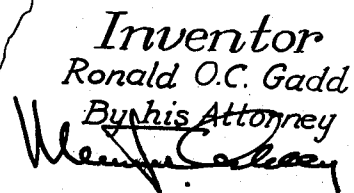


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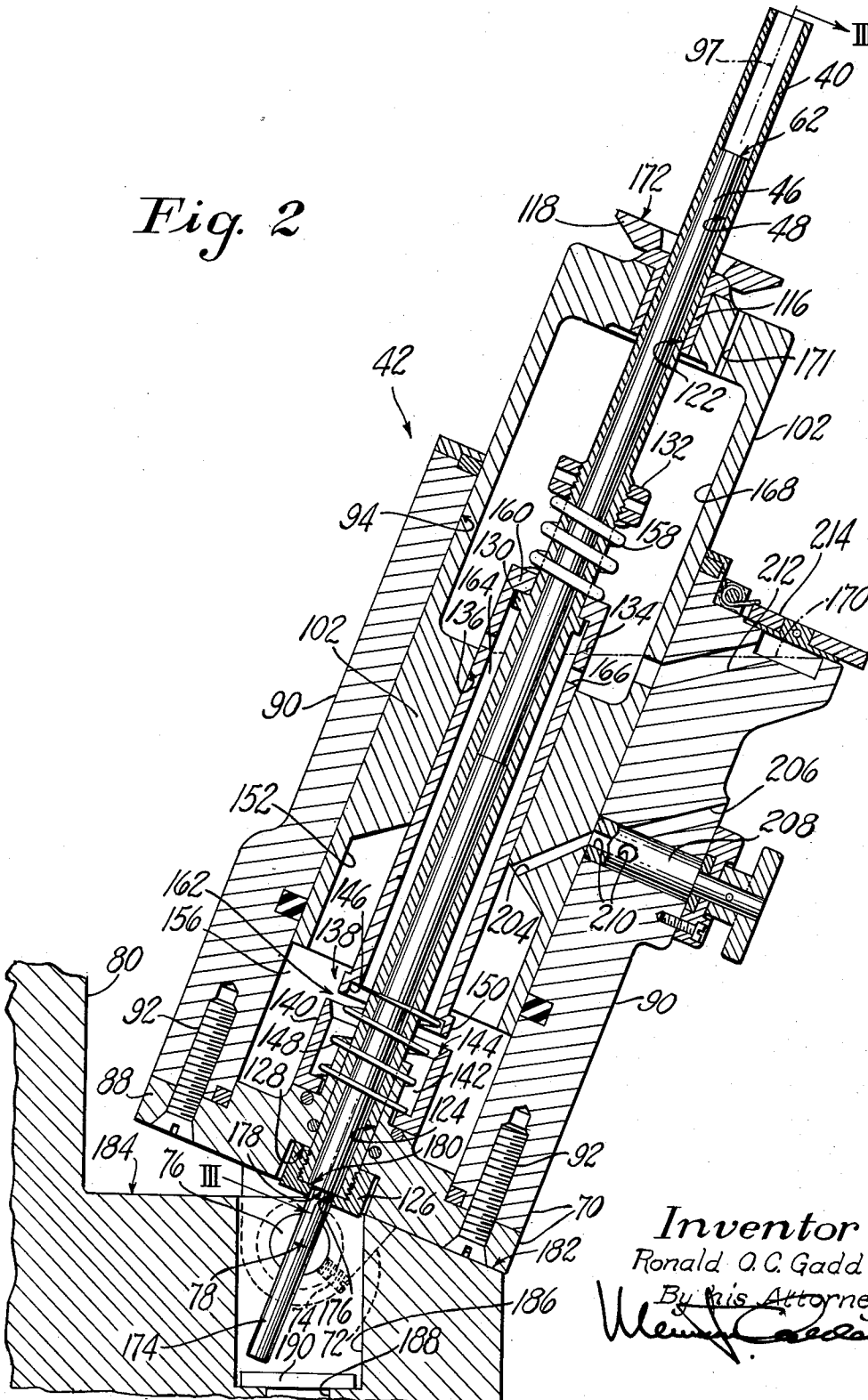
R. O. C. GADD
HEEL ATTACHING MACHINES

