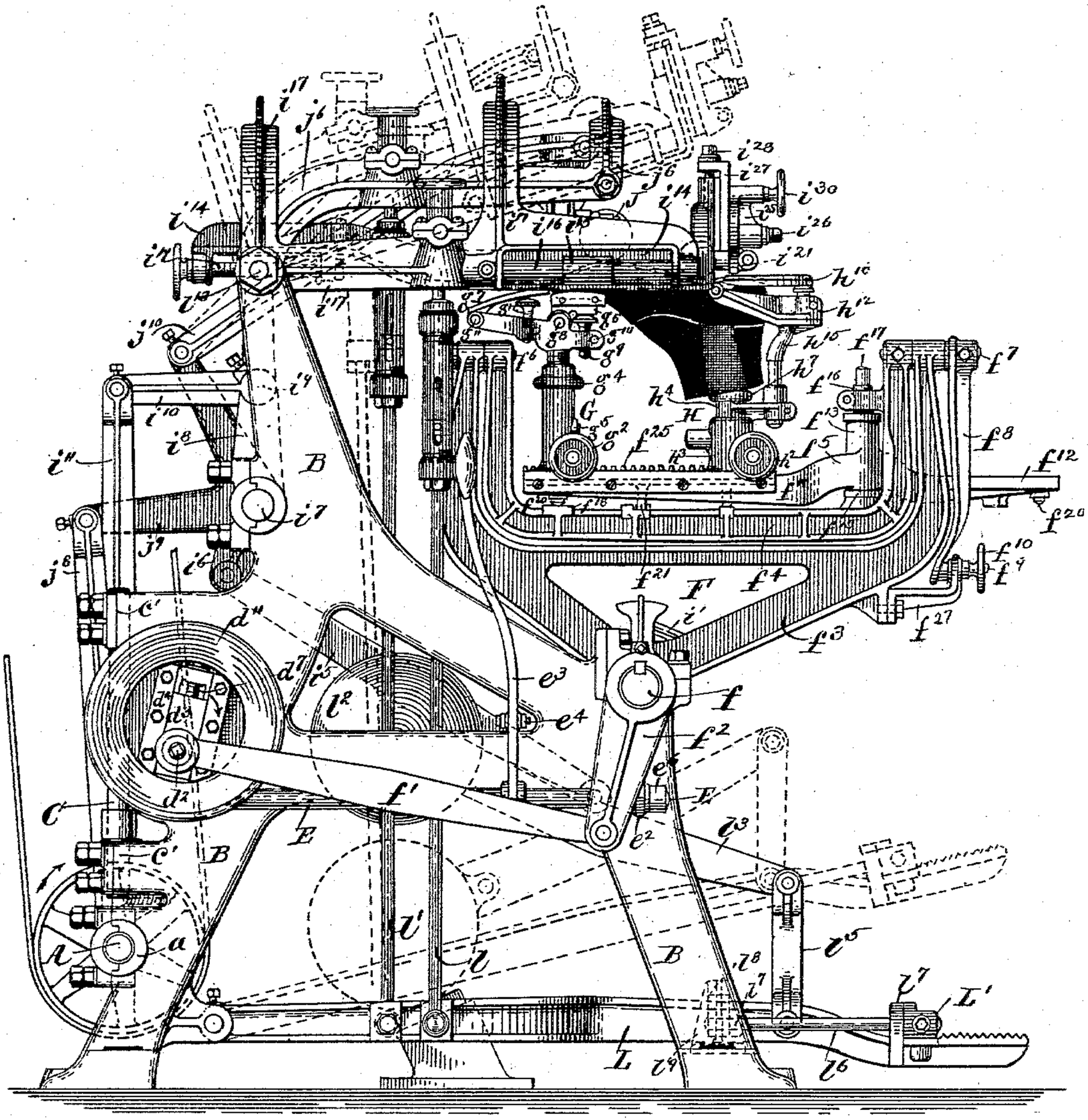
(No Model.) 11 Sheets—Sheet 1.

E. C. JUDD & H. E. CILLEY.

SOLE LEVELING MACHINE.

No. 563,666. Patented July 7, 1896.

Fig. 1.



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(No Model.) 11 Sheets—Sheet 2.

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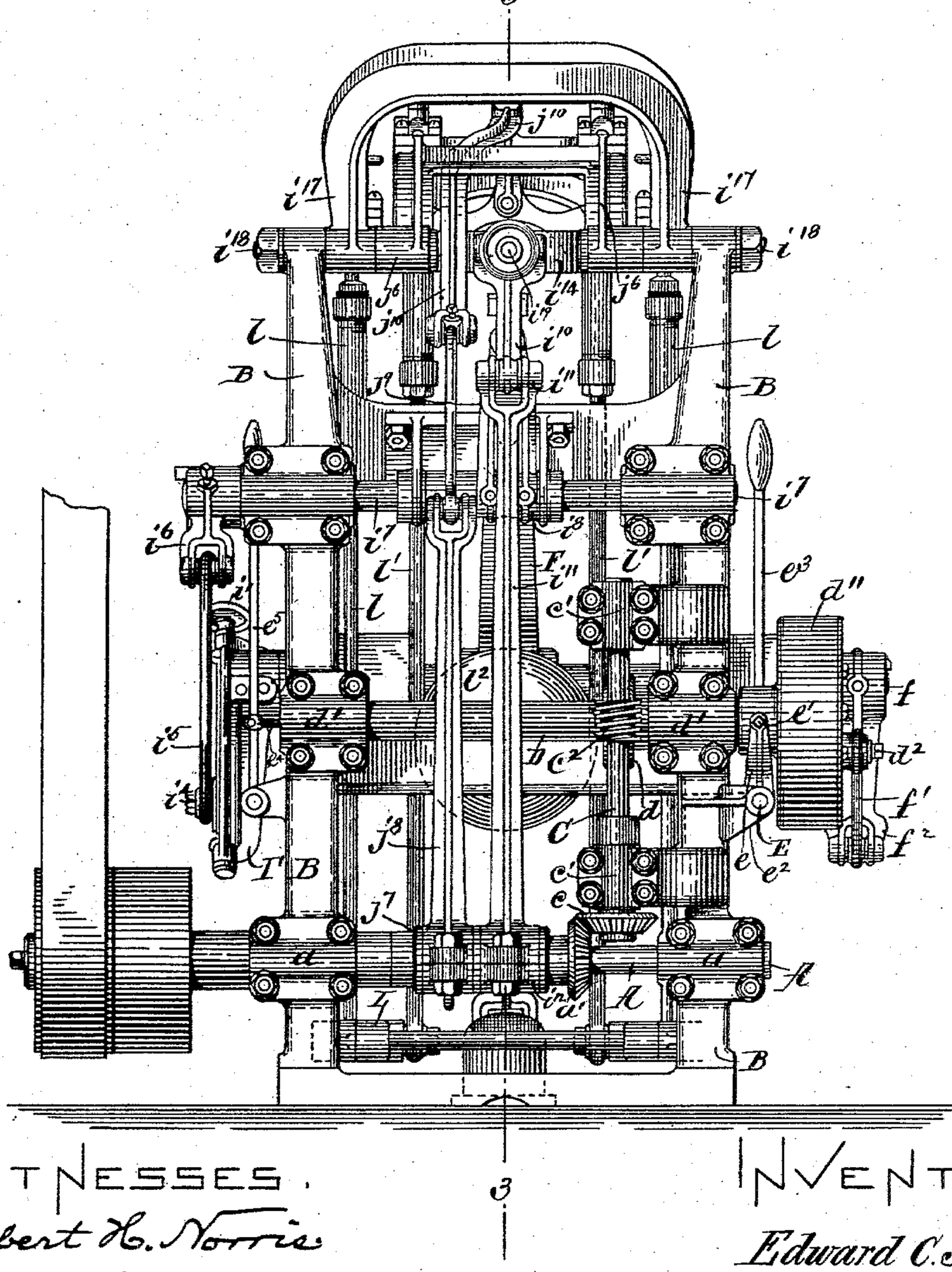
Fig. 2.



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(No Model.) 11 Sheets—Sheet 3.

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SOLE LEVELING MACHINE.

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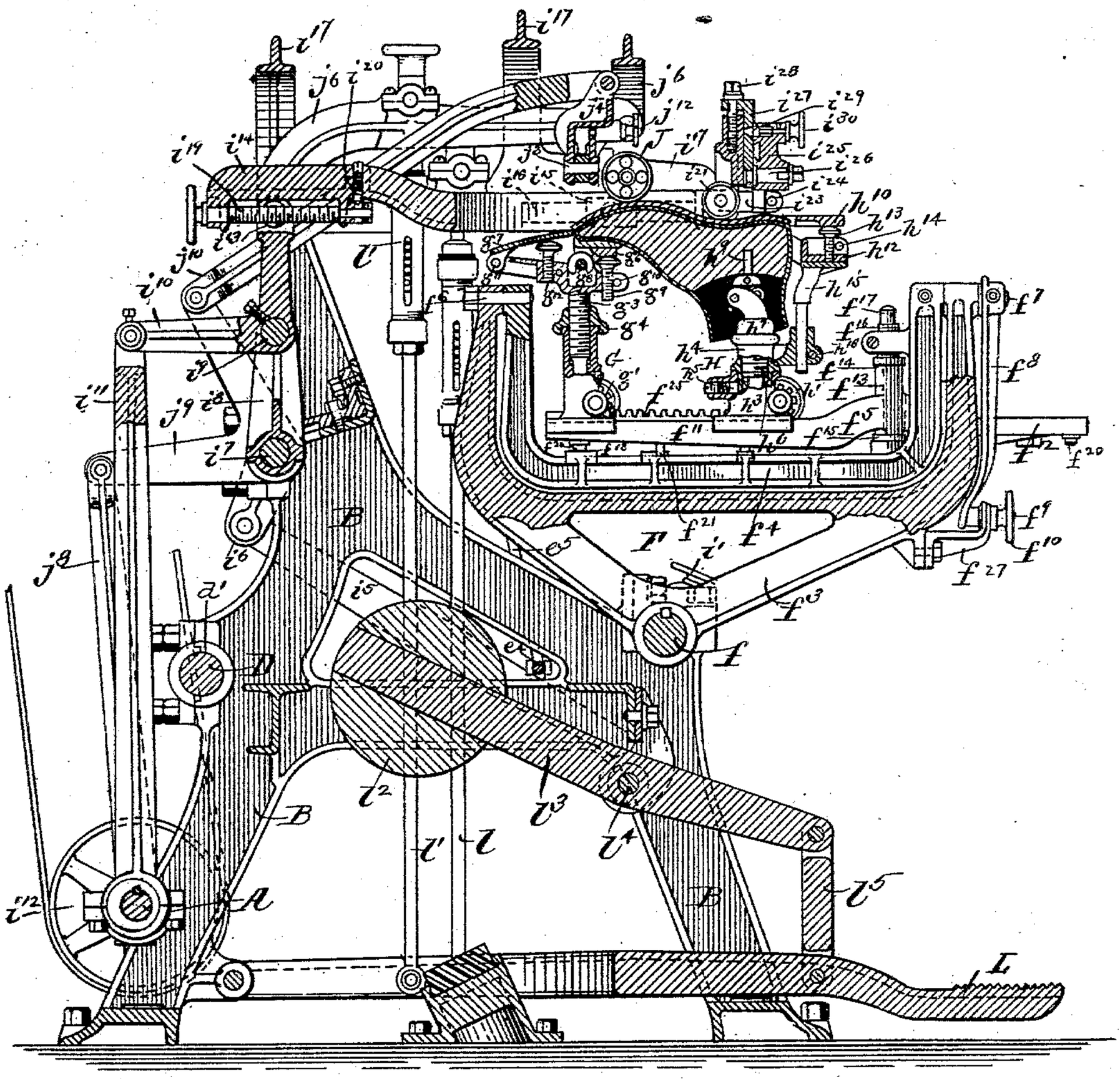
Fig. 3.



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(No Model.) 11 Sheets—Sheet 4.

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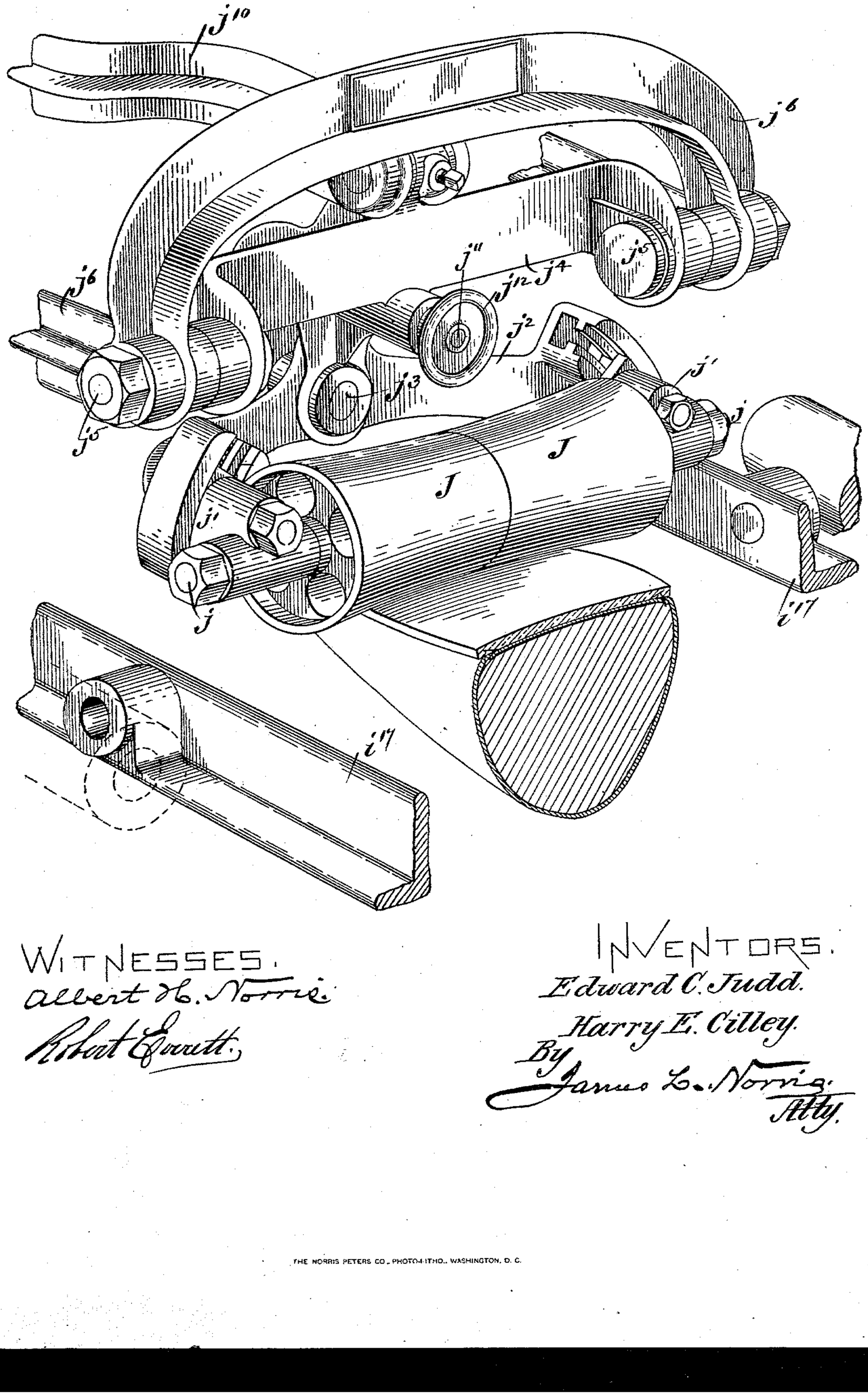
SOLE LEVELING MACHINE.

