July 22, 1930. W. C. STEWART 1,771,019

SOLE PRESSING MACHINE

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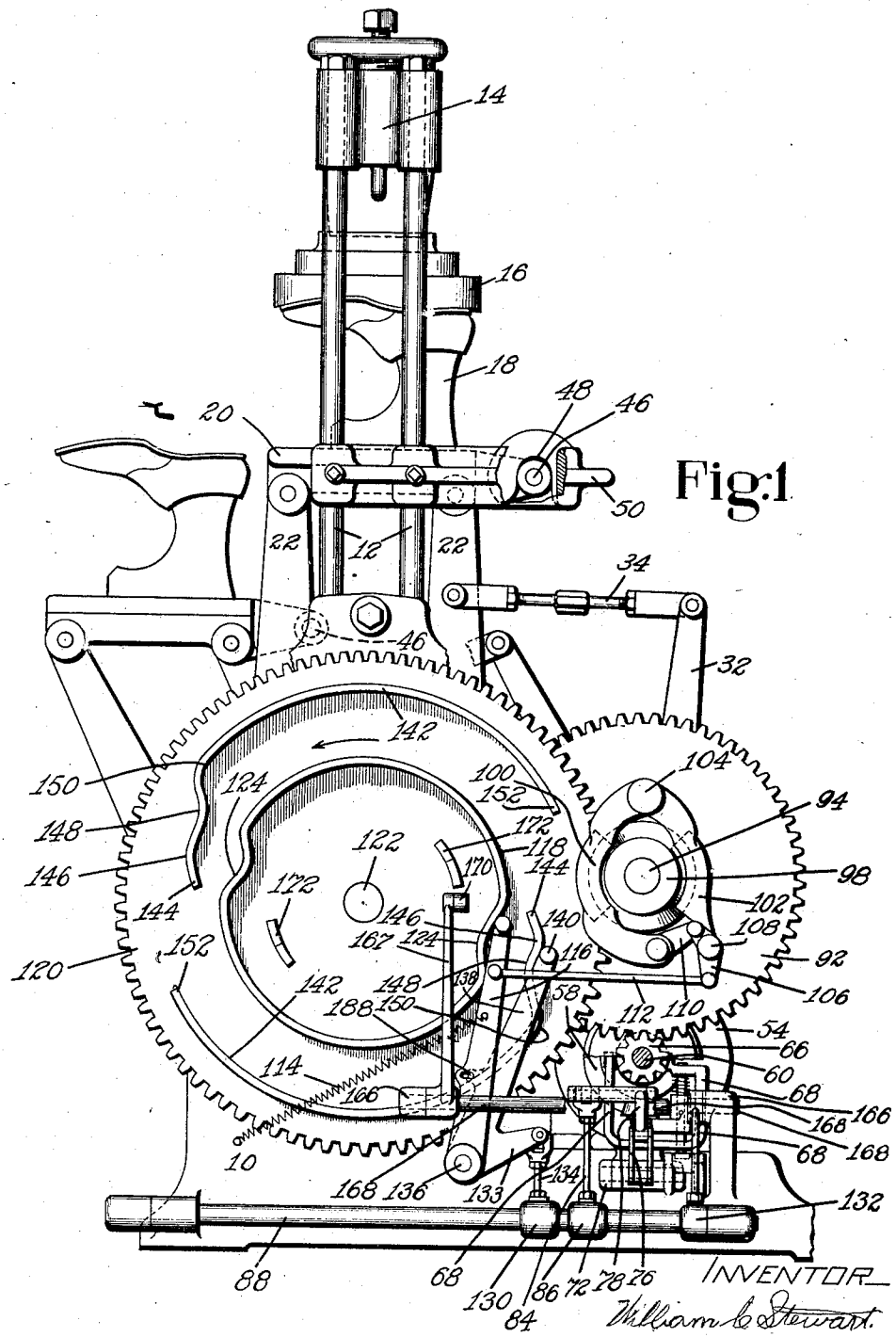


