Nov. 1, 1949. P. W. SENFLEBEN 2,486,537

MACHINE FOR PRESSING SOLES ON SHOES

Filed Sept. 5, 1946

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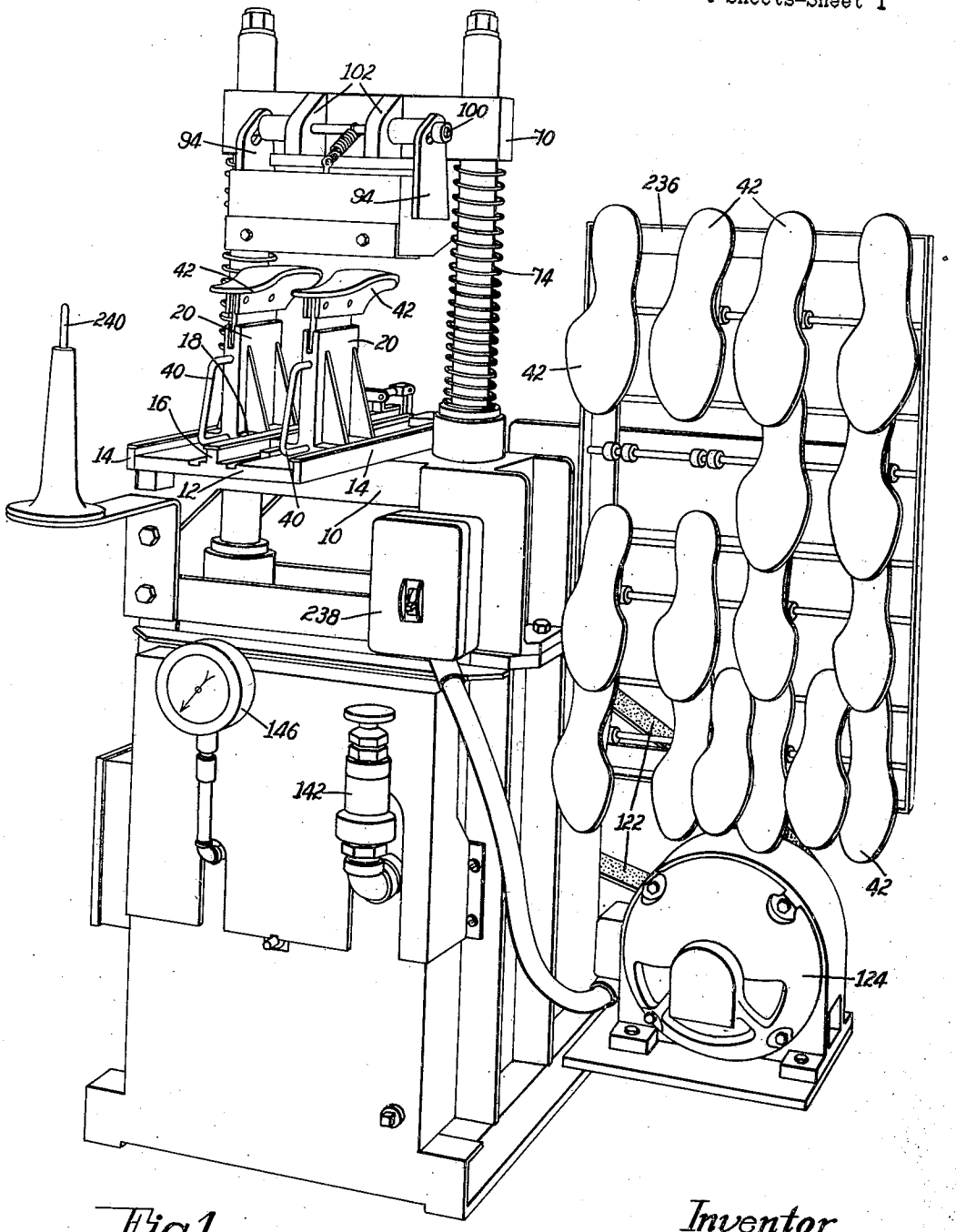



