

No. 657,926.

Patented Sept. 18, 1900.

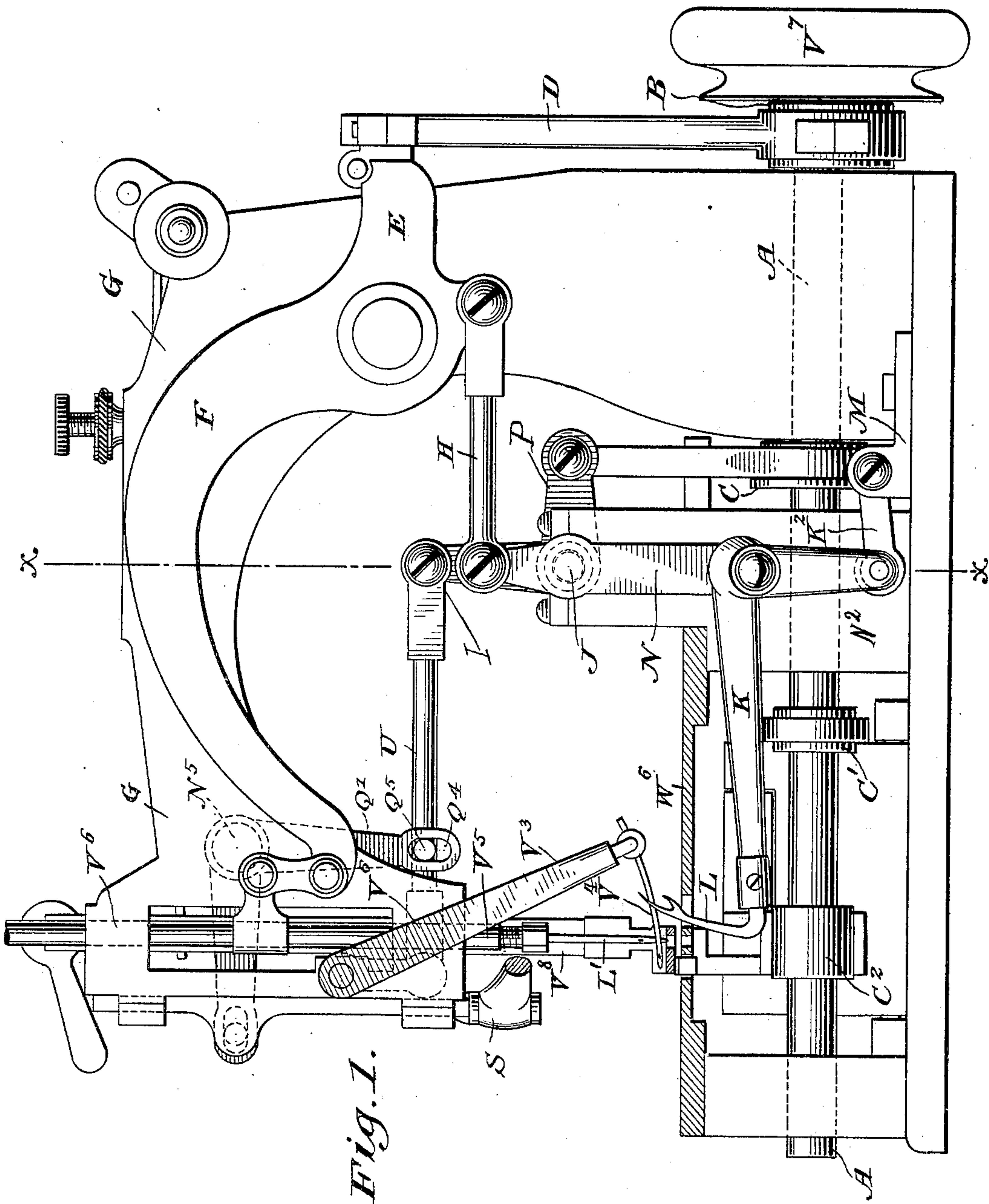
H. H. FEFEL.

OVERSEAMING SEWING MACHINE.

(Application filed Dec. 31, 1896. Renewed Nov. 26, 1898.)

(No Model.)

5 Sheets—Sheet 1.



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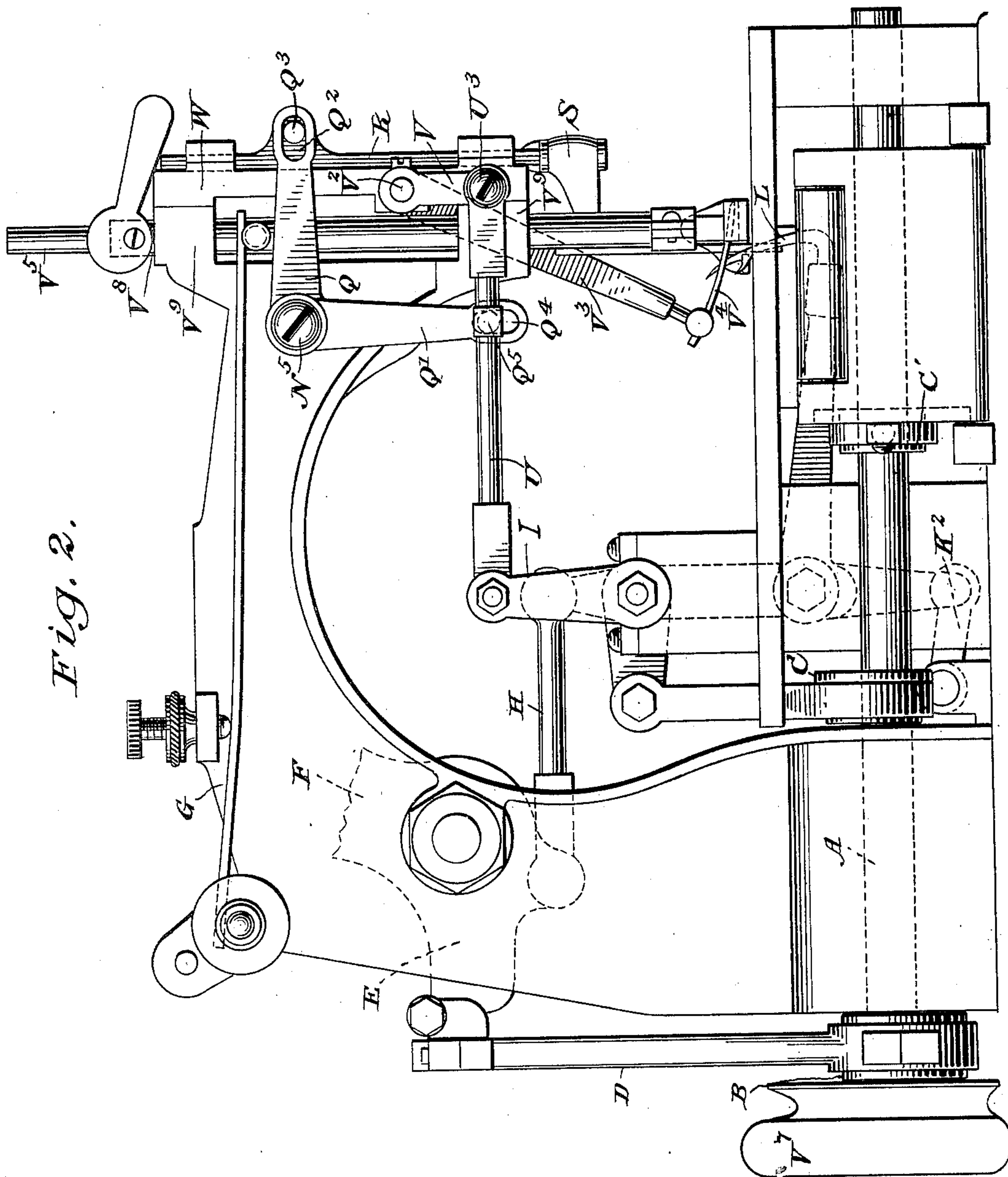
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Fig. 2.



