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PATENTED DEC. 31, 1907.

L. ONDERDONK.

LOOPER OPERATING MECHANISM FOR SEWING MACHINES.

APPLICATION FILED NOV. 9, 1901.

2 SHEETS—SHEET 1.

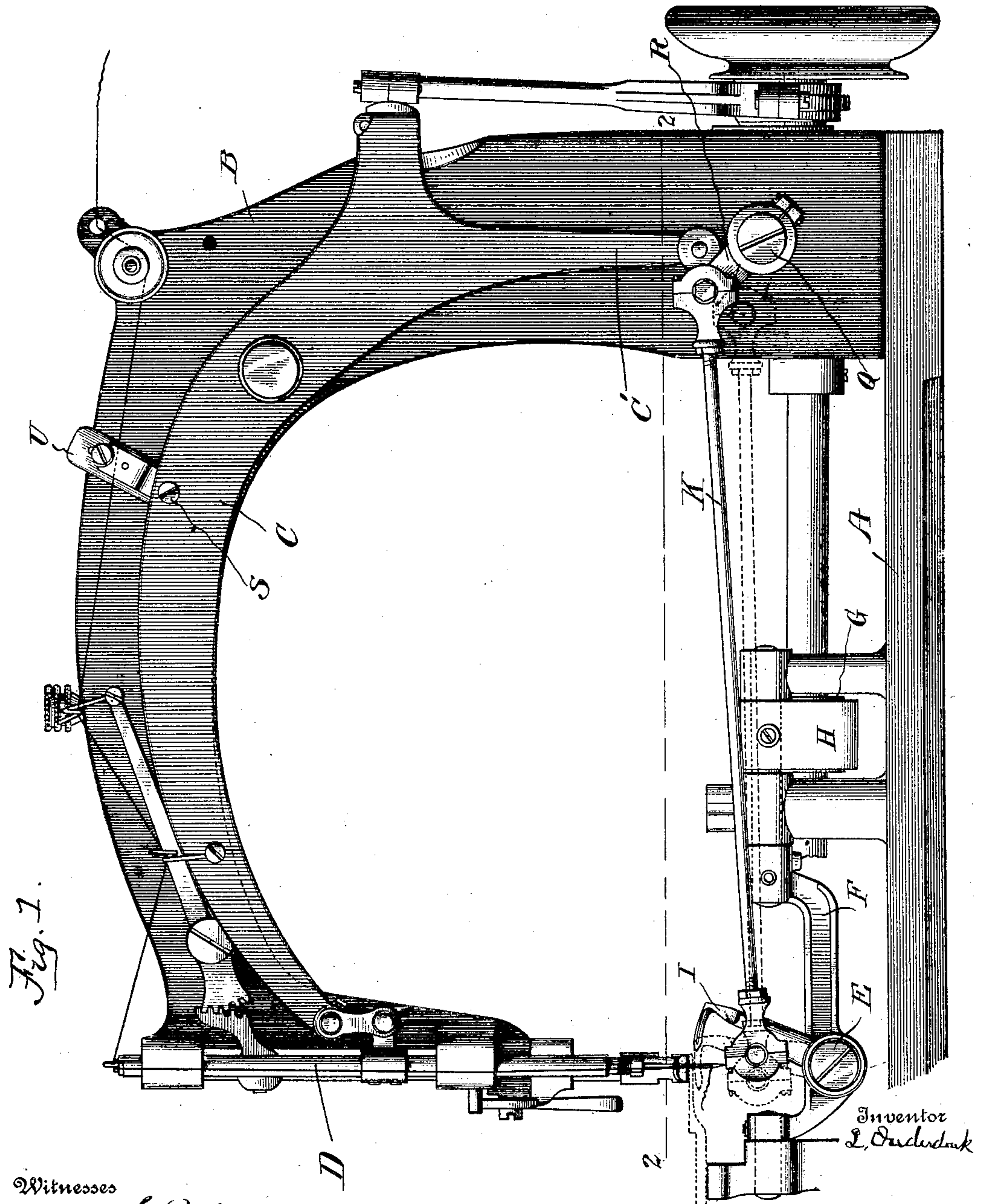


Fig. 1.

