(No Model.) 3 Sheets—Sheet 1.

E. C. JUDD & F. W. COY

VARIABLE MOTION MECHANISM FOR SOLE LEVELING OR OTHER MACHINES.

No. 545,407. Patented Aug. 27, 1895.

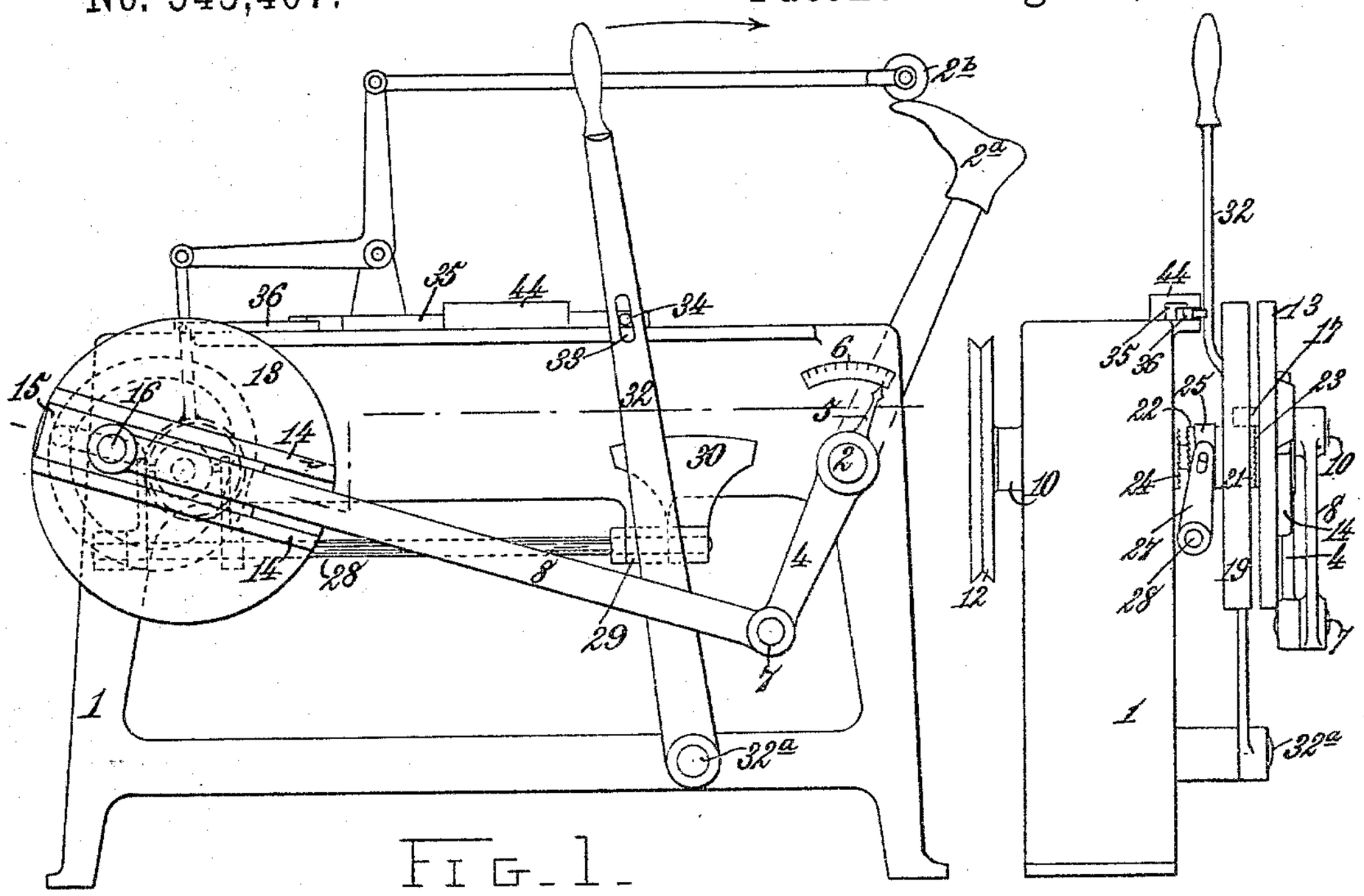

FIG. 1.

FIG. 2.

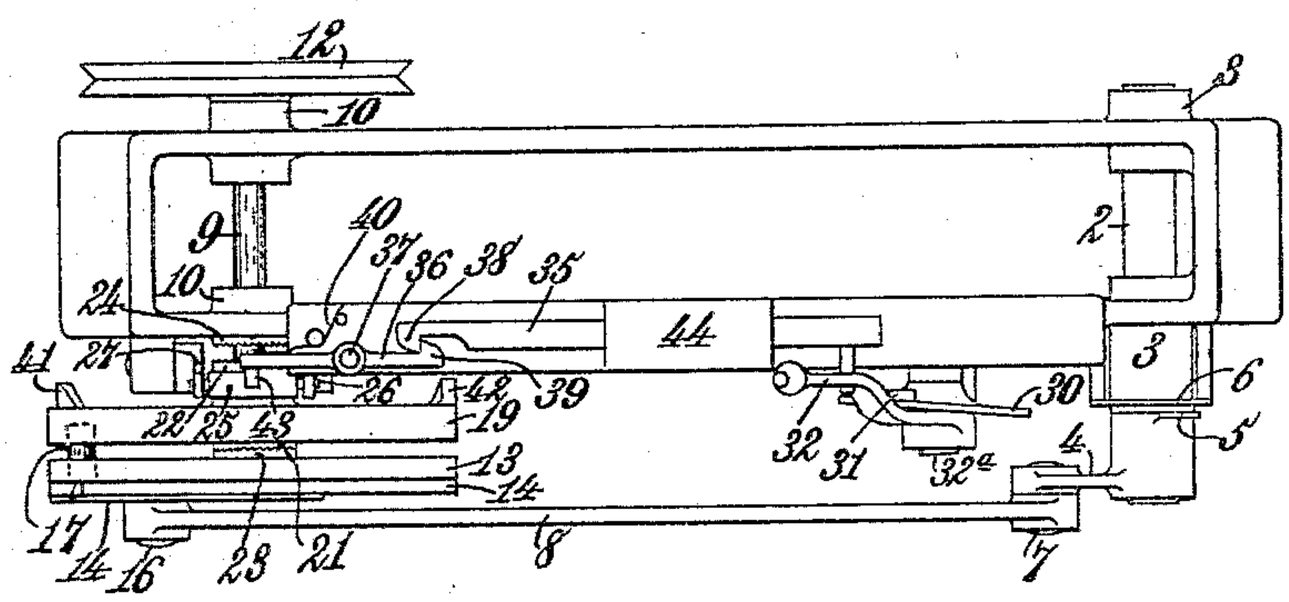

FIG. 3.

