

No. 715,323.

Patented Dec. 9, 1902.

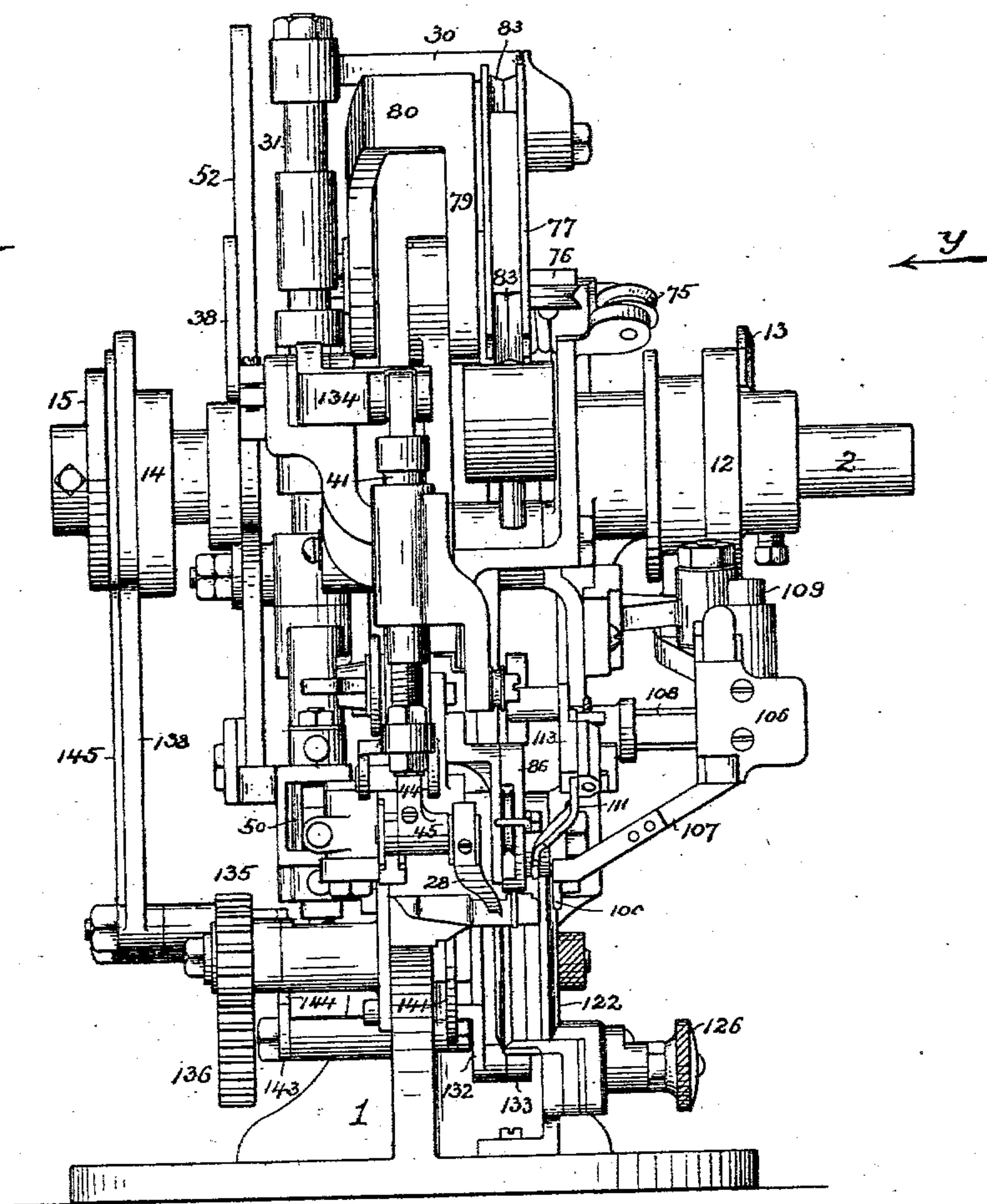
J. H. & J. B. URSBRUCK.
BOOT OR SHOE SEWING MACHINE.

(Application filed Aug. 6, 1900.)

7 Sheets—Sheet 1.

(No Model.)

Fig. 1.



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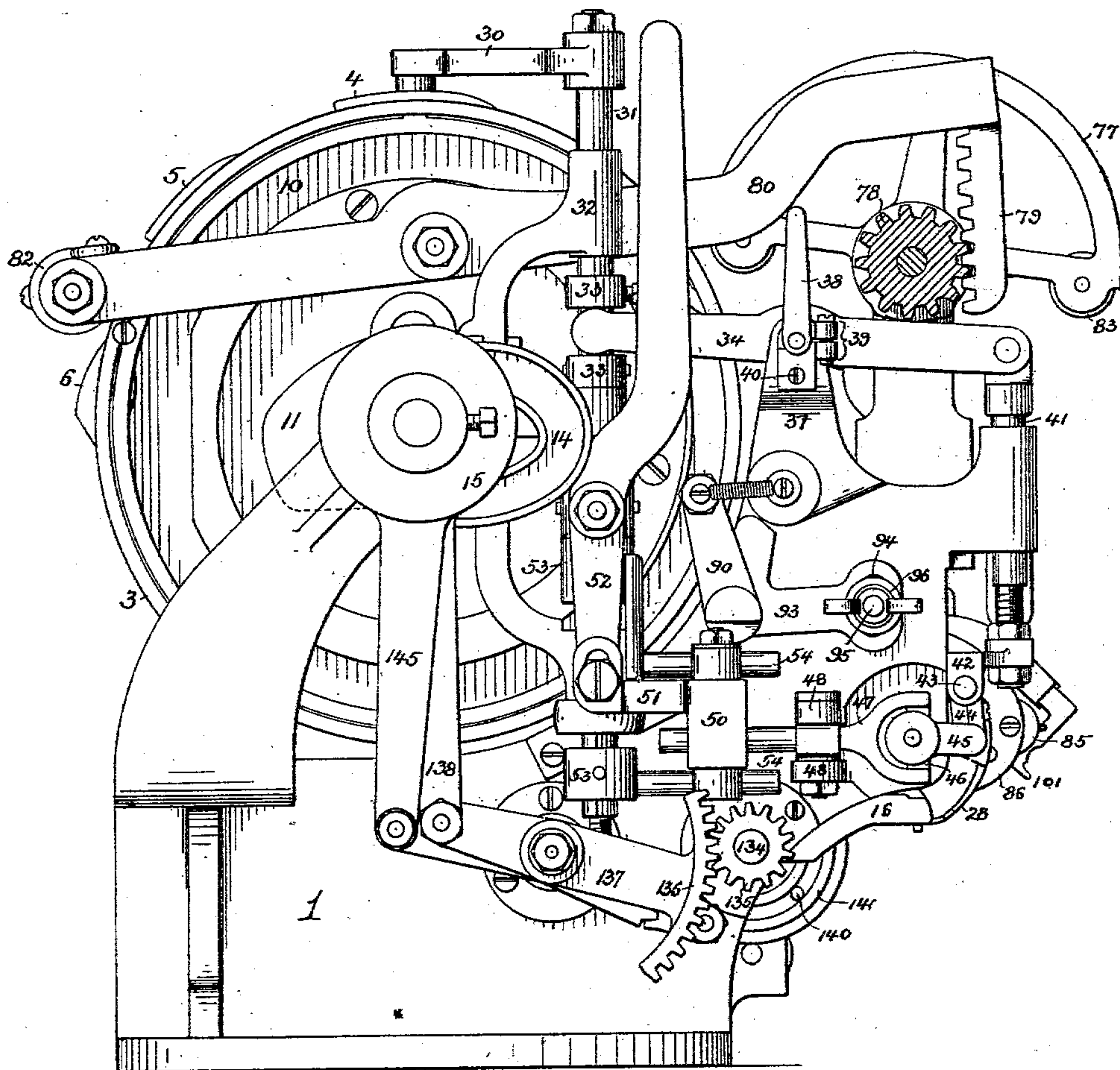
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7 Sheets—Sheet 2.

Fig. 2.



