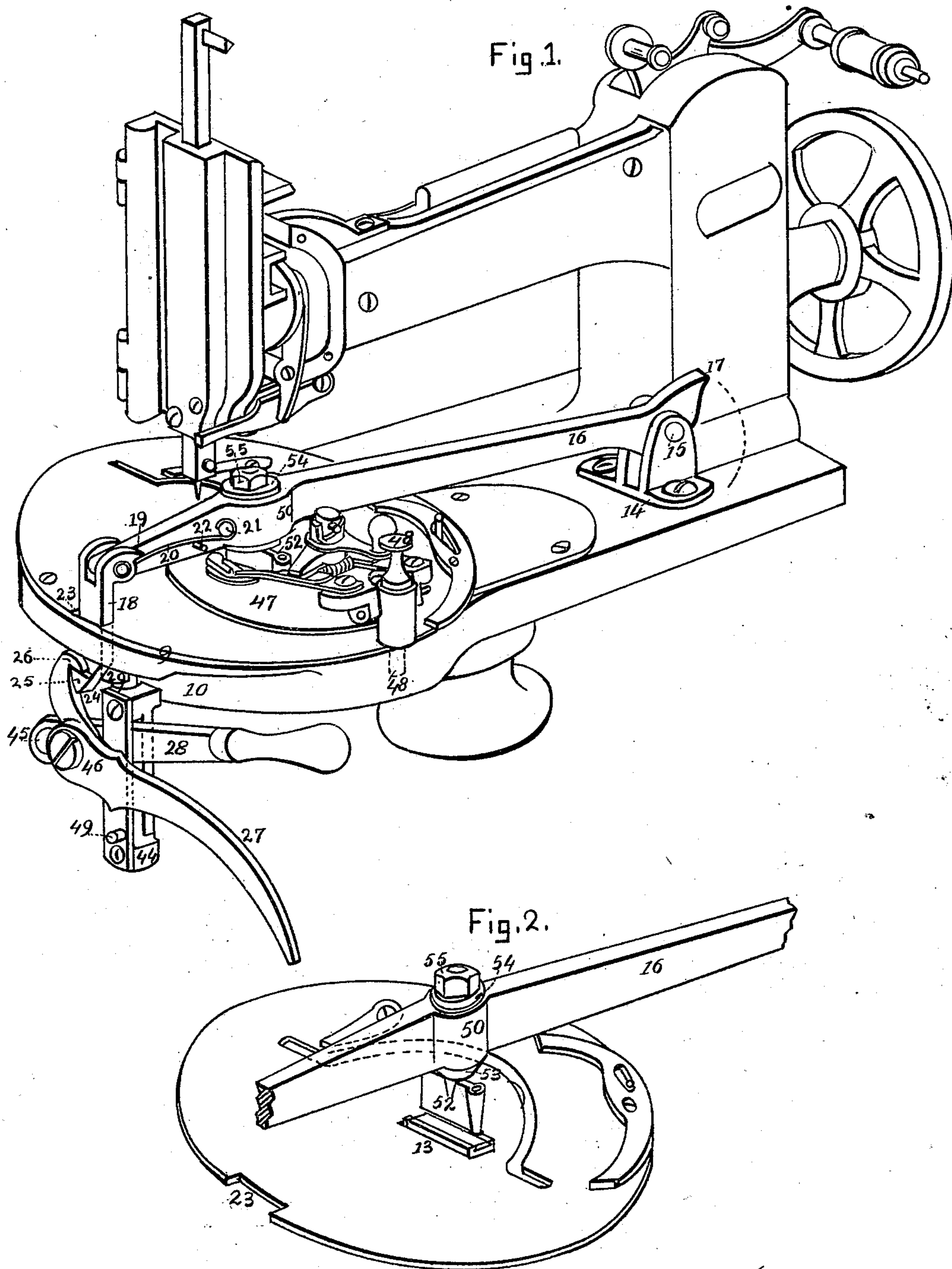


(No Model.)

4 Sheets—Sheet 1.

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CUTTING MECHANISM FOR BUTTON HOLE SEWING MACHINES.
No. 273,088. Patented Feb. 27, 1883.



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(No Model.)

4 Sheets—Sheet 2.

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CUTTING MECHANISM FOR BUTTON HOLE SEWING MACHINES.
No. 273,088.

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Fig. 3.

