

966,441.

Patented Aug. 9, 1910.

5 SHEETS—SHEET 1.

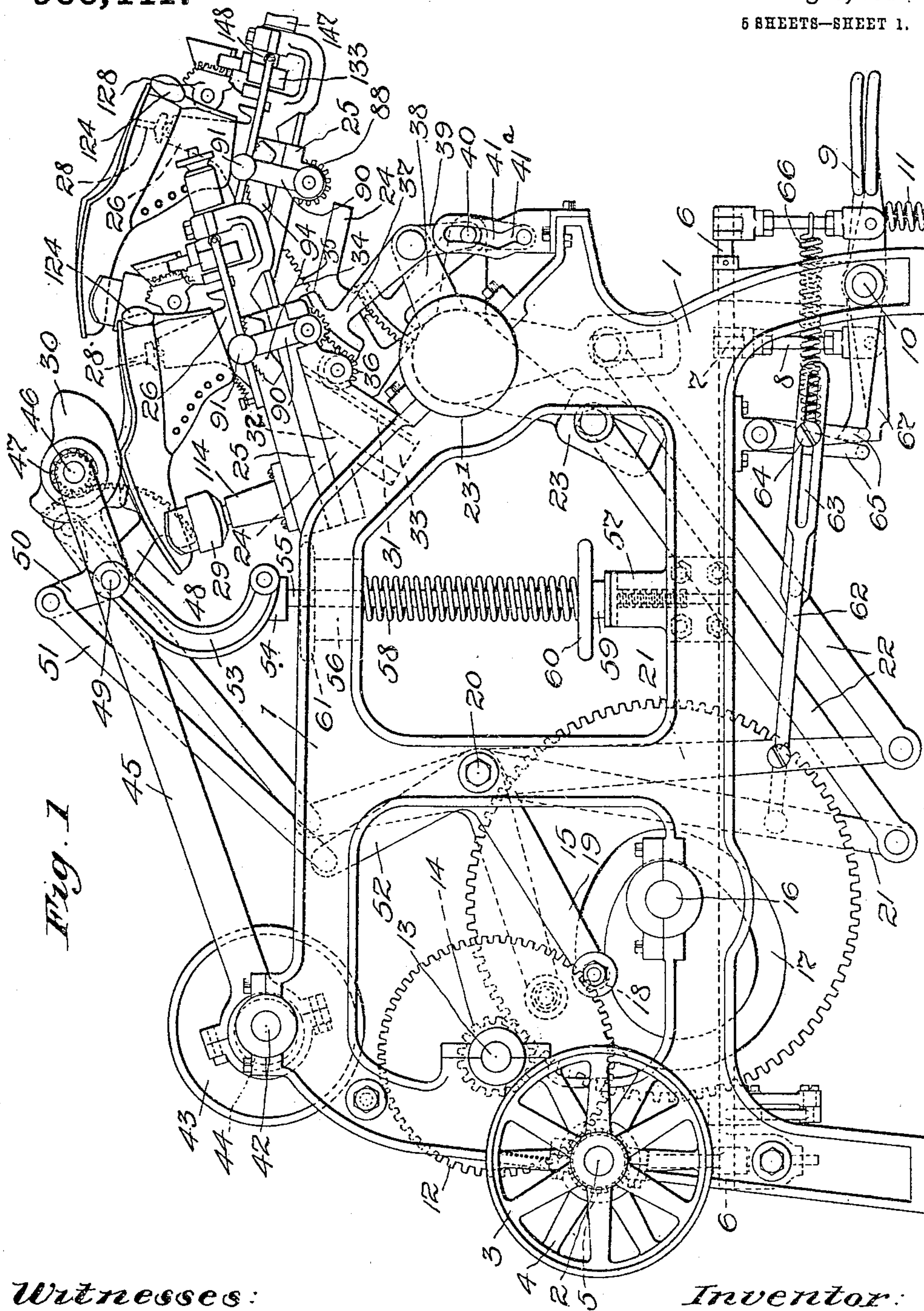


Fig. 1

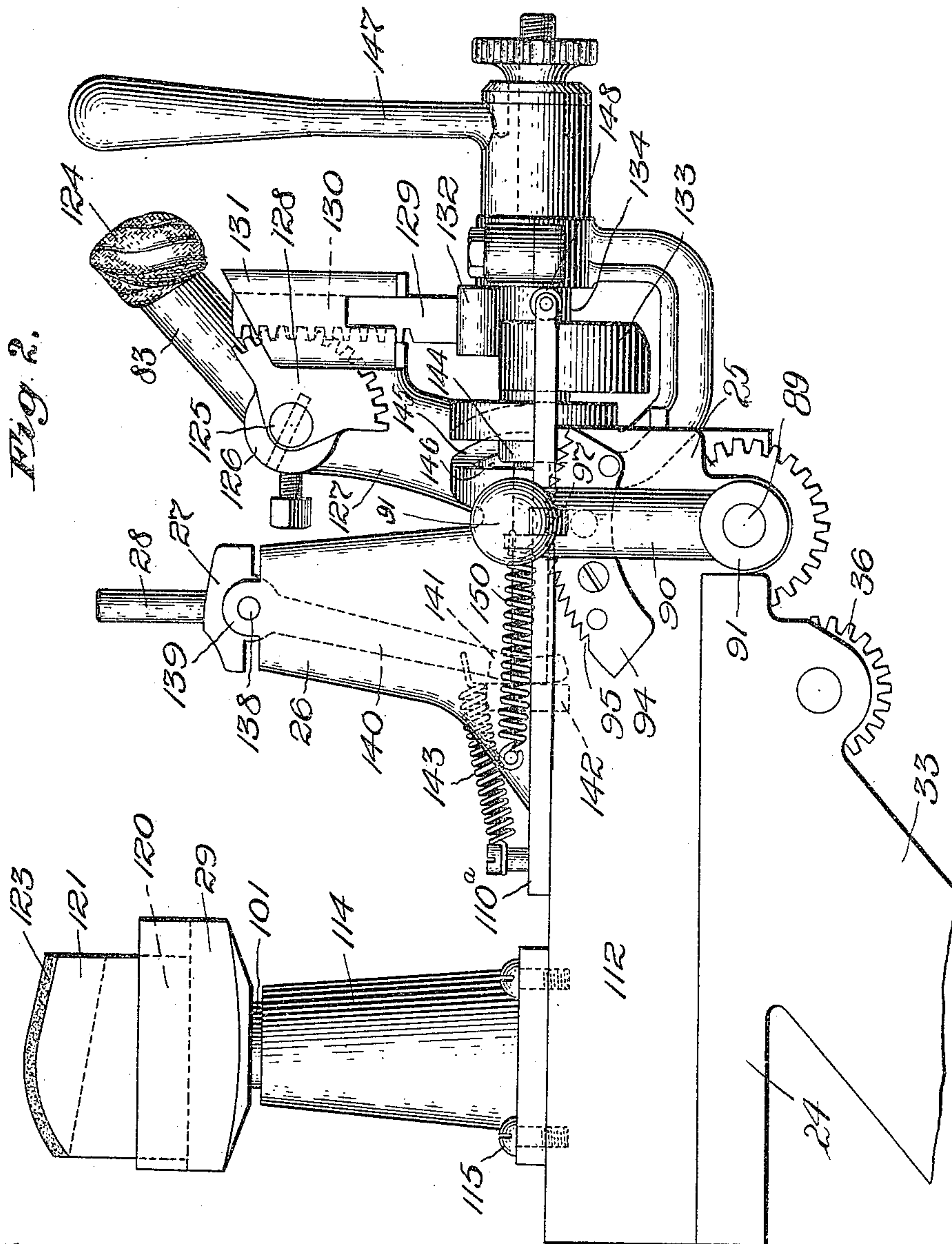
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by Emory Booth,
Attys

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6 SHEETS—SHEET 2.



