(No Model.) 3 Sheets—Sheet 1.

# E. E. WINKLEY & B. PHILLIPS.

## SOLE LEVELING MACHINE.

No. 540,223. Patented May 28, 1895.

Fig. I.

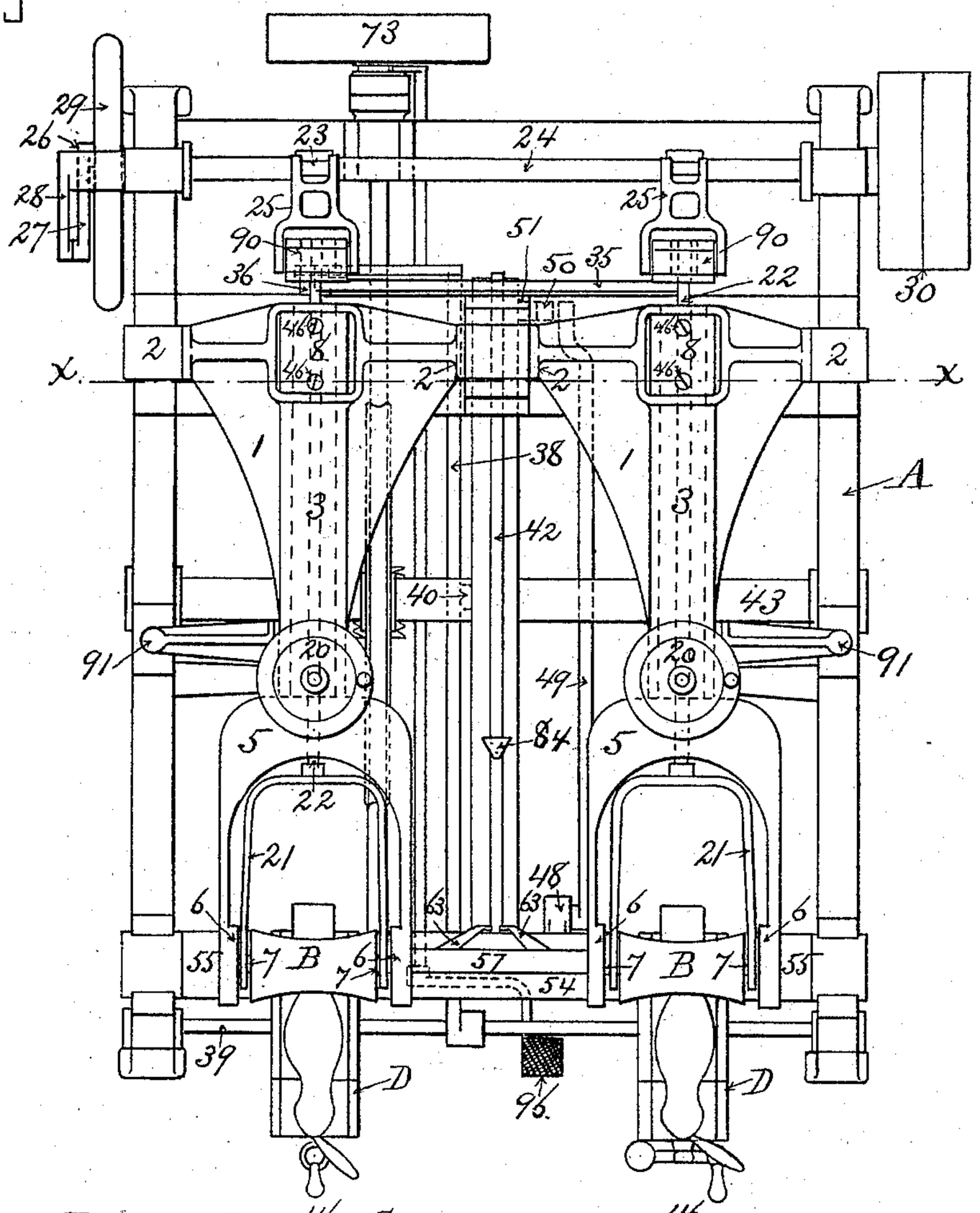
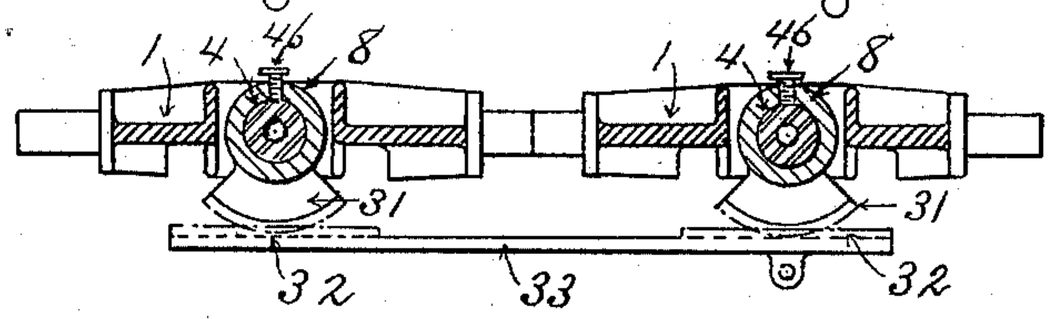



Fig. II.

