(No Model.) 3 Sheets—Sheet 1.

E. E. WINKLEY & B. PHILLIPS.

SOLE LEVELING MACHINE.

No. 540,222. Patented May 28, 1895.

FIG. I.

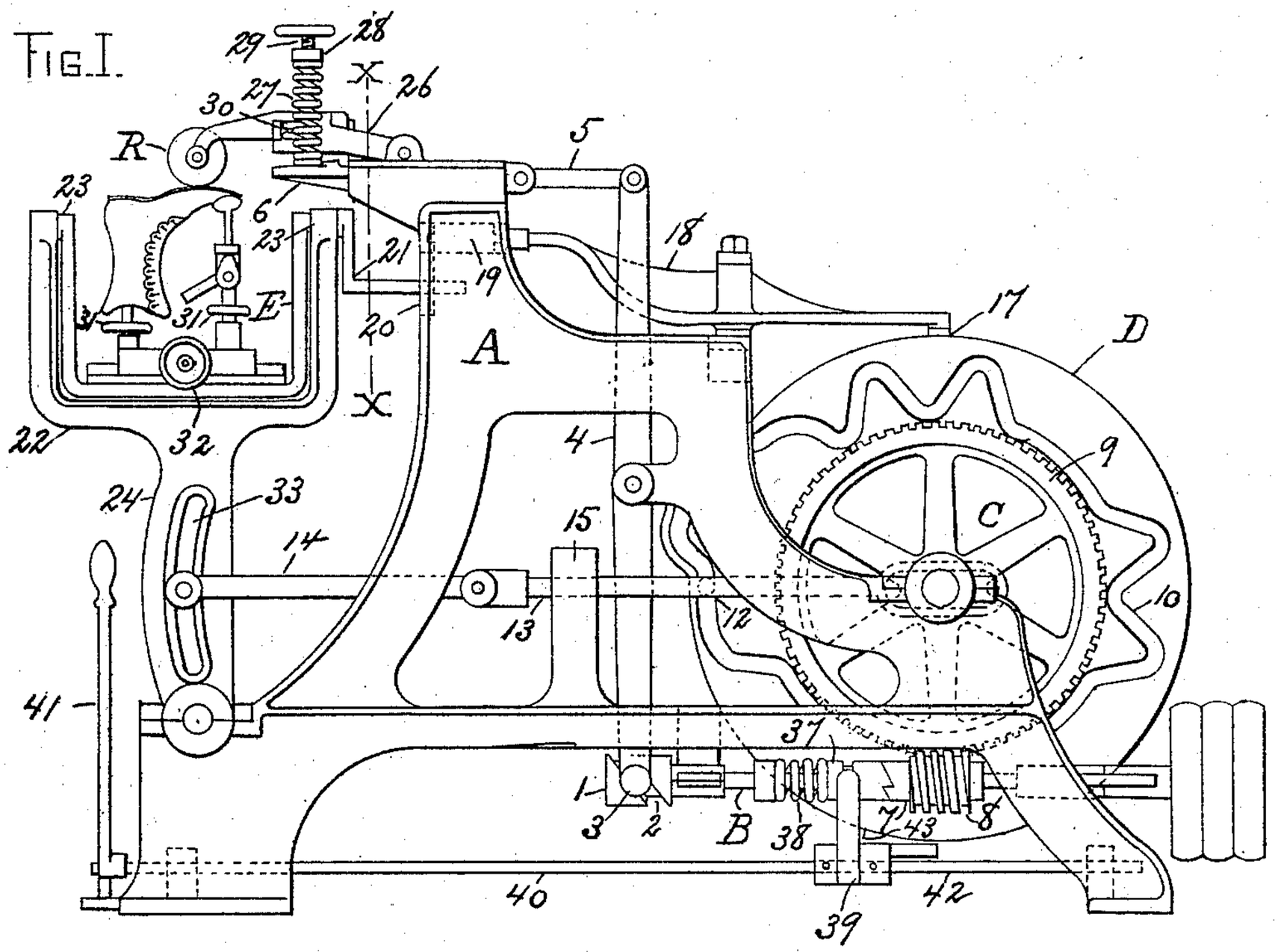
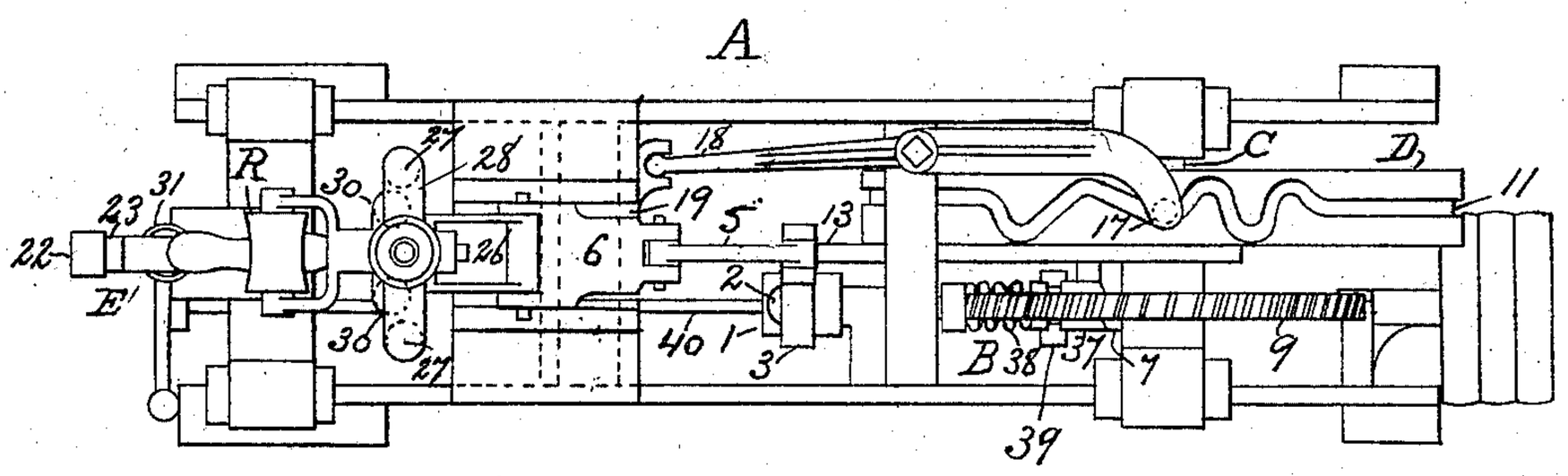


