

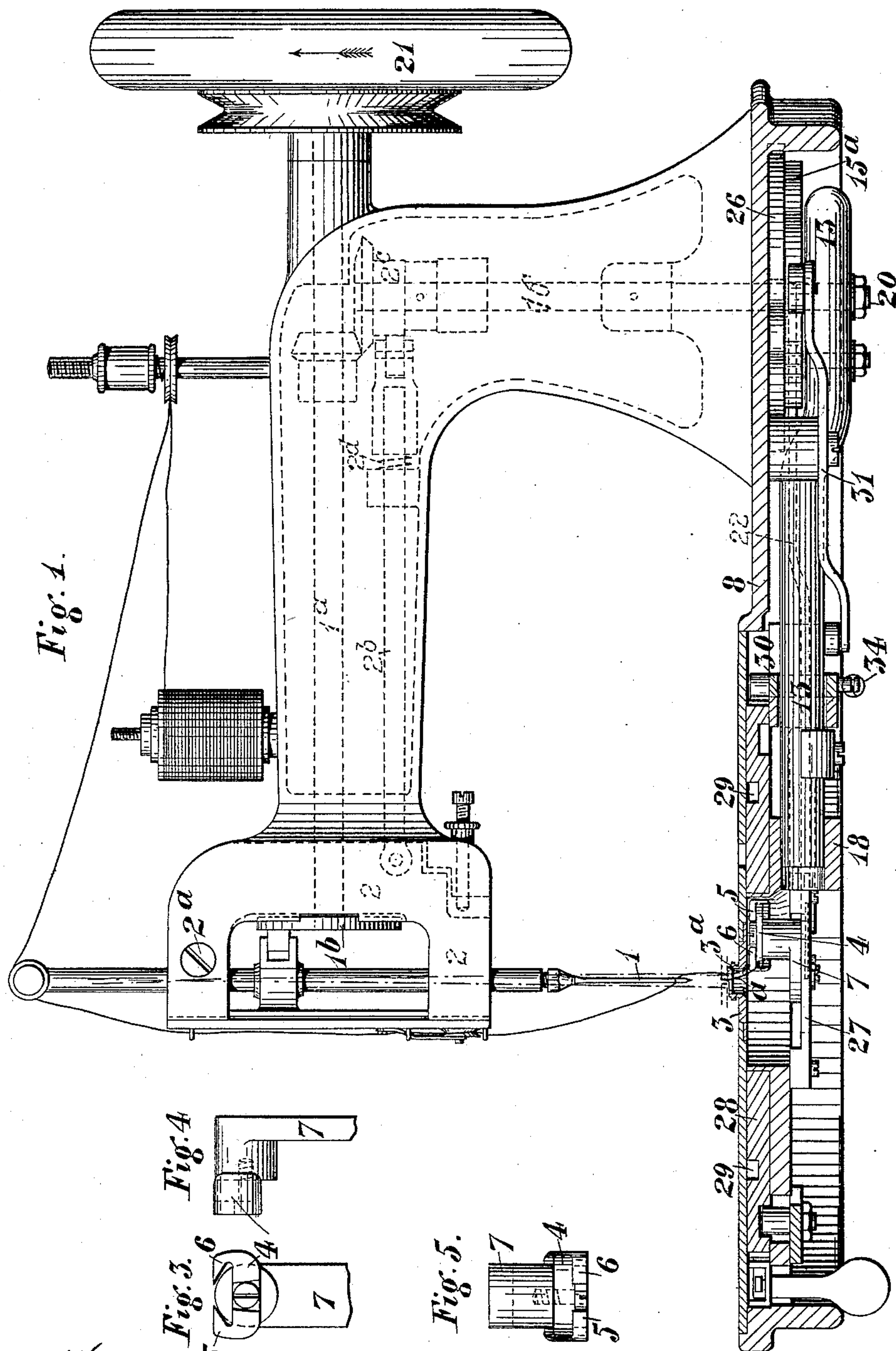
(No Model.)

3 Sheets—Sheet 1.

A. HELWIG.
SEWING MACHINE.

No. 465,132.

Patented Dec. 15, 1891.



Witnesses
C. M. Hule
H. E. Peck

Inventor
A. Helwig
per J. E. Dufferty.

(No Model.)

