

No. 629,735.

Patented July 25, 1899.

W. M. AMMERMAN & E. J. TOOF.

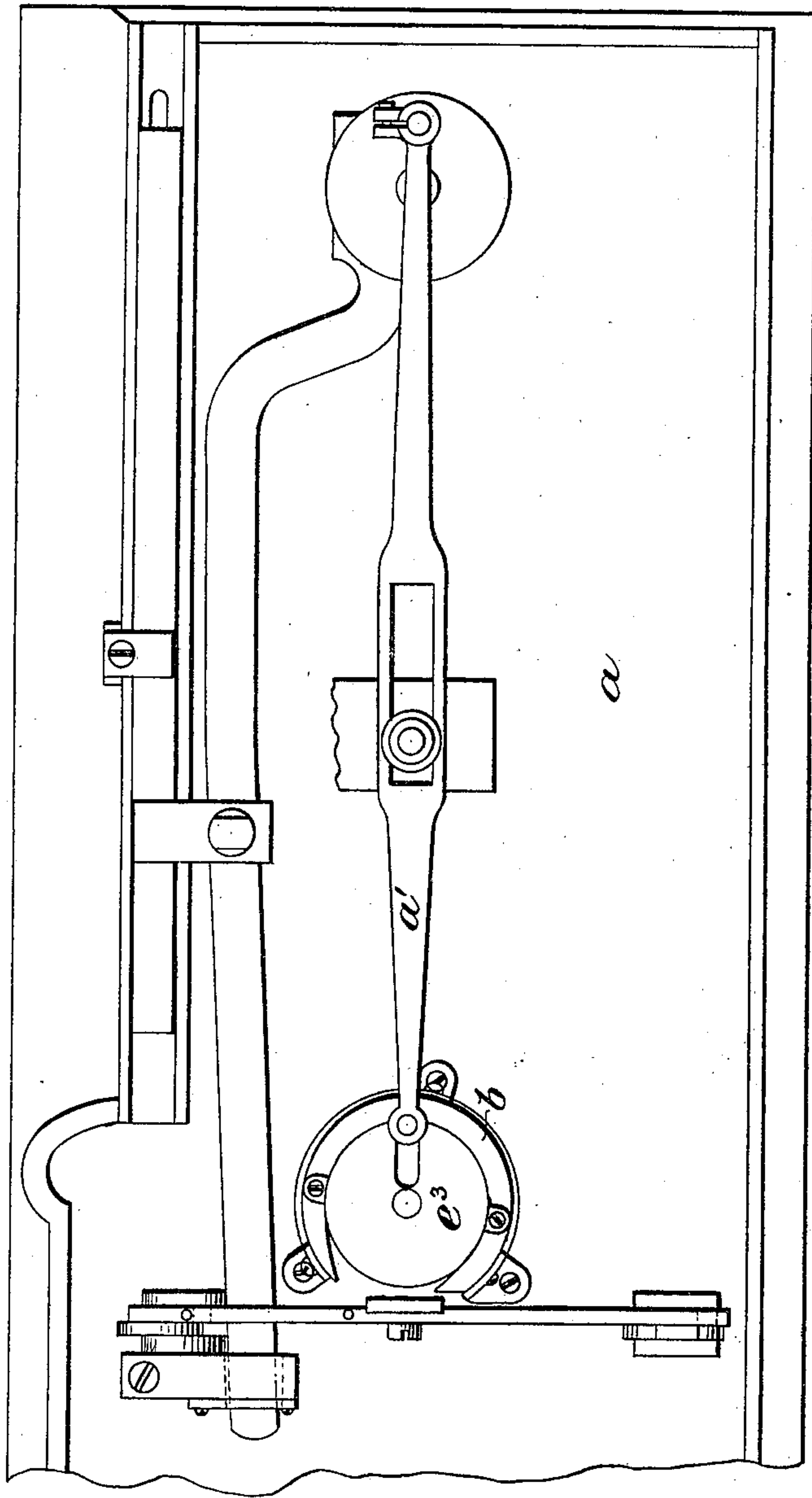
SEWING MACHINE.

(Application filed Dec. 31, 1894.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.



