

No. 679,660.

Patented July 30, 1901.

R. G. WOODWARD.

THREAD MANIPULATING DEVICE FOR SEWING MACHINES.

(Application filed Sept. 1, 1899.)

(No Model.)

5 Sheets—Sheet 1.

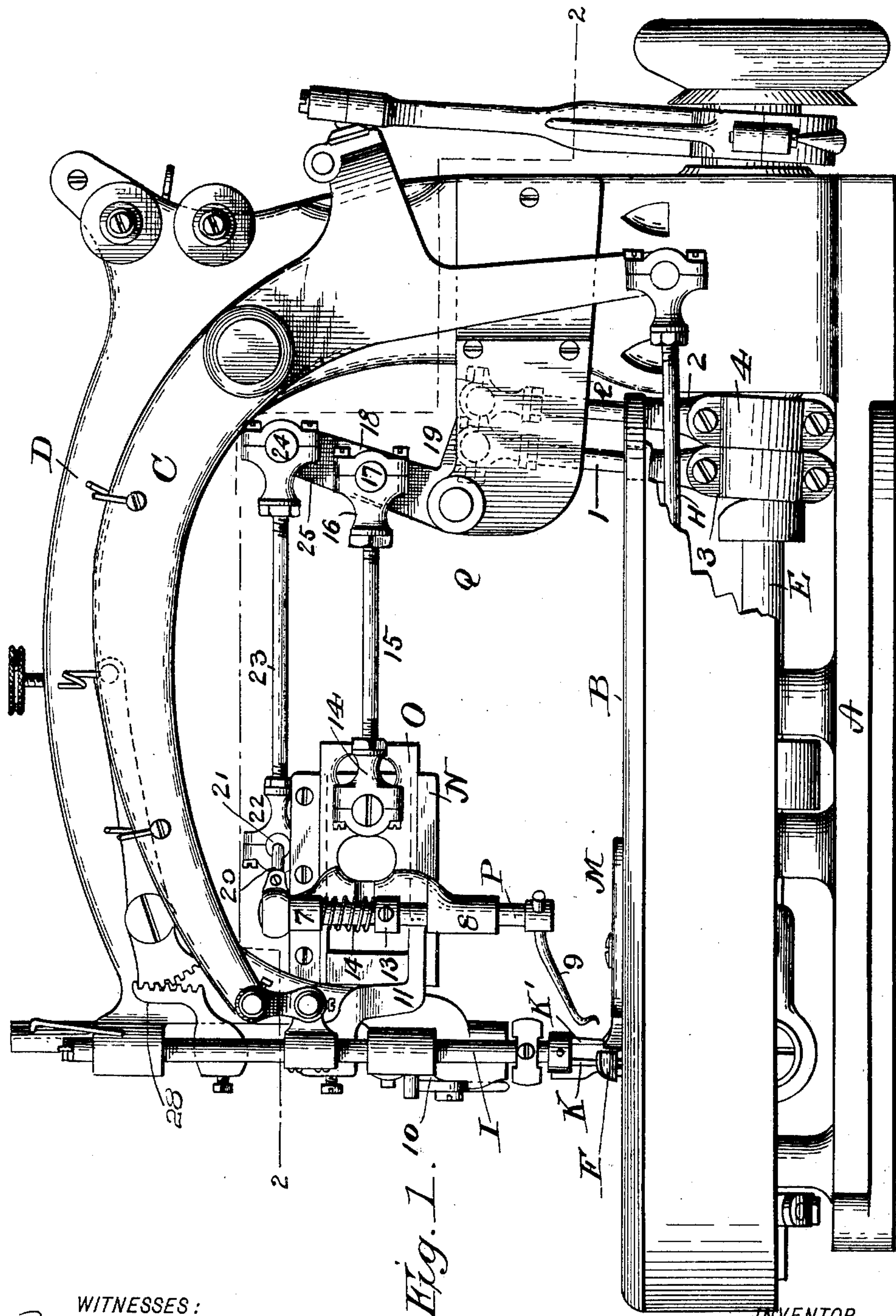


Fig. 1.