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Fig. 2



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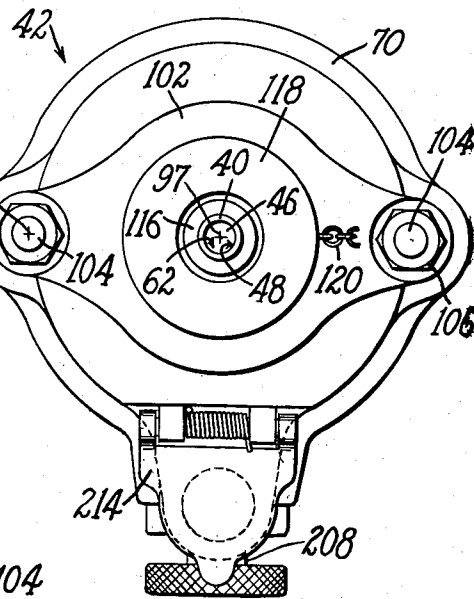
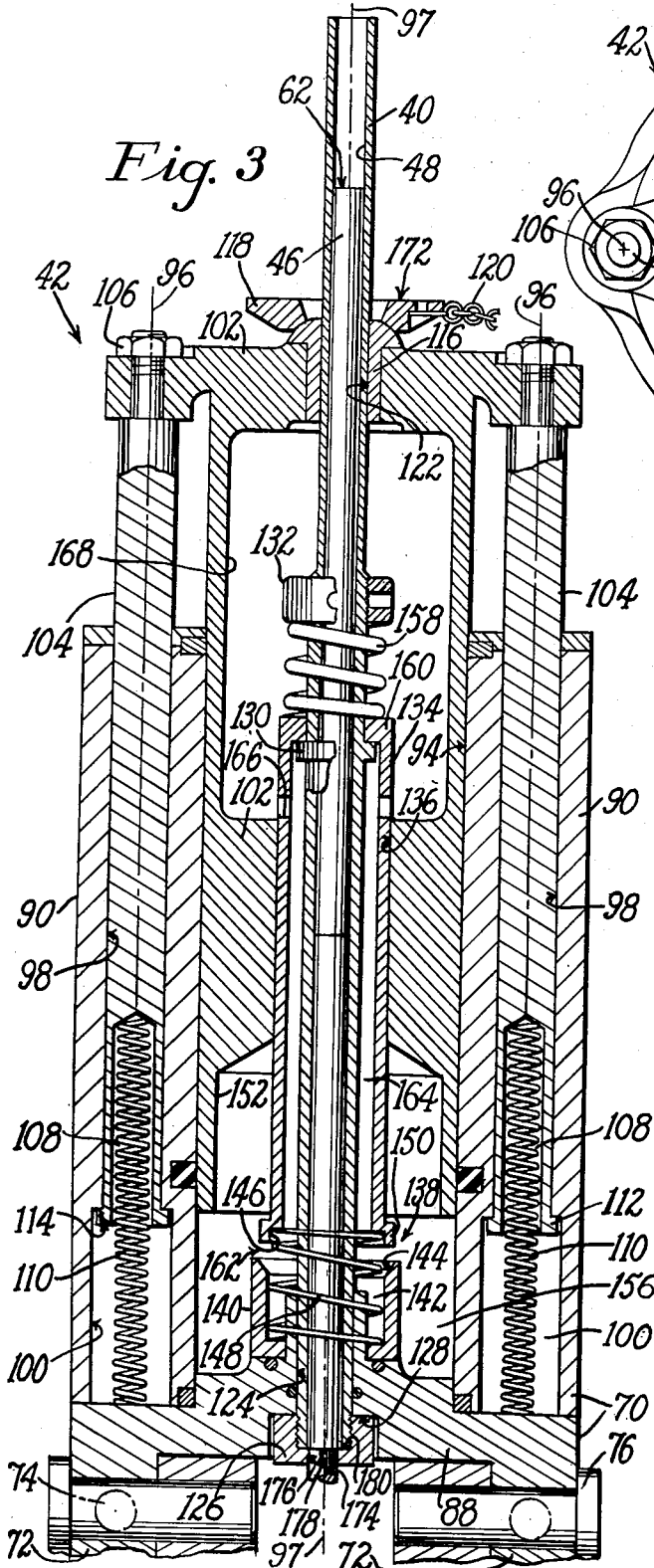
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HEEL ATTACHING MACHINES

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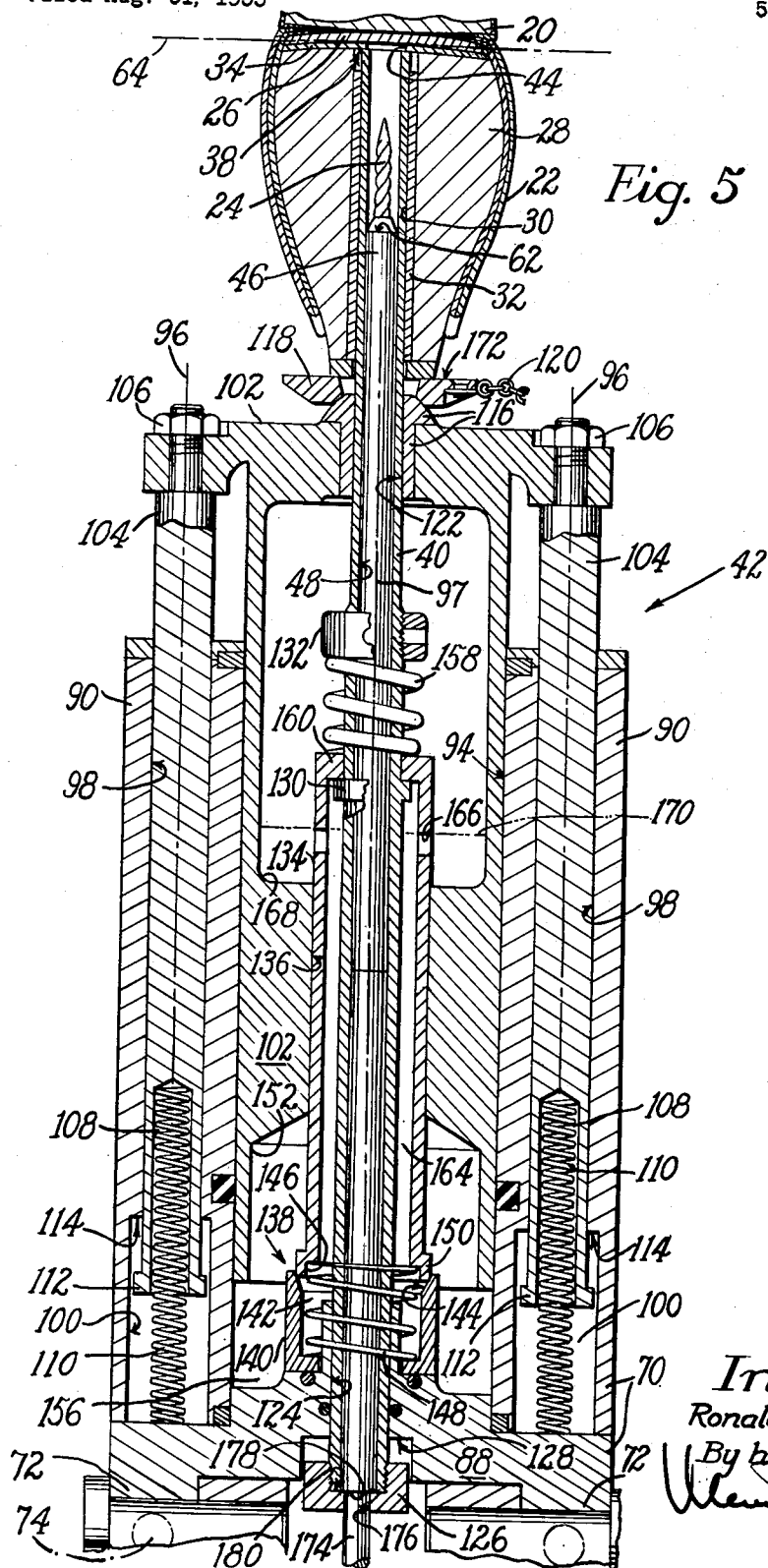


