

(No Model.)

2 Sheets—Sheet 1.

W. F. DIAL.

SHUTTLE OSCILLATING MECHANISM FOR SEWING MACHINES.

No. 304,711.

Patented Sept. 9, 1884.

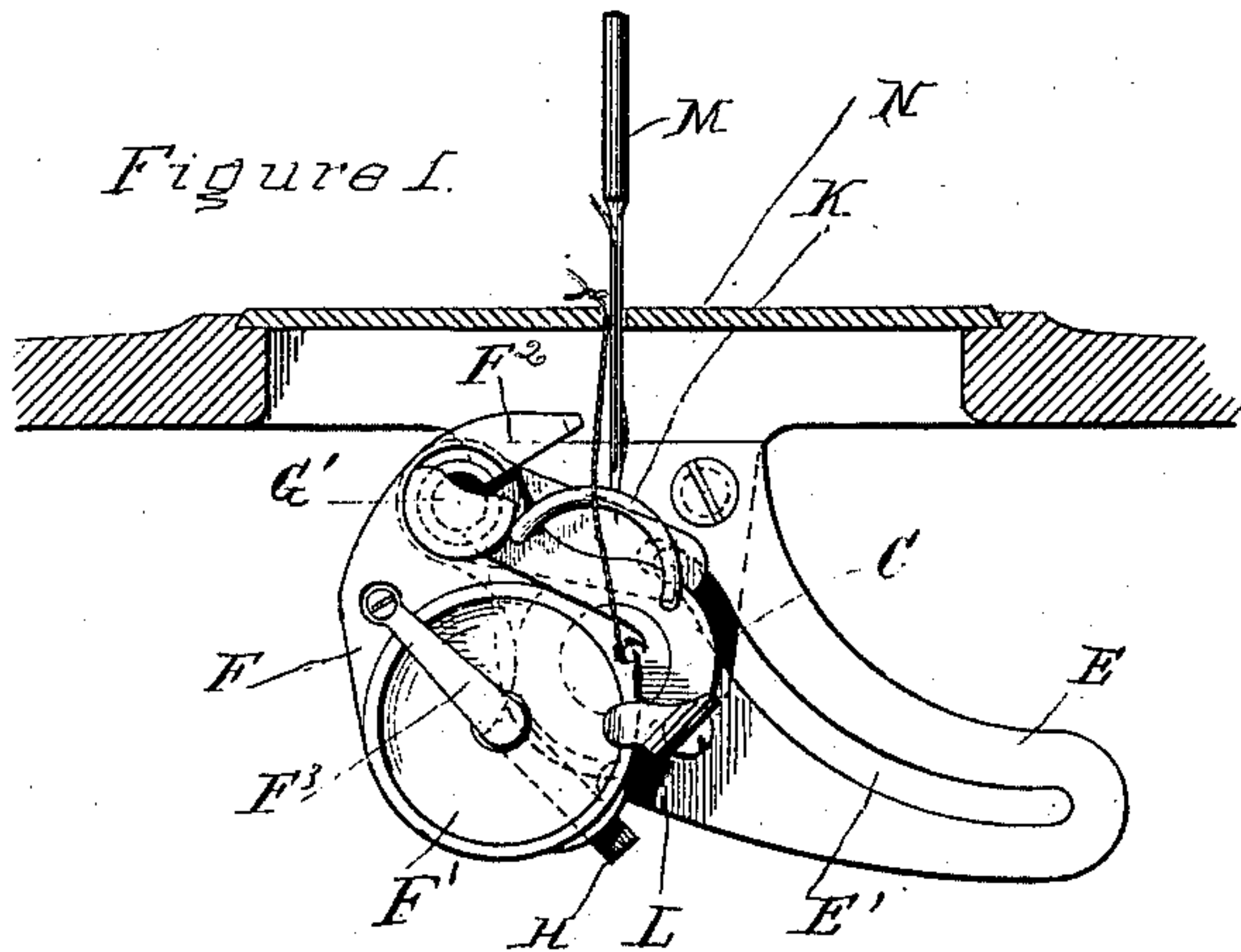


Figure 1.

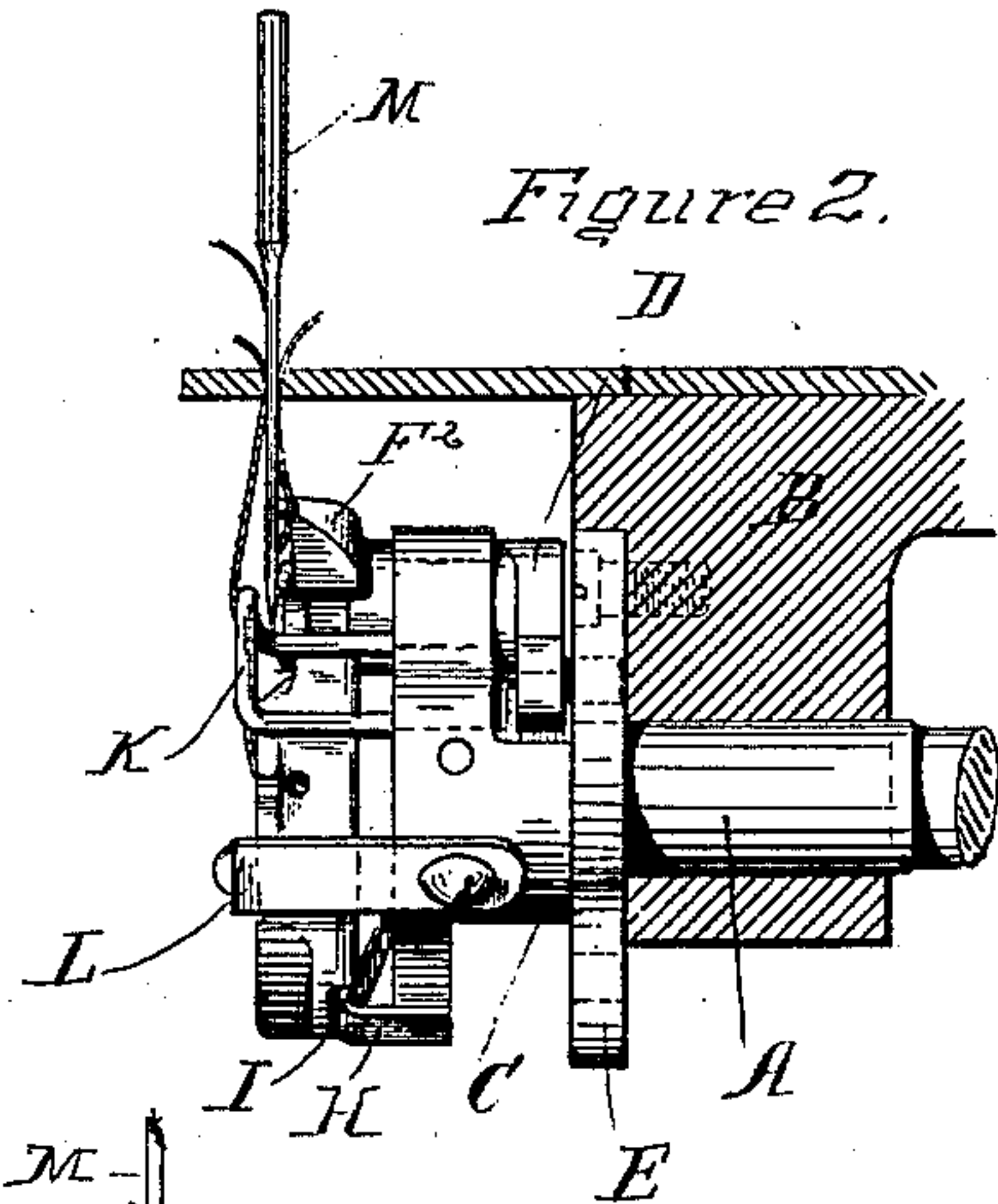


Figure 2.

