

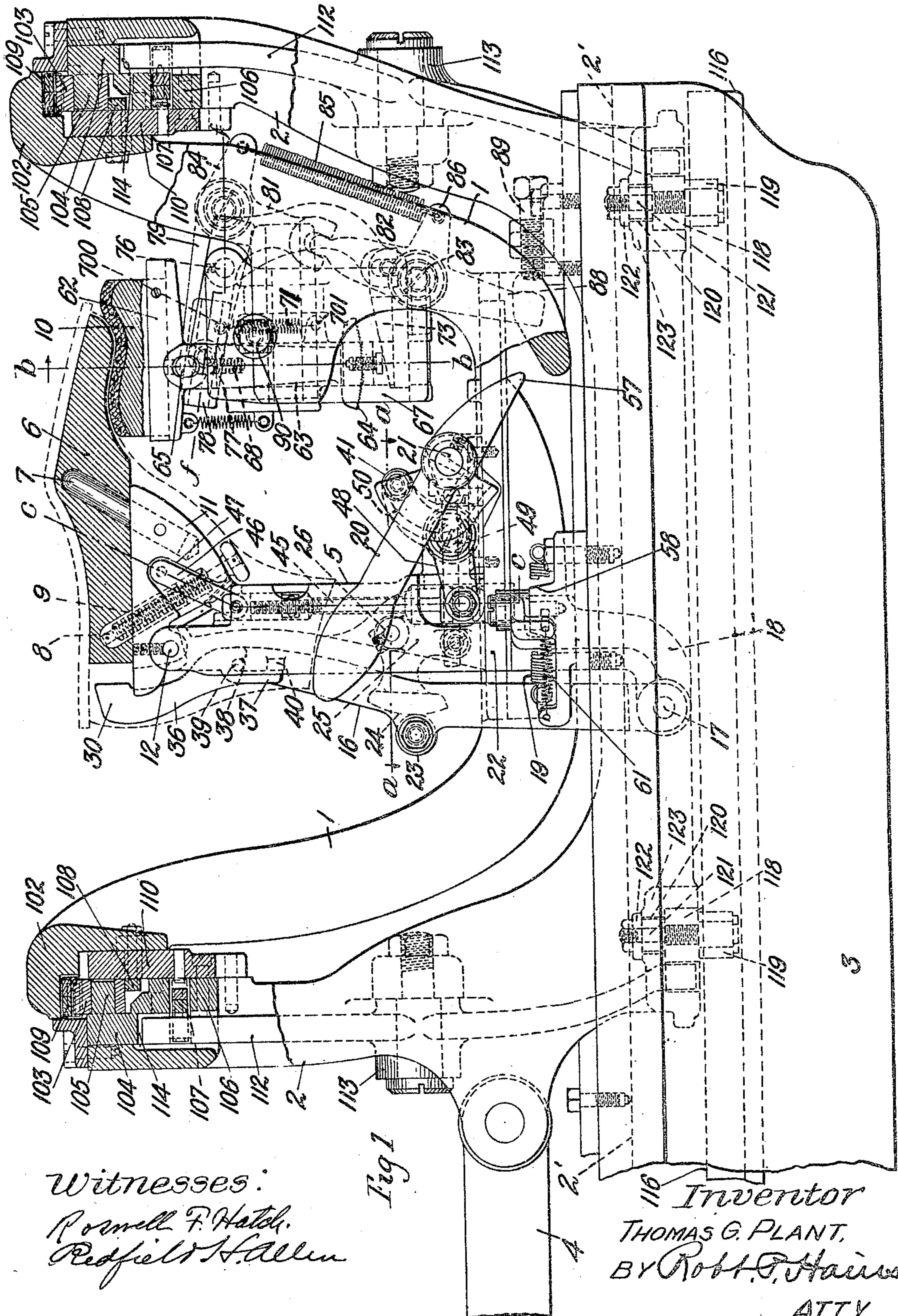
T. G. PLANT.  
SHOE JACK.

APPLICATION FILED FEB. 14, 1908. RENEWED DEC. 9, 1909.

958,301.

Patented May 17, 1910.

6 SHEETS—SHEET 1.



Witnesses:  
Roswell F. Hatch.  
Redfield Hallen

Fig 1

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ATTY.



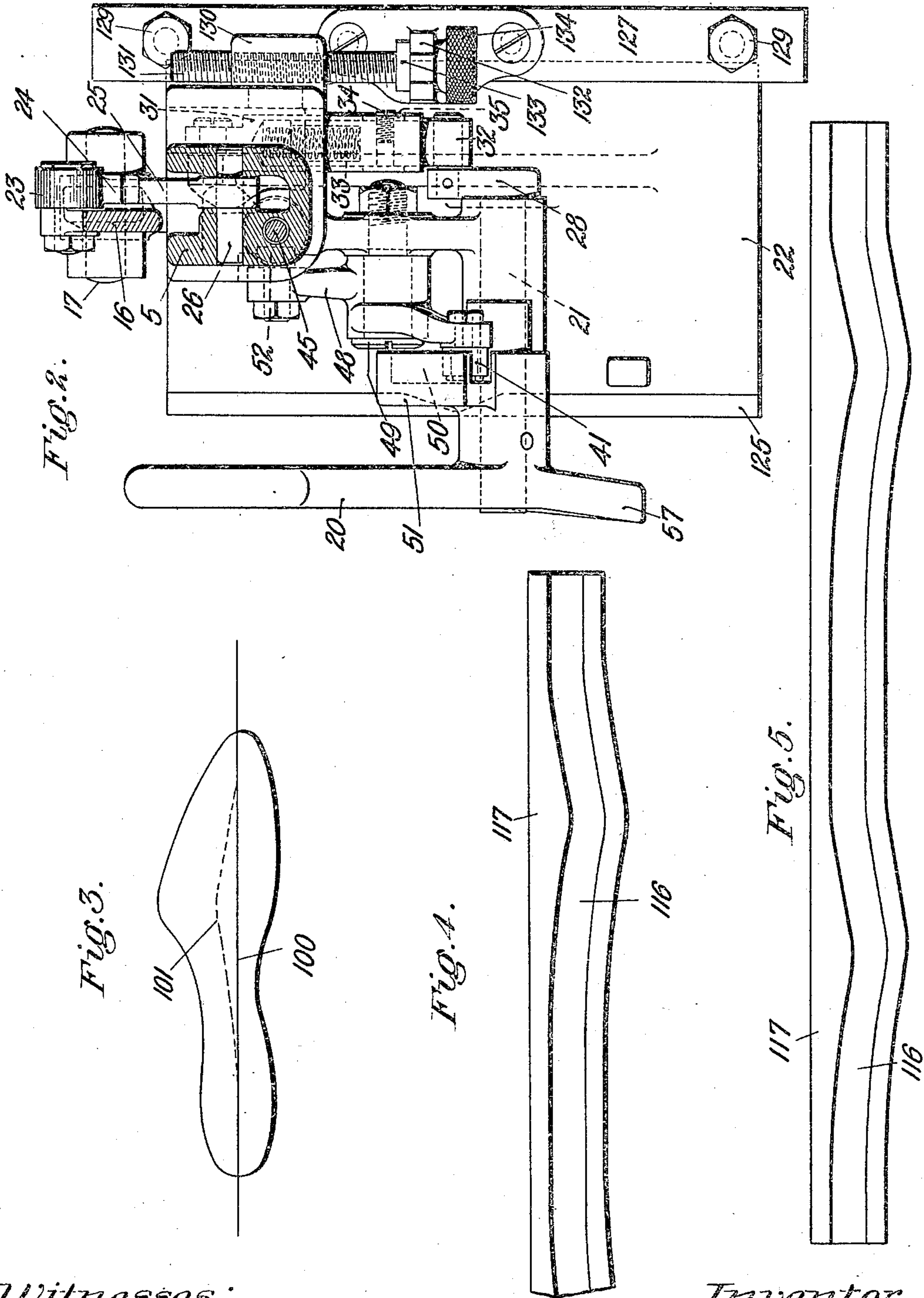
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6 SHEETS—SHEET 2.



Witnesses:  
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T. G. PLANT.