Fig:1

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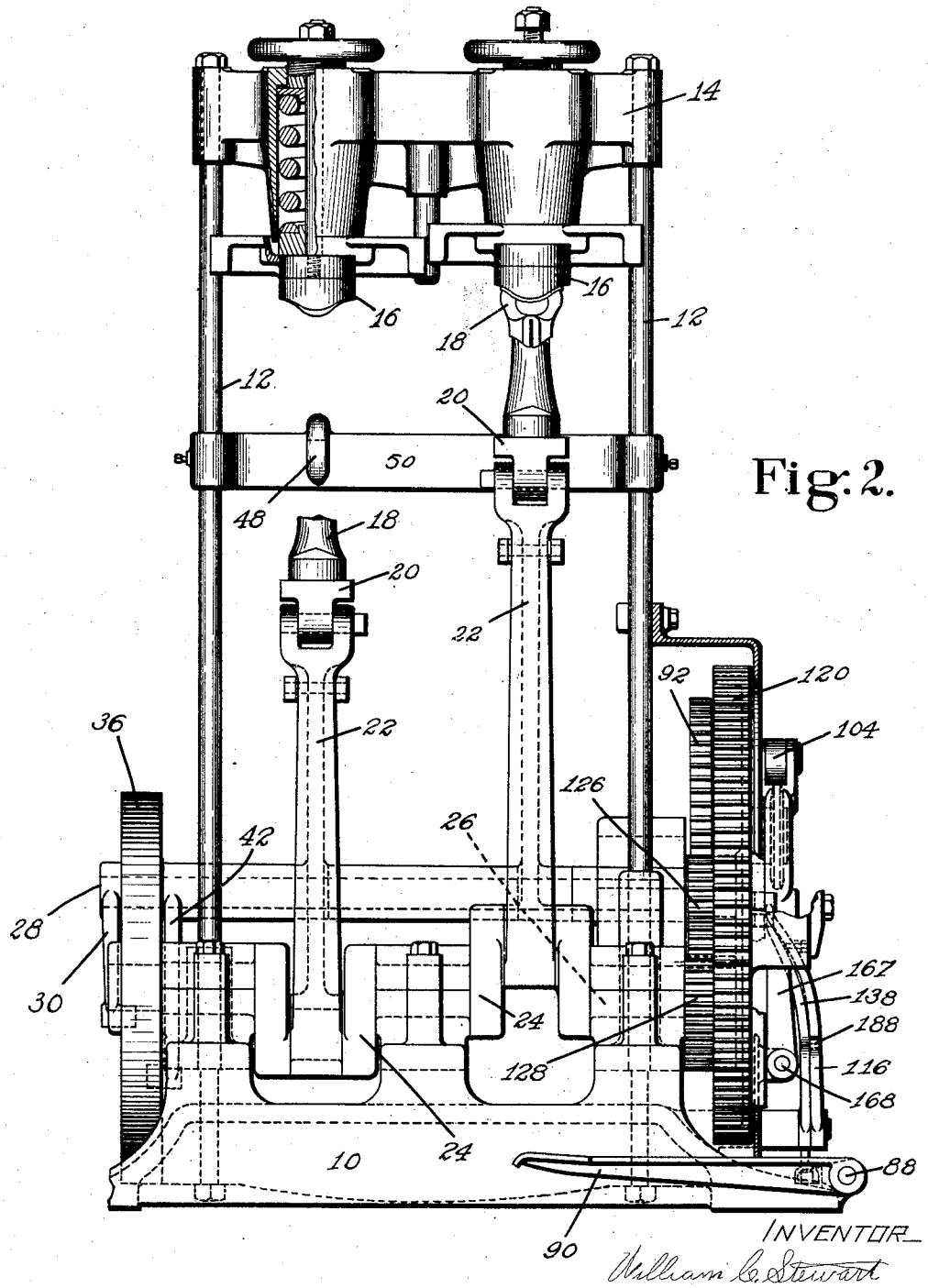


Fig. 2.

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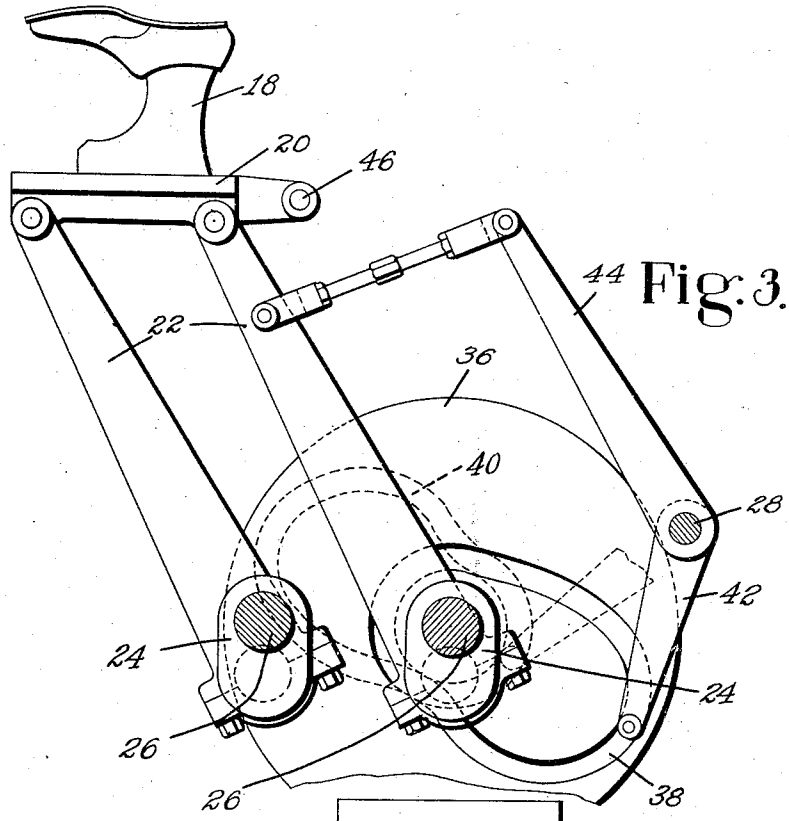


