

(No Model.)

2 Sheets—Sheet 1.

J. W. SMITH.
LASTING MACHINE.

No. 547,301.

Patented Oct. 1, 1895.

Fig. 1.

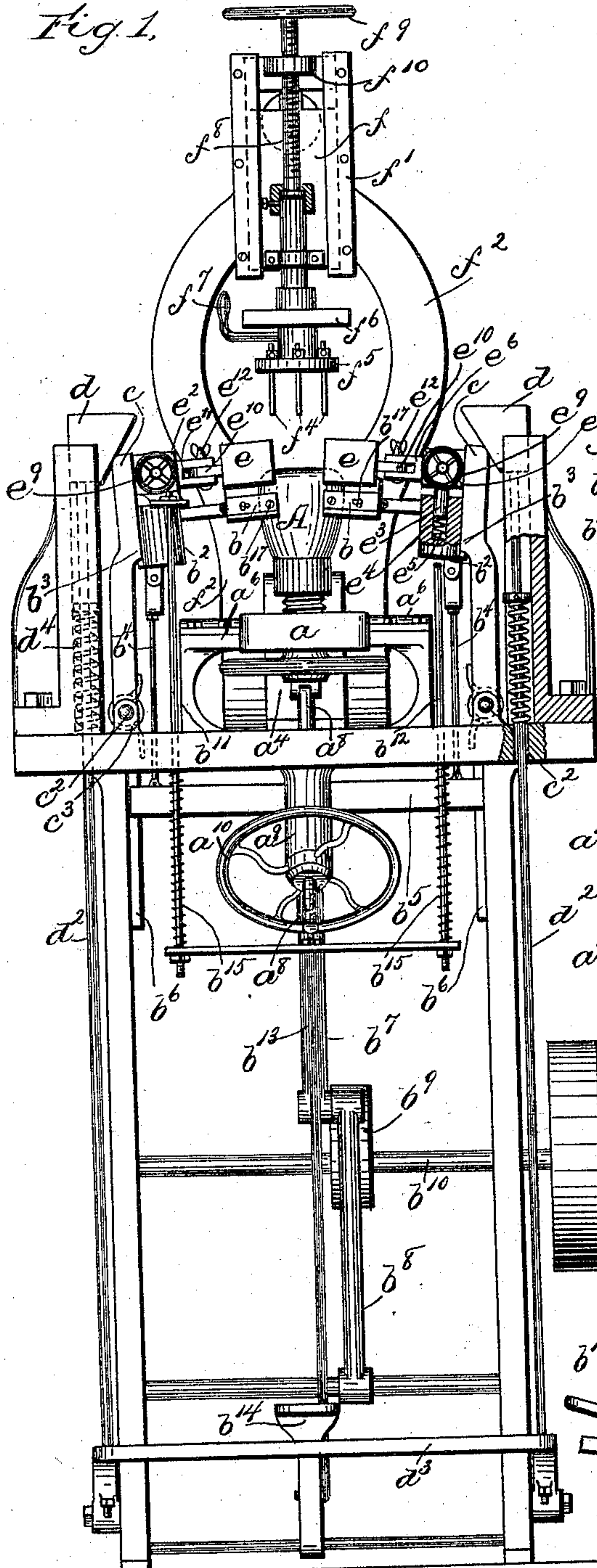
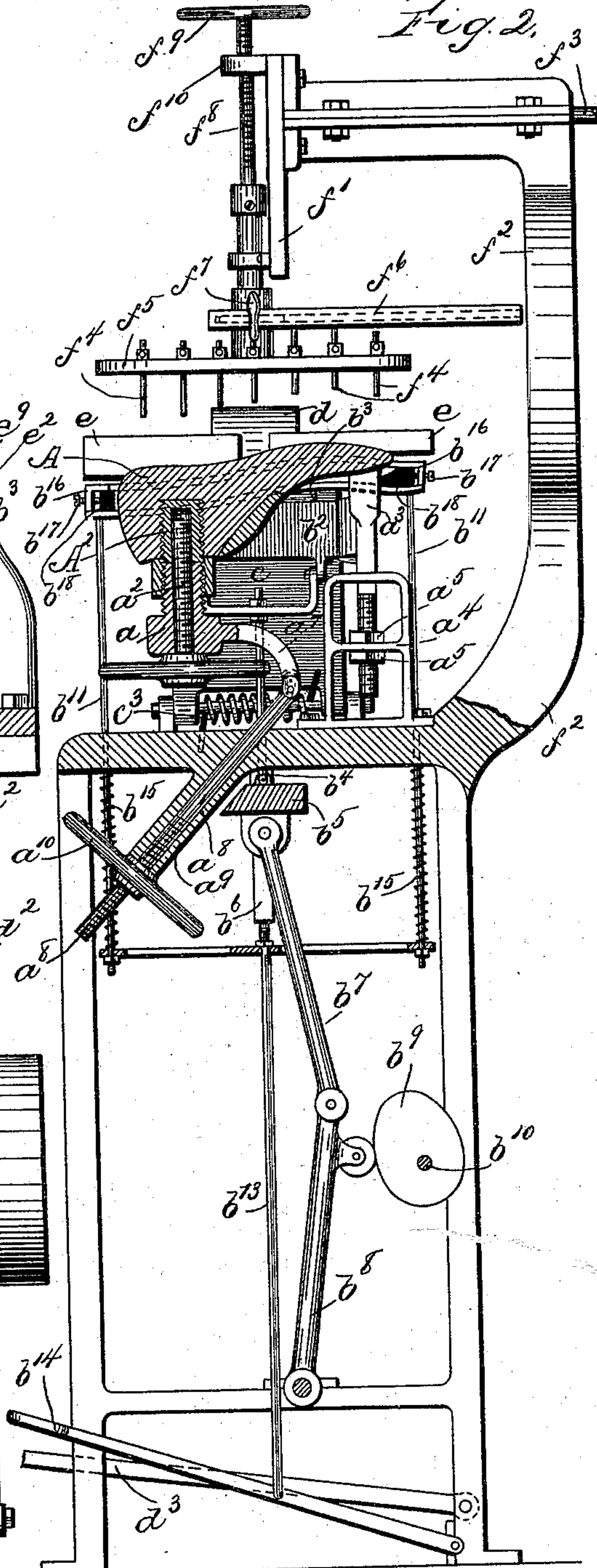


