

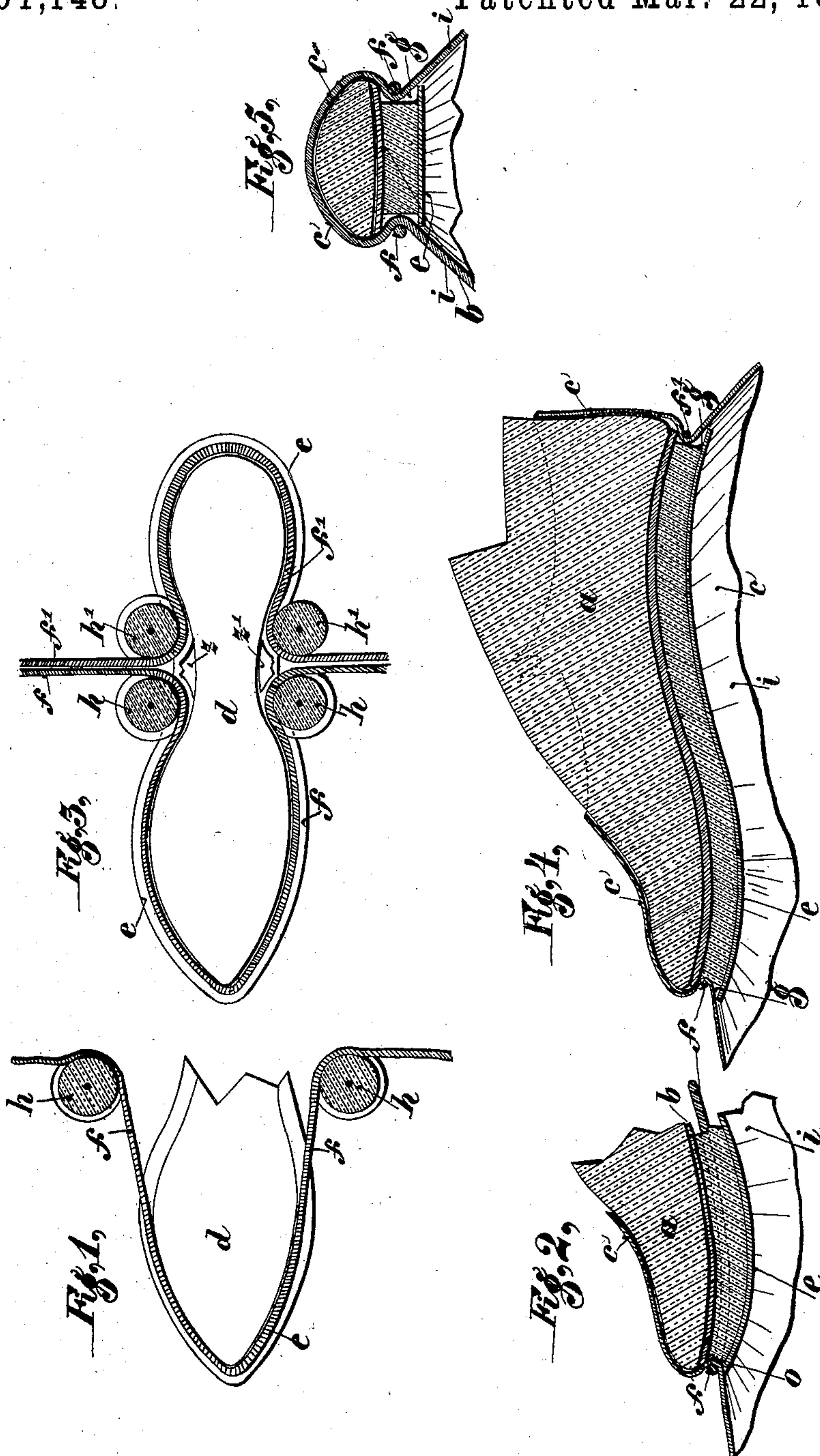
(No Model.)

5 Sheets—Sheet 1.

F. KEIL.  
LASTING MACHINE.

No. 601,148.

Patented Mar. 22, 1898.



Witnesses.

*J. B. Keefe*  
Geo. W. Rea

Inventor. Friedrich Keil.

by *James L. Norris*  
Attorney.