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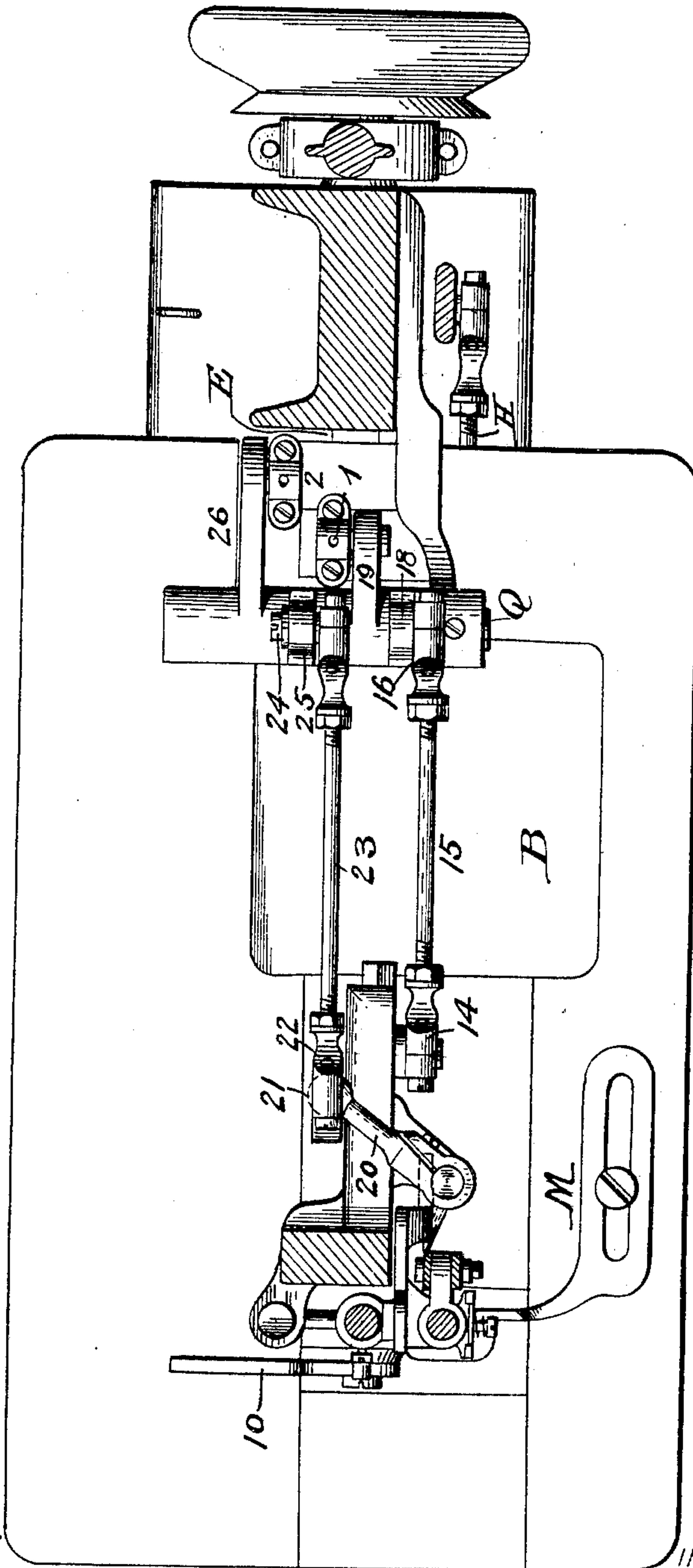
THREAD-MANIPULATING DEVICE FOR SEWING MACHINES.

(No. Model.)

(Application filed Sept. 1, 1899.)

5 Sheets—Sheet 2.

Fig. 2.



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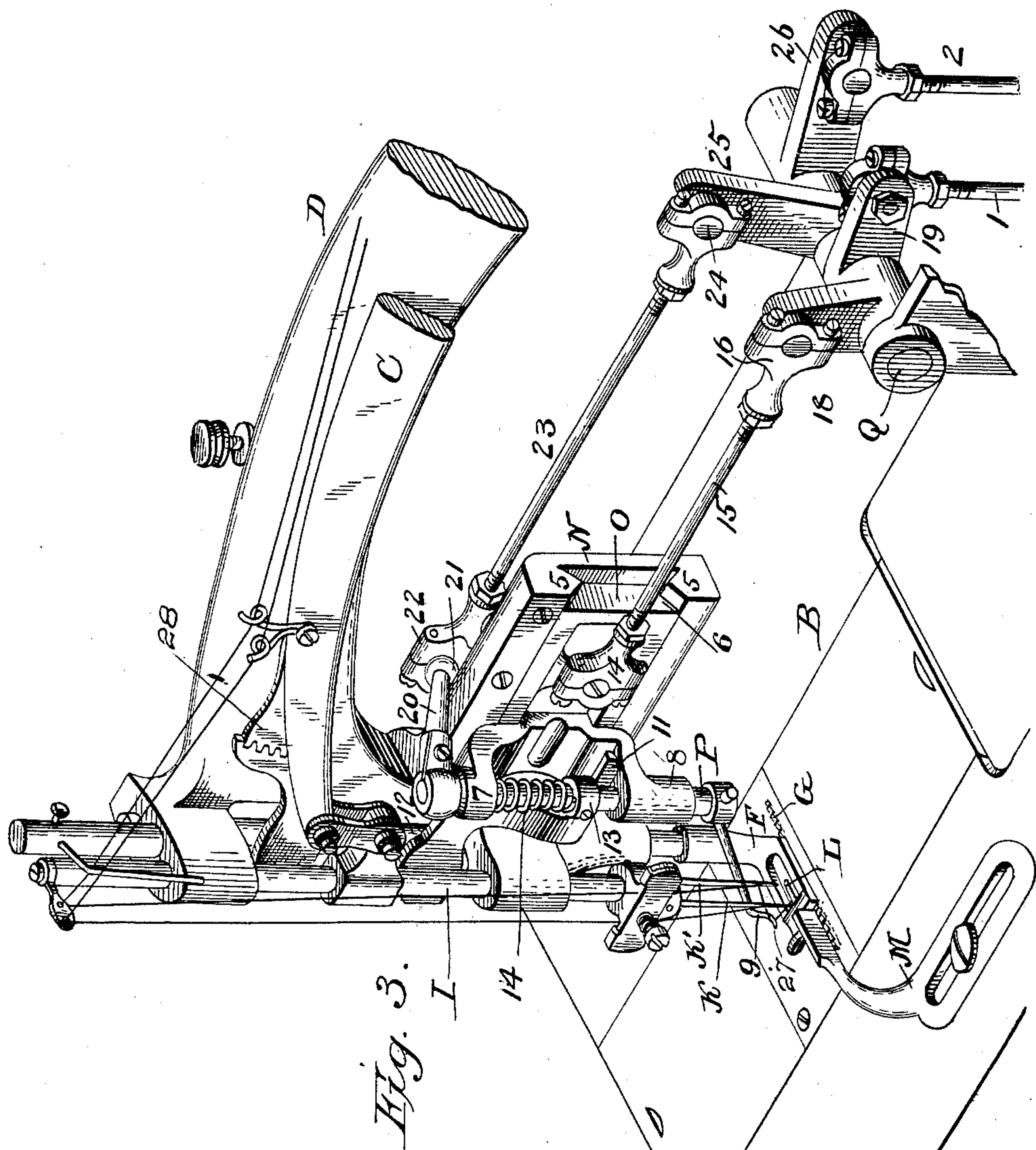


Fig. 3.