Witnesses:-

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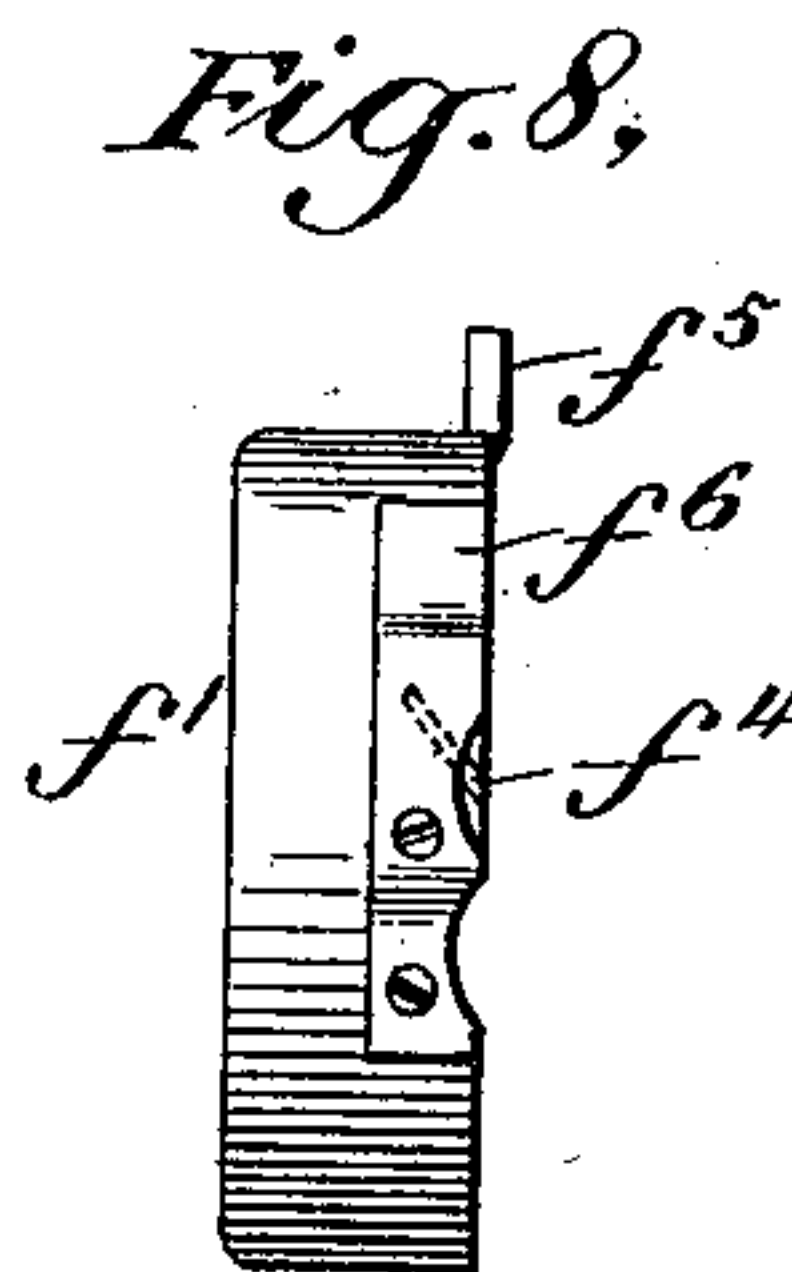
