(No Model.)

3 Sheets—Sheet 1.

E. C. JUDD.

SOLE LEVELING MACHINE.

No. 545,038. Patented Aug. 20, 1895.

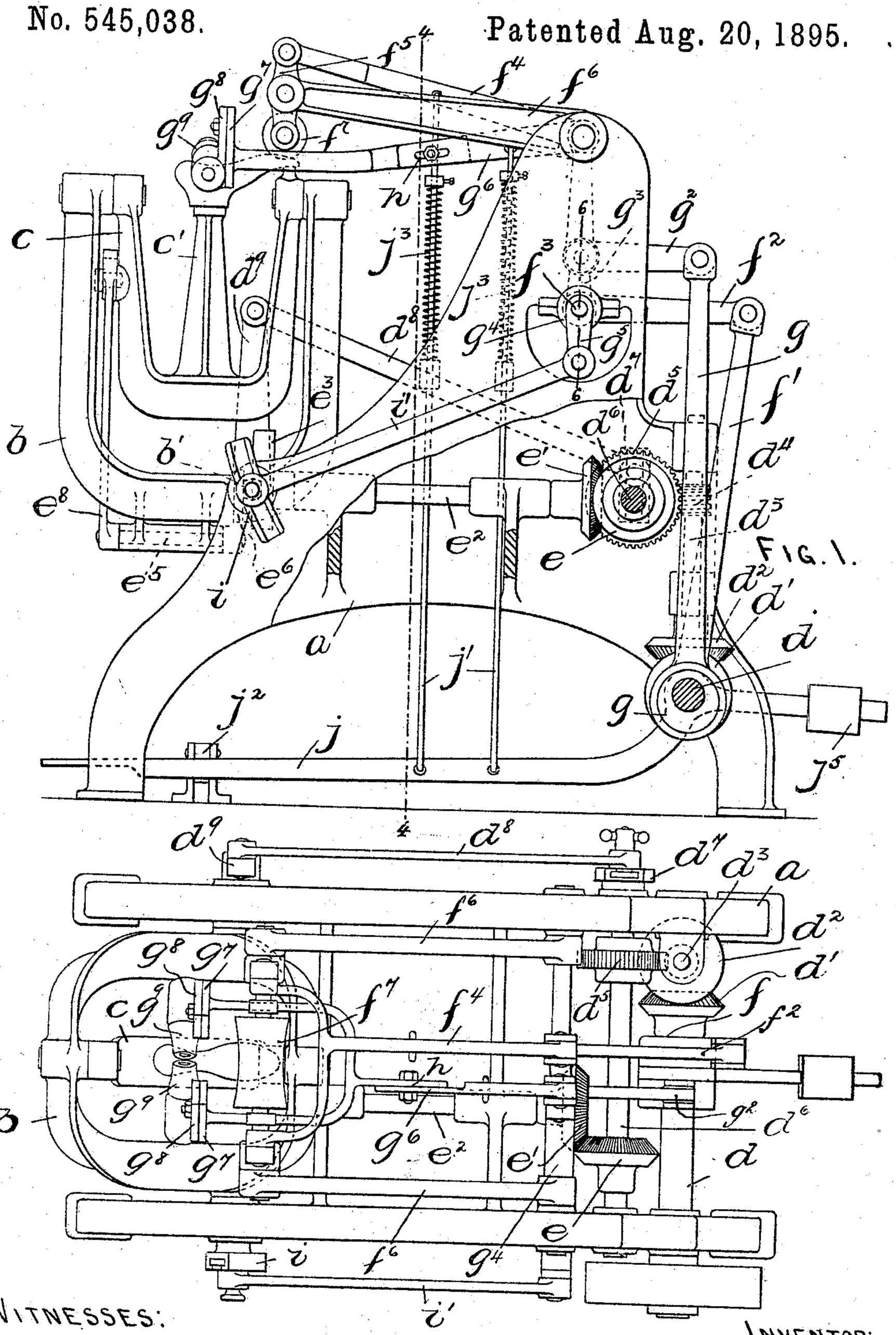

FIG. 1.

