No. 677,781. Patented July 2, 1901.

J. S. LADD.

LASTING MACHINE.

(Application filed July 8, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

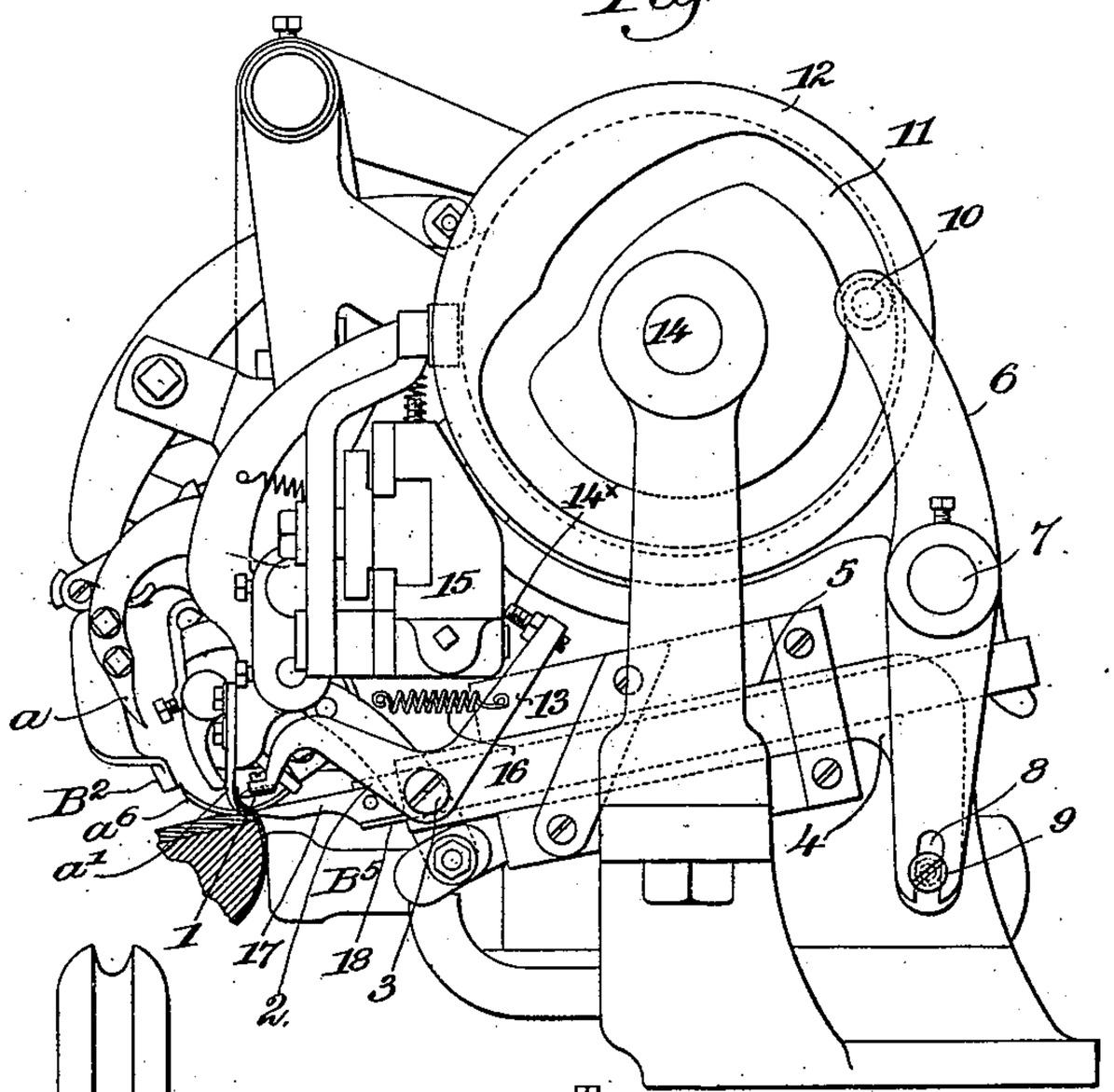

Fig. 2.