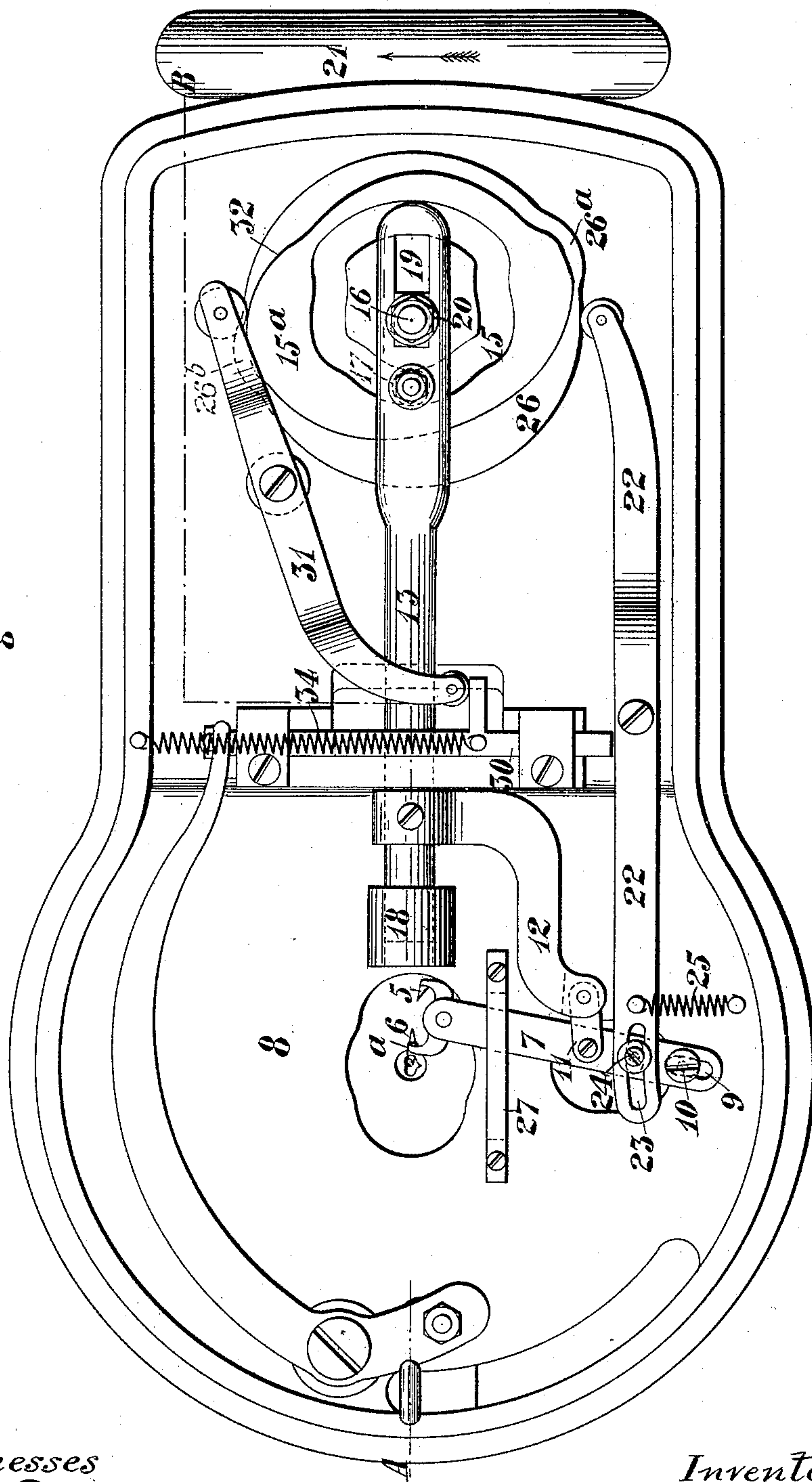
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Fig. 2.



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(No Model.)

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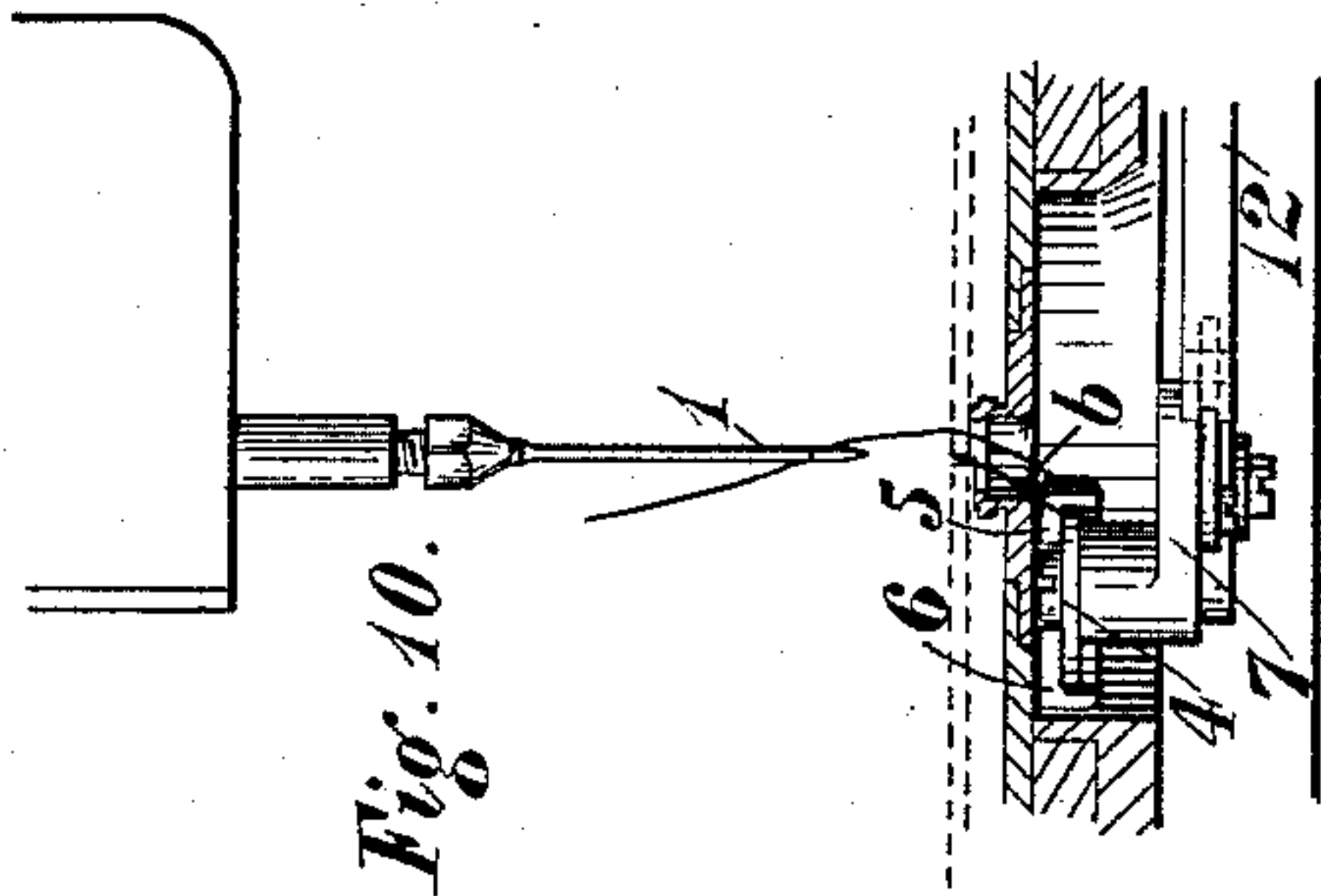


