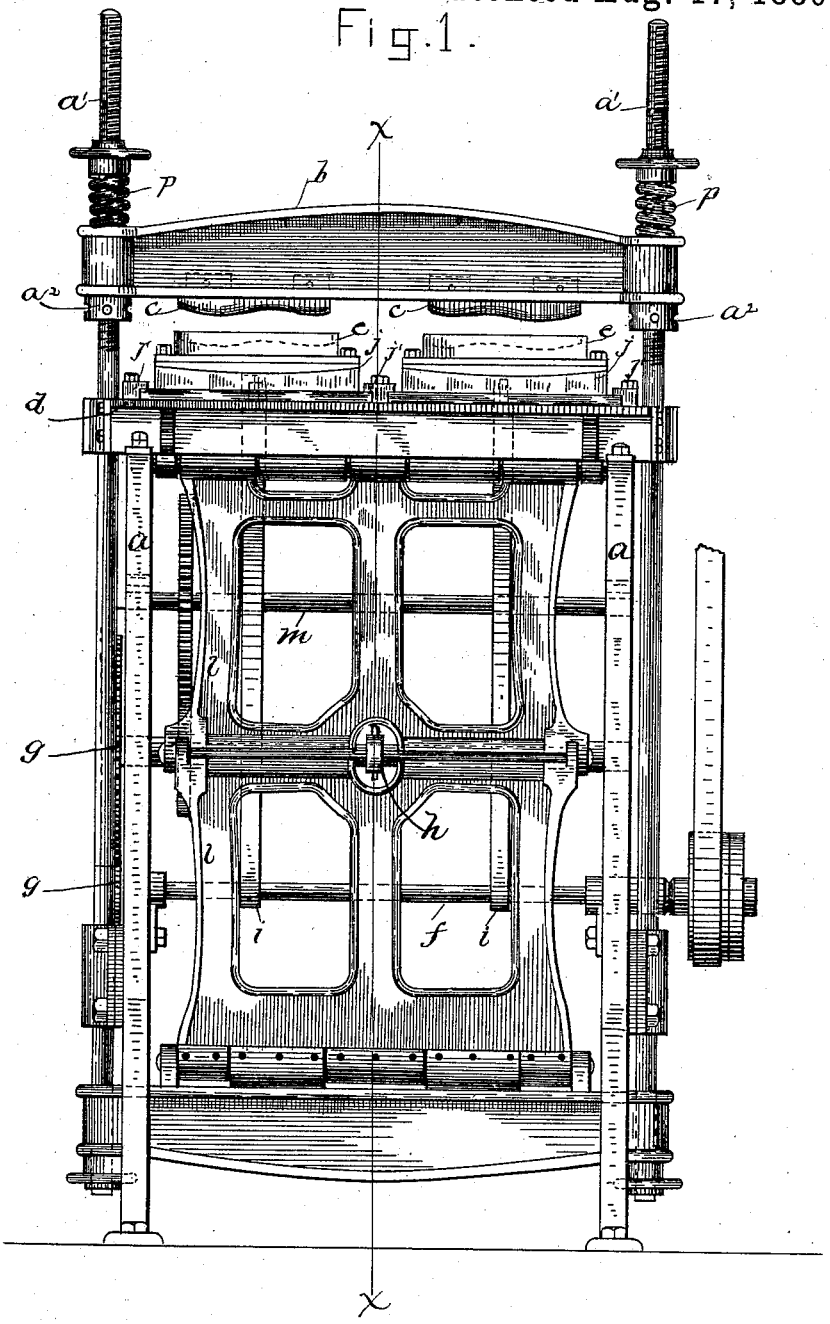
(No Model.) 3 Sheets—Sheet 1.

D. KNOX.

SOLE MOLDING MACHINE FOR BOOTS AND SHOES.

No. 347,429. Patented Aug. 17, 1886.

Fig. 1.



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INVENTOR:
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(No Model.) 3 Sheets—Sheet 2.