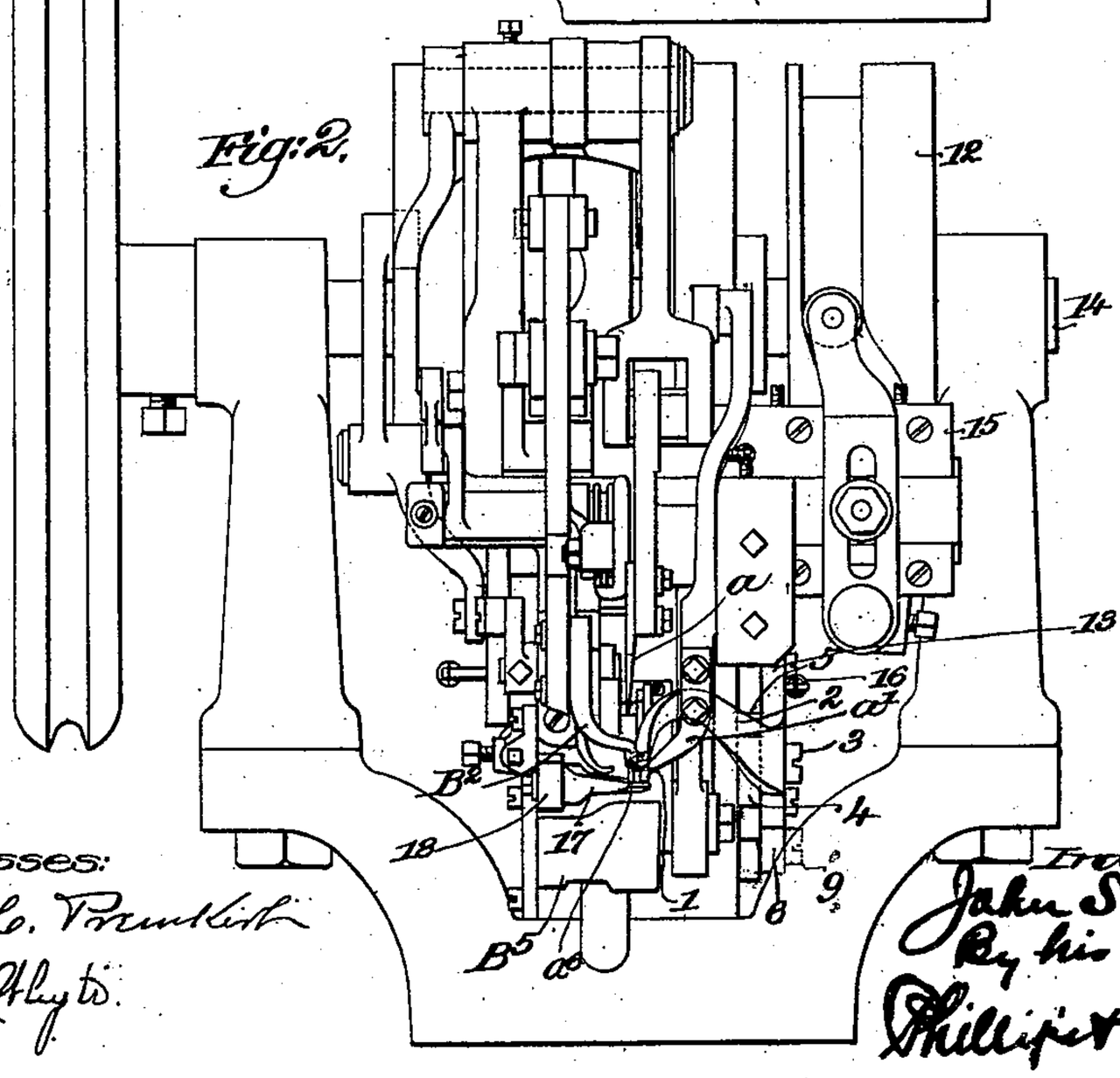

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Fig: 3.