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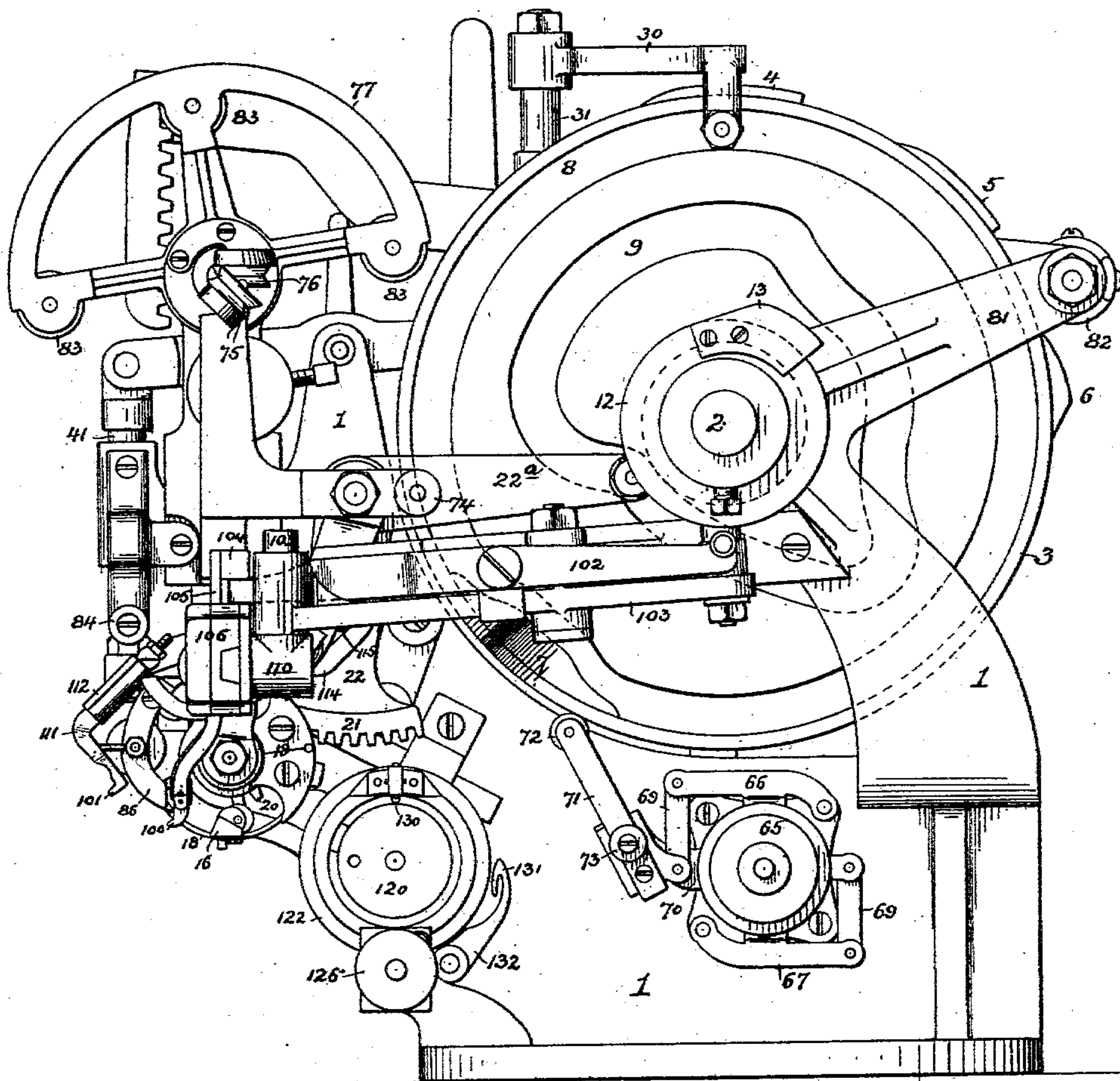
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7 Sheets—Sheet 3.

Fig. 3.



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Fig. 4.

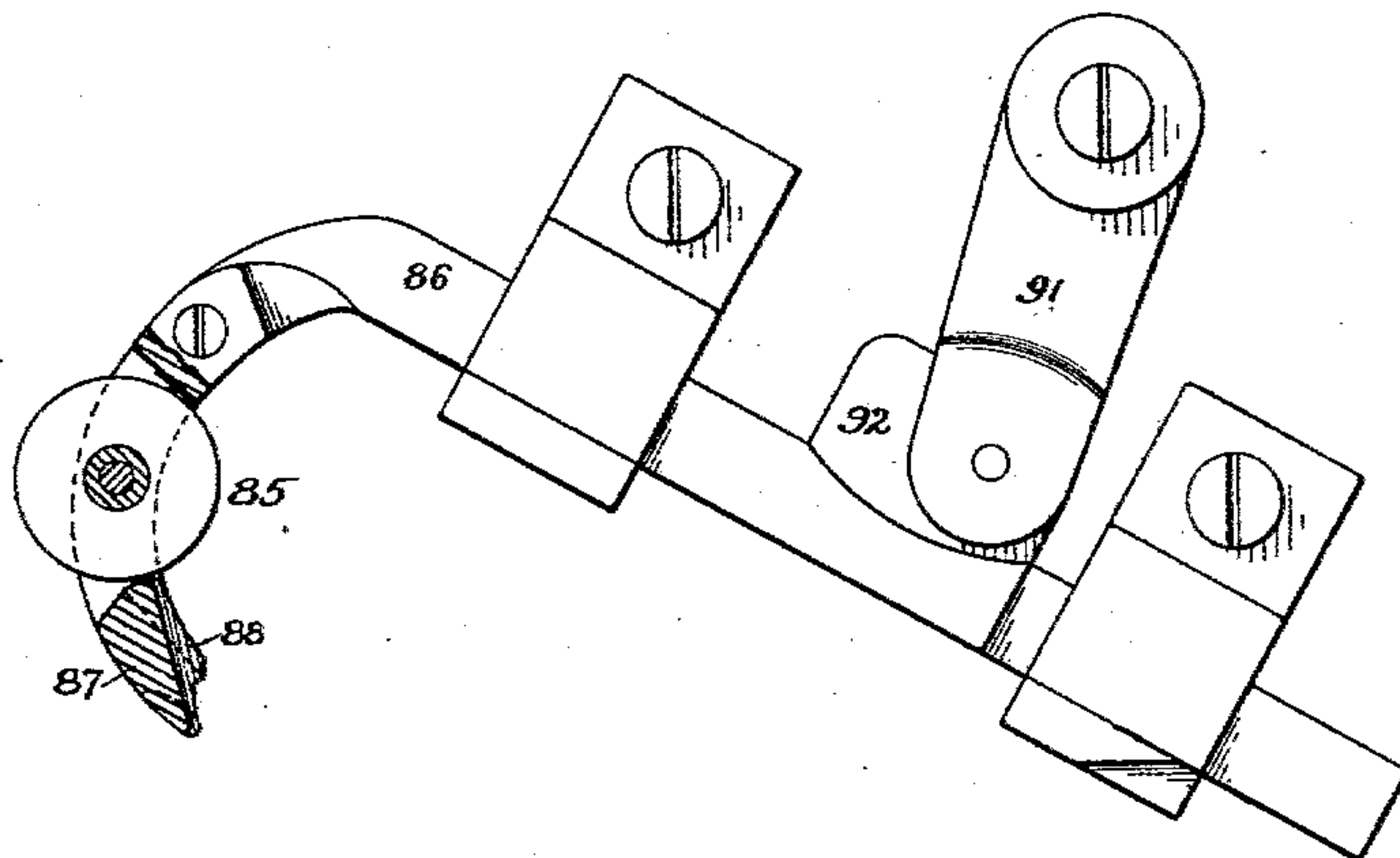


Fig. 5.