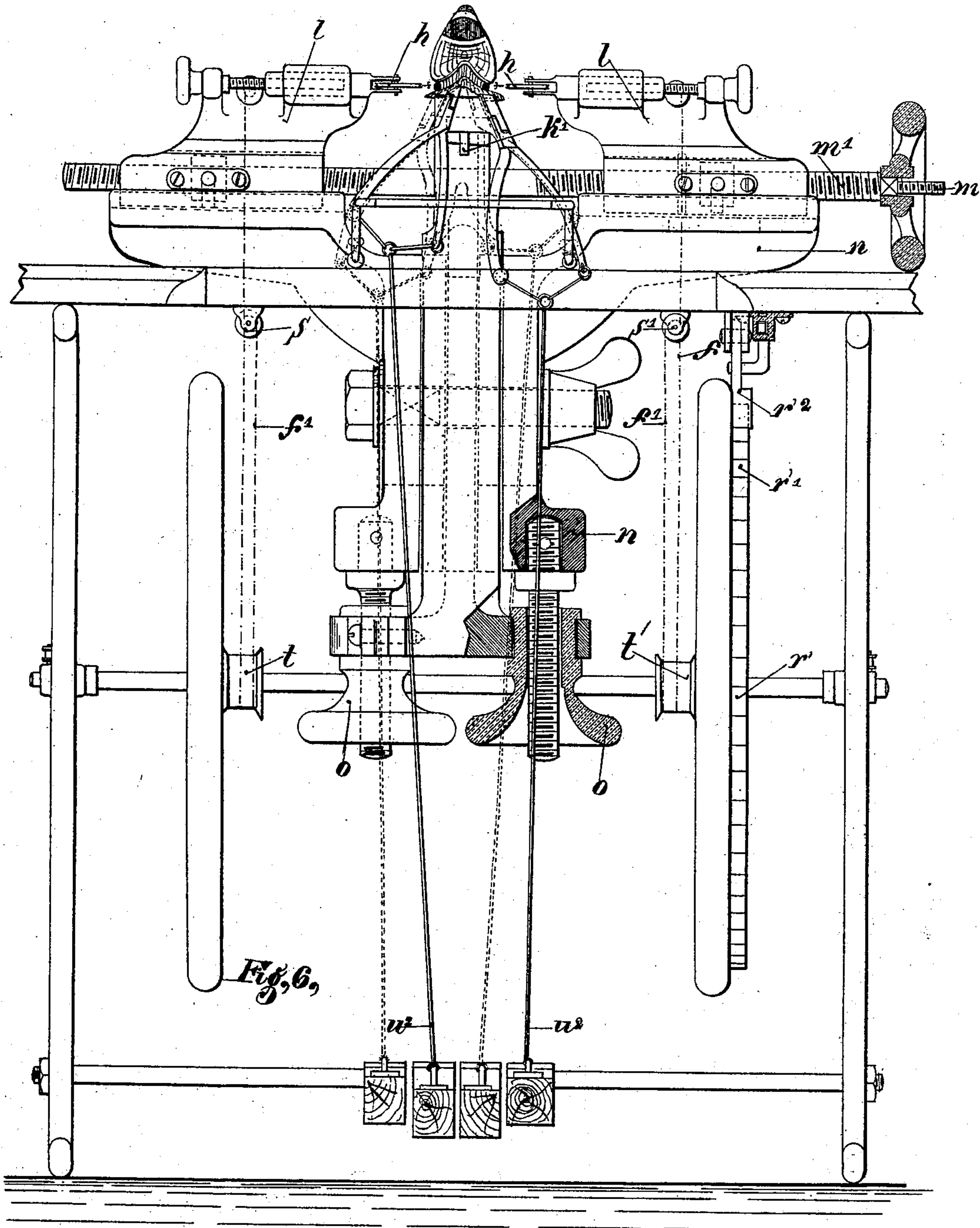
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