

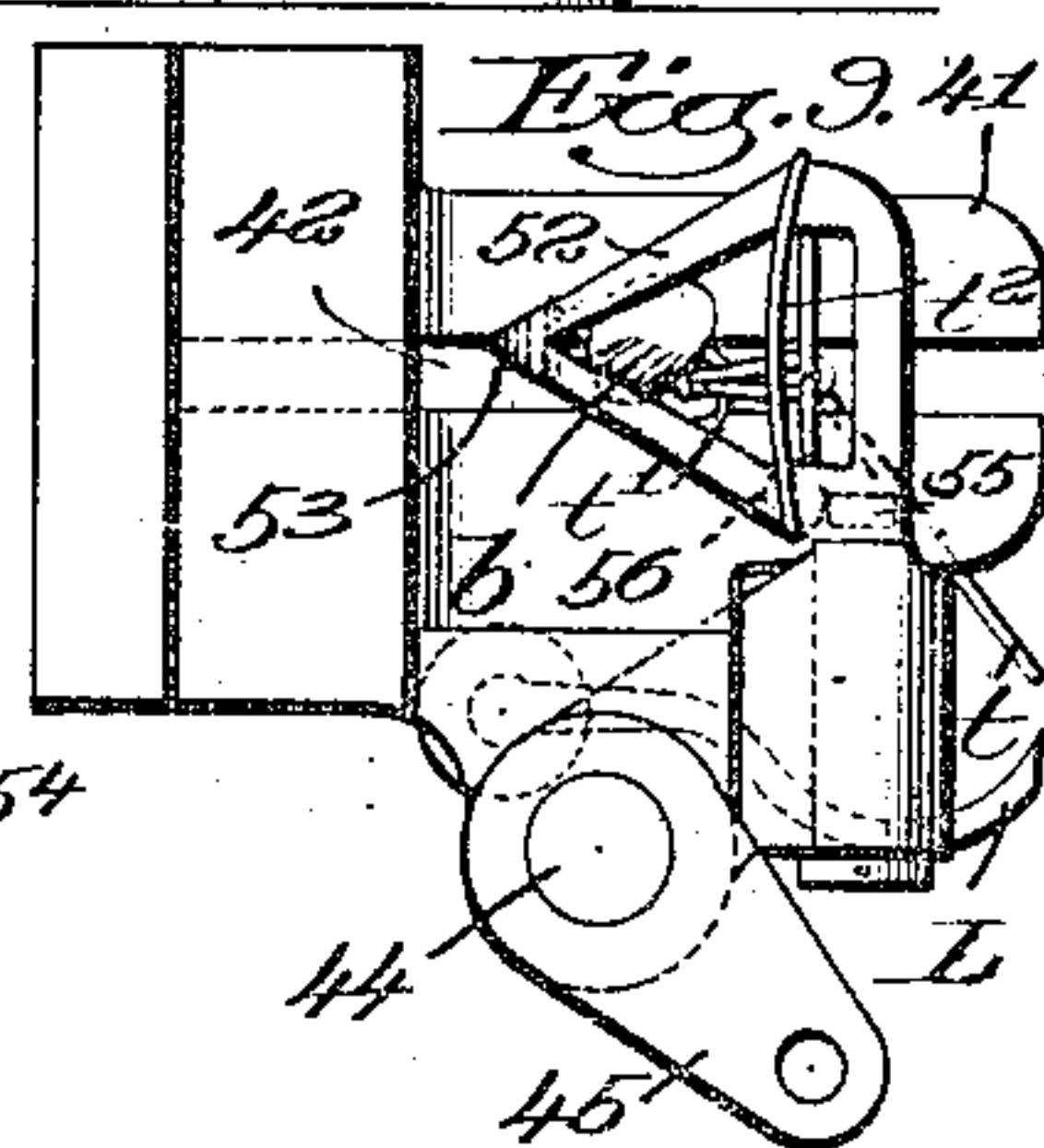