Fig. 3.

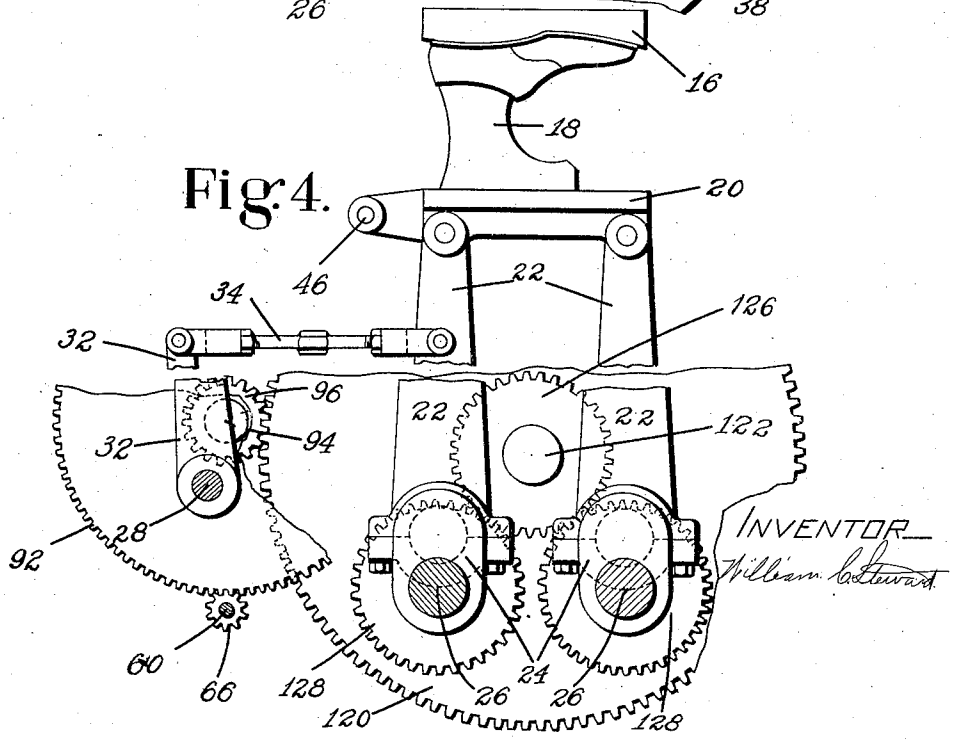


Fig. 4.

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Fig. 5.