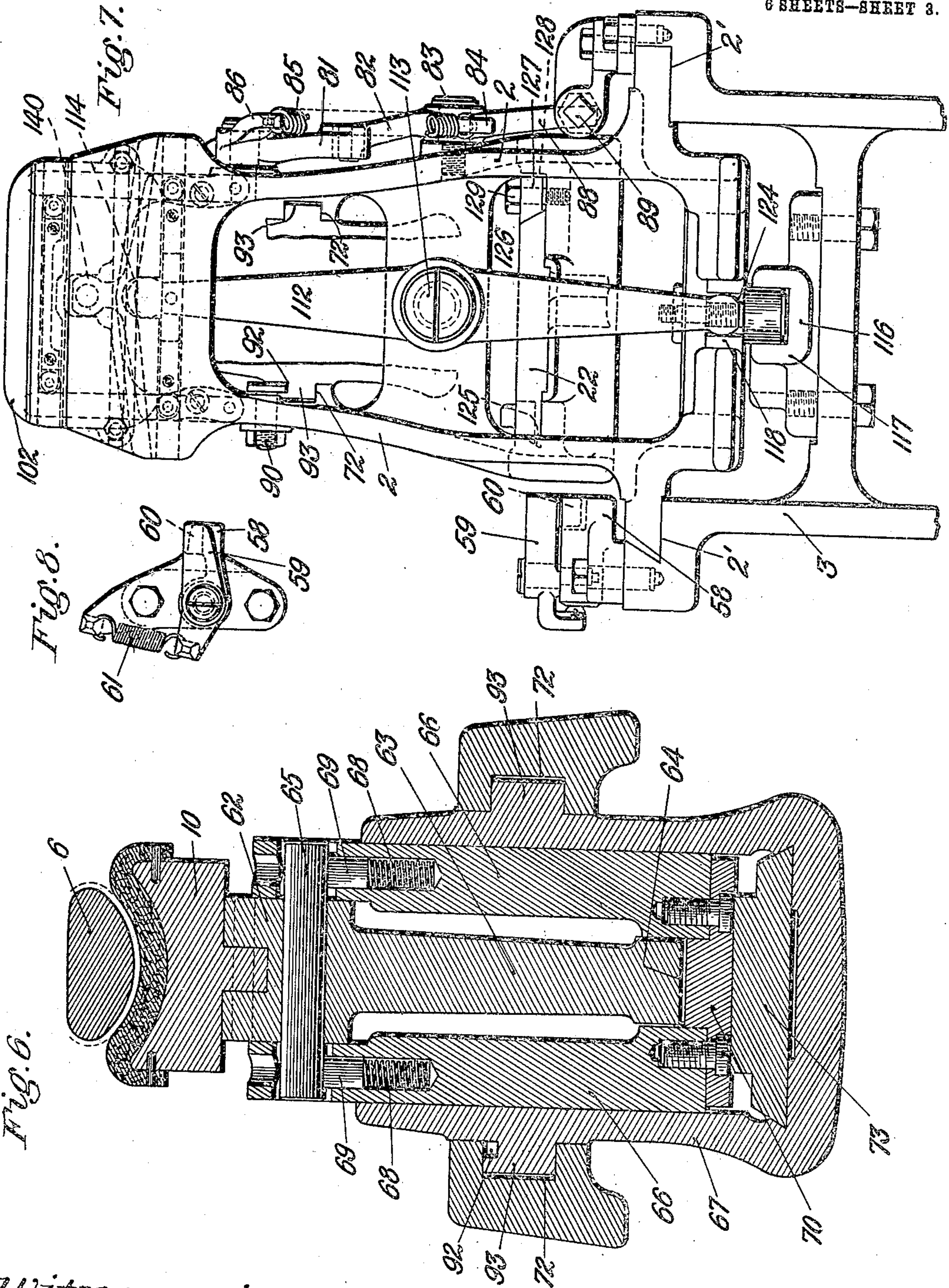
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6 SHEETS—SHEET 3.



Witnesses:  
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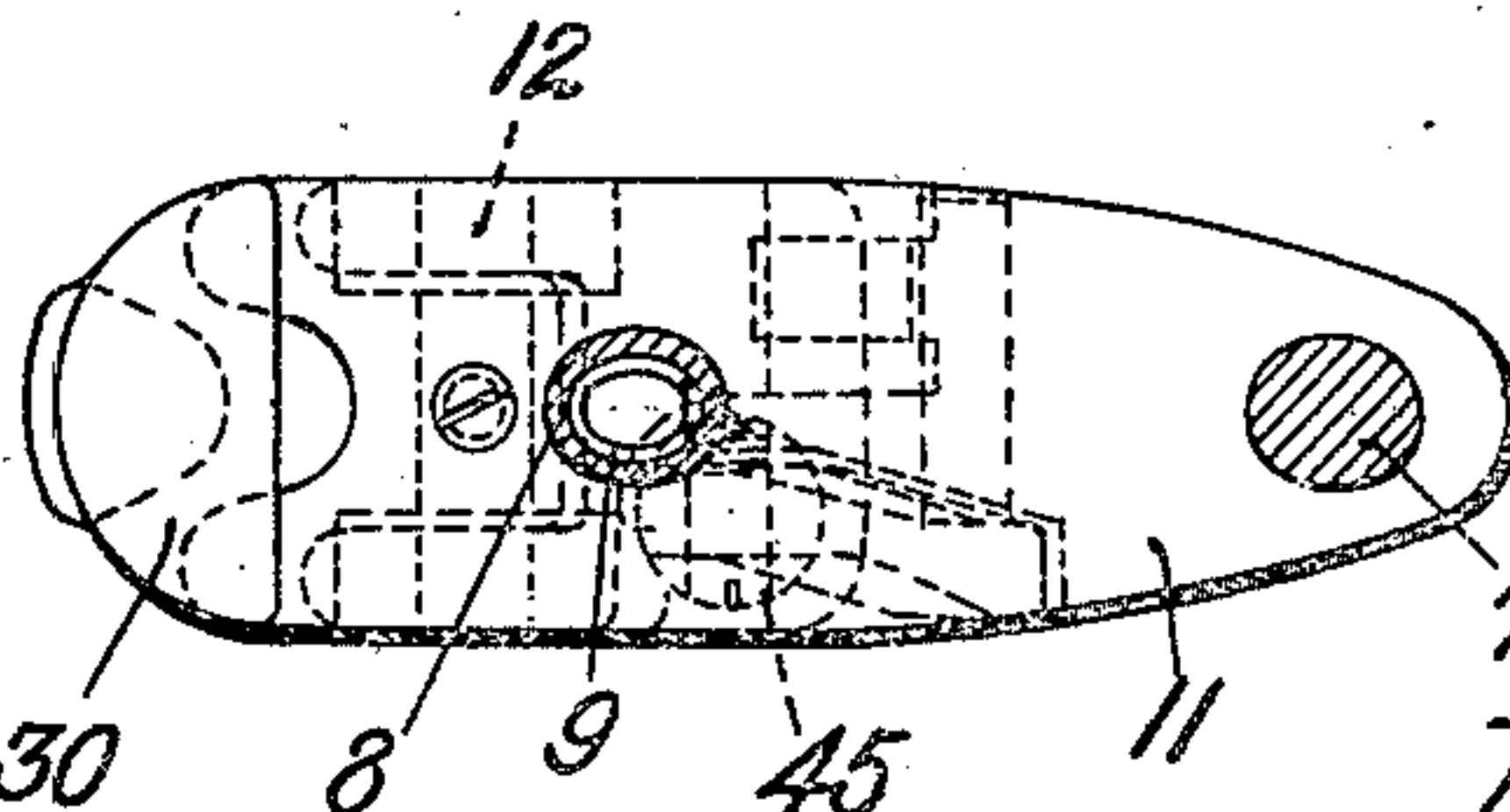
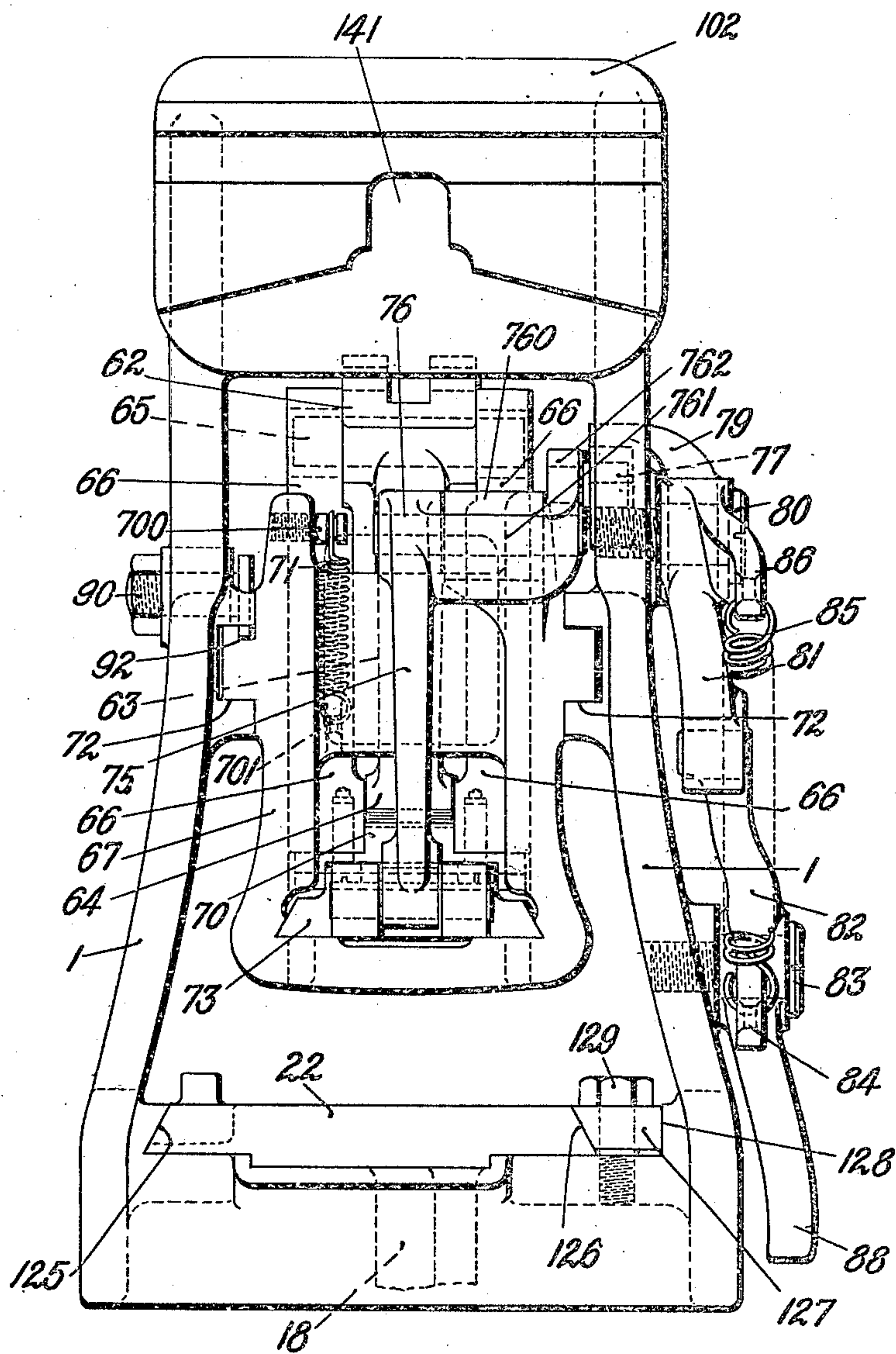
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6 SHEETS—SHEET 4.