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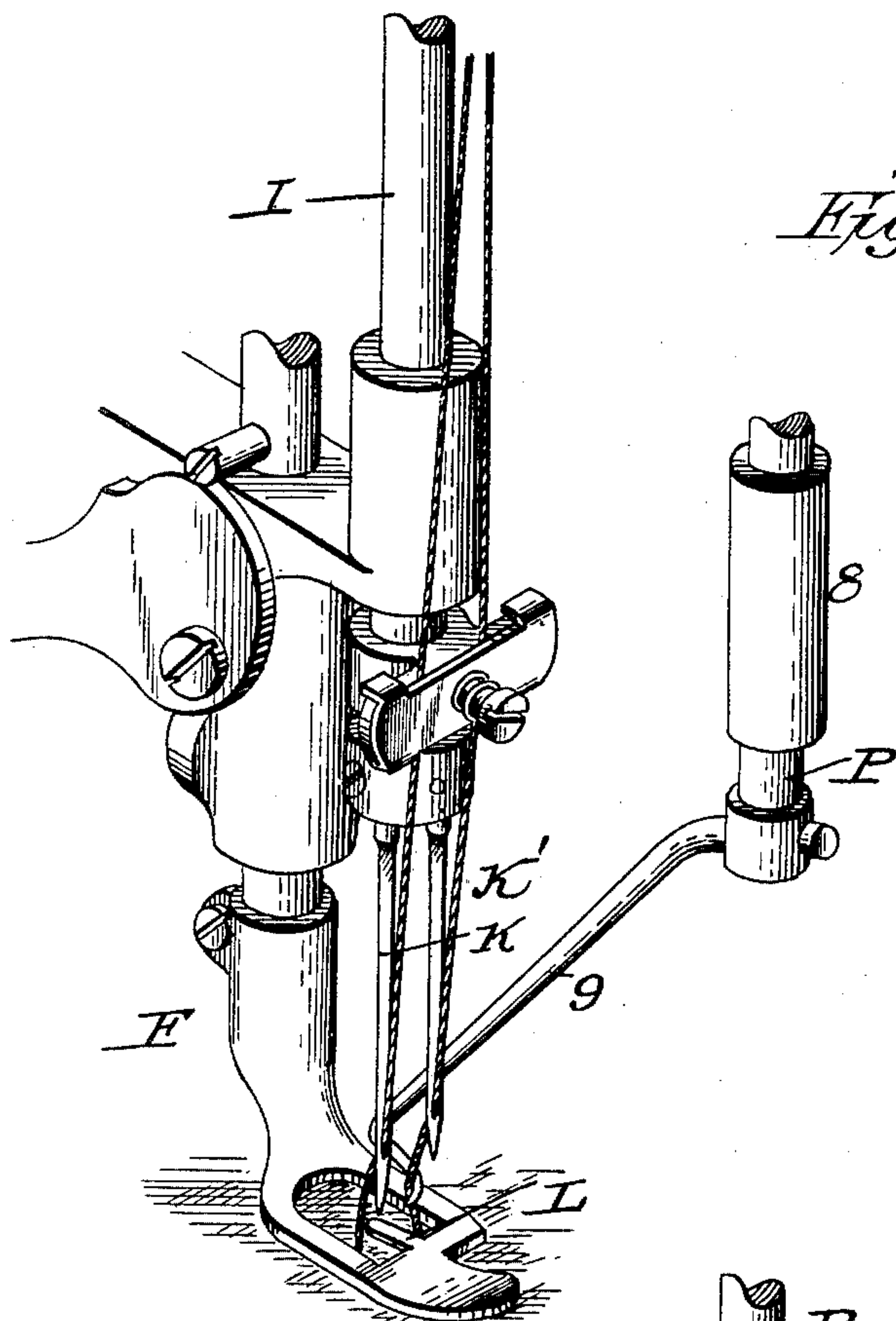


Fig. 4.