No. 563,666. Patented July 7, 1896.

Fig. 4.



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SOLE LEVELING MACHINE.

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Fig. 1a.

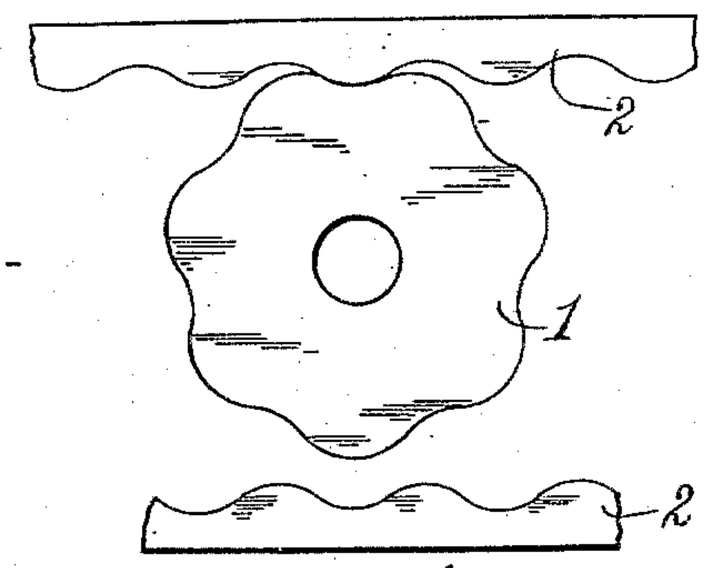
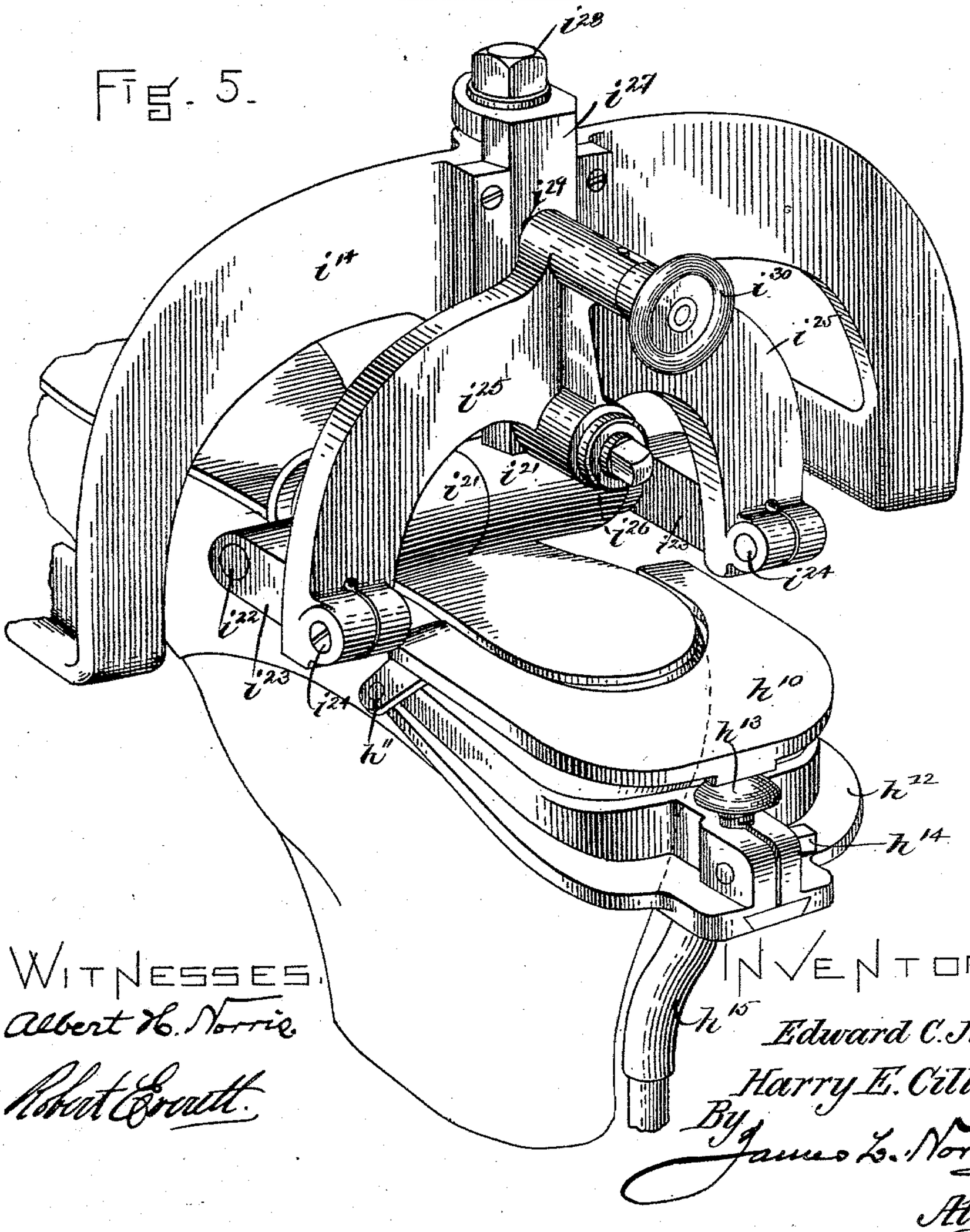


Fig. 5.



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(No Model.) 11 Sheets—Sheet 6.

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SOLE LEVELING MACHINE.

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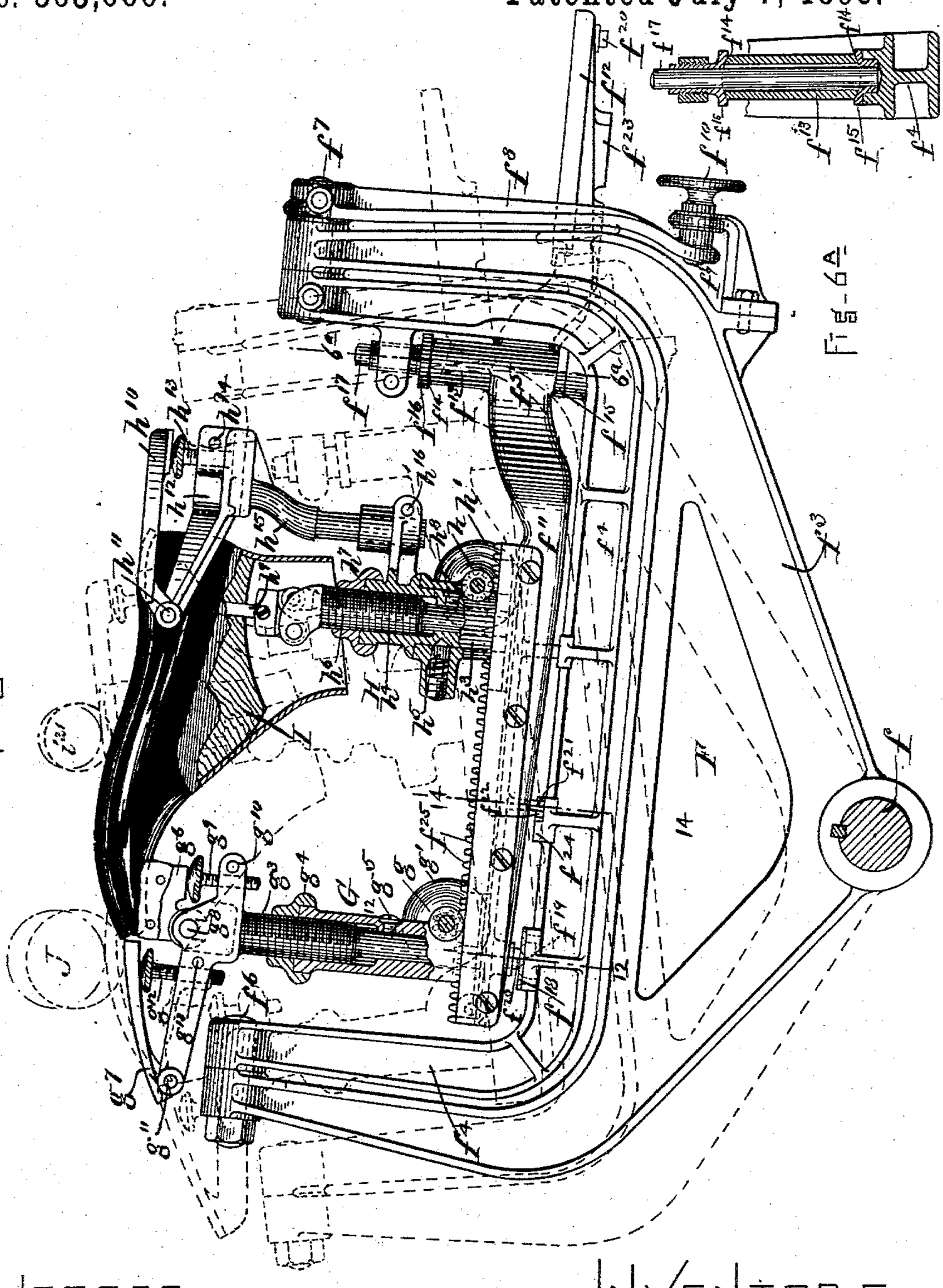

Fig. 6.

Fig. 6A.

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(No Model.) 11 Sheets—Sheet 7.

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SOLE LEVELING MACHINE.

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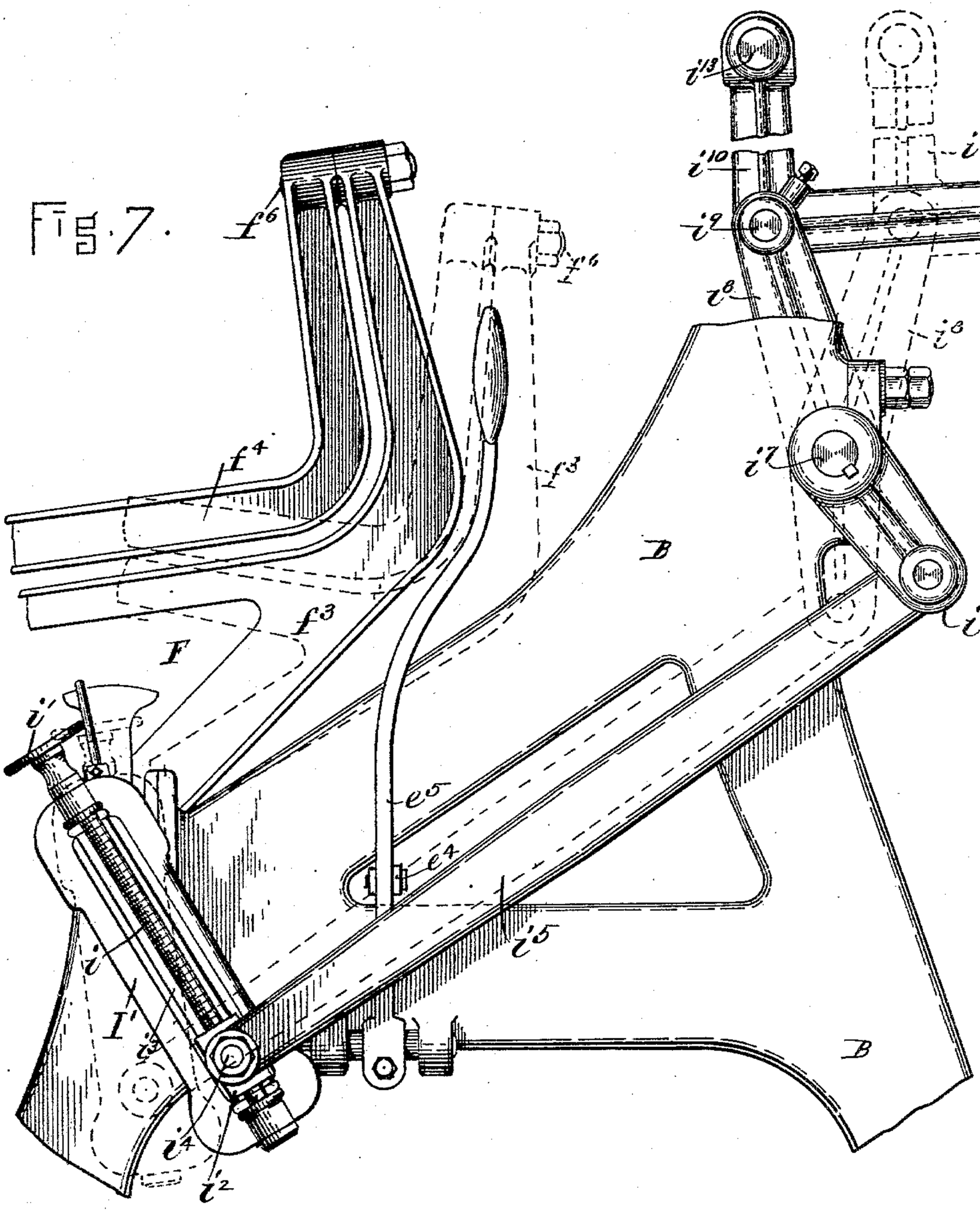
Fig. 7.