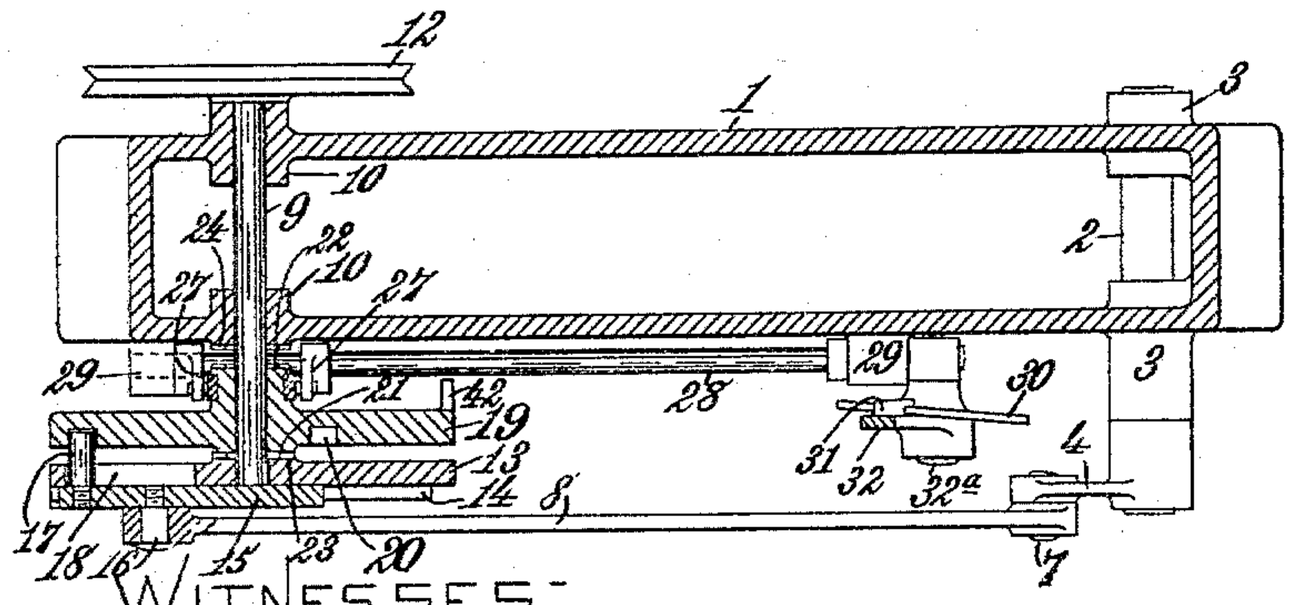

FIG. 4.

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(No Model.) 3 Sheets—Sheet 2.

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VARIABLE MOTION MECHANISM FOR SOLE LEVELING OR OTHER MACHINES.

No. 545,407. Patented Aug. 27, 1395.

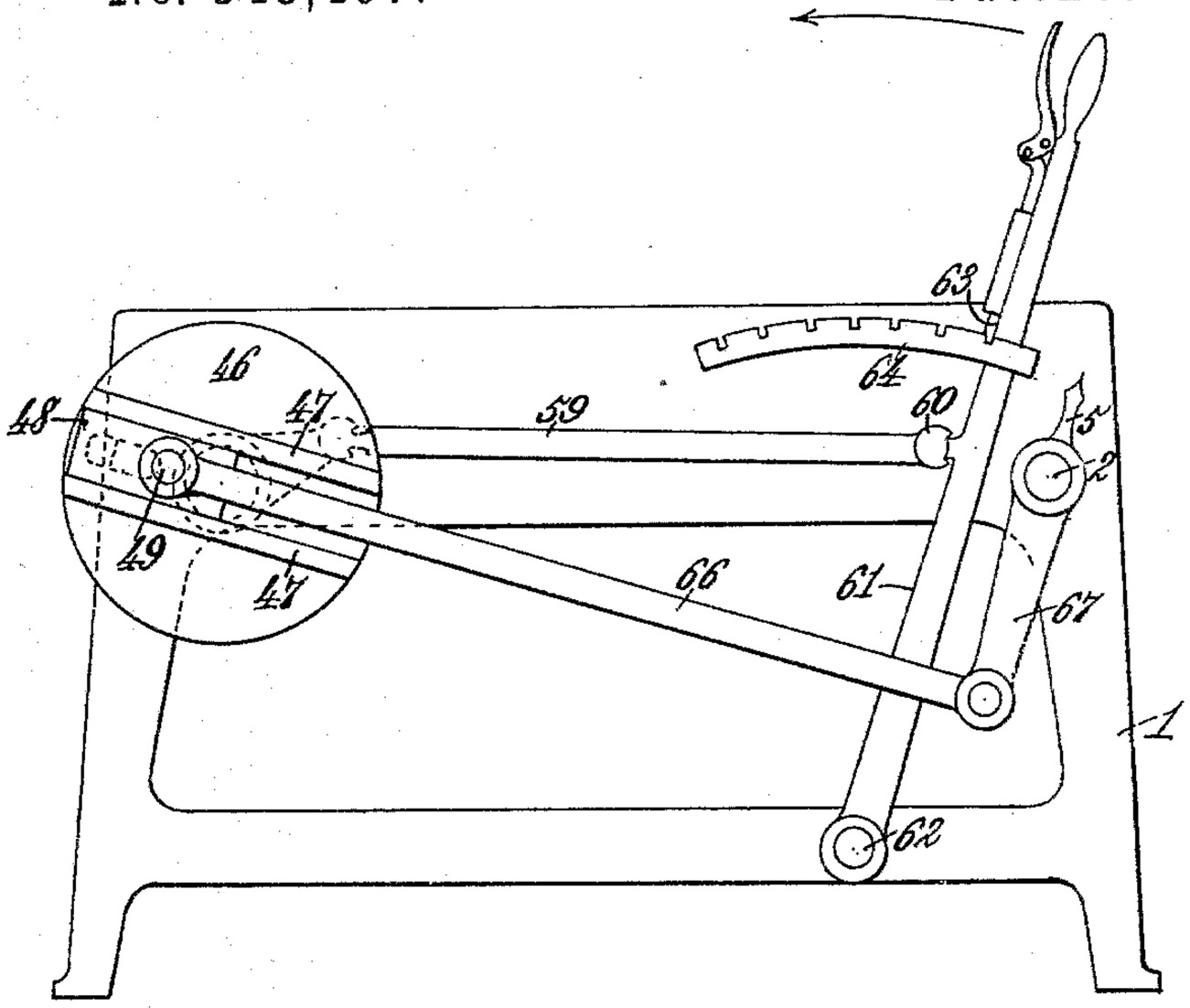

FIG. 5.