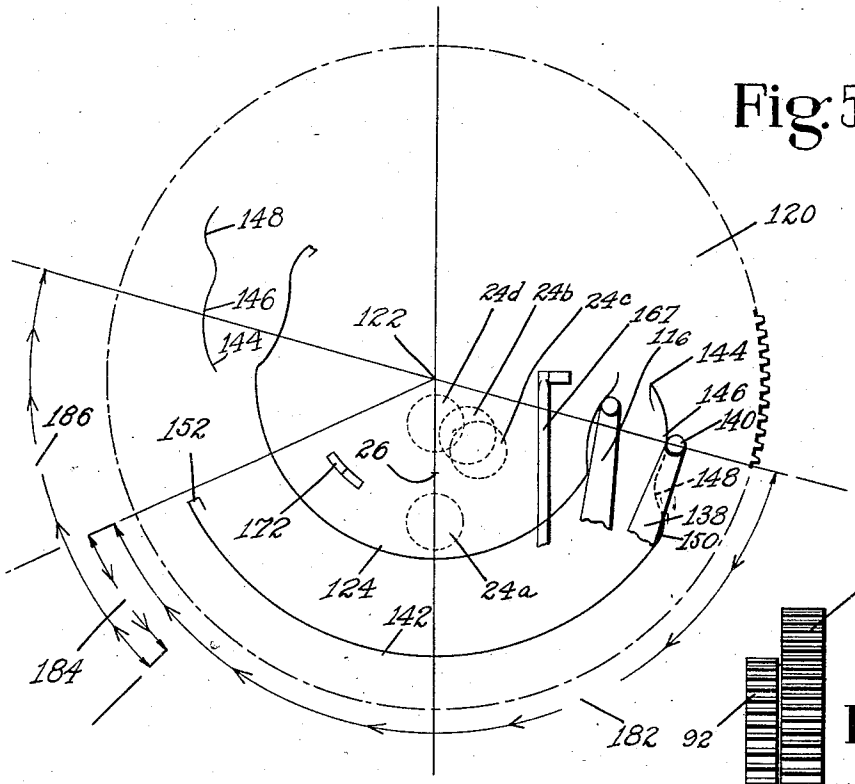
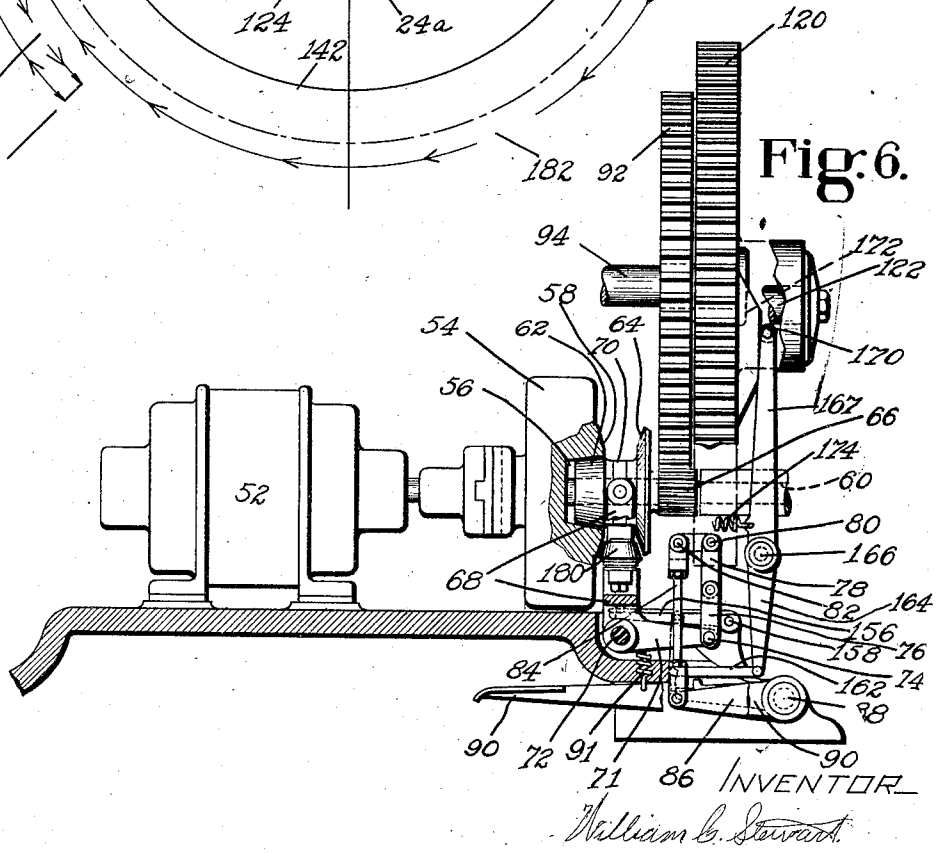


Fig. 6.



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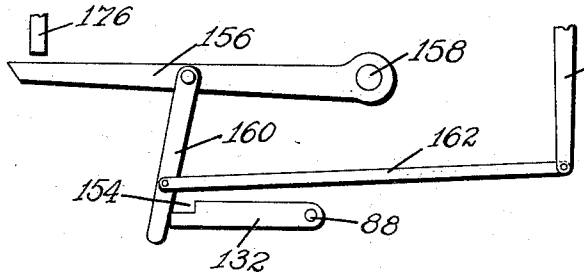


Fig. 7.

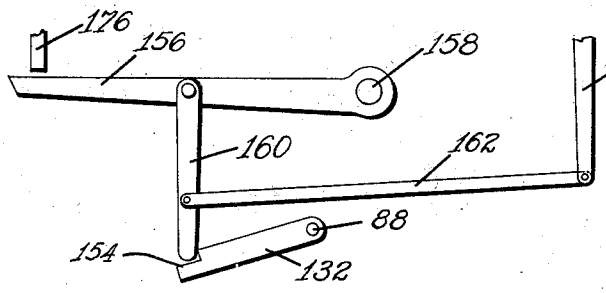


Fig 8.