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SOLE LEVELING MACHINE.

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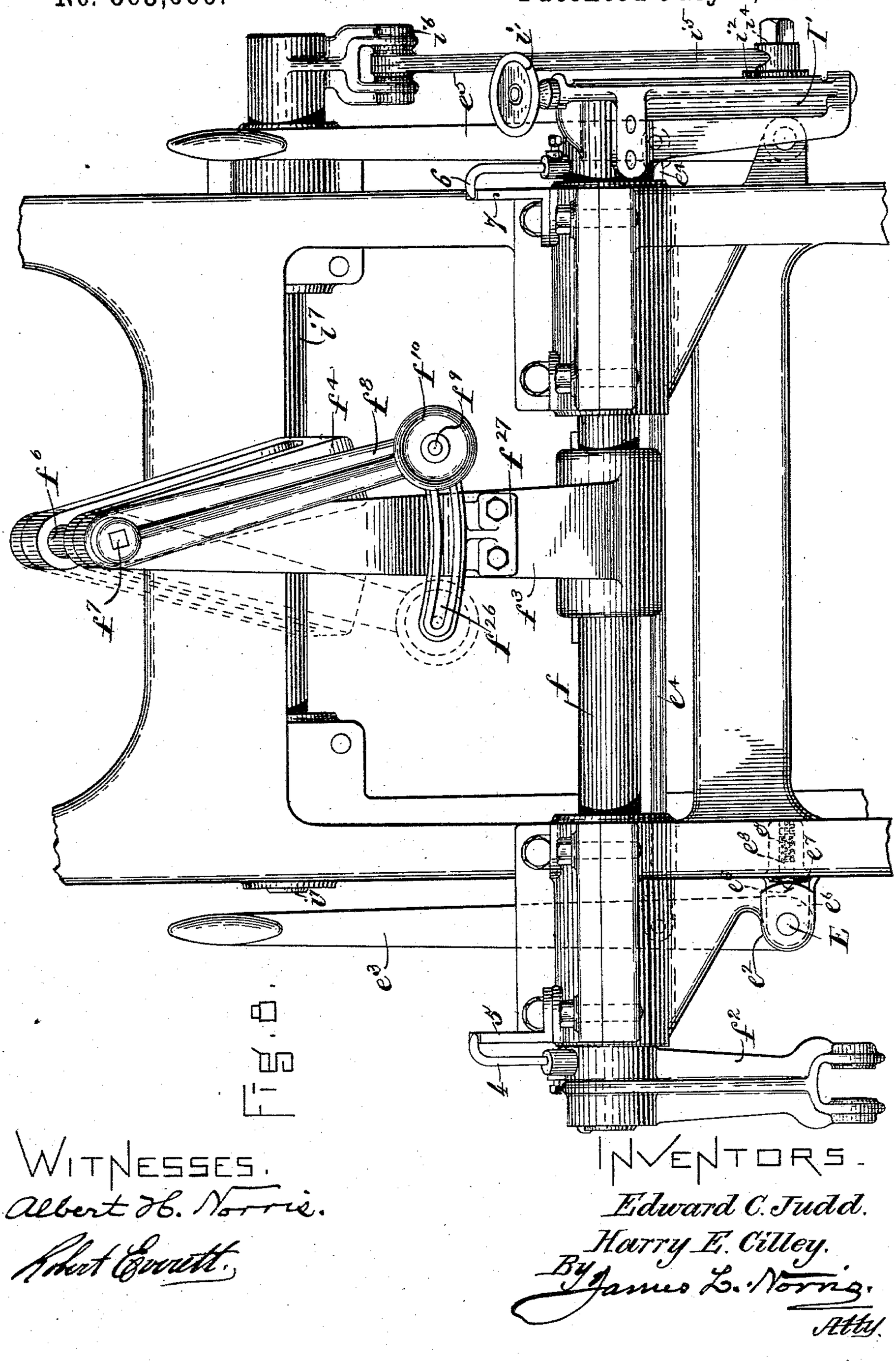

FIG. 5.

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SOLE LEVELING MACHINE.

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Fig. 7.

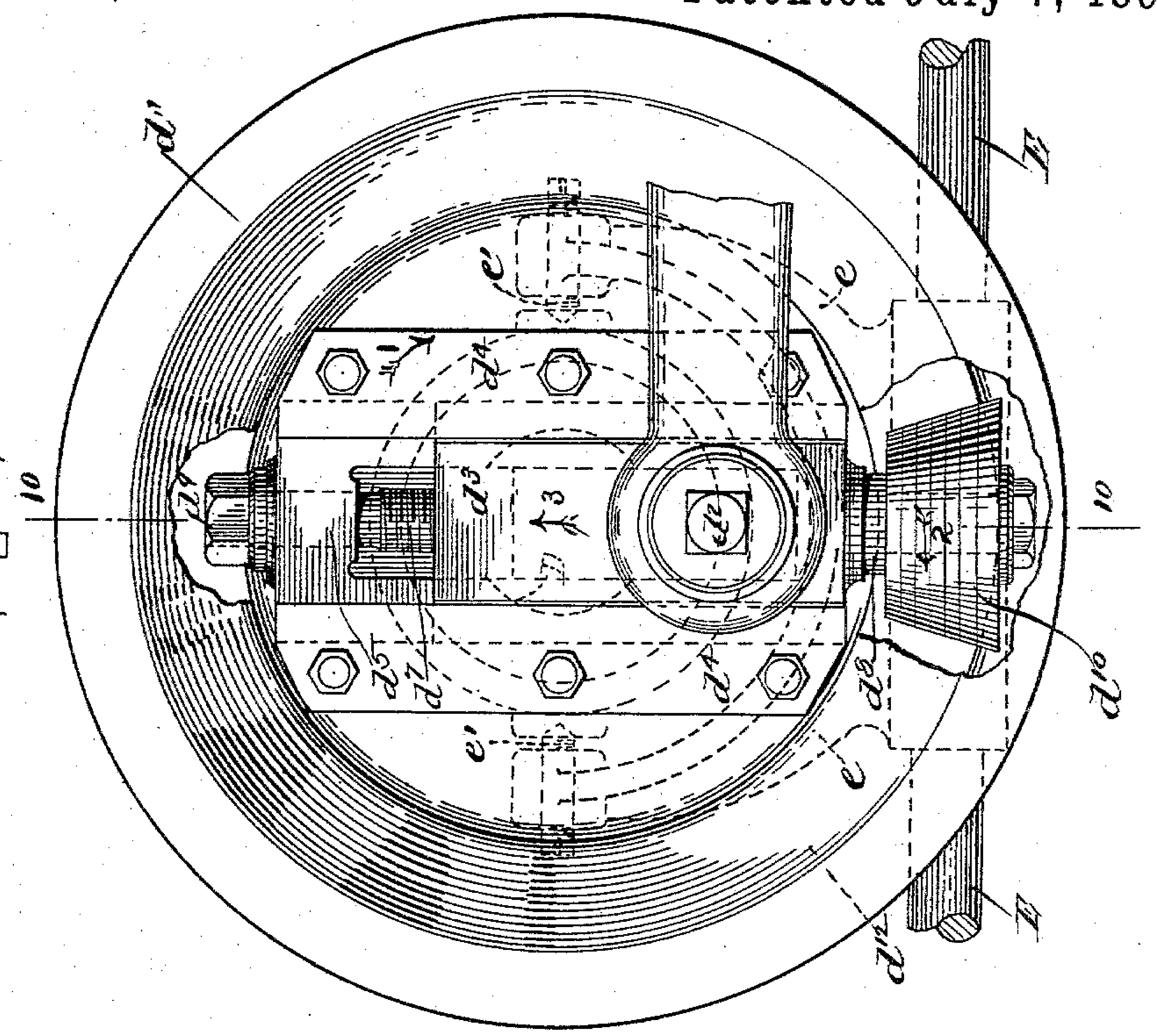
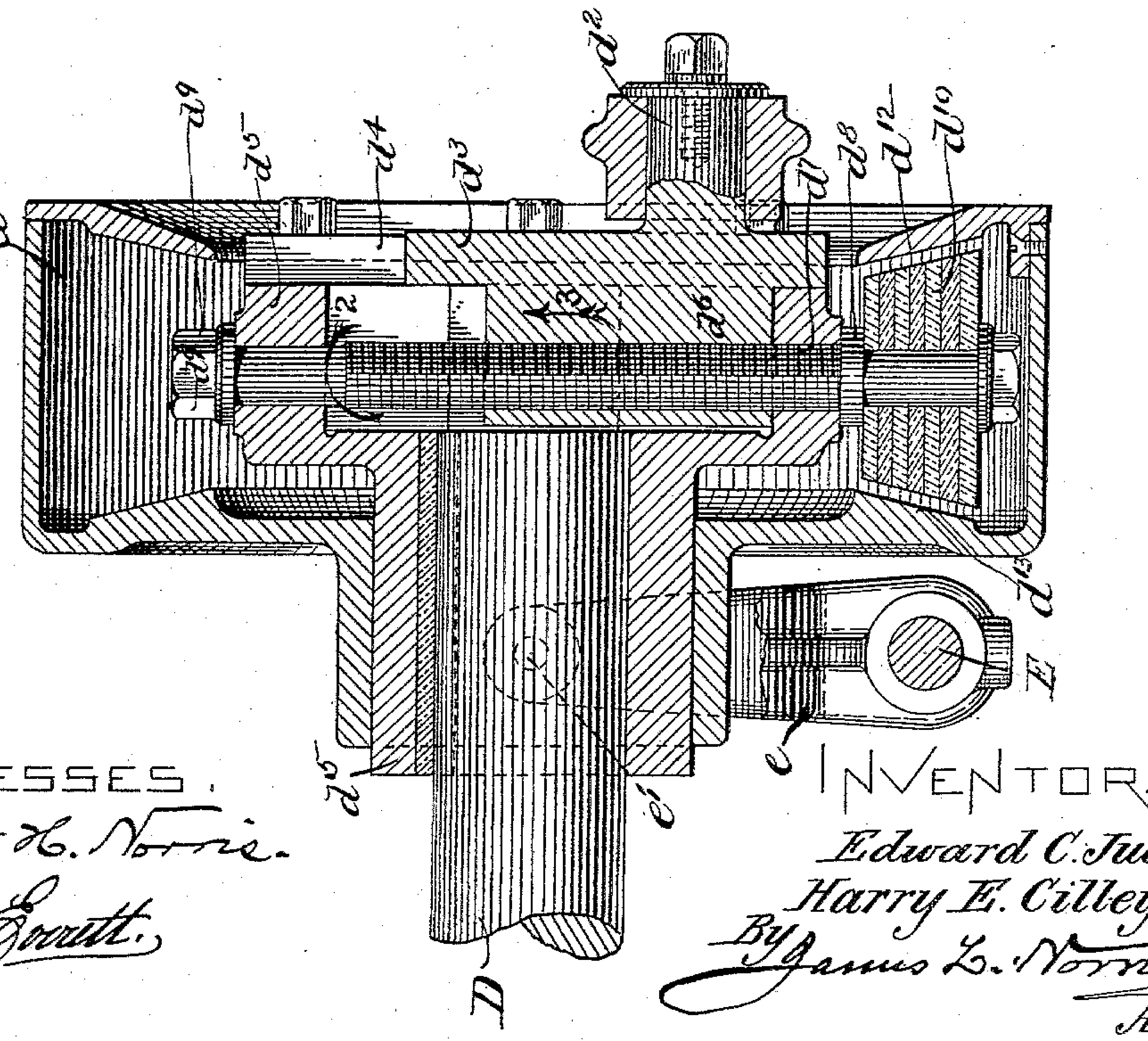


Fig. 10.



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E. C. JUDD & H. E. CILLEY.

SOLE LEVELING MACHINE.

No. 563,666. Patented July 7, 1896.

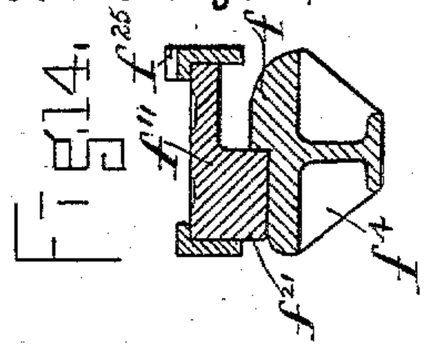

FIG. 14.