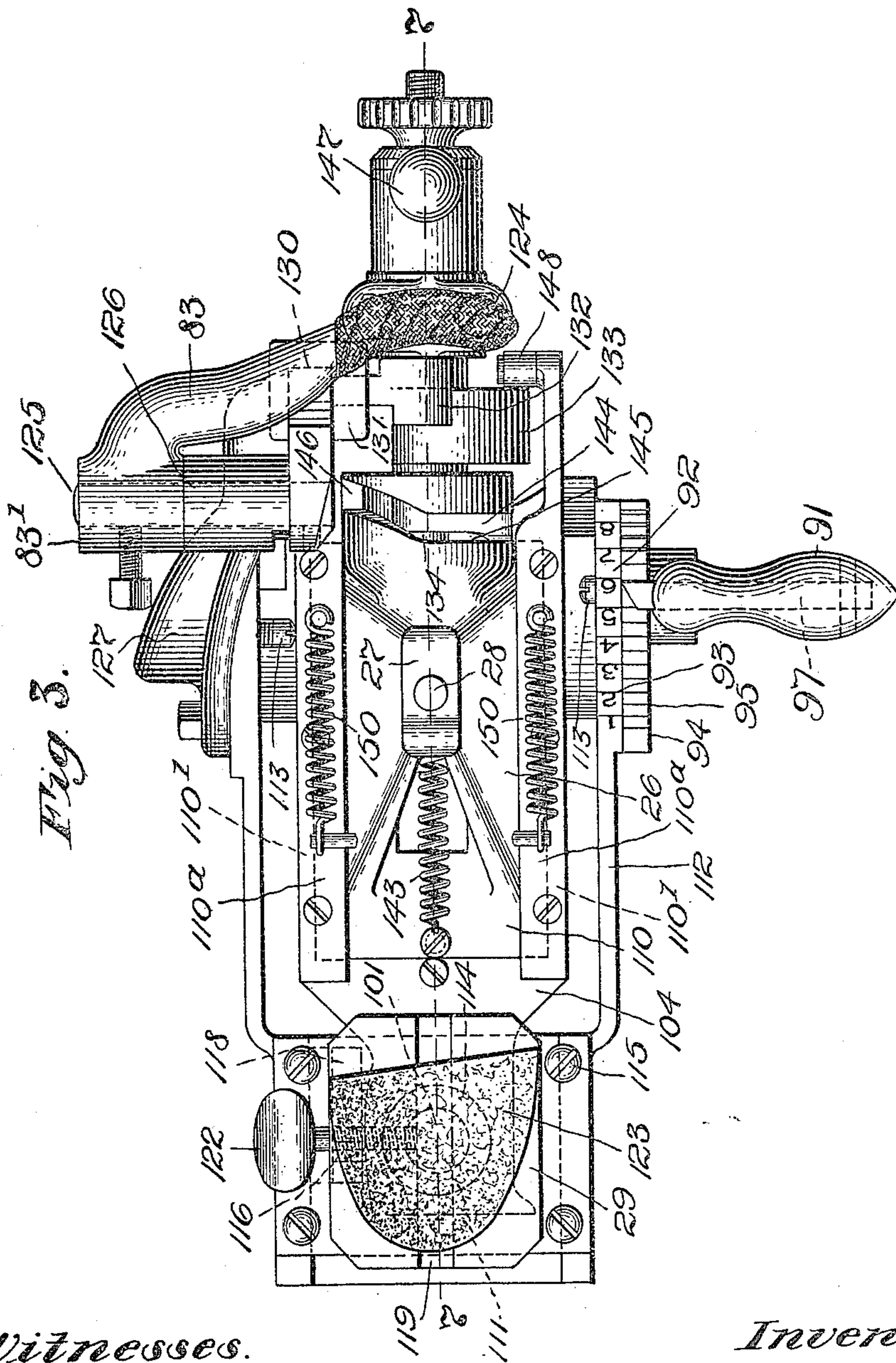
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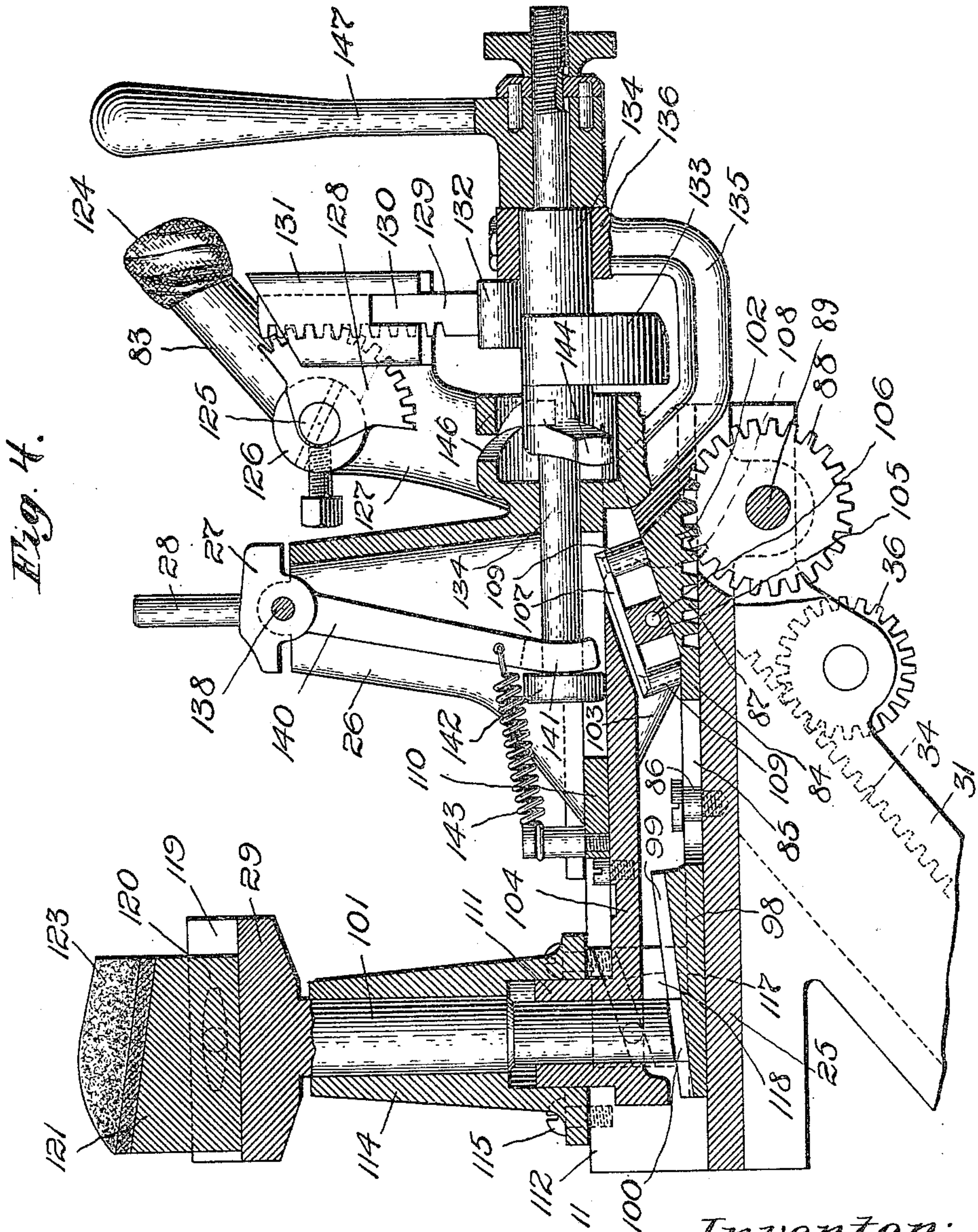
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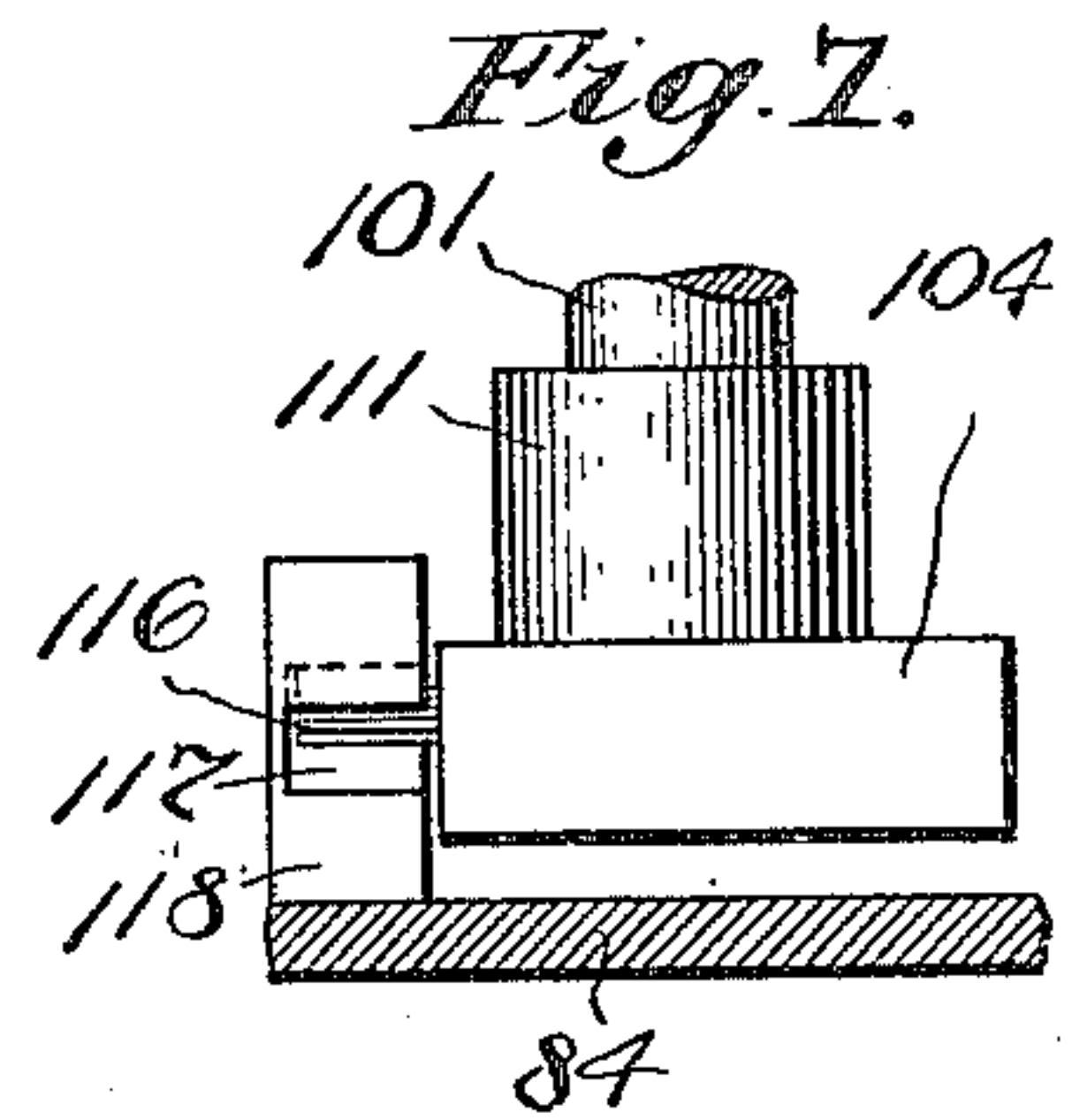