Fig. 2.



Witnesses

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Att'y.

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2 Sheets—Sheet 2.

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Fig. 3.

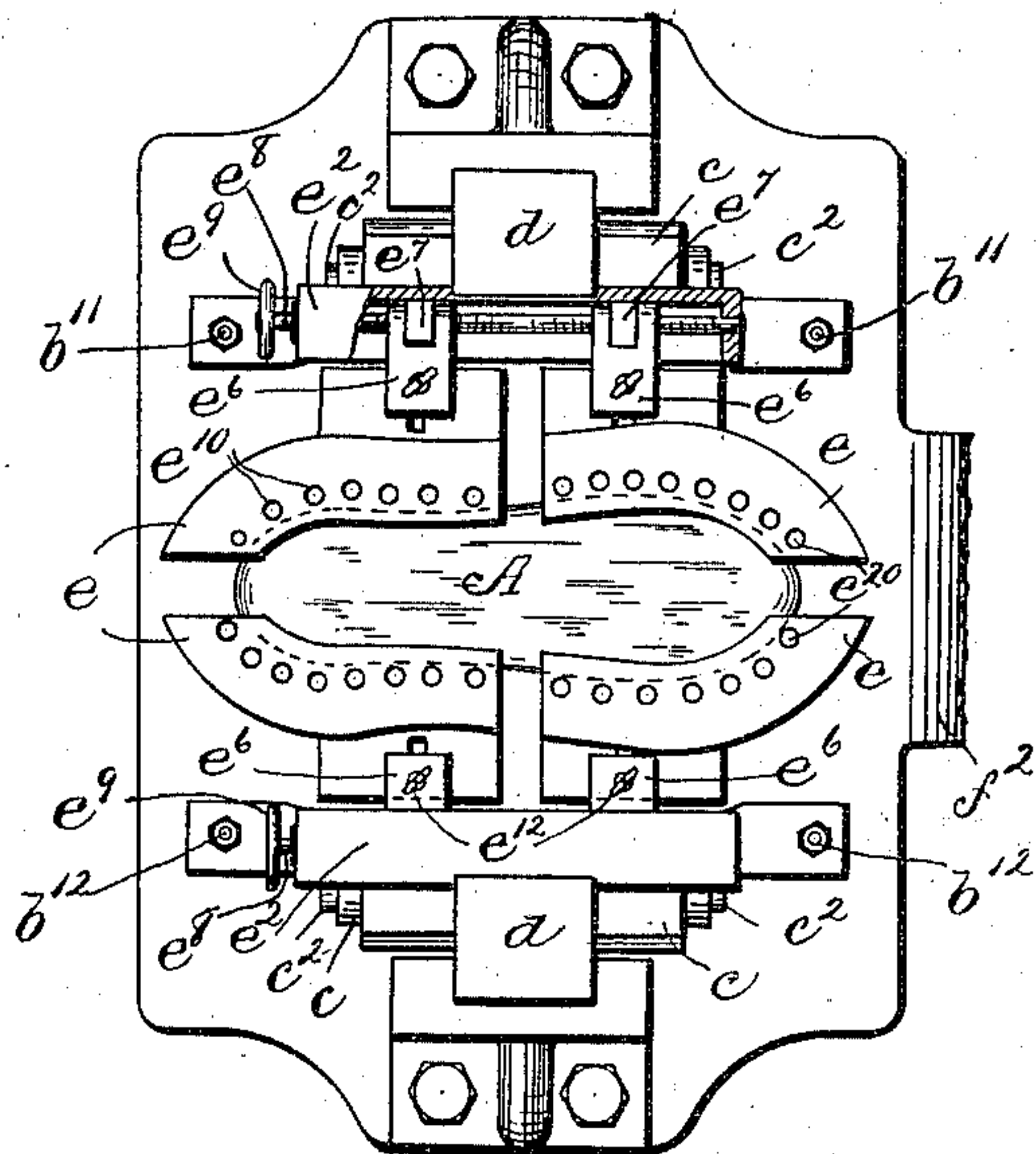
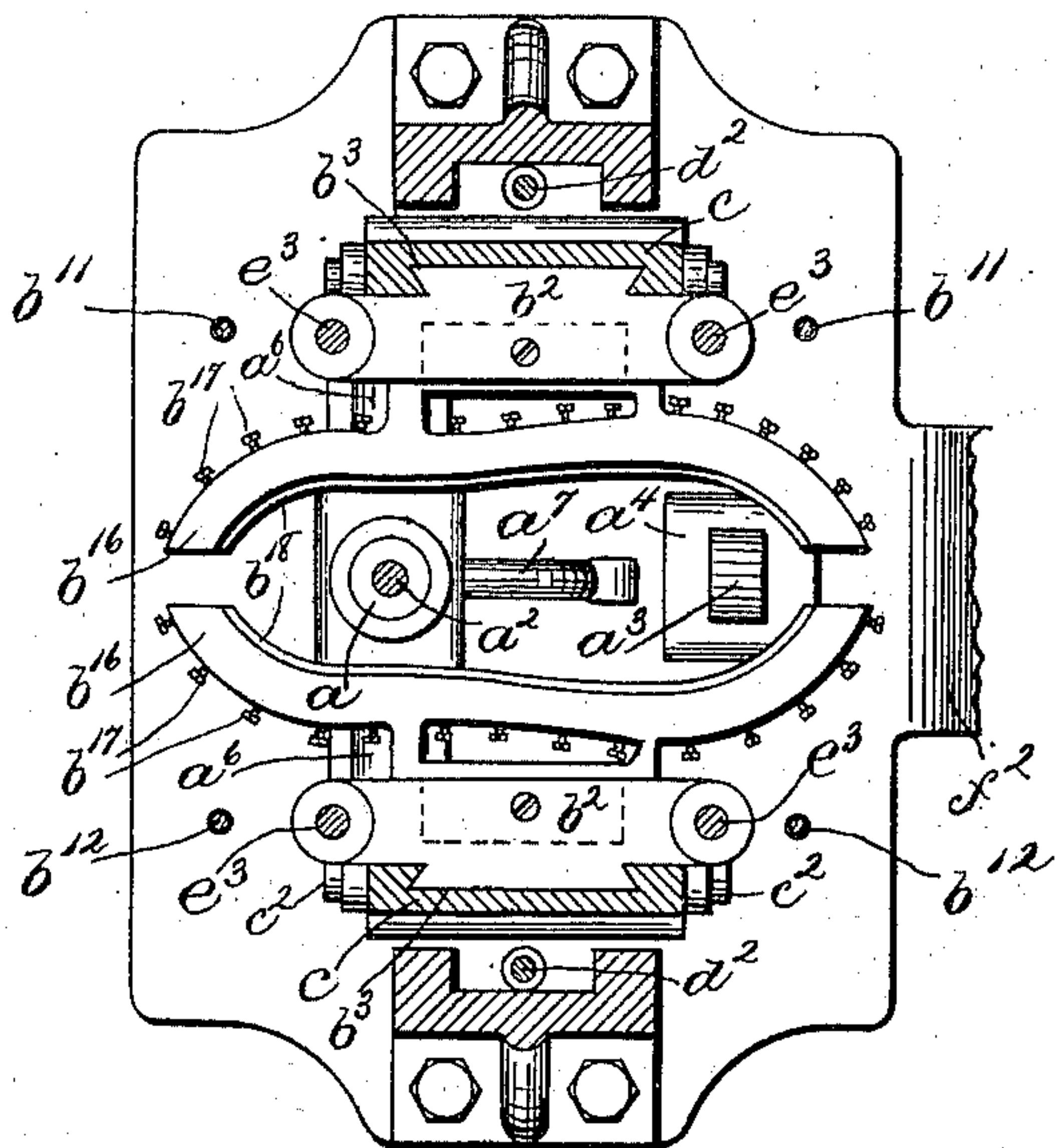