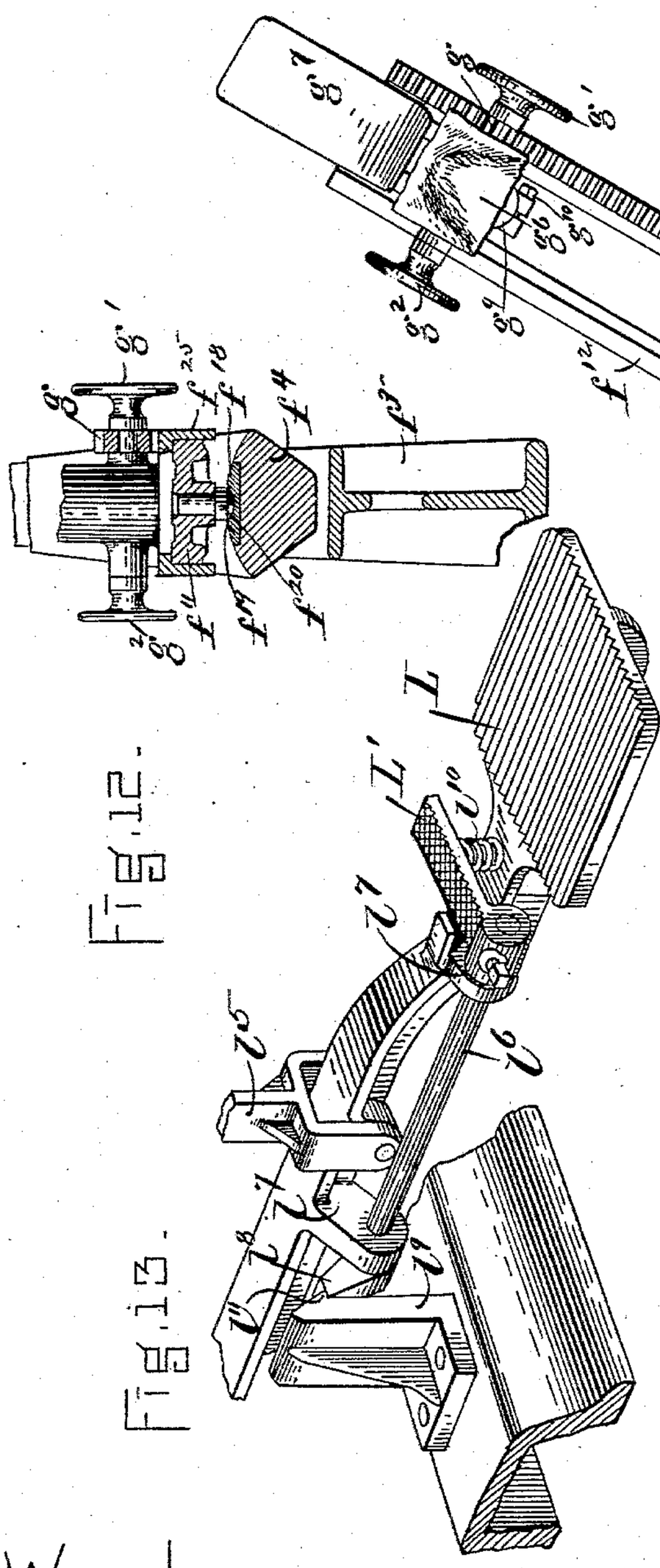

FIG. 12.

FIG. 13.

FIG. 11.

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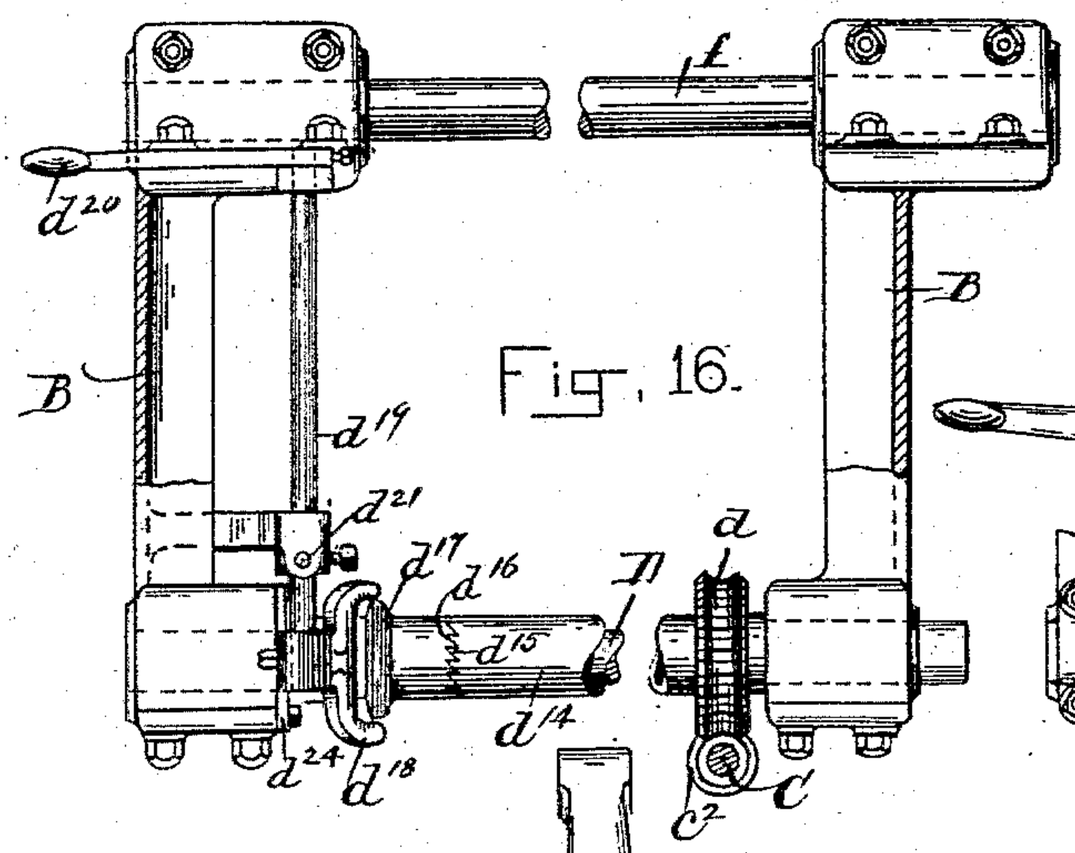

Fig. 16.

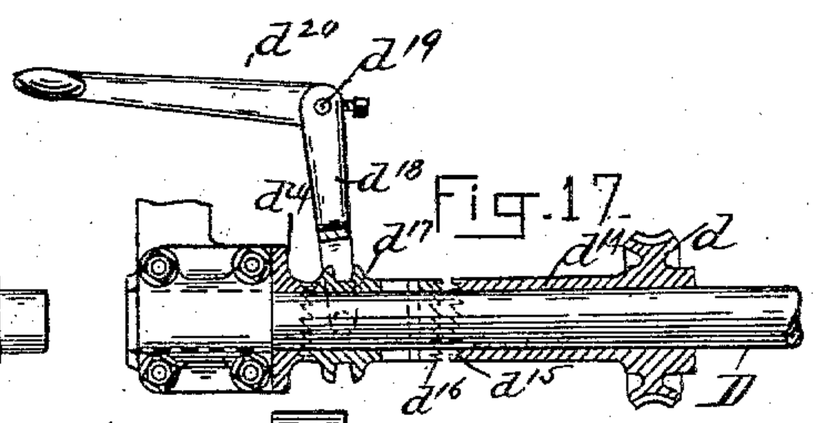

Fig. 17.

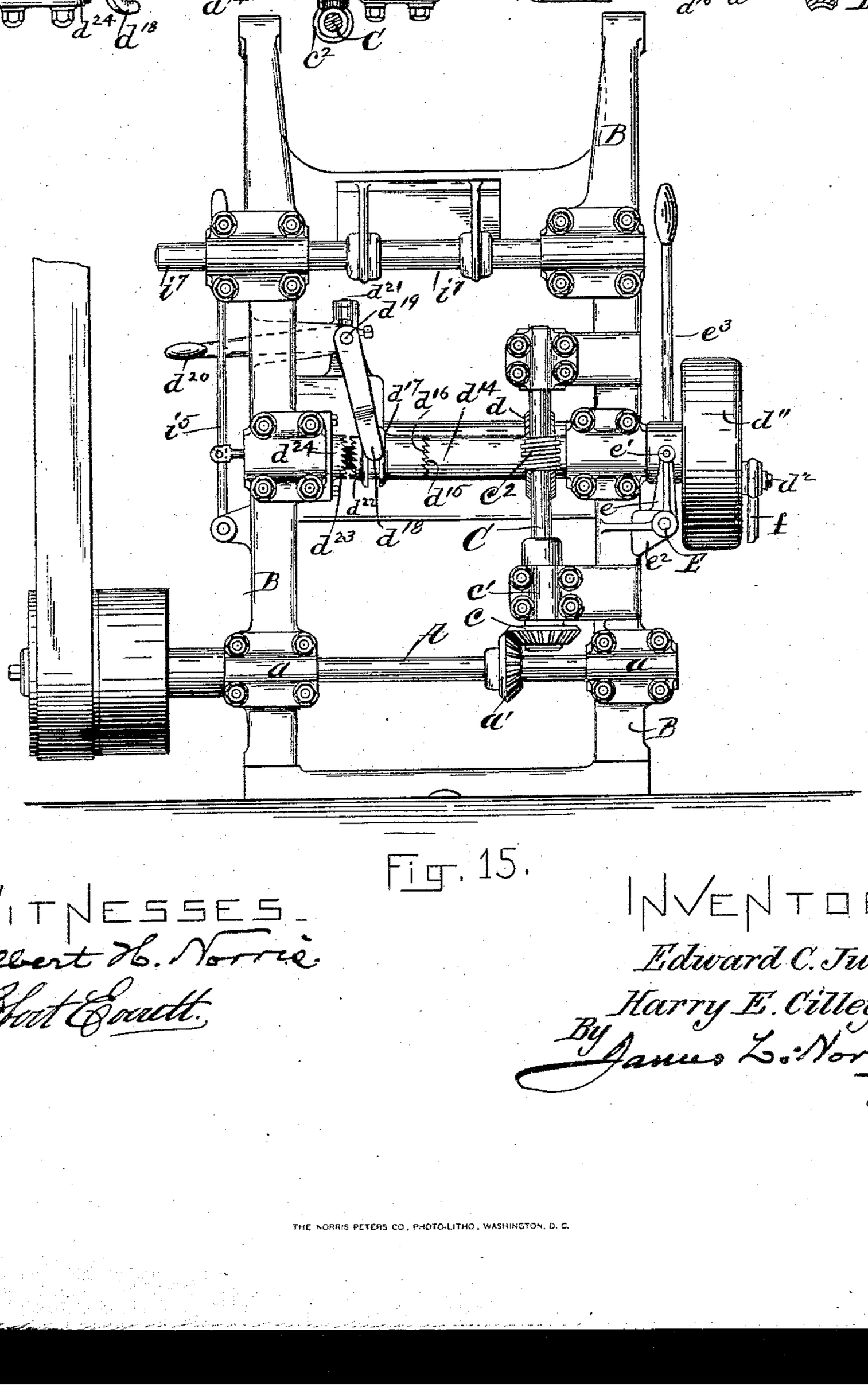

Fig. 15.

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UNITED STATES PATENT OFFICE.

EDWARD C. JUDD AND HARRY E. CILLEY, OF BOSTON, MASSACHUSETTS.

SOLE-LEVELING MACHINE.

SPECIFICATION forming part of Letters Patent No. 563,666, dated July 7, 1896.

Application filed February 12, 1896. Serial No. 579,059. (No model.)

To all whom it may concern:

Be it known that we, EDWARD C. JUDD and HARRY E. CILLEY, citizens of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Sole-Leveling Machines, of which the following is a specification.

This invention relates to machines designed for acting upon the soles of boots and shoes for leveling the same without the exercise of care and skill on the part of the workman otherwise than preparing the boots or shoes, mounting and dismounting the same, actuating the treadle, and manipulating the devices necessary to start and stop the machinery and adjust the working parts as occasion demands, or the conditions require, or the particular work in hand may render necessary.

The chief objects of our invention are to provide in one organized operative structure a sole-leveling machine which is susceptible of leveling the soles of boots or shoes which differ or vary in size from the minimum to the maximum; to provide a new and improved jack and mechanism for moving the same longitudinally under the leveling roll or rolls, whereby the jack is capable of properly supporting boots or shoes of different sizes or shapes, while the leveling-roll acts upon the soles to correctly level the same; to provide new and improved means for throwing the jack into and out of operative connection with the main driving-shaft; to provide new and improved leveling-rolls and mechanism for adjusting and operating the same to suit the conditions required when acting on boots or shoes of different shapes or sizes; to provide new and improved mechanism for changing, regulating, or varying the strokes of the jack according to the conditions required or the sizes of boots or shoes may render necessary; to provide new and improved means for locking and releasing the treadle by which the leveling-rolls are pressed upon the boot or shoe soles with more or less pressure; to provide a leveling-roll which is vertically adjustable with relation to the shoe-supporting jack; to provide means for receiving and supporting the leveling-roll when it moves off the heel end of the shoe-sole, for the purpose of avoiding pounding and consequent damage or injury to the sole; to provide new and improved heel and toe guards which receive and support the fore-part and shank rolls when they move off the heel and toe ends of the sole, and, finally, to generally improve the construction and operation of this class of machines. To accomplish all these objects, our invention involves the features of construction, the combination or arrangement of parts, and the principles of operation hereinafter described and claimed, reference being made to the accompanying drawings, in which—

Figure 1 is a side elevation of a sole-leveling machine embodying our invention, the leveling-rolls being shown lowered in full lines and raised in dotted lines. Fig. 2 is a rear end elevation of the machine. Fig. 3 is a vertical central sectional view taken on the line 3 3, Fig. 2. Fig. 4 is a detail perspective view of the fore-part-leveling roll and its rocking and longitudinally-reciprocating supports. Fig. 5 is a detail perspective view showing the shank-leveling roll, its laterally-rocking and longitudinally-reciprocating supports, and the heel-guard, a portion of a shoe being represented to show how the parts appear with relation to one another when in actual operation. Fig. 6 is a sectional side elevation showing the improved jack. Fig. 6ª is a detail sectional view taken on the line 6ª 6ª, Fig. 6. Fig. 7 is a detail side elevation of a portion of the machine, looking at the right-hand side of Fig. 1, to clearly illustrate the connecting devices between the jack and the shank-roll-actuating devices, whereby the motion of the shank-roll is made to correspond to the motion of the jack. Fig. 8 is a detail front elevation of the machine to clearly show the jack and some of the connections at opposite sides of the machine. Fig. 9 is a broken side elevation showing the devices for adjusting the crank or wrist pin by which the jack is longitudinally oscillated or reciprocated and its stroke changed, regulated, or varied. Fig. 10 is a sectional view taken on the line 10 10, Fig. 9. Fig. 11 is a top plan view of the jack, showing a shoe mounted on one of the laterally-movable arms and in position to be leveled and the other arm swung laterally and adapted to receive another shoe the sole of which is to be leveled. Fig. 12 is a detail sectional view taken on the line 12 12, Fig. 11. Fig. 13 is a

detail perspective view of a portion of the main treadle, showing the treadle locking and releasing mechanism. Fig. 14 is a detail sectional view taken on the line 14 14, Fig. 6. Fig. 15 is a rear end elevation of a modification, showing a clutch mechanism for throwing the jack into and out of operative connection with the main driving-shaft. Fig. 16 is a detail plan view showing a portion of the clutch mechanism represented in Fig. 15. Fig. 17 is a vertical longitudinal sectional view of the clutch, and Fig. 18 is a detail view showing a modification in the construction of the devices for adjusting the crank or wrist pin to change or regulate the strokes of the jack.