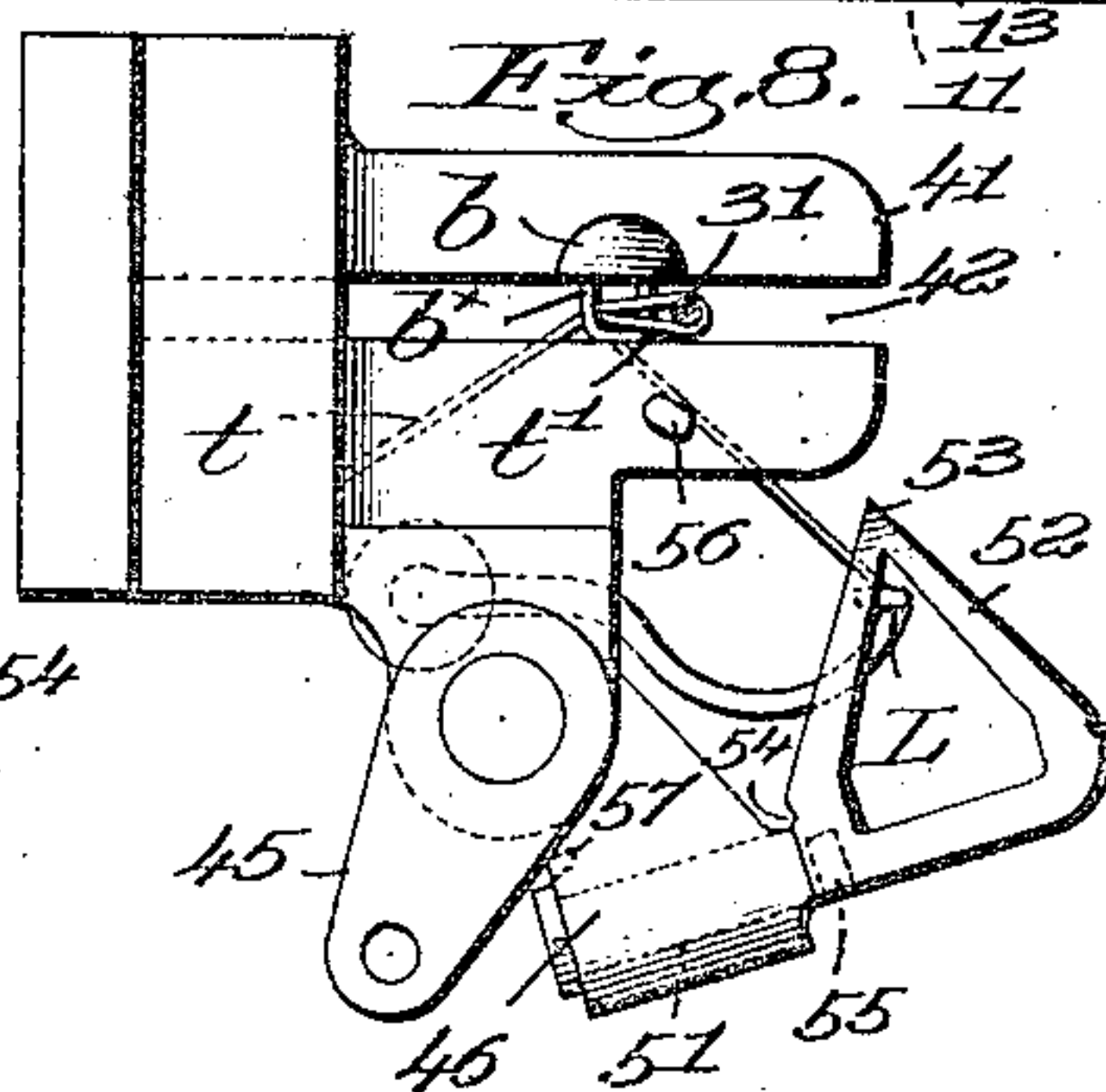
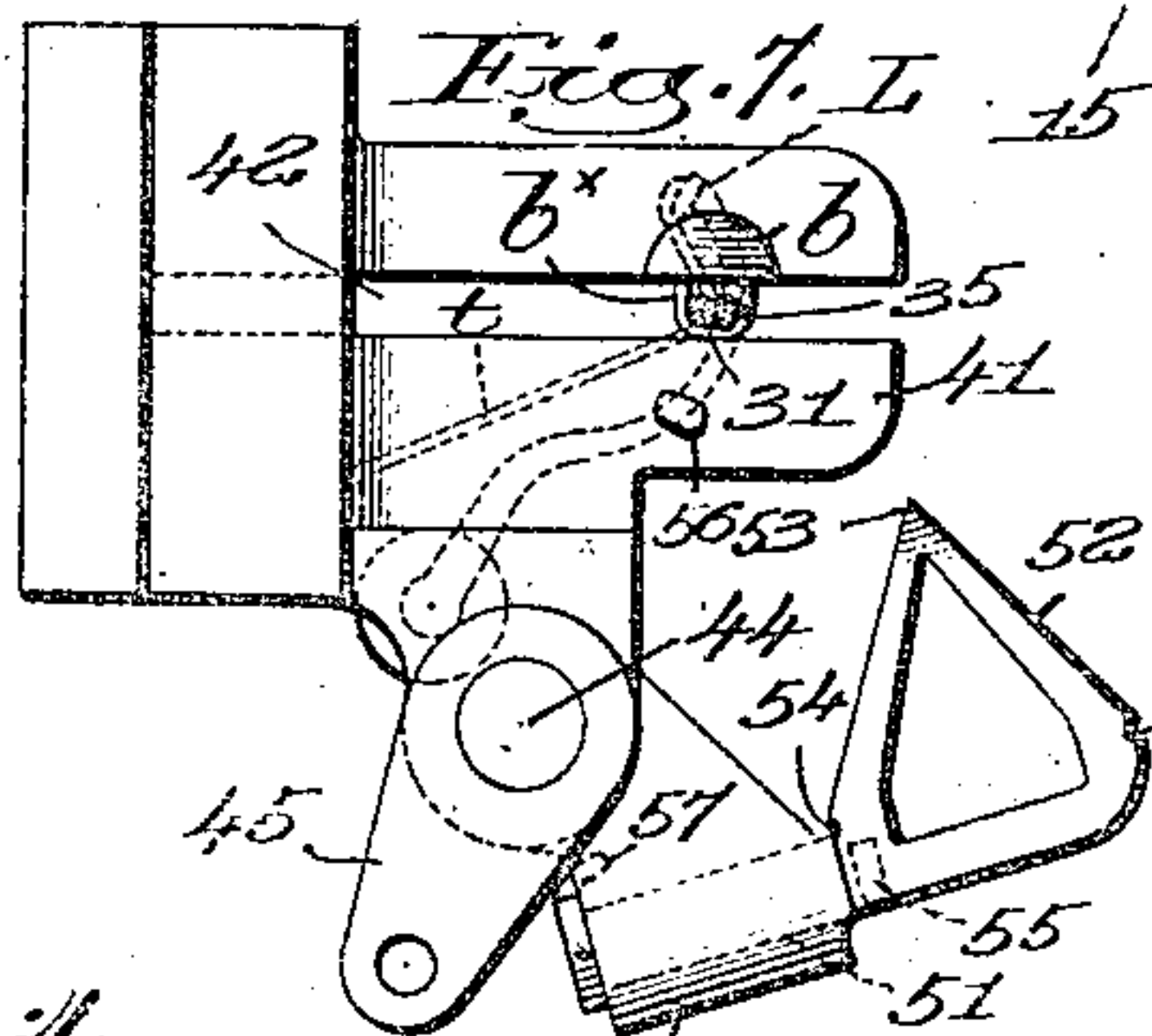