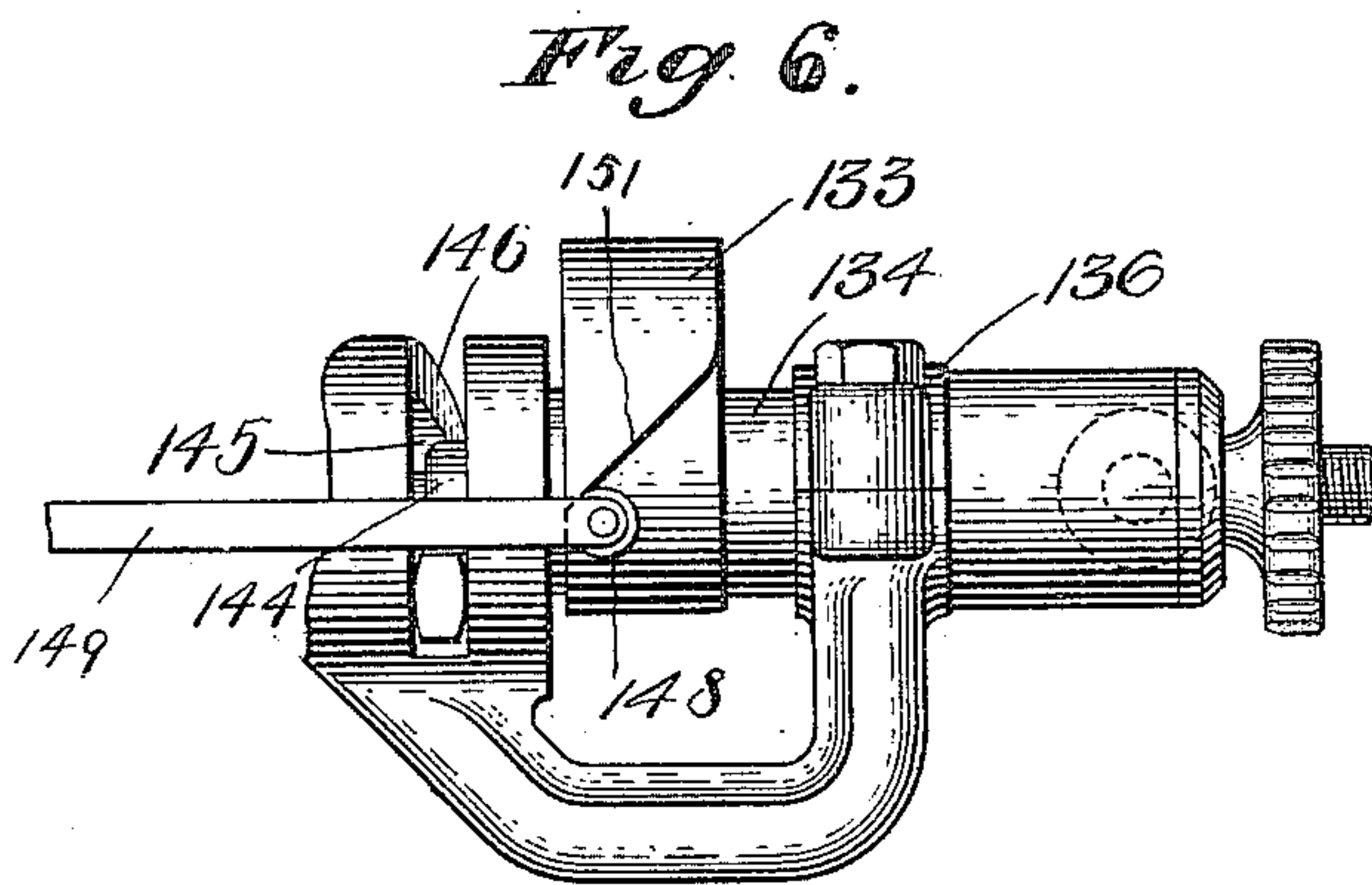
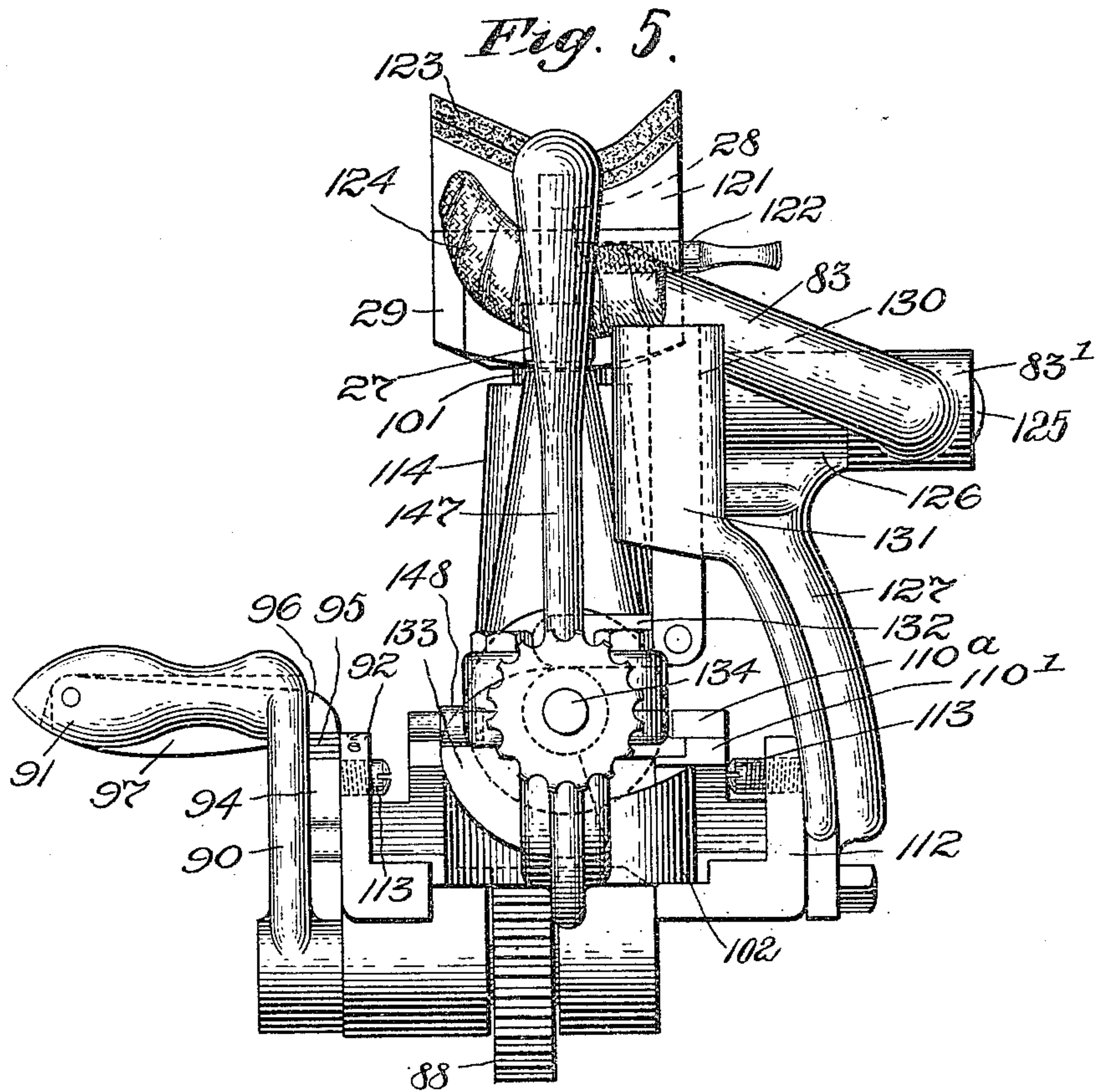
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5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