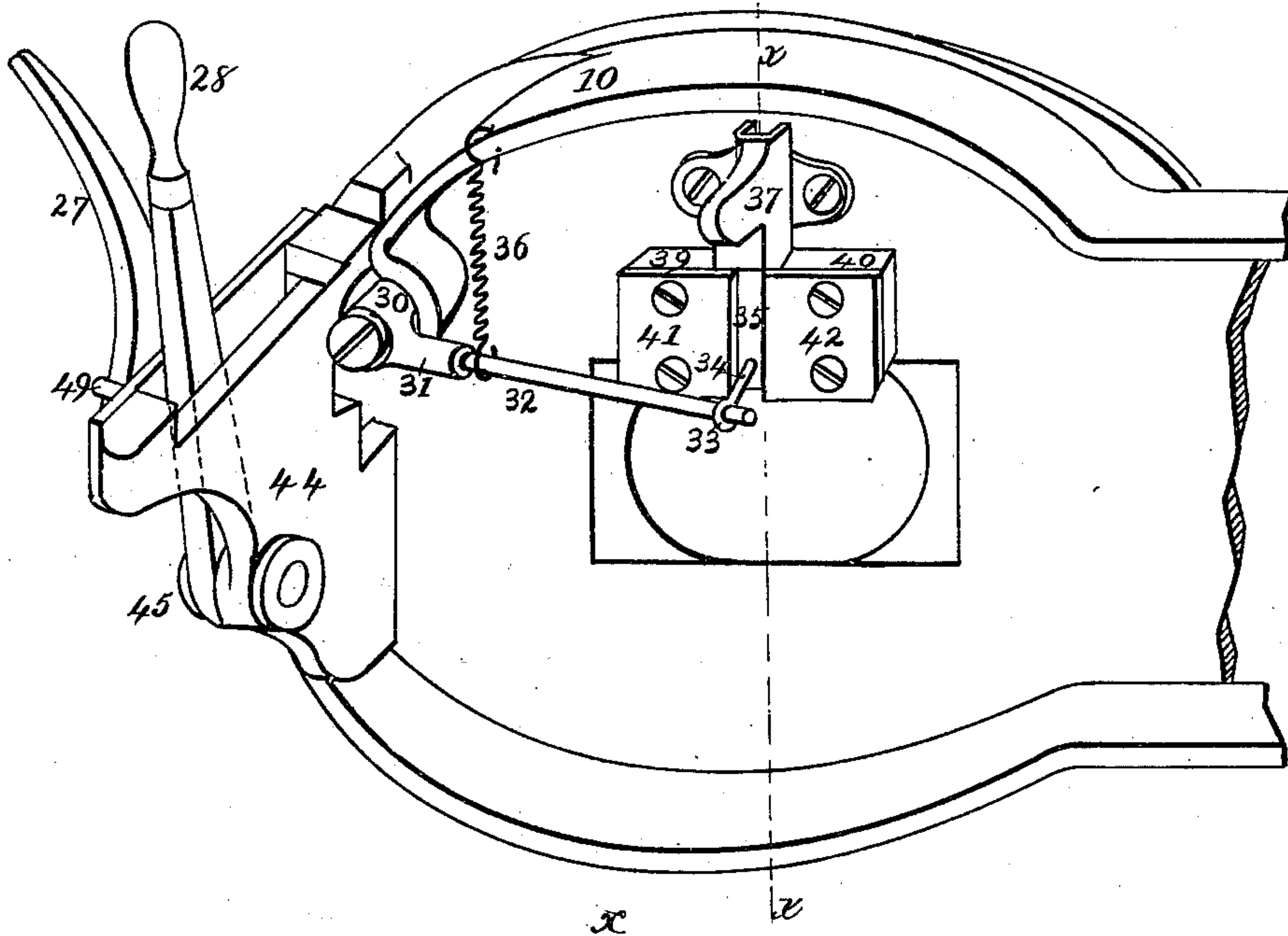
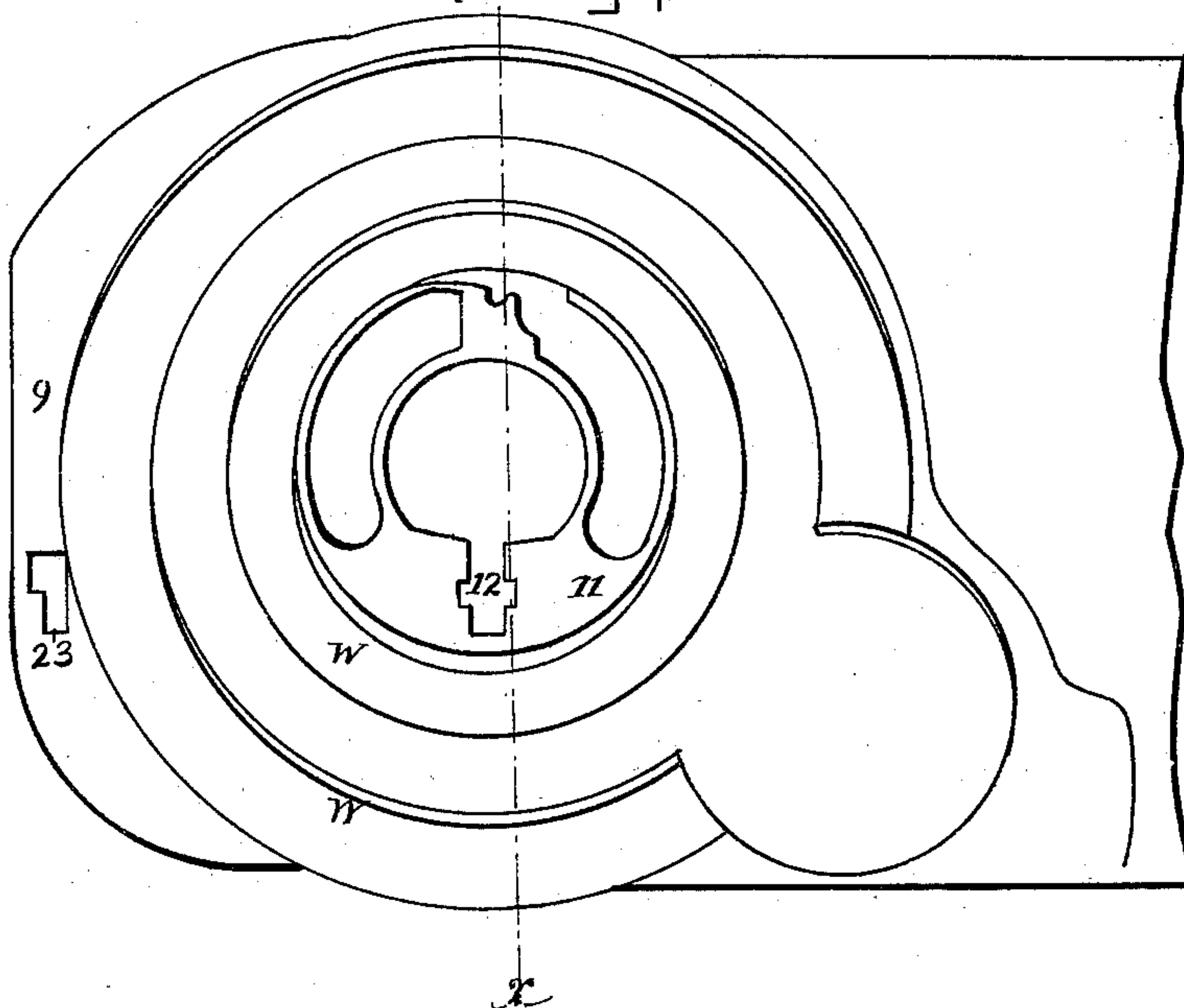


Fig. 4.