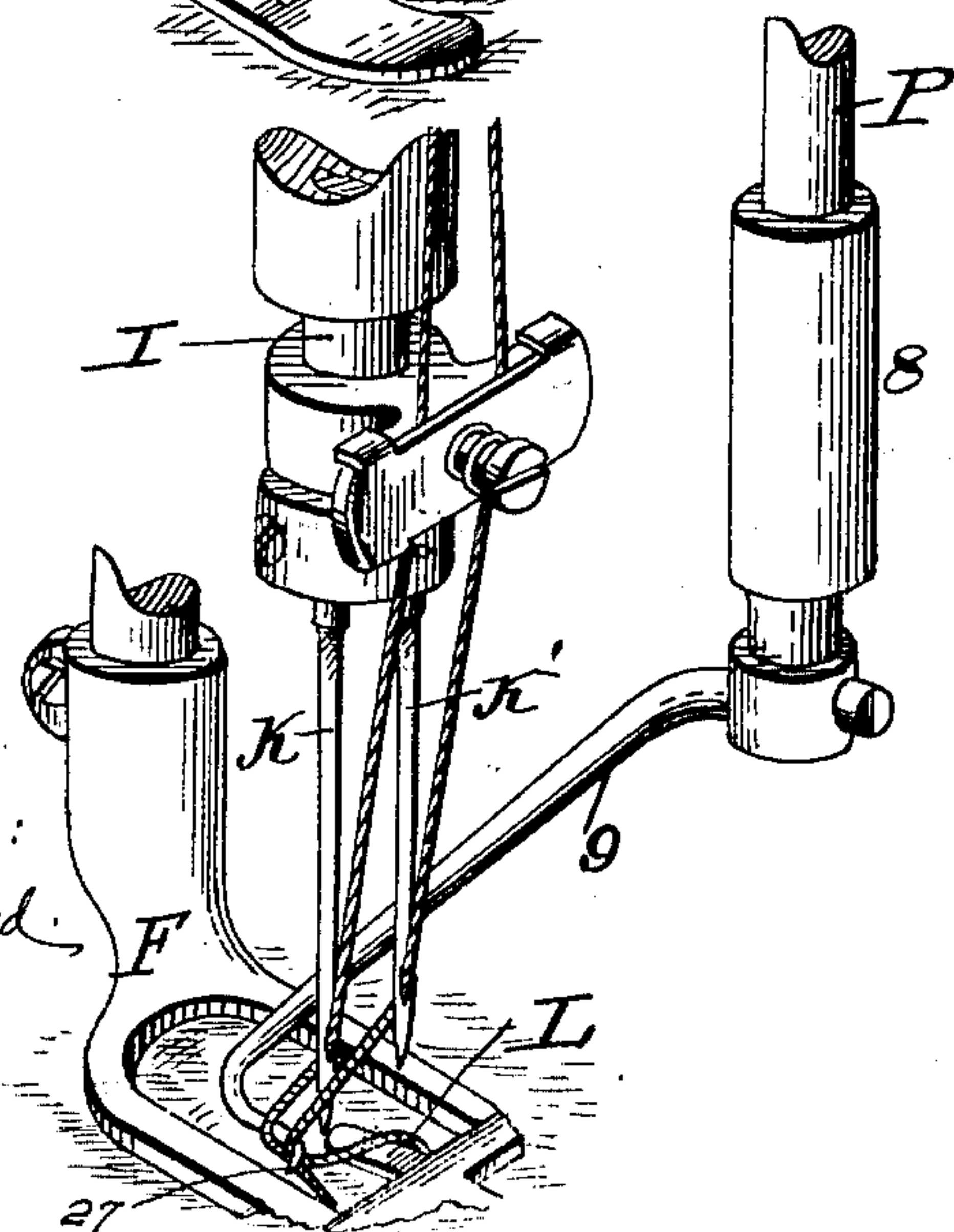


Fig. 5.

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Fig. 6.