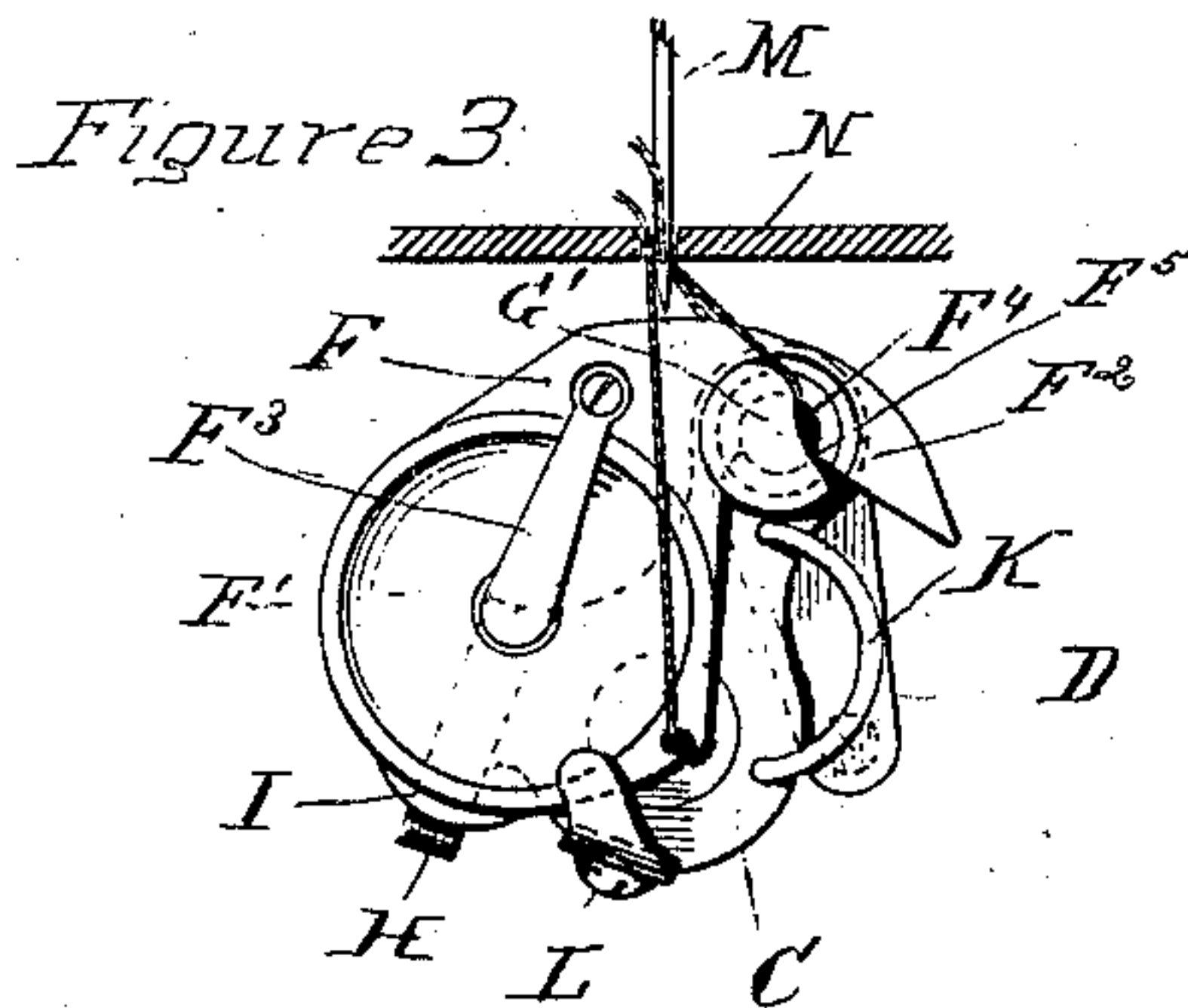


Figure 3.