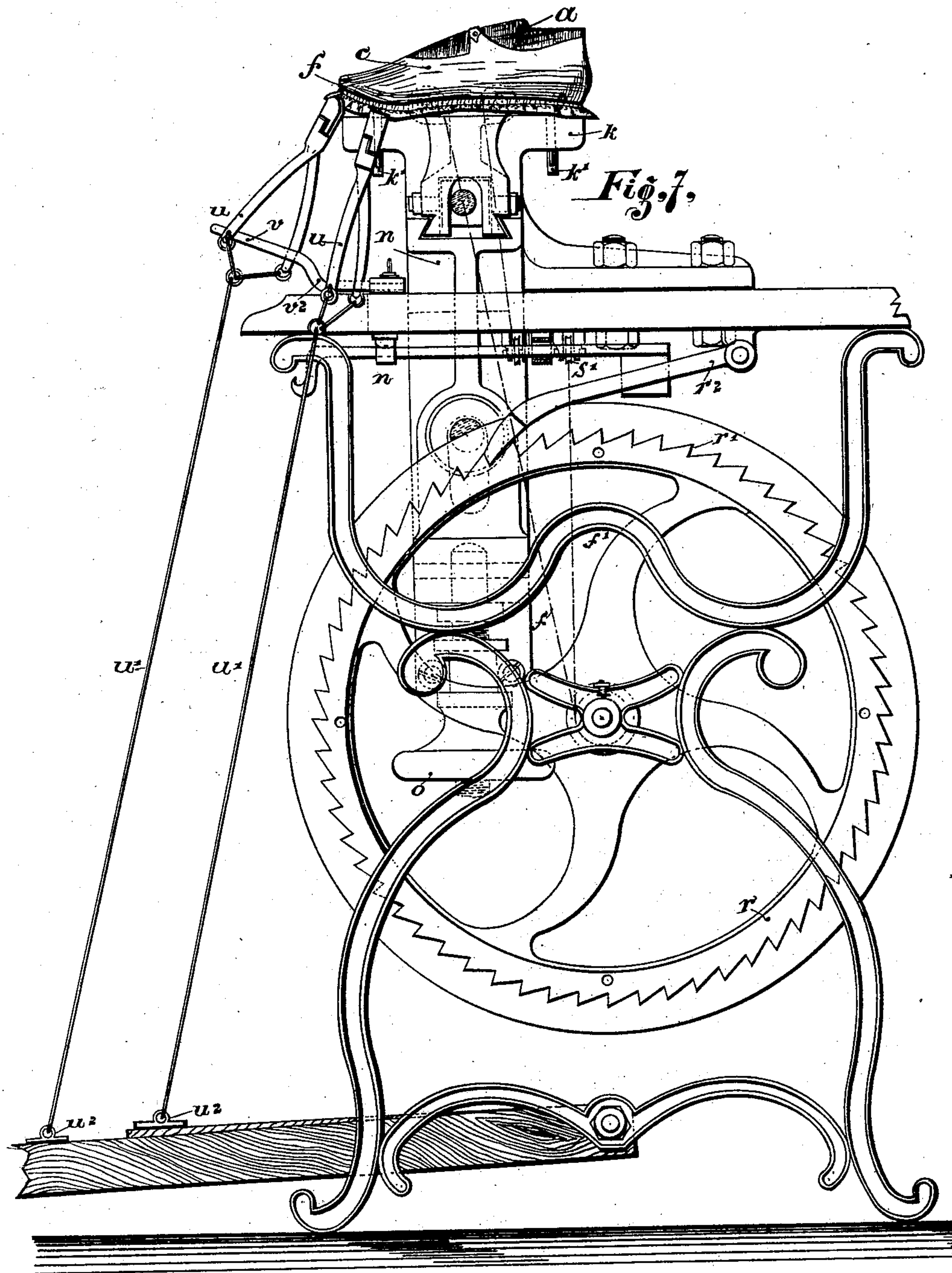
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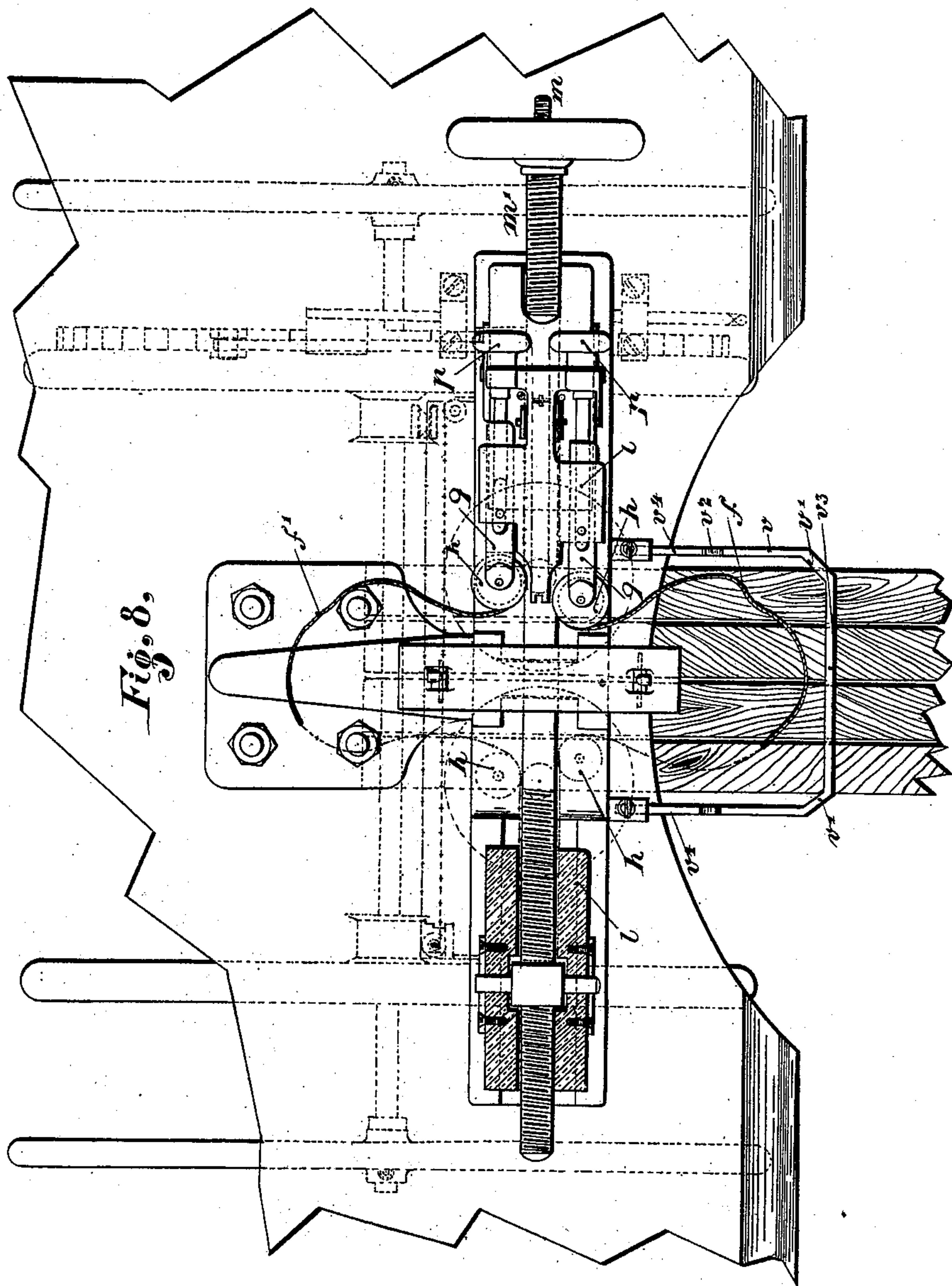