*Fig. 9.*



*Fig. 10.*

*Witnesses:*

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SHOE JACK.

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6 SHEETS—SHEET 5.

Fig. 12.

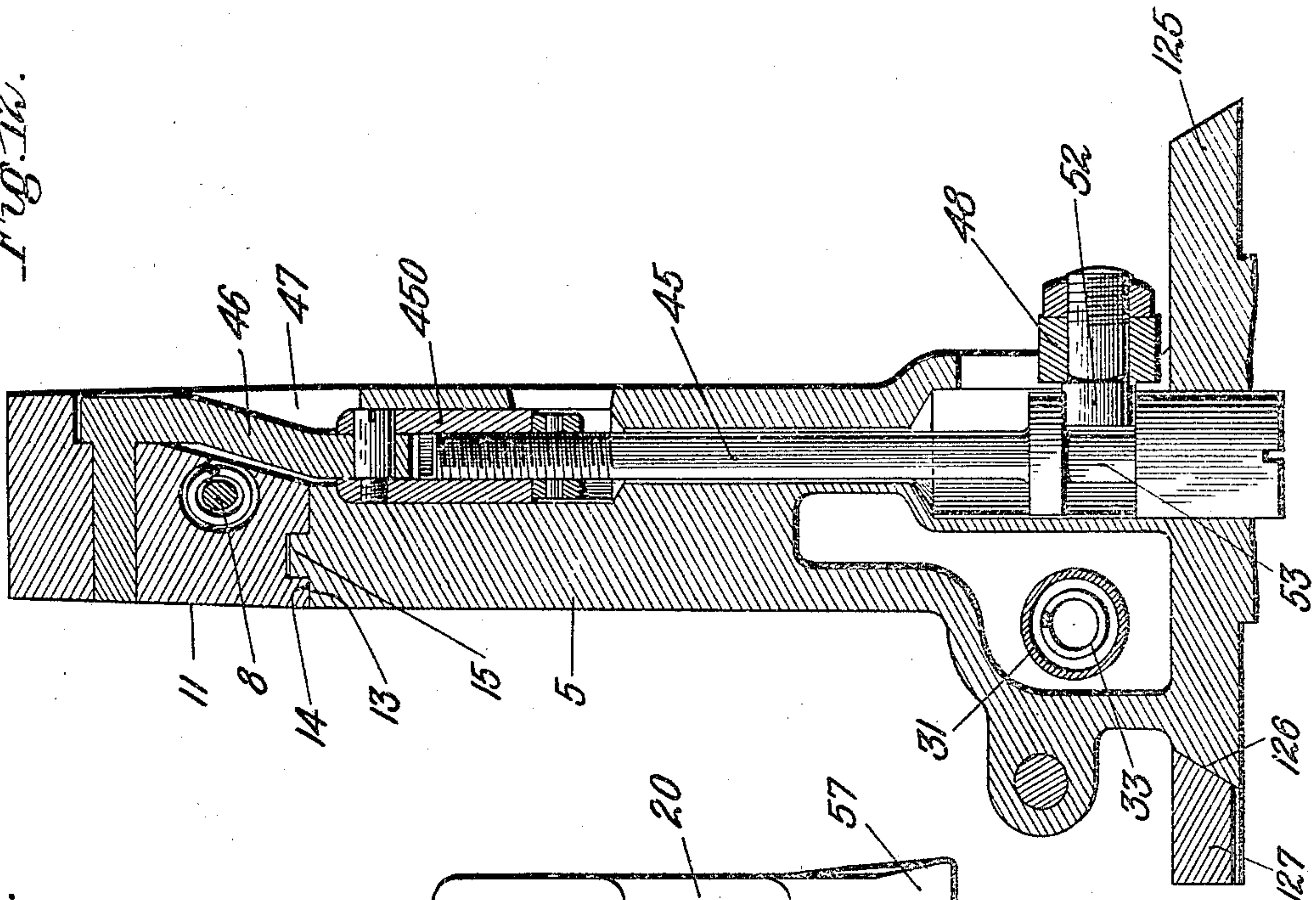


Fig. 11.

