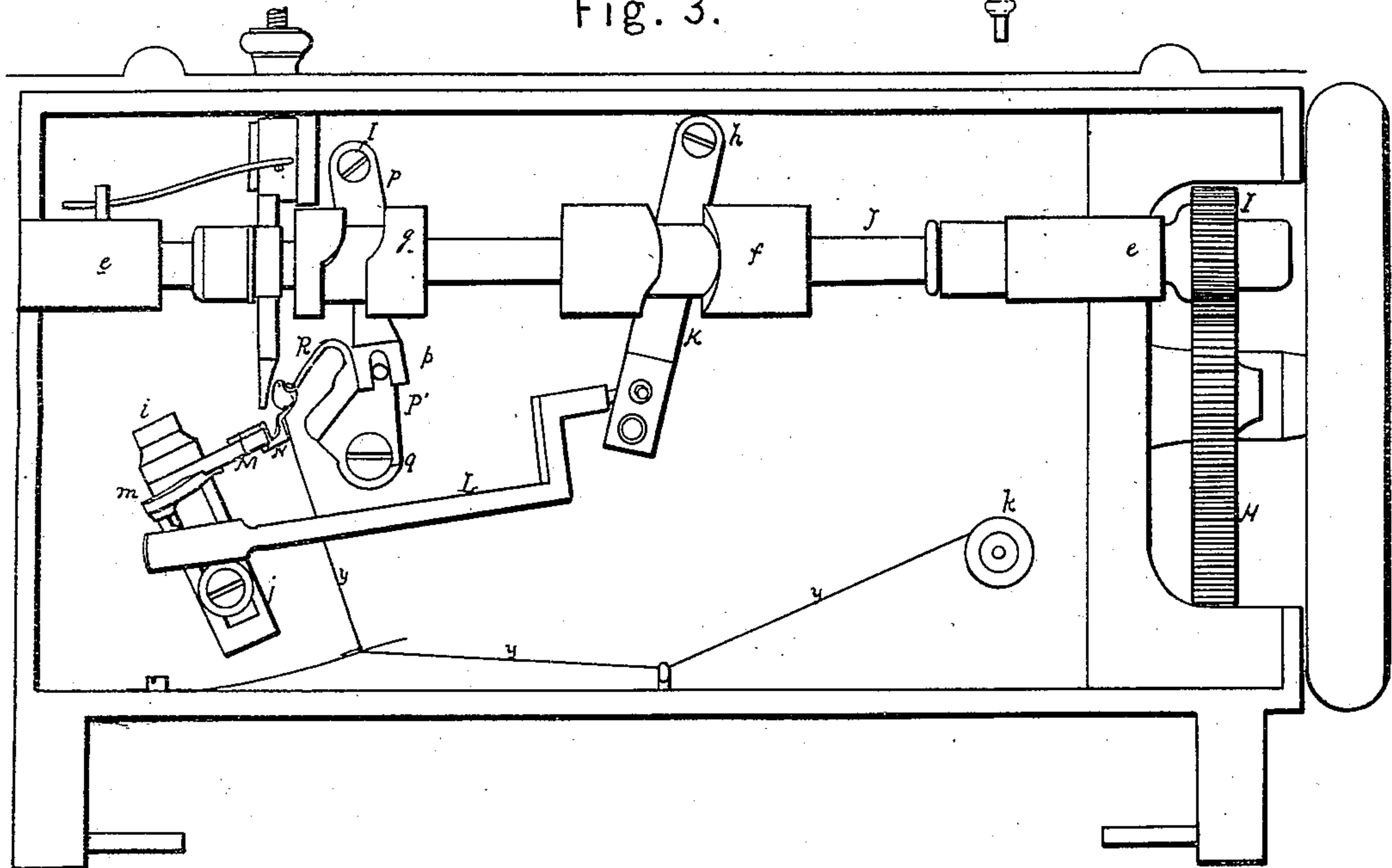
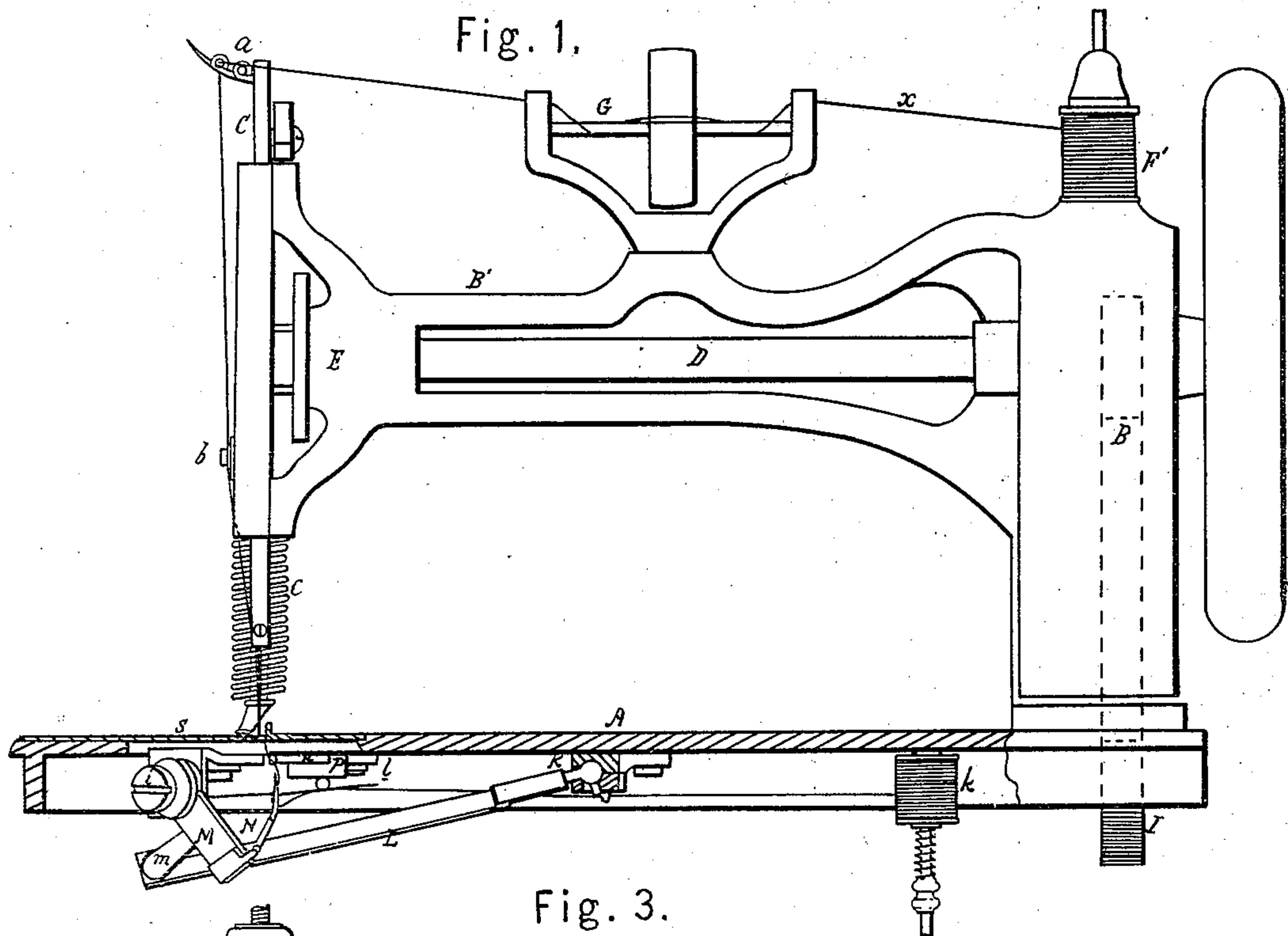