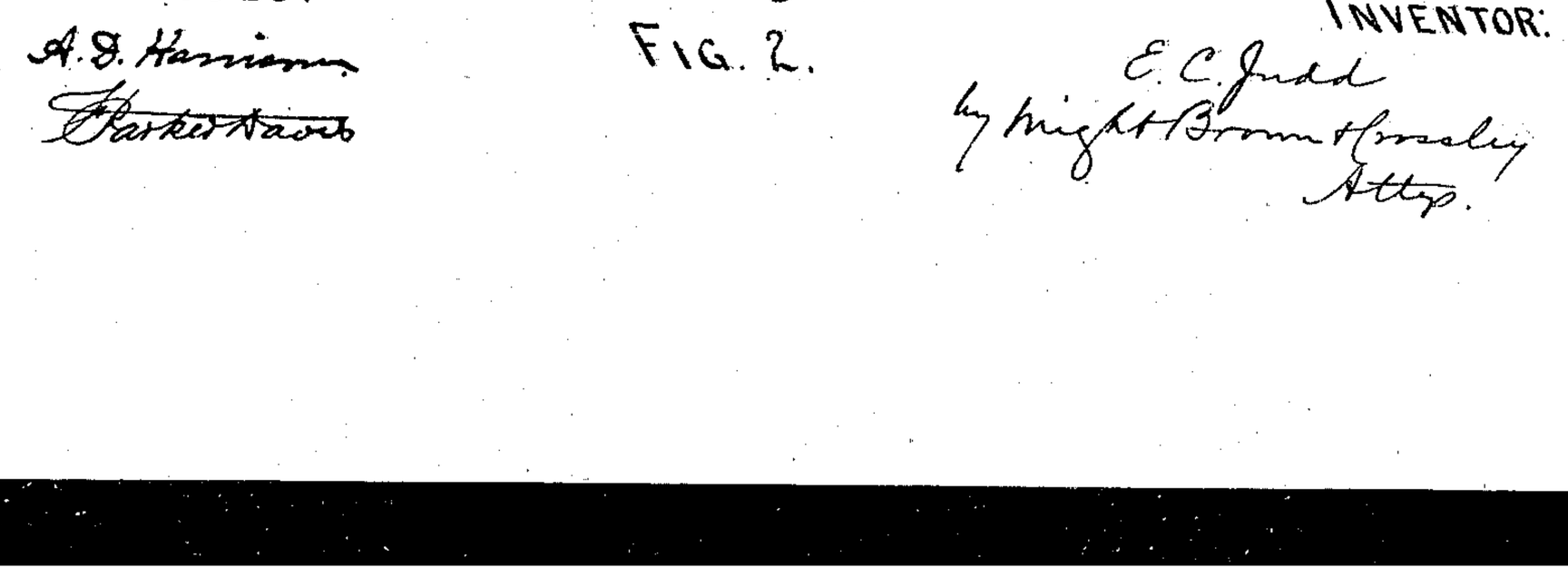

FIG. 2.

WITNESSES:

A. D. Harrison

Parker Davis

INVENTOR:

E. C. Judd

by Wright Brown & Quinby

Attys.

(No Model.)

3 Sheets—Sheet 2.

E. C. JUDD.

SOLE LEVELING MACHINE.

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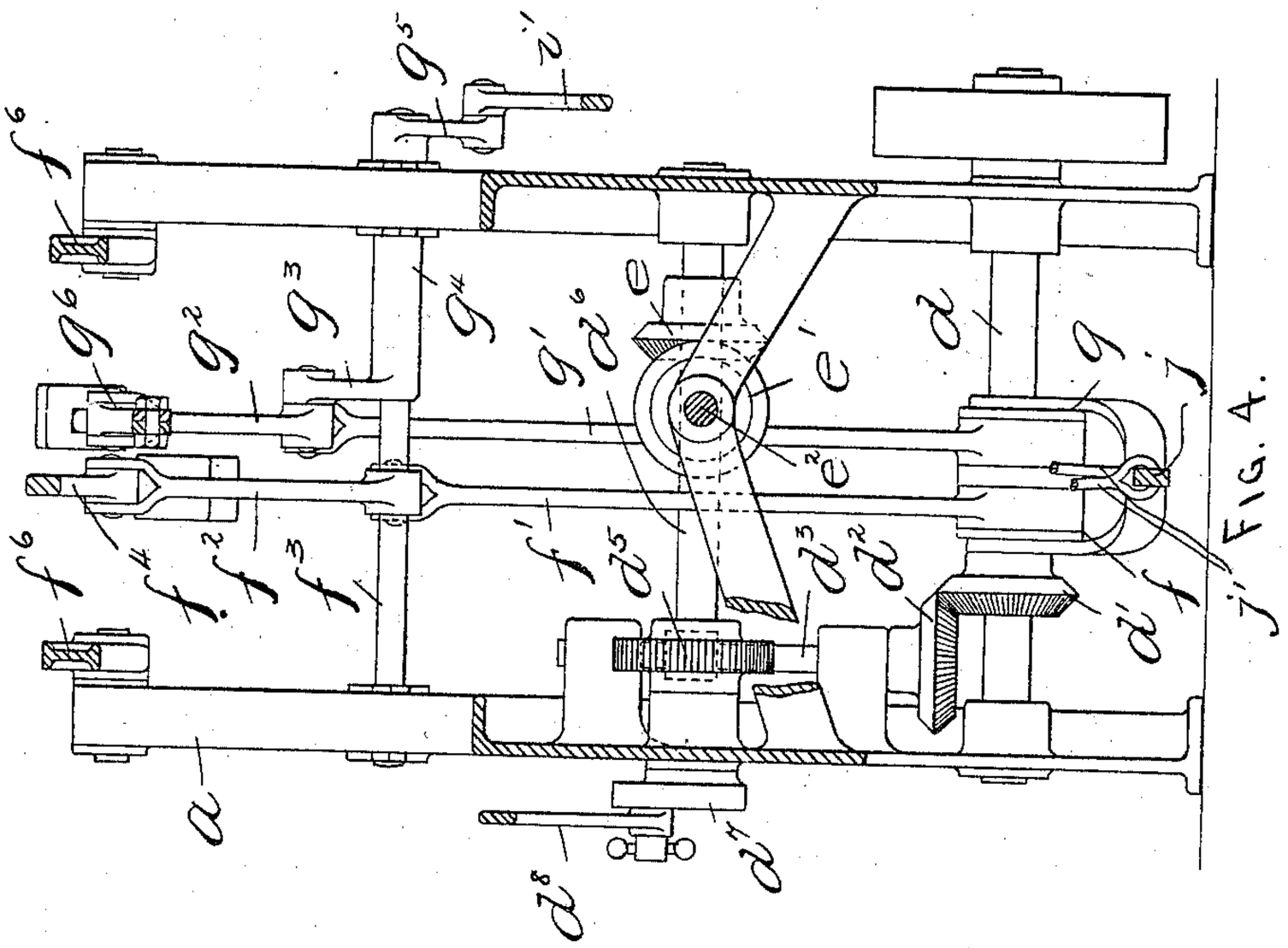

FIG. 4.