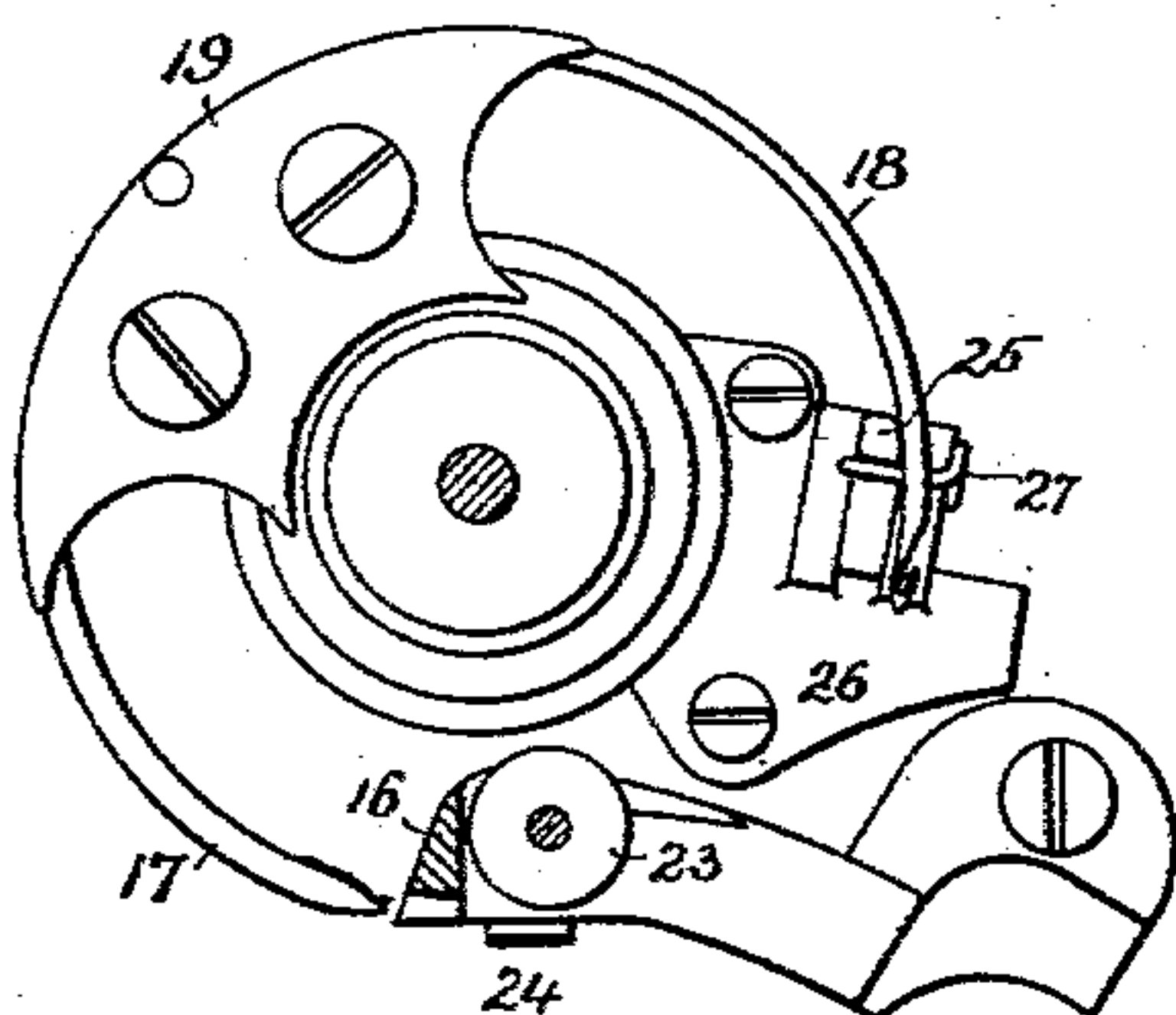
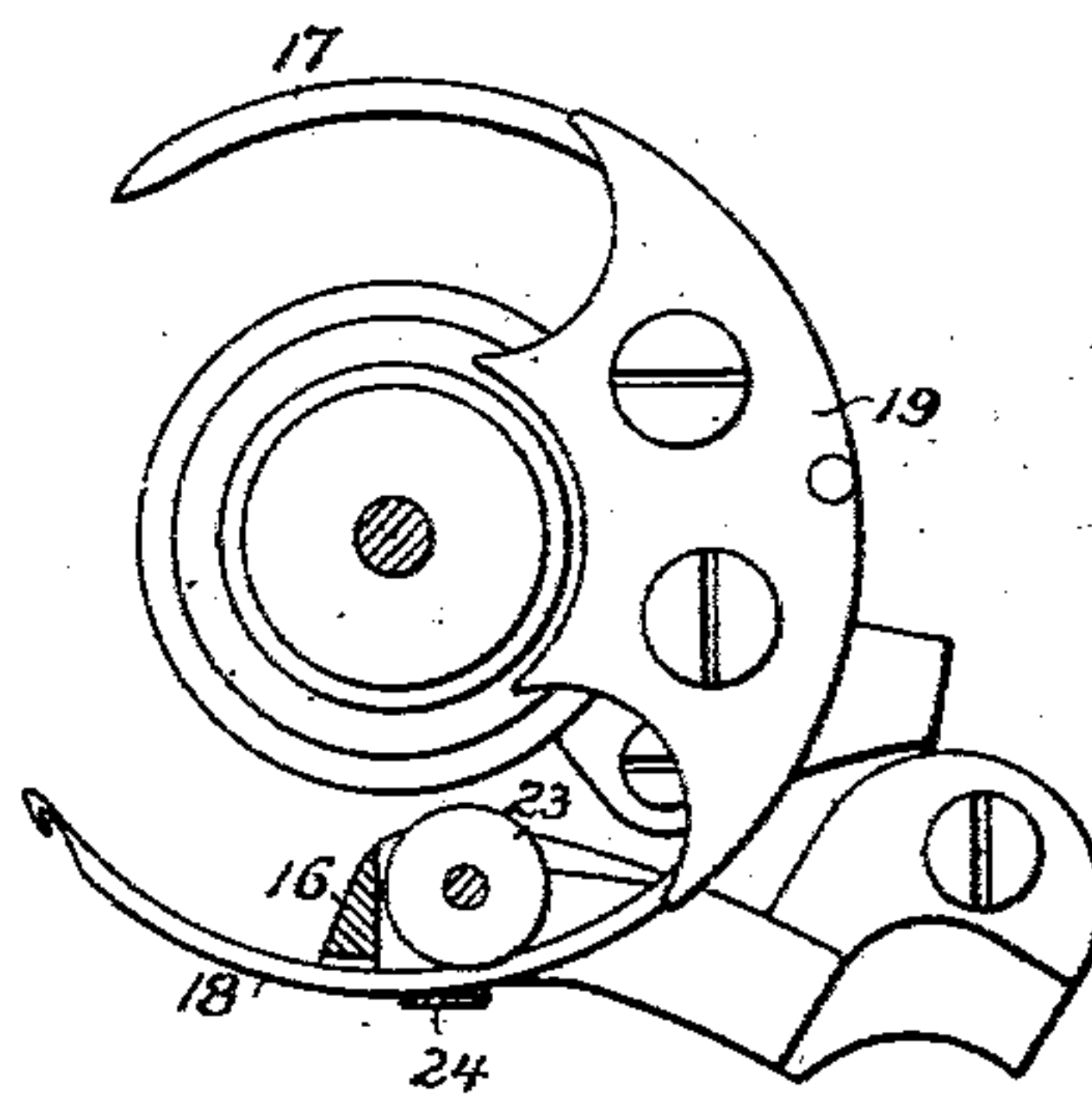


Fig. 6.



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Fig. 7.

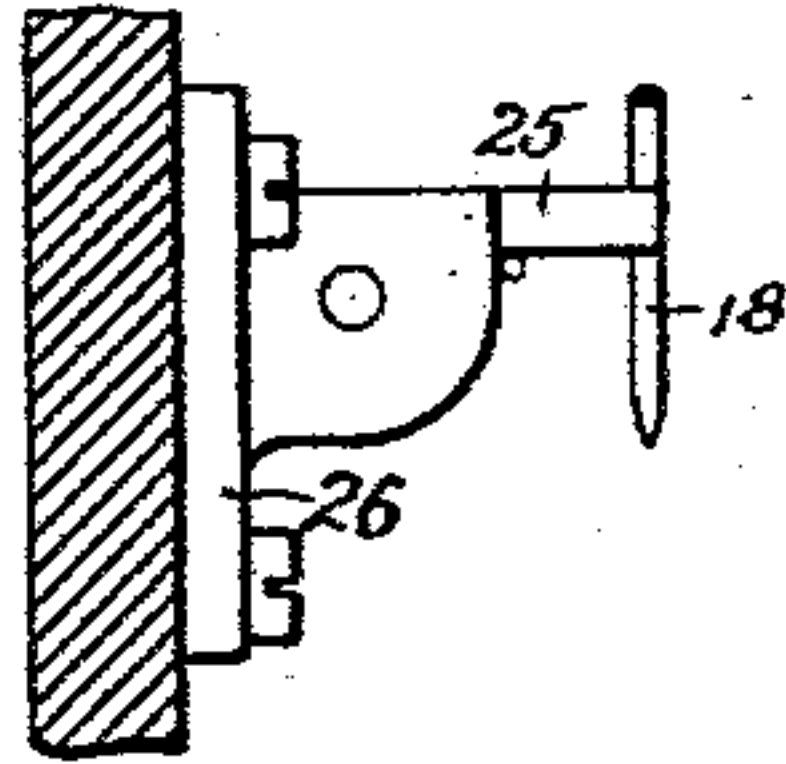


Fig. 8.