JOHN J. HEYS, OF LYNN, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO
THOMAS G. PLANT, OF BOSTON, MASSACHUSETTS.

SHOE-SUPPORTING JACK.

966,441.

Specification of Letters Patent.

Patented Aug. 9, 1910.

Application filed October 10, 1906. Serial No. 338,200½.

To all whom it may concern:

Be it known that I, JOHN J. HEYS, a citizen of the United States, residing at Lynn, in the county of Essex and State of Massachusetts, have invented an Improvement in Shoe-Supporting Jacks, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings representing like parts.

The invention to be hereinafter described relates to shoe supporting means or jacks and especially to such as are intended for use in that general class of machines known as sole pressing or leveling machines, which are now sometimes employed for laying or leveling the out soles of boots and shoes; and the general object of the present invention is to provide an improved jack of this class, which will avoid the objections heretofore encountered in the operation and mechanical construction of such devices, and provide a sole laying or leveling jack which will be effective in operation and simple in construction and by which a shoe may be readily and conveniently positioned, regardless of its size, for subsequent treatment.

The invention consists of the parts and combinations to be hereinafter described and then definitely pointed out in the claims, it being understood that the drawings accompanying this specification and forming a part thereof, illustrate only one of the many mechanical embodiments the invention may assume.

In the drawings: Figure 1 is an elevation of the right side of a machine illustrating one embodiment of my invention and selected for purposes of illustration only; Fig. 2, a detail in elevation of the jack table and the supporting and adjustable members of the jack mounted thereon; Fig. 3, a plan thereof; Fig. 4, a vertical section through the jack and its table taken on the line 7—7 of Fig. 3; Fig. 5, a rear elevation thereof; Figs. 6 and 7 are details of the adjusting mechanism for positioning the supports for the last or shoe to be referred to.

In the particular embodiment of my invention selected for the purpose of illustration herein two like machines are shown, arranged side by side, each independent in construction and operation from the other except in the provision of common supporting means, what would be the adjacent side

frames of the two machines being omitted for convenience in construction, the shafts and some of the supports extending from one side of the frame to the other. It will be understood, however, that this is a mere convenience and obviously not a necessary construction and my invention in no sense limited thereto. The two independent machines together constitute a twin or duplex machine, and being substantially similar one to the other, a description of but one will be given and will be sufficient, it being understood that like reference characters represent like parts operating in a like manner in the two machines.

Referring now particularly to Fig. 1, the side frame 1, the main or drive shaft 2 and the fast and loose pulleys 3, 4, may be of any desired or suitable construction. Inside of said frame 1, the drive shaft 2 is provided with a driving pinion 5, loosely mounted on said shaft and adapted to be operatively connected thereto and driven by suitable clutch mechanism operated from the horizontal actuating shaft 6, mounted in said frame, extending to the front of the machine where it is treadle actuated through a laterally extending arm 7 connected by a link 8 with the treadle 9, fulcrumed at 10 and supported from below by a spring 11. The pinion 5 drives a large gear wheel 12 fast upon a countershaft 13, journaled in said frame. This countershaft 13 also has a pinion 14 fast thereon which meshes with and drives a large cam wheel 15, loose upon a horizontal pivot shaft 16 supported in the frame. One of the side faces of this cam wheel has a suitable cam groove 17, (Fig. 1) which receives a roller stud 18 mounted on an arm 19 of a three-armed lever fulcrumed in the frame at 20 and provided with a depending arm 21. A link or rod 22 connects this depending arm with the lower slotted end of a jack actuating lever, 23, fulcrumed loosely upon the horizontal shaft 23', itself loosely mounted in the frame. By adjusting the connecting end of the link 22 in the slotted end of the jack lever 23, the extent of oscillation of the jack lever may obviously be varied as required, as, for instance, in operating upon different sizes of shoes. The upper arm of the jack lever 23 is provided with a jack supporting table 24, upon which rests the base 25 of a shoe support or jack. This jack as herein shown

comprises a heel post 26 (Fig. 2) provided at its upper end with a pivoted last supporting block 27, with its heel spindle or pin 28 and an adjustable exterior toe support 29. The heel pin or spindle 28 is adapted to fit into the pin socket provided in the heel of the last and the toe support 29 is provided with an adjustable toe rest 121 having a cushioned concave seat to receive and exteriorly support the toe of a shoe mounted on said last. The jack is also provided with an adjustable heel gage 83 that is adapted to be moved to a desired size position and against which the counter of the inverted shoe is brought thereon to accurately determine the position to be occupied by the shoe and its sole relative to the jack and the form 30 which operates upon the sole and simultaneously moves with it. These supports are relatively movable toward or from one another and also toward and from said form to bring the last or the shoe mounted thereon to a predetermined vertical and longitudinal position relative to the jack supporting table and said form 30 associated therewith. A detailed description of the jack and the means for adjusting the shoe supporting member thereof and for jacking the shoe thereon will be best understood and appreciated, however, after describing the movements of the jack lever and said table and the construction and operation of the form 30 which coöperates with the jack to lay or level the sole of a shoe mounted thereon.

By the rotation of the cam wheel 15 (Fig. 1) the arm of the jack actuating lever 23 is oscillated back and forth longitudinally of the machine to produce suitable progressive movements of the jack and its shoe relative to the form positioned above it. In order to move the jack in and out and respectively from and toward the operative, to bring the shoe into operative position relative to its form and for moving it in a position in which a shoe may be conveniently applied to or removed therefrom, any suitable means may be employed, though preferably the jack supporting arm 31 of said jack carrying lever 23 is provided with a suitable guide way 32 (Fig. 1) to receive a downwardly and obliquely extended arm 33 of the jack base 25, which, in the present instance, is provided with a guide rack 34. The teeth 35 of this rack are in mesh with a toothed pinion 36, loosely mounted in the jack supporting arm 31, said pinion being meshed with and operated by a segmental gear 37 pivoted upon a forwardly extending arm 38 of said jack carrying lever 23. For operating this segmental gear it has a depending arm 39 supporting a horizontal roller or other stud 40 received or running in a stationary cam slot 41 of said frame and which is caused to rise and fall therein as the jack

lever is oscillated upon its fulcrum. As here shown this cam slot is provided with an offset 41^a at its lower end that, as the jack is oscillated to the right (Fig. 1) toward the operative and immediately before it reaches the limit of its outward movement and as the roller 40 reaches said offset, causes a quick inward movement of the segmental gear 37, rotating the pinion 36 to cause the rack guide 34 to be slid outward and upward, carrying with it the jack base, jack and the shoe mounted thereon. By this arrangement the shoe is projected diagonally upward and forward toward the operative, above the path of the molding means or form 30 presently described, into a convenient shoe removing or applying position. Reverse movement of the jack actuating lever returns the same jack to its lowermost position on said jack table 24, in which it is oscillated to present the shoe sole to the action of said form 30 for leveling it. For producing the vibratory movements of this form, referring now to Fig. 1, the side frames 1 at the head and rear of the machine have bearings for a suitably driven shaft 42, having a pulley 43, which is preferably belted to and driven from an independent power or counter-shaft. I prefer this construction because of the fact that it is desirable to rotate this shaft much more rapidly than the main drive shaft 2 and because of the inconvenience in connecting it to said drive shaft to produce the rapid rotation required. Obviously, however, the particular means for driving this shaft may be varied as desired or to meet the conditions under which it is operated. Said shaft 42 is provided with an eccentric 44, the strap of which has an upwardly inclined arm 45 provided at its outer front end with suitable bearings for the shaft 46 of the former 30. The rotation of the shaft 42 rotates said eccentric 44 and causes short rapid vibratory movements of said form 30 back and forth over the sole for leveling the same by attritive action. The periphery of this form, in a direction perpendicular to its axis or the diameter, if such it may be termed, of the form should obviously be such that in making a complete oscillation in either direction its active face will traverse the shoe sole from the tip of the toe to the heel seat end thereof, or vice versa, and will thus produce perfectly accurate and predetermined longitudinal and transverse curvatures at all points, notwithstanding the rapid vibratory attritive action thereon during its progression or travel along the sole.