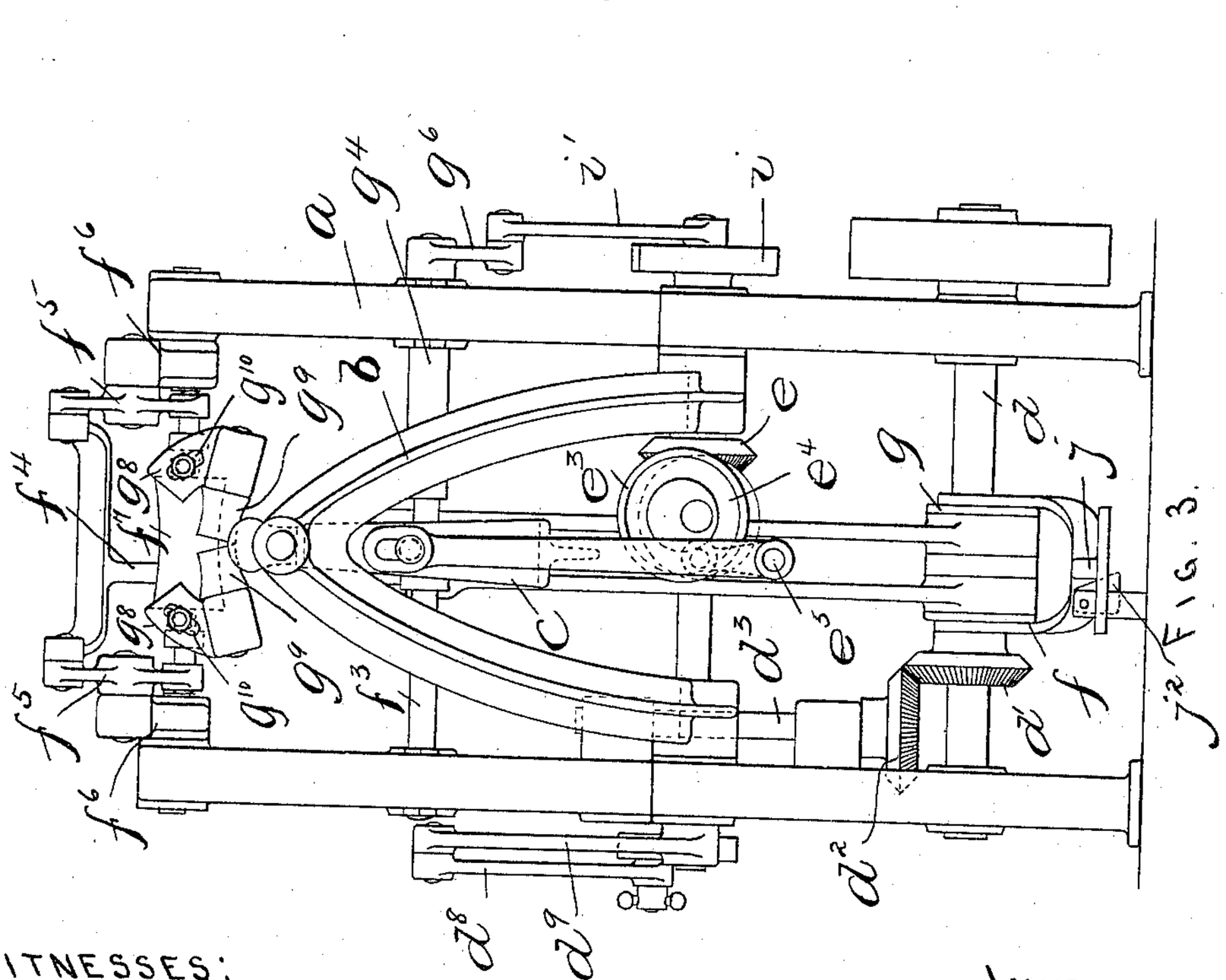

FIG. 3.

WITNESSES:

A. D. Harrison.

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INVENTOR:

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by Wright Brown Quinby & Atty