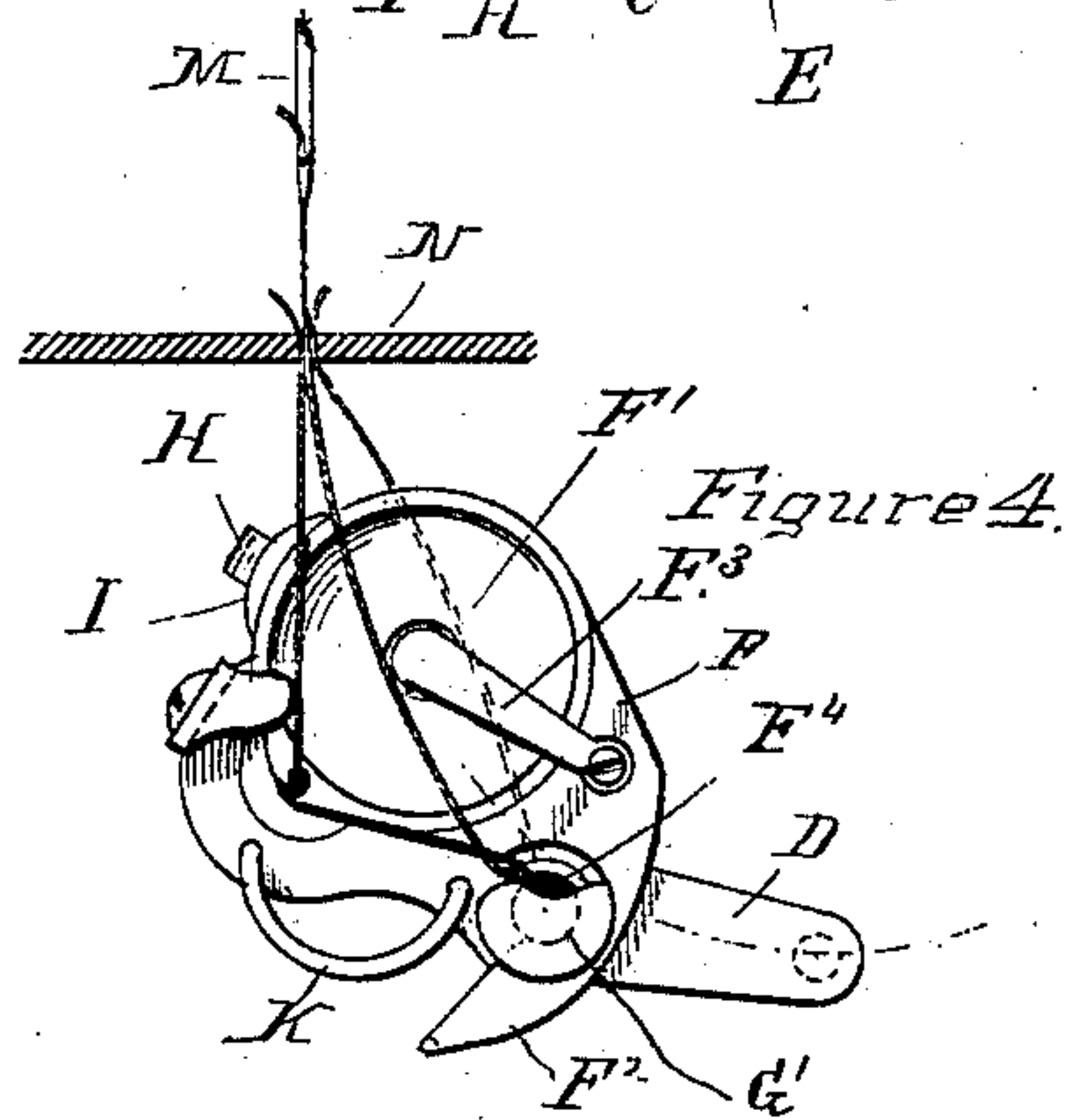


Figure 4.

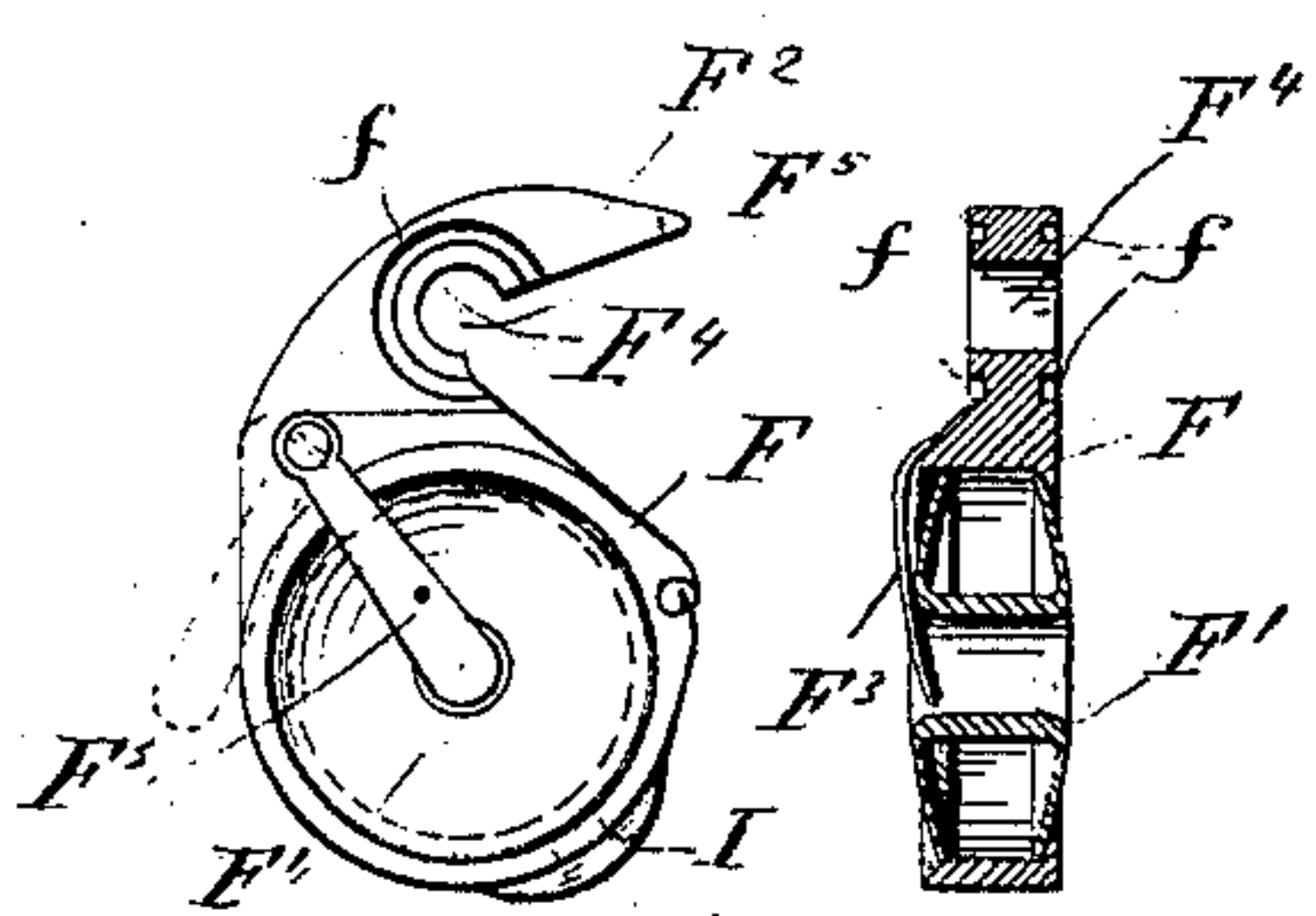


Fig. 5.

Fig. 6.

