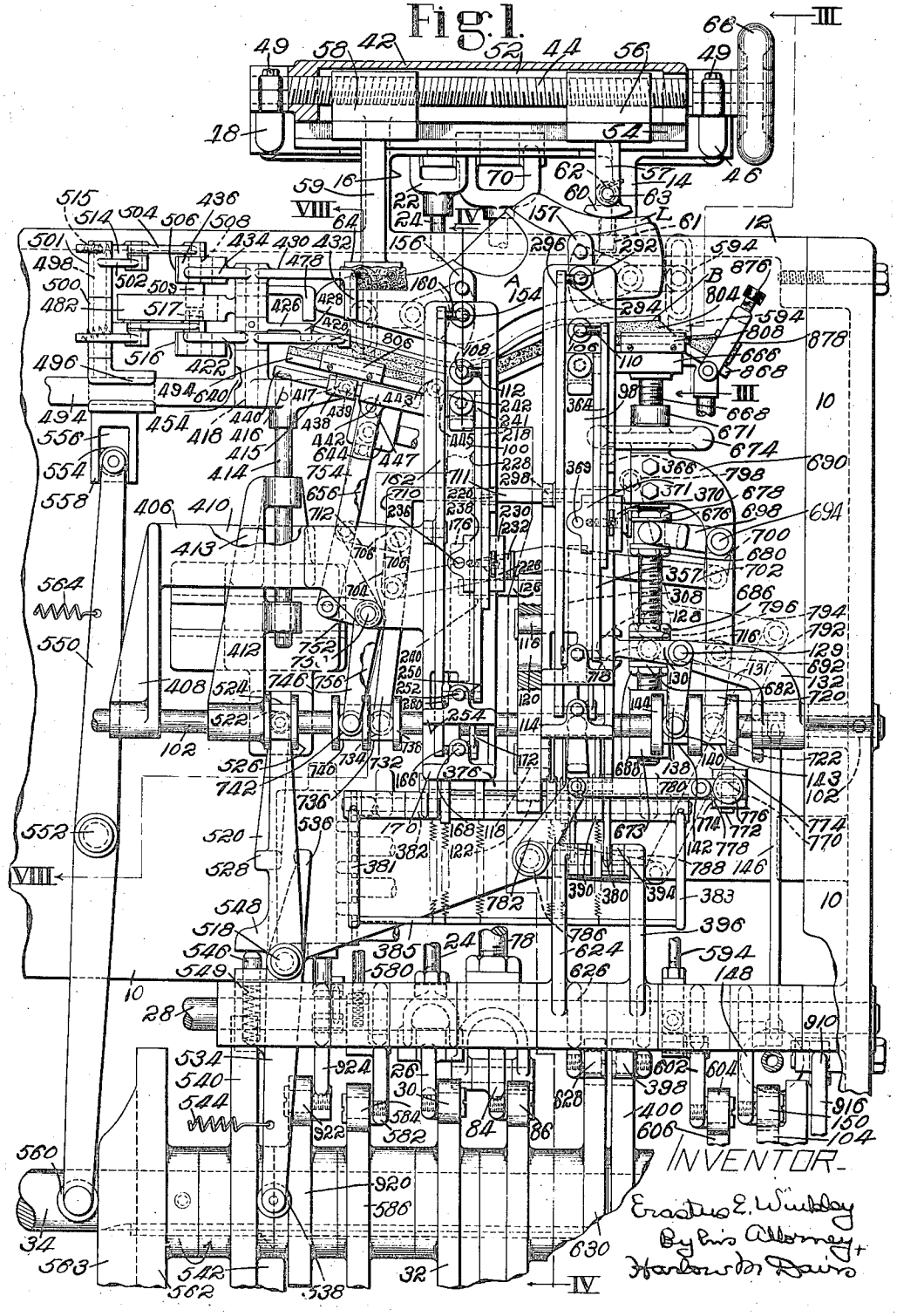
Nov. 24, 1936. E. E. WINKLEY 2,061,690

METHOD AND MACHINE FOR ATTACHING SOLES TO SHOES

Filed Dec. 6, 1933 10 Sheets-Sheet 1

Fig. 1.