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(No Model.) 3 Sheets—Sheet 2.

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## SOLE LEVELING MACHINE.

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Fig. III

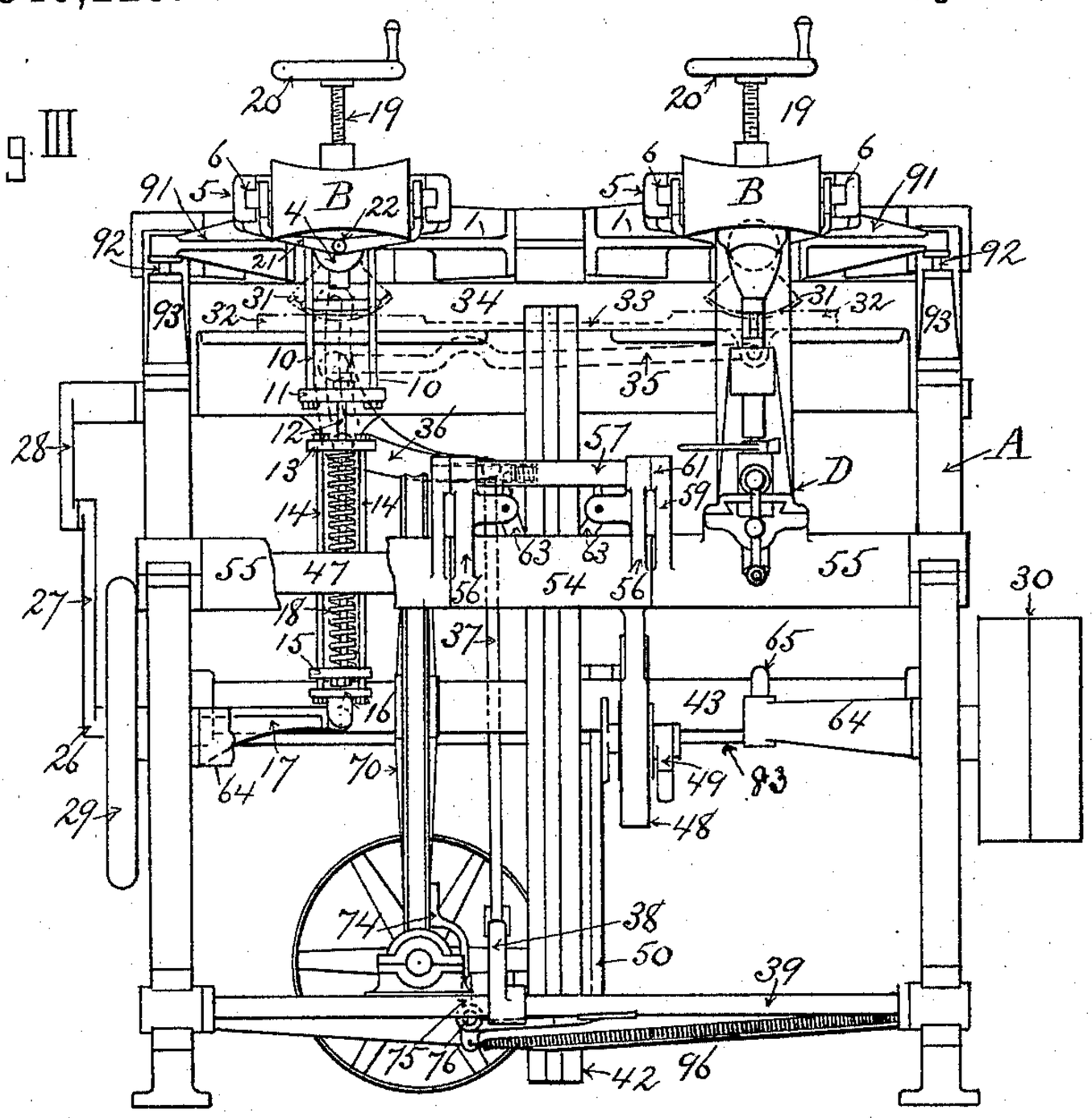



Fig. IV

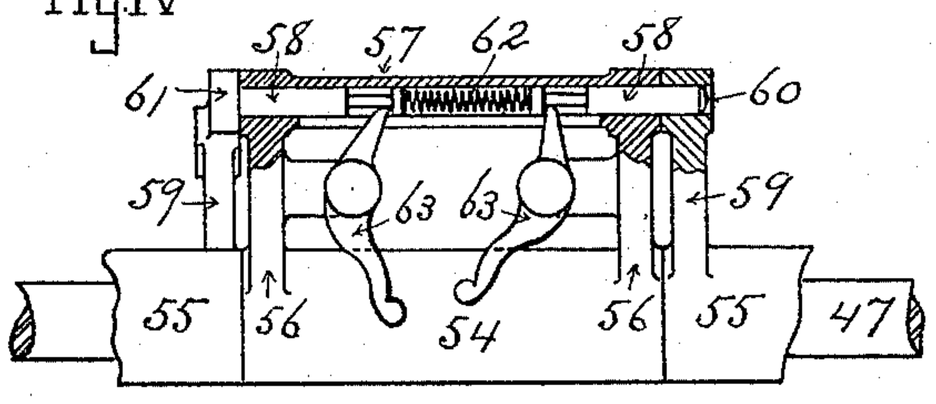
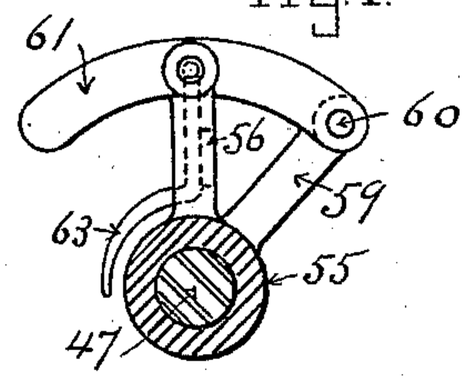



Fig. V.

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## SOLE LEVELING MACHINE.

No. 540,223. Patented May 28, 1895.

FIG. VI.