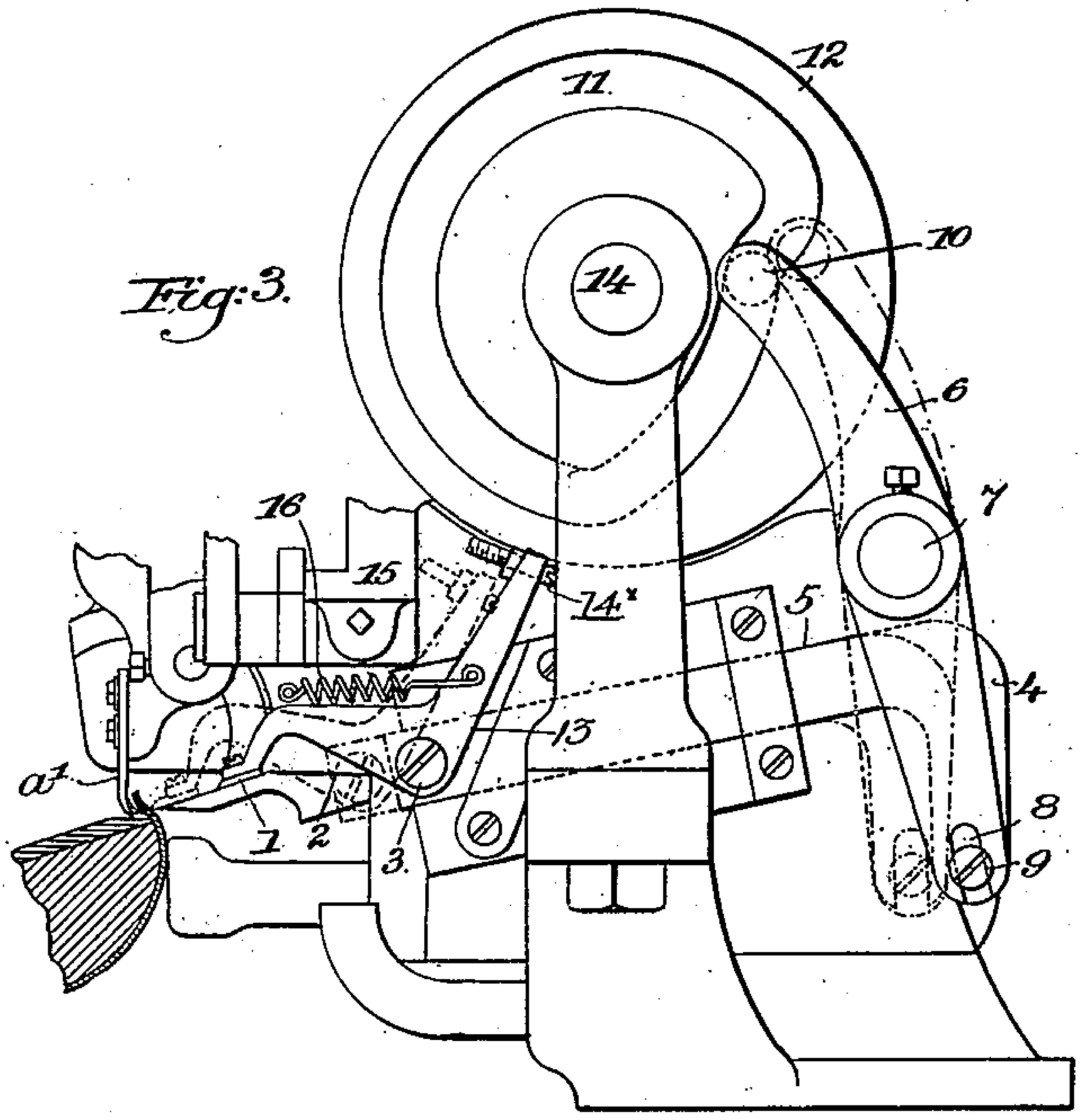
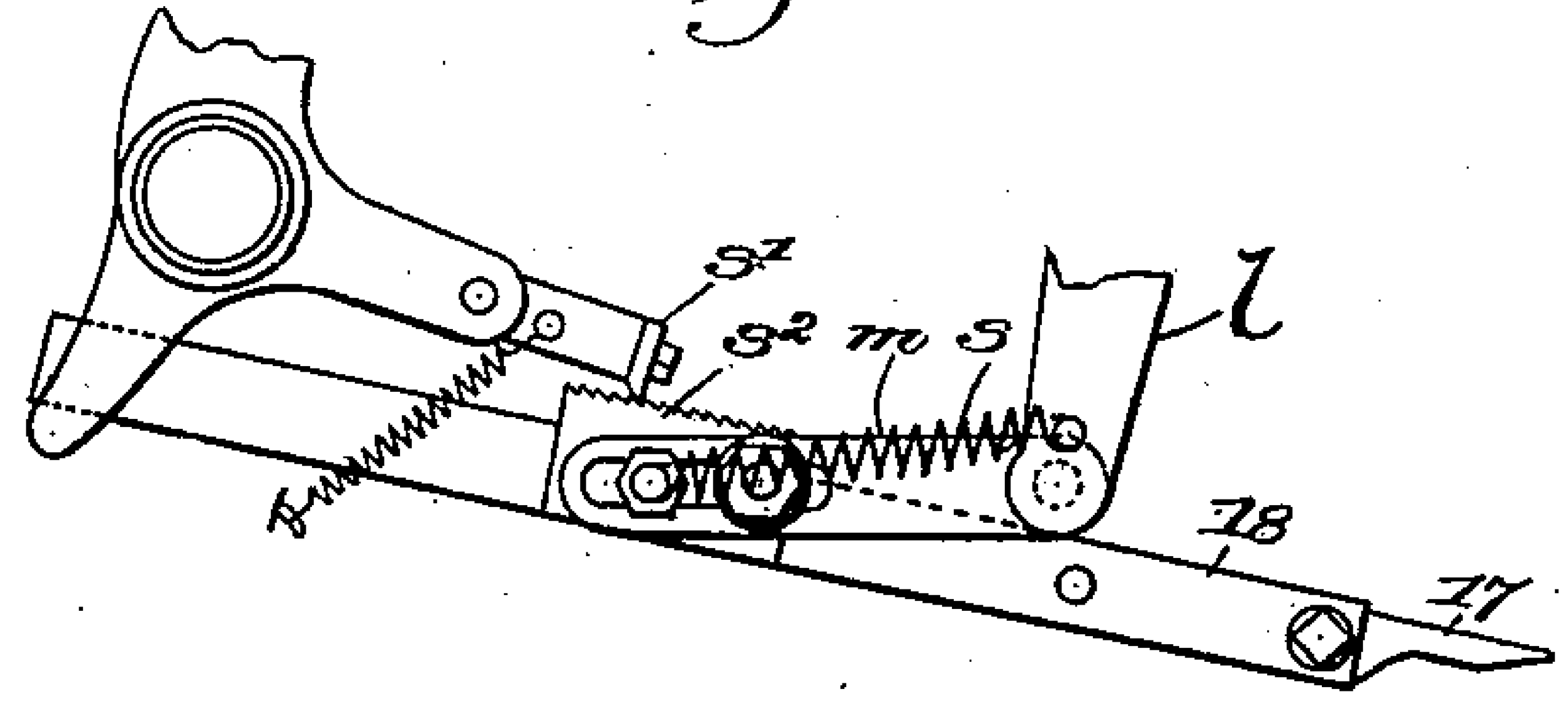