Fig. 1

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Fig. 2

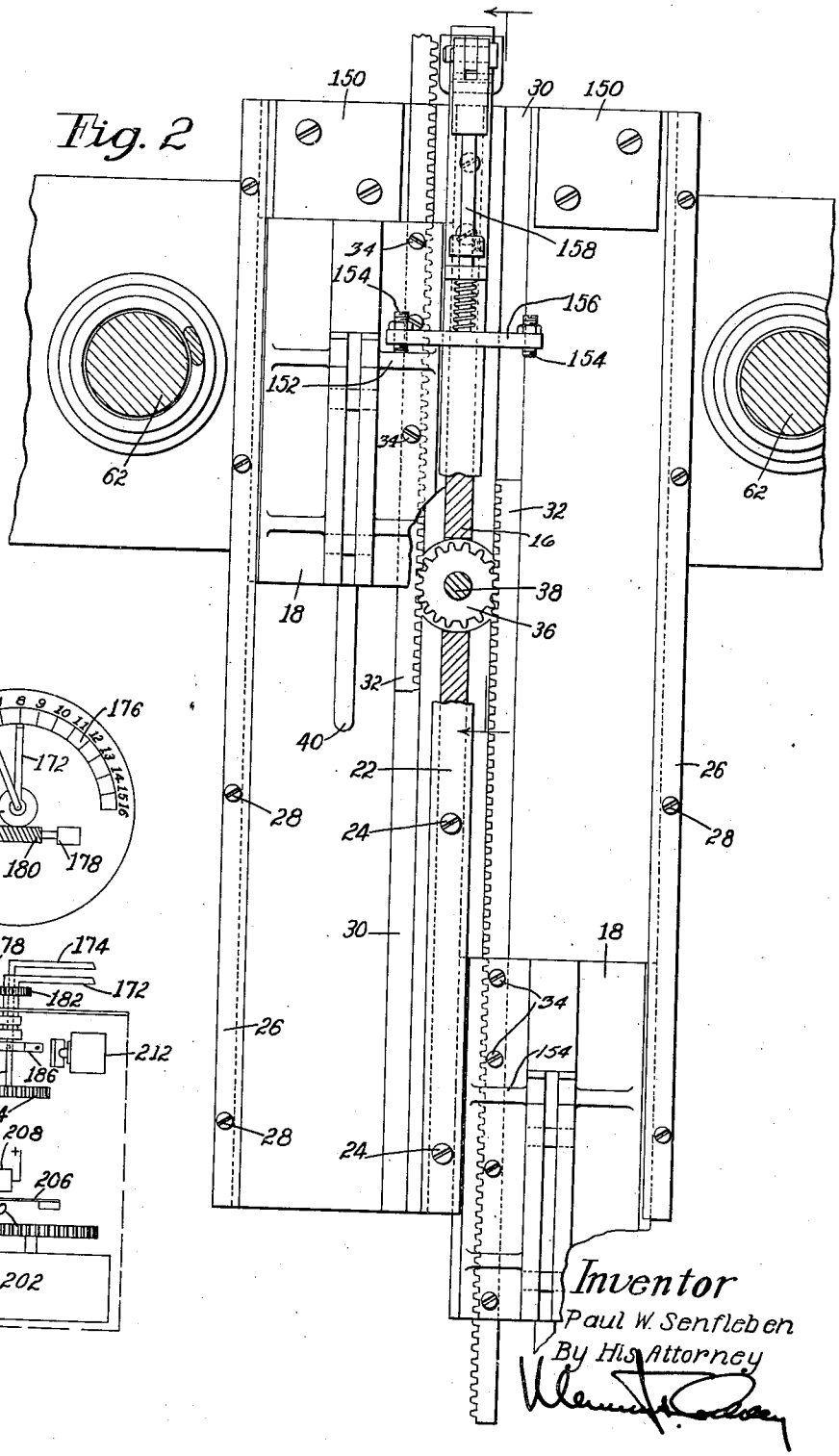



Fig. 3




Fig. 4




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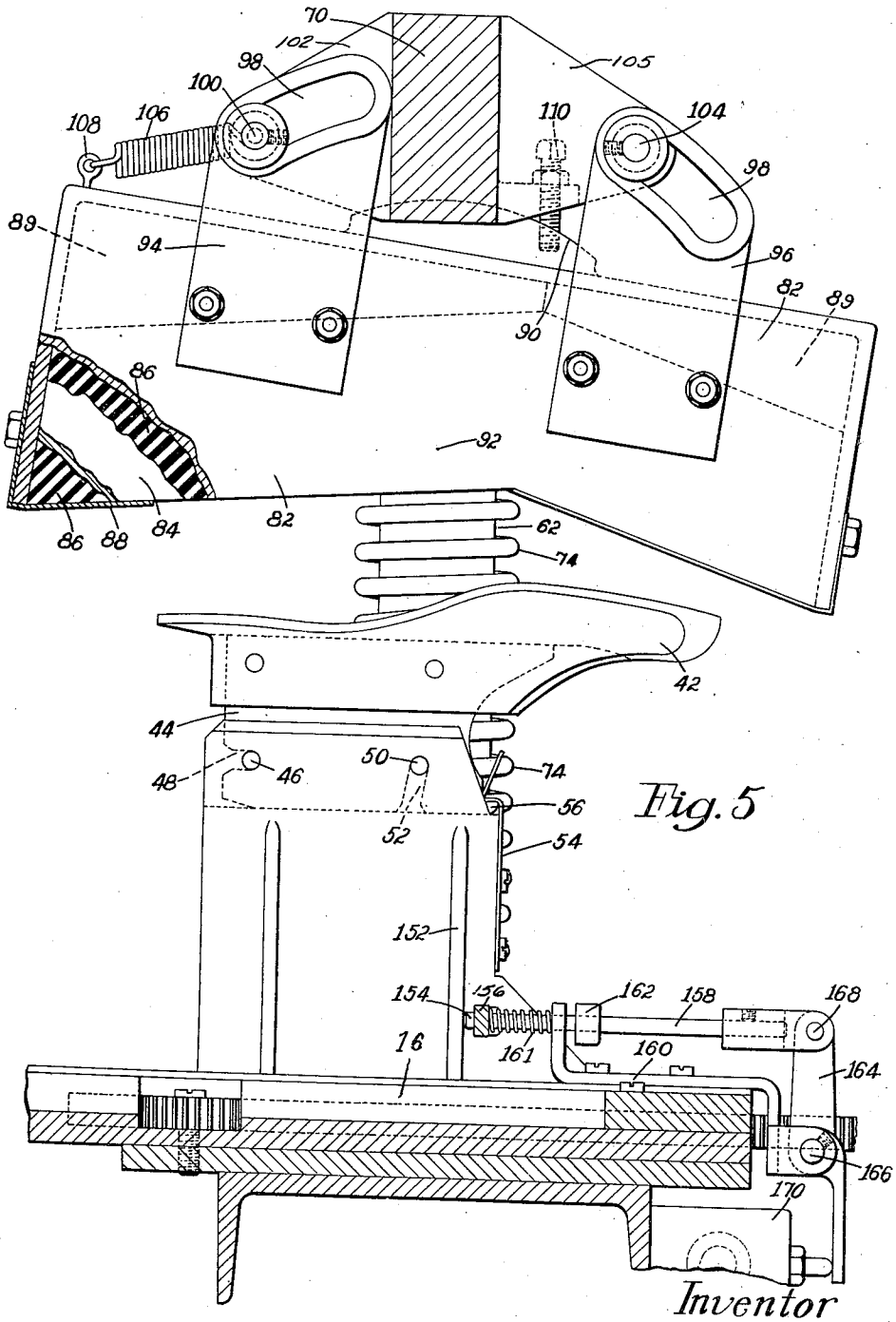