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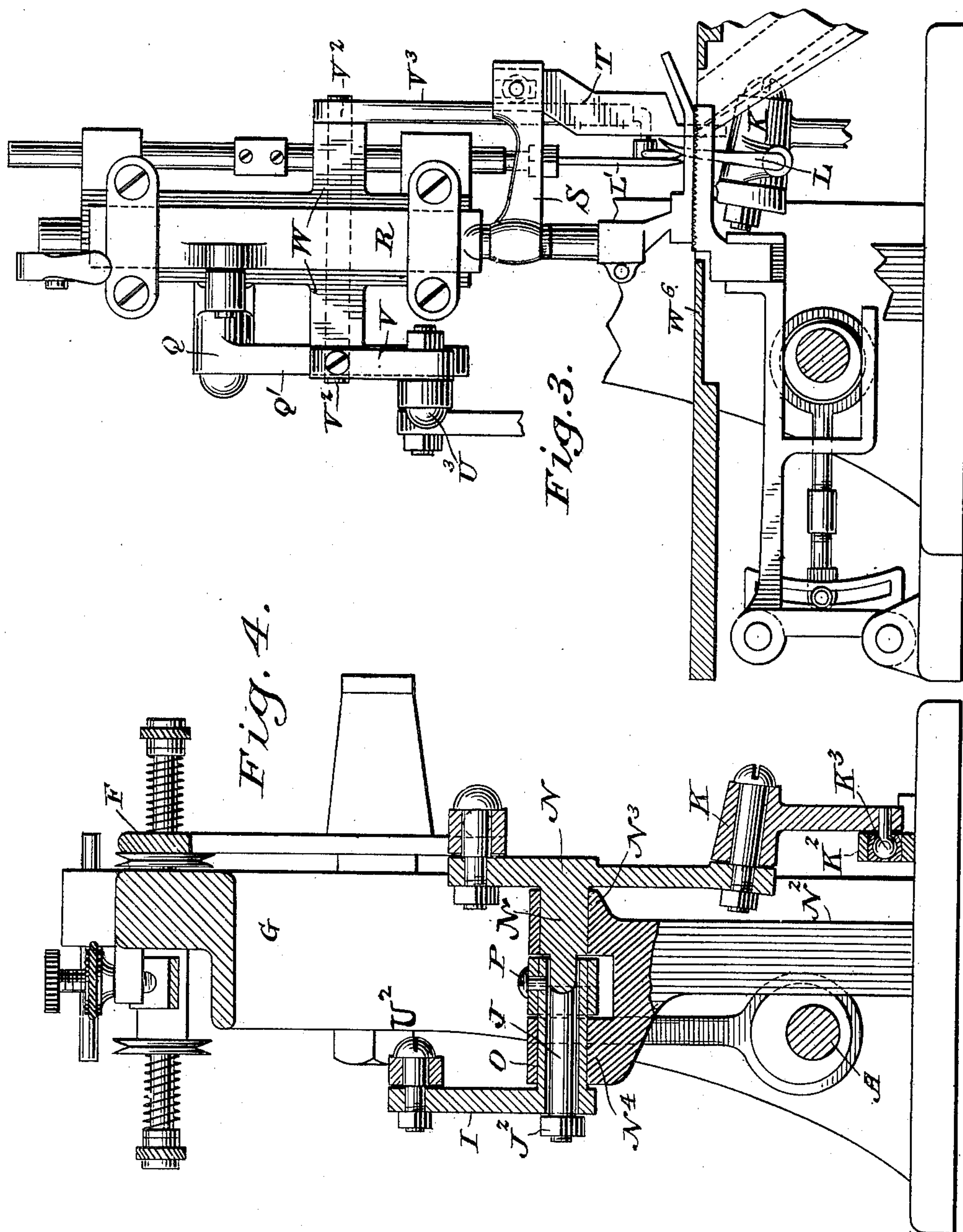
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Fig. 6.