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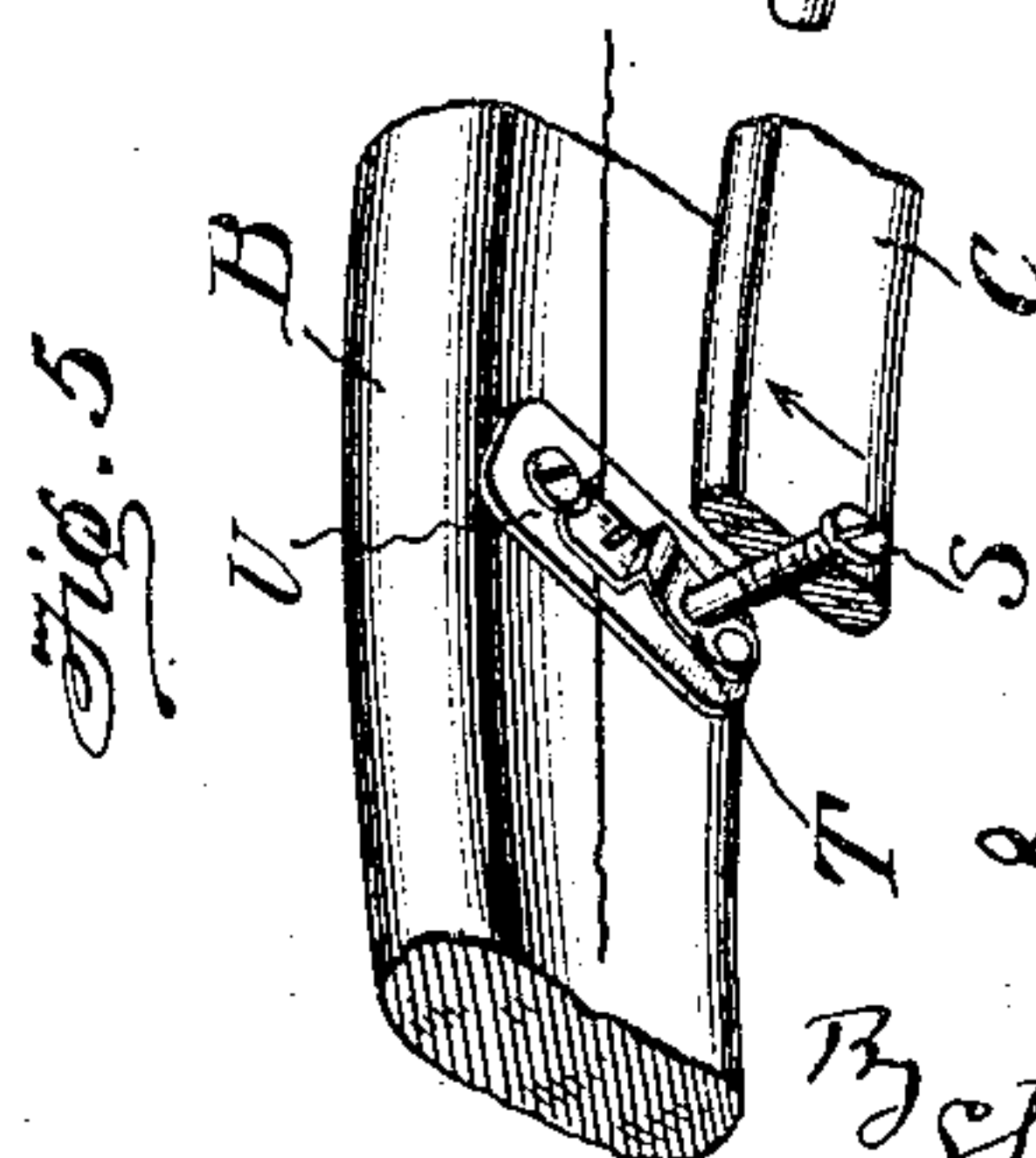