G. REHFUSS.
SEWING MACHINE.

No. 40,311.

Patented Oct. 13, 1863.



Witnesses.
Charles E. Foster
W. Albert Steel

Inventor.
Henry Howson
Atty for G. Rehfuß

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Fig. 1.

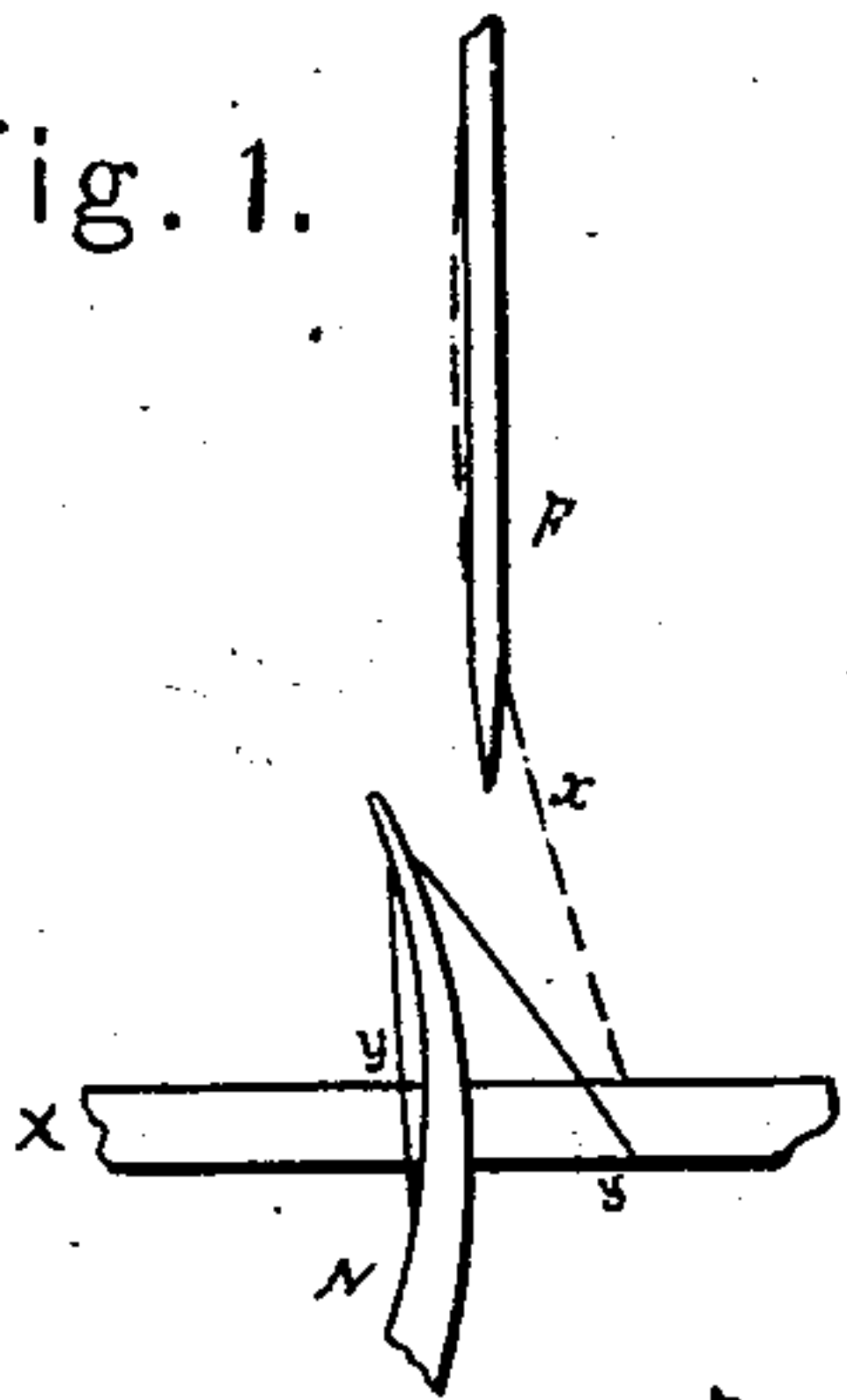


Fig. 3.

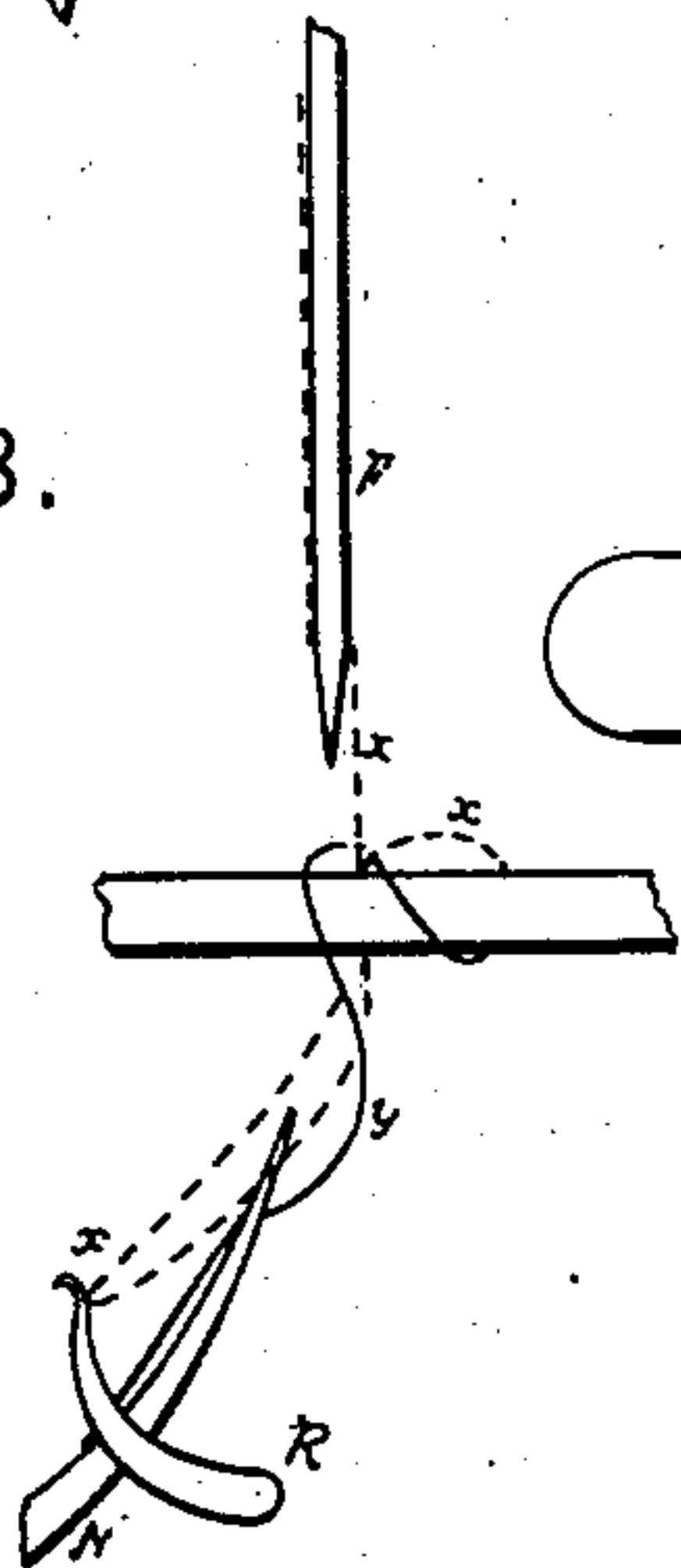


Fig. 7.