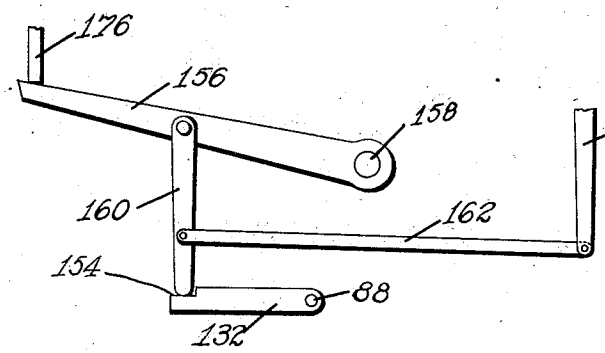


Fig. 9.

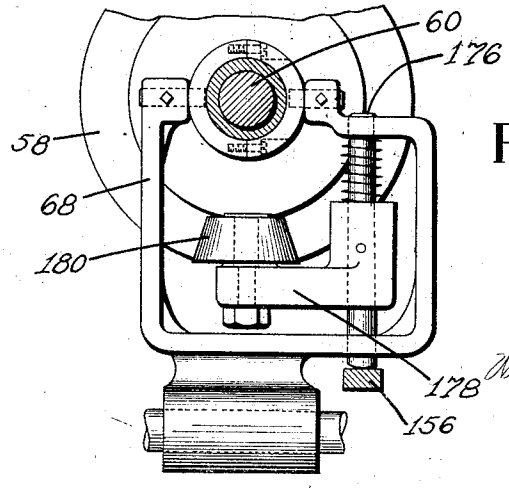


Fig. 10.

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Patented July 22, 1930 1,771,019

UNITED STATES PATENT OFFICE

WILLIAM C. STEWART, OF SWAMPSCOTT, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY

SOLE-PRESSING MACHINE

Application filed August 3, 1927. Serial No. 210,341.

This invention relates to sole pressing machines and is disclosed as embodied in a direct pressure leveling machine, i. e., a machine of that type in which the pressure is applied to all portions of the sole under treatment substantially simultaneously.

It has been found advantageous in sole pressing machines of this type, especially when used for the pressing or molding of soles having sharp bends or angles in their surface contours, to apply the desired pressure progressively by provision for one or more intervals of release or diminution of pressure. This enables the sole to adjust itself to its new form most advantageously, without risk of overstraining the sole material by a too rapid or extreme change in its shape.

It is one object of the present invention to provide an improved machine for shaping soles in the above-mentioned manner. In the machine described herein, I have provided operating means including a clutch which automatically changes the direction of the drive repeatedly during a cycle of the machine, thus providing a positive alternating forward and backward drive with consequent variations in pressure. The construction illustrated comprises a controlling member which sets the clutch for forward drive when in either of two extreme positions and which operates the clutch to reverse the drive in passing from one extreme position to the other. In the machine described the reversal is effected through a latch which is operated by the controlling member as it moves from one extreme position to the other and is automatically disconnected when a retrograde movement of the machine of predetermined extent has been accomplished.

I have also, in accordance with another feature of the invention, provided an improved structure for relatively moving the pressing members or forms toward and from each other. As herein illustrated, a moving form is supported on two equal parallel links, which are raised and lowered by a pair of equal and parallel cranks, and the links are swung to present this form alternately in a work-receiving position and in a position under the other form. Thus the movable form is always maintained in a parallel relation to its cooperating form, and insurance is afforded that different portions of the sole will be operated upon with uniform pressure.

These and other features of the invention comprising certain novel combinations and arrangements of parts will be apparent from the following description of a preferred embodiment of the invention shown in the drawings, in which—

Fig. 1 is a side elevation;

Fig. 2 is a front elevation with parts broken away;

Figs. 3 and 4 are enlarged side elevational details of the link and crank mechanism;

Fig. 5 is a diagram illustrating the variable pressure mechanism;

Fig. 6 is a detail of the driving mechanism;

Figs. 7, 8 and 9 illustrate different positions of a part of the variable pressure mechanism; and

Fig. 10 is a detail of the driving mechanism.

The illustrated machine comprises a base 10 on which two pairs of heavy side rods 12 are mounted. The side rods carry a cross yoke 14 from which are suspended vertically adjustable sole pressing or so-called upper forms 16, the machine shown being a twin machine. The suspension is preferably resilient against pressure from the lower forms or "lasts" 18 which are mounted on tables 20. The structure so far described is well known.

Each table 20 is pivotally mounted on two parallel links 22 of equal lengths the lower ends of which are pivoted on two parallel cranks 24 also of equal lengths on crank shafts 26. The cranks 24 appertaining to the same pair of links 22 extend in the same direction, opposite to that of the cranks appertaining to the other pair of links 22. As the crank shafts are rotated, therefore, one table 20 will rise and the other will fall so that as a shoe on one lower form is put under pressure a shoe on the other is released.