For oscillating the form back and forth while the jack with its supported shoe is simultaneously oscillated therewith and to move the active face of the mold progressively over the sole as described, said shaft 46 is preferably operatively connected to

said jack actuating mechanism. To this end I have, in the present instance, provided said shaft 46 with a pinion 47 fast thereon, which is driven by a segmental gear 48 fulcrumed upon a cross shaft 49 journaled in the form carrying arm 45. This shaft 49 has a forwardly extending arm 50 connected by a rod 51 with an upwardly extending arm 52 of the three-armed lever which oscillates the jack. By this arrangement the jack and said segmental gear, and hence the form, are simultaneously and uniformly oscillated and by thus positively oscillating the form in time with and from the same mechanism that oscillates the jack, it is possible to use a molded form that will cause a predetermined curvature to be given to the sole at any point thereof. Furthermore this construction permits the same form to be used for a large variety of sizes of shoes if the sole of the latter are presented in invariable position relative thereto and invariable for all sizes.

To support the form 30 and at the same time provide suitable means for automatically supplying pressure to press the form yieldingly to its work upon the sole and also to cause it to follow the various contours thereof, a cross shaft 49 of said form carrying arm 45, is provided at its ends with a curved supporting link 53. At its lower end this link is pivoted to the head 54 of a vertical rod 55 mounted to rise and fall in suitable upper and lower frame bearings 56, 57 respectively. Encircling this rod is a coil spring 58, seated at its upper end against the upper bearing 56 and at its lower end against an adjustable nut 59, shown as having a hand wheel 60 for operating it and threaded upon the lower end of said rod 55. By adjusting this nut by rotating said wheel, the tension of the pressure spring 58 may be varied to normally support the arm 45 and said form 30 at different elevations and thereby to vary the resultant pressure of said form upon the sole of the shoe, when the latter is oscillated in contact with it. Upon removing the shoe from such operative contact and in projecting the jack to its shoe removing position above said form, the head 54 seats upon an adjustable wheel nut 61 which prevents further depression of said form but permits the rapid vibratory movement thereof to be continued uninterruptedly, even when the shoe is removed from the machine.

That each machine may be automatically and independently stopped at the conclusion of the molding operation and immediately as the jack associated therewith is projected into its upper positions, I connect the lower end of the arm 21 of said three armed lever by a rod 62 extending toward the front of the machine and having a slot 63 to receive a stud 64 on a lever 65 depending from the

side frame 1. This lever is normally drawn by a spring 66 to the right Fig. 1 or forward in position to engage and lock the rear arm 67 of said treadle in the depressed position it assumes in starting the machine. When however the jack actuating arm 21 is swung abruptly to the left Fig. 1 to project the jack, as described, the right end of the slot 63, which, by the throw of the jack has been brought up to said stud 64, moves the latter to swing the locking lever 63, to the left, to release the treadle and permit its spring 11 to lift it to unclutch the driving shaft and stop the rocking movement of the jack and form.

When the shoe is mounted upon a jack and presented in operative relation to the form, the bottom of the sole or shank as it moves progressively therewith is not disposed in a horizontal plane or one which is parallel to the face of the heel but slopes away toward one side or the other and in different directions over the shank and foreparts respectively. Furthermore, the median line of the sole usually curves outwardly or laterally at the toe of the sole in one direction for a right shoe and in the opposite direction for a left.

To efficiently lay or level the sole of the shoe, the form which operates upon it should be arranged to fit upon the sole uniformly irrespective of whether the changes in contour or slope in the sole bottom are toward one side or the other, so that the pressure and molding action may be uniformly distributed, and all parts of the sole be brought in turn in actual contact with the form without producing any greater amount of action at one part or portion than at another.

As already stated, my invention contemplates novel means for supporting and presenting a shoe in operative relation to said forms, comprising the jack having a vertically movable toe support 29 (Fig. 2) and the movable last spindle 28 referred to. In addition to these supports the jack is also provided with the movable heel clamp or gage 83 (Fig. 4) adapted to engage the counter of the inverted shoe when mounted upon said heel spindle 28 and to determine the longitudinal position of the shoe on the jack.

In bringing a shoe into operative relation with the form which has a molding face adapted to correspondingly mold different portions of the sole, it is desirable that each and every shoe should be presented in the same manner and brought into a definite relation with said form regardless of variations in sizes. Accordingly, I have provided suitable means for bringing each shoe of the same size to the same position on the last when mounted thereon and for bringing each of the different sizes and styles of shoes to the same predetermined position, so

that when brought into active relation with the mold a predetermined portion of the sole will engage a predetermined portion of the mold, the portions selected in the present instance being the line of separation between the forepart and shank or what is termed the "ball line" of the sole and the corresponding part of the form. In thus presenting the shoe account must be taken not only of the fact that the principal variations in the lengths of the different sizes of shoes are over the forepart but that the heights or depths of the lasts employed vary greatly through the body portion, or in that part in which the spindle hole or socket is made. While there is considerable variation in depth across this portion of the last in different sizes, that through the toe portion is considerably less consequently in elevating the different sizes of lasts with their shoes to bring them to the proper height relative to the form, the elevation that would be suitable for the heel end of the last or shoe would be entirely too great for the toe, consequently a variable movement must be provided at the opposite ends of the lasts to raise each an amount proportional to their respective variations in depth, so that both ends of or the bottom of the shoe sole will always be brought to the same vertical position irrespective of the size of sole. Suitable means are therefore provided for producing this result and for also moving the shoe longitudinally to bring the shoe into the predetermined longitudinal position referred to and for securing or what is termed "jacking" the shoe in said position.

For positioning the toe and heel ends of the last in the vertical positions referred to I have, as one form of such device, arranged the following mechanism, which will be best understood by referring to Fig. 4. As herein shown the jack base 25 is provided with a horizontally slidable plate 84 having a longitudinal slot 85 to receive a guide pin 86, the head of which overlies the upper edges of said slot and retains the plate on its supporting base while permitting it to slide longitudinally thereon. At its front end (Fig. 4) this plate is provided at its under side with a rack 87 the teeth of which are meshed with and actuated by a vertical pinion 88 of a horizontal shaft 89 mounted in suitable bearings provided at the under side of said base 25. For operating said pinion, as here shown, the left end of said shaft extends through its bearings and is provided with a crank arm 90 (Fig. 2) having an operating handle 91, by which it may be turned or oscillated back and forth to rotate said pinion and by moving said rack 87 slide the plate longitudinally of the jack to adjust the toe and heel supports vertically to their size positions, as will be presently described. That this handle and lever may

be conveniently and accurately moved to and set in the proper position for a given size of shoe or last, suitable size or scale means are provided. As here shown, the handle end 91 of said arm 90 sweeps over the face of a graduated arc plate, 92 (Fig. 3), on the left side 112 of said base 25, said plate having graduations 93 corresponding to the sizes and half sizes of the different lasts employed in shoe manufacture. At its outer side, this arc plate is provided with a toothed or notched arc plate 94 (Fig. 2) having its notches 95 alined with said graduations 93 and each adapted to receive the tooth like end 96 (Fig. 5) of a latch 97 pivoted at its outer end within a longitudinal vertical slot of said handle 91 and therefore easily operated to raise its locking end out of the notch in which it rests and permit the handle to be moved to a desired size position, when the latch may be released to engage the notch below it, thus to lock the sizing mechanism and said supports in the corresponding size position. By these adjustments the toe and heel of the sole and hence all intermediate points thereof are always presented and supported at the same invariable height and the heel gage, as presently shown, is simultaneously operated to determine and place the shoe in an invariable longitudinal position. For simultaneously adjusting the toe and heel supports vertically by the movements of said adjusting plate 84, referring again to Fig. 4, the rear end of said plate is, as herein shown, provided with a wedge 98, the upper face of which is centrally provided with a rectangular longitudinal groove 99 (Figs. 3 and 4), to receive a rib-like projection 100 on the lower end of a central spindle 101, depending from said toe support 29, and by which the elevation of said toe support is adjusted as the wedge is moved thereunder. At its front, the upper face of the plate 84 is also provided with a wedge 102 preferably having a greater inclination or height than the wedge 98 and that supports a part of wedges 103 depending from the sides of a horizontal last supporting plate 104, the lower active faces having the same inclination as the active face of the wedge 102, said wedges sliding freely upon one another and adjusting the elevation of the front end of said plate 104 as the wedge carrying plate 84 is moved longitudinally beneath it. To retain the operative faces of the wedges 102 and 103 one upon the other while permitting said plate 104 to be elevated or depressed, a block 105 is pivotally mounted, between the active faces of said wedges 102, 103, upon a pin 106 extending transversely between said wedges with its ends secured therein. The lower face of this block rests upon the upper face of the wedge 102, the upper face of said block being engaged by a cross plate 107

(Fig. 4) secured at its ends by suitable screws 108 tapped into the upper face of said wedge 102. Suitable sleeves 109 are employed to space the cross plate from said wedge so as to permit said block 105 to slide between them but preventing it and the last supporting plate 104 that carries it from being separated from the wedge 102 or the adjusting plate 84 upon which it is formed.