Fig: 4.



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UNITED STATES PATENT OFFICE.

JOHN S. LADD, OF BOSTON, MASSACHUSETTS.

LASTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 677,781, dated July 2, 1901.

Application filed July 8, 1899. Serial No. 723,219. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. LADD, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Lasting-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.

The present invention relates to machines for lasting boots and shoes, and more particularly to lasting-machines comprising stitch-forming mechanism which coöperates with the lasting instrumentalities in uniting the upper to the sole of the shoe.

The object of the present invention is to combine with the stitch-forming devices of a welt and turn shoe sewing machine upper stretching and holding devices which stretch and hold the upper while the stitch-forming devices are operating to unite the upper to the sole of a boot or shoe, whereby the operation of lasting or conforming the upper to the contour of the last may be carried out simultaneously with the securing of the upper to the sole.

The present invention therefore consists of the devices and combinations of devices which will be hereinafter described and claimed.

The present invention is illustrated in the accompanying drawings, in which—

Figure 1 shows in side elevation the head of a machine embodying the invention, and Fig. 2 shows a front elevation of the machine as illustrated in Fig. 1. Fig. 3 shows a view of the machine similar to that shown in Fig. 1, with certain parts omitted for the sake of clearness and illustrating in full and dotted lines the movement of the stretching device as it advances toward the upper. Fig. 4 shows the slide which carries the pusher and portions of the mechanism for advancing and retracting it and locking it in its advanced position.

Similar reference characters will be employed throughout the specification and drawings to designate corresponding parts of the machine.

In the drawings there is represented a welt and turn sewing-machine embodying the present invention, which machine in so far as the stitch-forming instrumentalities are concerned is the well-known Goodyear welt and turn machine disclosed in Letters Patent of the United States No. 412,704, and in which B^5 is the back-rest, B^2 the looper, a the awl, a^6 the needle, and a' the channel-gage, all of which parts may be and preferably are constructed, organized, and arranged to perform the stitch-forming operation as the corresponding parts indicated by similar reference characters of the patent hereinbefore referred to, and inasmuch as the construction, organization, and mode of operation of said machine are familiar to those persons skilled in this art further description thereof in this specification is deemed unnecessary.