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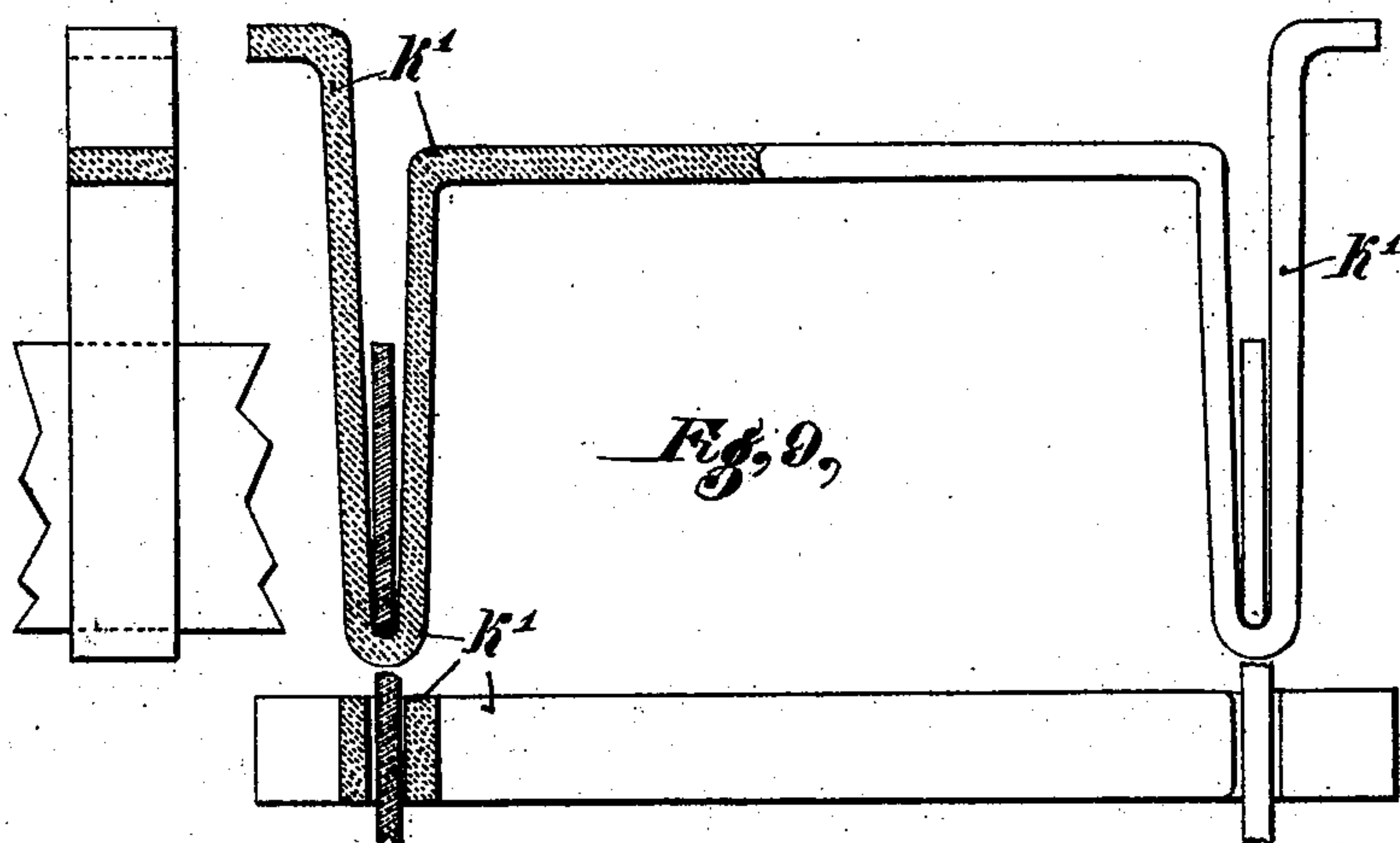