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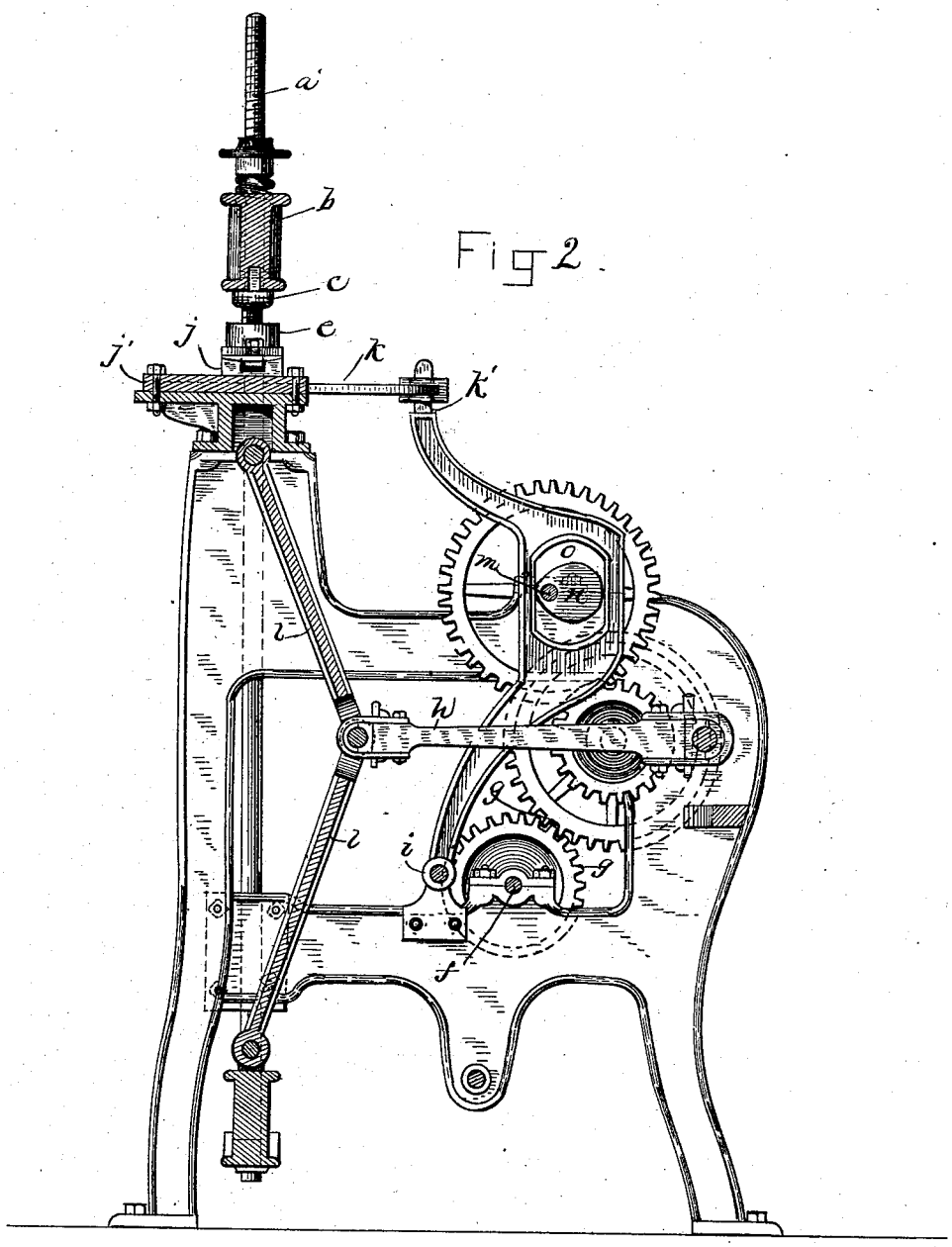
Fig 2.



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(No Model.) 3 Sheets—Sheet 3.