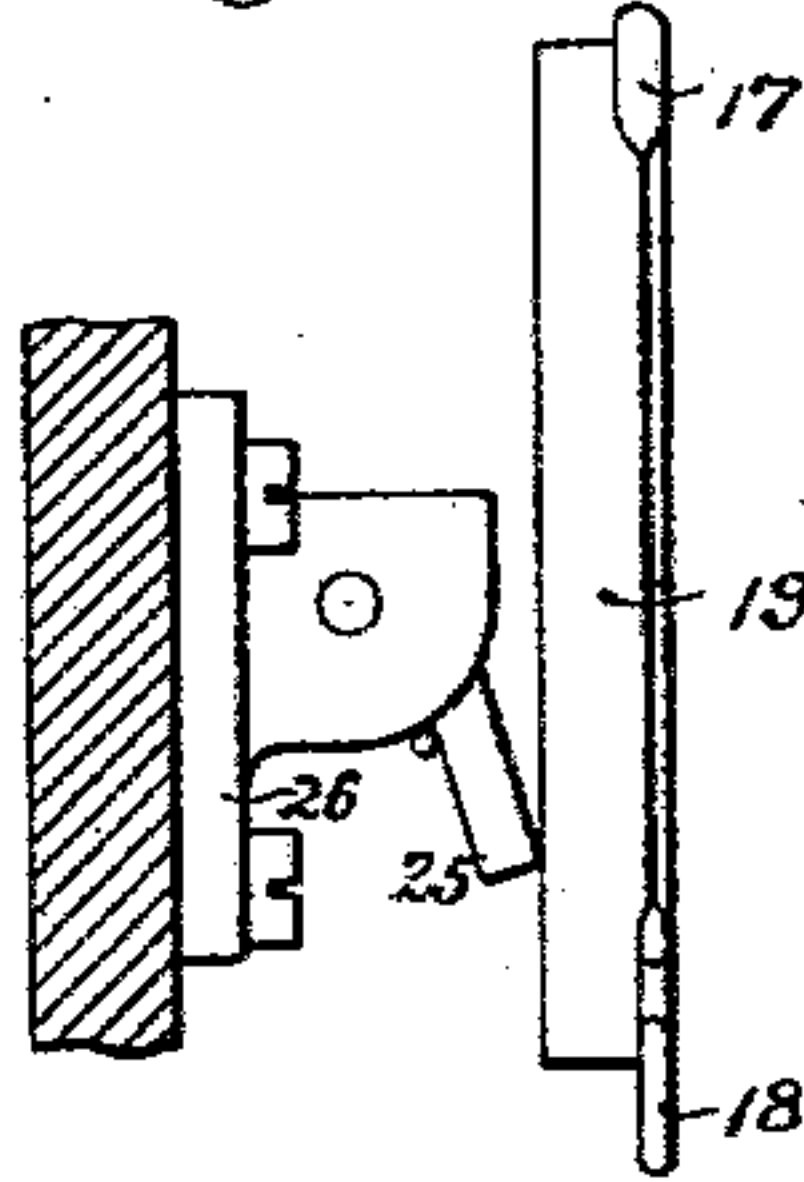


Fig. 9.

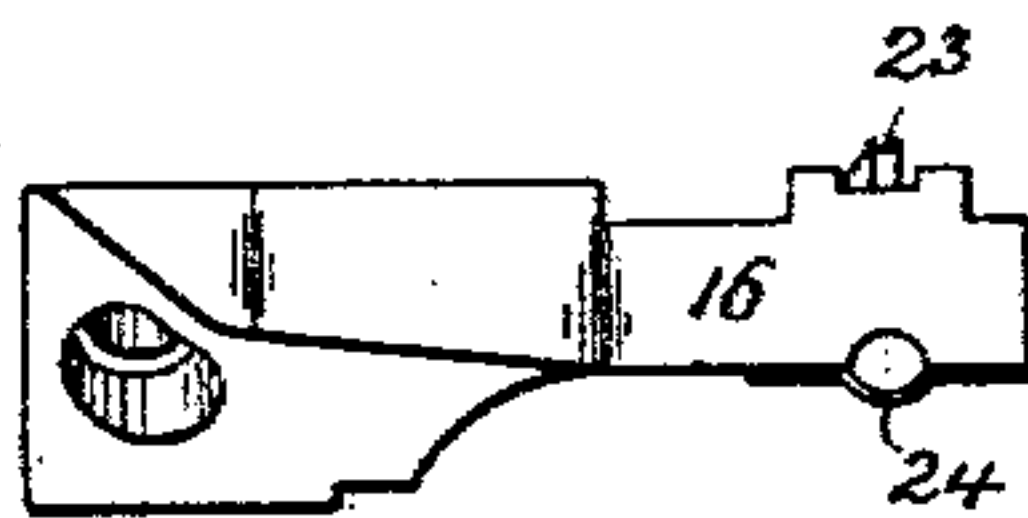


Fig. 10.

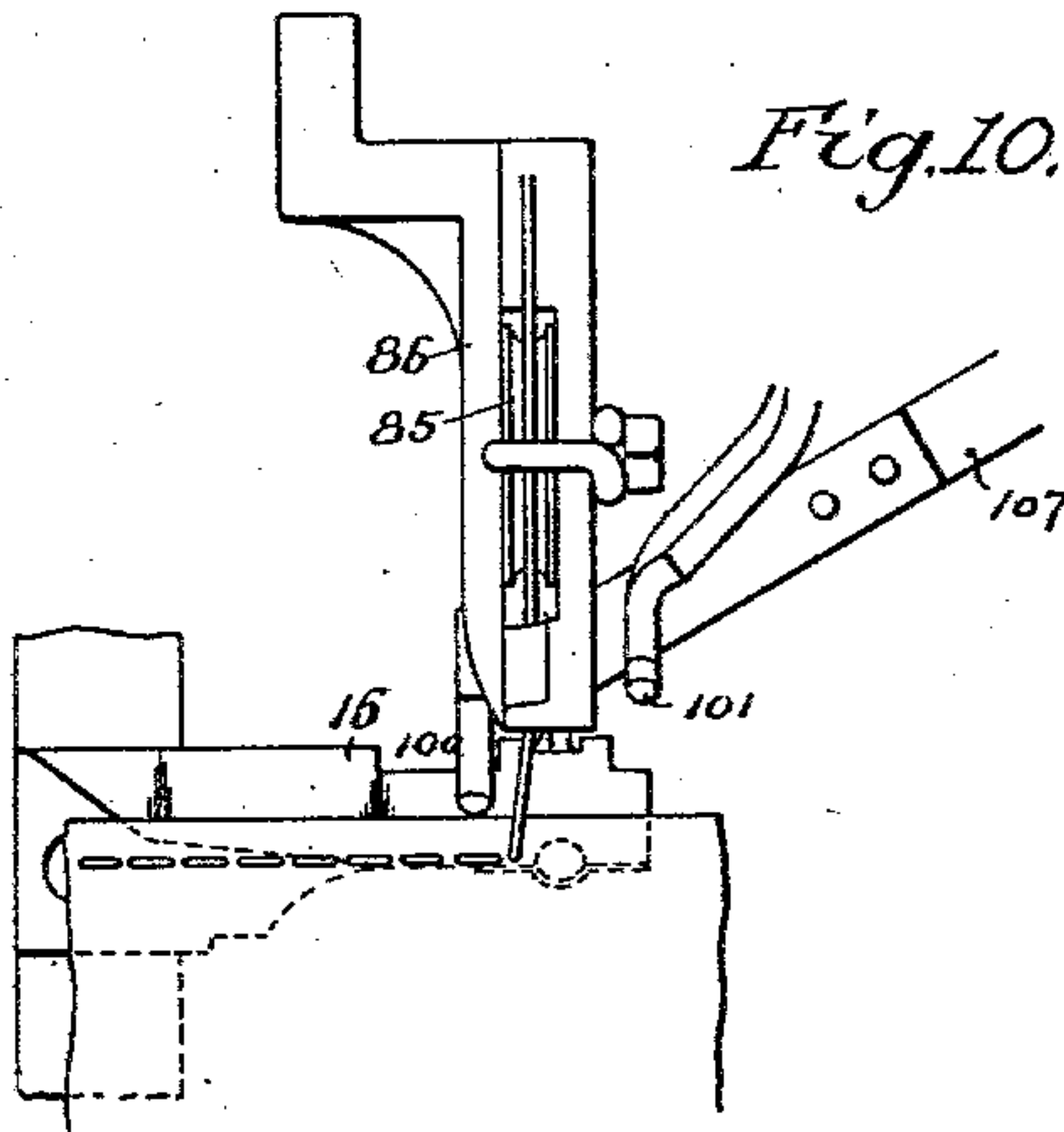


Fig. 11.