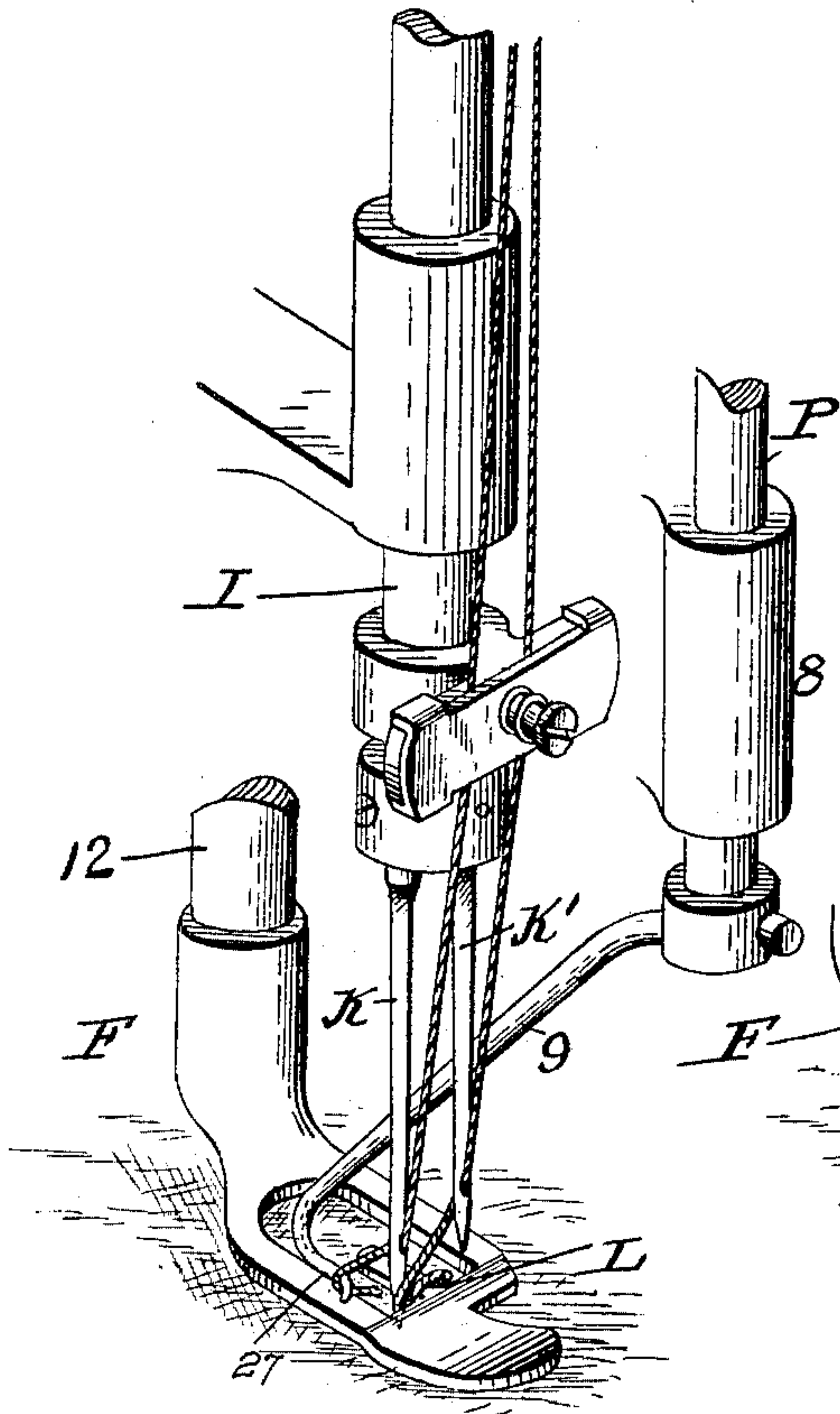


Fig. 7.

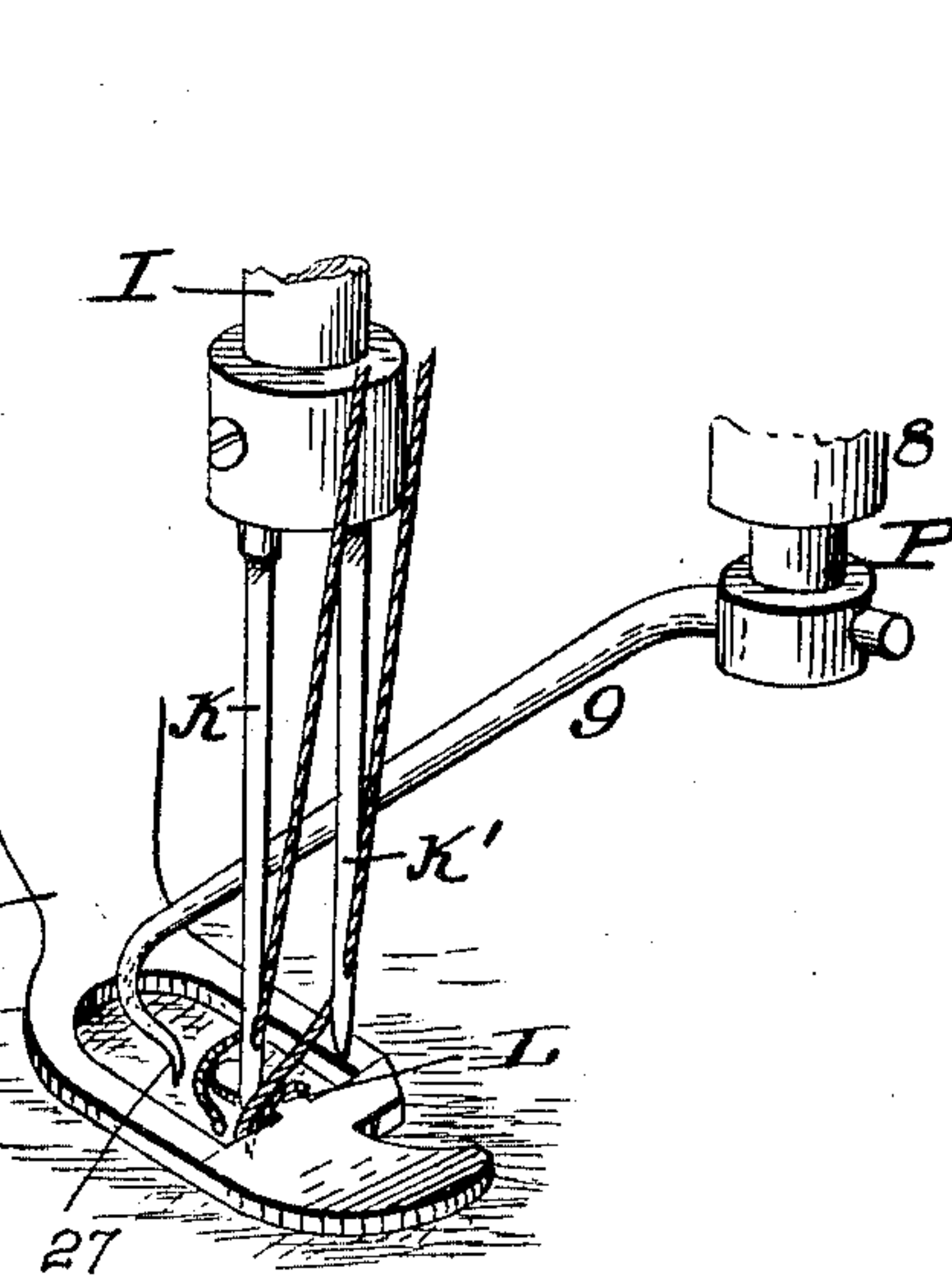


Fig. 9.