Mounted in the rear part of the machine is

a shaft 28 having a crank arm 30 on one end and a crank arm 32 mounted near its middle. The arm 32 is connected to the right-hand rear link 22 (Fig. 2) by a link 34 (see Fig. 1). The rear crank shaft 26 has mounted at its left end (Fig. 2) a disk 36 having oppositely extending path cams 38 and 40 on its sides. The cam 40 engages a cam roll on the end of the arm 30, and thus as the crank shafts 26 rotate will swing the links 22 of the right-hand table 20 forward toward the operator and backward under the upper form 16 alternately; while at the same time the cranks 26 alternately lower and raise the lower ends of the links 22.

The cam 38 engages the end of an arm 42 mounted on a sleeve surrounding the shaft 28 and having an arm 44 linked to the rear of the left-hand links 22 (Figs. 2 and 3). The operation of the left-hand mechanism is similar but alternate to that of the right. Each table 20 has a pin 46 which is arranged to enter a guide 48 in a yoke 50 mounted on the side bars 12, as the table 20 rises under the upper form 16. Thus the forms 16 and 18 are alined properly as they come together, and the double link and crank structure 22, 24 insures that the forms shall have the proper orientation, as the table 20 is always maintained parallel to a fixed plane as it moves.

The novel mechanism for driving the machine will now be described. A motor 52 (Fig. 6) at the rear of the machine drives continuously a fly wheel or clutch member 54 having an internal conical clutch face 56 and a conical boss 58. A shaft 60 having thereon a terminal clutch member or cone 62 and a conical collar 64 like but oppositely facing the boss 58, is mounted in the machine frame. The shaft 60 has a gear member or pinion 66 mounted on it and can slide endwise in its bearings when pushed by a yoke 68 engaging a collar 70 on the shaft and forming one arm of a bell crank 71 pivoted at 72. The other arm of the bell crank is pivoted at 74 to a link 76 engaging one end of a bell crank 78 pivoted at 80 on the machine frame. The other end of the bell crank 78 is pivoted at 82 to a link 84 the lower end of which is pivoted to an arm 86 on a controlling member or treadle shaft 88 having a treadle 90 at its front end, normally held up by a treadle spring 91. Depression of the treadle pulls down the link 84 and turns the bell crank 78 and the bell crank 71 counter-clockwise, forcing the cone 62 against the face 56 and clutching the shaft 60 to the motor 52.

The pinion 66 drives a gear 92 on a shaft 94 mounted in the frame of the machine and having a small pinion 96 (Fig. 4) and brake drum 98 (Fig. 1). The brake drum 98 is embraced by brake bands 100, 102 pivoted at 104 on the machine frame and drawn together by a bell crank 106 pivoted at 108 on the band 102 and pulling on a link 110 pivoted to the band 100. The brake is tightened by a rod 112 which is pulled by a spring 114 acting on a lever 116 to which the rod 112 is connected. The lever 116 is controlled by a cam 118 on a toothed disk 120 mounted on a shaft 122 and driven by the pinion 96. The cam 118 is generally circular and holds the brake released except for the two opposite depressions 124 which allow the spring 114 to set it. The disk 120 rotates 180° for each machine cycle and the brake sets at the end of each cycle.

The shaft 122 carries a pinion 126 (Figs. 2 and 4) which drives two pinions 128 fast on the crank shafts 26. The pinions 126 and 128 have the same number of teeth, so that the angular movement of the crank shafts 26 is equal to that of the disk 120 at all times.

The means for applying intermittent pressure to the shoe and for stopping the machine at the end of a cycle will now be described. The treadle shaft 88 has two more arms 130, 132 (Fig. 1) extending parallel to the arm 86. The arm 130 is linked to the end of a bell crank 133 by a link 134. The bell crank is pivoted on the frame of the machine at 136 and its other arm 138 carries a cam roll 140 which co-operates with a cam 142 on the disk 120. The cam 142 is circular except for alternating low and high points 144, 146, 148, 150 at its leading end, and it has an abrupt termination 152. There are two such cams on the disk 120, oppositely arranged.

The arm 132 has a notch 154 in its end (Fig. 7), and lies directly below a lever 156 pivoted at 158 on the machine frame. From the center of this lever hangs a pivoted latch 160, the lower end of which is opposite the end of the arm 132, and the middle part of the latch 160 is connected by a link 162 to the lower end of a lever 164 pivoted at 166 on the frame of the machine by means of a rock shaft 168. The upper end 167 of the lever 164 is mounted at the other end of its rock shaft 168 and has a cam roll 170 which is arranged to co-operate with two humps 172 on the disk 120, under the pull of a spring 174, which also keeps the lower end of the latch 160 pressed against the end of the arm 132 (Fig. 7).