Fig. 5

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MACHINE FOR PRESSING SOLES ON SHOES

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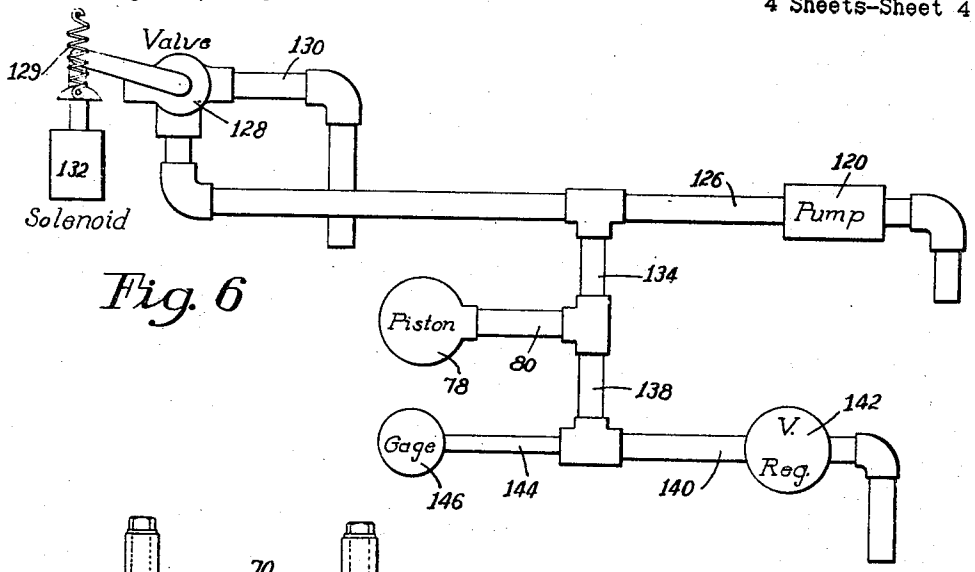