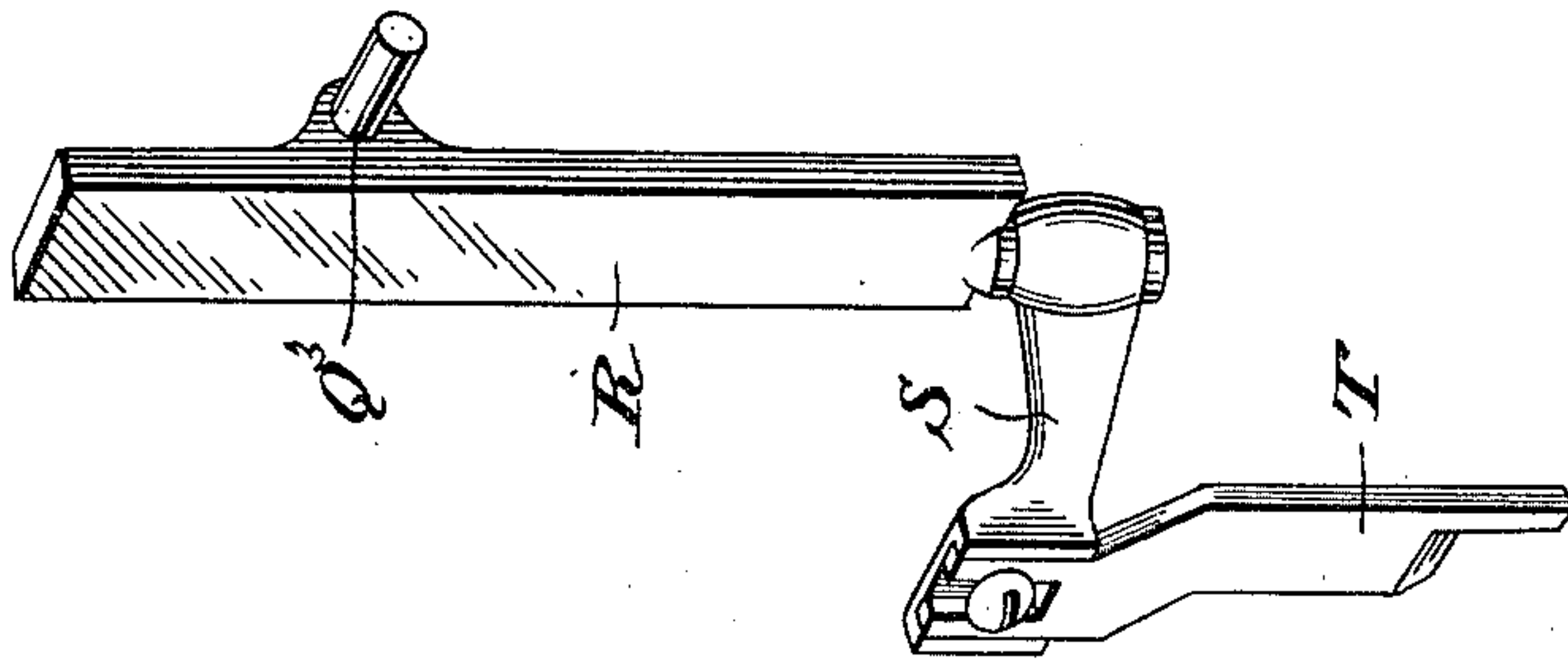
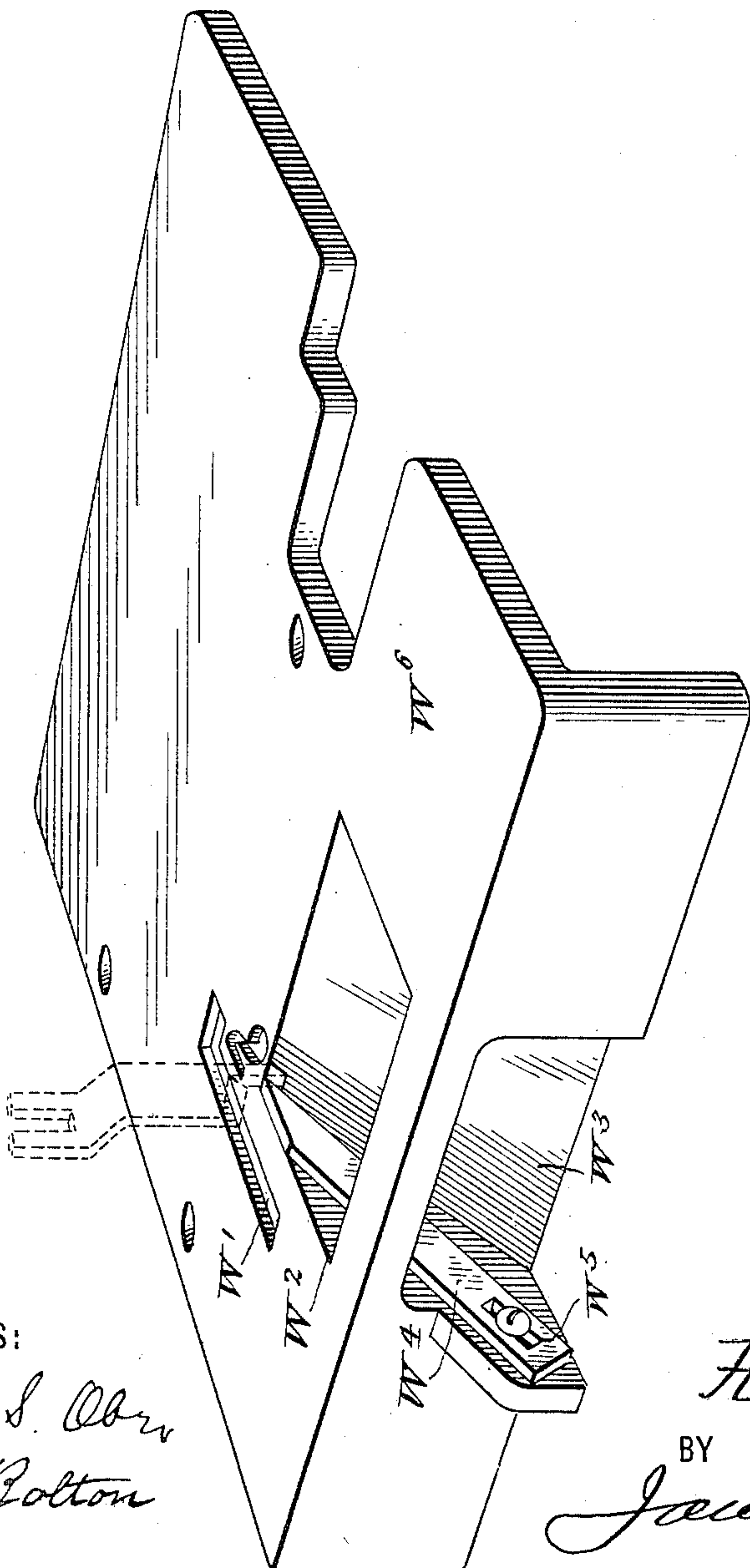


Fig. 5.