When the treadle is depressed by the operator the clutch cone 62 is engaged with the face 56 of the member 54 as above described, and the machine begins to run. The turning of the treadle shaft 88 also turns the bell crank 133 clockwise away from the cam 142 the high point 150 of which soon comes along under the cam roll 140 and holds the treadle down, with the shaft 88 rotated from normal stopped position. The turning of the shaft 88 has also dropped the end of the arm 132. The spring 174 pulls the link 162 and the latch 160 so that the lower end of the latch 160 falls into the notch 154 (Fig. 8). The machine

runs in a forward direction until the end 152 of the cam 142 reaches the cam roll 140 which then immediately drops toward the shaft 122 under the pull of the treadle spring 91 which pulls up the treadle as soon as the cam 142 becomes inoperative. This raising of the treadle lifts the arm 132 which pushes up the latch 160 and the lever 156 (Fig. 9).

The lever 156 (Fig. 10) extends under a rotatable and vertically sliding downwardly spring-pressed pin 176, which is mounted in one arm of the yoke 68. The pin 176 has a horizontal arm 178 on which is rotatably mounted a cone 180 directly between the cones 58 and 64, but normally not contacting with them. When the lever 156 rises as above described, it forces the cone 180 between the cones 58 and 64, forcing the shaft 60 to the right (Fig. 6) and disconnecting the clutch cone 62 from the face 56. The drive is then effected through the three cones 58, 180, 64, and in the opposite direction. This causes the machine to run backward relieving the pressure which has been applied up to the instant the reversal began. This reverse movement continues until one of the humps 172 passes under the cam roll 170. This turns the lever 164 clockwise (Fig. 6) and through the link 162, pushes the latch 160 off the end of the arm 132. The pin 176 then drops under the push of its spring and releases the cones, and the treadle spring 91 simultaneously raises the treadle still farther than the position indicated by Fig. 9. This rotates the bell crank 78 clockwise and the bell crank 71 counterclockwise and engages the clutch cone 62 again with the face 56. (Rotation of the bell crank 78 in either direction from its mean position will engage the clutch cone 62 with the face 56.) The machine now drives forward until the end 144 of the other cam 142 comes under the cam roll 140 and forces the treadle down to normal position, thus disengaging the clutch cone 62 from the face 56.

Fig. 5 shows diagrammatically the cam cycles, the disk 120 being regarded as motionless, and the rest of the machine turning around it. The machine is in stopped position when the cam roll 140 is on the high spot 146. The depression of the treadle moves the roll 140 out from the center 122 and the high point 150 of the cam 142 catches it and holds the treadle depressed, until it falls off the end 152 of the cam 142. This travel is indicated by the arm 182. The cam roll 140 then passes between the cams 142 and 124 and retrogrades through a path corresponding to the arc 184.

The end of the arm 167 passes over one of the humps 172 during the forward movement, but the resulting movement of the latch 160 is ineffectual, the arm 132 being then held down by the cam 142. As the roll 140 reaches the end of its retrograde movement, the hump 172 again actuates the lever 167 and this changes the direction of the drive again, whereupon the machine runs forward until the roll 140 strikes the rise 144—146 of the next cam 142, when its stops, this movement corresponding to the arc 186.

Fig. 5 also illustrates the movements of the cranks 24, corresponding to this cycle of movement. The circle 24^a represents the position of a crank 24 at the beginning of the cycle; the circle 24^b represents its position when the roll 140 falls off the end 152; the circle 24^c represents its position at the end of the retrograde movement, which relieves the pressure so far impressed on the sole, and the circle 24^d represents its position at the end of the cycle when the full pressure is impressed on the sole. The initial and final positions of the cranks are 180° apart.

The arms 116 and 138 have a pin and slot connection at 188. This enables clockwise movement of the arm 138 (Fig. 1) to loosen the brake at the beginning of the cycle. The brake is then held loose by the cam 124 until the end of the cycle, while the pin and slot at 188 enables the arm 138 to fall past the end 152 as described.

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

1. In a machine of the class described, a first pressing member, a second pressing member, parallel links on the upper ends of which the second pressing member is mounted, cranks connected to the lower ends of the links respectively, and means for rotating the cranks to move the second pressing member toward the first.

2. In a machine of the class described, a first pressing member, a second pressing member, parallel links on the upper ends of which the second pressing member is mounted, cranks connected to the lower ends of the links respectively, means for rotating the cranks to move the second pressing member toward the first, and means for swinging the links to carry the second pressing member between work receiving and operative positions.