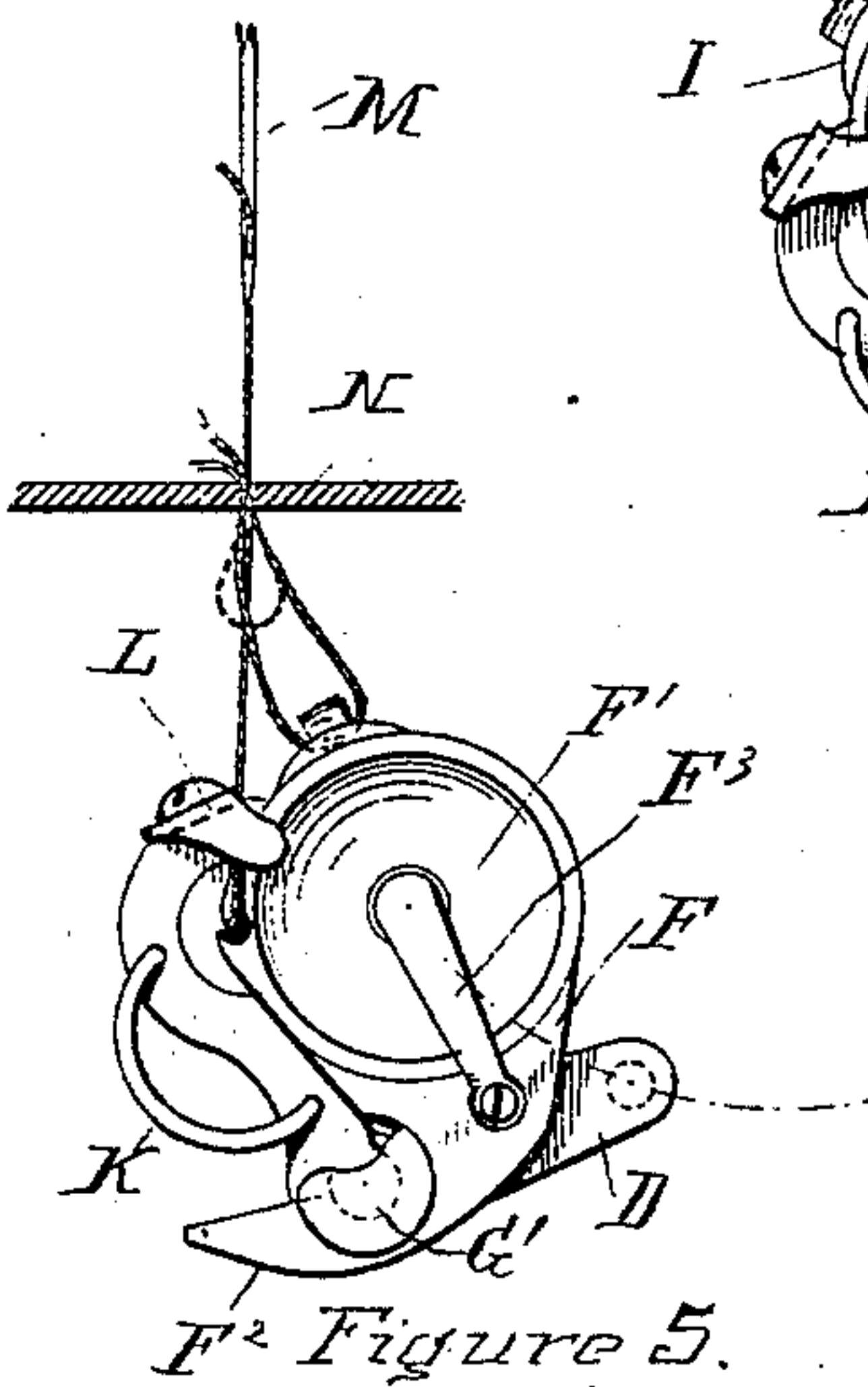


Figure 6.

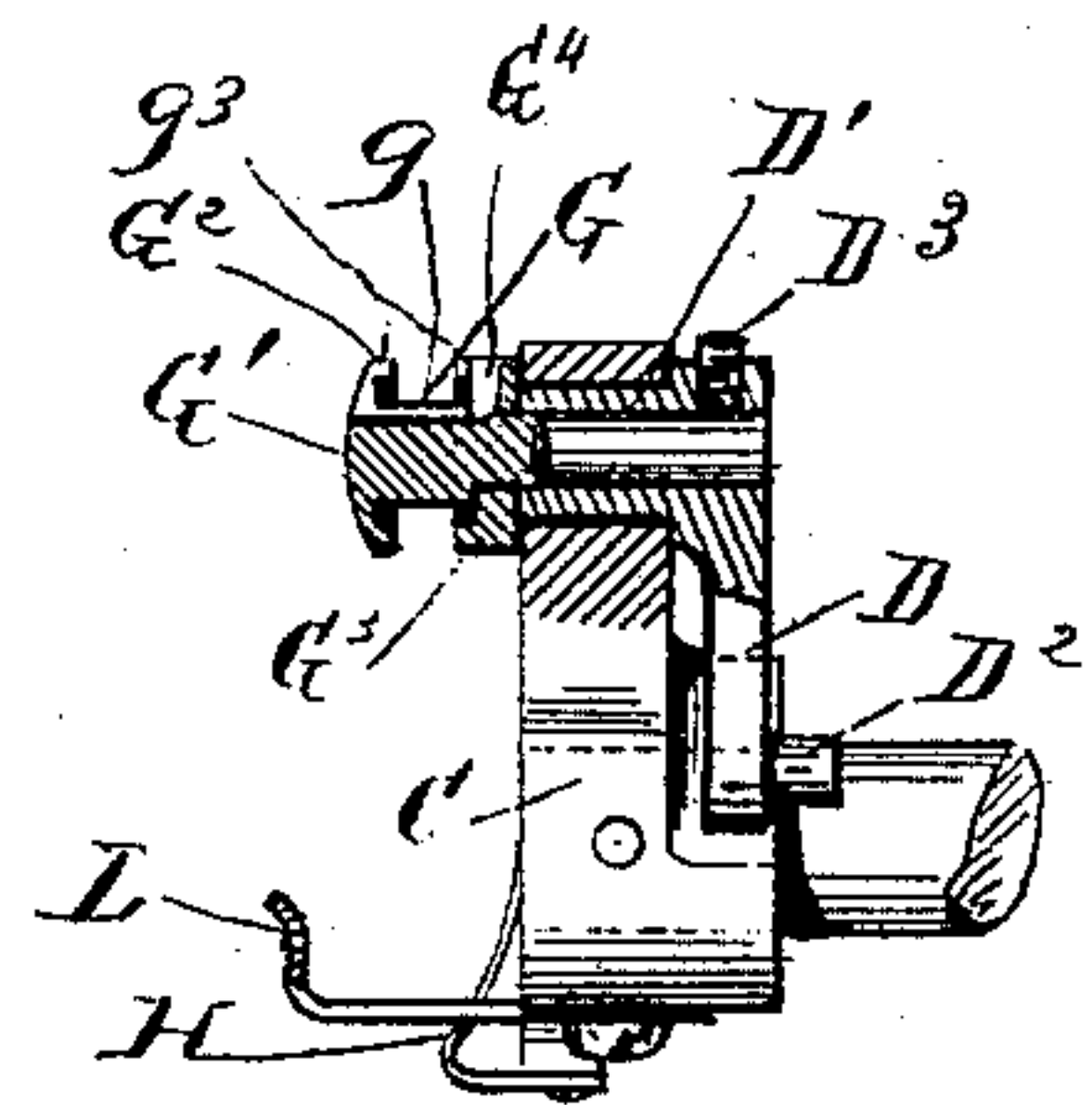


Figure 7.