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

The letter A indicates the main driving or power shaft, having fast and loose pulleys or other means whereby it may be rotated at will by power derived from any suitable motor. This driving-shaft is journaled in bearings a on the lower part of a main frame B of any construction suitable for supporting the various working parts which constitute our organized sole-leveling machine, and the shaft is provided with a bevel-gear a', keyed or otherwise attached thereto and meshing into a bevel-gear c, fixed on a vertical shaft C, which is arranged to rotate in upper and lower bearings c' of the main frame. The shaft C is also provided with a worm c^2, designed to engage a worm-gear d, (best seen in Fig. 2,) which is secured to and drives a transverse counter-shaft D, arranged to rotate in bearings d' on the rear end of the main frame, and provided at one end with an attached carrier or sleeve d^5, Figs. 9 and 10, keyed or otherwise connected therewith. The circular head of the carrier or sleeve d^5 is chambered or recessed to receive a rectangular or other suitable projection d^6, formed or otherwise provided upon the rear of a rectangular slide d^3, having a crank or wrist pin d^2 and susceptible of moving between suitable ways d^4, attached to or forming a part of the chambered or recessed head of the carrier or sleeve. The head of the carrier or sleeve is provided with a screw d^7, arranged approximately at right angles to the transverse shaft D and adapted to loosely turn in either direction in the head of the carrier or sleeve, but prevented from moving in the direction of its length through the medium of the end collar d^8 and nut d^9. The screw d^7 is provided on one end, at a point outside the chambered head of the carrier or sleeve, with a conical friction roll or wheel d^{10}, preferably made of superimposed layers, but which may be of any construction suitable for the purpose. The screw is in screw-threaded engagement with the rectangular projection d^6 of the slide, and obviously by turning the screw in one direction the slide will be shifted toward the center of the counter-shaft and the throw of the crank-pin d^2, carried by the slide, will be decreased, and, conversely, if the screw be turned in the opposite direction the slide will be moved in a direction away from the center of the counter-shaft and the throw of the crank-pin will be increased.

The sleeve or carrier and conical friction roll or wheel are housed within or surrounded by a cylindrical or other suitably-shaped casing d^{11}, having a hub portion encircling the sleeve or carrier, and provided upon its interior with two opposite conical or inclined surfaces d^{12} and d^{13}, either of which is adapted to bear against the surface of the friction roll or wheel d^{10} when the casing d^{11} is moved in one or the other direction upon the carrier or sleeve. The casing d^{11} is moved laterally through the medium of a rocker-arm e, pivotally connected with the hub of the casing d^{11} through the medium of pointed screws e. and secured to a rocker-shaft E, mounted in bearings e^2, Fig. 1, of the main frame. The pointed screws e', connecting the rocker-arm with the hub of the casing d^{11}, prevent the latter from rotating with the carrier or sleeve d^5, while enabling the casing to be shifted laterally thereupon.

The rocker-shaft E is oscillated or rocked through the medium of the hand-lever e^3, Figs. 1 and 2, which is rigidly secured at its lower end to the rocker-shaft and is provided at its upper end with a suitable handle. The hand-lever e^3, at the left-hand side of the machine, is connected by a transverse rod e^4 with a hand-lever e^5, located at the right-hand side of the machine, in such manner that the rocker-shaft E can be oscillated or rocked from either side of the machine. It will be obvious, therefore, that by operating either one of the hand-levers the rocker-arm e will be caused to rock and thereby shift the cylindrical casing d^{11} in one or the other direction and cause either of the inclined or conical surfaces d^{12} and d^{13} to come in contact with the periphery or surface of the conical friction roll or wheel d^{10}. Inasmuch as the driven counter-shaft D imparts rotary motion to the carrier or sleeve d^5, the conical friction roll or wheel is caused to rotate therewith and travel against either of the conical or inclined surfaces d^{12} and d^{13}. If the rocker-arm e be caused to move to the right, Fig. 10, the surface d^{13} will be pressed against the conical friction-roll d^{10}, and as this roll is revolved around shaft D in the direction of the arrow 1, Fig. 9, while the surface d^{13} is stationary, the friction-roll d^{10} is caused to rotate, and thereby turns the screw d^7 in the direction indicated by the arrow 2, Fig. 10, causing the slide d^3 to move in a direction toward the axis of the counter-shaft. By moving the rocker-arm e to the left, Fig. 10, the conical surface d^{12} is forced against the friction-roll d^{10} and the rotation of the screw is reversed, thereby moving the slide d^3 and crank or wrist pin d^2 in a direction away from the center of the shaft D.

The front end of the rocker-shaft E is provided with an attached plate e^6, (best seen in Fig. 8,) having a depression or recess e^7, adapted to receive the pointed outer extremity of a pin e^8, which is urged in an outward direction through the medium of a spring e^9. The pointed extremity of the spring-pressed pin lies in the depression or recess when the cylindrical casing d^{11} is in its central position, as shown in Fig. 10; that is to say, when it is in a position with both of its conical or inclined surfaces out of contact with the friction-roll, so that the screw will not be rotated, and consequently the slide will stand in the position to which it has been previously adjusted by the rotation of the screw.

The main frame of the machine is provided at its front portion with a transverse jack-shaft f, to which is firmly secured, in any suitable manner, the jack F. The jack is susceptible of oscillating or reciprocating longitudinally, which is accomplished by rocking the jack-shaft. This shaft is provided at the left-hand end with a crank-arm f^2, connected by a link f' with the crank-pin d^2 on the slide d^3. The rotary motion of the counter-shaft D causes the carrier or sleeve d^5 and crank-pin d^2 to rotate, and thereby transmits an oscillating motion to the crank-arm f^2 and the jack-shaft.

The main frame of the jack comprises a yoke-frame f^3, which is rigidly attached to the jack-shaft, a laterally-rocking yoke f^4, and a laterally-movable frame f^5, mounted on the rocking yoke and having two angularly-arranged shoe-supporting arms f^{11} and f^{12}. The jack, therefore, is of the type known as a "duplex" or "double" jack, and is provided with suitable holding devices for receiving two boots or shoes, so that while one part of the jack carrying a boot or shoe is in a position to be operated upon by the leveling-rolls another part for receiving the other shoe is in a position to enable the boot or shoe to be placed thereupon in readiness to be moved into position under and operated upon by the leveling-rolls at the proper time, as will be understood by reference to Fig. 11, wherein one of the shoe-supporting arms, as f^{11}, is represented as in position for the leveling-rolls to act upon the sole of such boot or shoe, while the other shoe-supporting arm, as f^{12}, is swung laterally into position to receive the prepared boot or shoe which is to be subsequently operated on by the leveling-rolls.

The arms of the yoke f^4 are pivoted at their upper ends to the arms of the yoke-frame f^3 through the medium of a fixed pivot-stud f^6 and a movable pivot f^7, fixed to one of the arms of the yoke f^4 and adapted to turn in one of the arms of the yoke-frame f^3. The pivot-stud f^6 is secured to one of the arms of the yoke f^3 through the medium of a screw, and one of the arms of the yoke f^4 is adapted to turn on this pivot-stud, while the pivot-stud f^7 can turn, all in such manner that while the yoke-frame oscillates or reciprocates longitudinally, as hereinbefore explained, the yoke f^4 is susceptible of moving or swinging laterally, although it may be locked stationary, as will hereinafter appear. The pivot f^7, which, as before stated, is adapted to turn in one of the arms of the yoke f^3 and is rigidly secured to one of the arms of yoke f^4, is provided with an attached pendent arm or lever f^8, having at its lower extremity a clamp-screw f^9 and a hand-nut f^{10}. The clamp-screw f^9 extends from the arm or lever through a curve or segmental slot f^{26}, Fig. 8, provided in or on a bracket f^{27}, which is rigidly secured to the front end portion of the yoke-frame f^3. The arm or lever f^8 is used for the purpose of manually rocking the yoke f^4 laterally, or sidewise, whenever desired, during the action of the leveling-rolls on the soles of the boot or shoe, but the construction of parts is such that the hand-nut f^{10} can be tightened upon the clamp-nut f^9, for the purpose of rigidly locking the yoke f^4 in any desired position to the frame f^3.

It will be obvious that the yoke f^4 can be rigidly locked while it stands in a perpendicular plane, or it can be locked at any desired angle of inclination, as will be readily understood by reference to Fig. 8.

The laterally-movable frame f^5, carrying the horizontally-arranged arms f^{11} and f^{12}, extends from a vertical sleeve f^{13}, Figs. 1 and 3, in such manner that when one of the arms supporting a shoe is in proper position under the leveling-rolls J and i^{31} the other arm extends laterally and rearward, as will be clearly understood by reference to Fig. 11, so that it is in convenient position to receive a boot or shoe the sole of which is to be subsequently leveled. The two horizontally-arranged arms are adapted to swing in a horizontal plane to place one arm in proper position under the leveling-rolls and the other out of position to receive a prepared boot or shoe. To accomplish this lateral swinging motion of the shoe-supporting arms, the sleeve f^{13} is constructed at its upper and lower ends with ball-bearings formed, as here shown, by constructing the upper and lower ends of the sleeve with convex or rounded ends f^{14}, (best seen in Fig. 6^a,) which seat in upper and lower concave seats formed in suitable supports f^{15} and f^{16}. A vertical, cylindrical pin or post f^{17} extends through these supports and the sleeve and tightly fits the supports, while it loosely fits the sleeve, so that the sleeve is free to turn without necessarily turning the pin or post. The bore or passage through the sleeve f^{13} is of a diameter greater than the diameter of the pin or post f^{17}, so that it is possible for the sleeve to tilt back and forth.

The arms f^{11} and f^{12} are each provided with a locking bolt or pin f^{20}, Fig. 6, adapted to engage a locking recess or depression f^{19}, formed in a plate f^{18}, Fig. 12, secured to the rear end portion of the rocking yoke f^4, the construction being such that when the arm f^{11}, for example, is in position to properly support a

shoe under the leveling-rolls, its bolt or pin f^{20} will lie over the recess of depression f^{19}, and, owing to the weight of the arm, the bolt or pin will engage the recess or depression. The downward pressure of the leveling-rolls on the sole of the shoe serves to hold the bolt or pin in engagement with the recess or depression. When the leveling-rolls are raised from the sole of the boot or shoe, as will hereinafter appear, the horizontally-arranged arm f^{11} is slightly raised at its rear end by the operator, for the purpose of disengaging the bolt or pin f^{20} from the recess or depression f^{19} in the plate f^{18}, after which the arm f^{11} can be swung laterally out of operative position, and the arm f^{12} into operative position in the yoke f^4, whereupon the bolt or pin f^{20} of the arm f^{12} will be engaged with the locking recess or depression f^{19} of the plate f^{18} by the weight of the arm and is held or locked in position by downward pressure of the leveling-rolls in the same manner as before explained with reference to the arm f^{11}.

As before stated, the bore of the sleeve f^{13} is of a diameter greater than the diameter of the pin or post f^{17}, and consequently the sleeve can tilt back and forth to slightly raise and lower the arm f^{11}, and thus cause the bolt or pin f^{20} to engage and disengage the recess or depression. The extent to which the sleeve, and consequently the arms f^{11} and f^{12}, can tilt, is regulated by the comparative size of the bore in the sleeve with relation to the size of the pin or post f^{17}.

The arm f^{11} is provided with a stop-lug f^{21}, Figs. 1, 3, and 14, constructed to engage a stop-lug or shoulder f^{22}, provided on the yoke f^4, so that when the arm is swung into operative position to engage the yoke the stop-lug f^{21} will rest against the stop-lug or shoulder f^{22}, thereby centering the arm and insuring the proper engagement of the locking bolt or pin f^{20} with the locking recess or depression f^{19}.

The arm f^{12} is provided with a lug f^{23}, Fig. 6, adapted to bear against a lug f^{24} on the yoke f^4, in substantially the same manner as described with reference to the arm f^{11}, for the purpose of centering the arm f^{12} in the yoke.

The horizontal arms f^{11} and f^{12} are each provided with a toe-post G and a heel-post H, (best seen in Fig. 6,) which are adjustable longitudinally in a direction toward and from each other, for the purpose of enabling shoes of different sizes to be mounted on the shoe-supporting arms and to be properly sustained while the soles are being leveled. The longitudinal adjustment of the toe and heel posts of each arm f^{11} or f^{12} is accomplished through the medium of a longitudinal rack f^{25}, rigidly secured to or formed with each arm, and into which mesh pinions g and h, having shafts suitably mounted, respectively, on parts of the toe and heel posts, and provided with hand-wheels g' and h', which can be readily manipulated for rotating the pinions and causing them to traverse the rack of each arm.