FIG. II.



WITNESSES.

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(No Model.) 3 Sheets—Sheet 2.

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FIG. III.

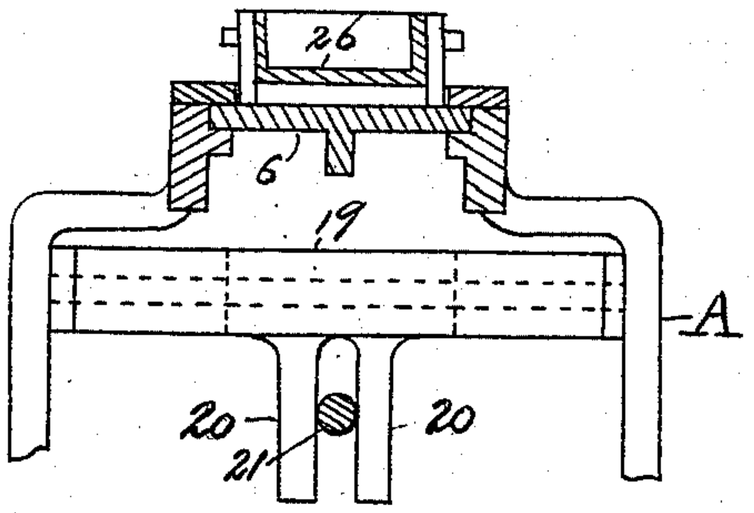


FIG. IV.