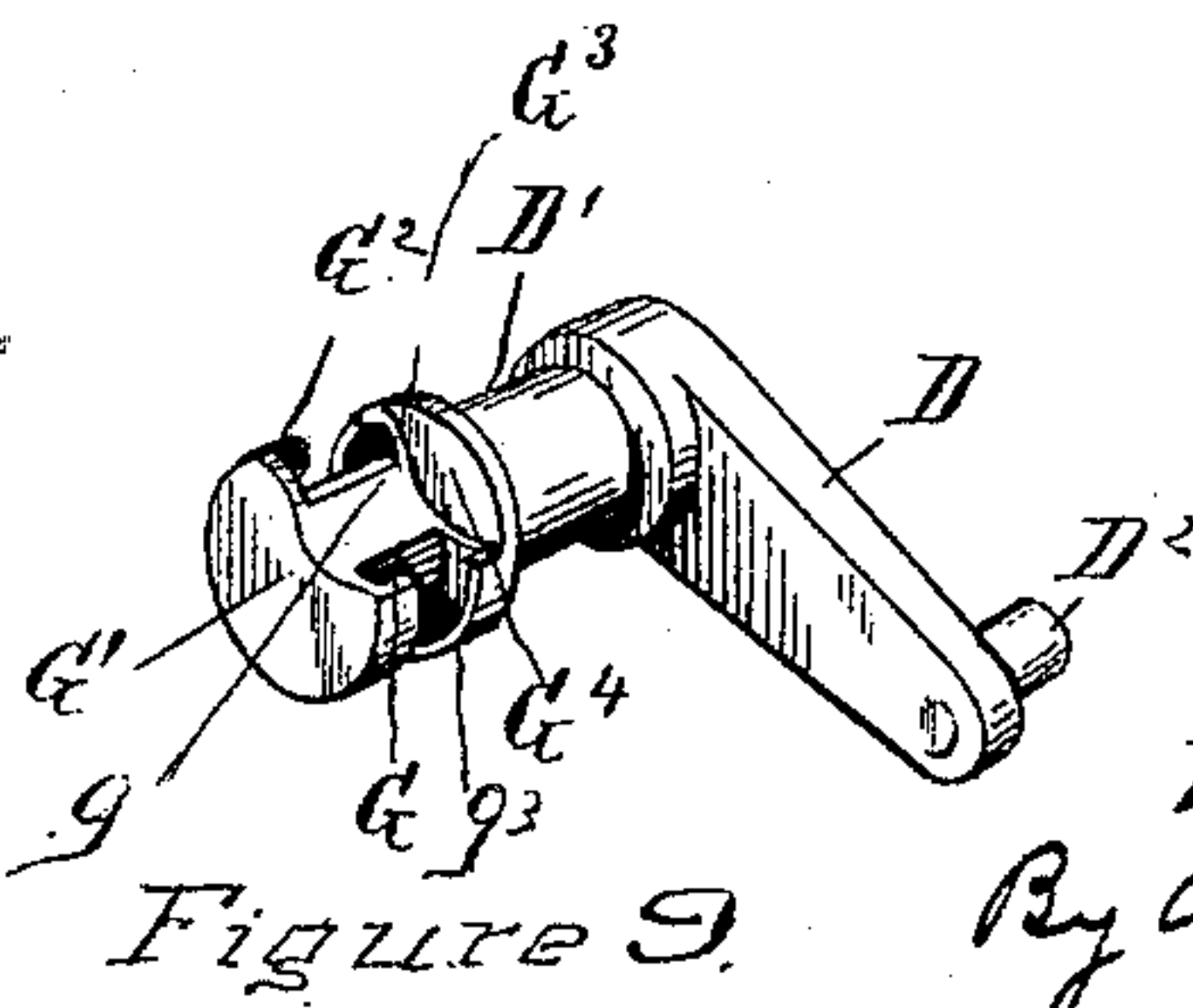


Figure 8.

Witnesses  
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(No Model.)

2 Sheets—Sheet 2.

W. F. DIAL.

SHUTTLE OSCILLATING MECHANISM FOR SEWING MACHINES.

No. 304,711.

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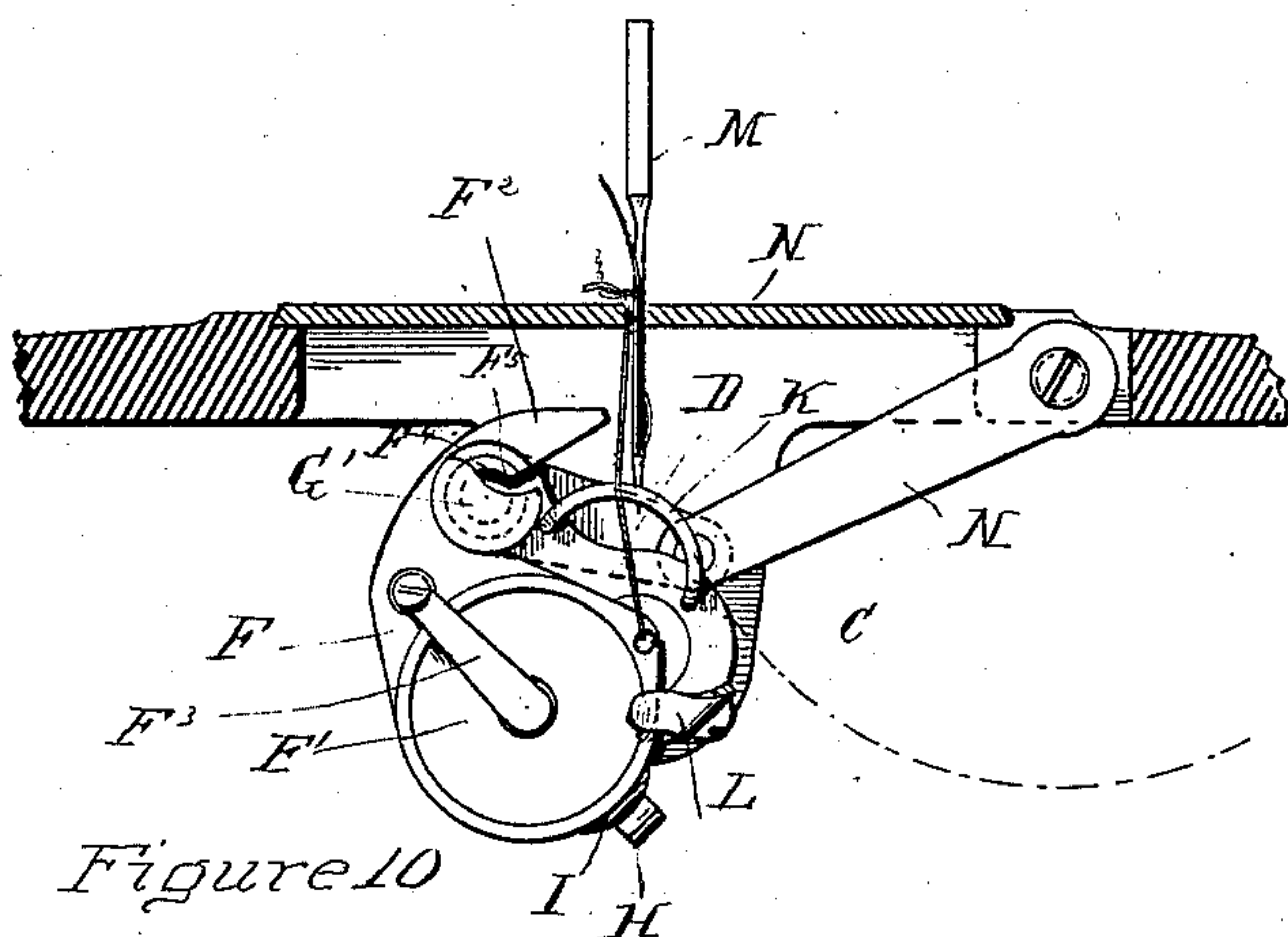