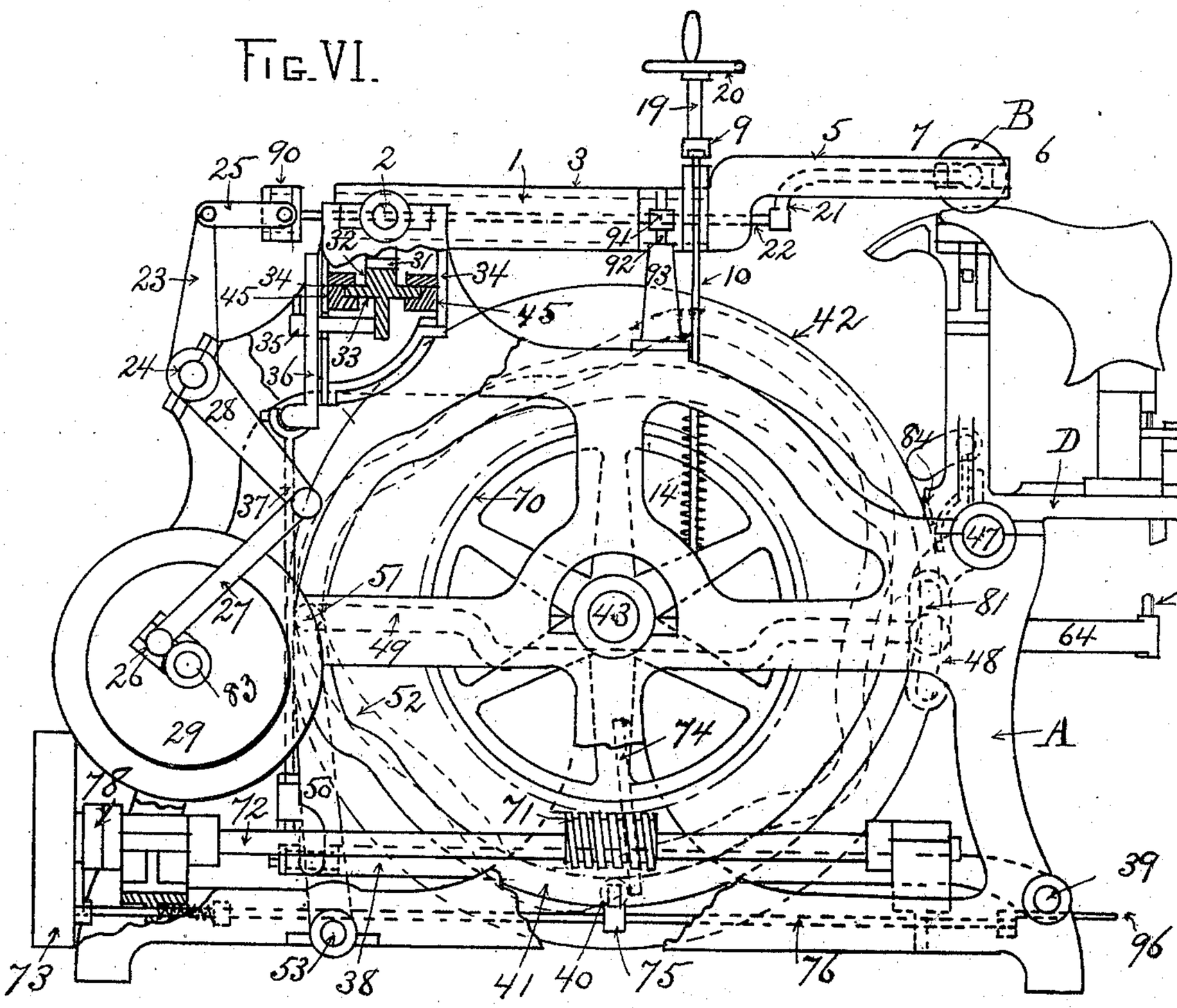



FIG. VII.

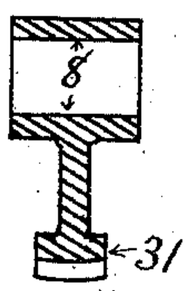
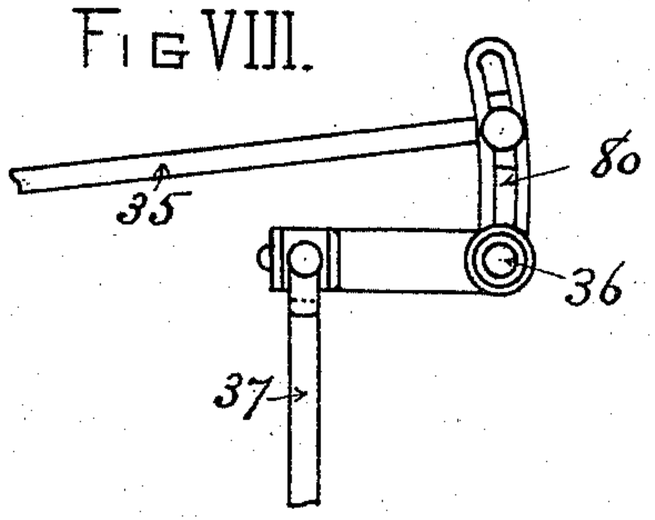



FIG VIII.

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# UNITED STATES PATENT OFFICE.

ERASTUS E. WINKLEY AND BENJAMIN PHILLIPS, OF LYNN, MASSACHUSETTS.

## SOLE-LEVELING MACHINE.

SPECIFICATION forming part of Letters Patent No. 540,223, dated May 28, 1895.

Application filed November 21, 1894. Serial No. 529,505. (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 Sole-Leveling Machines, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

Our invention relates to improvements in that class of the above named machines in which the operation of leveling is performed by a vibrating roll applied under pressure to the sole of a shoe, and consists of two shoe supporting jacks, a vibrating leveling roll associated with each jack, means for bringing each jack into operative position while the other jack is in a convenient position for the removal of a shoe therefrom, and connected mechanisms operating automatically to present each jack, when brought into operative position, to its associated roll.

Our invention further consists of the form and arrangement of mechanism for rocking the rolls and oscillating the jacks, of adjustment devices for the several movements of the machine, and of the devices and combination of devices hereinafter more specifically set forth and claimed.

The object of our invention is to increase the amount of work which can be accomplished by an individual operator on this class of machines; also to produce an automatic machine easy and efficient in operation and readily adjusted for different sizes and styles of shoes.

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

Figure I is a top view of a machine embodying the invention. Fig. II is a section on line X X, Fig. I. Fig. III is a front view with one jack removed to show parts back of same. Figs. IV and V are detached views of a preferred form of mechanism connecting the jacks with oscillating mechanism. Fig. VI is a side view with portion of frame broken out. Figs. VII and VIII are detached views of portions of mechanism for laterally rocking rolls.

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

In the drawings A represents a frame suitable to support the working parts of the machine.

B, B represent the leveling rolls each of which, in the form of our invention shown in the drawings, has three motions, to wit: a vertical oscillation, imparted to the roll, as the jack passes under same, by the varying contour of the last, a laterally rocking motion, and a motion of vibration. We will now describe in detail a preferred form of mechanism for accomplishing these motions, but before so doing we wish to say that we do not consider our invention limited thereto, as such mechanism can be modified in many details without departing from the essential nature of our invention. We would further say that it is not essential that the rolls B, B have the three motions above suggested, as the same result can be secured by movement of the jack as shown and described by us in an application for Letters Patent heretofore filed and now pending.