Fig. 5

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HEEL ATTACHING MACHINES

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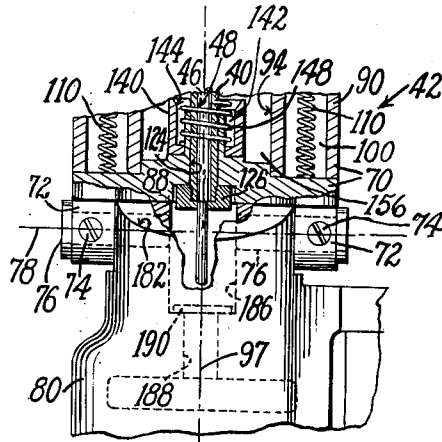
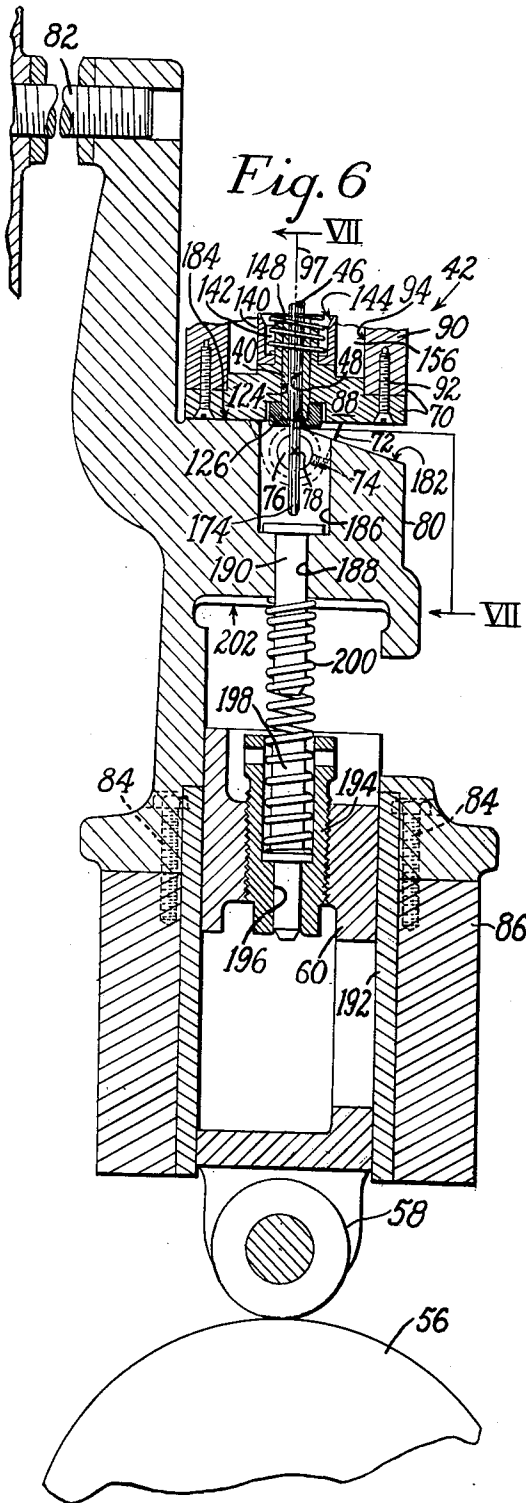


Fig. 7

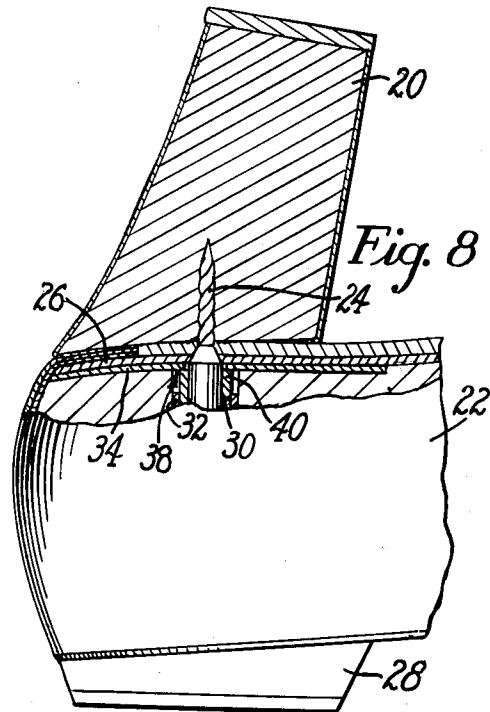


Fig. 8

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HEEL ATTACHING MACHINES

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Application August 31, 1953, Serial No. 377,554

Claims priority, application Great Britain
September 24, 1952

19 Claims. (Cl. 1—32)

This invention relates to work supports or jacks and is illustrated as embodied in a heel attaching machine.

In the manufacture of shoes having wood heels it is common practice, in order to make it possible to complete the various shoe finishing operations while the shoe is on the last, initially to attach the wood heel to the shoe by the use of a screw driven through a hole extending heightwise through the back cone of the last. After the last has been removed or "pulled" from the shoe the heel is further secured to the shoe by the use of a wood heel nailing machine which drives a plurality of nails through the heel seat of the shoe and into the wood heel, the screw which is relied upon temporarily to secure the heel to the shoe usually being left in the work to assist the nails in securing the heel permanently to the shoe.

A machine for use in the attachment of heels to shoes mounted upon lasts is disclosed, for example, in United States Letters Patent No. 2,428,047, granted September 30, 1947, on an application filed in the name of John F. Standish, said patent disclosing a machine in which a screw is driven through the heel seat of a shoe and into the heel through a passage extending generally heightwise through the back cone of the last and located rearward of a thimble hole in the last. Another machine for driving screws, which are relied upon to secure the heel temporarily to the shoe, through a modified thimble hole in the last is disclosed in United States Letters Patent No. 2,696,613, granted December 14, 1954 on an application filed January 15, 1953, in the names of Arthur A. Rivington et al. Machines such as above referred to have been found to be generally satisfactory, the lasts upon which the shoes are mounted being "measured" for height by depressing the work upon jacks respectively of the machines while said jacks are in a loading and unloading position or station. In the use of such machines the work depressed upon the jack is held depressed by the operator as the jack is moved to an operating or heel attaching position or station, the work being maintained in the proper heightwise position in accordance with the measured height of the last, so, that, after a mechanically actuated driver, which has a constant stroke the starting position of which may be varied, drives the screw through the heel seat of the shoe and into the heel, the head of the screw will be driven approximately flush with the insole of the shoe.

