J. KIMBALL.

MACHINES FOR SHAPING THE SOLES OF BOOTS AND SHOES.

No. 191,764. Patented June 12, 1877.

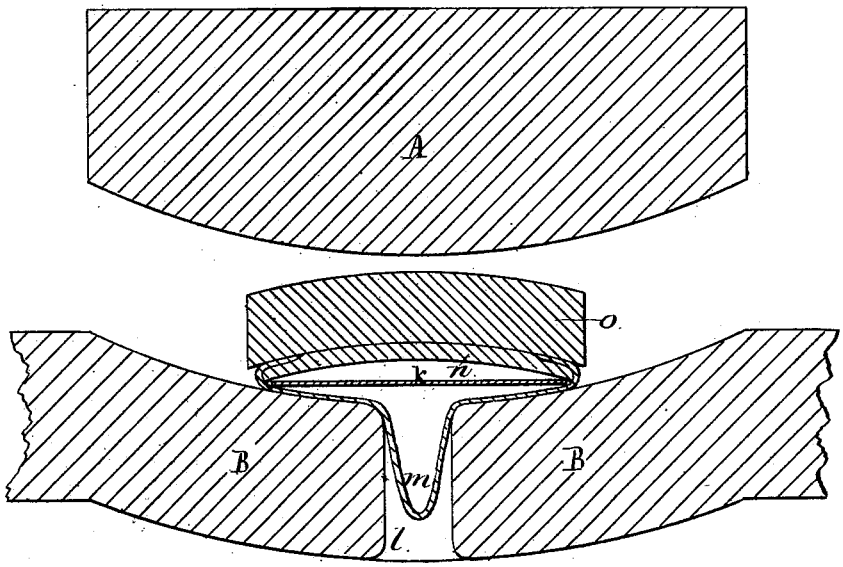


Fig. 3.

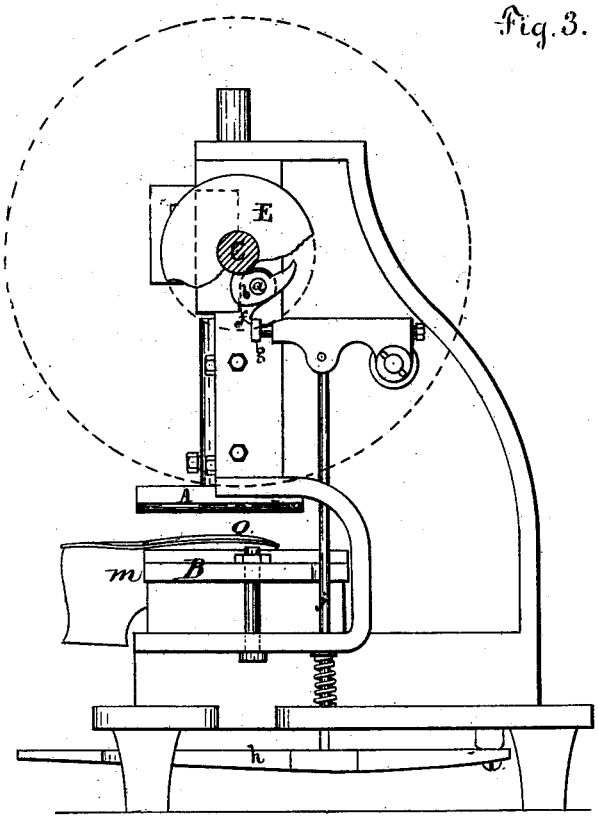


Fig. 2.

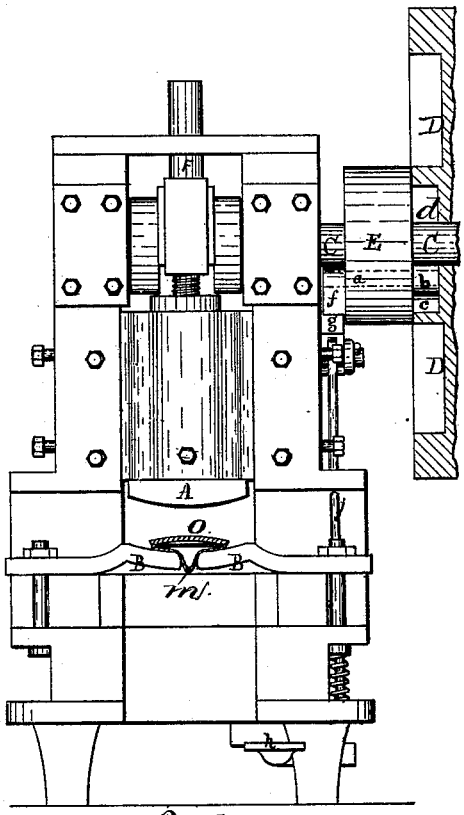


Fig. 1.