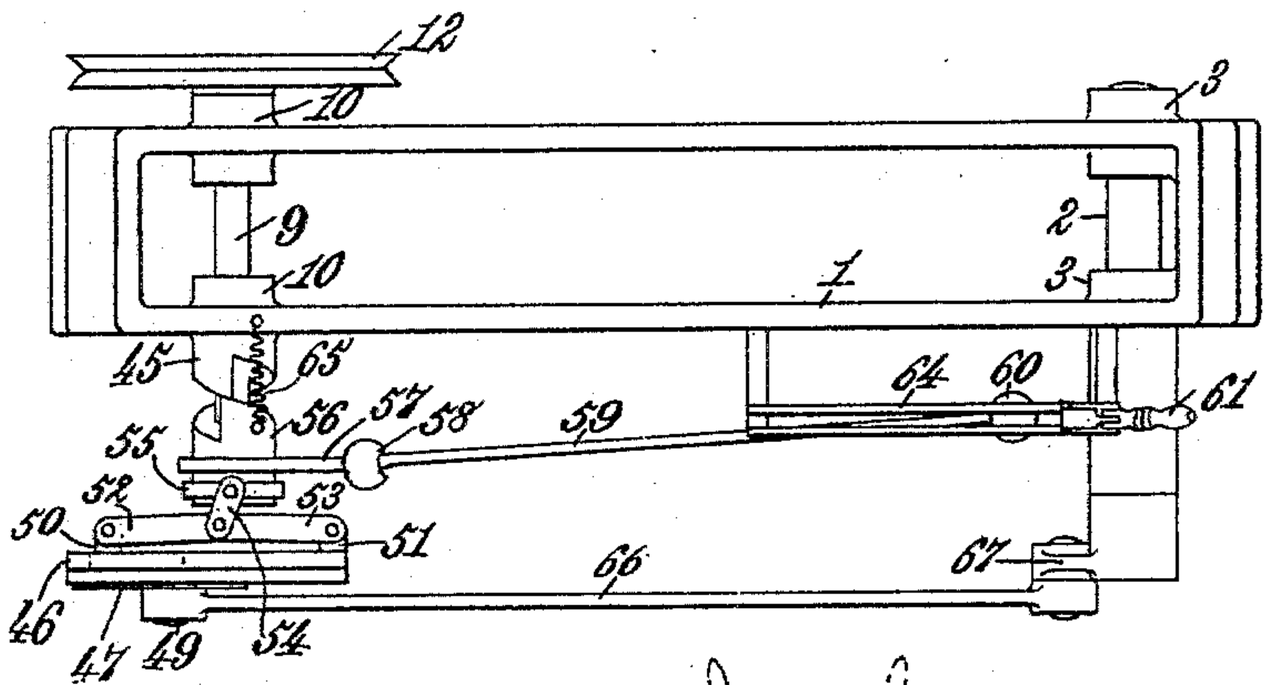

FIG. 6.

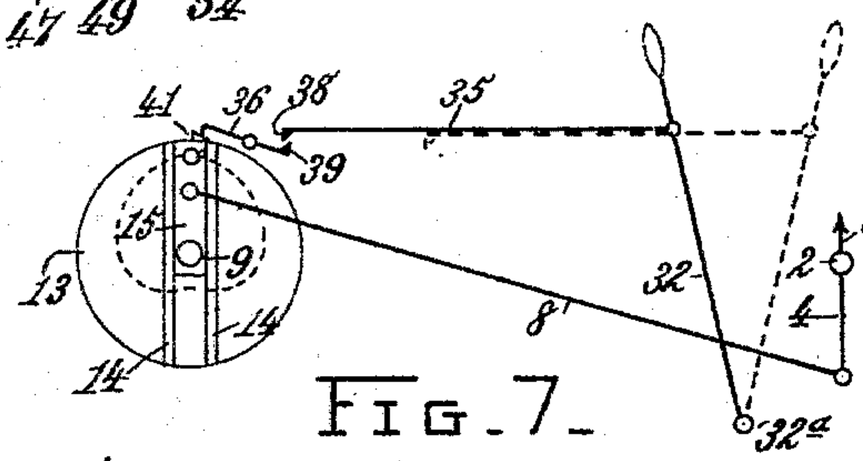

FIG. 7.

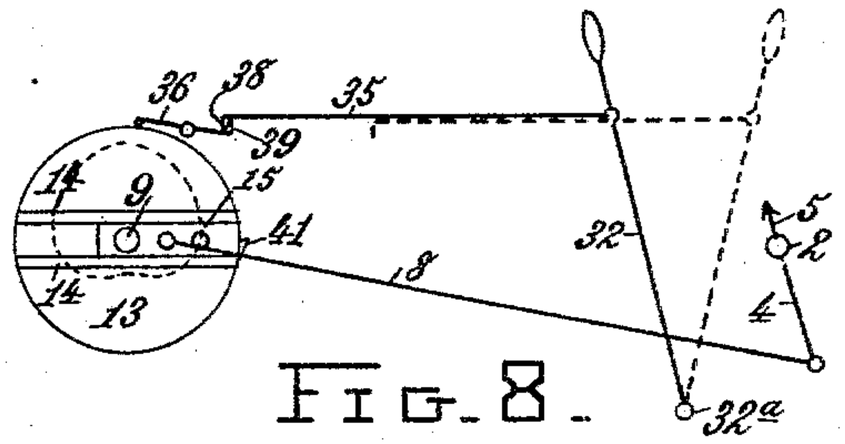

FIG. 8.

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(No Model.) 3 Sheets—Sheet 3.

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VARIABLE MOTION MECHANISM FOR SOLE LEVELING OR OTHER MACHINES.

No. 545,407. Patented Aug. 27, 1895.