The upper face of said plate 104 receives a horizontal plate 110 which carries the heel post 26 preferably formed integrally therewith. This plate is adapted to slide longitudinally thereon to bring the last and its shoe into the desired longitudinal and predetermined position on the jack, that is to present the ball line of each shoe invariably to the ball line of the form. That this plate 110 and its heel post may be prevented from being picked off its supporting plate 104 by the sticking of the sole to the form or to prevent vertical displacement of said plate 110, its supporting plate 104 is provided laterally with vertical flanges or sides 110' (Fig. 5) constituting guides for the side edges of said plate 110 as it is moved longitudinally, horizontal face plates 110^a (Fig. 3) are provided which are secured to and overlap said sides 110' and the opposed edges of the plate 110 and to retain the latter within the guideway thus formed while permitting it to slide freely toward and from said toe rest and heel gage. To provide for lateral adjustment of the heel supporting end of this plate 110 (the front Fig. 5), the rear end of the plate 104 is provided with a tubular post 111 (Fig. 4) to receive interiorly the lower end of the depending spindle 101 of said toe support 29, said spindle thus constituting a pivot stud for said plate. Said plate 104, however, is narrower than the base 25, which permits the rear end of said plate to be swung back and forth upon the plate 84 as a support and in the arc of a circle about said post as a center. The jack base 25 is provided with vertical sides 112 forming a recess to receive and guide said plate 84 in its longitudinal movement. For moving and securing the heel support end of the jack supporting plate 104 in a desired lateral or central position, horizontal adjusting screws 113 (Fig. 5) tapped into said sides 112 are provided which can be turned in either direction to swing the front end of said plate to one side or the other and to maintain it with the heel spindle 28 and gage 83 carried thereby in desired lateral adjustment, as when operating upon rights or lefts or upon different styles or types of shoes.

Above the post 111 (Fig. 4) the vertical sides 112 of the jack base 25 receive a hollow post 114, secured to said sides by suitable screws 115, said post having a central bore

constituting a bearing for the slidable spindle 101 of said toe support 29 and which holds the latter in fixed longitudinal position on said jack, the only movement secured by adjustment being the vertical movement produced by the wedge 98 at the lower end of said spindle.

In order to provide for raising the jack supporting plate 104 vertically the inner toe post 111 is provided at its right side (Fig. 4 or the left Fig. 7) with a horizontal pin 116 received into an inclined groove 117, formed at the inner side of an upwardly extending lug 118 at the right side of the rear end of said plate 84. The inclination of this groove 117 is the same as that of the wedge 102 so that as the latter and said lug 118 are moved either forwardly or rearwardly the plate 104 as a whole is simultaneously depressed or elevated and without raising one end more than the other. This, however, does not affect the adjustment of the toe support 29, which is only adjusted by the action of the wedge 98 upon the ribbed projection 100 at the lower end of the depending spindle 101 of said support, movements differing in extent being thus imparted to said last supports by the adjustment of said plate 84. To receive the toe end of the inverted shoe, said toe support 29 is provided with a longitudinal groove 119 to receive a depending rib 120 of converse shape formed upon the under side of a toe rest 121 (Fig. 4). By this construction the toe rest is slidably mounted in its support and is adjusted forwardly or rearwardly and retained in adjusted position by means of a clamping screw 122 tapped through the side of said support and engaging the rib 120 sliding in said groove. At its head this rest is provided with a concaved seat (Figs. 4 and 5) having a suitable pad or cushion 123 (Figs. 3 and 5) secured thereto, both the seat and cushion being adapted to the shape of the toe of the shoe and to prevent lateral motion of the same thereon when the shoe is jacked in position. As here shown the pad and its seat are shaped to receive a right shoe, the other jack having a pad adapted for a left shoe, each jack coöperating with their associated forms 30, which have molded peripheries adapted respectively to level one a right and the other a left shoe.

As has already been stated, I preferably employ a heel gage 83 to coöperate with the toe rest in supporting a shoe. This gage is adjustably mounted and adapted to be moved to a series of predetermined positions corresponding to the positions in which the counters of the shoes to be operated upon should be placed relative to the jack, so as to bring the ball line of the sole of each shoe to be operated upon invariably to the same position irrespective of whether the shoe is a long or short one, that is to say ir-

respective of the size of shoe. By bringing each shoe to said predetermined position and by simultaneously oscillating the jack and form for progressive movement together, each portion of the sole is brought in molding contact with the part of the form adapted to mold it, and longitudinal displacement of one relative to the other prevented.

While any suitable type of heel gage or other shoe positioning member may be employed in connection with the other features of my invention, that herein shown is preferred, in which the heel gage proper comprises a horizontal curved hook shaped rest 124 at the upper and outer end of an upwardly inclined arm already referred to, as the heel gage 83 and which is adjustably secured by its hubbed end 83' upon the right end of a horizontal rock shaft 125 (Figs. 3 and 5). This shaft, in the present invention, is journaled in a suitable tubular bearing 126 formed at the head of a vertical bracket 127 secured at the right side of said base 25, so that the bearing and said shaft are maintained in fixed position relative thereto. The curved head of this gage is adapted to embrace the shoe counter as the latter is brought against it to limit the movement thereof and thus to position the shoe longitudinally and is provided with suitable cushioning or flexible material, as flannel, to prevent marring the shoe upper.

For swinging the heel gage toward or from the heel spindle 28 and the toe support 29, said shaft extends inwardly through its bearing to receive the hub of a segmental gear 128 (Figs. 2 and 4), the teeth of which are meshed with a vertically slidably actuating rack 129. This rack is loosely mounted in a vertical recess 130, constituting a guide way therefor, formed at the rear side of a lug 131 extending inwardly from the left side of said bracket, the toothed edge of said gear also entering said recess to engage said rack and retaining the latter therein while permitting it to slide vertically to oscillate said gear. The lower end of this rack is provided with a horizontal foot 132 (Figs. 2 and 4) extending inward and normally resting upon a cam 133 of a shaft 134 extending longitudinally and centrally of said jack, the movements of which control those of the rack and said heel gage. To provide suitable bearings for this shaft, the front portion of the heel post plate 110 and at the base of said heel post 26 is provided with a vertical yoke 135 having tubular bearings 136 at the upper ends of its arms to receive said shaft 134 which is loosely mounted not only to oscillate or rotate but also to slide longitudinally therein. Between its bearings, said shaft is provided with the cam 133 upon which the foot 132 of the actuator rack rests, the rotation of

said cam or the elevation of it with its carrying shaft as the last supporting plate 104, and hence said plate 110 is adjusted vertically, elevating said rack 129 and moving the heel gage to its approximate position for the size of shoe to be operated upon and which is positioned thereby.