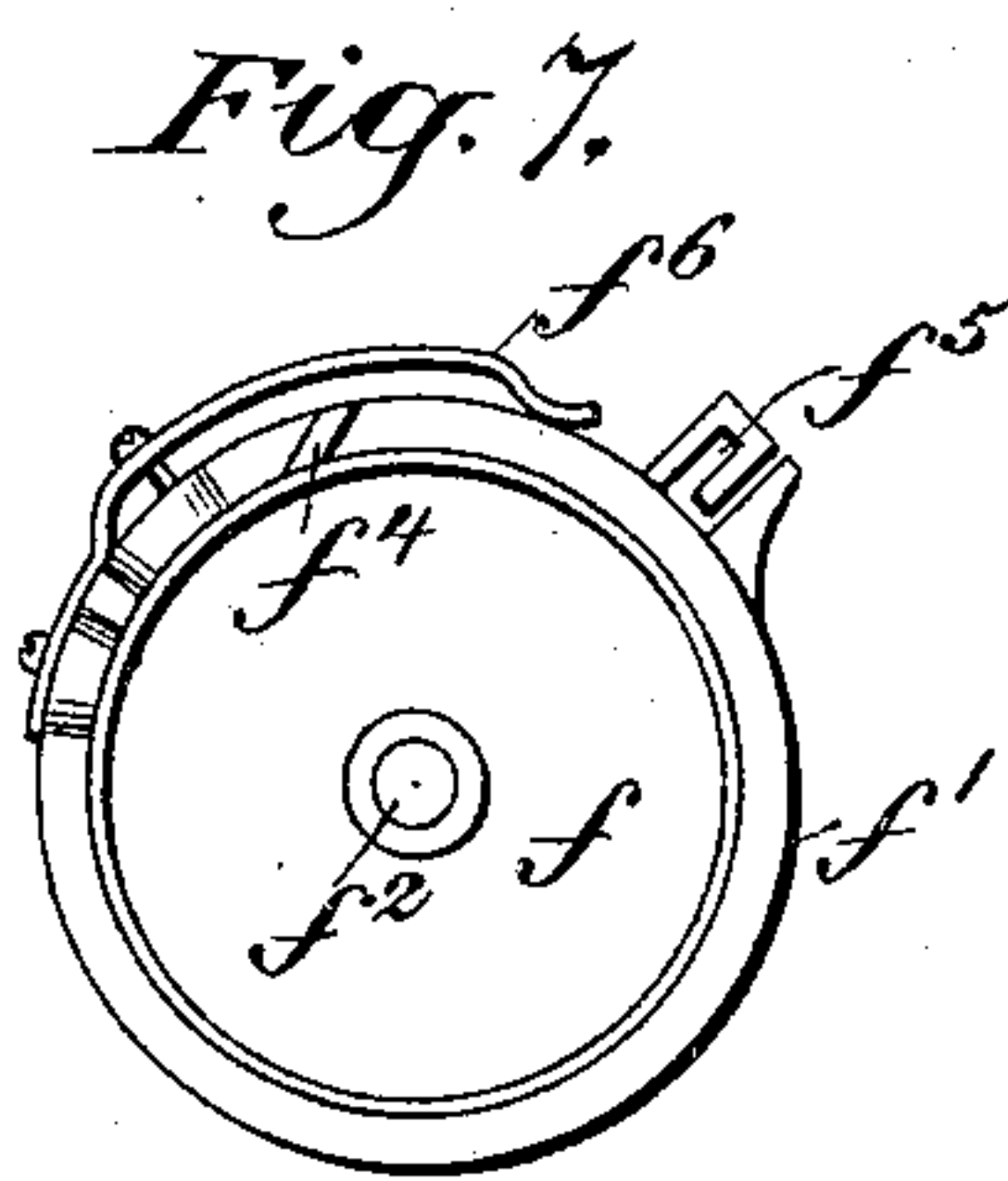
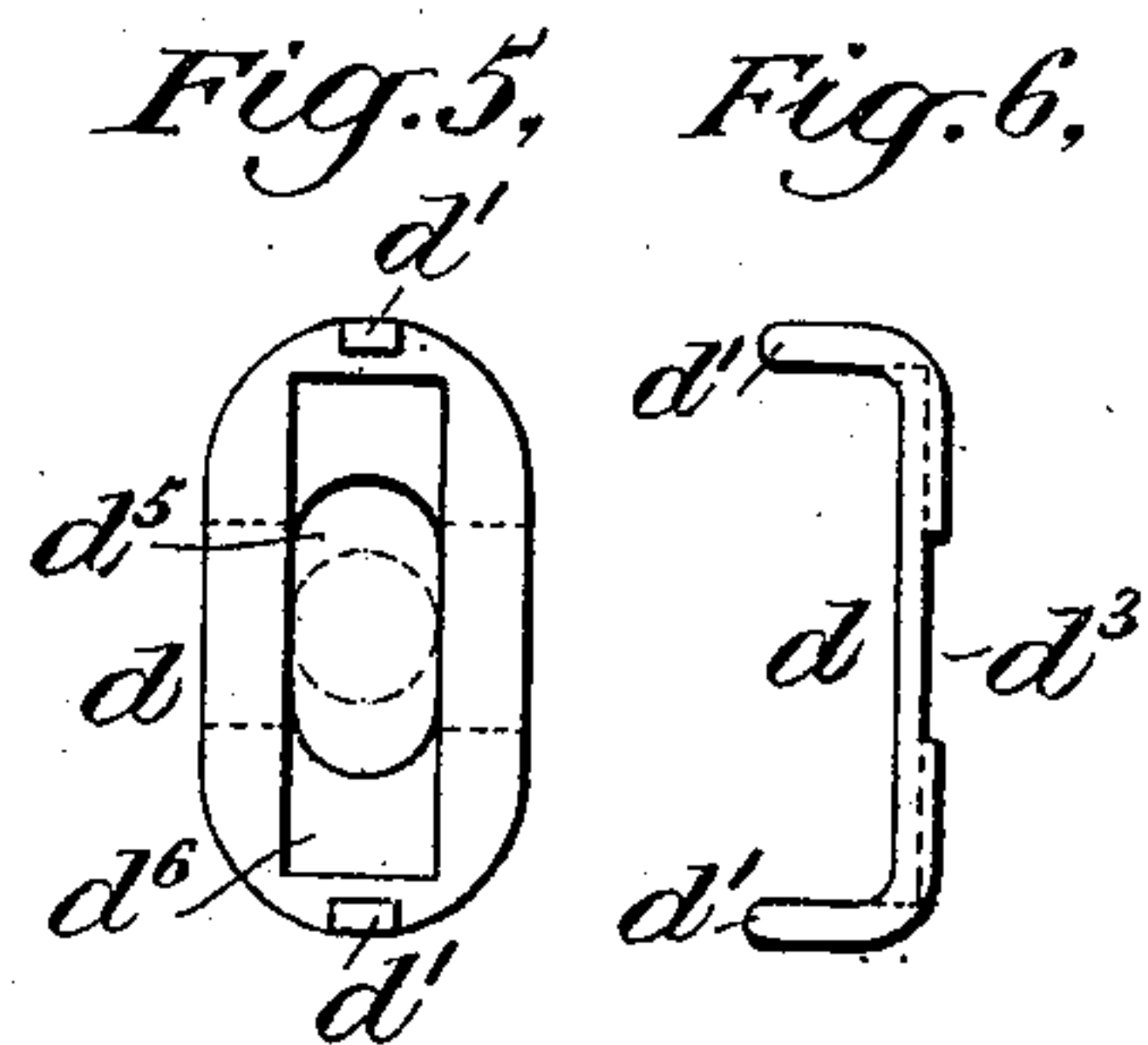
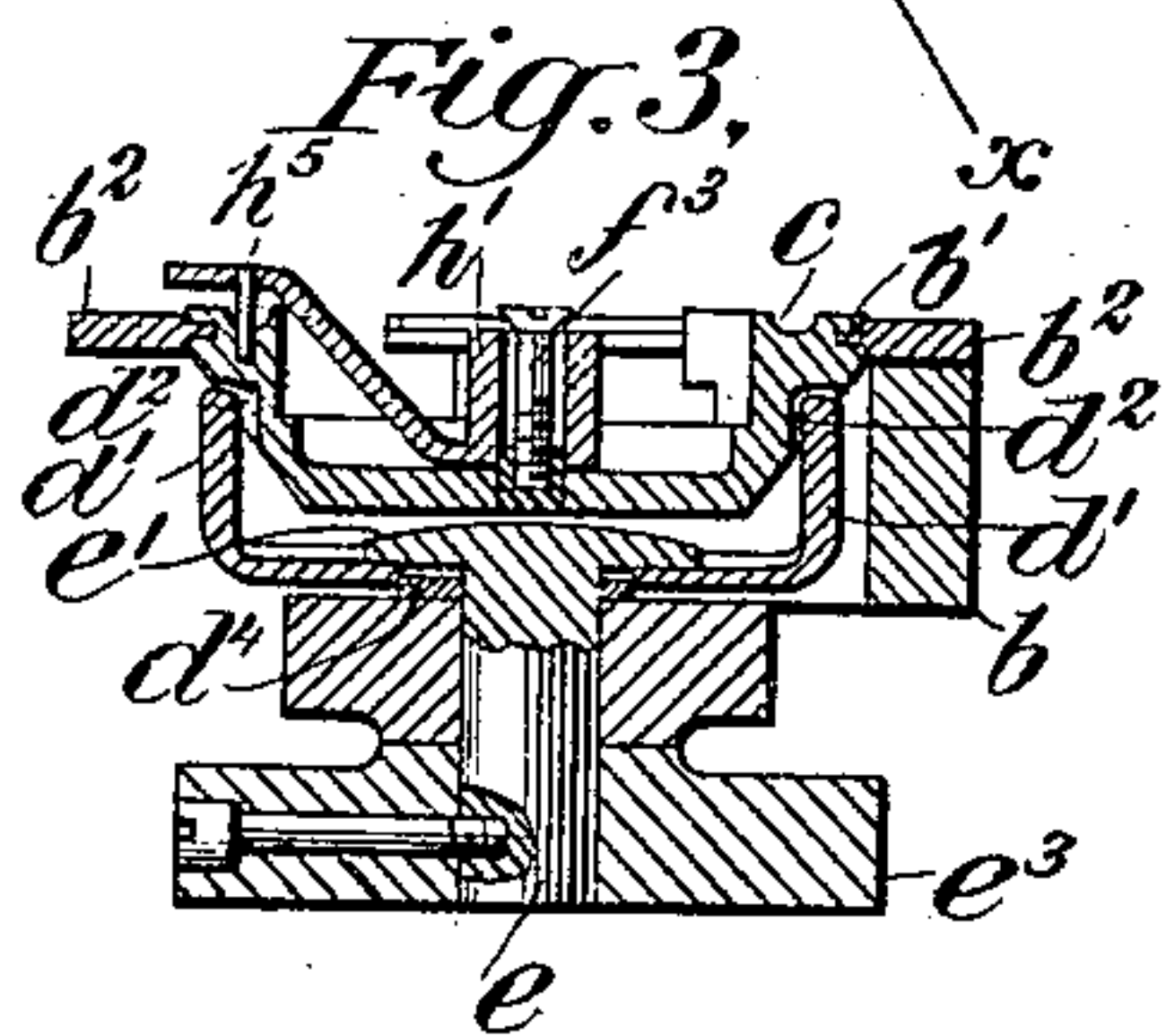
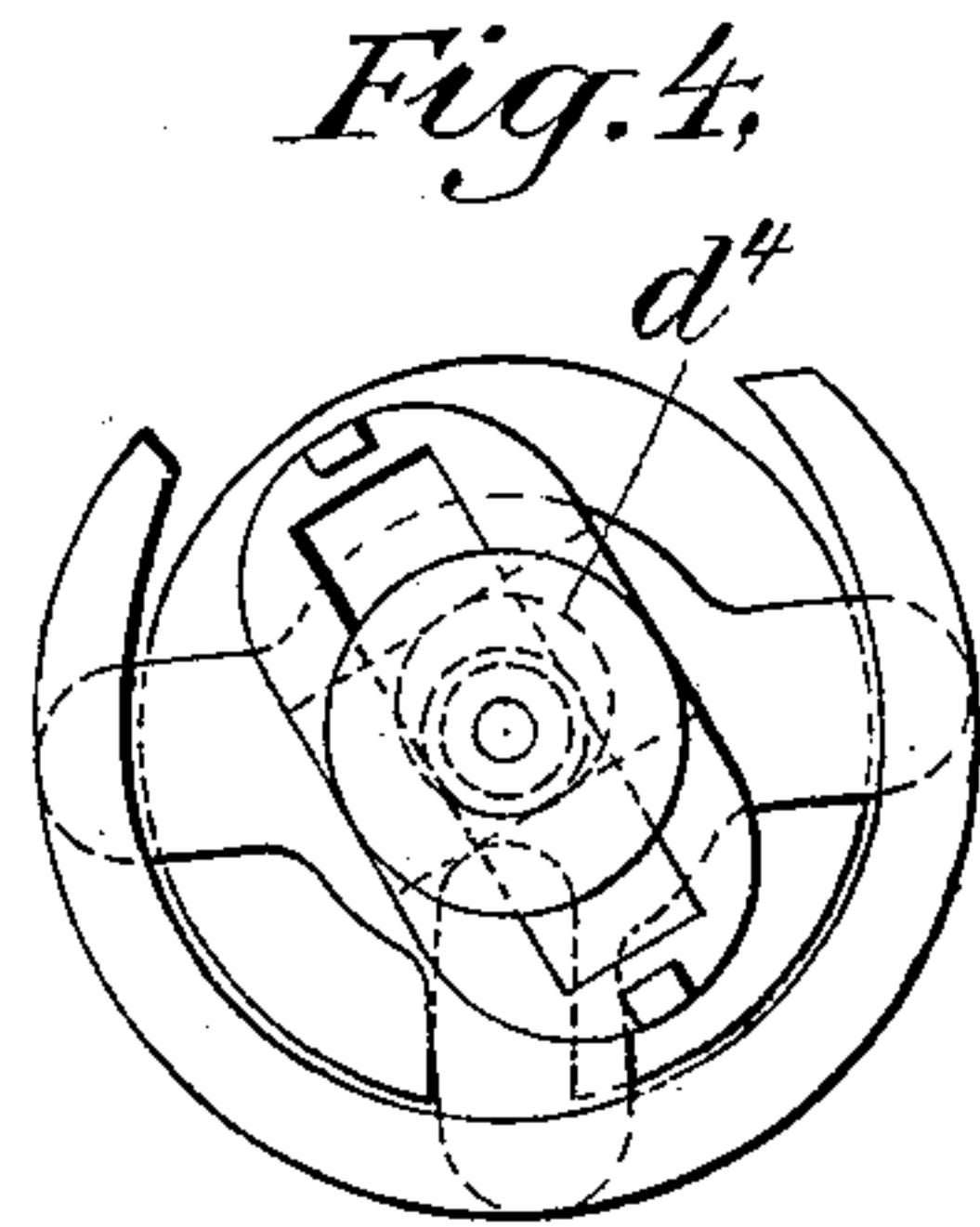