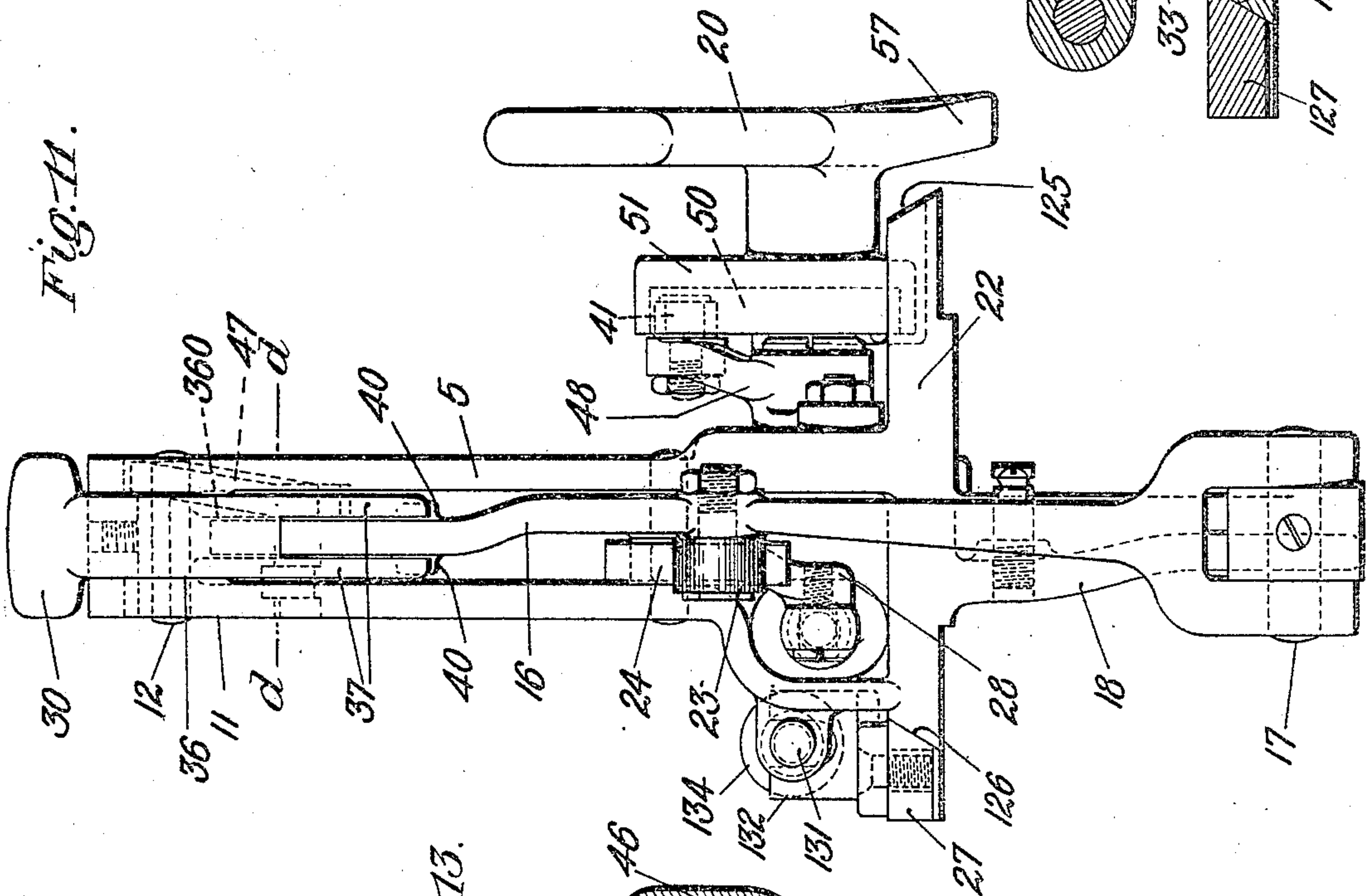
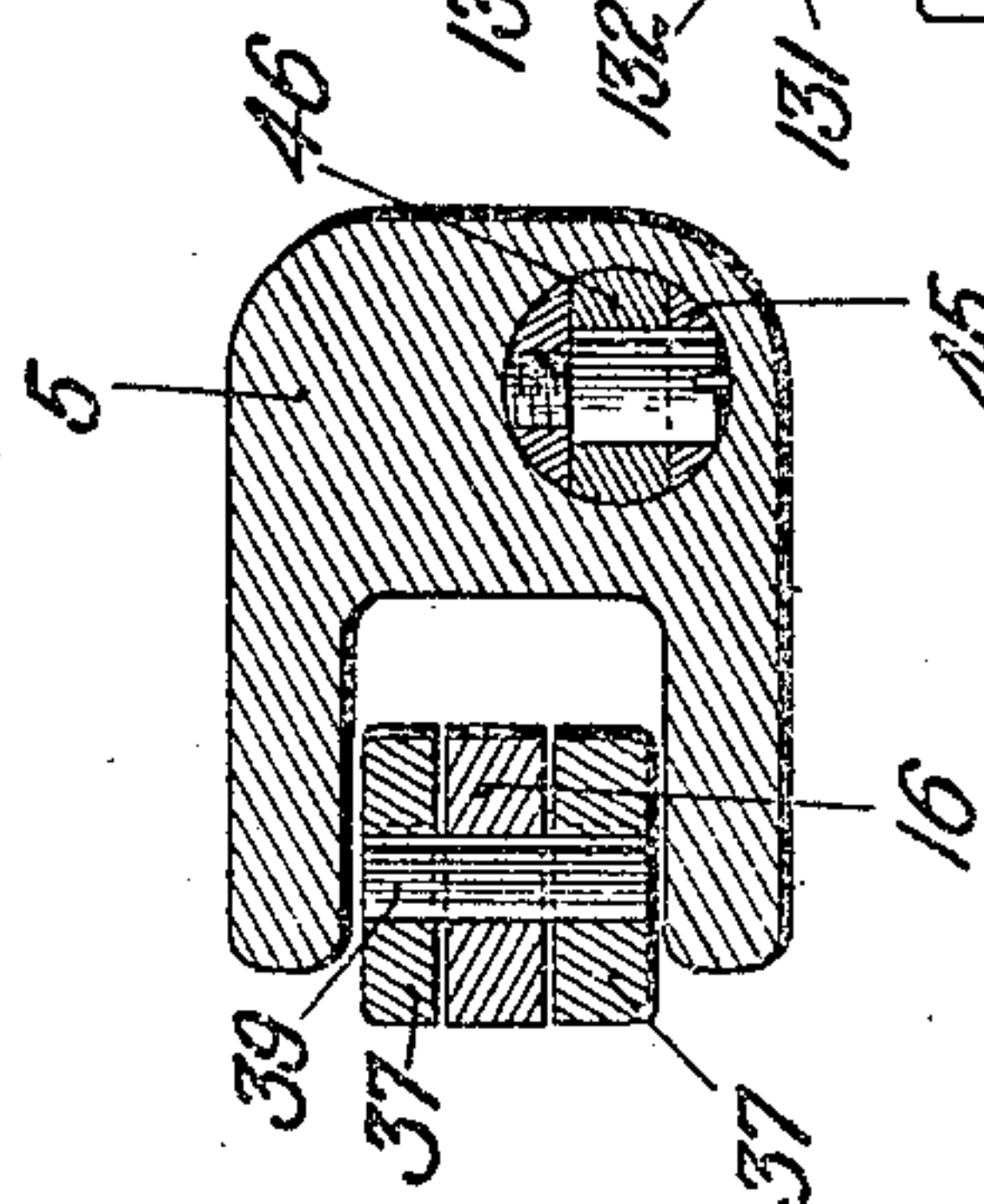


Fig. 13.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

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SHOE-JACK.

958,301.

Specification of Letters Patent.

Patented May 17, 1910.

Application filed February 14, 1908, Serial No. 415,835. Renewed December 9, 1909. Serial No. 532,249.

*To all whom it may concern:*

Be it known that I, THOMAS G. PLANT, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Shoe-Jacks, of which the following description, in connection with the accompanying drawings, is a specification, like numerals on the drawings representing like parts.

This invention relates to jacks for sole-leveling or laying machines, and especially to jacks of that type which includes a last onto which the shoe is placed for the leveling or laying operation and from which the shoe is removed after said operation has been completed.

One of the objects of the present invention is to provide a jack of such a construction that a great variety of sizes of shoes can be treated thereon without changing any of the operative parts of the jack except the heel portion and the toe portion of the last.

Another object of the invention is to provide a jack in which the last will be moved away from the toe rest when the jack is brought to rest thus placing the last in a position to facilitate the removal of the shoe therefrom or the placing of it thereon.

The invention also comprehends a novel means of supporting the toe rest which means is automatic in its action, and which when in operative position furnishes a perfectly solid unyielding support for the toe rest but which is automatically adjustable so that whenever a shoe is placed on the last the toe rest will automatically adjust itself to the proper position and will be firmly supported in this position.

Another object of the invention is to provide a construction wherein the pressure to which the sole is subjected may be evenly distributed across the sole throughout its length, or may be applied with greater force on one side or the other of the sole as desired.

The ordinary shape of a sole is such that a straight line drawn from the center of the toe to the center of the heel is nearer the inside edge than the outside edge along the shank portion and inside ball portion of the shoe. If, therefore, a shoe is supported in the jack so that the central line of support corresponds to this straight line joining the

central portion of the heel and toe of the shoe, and the central line of the pressure applied also corresponds to this line it will be seen that at the shank and ball portion of the shoe the pressure on the inner edge of the sole will be greater than on the outer edge.

It is often desirable to subject the outer edge of the sole to the same pressure as the inner edge, or otherwise to vary the relative amounts of pressure, applied to the opposite edges, from those obtained with the arrangement above referred to; and in the present invention this is accomplished by providing means for shifting the central line of support of the last relative to the central line along which the pressure is applied while the shoe is being treated so that the pressure will be distributed as desired across the width of the sole or will be greater on one edge or the other of the sole according to the relative positions of the central line of support for the last and the central line along which the pressure is applied.

The jack herein shown is one adapted to be used in connection with a form or mold which acts progressively on the sole from the heel end thereof to the toe end although I wish it understood that other forms or molds might be used without departing from the invention. Where such a form which acts progressively is employed the shifting movement of the central line of support for the last will occur during the application of pressure to the sole so as to always provide the proper relative positions between the central line of support and the line along which the pressure is applied to secure the desired results on the sole of the shoe.

These and other features of my invention will be more fully hereinafter described in the specification and will then be pointed out particularly in the claims.

In order to give an adequate understanding of my invention I have illustrated a preferred embodiment thereof without however attempting to show more than one embodiment.

In the drawings Figure 1 is a side view of a jack embodying my invention with parts thereof broken out to better show the construction; Fig. 2 is a section through the standard for supporting the last on the line *a-a*, Fig. 1; Fig. 3 shows the outline of the bottom of a sole; Fig. 4 is a detail of the



cam for controlling the relative positions of the central line of support for the last and the line along which the pressure is applied to the sole; Fig. 5 is also a view of this cam; Fig. 6 is a section through the toe rest on the line *b—b*, Fig. 1; Fig. 7 is an end view of Fig. 1; Fig. 8 is a detail of the stop device for throwing the lever that controls the position of the jack; Fig. 9 is an end view of the cradle which supports the jack; Fig. 10 is a top plan view of the support for the last; Fig. 11 is a view looking to the right Fig. 1 showing the support for the last; Fig. 12 is a section on the line *c—c*, Fig. 1; Fig. 13 is a section on the line *d—d*, Fig. 11; Fig. 14 is a detail view showing the levers for raising and lowering the toe rest; Fig. 15 is a section on substantially the line *f—f*, Fig. 1; Fig. 16 shows in perspective the slides and other parts at the point where the cradle is supported by the frame; Fig. 17 is a horizontal section through the resilient connection 32, 33.

The present invention is embodied in a jack of that type in which the support for the last is sustained by a cradle 1 which in turn is supported by a frame 2 that is mounted to slide in ways 2' formed in a bed 3, said frame having connected thereto a pitman or connecting rod 4 for moving it in the ways in the bed into operative position, in which position the shoe on the last is properly placed to be acted on by the mold or leveling mechanism, or into inoperative position in which latter position the last is removed from the molding mechanism so as to permit the shoe to be removed therefrom.

The cradle 1 has rising therefrom a standard 5 carrying at its upper end a last base or head 11 on which is removably mounted a last member 6 which may be either of wood or metal as desired, and which has such a shape that the line of termination between it and the last base is in the vicinity of the instep of the boot or shoe. This last may be secured to the last base in any suitable or usual way, and for this purpose said last base is shown as having two divergently arranged pins 7 and 8 which enter correspondingly shaped recesses or apertures in the last. The pin 8 is movably mounted and is backed by a suitable spring 9 so that by withdrawing the pin 8 from the last the latter will be readily removed from the last base. This manner of securing the last to the last base forms no part of the present invention but is adopted because by means of this construction a wooden last 6 may be used which is solidly supported on the standard 5. The standard 5 may conveniently be sustained by a base 22 which is in turn supported by the cradle.