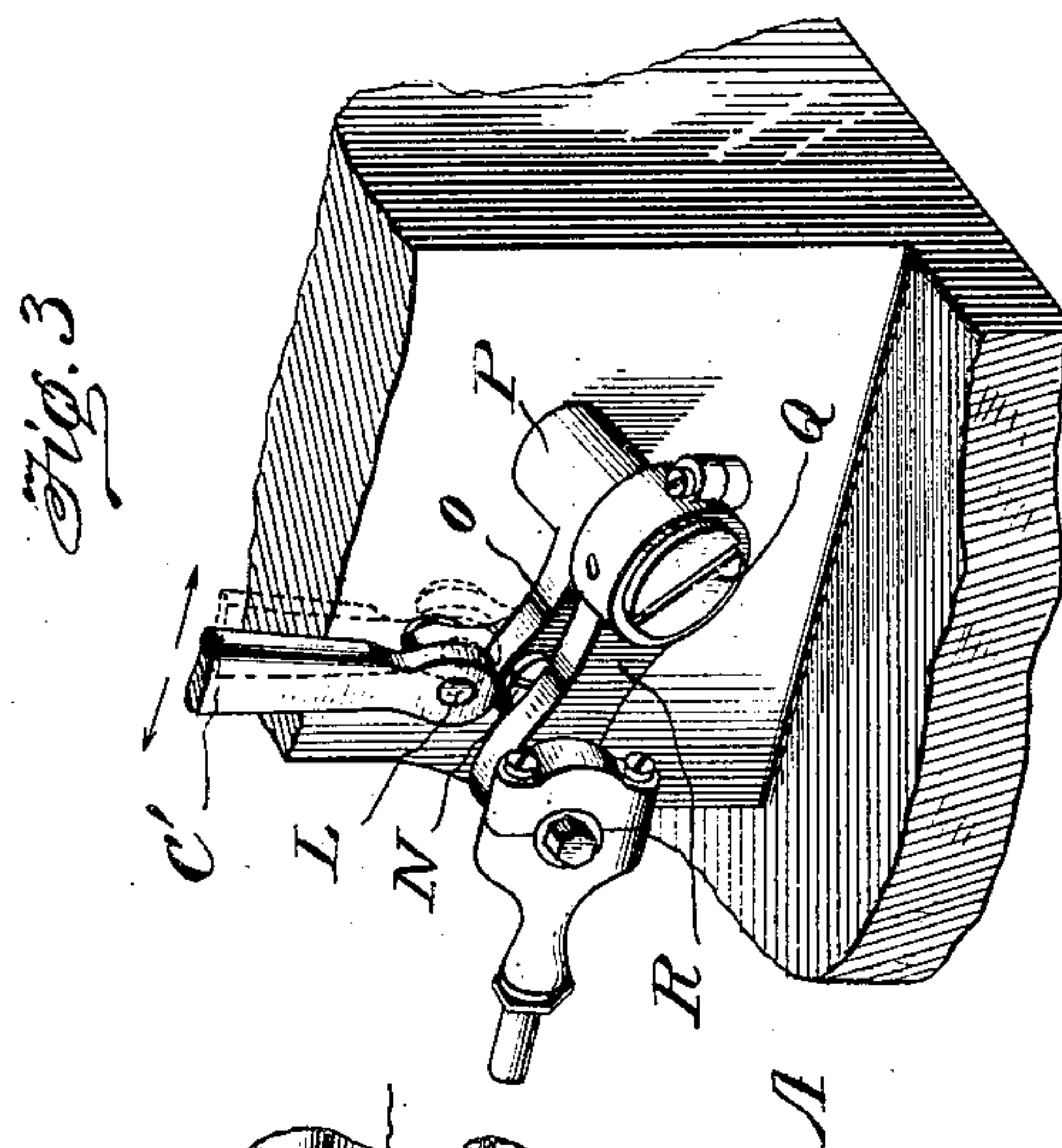
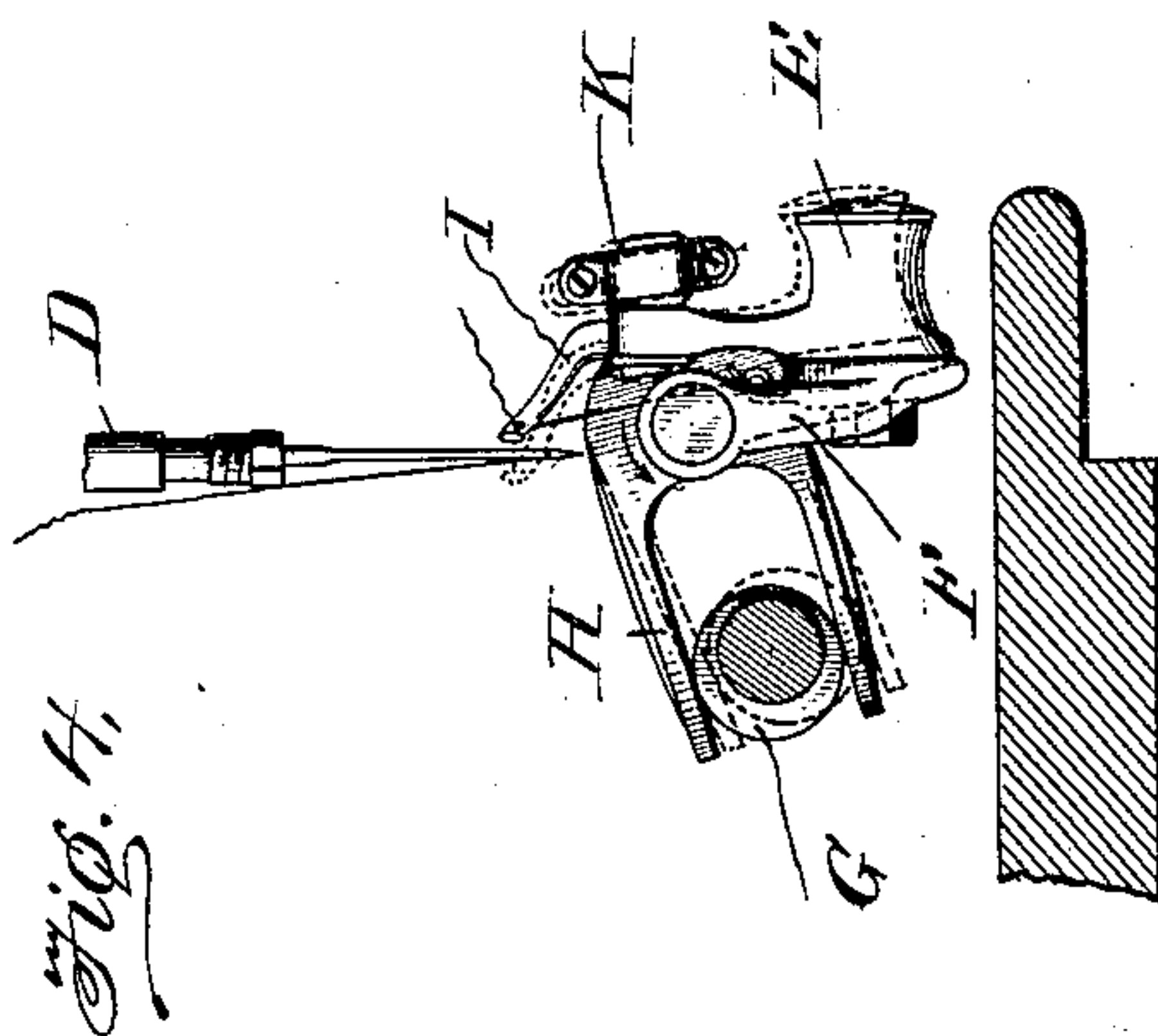