The roll carrier beds are shown at 1, 1, and are mounted in the bearings 2, 2 and 2, 2, in the frame A in which they are free to tip. On the roll carrier beds 1, 1, are the sleeves 3, 3, cast integral therewith or suitably secured thereto. Through the sleeves 3, 3, extend the hollow shafts 4, 4, which at their outer ends carry the forks 5, 5, which form the roll carriers.

In the forks 5, 5, are provided suitable ways 6, 6 and 6, 6, into which extend the trunnions 7, 7, upon which the rolls B, B, are mounted. The ends of the trunnions 7, 7, are free to slide along the ways 6, 6, and 6, 6, and are guided and held in position thereby. In the sleeves 3, 3 are formed suitable bearings for the shafts 4, 4, in which they are free to rock, the shafts 4, 4, being held in position longitudinally, or prevented from sliding in said bearings, by the collars 8, 8 having bearings against the carrier beds 1, 1.

The above described arrangement is such that each of the rolls B, B, is free to move vertically with the carrier bed 1, to rock laterally with the hollow shaft 4, and to vibrate along the ways 6, 6.

It will be noted that as shown in the drawings the fork 5 is bent upward so that the

under surface of the roll is substantially on a level with the center of shaft 4.

The vertical motion of the roll is the motion of compression, and may be conveniently secured as follows: Upon each of the roll carrier beds 1, 1, is a yoke 9, near its outer end, to which are secured the vertical rods 10, 10, one on each side of the carrier bed 1. To the vertical rods 10, 10, is secured the cross bar 11, to which is secured the vertical rod 12 which passes through the cross bar 13 and is secured to a cross bar 15. The vertical rods 14,14, are secured to cross bar 13 and passing through cross bar 15 are secured to a cross bar 16 which is secured to a bracket 17 on the frame A. A spring 18, coiled about rod 12, is interposed between cross bars 13 and 15. If desired other similar springs may be placed upon rods 14, 14. Pressure may be regulated by the threaded bolt 19 which extends through yoke 9 and bears upon carrier bed 1, the bolt 19 being provided with hand wheel 20, the arrangement being such that a rotation of wheel 20 raises or lowers yoke 9 and increases or diminishes the downward strain exerted by spring 18. The downward motion of the rolls is limited by means of the lateral arm 91 carried by the roll carrier bed 1, which (when the machine is not in operation), rests upon the head of a thread bolt 92, provided with a suitable threaded bearing in the frame A or the upright 93 thereon. The bolt 92 may be set at any desired height by rotating same in its threaded bearing, and the lowest point at which pressure can be exerted upon the rolls determined.

To vibrate the rolls B, B, we find the following to be a convenient form of mechanism: Embracing the roll B and suitably secured to the trunnion 7 is a light fork 21 secured to a rod 22 which passes through the hollow shaft 4 and is connected at the back of the machine with a lever 23 mounted upon a rock shaft 24 supported in suitable bearings in the frame A. The connection between rod 22 and lever 23 consists of the link 25 pivoted to lever 23 and to a collar 90, on rod 22, in which the rod 22 is free to rotate. This arrangement allows the tipping of the roll carrier bed and the rocking of the roll. A rocking motion is imparted to shaft 24 by the eccentric 26 and connecting levers 27 and 28. The eccentric 26 may conveniently be placed on a fly wheel 29 of sufficient weight to steady the motion and suitably counter weighted. The fly wheel 29 is mounted upon a shaft 83 having suitable bearings in the frame A and rotated by a belt on the fast and loose pulley 30.

A laterally rocking motion may be conveniently imparted to the rolls B, B, by the following mechanism: To each of the collars 8, 8, is secured a segmental gear 31 which meshes with a rack 32 carried by the sliding bar 33 for which suitable ways 45, 45 are provided between the parallel braces 34, 34 extending across the frame A and supported thereby. To the sliding bar 33 is pivotally secured the connecting rod 35, which connects the same with one arm of the bell crank lever 36 pivotally mounted at its angle on the rear brace 34. The other arm of the bell crank 36 is connected by the connecting rod 37 with the lever 38 rigidly secured to the rod 39 which is mounted in suitable bearings in the frame A in which it is free to rock. The lever 38 carries a cam roll 40 working in a cam path 41 on one of the faces of the wheel 42 which is keyed to a shaft 43 mounted in suitable bearings in the frame A in which it is free to rotate. The arrangement is such that as the wheel 42 rotates an oscillating motion is imparted to lever 38 which by means of bell crank 36 and the connecting rods 35 and 37 imparts a sliding or horizontally reciprocating motion to the bar 33 which by means of racks 32, 32, and segmental gears 31 and 31 imparts a laterally rocking motion to the leveling rolls B, B. It will be noted that each of the collars 8, 8, are adjustably secured to the hollow shafts 4, 4, by means of the set screws 46, 46 by which arrangement the roll may be given any predetermined inclination before being acted upon by the cam, which insures an even operation of the roll upon both sides of the shoe in cases where the bottom of the shoe is inclined to the spindle hole in the last. It will also be noted that the gears 31 and 31 are set in line with the bearings 2, 2, and 2, 2, of the roll carrier beds 1, 1, and that the peripheral faces of the gears 31, 31, are laterally curved or rounded off (see Fig. 7) to allow the tipping motion of the carrier beds 1, 1.