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4 Sheets—Sheet 3.

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CUTTING MECHANISM FOR BUTTON HOLE SEWING MACHINES.
No. 273,088. Patented Feb. 27, 1883.

Fig. 5.

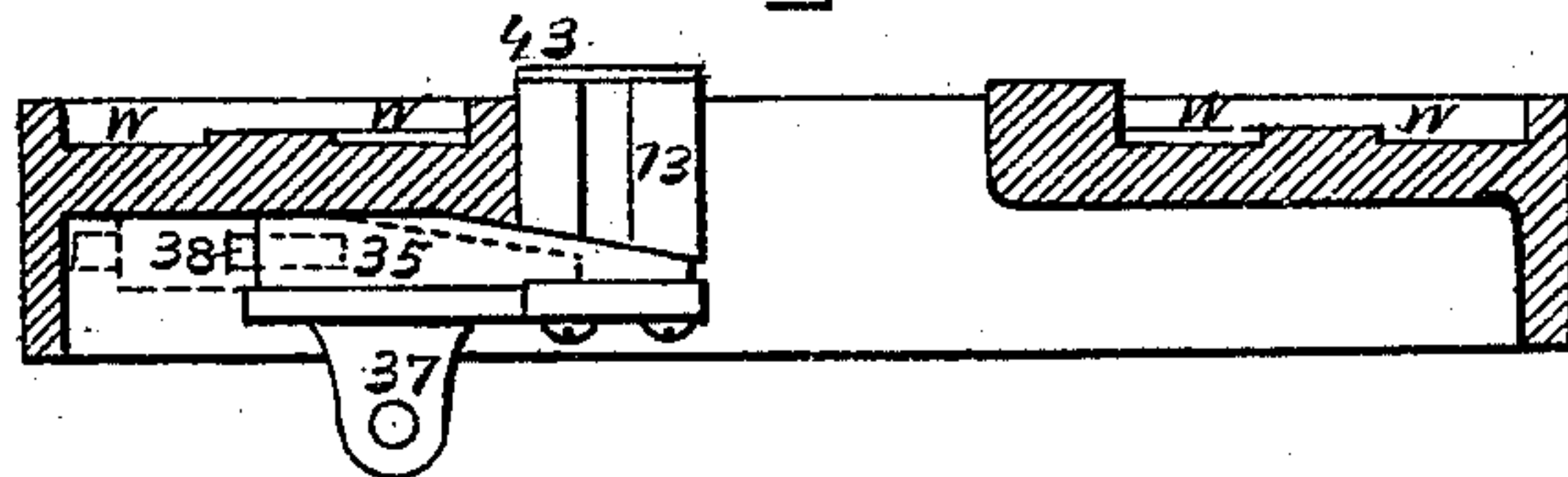


Fig. 6.