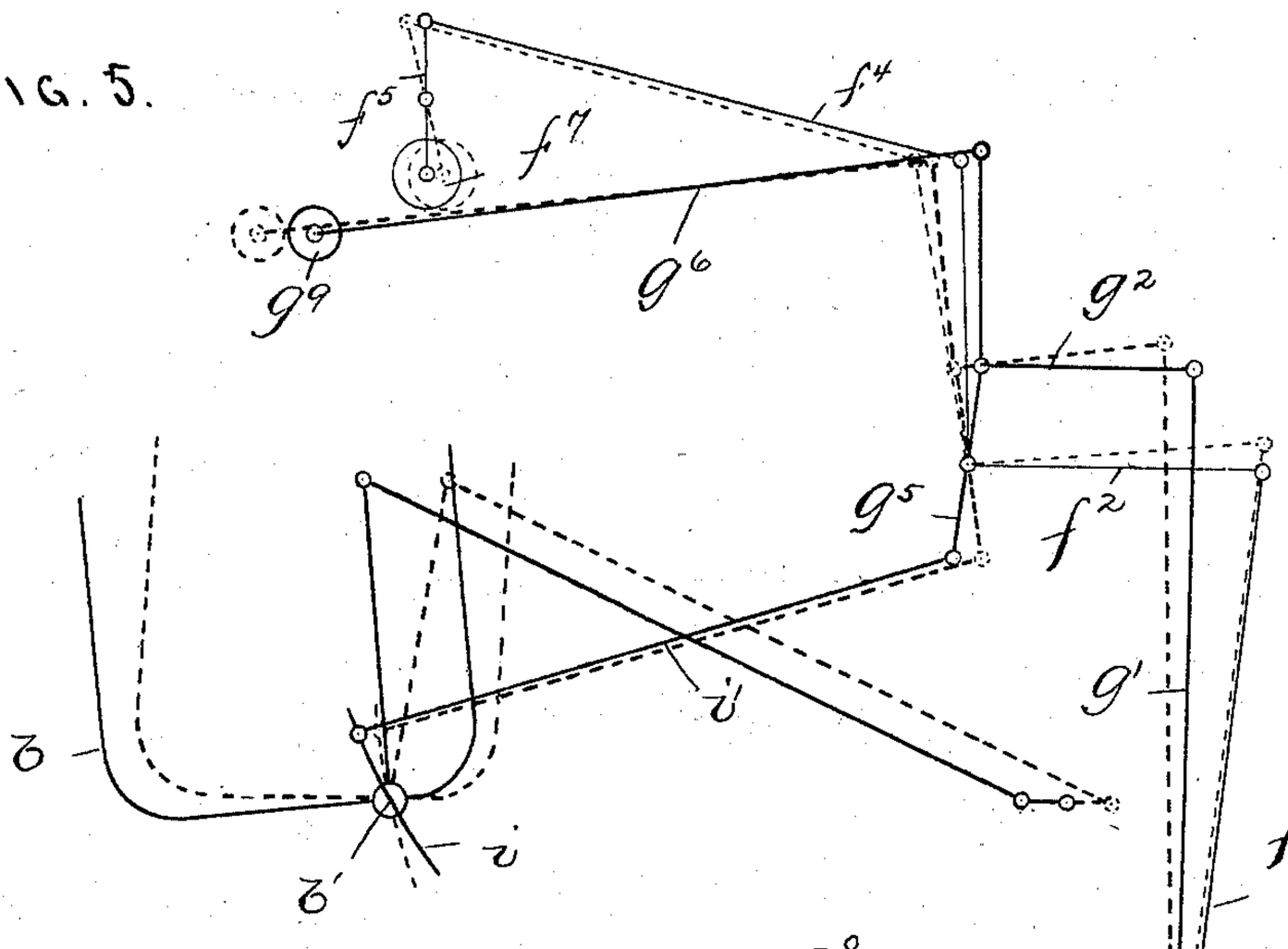
(No Model.) 3 Sheets—Sheet 3.

E. C. JUDD.

SOLE LEVELING MACHINE.

No. 545,038. Patented Aug. 20, 1895.

FIG. 5.



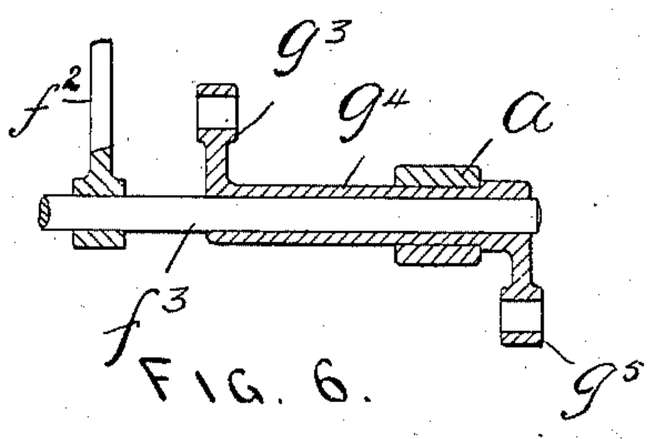


FIG. 6.

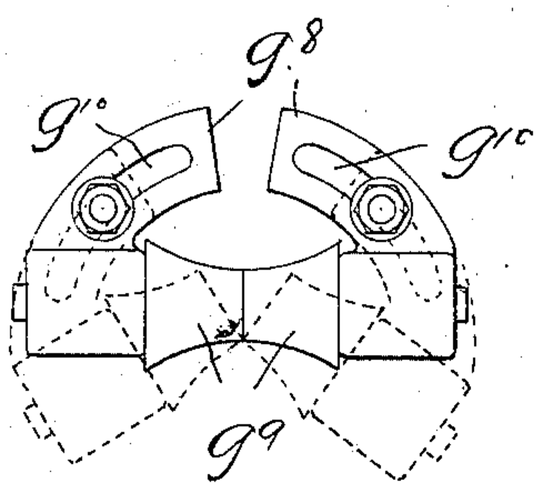


FIG. 7.

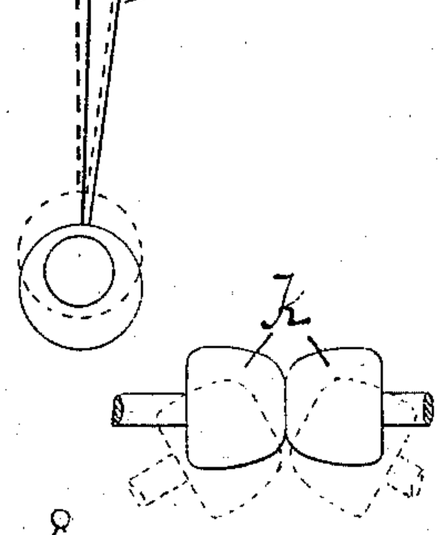


FIG. 10.