Fig. 6

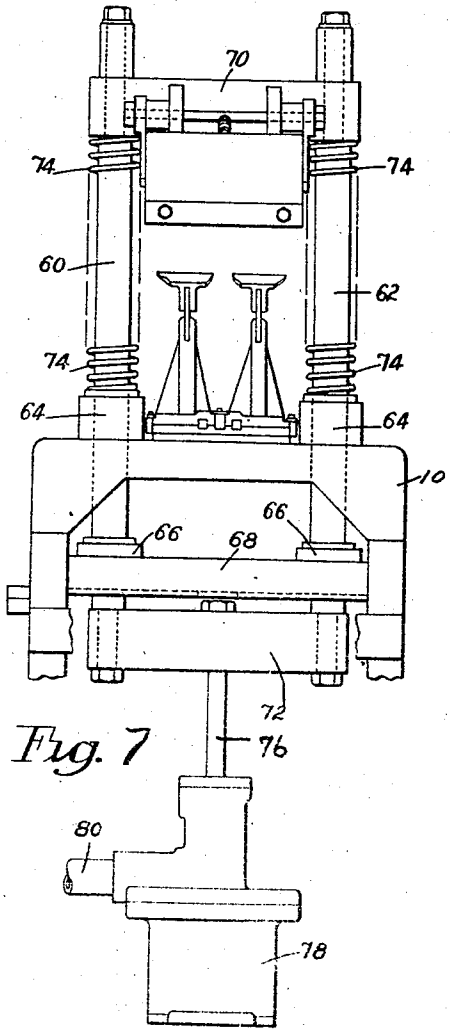



Fig. 7

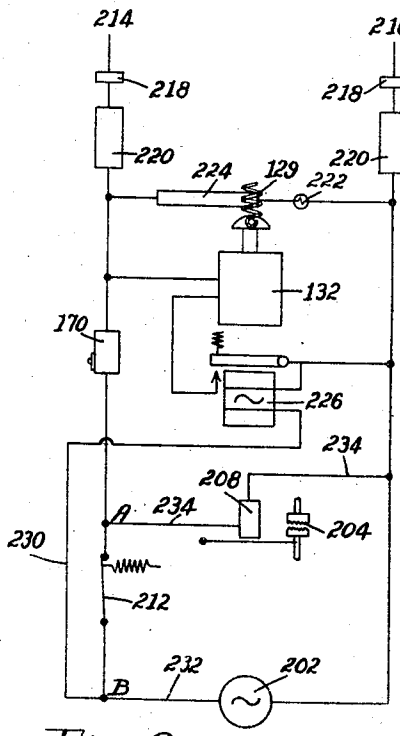



Fig. 8

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Patented Nov. 1, 1949

2,486,537

# UNITED STATES PATENT OFFICE

2,486,537

## MACHINE FOR PRESSING SOLES ON SHOES

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Application September 5, 1946, Serial No. 694,965

27 Claims. (Cl. 12—36)

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This invention relates to machines for use in attaching soles to shoes, and particularly for use in practising the method disclosed in an application for Letters Patent of the United States Serial No. 667,187, filed May 3, 1946, in my name.

Objects of the invention are to provide a simple and effective machine for applying pressure to shoe bottoms in which one shoe may be in position for treatment by an operator while another shoe is under pressure, to provide means for causing pressure to be applied to a shoe when placed in position to receive pressure, and to insure that the shoe will remain under pressure for an adequate period of time.

A feature of the invention consists in a pair of supports or jacks to receive shoes arranged to move horizontally in rectilinear paths into and out of position under pressure-applying pads and means for causing movement of one jack in one direction to effect equal movement of the other jack in the opposite direction.

Another feature of the invention consists in fluid-pressure-operated means for applying pressure to the shoe and means responsive to movement of either of the jacks into pressure-receiving position for initiating action of the fluid-pressure-operated means.

Another feature of the invention consists in means responsive to inward movement of either jack, for initiating the action of the fluid-pressure-operated means and means acting after a predetermined time to release the fluid-pressure-operated means.

These and other features of the invention will appear more fully from the following description when read in connection with the accompanying drawings and will be pointed out in the appended claims.

In the drawings,

Fig. 1 is a perspective view of a machine embodying my invention;

Fig. 2 is a plan view, partly in section, of the jacks and their connection;

Fig. 3 is a view of the dial of the timing device with which the machine is equipped;

Fig. 4 is a diagrammatic view of the construction of the timing device;

Fig. 5 is a side elevation, partly in section, of one of the jacks and the pressure-applying pad;

Fig. 6 is a diagram of the fluid pressure system employed in the machine;

Fig. 7 is a front elevation of the machine with parts omitted for the sake of clearness; and

Fig. 8 is a wiring diagram of the electrical circuits employed.

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The machine comprises a frame 10 (Fig. 1) to the top of which is secured a plate 12 having at each side a rail 14 and in the center a rail 16, the rails forming two horizontal parallel guideways for bases 18 of two jacks 20. A gib 22 (Fig. 2) is secured by screws 24 to the center rail and a gib 26 to each of the side rails by screws 28, the jacks being thus confined to rectilinear horizontal movement. A groove 30 is formed in the plate 12 at each side of the rail 16 and in each groove is a rack bar 32, the teeth of the bars facing each other. Each rack bar is secured by screws 34 to the under side of the base 18 of one of the jacks 20. Between the rack bars is a pinion 36 meshing with both racks and mounted to rotate on a fixed axis 38. Thus, movement of one jack in one direction produces an equal movement of the other jack in the opposite direction. Each jack has a handle 40 for convenience in moving it.

On each jack is mounted a shoe form 42 (Figs. 1 and 5) which has the shape, size and longitudinal contour of a last bottom but is reduced, except at the extreme toe end, so as not to engage the upper. The form 42 is slotted to receive a plate 44 which enters a slot in the top of the jack 20 where it is held by a pin 46 engaging a horizontal slot 48 in the plate, by a pin 50 engaging a nearly vertical slot 52 in the plate, and by a spring latch 54 engaging a projection 56 on the plate 44. The form and jack are more fully described in my application above referred to.