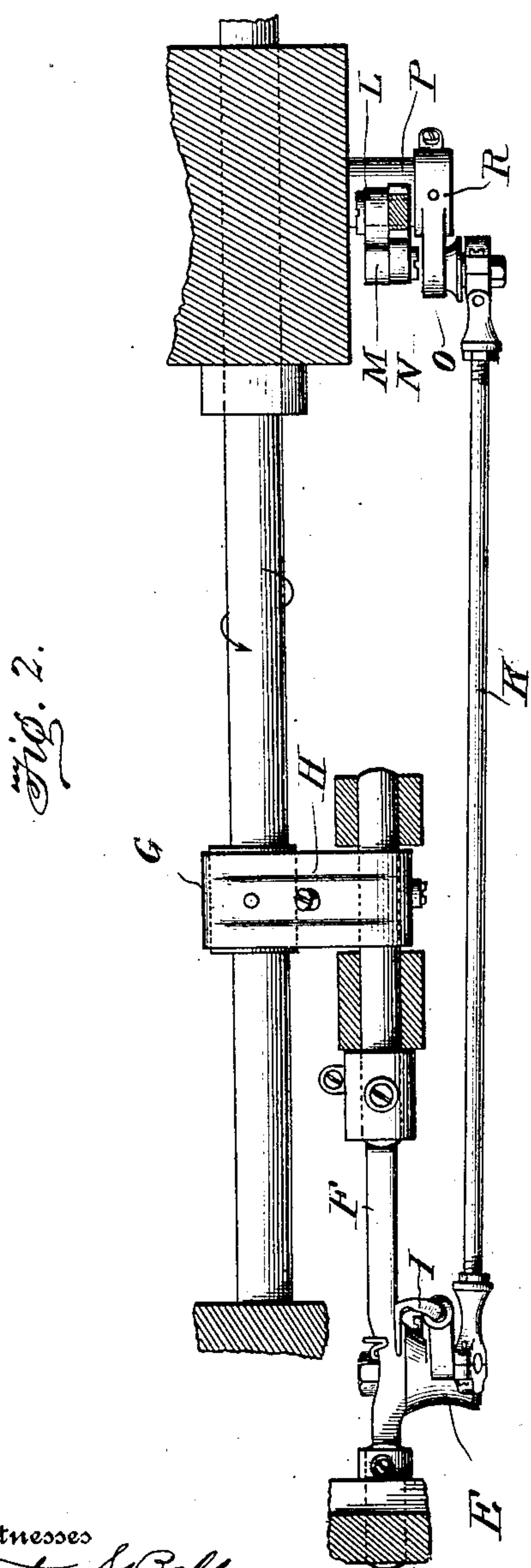
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2 SHEETS—SHEET 2.