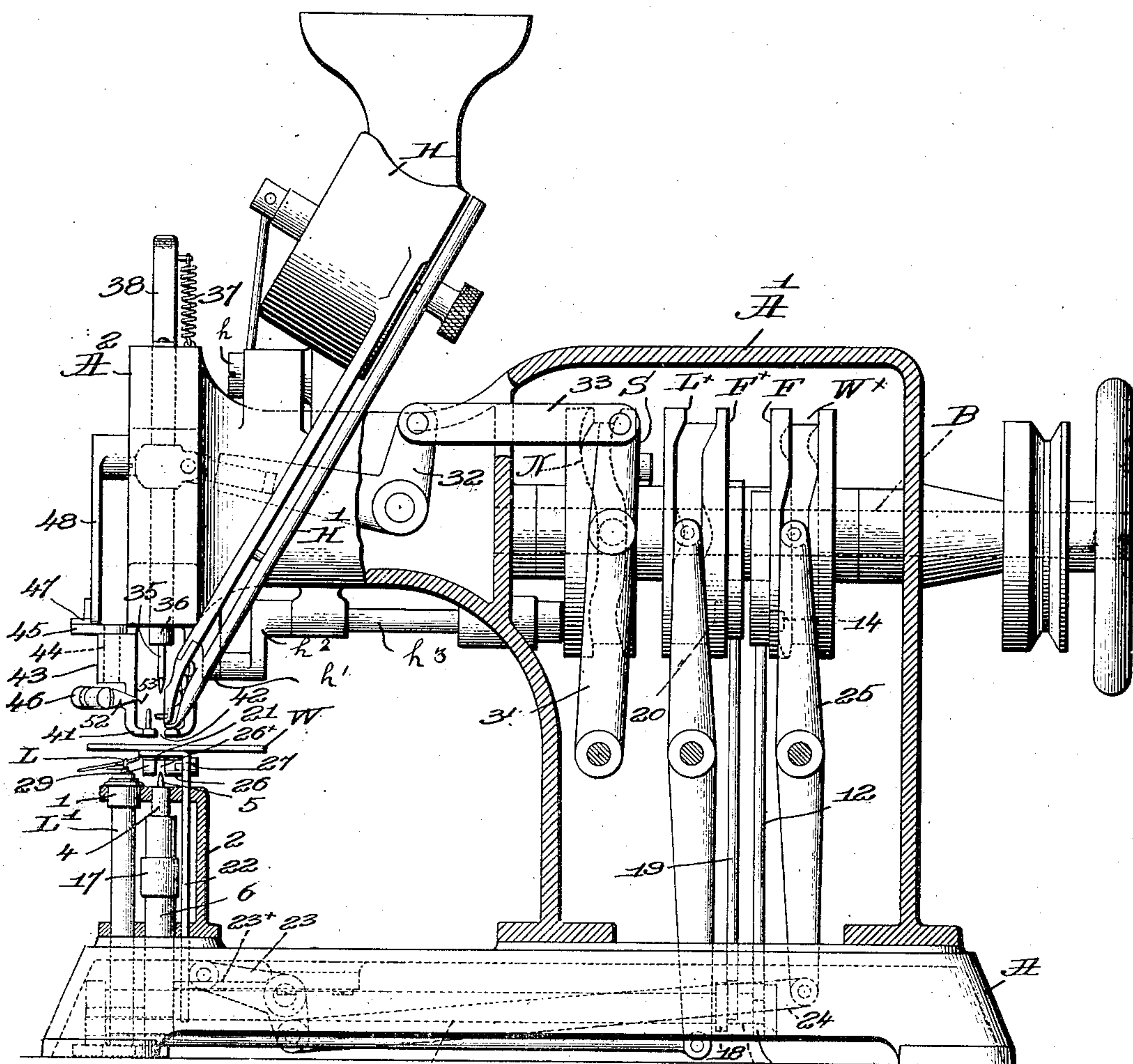
No. 886,826.