The last 6 does not have a complete heel portion and in order to support the heel of

the shoe I employ a heel expander in the form of an expander lever 16 which is pivoted at 17 to an arm 18 projecting below but rigid with the base 22, and which carries at its upper end the heel portion 30 of the last, said heel portion constituting with the body portion 6 the complete last.

The expander 16 is acted upon by a spring 19 which tends normally to draw it toward the last support and it is forced outwardly against the shoe after the latter has been placed on the last by means of an elbow lever 25 which is pivoted to the standard 5 at 26 (see Figs. 1 and 2) and which is provided with a cam face 24 adapted to act against a roll or projection 23 carried by the expander lever 16.

The lever 25 is arranged to be actuated by or through a lever 20 which is mounted on a rock shaft 21 that is journaled in suitable bearings carried by the base 22, and for this purpose I have provided said rock shaft with a crank 28 which is connected by a link to an arm of the elbow lever 25. When the lever 20 is swung into the position shown in Fig. 1 the cam face 24 of the elbow lever 25 is brought against the roll 23 thereby forcing the lever 16 backwardly and bringing the heel portion 30 of the last against the heel of the shoe.

The heel portion 30 will obviously occupy different positions in different sizes of shoes, and in order that this heel portion may always be brought against the heel of the shoe with the requisite pressure to hold the shoe in its proper position I have provided a yielding connection between the elbow lever 25 and the crank 28 which connection will yield when the heel portion 30 is brought against the heel of the shoe thereby to permit the lever 20 to make its full movement without subjecting the shoe to undue pressure. This yielding connection is best seen in Figs. 2 and 17, and in the form herein shown it comprises two members 31 and 32 which have a telescopic connection, the member 32 telescoping into the member 31, and which have interposed between them a spring 33. The member 31 is connected to the elbow lever 25 and the member 32 is connected to the crank 28. The member 32 carries a pin 34 which plays in a slot 35 formed in the member 31, said pins serving to limit the expansive and contractive movement of the connection. With such a construction it will be seen that if the heel member 30 is brought against the heel of the shoe with the desired pressure before the lever 20 has completed its movement into the position shown in Fig. 1 the spring 33 will yield during the remaining movement of the lever 20 thereby preventing excessive pressure from being put on the heel member.

In order to make the jack capable of use with a great variety of sizes of shoes I have



made the heel portion 30 separate from the expander lever 16 and I propose to provide a plurality of heel portions 30 of different sizes for the different sizes of shoes, any one of which may be used according to the particular size and style of the shoe being operated on.

The heel portion 30 may be detachably secured to the lever 16 in a variety of ways without departing from the invention. As one simple way I have shown said heel portion as provided with the shank 36 which is grooved on its inner side, as at 360, to receive the upper end of the lever 16 and which is forked at its lower end, as at 37, to straddle the back edge of the lever. Each branch of the fork is provided with a recess 38 to fit a projection 39 extending laterally from the arm 16, and said arm has also the laterally extending projections 40 against which the ends of the branches of the forked shank rests (see Fig. 1). This construction rigidly supports the heel portion 30 against backward pressure while yet permitting it to be readily removed when it is necessary to change it for one of another size. By thus making the heel portion 30 of the expander removable and interchangeable and providing for using the removable wooden last member 6, a great variety of sizes and styles of lasts can be placed on the jack without changing or shifting any of the parts except the body portion 6 of the last and the heel member 30.

During the sole leveling operation the toe of the last is supported by a toe rest 10 as usual.

In order to facilitate the removal of a shoe from the last and the placing of another one thereon I have provided a construction wherein when the jack is withdrawn from the machine the toe of the last member 6 may be swung upwardly. When the last is in this position the toe not only is separated from the rest 10 sufficiently so that the shoe can be easily drawn onto the last but the toe of the last is also carried above the top of the cradle 1 so that said cradle does not interfere in any way with the placing of the shoe on the last. It will be noted from Fig. 1 that when the last is in its operative position it is situated below the top of the cradle and in this position it may be more or less inconvenient to draw the shoe onto the last. By providing for tipping the toe of the last upwardly the placing of the shoe thereon is greatly facilitated. To provide for thus swinging the toe of the last upwardly the standard 5 has pivoted to the end thereof at 12 the last base or head 11 on which the last 6 is directly supported as above described. The standard 5 is provided with a rest 13 on which the edge 14 of the head 11 rests when said head is in operative position, as shown in Fig. 12. This rest

with the pivot 12 forms a solid support for the last base 11 so that the last 6 is supported as firmly and solidly as if said head and standard were made rigid or integral with each other.

To prevent lateral movement of the head the rest 13 may be shaped to interlock with the portion 14 of the head, and one convenient way of accomplishing this is to provide the rest 13 with the rib 15 which enters a groove in the portion 14 of the head (see Fig. 12).

For swinging the head 11 upwardly I have provided a device which operates in conjunction with the handle 20 which controls the expander lever 16, as above described, so that the operation of said handle to release the expander-lever will also operate to throw the toe of the last upwardly. One convenient way of accomplishing this result is by means of a plunger 45 which is slidably mounted in the standard 5 and which is pivotally connected at its upper end to the head 11 by means of the link 46, said head being cut away, as at 47, to form a recess in which the link is received.

The plunger is arranged to be operated by a lever 48 which is pivoted at 49 to the base 22 of the standard and which is provided at one end with a projection 41 that enters a cam groove 50 formed in a hub 51 which is rigid with the lever 20. The other end of said lever carries a projection or roll 52 which is received in a groove 53 formed in the plunger 45, see Fig. 12. The cam groove 50 is of such a shape that when the lever 20 is thrown into the position shown in Fig. 1 the right hand end of the lever 48 is elevated and the left hand end thereof depressed thereby turning the head 11 solidly down onto the support 5. When the lever is swung to the right, Fig. 1, the cam groove 50 lowers the right hand end of the lever 48 thereby elevating the plunger 45 and swinging the head 11 with the last thereon upwardly as will be obvious. The plunger 45 is preferably made adjustable in length so as to insure that the head or last base 11 shall be properly brought into operative position when the lever 20 is operated. This adjustment is herein provided for by screwing the plunger into a nut 450, see Fig. 12, to which the link 46 is pivoted. By screwing the plunger into or out of the nut the effective length of the plunger can be readily adjusted.

It is necessary for the proper operation of the machine that the handle 20 should be thrown completely over into the position shown in Fig. 1 while the sole is being leveled. In order to insure that the handle shall always occupy this position when the jack is drawn into the machine, I propose to make the lever 20 with the extended nose 57 which is adapted to be engaged by a stop



or projection when the jack moves to the left, Fig. 1, so that if said lever is not fully thrown the projection will engage the nose 57 of the lever and thus complete the movement thereof. The projection is so positioned that when the lever is fully thrown the nose 57 thereof will clear it as said jack moves toward the left, but if the lever is not fully thrown the projection operates to complete the throw of the lever as stated above. I have also provided a pawl device which is adapted to engage the nose 57 of the lever when the jack moves to the right into the position shown in Fig. 1, such pawl operating to swing the upper end of the lever toward the right and thus automatically release the expander lever 16 and throw the toe of the last 6 upwardly.

The projection above referred to is herein designated by 58 and it is shown as being rigidly secured to the bed 3. This projection is clearly seen in Figs. 1, 7 and 8. As stated above, the top of the projection is at such an elevation that when the lever 20 is fully thrown, the point of the nose 57 will just clear said projection, but if the lever is not fully thrown, the projection will complete the movement thereof.

Associated with the projection 58 is a pivoted pawl 59 which can swing freely toward the left Fig. 1, but which is limited in its movement toward the right by a nose 60 carried thereby and adapted to engage the projection 58. The pawl is normally maintained in the position shown in Figs. 7 and 8, by the spring 61 which is fast at one end to the pawl and at the other end to the projection 58.

When the jack moves to the left Fig. 1, the nose 57 engages the pawl 59 and the latter yields under the action of the spring 61 thereby permitting the lever to pass. The pawl 59 is at a higher elevation than the stop 58 so that when the jack returns or moves to the right, Fig. 1, the nose 57 of the lever engages the pawl again, but as the pawl cannot move toward the right owing to the engagement of the nose 60 with the projection 58, said pawl forms a fixed stop which operates to throw the upper end of the lever to the right Fig. 1 into a position to release the expander lever 16 and swing the toe of the last upwardly. This construction provides an automatic means for operating said lever 20 as the jack is moved away from the leveling mechanism and the operator is thus relieved from this duty. Said lever is supposed to be thrown by the operator into the position shown in Fig. 1 before the jack begins its movement however.