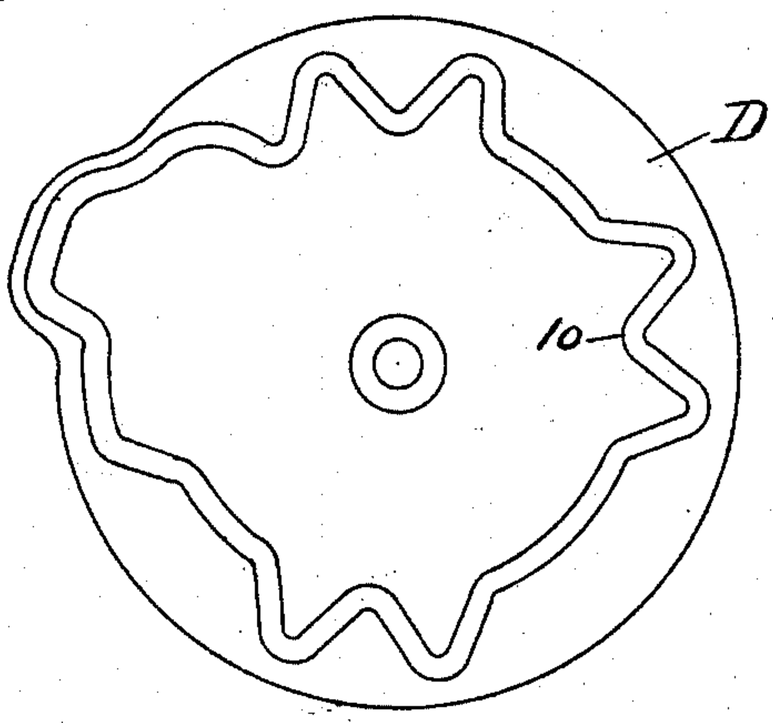


FIG. V.

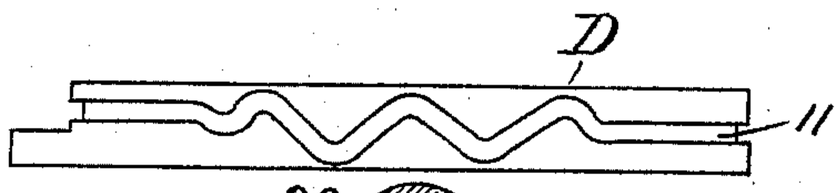
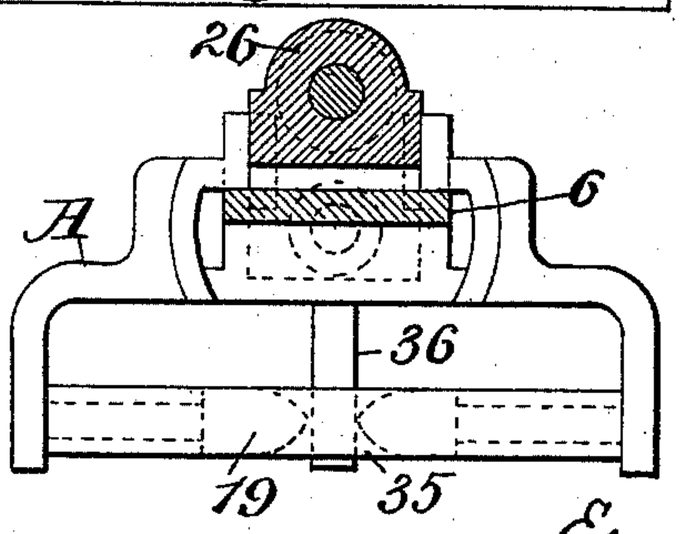


FIG. VIII.



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(No Model.) 3 Sheets—Sheet 3.

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SOLE LEVELING MACHINE.

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FIG. VI.