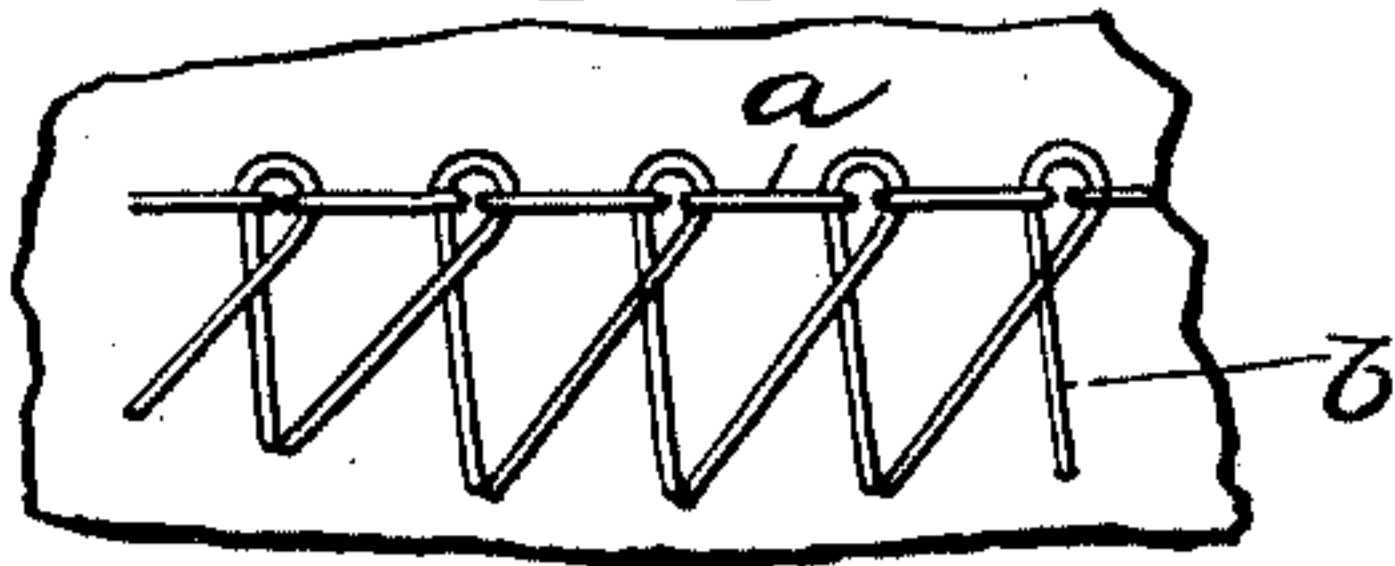
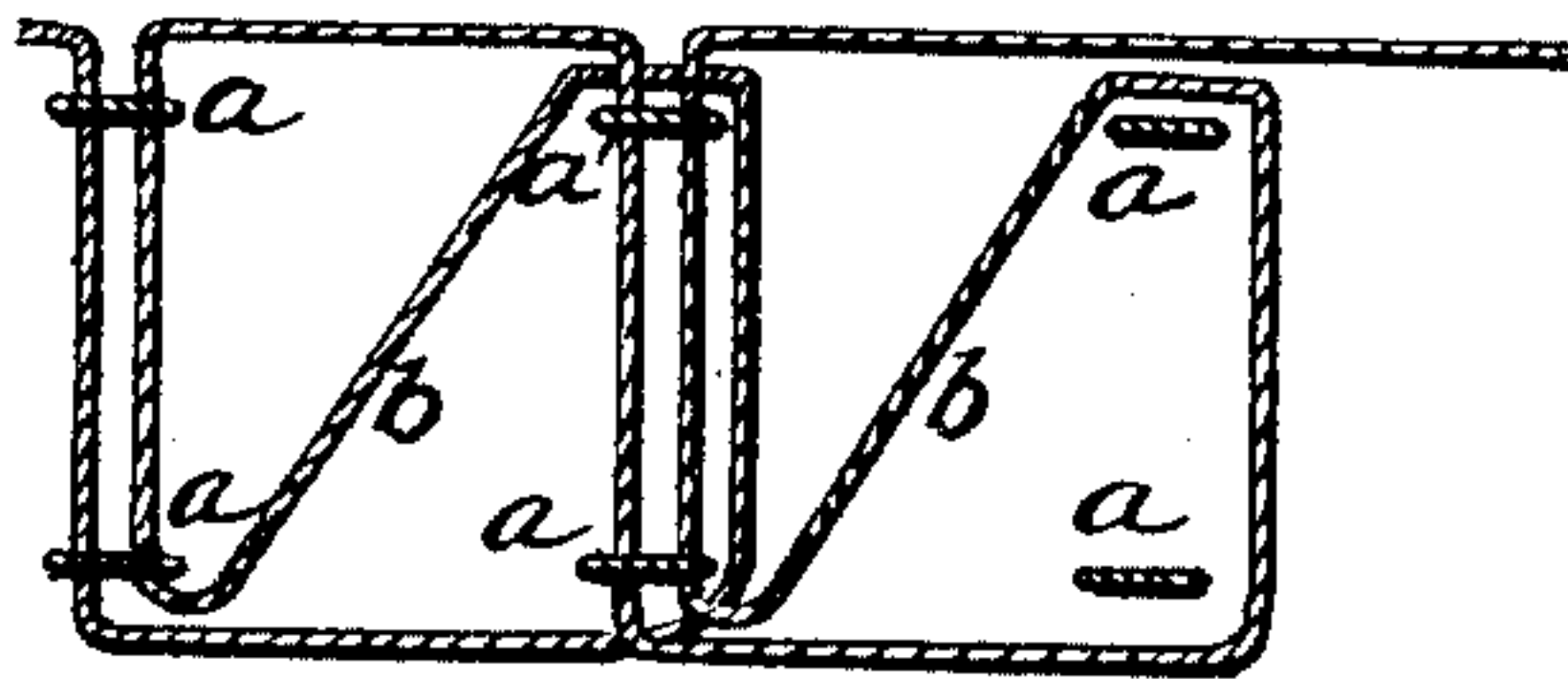


Fig. 8.