It is an object of the present invention to provide an improved heel attaching machine which is of the general type disclosed in said Patent No. 2,696,613 and which is quick and effective in its operation and may be operated with a minimum amount of effort on the part of the operator. With the above object in view the illustrative heel attaching machine has a jack comprising a housing, a last receiving feeler and a last mount movable independently in the housing in the same general direction against the action of resilient means and under pressure applied by a last upon which the shoe is mounted and, in accordance with a feature of the present invention, means responsive to movement of the feeler to a predetermined

position for locking the mount against movement in said direction.

Although the illustrative jack is described as embodied in a heel attaching machine it will be understood that the jack in its present or slightly modified form may be effectively used in different types of shoemaking machines where it is desired to position in a predetermined plane as well as rigidly to support in said position the heel seats of lasts which vary in height and upon which shoes to be operated upon are mounted.

The present invention consists in the above and hereinafter described novel features, reference being had to the accompanying drawings which illustrate one embodiment of the invention selected for purposes of illustration, said invention being fully disclosed in the following description and claims.

In the accompanying drawings

Fig. 1 shows a portion of the illustrative machine in side elevation, the jack of the machine being shown in a loading and unloading position or station by dot and dash lines and being shown in a heel attaching or operating position by full lines;

Fig. 2 is a vertical longitudinal section through the central portion of the jack in its loading and unloading position;

Fig. 3 is a section on the line III—III of Fig. 2;

Fig. 4 is a plan view of the jack;

Fig. 5 is a section corresponding to Fig. 3 showing the jack in its heel attaching position and having mounted upon it work comprising a shoe and a heel which is to be attached to the shoe, said work being positioned and clamped upon the jack preparatory to driving a screw into the work;

Fig. 6 is a longitudinal vertical section through the lower end of the jack and a bracket which is secured to the main frame of the machine and by means of which the jack and screw driving means associated with the jack are supported;

Fig. 7 is a view on the line VII—VII of Fig. 6; and

Fig. 8 is a view showing, partly in side elevation and partly in longitudinal section, the rear portion of a shoe the heel of which has been attached by the use of the illustrative machine.

The illustrative machine is described with reference to attaching a covered wood heel 20 (Figs. 1, 5 and 8) to a shoe 22 by the use of a "drive" screw 24 which is driven through the heel seat of the shoe and into the heel, the head of the screw driven into the work being approximately flush with an insole 26 of the shoe.

The present machine, which is an improvement on the machine disclosed in the above-mentioned Patent No. 2,696,613, is adapted to attach the heels 20 to shoes 22 mounted on lasts 28 having spindle holes 30 (Figs. 5 and 8) which are cylindrical bores in bushings 32 extending heightwise through or substantially through the back cones of the lasts. Each last 28 commonly has a heel seat formed by a plate 34 provided with a shoulder 38 which, as will be explained later, engages the upper end of a hollow or tubular spindle, feeler or member 40 which fits slidingly in the holes 30 and forms part of a jack 42 of the machine. A circular hole 44 (Fig. 5) formed in the heel plate 34 of the last 28 and defining the inner end of the shoulder 38 is in axial alignment with and has a diameter slightly greater than that of a cylindrical driver 46 which, as will be explained later, is raised in a bore 48 of the spindle, feeler or member 40 to drive the screw 24 into the work.

The novelty in the present machine resides mainly in the jack 42 which will be described as embodied in a machine similar to the machine which is disclosed in United States Letters Patent No. 1,545,575, granted July 14, 1925, upon an application filed in the name of John

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F. Standish and which comprises a clamp 50 (Fig. 1) having pressure equalizing tread and rear abutments or pads 52, 54 respectively for forcing the heel positioned upon a fitted heel seat of the shoe 22 mounted upon the jack 42 tilted to its full line operating or heel attaching position 5 shown in Fig. 1 against said heel seat.

The clamp 50 is operated by mechanism comprising a treadle (not shown, but corresponding to the treadle 132 disclosed in Patent No. 1,545,575) which is initially depressed to clamp the heel against the heel seat of the shoe and is further depressed to trip a one-revolution clutch (not shown). Engagement of the clutch effects rotation of a cam 56 (Fig. 6) which is operatively connected to a drive-shaft (not shown) of the machine and is engaged by a roll 58 journaled on the lower end of an actuator slide 60. Elevation of the slide 60 causes, through mechanism hereinafter described, the driver 46 to be raised a constant distance along the bore 48 of the spindle 40 to drive the screw, which between heel attaching operations is manually inserted head down into the spindle, feeler or member 40 with its head engaging a driving face 62 of the driver 46, through the heel seat of the shoe 22 and into the heel 20. Upward movement of the driver 46 ceases when its driving face 62 reaches a predetermined but initially variable horizontal plane 64 (Figs. 1 and 5), the screw 24 being driven into the work with its head substantially flush with the insole 26 of the shoe which, by the provision of hereinafter described mechanism, has the heel portion of its insole rigidly supported substantially in said plane irrespective of the height of the last upon which the shoe is mounted.

The jack 42 comprises a multipart carrier, housing or support 70 (Figs. 1 and 5) having depending flanges 72 to which are secured by screws 74, pins 76 journaled for movement about their common axis 78 in aligned bores of a bracket 80, said carrier being swung between its forward, inclined or loading and unloading position or station and its rearward or upright or operating position or station upon the bracket 80 which is secured by an elongated screw 82 (Fig. 6) and by screws 84 to upstanding and horizontal portions respectively of a main frame 86 of the machine. The carrier 70 comprises a base portion 88 and an upstanding cylindrical portion 90 which are secured together by screws 92 (Figs. 2 and 6), said upstanding portion having formed in it a bore 94. Formed in and arranged vertically at opposite sides of the upstanding portion 90 of the carrier 70 and having axes 96 which are parallel to a central vertical axis 97 of the bore 94 of the jack 42, are guideways 98 (Figs. 3 and 5) and recesses 100.

Slidably mounted in the bore 94 of the upstanding portion 90 of the carrier or housing 70 is a mount or member 102 comprising a pair of cylindrical elevating rods 104 which are secured by nuts 106 to the main portion of the mount and which have formed in their lower ends recesses 108 for receiving the upper portions of compression springs 110 the lower ends of which bear against the base 88 of the carrier. The elevating rods 104 of the mount 102 have formed at their lower ends flanges 112 which travel in the recesses 100 formed in the carrier 70 and which when the machine is idle engage shoulders 114 respectively of the carrier 70 to limit upward movement of the mount acted upon by the compression springs 110 thereby establishing the raised, rest, retracted or work receiving position of the mount 102. The elevating rods 104 of the mount 102 also insure against rotation of the mount in the bore 94 of the carrier 70. Universally supported on a bearing 116 carried by and forming part of the mount 102 is a tilt plate 118 against the upper face of which rests the upper face of the back cone of the last 28 positioned upon the jack 42. In order to insure against the tilt plate 118 being lost it is attached to the mount by a chain 120.