The toe rest is yieldingly mounted and is arranged so that it is automatically positioned in the correct position to properly support the last by the engagement of the lasted shoe therewith, and means are pro-

vided for locking it in such position and for firmly and unyieldingly supporting it therein while the pressure is applied to the sole. As herein shown the pad 10 of the toe rest is sustained by a head 62 having a stem 63 depending therefrom, the lower end of said stem being provided with a foot 64 having a serrated face. The head 62 is pivotally mounted on a pin 65 which is received in two slots or enlarged apertures formed in a support 66 which is slidably mounted in a yoke-shaped frame 67, see Figs. 6 and 9. This support 66 is provided with recesses in which are springs 68 which act against pins 69 that in turn bear against the pivotal pin 65, said springs 68 forming a yielding support for the toe rest. The support 66 carries at its lower end a locking dog 70 which is provided with a serrated face adapted to lock with the face of the serrated foot 64 and thus lock the arm 63 and pad 10 from turning movement. The springs 68 tend normally to raise the head 62 sufficiently to separate the foot 64 from the dog 70 and when the foot is thus separated the toe rest is free to turn about the pivotal pin 65 as an axis. When the shoe is placed on the last and the last is swung down into its operative position, as shown in Fig. 1, the toe of the shoe engages the pad of the toe rest 10, and since the toe rest is free to turn about the pivotal pin 65, said rest will automatically position itself correctly to receive the toe of the shoe. As the toe bears downwardly on the rest, the springs 68 are compressed thus forcing the foot 64 into locking engagement with the locking dog 70, this occurring after the toe pad has been properly positioned by its engagement with the lasted shoe. As soon as the foot 64 is brought into locking engagement with the locking dog 70, further downward movement of the toe of the last forces the support 66 downwardly in the frame 67 against the action of a spring 71 which is secured at one end to a projection 700 carried by the frame 67 and at its other end to a projection 701 carried by the frame 66.

It is desirable to firmly and rigidly support the toe rest while the sole is being leveled and to accomplish this I have provided for inserting a spacing member between the locking dog 70 and the frame 67 after the toe pad has been brought into its correct position thus making a perfectly solid support from the toe pad to the frame 67 which in turn is unyieldingly supported in the ways 72 formed in the arms of the cradle 1, see Figs. 6 and 9. This spacing member is normally withdrawn to permit the toe rest to be properly positioned and is inserted only after the toe rest is positioned. The preferred form of spacing member is that of a wedge, this shape being adopted because it provides a spacing member having a vary-



ing thickness which may be inserted to a greater or less extent depending upon the thickness of the member necessary to form the solid support. This wedge is shown at 5 73 (see Figs. 6, 9 and 1) and is slidably mounted on the base of the frame 67. When in position, as shown in Fig. 1, it forms a solid rest for the stem 63 of the toe pad. The means that I prefer to employ for operating this wedge are automatic in their 10 action, and are constructed so that as the jack starts its movement toward the machine the wedge will be automatically moved into place the correct distance to make the de- 15 sired solid support for the toe rest, and when the jack returns to its retracted position said wedge will be withdrawn automatically thereby unlocking the toe pad. To accom- 20 plish this movement of the wedge I have herein shown the following construction: The wedge is pivotally connected to the lower end of an arm 75 (see Figs. 1, 9 and 14) which in turn is pivotally mounted on a pin 76 which is sustained in the hub 760 25 carried by the frame 67 (see Figs. 9 and 15). The arm 75 is formed with the yoke portion 761 which embraces the hub 760 and one arm 762 of the yoke is extended as seen in Figs. 9 and 15. This extended arm 762 30 carries a roll 77 that operates in a groove 78 formed in the forward end of an arm 79. This arm is pivoted to the cradle 1 at 80 and has integral therewith an arm 81 that is pivotally connected to a rocker 82 also piv- 35 oted to the cradle 1 at 83. The rocker 82 is connected with the arm 79 by the spring 85 which is connected to the projections 84 and 86 extending from the rocker and arm respectively. The spring 85 tends normally 40 to swing the free end of the arm 79 upwardly, and as said arm has a sliding pivotal engagement with the arm 762, such upward movement of the arm 79 will throw the lower end of the arm 75 to the left, Fig. 45 1, thus carrying the wedge 73 underneath the locking dog 70. The movement of the wedge into its operative position therefore is accomplished entirely by the action of the spring 85, and this spring is designed to 50 be merely of sufficient tension to properly locate the wedge.

For automatically retracting the wedge when the jack has been carried to the limit of its movement to the right, Fig. 1, the 55 rocker 82 is provided with an arm 88 which is adapted to be engaged by a stop screw 89 carried by the bed 3 when the jack reaches the limit of its movement to the right. This stop screw is adjustably mounted so that it 60 can be properly positioned to give the wedge a sufficient amount of backward movement.

In Fig. 1 and in full lines Fig. 14 the parts are shown as in the positions they assume when the jack has just started its 65 movement to the left and the arm 88 has

been withdrawn from the stop screw 89. When the jack is at the extreme limit of its movement with the arm against the stop screw 89, the parts are in the position shown by dotted lines Fig. 14, and the wedge 73 is 70 withdrawn. The shoe is placed on the jack when the wedge is thus withdrawn, and said wedge is positively held in its retracted position while the last is being swung down into the position shown in Fig. 1 and the toe rest 75 is being automatically centered, as above described. As soon as the jack begins its movement to the left thereby to move the arm 88 away from the stop screw 89, the spring 85 comes into play to automatically 80 shift the wedge forward into the proper position to constitute a solid rest or support for the toe rest; and said wedge remains in this position during the operation of treating the sole and until the jack has been re- 85 turned to the extreme limit of its movement to the right. The toe rest is adjustably mounted so that it can be moved toward and from the support 5 as required for different sizes of shoes. It will be remembered 90 that the wedge and the arm 75 for operating it are carried by the frame 67 while the lever 79 and rocker 82 are carried by the cradle 1. In providing for the adjustment of the toe rest toward and from the last sup- 95 port, I have designed a construction wherein the frame 67 carrying the toe rest and the wedge may be adjusted without in any way affecting the operative connections between the arms 762 and 79. This adjustment of the 100 toe rest is provided for by adjusting the frame 67 in the ways 72 of the cradle, said frame having thereon ribs 93 which are received in said ways. The toe rest may be 105 locked in its adjusted position by means of a clamping screw 90 which is mounted in the arm of the cradle and the head of which is received in a groove 92 formed in one of the ribs 93 of the frame 67. By tightening 110 up said clamping screw the frame 67 is clamped rigidly in its adjusted position. The arm 79 is of such a shape that when the jack is at the limit of its movement toward the right, Fig. 1, with the arm 88 of the rocker 82 in engagement with the stop screw 115 89, the groove 78 stands parallel with the ways 72 in the cradle, as shown in dotted lines Fig. 14, and therefore the adjustment of the frame 67 in said ways does not affect the position of the arm 762 or of the wedge 120 73 because the roll 77 in said arm will merely slide back and forth in the groove 78 as the adjustment is made. This is a very desirable feature of the invention because it permits the adjusting of the toe rest to- 125 ward and from the last support by simply shifting the frame 67 in the ways 72 of the cradle and without necessitating any re-adjustment of any of the other parts. The jack herein illustrated is especially designed 130



to be used in connection with a leveling machine wherein the pressure is applied to the sole progressively from one end to the other thereof. In thus applying the pressure to the soles it is desirable to be able to vary the center line of pressure as it is applied to the sole so that the pressure may be evenly distributed across the sole or may be applied with greater force at one edge or the other of the sole as circumstances dictate.

Referring for instance to Fig. 3 which shows the shape of the sole, it will be seen that a straight line 100 drawn from the center point of the heel to the center of the toe is considerably at one side of the center of the sole at the ball portion thereof, and if the center of the pressure applied by the form should be applied along the straight center line 100 of the sole the inside edge of the sole would receive a much greater pressure than the outside edge at the ball of the shoe.

In order to have the pressure applied equally from one edge of the sole to the other at any point along the sole it will be necessary to apply the pressure along a line which is situated at all points midway between the edges of the sole, such, for instance, as the line 101 in Fig. 3. If, on the other hand, it should be desired to apply a greater pressure on one side of the sole than on the other, it would be necessary to apply the pressure along a line nearer one edge of the sole than the other.

In my present invention I have provided a construction by which the pressure of the mold may be distributed over the sole in any desired way, that is, it may be evenly distributed over the entire sole or may be applied with greater force at one edge or the other of the sole. I accomplish this object by pivotally mounting the cradle and providing for shifting the pivotal supports therefor laterally relatively to the direction of application of pressure by the mold, such shifting preferably being accomplished without tilting or swinging the cradle. If the line of the pivotal supports for the cradle is maintained centrally of the mold, the pressure will be equally distributed on the sole on either side of said line, but if the said pivotal supports are shifted laterally relative to the center of the mold, said pressure will be applied with greater force on one side of said line than on the other, as will be obvious. In the present embodiment this shifting of the points of support for the cradle is provided for as follows: The arms of the cradle 1 are provided at their upper ends with heads 102 by which the cradle is supported. Each head 102 rests on a slide 103, see Figs. 1 and 16, which is mounted to move transversely of the frame 2 and which has pivotal connection with another slide 104 also mounted to move transversely of

the frame. The pivotal connection between these slides is herein shown as being provided for by making the slide 104 with the pivotal stud 105 which enters an aperture or recess in the slide 103. The slide 104 is shown as supported on a track or way 106 rigidly carried by the frame 2 and preferably suitable roller bearings 107 will be situated between said slide and the supporting track 106. The slide 103 is held in its position by means of a guide rib 108 rigidly carried by the frame which fits underneath said slide, and preferably suitable roller bearings 109 will be interposed between the head 102 and the slide. For convenience in assembling the parts, the frame 2 is formed with the detachable plate 110 which carries the guide rib 108 and which covers the inner faces of the slides 103, 104. The pressure to which the jack is subjected is, with this construction, transmitted through the cradle 1 and its heads 102 to the slides 103, from the slides 103 through the pivotal pins 105 to the slides 104 and from the latter through the roller bearings 107 and the track 106 to the frame 2. Any pressure to which the heads are subjected therefore is transmitted to the frame 2 through the pivotal pins or trunnions 105, and the line connecting these pins constitutes the central line of support for the jack. This central line of support it will be noted is in the general horizontal plane of the last so that the support for the last is substantially in the plane thereof. The shifting of this central line of support laterally is herein accomplished by shifting the slides 104 relative to both the frame 2 and cradle 1, thus carrying the pivotal pins 105 to one side or the other of the central line along which the force is applied. For shifting these slides 104 I have herein shown the levers 112 which are pivoted to the frame at 113 and the upper ends of which work in recesses 114 formed in the slides 104. The lower ends of the levers are controlled by a cam 116 which is secured to the bed of the machine. This cam may have any appropriate shape according to the manner in which it is desired to shift the central point of support of the jack during the operation of the machine.