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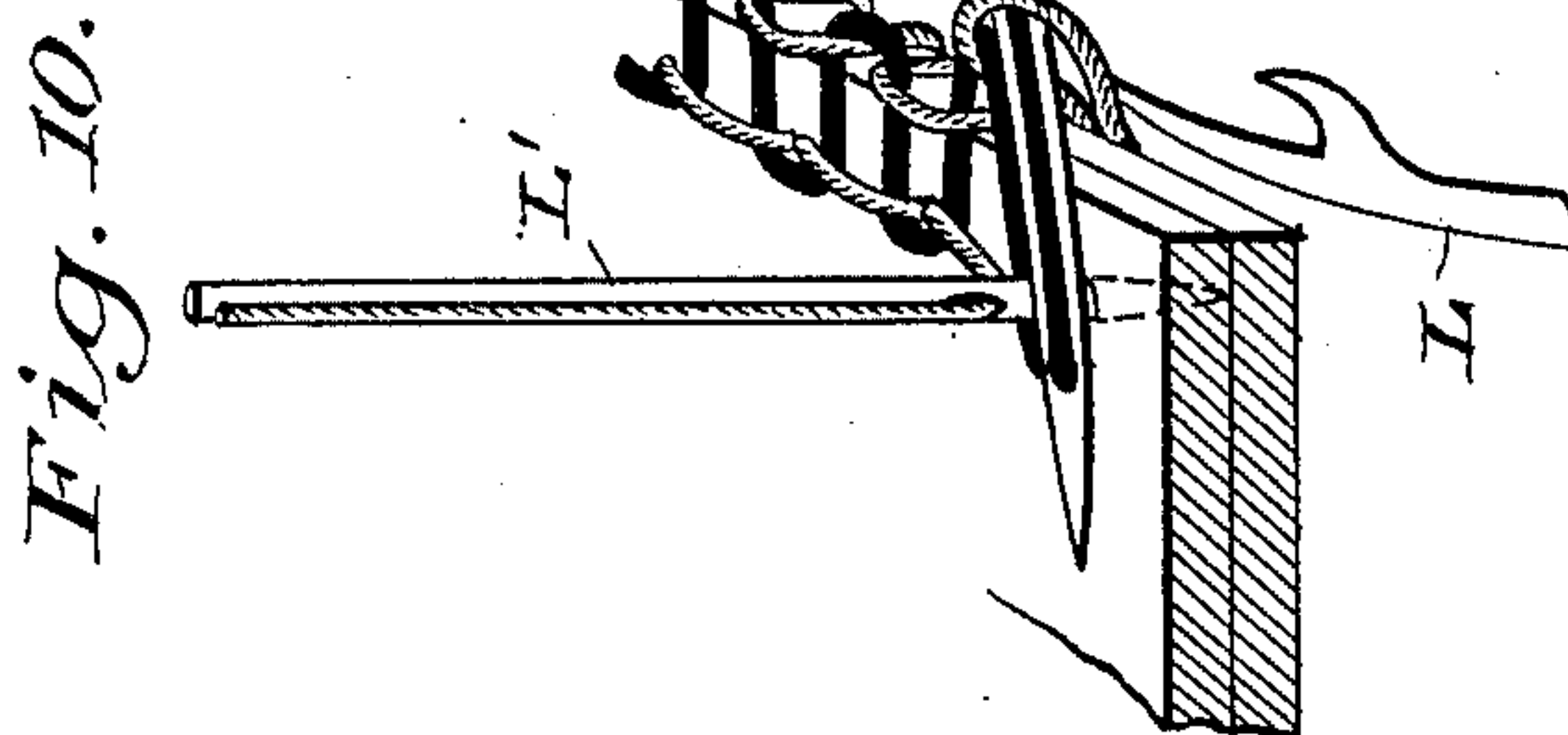