The pinions can be independently rotated, so that the toe and heel posts are independently adjustable longitudinally, or in a direction along the length of the arm on which the parts are mounted. The heel and toe posts can be rigidly held in the position to which adjusted by locking the pinions against rotation, and while this can be accomplished in any suitable manner, we prefer to effect the locking operation through the medium of lock-nuts g^2 and h^2, Fig. 11, which can be operated to rigidly clamp and hold the hand-wheels g' and h' against rotation, and since the pinions g and h are rigid on the shafts or spindles to which the hand-wheels are secured, it will be obvious that the pinions will be locked in engagement with the rack, and thereby prevent movements of the toe and heel rests.

The toe-post comprises a toe-rest g^6, a toe-guard g^7, a screw-shank g^3, having a head, and a tubular post in which the screw-shank is arranged and on which the shaft of the pinion g is mounted.

Inasmuch as all the parts of the toe and heel posts of the arms f^{11} and f^{12} are alike, a description of one is sufficient for both.

The screw-threaded shank g^3 of the toe-post is vertically adjustable in the tubular post through the medium of the nut g^4, mounted on the upper end of the post and in screw-threaded engagement with the shank. The shank is prevented from rotating by means of a screw g^5, inserted laterally through the tubular post and bearing against an unthreaded part of the shank. The screw preferably enters the slot in the shank, so that rotation of the latter is effectually prevented unless the screw be disengaged from the slot.

The toe-rest g^6 and toe-guard g^7 are pivoted to the head of the screw-shank g^3 through the medium of suitable pins or pivots, as at g^8 and g^{11}. The rear end portion of the toe-guard is the pivoted part, so that its rear front portion can be raised or lowered with relation to the toe portion of the sole of the shoe mounted on the last I, which is carried by the heel-post. The vertical adjustment of the front end of the toe-guard is effected by means of a set-screw g^{12}, tapped into the head of the screw-shank g^3. The toe-guard g^7 is composed of a curved plate, upon which the fore-part-leveling rolls J pass and rest when they run off of the toe portion of the sole of a boot or shoe. The adjusting-screw g^{12} is adapted to be held against rotation after the desired adjustment of the toe-guard is effected by means of a screw g^{13}, or in any other suitable manner. The front end of the toe-rest g^6 can be raised or lowered by a set-screw g^9, tapped into the head of the screw-shank g^3. This screw g^9 can also be locked in position after the desired adjustment is effected by means of a screw g^{10}, or by any other suitable means.

The toe-rest g^6 can be adjusted to accommodate varying shapes of boots or shoes, while the toe-guard g^7 can be accurately and nicely

adjusted approximately flush with the tread of the boot or shoe sole when the latter is mounted and in position to be acted upon by the leveling-rolls J and i^{21}. The toe-guard receives and supports the fore-part roll J when it leaves the extreme point of the toe portion of the sole, and thus prevents the toe end of the sole from being mashed down or otherwise damaged or injured; and, likewise, when the fore-part roll passes from the toe-guard onto the toe portion of the sole, the latter will not be pounded and damaged or injured, because the upper surface of the toe-guard is approximately flush with the tread of the sole.

The heel-post H comprises a tubular post h^3, at the base of which the shaft which carries the hand-wheel h' and pinion h is mounted. The tubular post h^3 contains a cylindrical heel-guard carrier h^4, which is journaled in the post h^3, so that it can be axially rotated. The post h^3 is provided with a spring-pressed locking-pin h^5, adapted to engage a locking-recess in the cylindrical carrier h^4, for holding the latter in a central position, as shown in Fig. 6. The cylindrical carrier h^4 contains a screw-shank h^6, engaging a screw-nut h^7, mounted on the upper end of the carrier, so that it is possible to raise and lower the screw-shank by rotating the nut. The screw-shank is prevented from rotating in the carrier through the medium of a screw h^8, which passes through the base portion of the carrier and engages the unthreaded lower end of the screw-stud. The screw preferably engages a slot in the unthreaded part of the screw-shank, so that the latter is effectually held against rotary motion in the carrier. The upper end of the screw-shank is provided with a head which carries a pin h^9, adapted to enter a pin-hole in the last I, as is usual in this class of machines. The cylindrical heel-guard carrier is provided with a horizontally-projecting socket in which a standard h^{15} is vertically adjustable through the medium of a clamping-screw h^{16}, which can be loosened to raise or lower the standard, and then tightened to clamp it in its adjusted position. The upper end of the standard is provided with a horizontally-movable slide h^{12}, Figs. 6 and 12, which is bifurcated to embrace the heel portion of the shoe. The slide is preferably dovetailed to the upper end of the standard, and to the rear extremities of the arms of the bifurcated slide are pivoted, by pivot-pins h^{11}, the arms of a heel-guard h^{10}, which is susceptible of being raised and lowered, to suit the conditions required, through the medium of a vertically-adjustable set-screw h^{13}, mounted in a part of the slide. This set-screw is adapted to be rigidly locked after adjustment through the medium of a clamping screw h^{14}, engaging a split part of the slide h^{12}, which split part embraces the dovetailed guide or way provided on the upper end of the standard h^{15} for the longitudinal adjustment of the slide.

The clamping-screw not only clamps the set-screw on which the heel-guard rests, but also clamps the split part of the slide upon the dovetailed guide or way.

The devices described render the heel-guard susceptible of being bodily raised and lowered by raising and lowering the standard h^{15}, also of being adjusted to different angles of inclination by vertically adjusting the set-screw h^{13}, and of being adjusted horizontally by shifting the slide h^{12} on the head of the standard, whereby the heel-guard is rendered practicably operative under all possible conditions and in connection with shoes of different sizes and shapes. The broad body portion of the heel-guard h^{10} serves to protect the portion of the shoe where the heel is attached from being damaged by the shank-roll i^{21}. The heel-guard also serves to receive and support the shank-roll where spring-heel shoes are being leveled; that is to say, in operating on this class of shoes the shank-roll passes over the heel and onto the heel-guard. In shoes which are to have heels attached, the shank-roll should not pass over the breast of the heel, and the heel-guard should be adjusted so that the shank-roll will roll onto the heel-guard after passing the shank as far as the breast of the heel. The mechanism controlling or governing the shank-roll controls or governs the distance of travel of this roll on the shank, but the improved heel-guard will enable the operator to exercise his own judgment as to changing the travel of the roll or setting the heel-guard so that the roll may pass or travel the same distance and yet not operate directly on the sole more than is necessary to secure the best results. In spring-heel work the heel-guard performs the same work for the shank-roll as the toe-guard does for the fore-part roll; that is to say, the guard acts as a rest for the roll after the latter passes over the shank and heel portion of the sole.

The shank-roll is preferably composed of two sections having properly concaved or grooved peripheries, and is journaled on a shaft i^{22}, secured in arms or supports i^{23}, extending from a yoke-shaped oscillatory frame or support i^{25} and connected to the arms thereof by clamp-screws i^{24}, so that it is possible to adjust the shank-rolls vertically with relation to the jack by loosening the clamp-screws, raising or lowering the arms or supports, and then tightening the clamp-screws.

The yoke-shaped frame or support i^{25} is vertically adjustable and is adapted to rock or oscillate laterally, and to accomplish this it is centrally journaled on a stud i^{26}, projecting from a vertically-movable slide i^{27}, mounted in suitable ways at the center of a longitudinally-movable yoke-shaped carrier-frame i^{11}. The vertically-movable slide i^{27} can be raised and lowered in the ways at the center of the carrier-frame i^{11} by means of a set-screw i^{28}, thereby raising or lowering the shank-roll to suit the conditions required.

The yoke-frame i^{25} is locked in its central position to the slide i^{27}, as shown in Fig. 5,

by means of a spring-pin i^{29}, which can be withdrawn from engagement with the slide by a suitable handle i^{30}, thereby leaving the yoke-frame i^{25} and the shank-roll free to oscillate or rock from one side to the other of the shoe-sole, for the purpose of properly conforming to the varying curves of the shank portions of the soles and to accommodate itself to whatever conditions may be required.

It will be seen from the foregoing description that the yoke frame or carrier i^{25}, which directly supports the shank-roll, can be locked in a fixed central position, or it can be permitted to freely oscillate or rock laterally, as may be desired in operating upon the soles of boots or shoes differing in shape or size.

The rear extremity of the carrier-frame i^{14} rests against and is movable upon the upper side of a horizontal pin i^{13}, mounted in the vertical arm of a bell-crank lever i^{10}, which is pivoted by a pivot-pin i^{9}, carried by the upper end of a rocker-arm i^{8}, Figs. 3 and 7, which is fixed to a rocker-shaft i^{7}, mounted in suitable bearings on the main frame B, all in such manner that when the rocker-shaft i^{7} is rocked the rocker-arm i^{8} is rocked, the bell-crank lever i^{10} is bodily shifted back and forth, and a longitudinally-reciprocating motion is imparted to the carrier-frame i^{14} and to the parts carried thereby, thereby causing the shank-roll to move in the same direction that the jack is moving, the extent of movement or longitudinal travel of the shank-roll being governed by the extent of movement of the jack.

The rocker-shaft i^{7} is rocked by connections with the jack-shaft f through the medium of the following connections, to wit: a rocker-arm i^{6}, keyed or otherwise secured to the rocker-shaft i^{7} and connected by a link i^{5} with a rocker-arm I′, secured to the jack-shaft f. The rocker-arm on the jack-shaft is provided with a longitudinal slot i^{3}, in which a slide-nut i^{2} is adapted to move. The nut i^{2} is pivotally connected with the link i^{5} by a pin i^{4}, and the nut is in screw-threaded engagement with a rotatable screw i, having at its upper end a suitable hand-wheel i', so that by rotating the screw in one or the other direction the nut i^{2} is raised or lowered, and the stroke of the rocker-arm i^{6}, and consequently the extent of motion of the rocker-arm i^{8} and the parts connected therewith, can be regulated or varied at will, thereby enabling the extent of travel of the shank-roll to be changed, as may be required, according to the size of the boot or shoe which is to be operated upon.

The horizontally-arranged arm of the bell-crank lever i^{10} is connected by a connecting-rod i^{11} with an eccentric i^{12}, mounted on the main driving-shaft A, as best seen in Fig. 3, whereby the bell-crank lever is oscillated or vibrated independently of the back-and-forth motion produced by the rocking movements of the rocker-arm i^{8}. In other words the rocking movements of the rocker-arm i^{8} impart a longitudinally-traversing motion to the carrier-frame i^{14} and the shank-roll, while at the same time this carrier-frame and the shank-roll are vibrated longitudinally by the movements of the bell-crank lever i^{10}. The extent of longitudinal motion of the carrier-frame i^{14} and shank-roll i^{31} is regulated, as before stated, by the adjustment of the nut i^{2} and screw i, so that it is possible to cause the shank-roll to pass up onto the toe of the sole or back on the heel portion thereof a greater or less distance, according to the adjustment of the connections which operate the rocker-arm i^{8}. It will be obvious, therefore, that the travel of the shank-roll relatively to the heel, or the fore part of the sole, can be changed to suit whatever conditions may be required.

The forward end portions of the arms of the bifurcated carrier-frame i^{14} are supported by slidable blocks i^{15}, Figs. 1 and 3, which are pivotally connected with the arms of the carrier-frame and slide upon suitable guides or pins i^{16}, fixed or secured in the horizontal side portions of a frame i^{17}, which is pivoted at its rear end, as at i^{18}, to the top portion of the main frame B in such manner that the frame i^{17} can be raised and lowered and will carry with it the shank-roll and its supporting devices hereinbefore described.

The slide-blocks i^{15}, moving on the guides or pins i^{16}, serve to accurately guide the carrier-frame i^{14} in all its longitudinal movements on the frame i^{17}.

The carrier-frame i^{14} is capable of longitudinal adjustment to vary the relative position of the shank-roll and the boot or shoe mounted on the jack through the medium of a screw-shaft i^{19}, journaled to rotate in suitable bearings at the rear end portion of the carrier-frame and passing through and in screw-threaded engagement with the pivot-pin i^{13}. Fig. 3, on the upper side of which the rear end portion of the carrier-frame rests, as before explained. The rotary motion of the screw-shaft i^{19} in one or the other direction in the pivot-pin i^{13} will shift the carrier-frame i^{14} backward or forward. After the screw-shaft i^{19} has been turned to secure the desired adjustment of the carrier-frame, the screw-shaft is designed to be locked in a fixed position through the medium of a spring-pressed locking pin or bolt i^{20}.

The leveling-roll J, which acts upon the fore part of the shoe-sole during the time the shank-roll is acting upon the shank and heel portion of the sole, is reciprocated or vibrated longitudinally through the medium of a vibrating or reciprocating carrier-frame j^{4}, Fig. 4, having its ends pivotally connected through the medium of pivot-pins j^{5} to the extremities of a yoke-frame j^{6}, which, at its rear extremity, is pivoted to the top portion of the main frame B, as at i^{18}, in such manner that the frame j^{6} can be raised and lowered, and will carry with it the fore-part roll. The vibrating carrier-frame j^{4} is provided with a pivot pin or stud j^{3}, on which is centrally mounted

a laterally-rocking bar or frame j^2, having its ends constructed with segmental guideways, in which are adjustable the slide-blocks j', which carry the axles or shafts j of the two sections comprising the fore-part-leveling roll. The top portion of the vibratory carrier-frame j^4 is connected by a rod j^{10} with the upwardly-projecting arm of a bell-crank lever j^9, mounted on the rocker-shaft i^7, which carries the rocker-arms i^6 and i^8. The horizontally or rearwardly extending arm of the bell-crank lever j^9 connects by a rod j^8 with an eccentric j^7 on the main driving-shaft A, Fig. 2, in such manner that the bell-crank lever j^9 is oscillated by the eccentric, and a vibrating motion is thereby imparted to the carrier-frame j^4, for the purpose of vibrating the fore-part-leveling roll.