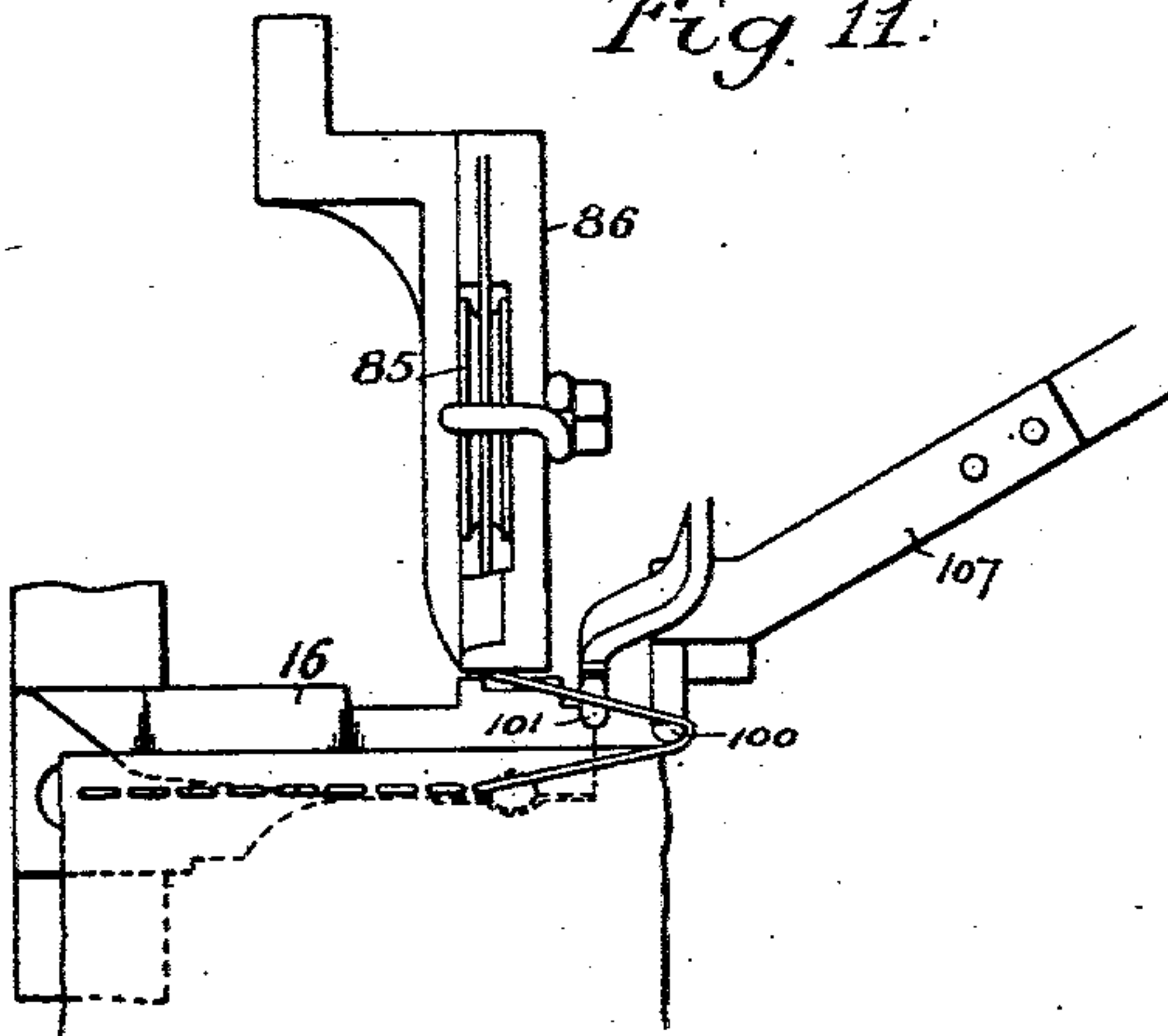
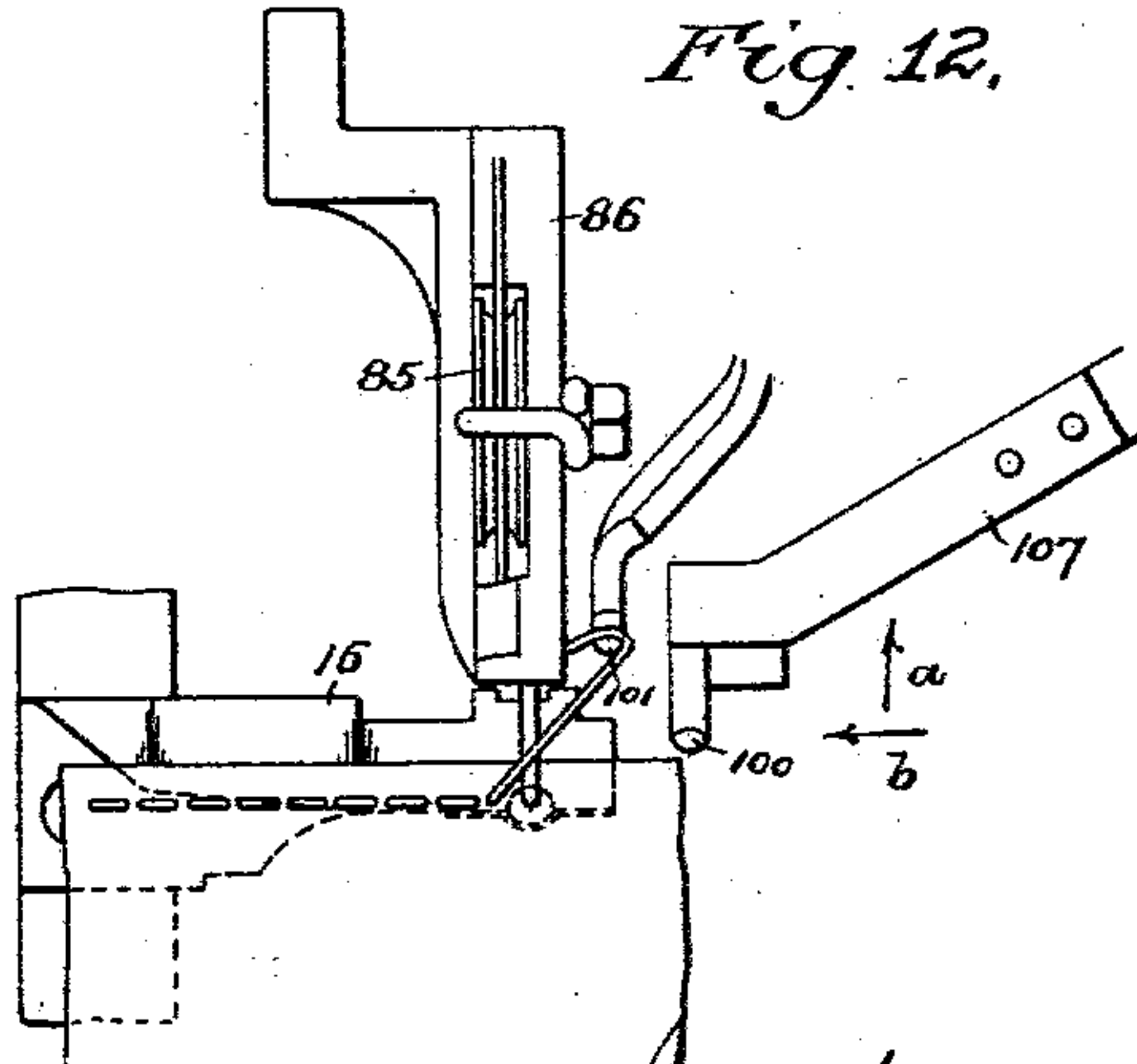


Fig. 12.