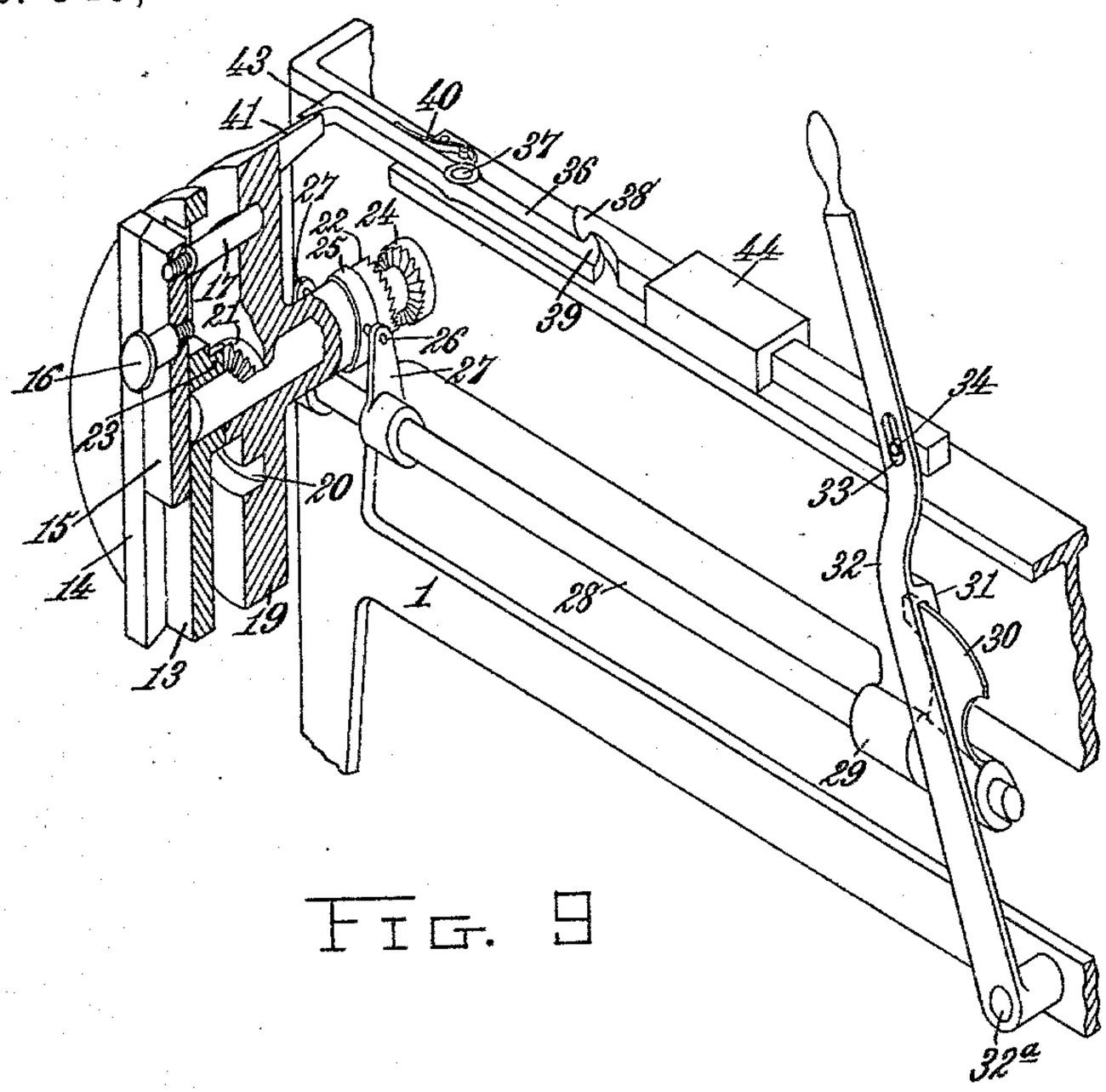

FIG. 9

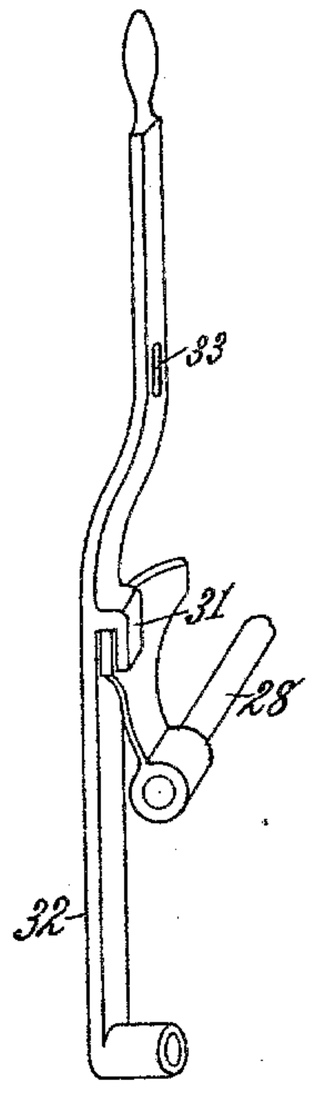

FIG. 10

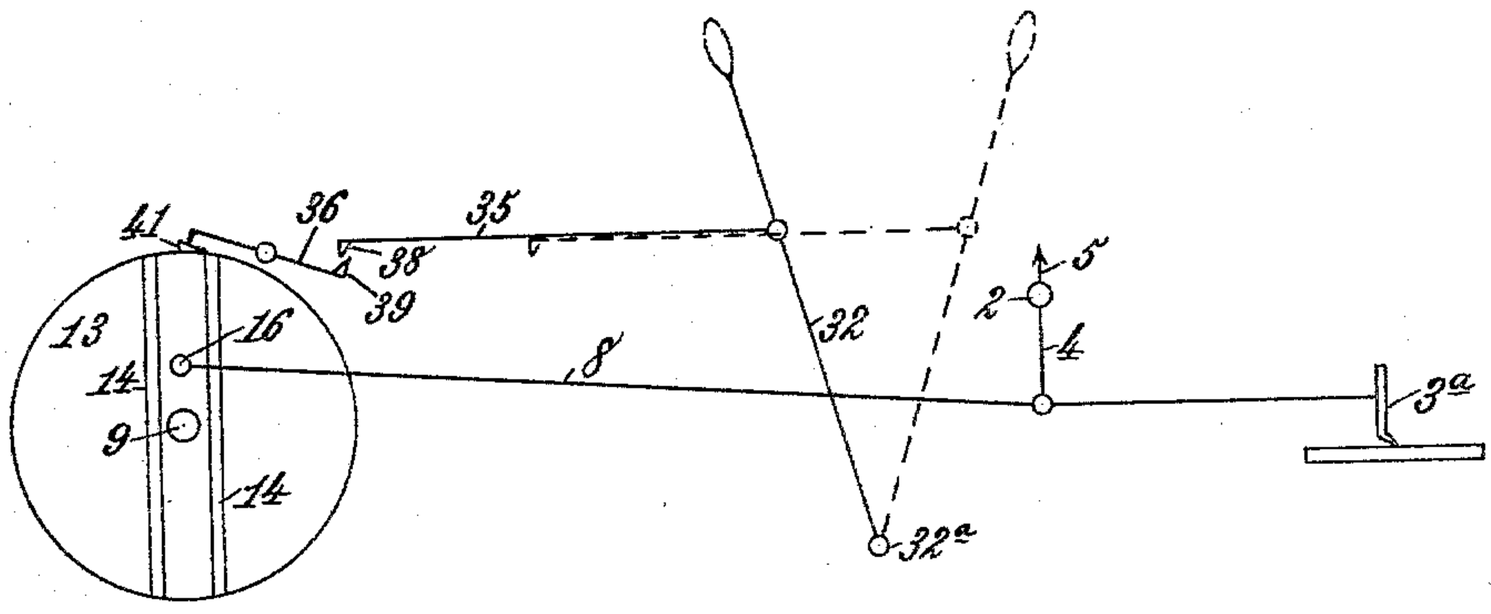

FIG. 11

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UNITED STATES PATENT OFFICE.

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SAID COY ASSIGNOR TO SAID JUDD.

VARIABLE-MOTION MECHANISM FOR SOLE-LEVELING OR OTHER MACHINES.

SPECIFICATION forming part of Letters Patent No. 545,407, dated August 27, 1895.

Application filed April 4, 1895. Serial No. 544,479. (No model.)

To all whom it may concern:

Be it known that we, EDWARD C. JUDD and FREDERICK W. COY, citizens of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Variable-Motion Mechanism for Sole-Leveling and other Machines, of which the following is a specification.

This invention relates to power-driven mechanism for imparting an oscillatory or reciprocatory motion to a mechanical device through the medium of connections with a rotary power-shaft.

The chief object of our present invention is to provide new and improved means for changing or varying the extent of travel or the stroke of the oscillatory or reciprocatory device or member without stopping or interfering with the rotation of the power-shaft, whereby an attendant or workman can, without leaving or moving from his proper position in performing the work in hand, cause the extent of travel or the stroke of the oscillatory or reciprocatory device or member to change or vary according to the conditions required in operating on different kinds of work or upon objects which vary in dimensions or size.

The invention is particularly designed for machines adapted to level the soles of boots and shoes by the movement of a jack under a sole-leveling roll or rolls; but the invention is useful in machines for molding the soles of boots and shoes, shaping and finishing metal work, and generally in machines wherein it is desirable to change or vary the extent of motion or travel or the stroke of oscillatory or reciprocatory devices or members—as, for example, the jack on which a shoe is mounted—or the sole-leveling roll or rolls which reciprocate or vibrate over the jack.

To accomplish the object above stated, the invention involves the features of construction, the arrangement or combination of devices, and the principles of operation hereinafter described, and pointed out in the claims, reference being made to the accompanying drawings, in which—

Figure 1 is a side elevation of sufficient of a machine to illustrate our invention. Fig. 2 is a rear end elevation of the same, omitting the leveling-roll and the shoe-jack, which are represented in Fig. 1. Fig. 3 is a top plan view of the same, omitting the reciprocating or vibrating leveling-roll and the shoe-jack, which are represented in Fig. 1. Fig. 4 is a horizontal sectional view taken on the line 4 4, Fig. 1, omitting the shoe-jack and the devices for reciprocating or vibrating the leveling-roll, which are represented in Fig. 1. Fig. 5 is a side elevation showing a modification of our invention. Fig. 6 is a top plan view of the same. Figs. 7 and 8 are diagrams hereinafter explained. Fig. 9 is a sectional perspective view of a portion of the machine to more clearly illustrate some of the operative parts. Fig. 10 is a detail view of the hand-lever and the inclined plate of the rock-shaft to more clearly show the action of the hand-lever and the inclined plate, and Fig. 11 is a diagram of a modification hereinafter explained.