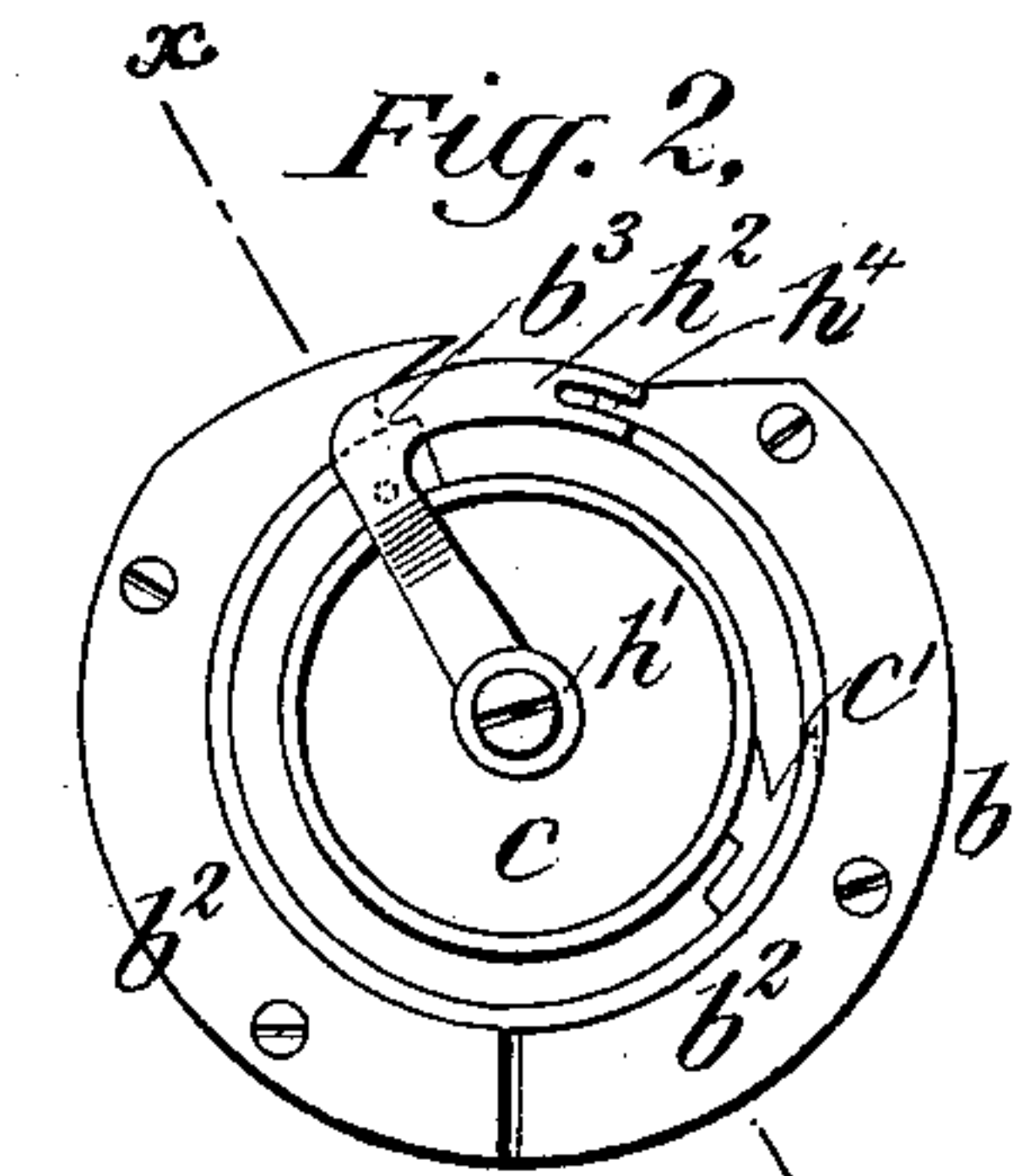
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SEWING MACHINE.