Fig. 10.

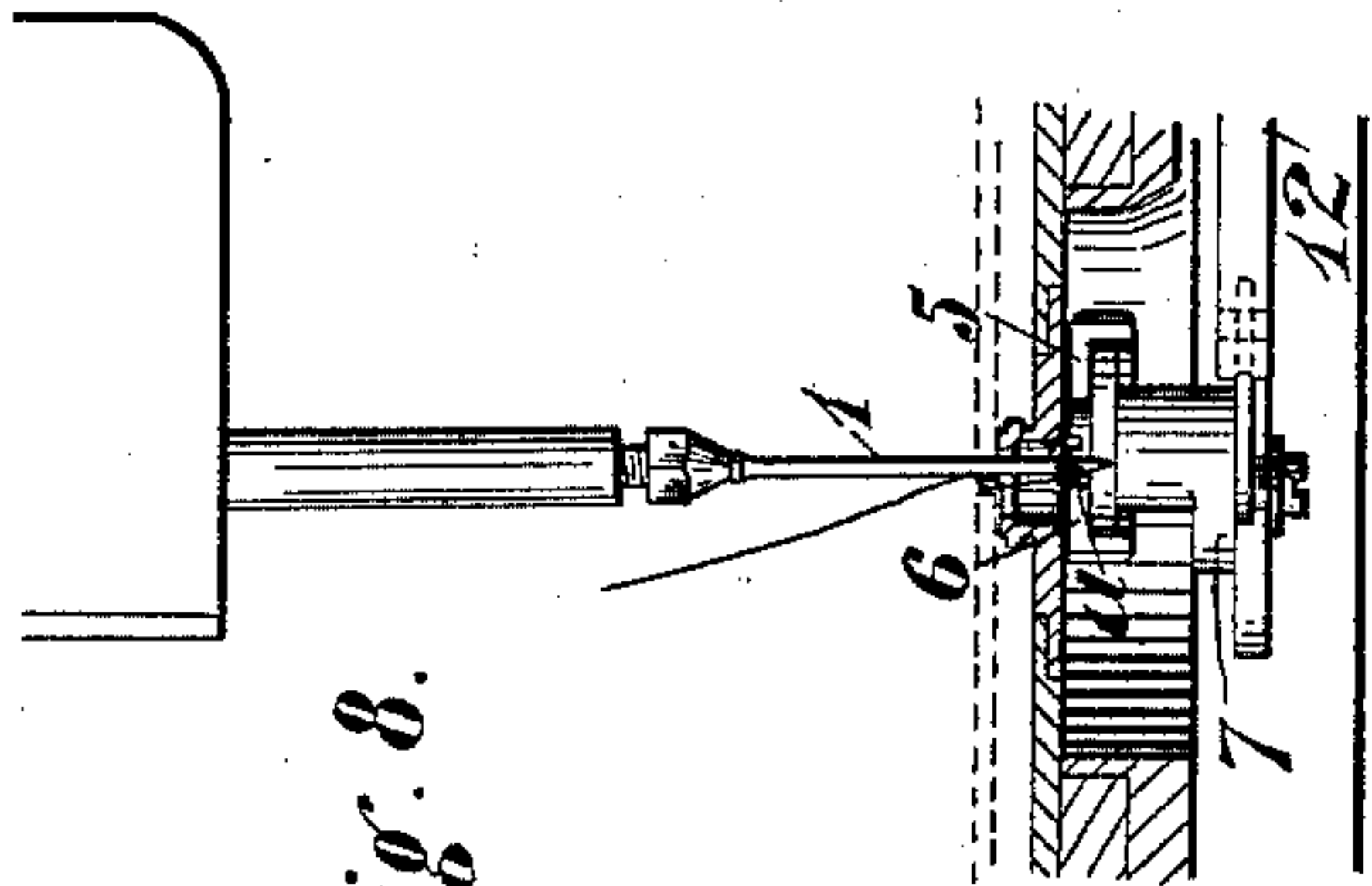


Fig. 8.