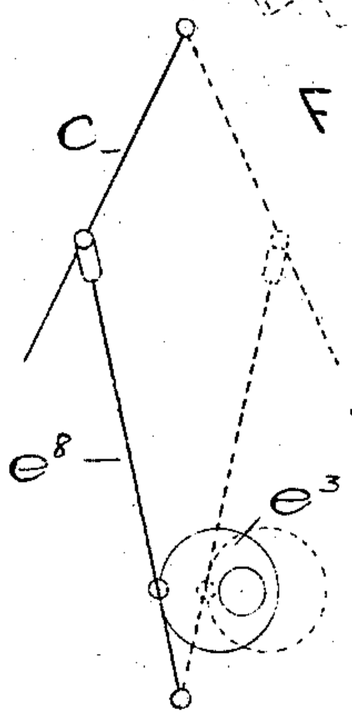


FIG. 9.

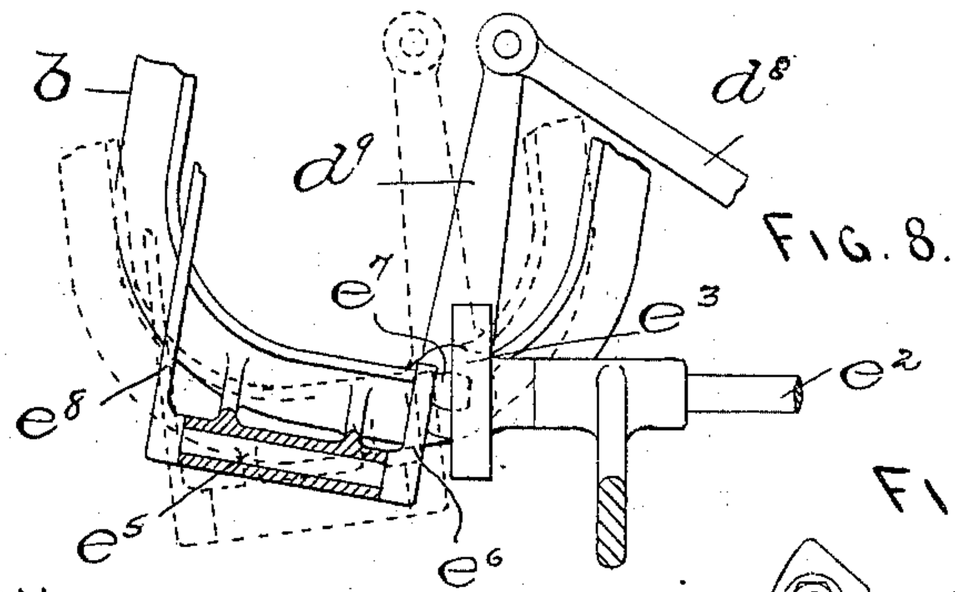
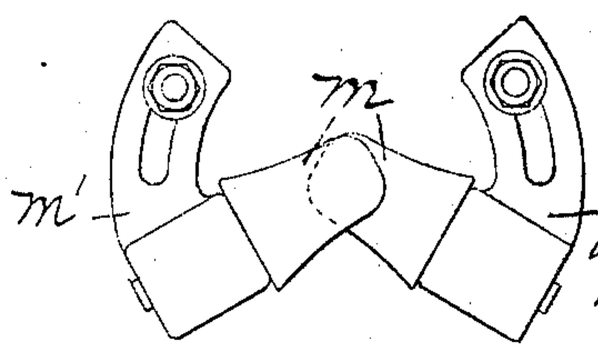


FIG. 8.

FIG. 11.



WITNESSES:

A. D. Harrison.

Parker Davis

INVENTOR:

E. C. Judd

by Wright Brown Quinby & Otts.

Attys.

UNITED STATES PATENT OFFICE.

EDWARD C. JUDD, OF BOSTON, MASSACHUSETTS.

SOLE-LEVELING MACHINE.

SPECIFICATION forming part of Letters Patent No. 545,038, dated August 20, 1895.

Application filed June 26, 1893. Serial No. 478,785. (No model.) Patented in England October 21, 1893, No. 19,876.

To all whom it may concern:

Be it known that I, EDWARD C. JUDD, a citizen of the United States, residing at Boston, Suffolk county, State of Massachusetts, have invented certain new and useful Improvements in Sole-Leveling Machines, (for which I have obtained a patent in Great Britain, No 19,876, dated October 21, 1893,) of which the following is a full, clear, and exact specification.

This invention relates to sole-leveling machines for leveling the soles of boots and shoes after they leave the sewing-machine.

The object of the present invention is to provide for using a plurality of leveling-rolls supported by independent carriers, whereby all parts of the sole may be perfectly and quickly acted upon.

The invention also has for its object to provide new and improved mechanism for adjusting or varying the travel of a leveling-roll relatively to the heel or to the ball or fore part of the sole of a boot or shoe.

The invention also has for its object to provide leveling-rolls which operate substantially simultaneously, one upon each side of the bottom of the sole, and are adjusted to the contour of opposite sides of the bottom of the last, whereby the rolls may be adjusted to suit the conditions required, according to the varying contour or shape of shoe-soles, thus rendering it possible to practicably use the same rolls on soles which greatly vary in shape.

The invention also has for its object to provide a machine in which both the longitudinally-movable member and the laterally-movable member of the jack may be oscillated automatically by mechanical contrivances instead of manually or by hand.