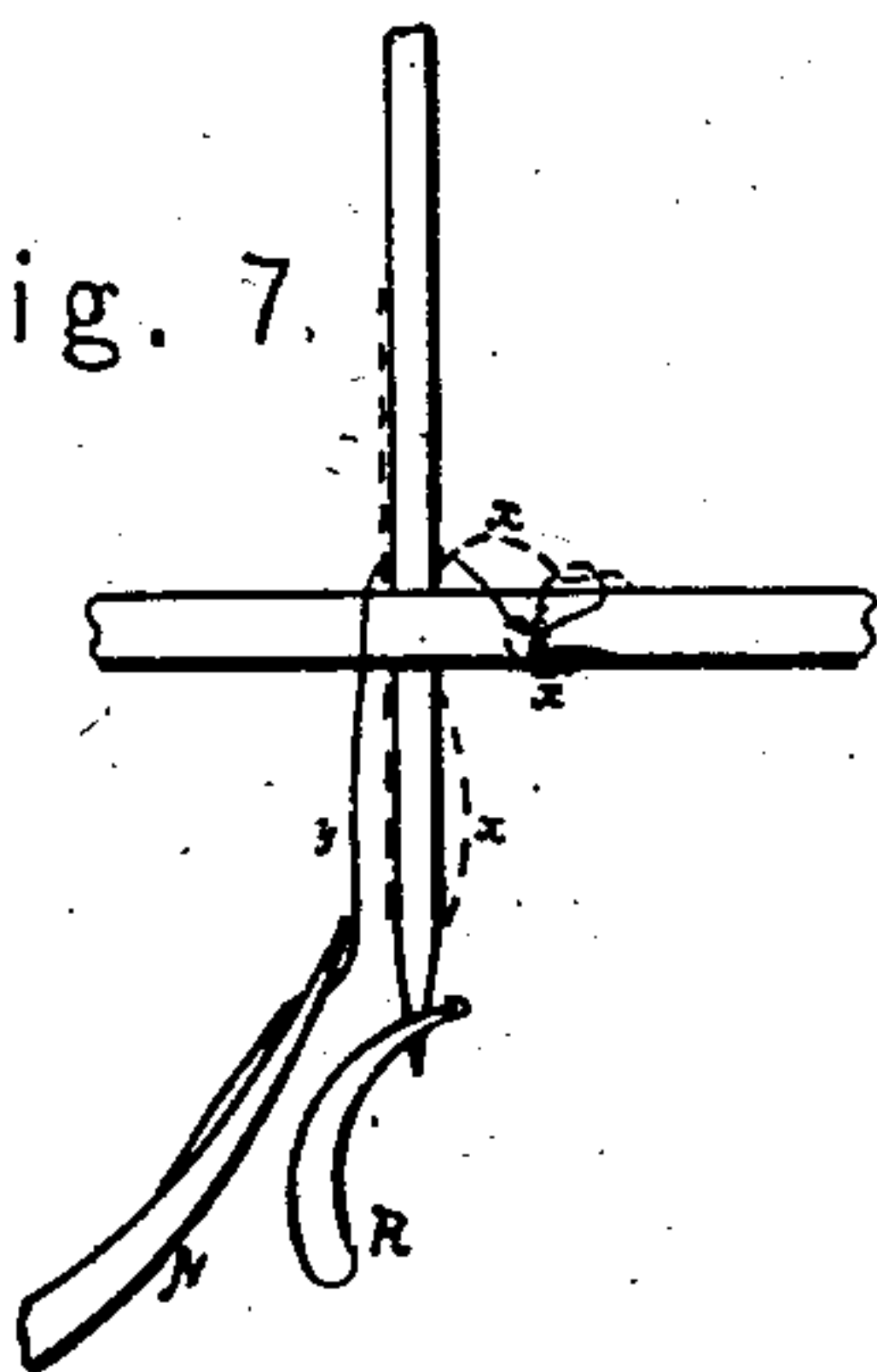


Fig. 2.