The present invention is particularly designed for those machines wherein the travel of an oscillatory or reciprocatory device or member is changed or varied with greater or less frequency to adapt the oscillatory or reciprocatory device or member to the particular work in hand—as, for example, where different objects or work to be operated upon differ in dimensions or size, as in a shaper for finishing metal work and in a sole-leveling machine where it is desirable or necessary to frequently change the travel of a shoe-jack to operate on shoes which differ or vary in size.

The numeral 1 indicates the main frame of a machine having an oscillatory or reciprocatory device or member, which, in the present example of our invention, is composed of a rocking-shaft 2, journaled in bearings 3 on the main frame, and having at one end a crank-arm 4, provided with an index or pointer 5, adapted to move or travel over or in juxtaposition to a segmental or other suitable graduated or scale plate 6, suitably supported on the main frame of the machine.

The crank-arm 4 is pivotally connected, as at 7, with one end of a link or pitman 8, which, at its other end, has a crank connection with a power-transmitting shaft 9, journaled in

bearings 10 on the main frame, and designed to be rotated by any suitable power—such, for example, as a belt-pulley 12 adapted to be belted to a motor or engine of any desired type.

The crank connection between the link or pitman 8 and the primary power-shaft 9 is composed of a disk or wheel 13, having parallel guide-strips 14, extending diametrically across its outer face, and between which a plate 15 is adapted to move or slide. The plate is provided with a crank or wrist pin 16, with which one end of the link or pitman 8 is connected in such manner that when the primary power-shaft is rotated the link or pitman 8 is moved back and forth, the crank-arm 4 is swung like a pendulum, and the device or member 2^a is oscillated or reciprocated.

The index or pointer 5 and graduated plate 6 indicate the extent of motion or travel or the stroke of the oscillatory or reciprocatory device or member 2^a. In order to vary the extent of motion or travel or the stroke of the oscillatory or reciprocatory device or member 2^a, the crank connection between the link or pitman 8 and the primary power-shaft 9 is rendered adjustable relatively to the geometrical axis of the shaft, so that, according to the position of the crank connection with relation to the center of the shaft, the extent of motion or travel or the stroke of the oscillatory or reciprocatory device or member is increased or diminished to suit the conditions required in operating upon different kinds of work or upon objects which differ or vary in dimensions or size.

It is very desirable to enable the extent of motion or travel of the device or member 2^a to be changed or varied at the will of the operator or workman without stopping the motion of the power-shaft, and without the necessity of the operator or workman moving from his proper position in inspecting and controlling the work in hand; and to accomplish this object we adjust the crank connection through the medium of devices operated by motion of the rotary shaft, as will now be explained in detail.