That the toe of the lasted shoe may be depressed upon the toe rest 121 in proper size position and for clamping said toe thereon, the last supporting block 27 and its pin or spindle 28 are adapted to be tilted forward, first, to seat the toe of said shoe and then to clamp the same against said toe rest and to hold it thus jacked. For pivotally mounting this last supporting block 27 (Fig. 2) from which the heel pin 28 projects, it is provided at its under side with a horizontal pivot shaft 138, the ends of which are journaled in suitable ears 139 at the head of said heel post 26. For tilting said last block and its pin 28, any suitable means may be employed, that preferred, in the present embodiment of my invention, comprising an arm 140 (Fig. 4) depending from the under side of said last supporting block 27 having a forked tail piece 141 to embrace the rear end of said shaft 134, the latter, immediately in the rear of said tail piece, having a collar 142, the front face of which bears against the forks of said tail piece, so that as the shaft is slid forward the tail piece is correspondingly moved to swing the arm to tilt the heel pin rearwardly, thereby seating and clamping the toe of the lasted shoe upon said toe rest. Said depending arm is normally swung rearwardly and the heel pin tipped up into a convenient position to receive a last by means of a coil spring 143 (Figs. 3 and 4) connecting it with the heel post carrying plate 110. For sliding the shaft 134 longitudinally to operate said heel pin, I preferably provide it with an arm 144 (Figs. 4 and 6) extending radially therefrom, its outer cam faced end extending into a peripheral cam slot 145 (Figs. 3 and 6) formed in the rear bearing 136 of said shaft 134, said slot having an offset or oblique portion 146 (Fig. 3) that causes the arm when turned with its shaft to the right Fig. 3 to enter therein, to slide forwardly to move the shaft with it. By this movement the shaft collar 142 acting upon the forked tail piece 141 swings the last supporting block 27 and its heel pin 28 rearwardly to depress the toe of the last and jack the shoe in position. This shaft, hereinafter referred to as the jacking shaft, is conveniently rocked to move said heel gage to its final size position and to actuate said heel pin, thereby to jack the shoe as described, by means of a lever 147 (Fig. 4) removably secured on the front end of said shaft, which extends forward through its front bearing to receive it. In its normal position, said

lever which is formed to constitute an operating handle for rocking said shaft in jacking and unjacking the shoe, extends vertically upward and the part of said cam 133 which is of the greatest diameter, or the high part thereof, extending to the left (Figs. 3 and 5) with the edge of its front face bearing upon a horizontal roller or other stud 148 carried at the front end of a forwardly extending arm 149 of the left facing plate 110^a. With the cam in this position, the shaft is prevented from sliding forwardly, or to express it differently, the heel pin is maintained in approximately vertical position to receive a last and the heel post carrying plate 110, in a rear position with the shoe counter out of engagement with said heel gage, so as to provide suitable clearance for removing or applying a lasted shoe. This plate, however, said heel support and said jack shaft are automatically moved forward as soon as said shaft and its cam are rocked sufficiently to cause the high part of said cam 133 to turn away from said roller or to bring its wedge shaped end above the same, the means for producing this automatic movement, in the present embodiment of my invention comprising a pair of coil springs 150 connecting the front end of said plate 110 with stationary parts of the base herein shown as said face plates 110^a. When said shaft and its cam are rotated to the right (Figs. 3 and 5) said cam is turned out of engagement with the roller 148, thereby permitting said springs 150 to operate to slide the plate and its heel support forwardly and consequently to bring the counter of the shoe mounted thereon into engagement with the curved arm or rest 124 of said heel gage, which is simultaneously moved by the action of the high part of said cam upon the foot 132 of the actuating rack 129 to move the shoe rearwardly and to position it to bring the ball line to the invariable position referred to relative to said jack and to the form which operates thereon. Immediately following this movement, the shaft arm 144 enters the oblique or offset portion 146 of the cam slot 145 and, as further forward movement of said plate 110 and the shoe mounted thereon is prevented by the engagement of the latter with said heel gage, said shaft is moved forward to produce the rearward tipping movement of said heel pin as described to depress the toe of the shoe upon the toe rest adjusted to the proper height for the size of shoe operated upon and to clamp or jack the shoe thereon and in said position.

As the handle 147 is thrown down to the right (Figs. 3 and 5) and as the arm 144 remains at the front end of the oblique portion of said cam slot, the shoe remains locked or jacked in position during the subsequent leveling operation and until the

handle is again restored to normal elevated position by swinging it back in a reverse manner. By such movement the shoe is unjacked and its toe elevated as the shaft arm is moved to the left and rearwardly into the circumferential portion of said cam slot, the shaft, of course, moving with it to the position indicated in Fig. 4 and permitting the depending arm 140 of said last supporting block 27 to be swung rearward automatically by its spring 143 to restore the heel pin to its normal last receiving or removing position. Immediately following this movement the continued rotation of the cam 133 (Figs. 3 and 5) brings the wedge shaped end 151 thereof (Fig. 6) to bear upon the inner or rear side of said roller 148 which being stationary positively causes the cam and its shaft to slide rearward, sliding the plate 110 with it against the tension of its operating springs 150. By this arrangement the shoe is moved away from said heel gage into what may be termed its unjacked position in which the lasted shoe may be conveniently removed and another placed upon the last supporting block to be subsequently positioned, jacked and operated upon.

The last mounted upon the heel pin may be of any desired type or construction, but I preferably employ the same wooden last upon which the shoe was lasted and which remains in the shoe continuously during the process of its manufacture.

Upon McKay work an iron last is usually provided for supporting a shoe in a beating-down machine, owing to the heavy pressure required to beat down or level the shoe sole uniformly at all points. By my invention, however, since the pressure is distributed or caused to operate over a limited or small area at one time and not over the whole sole at once, the pressure may be greatly reduced, the approximate universal movement of the form, herein provided for, permitting the latter automatically to seat itself uniformly thereon while it is simultaneously oscillated and vibrated.

As a support having the rigidity of iron is not required to withstand the pressure employed in operating with my form, my construction permits the use of the same wooden last that the shoe was lasted upon, thereby dispensing with or avoiding the necessity of iron lasts and hence greatly reducing the cost of leveling.

While in the present embodiment of my invention I preferably employ a wooden last, obviously my invention is not limited thereto as any suitable material may be employed, wood being referred to simply because it is commonly employed.

In operating the machine, assuming that both jacks are in their front elevated shoe receiving position convenient of access to the operative and with their shoe supports

in unjacked position, the operative first adjusts the jacks to the size of shoes to be operated upon by turning the handle 91 of the sizing mechanism to bring the latching end of the latch 97 into the notch 95 corresponding to the size of shoe.

As it is preferable or customary, in practice, to level a pair of shoes at a time, and obviously, as nearly simultaneously as efficient results and ability of the operative permit, the following description relates particularly to that method of operation, though if desired but one shoe may be operated upon or any number, whether pairs or not being immaterial. Having adjusted the size mechanism to correspond to the particular shoe to be operated upon, the operative first mounts one shoe, say the right upon the left jack or a left shoe upon the right jack, the right and left jacks herein being especially adapted for operating upon a left and right shoe respectively, because of the conformation of the toe rest, the molding face of the associated form and the lateral adjustment of the heel end of the last for such work. The lasted shoe having been mounted upon the jack, the handle 147 of the jack shaft is then turned to the right to bring the heel gage into position to determine that of a shoe on the jack, this movement permitting the springs 150 to operate automatically to bring the counter of the shoe against said heel gage and to position the latter against it. Simultaneously or immediately following the latter movement, the toe of the shoe is depressed or seated upon the toe pad 124, which, as has been stated, is adjusted to the proper height for the size of shoe operated upon. The continued movement of the toe of the shoe caused by the positive tipping of the heel pin acts to clamp the shoe upon said pad and jack the shoe firmly in place and in the predetermined invariable position required to properly present it to said form. When thus "jacked" the shoe is held rigidly in place to be operated upon by said form and to be progressively moved therewith to produce which the operative next depresses the left treadle (Fig. 1) to start the left jack moving mechanism and simultaneously to oscillate the form associated therewith. The first movement of the gear wheel 15 imparts a quick movement to the jack actuating lever 23 to produce a rapid inward and downward movement to the jack from its elevated position to properly locate it upon the jack table 24 following which the jack is rocked rearwardly simultaneously with its form and in the same direction, so that the relations or relative longitudinal positions, between portions or points of the shoe sole and the active face of the form that shapes said sole, remain constant.

During the oscillatory and progressive movement of the form and of the supported

sole, and while the form is also given its short rapid and independent vibrating movement, all portions of the sole are successively brought into contact with a mold face adapted to shape them and hence said sole to the desired contour both laterally and longitudinally and according to the style or type of mold and shoe. While being thus operated upon, the operative jacks the left shoe of the pair upon the right jack and starts the machine to level the sole by depressing the right treadle which independently starts and controls that side of the machine. He may obviously if desired operate the second jack as soon as the shoe has been mounted and jacked and without waiting for the first machine to stop, thereby economizing the time spent in operating.

As the left jack approaches the limit of its forward movement, the operating cam 15 imparts to the jack a quick forward impulse causing the roller or stud 40 Fig. 1 to enter the lower offset and angular portion 42 of said cam slot 41, which swings the segmental gear 37 down to rotate the pinion 36 and project the jack forwardly and upwardly toward the operative and clear of the form and in convenient position for the operative to unjack and remove the shoe and to apply another thereto. Immediately following the projection of the jack to this position the machine is stopped by the automatic release of its depressed treadle, its associated form, 30, however, vibrating continuously through the independent operating mechanism provided therefor. The operative then mounts the right shoe of a second pair, provided two pairs are to be leveled on this jack, and while the left shoe of the first pair is being operated upon and immediately depresses the treadle to start the machine to level the second right shoe. At the conclusion of the leveling operation upon the left shoe its supporting jack is also projected into shoe removing position, as described, following which the machine is automatically stopped and the shoe removed. The other shoe of the second pair may then be mounted thereon and leveled, and the jacking and leveling of successive pairs continued until all have been operated upon.