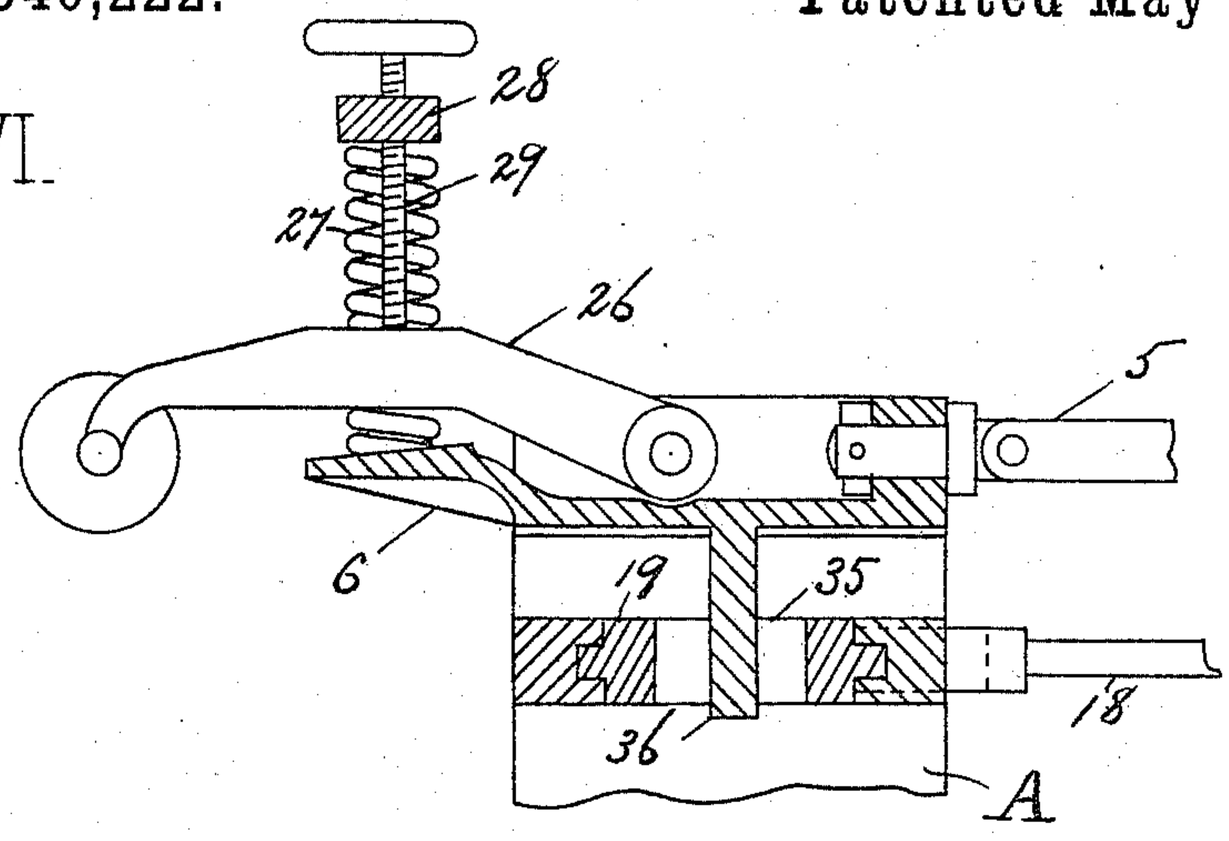
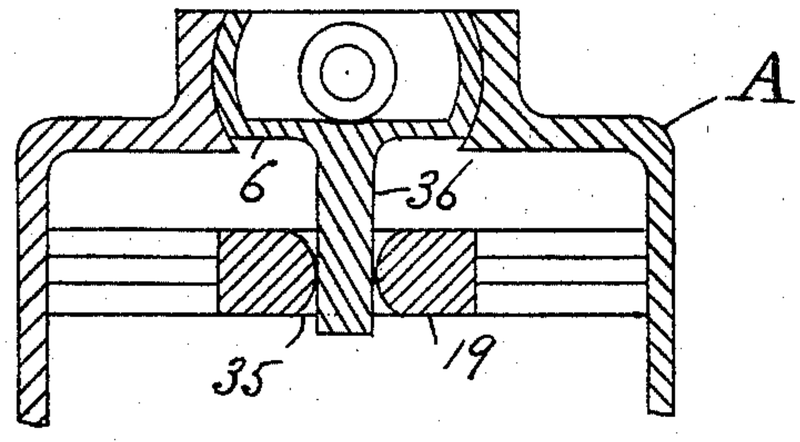


FIG. VII.



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UNITED STATES PATENT OFFICE.