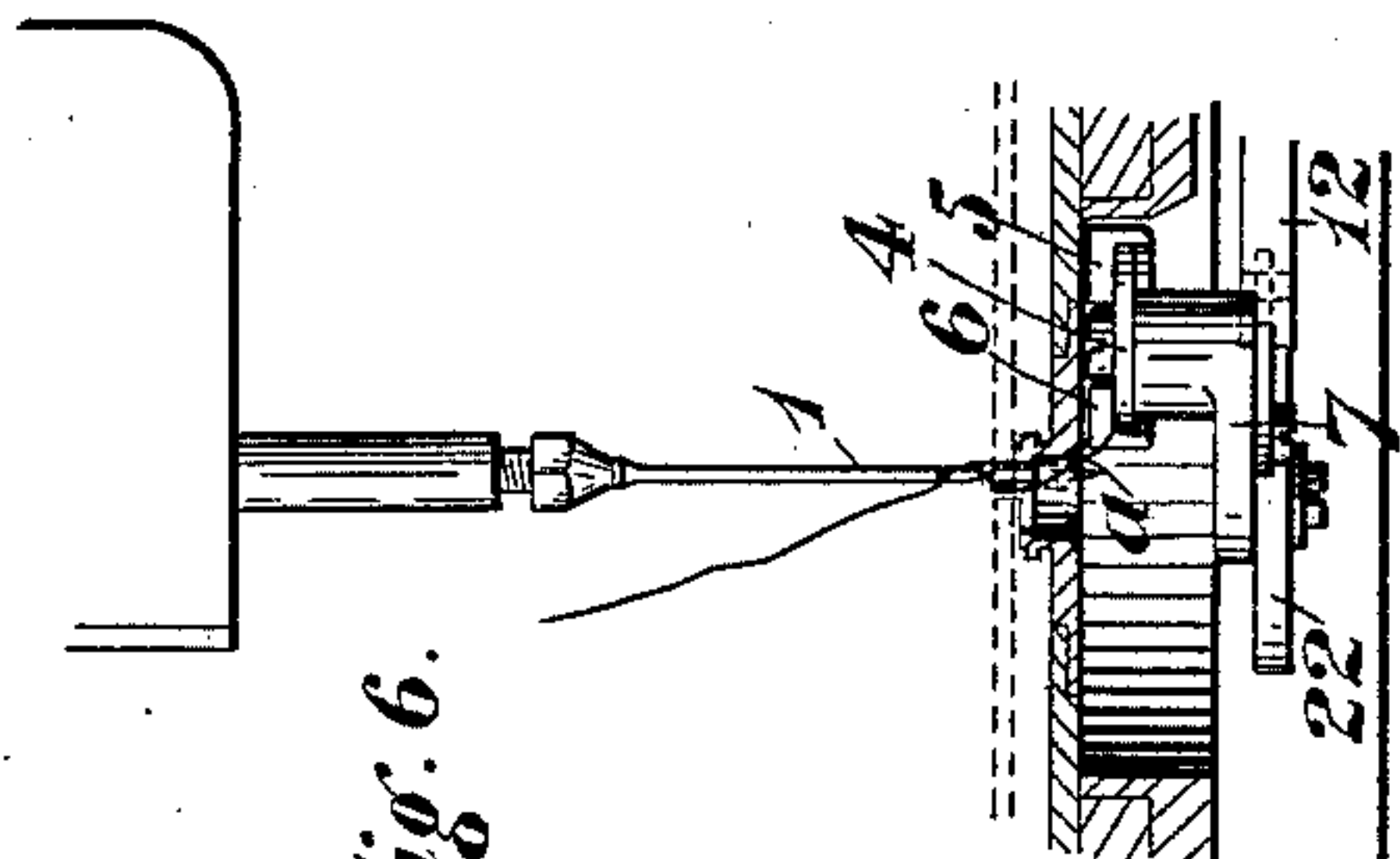


Fig. 6.