(No Model.)

(Application filed Dec. 31, 1894.)

3 Sheets—Sheet 2.



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SEWING MACHINE.

(No Model.)

(Application filed Dec. 31, 1894.)

3 Sheets—Sheet 3.

Fig. 9.

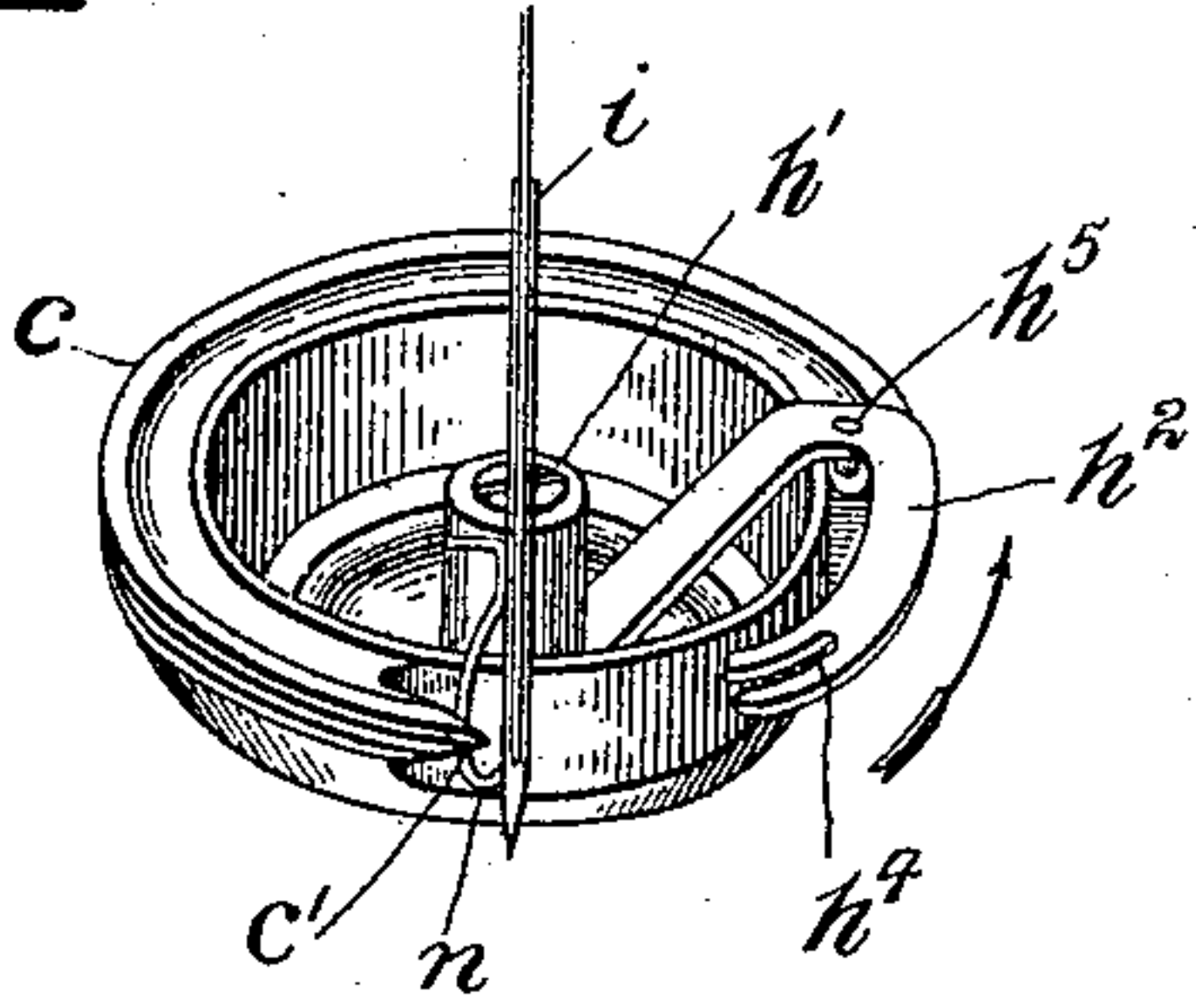


Fig. 11.