ERASTUS E. WINKLEY AND BENJAMIN PHILLIPS, OF LYNN, ASSIGNORS TO ELMER P. HOWE, OF BOSTON, MASSACHUSETTS.

SOLE-LEVELING MACHINE.

SPECIFICATION forming part of Letters Patent No. 540,222, dated May 28, 1895.

Application filed March 8, 1893. Serial No. 465,176. (No model.)

To all whom it may concern:

Be it known that we, ERASTUS E. WINKLEY and BENJAMIN PHILLIPS, citizens of the United States, and residents of Lynn, in the county of Essex and Commonwealth of Massachusetts, have invented a new and useful Improvement in Leveling-Machines, of which the following is a specification.

Our invention relates to improvements in that class of leveling machinery by which the operation of leveling is performed by a leveling roll applied under pressure to the sole of the shoe, and consists of a vibrating leveling roll and a shoe supporting jack, and intermediate mechanism operating automatically to change the relative longitudinal position and lateral inclination of the roll and jack.

Our invention further consists of the devices and combination of devices hereinafter set forth and claimed.

The object of our invention is to produce a machine of the above class whereby the operation of leveling a shoe may be performed without manual interference of the operator after the shoe is in position to be acted upon by the roll, so that two or more machines placed in convenient juxtaposition or assembled in what is known in the art as a "gang machine" may be operated by the same operator, and a great saving of manual labor thereby effected.

Our invention is illustrated by the drawings herewith submitted, in which—

Figure I is an end view of a machine embodying same. Fig. II is a plan view. Fig. III is a sectional view, enlarged, on line *x x*, Fig. I. Figs. IV and V are respectively a face and reverse plan view of wheel forming part of said machine, showing face-cam and a portion of periphery-cam on same. Figs. VI, VII, and VIII are sectional views showing another form of constructing a portion of said machine.

Similar letters and figures of reference refer to similar parts throughout the several views.

Referring to the drawings, R represents the leveling roll shown as concave, but the form of which may be varied. To the leveling roll R, we impart a vibrating motion by the following mechanism: Mounted in frame A, which is a frame suitable to support the working parts of the machine, is a shaft B, to which power may be applied by any convenient device. The shaft B carries a roll 1, in which is cut the cam path 2. In the cam path 2 runs the cam roll 3, carried by the pivoted lever 4, at or near its lower end, the lever 4 being intermediately pivoted to a suitable support on the frame A, and pivoted at or near its upper end to a connecting rod 5, which is pivotally connected with the roll carrier bed 6. The roll carrier bed 6 is free to slide in suitable ways in the frame A, and upon it is mounted the roll carrier 26, the outer end of which is forked and provided with bearings in which is mounted the leveling roll R.

We obtain and regulate pressure on the roll R as follows: The roll carrier 26 at its inner end is pivoted to the roll carrier bed 6 and normally rests on the same, its outer end carrying the roll R extending beyond the outer end of the carrier bed and curved downward to bring the roll R in convenient position to operate as hereinafter described. Upon the carrier bed 6 near its outer end are mounted the springs 27—27 on each side of roll carrier 26, which are secured to the cross-head 28 extending across the same. Through the cross-head 28 runs the threaded bolt 29, which bears on the roll carrier 26 so that same is raised against the tension of the springs 27—27, which tension may be regulated by raising or lowering the cross-head 28 by means of the bolt 29. We find it convenient to construct the roll carrier in two parts capable of slight rocking motion with reference to each other, regulated by interposed springs 30—30, so that the roll will be allowed slight play to adjust itself to the work.

The last supporting jack is shown at E, but forms no essential feature of our invention. In the form shown in the drawings (Fig. I) it is provided with standards for supporting the last, adjustable vertically by means of set screws 31—31, and horizontal for different sizes of last by set screw 32.

To change the relative longitudinal position of the roll and jack we find it preferable to oscillate the jack E, but we do not wish to limit our invention to such construction for it is evident that by a slight change in the in-

termediate mechanism hereinafter described the roll R may be similarly oscillated and the same result secured. We would further say that by the term "oscillating" we wish to be understood as including a "to and fro" motion generally, whether along a rectilinear or curvilinear path.