PATENTED MAY 5, 1908.

B. T. LEVEQUE.
BUTTON SEWING MACHINE.
APPLICATION FILED DEC. 14, 1907.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
Fred. L. Grunlap.
W. C. Lunsford.

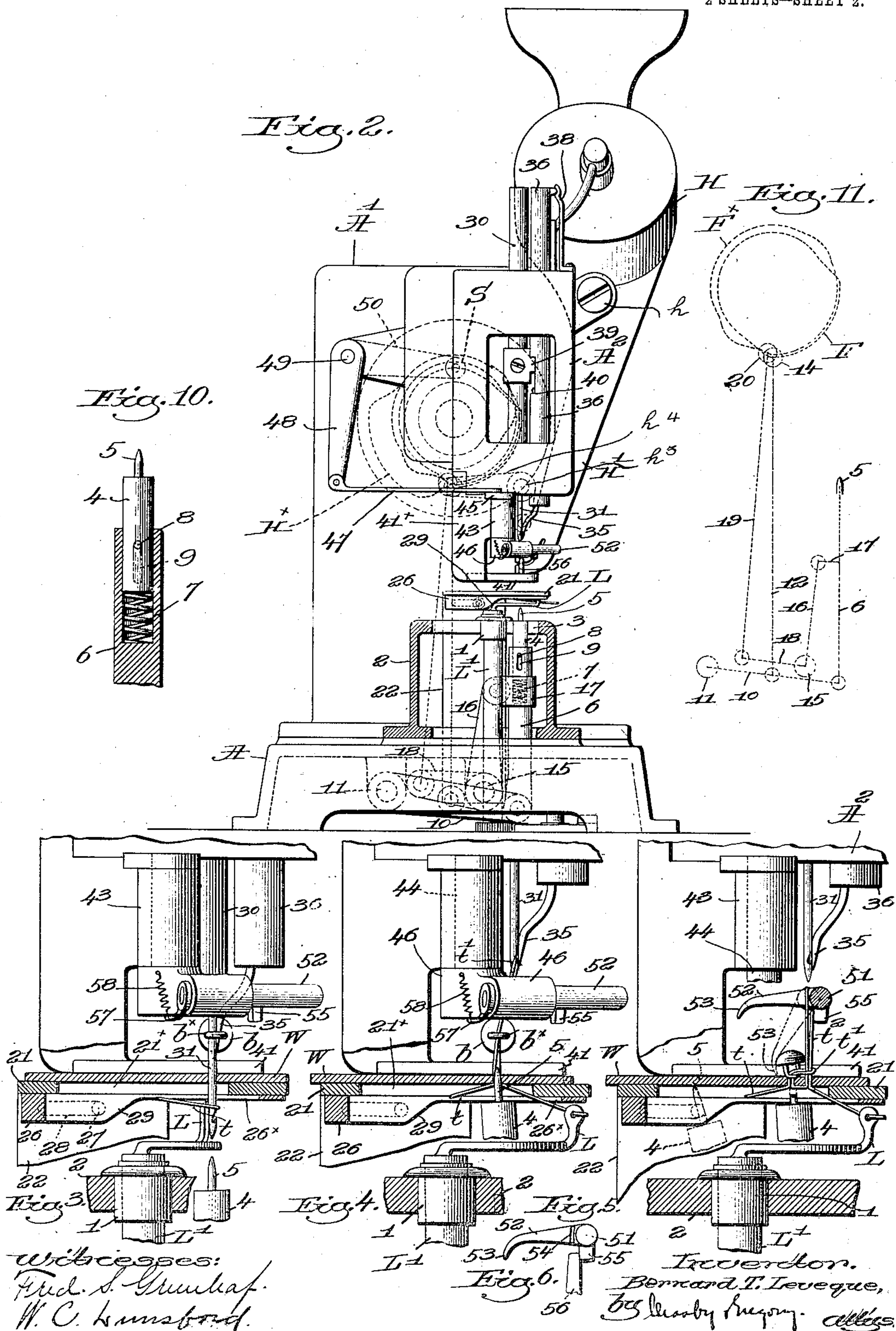
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2 SHEETS—SHEET 2.



UNITED STATES PATENT OFFICE.

BERNARD T. LEVEQUE, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE REECE BUTTON HOLE MACHINE COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

BUTTON-SEWING MACHINE.