The spindle 40 is reciprocable in a bore 122 formed in the bearing 116 of the mount 102 and in a bore 124 formed

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in the base portion of the carrier 70, said spindle having threaded onto its lower end a stop nut 126 which when the machine is at rest is in forced engagement with a face 128 of the base portion 88 of the carrier 70 as best shown in Figs. 2 and 3, thereby establishing a raised, rest, retracted or work receiving position of the spindle. The spindle, feeler or member 40 has formed on it and threaded onto it a flange 130 and a nut 132 respectively and surrounding the spindle is a sleeve, slide or member 134 slidably mounted in a bore 136 which is formed in the mount 102 and is centered about the axis 97, said sleeve forming part of a valve 138 and being movable between a rest or valve opening position shown in Figs. 2 and 3 and a valve closing position shown in Fig. 5. Fixed to the base portion 88 of the carrier 70 and arranged concentrically with relation to the central axis 97 of the jack 42 is a valve seat 140 provided with a cylindrical recess 142 and a bevel circular face 144. Surrounding the spindle, feeler or member 40 and arranged in the recess 142 and in a cylindrical recess 146 formed at the lower end of the sleeve 134 is a compression spring 148 which constantly urges the sleeve upward, said sleeve which constitutes a movable member of the valve 138 having at its lower end a circular flange 150 arranged opposite the bevel face 144 of the valve seat 140 which constitutes a fixed member of the valve and which may be considered part of the carrier 70 and may be referred to as a stop, the valve being closed when the flange 150 engages the face 144 of said seat, as shown in Fig. 5, and being open when said flange is spaced from the seat, as shown in Figs. 2 and 3.

In the lower end of the mount 102 is a recess 152 which forms, with the valve seat 140, the bore 94 of the carrier 70 and the sleeve 134, a ring-shaped chamber 156 which for reasons which will appear later may be referred to as a trap chamber and the height of which varies in accordance with the heightwise position of the mount 102 in the carrier. Surrounding the spindle feeler or member 40, and having its upper and lower ends engaging respectively the nut 132 and the upper end of the sleeve 134, is a compression spring 158 which is substantially stronger than the spring 148 and which constantly forces an in-turned flange 160 of the sleeve against the flange 130 of the spindle 40.

When the machine is at rest and the jack 42 with the work on it has been swung back from its inclined or loading and unloading position, shown in dash lines in Fig. 1, to its upright full line position shown in this figure, the spindle, feeler or member 40 and the sleeve 134 are in their raised, rest, retracted or work receiving positions (shown in Fig. 3), said sleeve and spindle being held in their raised positions as a unit by the spring 148, the stop nut 126 secured to the spindle being in engagement with the abutment face 128 of the base portion 88 of the carrier 70 and the circular flange 150 of the sleeve 134 being spaced from the circular bevel face 144 of the valve seat 140 to form an opening 162. The major portion of the sleeve 134 is spaced from the spindle, feeler or member 40 and forms with said spindle a passage 164 which, with ports 166 extending through the upper part of the sleeve, allows oil from the ring-shaped chamber 156 to be transferred to a surge chamber 168 formed in the upper portion of the mount 102 when said mount is depressed by work from its raised or retracted position shown in Fig. 3 to its work clamping position shown in Fig. 5. When the machine is at rest as shown in Fig. 2 the oil in the surge chamber 168 has a level 170, said chamber being open at all times to atmospheric pressure through a vent passage 171.

It will be apparent that when the machine is at rest the spindle, feeler or member 40 and the sleeve 134 of the valve 138 are held in their raised or retracted work receiving positions determined by the engagement of the stop nut 126 with the face 128 of the base portion of the carrier 70, as shown in Figs. 2 and 3, the mount 102 at

this time being in its rest or retracted work receiving position determined by the engagement of the flanges 112 of the elevating rods 104 of the mount with the shoulders 114 of the carrier.

When the machine is at rest the distance between a work supporting face 172 of the tilt plate 118, which plate may be considered part of the mount 102, and the upper end of the spindle 40 is somewhat less than the height of the back cone of the smallest last 28 to be used. Accordingly, when the last 28 having the shoe 22 mounted on it is initially placed upon the spindle, feeler or member 40 with the spindle hole 30 of the last slidably engaging the spindle, the back cone of the last seats upon the tilt plate 118 but the shoulder 38 of the heel plate 34 of the last is spaced from the upper end of the spindle 40. After the heel 20 has been positioned upon the fitted heel seat of the shoe 22 which is mounted on the last 28 placed upon the spindle, feeler or member 40 and the jack has been tilted rearward from its inclined dash line position to its upright or full line position shown in Fig. 1, the operator depresses the treadle (not shown) causing the clamp 50 to force the heel downward against the heel seat of the shoe. As the shoe is depressed the mount 102 is lowered with relation to the spindle 40 against the action of the springs 110 and also against the action of oil in the ring-shaped chamber 156, a portion of said oil being transferred through the passage 164 and the ports 166 into the surge chamber 168.

When the last 28 and the shoe 22 on it have been depressed to an elevation in which the shoulder 38 of the heel plate 34 of the last engages the upper end of the spindle 40, the mount 102 and the spindle, feeler or member are depressed as a unit until the circular flange 150 of the sleeve 134, which is constrained by the spring 158 for movement with the spindle, engages the bevel face 144 of the valve seat 140 thus closing the opening 162 and accordingly the valve 138 and thereby causing oil to be sealed in the ring-shaped trap chamber 156, which may also be referred to as a measurement locking chamber, to prevent further depression of the mount 102. If during the heel attaching operation excessive downward pressure should be brought to bear against the upper end of the spindle 40, said spindle, feeler or member will be depressed relatively to the sleeve 134 against the action of the spring 158, thus insuring against damage to the heel plate 34 of the last 28.