The lasting instrumentalities of the machine of the drawings comprise an upper-stretching device which is constructed and arranged to engage the projecting edge of the upper prior to the passage of the needle therethrough and to stretch the upper over the sole. The stretching device is preferably arranged to impart to the upper a stretching movement inward over the edge of the last in a plane substantially parallel to the surface of the sole and an upward-stretching movement in a direction substantially at right angles to the surface of the sole. The greater part of the stretching movement is the resultant of the inward and upward movements, the movement in a plane substantially parallel to the surface of the sole in practice being little more than sufficient to cause the stretching device to firmly grip the shoe-upper. In the present machine this stretching device is preferably constructed and arranged as follows: The stretching device is shown at 1, and consists of a plate having formed on its forward edge teeth or projections arranged to engage the edge of the upper. The stretching device 1 is mounted on the forward end of a bell-crank lever 2, which is fulcrumed at its angle to a stud 3, which stud is carried by a reciprocating slide 4, arranged to reciprocate, preferably, in an inclined direction in the guideway 5, secured to the side of the head of the machine, as shown clearly in Fig. 1 of the drawings. The slide 4 is reciprocated toward and from the work by means of a lever 6, ful-

crumed on a post 7, secured in the frame of the machine, the lower end of the lever 6 being preferably slotted, as shown at 8, and engaging a screw 9, mounted in the end of the slide 4, and the upper end of the lever 6 carries a cam-roll 10, engaging a cam-groove 11, formed in the face of a cam 12, mounted on a cam-shaft 14.

The above-described arrangement is such that a rotation of the cam 12 will by means of the cam-groove 11 and lever 6 impart reciprocating movements to the slide 4 and the stretching device 1 to cause said device to engage the edge of the upper of a boot or shoe, as shown in Fig. 1 of the drawings, and impart thereto a stretching movement over the edge of the last.

As hereinbefore set forth, it is designed that the stretching device 1 also have a stretching movement in a line substantially at right angles to the surface of the last, and for this purpose the arm 13 of the bell-crank lever 2 is provided with a stud $14^{\times}$, which as the slide 4 is advanced toward the shoe comes in contact with the back of the guideway 15 of the feed-slide of the machine and causes the lever 2 to be rocked about its fulcrum 3, as shown in Fig. 3, thus raising the forward end of the lever 2 and imparting an upward movement to the stretching device 1. The lever 2 is restored to its normal position, with the stretching device 1 lowered and in contact with the upper surface of the pusher or holder 17, to be described, upon which it slides, by means of a coiled spring 16, one end of which is secured to the arm 13 of the lever 2 and the other end to a fixed part of the frame. The extent of the upward movement of the stretching device 1 may be regulated by means of the stud $14^{\times}$, which is formed with a screw-threaded exterior fitted into a bearing in the lever 2, whereby it may be projected more or less to engage the back of the guideway 15 sooner or later as it is advanced toward the shoe.

It will be noted that the arm of the bell-crank lever 2, which carries the stretching device 1, is, as shown in Fig. 2, curved laterally to the left, and its free end is preferably positioned so that the stretching device 1 will be in substantial alinement with the channel-gage a', so that the channel-gage will form an abutment, or, as it were, one member of a stretching instrumentality whereof the stretching device 1 forms the other member—that is, as the stretching device 1 is advanced toward the work it moves in substantial alinement with the channel-gage and grips the upper against the channel-gage, thus insuring that the teeth of the stretching device 1 will penetrate the upper and impart thereto the inward and upward stretching movements against the rear face of the channel-gage a'. I desire to state in this connection, however, that while the illustrated embodiment just described is the preferred form and arrangement of my invention it is in no respect limited thereto, as I have obtained good results by locating the stretching device 1 upon either side of the channel-gage a'.