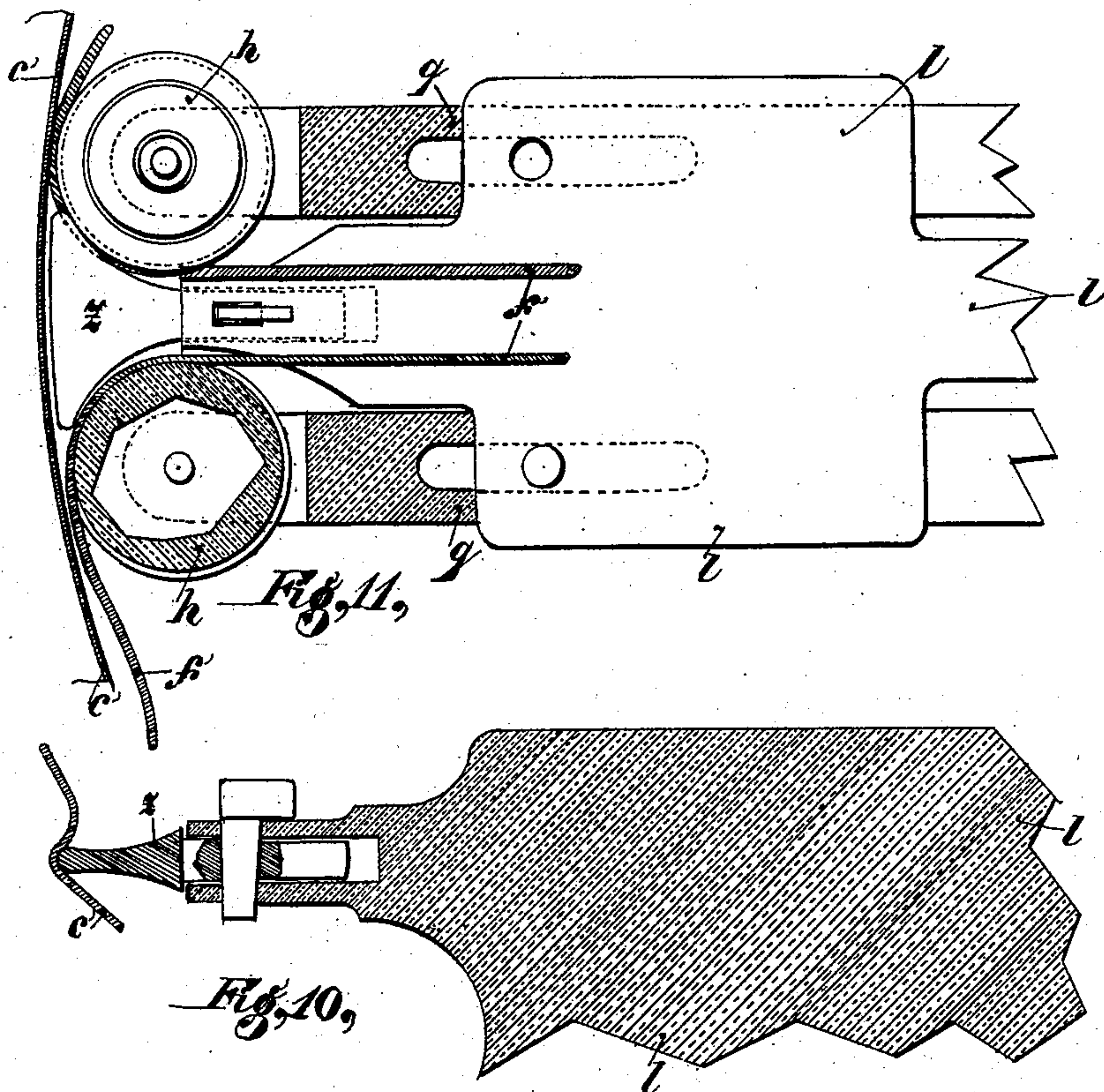
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Witnesses