The slidable plate 15 is provided with a pin 17, extending through a radial slot 18 in the disk or wheel 13 and engaging a cam mounted on the shaft 9 and composed of a disk or wheel 19, having a cam-groove 20 into which the pin 17 projects. The hub of the disk or wheel 19 is provided at one side with a clutch-section 21, and at the opposite side with a clutch-section 22, in such manner that if the disk or wheel 19 is shifted in one direction, the clutch-section 21 will engage a clutch-section 23 on the inner face of the disk or wheel 13, while if the disk or wheel 19 is shifted in the opposite direction, the clutch-section 22 will engage a clutch-section 24 on the main frame of the machine. The inner end of the hub of the disk or wheel 19 is provided with a circular groove, in which is arranged a collar 25, having oppositely projecting pins 26 entering eyes in arms 27, which are rigidly secured to a longitudinal rock-shaft 28. The rock-shaft is journaled in bearings 29 on the main frame, and the front end of the rock-shaft is provided with an inclined or diagonally-arranged plate 30, engaging an inclined guide 31 on a hand-lever 32, which is pivoted, as at 32^a, to the main frame of the machine, so that a swinging motion of the hand-lever causes the inclined guide 31 to so act on the inclined plate 30 as to rock the shaft 28 in one or the other direction, thereby shifting the disk or wheel 19 on the power-shaft 9. If the hand-lever 32 is shifted toward the front end of the machine or in the direction of the arrow, Fig. 1, the rock-shaft 28 will be turned in the direction to cause the clutch-section 22 to engage the clutch-section 24 on the main frame. By this means the disk or wheel 19 will be locked stationary, but the shaft 9 and disk or wheel 13 will continue to rotate, and consequently the pin 17, traversing the cam-groove 20, will cause the plate 15 to slide and adjust the crank or wrist pin 16 relatively to the geometrical axis of the power-shaft. If the hand-lever 32 is shifted toward the rear end of the machine or in the direction opposed to the direction of the arrow, Fig. 1, the disk or wheel 13 will be shifted outwardly on the power-shaft 9, and a clutch-section 21 will be engaged with the clutch-section 23 of the disk or wheel 13, thereby causing the two disks or wheels 13 and 19 to be locked together and to rotate in unison with the power-shaft.

The hand-lever 32 is provided at a point above the inclined or diagonal plate 30 with a longitudinal slot 33, into which projects a pin 34 extending from a sliding bar or rod 35. The rear end of the bar or rod 35 is constructed to engage and disengage a lever 36, pivoted intermediate its extremities, as at 37. The means for connecting and disconnecting the bar or rod 35 and the lever 36 consists of a hook 38 on the rear end of the bar or rod 35, and a hook 39 on the front end of the lever 36. The hook of the lever 36 is normally held in engagement with the hook of the bar or rod 35 by a spring 40. The lever 36 is automatically disengaged from the bar or rod 35 at recurring intervals through the medium of tappets or inclined lugs 41 and 42, secured to and projecting from the inner face of the disk or wheel 19. The tappets or inclined lugs are so placed that when the disk or wheel 19 rotates they will strike a pin 43 projecting from the rear end of the lever 36, and shift this lever so that its hooked end 39 is disengaged from the hooked end of the bar or rod 35. When this occurs, the lever 32 can be shifted for the purpose of adjusting the position of the crank connection relatively to the axis of the primary power-shaft and thereby changing the extent of motion or travel or

the stroke of the oscillatory or reciprocatory device or member 2^a.

The sliding bar or rod 35 is guided in a suitable bearing 44, secured to the main frame of the machine.

The crank or wrist pin 16 is offset sufficiently far from the pin 17 that when the latter is at a point in the cam-groove nearest the center of motion or rather nearest the axis of the primary power-shaft 9, the crank or wrist pin 16 is directly at the center of motion or coincident with the axis of the primary power-shaft. In consequence of this if the disk or wheel 19 is engaged with the disk or wheel 13, through the medium of the clutch-sections 21 and 23, no motion of the crank-arm 13 can take place, although the primary power-shaft continues to rotate. If the disks or wheels 13 and 19 are engaged while the pin 17 is at any other part of the cam-groove, a corresponding length of travel or throw of the crank or wrist pin 16 occurs, and through the connections hereinbefore explained the movement of the oscillatory or reciprocatory device or member 2^a will be governed, and the length of this motion or throw will be indicated by the pointer or index 5 and graduated plate 6.

When it is desired to change the extent of motion or travel or the stroke of the oscillatory or reciprocatory device or member 2^a, the hand-lever 32 is shifted in the direction of the arrow, Fig 1, at the time that one of the tappets or inclined lugs 41 and 42 strikes the pin 43 and disengages the hook 39 of the lever 36 from the hook 38 of the sliding bar or rod 35. As the hand-lever 32 is shifted forward, as described, the inclined plate 30 is moved laterally and the shaft 28 is rocked in its bearings in the direction required to adjust the disks or wheels 13 and 19, and moves the clutch-section 22 of the disk or wheel 19 into engagement with the clutch-section 24 on the main frame. The disk or wheel 19 will then be held stationary, but the shaft 9 and disk or wheel 13 will continue to rotate, so that the pin 17 traverses the cam-groove and changes the distance of the crank or wrist pin relatively to the center of motion or the geometrical axis of the primary power-shaft. When the required amount of motion or travel of the oscillatory or reciprocatory device or member 2^a is secured, which is determined by watching the pointer 5, the hand-lever 32 is shifted rearward, and the disks or wheels 13 and 19 are engaged, so that the length of motion or travel of the oscillatory or reciprocatory device or member 2^a is fixed until it is again necessary to change the extent of motion or travel of said device or member. This mode of operation is diagrammatically illustrated in Figs. 7 and 8, which indicates the change from the extreme motion or extent of travel of the oscillatory or reciprocatory device or member to about one-half the extent of motion or travel of the same.

The oscillatory or reciprocatory device or member 2^a is designed to operate any mechanical contrivance—such, for example, as a shoe-jack 2^a, Fig. 1, which is to be oscillated or rocked or reciprocated longitudinally under a sole-leveling roll or rolls, as at 2^b, Fig. 1. If a shoe-jack is mounted on the oscillatory or reciprocatory device or member 2^a, the necessary extent of motion or travel of the jack for enabling the sole-leveling roll or rolls to operate upon long or short shoes can be governed by the attendant or workman without leaving his position at the front of the machine and without stopping the motion of the primary power-shaft.

If the invention is used in a sole-leveling machine, as in Fig. 1, the sole-leveling roll 2^b will be reciprocated or vibrated through the medium of any suitable connections with the power-shaft 9. Further description in this connection is deemed unnecessary, as sole-leveling machines having reciprocating or vibrating leveling-rolls are well known.