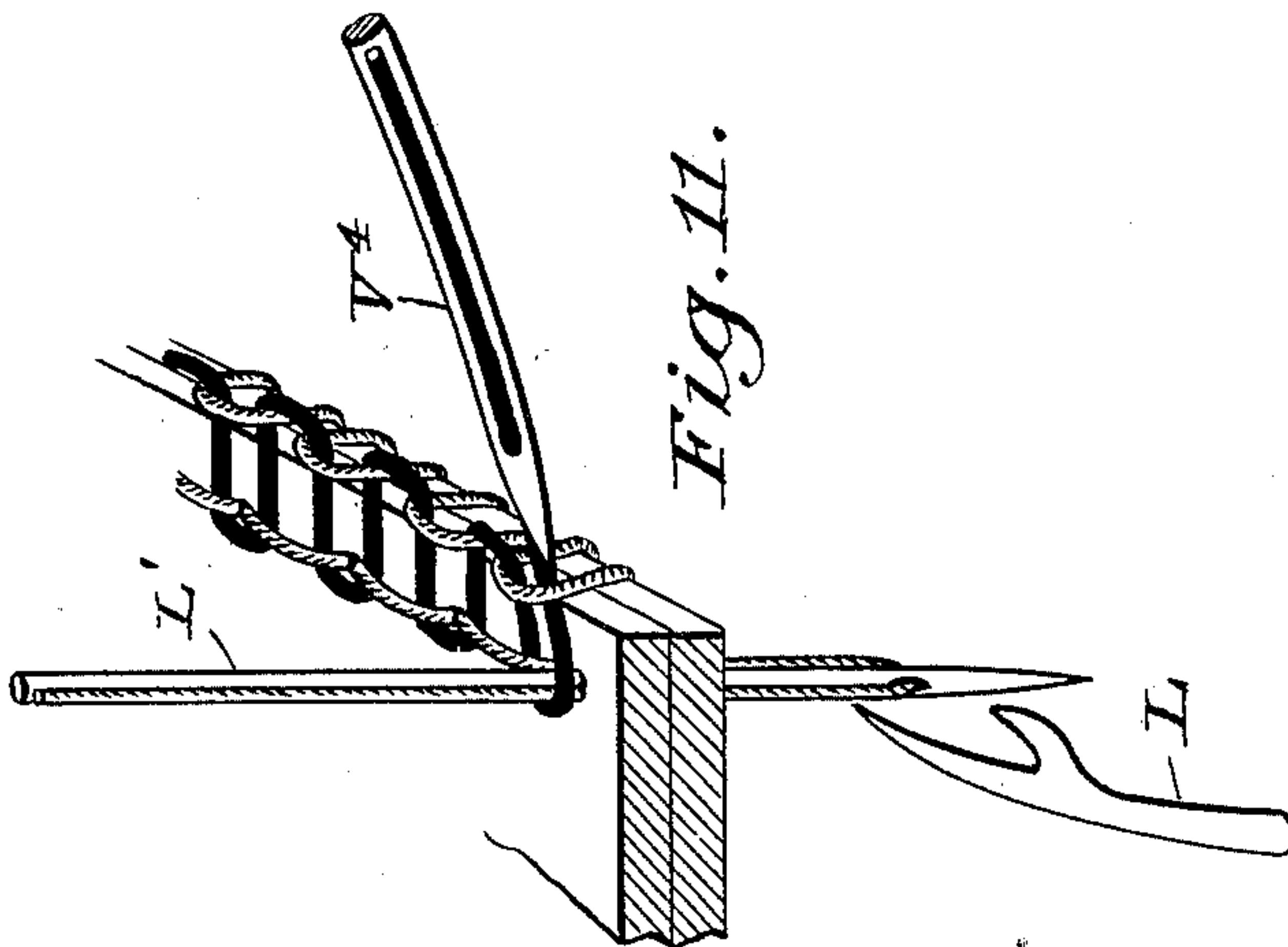
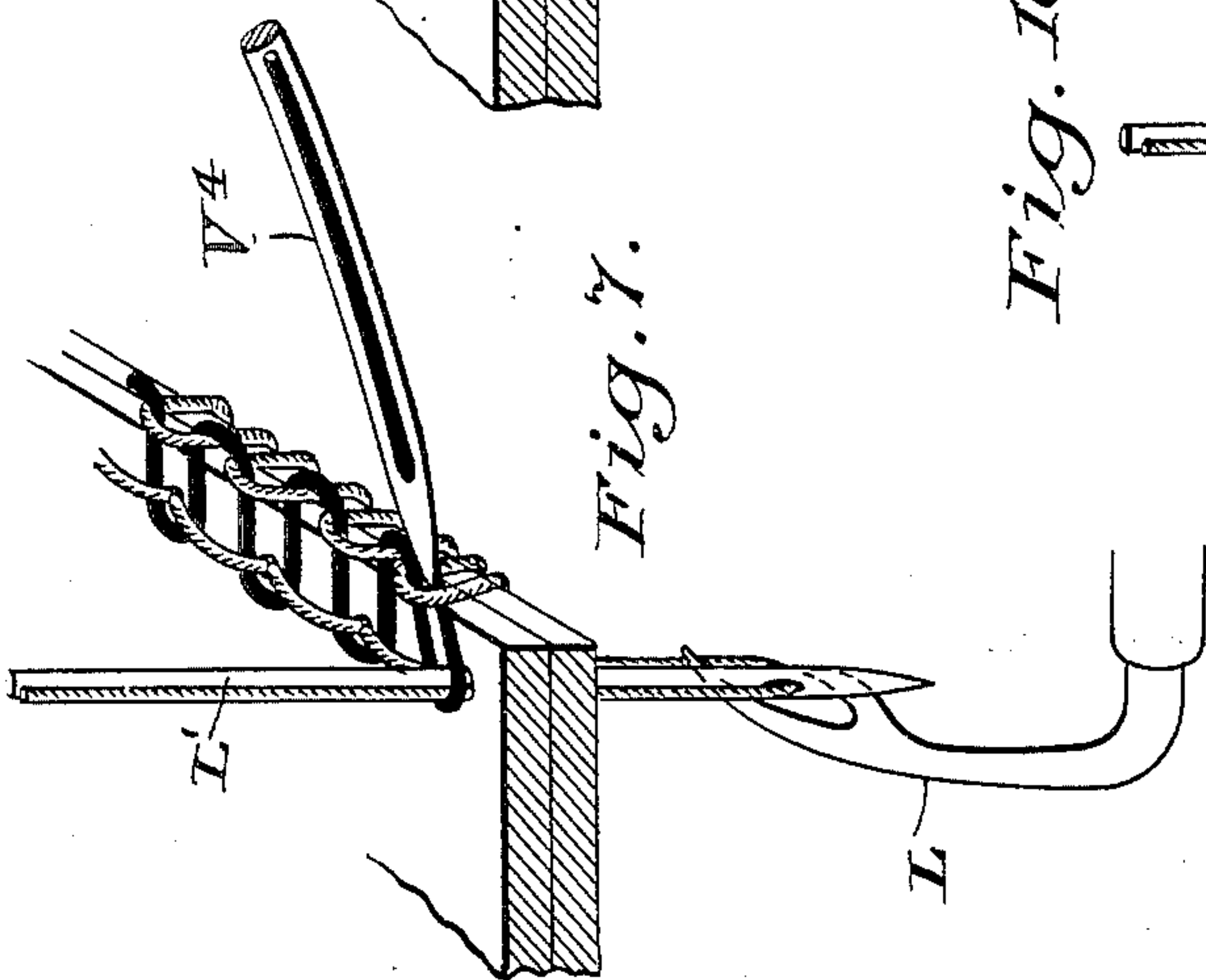
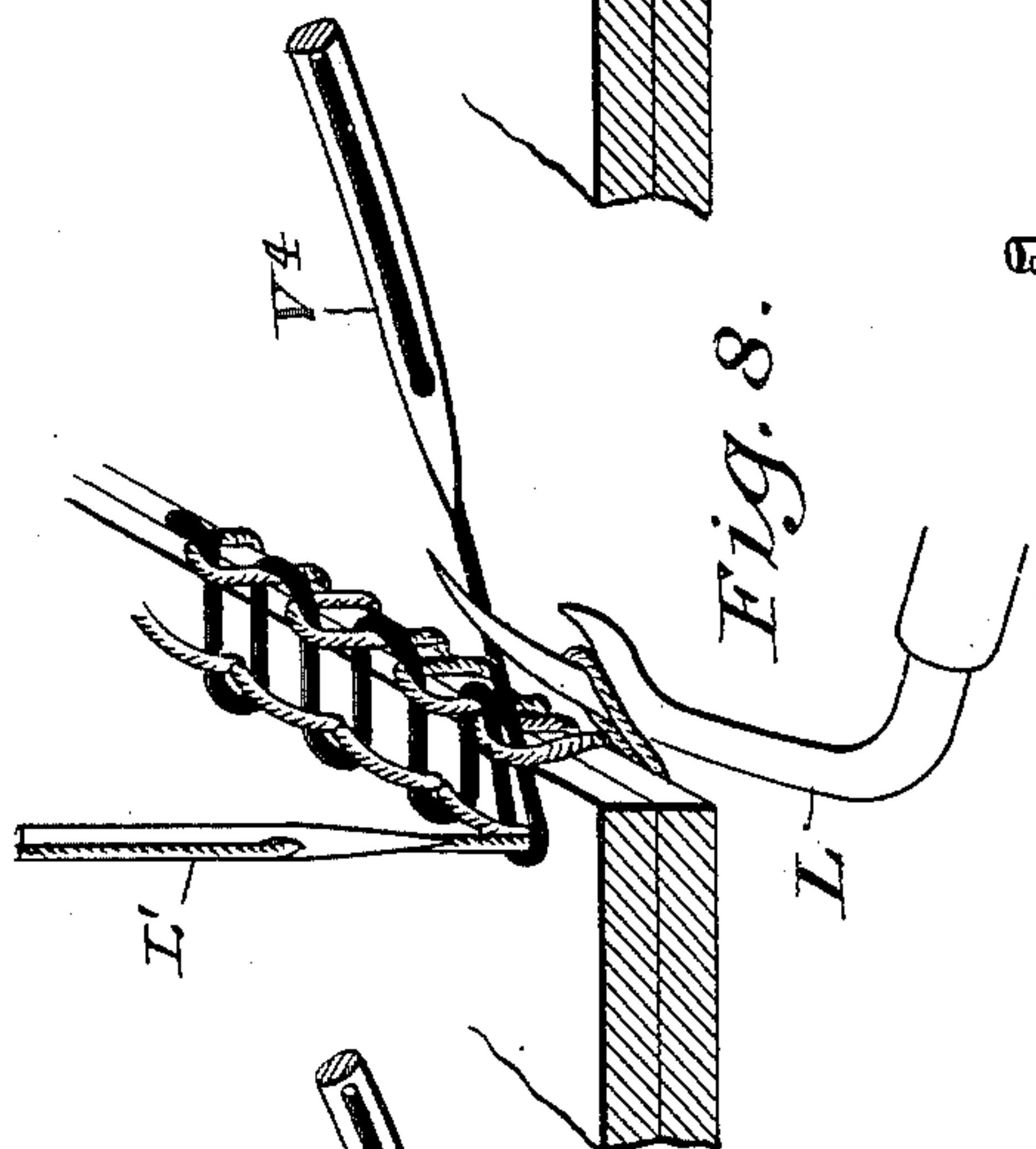