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# UNITED STATES PATENT OFFICE.

FRIEDRICH KEIL, OF ARNSTADT, GERMANY.

## LASTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 601,148, dated March 22, 1898.

Application filed December 23, 1896. Serial No. 616,741. (No model.)

*To all whom it may concern:*

Be it known that I, FRIEDRICH KEIL, shoe manufacturer, a subject of the Prince of Schwarzburg-Sondershausen, residing at Arnstadt, in the principality of Schwarzburg-Sondershausen and German Empire, have invented new and useful Improvements in Lasting Boots and Shoes and Apparatus Connected Therewith, of which the following is a specification.

My invention relates to apparatus for lasting boots and shoes.

It is a well-known drawback in lasting-machines that the toe of the shoe, especially in the case of patent-leather shoes, cannot be properly lasted, as even the best pincers do not prevent the formation of irregular folds at the toe.

The present invention comprises apparatus intended not only to press the upper at the ball, at the part between the sole and the heel and at the heel, but also at the toe, regularly and smoothly upon the last. The operation consists in placing around the upper to be lasted, after it has been tightly stretched at the sides and at the toe, a thin and elastic but durable wire cord in such a manner that it fits exactly to the form of the last, the upper being thereby drawn tight—i. e., pressed upon the last.

In order that those skilled in the art may make and use my invention, I will describe the same in detail, reference being had to the accompanying drawings, wherein—

Figures 1 to 5 are detail views illustrating the manner in which the wire cords are drawn about the upper and between the inner and lower soles. Fig. 6 is a front elevation of the machine, a part being shown in section. Fig. 7 is a side elevation. Fig. 8 is a top plan view, partially in section. Fig. 9 is a detail view, partially in section, of the last-supporting frame or table and clamps; and Figs. 10 and 11 are detail views illustrating the inserted piece or guide for guiding the wire cords between the toe and heel.