A preferred form of mechanism for securing the above result is described as follows: The shaft B carries a sleeve 7 on which is cut a worm 8. The sleeve 7 is free to rotate about the shaft B, but is prevented by suitable stops from sliding on the same. By a clutch mechanism hereinafter described the sleeve 7 may be made to rotate with the shaft B. In the frame A above and transversely to the shaft B is mounted a shaft C, which carries keyed or otherwise rigidly secured thereto, a worm gear 9, which engages with the worm 8 on the shaft B. Upon the shaft C also rigidly secured thereto is a wheel D, having on its face the path cam 10, the form and function of which will be hereinafter more fully set forth. In the path cam 10 runs the cam roll 12, carried by the rod 13, the rear end of which is forked and embraces the shaft C and the front end pivoted to the connecting rod 14, which is also pivotally connected with the arm 24, its connection therewith being rendered vertically adjustable by the circular slot 33. The rod 13 is intermediately supported in bearing in standard 15. The arm 24 supports the jack supporting carriage 22, in which is mounted in bearings 23—23, so as to be free to swing transversely, the last supporting jack E. The arm 24 is mounted upon suitable bearings in the frame A, upon which it is free to swing.

The relative lateral inclination of the roll and jack is changed either by rocking the jack E on longitudinal axis or rocking the roll R on transverse axis. A form of mechanism for accomplishing this result by the first of the above suggested methods is the following: Upon the wheel D is the periphery path cam 11, the particular form and function of which will be hereinafter more fully described, in which runs the cam roll 17, carried at or near the rear end of lever 18. The front end of the lever 18 is connected with the cross-head 19, which is mounted in suitable ways in which it is free to slide, the connection between the cross-head 19 and the lever 18 being arranged to allow play for swinging motion of lever 18. The lever 18 is intermediately pivoted on frame A. To the cross-head 19 are secured the rigid downwardly extending arms 20—20, which embrace the handle of the crank lever 21, connected with and adapted to rock the last supporting jack E.

Our second method for accomplishing the above suggested result is described as follows, particular reference being had to Figs. VI, VII, and VIII of the drawings: The construction of roll carrier bed is similar to that already described except that its sides, and ways in the frame A in which it slides, are made circular to allow a rocking motion, and its connection with connecting rod 5 is swiveled. The form and arrangement of roll carrier are similar to that already described, that is, it may be made in two parts having a slight rocking motion with reference to each other, as indicated in Fig. VIII but such construction is not essential and the roll carrier may consist of a single casting or rigidly connected parts as shown in Fig. VI. The cross-head 19 is provided with a slot 35 into which extends a rigid arm 36 secured to the roll carrier bed. The slot 35 is arranged to allow play for swinging motion of said arm 36.

It is evident from the foregoing description that in this construction the swinging jack supporting carriage 22 and the crank lever 21 are unnecessary as the jack has but one motion. These elements may therefore be omitted and the jack rigidly mounted upon the arm 24.

The clutch mechanism on shaft B is described as follows: A sleeve 37 is splined to shaft B and free to slide thereon. The sleeve 37 is notched to engage with notches on sleeve 7 and normally held in engagement therewith by a spring 38, bearing against a collar on said shaft B. In the sleeve 37 is an annular groove in which runs a fork on the arm 39, which is free to rotate on rod 40, but prevented from sliding thereon by suitable collars. The rod 40 is free to rotate and slide in suitable bearings in frame A, and is provided with an operating lever 41. Upon rod 40 is the rigid projection 42. On the wheel D is a dog 43 which upon revolution of wheel D comes in contact with the rigid projection 42, pushes out rod 40 and by arm 39, and its fork running in groove in sleeve 37, disengages sleeves 37 and 7. By rotating rod 40, projection 42 may be turned out of the way of the dog 43 and sleeve 37 thrown into engagement with sleeve 7 by spring 38. The rod 40 may also be drawn out at any time by lever 41 and sleeves 37 and 7 disengaged.