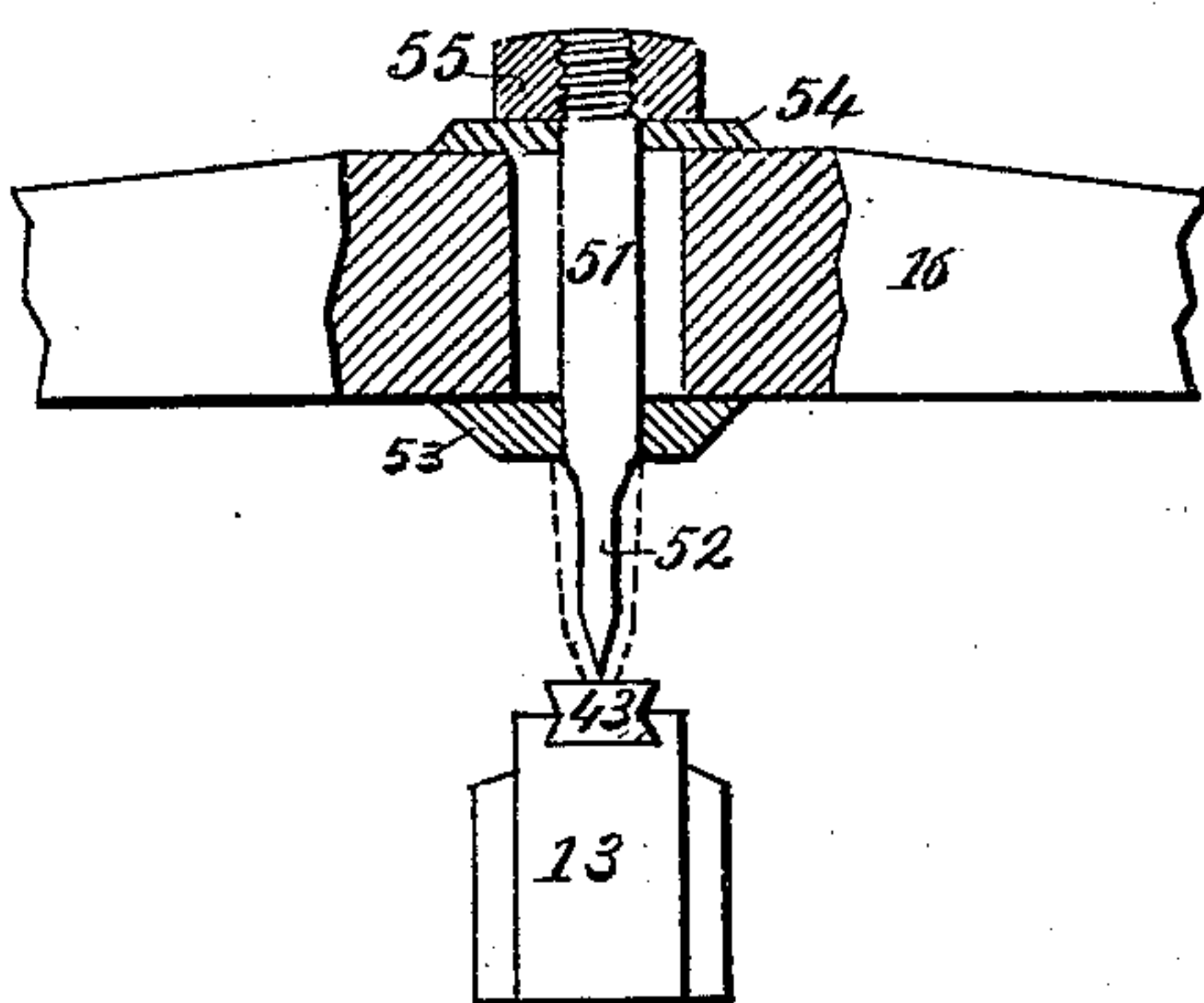


Fig. 7.

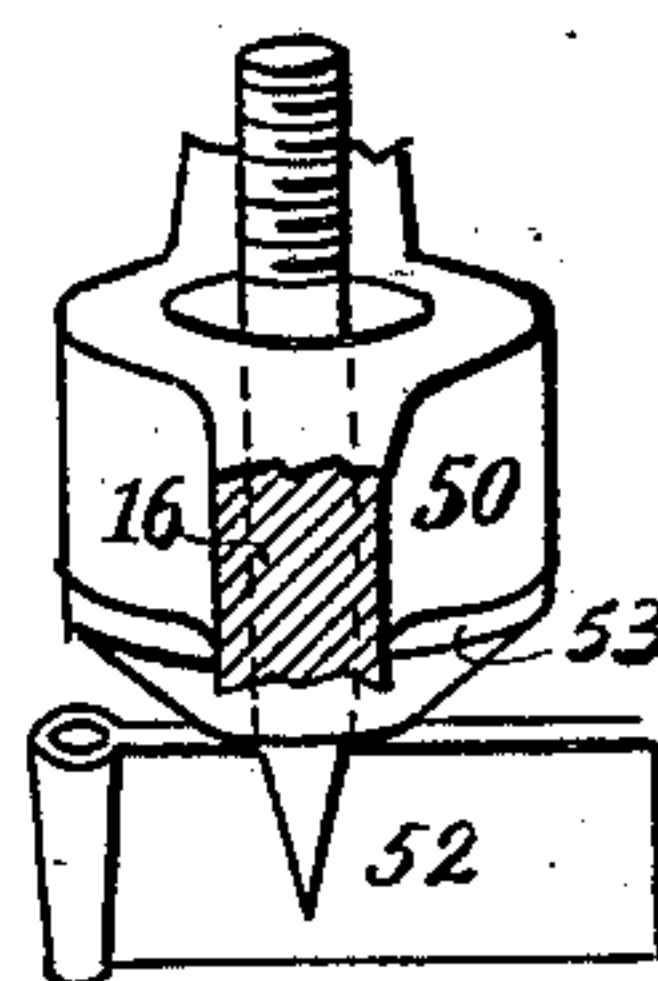
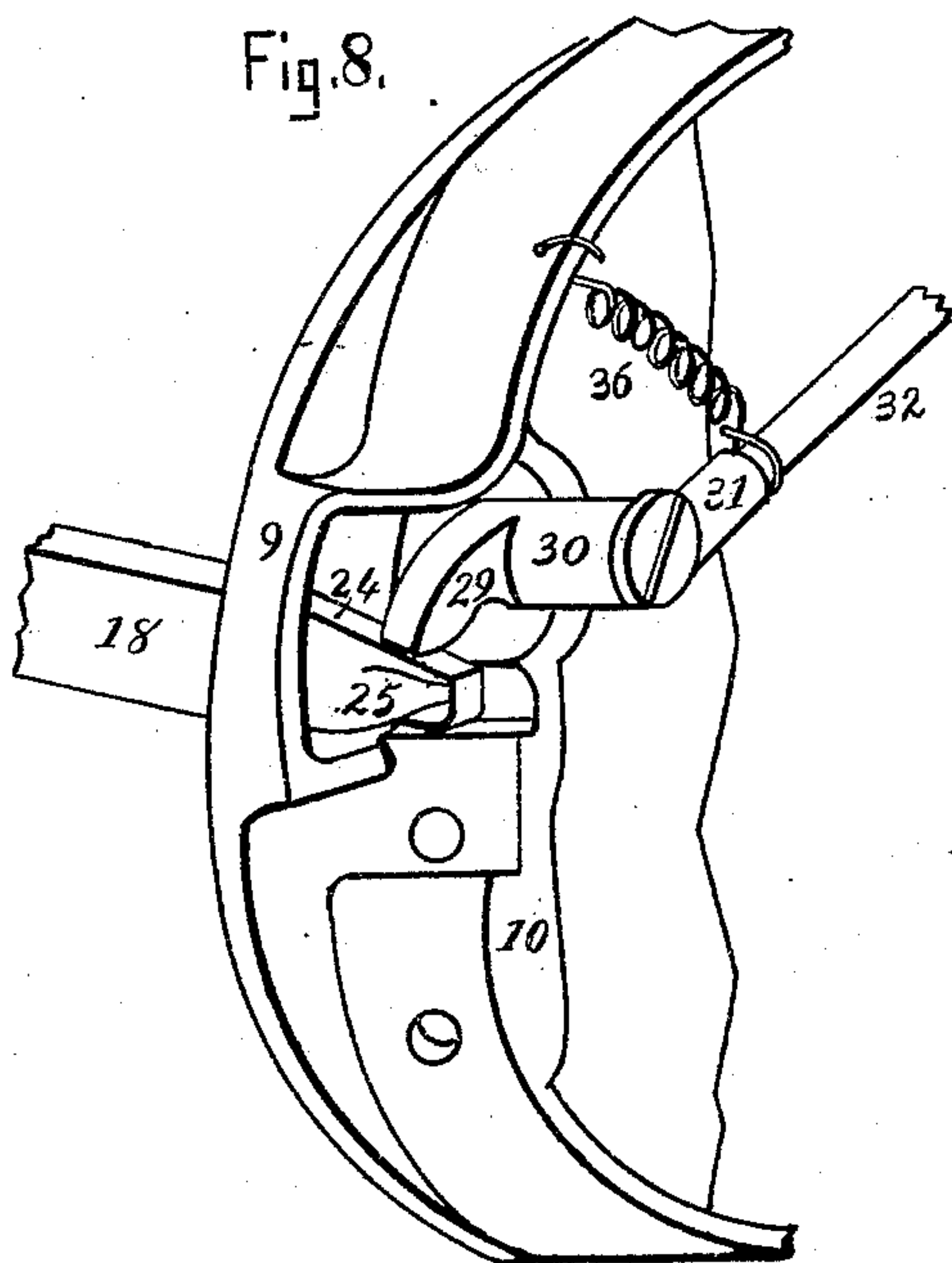