It is proposed to use the link or pitman 8 for controlling the rectilinearly-reciprocating movement of any device or member which is to be reciprocated in a right line. We have illustrated this feature diagrammatically in Fig. 11, where the numeral 8 indicates the link or pitman, 5 the index or pointer, and 3^a the device, member, or tool which is to be reciprocated in a right line. In this diagram, Fig. 11, the other parts which are designated by reference-numerals are the same as corresponding parts shown in Figs. 1 and 2, and hereinbefore described in detail.

In Figs. 1 to 4, inclusive, a plain-faced cam in the form of a groove 20 in a disk or wheel 19 is shown for the purpose of changing the extent of motion or travel, after which this cam is locked in the required position. Obviously various-shaped cams can be used whenever it is desirable to provide an extreme movement varying in speed at different points in the revolution, which would be the result if the cam disk or wheel 19 was thrown back against the main frame of the machine, and the pin 17, moving in the cam-groove 20, would vary in distance from the center of the shaft 9, and have corresponding effect on its connections with the oscillatory or reciprocatory device or member.

In the modifications 5 and 6 the extent of motion or travel of the oscillatory or reciprocatory device or member 2^a is effected in the following manner: The main frame is provided with a sleeve 45, the acting face of which is helical. The disk or wheel 46, corresponding to the disk or wheel 13, Figs. 1 to 4, inclusive, is mounted on the primary power-shaft 9, and is provided on its outer face with parallel guide-strips 47, between which a plate 48 is adapted to slide. The slidable plate 48 is provided with a crank or wrist pin 49, and with an inwardly-projecting arm or lug 50, movable in a radial slot, like radial slot 18 of the disk or wheel 13. The disk or wheel is also provided with a fixed arm or lug

51, and to the lugs or arms 50 and 51 are respectively pivoted toggle-levers 52 and 53, jointed at their adjacent or contiguous ends to a link 54, which is pivotally connected with a collar 55, adapted to turn in a circular groove in a sleeve 56, mounted on the shaft 9. The acting face of the sleeve 56 is helical, and runs in a direction opposed to the helical face of the sleeve 45 on the main frame. The sleeve 56 is provided with an arm 57, which connects by a ball-and-socket joint 58 with one end of a bar or rod 59, the other or front end of which connects by a ball-and-socket joint 60 with a hand-lever 61, pivoted, as at 62, to the main frame of the machine. The hand-lever 61 is provided with a spring-latch 63, adapted to co-operate with a notched segment 64 on the main frame. The sleeve 56 is drawn into engagement with the sleeve 45 through the medium of a suitable spring 65, connected at one end with the main frame and at the other end with the sleeve 56. The crank or wrist pin 49 connects with a link or pitman 66 for swinging a crank-arm 67 fixed to the oscillatory or reciprocatory device or member 2^a, as described with reference to Figs. 1 to 4, inclusive.

If the hand-lever 61 is shifted in the direction of the arrow, Fig. 5, the helical sleeve 56 is held in engagement with the helical sleeve 45, through the medium of the spring 65, and the slidable plate 48, which carries the crank or wrist pin 49 is drawn toward the center of motion or the axis of the shaft 9 by the toggle-levers 52 and 53 and link 54. By this means any motion or travel of the crank or wrist pin, from a point in which there is no throw whatever to the point of extreme throw, can be governed at the will of the operator by shifting the hand-lever and causing the spring-latch to engage the proper notch in the quadrant.

The sleeve 56 is susceptible of sliding along the length of the shaft 9, and is also adapted to rotate on said shaft.

We believe that we are the first to change or vary the extent of motion or travel or the throw of an oscillatory or reciprocatory device or member at the will of the operator without stopping or interfering with the rotation of the power-transmitting shaft, and therefore we do not wish to be understood as confining ourselves to the specific construction and arrangement of devices for accomplishing the result stated, as other arrangements for the same purpose may be employed without affecting the spirit of our invention.

If our invention is applied to a machine for leveling the soles of boots and shoes and it is desired to change or vary the extent of motion or the stroke of the shoe-jack, the operator is not required to interfere with the operation of the machine by stopping the rotation of the main power-shaft, but through the medium of the hand-lever can make any desired change in the extent of travel of the jack from a dead-center to the utmost limit of the travel without in any manner interfering with or stopping the rotation of the power-shaft. The extent of travel of the jack can be varied almost instantly to accommodate the machine to large or small shoes. For instance, a shoe size No. 6 does not require so much travel of the jack as a shoe size No. 8. By means of the dial and pointer any size can be quickly arranged for, and the operator does not require to shift the belt, stop the machine, and pass around behind the same with a wrench and make adjustments necessary to change or vary the extent of travel or the stroke of the jack.

In our present invention it is possible to throw the jack rearward toward the operator with the shoe and last on the jack practically out from under the roll, in which position the jack can be held motionless until the operator performs any work necessary. At the same time the power-shaft continues to rotate, and all or nearly all the other parts of the machine are in operation, and the leveling-roll—one or more—is reciprocating or vibrating ready to be brought into contact with the shoe-sole whenever the operator desires.

Having thus described our invention, what we claim is—

1. The combination of an oscillatory or reciprocatory device, a driving-shaft, a crank or wrist-pin adjustably connected with the driving-shaft, a cam shiftable along the length of the shaft and in operative connection with the crank or wrist-pin for adjusting the latter relatively to the center of motion, means for shifting and holding the cam stationary in connection with the crank or wrist-pin while the latter and the shaft rotate, and means for shifting the cam and locking it and the crank or wrist-pin together when the desired adjustment of the crank or wrist-pin is effected.

2. The combination of an oscillatory or reciprocatory device, a driving-shaft, a disk or wheel secured to the driving-shaft and having an adjustable crank or wrist-pin, a connection between the oscillatory or reciprocatory device and the crank or wrist-pin, crank or wrist-pin adjusting-devices mounted on the driving-shaft and adapted to be thrown into and out of engagement with the said shaft, a lever, a rod connected with the lever, and a lever detachably connected with the rod and actuated at intervals by a part of the crank or wrist-pin adjusting-devices mounted on the driving shaft, for severing and establishing the operative connection between the detachably connected rod and lever.

3. The combination of a rotary driving-shaft, a radially adjustable crank or wrist-pin connected with the driving-shaft, a cam loosely mounted on the driving-shaft, movable along the length thereof and normally held in engagement with the driving-shaft and with a part of the crank or wrist-pin, devices for shifting the cam on the shaft and locking said cam thereto and in engagement with a part of the crank or wrist-pin, devices for locking the cam stationary in operative connection

with the crank or wrist-pin while the latter and the driving-shaft continue to rotate, and lever mechanism for shifting the cam on the driving-shaft from one of said locking devices to the other.