Two rods 60, 62 (Fig. 7) are mounted for vertical reciprocation in the frame 10, each rod having two bearings, one at 64 in the upper part of the frame 10 and the other at 66 farther down in a crosspiece 68 of the frame. At their upper ends the rods 60, 62 are connected by a crosshead 70 and at their lower ends by a crosshead 72, the rods and crossheads being normally maintained in their upper positions by a pair of compression springs 74, one on each of the rods between the crosshead 70 and the bearing 64. A rod 76 secured at the middle of the crosshead 72 forms the piston rod of a piston in a cylinder 78 to which fluid under pressure may be admitted through a pipe 80 to draw the rods 60 and 62 and crossheads 70, 72 downwardly. Engagement of the piston with the upper end of the cylinder limits upward movement of the crossheads in response to the springs 74. Mounted on the crosshead 70 (Fig. 5) is a pad box 82 having a longitudinal partition 84. In each chamber thus formed is placed a resilient pad 86, the pads being held in place by thin metal angle plates 88 attached at each end of the box and having portions

underlying the pads. The pads 86 are of substantially uniform thickness and are held in the desired longitudinal contour by blocks 89 placed over the pad in the box 82.

The top of the pad box has convexly curved surfaces 90 which bear against corresponding concave surfaces on the crosshead 70, the curvature of both surfaces being struck from a center 92 lying close to the pressing surface of the pad. To sustain the pad box, it has on each side a pair of ears 94, 96 each of which has a curved slot 98, the curvature of which is struck from the center 92. A rod 100 passes through the slots 98 in the ears 94 at the front of the machine, this rod also passing through a pair of projections 102 on the front side of the crosshead 70 (Fig. 1). A similar rod 104 passes through the curved slots in the ears 96 and through similar projections 105 (Fig. 5) on the rear side of the crosshead 70. A tension spring 106 connected to the rod 100 at one end and to an eye-bolt 108 at the other holds the pad box with the toe-engaging end tilted down so the pad will first engage the toe end of the shoe on the jack, the pressure progressing from the toe rearwardly. Surfaces 90 of the pad box slide on the corresponding surfaces on the crosshead 70 about the center 92 against the tension of the spring 106 until the box 82 engages a stop screw 110 which is adjusted to insure the application of adequate pressure to the forepart after the entire shoe bottom is engaged by the pad.

The hydraulic system is shown diagrammatically in Fig. 6. A pump 120 is driven by a belt 122 from a motor 124 (Fig. 1). The pump 120 (Fig. 6) normally circulates pressure fluid from a tank (not shown) through a pipe 126 and through a valve 128 normally held open by a spring 129 and back to the tank through a pipe 130. When the valve 128 is closed, for example by energizing a solenoid 132, the pressure fluid passes through the pipes 134 and 80 to the cylinder 78. Pipes 138 and 140 lead to a pressure-control valve 142, and a pipe 144 to a pressure gage 146. The gage and pressure-control valve are, for convenience, located at the front of the machine, as shown in Fig. 1.

The solenoid 132 is caused to be energized and the pads 86 to be drawn down by a movement of either of the jacks into position under its pad, the pads being arranged one over one jack and the other over the other.

When either jack approaches the inner limit of its movement (Fig. 2), as determined by its engagement with a limit block 150, a fin 152 on the jack engages one of two screws 154 threaded through a crosspiece 156 secured to a rod 158 (Fig. 5) mounted to slide through a bracket 160 which is secured to the center rail 16. A compression spring 161 on the rod 158 urges the rod forward as far as permitted by a collar 162 on the rod. A lever 164 fulcrumed at 166 to the bracket 160 is pivotally connected at 168 to the sliding rod 158, and the lower end of the lever is so located as to engage a switch 170 and close it when the fin 152 on the jack strikes the screw 154 and moves the rod 158 and the lever 164, as shown in Fig. 5. Closing of the switch 170 causes the solenoid 132 to be energized and the valve 128 to be closed whereupon the piston in the cylinder 78 is forced down and with it the pads 86 on the crosshead 70 thus pressing a sole on the shoe of the jack which is under a pad.

Preferably a timing device is employed to determine the period during which the shoe remains under pressure. Such a device may be



obtained from the R. W. Cramer Company, Centerbrook, Connecticut, and may comprise the elements shown diagrammatically in Figs. 3 and 4.