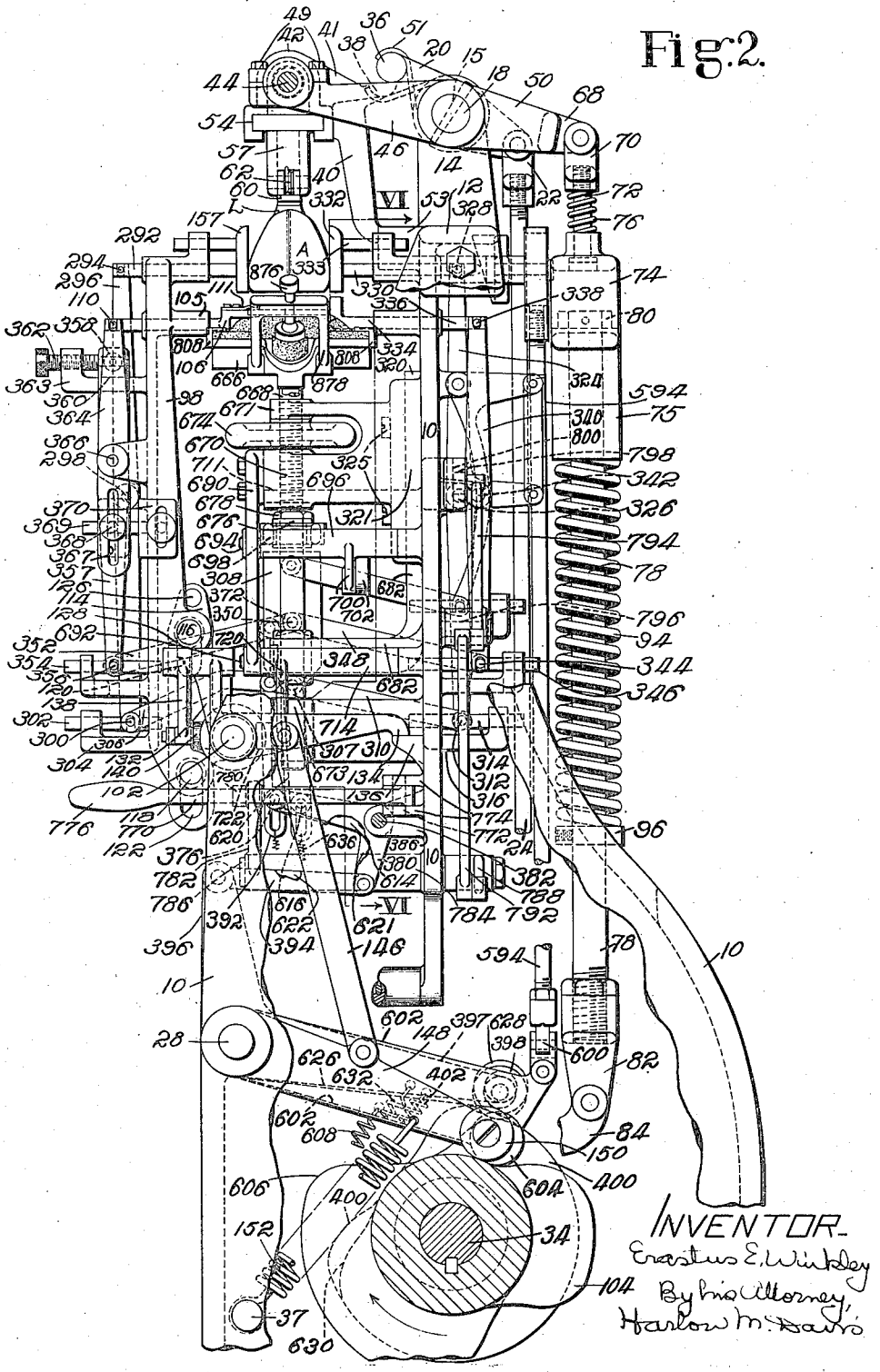


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METHOD AND MACHINE FOR ATTACHING SOLES TO SHOES

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Fig. 2.