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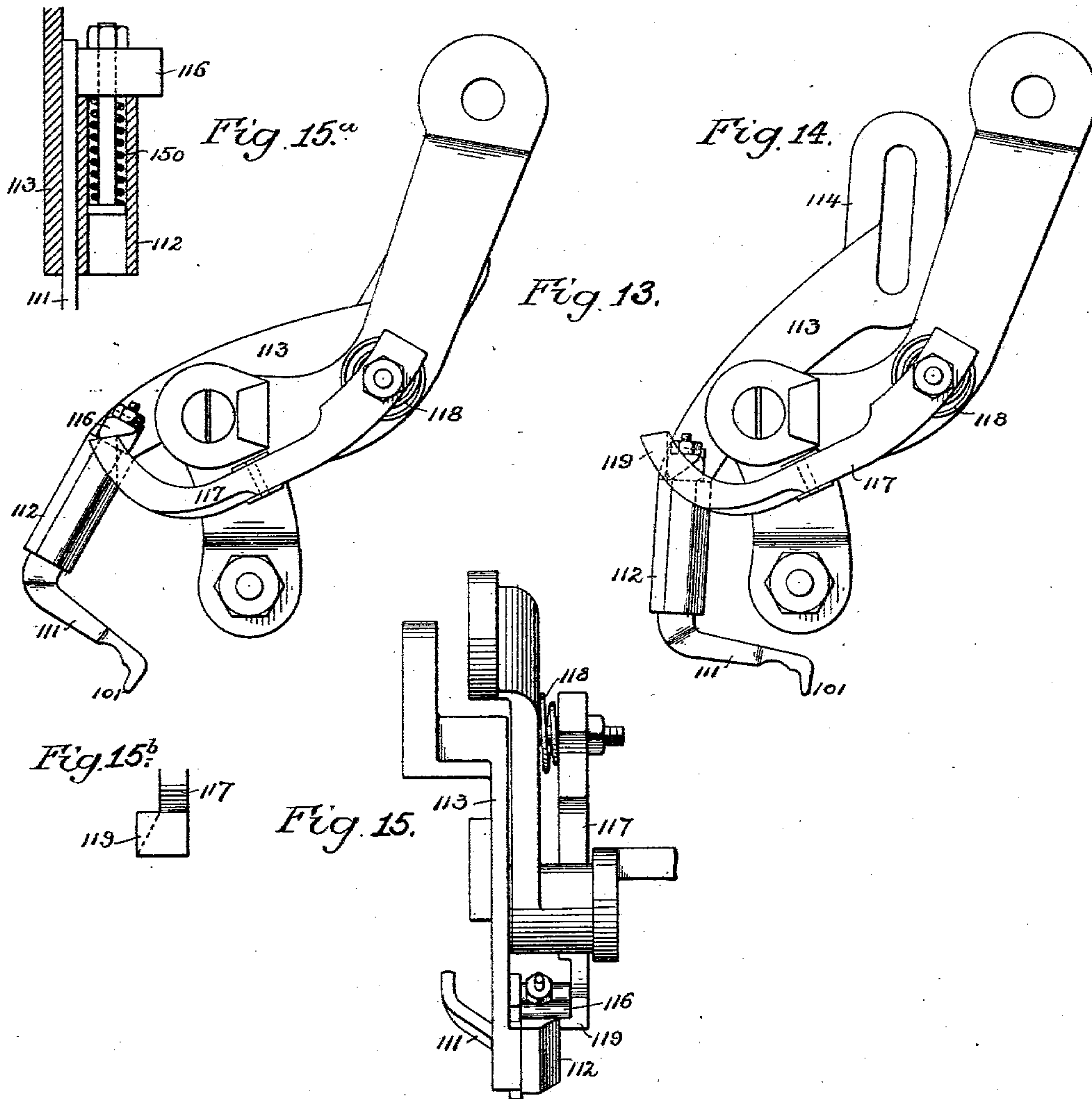
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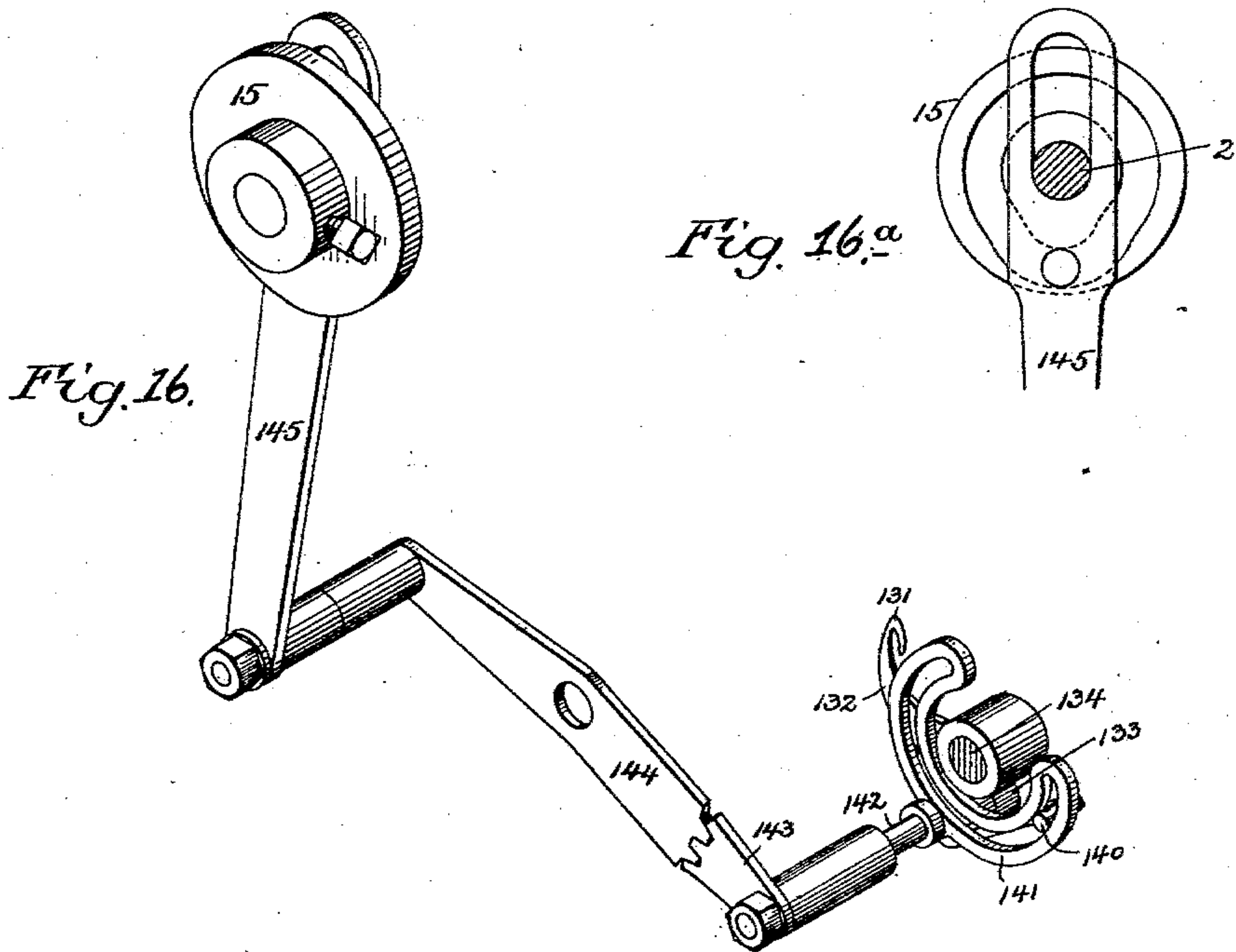
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7 Sheets—Sheet 7.



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UNITED STATES PATENT OFFICE.

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PENNSYLVANIA, ASSIGNORS OF ONE-HALF TO JOHN A. HUNTER
AND MARY A. HUNTER, OF PHILADELPHIA, PENNSYLVANIA.

BOOT OR SHOE SEWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 715,323, dated December 9, 1902.

Application filed August 6, 1900. Serial No. 26,071. (No model.)

To all whom it may concern:

Be it known that we, JOHN H. URSBRUCK and JOSEPH B. URSBRUCK, citizens of the United States, and residents of Philadelphia, Pennsylvania, have invented certain Improvements in Boot or Shoe Sewing Machines, of which the following is a specification.

Our invention relates to that class of boot and shoe sewing machines which use two threads and form a lock-stitch, the object of our invention being to provide a machine of this type in which all of the numerous operations essential for the perfect sewing of leather and other heavy materials can be accomplished by the use of mechanical elements as few in number and as compactly arranged as the necessities of the case will permit.