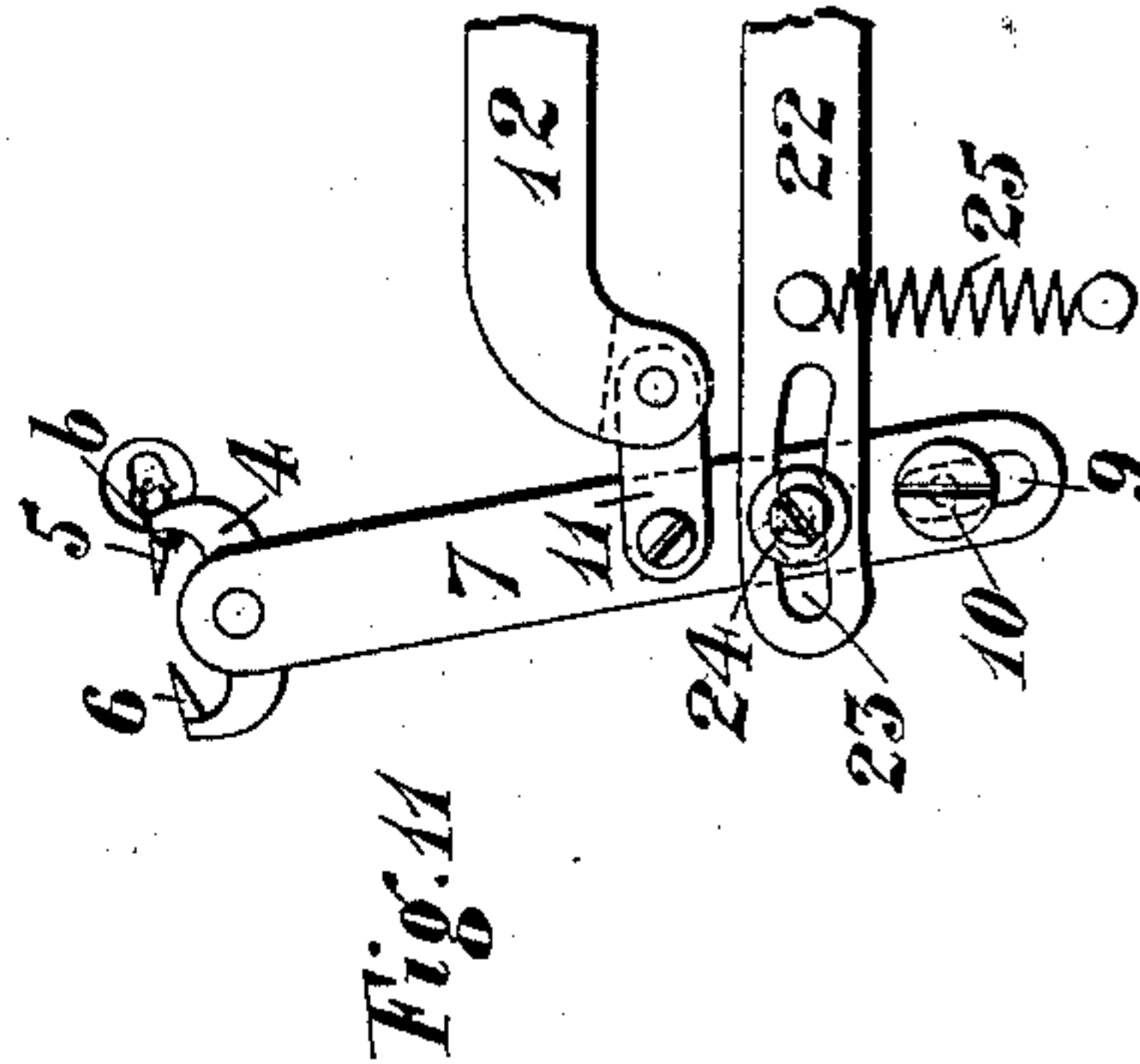


Fig. 11.