The cylindrical driver 46 fits slidably in the bore or passage 48 of the spindle, feeler or member 40 and has a reduced cylindrical lower end portion 174 which fits slidably in a bore 176 in the nut 126 and is offset inward from the main portion of the driver by a transverse shoulder 178. The driver 46, which if desirable may be made in two parts, moves under the influence of gravity to a retracted starting position in which its shoulder 178 engages a ledge 180 of the nut 126. It will thus be apparent that the starting or retracted position of the driver 46 will vary in accordance with the height of the last but this is of no consequence since the driver at the upper end of its stroke is always raised to but not beyond the horizontal plane 64.

The inclined dash and upright full line positions of the jack 42 (Fig. 1) about the common axis 78 are established by the engagement of the bottom of the base portion 88 of the carrier with faces 182, 184 respectively of the bracket 80. The axis 97 of the driver 46 is disposed at right angles to and intersects the common axis 78 of the pins 76. The axis 97 of the driver 46 is coincident with and therefore constitutes the axis of the jack 42, it being noted that the carrier 70, the mount 102, the sleeve 134, the spindle 40 and the driver are concentrically arranged with relation to the axis 97. With such an arrangement there is little tendency for the various sliding parts of the jack 42 to bind during the heel attaching operation.

Secured to the bracket 80 beneath the median part of the jack 42 is a cylindrical well 186 which is of suitable diameter to permit the driver 46 to be tilted between its loading and unloading position or station and its heel attaching position or station without the lower end portion 174 of the driver engaging the side wall of the well. Mounted for reciprocation in a vertical bore 188 of the bracket 80 and having an enlarged head which is movable vertically in the well 186 of the bracket and at all times lies beneath the lower end 174 of the driver 46 is a plunger 190 which is constantly urged to its rest position shown in Fig. 6 by the action of gravity. Secured to the bottom of the bracket 80 and to the main frame 86, to which the bracket is screwed, is a bearing sleeve 192 (Fig. 6) in which reciprocates the actuator slide 60 carrying at its lower end the roll 58 engaged by the cam 56 which, as above explained, is mounted upon a drive shaft of the machine, said shaft corresponding to the shaft (36) disclosed in said Patent No. 1,545,575. Threaded into and accordingly adjustable in the actuator slide 60 is a bearing screw 194 provided with a bore 196 into which is force fitted a shank of a striker pin 198. Formed between the bearing screw 194 and the striker pin 198 is an opening adapted to receive the lower end of a spring 200 the upper end of which engages a face 202 of the bracket 80. The spring 200 constantly urges the actuator slide 60 to its lowered position and serves to maintain the roll 58 against the cam 56. As the actuator slide 60 is raised the striker pin 198 engages the plunger 190 causing the driver 46 to be raised a predetermined distance, movement of the driver being reversed when its upper face 62 reaches the horizontal plane 64.

In order to enable the operator quickly to bleed any trapped air from the ring-shaped chamber 156, the mount 102 and the carrier 70 are provided with passages 204 and 206 which when the machine is at rest are in substantial alignment as shown in Fig. 2. Rotatably mounted in the carrier 70 is a valve 208 which is manually rotatable between an open position, in which an angular passage 210 formed in the valve connects the passages 204, 206 and allows any trapped air in the ring-shaped chamber 156 to escape from said chamber, and a closed position in which the valve closes the passage 206 from the passage 204. The desired oil level 170 in the surge chamber 168 may be maintained by supplying oil to an oil passage 212 which is sealed by a spring-biased cover 214.

Having described the invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a machine for use in the manufacture of shoes, a jack comprising a support, a last mount movable to and from a retracted position in the support, means for constantly urging the mount to its retracted position, a feeler which projects beyond and is movable with relation to said mount and is movable to and from a retracted position, means for constantly urging the feeler to its retracted position, mechanism for forcing work against said mount and said feeler to move said mount and feeler away from their retracted positions in the support, means for limiting movement of the mount away from its retracted position in the support, and means responsive to movement of the feeler away from its retracted position for rendering said last-named means active in limiting movement of the mount away from its retracted position.

2. In a machine for use in the manufacture of shoes, a jack comprising a housing, resilient means, a last receiving feeler and a last mount movable independently in the housing in the same general direction, mechanism for forcing a last upon which a shoe is mounted against said mount and said feeler to move in opposition to said resilient means said mount and feeler in said general direction, and means responsive to movement of the feeler to a predetermined position for locking the mount against movement in said direction.

3. In a machine for use in the manufacture of shoes,

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a jack for supporting work, said jack comprising two members which support the work and are engaged by different portions of the work and which are independently movable in one general direction by pressure exerted against them by the work, mechanism for forcing said work against said members, a stop, and means which comprises said stop and other portions of which are responsive to movement of one of said members in said one direction to a position determined by said stop for causing the other of said members to be secured against movement in said one direction.

4. In a machine for use in the manufacture of shoes, a jack comprising a support, a last mount movable to and from a retracted position in the support, means for constantly urging the mount to its retracted position, a feeler which projects beyond and is movable with relation to said mount and is movable to and from a retracted position, means for constantly urging the feeler to its retracted position, mechanism operative against work on a last upon said mount and said feeler for moving said mount and feeler away from their retracted positions in the support, and fluid means for limiting movement of the mount away from its retracted position in the support, said fluid means comprising a valve which is operative in response to movement of the feeler away from its retracted position for rendering said fluid means active in limiting movement of the mount away from its retracted position.

5. In a heel attaching machine, a jack comprising a housing, resilient means, a last receiving spindle and a last mount movable independently in the housing in the same general direction under pressure applied by a last upon which a shoe is mounted and against the action of said resilient means, mechanism for moving the last in said general direction, and means responsive to movement of the last receiving spindle to a predetermined position for locking the mount against movement in said direction, said spindle being yieldable in said direction with relation to the mount when excessive pressure is applied thereto after said locking of the mount.

6. In a machine for use in the manufacture of shoes, a jack comprising a work carrier movable between a loading and unloading station on the one hand and an operating station on the other hand, a mount movable in the carrier to and from a retracted position, resilient means for constantly urging the mount to its retracted position, a spindle movable in the carrier and in the mount to and from a retracted position, resilient means for constantly urging the spindle to its retracted position, mechanism operative against work on a last upon said mount and said spindle for moving the mount and the spindle away from their retracted positions, and fluid means for limiting movement of the mount away from its retracted position, said fluid means comprising a valve which is operative in response to movement of the spindle away from its retracted position for rendering said fluid means active in limiting movement of the mount away from its retracted position.