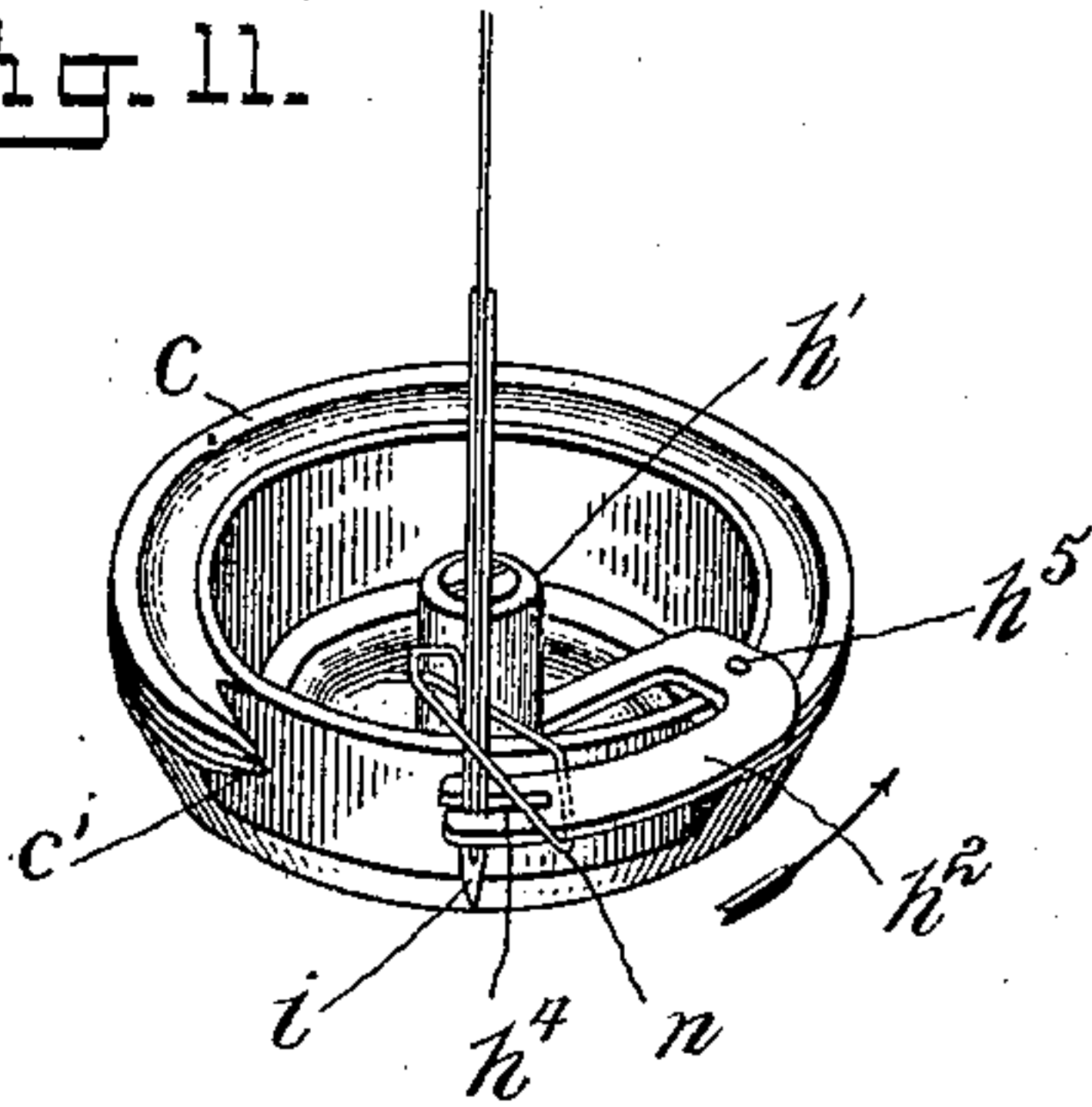


Fig. 10.

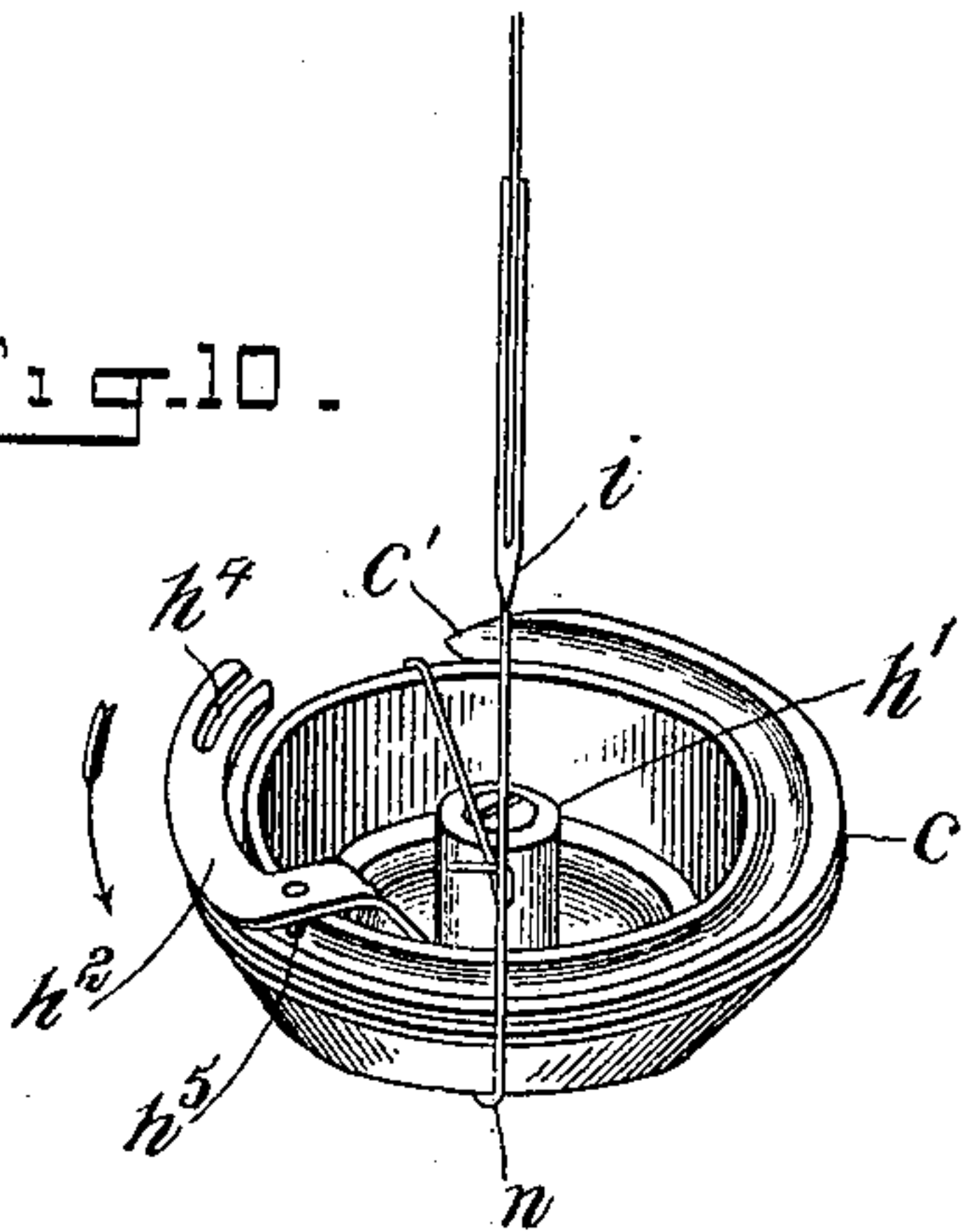
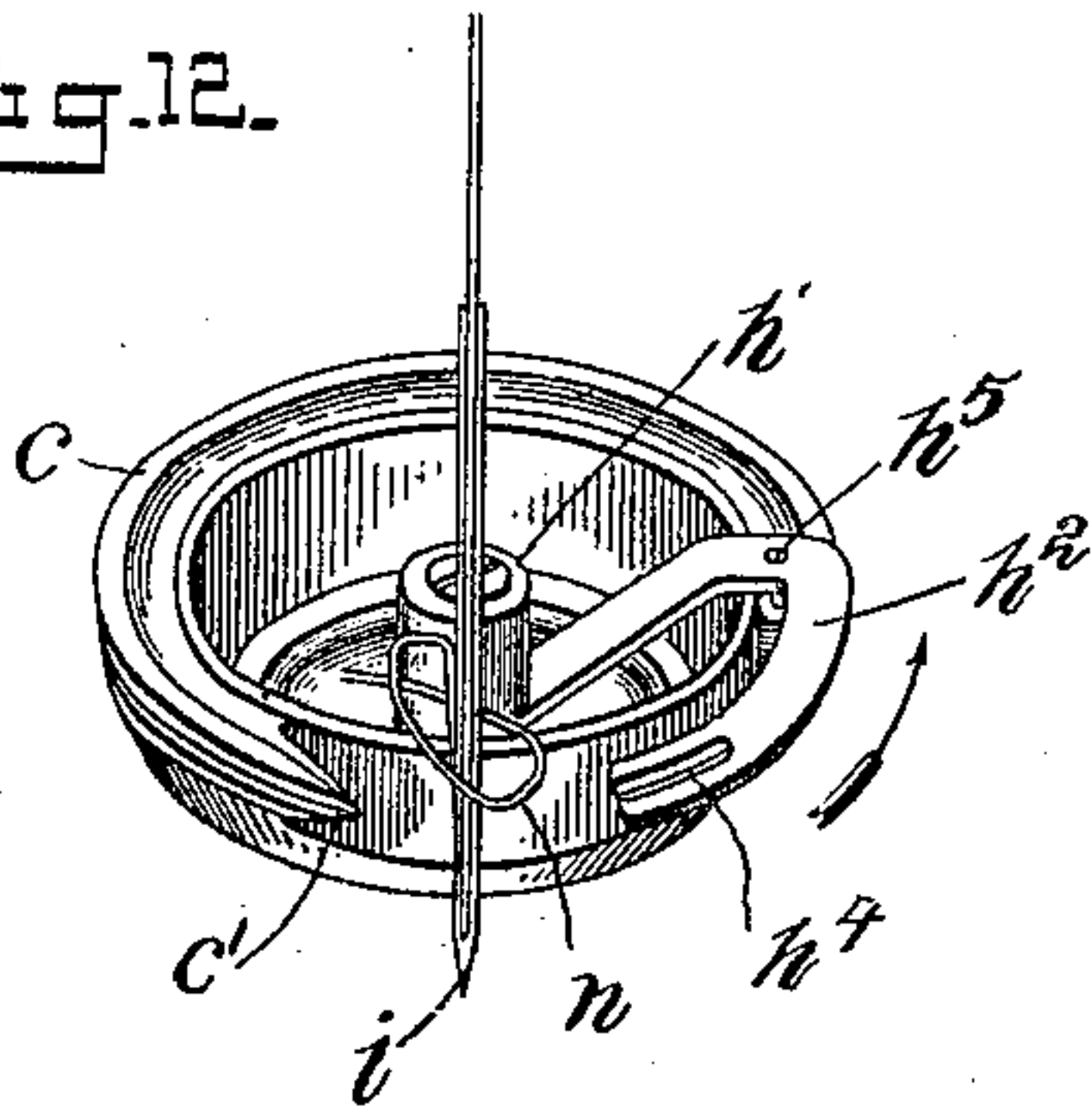