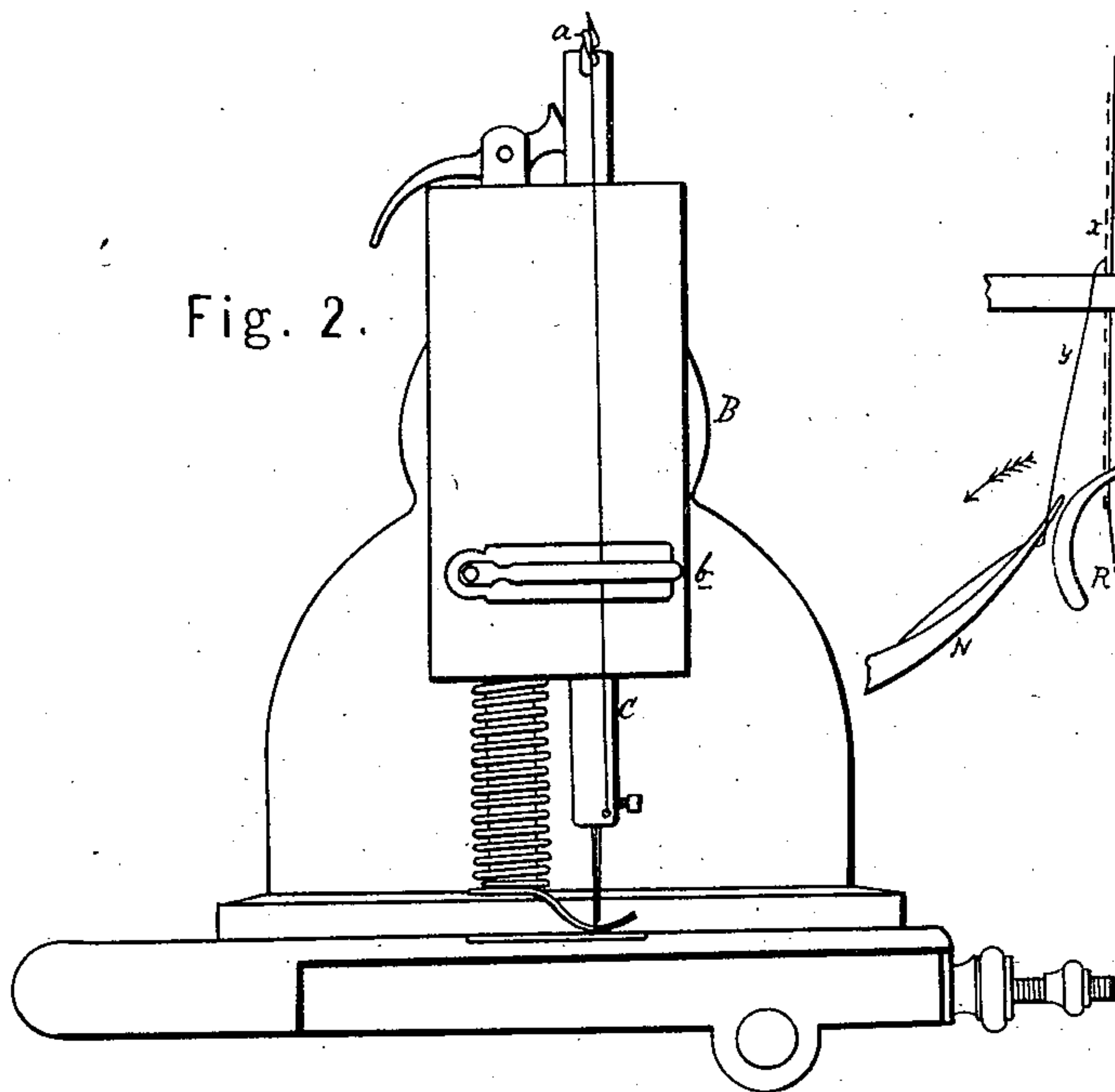


Fig. 4.