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Fig. 3

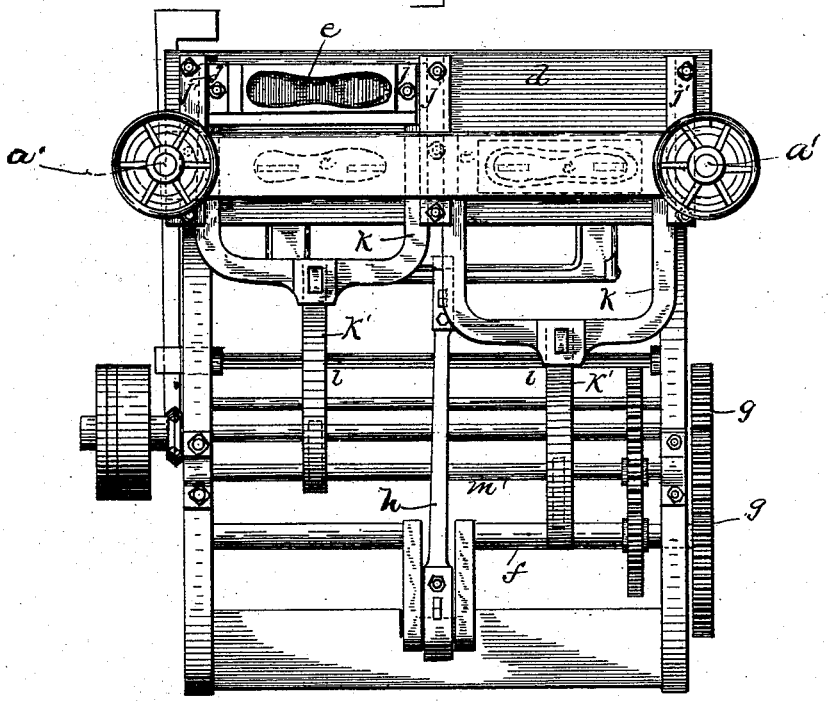


Fig. 4

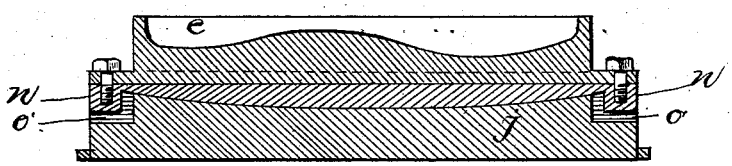
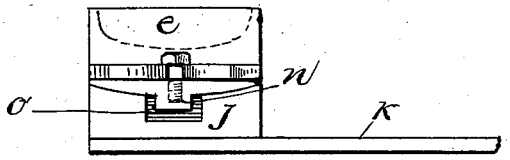


Fig. 5.



WITNESSES:
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A. D. Harrison

INVENTOR:
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UNITED STATES PATENT OFFICE.

DAVID KNOX, OF LYNN, MASSACHUSETTS.

SOLE-MOLDING MACHINE FOR BOOTS AND SHOES.

SPECIFICATION forming part of Letters Patent No. 347,429, dated August 17, 1886.

Application filed January 9, 1886. Serial No. 188,081. (No model.)

To all whom it may concern:

Be it known that I, DAVID KNOX, of Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Sole-Molding Machines for Boots and Shoes, of which the following is a specification.

My invention relates to soles preparatory to being placed on boots or shoes, in which the sole is given the proper form or mold to fit the shape of the last.

It is the object of my invention to provide a machine of the class mentioned which shall have an increased productive capacity, and at the same time be absolutely safe for the attendant, and more effective and convenient in operation, and, by avoiding the necessity of using a rubber cushion under the molds, be more economical than any machine which is being used for the purpose mentioned now known to me.

To the foregoing ends my invention consists in the machine, and in the construction and combination of parts therein, which I will now proceed to describe, and subsequently point out in the claims.

In the accompanying drawings, forming a part of this specification, Figure 1 represents a front view of my improved machine. Fig. 2 is a transverse vertical section thereof on the line *x x*, Fig. 1. Fig. 3 is a top plan view. Figs. 4 and 5 represent details of the former, hereinafter referred to.

Like letters of reference refer to like parts in all the figures.

In the drawings, *a* represents the frame, of any suitable form and construction, to support the various parts of the machine.

b is the cross-head provided with the male dies or formers *c c*, and *d* is the platen provided with the female dies or formers *e e*.

f is the driving-shaft, provided with the crank-wheels *g g*, which, through the medium of the connecting-rods *h h*, operate the toggle-levers *i i*, suitably supported and connected to the bed *d*, which draw the cross-head with its dies or formers down upon the female dies *e e* on the platen.

Instead of providing a machine with a single set or pair of dies or formers, as has been customary in all machines heretofore in use, so far as known to me, for molding soles preparatory to being placed on boots or shoes, I provide each machine with two sets of formers—a "right" and "left"—and so operate the lower or female die of each as that one person may be able to attend to both sets of formers without liability of accidental injury to the hands or arms of such attendant. This is accomplished as follows: I provide the bed *j* of each female die with flanges adapted to be guided in suitable ways or tracks, *j'*, on the platen, so that said bed can be moved forward and back thereon—that is, forward from under male die and backward directly thereunder, providing for a dwell at each extremity of its movement, the dwell at its forward movement being to enable the attendant to remove the molded sole from the lower die, and place another in position thereon to be molded or formed, and the dwell at the rearward movement being to provide time for the press to operate on the dies, and to rise so as to allow the lower die to clear when passing from under the upper. Rods *k* are secured to the rear of ends of beds *j*, the other ends of said rods being pivoted to the upper ends of knee-levers *k'*, which latter levers are pivoted at their lower ends, at *l*, to the frame of the machine. A shaft, *m*, is journaled in the sides of the frame above main shaft *f*, and is driven therefrom by suitable gearing. Said shaft *m* is provided at suitable points with cams *n*, adapted to operate in slots *o* in knee-levers *k'*, as clearly shown in Fig. 3 of the drawings. The form and arrangement of the cams and slots is such that when the shaft *m* is rotated one of the lower beds and its die will be moved to the extremity of its forward movement, while the other will be at its extreme rearward position under the male die undergoing the operation of being molded, the attendant meanwhile having opportunity and time to remove the molded sole on the forward die and place a new blank in position thereon. In the next rotation of shaft *m* the positions of the female dies and their beds are reversed, and the same operation takes place as before, but on the opposite dies, and so on alternately, so that the capacity of the machine is not only doubled and a single attendant enabled to manipulate the work for two sets of dies, but all operations are carried on in front of the pressing or molding point, and out of the way of danger.