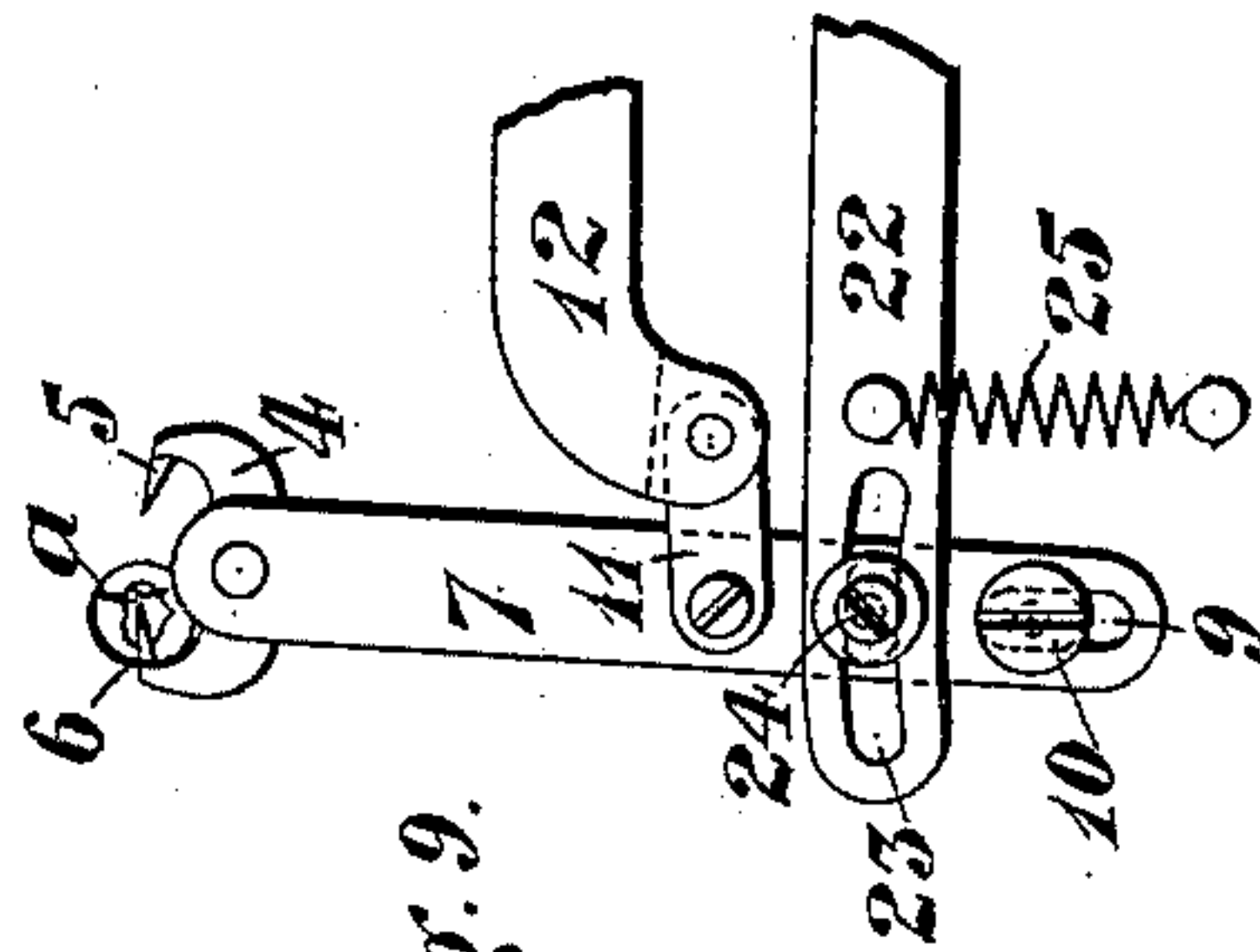


Fig. 9.

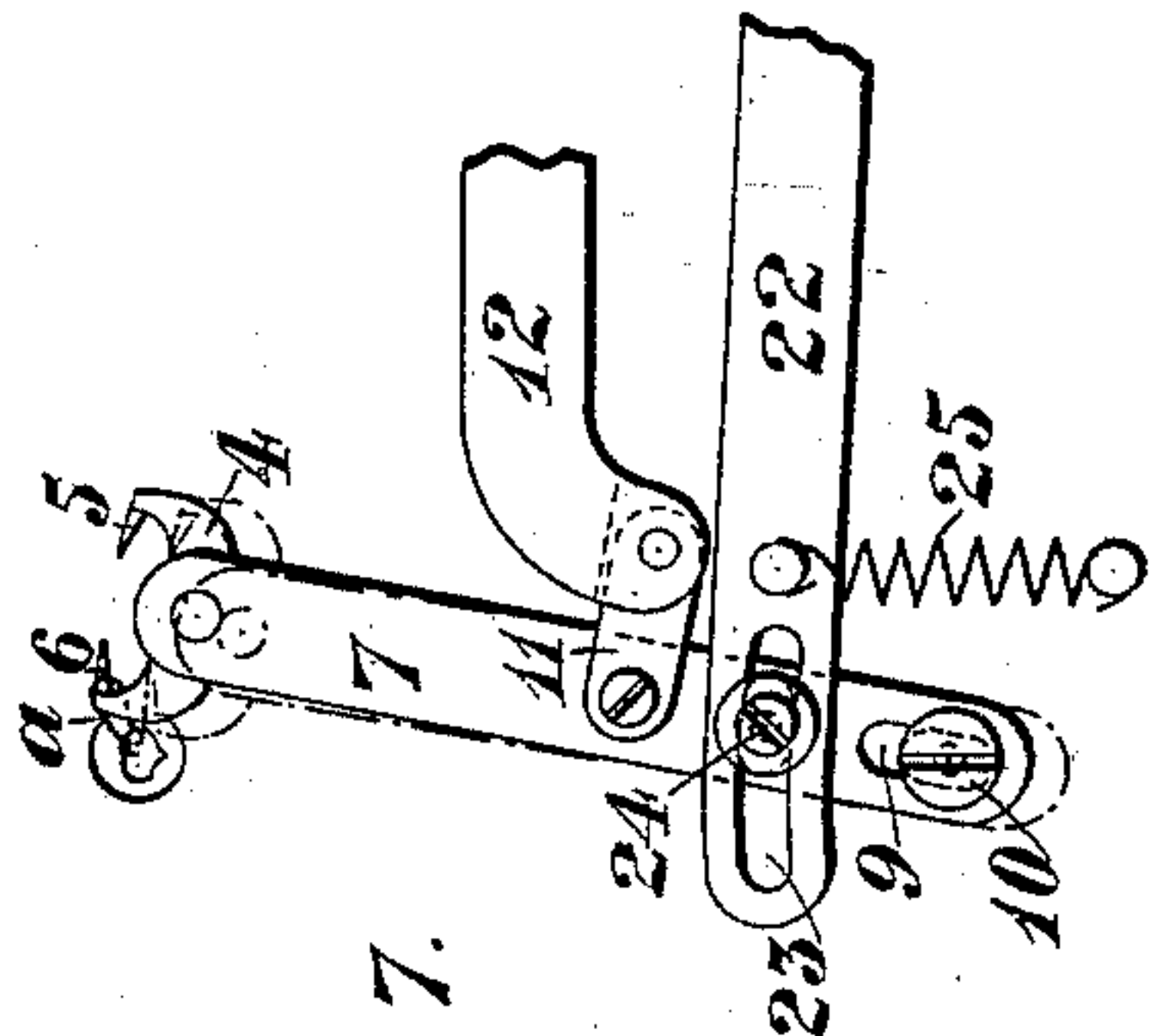


Fig. 7.