D, D represent the shoe supporting jacks, the form of which forms no essential part of our invention, but which may conveniently be of any suitable form. In the form of our invention shown in the drawings the jacks D, D have but one motion, to wit: a motion of longitudinal oscillation which presents each jack to its associated roll, but it is evident to one skilled in the art that each of the jacks D, D may be mounted in a pivoted carriage, and a laterally rocking motion imparted thereto, with slight changes in the mechanism herein shown and described, dispensing with the necessity of rocking the roll.

To present each jack to its associated roll while the other is in a convenient position for the removal of a shoe therefrom we have found the following to be a convenient mechanism: Mounted in the frame A, in suitable bearings, is a rock shaft 47 from which depends an arm 48 which is pivotally connected by a connecting rod 49 with a swinging lever 50, rigidly connected with lateral rod 53 near the bottom of the frame, which is mounted in suitable bearings in which it is free to rock. The lever 50 carries near its upper end a cam roll 51 working in the cam path 52 on the wheel 42, the arrangement being such that the rotation of wheel 42 imparts a swinging motion to lever 50 and by means of connecting rod 49 and arm 48 a rocking motion to the shaft 47.

As shown in the drawings the arm 48 is secured to shaft 47 by means of a sleeve 54 which is splined or otherwise rigidly connected therewith, but it is evident that this construction may be varied by loosely mounting the sleeve 54 upon the shaft 47 which may then be rigidly mounted in frame A, without effecting the operation of mechanism hereinafter described or departing from the principle of our invention. Upon each side of the sleeve 54 is a sleeve 55 which is free to turn upon the shaft 47. Upon the sleeves 55, 55 are rigidly mounted the jacks D, D, being preferably secured thereto at a point substantially under the toe rest. The sleeve 55 may be conveniently cast integral with the fixed portions of the jack D. Secured to the sleeve 54 by suitable brackets 56 56, is a tubular rod 57, in which work the sliding pinions 58, 58. On each of the sleeves 55, 55, is a rigid arm 59 in which is a socket 60, adapted to be turned thereby in front of the pin 58 and to receive the same. (See Fig. IV.) Each of the arms 59 is also provided with a segmental guard 61 (see Fig. V) which prevents the pin 58 from projecting beyond the inner face of the arm 59 except when it enters socket 60. Between the pins 58, 58, is a coiled spring 62 bearing against the inner end of each pin, the tendency of which is to push both pins out to the limit of their outward motion. Pivoted to each of the brackets 56, 56 is a pawl 63 one end of which extends into the tubular rod 57 (through a suitable slot) and the other is curved downwardly over sleeve 54 and projects beyond the same. (See Fig. I.) The end of the pawl 63 which enters the tubular rod 57 bears against a shoulder upon the pin 58 and controls its sliding motion. When the pawls 63, 63 are free, the pins 58, 58 are forced outward by the spring 62 into the socket 60, if in position to be engaged, otherwise against the segmental guards 61, 61. The wheel 42 carries, projecting beyond its periphery, the wedge shaped dog 84, and the pawls 63, 63 are so formed and arranged that if either of the pins 58 is in engagement with socket 60, the pawl 63 controlling that pin is in the path of the dog 84, and upon coming in contact therewith is turned thereby until the pin 58 is withdrawn and disengaged from the socket 60. When not engaged in sockets 60, 60, pins 58, 58 are pressed against the segmental guards 61, 61. The dog 84 is so placed upon the wheel 42 that contact with pawls 63, 63, occurs just before the rotation of wheel 42 is stopped by stop mechanism hereinafter described, sufficient time however being given before the wheel 42 stops to allow dog 84 to clear the pawls 63, so as to leave pins 58, 58 free to re-engage with sockets 60, 60. It will be noted that as the roll passes off the toe of the last the center of gravity of the jack falls outside of the point of support and if the pin 58 is not in engagement with the socket 60 the jack will fall outward. The outward motion of the jack is stopped, when the jack is in convenient position for the removal of a shoe therefrom, by means of a suitable rest, convenient to the bracket 64 which receives the falling jack upon a rest 65 mounted upon an elastic bearing (not shown) in the bracket 64, which takes up any jar that might occur from the falling jack. The correlative functions of parts above described can be better explained in connection with the description of the operation of the machine. The wheel 42 may be conveniently rotated by a worm gear 70 keyed or otherwise rigidly secured to shaft 43, and engaged by a worm 71 on the shaft 72, provided with suitable bearings in frame A, and conveniently rotated by belt on pulley 73. The gear 70 carries a dog 74 which engages with an arm 75 on the rod 76 mounted in suitable bearings in frame A in which it is free to rotate and slide. The rod 76 is connected with spring controlled clutch 78 by means of which the rotation of pulley 73 is communicated to shaft 72, the arrangement being such that engagement of dog 74 with arm 75 disengages clutch 78 and stops rotation of shaft 72. The arm 75 may be thrown out of engagement by rotating rod 76 in its bearings by means of treadle 96. We have not described clutch mechanism in detail as such mechanism is well known in the art and a description thereof may be found in our pending application for sole leveling machines, Serial No. 465,176, filed March 8, 1893, in which a suitable form is shown and described. It will be noted that in bell crank 36 there is a circular adjustment way 80 along which the connecting rod 35 may be adjusted and the amount of tip given to the rolls by the action of the cam regulated. It will also be noted that the arm 48 is provided with a circular adjustment way 81 along which the connecting rod 49 may be adjusted and the lengths of the oscillations of the jack regulated. The arc 81 may be struck, to make any point on the jack (for example the toe) a positive point for any adjustment, using rod 49 as a radius when arm 48 is in desired position. With regard to the shape of the cam paths 52 and 41, which control the oscillation of the jacks and inclination of the rolls it is evident to one acquainted with the art of leveling soles that many variations may be made therein and successful results secured, and it is further evident to a person skilled in the art that by varying the shape of the cam paths any combination of motions can be secured that can be obtained upon that class of machine in which said motions are directly under the control of the operator.