4. The combination with a machine having an oscillatory or reciprocatory device or member, and a rotary-shaft, of a disk or wheel fixed to the shaft and having an adjustable crank or wrist-pin in operative connection with the oscillatory or reciprocatory device or member, a cam movable along the length of the shaft and engaged with a part of the crank or wrist-pin for adjusting the latter relatively to the center of the shaft, a rock-shaft having devices connecting it with the cam for shifting the latter along the length of the rotary-shaft toward and from the disk or wheel which carries the crank or wrist-pin, a lever engaged with a part of the rock-shaft for turning the latter to shift the cam when said lever is actuated, and means for locking the cam either to the disk or wheel or to a fixed part of the frame.

5. The combination with a machine having an oscillatory or reciprocatory device or member, and a rotary-shaft, of a disk or wheel fixed to the shaft and provided with a radially adjustable crank or wrist-pin, a cam shiftable on the shaft and acting upon the crank or wrist-pin to adjust the latter relatively to the center of the shaft, a clutch for connecting and disconnecting the cam and the disk or wheel, a clutch for connecting and disconnecting the cam and a fixed object, a pivoted swinging lever, and connections between the lever and the cam for shifting the latter on the rotary shaft to engage one or the other clutch.

6. The combination of a rotary-shaft carrying a shoe-jack, a leveling-roll under which the shoe-jack oscillates, travel or stroke-changing mechanism in operative connection with the rotary-shaft and actuated whenever required by a moving part of the machine to change or vary the extent of motion or travel of the jack without stopping the operation of the power-transmitting shaft, an index or scale, and a pointer moved by the travel or stroke-changing mechanism over the index or scale to indicate the extent of motion of the oscillatory shaft which carries the shoe-jack.

7. The combination with a machine having an oscillatory or reciprocatory device or member, and a rotary-shaft, of a disk or wheel provided with a crank or wrist-pin adjustable relatively to the center of the shaft, a link or pitman connecting the crank or wrist-pin with the oscillatory or reciprocatory device or member, a cam mounted on the rotary-shaft and acting upon the crank or wrist-pin to shift the latter toward or from the center of the shaft, devices for shifting the cam into engagement with the disk or wheel, devices for shifting the cam out of engagement with the disk or wheel, and devices which hold the cam stationary when out of engagement with the disk or wheel while the rotary shaft and the crank or wrist-pin continue to rotate.

8. The combination with a machine having an oscillatory shaft, and a rotary driving-shaft, of a crank-arm on the oscillatory shaft, a disk or wheel having an adjustable crank or wrist-pin, a link or pitman connecting said crank-arm with the crank or wrist-pin, a cam acting upon the crank or wrist-pin to shift the latter relatively to the center of the shaft, a clutch for connecting and disconnecting the cam and the disk or wheel, a clutch for connecting and disconnecting the cam and a fixed object, and suitable mechanism for shifting the cam on the shaft to engage one or the other clutch.

9. The combination with a machine having an oscillatory shaft provided with a crank-arm, and a rotary driving-shaft provided with a disk or wheel having a radially adjustable crank or wrist-pin, of a link or pitman connecting the crank or wrist-pin with the crank-arm of the oscillatory shaft, cam mechanism mounted on the driving-shaft and operating to adjust the crank or wrist-pin relatively to the center of said shaft, a hand-lever, connections between the hand-lever and the cam mechanism for causing the latter to adjust the crank or wrist-pin, an index or scale, and a pointer moved by oscillatory shaft over the index or scale to indicate the extent of motion of said oscillatory shaft.

10. In a machine having an oscillatory or reciprocatory device or member, a disk, plate, or wheel fixed to a rotary-shaft and provided with a crank or wrist-pin adjustable relatively to the center of motion and in operative connection with said device or member, a cam for varying the distance of the crank or wrist-pin with respect to the center of motion, means for holding the cam stationary whenever desired while the shaft and crank or wrist-pin continue to rotate, and means for locking the cam and the disk, plate or wheel together when the desired adjustment of the crank or wrist-pin is effected.

11. The combination with a machine having an oscillatory or reciprocatory device or member, and a rotary-shaft, of a disk or wheel fixed to the shaft and having an adjustable crank or wrist-pin in operative connection with the oscillatory or reciprocatory device or member, a cam mounted on the shaft for adjusting the crank or wrist-pin relatively to the center of the shaft, a rock-shaft in operative connection with the cam for shifting the latter toward and from the disk or wheel which carries the crank or wrist-pin, and a lever acting on a part of the rock-shaft for turning the latter to shift the cam.

12. The combination with a machine having an oscillatory or reciprocatory device or member, and a rotary-shaft, of a disk or wheel fixed to the shaft and provided with an adjustable crank or wrist-pin in operative connection with the oscillatory or reciprocatory device or member, a cam mounted on the shaft

and acting on the crank or wrist-pin to shift the latter relatively to the center of the shaft, a rock-shaft connected with the cam for shifting the latter toward and from the disk or wheel, an inclined plate rigid with the rock-shaft, and a lever having an inclined guide engaging the inclined plate for turning the rock-shaft when the lever is actuated.

13. The combination with a machine having an oscillatory or reciprocatory device or member, and a rotary-shaft, of a disk or wheel fixed to the shaft and provided with an adjustable crank or wrist-pin, a cam acting upon the crank or wrist-pin to shift the latter relatively to the center of the shaft, a clutch for connecting and disconnecting the cam and the disk or wheel, a clutch for connecting and disconnecting the cam and a fixed part of the main frame, and suitable mechanism for shifting the cam on the shaft.

14. The combination with a machine having an oscillatory or reciprocatory device or member, and a rotary-shaft, of a disk or wheel fixed to the shaft and provided with an adjustable crank or wrist-pin, a cam acting upon the crank or wrist-pin to shift the latter relatively to the center of the shaft, a clutch for connecting and disconnecting the cam and the disk or wheel, a clutch for connecting and disconnecting the cam and a fixed part of the main frame, a rock-shaft connected with the cam for shifting the latter on the shaft, and a lever acting upon a part of the rock-shaft to turn the latter when the lever is actuated.

In testimony whereof we have hereunto set our hands and affixed our seals in presence of two subscribing witnesses.

EDWARD C. JUDD. [L. S.]
FREDERICK W. COY. [L. S.]

Witnesses:
A. C. HOWARD,
H. STORER BARRY.