As the wheel D revolves the cam roll 12 imparts a reciprocating motion to rod 13 which by connecting mechanism hereinbefore described imparts an oscillating or to and fro motion to the jack E. It is evident that the length of path over which such oscillation occurs, or the extent of such motion, varies as the path cam 10 varies from circular form, and that the position of jack with reference to leveling roll at any given time may be determined by the position of the cam roll 12 on the path cam 11. As the wheel D revolves, the cam roll 17 by lever 18 and connecting mechanism hereinbefore described imparts a transversely rocking motion to the jack E or rocks the roll R, the extent of rocking motion varying as the path cam 11 varies from circular form, and the inclination of the roll at any given time to the sole of a shoe upon the jack E being determined by position of roll 17 in path cam 11. The path cams 10 and 11, controlling these two movements, may be

so constructed as to produce any combinations thereof, heretofore produced by manual interference of the operator in the operation of machines of the class heretofore known in the art.

The path cams 10 and 11, as shown in the drawings, are so formed and timed with reference to each other that the greatest inclination of leveling roll R will occur at the toe and shank of the shoe, and the vibrating roll will operate longest on those parts. We find such operation preferable, owing to the curvature of those parts, and owing to the fact that being slightly lower than the face of the sole they receive less pressure from the roll. The downward action of the roll is limited by the roll carrier bed 6 and by proper vertical adjustments of shoe upon the last supporting jack, the pressure of the roll thereon being caused by the lifting of the roll thereby. The amount of the pressure and extent of action thereof may be limited, and the roll arranged to fall but a short distance below the toe when it passes off the shoe.

By raising or lowering the rod 14 in the slot 33, the several oscillations of jack E will be proportionately lengthened or shortened but the time in which a given oscillation occurs will be the same. The machine may thus be adapted for different sizes of shoes, the sizes varying proportionately, and its operations will occur at the proper places thereon.

The operation of our machine is as follows: The machine being in adjustment to receive the size of shoe to be leveled, and power being applied thereto, the operator places a shoe on the jack E and adjusts the same vertically as hereinbefore described. The lever 41 is then pushed out and the wheel D begins to revolve. The shoe is thereby carried under the vibrating roll R, and moved to and fro, while the leveling roll R vibrates over the same, under pressure of springs 27—27 varying its inclination and length of operation on the different parts until the wheel D has made a complete revolution, when the clutch mechanism is thrown out and the operation ceases, the shoe being then thrown out in convenient position for removal by the operator.

We are aware of the state of the art as shown in the following patents: Gilmore, No. 266,283, dated October 24, 1882; Gilmore, No. 344,650, dated June 29, 1886; Washburn, No. 435,882, dated September 2, 1890; Strong, No. 403,495, dated May 14, 1889, and claim nothing shown therein.

We have not herein claimed the mechanism herein shown and described for regulating the extent of the change in the relative longitudinal position of the roll and jack as we have embodied and claimed such feature in our pending application, Serial No. 507,760½, filed April 16, 1894, which is a division of this application.

We, however, do not consider our invention limited to mechanism herein shown and described, but claim as novel and desire to secure by Letters Patent—

1. In a sole leveling machine, the combination of a vibrating leveling roll, a shoe supporting jack, and connected mechanisms operating automatically to change the relative longitudinal position and lateral inclination of the roll and jack, substantially as described.

2. In a sole leveling machine, the combination of a leveling roll, a shoe supporting jack, means for changing the relative longitudinal position and lateral inclination of the roll and jack, and mechanism for variably actuating said means, substantially as described.

3. In a sole leveling machine, the combination of a leveling roll, a movable shoe supporting jack, mechanism for imparting a varying oscillation to said jack, and connecting mechanism for changing the relative inclination of the jack and roll, substantially as set forth and for the purposes specified.

4. In a sole leveling machine, the combination of a vibrating leveling roll, a shoe supporting jack capable of being rocked laterally and of being oscillated longitudinally, and connected mechanisms for automatically rocking and oscillating the jack relatively to the vibrating roll, substantially as described.

Dated at Lynn this 4th day of March, A. D. 1893.

ERASTUS E. WINKLEY.
BENJAMIN PHILLIPS.

In presence of—
BERTHA M. MCCAUL,
WINFIELD S. PARTRIDGE.