Two hands 172, 174 (Fig. 3) move over a scale 176 graduated in seconds. The hand 172 is set for the required period, as shown by the scale, by turning a thumbhead 178 connected by a worm 180 and a worm wheel 182 to the hand 172. The hand 174 is on a shaft 184 (Fig. 4) and is normally held, by a spring 186 tending to move it clockwise, in coincidence with the hand 172, its movement in that direction being limited by an arm 188 on the shaft 184 which is held by the spring in engagement with a stop 190 on an arm 192 secured to the hand 172. The shaft 184 is connected by suitable gearing 194 to a shaft 196, in alinement with which is a shaft 198 connected by suitable gearing 200 to a synchronous motor 202. Between the shafts 196 and 198 is a clutch 204 the lower element of which is carried by a spring arm 206 between the ends of which is an electromagnet 208. Activation of the magnet will engage the clutch elements to cause the hand 174 to be driven by the motor 202 in a counterclockwise direction toward zero on the scale 176. When the hand 174 reaches zero, a projection 210 on the arm 188 opens a normally closed microswitch 212 which stops the motor but does not de-energize the magnet 208 which holds the clutch engaged with the hand at zero.

A simplified diagram of the necessary wiring is shown in Fig. 8. The lead wires of an A. C. line supply are indicated at 214, 216, current passing through a main switch 218 and suitable fuses 220. A pilot light 222 is connected across the line through a resistance 224. The solenoid 132 which is connected across the line through a relay 226, becomes actuated with the closing of the relay contacts thereby closing the valve 128 and causing pressure to be applied to the shoe. In the line 214 is the switch 170 which is closed by inward movement of the jack. From the switch 170 a wire leads to points A, B. At B a line 230 leads to the relay 226 and thence to the line 216. At B also a line 232 leads to the synchronous motor 202 and thence to line 216. In the line connecting A and B is the normally closed microswitch 212, and from A a line 234 leads to the magnet 208 and thence to the line 216.

When the switch 170 is closed by the inward movement of either jack the relay 226 is energized to operate the solenoid 132. The magnet 208 is energized to throw in the clutch 204 between the hand 174 and the motor 202, and current is supplied through the microswitch 212 to run the motor 202 to cause the hand to move toward zero on the scale, starting from wherever the hand 172 was set. Upon reaching zero, the projection 210 opens the microswitch 212, thus cutting off current from A to B and hence both to the relay 126 and to the motor 202. Therefore, the valve 128 is opened by its spring 129 to release pressure on the shoe, and the motor 202 stops, the clutch 204 still holding the hand 174 at zero because the magnet 208 is still energized. When the jack in use is withdrawn from under the pad, however, the switch 170 opens, breaking the supply of current to the magnet 208, whereupon the clutch 204 opens, allowing the hand 174 to be moved by its spring 186 into coincidence with the hand 172, the machine then being in normal starting position.

A rack 236 (Fig. 1) is provided to hold spare forms 42 of various sizes. A starting switch 238

for the motor 124 is located on the front of the machine and a last pin 240 is provided to hold a usual last in case a shoe, after a platform sole has been pressed thereon by the machine, is to have a usual last inserted therein.

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

1. A machine for pressing soles on shoes comprising a vertically movable pressure-applying means, a pair of jacks movable horizontally only, direct connections between the jacks whereby movement of either jack in one direction produces an equal and opposite movement of the other jack, and means for operating the pressure-applying means to press the sole of a shoe on one of the jacks.

2. A machine for applying pressure to shoe bottoms comprising a pair of pads, a pair of jacks, direct connections between the jacks whereby manual movement of one jack moves the other jack in the opposite direction, and fluid-operated means for moving the pads to press the bottom of a shoe on one of the jacks.

3. A machine for pressing soles on shoes comprising a vertically movable crosshead, a pair of pads carried by the crosshead, a pair of jacks movable horizontally parallel to each other, direct connections from one jack to the other for causing movement of one jack into and movement of the other out of position under the pads, and fluid-operated means for moving the crosshead toward the jack in use.

4. A machine for pressing soles on shoes comprising a crosshead movable in a right line, pads carried by the crosshead, a pair of jacks movable manually in right lines at right angles to the movement of the crosshead, direct connections between the jacks for imparting to either jack a movement equal and opposite to that of the other jack whereby one jack may be positioned under a pad while the other jack is in shoe-receiving position, and power-operated means for moving the crosshead toward the jack in use.

5. A machine for pressing soles on shoes comprising pressure-applying means, a pair of jacks, means for relatively moving the jacks and pressure-applying means to press a sole on the shoe, a pinion on a fixed axis between the jacks, and a rack on each jack meshing with the pinion whereby when either jack is in pressure-receiving position the other jack is removed from pressure-receiving position.

6. A machine for applying pressure to shoe bottoms comprising vertically movable pressure-applying means, a pair of jacks each movable into and out of position under the pressure-applying means, a pinion on a fixed axis, a rack on each jack meshing with the pinion whereby when one jack is moved under the pressure-applying means the other is moved out from under the pressure-applying means, and means for effecting downward movement of the pressure-applying means to press a sole on a shoe on the jack positioned thereunder.