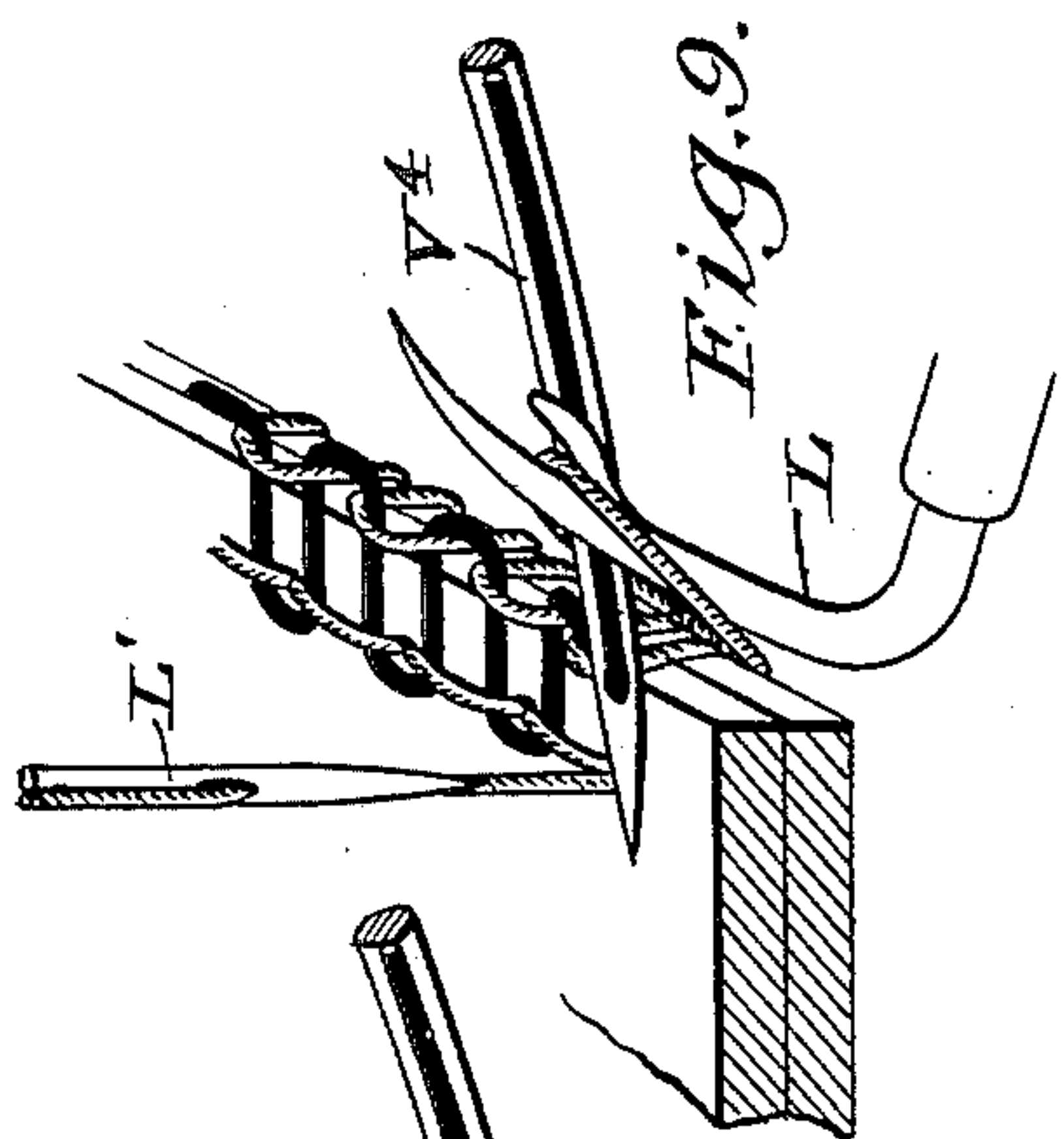
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UNITED STATES PATENT OFFICE.