3. In a machine of the class described, a first pressing member, a second pressing member, equal and parallel links on the upper ends of which the second pressing member is pivoted, parallel cranks connected to the lower ends of the links respectively, and means for rotating the cranks and maintaining their parallelism to move the second pressing member toward the first.

4. In a machine of the class described, a resiliently supported pressing member, a second pressing member, equal and parallel links on the upper ends of which the second pressing member is pivoted, parallel cranks connected to the lower ends of the links respectively, means for rotating the cranks and maintaining their parallelism to raise and

lower the lower ends of the links, and a cam and connections constructed and arranged to swing the upper ends of the links to bring the second-named pressing member under the first as the cranks raise the lower ends of the links.

5. In a machine of the class described, a resiliently supported pressing member, a second pressing member, equal and parallel links on the upper ends of which the second pressing member is pivoted, parallel cranks connected to the lower ends of the links respectively, means for rotating the cranks and maintaining their parallelism to raise and lower the lower ends of the links, a cam and connections constructed and arranged to swing the upper ends of the links to bring the second-named pressing member under the first as the cranks raise the lower ends of the links, and means for positively alining the pressing members as they come together.

6. In a sole pressing machine, two pressing members arranged to press a sole between them, mechanism for moving one of said members toward the other, a driving member, and a clutch between the driving member and said mechanism constructed and arranged automatically to change the direction of the drive repeatedly during a machine cycle to effect alternate application and relief of pressure on a sole.

7. In a sole pressing machine, two pressing members arranged for relative movement toward each other to press a sole between them, and means for effecting said relative movement comprising a gear member automatically controlled to advance in successive steps and to have a retrograde movement between two advancing steps in operating on each sole.

8. In a sole-pressing machine, co-operating pressing members relatively movable to press a sole between them, operating means comprising a rotatable gear member for effecting relative movement of said pressing members, and automatic means to cause said rotatable gear member to reverse its movement after subjecting the sole to a preliminary pressure and thereafter by movement again in a forward direction to subject the sole to a greater pressure than that first applied.

9. In a sole pressing machine, two pressing members arranged for reciprocating relative movement toward and from each other, and a driving mechanism for effecting said movement comprising a reversible clutch, a member arranged to set the clutch for forward driving by movement to each of two extreme positions and manually movable to one of said positions, means for holding the member in the last-mentioned position, automatic means for moving the member to the other extreme position, and means cooperating with the member as it moves from one position to the other to set the clutch for driving the machine backward.

10. In a sole pressing machine, a pair of sole pressing members and means for effecting relative movement of the pressing members comprising a clutch having two relatively movable members engageable directly to effect forward movement of the machine, a reversing member associated with said clutch member to cause the clutch to drive the machine in the opposite direction, a controlling member arranged to engage said clutch members directly with each other by movement to either of two positions, means for latching the reversing member to the controlling member to cause movement of the controlling member from one position toward the other to move the reversing member into operative position, and means for unlatching the reversing member from the controlling member to cause said controlling member to move farther toward its other position and thereby to set the clutch for further forward movement of the machine.

11. In a sole pressing machine, a pair of sole pressing members, and means for effecting relative movement of the pressing members comprising a clutch having two relatively movable members engageable directly to effect forward movement of the machine, a reversing member associated with said clutch members to cause the clutch to drive the machine in the opposite direction, a controlling member arranged to engage the clutch members directly with each other by movement to either of two positions, resilient means for urging the controlling member toward one position, means for holding it in the other position after the machine is started and for releasing it at a predetermined point, a latch associated with the reversing member and arranged to be operated by the controlling member as the latter moves toward the first mentioned position after its said release, whereby the reversing member is rendered operative to reverse the drive, and means for disconnecting the latch at a predetermined point to cause the resilient means to reengage the clutch directly to drive the machine forward.

12. In a machine of the class described, a relatively stationary pressing member, a second pressing member, parallel links supporting the second pressing member, and two cranks directly connected to said links respectively for operating them to move the second pressing member toward the first.

13. In a sole-pressing machine, co-operating pressing members relatively movable to press a sole between them, driving means comprising a reversible clutch for effecting relative movement of said pressing members, and automatic means for controlling said clutch to cause it to reverse the direction of the drive after subjecting the sole to a pre-

liminary pressure and thereafter again to drive the machine in a forward direction to subject the sole to a greater pressure than that first applied.

14. In a sole-pressing machine, co-operating pressing members relatively movable to press a sole between them, driving means comprising a reversible clutch for effecting relative movement of said pressing members, and automatic means to cause said clutch to reverse the direction of the drive at a predetermined point in the sole-pressing operation and thereafter to resume the forward drive to complete the pressing of the sole.

In testimony whereof I have signed my name to this specification.

WILLIAM C. STEWART.