7. A machine for pressing soles on shoes comprising a shoe support movable horizontally, a pad movable vertically, fluid-pressure-operated means for moving the pad toward the work support, a solenoid controlling the fluid-pressure-operating means, and a switch closed by movement of the jack under the pad for energizing the solenoid.

8. A machine for pressing soles on shoes comprising a pair of shoe supports movable horizontally, a pair of pads movable vertically, fluid-pressure-operated means for moving the pads toward the shoe support, a solenoid controlling the fluid-pressure-operated means, and a switch closed by movement of either jack under its pad for energizing the solenoid.



9. In a machine for applying pressure to shoe bottoms, a pad, a jack movable into and out of position under the pad, fluid-pressure-operated means for relatively moving the pad and jack to apply pressure to the shoe bottom, a solenoid energization of which initiates the action of the fluid-pressure-operated means, and means controlled by movement of the jack for energizing the solenoid.

10. In a machine for applying pressure to shoe bottoms, a pair of pads, a pair of jacks movable into and out of operative position relatively to said pads, fluid-pressure-operated means for relatively moving the pads and jacks to apply pressure to the bottoms of shoes on the jacks, a solenoid energization of which initiates the operation of said fluid-pressure-operated means, and means operated by movement of either jack to cause the solenoid to be energized.

11. In a machine for applying pressure to shoe bottoms comprising a crosshead movable in a right line, a pair of pads carried by the crosshead, a pair of jacks movable at right angles to the crosshead, means for causing movement of one jack into position under a pad on the crosshead to effect movement of the other jack out of position under the pad, fluid-pressure-operated means for moving the crosshead, and means operated by movement of either jack under the crosshead for initiating the action of said fluid-pressure-operated means.

12. In a machine for applying pressure to shoe bottoms, a pair of shoe supports, a pair of pads for pressing soles on shoes carried by said supports, connections between said supports for causing movement of one support under its pad to effect movement of the other support out from under its pad, fluid-pressure-operated means for effecting relative movement between a pad and its shoe support to press a shoe thereon, and means operated by movement of either support under its pad for initiating the action of said fluid-pressure-operated means.

13. In a machine for applying pressure to shoe bottoms, a pair of shoe supports, a pair of pads for pressing soles on shoes carried by said supports, connections between said supports for causing movement of one support under its pad to effect movement of the other support out from under its pad, fluid-pressure-operated means for effecting relative movement between a pad and its shoe support to press a shoe thereon, means operated by movement of either support under its pad for initiating the action of said fluid-pressure-operated means, and a timing device acting to terminate the action of said fluid-pressure-operated means after a predetermined time.

14. A machine for applying pressure to shoe bottoms comprising a pad, a jack movable into and out of operative relation to the pad, fluid-pressure-operated means for relatively moving the pad and jack to apply pressure to the shoe thereon, a valve for controlling said fluid-pressure-operated means, and means controlled by movement of the jack for operating said valve.

15. A machine for applying pressure to shoe bottoms comprising a pad, a jack movable into and out of operative relation to the pad, fluid-pressure-operated means for relatively moving

the pad and jack to apply pressure to the shoe thereon, a solenoid-operated valve for controlling said fluid-pressure-operated means, and a switch closed by movement of the jack for causing the solenoid to be energized for operating said valve.

16. A machine for applying pressure to shoe bottoms comprising a pad, a jack movable into and out of operative relation to the pad, fluid-pressure-operated means for relatively moving the pad and jack to apply pressure to the shoe thereon, a solenoid-operated valve for controlling said fluid-pressure-operated means, a switch in the solenoid circuit, a relay for operating said switch, a switch in said relay circuit, and means operated by movement of the jack to close said relay switch and cause operation of said fluid-pressure-operated means.

17. A machine for applying pressure to shoe bottoms comprising a pad, a jack movable into and out of operative relation to the pad, fluid-pressure-operated means for relatively moving the pad and jack to apply pressure to the shoe thereon, a solenoid-operated valve for controlling said fluid-pressure-operated means, a switch in the solenoid circuit, a relay for operating said switch, a switch in said relay circuit, means operated by movement of the jack to close said relay switch and cause operation of said fluid-pressure-eprated means, and means operated after a predetermined time to break the said relay circuit.

18. A machine for applying pressure to shoe bottoms comprising a pad, a jack movable into and out of operative relation to the pad, fluid-pressure-operated means for relatively moving the pad and jack to apply pressure to the shoe thereon, a solenoid-operated valve for controlling said fluid-pressure-operated means, a switch in the solenoid circuit, a relay for operating said switch, a switch in said relay circuit, means operated by movement of the jack to close said relay switch, a motor, a normally closed switch in said motor circuit and in said relay circuit, a hand movable toward zero by said motor, and means operated by said hand when it reaches zero for opening said switch to de-energize the relay and hence the solenoid.