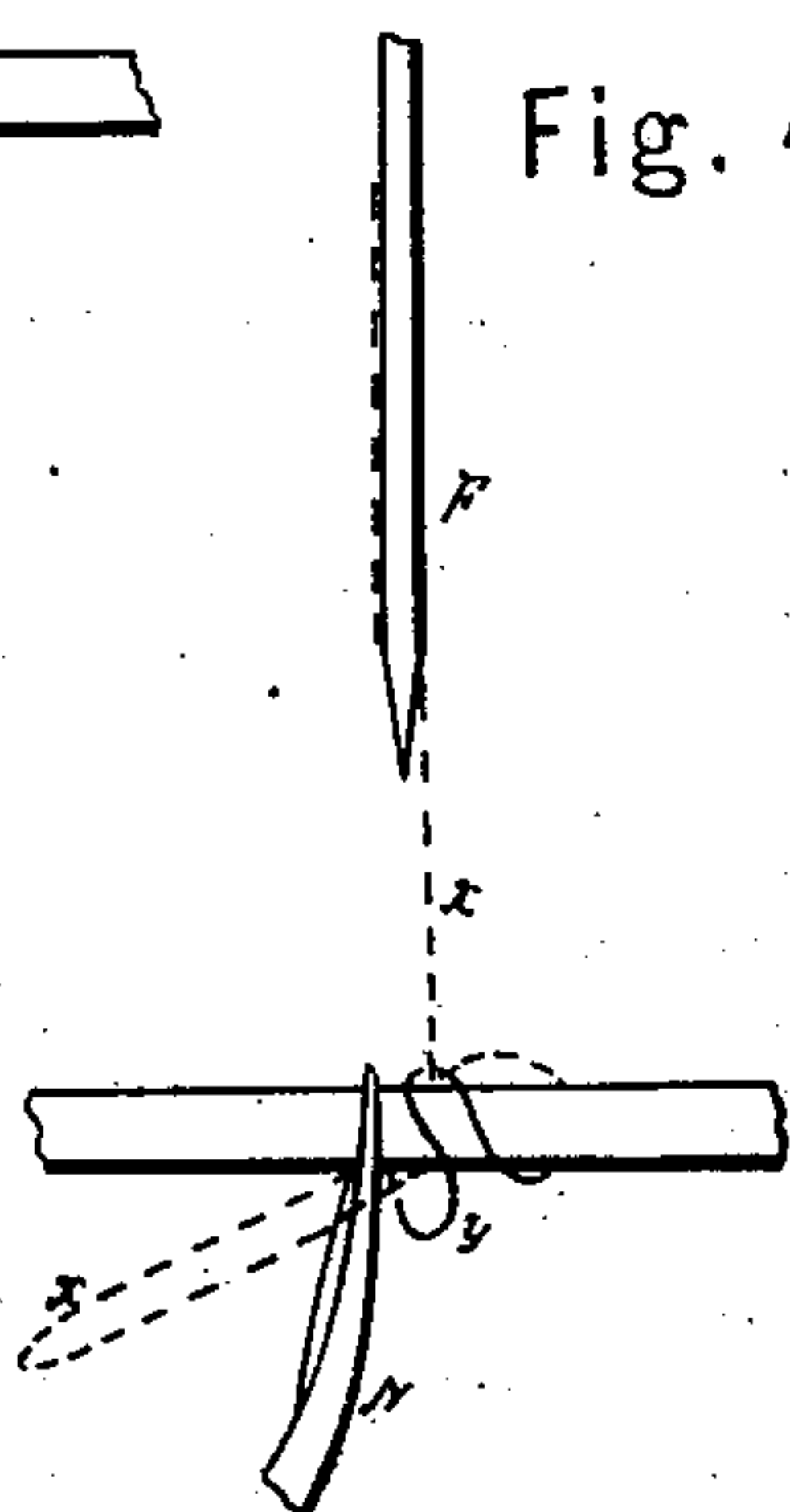


Fig. 5.