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# UNITED STATES PATENT OFFICE.

JOHN KIMBALL, OF BOSTON, MASSACHUSETTS.

## IMPROVEMENT IN MACHINES FOR SHAPING THE SOLES OF BOOTS AND SHOES.

Specification forming part of Letters Patent No. **191,764**, dated June 12, 1877; application filed December 4, 1875.

*To all whom it may concern:*

Be it known that I, JOHN KIMBALL, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in the Art of Finishing the Soles of Boots and Shoes, which is fully described in the following specification, taken in connection with the accompanying drawings of the apparatus invented and used by me for practising it.

In certain classes of boots and shoes as now made the tread of the sole curves not only lengthwise of the shoe, but also crosswise, so that the line of the cross-section of the sole is concave where the foot rests upon it, and convex where it rests upon the ground. This is especially the case in machine-sewed shoes, in which the tread of the sole is convex to a degree which is a serious detriment, not only greatly injuring the appearance of the shoe, but also the fit, and from both these causes making the shoe not readily salable at a good price.

The main object of my invention is to remedy this difficulty; and the main feature of my invention consists in subjecting the soles to a heavy pressure upon the tread, in such a manner as to bring the tread to the desired surface, and set it there permanently.

The apparatus I employ for use in practising this part of my invention is that invented by me, and shown in the accompanying drawings, in which Figure 1 is a front elevation, and also showing the shoe and sole-shaped sheet of metal in transverse in position to be acted upon. Fig. 2 is a side elevation, also showing the shoe, in side elevation, in position for the action of the machine; and Fig. 3 is an enlarged detached section, showing the shoe as in Fig. 1, and also showing the bed-plate, the plunger, and the sole-shaped metal plate, all in their proper relative positions for action.

This apparatus consists of the head or plunger A and the bed-piece B, both of which are suitably connected by a proper frame. The head is mounted in ways, in a manner well known, and is reciprocated by a crank on the shaft C, also in a well-known manner. Upon this shaft C is the main driving-pulley D, which is made heavy, or provided with a fly-wheel, so that great power may be imparted to the plunger A. This pulley D turns loosely upon the shaft C, except when controlled by a clutch. This clutch is made up of the stout collar E, secured to the shaft C and rod *a*, which passes through the collar, and has a pawl at each end. One of these pawls, *b*, is in a chamber, *d*, formed in the hub of the pulley D, and engages with a notch, *c*, in the periphery of this chamber, thereby connecting the shaft C and pulley D, a spring upon the rod *a* serving to keep the pawl *b* in position to engage with this notch *c*. The other pawl, *f*, serves only to release the pawl *b* from the notch *c*, this release allowing the pulley D to revolve as a loose pulley upon the shaft C. This pawl *f* strikes against the stop *g* when the shaft C is revolved, and the rod *a* is thereby turned on its axis against its controlling-spring, and the pawl *b* liberated from its notch *c*, thus bringing the shaft C to rest. As soon as the stop *g* is removed, by means of the treadle *h* and its rod *j*, the rod *a* is turned back on its axis by its controlling-spring the pawl *b* engages with the notch *c*, and the shaft C is revolved, and continues to revolve as long as the stop *g* is held out of the way of pawl *f* by pressure upon the treadle *h*. This clutch is also well known. The connecting-rod F, which connects the plunger A with the crank on shaft C, is adjustable in length, in order to regulate the distance between the lower face of the plunger and the upper face of the bed, this construction being also well known.