No. 886,826.

Specification of Letters Patent.

Patented May 5, 1908.

Application filed December 14, 1907. Serial No. 406,422.

To all whom it may concern:

Be it known that I, BERNARD T. LEVEQUE, a subject of the King of Great Britain, and resident of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Button-Sewing Machines, of which the following description, in connection with the accompanying drawing, is a specification, like letters on the drawing representing like parts.

This invention has for its object the production of a novel, simple and direct-acting machine for sewing buttons onto fabrics at high speed, my invention involving a number of valuable and novel features of construction and arrangement, as will appear hereafter.

In machines of the general class to which my invention relates the primary loop is formed and drawn through the shank or eye of the button, and a secondary loop is then formed and interlocked with the primary loop by being drawn through it, and heretofore the vertically reciprocating needle has been given a lateral movement after the formation of the primary loop. Such lateral movement positions the needle with relation to the work in readiness to form the secondary loop, but the vertically reciprocating and lateral movements imparted to the needle-bar have necessitated complicated mechanism, and have made the machine slow in operation.

In my present invention I employ a needle having a movement in a single path, that is without any lateral movement, and thus at once simplify the construction and increase the speed at which the machine may be operated, the work being given a slight advance, after the formation of the primary loop, by means independent of the needle. Such advance positions the work for the formation of the secondary loop, and after the latter has been formed and drawn through the primary loop it is spread and cast off from the needle by novel means, to be described, and placed over the button close to the work. The loop is then drawn taut and the work is fed automatically into position for the attachment of the next button.

By means of my novel loop spreading means the secondary loop is placed over the button close to the work without tipping the button, eliminating any button-tipping mechanism.

I have so constructed the work feeding mechanism that it effects the slight advance of the work after the formation of the primary loop, as well as the main feed, and means have been provided for regulating at will the effective length of the main feed according to the spacing or distance desired between successive buttons.

The various novel features of my invention will be fully described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is a front elevation and partial section of a button-sewing machine embodying one form of my present invention, showing some of the operating mechanism as well as the button-hopper and feed raceway; Fig. 2 is a left hand end elevation of the machine shown in Fig. 1, with the parts in the same position; Figs. 3, 4 and 5 are enlarged views in end elevation and section showing by successive steps the mode of forming the interlocking primary and secondary loops, and the action of the feeding mechanism in connection therewith; Fig. 6 is a detail of the tipping device for the loop spreader, to be described; Figs. 7, 8 and 9 are enlarged details in plan showing the movements of the looper and the loop spreader during the formation of the interlocked loops, and corresponding to the positions shown in Figs. 3, 4 and 5; Fig. 10 is an enlarged detail in section of the upper end of the carrier for the feed-prong, showing the manner in which the prong is yieldingly mounted; Fig. 11 is a diagrammatic view of the feed controlling cams and the parts of the feed mechanism governed thereby.

The base A, the head A' provided with suitable bearings for the main shaft B driven from any suitable source of power, the button-hopper H having an attached raceway H' to direct the buttons to the proper position to be attached to the work, the looper L mounted on a rotatable looper-bar L' and oscillated from the cam L^x on the shaft B, Fig. 1, by suitable intervening connections, may be and are of any well known construction in button-sewing machines.

The upper end of the looper-bar L has a bearing 1 fixed in a housing 2 erected on the base and provided with a longitudinal slot 3, Fig. 2, parallel to the direction of feed, the slot guiding the enlarged shank 4 of the feed-prong 5, said shank being slidably mounted

in the socketed upper end of a carrier 6 and yielding sustained by a spring 7, Fig. 10, a stop-pin 8 on the shank playing in a slot 9 in the sidewall of the socket, Fig. 2. At its lower end the carrier is jointed to an arm 10 on the outer end of a horizontal rock-shaft 11 mounted in the base of the machine, a link 12 connected with a second arm 13 on the rock-shaft having a follower 14 which coöperates with a side cam F on the main shaft B, Fig. 1, the shape of the cam being shown in Fig. 11.

The prong carrier 6 is raised and lowered at the proper times, to cause the prong 5 to enter the work after the primary loop has been formed, and to be withdrawn after the feed stroke of the carrier has been accomplished. A second horizontal rock-shaft 15 has an upturned arm 16 provided with a pivotally connected sleeve 17 which loosely embraces the carrier 6 near its upper end, Fig. 2, a second arm 18 on the shaft 15 being pivotally connected with a link 19 provided with a follower 20 coöperating with a side cam F^x on the shaft B, said cam having the contour shown in Fig. 11. As the shaft 15 is rocked the arm 16 is vibrated in the direction of feed, and the carrier 6 will vibrate in unison with it, swinging on its pivotal connection with the arm 10, as will be manifest.