Fig. 4.



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UNITED STATES PATENT OFFICE

JOHN W. SMITH, OF DERRY, NEW HAMPSHIRE, ASSIGNOR OF ONE-EIGHTH
TO JOSEPH A. WYCKOFF, OF SAME PLACE.

LASTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 547,301, dated October 1, 1895.

Application filed April 4, 1895. Serial No. 544,418. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. SMITH, of Derry, county of Rockingham, State of New Hampshire, have invented an Improvement in Lasting-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to lasting-machines, the main object being to produce a machine that will last shoes more rapidly than the machines heretofore used. To this end the instrumentalities are so devised that a last, insole, and upper may be introduced into the machine without the preliminary partial drawing over and attachment of the upper to the last that is commonly required to prepare boots and shoes for lasting in the machines heretofore used.

The machine embodying this invention comprises a jack for holding the last of novel construction, said jack holding the last securely in the machine against upward pressure without requiring any engagement of the bottom of the last or insole from above, thus leaving the bottom of the last free on all sides for the operation of the edge-turning devices.

The machine also comprises wipers adapted to engage with the sides of the upper and means for giving said wipers a lateral inward movement against the sides of the upper and an upward movement, so that they operate to press the upper against the sides of the last and draw it upward thereon, thus fitting it closely to the last.