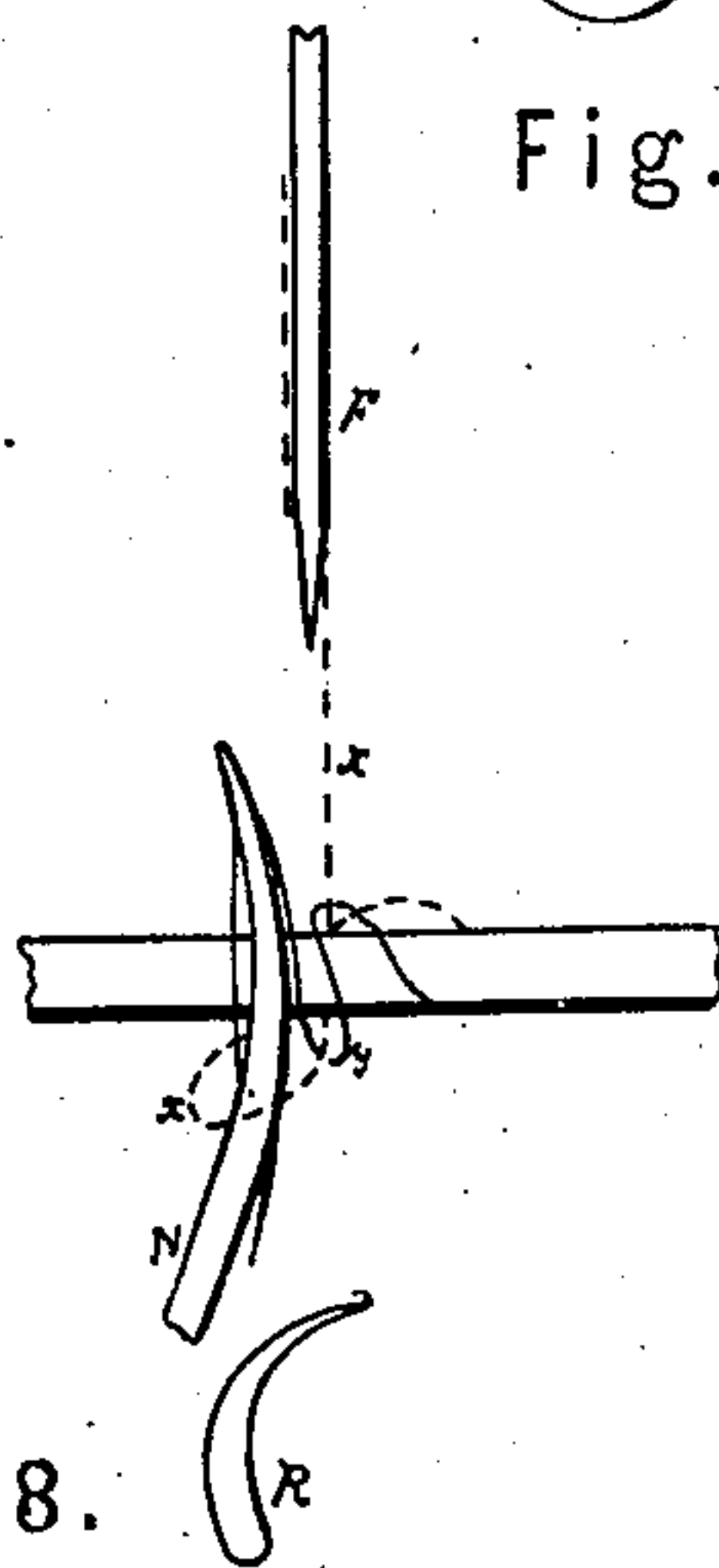


Fig. 6.