7. In a machine for use in the manufacture of shoes, a support, a last mount movable to and from a retracted position in the support, resilient means for constantly urging the mount to its retracted position, a feeler projecting from said mount and movable with relation to the support and the mount to and from a retracted position, resilient means for constantly urging the feeler to its retracted position, mechanism operative against work to cause said work to move in opposition to said resilient means the mount and the feeler away from their retracted positions, fluid means for limiting movement of the mount away from its retracted position in the support, said fluid means comprising a valve having a sleeve, and means for yieldingly securing the sleeve to the feeler and for effecting movement of the sleeve in response to movement of the feeler away from its retracted position

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thereby rendering said fluid means operative to limit movement of the mount away from its retracted position.

8. In a machine for use in the manufacture of shoes, a jack comprising a carrier, said carrier being mounted for pivotal movement between a work loading and unloading position on the one hand and a work operating position on the other hand, a last mount movable to and from a retracted position in the carrier, resilient means for constantly urging the mount to its retracted position in the carrier, a last spindle projecting from the mount and movable with relation to the carrier and the mount to a retracted position, resilient means for constantly urging the spindle in the carrier to its retracted position, mechanism operative against work to cause said work to move in opposition to said resilient means the mount and the spindle away from their retracted positions, and fluid means for limiting movement of the mount away from its retracted position in the carrier, said fluid means comprising a valve having a sleeve which is yieldingly secured to the spindle and is responsive to movement of the spindle away from its retracted position for rendering said fluid means active in limiting movement of the mount away from its retracted position.

9. In a heel attaching machine, a jack comprising a mount and a spindle constructed and arranged to be engaged respectively by the back cone of a last and a transverse shoulder in a bore which extends heightwise through said cone and slidably receives the spindle, said mount and said spindle being yieldably movable independently in one general direction to measure the last heightwise, mechanism for moving the last in said one general direction, fluid means comprising a valve for locking the mount against movement in said one general direction, and means responsive to movement of the spindle to a predetermined position for controlling said valve to cause said fluid means to limit movement of the mount in said one general direction.

10. In a heel attaching machine, a jack comprising a housing, a mount, a hollow spindle which projects beyond the mount, said mount and said spindle being slidable in the housing and being adapted to be engaged respectively by work constituting a last and a shoe mounted upon said last, stops, resilient means for independently urging the mount and the spindle in one direction until limited by said stops respectively, mechanism operative against the work for causing said work to move the mount and the spindle in a direction opposite to said one direction, and hydraulic means opposing movement of the mount acted upon by the last in a direction opposite to said one direction, said hydraulic means including a valve having a slide which is constantly urged by said resilient means to a valve opening position and which is connected yieldingly to the spindle, movement of the spindle in a direction opposite to said one direction, when acted upon by the last, being effective to move the slide from its valve opening position to a valve closing position thereby causing said hydraulic means to prevent further movement of the mount in said opposite direction.

11. In a heel attaching machine, a mount yieldingly movable in one direction under pressure applied against said mount by the top of a back cone of a last, a spindle which projects through and beyond said mount and which is movable with and with relation to said mount in said one direction under pressure applied against an end of the spindle by a shoulder extending transversely of a spindle hole extending heightwise through said cone, fluid means which comprises a valve and is adapted to limit movement of said mount in one direction, means for operatively connecting the spindle and the valve, and means for forcing a heel against the heel seat of a shoe mounted upon the last to move the mount relatively to the spindle until the spindle engages said shoulder of the last and for thereafter moving the spindle and mount as a unit to a predetermined position in said one direction to close said

valve thus rendering said fluid means effective to limit movement of the mount in said one direction.

12. In a heel attaching machine, a jack comprising a movable spindle which has a cylindrical passage and is constructed and arranged to be received in a bore extending heightwise of the back cone of a last having a shoe mounted on it and an end of which is engaged by a shoulder extending transversely of the bore, a mount which is adapted to support the last by engagement with said cone and is movable in one direction by pressure applied by the last, means responsive to movement of the spindle acted upon by the last to a predetermined position for locking the mount against movement in said one direction, a cylindrical driver fitting slidably in said passage of the spindle and having an axis, a bracket, said jack being pivotally mounted on said bracket for movement between a loading and unloading position on the one hand and an operating position on the other hand about an axis disposed at right angles to and intersecting the axis of the driver near a lower end thereof, a clamp for forcing in said one direction a heel against a heel seat of the shoe which is mounted on the last on the jack swung to its operating position, said bracket having a well in which the lower end of the driver is housed, a plunger which is movable in said well, and means for moving the plunger through a predetermined stroke to cause the driver to drive a screw through the heel seat portion of the shoe and into the heel to attach the heel to the shoe.

13. In a machine for use in the attachment of heels to shoes, a jack comprising a carrier, a mount slidable in the carrier, a spindle slidable in the mount and in the carrier, springs for constantly urging respectively with relation to the carrier the mount and the spindle to work receiving positions in which a last having a shoe on it engages the mount and in which a spindle hole formed in the last receives the spindle, mechanism operative against the shoe for forcing the last against said mount and against said spindle, a valve having members which are fixed and movable respectively with relation to the carrier, resilient means for constraining said movable member slidably with the spindle and for permitting, when substantial pressure is applied against the spindle and said movable member has been forced against said fixed member to close said valve, said spindle to be slid relatively to said movable member, and a chamber which is filled with fluid and is formed between the carrier, the amount and said members, said mount being slidable in opposition to its associated springs relatively to the spindle and the carrier to displace fluid from said chamber as the last is forced against the mount and until the spindle has been moved by the work away from its work receiving position sufficiently to cause said valve to be closed and accordingly to trap fluid in said chamber to prevent further movement of the amount away from its work receiving position.