The machine also comprises edge-turning devices adapted to act substantially simultaneously around substantially the entire edge of the upper to turn the same in over the insole, the said edge-turning devices being provided with guides for lasting-tacks and when closed in constituting a tack-guiding form by which the entire series of tacks may be driven at a single operation by a suitable tack-driver composed of a form provided with a gang of drive-bars corresponding in position to the tack-guiding passages of the edge-turning devices when closed in around the edges of the upper over the insole. The said edge-turning devices are shown as connected with the same supports as the wipers before mentioned and thus partake of the inward and upward movements of the latter; but

they are yieldingly connected with the said supports, so that they can yield vertically downward after the wipers have been brought to their final position by their operating mechanism, the said edge-turning devices thus yielding under the pressure of the tack-driver before mentioned when the latter descends to drive the series of tacks and thus pressing the turned edges of the upper down firmly and smoothly upon the insole when it is fastened thereto by the tacks. By thus providing for driving the entire series of fastenings simultaneously and by dispensing with the preliminary hand operation of partially fitting the upper to the last and tacking it thereon the speed and capacity of the machine are greatly increased.

The invention consists in the novel combination of the foregoing instrumentalities and their actuating mechanism by which they are caused to operate, as described, with relation to one another and to the material being operated upon, and also in various details of construction of the several instrumentalities that will be hereinafter pointed out.

Figure 1 is a front elevation of a lasting-machine embodying this invention; Fig. 2, a vertical section thereof; Fig. 3, a top plan view; and Fig. 4, a horizontal section with the last removed, showing the wipers and means for adjusting the inner surfaces thereof to conform to the sides of the last.

The last A is provided with a thimble or socket-piece A², rigidly fixed therein and shown in this instance as having an external screw-thread, so that it is screwed tightly into the bore of the last. The said socket-piece is adapted to be locked down firmly upon the jack-post a, being shown in this instance as internally screw-threaded to co-operate with the threaded spindle a² in the jack-post. In jacking the last the toe end thereof is supported upon a toe-rest a³, which may be of usual character, being shown in this instance as vertically adjustable in its supporting-frame a⁴ by nuts a⁵. The locking-spindle is provided with a hand-wheel or otherwise adapted to be readily and quickly turned by the operator, and in jacking the shoe preparatory to lasting it is placed upon the toe-rest and jack-post and the clamping screw or spindle a² then run up by a quick turn, so that its

upper end screws into the socket-piece A^2 , fixed in the last, thereby locking the last down firmly upon the jack, while its tread portion is perfectly free and accessible from above and on all sides. In order to bring the toe end of the last into firm contact with the toe-rest, so as to clamp the upper between the last and toe-rest at this point when the last is first jacked, the jack-post a is pivotally supported in bearings at a^6 , so that it may rock in line with the length of the last, it being provided with an arm a^7 , connected to a rod a^8 , movable longitudinally in the guide a^9 and provided with an operating hand-wheel a^{10} , internally threaded to engage with the threaded end of the rod a^8 , so that by turning the said hand-wheel up against the end of the guide a^9 the arm a^7 is drawn down and the upper end of the jack-post a^2 is thrust forward, bringing the toe end of the last clamped to the jack-post, as before stated, to a firm bearing on the toe-rest a^3 . It obviously will not, as a general thing, be necessary to operate the hand-wheel a^{10} , as with the toe-rest and jack-post properly adjusted the act of clamping the last to the jack-post by its locking-spindle a^2 will also bring it to a proper bearing on the toe-rest. The upper may be held in proper position on the last by the operator in jacking the shoe, as just stated, and when jacked will be retained in proper position for subsequent lasting operations by the engagement of the toe-rest a^3 . The upper thus supported is drawn and fitted properly to the last mainly by the action of the side wipers b , which are connected with carriages or slides b^2 , having a substantially upward movement on suitable guideways b^3 on oscillating side arms or rockers c , pivoted at c^2 to the bed or framework of the machine. Thus by a sliding movement of the carriages b^2 on the rockers c , accompanied by a rocking movement of the latter, the wipers may be pressed against the sides of the upper and moved upward along the same to press and draw it tightly to the last. The actuating mechanism for the upward movement is shown as comprising rods b^4 , loosely or pivotally connected with the lower ends of the carriages b^2 and with a cross bar or yoke b^5 , having a forward movement in suitable guideways b^6 , the said cross-head being actuated by a toggle-lever b^7 b^8 , the joint of which is acted upon and straightened by a cam b^9 on a shaft b^{10} , adapted to be intermittently operated by any suitable power, its movement being controlled by a clutch or otherwise, at the will of the operator. Thus in a half-revolution of the cam b^9 the toggle-joint is straightened and the wipers b are moved forcibly upward to draw and smooth the upper upon the sides of the last, the pressure of said wipers against the side of the last being produced and controlled by the operator as follows: The rockers c are acted upon by cams or wedges d , the downward movement of which tends to crowd said rockers toward the middle of the