The bed-piece B consists of a stout metal plate, formed with a transverse curvature (shown in Figs. 1 and 3,) and with a slot, *l*, open at the front and extending inwards far enough to receive the upper *m* of the shoe, when in position to be operated upon, as shown in Fig. 2. The object and function of this slot is to receive the "bight" or "slack" of the upper when the sole is being pressed. For it is indispensable that only so much of the upper as is equal in area to the surface of the inner sole shall remain between the inner sole and bed when the plunger descends and presses the sole *o* and the inner sole to the configuration of the bed and plunger; because, if the slack or surplus of the "upper" was allowed to rest upon the bed, it would not only be in-

jured or ruined by creases and wrinkles, but the true form could not be imparted to the sole while such superfluous portion of the upper remained between it and the bed. Hence the necessity not only of the slot, but also that it be open in front, in order that the operator may, as the shoe is slid forward into position upon the bed, draw down the bight of the upper or vamp, as shown in Figs. 1 and 3, so that when the pressure is applied there shall be no superfluous portion upon the bed, but only an area equal to that of the sole. It is also necessary that this slot extend far enough into the plate to receive the bight or surplus of all that portion of the upper which is coincident to that part of the sole (the tread or ball) which is to be thus acted upon by the press. The curvature of the bed and plunger, which are practically alike, is such that when the sole is released after being acted upon, and the limited reaction in form has taken place, the sole shall be flat in its cross-section, or as nearly approximating thereto as is desired.

It is preferable to mount this bed-piece upon stout springs, so that it may be slightly self-adjustable, as thereby the adjustment of the plunger in relation to the bed-piece need not be of extreme accuracy.

In practising my invention, the shoe is placed in the machine with its sole between the bed and plunger, and its upper in the slot in the bed-piece; or the upper may be otherwise protected from damage. The treadle *h* is then depressed, releasing stop *g* and pawl *f*, which causes the clutch to connect together shaft C and pulley D, which is in motion. The shaft C therefore revolves, and the plunger is brought down with very great force upon the tread of the sole, and the sole is compressed between the under face of the plunger and the upper face of the bed. As soon as the shaft C completes one revolution the pawl *f* strikes the stop *g*, (the treadle having been released,) and thereby disconnects shaft C and pulley D, the shaft C and plunger thereupon ceasing to move. Two or more strokes should usually be made on each sole by keeping the treadle *h* depressed; but one will answer in some cases, especially if the face of the plunger be well rounding, and the face of the bed be hollowing, as shown in the drawings.

The inner face of the sole may also be effectually smoothed during this process by inserting in the shoe a sole-shaped piece of steel before the shoe is submitted to the process. This is shown in Fig. 3, which is a section through the plunger and bed with the shoe in place between them. Here *k* represents the steel sole. The use of this steel sole also prevents the wax on the threads of a sewed shoe from soiling the lining of the upper.

Although my process is especially adapted to goods made upon the McKay sewing-machine, it is of course applicable to all shoes and boots which have the defect of a practically convex tread.

The main novelty of my apparatus, and upon which its value depends, is the slotted bed-piece B, the slot being adapted to receive the upper. By means of this slot the upper is kept smooth, and very great pressure may be brought upon the sole without injuring the upper.

The shoe is usually subjected to this process immediately after sewing when sewed upon the McKay machine and before it is relasted. In all cases this process should precede the process of finishing the edges, especially if the sole be of two or more thicknesses.

I am aware that soles are frequently molded by heavy pressure when confined to a male and female mold, as in the patent to Baldwin, No. 139,354; and also that it is common to unite the upper and outer soles by cement and pressure, as shown in the patent to Whorf & Rice, No. 14,380; but my invention is wholly different from such processes both in operation and result, as will be clear from the above description of it.

What I claim as my invention is—

1. The process above described, consisting in flattening the tread of the sole crosswise after it is attached to the upper by subjecting it to heavy pressure between a rounding-surface, and a hollowing-surface, all as set forth.

2. The process above described of smoothing the inner surface of the sole after it is united to the upper by inserting within the shoe after it is formed the sole-shaped piece *k* of hard metal, and then compressing the sole between the bed and plunger, as set forth.

3. In combination with the plunger, the bed-piece B, having the narrow slot open at its forward end, in order that the shoe may be readily placed upon the bed-piece and submitted to the action of the plunger without injury to the upper, the whole combination being and operating substantially as and for the purpose specified.

JOHN KIMBALL.

Witnesses:

BUSHROD MORSE,

J. E. MAYNADIER.