Figure 10

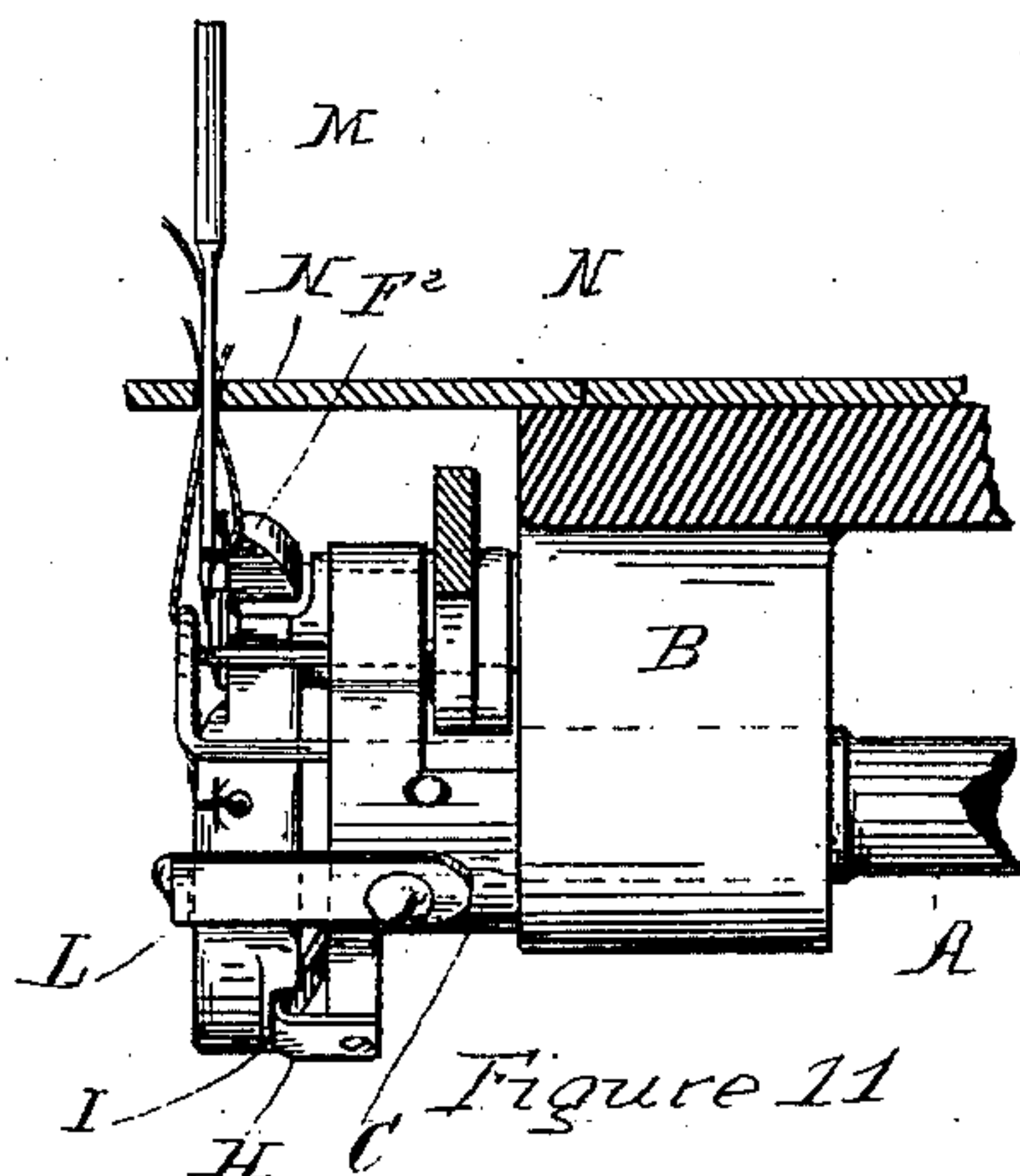


Figure 11

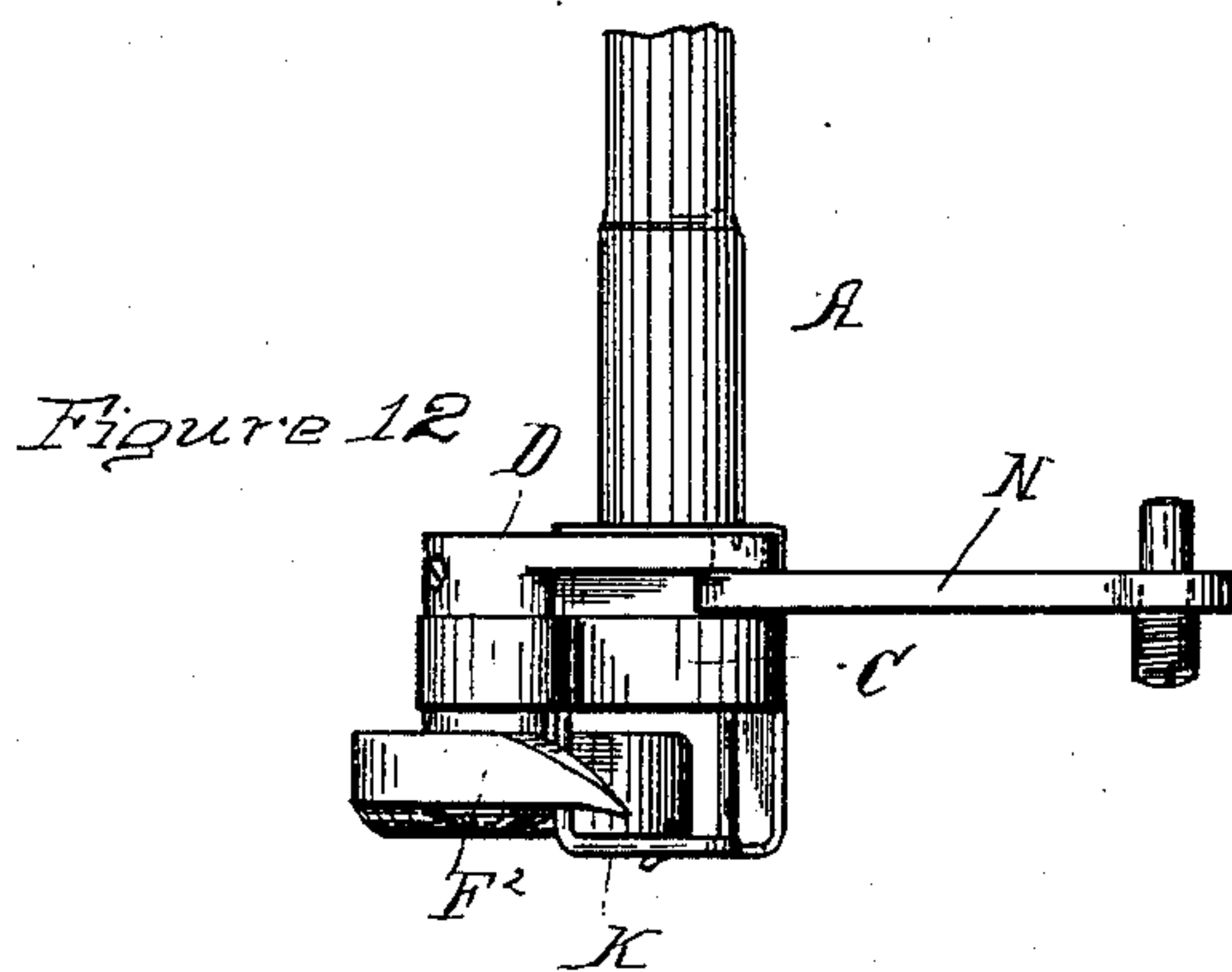


Figure 12

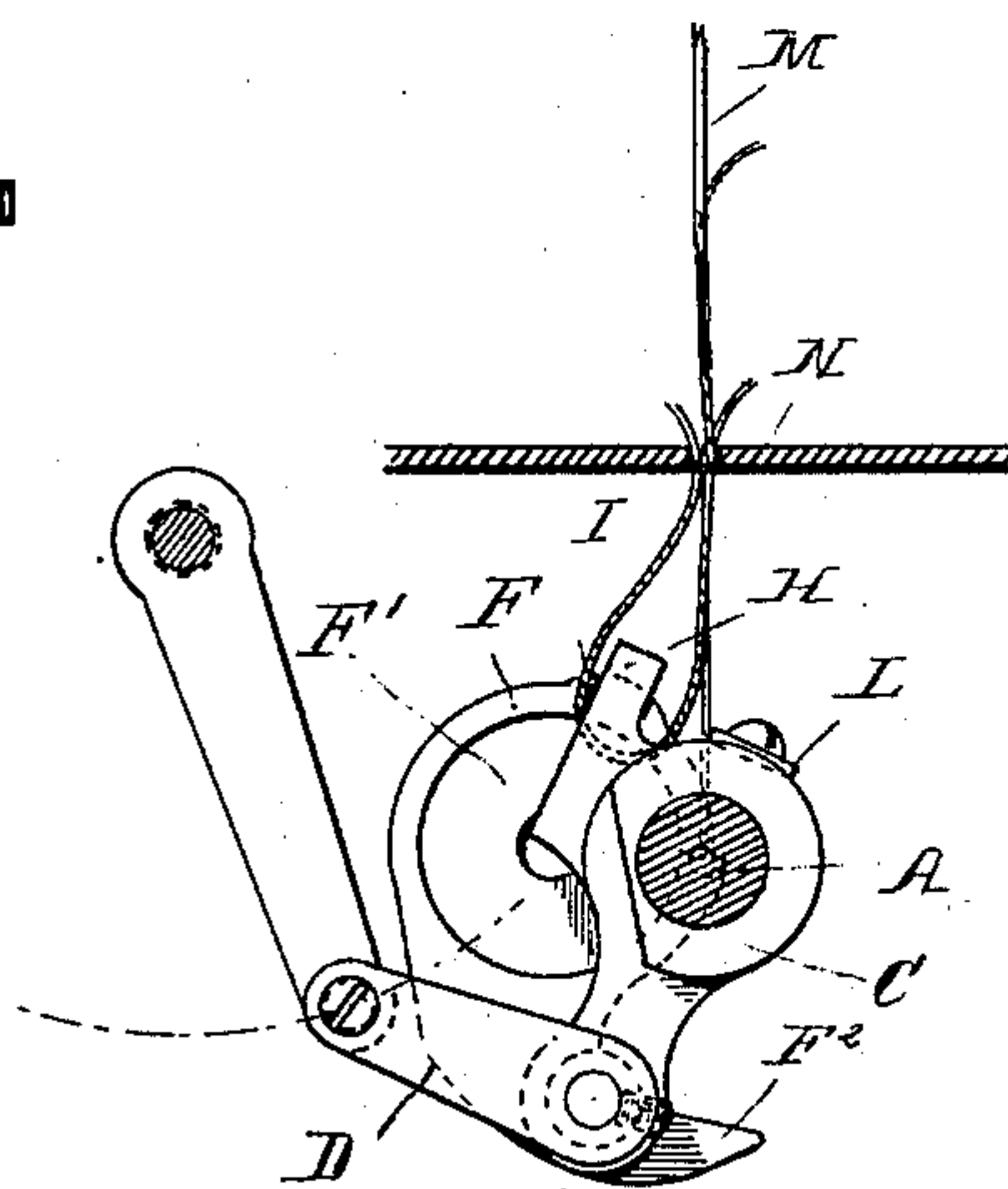


Figure 13

Witnesses.

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# UNITED STATES PATENT OFFICE.

WILBUR F. DIAL, OF BRIDGEPORT, CONNECTICUT.

## SHUTTLE-OSCILLATING MECHANISM FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 304,711, dated September 9, 1884.

Application filed January 23, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, WILBUR F. DIAL, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Shuttle-Oscillating Mechanism for Sewing-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to machines of the class known as oscillators, and has for its object to overcome several serious objections to that class of machines as they are now constructed—as, for instance, the friction and consequent wear on the shuttle-race, and the constant liability of soiling the thread. With these ends in view I have devised a novel construction in which no shuttle-race is used, my invention consisting in the construction and combination of parts, as hereinafter fully described, and then pointed out in the claims.

For the purpose of enabling others skilled in the art to which my invention relates to understand its construction, I will proceed to describe the same, referring by letters to the accompanying drawings, forming part of this specification, in which—

Figure 1 is an end elevation showing the position of the operative parts just before the taking of the loop; Fig. 2, a side elevation with the parts in the same position; Fig. 3, an end elevation after the taking of the loop; Fig. 4, an end elevation showing the loop carried around and just being released; Fig. 5, an end elevation showing the shuttle at the