The invention has other objects, which will hereinafter appear.

To accomplish the objects of my invention I employ the mechanism hereinafter described and claimed, reference being made to the accompanying drawings, in which—

Figure 1 is a side elevation of a machine embodying my invention, parts of the frame appearing in section. Fig. 2 is a top plan view of the same. Fig. 3 is a front elevation of the same. Fig. 4 is a sectional view taken on the line 4 4, Fig. 1. Fig. 5 is a diagram indicating the operation of the adjusting mechanism. Fig. 6 is a detail sectional view taken on the line 6 6, Fig. 1. Fig. 7 is a detail view of the shank-rolls. Fig. 8 is a detail view of mechanism for oscillating the laterally-movable member of the jack. Fig. 9 is a diagram indicating the operation of the mechanism shown in Fig. 8, and Figs. 10 and 11 are detail views showing modifications in the construction of the shank-rolls.

Similar letters of reference indicate corresponding parts in all the figures.

In order to enable those skilled in the art to make and use my invention, I will now describe the same in detail, referring to the drawings, wherein—

The letter *a* indicates the main frame of the machine, which may be of any construction suitable for the purpose in hand, and *b* a yoke or tree pivoted, as at *b'*, to the frame in such manner as to oscillate longitudinally of the machine. The yoke or tree *b* is provided with a secondary yoke *c*, pivotally supported and having a central standard *c'*, adapted to carry the last. The yokes *b* and *c* and standard *c'* constitute a jack by which the shoe is supported during the leveling of the sole thereof.

The letter *d* designates the driving-shaft supported in bearings on the frame *a* and carrying a bevel-gear *d'*, which meshes with a similar gear d^2 on a vertical shaft d^3. Said vertical shaft carries a worm d^4, which engages a gear d^5, mounted on a horizontal shaft d^6, said shaft carrying a crank d^7, to which is connected one end of a rod d^8, the opposite end of which is connected with an arm d^9, fastened to one of the journals of the jack-tree *b*. It will be understood that the latter is slowly oscillated through the media described. The shaft d^6 carries a bevel-gear *e*, which meshes with a similar gear *e'* on a shaft e^2, which is supported in bearings on the frame *a* and extends at right angles to the said shaft d^6. A disk e^3 is fixed on the end of the shaft e^2 and has a cam-groove e^4 in its outer face. This cam-groove is partly in a plane which includes the center of oscillation or axis of the tree *b*. A rock-shaft e^5 is supported in a bearing on the under side of the tree *b* and has an arm e^6 on one end, which arm carries a roller e^7 in engagement with the

cam-groove in the disk e^3. The rock-shaft e^5 has an arm e^8 on the opposite end, which is connected with the yoke *c*. Through these instrumentalities the said yoke is oscillated, and it will be observed that the connection of parts is not disturbed by the oscillations of the tree *b*, by reason of the fact that the cam-groove is brought into the plane of the axis of the tree, whereby the roll e^7 engaging it will have a very slight movement. The sides of this roller are rounded to prevent it from binding in the groove.

An eccentric *f* on the driving-shaft *d* is connected by a rod *f'* with one arm of a bell-crank f^2, which is pivoted by means of a shaft f^3, supported on the main frame *a*. The bell-crank f^2 has a vertically-extending arm, which is jointed to a rod f^4, and the latter has a forked outer end whose branches are jointed to a roll-carrier composed of levers f^5, pivotally supported by arms f^6, pivoted to the main frame *a*, said levers forming bearings for the roll f^7.

The levers f^5, composing the roll-carrier, are pivoted intermediate their extremities to the arms f^6, and the roll f^7 is adapted to operate upon the ball or fore part of the shoe-sole and has an oscillatory motion imparted to it as it operates on the sole.

The driving-shaft *d* is provided with an eccentric *g*, connected by a link or rod *g'* with the horizontal arm of a bell-crank lever g^2, pivoted to an arm g^3 of a rocker-shaft or sleeve g^4, mounted on the shaft f^3, and provided with an arm g^5, extending in a direction opposite the direction of the arm g^3. The vertical arm of the bell-crank g^2 is pivotally connected with a rod g^6, having a forked outer end, each of whose branches is constructed with a flat head g^7, which presents a vertical surface, by which means a head or carrier is provided for supporting or carrying the independent bearings of two rolls g^9, suitably arranged relatively to each other to operate on a part of the sole of a shoe supported by the jack hereinbefore alluded to. The bearings of the rolls g^9 are mounted on the head or carrier g^7, which is arranged to be reciprocated in a plane above the shoe-jack, and the bearings of the rolls are provided with means whereby they can be adjusted into various positions and rigidly clamped or held in the position to which adjusted, whereby the axes of the rolls are adjustable to varying angles relatively to one another. To accomplish this adjustment I provide each bearing with a plate g^8, having a curved or segmental slot g^{10}, Fig. 7, through which a clamping-bolt passes into the head or carrier g^7. By loosening the clamping-bolts the roll-bearings can be moved in the arcs of circles to adjust the axes of the rolls g^9 into the position desired, after which the bolts can be tightened to rigidly clamp or hold the roll-bearings in fixed positions on the head or carrier g^7.