The bar or frame j^2, on which the fore-part roll is directly mounted, is susceptible of freely rocking laterally, or it can be rigidly locked centrally in the position shown in Fig. 4 through the medium of a spring-pin j^{11}, mounted on a part of the vibrating carrier-frame j^4, and adapted to engage and disengage a part of the laterally-rocking bar or frame j^2. The spring-pin referred to is provided with a handpiece j^{12}, by which the spring-pin can be withdrawn from engagement with the laterally-rocking bar or frame whenever desired.

The adjustable blocks j', carrying the axles or shafts of the two-part or sectional fore-part-leveling roll, can be adjusted in the curved or segmental ways on the ends of the bar or frame j^2, for the purpose of adapting the sections of the fore-part roll to shoe-soles which differ in contour or shape.

As before stated, the frames j^6 and i^{17}, which are in fact the supporting-frames, respectively, of the fore-part roll and the shank-roll, are pivotally mounted, as at i^{18}, at the top portion of the main frame B, and consequently it is possible for these two frames to bodily rise and fall. These frames are connected, respectively, with the upper ends of vertically-arranged spring-rods l and l', attached at their lower ends to a main treadle L, pivoted at its rear portion to the main frame and adapted to rise and fall, as will be understood by reference to Fig. 1, where the treadle is indicated by dotted lines in its highest position. The treadle-frame is pivotally connected by a link l^5, with the front extremity of a lever l^3, pivoted intermediate its extremities, as at l^4, to the main frame of the machine, and having its rear extremity provided with a counterbalance-weight l^2, which, as here shown, is spherical, but which may be of any desired form or shape. The counterbalance-weight serves to counterbalance the treadle-frame and the main frames i^{17} and j^6 and all parts which are mounted upon said frames. When the treadle-frame L is depressed, the connecting-rods l and l' serve to draw the supporting-frames j^6 and i^{17} downward for the purpose of pressing the leveling-rolls upon the sole of the boot or shoe which is to be leveled, and when the treadle-frame is depressed, as above stated, it is designed to be locked in such depressed condition until the sole is leveled and the leveling-rolls are to be raised from contact with the shoe-sole. The mechanism for locking the treadle is composed of a secondary treadle L', Figs. 1 and 13, arranged in juxtaposition to the main treadle and secured to a longitudinally-arranged rock-shaft l^6, mounted in suitable bearings l^7, on the main treadle-frame. The rear end portion of the rock-shaft l^6 is provided with an attached locking dog or pawl l^8, so constructed and arranged that when the main treadle L is depressed the locking dog or pawl will, by the action of the spring l^{10}, spring into engagement with a bracket or catch l^9, attached to a part of the main frame, thereby holding the main treadle L in its depressed position until such time as it is desired to raise the leveling-rolls from the shoe-sole, whereupon the secondary treadle L' is depressed to rock the rock-shaft l^6 and disengage the dog or pawl l^8 from the bracket or catch l^9. By placing the foot upon the secondary treadle L', and also upon the main treadle L, it is possible to operate the main treadle without locking the same so long as the pressure of the foot is maintained upon both treadles.

In Figs. 15, 16, and 17 we illustrate a clutch mechanism in operative connection with the counter-shaft D, which serves to actuate the jack, whereby it is possible to throw the jack out of and into operative connection with the main drive-shaft, for the purpose of causing the jack to stand stationary while the fore part and shank rolls travel backward and forward upon the sole of the boot or shoe to the extent of the motion imparted to said rolls by their actuating-eccentrics. For this purpose the worm-gear d, Figs. 15, 16, and 17, is loosely mounted upon the counter-shaft D, and is constructed with a hub portion d^{14}, having a clutch-section or teeth d^{15}, with which are adapted to engage the teeth d^{16}, formed at one end of the clutch-section d^{17}, which is also provided with a clutch-section or teeth d^{22}, adapted to be engaged with a fixed clutch-section or teeth d^{23}, forming a part of the stationary bracket or piece d^{24}, secured in a fixed position to the main frame.

The clutch-section d^{17} is keyed or feathered to the counter-shaft, so that it must rotate with the shaft, but is susceptible of being moved longitudinally thereof through the medium of a clutch-shifting lever d^{18}, mounted on a rock-shaft d^{19}, having a suitable handle d^{20}, by which the shaft can be rocked to swing the clutch-operating lever, and thereby throw the clutch-section d^{17} either into engagement with the clutch-section or teeth d^{15} or the clutch-section or teeth d^{23}.

The rock-shaft d^{19} is designed to be locked by a spring-pin d^{21} whenever the clutch-section d^{17} has been shifted into engagement

with the clutch-section or teeth d^{15} or the clutch-section or teeth d^{23}.

When the clutch-section d^{17} is shifted into engagement with the clutch-section or teeth d^{15} on the hub of the worm-gear, the rotary motion of the latter, produced by the worm c^2 on the shaft C, which is driven by the main driving-shaft A, is imparted to the counter-shaft and the jack is oscillated or reciprocated longitudinally. Conversely, when the clutch-section d^{17} is shifted to disengage the hub d^{14} of the worm d and to engage the clutch-section or teeth d^{23}, the counter-shaft is rigidly held against rotary motion and the jack remains stationary, while the eccentrics serve to vibrate or reciprocate the fore part and shank rolls.

In Figs. 3 and 6 of the drawings it will be seen that the cylindrical heel-guard carrier h^4 is rotatable in the tubular post h^3, so that the said carrier can be rotated for the purpose of placing the shoe-carrying last on the pin h^9 without interference from the toe-rest g^6 or other parts of the toe-post G.

The pin h^9, which engages the shoe-carrying last, is termed a "spring-pin," in that it is acted on by a spring which tends to press the pin in a forward direction, and thereby hold the toe of the shoe in or against the toe-rest g^6.

Where the toe and heel guards are employed, the carrier h^4 should be rotatable, as otherwise the shoe-last could not be conveniently placed on the last-pin h^9. By making the carrier h^4 rotatable it can be turned so that the shoe can be put on sidewise without interference from the toe-rest, after which the carrier is turned back and the operator lifts the toe of the shoe onto the toe-rest. If the heel-guard is not used, it will be obvious that the shoe can be placed on sidewise without turning the post h^4, but this cannot well be effected when the heel-guard is in position, and for this reason the carrier h^4 is made rotatable, so that it can be turned to facilitate the placing of the shoe in position.

In Fig. 18 we show a modification of the mechanism for rotating the screw d^7, by which the crank or wrist pin d^2 is adjusted in a direction toward and from the center of the counter-shaft D. In this modification the numeral 1 indicates a roll or wheel to take the place of the conical roll d^{10}, described with reference to Figs. 9 and 10, and the numerals 2 indicate corrugated or undulated sides to take the place of the conical or inclined surfaces d^{12} of the cylindrical casing d^{11}. By this means the roll or wheel 1 is positively engaged with and compelled to rotate by the corrugated or undulated surfaces 2, thereby entirely avoiding any tendency which the conical friction-roll d^{10} might have to slip upon the conical or inclined surfaces of the cylindrical casing.

The mechanism for adjusting the crank or wrist pin d^2 toward and from the center of the transverse drive-shaft D renders it possible to change or vary the extent of travel or the stroke of the longitudinally oscillating or reciprocating jack without stopping or interfering with the rotation of the main driving-shaft A, so that the workman can, by simply operating the hand-lever e^3 or e^5, cause the extent of travel or the stroke of the jack to change or vary according to the size or shape of the shoes or shoe-soles which are to be leveled. In this respect a part of our present invention is an improvement upon the variable-motion mechanism described and shown in Letters Patent No. 545,407, issued August 27, 1895, to Edward C. Judd.

The adjustment of the toe and heel posts of the jack toward and from one another is a very desirable feature in a sole-leveling machine, in that it enables boots or shoes of widely different size to be mounted upon the same jack, and to have their soles properly leveled.

The improved toe and heel guards are desirable and useful features of our improved machine, in that they effectually protect the toe and heel ends of the sole when the fore part and shank rolls move off of and onto the toe and heel portions of the soles.

The simple means provided for adjusting the shank-roll relatively to the fore-part roll renders the rolls susceptible of proper adjustment for operating on and leveling the soles of boots or shoes which differ widely in size.

The simple mechanism comprising the screw-shaft i, for changing or varying the extent of travel or the stroke of the shank-roll, renders it possible to cause the shank-roll to traverse a greater or less surface of the sole, according to the size of the boot or shoe.

The shoe-supporting devices arranged upon the horizontally-swinging frame, supported by the laterally-rocking yoke of the jack F, is very desirable, in that it secures a compact, simple, and convenient structure wherein a boot or shoe can be properly prepared and mounted, while the sole of another shoe, previously mounted, is being leveled by the leveling-rolls.

The simplified treadle-locking mechanism is desirable, in that it enables the main treadle to be depressed and locked to hold the leveling-rolls down upon the boot or shoe sole without the necessity of the workman maintaining his foot upon the treadle for this purpose.

The connected hand-levers arranged at opposite sides of the machine, and either of which is capable of operating the mechanism by which the crank or wrist pin d^2 is automatically shifted to vary the stroke of the jack, is a very desirable and important feature of our improved machine, in that it materially simplifies the operation thereof and reduces the cost of manufacture of a sole-leveling machine with mechanism for changing or varying the extent of motion or the stroke of the oscillating or reciprocating jack.

All of our present improvements are designed to perfect a sole-leveling machine, and to provide a machine of this character which will perfectly level the soles of boots or shoes without special care and skill from the workman, thus relieving him in a large measure, and only requiring the preparation of the boots or shoes, the mounting and dismounting of the same, the depression of the treadle, the manipulation of the devices necessary to start and stop the machinery, and the adjustment or movement of those working parts which can be readily effected by an unskilled person to meet all the conditions required for the particular work in hand.

Our improved stroke-changing mechanism renders it possible to change or vary the extent of motion or the stroke of the shoe-jack without interfering with the operation of the machine by stopping the rotation of the main driving or power shaft, and it is only necessary for the attendant or operator to actuate either one of the hand-levers e^3 and e^5 to make any desired change in the extent of travel of the jack from a dead-center to the utmost limit of the travel. The extent of travel of the jack can be changed almost instantly for the purpose of accommodating the machine to boots or shoes of different sizes.

The changes in the motion of the jack to suit different sizes of boots or shoes may be indicated by fingers or pointers 4, and best seen in Figs. 1 and 8, which are secured, respectively, to the crank-arm f^2 and rocker-arm I′, traveling over dial-plates 5 and 7, which may be so graduated as to represent the required adjustment for different sizes of boots or shoes.

The fingers or pointers and dial-plates are duplicated, so that one finger or pointer and dial-plate will be convenient to the operator at whichever side of the machine he may be standing. For instance, when using the hand-lever e^3 the operator can conveniently observe the finger or pointer 4 and dial-plate 5, while if he is operating the hand-lever e^5 he can conveniently observe the finger or pointer 6 and the dial-plate 7, as will be obvious.

The dial devices described enable the required changes to be effected in a very accurate manner for the purpose of accommodating the motions of the jack and the motions of the shank-roll to the size of the shoe mounted on the jack.

Our sole-leveling machine is organized with special reference to perfectly leveling, in a single structure, the soles of boots or shoes which differ more or less widely in size and shape, and to this end we have originated such construction that the various working parts are susceptible of quick adjustments, particularly the shank-roll, the jack and its shoe-supports, and the toe and heel guards.

Having thus described our invention, what we claim is—

1. The combination with a vibrating sole-leveling roll, of a longitudinally-reciprocating jack provided with a laterally-movable arm having toe and heel supports adjustable toward and from one another, substantially as described.

2. The combination with a vibrating leveling-roll, of a longitudinally-reciprocating jack provided with two connected, horizontally-arranged arms movable laterally in unison and each having toe and heel supports, one arm moving into position under the leveling-roll as the other arm moves laterally out of position, substantially as described.

3. The combination with a vibratory leveling-roll, of a longitudinally-rocking jack connected with and serving to move the roll back and forth and provided with two connected arms movable laterally in unison in substantially a horizontal plane, each arm having toe and heel supports adjustable toward and from one another, and one arm moving into position beneath the leveling-roll as the other arm moves out of position, substantially as described.

4. The combination of a longitudinally-movable jack, provided with toe and heel supports, means for adjusting the toe and heel supports toward and from one another, a vibrating fore-part roll, a shank-roll connected with and moved back and forth by the jack, means for vibrating the fore-part and shank rolls independent of the connections between the shank-rolls and the jack, means for changing the position of one roll longitudinally with relation to the other roll, and mechanism under control of the attendant for automatically changing or varying the stroke or travel of the jack and simultaneously therewith changing the travel of the shank-rolls longitudinally, substantially as described.

5. The combination of a rocking jack-shaft, a longitudinally-rocking jack mounted on said jack-shaft, a vibrating fore-part roll, a shank-roll connected with and moved back and forth by the jack-shaft, means for vibrating the fore-part and shank rolls independent of the connections of the shank-rolls with the jack-shaft, mechanism for changing the position of one roll longitudinally with relation to the other roll, and power-driven jack-moving and stroke-changing mechanism connected with the jack-shaft for changing or varying the extent of rocking motion of said shaft and thereby regulating the extent of motion of the jack and the travel of the shank-roll longitudinally, substantially as described.

6. The combination, in a sole-leveling machine, of a fore-part-leveling roll, a shank-leveling roll, means for adjusting said rolls longitudinally with relation to one another, a longitudinally-movable jack provided with toe and heel supports adjustable toward and from one another, a power-driven shaft having connections with the rolls for vibrating the same, and lever-controlled jack-moving and stroke-changing mechanism in operative

connection with said power-driven shaft for changing or varying the strokes or travel of the jack, at will, without stopping the power-driven shaft, substantially as described.