The cam F^x is shaped to impart a short advance movement to the carrier 6 and the feed-prong 5 immediately after the latter is raised by the cam F to engage the work, and then after a dwell a second and longer advance is effected, thereby feeding the work forward the desired distance to properly space the buttons on the work. It will be seen that the up and down movement of the carrier 6 is uniform, and so too the swinging movement of said carrier is uniform, but I have provided means whereby the effective length of the feed movement of the prong 5 may be varied, to provide for the spacing of the buttons at different distances apart.

The work W is sustained upon a horizontal work-support 21 having a depending portion 22 guided in the housing 2, and the work-support is raised and lowered automatically by means of a bell-crank 23, Fig. 1, actuated by a link 24 and rocker-arm 25 operated by a suitable cam W^x. The work-support 21 overhangs the path of movement of the feed-prong 5, as shown, and has upon its under side a cam piece 26 held in adjusted position by a screw 27 the shank of which enters a slot 28, see dotted lines Figs. 3, 4 and 5, in the part 22 of the work-support. The work-support has a longitudinal slot 21^x through which the prong travels when in engagement with the work, and the cam piece 26 is correspondingly slotted at 26^x, the slot extending into the thicker portion of the cam piece and leaving cam shoulders 29 adapted to engage the upper end of the shank 4 at opposite sides of the prong.

If the full feed movement of the prong is desired the cam piece 26 is set as shown in Figs. 3, 4 and 5, the prong being shown in dotted lines, Fig. 5; as just leaving the work at the extreme end of the active stroke of the carrier 6. Should it be desired to reduce the spacing between successive buttons the cam piece is moved to the right, viewing said figures, so that the cam shoulders 29 will engage the shank 4 before the carrier reaches the end of its active stroke, to depress the shank against the spring 7, thereby withdrawing the prong 5 from the work sooner. By this adjustable retractor, as the cam piece may be termed, the effective length of the feed movement of the prong is varied as may be desired without interfering with the uniform and constant movements of the carrier 6 heretofore explained.

The overhanging end A² of the head A' is provided with fixed bearings for the vertically-reciprocating needle-bar 30 carrying a hooked needle 31, the needle moving in a single, fixed path, as will be obvious, and being reciprocated in any suitable manner, as by the bell-crank 32, link 33 and rocker-arm 34, operated by the cam N, Fig. 1. A hook-closer 35 is carried by a bar 36 mounted adjacent the needle-bar and is thrown down by a spring 37 when released from the spring-catch 38, such release being effected positively by the lug 39 fast on the needle-bar and moving in the notch 40 cut in the bar 36. When the needle-bar rises the lug 39 engages the top of the notch and lifts the bar 36 to enable the spring-catch 38 to act, as shown in Fig. 2, the hook-closer *per se* not being of my invention. By imparting a vertical reciprocation only to the needle I am enabled to simplify the actuating mechanism therefor and also to greatly increase the speed of operation, the initial movement of the feed mechanism when in engagement with the work positioning the same in readiness for the descent of the needle preparatory to forming the secondary loop.

The machine is arranged to perform its cycle of operations necessary to attach a button to the work and then to stop automatically, as is usual in button-sewing machines, in readiness to be started by the operator when the next button is to be attached, and as the presser-foot 41 is stationary the work W is clamped between said presser-foot and the work-support 21 when the latter is raised. As soon as the work is clamped the needle and hook-closer descend, the latter into the position shown in Fig. 3 within the staple or eye b^x of the endmost button b in the race-way H', while the needle passes through the eye and penetrates the work. The looper L then carries the thread t around the needle, Figs. 3 and 7, so that the hook catches and draws up the primary loop t' through the work and also through the button-eye, as in

Fig. 4, the rising hook-closer 35 preventing accidental displacement of the loop. As the needle rises the carrier 6 is lifted and the prong 5 enters the work in the hole just made by the needle and while the latter is elevated and at rest the initial movement or advance of the prong is effected, moving the work forward about $\frac{3}{16}$ of an inch, into the position shown in Figs. 4 and 8. The needle now descends clear of the button-eye but passing through the primary loop and penetrates the work a second time behind the button, and the thread for the secondary loop is carried around the needle by the looper, the needle rising and drawing said loop t^2 up through the primary loop, effecting the interlocking of the two loops. The button raceway H' is now moved away by means of the cam H^x and intervening connections, as usual, leaving the button free, and a loop-spreader enters and spreads the secondary loop, casts it off from the needle and by a peculiar movement places the loop over the button close to the work.

The hopper H is pivotally mounted on the horizontal stud h and the raceway H' is rigidly connected at its upper end with the hopper, a lug h' on the raceway near its lower end being pivotally connected with a crank arm h^2 fast on a rock-shaft h^3 mounted in suitable bearings on the head A' , as shown in Fig. 1.

The cam H^x , Fig. 2, coöperates with a roll on an arm h^4 , shown in dotted lines Fig. 1, fast on the shaft h^3 , to rock the latter at the proper time and through the crank-arm h^2 and lug h' move the raceway and the hopper on the stud h , this entire arrangement and operation having no novel features so far as I am aware, and having been in common use for many years.