After the upper has been stretched by the stretching device 1, as hereinbefore described, it should be held against the edge of the sole during the action of the stitch-forming mechanism and, particularly in the case of turned shoes, should be forced closely in the angle or shoulder formed by the channel or lip cut in the sole, and for this purpose I have provided a pusher or holder 17, which is provided with a forward beveled end arranged to engage the upper below the point at which it is engaged by the stretching device and force it closely within the angle or shoulder of the sole, as hereinbefore described. For this purpose the pusher 17 has imparted to it reciprocating movements toward and from the shoe, and such movements are conveniently obtained by mounting the pusher upon the slide 18, which slide is substantially the slide N^3, which carries the welt-guide in the machine of the patent hereinbefore referred to, and said slide 18 is preferably advanced and retracted by a lever l, link m, and spring s and locked in its advanced position by a pawl s' and ratchet s^2, all of which may be and preferably are constructed and arranged as described in said patent and which need not herein be specifically set forth.

It will be noted that the slides 4 and 18, which carry the stretching device and the pusher or holder, reciprocate in substantially the plane of the bottom of the last. By this arrangement the stretching device and the pusher or holder perform their respective functions without tending to disturb or knock down the shoe in the hands of the operator.

The operation of the machine of the drawings is as follows: The upper is drawn onto the last in the usual way preparatory to lasting the same—that is, it is drawn over at the heel, toe, and shank—and tacks or temporary fasteners are inserted through the upper into the last at the toe, heel, and shank, all as is usual in preparing shoes for lasting. The shoe is now presented to the machine, substantially as indicated in Fig. 1 of the drawings, with the channel-gage a' engaging the channel of the sole. Motion now being imparted to the machine, the slide 4 will be advanced toward the work and the stretching device 1 will engage the edge of the upper, as shown in Fig. 1 of the drawings, imparting thereto a stretching movement substantially in the plane of the surface of the sole over the edge of the last, and a continued forward movement of the slide 4 will cause the projection $14^{\times}$ to engage the back of the guideway 15 of the feed-slide and rock the lever 2 about its fulcrum, imparting an upward movement to the stretching device 1, thus stretching the upper in a line substantially at right angles to the surface of the sole against the back of the channel-guide a'. As the stretching device 1 moves upward, the pusher 17 will be ad-

vanced and engage the upper below the stretching device 1 and force it closely into the angle formed by the shoulder of the sole, in which position it will be locked, holding the upper closely against the shoulder of the sole, while the stitch-forming devices are actuated to force the needle through the edge of the upper and the between substance of the sole and to form a stitch, thus securing the edge of the upper to the sole, after which the stretching device will be retracted, also the pusher or holder, and the shoe will be fed by the work-feeding instrumentalities of the machine to bring the shoe into position for another operation of the machine, and this is continued until the shoe being operated upon is fully lasted.

Having described the construction, organization, and mode of operation of my invention, I claim as new and desire to secure by Letters Patent of the United States—

1. In a lasting-machine, the combination with an upper-stretching device and its carrier, of a pusher or holder and its carrier, independent mechanisms to actuate the carriers to advance the stretching device to stretch the upper, and to thereafter force the pusher or holder against the upper, the paths of movement of the stretching device and the pusher or holder being substantially in the plane of the bottom of the last, substantially as described.

2. In a lasting-machine, the combination with an upper-stretching device, and mechanism to impart thereto first a movement toward the last in substantially the plane of the bottom of the last and thereafter a movement at substantially a right angle to the bottom of the last, of a pusher or holder coöperating with said stretching device to engage the upper below the stretching device and force it against the shoulder of the sole, substantially as described.

3. In a lasting-machine the combination with a stretching device, and mechanism to cause said stretching device to engage the upper and impart thereto first inward, and thereafter upward stretching movements, of a pusher arranged to engage the upper below the stretching device and means to lock the pusher in its advanced position, substantially as described.

4. In a lasting-machine the combination with stitch-forming mechanism, of an upper-stretching device and its carrier, a pusher or holder and its carrier, and independent mechanisms for actuating the carriers to cause the stretching device to stretch the upper over the sole and the pusher or holder to engage the upper below the stretching device and hold it while the stitch-forming mechanism is actuated to unite the upper and sole, substantially as described.

5. In a lasting-machine the combination with stitch-forming mechanism, of a stretching device and means to actuate the same to cause it to engage the upper and impart thereto a stretching movement first substantially in the plane of the bottom of the last and thereafter substantially at a right angle to the bottom of the last, a pusher or holder and mechanism to actuate the pusher or holder to cause it to engage the upper and hold it while the stitch-forming mechanism is actuated to unite the upper and sole, substantially as described.

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

JOHN S. LADD.

Witnesses:
T. HART ANDERSON,
WILLIAM H. LADD.