7. The combination with a jack-shaft, a jack mounted thereon and provided with a shoe-supporting device, a longitudinally-adjustable carrier-frame, provided with a leveling-roll, a carrier-frame provided with a vibratory leveling-roll, mechanism for vibrating the longitudinally-adjustable carrier-frame and the vibrating leveling-roll on the other frame, and automatic, power-driven stroke-changing mechanism under the control of the attendant and connected with the jack-shaft for changing or varying the stroke or travel of the jack, substantially as described.

8. The combination with a carrier or frame, of a vertically-adjustable support on which the carrier or frame is mounted, and a leveling-roll journaled on said carrier or frame and adjustable vertically therewith, for raising or lowering the leveling-roll, substantially as described.

9. The combination with a jack, of a vibrating or reciprocating carrier or frame, a vertically-adjustable slide on which the carrier or frame is mounted, means for adjusting the slide vertically, and a leveling-roll carried by the carrier or frame and adjustable therewith for raising and lowering the leveling-roll relatively to the jack, substantially as described.

10. The combination with a jack, of a vibrating or reciprocating carrier or frame provided with adjustable supporting-arms, means for holding the said arms in their adjusted position, and a leveling-roll carried by said arms and adjustable therewith, for raising or lowering the leveling-roll relatively to the jack, substantially as described.

11. The combination with a jack, of a longitudinally-reciprocating and laterally-rocking carrier or frame provided with a vertically-adjustable support, means for adjusting the said support, and a leveling-roll carried by the rocking carrier or frame and adjustable therewith, for raising or lowering the leveling-roll relatively to the jack, substantially as described.

12. The combination with sole-leveling rolls, of a jack having toe and heel supports adjustable toward and from each other and provided, respectively, with attached vertically and angularly adjustable toe and heel guards to receive and sustain the leveling-rolls as they roll off the toe and heel portions of the sole, substantially as described.

13. The combination with sole-leveling rolls, and a jack, of pivoted toe and heel guards mounted on parts of the jack and serving to receive and sustain the leveling-rolls when they roll off the toe and heel portions of the sole, substantially as described.

14. The combination with a leveling-roll, and means for operating the same, of a jack, a vertically-adjustable support provided with a heel-guard arranged to receive and sustain the leveling-roll as it moves off the heel end of the sole, and means for adjusting the heel-guard to different angles of inclination, substantially as described.

15. The combination with a leveling-roll, and a jack having a heel-support, of a heel-guard support, an adjustable heel-guard mounted on said heel-guard support and arranged to receive and sustain the leveling-roll as it moves off the heel end of the sole, and means for adjusting said heel-guard to different angles of inclination on said heel-guard support, substantially as described.

16. The combination with a leveling-roll, of a jack having a heel-support, a vertically-adjustable standard carried by the heel-support, a heel-guard mounted on the head of the standard and arranged to receive and support the leveling-roll when it moves off the heel end of the sole, and means for adjusting the heel-guard into different positions, substantially as described.

17. The combination with a leveling-roll, of a swinging arm provided with toe and heel supports, and an adjustable heel-guard swinging with the said arm and arranged to receive and support the leveling-roll when it moves off the heel end of the sole, substantially as described.

18. The combination with a leveling-roll, of a laterally-movable frame comprising two angularly-arranged arms, each provided with adjustable shoe-supports and adjustable toe and heel guards, the heel-guard being arranged to receive and support the leveling-roll when it moves off the heel end of the sole, substantially as described.

19. The combination with a leveling-roll, of an oscillating jack having a laterally-movable frame comprising two angularly-arranged rigid arms, each having adjustable toe and heel supports provided respectively with adjustable toe and heel guards, the heel-guard on each arm arranged to receive and support the leveling-roll as it moves off the heel end of the sole, substantially as described.

20. The combination with a vibrating leveling-roll, of a longitudinally-reciprocating jack provided with a horizontally-movable frame reciprocating with said jack and having angularly-arranged arms carrying shoe-supporting devices, whereby a boot or shoe carried by one arm can be leveled while another boot or shoe is prepared and mounted on the other arm, substantially as described.

21. The combination with a leveling-roll, of a jack provided with a laterally-oscillating frame comprising two angularly-arranged arms carrying shoe-supporting devices, each arm having a projecting stop-lug, and stop-lugs mounted on a part of the jack and co-operating respectively with the stop-lugs on said arms, whereby each arm is stopped in the proper central position under the leveling-roll, substantially as described.

22. The combination with a leveling-roll, of

a jack having a horizontally-movable frame provided with two angularly-arranged arms, each carrying toe and heel supports adjustable longitudinally toward and from one another, substantially as described.

23. The combination with a leveling-roll, of a jack provided with a laterally-rocking yoke or frame, laterally movable, connected arms mounted on said yoke or frame and moving independently thereof and each having shoe-supporting devices, whereby a boot or shoe mounted on one arm can be leveled while another boot or shoe is prepared and mounted on the other arm, and means for locking each arm in a central position under the leveling-roll, substantially as described.

24. The combination with a leveling-roll, of a longitudinally-movable jack having a pivoted, laterally-swinging frame constructed with a pair of angularly-arranged arms each provided with toe and heel posts adjustable longitudinally thereupon, said frame by its lateral movement placing one of the said arms in position beneath the leveling-roll, and the other arm out of position with respect to said roll, substantially as described.

25. The combination with a leveling-roll, of a longitudinally-rocking jack having a pivoted, laterally-swinging frame, comprising a pair of connected angularly-arranged arms each provided with a rack and with toe and heel posts movable on the arm, and pinions carried by the toe and heel posts and engaging the racks on the arms, substantially as described.

26. The combination with a leveling-roll, of a jack having shoe-supports, and a heel-guard constructed and arranged to embrace the heel portion of the boot or shoe and to receive and sustain the leveling-roll when it moves off the heel end of the sole, substantially as described.

27. The combination with a leveling-roll, of a longitudinally-movable jack having shoe-supports, and a vertically-movable heel-guard constructed to embrace the heel of a boot or shoe and to receive and sustain the leveling-roll when it moves off the heel end of the sole, substantially as described.

28. The combination with a leveling-roll, of a jack provided with shoe-supports and a vertically-movable heel-guard adjustable to varying angles of inclination and constructed to receive and support the leveling-roll when it moves off the heel end of the sole, and means for vertically and angularly adjusting the heel-guard, substantially as described.

29. The combination in a sole-leveling machine, of a jack having movable heel and toe posts provided respectively with pinions, a fixed rack with which the pinions engage, means for rotating the pinions and causing them to traverse the rack for adjusting the toe and heel posts toward and from each other, and locking devices for locking the pinions against rotation after the desired adjustment of the heel and toe posts is effected, whereby the posts are locked in fixed positions relatively to each other, substantially as described.

30. The combination in a sole-leveling machine, of a jack having a laterally-movable shoe-supporting arm, a rack fixed to said arm, a heel-post movable along the rack, a pinion journaled on the heel-post, and means for rotating the pinion and causing it to traverse the rack, substantially as described.

31. The combination with a jack-frame, of a swiveled support mounted on said jack-frame and comprising angularly-arranged rigid arms, each provided with longitudinally-adjustable shoe-supports, means for adjusting the shoe-supports longitudinally on the arms, and means for locking each arm in operative position to a part of the jack-frame, substantially as described.

32. The combination with a jack-frame, of a support swiveled to a part of the jack-frame and provided with angularly-arranged rigid arms having shoe-supports, racks mounted on the arms, pinions journaled on the shoe-supports and engaging the racks for independently adjusting the shoe-supports longitudinally of the arms, and means for rotating the pinions, substantially as described.

33. The combination with a jack-frame, of a support swiveled to a part of the jack-frame and provided with angularly-arranged rigid arms having shoe-supports, racks mounted on the arms, pinions engaging the racks for adjusting the shoe-supports longitudinally of the arms, means for rotating the pinions, and locking devices for locking the pinions against rotation for the purpose of rigidly holding the shoe-supports in their adjusted positions, substantially as described.

34. The combination with a jack-frame, of an approximately vertical support having top and bottom rounded bearings and angular rigid arms provided with shoe-supports, and means for adjusting the shoe-supports longitudinally on the arms, substantially as described.

35. The combination with a sole-leveling roll, of a jack having a pivoted yoke or frame provided with stop-shoulders, a swiveled support mounted on the yoke or frame and having angularly-arranged rigid arms provided with shoe-supports and stop-lugs adapted to strike the stop-shoulders of the yoke or frame, and locking devices for locking each arm to the yoke or frame in operative position under the leveling-roll, substantially as described.

36. The combination with a leveling-roll, of a jack having a laterally-swinging arm provided with a rack, heel and toe posts or supports mounted on said arm, pinions mounted on the posts or supports and engaging the racks, and means for rotating the pinions for adjusting the posts or supports on the arm, substantially as described.

37. The combination with a leveling-roll, of a jack having a laterally-swinging arm provided with a rack, heel and toe posts or sup-

ports mounted on said arm, pinions mounted on the posts or supports and engaging the rack, means for rotating the pinions to adjust the posts or supports, stops for limiting the lateral motion of the arm, and a locking bolt or pin for locking the arm to a part of the jack-frame when said arm is in a central position to support a boot or shoe under the leveling-roll, substantially as described.

38. A jack having a laterally-movable yoke or frame carrying a laterally-movable frame comprising connected angularly-projecting shoe-carrying arms provided with shoe-supports, substantially as described.

39. A longitudinally-reciprocating jack having a laterally-rocking yoke or frame carrying a pivoted, laterally-swinging frame which is provided with shoe-supports, substantially as described.

40. The combination with a leveling-roll, of a jack having a laterally-movable yoke or frame carrying laterally-movable arms, each of which is provided with shoe-supports, means for longitudinally adjusting the shoe-supports on each arm, and means for holding each arm in operative connection with the laterally-movable yoke or frame, substantially as described.

41. The combination with a leveling-roll, of a longitudinally-reciprocating jack having a laterally-rocking yoke or frame carrying pivoted, laterally-swinging arms, each provided with shoe-supports, means for adjusting the shoe-supports longitudinally on each arm, and locking devices for locking each arm in operative connection with the laterally-rocking yoke or frame, substantially as described.

42. The combination with a leveling-roll, of a jack having a laterally-movable frame comprising angularly-arranged arms provided with shoe-supports, and spring bolts or pins for locking said arms alternately in operative connection with a part of the jack-frame, substantially as described.

43. The combination, in an organized sole-leveling machine, of a vibratory leveling-roll, a longitudinally-movable jack, a power-driven shaft connected with the leveling-roll and serving to vibrate the same, jack-moving and stroke-changing mechanism operatively connected with and actuated by the power-shaft, a lever connected with and serving to operate the stroke-changing mechanism at will to change or vary the strokes of the jack without stopping the rotation of the power-shaft, and a clutch mechanism under control of the operator for throwing the jack-moving and stroke-changing mechanism into and out of operative connection with the power-driven shaft without stopping the motion of the latter, substantially as described.

44. The combination in an organized sole-leveling machine, of a vibratory leveling-roll, a longitudinally-movable jack, a power-shaft connected with the leveling-roll and serving to vibrate the same, a driven shaft geared with and rotated by said power-shaft, jack-moving and stroke-changing mechanism operatively connected with the said driven shaft and with said jack, a lever connected with and serving to operate the stroke-changing mechanism at will to change or vary the strokes of the jack without stopping the rotation of either the power-shaft or the driven shaft, a clutch for throwing the driven shaft into and out of operative connection with the power-shaft which vibrates the leveling-roll, and means under control of the operator for actuating said clutch, substantially as described.

45. The combination in an organized sole-leveling machine, of a vibratory leveling-roll, a longitudinally-movable jack connected with and serving to move the leveling-roll back and forth, a power-shaft connected with the leveling-roll and serving to impart a vibrating motion to the same as it is moved back and forth by the jack, a driven shaft geared with and rotated by said power-shaft, jack-moving and stroke-changing mechanism operatively connected with the said driven shaft and with said jack, a lever connected with and serving to operate the stroke-changing mechanism at will to change or vary the strokes of the jack without stopping the rotation of either the power-shaft or the driven shaft, a clutch for throwing the driven shaft into and out of operative connection with the power-shaft which vibrates the leveling-roll, and means under control of the operator for actuating said clutch, substantially as described.

46. The combination with a leveling-roll, a jack, and a main treadle for depressing the leveling-roll, of a rock-shaft journaled on the main treadle and provided with a dog or pawl, and a secondary treadle, said dog or pawl serving to lock the main treadle depressed, and the secondary treadle serving to release the dog or pawl to permit the main treadle to rise, substantially as described.

47. The combination of a driving-shaft, a gear loose on the driving-shaft, a vibratory leveling-roll actuated by connections with the driving-shaft, a reciprocating jack operated by the rotation of the counter-shaft, a clutch-section on a part of the gear, a fixed clutch-section, and a movable clutch-section for throwing the gear into and out of operative connection with the counter-shaft and locking the latter, whereby the motion of the jack can be stopped while the motion of the leveling-roll continues, substantially as described.

48. The combination with a yoke or frame having a pin or post, of a sleeve adapted to tilt back and forth and through which the pin or post extends, an arm connected with the sleeve and provided with toe and heel posts, a locking bolt or pin which is caused to engage and disengage a part of the yoke or frame when the sleeve is tilted back and forth, and a leveling-roll which in operation exerts downward pressure on the toe and heel post carrying arm to hold or lock the bolt or

pin in engagement with a part of the yoke or frame, substantially as described.

49. The combination with a yoke or frame, of a sleeve having upper and lower bearings and adapted to tilt back and forth, an arm connected with the sleeve and provided with toe and heel posts, and a bolt or pin for locking the toe and heel post carrying arm to said yoke or frame, substantially as described.

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

EDWARD C. JUDD.
HARRY E. CILLEY.

Witnesses:
HENRY C. MULLIGAN,
WILTON E. DRAKE.