14. In a heel attaching machine, a jack, a clamp, means for moving the clamp relatively to the jack to apply pressure between a heel in engagement with said clamp and the heel seat portion of a shoe which is on a last mounted upon said jack, said jack comprising a carrier, a hollow last spindle which slidably engages in a bushing extending heightwise of a back cone of the last and which is slidable in a rectilinear path in said carrier, a mount which is slidable in said carrier in a rectilinear path parallel to the path of movement of the spindle in the carrier and which is engaged by the cone of the last upon said spindle, resilient means for urging the spindle and the mount in one direction in their respective paths, means responsive to movement of the spindle in its rectilinear path in a direction opposite to said one direction for locking the mount against movement in its rectilinear path in a direction opposite to said one direction when the central portion of the heel seat of the last, irrespective of its height, is arranged in a predetermined position, mechanism for enabling the spindle after the locking of the mount to yield relatively to the mount in said opposite

direction when a substantial amount of pressure is applied to the spindle by the work, a driver movable in the spindle, and means for operating the driver to drive a screw through the heel seat of the shoe and into the heel.

15. In a heel attaching machine, a jack, a clamp, means for moving the clamp toward the jack to apply pressure between a heel acted upon by the clamp and the heel seat portion of a shoe on a last mounted upon the jack, said jack comprising a carrier movable to and from a heel attaching position, a mount which is slidable in a predetermined path in the carrier and is engaged by a back cone of the last, a hollow spindle which engages a bushing extending heightwise of said cone of the last and is slidable in the carrier in a path substantially parallel to the first-named path, resilient means for urging the spindle and the mount in one direction in their respective paths, fluid means comprising a valve having one member which is fixed to the carrier and a second member which is yieldingly connected to the spindle, said second member of the valve being movable together with the spindle in a direction opposite to said one direction into engagement with said one member of the valve to close said valve thereby locking the mount against movement in a direction opposite to said one direction when the central portion of the heel seat of the last is located at a predetermined position, a driver slidable in said spindle, and means for operating the driver to drive a screw through the heel seat of the shoe and into the heel, said spindle by reason of its yielding connection to said second member of the valve being adapted to yield in said opposite direction relatively to the mount when said mount is locked against movement in said opposite direction thus insuring against the spindle exerting any substantial amount of pressure against the work after the mount has been locked against the movement in said opposite direction.

16. In a machine for use in the manufacture of shoes, a jack comprising a housing, a mount slidable in said housing and adapted to support a last, resilient means for moving the mount to a rest position in the housing, a spindle which projects from the mount and which is shaped and arranged to fit in a bore of said last, a valve comprising a slide and a seat, means comprising a relatively strong spring for normally retaining said slide in a predetermined position upon the spindle, a relatively weak spring for constantly urging the slide away from said seat and acting through the strong spring to urge the spindle to a rest position, fluid means comprising said valve and trap and surge chambers which are in communication when the valve, by reason of the slide being spaced from said seat, is open thereby permitting the mount to be moved against the action of said resilient means by reason of fluid being displaced from the trap chamber to said surge chamber, said valve being closed when the slide, by reason of pressure applied against the spindle and acting through said strong spring against the slide, is forced against said seat thereby causing movement of the mount against the action of said resilient means to cease positively to support the last, said spindle thereafter being movable relatively to the slide and the mount through said relatively strong spring in the event that substantial pressure is applied by said work against the spindle, and mechanism operative against a shoe on the last for forcing said last against the spindle and the mount.

17. In a heel attaching machine, a jack comprising a housing, a mount slidable in the housing, resilient means for constantly urging the mount toward a rest position in the housing, a spindle slidable in the housing and in the mount, a trap chamber which is filled with fluid and is formed between the housing and the mount, a surge chamber formed in the mount, a valve comprising a seat, which is fixed with relation to the housing, and a sleeve which is slidable with the spindle and has ports opening into the surge chamber and which forms with said spindle a pas-

sage which when the valve is open allows circulation of said fluid between the trap chamber and said ports and accordingly the surge chamber, a spring for constantly urging the spindle toward a rest position and for urging the sleeve away from said seat to maintain the valve open, said mount being slidable in one direction against the action of said resilient means, by reason of pressure applied against it by a cone of a last which has extending through it a bore and is positioned upon the spindle with its bore engaging the spindle, until an end of the spindle is engaged by a heel plate of the last to measure said last whereupon the spindle and the valve sleeve are moved against the action of the spring and together with the mount until the valve is closed to cut off communication between the trap chamber and said passage thereby preventing further movement in said one direction of the mount, said spindle, after the engagement of the sleeve with the valve seat, being movable relatively to the sleeve by reason of its yielding connection to the sleeve, whenever substantial pressure is applied to the spindle thereby insuring that the pressure applied by the work against the spindle shall be supported entirely by the mount, and a clamp operative against a shoe on the last for forcing the mount and the spindle away from their rest positions.

18. In a machine for use in the manufacture of shoes, a jack comprising a pair of members, resilient means, said members being adapted to be engaged by different portions of a last upon which is mounted a shoe and being yieldingly movable in the same general direction independently from retracted positions against the action of said resilient means, mechanism operative against said shoe for causing different portions of the last to engage said members and for thereafter moving said members as a unit in said general direction, means associated with one of said members for terminating movement of said members in said direction when the central part of the heel seat of the last mounted upon said one member is arranged in a predetermined plane, and means responsive to movement of said one member to the position in which its movement is terminated for locking said other member in a work retaining position in which it rigidly sup-

ports the last and the shoe mounted on it against further movement in said general direction.

19. In a heel attaching machine, a carrier, a hollow spindle which is movable relatively to the carrier and is constructed and arranged to receive a last upon which is mounted a shoe to which a heel is to be attached with the spindle fitting in a bore extending heightwise through a back cone of the last, a mount which is movable in the carrier and is shaped and arranged to be engaged by said cone of the last upon the spindle, resilient means for urging with relation to the carrier the spindle in one direction, resilient means for urging with relation to the carrier the mount in said one direction, mechanism operative against the shoe for forcing the last against said mount and said spindle to move said mount and the spindle in said one direction against the action of said resilient means, and fluid means comprising a valve having a seat fixed with relation to the carrier and a slidable member which is movable with relation to the carrier and is operatively connected to the spindle, said spindle being moved yieldingly by said mechanism against the action of said first-named resilient means in a direction opposite to said one direction to a position determined by the engagement of said slidable member with said seat to cause the central portion of a heel seat of the last to be positioned in a predetermined plane, said mount also being moved in said opposite direction by said mechanism as the central portion of its heel seat is moved toward said predetermined plane against the action of said second-named resilient means to a mount sustaining position, said fluid means being responsive to engagement of said slidable member with said seat to cause the valve to be closed and accordingly the fluid means to lock the mount against movement in said opposite direction when the central portion of the heel seat of the insole of the shoe on the last lies in said plane.

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