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UNITED STATES PATENT OFFICE.

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THREAD-MANIPULATING DEVICE FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 679,660, dated July 30, 1901.

Application filed September 1, 1899. Serial No. 729,194. (No model.)

To all whom it may concern:

Be it known that I, RUSSEL G. WOODWARD, a citizen of the United States, residing at Waukegan, in the county of Lake, State of Illinois, have invented certain new and useful Improvements in Thread-Manipulating Devices for Sewing-Machines, of which the following is a description, reference being had to the accompanying drawings and to the letters and figures of reference marked thereon.

My invention relates to an improvement in sewing-machines, and especially to machines for overseaming or finishing the edges of fabrics or for ornamenting the faces of fabrics. The object of the invention is especially to provide a novel machine for finishing the edges of knit goods, articles made of lace, and the like, and it is herein shown as applied to a sewing-machine of the chain-stitch type; but it will be understood that it is not necessarily limited to this type of machine nor to the particular work above referred to, for it is adapted to various kinds of material, and in addition to finishing the edges of fabrics may be used to ornament the flat face of garments.

The invention consists, primarily, of a mechanism for adaptation to a "Union Special Twin Needle Machine," such as illustrated in Patent No. 344,492, of June, 1886, whereby the thread carried by one needle is seized by an implement and carried over into the path of the other needle, so that said other needle passes down into the bight of the loop formed in the thread of the other needle by the aforesaid implement, thereby forming an ornamental cross-stitch on the upper surface of the material being sewed, or if the one needle pass down outside the edge or near the edge of the goods being sewed, forming an overseam or edge finish which not only ornaments the edge of the garment being sewed, but binds its raw edges and prevents raveling.

The invention consists, secondly, in the combination with a stitch-forming mechanism of a thread-manipulating device adapted to carry a loop of thread across the line of the seam, release it and move back to its initial position.

It consists, finally, in various details of construction and arrangement of parts, all as

hereinafter described, and referred to in the appended claims.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a sewing-machine embodying my invention. Fig. 2 is a sectional plan view on the line 2 2 of Fig. 1. Fig. 3 is a perspective view, certain of the parts of the frame being removed to show the mechanism forming the features of my invention more clearly. Figs. 4, 5, 6, and 7 are perspective views illustrating the various positions of the thread-manipulating finger. Fig. 8 is a bottom plan view of the stitch made on my improved machine, and Fig. 9 is a top plan view of the same.

In the drawings, A represents the base of a sewing-machine of the "Union Special Twin Needle" type. B is the cloth-plate; C, the needle-lever; D, the gooseneck; E, the driving-shaft; F, the presser-foot; G, the feed-dog; H, the looper-operating pitman; I, the needle-bar; K K', the needles; L, the tongue on the presser-foot, over which the stitches are formed and off of which they slide as the feed progresses, and M is the adjustable guide for the edge of the garment to be sewed, all these parts being of well-known construction and substantially like corresponding parts in the "Union Special Twin Needle Machine," the material features of which are illustrated in the patent hereinbefore referred to. The action of the looper with respect to the needles is as described in connection with said patent, the under or looper thread concatenating with the upper or needle threads on the undersurface of the fabric beneath the tongue on the throat-plate, the appearance of the stitch on the under surface of the fabric being illustrated in Fig. 8, in which *a a* are the loops of needle-thread, and *b* is the looper or under thread.

Upon the rear end of the driving-shaft E, adjacent the frame of the machine, are mounted two eccentrics or a part having two eccentric surfaces, over each of which is clamped the lower end of a connecting-rod, these connecting-rods being indicated by the numerals 1 2 and the parts which embrace the eccentric and in which it travels by 3 4.

Secured to the head of the sewing-machine

by any suitable means is a rectangular frame or block N, provided with V-shaped tracks 5, fitting beveled grooves 6 in a gate or frame O, which slides on said tracks or ways 5. This gate or frame O has two lugs 7 8 projecting toward the front of the machine, provided with openings through which passes and in which is journaled a vertical bar or shaft P, to the lower end of which is secured the thread-manipulating device, herein shown as a finger 9, the movements of which will be referred to hereinafter. The rod or shaft P, and with it the finger 9, is raised by the action of the presser-bar-lifting cam 10 by reason of the connecting angular piece 11, which at one end is formed with a collar embracing the presser-bar 12, while its lower extending portion lies beneath a collar 13 on the rod or shaft P, and as the presser-bar is lifted rises against the collar 13 and raises it also. The rod or shaft P is normally kept in a depressed position by means of the coiled spring 14, lying between the collar 13 and the lug 7.

To enable the thread-manipulating device 9 to properly do its work, it is desirable that it should have movement in an elliptical path, or at least that it should have movement to enable it to take the thread carried by needle K', carry it over so that the needle K will go down in the loop thus formed, then it must release the loop and move out of the vertical plane of the needles as they are moving down, and then move back to first position, so as to pass underneath the points of the needles as they are completing their upward movement. To give the device 9 its forward-and-backward movement to carry the thread of the needle K' over into the path of needle K, the sliding gate or frame O is provided on its front face with a ball-stud fitting in a socket in the head 14, to which is secured one end of the connecting-rod 15, which at its opposite end is secured to a similar head 16, pivotally attached to the stud 17 on the upper arm 18 of a bell-crank lever sleeved on the shaft Q, the lower or transverse arm 19 of this bell-crank lever having a ball-and-stud or other flexible joint connection with the upper end of the eccentric connecting-rod 1. By this arrangement it will be noticed that as the eccentric on the driving-shaft E rotates it will raise the rod 1 up and down, oscillate the bell-crank lever 18 19, and through the connections described slide the gate or frame O, which supports the thread-manipulating device, back and forth. While the reciprocating movement is taking place the device 9 must also have an oscillatory movement on a vertical axis to cause it to take and leave the needle-thread and move sidewise to avoid the needles in their descent. This movement is accomplished by oscillating the rod or shaft P on its axis. This rod or shaft P has clamped about its upper end the end of a link 20, which at its opposite end is provided with a ball 21, fitting in a socket in the head 22 on the end of connecting-rod 23, which at its opposite