Before describing the loop-spreader and its operation in detail it should be stated that the presser-foot 41 is longitudinally slotted at 42 for the passage of the needle and the thread loops, as shown. An offset tubular bearing 43 herein shown as mounted on the upright part 41^x of the presser-foot supports a vertical rock-shaft 44 having laterally extended arms 45, 46 at its upper and lower ends, the arm 45 being connected by a link 47 with a depending arm 48 on a horizontal rock-shaft 49 mounted on the head of the machine, said rock-shaft having a second arm 50 provided with a suitable roll or stud to coöperate with an operating cam S on the shaft B . The cam acts through the intervening connections to oscillate the rock-shaft 44 and move the arm 46 in a curved path from the position shown in Figs. 1, 2, 3 and 7 to the position shown in Figs. 5 and 9, and then back again. Upon the arm 46 is pivotally mounted the shank 51 of a triangular skeleton loop-spreader 52, the tip 53 thereof being downcurved, as shown in Figs.

5 and 6, and opposite shallow notches 54 are formed in the sides of the spreader adjacent its base.

A lug 55 depends from the spreader near its axis of rotation, to be at times engaged by a tipping device, shown as an upright pin or stud 56 erected on the presser-foot, to be referred to again. The outer end of the shank 51 has fast upon it a collar provided with an extension 57 extended at its extremity under the arm 46, a light spring 58 being made fast at one end on the arm and at its other end to the extensions 57, to normally maintain the latter against the bottom of the arm, with the spreader 52 in substantially horizontal position, see full lines Fig. 5, and as shown in Figs. 3, 4 and 6.

When the needle draws up the secondary loop t^2 through the primary loop, as has been described, the loop-spreader is moved bodily in its curved path above the button, which has been released by withdrawal of the raceway H' , and the point of the spreader enters the secondary loop. The needle is given a slight dip at this time, to uncover the hook and release the loop, the continued movement of the spreader 52 casting off the loop from the needle and spreading the loop as shown in Figs. 5 and 9, the skeleton form of the loop-spreader permitting the needle to descend within it at the time it dips. When the loop is fully spread it enters the notches 54 and is temporarily held; the final bodily movement of the spreader bringing the lug 55 against the tipping device 56 and thereby tipping the spreader about its shank or axis 51 into dotted line position, Fig. 5. At this time the down curved tip 53 is close to the work and overhangs the button, the extremity of the tip depending below the bottom of the button and closely approaching the button-loop, as in dotted lines Fig. 5, and the secondary loop t^2 is then shed from the spreader and placed over the button, the loop being pulled taut around the button-eye or shank as the thread is taken up in usual manner.

When the secondary loop is shed from the spreader the spring 58, which was stretched by the tipping of the spreader, contracts and returns the spreader to its normal substantially horizontal position and the spreader, and the means for sustaining the same, are returned to normal position. The feed of the work by the longer advance of the feed-prong 5, and the return of the prong to normal position completes the cycle of operations, the work-support descending to the position shown in Figs. 1 and 2 at the completion of the cycle.

It should be stated that the work-support 21 is raised by means of the spring finger 23^x , Fig. 1, extended through the depending part 22 of the support, so that the work is held yieldingly between the work-support and

the presser-foot, permitting the short advance of the work after the formation of the primary loop and the latter main feed, but the descent of the work-support is positive, the bell-crank 23 engaging and depressing the spring finger 23^x. I consider the feeding movement of the work, which is effected by a short and a long advance or step, is of great importance as the mechanical structure of the machine is simplified, insuring greater speed of operation and better wearing qualities, and at the same time it enables me to impart to the needle a vertical movement only, in a single path, without any lateral movement.

Heretofore it has been necessary to impart a lateral movement to the needle, as well as a vertical reciprocation, complicating the mechanism and retarding the button sewing or attaching operations. By the main feed movement the spacing of the buttons is effected, and such spacing can be varied by a single adjustment which is readily made, it being manifest that no other adjustment of the entire machine is required.

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

1. In a button-sewing machine, mechanism to form interlocking primary and secondary loops and draw the former through the button-eye, independent means to position the work for the formation of the secondary loop, and a device to spread the secondary loop and place it over the button.

2. In a button-sewing machine, mechanism, including a hooked needle and a cooperating looper, to form interlocked primary and secondary loops and draw the former through the button-eye, a device to spread the secondary loop and place it over the button, and means to position the work for the formation of the secondary loop while the needle is at rest.

3. In a button-sewing machine, a vertically-reciprocating needle and a cooperating looper, to form interlocked primary and secondary loops, the former being drawn through the button-eye, a device to spread the secondary loop and place it over the button, and means independent of the needle to advance the work slightly after the primary loop has been drawn through the button-eye and to feed the work after the secondary loop has been placed over the button.

4. In a button-sewing machine, mechanism, including a needle moving in a single path, to form interlocked primary and secondary loops, the former through the button-eye, a device to cast off the secondary loop from the needle and place it over the button, and means to position the work for the formation of the secondary loop.