The devices described enable the rolls g^9 to be adjusted to suit the conditions required according to the varying contour or shape of shoe-soles, thus rendering it possible to practicably use the same rolls on soles which greatly vary in shape, particularly the shanks of soles which vary in contour from a slight curve to an approximately V shape in cross-section. In the present instance the rolls g^9 are designed to operate on the shanks of the soles, and, obviously, the rolls can be independently and quickly adjusted to varying angles for adapting the rolls to shanks which are more or less crowning. It will be obvious that the mechanism described as being connected with the said rolls provides for their reciprocation during the operation of the machine.

The rod g^6 is made lengthwise extensible through the medium of a slot and a bolt and nut, as indicated at *h*, Fig. 1, for the purpose of adjusting the shank-rolls relatively to the roll f^7, which operates on the ball or fore part of the sole. The adjustable rolls g^9 can be used for leveling the ball or fore part of the sole, as well as for operating on the shank of the sole. The jack or tree *b* rocks slowly as compared to the speed of the reciprocating or vibrating head or carrier g^7, which carries the shank-rolls.

An arc-shaped adjustment-way *i*, of which the length of the arm *i'* is the radius, is fixed on one of the journals of the slowly-moving jack yoke or tree *b* and extends on each side of said journal. This adjustment-way receives a pin carried by one end of the rod *i'*, which, at its other end, is pivotally connected to the arm g^5 in such manner that the travel of the shank-rolls g^9 relatively to the heel or the ball or fore part of the sole can be changed or regulated by simply adjusting one end of the rod *i'* in the adjustment-way *i*. By reference to the diagram, Fig. 5, it will be seen that by moving the pin of the rod *i'* to a point on the upper side of the center of oscillation of the tree or yoke the rearward movement of the latter moves the pivot of the bell-crank g^2 forward, and the travel of the rolls g^9 is correspondingly increased toward the heel. By connecting the rod *i'* on the lower side of the center of oscillation of the tree or yoke *b*, the opposite effect is produced—that is, the travel of the rolls toward the ball is increased. When the pin of the rod *i'* is adjusted and secured in a fixed position to the adjustment-way *i* at a point above or below the center of oscillation of the tree or yoke *b*, the rocker shaft or sleeve g^4 is rocked, the pivot of the bell-crank g^2 is continuously shifted back and forth, and consequently the rod g^6 and rolls g^9 are caused to move back and forth, and at the same time are vibrated by the oscillation of the bell-crank g^2. Therefore the rolls have a compound movement, which is very advantageous in leveling the sole. As regards this compound movement, the leveling roll or rolls may be of any suitable construction.

The means described also automatically vary the longitudinal inclination of the jack

and the relative position of the roll, while enabling the travel of the roll to be changed or regulated.

As before stated, the segmental adjustment-way i is fixed to the pivot or shaft of the longitudinally-rocking jack b, and consequently the way i is rocked in unison with the jack. If the front end of the rod i' is adjusted and fixed to the way at a point above or below the center of the pivot or shaft of the jack, the rocking of the way imparts a rocking motion to the rocker shaft or sleeve g^4 through the medium of the crank g^5. The arm g^3, Fig. 6, of the rocker shaft or sleeve g^4 carries the pivot of the bell-crank lever g^2, and as the rocker shaft or sleeve oscillates or rocks it bodily carries with it the bell-crank lever g^2, thereby slowly shifting the rod g^6 longitudinally, while at the same time the rod g^6 is being reciprocated by the oscillatory movement of the bell-crank lever g^2. By means of a treadle j and rods j', connecting the same with the rods f^4 and g^6, the rolls are brought down upon the sole and said treadle is held down by a pivoted latch j^2. The springs j^3 on the rods and a counterbalancing-weight j^5 on the treadle tend to raise the rolls from the sole.

While the shank-rolls g^9 are shown and described as supported so as to be adjusted axially, with the point of their meeting edges at the lower side as a center, they may be constructed as illustrated in Fig. 10, where two rolls k, with convex exterior contours and egg-shaped confronting ends, are shown. In Fig. 11 the rolls m are shown as overlapping and supported in holders m', like the holders g^8, whereby they may be adjusted axially. With either of these constructions, scoring of the shank of the shoe-sole would be prevented.

Where two rolls or two sets of rolls are employed, one to act on the shank and the other on the ball of the sole, a convex roll such as shown in Fig. 10 may be employed, and in some cases will be found of special advantage—as, for instance, in a shoe where it is desired to roll the ball portion of the sole perfectly flat, while the shank is rounded. In such a case as this a concaved roll such as ordinarily employed would round the ball-portion of the sole under oscillation of the jack, whereas with a convex roll the ball could be made flat.

It is evident that numerous variations might be made in the construction of the various parts of the machine without departing from the spirit and scope of the invention, and it is to be understood that the invention is not limited to the construction shown.

It will be observed that the rod i' and adjustment-way i render it possible to change or vary the extent of motion or travel of the shank-rolls, and that this motion is controlled by the oscillation of the jack yoke or tree b; but I do not wish to be understood as confining myself to this exact connection, because other adjustable mechanism may be provided in the combination for changing or varying the extent of motion or the travel of the shank roll or rolls.

The back and forth or traversing motion of the roll or rolls g^9 is comparatively slow as compared with the rapid vibration of the roll or rolls during the back and forth or traversing motion. In the operation of the rolls g^9 they act on the sole a less distance in most cases than the distance acted on by the roll f^7. The shank of a shoe is generally not so long as the fore part or ball portion, and therefore it is important to cause the shank-rolls to recede when they reach a given point on the shoe and start back. Otherwise they would pass off of the heel portion or rear end of the sole. The improvements described adapt the shank-rolls to act on the shank only the distance desired, and as the jack moves backward and forward the shank-rolls act on the sole in proportion to the travel of the jack. If it is desired to cause the shank-rolls to pass up onto the toe of the sole or back on the heel portion thereof a greater distance than is necessary on ordinary work, the adjustment of the rod i, as hereinbefore explained, secures the desired movement. The provision of adjustable mechanism for changing the travel of the roll or rolls g^9 relatively to the heel or the ball or fore part of the sole is an important feature in a sole-leveling machine.