Fig. 8.



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(No Model.)

4 Sheets—Sheet 4.

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CUTTING MECHANISM FOR BUTTON HOLE SEWING MACHINES.
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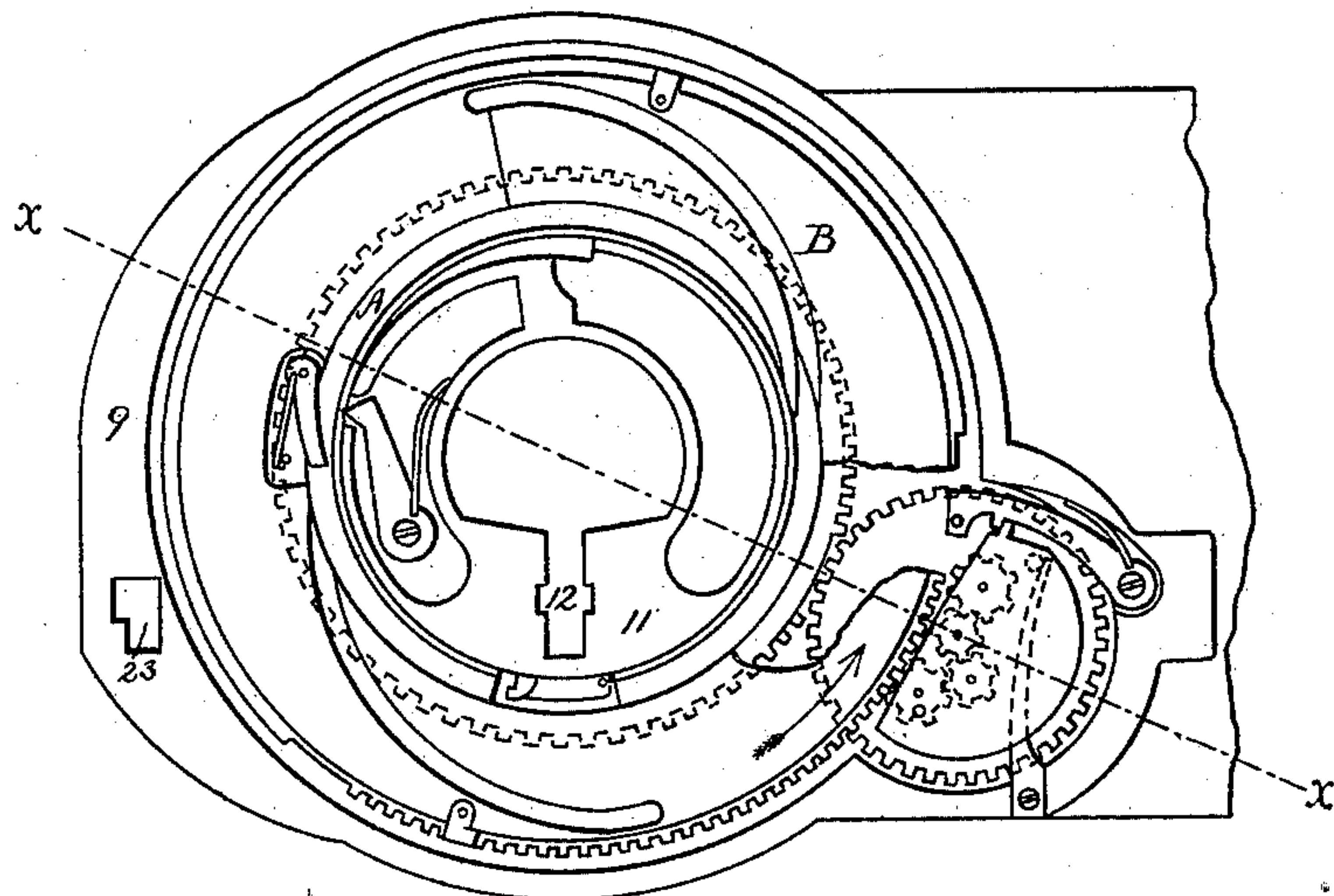