extreme of its throw and the loop being drawn up; Fig. 6, an elevation, and Fig. 7 a central section, of the shuttle and bobbin; Fig. 8, a side elevation of the end of the shaft, the shuttle-carrier and the crank, with the shuttle-stud, washers, and sleeve, being shown in section; Fig. 9, a perspective of the shuttle-stud washers, sleeve, crank, and pin. Figs. 10 and 11 are respectively end and side elevations of a modification; Fig. 12, a plan view of the same; and Fig. 13, an end elevation showing the side opposite to that shown in Figs. 1 and 10, with the shuttle at the extreme of its throw.

Similar letters indicate like parts in all the figures.

A represents the shaft of the machine, the end of which is supported in a bracket, B, projecting downward from the bed of the machine.

C is the shuttle-carrier secured to the end of the shaft.

D is a crank, having a hollow sleeve, D', at one end, which is journaled in the shuttle-carrier, and a pin, D<sup>2</sup>, at the other end, which engages in groove E' in plate E, which is rigidly secured to the bracket. (See Figs. 1 and 2.)

F is the oscillating shuttle, which carries bobbin F', and is provided with a hook, F<sup>2</sup>, which takes the loop in the needle-thread. The bobbin is held in place by a spring, F<sup>3</sup>. The shuttle is also provided with a recess, F<sup>4</sup>, contracted at its opening, as at F<sup>5</sup>, in which the shuttle-stud rests, and with grooves *ff* on opposite sides around recess F<sup>4</sup>, for a purpose presently to be explained.

G is the shuttle-stud, the head G' of which has a flange, G<sup>2</sup>, around its edge on the inner side, except at the groove or portion *g*, where both the head and flange, as well as the stud itself, are cut away, as will presently be more fully explained.