In carrying my invention into effect an auxiliary sole *d* is placed upon the last *a*, provided with an insole *b* and upper *c*, this sole *d* being about ten millimeters shorter and narrower than the last and being covered by an under sole *e*, of metal, corresponding to the

size and shape of the last. A space is thus formed between the insole *b* or last *a* and the under sole *e*, in which the outer edge of the upper is inserted or drawn in. The upper is of such form that its border may be placed V-shaped into the space *g*, and the thickness of the sole *d* is considered in order that the lower border of the upper may be squeezed or forced into the space or groove *g* by means of the wire cords *f f'*. Figs. 1 and 2 show an arrangement upon this principle.

In order to press the upper over the last, it is furthermore necessary that the rollers *h h* and *h' h'*, serving to guide the wire cords *f f'*, should be driven into the groove at the part between the sole and the heel of the last in such a manner that the wire cords are enabled to completely secure at the narrowest part of the sole both the front and back part of the upper and to fit themselves to the shape of the last or of the auxiliary sole *d*. Figs. 3 and 4 show this arrangement.

When the wire cords *f* and *f'* are drawn equally on each side, which may, for example, be effected by winding the cords on drums or rollers, the upper is grasped by the cords and drawn around the last into the groove formed between the insole and the under sole. The employment of a ribbed or twisted wire cord instead of a single or smooth wire prevents the cord from slipping on the upper and enables the latter to be drawn tight in a regular and uniform manner.

It is necessary that the wire cords *f f'* be drawn on both sides at the same time, so that the drawing or pulling may be effected in both directions, and the upper cannot be distorted or unevenly stretched by one-sided pulling.

The machine represented in Figs. 6, 7, and 8 serves to carry the operation set forth into effect. The machine consists in the combination of two wire-cord-stretching devices and of a pincer device. It has the advantage that the shoe may be placed on a frame in a non-inverted position with the insole placed downward, so that the upper, even during the lasting, is perfectly visible, and the lasting can be watched during its whole course.

The arrangement of the machine is as follows: The last *a*, with the upper *c* drawn over it, and the insole *b*, together with the intermediate sole *d* and the under sole *e*, are mounted



on the frame  $k$  and secured to this frame in any suitable manner—for example, by means of clamps  $k'$ , secured by wedges. A pair of rollers  $h$   $h'$  serve to tighten the wire cords  $f$   $f'$ . These rollers are mounted in slides  $l$   $l'$ , which may be simultaneously or separately caused to approach or recede from the stand or frame  $k$ , this being effected by means of the hand-wheel or hand-wheels  $m$  and spindles  $m'$ , the slides  $l$  being movable on the standards  $n$ . The standards  $n$  are moved upward by means of adjusting devices  $o$ , in order to be able to adjust the height according to the thickness of the intermediate sole  $d$ . The individual rollers  $h$   $h'$  are also adjustable in the slide  $l$  by means of adjusting devices in order to regulate their position on the auxiliary sole  $d$  in such a manner that the wire cords  $f$   $f'$  may be caused to lie around the upper in a suitable manner, the rollers  $h$   $h'$  revolving upon their axes. The stretching of the wire cords  $f$   $f'$  is effected in such a manner from a wheel  $r$ , that both ends of the wire cords may be equally drawn or acted upon. For this purpose the wire cords are suitably guided over rollers  $s$   $s'$  and are wound on drums  $t$   $t'$ . The wire cords  $f$   $f'$  are retained in the stretched position by means of a ratchet mechanism, consisting of a ratchet-wheel  $r'$  and pawl  $r''$ .

A pincers mechanism is provided for the purpose of stretching the upper over the insole and for adjusting the wire cord  $f$ , especially at the toe, in the best possible manner. It consists of four or more pincers  $u$   $u'$ , which are actuated by means of wires or rods  $u'$  and treadles  $u''$  and guide  $v$ , of suitable form, on which the pincer-arms are guided. The guide  $v$  is U-shaped and is inclined at its front end upwardly in a slanting direction and provided there with bent or angular corners  $v'$ . It is also provided with a bend  $v''$ . The corners  $v'$  allow the pincers to be applied on each side of the toe. The front part  $v'''$  allows one or more of the pincers to be applied to the toe, and the parts  $v''''$  allow the pincers to be applied at each side of the upper.