Fig- 9-

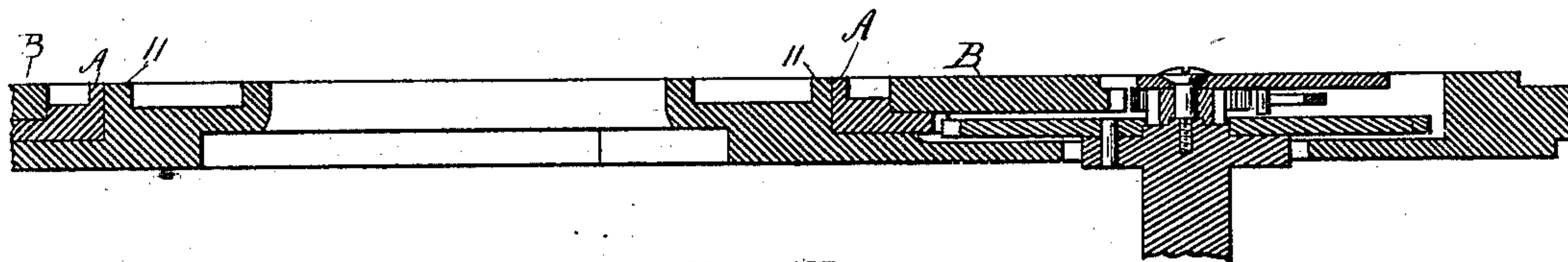


Fig- 10-

WITNESSES

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UNITED STATES PATENT OFFICE.

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CUTTING MECHANISM FOR BUTTON-HOLE SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 273,088, dated February 27, 1883.

Application filed July 24, 1882. (No model.)

To all whom it may concern:

Be it known that I, DANIEL W. G. HUMPHREY, of Chelsea, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Cutting Mechanism for Button-Hole Sewing-Machines; which invention is fully set forth in the following specification, reference being had to the accompanying drawings.

My invention relates to improvements in the mechanism of button-hole sewing-machines by which the button-holes are cut while the garment or material is in position in the cloth-clamp, which holds and guides it while the holes are being stitched.

In the accompanying drawings, Figure 1 is a perspective view of a button-hole-stitching machine with my improved cutting mechanism thereto applied. Fig. 2 is a detached perspective view, showing the work-plate, the cloth-clamp being removed, the cutting-block, the cutter, and a portion of its actuating-bar in their proper relative positions when brought together to cut a button-hole. Fig. 3 is a detached perspective view, showing the under side of the front end of the machine-bed and such part of my improved cutting mechanism attached thereto as is employed to raise and support the cutter-block, together with the levers and their supporting-bracket employed to force the cutter down upon said block. Fig. 4 is a detached top view of the front end of the machine-bed fitted to receive the feed-wheels which operate around a central hub, and showing the opening in said hub, in which my cutter-block works. Fig. 5 is vertical section taken on line *x x*, Figs. 3 and 4, as viewed from the right when the machine is right side up, as in Fig. 4, and shows the cutter-block in position in the hub of the bed, and its actuating-slide in elevation. Fig. 6 is a detached side elevation of a portion of the cutter-bar, showing its hollow hub broken away on one side, and the stem of the cutter as adjustably held therein by means of its collars and nut, shown in section, and also showing an end elevation of the cutter-block in its proper relation to the cutter. Fig. 7 is a view of the cutter-bar hub detached; a side view of the cutter and one of its collars, all in perspective, and

showing the threaded stem of the cutter projecting up through the circular passage in the hub, in which it is adjustably secured when in practical use. Fig. 8 is a detached perspective view taken from the left of Fig. 3, with cutter-bar levers and their supporting-bracket removed, and showing the rocking-lever through which the block-elevating slide is actuated and a portion of the bolt attached to the cutter-bar, by which said lever is rocked for that purpose. Fig. 9 is a plan of that portion of the machine-bed shown in Fig. 4, but including a top view of the feed-wheels and their actuating-pinions in position in the recesses of the bed. Fig. 10 is a vertical section of the same, taken on line *x x*, Fig. 9.

The cast-iron bed of the machine is formed at its front end with an overhanging projection, 9, of irregular outline, Figs. 1, 4, 8, and with an increased thickness of rib, 10, Figs. 1, 3, 8, adapting it to my improved button-hole-cutting mechanism when thereto applied, as shown in Fig. 1. Said bed is also there formed with a circular recess sunk therein, in which there is an enlarged central hub, around which the feed-wheels that impart movement to the cloth-clamp revolve in the circular paths *W W* when the machine is in practical operation. The method of feeding which admits of such enlarged central hub, and which may constitute, in part, the subject-matter of a subsequent application by me for Letters Patent, also admits of the practical application to such machine of an important feature in my present invention by permitting the cutting to be done upon a block held and operated in such hub and within the inner circumferential line of the path of the feed-wheels, thus avoiding the disadvantages of bringing the block and cutter together through the bed in the path of the feed-wheel and through the wheel, as has heretofore been done. The said new method of feeding and peculiar arrangement of feed-wheels which admits of such cutting, irrespective of the position of said wheels, consists in the employment of two feed rings or wheels, *A* and *B*, Figs. 9 and 10, having teeth upon their peripheries, by which they are actuated through suitable pinions working therein, one of them, *A*, being placed upon or around said hub

and seated in the inner part of recess W, Fig. 5, and being adapted to serve, in part, as the hub or journal of the outer wheel, and the other wheel, B, being placed upon and around said inner wheel, and seated partly upon the same and partly in the outer part of recess W, the slight rise between the two portions of the recess marked W W, Fig. 5, serving the purpose merely of relieving the inner wheel somewhat from the pressure and friction of the outer wheel, B, and being cut away where the pinion is seated, which actuates the inner wheel, Fig. 10, the two wheels being operated through pinions, as shown, geared into their peripheral teeth, wheel A having a vacancy in its teeth, which causes it to rest until an attachment on the outer wheel moves it, at the proper time, into gear with its actuating-pinion, when it rotates around hub 11 in one direction only, to impart the requisite movement to the clamp while the circular or eyelet end of the button-hole is being stitched, and wheel B operating with a circular reciprocating movement around wheel A to feed the clamp while stitching the sides of the button-hole, both said wheels and their actuating mechanism being entirely outside of the range or paths of the cutter and block as they are made to approach each other through said hub, and not in any manner intercepted, obstructed, or interfered with by the operations of the cutting devices.