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OVERSEAMING SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 657,926, dated September 18, 1900.

Application filed December 31, 1896. Renewed November 26, 1898. Serial No. 697,567. (No model.)

To all whom it may concern:

Be it known that I, HENRY H. FEFEL, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in 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.

This invention relates to the production of that style of overedge sewing in which two threads are employed in the formation of the stitches. Such style of sewing is also known as "overseaming" when used to secure together the edges of two or more pieces of superposed material.

The invention has for its objects to make double-thread overedge or overseam sewing-stitches that will securely bind all parts of the edges of the materials together by a regular spreading apart and a uniform distribution of the parts of the stitches around the edges and that will yield readily without undue strains on any part of the stitches when applied to yielding or elastic goods, such as knitted fabrics, and also the construction of a machine that is simple in its mechanisms and that will perform its functions with great efficiency.

In the formation of the stitches one of the threads is passed in loops through the material near its edge, as in ordinary sewing, and the loops extend from under the material around its edge in open condition—that is, without any twist. The second or locking thread at the upper surface of the material is interlaced with the line of the stitches that is within the edge of the material and with the loops of the first thread at the edge, said second thread being also arranged in open condition and without any twisting of its parts. The stitch-forming devices of the machine consist of a vertically-reciprocating thread-carrying needle which pierces the material and leaves the thread in loops therein, a loop-transmitter which carries the loop from the needle beneath the material to and around the edge thereof, and a locking-thread carrier which passes its thread through the loop held

at the edge of the material by the loop-transmitter and holds its own thread in position for the needle to pass through a loop of the same as it descends to carry its thread through the material.

The improved mechanisms devised by me for operating the stitch-forming devices will, with other features of the machine, be hereinafter fully described by reference to the accompanying drawings, in which—

Figure 1 is a front elevation, partly in section, of a sewing-machine embodying my improvements. Fig. 2 is a rear elevation of the same. Fig. 3 is an end elevation of the machine, showing the cloth plate or table in section and some of the other parts broken away. Fig. 4 is a transverse vertical section taken on the line *x x*, Fig. 1. Fig. 5 shows the cloth plate or table detached and on enlarged scale. Fig. 6 is a detached perspective view of the upper cutter and cutter-bar, and Figs. 7 to 11 illustrate the different steps in the cycle of operation in the formation of the stitches.

I will first describe by reference to Figs. 7 to 11 of the drawings the manner in which the improved overedge sewing-stitches are made and then describe the construction and operation of the machine. In the first step for descriptive purpose a loop is supposed to be extending beneath the material, as shown at Fig. 7, the needle *L* having pierced the material near its edge, carrying its thread down through and to the under side of the material, the loop-transmitter *L* has just started on its upward path with its point engaging with the loop of the thread above the eye of the needle, the locking-thread carrier *V*⁴ now being just about to complete its retrograde movement, having moved out of the preceding loop of the needle-thread. In the next step (shown at Fig. 8) the needle *L* has just moved up out of the material and the loop-transmitter raised the loop to the edge, the locking-thread carrier *V*⁴ being now in its most backward position ready to pass through the loop on the loop-transmitter *L* when the loop is brought into the path of the carrier *V*⁴. In view Fig. 9 the material has been fed forward and the loop-transmitter *L* is shown as having brought the loop in the line of travel

of the carrier V^4 , and said carrier is shown as having passed through the loop on the transmitter during its forward movement to carry its thread in the path of the needle L' , which is still above the material, but just about to descend. The next step, Fig. 10, shows the carrier V^4 in its most forward position and the needle L' passed through a loop of the locking-thread and piercing the material, the loop-transmitter L now being withdrawn from the loop, which is brought to the edge of the material, which loop surrounds the carrier V^4 and its locking-thread. The last step in the cycle of operations is shown at Fig. 11, the needle L' and loop-transmitter L being in their lowest positions and the carrier V^4 withdrawn from the loop of the needle-thread, leaving the locking-thread around the needle, the tension on said thread, combined with the forward movement of the material, having drawn the loop of the needle-thread snugly against the edge of the material. From an examination of these views, which clearly show the arrangement of the different parts of the two threads, it will be seen that the loops and the interlocking parts of the locking-thread are well and uniformly distributed over the edge of the material to bind said edge perfectly to prevent its fraying, that the strands or parts of the stitches are arranged to impart the greatest strength to the seam by the use of a minimum quantity of thread, that no twisting of the strands or loops occurs, making a close compact seam, and that the stitches, while having great capacity for yielding or stretching in the direction of the length of the seam, afford ample security against the seam giving way or spreading apart under lateral strains. As shown in these views, the interlacings of the locking-thread and the loops are at the upper part of the edge. By adjustment of the tensions of the two threads their interlacing parts may be caused to occupy other positions.

The frame of the machine comprises a base from which projects a curved arm G , having at its outer end the head W , a central standard N^2 , and a forward standard upon which the cloth plate or table W^6 is supported. The shaft A , provided with a driving-pulley V^7 , has its bearings in the arm G and the standards projecting from the base. Adjacent to the pulley V^7 is an eccentric B , which imparts motion to the curved lever F , rocking on a stud secured to the arm G through the medium of the connecting-rod D , which connects with the short arm E of the lever F . The outer end of this lever F is by means of a short link connected to the needle-bar V^5 , carrying at its lower end the needle L' and fitted to slide vertically in bearings V^6 , formed in the head W . The presser-foot is carried on the end of the bar V^8 , which slides in bearings V^9 , also formed on the head W . Beneath the presser-foot is located the feeding device, which is of ordinary construction, being clearly shown in Fig. 3, and it is actuated by

the eccentrics C' and C^2 , Fig. 1. All of these parts of the machine so far described embody nothing essentially new in their construction, and the operation of the same being so well understood will not be entered into here.

The loop-transmitter L , by reason of the function it has to perform, as set forth in the description of Figs. 7 to 11, requires to be moved in an upwardly-swinging path in relation to the needle L' and the locking-thread carrier V^4 and also to move laterally as it takes the thread from one side of the needle L' and presents it to the opposite side of the carrier V^4 . A simple and efficient means is provided for this purpose in the bell-crank lever K , to the end of the horizontal arm of which the loop-transmitter L is adjustably attached, a rocking lever N , having a journal N' fitted in a bearing on the standard N^2 and provided with an inclined crank-pin which carries the bell-crank lever K and which constitutes the fulcrum of said lever, and a link K^2 , connecting the short arm of the bell-crank lever K to a bracket M on the base of the machine. The joint between the link K^2 and the lever K requires to be of a universal character and is here shown as a spherical-headed stud K^3 , projecting from the lever K and working in a plug in the link K^2 . The lever N is actuated from the needle-bar lever F by the link H , connecting a downwardly-projecting arm of this lever to a short upwardly-projecting arm of the lever N .

The operation of the device is as follows: As the needle L' is caused to descend by the downward movement of the lever F the inclined crank-fulcrum of the lever K is moved in direction toward the needle, and as the short arm of the lever K is held by the link K^2 the loop-transmitter L is caused to move in a curvilinear path toward the needle as it descends and is also caused to move in a lateral direction by reason of the angular position of the inclined fulcrum of the lever K , thus bringing the upper end of the loop-transmitter to the rear side of the needle, as shown in Figs. 7 and 11, it again coming in front of the carrier V^4 , as shown in Figs. 1, 3, and 9, when the parts again occupy the positions shown in Fig. 1.