19. A machine for pressing soles on shoes comprising a crosshead, a pair of jacks movable into and out of position under the pads, fluid-pressure-operated means for moving the crosshead to apply pressure to the bottom of a shoe on one of the jacks, a timing device having a hand biased toward the initial setting, means for connecting the hand to a motor to turn at a substantially constant rate, means responsive to inward movement of either jack to initiate the action of the fluid-pressure-operated means and to connect the hand to its motor, and means responsive to movement of the hand for releasing the fluid pressure.

20. A machine for pressing soles on shoes comprising a crosshead, a pair of jacks movable into and out of position under the pads, fluid-pressure-operated means for moving the crosshead to apply pressure to the bottom of a shoe on one of the jacks, a timing device having a hand biased toward the initial setting, means for connecting the hand to a motor to turn at a substantially constant rate, means responsive to inward movement of either jack to initiate the action of the fluid-pressure-operated means and to connect the hand to its motor, means responsive to movement of the hand for releasing the fluid pressure and means responsive to outward movement of the jack to disconnect the hand from the motor.

21. A machine for pressing soles on shoes comprising a crosshead, a pair of jacks movable into and out of position under the pads, fluid-pressure-operated means for moving the crosshead to apply pressure to the bottom of a shoe on one of the jacks, a timing device having a hand to be given an initial setting, means for connecting the hand to a motor to turn at a substantially constant rate, means responsive to inward movement of either jack to initiate the action of the fluid-pressure-operated means and to connect the hand to its motor, means responsive to movement of the hand for releasing the fluid pressure, means responsive to outward movement of the jack to disconnect the hand from the motor, and means for returning the hand to its initial position.



22. In a machine for pressing shoe bottoms, a pad, a shoe support movable into and out of operative relation to the pad, said pad and support being relatively movable to apply pressure to a shoe on the support, fluid-pressure-operated means for relatively moving the pad and support, a timing device comprising a timing hand arranged to be motor driven, means operated by movement of the jack under the pad for initiating the pressure of the fluid-pressure-operated means and connecting the timing hand to its motor, and means operated by the hand after a predetermined interval of time for releasing the fluid pressure.

23. In a machine for pressing shoe bottoms, a pad, a shoe support movable into and out of operative relation to the pad, said pad being movable to apply pressure to a shoe on the support, fluid-pressure-operated means for moving the pad, a timing device comprising a timing hand arranged to be motor driven, means operated by movement of the support under the pad for initiating the pressure of the fluid-pressure-operated means and connecting the timing hand to its motor, and means operated by the hand after a predetermined interval of time for releasing the fluid pressure.

24. In a machine for applying pressure to shoe bottoms, a pad, a shoe support movable into and out of operative relation to the pad, said pad and support being movable to apply pressure to a shoe on the support, fluid-pressure-operated means for relatively moving the pad and support, a timing device comprising a timing hand biased toward a predetermined scale setting and movable toward zero on the scale, a motor for moving the hand, a clutch between the motor and the hand, means responsive to movement of the shoe and support into operative relation to the pad for initiating operation of the fluid-pressure-operated means and for setting said clutch to drive the hand, means responsive to movement of the hand as it approaches zero for releasing said fluid-pressure-operated means, and means responsive to movement of the shoe support out of operative relation to the pad for releasing said clutch.

25. In a machine for applying pressure to shoe bottoms, a pad, a shoe support movable into and out of operative relation to the pad, said pad and support being relatively movable to apply pressure to a shoe on the support, fluid-pressure-operated means for relatively moving the pad and support, a timing device comprising a timing hand biased toward a predetermined setting and movable toward zero, a motor for moving the hand, a clutch between the motor and the hand, means responsive to movement of the shoe support into operative relation to the pad for in-

itating operation of the fluid-pressure-operated means and for setting said clutch to drive the hand, and means responsive to movement of the hand as it approaches zero for releasing said fluid-pressure-operated means.

26. In a machine for applying pressure to shoe bottoms, a pad, a shoe support movable into and out of operative relation to the pad, said pad being movable to apply pressure to a shoe on the support, fluid-pressure-operated means for moving the pad, a timing device comprising a timing hand biased toward a predetermined scale setting and movable toward zero on the scale, a motor for moving the hand, a clutch between the motor and the hand, means responsive to movement of the shoe support into operative relation to the pad for initiating operation of the fluid-pressure-operated means and for setting said clutch to drive the hand, means responsive to movement of the hand as it approaches zero for releasing said fluid-pressure-operated means, and means responsive to movement of the shoe support out of operative relation to the pad for releasing said clutch.

27. In a machine for pressing soles on shoes, a shoe support, means for applying pressure to the



bottom of a shoe on said support including a crosshead, a box carried by the crosshead, a yielding pad in said box, said box being mounted to turn on a transverse axis located approximately in the pressing surface of the pad, yielding means for holding the pad at an angle to insure contact of the pad first with the toe end of the shoe on said support and to transmit pressure progressively rearwardly of the shoe bottom, an adjustable stop to limit said turning movement of the pad when the pad has engaged the entire shoe bottom, and fluid-pressure-operated means for moving the crosshead to apply pressure to the shoe.

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