It not infrequently happens from the varying thickness of the sole to be molded, or from

other causes, that the pressure of the female die or former against the male die is uneven; and to provide for this exigency, and to overcome the objections consequent upon it, I mount the female die somewhat loosely on its bed, making the latter of slightly-concave form on its upper surface, and the female die convex on its lower surface, as represented in the longitudinal section in Fig. 4 and the end view in Fig. 5. Said female die is provided with lugs or studs *n*, which project into holes *o'*, formed in the bed, and which holes are larger than the base of the studs, by which construction a limited movement of said dies independent of their beds *x x* is permitted, which movement allows the dies to accommodate themselves to inequalities, &c., in the thickness of soles, hereinbefore mentioned, which is an important advantage, as will be understood by those skilled in the art.

To overcome sudden jars in the operation of the press, which would result in its injury, as well as injury to the work, and to render the machine self-adjusting to soles of varying thickness, and to avoid the use of rubber cushions under the molds, as in machines heretofore constructed, which cushions are very expensive and wear or grind out very rapidly, I surround the rods or standards *a'*, which pass through the ends of the cross-head *b* and support the same by means of adjustable collars a^2 thereon, with a strong spiral spring, *p*, one end of which rests upon the upper end of said cross-head, the other end of said spring bearing directly against the lower end of an adjusting-nut adapted to be screwed upon the upper screw-threaded end of the rod *a'*, whereby the force with which the spring bears upon the cross-head can be properly regulated. The adjustable collar upon which the cross-head rests provides means for accurately adjusting the position of the latter, and is an important feature of my invention, as will be understood by those acquainted with this class of machines. The rods or standards *a'* are screw-threaded from their extreme upper ends to a point below the cross-head, by which construction I am enabled to apply and adjust the collars upon which the cross-head rests.

It is essential, as is well known, that cross-head *b* should, as stated, be yieldingly mounted on its supports, and the means just described are effective and lasting in this respect, entirely avoiding, as stated, the employment of the expensive rubber cushion under the molds, and at the same time enable me to adjust the parts with the utmost nicety.

It is obvious that the means for moving the female dies and the beds to and fro on their supports, and for guiding them in their movements, may be varied without departing from the spirit of my invention.

The construction and arrangement of other parts of the machine—for instance, the means for effecting the pressure of the male dies against the female dies—may be varied within the scope of the invention.

What I claim is—

1. In a machine for molding the soles of boots or shoes preparatory to placing the same on the lasts, the combination of the two pairs of molds *c c* and *e e*, the horizontally-reciprocating beds *j*, and the vertically-reciprocating cross-head *b*, arranged and adapted to operate as and for the purposes set forth.

2. In a machine for molding the soles of boots or shoes preparatory to placing the same on the lasts, the combination, with the frame, of the alternately and horizontally reciprocatory beds *j*, provided with the molds or dies *c c*, the vertically-reciprocating cross-heads *b*, provided with the molds *e e*, rods or levers secured to the rear sides of said beds, and mechanism, substantially as described, for operating said rods or levers to alternately move said beds and their dies to and fro under the molds or dies of the cross-heads, substantially as and for the purpose hereinbefore set forth.

3. The combination, with the frame, of two sets or pairs of dies, the lower or female dies of said pairs of dies being movable to and fro from under the upper or male dies, mechanism for pressing the upper dies against the lower dies, rods attached by one of their ends to the rear sides of said movable dies, slotted levers pivoted at their lower ends to the frame and at their upper ends to the outer ends of said rods, a revolving shaft journaled in the frame and provided with cams adapted to operate in the slots of said levers, whereby when one of said lower dies is under its upper die the other lower die will be moved therefrom-under, as set forth.

4. In a machine for molding the soles of boots or shoes preparatory to placing the same on the lasts, the combination of the frame *a* and the platen *d* of the alternately and horizontally reciprocating beds *j*, provided with the molds or dies *c c*, the standards or rods *a'*, cross-head *b*, provided with the molds *e e*, adjustable collar, spring *p*, mechanism, substantially as described, for adjusting the degree of pressure of said spring upon said cross-head, and mechanism, as set forth, for vertically reciprocating the cross-head, substantially as and for the purposes described.

5. The combination, with the die provided with lugs or projections, of the bed for the die, said bed being provided with slots, in which the lugs of the die are permitted to move to a limited degree, whereby when said die is pressed against its corresponding die to mold a shoe-sole therebetween said first-mentioned die will be permitted to accommodate itself to inequalities in the thickness of the leather, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 5th day of January, 1886.

DAVID KNOX.

Witnesses:
A. D. HARRISON,
ARTHUR W. CROSSLEY.