The connection between each lever 112 and the cam groove 116 is provided for herein by pivotally connecting the lower end of said lever to a slide 118 to which is attached a roll or projection 119 working in the cam groove 116. This slide is shown as being supported by a bridge 123 forming part of the frame 2, said bridge having therein a slot 120 through which projects the stem 121 carrying the roll 119. This stem 121 has thereon a collar 122 which spans the top of the slot 120 and slides back and forth on the bed of the frame. The roll 120 and slide 118 are thus suspended from the upper side



of the bridge 123. The slide 120 is provided with a slot or recess 124 in which the rounded lower end of the lever 112 is received, this constituting the pivotal connection between the lever and the slide. This construction is duplicated for each of the levers 112, and is such that as the rolls 119 are moved by the contour of the cam groove 116 the slides 118 are moved laterally of the frame, thus rocking the levers 112 and shifting the slides thereby laterally shifting the points of support for the jack without rocking the latter.

The cradle 1 is held from lateral shifting movement when the slides are moved by making the plate 110 with a projection 140 which fits into a recess 141 formed in the head 102, see Fig. 9. The plate 110 is rigid with a frame 2 and the projection 140 serves to rigidly hold the cradle from movement.

There is some clearance space provided between the slides 103 and 104 to permit the slides 103 and the cradle to rock slightly should the form of the mold require it as said mold presses on the shoe sole.

The cam groove 116 shown herein is of a shape adapted to shift the center line of support for the jack so that the center line of the pressure applied to the sole by the mold will follow substantially the line 101 shown in Fig. 3, in which case the pressure will be evenly distributed over the sole at all points thereof. But it will be understood that a cam of any shape may be employed depending on the results desired.

It is desirable that the two slides 104 should move in unison and to accomplish this the cam groove 116 is made in two sections which are duplicates of each other, as shown in Fig. 5, said sections having such a relation to each other that as the rolls 119 pass along the cam groove they are acted upon simultaneously by corresponding portions of the cam groove.

It is sometimes desirable to be able to adjust the standard or support 5 for the last longitudinally of the bed or toward and from either end of the cradle. In the present embodiment this is provided for by mounting said standard 5, the lever 20 and the parts which operate in connection therewith, and the expander lever 16 all on a bed 22 which is sustained by the cradle for adjustment longitudinally thereof. This bed 22 is shown as having inclined edges 125 and 126, the edge 125 fitting a correspondingly-shaped shoulder formed on the cradle base and the edge 126 fitting a gib 127 which is received between said base 22 and a shoulder 128 formed on the cradle. The gib is held in place by clamping screws 129, and when it is rigidly clamped in position it serves to lock the base 22 and clamp it positively to the cradle. For adjusting the base the support 5 has formed thereon a boss 130

through which is screw-threaded an adjusting screw 131, said screw being sustained in a bearing 132 carried by the gib 127 and being held from longitudinal movement by said bearing, said screw for this purpose having a collar 133 thereon between which and the head 134 thereof the bearing 132 is received.

To adjust the base 22 and the parts thereon it is simply necessary to loosen the clamping screws 129 and then to turn the adjusting screw 131, the turning of the screw operating to shift the base 22 backwardly or forwardly as desired.

When the base 22 and the last support have been properly positioned they may be held firmly clamped by tightening the clamping screws 129.

While that feature of the invention pertaining to the shifting of the line of support is shown as associated with a particular form of last support or jack, hereinbefore described, it is to be distinctly understood that the invention is not restricted in this respect, and that the feature of relatively shifting the line of support and last sustaining means is broadly new, regardless of the particular form or character of the jack or last sustaining means, and that any desired form of last supporting means or jack may be employed in connection with that feature of the invention relating to the relative shifting of the line of support and last sustaining means, the invention being generic in this respect and so set forth in the claims.

Having described my invention what I claim as new and desire to secure by Letters Patent is:—

1. In a jack, the combination with last-sustaining means, of means to support said last-sustaining means along a line of support, and means to shift said line of support and last-sustaining means relative to each other.

2. In a jack, the combination with a frame, of last-sustaining means supported by said frame along a line of support, and means to shift said line of support laterally relatively to the last-sustaining means.

3. In a jack, the combination with a frame, of last-sustaining means supported thereby along a line of support, means to prevent lateral movement of the last-sustaining means relative to said frame, and means to shift the line of support laterally relatively to said last-sustaining means.

4. In a jack, the combination with a frame, of last-sustaining means supported by said frame along a line of support substantially in the horizontal plane of the last supported by said means, and means to shift said line of support and said last-sustaining means laterally relative to each other.

5. In a jack, the combination with a frame, of last-sustaining means pivotally



supported by the frame, and means to shift the position laterally of the pivotal axis of said last-sustaining means.

6. In a jack, the combination with a frame having trunnions, of last-sustaining means supported on said trunnions, and means to shift said trunnions relative to said last-sustaining means.

7. In a jack, the combination with a frame having trunnions, of a cradle supported thereby, a last support mounted on the cradle and means to shift the trunnions relative to the last support.

8. In a jack, the combination with a frame, of last-sustaining means pivotally supported by the frame upon an axis which is in substantially the plane of the last to be supported by said last-sustaining means, and means to shift the position laterally of the pivotal axis of said last-sustaining means relative thereto.

9. In a jack, the combination with a frame having trunnions, of last-sustaining means supported on said trunnions, the latter being in substantially the horizontal plane of the last supported by said last-sustaining means, and means to shift said trunnions laterally relative to the last-sustaining means.

10. In a jack, the combination with a frame having trunnions, of last-sustaining means supported on said trunnions, means to hold said last-sustaining means from movement laterally relative to the frame, and means to shift the trunnions laterally relative to the last-sustaining means.

11. In a jack, the combination with a frame having trunnions, of last-sustaining means supported on said trunnions but held from movement laterally relative to the frame, said trunnions being in substantially the horizontal plane of the last to be supported on said last-sustaining means, and means to shift the trunnions laterally relative to said last-sustaining means.

12. In a jack, the combination with a bed, of a frame movable thereon, last-sustaining means supported on the frame along a central line of support, and means to shift said central line of support laterally relative to said last-sustaining means as the frame moves on the bed.

13. In a jack, the combination with a bed, of a frame movable thereon, said frame having trunnions, last-sustaining means supported on said trunnions but held from movement laterally relative to the frame, and means to shift the position laterally of the trunnions as the frame moves on the bed.

14. In a jack, the combination with a bed, of a frame movable thereon, said frame having trunnions, a cradle supported on said trunnions but held from movement laterally relative to the frame, a last sustained by the

cradle, and means to shift the position of the trunnions laterally relative to the last as the frame moves on the bed.

15. In a jack, the combination with a bed, of a frame movable thereon, said frame having trunnions, a cradle supported on said trunnions but held from movement laterally relative to the frame, a last sustained by the cradle, said trunnions being in the horizontal plane of the last, and means to shift the position of the trunnions laterally relative to the last as the frame moves on the bed.

16. In a jack, the combination with a frame, of slides sustained thereby provided with trunnions, last-sustaining means supported on said trunnions, and means to shift the slides relative to said last-sustaining means thereby to shift the position laterally of the line of support for said last-sustaining means.

17. In a jack, the combination with a frame, of two slides mounted thereon each having a trunnion, a slide supported by each trunnion, last-sustaining means supported by said latter slides, and means to shift said slides relative to the last-sustaining means.

18. In a jack, the combination with a bed having a cam groove, of a frame movable on the bed, a last-sustaining cradle pivotally carried by the frame, and means actuated by said cam groove as the frame moves on the bed to shift the pivotal connection between the cradle and the frame.

19. In a jack, the combination with a bed having a cam groove, of a frame movable on said bed, slides carried by said frame, each slide having a trunnion, a last-sustaining cradle supported by said trunnions, and means actuated by the cam groove as the frame moves over the bed to shift the trunnions laterally relative to the cradle.