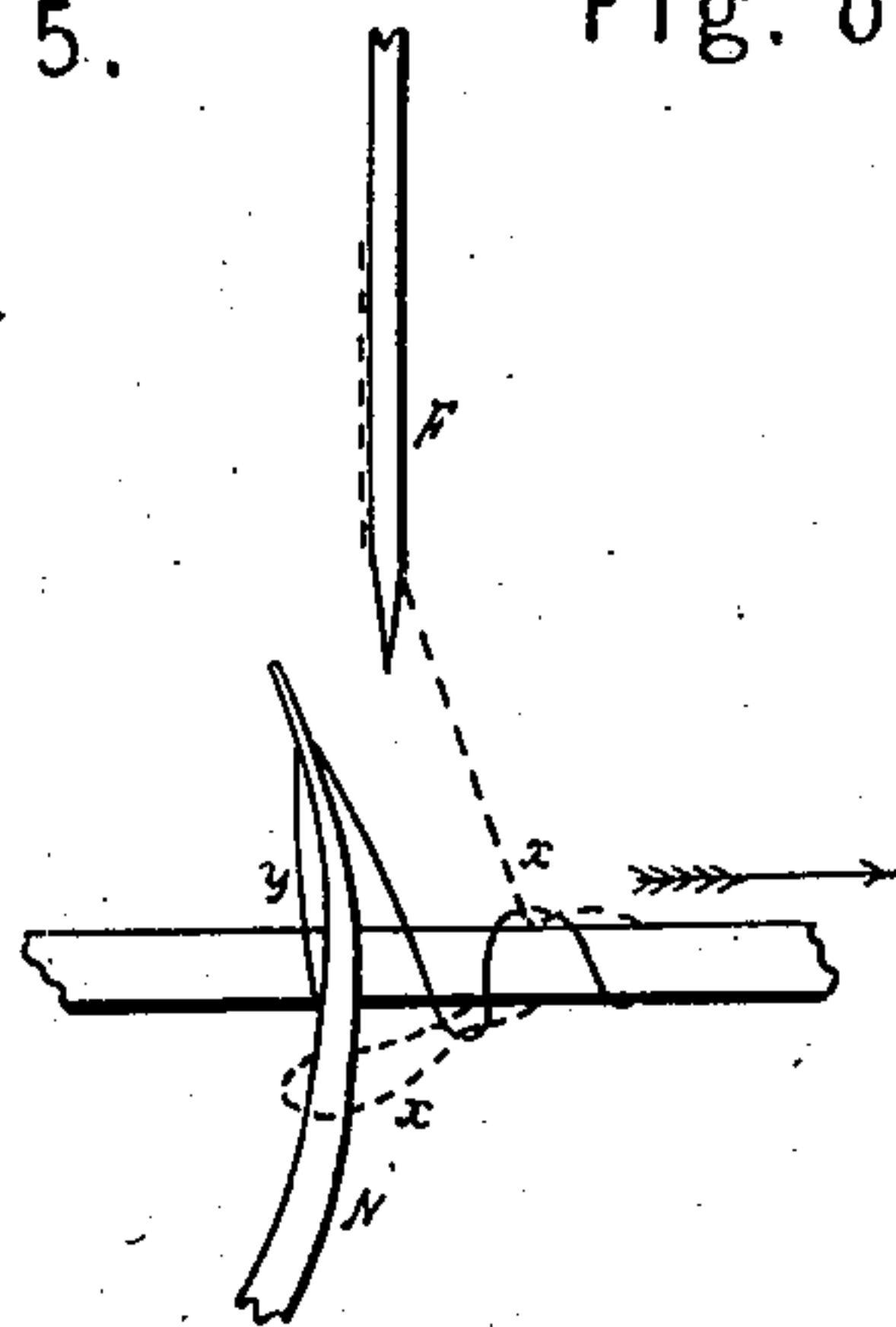


Fig. 8.

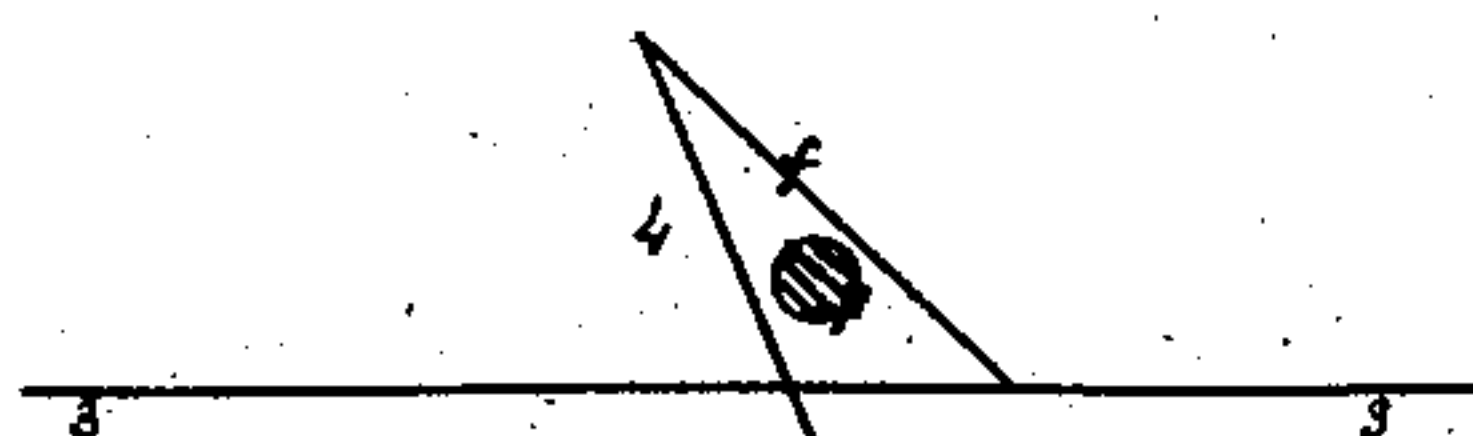


Fig. 9.



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UNITED STATES PATENT OFFICE.

GEO. REHFUSS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO C. S. PATTERSON, E. PINCUS, A. HART, M. MOORE, A. MITCHELL, AND H. H. REED
ALL OF SAME PLACE.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 40,311, dated October 13, 1863.

To all whom it may concern:

Be it known that I, GEORGE REHFUSS, of Philadelphia, Pennsylvania, have invented certain Mechanism for Stitching Button-Holes; 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, and to the letters of reference marked thereon.

My invention consists in certain mechanism, described hereinafter, for making a button-hole stitch from two threads.

In order to enable others skilled in the art to practice my invention, I will now proceed to describe the manner of carrying it into effect.

On reference to the accompanying drawings, which form a part of this specification, Figure 1, Drawing No. 1, is a side view, partly in section, of a sewing-machine exhibiting my devices for sewing button-holes, and for cording and braiding. Fig. 2 is a front view of Fig. 1, and Fig. 3 an inverted plan view.

The figures in Drawing No. 2 represent diagrams illustrating the manner of forming the stitch.

Similar letters refer to similar parts throughout the several views of both drawings.

On reference to Drawing No. 1, A is the base-plate of the machine, and to this plate, at the rear of the same, is secured the hollow standard B, from which projects the stationary arm B', and in the front end of this arm slides the reciprocating needle-bar C.

D is the driving-shaft, turning at one end in the hollow standard B, and at the other end in the head of the stationary arm B', the front end of the driving-shaft being furnished with a crank-wheel, E, the pin of which operates in a curved slot at the rear of the needle-bar, so as to impart to the same the desired reciprocating motion.