5. In a button-sewing machine, mechanism,

including a reciprocating needle movable in a single path, to form interlocked primary and secondary loops, means to advance the work for the secondary loop after the primary loop is drawn through the button-eye, and to feed the work after the secondary loop is cast off, and a positively acting device to cast off the secondary loop and place it over the button.

6. In a button-sewing machine, mechanism, including a vertically-reciprocating needle, to form and draw a primary loop through the button-eye and to form and draw a secondary loop through the primary loop, means to spread the secondary loop and place it over the button, and means independent of the needle to advance the work after the formation of the primary loop and to feed the work after the secondary loop has been placed over the button.

7. In a button-sewing machine, a needle reciprocating in a fixed path, and a cooperating looper, to form primary and secondary interlocked loops, the former being drawn through the button-eye, and a device to spread and cast off the secondary loop and place it over the button, combined with means to positively engage and advance the work prior to formation of the secondary loop and while the needle is at rest.

8. In a button-sewing machine, mechanism to form interlocking primary and secondary loops and draw the former through the button-eye, a triangular and substantially flat spreader having a down-curved tip and straight sides converging from its base to the tip, to enter and spread the secondary loop, and means to thereafter automatically tip the spreader about its base and depress the down-curved tip below the bottom of the button and close to the button-eye, to shed the loop and slide it over the button close to the work, the base of the spreader being close to the needle path when the spreader is tipped.

9. In apparatus of the class described, mechanism to form interlocked primary and secondary button-attaching loops, combined with feed mechanism including a work-engaging member having a short, uniform advance movement after the formation of a primary loop and a succeeding longer movement in the same direction after the secondary loop has been formed and placed over the button, and means to vary the effective length of the longer movement.

10. In apparatus of the class described, a vertically reciprocating needle and a cooperating looper, to form interlocked primary and secondary loops, the former through the button-eye, combined with mechanism to intermittently engage the work and advance the same by a short step after the formation of the primary loop and by a long step after the secondary loop has been formed and

placed over the button, and manually controlled means to determine the effective length of the long step.

11. In a button-sewing machine, mechanism, including a needle to enter the work, and a cooperating looper, to form a primary loop and draw it through a button-eye and thereafter to form a secondary loop and draw it through the primary loop, means, including a prong to enter the primary loop opening in the work, to advance the work for the formation of the secondary loop and subsequently to effect feed of the work, and a device to engage and place the secondary loop over the button before the prong effects feed of the work.

12. In apparatus of the class described, loop-forming mechanism to form interlocking primary and secondary button-attaching loops, combined with feeding mechanism, including a work-engaging member having an initial short movement after the formation of the primary loop and a final and longer feeding movement after the secondary loop has been placed over the button, and adjustable means to effect automatically disengagement of said member from the work at a predetermined point in its longer movement to thereby vary the effective length of the feeding movement.

13. In apparatus of the class described, mechanism to form interlocking primary and secondary loops and to draw the former through the button-eye, and means to place the secondary loop over the button, combined with means to effect a short advance of the work after formation of the primary loop and thereafter to feed the work, and a manually adjustable device to vary the length of the feed.

14. In a button-sewing machine, mechanism to form interlocking primary and secondary loops, the former through the button-eye, a support, a loop spreader mounted thereon and movable with and also relatively to the support, means to move the support and spreader as a unit in a substantially horizontal, curved path to cause the spreader to enter and spread the secondary loop, and a device to tip the spreader with relation to its support and thereby shed the loop over the button, the tip of the spreader being down-curved to overhang and extend under

the button close to the button-eye when said spreader is tipped and the loop is shed therefrom.

15. In a button-sewing machine, mechanism to form interlocking primary and secondary loops, the former through the button-eye, a spreader movable in a substantially horizontal, circular path above the button, to enter and spread the secondary loop, and relatively fixed means to engage the spreader and depress the point thereof as the spreader is about to complete its movement over the button, to thereby discharge the loop and place it over the button close to the work.

16. In a button-sewing machine, mechanism to form interlocking primary and secondary loops, the former through the button-eye, a fixedly positioned upright fulcrum, a support mounted to swing laterally upon said fulcrum, a loop spreader pivotally mounted on the support at right angles to the fulcrum thereof, means to swing the support about its fulcrum to introduce the spreader into the secondary loop, and a device fixed with relation to said support and the spreader to engage and tip the latter relatively to the support when in position over the button, to depress the point of said spreader and shed the loop therefrom and place it over the button.

17. In a button-sewing machine, mechanism to form interlocked primary and secondary button-attaching loops, a loop-spreader having a down-curved tip, means to move the spreader about a fixed center in a substantially horizontal path to enter and spread the secondary loop, and a separate device to thereafter positively engage and tip the spreader with relation to its moving means, as said means is about to complete its movement, to thereby move the down-curved tip of the spreader over the button and adjacent the work, to shed the spread loop over the button close to the work.

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

BERNARD T. LEVEQUE.

Witnesses:

JOHN C. EDWARDS,
MARGARET A. DUNN.