The operation of our improved leveler so far as the same need be set forth in the present application is described as follows: Presuming both jacks to rest upon the rests 65, 65 and power to be applied to the pulleys 30 and 73, a shoe upon its last is placed upon one of the jacks D, the desired set is given to the roll B by means of the set screw 46, 46, the oscillating mechanism adjusted to properly present the shoe to roll, by means of the ad-

justment slot 81, and the roll rocking mechanism adjusted to give proper inclination to the roll by the adjustment slot 80. The vibrating mechanism being set in operation to vibrate the roll B, B, the operator raises the jack B until the pin 58 (which slides along the segmental guard 61) engages with the socket 60. He then starts the wheel 42 by a downward pressure on the treadle 96 which sets in operation the mechanisms for rocking the roll B and oscillating the jack D to present it to the roll. The operator then places a shoe upon the other jack (in practice laying the channel after the shoe is placed upon the jack). In the meantime the wheel 42 is completing its rotation and the connected mechanism performing the operation of leveling, which is completed during a single rotation. As the wheel 42 approaches the end of a rotation the dog 84 engages with the pawl 63 and by turning the same disengages the pin 58 from the socket 60, and the cam path 52 being so formed and timed that the roll B is then passing, or has just passed off of the toe of the last, the jack D falls on to the rest 65 into a convenient position for the removal of the shoe therefrom. The operator then raises the other jack until it is connected with the oscillating mechanism, and, leaving same to the action of the machine, proceeds immediately to remove the finished work from the first jack. These operations may be repeated indefinitely, the jacks acting alternately and the proper adjustments being made from time to time to accommodate the operation of the machine to different sizes and shapes of last.

The operation of the several parts not specifically described above has already been sufficiently described in connection with the description of their form and arrangement already hereinbefore given. We wish however to say that by means of the upward bend in fork 5, 5, we bring the centers of the rolls B, B, above the centers of the shafts 4, 4, which are their tipping or rocking centers, which produces a more even working of the rolls when changing their lateral inclination, the rolls sliding along the surface of the sole rather than raising themselves on the same during the operation of tipping. It will be readily seen that by this arrangement the variation between the amount of pressure at the edges and in the center will be greatly reduced and the roll will more nearly center itself upon the shoe.

Having fully described our invention and the operation and method of using the same, we claim as novel and desire to secure by Letters Patent—

1. In a sole leveling machine, the combination of two shoe-supporting jacks, a vibrating leveling roll, associated with each jack, and means common to both jacks for automatically presenting each jack independently to its associated roll when the jack is brought into operative position, substantially as described.

2. In a sole leveling machine the combination of two shoe supporting jacks, a vibrating leveling roll associated with each jack, mechanism for changing the relative lateral inclination of the rolls and jacks, mechanism for oscillating the jacks under the rolls and connected mechanism operating automatically to disconnect each jack from the oscillating mechanism, substantially as described.