A bracket, 14, Fig. 1, is secured to the bed of the machine, as shown, in which is pivoted at 15 the cutter-bar 16, which is shown in horizontal and working position. When not so employed it is turned upward into a nearly vertical position, resting at a slightly-backward inclination upon its projecting point 17, then moved into contact with said bed, as indicated by the dotted line from said point to the bed. This bar is formed with an enlargement or hub, 50, in which, as hereinafter described, is secured the button-hole cutter, and at the forward end of the bar is pivoted an interlocking bolt, 18, which passes down through the overhanging projection 9, as shown. This bolt is formed near its pivot with a lip, 19, beneath which the end of a spring, 20, bears with an upward resistance, the spring being secured to the bar at 21, and resting over a pin, 22, and is for the purpose of keeping said pivoted bolt, when the bar 16 is turned upward, as before described, into its idle or resting position, at the proper angle with said bar, so that in its descent with the bar into the horizontal position shown it will readily enter and pass down through the opening 23 in the overhanging edge 9, Figs. 1, 4, 8, and as shown in Fig. 1. The lower end of bolt 18 is formed with an incline, 24, Figs. 1, 8, for a purpose hereinafter explained, and with a projection, 25, to engage with the hook 26 of the interlocking lever 27, which is pivoted to the hand-lever 28. The incline 24 on bolt 18, as it descends through the opening 23 in the bed, comes in contact with the arm 29 of rock-lever 30, which projects into the path of said bolt,

Figs. 1, 8, and as the bolt descends the contact of said arm and incline rocks said lever 30 and its arm 31, which is lengthened by a wire, 32, Fig. 3, secured therein, and which extends through the eye 33 of a projecting stud, 34, inserted in the block-elevating slide 35, Figs. 3, 5, and thereby the slide is actuated to raise the block 13, in the manner and for the purpose to be described. When bolt 18 is withdrawn and said arm 29 is relieved from the pressure of its incline 24 the rock-lever and the parts so actuated thereby are moved in an opposite direction by force of the spiral spring 36, attached at one end to the edge or rib of the machine-bed and at its other end to arm 32. The slide 35 is formed with an incline, as shown, Fig. 5, which operates horizontally under and against the base of block 13, which is correspondingly formed, and, when the block is elevated thereby, serves as the seat of the block, while the cutter is brought to bear on its top. Said slide 35 is operated on the under side of the bed, Fig. 3, in a channel formed in the base of the spool-stand 37, secured to the bed, and between the bosses 39 40, cast upon the bed, and is upheld and further supported in said channel by the overlapping caps 41 42, screwed to said bosses. When the slide is moved by force of spring 36, as before stated, its square end is carried back to the rib of the bed, and for that reason it is cushioned by a piece of rubber, 38, inserted in that end of the slide, as shown in Fig. 5.

The block 13, formed with a wing or flange on either side, moves freely in the corresponding vertical passage, 12, Fig. 4, in the hub 11, so that when its actuating and supporting slide 35, after having been forced under it by the action of the rock-lever 30, before described, and raised it, as shown in Fig. 5, has been withdrawn to the position indicated by dotted lines in said figures by force of said spring 36, as before stated, it (said block) drops by its gravity and rests lower down upon the said incline of slide 35, as indicated by said dotted lines, and thus its top line is brought below or in a level with the upper surface of the work-plate, so as not to obstruct the movement of the cloth-clamp upon said plate while the stitching of the button-hole is in progress. The block 13 is provided with a soft-metal removable cap, 43, Fig. 6, dovetailed into the top thereof, to receive and preserve the edge of the cutter, the cap being so formed, as shown, that when one side has become worn by repeated cutting upon it, then it may be inverted in the block and the opposite side thereof be turned up to receive the pressure of the cutting-edge.

To the thick part of the rib of the machine, on the front end of the bed, there is secured a bracket, 44, Figs. 1 to 3, to which the hand-lever 28 is pivoted at 45, as shown, and to said hand-lever the interlocking lever 27 is pivoted at 46, Fig. 1. The purpose and operation of these levers will hereinafter be fully explained.

The cloth-clamp is of ordinary construction,

and holds and carries the material to be stitched in the usual manner. When in position to properly present the material to the button-hole cutter, it is drawn back to the front edge of the work-plate, as shown, Fig. 1, resting thereon, with its feed-pin 48 projecting down into a hole in the plate and bed, as indicated by the dotted lines, and outside of the path of the underlying feed-wheels. In this position of the clamp the cutting-block 13 may be forced up, in the manner and by the means already referred to, through the work-plate, Fig. 2, and the usual opening in the clamp-base, against the material to be cut, when the cutter 52 may be brought down from above upon said material and the block centrally between the arms of the clamp, Fig. 1, for the purpose of cutting the button-hole in the material while so held in the clamp, which operation by means of my improved mechanism is as follows: The clamp, holding the material to be cut in the usual manner, being placed in position on the machine, as shown, Fig. 1, the bar 16 is brought down by the hand of the operator into the position shown, and with it bolt 18 is also brought down and passes through the overhanging edge, as shown. As the bolt thus descends through the opening 23 in the overhanging edge, its beveled edge or incline 24 comes in contact with arm 29, Fig. 8, as hereinbefore described, and through the movement of said rock-lever, caused by such contact, slide 35, attached to one arm of said lever, is actuated to raise and support the block 13, as before described, against the under side of the material held in the clamp, while the cutter is brought to bear upon the upper side of the material, between the arms of the clamp, and over and upon said block. The descent of bolt 18 through the edge of the bed forces hook 26 on lever 27 out of the path of its projection 25 until the same has descended below the point of said hook, when, by the preponderance of the handle of lever 27, it rocks upon its fulcrum 46, and thus brings said hook over and upon the projection 25, thereby interlocking said lever and bolt. Pressure now being applied by the operator to the hand-lever 28, the cutter 52 in bar 16 is by the connection thus formed forced down through the material upon the block, thereby cutting the button-hole as required, while the block is, through the means described and by the same pressure, firmly held in position beneath the goods and the cutter. Now, by raising the levers 27 and 28, bolt 18 and its bar 16 are released from the depressing devices and may be swung up into their resting position, before described, and out of the way of the cloth-clamp. The levers 27 and 28 meanwhile rest, the former upon its supporting-pin 49 and the latter in the lower part of the bracket 44, Figs. 1 to 3, and in such relation to each other as to be conveniently manipulated by the operator.