F' is the spool containing the upper thread, *x*, which passes in contact with the tension device G, the latter being a modification of tension devices heretofore used in connection with sewing-machines, and therefore requiring no elaborate explanation. From the tension device the thread *x* passes through an eye, *a*, on the top of the needle-bar, thence through a guide-opening at the lower end of the said bar,

and thence through the eye of the needle to the fabric. The spring pressure-pad *b* is of the ordinary construction.

On the driving-shaft D, and within the hollow standard B, is a pinion gearing into a wheel, H, which turns on a stud secured to the said standard, and which gears into a pinion, I, on the cam-shaft J, the latter turning in projections *e e* on the under side of the base-plate A, and the gearing being such that the cam-shaft and driving-shaft shall turn at the same speed.

On the shaft J is a cam, *f*, into the curved groove of which fits a pin on the horizontal lever K, which has its fulcrum on a pin, *h*, secured to the base-plate A. The outer end of this lever K is connected by means of a ball-and-socket joint to one end of the rod L, the opposite end of which is connected by a ball-and-socket joint to a projection, *m*, on an arm, M, which is hung to a pin, *i*, on a plate, *j*.

It should be here understood that the pin *i* and arm M are arranged diagonally for a purpose described hereinafter.

To the end of the arm M is secured the curved looper N through two eyes, near the end of which passes the under thread, *y*, the supply of the latter being derived from a spool, *k*, on a pin attached to the under side of the base-plate. Another cam, G, is secured to the cam-shaft J, and into the groove of this cam projects a pin on the horizontal arm P, which is hung to a pin, *l*, on the base-plate; the forked end *p* of this arm embracing a pin on another horizontal arm, P', which is hung to a pin, *q*. This arm P' carries what I term the "curved loop-holder R." The feeding device may be similar to those of other sewing-machines.

S is the plate, forming a rest for the fabric, represented at X in the several diagrams illustrated in Drawing No. 2, in which diagrams are also represented, on an enlarged scale, the reciprocating eye-pointed needle F, the looper N, and the loop-holder R, which, by their joint action, form the desired stitch on the edge of the fabric X in a manner which I will now proceed to describe. In Fig. 1, Drawing No. 2, the looper N, carrying the under thread, *y*, has reached the limit of its upward vibration, and

the needle F is in the act of descending, while the looper remains stationary, the upper thread, x , passing through the fabric and the eye of the needle, while the under thread, y , occupies a position in front of the edge of the fabric—as, for instance, the edge of a button-hole. As the needle descends it penetrates the fabric and carries with it the needle-thread x ; but in the act of descending the needle, with its thread, passes in front of the thread y , which is held by the looper in a proper position for the purpose. As the point of the needle F enters the fabric the looper begins to descend, carrying with it the under thread, y , the needle and looper arriving at the limit of their downward movement simultaneously and occupying the relative positions illustrated in Fig. 2. The needle F then rises slightly, looping the thread x at its side beneath the fabric, so that it may be caught by the loop-holder R, which carries it to the position shown in Fig. 3. The needle then rises free from the fabric, and the looper N also rises, so that its point shall enter the open loop held by the loop-holder R. The looper N, continuing to rise, carries the thread y under one side of the loop of the thread x , Fig. 4, and the loop-holder R drops the thread x and moves back to its original position, Fig. 5. When the looper reaches its first position the thread y will be drawn across the path of the needle F, as shown in Fig. 6, presenting an open loop through which the needle may descend, the opening of the loop being increased by the movement of the fabric in the direction of the arrow. The needle again descends in front of the thread y , the looper also descending the instant the needle has pierced the fabric, and both simultaneously reaching the limit of their downward movement. The needle then ascends, so as to loop the thread at its side. The loop-holder carries the same to the position shown in Fig. 3, and the operation is continued as before.

It will be seen from the foregoing description that loops of the under thread, y , are lapped over the edge of the fabric and interlocked by the upper thread, x , and secured by the same to the fabric, so as to form a stitch of the character represented in the diagram

Fig. 9, and this with the greatest precision and the desired rapidity by the aid of the simple mechanism described. When there is an equal tension upon both the threads x and y the lock of the stitch is formed directly on the center of the edge of the fabric, where it presents a uniform ridge, as seen in Fig. 9, Drawing No. 2. When it is desired to form the lock or the continuous ridge of interlocked threads upon the upper edge of the fabric the tension upon the upper thread, x , is diminished and that upon the lower thread, y , is increased, so that the lower thread may draw the lock to the top of the fabric. To form the lock of the stitch upon the lower edge this operation is reversed, the tension on the lower thread, y , being diminished and that on the upper thread, x , increased.

It will be seen that it is necessary, before the descent of the needle F, for the thread carried by the looper to be so opened that the needle may descend between it and the looper. This is accomplished by causing the looper to carry the loop diagonally across the vertical path of the needle, the necessary motion required to be imparted to the looper N being attained by arranging the arm M, to which the looper is attached, diagonally upon the bed-plate of the machine, as described above. The effect of this diagonal movement of the looper will be best understood by reference to the diagram Fig. 8, Drawing No. 2, where F represents a sectional plan of the needle on an enlarged scale, the line 3 representing the edge of the fabric, the line 4 showing the diagonal course taken by the point of the looper, and f representing the loop of the under thread.

I claim as my invention and desire to secure by Letters Patent—

The combination of the reciprocating eye-pointed needle F, the looper N, and loop-holder R, the whole being arranged and operating substantially as and for the purpose specified.

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

GEO. REHFUSS.

Witnesses:

HENRY HOWSON,
JOHN WHITE.