Having thus described my invention, what I claim is—

1. In a sole-leveling machine, a roll or rolls for acting on the ball of the sole, a roll or rolls for acting on the shank, independent carriers supporting the rolls, and independent means for operating said carriers.

2. In a sole-leveling machine, a roll or rolls for acting on the ball of the sole, a roll or rolls for acting on the shank, independent carriers supporting the rolls, and means for adjusting the distance between the carriers.

3. The combination with a supporting and forming last, of a pair of longitudinally-reciprocating leveling-rolls operating substantially simultaneously, one upon each side of the bottom of the sole, and mechanism for adjusting said rolls to the contour of opposite sides of the bottom of the last.

4. The combination of a pair of leveling rolls operating substantially simultaneously, one upon each side of the bottom of a sole, mechanism for adjusting said rolls to the contour of opposite sides of the bottom of the last supporting said sole, and a leveling-roll operating upon the central portion of the bottom of said sole.

5. In an organized sole-leveling machine, the combination with a jack for supporting a shoe, and a carrier arranged above the jack, of roll-bearings adjustably mounted on the carrier, rolls arranged in the roll-bearings and having the angularity of their axes varied by the adjustment of said bearings, and devices

for rigidly securing the roll-bearings directly to the carrier in the desired position of adjustment.

6. In an organized sole-leveling machine, the combination with a jack for supporting a shoe, and a reciprocating carrier arranged above the jack, of roll-bearings mounted on the carrier and adjustable independently of one another, rolls mounted in said independently adjustable bearings and having the angularity of their axes varied by the adjustment of the said bearings, and devices for rigidly securing the roll-bearings to the carrier in the desired position of adjustment.

7. In an organized sole-leveling machine, the combination with a jack for supporting a shoe, and a carrier arranged above the jack, of independently adjustable roll-bearings provided with curved or segmental slots, rolls mounted in said independently adjustable bearings and having the angularity of their axes varied by the adjustment of the roll-bearings, and screws passing through the slots of the roll-bearings into the carrier for rigidly securing the said bearings to the carrier in the desired position of adjustment.

8. In an organized sole-leveling machine, the combination with a jack for supporting a shoe, a reciprocating leveling-roll for acting on the ball or fore part of the sole, and a reciprocating carrier, of shank rolls having bearings independently adjustable on the said carrier to vary the angularity of the axes of the shank rolls and adapt the latter to sole shanks which vary in contour, devices for rigidly holding the bearings of the shank-rolls in their positions of adjustment, and means for reciprocating the leveling-roll and the carrier.

9. In a sole-leveling machine, rolls supported end to end and axially adjustable and having their confronting ends rounded or convexed.

10. In a sole-leveling machine, the combination with a reciprocating leveling-roll, a longitudinally oscillating jack, and mechanism for automatically reciprocating the leveling-roll and oscillating the jack, of adjustable connections positively connecting said roll and said jack for changing or regulating the travel of the roll relatively to the jack, substantially as described.

11. In a sole-leveling machine, a jack for supporting the shoe, the same comprising a yoke or tree pivotally supported and arranged to move on the pivot in the direction of length of the shoe, a yoke pivotally supported in said tree and arranged to move on its pivot in a direction transverse to the movement of the same, means for oscillating the tree, a cam-disk having a groove at the center of oscillation of said yoke, and a rock-shaft supported in a bearing on said tree and having an arm which carries a roll engaging said cam-groove, and an arm connecting it with the yoke.

12. The combination of a longitudinally movable jack, a vibrating fore-part roll, a shank-roll, means for moving the jack longitudinally and vibrating the fore-part and shank rolls, and mechanism for automatically changing the position of the shank-roll longitudinally with relation to the fore-part roll during the vibratory motion of the rolls.

13. The combination with a longitudinally movable jack, a vibrating leveling roll, and means for moving the jack longitudinally, of a rocker-shaft, means for rocking said rocker-shaft, a lever pivotally mounted on the rocker-shaft and connected with the leveling-roll, and devices for vibrating the lever to impart a vibratory motion to the leveling roll.

14. In a sole-leveling machine, the combination of an oscillating jack having an adjusting-way at its center of oscillation, a reciprocating leveling-roll, a lever which reciprocates said roll, and a rod connecting the pivot of said lever with the adjusting-way on the jack, as and for the purpose described.

15. In a sole-leveling machine, the combination of an oscillating jack having an arc-shaped adjusting-way at its center of oscillation, a leveling-roll or rolls for acting on the ball of the sole, a roll or rolls for acting on the shank, a bell-crank lever connected with the ball-roll or rolls, a shaft supporting said lever, means for actuating the lever, a sleeve mounted on said shaft and having oppositely-extending arms, a bell-crank lever supported by one of said arms and connected with the shank-roll or rolls, means for vibrating said lever, and a rod connecting the other arm of the sleeve with the adjustment-way on the jack-tree.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 19th day of June, A. D. 1893.

EDWARD C. JUDD.

Witnesses:
C. F. BROWN,
F. PARKER DAVIS.