3. In a sole leveling machine having a vibrating leveling roll and shoe supporting jack, mechanism for oscillating the jack under the roll consisting of a rocking member and suitable connections with the jack, a rigid arm dependent from said rocking member, a circular adjustment slot in said arm, a cam actuated swinging lever, a connected rod pivotally secured to the swinging lever and pivotally and adjustably secured in the circular adjustment slot all substantially as described.

4. In a sole leveling machine having a vibrating leveling roll, mechanism for laterally rocking the leveling roll consisting of a suitable roll carrier, a segmental gear having a laterally curved peripheral face adapted to rock the roll carrier, a sliding rack engaging with said gear and mechanism for actuating said rack, substantially as described.

5. In a sole leveling machine, the combination of a vibrating leveling roll, a shoe supporting jack, a cam and connected mechanism for oscillating the jack under the roll, means for operating the cam, and a clutch mechanism actuated by the cam operating means, arranged to stop the rotation of the cam when the jack is in a convenient position for the removal of a shoe therefrom, substantially as described.

6. In a sole leveling machine the combination of a laterally rocking roll carrying yoke, longitudinal guide ways in the yoke above its rocking axis, and a leveling roll mounted upon and free to rotate about a trunnion, the opposite ends of which are supported by and reciprocate along said guide ways, substantially as described.

7. In a sole leveling machine the combination of a vibrating leveling roll having a predetermined normal lateral inclination or permanent set, mechanism for changing its lateral inclination, and means for adjusting the normal inclination or permanent set of the roll when not acted upon by said mechanism, substantially as described.

8. In a sole leveling machine having two shoe supporting jacks and a vibrating leveling roll associated with each jack, the combination of a rocking member, means for actuating the same, two sleeves, arranged to tip on the rocking axis of the rocking member, upon which the jacks are mounted and mechanism for locking the sleeves to the rocking member, substantially as described.

9. In a sole leveling machine the combina-

tion of two shoe supporting jacks, a vibrating leveling roll associated with each jack, a rocking member and mechanism for actuating the same, two sleeves, adapted to tip on the rocking axis of the rocking member, upon which the jacks are mounted, mechanism for locking the sleeves to the rocking member and mechanism operating automatically to unlock the sleeves from said member leaving the same free to rock independently thereof, substantially as described.

10. In a sole leveling machine having a vibrating leveling roll and shoe supporting jack, a swinging arm, for oscillating the jack, having a circular adjustment way arranged to present a predetermined point on the jack to the roll at the same time, relative to the operation of the machine, for any length of oscillation of the jack, substantially as described.

11. In a sole leveling machine having a vibrating leveling roll, the combination with suitable mechanism for changing the lateral inclination of the roll, of a pivotally supported bell crank having in one arm a circular adjustment way for adjusting said mechanism, substantially as described.

12. In a sole leveling machine the combination of a rocking member, two sleeves loosely mounted on the shaft supporting said member, a socket in each of said sleeves, sliding spring pressed pins on the rocking member adapted to engage with said sockets, suitably placed pivoted pawls for disengaging said pins and mechanism for actuating said pawls substantially as described.

13. In a sole leveling machine the combination of a vibrating leveling roll and a shoe supporting jack and connected mechanisms operating automatically to present the jack, when brought into operative position, to the roll and to return the jack after the operation of the roll thereon into a convenient position for the removal of a shoe therefrom.

14. In a sole leveling machine having a vibrating leveling roll mounted in a suitable roll carrier, the combination of a spring secured to a fixed support for automatically applying pressure to the roll, and an adjustable stop for limiting the downward action of said spring, substantially as described.

15. In a sole leveling machine having a vibrating leveling roll and shoe supporting jack, mechanism for oscillating the jack under the roll consisting of a suitably formed cam and means for rotating the same, a connecting rod adapted to be longitudinally reciprocated by the rotation of the cam, a swinging lever connected with the jack and pivotally connected with the connecting rod, substantially as described.

16. In a sole leveling machine, the combination with a vibrating leveling roll, of a shoe supporting jack, mechanism for variably oscillating the jack under the roll, and means for automatically supplying pressure to the roll during the variable movement of the jack, substantially as described.

17. In a sole leveling machine, the combination with a vibrating leveling roll and its carrier, of mechanism for vibrating the roll, and means for laterally rocking the roll comprising a gear extension on the carrier and a reciprocating rack engaging the gear extension, substantially as described.

18. In a sole leveling machine, the combination of two shoe supporting jacks, a vibrating leveling roll associated with each jack, and connected mechanisms operating automatically to change the relative lateral inclination of the rolls and jacks, and to present each jack, after it has been brought into operative position, to its associated roll, while the other jack is left in a convenient position for the removal of a shoe therefrom, substantially as described.

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

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