Fig. 12.



Witnesses.  
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# UNITED STATES PATENT OFFICE.

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## SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 629,735, dated July 25, 1899.

Original application filed October 16, 1890, Serial No. 368,353. Divided and this application filed December 31, 1894. Serial No. 533,399. (No model.)

*To all whom it may concern:*

Be it known that we, WILLIAM M. AMMERMAN and EDWIN J. TOOF, citizens of the United States, and residents of the city and county of New Haven, State of Connecticut, have invented new and useful Improvements in Sewing-Machines, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof.

Our present invention, which forms a division of an application of ours filed October 16, 1890, and bearing Serial No. 368,353, patented May 11, 1897, No. 582,382, relates more particularly to that portion of the stitch-forming mechanism of the machine located beneath the cloth-plate, and has for its objects, first, to provide a simple and effective looper-actuating mechanism that will be certain and positive in its operation, and, second, to provide a loop-spreader attachment that may be removably connected with an ordinary rotary looper of a lock-stitch sewing-machine and by dispensing with the under thread render such machine capable of forming a single-thread chain-stitch. These objects we secure by means of the construction and arrangement of parts, as hereinafter set forth in detail, and pointed out in the claims.

In the accompanying drawings, which show only so much of a sewing-machine as is necessary to illustrate our invention, Figure 1 is a bottom view of a portion of the bed-plate of a sewing-machine embodying our invention. Fig. 2 is a plan view of the looper and its race-frame detached from the machine, showing the loop-spreader in connection with the looper. Fig. 3 is a sectional view through line  $x x$  of Fig. 2. Fig. 4 is a plan view of a portion of the looper-actuating mechanism with the looper removed. Figs. 5 and 6 are plan and edge views, respectively, of the looper-driver. Figs. 7 and 8 are plan and edge views, respectively, of the bobbin-case; and Figs. 9 to 12, inclusive, are perspective views showing the relative positions of the looper with an attached loop-spreader and the needle at different times during the formation of the stitch.

To explain in detail,  $a$  represents the bed-plate of a sewing-machine;  $b$ , the looper race-

frame;  $c$ , the looper, and  $a'$  the looper-driving lever.

According to our present invention the frame  $b$ , which is attached to the under side of the bed-plate in a horizontal position, is provided with a projecting or overhanging flange  $b'$ , partially surrounding its inner periphery, which is adapted to extend within a counterpart groove located in the outer periphery of the looper, as more clearly shown in Fig. 3, and serve as a support and guide for the same. This supporting and guiding flange, as herein shown, is formed by the inner edge of two plates  $b^2 b^2$ , which are detachably secured on the upper surface of the frame  $b$ , so as to permit of the ready placing of the looper into or removal from its operative position.