In the accompanying drawings, Figure 1 is a front view of a boot and shoe sewing machine constructed in accordance with our invention. Fig. 2 is a side view of the same looking in the direction of the arrow *x*, Fig. 1. Fig. 3 is a side view looking in the direction of the arrow *y*, Fig. 1. Fig. 4 is a side view, partly in section, of the device whereby the upper or needle thread is applied to the hooked or barbed end of the needle and the stitch is drawn tight against the work. Figs. 5 and 6 are views showing, partly in side elevation and partly in section, the vibrating needle and awl carrier, the work-support, and a certain supplementary needle support or brace. Figs. 7 and 8 are front views in different positions of said supplementary needle support or brace. Fig. 9 is a front view of the work-support. Figs. 10, 11, and 12 are diagrams illustrating the operation of certain mechanism used in conjunction with the thread-applying device for insuring the proper application of the thread to the needle and the delivery of thread thereto as it draws the loop through the work. Figs. 13 and 14 are side views, in different positions, of elements of said mechanism. Fig. 15 is a plan view of the same. Fig. 15^a is a sectional view of part of one of said elements. Fig. 15^b is a plan view of part of another of said elements. Fig. 16 is a perspective view of mechanism employed in connection with the hook whereby the needle-thread is passed

over the under-thread bobbin case or carrier. 50
Fig. 16^a is a view of part of said mechanism.

The fixed frame or bed of the machine is represented at 1, and on this frame are suitable bearings for the driving-shaft 2, to which power may be applied in any convenient way, 55 so as to rotate the same.

Fixedly secured to the shaft 2 is a cam-disk 3, having peripheral cams 4, 5, and 6, a side face-cam 7, cam-grooves 8 and 9 in one side, a cam-groove 10 in the other side, and a cam 11, projecting into a central recess or depression in said side of the disk. On said shaft 2 are also secured a cam 12 with peripheral groove and projecting tappet 13 and two other cams 14 and 15 with grooved faces for the 65 purpose hereinafter described.

The work is supported upon a projecting bracket or finger 16 at the front of the frame 1, the forward face of said finger or bracket being preferably beveled rearwardly 70 and the under side of the finger being grooved, as shown in Figs. 5, 6, and 9, for the passage of the curved awl 17 and needle 18, both awl and needle being securely confined to a vibrating holder 19, which is mounted on 75 a stud on the fixed frame and has secured to it a spur-wheel 20, which meshes with a segmental rack 21 on an arm 22, the latter being secured to a rock shaft or stud which can turn in the fixed frame and which has another 80 arm 22^a, with antifriction-roller engaging with the cam-groove 9 of the disk 3, whereby rocking movements are imparted at proper intervals to the carrier 19, so as to force the awl 17 through the work in one direction and 85 then drive the needle in the opposite direction through the opening formed by said awl. The work-supporting finger 16 serves as a mount for a grooved roller 23, which provides a top bearing for the needle when the latter 90 is passing forwardly or rearwardly through the work, a plate 24 bridging the recess in the finger 16, in which the roller 23 is mounted, so as to prevent the needle from being sprung downwardly by upward pressure upon it. 95 When the needle 18 is carried inwardly so far as to be deprived of the supporting influence of the grooved roller 23, said needle is

supported and guided in its proper course by a finger 25, pivoted to a bracket 26 on the fixed frame and acted upon by a spring 27, which tends to maintain it normally in the projected positions shown in Figs. 5 and 7, so as to bear upon the inner side of the needle 18 and prevent the point of the same from being deflected inwardly or toward the axis of rotation of the needle. As the supporting-finger 25 is pivoted and acted upon by a spring it will readily yield and swing downwardly when struck by the advancing edge of the vibrating needle and awl-holder 19, as shown in Figs 6 and 8, resuming its former projected position as soon as the said holder 19 is withdrawn from engagement with it on the backward movement. The work holding and feeding finger 28 has imparted to it a rising-and-falling movement and a longitudinally-reciprocating movement, the finger first rising from and releasing its hold upon the work resting upon the support 16, then moving backwardly to such a distance as is required for the length of stitch to be produced, then descending so as to again grip the work, and then moving forwardly so as to feed said work forwardly over the work-support. The mechanism for accomplishing this movement, however, forms no part of the present invention nor do the tension devices. Hence no specific description of the same will be required further than to say that the tension devices are such as to grip and release the needle-thread at the proper intervals under the action of the cams 4 and 5.

The thread passes from the tension device around a roller 73 on the lever 70, thence to and around a roller 74 on the fixed frame of the machine, and thence around a pair of grooved rollers 75 and 76, so arranged as to direct the thread to a point in line with the axis of a let-off and take-up segment 77, which is mounted so as to swing on the fixed frame, the hub of said segment having a spur-pinion 78, which meshes with a rack 79 on the end of a lever 80, hung to a bracket 81 on the fixed frame and having an antifriction-roller, which is acted upon by the cam 11 of the disk 3 to raise the outer end of the lever 80 and cause an upward swing or thread-pulling movement of the segment 77, the backward swing or delivery movement of said segment being resisted only by the action of a coiled spring 82 at the hub of the lever, so that while the thread-pulling movement of the segment 77 is a positive one, due to the action of the cam, the delivery movement is due to the action of the spring and is dependent upon the amount of thread which is pulled by the stitch-forming device of the machine. From the rollers 75 and 76 the thread passes around rollers 83 of the segment and thence around a roller 84 on the fixed frame and to and around a roller 85 on the hooked or bent end of the thread-applying and stitch-pulling arm 86 and through an opening 87 at the lower or delivery end of said arm, as shown by dotted

lines in Fig. 7. Said lower end of the arm 86 also has a groove 88, into which the hooked or barbed end of the needle enters when said needle is at the limit of its forward swing. The arm 86 is reciprocated by means of the cam 6 of the cam-disk 3, said cam acting upon an antifriction-roller carried by an arm 90 on a rock-shaft, which is adapted to a suitable bearing on the fixed frame and has another arm 91, pivoted to a lug 92 on the back of the arm 86, as shown in Fig. 7. The cam 6 is a pivoted cam, and the extent of outward movement imparted to the arm 86 depends upon the extent to which the inner portion of this cam projects into the cam-groove 10 of the disk 3, and this is determined by the adjustment of a lever 93, which is hung to the rock-shaft carrying the arms 90 and 91, but is free to turn thereon and is adapted to act upon that portion of the cam 6 which projects beyond the periphery of the disk 3, so that by the adjustment of this lever 93 the cam 6 can be pushed inwardly to such an extent as to provide for any desired degree of projection of the inner portion of the cam into the groove 10 and hence for any required degree of outward movement of the arm 86 necessary to pull the stitch tight upon the work. The lever 93 has an enlarged and slotted end 94, through which passes a bolt 95, provided with a thumb-nut 96, as shown in Fig. 2, whereby the lever 93 can be readily secured in any desired position of adjustment.

In order that the needle-thread may be drawn taut across the grooved face of the thread-applying arm 86, so as to insure certainty in the application of the thread to the barbed end of the needle, we employ a pair of fingers 100 and 101, the finger 100 having a movement across the end of the arm 86 and the finger 101 having a movement alongside of said arm, so that the finger 100 may engage with that portion of the needle-thread extending from the work up to the end of the arm 86 and may draw the same laterally into position for engagement with the finger 101, which catches the loop thus drawn, removes it from the finger 100, and draws it up alongside of the arm 86, these successive operations being represented in Figs. 13, 14, and 15. As the finger 101 descends it delivers the thread as fast as the needle requires it, and thus prevents the drawing of the thread through the barb or hook of the needle, which results when the thread is confined in any part during the drawing of the loops through the work by the needle. The normal position or position of rest of the finger 100 is that represented in Fig. 15, and said finger is first lifted in the direction of the arrow *a*, Fig. 15, then moved forwardly in the direction of the arrow *b*, then dropped behind the thread, as represented in Fig. 13, and then moved backwardly again to its original position, so as to draw a loop of thread, as shown in Fig. 14. The rising and falling movements are imparted to the finger 100 by means of the cam-