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UNITED STATES PATENT OFFICE.

ARTHUR HELWIG, OF LONDON, ENGLAND.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 465,132, dated December 15, 1891.

Application filed October 24, 1890. Serial No. 369,251. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR HELWIG, a subject of the Queen of Great Britain and Ireland, residing at Kentish Town, London, in the county of London, Kingdom of Great Britain and Ireland, have invented Improvements in Button-Hole Sewing-Machines, of which the following is a specification.

This invention has reference to improvements in button-hole sewing-machines. In such a machine, according to this invention, there is used in conjunction with a needle having an endwise and a swinging or side-to-side movement for sewing with a single thread a peculiarly-formed combined looper and spreader having two oppositely-arranged hooks, pins, or projections, (hereinafter called "hooks,") and to which is imparted an oscillating or a reciprocating motion in a horizontal plane for the purpose of causing the hooks to engage alternately with loops of threads from the needle, and also motion in another direction in the same plane for the purpose of first causing the hook that has engaged a loop of thread to move the loop into a position in which it will be entered by the needle when the same makes its next downward stroke and afterward to move the hook out of the path of the needle, which will then disengage the loop from the hook and form a fresh loop, which is in like manner engaged by and moved by the second hook, which is operated in a similar manner to the first.

In order that my invention may be readily understood, I will proceed to describe the same with reference to the accompanying drawings, in which—

Figure 1 is an elevation, partly in section on the line A B, Fig. 2; and Fig. 2 is an under-side view of a button-hole sewing-machine according to this invention. Figs. 3, 4, and 5 are plan, side, and end views, respectively, of the combined looper and spreader and part of a lever for carrying the same. Figs. 6 to 11, inclusive, are diagrammatic views illustrating, approximately, the relative positions of the needle and combined looper and spreader at various stages of their movements, as hereinafter described.

1 is a sewing-needle carried by a needle-bar,

to which a reciprocating motion is imparted by a driving-shaft 1^a and crank-disk 1^b. A swinging or side-to-side motion is also imparted to the needle and needle-bar by a block 2, through which the needle-bar works. This block is pivoted at 2^a and oscillated by a rod 2^b, that is moved endwise in one direction by a rotary cam 2^c and in the opposite direction by a spring 2^d. This mechanism (shown in dotted lines in Fig. 1) is such as is commonly used for imparting the motions mentioned to the sewing-needles of button-hole sewing-machines and forms no part of my present invention. 3 is the needle-plate, formed with the usual perforated stud or pivot 3^a, through which the sewing-needle passes.

4 is my novel form of combined looper and spreader, having two oppositely-arranged hooks 5 6. This combined looper and spreader in the arrangement shown is carried by a lever 7, arranged in a horizontal plane below the bed-plate 8 of the machine. To this lever an oscillating and a longitudinal or radial motion are imparted. The lever 7 is formed with a slot 9, through which extends a pivot-pin 10, screwed into the bed-plate 8. The lever is connected by a link 11 and arm 12 to a rod 13, to which an endwise or reciprocating motion is imparted by a cam-groove 15, formed in a plate 15^a, fixed to a vertical driving-shaft 16 and acting against a roller 17, fixed to the rod. By these means the lever 7 is caused to make a complete to-and-fro oscillating motion about the pin 10 as a center for each rotation of the driving-shaft 16 and while the needle is making two complete downward and upward strokes. The forward end of the rod 13 is supported by a bearing 18. The rearward end of the rod is slotted at 19 for the passage of the driving-shaft 16, which, by means of a nut and washer 20, serves to support this end of the rod. The vertical shaft 16 is driven from the main driving-shaft 1^a and wheel 21 in the usual manner. Endwise or radial motion is imparted to the lever 7 by means of a lever 22, which at one end is slotted at 23 and engages a pin 24, fixed to the lever 7, and at the other end carries a roller that is caused to bear by the ac-

tion of a spring 25 against a cam-plate 26, also fixed to the vertical driving-shaft 16 and formed with cam projections 26^a and 26^b.

27 is a guide-bar for the combined looper and spreader end of the lever 7.