machine, and thus to press the wipers b , connected therewith, against the upper and around the sides of the last. The said wedges d are shown as connected by rods d^3 with an operating lever or treadle d^3 , adapted to be manipulated by the operator, downward pressure on which thus causes the wedges d to press the rockers c and wipers b inward, as is required during their upward movement produced by the cam b^9 , as before stated, said wipers thus frictionally engaging with the sides of the upper and drawing it snugly into contact with the surface of the last. At the same time the edge-turning devices are brought in position to turn or fold the edges of the upper over upon the insole, the said edge-turning devices being shown as consisting of a four-part sectional form, each part e of which is adapted to conform to about a quarter of the periphery of the last-bottom or to extend from about the middle of the end portion of the last (heel or toe) to about the middle of the side of the last. The said form is divided on a longitudinal median line into two members, each of which co-operates with substantially one-half the outline of the last from the middle of one end to the middle of the other end thereof, said members being supported, respectively, upon the carriages of the side wipers, as will be described, and partaking of their upward and inward movements above mentioned, and each of said members is divided into two parts or sections on a line transverse to the last-bottom, said parts having a movement relative to each other longitudinally of the last. By this construction the four parts when closed together produce a form of definite size, shape, and position, and thus in addition to their function of turning the upper down upon the insole and last-bottom may also serve as a guiding-form for the tacks or fasteners, so that the entire series of fasteners may be driven simultaneously by a gang-driver. The two form-pieces e at each side are connected with a form-carrier e^2 , which is yieldingly connected with the carriage b^2 for the wiper b on the same side of the last, so that said form-pieces partake substantially of the upward and inward movements of the wipers, but are capable of having an independent vertical movement owing to the yielding connections between the carriers and the carriages b^2 , said connection being shown in this instance as made by supporting rods or stems e^3 from said carriers entering and longitudinally movable in sockets e^4 in the carriage b^2 and acted upon by springs e^5 , or otherwise, so as to cause the form-carriers to move upward with the carriages, but not necessarily to so great an extent, and also to enable the said form-carriers and forms to move downward with relation to the carriages when the latter have arrived at the end of their upward movement. The said edge-turning devices are also preferably connected, as shown, by rods b^{11} b^{12} b^{13} with a treadle b^{14} , so that they may be pressed down upon the sole of the