tappet 13, said tappet acting upon an anti-friction-roller on a lever 102, which is hung to a stud on another lever 103, this latter lever being pivoted so as to swing in a substantially horizontal plane on a fixed stud on the frame. The forward end of the lever 102 acts upon a lug or projection 104 upon a slide 105, which is vertically guided in a block 106 and carries the arm 107, on which the finger 100 is mounted. The block 106 is mounted so as to slide longitudinally upon an arm 108, which projects from the fixed structure of the machine, and longitudinal sliding movement is imparted to said block 106 by the cam 12, which acts upon an antifriction-roller carried by the lever 103, the forward end of this lever engaging with a pin 109, which projects upwardly from a stud 110 on the back of the block 106, as shown in Fig. 3. The finger 101 has a forward-and-backward and a rising-and-falling motion imparted to it—that is to say, as it is drawn inward it is lifted so as to pass over the loop of thread drawn by the finger 100 and then drops back of the same, as shown in Fig. 14, and then moves forwardly and upwardly, so as to catch said loop, draw it off of the finger 100, and pull it up alongside of the arm 86, as shown in Fig. 15. The arm 111, which carries the finger 101, slides in a guide 112 on a lever 113, which is hung to a suitable stud on the fixed frame and has a slotted end 114 engaging with a pin 115, projecting from the face of the segment-lever 22, whereby as said lever is vibrated vibrating movement will also be imparted to the lever 113, the arm 111 being depressed by a suitable spring 150, Fig. 18^a, within the guide 112 to an extent limited by contact of a block 116 on the arm with the upper end of said guide. The foremost position of the finger 101 and of the parts carrying the same is that represented in Fig. 3, and as the forward end of the arm 113 swings downwardly and inwardly the block 116 is brought into contact with the forward end of a lever 117, which is pivoted to a stud on a fixed bracket of the machine so that it can swing in a plane at right angles to that in which the lever 113 moves, the rear end of said lever 117 being acted upon by a coiled spring 118, which holds the forward end of the lever normally in position for engagement with the block 116, as shown in Fig. 18. When the block 116 comes in contact with the end of the lever 117, continued downward movement of the forward end of the lever 113 causes said lever 117 to push upwardly upon the block 116, and thereby raise the arm 111, which carries the finger 101; but as the downward movement of the forward end of the lever 113 is also accompanied by an inward movement of the same the block 116 eventually leaves the forward end of the lever 117 and drops down behind a beveled block 119, Fig. 18^b, at the end of said lever, as shown in Fig. 17, so as to carry the hook 101 down behind the loop drawn by the hook 100, as shown in Fig. 14. When the

lower end of the lever 113 swings forwardly, the block 116, acting on the beveled block 119, pushes the forward end of the lever 117 out of the way, and as soon as the block 116 is free from contact with the block 119 the lever 117 again swings into position for acting upon the block 116 on the next downward movement of the lever 113.

The bobbin which carries the under thread is contained in a case 120, which is loosely mounted in the supporting-frame, so as to permit the free passage around the said case of the loop of needle-thread. The slipping of the loop of needle-thread over the bobbin-case is effected by means of a hook 131, which has a movement of partial rotation around the case, said hook when at the upward limit of its movement engaging with the needle-thread and withdrawing the same from the barb or hook of the needle, the hook then carrying the loop of needle-thread down around the back of the bobbin-case until it has reached such a point that its further movement around the same can be effected by the pull upon the thread due to the action of the arm 86, which pulls the stitch tight against the work. The hook 131 forms part of a lever 132, which is fulcrumed upon an arm 133, carried by a rock-shaft 134, the latter being mounted in a bearing on the fixed frame of the machine so that its axis is coincident with that of the bobbin-case. The shaft 134 has a pinion 135, which meshes with a segmental rack 136 on a lever 137, said lever being hung to a stud on the fixed frame and having connected to it a link 138, which has an antifriction-roller acted upon by the cam 14, whereby rocking movement is imparted to the lever 137 and thence is transmitted to the arm 133, carrying the hook-lever 132. In addition to the rotating movement around the axis of the bobbin-case which is thus imparted to the hook-lever, it is advisable to give said lever a slight swinging movement on its own fulcrum, so that when the hook has been moved forward into position for engaging with the needle-thread it can receive a quick movement of depression, which will carry it downwardly into the loop, and thus insure the catching of the latter by the hook. This movement we effect by providing the hook-lever 132 with a pin 140, which engages with a slotted segment 141, carried by a rock-shaft 142, mounted in bearings on the fixed frame and having a toothed segment 143, which meshes with teeth upon a lever 144, hung to the same stud as the lever 137 and connected to a link 145, which has an antifriction-roller acted upon by the cam 15, as shown in Fig. 21^a, whereby vibrating movement is imparted to said lever 144 and thence to the slotted segment 141. In its normal position or position of rest the slotted segment 141 is eccentric with the axis of rotation of the arm 133, which carries the hook-lever 132, so that during the greater part of the travel of said hook-lever the hook moves in a path eccentric with the axis of

the shaft 134 and of the bobbin-case; but just as the hook 131 reaches the limit of its forward movement the segment 141 is rocked slightly, so as to impart to said hook the movement of depression, whereby it is caused to properly catch the loop of needle-thread.

It will be observed that most of the cams in our improved machine are combined in the single cam-disk 3 and that the machine is therefore very compact as compared with other machines of its type in which a number of main cams strung upon a shaft at the rear of the machine are employed, and the same desire for such compactness as is compatible with proper and efficient operation has governed the construction and arrangement of the working parts of the machine.

Having thus described our invention, we claim and desire to secure by Letters Patent—

1. The combination in a sewing-machine, of a curved awl, a curved needle and a carrier therefor, and means for vibrating said carrier with a fixed work-supporting arm having a roller whose axis is transverse to the plane of movement of the needle and awl, and whose periphery serves as a bearing for said awl and needle in their swinging movements, substantially as specified.

2. The combination in a sewing-machine, of a carrier having a curved needle, and means for vibrating said carrier, with a yieldingly-supported finger projecting across the plane of the needle-path, and pivoted so as to swing in a plane transverse to the plane of the needle and bearing upon the inner side of the needle and preventing inward deflection of the same during a portion of its travel, substantially as specified.

3. The combination in a sewing-machine, of a carrier with hooked or barbed needle, an arm for applying thread to the hook of said needle, a finger reciprocating transversely across said arm and serving to draw a loop of thread laterally beyond the same, a second finger moving parallel with the arm and serving to draw said loop up alongside of the same, and means for imparting movement to the various parts, substantially as specified.

4. The combination in a sewing-machine, of a carrier having a hooked needle, an arm for applying thread thereto, means for operating said carrier and arm, a transversely-moving finger for drawing the loop of thread across said arm, means for operating said finger, a swinging finger moving parallel with the arm, and means for imparting such swinging movement to said finger and for first lifting and then dropping the finger as it approaches the inward limit of its swinging movement, substantially as specified.

5. The combination in a sewing-machine, of the needle and its carrier, the thread-applying arm and means for operating the same, a transversely-reciprocating looping-finger, an arm carrying the same, a slide in which said

arm is free to rise and fall, a longitudinal guide for said slide, means for reciprocating the slide, and means for imparting rising-and-falling movement to the arm which carries the finger, substantially as specified.

6. The combination in a sewing-machine, of the needle-carrier and its needle, a thread-applying arm and means for operating the same, a loop-drawing finger, an arm carrying the same, a lever in which said arm is guided, a block on the arm, means for swinging the arm, and a catch-lever for engaging said block as the lever swings, and causing movement of the arm on the lever, substantially as specified.

7. The combination in a sewing-machine, of the needle-carrier and its needle, the thread-applying arm and means for operating the same, a loop-drawing finger, an arm carrying the same, a lever in which said arm is guided so as to slide, a block on the arm, means for swinging the same, and a catch-lever for engaging said block as the lever swings and causing movement of the arm on the lever, said catch-lever being yieldingly mounted whereby it can be pushed out of the way by the block on the return movement of the lever, substantially as specified.

8. The combination in a sewing-machine, of the stitch-tightening arm, a cam-disk having a yielding cam for imparting movement to said arm, and an adjustable regulator mounted on the fixed frame and serving by contact with said cam to govern the extent of projection of the same and the consequent extent of movement imparted to the stitch-tightening arm, substantially as specified.

9. The combination in a sewing-machine, of the stitch-tightening arm, a cam-disk having a pivoted cam for imparting movement to said arm, and an adjustable regulator mounted on the fixed frame and serving by contact with said cam to govern the extent of projection of the same and the consequent extent of movement imparted to the stitch-tightening arm, substantially as specified.

10. The combination in a sewing-machine, of the needle-thread-controlling arm, with a let-off and take-up device comprising a swinging segment around which the thread passes, a spur-pinion secured to the shaft of said segment, a lever having a rack engaging said pinion, a cam acting upon said lever to move it so as to take up the thread, and a spring also acting on the lever and resisting the movement of the same due to the pull upon the thread, substantially as specified.

11. The combination in a sewing-machine, of a needle-thread let-off and take-up device comprising a swinging segment having guides for the thread and grooved rollers disposed at an angle to each other for directing the thread and changing the direction of travel of the same at a point coincident with the axis of vibration of said segment, substantially as specified.

12. The combination in a sewing-machine,
of the needles, the thread-feeder and means
for operating the same, a casing for contain-
ing the under-thread bobbin, an arm having
5 a hooked lever for drawing the loop of needle-thread over said casing, means for vibrating said arm, a controlling device for said lever comprising a slotted segment normally concentric with the axis of rotation of the
10 hook, and means for rocking said segment

when the hook reaches the forward limit of its swing, substantially as specified.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

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JOSEPH B. URSBRUCK.

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