The locking-thread carrier V^4 is by adjustable connection carried at the end of the arm or lever V^3 which is attached to the shaft V^2 , fitted to rock in horizontal bearings in the head W , and on the other end of this shaft is secured the arm V , the free end of which is connected with the arm or lever I by the link or rod U . This lever I is provided with a tubular journal O , which seats in the bearing N^4 at the upper end of the standard N^2 and in line with the bearing N' . Said standard is bifurcated, and in the opening is located the lever P , secured to the end of the tubular journal O of the arm I . The outer end of the lever P is by means of a connecting-rod connected to and receives motion

from the eccentric C on the shaft A. To hold the rocking lever N in its bearing, an extension J projects from the end of the journal N', and a nut J² on its end bears against the face of the arm I.

At Figs. 5 and 6 are shown the cloth-table W⁶ and upper member of the cloth-trimming shears detached. The table is provided with an opening W², having an inclined bottom W³, against the side of which opening is secured the lower member of the shears W⁴ by means of a screw passing through the slot W⁵, the upper member of the shears being shown by dotted lines in position to cooperate therewith. The feeding device of the machine operates through the L-shaped opening W', and alongside this opening just ahead of the cutting edge of the part W⁴ of the shears is formed an irregular-shaped opening, through which the needle L' and the loop-transmitter L pass in cooperating to form the stitch.

A slide R constructed to be vertically reciprocated in ways formed in the head W carries at its lower end an arm S, and to this arm is secured the upper member T of the shears. The mechanism for imparting motion to this slide R comprises a bell-crank lever Q Q', pivoted at N⁵ to the arm G of the frame, a stud Q³ projecting from the slide R and engaged by the slot Q² at the end of the branch Q of the bell-crank lever, and a stud Q⁵, projecting from the side of the connecting-rod U and engaging in a slot Q⁴ at the end of the branch Q' of the lever.

By the arrangement of mechanical devices of simple construction the locking-thread carrier V⁴ is caused to move in a curvilinear path above the edge of the material and to work in unison with the needle L' and loop-transmitter L, as before described, by the rotation of the eccentric C, and the same actuating means through the medium of the bell-crank lever Q Q' and the slide R cause the member T to play against the member W⁴ of the shears to properly trim the edge of the material just ahead of the formation of the stitches around the edge by the stitch-forming devices, the trimmings from the shears falling down the inclined bottom of the opening W² of the cloth-table.

I claim as my invention—

1. In an overedge sewing-machine, in combination, a vertically-reciprocating needle, a loop-transmitter, a rocking lever having an inclined crank on which the loop-transmitter is mounted as a fulcrum and actuated to take the thread from the needle, a locking-thread carrier adapted to take the needle-thread from the loop-transmitter and deliver a loop of its own thread in position for the needle to pass through it, and means for operating said parts.

2. In a sewing-machine of the character described, the combination of a driving-shaft, a needle-arm driven by link connection with an eccentric on said driving-shaft, a needle actuated by said arm, a lever having an in-

clined crank-pin actuated by link connection with said arm, a bell-crank lever mounted on the inclined crank-pin and carrying a loop-transmitter and a locking-thread carrier adapted to take the needle-thread from the loop-transmitter and deliver a loop of its own thread in position for the needle to pass through it.

3. In a sewing-machine the combination of a driving-shaft, a needle-carrying arm driven by a link connection with an eccentric on said driving-shaft, a lever having a crank-pin actuated by link connection with said arm, a bell-crank lever mounted upon the crank-pin at the free end of the lever, an adjustable loop-transmitter upon the free end of said bell-crank and a locking-thread carrier adapted to take the needle-thread from the loop-transmitter and deliver a loop of its own thread in a position for the needle to pass through it.

4. In a sewing-machine the combination of a driving-shaft, a needle-carrying arm driven by link connection with an eccentric on said shaft, a front lever having an inclined crank-pin, connection between said arm and said front lever, a bell-crank lever having its fulcrum upon said inclined crank-pin, a loop-transmitter carried by said bell-crank lever, a rear rocking arm having its axis coincident with the front lever, a locking-thread carrier, a link connecting the latter with said rear rocking arm, a stationary cutter on the cloth-plate, a reciprocating cutter operating therewith, a second bell-crank lever connected with said link, and with said reciprocating cutter to operate the latter, and means for actuating the rear rocking arm.

5. A sewing-machine provided with a driving-shaft, a needle-carrying arm having link connection with an eccentric on said driving-shaft, a lever having a crank-pin and having link connection with said arm, a bell-crank lever upon said crank-pin carrying a loop-transmitter, a link pivotally connected to a bracket and with the free end of said lever, and a locking-thread carrier adapted to take the needle-thread from the loop-transmitter and deliver a loop of its own thread in position for the needle to pass through it.

6. A sewing-machine provided with a driving-shaft, a needle-carrying arm having link connection with an eccentric on said driving-shaft, a lever provided with a link connection with said arm, a bell-crank lever upon the free end of said lever carrying a loop-transmitter, a link pivoted to a bracket upon the bed-plate, a universal connection between the free end of said bell-crank lever and the end of said last-mentioned link, and a locking-thread carrier adapted to take the needle-thread from the loop-transmitter and deliver a loop of its own thread in position for the needle to pass through it.

7. A sewing-machine provided with a reciprocating needle, a bifurcated standard, a front lever provided with a journal fitted in a bear-

ing in one side of said standard, said journal having a reduced extension, a rear rocking arm carrying a tubular sleeve through which said extension passes, said sleeve being jour-
 5 naled in the other side of the standard, a loop-transmitter carried by said front lever, and a locking-thread carrier operated by the rear rocking arm and means for actuating said parts.

10 8. A sewing-machine provided with a driving-shaft carrying eccentrics, a needle-carrying arm having link connection with one of said eccentrics, a bifurcated standard, a front lever having a journal fitted in a bearing in
 15 said standard, and having link connection with said arm, a loop-transmitter connected to said lever, a rear rocking arm journaled in said standard having link connection with the other of said eccentrics, a locking-thread

carrier and connections between the same and 20 the rear rocking arm.

9. A sewing-machine provided with a reciprocating needle, a front lever, a bell-crank lever upon the same carrying a loop-transmitter, means for actuating said parts, a cloth- 25 plate provided with slots, a stationary cutter mounted in one of the slots, a reciprocating cutter operating therewith, a rear rocking arm, a locking-thread carrier, connections between the rear rocking arm, the locking- 30 thread carrier and the reciprocating cutter, and means for actuating the rear rocking arm.

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

HENRY H. FEFEL.

Witnesses:

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 M. F. HAMMEL.