20. In a jack, the combination with a standard, of a last sustained thereby, and means automatically operative as the shoe is unjacked to swing the toe of the last upwardly relative to the standard.

21. In a jack, the combination with a cradle having a standard rising therefrom, of a last-supporting member pivoted to the standard, and means operative as the shoe is unjacked to swing said member relative to the standard to carry the toe of the last upwardly to permit the boot or shoe to be applied or removed.

22. In a jack, the combination with a cradle having a standard rising therefrom, of a member pivoted to said standard and constituting a last base extending toward the instep and which is adapted to support a last member, and means to swing said last base relative to the standard to carry the toe of the last supported thereby upwardly to permit the boot or shoe to be applied or removed.



23. In a jack, the combination with a cradle having a standard rising therefrom, of a last base pivoted to said standard and having a last supporting surface extending toward the instep, means carried thereby for supporting a last member, and means carried by the cradle to swing the last base and the toe of the last member upwardly.

24. In a jack, the combination with a cradle having a standard rising therefrom, of a last base pivoted to the standard and having means to support a last member, a plunger mounted in the standard and pivotally connected to said last base, and a cam member carried by the cradle for operating the plunger thereby to move the last base and toe of the last member upwardly and downwardly.

25. In a jack, the combination with a cradle having a standard rising therefrom, of a last base pivoted to said standard and provided with means to sustain a last member, a manually operated lever carried by the cradle, a plunger working in the standard, and a cam operated by said lever for actuating the plunger thereby to swing the toe of the last upwardly and downwardly.

26. In a jack, the combination with a cradle having ways, of a bed removably mounted in said ways and having a jack-sustaining standard rising therefrom, a clamping gib forming one side of said ways, means to adjust the bed in the ways, and means to clamp the gib to the cradle thereby to clamp the bed in position.

27. In a jack, the combination with a standard adapted to sustain a last, of a last member mounted thereon, an expander lever pivoted to the standard, a heel portion of a last sustained by said lever, a cam member to actuate the lever, and a manually-operated lever having yielding connections with and to actuate the cam member yieldingly.

28. In a jack the combination with a standard adapted to sustain a last, of a last member mounted thereon, an expander lever pivoted to the standard, a cam member to actuate the lever, a manually-operated lever to actuate the cam member, and yielding connections between said lever and cam member.

29. In a jack, the combination with a cradle having a standard rising therefrom, of a last base pivoted to said standard and adapted to sustain a last member, an expander lever pivoted to the standard and having at its upper end the heel portion of the last, a manually-operated lever carried by the cradle, and means actuated by said lever to operate the expander lever and swing the last base relative to the standard.

30. In a jack, the combination with a bed having ways, of a frame movable in said ways, a cradle sustained by the frame, said cradle having a standard rising therefrom,

a last base pivoted to said standard and adapted to support a last member, an expander lever also pivoted to the standard and having the heel portion of a last at its upper end, a manually-operated lever carried by the cradle for actuating said expander lever and said last base, and means sustained by the bed to actuate said lever as the frame moves on the bed.

31. In a jack, the combination with a bed having ways, of a frame movable in said ways, a cradle sustained by the frame, said cradle having a standard rising therefrom, a last base pivoted to said standard and adapted to support a last member, an expander lever also pivoted to the standard and having the heel portion of a last at its upper end, a manually-operated lever carried by the cradle for actuating said expander lever and said last base, and means sustained by the bed to actuate the lever and thereby to throw the toe of the last upwardly as the frame moves backwardly on the bed.

32. In a jack, the combination with a support for the interior of a shoe, of a yieldingly-mounted and freely pivoted toe rest, a movable wedge-shaped member to unyieldingly sustain the toe rest when in operative position and a lock to prevent pivotal movement of the toe rest under pressure, and means to operate said member.

33. In a jack, the combination with a movable cradle and a support for the interior of a shoe sustained thereby, of a yieldingly-mounted toe rest also sustained by the cradle, a wedge member to unyieldingly sustain the toe rest when it is under pressure, and means controlled by the movement of the cradle to place said wedge in operative position.

34. In a jack, the combination with a movable cradle and a support for the interior of a shoe sustained thereby, of a yieldingly-mounted toe rest also sustained by the cradle, a wedge member to unyieldingly sustain the toe rest when it is under pressure, and automatically-operative means to place the wedge in operative position when the cradle makes its initial movement.

35. In a jack, the combination with a movable cradle and an interior shoe support sustained thereby, of a yieldingly-mounted toe rest, a wedge member adapted to unyieldingly sustain said toe rest when in operative position, and means to withdraw said wedge from its operative position by the movement of the cradle.

36. In a jack, the combination with a movable cradle and an interior shoe support sustained thereby, of a yieldingly-mounted toe rest also carried by the cradle, a wedge member adapted when in operative position to sustain said toe rest unyieldingly, automatically-operative means to place said wedge in operative position, and means to



maintain the wedge withdrawn when the cradle is at the limit of its movement.

37. In a jack, the combination with a support for the interior of a shoe, of a toe rest, a yielding supporting member therefor, a rest of varying thickness for unyieldingly supporting said member while under pressure, said rest being normally in inoperative position, and means to move the rest into operative position as the toe rest is properly positioned to receive pressure.

38. In a jack, the combination with a support for the interior of a shoe, of a yieldingly-mounted supporting member, a toe rest yieldingly supported by said member, a device to be inserted beneath said member to rigidly support the latter when the toe rest is in operative position, and means to operate said device.

39. In a jack, the combination with a support for the interior of a shoe, of a yieldingly-mounted supporting member, a yieldingly-mounted toe rest pivoted to said member, a wedge device normally in inoperative position, and means to place the wedge device in operative position to unyieldingly support said supporting member when the toe rest is properly positioned.

40. In a jack, the combination with a movable cradle and a support for the interior of a shoe sustained thereby, of a yieldingly-mounted supporting member, a toe rest yieldingly sustained thereby, a device to be inserted beneath said member to unyieldingly support the latter, and means controlled by the movement of the cradle to place said device in operative position to thus support said member.

41. In a jack, the combination with a movable cradle and a support for the interior of a shoe sustained thereby, of a yieldingly-mounted supporting member, a toe rest yieldingly sustained thereby, a device to be inserted beneath said member to unyieldingly support the latter, and means controlled by the movement of the cradle to place said device in operative position to thus support said member and to withdraw said device from operative position.

42. In a jack, the combination with a movable cradle and a support for the interior of a shoe sustained thereby, of a yieldingly-mounted supporting member, a toe rest yieldingly sustained thereby, a device to be inserted beneath said member to unyieldingly support the latter, and means controlled by the movement of the cradle in one direction to place said device in operative position to thus support said member and by the movement of the cradle in the other direction to withdraw said device from operative position.

43. In a jack, the combination with a support for the interior of a shoe, of a yieldingly-mounted supporting member, a toe rest

yieldingly sustained thereby, means to lock the toe rest to the supporting member when said toe rest is properly positioned, and a movable device to unyieldingly support said supporting member.

44. In a jack, the combination with a support for the interior of a shoe, of a frame for sustaining a toe rest, a supporting member yieldingly sustained by the frame, a toe rest yieldingly sustained by said supporting member, a wedge-shaped device, and means to insert said wedge-shaped device between the supporting member and frame thereby to unyieldingly support said member when the toe rest is under pressure.

45. In a jack, the combination with a movable cradle and a support for the interior of a shoe sustained thereby, of a frame 67, a supporting member yieldingly sustained thereby, a toe rest carried by the supporting member, a wedge to be inserted between said member and frame 67, and means controlled by the movement of the cradle to insert said wedge thereby to unyieldingly support said member.

46. In a jack, the combination with a cradle and a support for the interior of a shoe sustained thereby, of a frame adjustably sustained on the cradle, a supporting member yieldingly sustained by the frame, a toe-rest carried by the supporting member, a wedge member, and means to insert the wedge member between the frame and the supporting member to unyieldingly support the latter.

47. In a jack, the combination with a cradle and a support for the interior of a shoe thereon, of a frame carried by the cradle, a supporting member yieldingly sustained by the frame, a toe rest mounted on said supporting member, a wedge adapted to be inserted between the frame and the supporting member to unyieldingly support the latter, a lever carried by the frame for operating the wedge, and means mounted on the cradle to operate the lever.

48. In a jack, the combination with a cradle and a support for the interior of a shoe thereon, of a frame carried by the cradle, a supporting member yieldingly sustained by the frame, a toe rest mounted on said supporting member, a wedge adapted to be inserted between the frame and supporting member to unyieldingly support the latter, a lever carried by the frame for operating the wedge, and spring-actuated means mounted on the cradle to operate the lever.

49. In a jack the combination with a cradle and a support for the interior of a shoe thereon, of a frame carried by the cradle, a supporting member yieldingly sustained by the frame, a toe rest mounted on said supporting member, a wedge adapted to be inserted between the frame and the



supporting member to unyieldingly support  
the latter, a lever carried by the frame for  
operating the wedge, and spring-actuated  
means mounted on the cradle to operate the  
5 lever, said frame and the parts carried there-  
by being adjustable relatively to the cradle  
and the parts carried thereby.

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

THOMAS G. PLANT.

Witnesses:

AMELIA M. ROSS,  
MARION F. KIMBALL.