It is practically necessary, in order to meet the requirements of different materials and the

slight but unavoidable variations in the fitting of the clamps in different machines, to have some means of adjusting the cutter relative to its bearing upon the block to secure a proper centering and location of the hole in the jaws of the clamp. Such adjustment has hitherto been effected by regulating the position of both the clamp and the cutter, the former by means of an adjustable slide in the work-plate provided with a screw-fastening and having a hole into which the feed-pin of the clamp dropped, thus rendering the position of the clamp on the work-plate adjustable in the direction of the length of the cutter-block, and the latter by a movement of the cutter-bar bracket on the machine-bed, thus making the cutter adjustable laterally on the block. My improved method of effecting such adjustment relates wholly to a movement of the cutter in any desired direction, and is illustrated in Figs. 6 and 7. The hub 50 of the cutter-bar is centrally bored out to receive the shank or stem 51 of the cutter 52, the circular hole in the hub being considerably larger in diameter than the diameter of the cutter-stem, as shown. Upon the cutter-stem is fitted a collar or washer, 53, which rests upon the back of the blade 52, and when in such position the stem is passed up through the hole in the hub, when another washer, 54, fitted to said stem, is placed thereon and resting on the top of the hub, when the whole is secured in position and upon the hub by a nut, 55, threaded onto the upper end of the cutter-stem, as shown. The washers are made nearly or quite as large in diameter as the hub, and being centrally fitted to the stem of the cutter, as shown, they are movable with the same horizontally in any direction desired to the extent of the circular space within the hub which surrounds such stem, and consequently the blade 52 may be so adjusted to any required position upon the block 43 to secure a properly centered or located cut in the material between the jaws of the cloth-clamp when the cutter and block are brought together by the means and in the manner hereinbefore described, and when the stem of the cutter is so adjusted in said hub to the desired position, nut 55, being turned down upon washer 54, will draw the back of the cutter-blade against washer 53 and the washer against the under side of the hub, and thus will firmly clamp the hub between said washers and secure the stem in position within the hub and the cutter from displacement when in the act of cutting. In this manner a nice adjustment of the cutter relative to the block and clamp in any direction is easily and quickly accomplished.

Heretofore in cutting attachments to button-hole-stitching machines the cutter has been held in the outer end of the pivoted bar and the power applied to the bar between the cutter and the fulcrum or pivot of the bar, thereby requiring more power to be exerted thereon and greater strength in the parts. By my present improved method of applying the

power to the outer end of the cutter-bar and locating the cutter between such end and the fulcrum of the bar, as described and shown, I gain intensity of force on the cutter, thus requiring less exertion on the part of the operator in cutting the hole and less strength in the parts, which may be lighter and more cheaply constructed, and are more durable in practical use.

There is also an important advantage in my present improvement over the usual cutting attachments, in cutting the button-hole by means of a cutter and block brought together through the bed of the machine, inside of the inner circumferential line of the path of the feed-wheels, as hereinbefore described, thus avoiding a passage through the wheels and the necessity of adjusting the position of the same every time a button-hole is cut.

What I claim is—

1. In a button-hole cutting and stitching machine, the combination, with a hub, 11, of a cutter-block and a coacting cutter arranged to operate within said hub and inside the inner path of the feed-wheels, substantially as described.

2. In a button-hole-cutting mechanism, the combination of a bar, 16, formed with a transverse passage in the hub 50 thereof, and the cutter 52, having a shank, 51, of a size which admits of a lateral movement thereof in all directions when centrally inserted in the hole in said hub, and devices for seating and securing said cutter and its shank to said bar, substantially as and for the purposes specified.

3. In combination, hub 11, formed with an opening, 12, block 13, fitted to move and be operated in said opening, and slide 35, arranged

upon suitable guideways beneath said block, and provided with means for actuating the same, and through it the said cutting-block, substantially as and for the purposes specified.

4. In combination, cutter-bar 16, pivoted to the upper side of the machine-bed, lever 30, pivoted to the under side thereof, bolt 18, pivoted to the free end of the cutter-bar and constructed and arranged to operate said lever, spring 36, connected and arranged to return the said lever when released by said bolt, and slide 35, actuated thereby, substantially as and for the purposes specified.

5. In combination, bolt 18, pivoted to the free end of the cutter-bar, hand-lever 28, pivotally supported by the machine-bed, and interlocking lever 27, pivoted to said hand-lever and formed and arranged to engage and interlock with said bolt, substantially as and for the purposes specified.

6. In combination with the bed of a button-hole-stitching machine, a cutter-carrying lever, 16, and an actuating-lever, 28, both pivoted to said bed, and devices whereby said levers may be connected and disconnected, substantially as and for the purposes specified.

7. In combination with the bed of a button-hole-stitching machine, the cutter-lever 16, pivoted thereto, the actuating-lever 28, also pivoted to the bed and detachably connected with the free end of lever 16, the cutter-block 13, arranged in said bed, and the coacting cutter 52, secured to and actuated by lever 16, all substantially as and for the purposes specified.

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