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# UNITED STATES PATENT OFFICE.

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## LOOPER-OPERATING MECHANISM FOR SEWING-MACHINES.

No. 875,671.

Specification of Letters Patent.

Patented Dec. 31, 1907.

Application filed November 9, 1901. Serial No. 81,760.

*To all whom it may concern:*

Be it known that I, LANSING ONDERDONK, a citizen of the United States, residing at New York, in the county of New York, State of New York, have invented certain new and useful Improvements in Looper-Operating Mechanism for Sewing-Machines, of which the following is a description, reference being had to the accompanying drawing, and to the letters and figures of reference marked thereon.

My invention relates to an improvement in sewing machines of the chain stitch type, the object being to provide a stitch which is capable of being drawn up closely into the goods, and which in appearance on the under side so closely resembles a lock stitch as to be scarcely distinguishable therefrom, thereby gaining all the advantages attendant upon the use of a chain stitch over a lock stitch, and at the same time, avoiding the objections existing to the use of a chain stitch upon certain classes of work, namely that the same could not be properly drawn up into the goods, so as to avoid a ridge due to the accumulation of thread on the under side; and that the stitch did not look alike on both sides. These features are particularly desirable in shoe work, or other work where the material is such that the stitch needs to be practically buried in the goods. In general, to accomplish this result, I have provided a machine in which the needle and thread-carrying looper are so arranged and the looper mechanism so timed and operated that the looper moves into the loop, then there is a cessation of the longitudinal movement thereof while the sidewise or needle avoiding movement is taking place, and then a quick withdrawal of the looper from the needle loop immediately after the point of the needle has passed into the looper loop, the looper having a variable movement imparted to it by means of connections operated from the needle lever extension. By this arrangement the looper sheds the needle loop so the stitch can be drawn up quickly, and firmly, and the use of a take-up for the looper thread is dispensed with.

The invention therefore, consists in the parts, improvements and arrangements hereinafter shown and described and set forth in the claims.

The invention is illustrated in the accompanying drawings, in which

Figure 1 is a side elevation of a sewing machine, embodying my invention, the cloth plate and certain parts non-essential to an understanding of the invention being removed; Fig. 2 is a sectional plan view on line 2—2, of Fig. 1; Fig. 3 is a perspective view illustrating the connection between the needle lever extension and looper operating pitman; Fig. 4 is a cross section illustrating the sidewise movements of the looper; and Fig. 5 is a detail perspective of the intermittent nipping mechanism for the upper thread.

In these drawings, the machine is in general of the well known Union Special type, the bed plate A, goose neck B, needle lever C, needle bar D, feeding mechanism, and other usual parts, such as the looper rocker E, oscillating looper rocker and supporting yoke, F, the cam G, and fork H, being of well known construction.