end is pivoted on the stud 24 on the end of the vertical arm 25 of a bell-crank lever, journaled on the stationary shaft Q, and having its horizontal arm 26 connected by a ball-and-socket or other flexible joint to the eccentric connecting-rod 2. By this arrangement when the driving-shaft rotates the eccentric rod 2 rises up and down and through the connections described oscillates the shaft P and through it the thread-manipulating device 9.

Assuming that the needles have reached their lowest position, the looper its retracted position, and the thread device 9 its retracted position, movement of the driving-shaft raises the needles, moves forward the looper to engage the needle-loops, and at the same time the end of the device 9 swings in, so that in the continued movement it will move bodily forward, so that the depression 27 in the end will engage the thread carried by the needle K', will pass beneath the points of the needles K' and K, and carry the loop drawn out by it to such position that the needle K in its descent will pass into the bight of the loop, as shown in Fig. 9. When the needle K has engaged the loop, the device 9 swings toward the rear of the machine to pass out of the loop and then moves positively backward in a plane to the rear of the needles. It will be seen that the parts are so timed that after the device has engaged the thread of needle K' the bell-crank levers move in unison for a distance until the line of seam has been crossed, when the smaller moves ahead of the other and the latter begins to move back ahead of the smaller one, thus swinging the device out of the thread-loop, this swinging of the device on its axis taking place when it moves in to engage the thread and moves out to release it.

To prevent danger of breaking of the thread of the needle K', it is desirable to pull off from the spool an additional quantity of that particular thread to allow for its passage across the line of seam, and therefore the pull-off 28 is provided.

Various minor modifications and changes may be made in the construction of the parts of the machine without departing from the spirit of my invention, and it will be readily seen that the mechanism which actuates the thread-carrying device 9 may be employed to actuate a finger which is threaded to carry a thread which would be interwoven with the needle-threads, and I wish, therefore, to claim the mechanism for operating the thread-carrying device, broadly, no matter for what purpose it may be applied.

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

1. In a sewing-machine in combination with the stitch-forming mechanism thereof, a thread-manipulating device arranged on a vertical support with means for reciprocating said thread-manipulating device trans-

versely of the line of feed, and means for oscillating it on its vertical axis of support; substantially as described.

2. In a sewing-machine, in combination 5 with the stitch-forming mechanism thereof including a plurality of needles, a thread-manipulating device arranged on a vertical support with means for moving said thread-manipulating device transversely of the line 10 of feed, in a plane below the points of the needles, means for oscillating it on its supporting axis, and means for returning it to its first position; substantially as described.

3. In a sewing-machine having suitable 15 stitch-forming mechanism, a thread-manipulating device, a vertical shaft supporting the same, means for oscillating said shaft, a support for said shaft, and means for reciprocating said support; substantially as described.

20 4. In a sewing-machine having suitable stitch-forming mechanism, a thread-manipulating device, a vertical shaft supporting the same, means for oscillating said shaft, a gate or frame on which said shaft is journaled, a 25 stationary frame on which said gate or frame is supported; and means for reciprocating said gate or frame on its supporting stationary frame; substantially as described.

5. In a sewing-machine, in combination 30 with the stitch-forming mechanism, a driving-shaft, a thread-manipulating device, a sliding support therefor, and means for operating said thread-manipulating device comprising a bell-crank lever, connections be- 35 tween the bell-crank lever and said support and eccentric connections between the bell-crank lever and the driving-shaft; substantially as described.

6. In a sewing-machine, in combination 40 with the stitch-forming mechanism, a driving-shaft, a thread-manipulating device, a shaft supporting the same, a sliding support

for the shaft, a bell-crank lever oscillated from the driving-shaft and operatively connected with the shaft which supports the 45 thread-manipulating device, and a second bell-crank lever oscillated from the driving-shaft, and operatively connected with the sliding support; substantially as described.

7. In a sewing-machine, the combination 50 with two vertically-reciprocating thread-carrying eye-pointed needles, and complementary stitch-forming mechanism, an oscillating and reciprocating thread-manipulating device with means for moving it into position to en- 55 gage the thread of one of the needles, and to carry it across into position to be engaged by the other needle, and then to move it toward the rear of the machine to pass out of the 60 loop; substantially as described.

8. In a sewing-machine including a plurality of needles, a thread-manipulating device arranged on a vertical support, with means for reciprocating it to carry a loop of thread 65 across the line of the seam and means for oscillating it to release the loop of thread and for returning it in a plane back of the needles to its initial position.

9. In a sewing-machine having a plurality of needles, a thread-manipulator arranged to 70 engage the thread of one of the needles and carry it across into position to be engaged by the other needle and a pull-off 28, adapted to engage the thread acted upon by the manipulator, whereby an extra amount of slack is 75 supplied to said thread; substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

RUSSEL G. WOODWARD.

Witnesses:

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JULIUS SHIRE.