G<sup>3</sup> is a washer upon the shuttle-stud, which is held from rotation by a pin and groove, (not shown,) or in any suitable manner, and is provided with a flange, *g*<sup>3</sup>, similar to the flange upon head G'. A portion of the flange *g*<sup>3</sup> is cut away, (see G<sup>4</sup> in Fig. 9,) leaving a space between the hook and the washer, to permit the passage of the hook in the formation of each stitch. The shank G<sup>4</sup> of the shuttle-stud passes into and through the sleeve D' of crank D, and is secured therein by set-screw D<sup>3</sup>. Thus it will be seen that the stud, sleeve, and crank move as one piece, the sleeve itself being journaled in the shuttle-carrier, as stated above.

H is a lug secured to the shuttle-carrier, which engages a groove, I, in the base of the shuttle, and acts to secure it against lateral motion.

K is a thread-guard, preferably made of wire and secured to the shuttle-carrier, which acts to prevent the shuttle-thread from being caught by the hook or the head of the shuttle-stud. In use the base of the shuttle is engaged by lug H, the shuttle is supported by stud G, which rests in recess F<sup>4</sup>, the flanges G<sup>2</sup>



and  $g^3$  upon the head of the shuttle-stud and the washer engaging in grooves  $f f$ , which surround recess  $F^4$  in the shuttle. Thus it will be seen that the shuttle bears upon the stud as well as upon both washers. The contraction  $F^5$  at the opening of the recess enables me to make the grooves  $f f$ , which surround the recess, more than half a circle, thus holding the flanges  $G^2$  and  $g^3$  in the grooves, and preventing the shuttle from dropping away from the stud at any stage of its oscillation, although the recess is of sufficient size to permit the stud to move freely in the shuttle.  $L$  is a guard secured to the shuttle-carrier and curved over the edge of the shuttle, but not bearing on it. Should any disarrangement of the parts occur by accident this guard would prevent any severe strain on the shuttle-stud, thus preventing any binding of the washers.

$M$  is the needle, and  $N$  the cloth-plate. I have shown no take-up for the needle-thread, as that is no part of my present invention. It should be understood, however, that a take-up of ordinary construction is essential, as in all lock-stitch machines.

The operation is as follows: Fig. 1 shows the position of the parts at the moment the loop is about to be taken—i. e., at the beginning of the formation of a stitch. This figure also illustrates the action of the thread-guard in keeping the shuttle-thread out of the way. In Fig. 3 the forward movement of the point of the shuttle has proceeded, and the loop is shown as taken by the point of the shuttle, and is lying in recess  $F^4$ , between the outer edge of said recess and the cut-away portion of the shuttle-stud and washers. In Fig. 4 the loop has passed entirely around recess  $F^4$ , and is about to be thrown off by the shuttle, the thread being shown as just passing out of the open space between the cut-away portion of the shuttle-stud and washers and the portion of the hook surrounding the recess. At the instant the parts are in this position the take-up begins to act. Fig. 5 shows the extreme of the throw of the shuttle. The loop has been thrown off by the shuttle after being carried around the shuttle-thread and the take-up has nearly drawn it up. From the position shown in Fig. 5 the shuttle is carried back to the position shown in Fig. 1, when it is ready to take another loop.

The advantages of the construction I have shown are its extreme simplicity and non-liability to get out of repair from constant use. The fact that no shuttle-race is used does away with a large amount of friction and wear, and with a constant liability to soil the thread in this class of machines.

It will be observed in Figs. 1, 3, 4, and 5 that the position of the groove or cut-away portion of the shuttle-stud relatively to the plane of the cloth-plate does not materially change during the oscillation of the shuttle, which leaves ample room for the thread between the stud and the shuttle during the os-

cillation of the latter. Thus, although this stud imparts to the shuttle an oscillatory motion equal to more than half a revolution, it has slight axial rotation of its own. This peculiarity of movement is owing to the stud being solid with crank  $D$ , whose pin  $D^2$  engages in the slot  $E'$  in plate  $E$ , thus preserving the plane of the groove. I have shown slot  $E'$ , which is engaged by the crank-pin, as curvilinear in form; but this is not essential, as a straight slot may be used with a different adjustment of parts.

In the modifications shown in Figs. 10, 11, 12, and 13 the slotted plate  $E$  is dispensed with and the crank is pivoted to a link, which in turn is pivoted to the bed of the machine in front of the cloth-plate. This link supports and carries the outer end of the crank, thus preserving the plane of the stud the same as in the former construction.

I do not desire to limit myself to the exact construction of parts which I have shown in the drawings, as the construction may be varied within reasonable limits without departing from the spirit of my invention. No claim is made, however, in this application to subject-matter covered by the claims of my applications, Serial Nos. 118,401, 118,402, and 118,403, filed January 23, 1884, or my application, Serial No. 128,395, filed April 18, 1884.

I claim as my invention—

1. In a sewing-machine, the needle, shuttle, oscillating shaft, and shuttle-carrier, in combination with a crank having a sleeve journaled in the shuttle-carrier and a shuttle-stud secured in said sleeve, substantially as described.

2. The combination, with the needle, of an oscillating shuttle carried by a pin which, while it imparts motion to the shuttle, has free movement therein and also in the carrier, substantially as described.

3. The oscillating shuttle-carrier with shuttle-stud and crank journaled therein, in combination with the shuttle having a recess which engages the shuttle-stud, and means for supporting and guiding the opposite end of the crank.

4. In a sewing-machine, the shuttle-stud cut away on one side, as shown, and having head  $G'$ , with flange  $G^2$ , and a washer,  $G^3$ , with a corresponding flange, cut away as shown, in combination with a shuttle having a recess,  $F^4$ , and grooves  $f f$ , surrounding the recess, and mechanism for oscillating the shuttle.

5. The shuttle-stud having a head and flange, and carrying a fixed washer, all of which are cut away as shown, and a crank, in combination with an oscillating carrier in which both crank and stud are journaled, means for supporting and guiding the opposite end of the crank, and a shuttle having a hook and recess, as described, and for the purpose set forth.

6. The shuttle having hook  $F^2$ , recess  $F^4$ , and spring  $F^3$ , which holds the bobbin, in combination with the needle, stud  $G$ , cut away as shown, and journaled in an oscillating carrier,



and means for imparting motion to the stud, whereby the needle-thread is caused to pass between the stud and the recess in the formation of each stitch.

5 7. The shuttle-carrier having lug H, and guard L and stud G, journaled in the carrier, in combination with the shuttle having recess F<sup>4</sup>, and groove I.

10 8. The needle, the shuttle having grooves f, the carrier, and the shuttle-stud having a flange with a groove, g, upon its head, and a washer with flanges, in combination with the crank having a sleeve through which the stud passes, and means for supporting the opposite  
15 end of the crank which permits endwise movement, but preserves substantially the plane of the stud.

9. The shuttle-carrier having sleeve D' of crank D journaled therein, and stud G, which carries the shuttle, in combination with a 20 plate having a slot which is engaged by a pin at the opposite end of the crank.

10. In a sewing-machine, a crank having a pin engaging a slotted plate, and a sleeve at the opposite end journaled in the shuttle-car- 25 rier, in combination with the shuttle-stud, which is secured in the sleeve, and means for securing the shuttle upon the carrier.

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

WILBUR F. DIAL.

Witnesses:

A. M. WOOSTER,

A. B. FAIRCHILD.