When employing the arrangement represented in Figs. 6 to 8, the pincers  $u$   $u'$  are connected at the toe, and by operating the treadles  $u''$  the upper is drawn or stretched over the last at the toe. The wire cord  $f$  is then placed around the toe. The laterally-arranged pincers are then applied to the upper, and the latter is drawn tightly downward and the wire cord, by the gradual loosening of the pincers, tightly stretched. The wire cord  $f'$  is placed in the same manner around the heel portion of the upper and is tightly drawn. At the back part of the shoe the employment of the pincers is of little or no use, the upper being attached or cemented to the sole by an adhesive material.

The manner of lasting the shoe so that it is in an upright and not inverted position has the great advantage that a cap can be in-

serted and secured between the lining and upper, which has not been possible hitherto.

The clamps  $k'$  for securing the last-support in the machine are shown on an enlarged scale in Fig. 9. Figs. 10 and 11 show the inserted piece  $z$ , which is interchangeable in the slide and is made of such a shape that it conforms to the shape or course of the part of the upper between the sole and the heel. Furthermore, it is shaped at the side according to the diameter of the rollers  $h$   $h'$  and grooved in order that the wire cords may lie and be guided in these grooves and be prevented from falling off the rollers.

The clamps  $k'$  (shown in Fig. 9) serve to secure the last with the inner sole to the auxiliary and lower soles and the latter to the frame of the machine, so that the relaying of the wire cord can be proceeded with. For this purpose the clamps  $k'$  are provided with ends bent outward, and the last has on its lower surface undercut slits with which engage the hook-shaped ends of the clamps, whereby the last is held fast. On the lower side of the last is placed the insole of the boot. In order to enable the hook-shaped ends of the clamps to pass through this sole, the latter is cut at suitable places, and the pieces of leather so cut are bent back. The auxiliary sole, forming the groove, and the lower sole, arranged under the auxiliary sole, are provided with corresponding holes for the passage of the hooks. When the hook-shaped clamps engaging with the top part of the machine are secured to the last and passed through the auxiliary and the lower soles, the whole is secured to the machine by driving wedges from the side into the loops of the clamps under the frame of the machine. The clamps thus serve for a double purpose—viz., to connect the auxiliary sole with the last and then to press the two together against the frame of the machine by means of a wedge.

Having now particularly described the nature of my invention, what I claim is—

1. The combination with a work-supporting table, of laterally-movable rollers arranged to draw cords about the upper and between the inner and lower soles, and means for forcing said rollers in the hollow between the heel and toe, substantially as described.

2. The combination with a work-supporting table, of laterally-movable rollers arranged to draw cords about the upper and between the inner and lower soles, means for winding up said cords, and means for forcing said rollers in the hollow between the heel and toe, substantially as described.

3. The combination with a work-supporting table, of laterally-movable rollers arranged to draw cords about the upper and between the inner and lower soles, means for independently adjusting said rollers and for forcing the rollers in the hollow between the heel and toe and means for adjusting said rollers vertically, substantially as described.



4. The combination with a work-supporting table, of laterally-movable rollers arranged to draw cords about the upper and between the inner and lower soles, means for forcing  
5 said rollers in the hollow between the heel and toe, and guides arranged between the rollers and movable therewith, substantially as described.

10 5. In a lasting-machine, the combination with a work-supporting table, pincers for drawing the upper about the last, and means for operating the pincers, of means for guiding the pincer-arms comprising a U-shaped  
15 bail arranged beneath the front of the work-table, and provided with beveled corners and

having its arms bent to extend upward and outward, the front end, sides and corners of said bail affording guides for said pincer-arms over which they slide in the operation of stretching the upper over the last and said  
20 bent portion affording guides at the side on different horizontal planes, the combination operating as set forth.

In testimony whereof I have hereunto set my hand in presence of witnesses.

FRIEDRICH KEIL.

Witnesses:

PAUL TEICHMANN,  
FANNIE MOORE,  
EMILY O. MILLER.