The frame  $b$  and the plates  $b^2 b^2$ , forming part of the same, are cut away on that side adjacent to the path of the needle in order that the point or beak  $c'$  of the looper may pass adjacent to the needle and enter the loop thrown out by the same. One of the plates  $b^2$  is formed with a recess  $b^3$ , adjacent to the path of the needle, as shown in Fig. 2, which is adapted to receive the inner side of the thread-loop to hold and direct the same beneath the looper when the beak of the latter carries the loop around and beneath the same to lock with the bobbin-thread in a manner as well understood by those skilled in the art. The point or beak  $c'$  of the looper projects and moves beneath the flange  $b'$ , as shown in Fig. 2, in order that the latter may serve as a wall or guard to prevent the thread from becoming disconnected with said beak after the latter has engaged with the thread and is carrying the loop around the looper, as described.

The looper is operated by a rotating reciprocatory driver  $d$ , which consists of a horizontally-arranged plate supported on the frame  $b$  beneath the looper and provided with two vertically-projecting arms  $d' d'$ , which alternately engage with and withdraw from the opposite sides of the looper within the recesses  $d^2 d^2$  therein, as shown in Fig. 3, in order to drive or rotate the looper and allow for the passage of the thread thereunder.



This looper-driver is provided with a transversely-arranged groove  $d^3$  on its under side, which receives a stationary cam or eccentric  $d^4$ , located on the bottom of the frame  $b$ , from which the driver receives its reciprocating movement when rotated by the connecting rotating shaft  $e$ , and the latter has connection with said driver in a manner to rotate the same and allow for its said reciprocating movement in a manner as follows: The shaft  $e$  projects through an elongated slot  $d^5$  in the driver  $d$  and is provided with a head  $e'$ , having a squared projection on its under side, which extends within an elongated seat or way  $d^6$ , formed in the upper surface of the driver, in a manner to move or rotate the latter therewith and allow the same to reciprocate for the purpose set forth.

The shaft  $e$  is provided with a crank-disk  $e^3$  on its lower end, which is engaged and operated by the sliding vibrating lever  $a'$ , as shown in Fig. 1. Any suitable means for operating said crank, however, other than shown may be employed without affecting the spirit of our invention.

Referring to Figs. 7 and 8,  $f$  represents a bobbin, and  $f'$  a bobbin-case, the latter being provided with a central hollow spindle  $f^2$ , which is adapted to receive the central post  $f^3$  in the looper and be supported thereon in the usual manner. The bobbin-case is also provided with an obliquely-arranged slit  $f^4$  in one side thereof, through which the thread is adapted to be drawn from the bobbin, and with a thread-guide  $f^5$ , located on its outer wall, through which the thread is adapted to be passed from said slit  $f^4$ . A tension-spring  $f^6$  is secured on the bobbin-case with its free or working end bearing against the same at a point between the slit  $f^4$  and guide  $f^5$ , as more clearly shown in Fig. 7, to impinge the thread and produce a proper tension on the same.

Referring to Figs. 2, 3, 9, 10, 11, and 12, we have shown the loop-spreader in connection with the looper in lieu of the regular bobbin, the same being employed for adapting the machine to form a single-thread or chain stitch in lieu of a lock-stitch, as before referred to. This loop-spreader consists of an arm or tail  $h^2$ , having a forked end  $h^4$ , the same being provided with suitable means for securing detachable connection with the looper, such means, as herein shown, being a hollow shank  $h'$ , adapted to receive the looper-post  $f^3$ , and a pin  $h^5$ , adapted to enter a counterpart opening in the looper. (See Fig. 3.) This construction serves to support the loop-spreader in fixed relation to the looper after being placed in connection therewith and also permits the same to be interchangeable with the usual bobbin and bobbin-case, whereby the machine may be readily adapted for either a lock-stitch or chain-stitch without other change or adjustment of the parts. Any suitable means, however, other than that shown and described for securing detachable

connection of the loop-spreader with the looper may be employed without departure from our invention.

The operation of the loop-spreader in combination with the other coacting parts in the formation of stitches, in brief, is as follows: The machine being set in motion, so as to rotate the looper and reciprocate the needle, the latter (denoted at  $i$ ) descends and then rises to throw out the thread-loop, (denoted at  $n$ ), which is entered by the beak of the looper, as shown in Fig. 9. As the looper continues its rotation it carries the thread-loop around the same until it reaches the position shown in Fig. 10, where it releases or casts off the loop in the usual manner to be drawn up by the usual take-up device operating above the cloth-plate of the machine. As the loop is now drawn up it is received or engaged by the loop-spreader and carried thereby in an open or distended condition across the path of the needle, as shown in Fig. 11, in which latter position of the parts the needle has again descended and entered the distended loop and passed into the space between the forks at the end of the loop-spreader, as shown. As the looper now continues its rotation the loop is cast off the end of the loop-spreader, as shown in Fig. 12, and drawn up into the work, and the beak of the looper enters the next loop thrown out by the needle and draws the same through the first loop  $n$  as it is passed around the shuttle in the manner as described relative to said first loop.

The rotary looper  $c$ , as shown and described, is in the form of a shuttle; but as the loop-spreader may be used in connection with any suitable form of looper other than the particular shuttle shown we use the term "looper" in the claims in its generic sense.

Having thus set forth our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a sewing-machine, the combination, with the needle and looper, of a detachable loop-spreader carried by said looper in position for receiving the needle-thread loop after it has been released by the beak of the looper and holding the same in an open or distended condition across the path of the needle, and having a forked end for the passage of the needle into the loop held thereby.

2. In a sewing-machine, the combination, with a looper provided with a central post and an opening, of a forked loop-spreader having a spindle for connection with the post and a pin for entering the opening of said looper, for the purpose set forth.

3. In a sewing-machine, the combination, with the race-frame and rotating looper, of a rotating driver having a reciprocating movement in the same plane in which it rotates, provided with two arms extending at right angles therefrom for engaging with the opposite sides of said looper, and with a transverse groove in its under side, a cam engaging with the driver in the said transverse



groove to reciprocate the same, and a rotating shaft having a loose connection with said driver to rotate the same.

4. In a sewing-machine, the combination,  
5 with a rotating looper, of a rotating driver  
for engaging with said looper having an elongated slot therein, a rotating shaft having a  
part thereof extending through said slot in  
the driver and engaging with the latter to ro-  
10 tate the same, the said driver being also pro-

vided with a transverse groove in its under side, and a cam engaging with the driver in said transverse groove to reciprocate the same.

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