The looper I is a thread carrying looper and is supported in a socket in the rocker in the usual way, but the looper itself is shorter than those ordinarily in use, and has a short throw, this feature it being possible to embody by reason of the operating mechanism for the looper hereinafter described. In the Union Special machines, as ordinarily constructed, the looper had its forward and backward movement in the direction of its length, imparted to it by a pitman connection between the looper rocker and the extension of the needle lever. In the present instance, I retain the pitman rod K, but interpose between it and the needle lever extension C' a rocking lever and link mechanism for imparting variable speed to the looper, this mechanism including the following mechanism.

The needle lever extension C' is provided at its lower end with a short shaft or stud L, screwed into it, one end of a link M being pivoted thereto, the other end of said link being screw-threaded to receive the end of a stud N, which passes through the end of an arm or crank O, on the rocking sleeve P, journaled in a stud or short shaft Q screwed into the machine standard. Clamped around this sleeve, and rocking with it is one end of an arm or crank R, which at its outer end has a ball and stud connection with the end of the pitman rod K.

It will be seen that this construction provides a compound toggle lever mechanism for operating the looper, of which the needle



lever extension, the link M and the rocking crank O form one part; and the rocking crank R, the ball joint and the pitman rod K form the other. It will be seen also, that the  
 5 needle lever extension, the link M and the rocking crank O form a differential mechanism, wherein the angular movement of the needle lever extension is different from the angular movement of the rocking crank O;  
 10 and the crank R, link K, and looper I, form a second differential mechanism, wherein the angular movement of the looper is different from that of the crank R. I have therefore, provided two differential mechanisms between the needle lever extension, and the  
 15 looper, one of which conveys its movements through the other. By this arrangement of parts, the looper may be given a greatly extended dwell at the end of its stroke and a  
 20 very high speed intermediate the ends of its stroke.

As the needle is moving upward and the looper moving forward, the screw or projection S on the needle lever C, rides on the  
 25 spring nipper plate T and causes the same to grip the needle thread between it and the plate U on the goose neck, and prevents pulling off of thread during the upward movement of the needle, thus setting the stitch  
 30 and properly drawing it up into the goods. It will be noticed by referring to the drawings, that when the needle begins to move upwardly, the lower end of the needle lever extension *c'* moves forward. The link M  
 35 moves toward the vertical position, swinging forward the cranks O, R, and moving the looper quickly into the needle loop but when the dead center is reached the cranks remain stationary and the further forward move-  
 40 ment of the needle lever extension, due to the completion of the upstroke of the needle, merely serves to swing the link M and its pivot N independent of the cranks, and during this period the sidewise movement of the  
 45 looper takes place, which sidewise movement ceases when the needle lever extension has reached in its backward movement, the point at which the cranks O, R, begin to rise. Then the looper starts backward slowly, but in-  
 50 creases its speed, and moves out of the needle loop quickly, allowing the stitch to be drawn up as the needle moves up.

The looper may be very short and has a short throw, the needle taking the looper loop  
 55 near the point of the looper, and allowing the looper to back immediately out of the loop, and also to enter the needle loop quickly, which is desirable in overcoming the liability to skip stitches and also obviates the neces-  
 60 sity of throwing out as large a loop as is common in chain stitch machines.

I am aware that it is not new broadly to provide variably speeded loop-taking de-  
 65 vices, but my invention differs from devices heretofore proposed, not only in the details

hereinafter claimed and above described, but also in the manner and time in which the variable movement takes place, and in the results accomplished, the main feature of the present invention being the fact that the forward movement of the looper into the loop  
 70 or toward the center of its movement, is a quick one, which is of especial advantage in a looper having a very short throw, for it avoids the liability of skipping stitches; then  
 75 an inactive period while the needle-avoiding movement is taking place; then it starts back slowly but has a very quick movement out of the loop when the needle point has passed into the looper loop to enable the stitch to be  
 80 drawn up quickly as the needle moves up; this is perhaps the most important feature of the present invention, and one which clearly distinguishes from the prior art, for by this arrangement, the looper sheds the needle  
 85 loop quickly, and the use of a take-up for the loop thread is dispensed with.

Various minor modifications and changes may be made, without departing from the spirit of my invention.