In Figs. 1 and 2 the combined looper and spreader is shown in the positions it occupies when fully moved over to the right-hand side, its hook 6 being shown engaged with a previously-formed loop *a* of thread extending from the material being sewed. The needle is shown in its uppermost and central position and about to move into the position indicated and make a downward stroke. If the machine be now set in motion by revolving the wheel 21 in the direction of the arrow, the lever 7 will be moved forward and endwise into approximately the position shown in full lines in end and plan views in Figs. 6 and 7, respectively, by the cam projection 26^a, so as to bring the loop *a* of thread into a position to be entered by the now-descending needle. When the cam projection 26^a passes beyond the adjacent end of the lever 22, the combined looper and spreader will be caused by the action of the spring 25 to move backward and endwise into approximately the position shown in dotted lines in Figs. 6 and 7, so as to move the hook 6 out of the path of the descending needle. The combined looper and spreader lever will then be turned about the pin 10 by the arm 12 into the position shown approximately in Figs. 8 and 9, when the needle will have entered sufficiently far into the loop *a* of thread to disengage it from the hook 6. The new loop *b* of thread formed immediately afterward by the needle will then be engaged by the hook 5, which in carrying this loop to the left into the position shown approximately in Figs. 10 and 11 and thus extending this loop will take up the loop *a* previously disengaged and tighten the stitch formed by this loop.

In Figs. 10 and 11 the combined looper and spreader and needle are shown in their extreme left-hand positions, the needle being about to descend. The combined looper and spreader lever will then be moved forward and endwise, as before, but in this case by the cam projection 26^b, in order that the hook 5 shall bring the loop *b* into the path of the descending needle, and after the needle has entered the loop the lever will be moved backward and endwise, as before, to move the hook 5 out of the path of the needle, after which the combined looper and spreader will be caused to turn to the right and into the position shown approximately in Figs. 1 and 2. During this movement to the right the needle will farther enter the loop *b* and disengage it from the hook 5, and the next succeeding loop of thread will be entered by the hook 6, which in carrying the new loop to the right will draw up the disengaged loop *b* and tighten another stitch. The above-described operations will

be repeated during the continued rotation of the machine.

With a combined looper and spreader constructed and operating in the manner described the loops of thread alternately taken up and held by its respective hooks are much shorter in length than those taken up and held by a rotary looper such as has heretofore been used in button-hole sewing-machines, thereby enabling each stitch to be drawn up and tightened by the looper alone and the use of an independent take-up such as has heretofore been necessary for this purpose to be dispensed with. Furthermore, as the length of thread drawn through the eye of the needle during the formation of each stitch is much less than usual, the friction of the thread and its consequent liability to fracture are reduced. As will be evident, the oppositely-arranged pointed parts of the hooks might consist of suitably-formed pins securely fixed to the other parts of the hooks.

A button-hole sewing-machine with combined looper and spreader such as described can be constructed with means such as are commonly employed for cutting button-holes in the material to be sewed, and also with a feed-plate for automatically feeding a clip or holder for the material to be sewed to effect the sewing around the edge of the button-hole; but these features form no part of my present invention.

In the drawings, 28 is the feed-plate with slot 29 for the purpose mentioned, the plate being operated by a pawl pivoted to a slide 30, that is moved in one direction by a lever 31 and cam 32, and in the other direction by a spring 34, in a manner well understood.

What I claim is—

1. In a button-hole sewing-machine, the combination, with a vertically and laterally movable needle and actuating mechanism therefor, of a combined looper and spreader having two oppositely-arranged hooks, a lever carrying said combined looper and spreader and pivoted by a pin-and-slot connection to the under side of the machine-bed, a reciprocating rod jointed to said lever, means for reciprocating said rod, a second lever jointed to said combined looper and spreader lever by a pin-and-slot connection, and means for periodically oscillating said second lever, substantially as herein described, for the purpose specified.

2. In a button-hole sewing-machine, the combination, with a vertically and laterally movable needle and actuating mechanism therefor, of a combined looper and spreader 4, having oppositely-arranged hooks 5 and 6, a lever 7, carrying said combined looper and spreader and jointed to the under side of the machine-bed by a pin-and-slot connection, a sliding rod 13, carrying an extension 12, a link connecting said lever and extension, a rotary plate 15^a, formed with a cam-groove 15 for re-

5 ciproating said rod, a lever 22, connected at one end by a pin-and-slot connection to said lever 7, a rotary cam-plate to move said lever 22 in one direction, a spring 25 to move said lever 22 in the opposite direction, and a shaft 16, driven from the driving-shaft of the machine and to which said cam-plates are secured, substantially as herein described, for the purposes specified.

10 3. The combination, with a laterally movable and reciprocating needle and its actuating mechanism, of a carrier mounted to have a compound movement in lines at right angles to each other, for the purpose set forth, 15 the combined looper and spreader mounted on said carrier and consisting of the opposite relatively-fixed hooks coacting with the needle, as set forth, the driving-shaft, a push-rod operated thereby to oscillate the carrier, 20 and a lever controlled by a cam on the shaft to move the carrier in the opposite direction, substantially as described.

4. In a single-thread sewing-machine, the combination, with a vertically and laterally 25 movable needle and actuating mechanism

therefor, of the combined looper and spreader having movements in planes at right angles to each other and composed of the carrier and the two opposite relatively-fixed hooks, driving mechanism, connections therefrom to said carrier arranged and constructed to move the looper and spreader to the right and left of the needle to alternately engage the thread, and mechanism, substantially as described, arranged and constructed to impart an intervening movement to the carrier after each movement to right or left of the needle and at right angles thereto to move the formed loop beneath the needle and to release the hook, as set forth. 30 35 40

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ARTHUR HELWIG.

Witnesses:

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