last by the operator. Springs b^{15} may also be provided, as shown, which tend to automatically press the said devices toward the sole of the last. The two portions of the edge-turning form at each side of the last are longitudinally movable in a guide in the corresponding carrier e^2 and are operated in their longitudinal movement by devices best shown in Fig. 3. Each form-piece is secured to a shank or slide e^6 entering and adapted to travel longitudinally in the carrier e^2 , the said shank or projection e^6 engaging with a nut e^7 , which is restrained from rotary movement. The two nuts e^7 corresponding to the two sections of the former engage, respectively, with the right and left threaded portions of a screw-shaft e^8 , provided with a hand-wheel e^9 , said shaft turning with longitudinal movement in bearings in the carrier e^2 , and thus by its rotation in one direction tending to separate the nuts and form-pieces engaged therewith, and by its rotation in the other direction tending to draw the said form-pieces together. Thus as the said form-pieces of the edge-turning devices are closed in laterally over the sides of the last by the action of the rockers c , as before described, the hand-wheels e^9 are manipulated by the operator, so as to draw the two form-pieces at each side toward one another longitudinally of the last, thus closing in their end portions longitudinally over the ends of the last, so that at the end of the operation the four-part form extends substantially around the periphery of the shoe, except as gaps may be made therein or left between the parts of the former to enable pinchers to be used to draw the upper a little more, if necessary. The said edge-turning form is provided with a series of guide-passages e^{20} for tacks or other fastenings that are used to attach the edges of the upper to the insole and last, said guides thus coming to a definite position with relation to one another when the form is properly closed in, so that they may be filled simultaneously with tacks, for example, by the use of a "skimmer," such as is used in nailing-machines, which may then be driven simultaneously by a driver provided with a gang of rods or plungers corresponding to the guides e^{20} . The said driver may be mounted upon a support, so that it may be swung out of the way while the lasting operations thus far described are being performed, and after the upper has been fitted to the last by the action of the wipers, as before described, and the edge-turning form has been closed in over the edge of the upper and provided with nails or tacks the driver is brought into position and descends, so that all the said tacks may be driven simultaneously. The edge-turning form yields on its spring-supports e^5 , before mentioned, as the driver descends, and thus comes to a firm bearing on the edges of the upper, pressing it into proper shape as the fastenings are being driven. The operation of lasting may thus be performed with great rapidity.

After the tacks are driven the pressure on the treadle d^3 may be relieved, permitting the rockers to separate, springs c^{30} being preferably provided to cause such separation automatically and thus free the last, which may then be unjacked by turning the locking-spindle a^2 , and the cam b^9 is caused to make another half-turn, thus relieving the pressure on the toggle-arms b^7 b^8 , when the cross-head b^5 and carriages b^2 and appliances connected therewith will drop by gravity, assisted, if necessary, by the action of springs, when the machine is ready to have another shoe jacked and lasted therein.

While any of the well-known gang of tack-drivers heretofore commonly used can be adapted for use with the lasting-machine which forms the subject of the present invention, it is preferable to employ the device shown in Figs. 1 and 2, which is designed especially for this purpose and consists of an upright f , mounted in guides f' on a standard or frame f^2 , extending upward from the back of the base or standard of the lasting-machine, the said upright being connected with a shaft f^3 in such a manner as to make one complete up-and-down stroke at each revolution of the said shaft under the control of the operator. The tack-drivers themselves consist of rods or pins f^4 , mounted in a base-plate f^5 , which is connected with and supported by a guideway f^6 , connected with the said upright f . The said base-plate is provided with a handle f^7 , by which it may be pushed back (from left to right, Fig. 2) in the said guideway, so that it will be out of the way of the operator during the lasting operation and can be returned to its operative position, as shown in Fig. 2, when the lasting operation is completed and the tacks are to be driven. The said guideway and base-plate are provided with means for vertical adjustment, said means consisting of a spindle f^8 , connected thereto and having an operating-wheel f^9 , said spindle being screw-threaded to co-operate with an internally-threaded projection f^{10} from the upright f , as shown. When the upper is properly fitted to the last, the operator pulls the said base-piece containing the drivers f^4 forward in the guideway f^6 to the position shown in Fig. 2, and then operates a suitable clutch or shipper, whereby the shaft f^3 is caused to make one revolution, so that the upright f by its down movement drives the tacks, and by its up movement is returned to its normal position.

In accordance with the present invention means are provided for adjusting the inner surfaces of the wipers b to lasts of different sizes, and also for changing the formation of said surfaces to fit lasts of different shapes. As best shown in Figs. 2 and 4, this is accomplished by constructing the shell or frame of the said wipers in the form of a channel, Fig. 2, into which project a number of screws b^{17} , inserted in the outer wall of said channel and screwed in from the outside thereof.

The wipers proper consist of strips of yielding material b^{18} , inserted in said channel, and which may be reinforced, if desired, at the back by a strip of some stronger substance, as sheet metal, against which the sides of the screws b^{17} bear. With this arrangement it is evident that by adjusting the screws in and out the shape of the inner surface of the wipers can be modified as may be found desirable.