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

1. In a chain stitch sewing machine, stitch-forming mechanism including a needle lever having an extension, a needle and a cooperating thread-carrying looper, and means for imparting forward and backward movements to said looper, to take and leave the needle loop, said means including de-  
 95 vices for imparting to said looper a relatively slow forward movement in the direction of its length until it is about to enter the needle loop, as the needle is ascending, a relatively quick movement into the needle  
 100 loop, a relatively slow further forward movement, and an initial slow backward movement, and a relatively quick backward movement as it is about to leave the needle loop, and the needle in its descent passes  
 105 into the looper loop, and a relatively slow final backward movement, said looper operating means including a pitman, and variable speed mechanism interposed between one end of the pitman and the needle lever  
 110 extension; substantially as described.

2. In a chain stitch sewing machine, stitch-forming mechanism including a needle and a cooperating thread-carrying looper, and means for imparting forward and back-  
 120 ward movements to said looper, to take and leave the needle loop, said means including devices for imparting to said looper a relatively slow forward movement in the direction of its length until it is about to enter  
 125 the needle loop, as the needle is ascending, a relatively quick movement into the needle loop, a relatively slow further forward movement, and an initial slow backward movement, and a relatively quick backward  
 130



movement as it is about to leave the needle loop, and the needle in its descent passes into the looper loop, and a relatively slow final backward movement, said devices including a pitman and variable speed mechanism interposed between one end of the pitman and the needle lever extension, said variable speed mechanism comprising rocking cranks, one of which has a pivotal link connection with the needle lever extension, and the other of which is movable uniformly with the first crank and is operatively connected with the pitman, substantially as described.

3. In a chain stitch sewing machine, stitch-forming mechanism including a needle and a cooperating thread-carrying looper, and means for imparting forward and backward movements to said looper, to take and leave the needle loop, said means including devices for imparting to said looper a relatively slow forward movement in the direction of its length until it is about to enter the needle loop, as the needle is ascending, a relatively quick movement into the needle loop, a relatively slow further forward movement, and an initial slow backward movement, and a relatively quick backward movement as it is about to leave the needle loop, and the needle in its descent passes into the looper loop, and a relatively slow final backward movement, said devices including a pitman, and variable speed mechanism interposed between one end of the pitman and the needle lever extension, said variable speed mechanism including a link pivoted to the needle lever extension, a crank arm pivoted to the link at one end, and at its opposite end to the machine frame, a second crank arm secured to the first crank arm and pivoted at its opposite end to the looper-operating pitman; substantially as described.

4. In a chain stitch sewing machine, stitch-forming mechanism including a needle and a cooperating thread-carrying looper, and means for imparting forward and backward movements to said looper, to take and leave the needle loop, said means including devices for imparting to said looper a relatively slow forward movement in the direction of its length until it is about to enter the needle loop, as the needle is ascending, a relatively quick movement into the needle loop, a relatively slow further forward movement, and an initial slow backward movement, and a relatively quick backward movement as it is about to leave the needle

loop, and the needle in its descent passes into the looper loop, and a relatively slow final backward movement, said devices including a swinging lever, a link pivoted thereto, a crank arm pivoted to the link at one end, and at its opposite end to the machine frame, a second crank arm secured to the first crank arm, and pivoted at its opposite end to the looper-operating rod; substantially as described.

5. In a sewing machine, stitch-forming mechanism including a needle, a looper and a looper support, and means for operating said looper support including a compound toggle lever mechanism; substantially as described.

6. A sewing machine including in combination stitch forming mechanism, comprising a needle, a looper and a looper support and means for imparting a variable movement to said looper support including a plurality of toggle levers, one of which imparts its motion to the looper through the other; substantially as described.

7. In a sewing machine, stitch-forming mechanism including a needle and a looper, and means for operating said looper including a compound toggle lever mechanism, said compound toggle lever mechanism comprising the needle lever extension, the link pivoted to the lower end thereof, the rocking crank having pivotal connection with the link, the second rocking crank secured to the first rocking crank, and a pitman rod having a ball and stud connection at one end with the rocking crank and at the other end with the looper rocker; substantially as described.

8. A sewing machine including in combination, stitch forming mechanism, comprising a needle lever having an extension, a needle, a thread-carrying looper, a looper support and means for imparting a variable movement to said looper support and looper from the said needle lever extension, including a plurality of differential mechanisms, one of which imparts its motion to the looper through the other, whereby said looper is moved forward first slowly, then rapidly into the needle loop and then slowly to the end of its stroke.

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

LANSING ONDERDONK.

Witnesses:

W. H. BOYER,  
J. H. HOWELL.