Should there be a run of different sizes during the leveling operation, the operative adjusts the jack supports by swinging the handle of the sizing mechanism to bring its latch into the notch corresponding to the size of shoe to be operated upon, thereby automatically raising or lowering the heel pin, the actuating rack of the heel gage and said toe support to the predetermined position corresponding to that size, and then jacks and levels the shoe as just described.

While I have described my machine as of the twin or duplex type, obviously, a single machine or more than two, each provided

with its jack and associated form, may be employed, so that a single shoe or any desired number may be operated upon approximately simultaneously, my invention
5 not being restricted to the number of machines or jacks employed. I wish it furthermore to be understood that by the term "jack" as used herein and in the claims I mean any form of shoe support whatever
10 be its construction.

It will be obvious that my invention is not limited to the specific details or to the arrangement of parts herein shown for illustrative purposes only, but that the same may
15 be modified and varied within wide limits without departing from the spirit and scope of my invention.

Claims:

1. In a machine of the type described, a shoe supporting jack having a toe rest and heel pin, a positioning member to engage the rear portion of the shoe, means for simultaneously adjusting the toe rest, heel pin and positioning member toward and from
20 the base of the jack, and means for tilting the heel pin in any of its adjusted positions to jack the shoe.

2. In a machine of the type described, a shoe supporting jack provided with toe and heel supporting members, means comprising a scale for simultaneously moving said members unequal amounts in the same direction and means for jacking the shoe in any of
30 its adjusted positions.

3. In a machine of the type described, a shoe supporting jack provided with toe and heel supporting members, means simultaneously and differentially to adjust them toward or from the base of the jack to bring
35 the different parts of soles of shoes of differing sizes to predetermined vertical position relative thereto, and means for jacking the shoe in said position.

4. In a machine of the type described, a shoe supporting jack provided with toe and heel supporting members, means simultaneously to adjust them differentially toward or from the base of the jack, means for relatively moving said members toward or from
40 one another to singly support shoes of different sizes and present them in predetermined longitudinal position, and means for jacking the shoe in said position.

5. In a machine of the type described, vertically adjustable last holding means comprising heel and toe supporting members adapted to support a lasted shoe thereon, a positioning device adapted to engage one end of said shoe and determine its position
55 longitudinally, and operative controlled means for moving said heel holding means and said positioning device in the same direction proportionately to the size of the shoe to bring the sole of said shoe into
60 predetermined position.

6. In a machine of the type described, vertically adjustable last holding devices adapted to support a lasted shoe thereon, a positioning device adapted to engage one end of said shoe and determine its position longitudinally, and operative controlled means
70 for moving said last holding devices and said positioning device in the same direction to bring the sole of said shoe into predetermined vertical positions and to jack said
75 shoe thereon.

7. In a machine of the type described, a toe rest, a movable heel support provided with a longitudinally swinging heel pin adapted to receive a lasted shoe, a device
80 for determining the vertical position of the latter, means for moving said device to a predetermined position corresponding to the size of shoe to be operated upon, and means for causing the same to clamp a shoe mounted
85 on said support and for tipping said heel pin to clamp the shoe toe upon said toe rest for jacking the shoe.

8. A jack for sole laying or leveling machines, comprising a toe rest, a last pin and a back gage, a slide carrying the last pin and back gage, means for moving the slide and with it the last pin and back gage toward and from the toe rest, and means to relatively move the last pin and back gage
90 according to the size of the shoe to be treated, and for tilting the last pin.

9. A jack for sole laying or leveling machines, comprising a toe rest, a last pin to engage the pin socket of a last, gaging means movable relative to the last pin to position determined by the size of the shoe to be treated, and means for so moving the gaging means and for tilting the last pin to jack the shoe in the determined position.
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10. In a machine of the type described, shoe positioning and supporting means; said means comprising a toe rest, a pivoted heel pin, and a heel gage for adjustment of the shoe to a predetermined position corresponding to the size of the shoe to be operated upon, and means for causing said heel gage to clamp the counter of said shoe and connections therewith for tipping said heel pin to depress and clamp the shoe toe upon said
110 115 toe rest.

11. In a machine of the type described, shoe supporting members, means for adjusting one of said members laterally about a center passing through the other supporting member, to bring the sole of a shoe supported thereby to a predetermined lateral position and hold it in said adjusted position, and means to determine the lateral adjustment.
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12. In a machine of the type described, a toe support, a carriage pivotally connected therewith having a heel support, and means for adjusting the heel support end of said carriage laterally to bring the shoe mounted
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on said supports in a predetermined lateral position.

13. In a machine of the type described, a vertically movable toe rest, a vertically and horizontally movable heel pin, a gage for determining the horizontal position of said heel pin, means for simultaneously adjusting said heel pin and gage to predetermined size positions, and means for jacking the shoe in the determined position.

14. In a machine of the type described, a vertically movable toe rest, a vertically and horizontally movable heel pin, a gage for determining the horizontal position of said heel pin, means for simultaneously adjusting said toe rest and heel pin to predetermined size positions, and means for jacking the shoe in said position, said means operating to slide said heel pin horizontally to bring the shoe counter against said gage and to tip said pin to depress and clamp the toe of a shoe upon said toe rest in the adjusted position of the latter.

15. A jack comprising a last pin and toe rest, a positioning device to engage the rear of the shoe, and means for moving the toe rest to varying distances from the jack base and for simultaneously moving the last pin and positioning device in the same direction but to different extent.

16. A jack comprising a toe rest having a fixed longitudinal position, a last pin movable toward and from the toe rest, and means for simultaneously and differentially moving the last pin and toe rest toward and from the jack base.

17. A jack comprising a toe rest and last pin, a positioning device movable toward and from the last pin, a shaft, and connections between the shaft and positioning device and last pin to move the positioning device toward the last pin and to tilt the last pin.

18. A jack comprising a toe rest and a last pin, a slide carrying said last pin, springs normally acting to move the slide and last pin longitudinally, a shaft having a cam, means coacting with said cam to hold the slide from responding to the springs until the shaft is turned, and means connected to the shaft for jacking the shoe.

19. A jack comprising a toe rest and last pin, a positioning device to engage the rear of the shoe mounted on the jack, a shaft, and connections between the shaft, the last pin and positioning device to move the latter to operative position and to tilt the last pin in jacking the shoe.

20. A jack comprising a toe rest and last pin, a positioning device to engage the rear of the shoe mounted on the jack, a longi-

tudinally movable shaft, and connections between the shaft, the last pin and positioning device to move the latter to operative position and to tilt the last pin in jacking the shoe.

21. A jack comprising a toe rest and last pin, a swinging positioning device, a circularly arranged series of teeth connected to said positioning device, and a rack for engaging said series of teeth and operating the positioning device.

22. A jack comprising a toe rest 29, its sustaining spindle 101, and the last supporting plate 104 carrying the last pin 28, the adjusting plate 84 having wedge faces 98 and 102 for engaging the sustaining spindle and last supporting plate to raise the toe rest and last pin.

23. A jack comprising an adjusting plate 84 having wedge faces 98 and 102, a pinion 88 and operating means for moving said adjusting plate, and a toe rest and last pin co-acting with said wedge faces 98 and 102.

24. In a jack, a longitudinally movable heel post supporting plate 110, a heel post 26 having a last pin 28 pivotally mounted thereon, an arm 140 for tipping the last pin, the shaft 134 having a head 142 to engage and move said arm, and means for moving said shaft longitudinally to effect jacking movement of the last pin.

25. In a jack, a jacking shaft 134 having an arm 144, a member provided with a cam slot 145, an offset 146 to receive said arm, a pivoted last pin 28, means intermediate said pin and shaft for tipping said pin by movement of said shaft longitudinally, and means for turning said shaft to cause its arm to travel in said slot 145 and offset 146 to produce longitudinal movement of said shaft.

26. In a jack, a pivoted heel gage 83, a jacking shaft 134, a cam 133 thereon, means intermediate said cam and gage for moving said gage, and means for moving the said shaft and its cam, thereby to operate said gage for positioning and jacking the shoe.

27. In a jack, a slidable heel plate 110, having a heel post 26, a last pin 28 mounted thereon, a heel gage 83 provided with means to move it to predetermined size positions, and means normally acting to slide said plate 110 toward said gage for positioning the shoe mounted thereon.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

JOHN J. HEYS.

Witnesses:

MAURICE V. BRESNAHAN,
SIDNEY F. SMITH.