In order to render the machine still further adaptable for use with lasts of different sizes, the edge-turning devices e are so arranged as to be readily detachable from the shanks e^6 , which travel in the carriers e^2 and, as shown in Fig. 1, are provided with tongues e^{10} , fitting in slots or grooves e^{11} in the said shanks e^6 , the jaws of said slots being provided with thumb-screws e^{12} , by which they are forced together upon the said tongues, so as to hold the said edge-turning devices firmly in position. The thumb-screws e^{12} do not engage directly with the tongues e^{10} , but merely force together the jaws of the shank e^6 , so that the said edge-turning devices may be laterally adjusted and when in the proper position held in place by the frictional bearing thereon of the said jaws pressed together by the thumb-screws.

To insure the return of the operative parts of the machine to their normal positions after a complete operation, springs c^3 and d^4 , Fig. 1, are provided, acting, respectively, on the rods d^2 and rockers c , so that the said operative parts are out of the way of the operator and do not interfere with the jacking of the last preparatory to the next operation of the machine.

I claim—

1. The combination of side-wipers, their supporting carriages and mechanism for moving the same in a direction parallel to the sides of the last, with edge-turning devices supported on said carriages, and independent means for pressing said carriages and the wipers and edge-turning devices supported thereon laterally toward the sides of the last, as described.

2. The edge-turning devices comprising two two-part members and supporting carriers for said members, combined with means for moving said carriers and the edge turning members thereon laterally toward the last, and means for moving the two parts of each member longitudinally on its supporting carrier, substantially as and for the purpose described.

3. The herein described jack for the last comprising a supporting post for the body of the last, a threaded clamping spindle extending longitudinally through said post, and means for rotating the same to engage said spindle with the said last, and a toe support for the last, substantially as described.

4. The herein described jack for the last, comprising a pivotal supporting post provided with a threaded clamping spindle, and means for rotating the same to engage it with the body of the last, a toe-support, and

means for rocking said supporting post on its pivot, as and for the purpose described.

5. The combination with the jack, of side-wipers movable in substantially vertical guides and having suitable mechanism whereby they are thus moved, cams or wedges cooperating with said guides to press them laterally toward the last, and a treadle or similar device for operating said cams, substantially as described.

6. The combination with the jack, of wipers for the sides of the upper and supporting carriages therefor; edge-turning devices comprising two two-part members supported on said carriages and means for moving the two parts of each member with relation to each other, and tack guides in said edge-turning devices adapted to hold a series of tacks in position to be operated upon simultaneously by a tack-driver, substantially as described.

7. In a lasting machine, adjustable side-wipers comprising a rigid shell or frame containing adjusting-devices, as screws, and a flexible surface portion cooperating with said adjusting devices, substantially as described.

8. The combination with the jack and side-wipers, of edge-turning devices comprising two two-part members and supporting carriers for said members, and means for moving said carriers and the edge-turning members thereon laterally toward the last, and means for moving the two parts of each member longitudinally on its supporting carrier, substantially as and for the purpose described.

9. In a lasting machine, the combination with the jack, of side-wipers and edge-turning devices adapted to cooperate therewith, a carriage for said side-wipers and edge-turning devices, a yielding support in said carriage for said edge-turning devices, and means for moving said edge-turning devices with relation to said yielding support, as and for the purpose described.

10. The combination of the carriers for the edge-turning devices provided with longitudinal guides, of slides and means for moving the same longitudinally in said guides, and the edge-turning sections detachably secured in said slides, substantially as described.

11. In a lasting machine, the combination with the jack, of side-wipers and edge-turning devices adapted to cooperate therewith, a carriage for said side-wipers and edge-turning devices, a yielding support in said carriage for said edge-turning devices, tack-guides in said edge-turning devices, and a tack-driver, substantially as described.

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

JOHN W. SMITH.

Witnesses:

H. J. LIVERMORE,
HENRY E. NEWELL.