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METHOD AND MACHINE FOR ATTACHING SOLES TO SHOES

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Fig. 3.

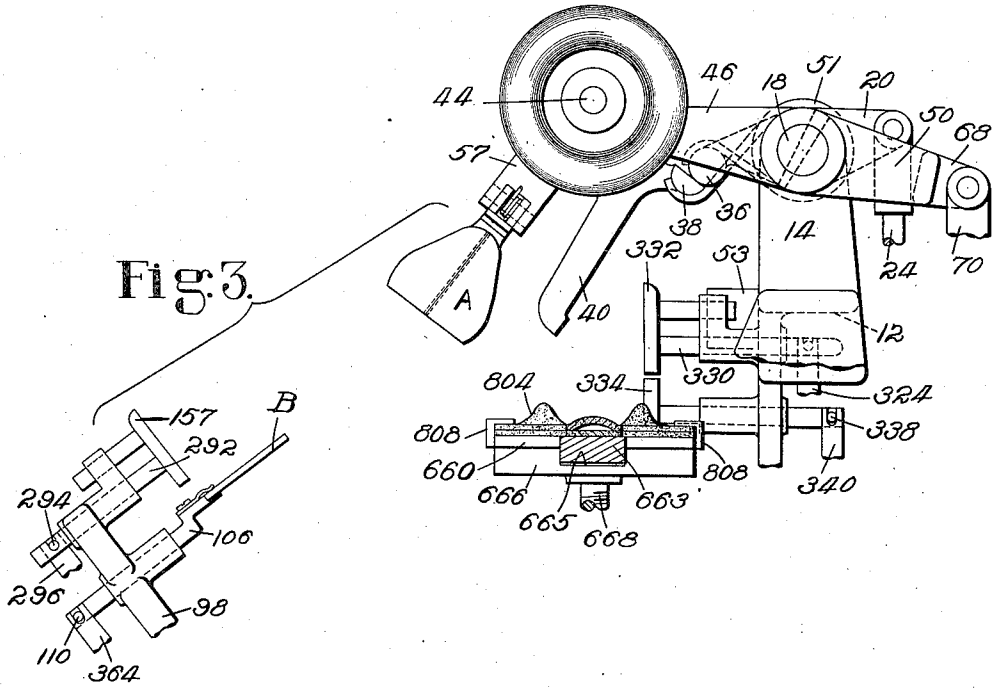


Fig. 11.

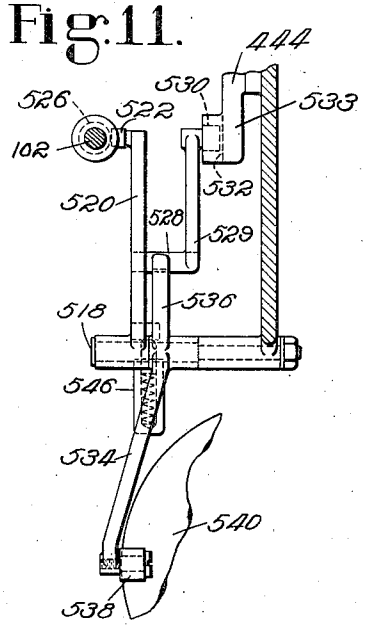
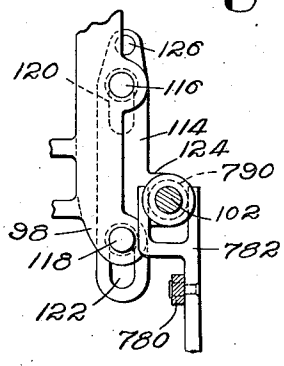


Fig. 5.



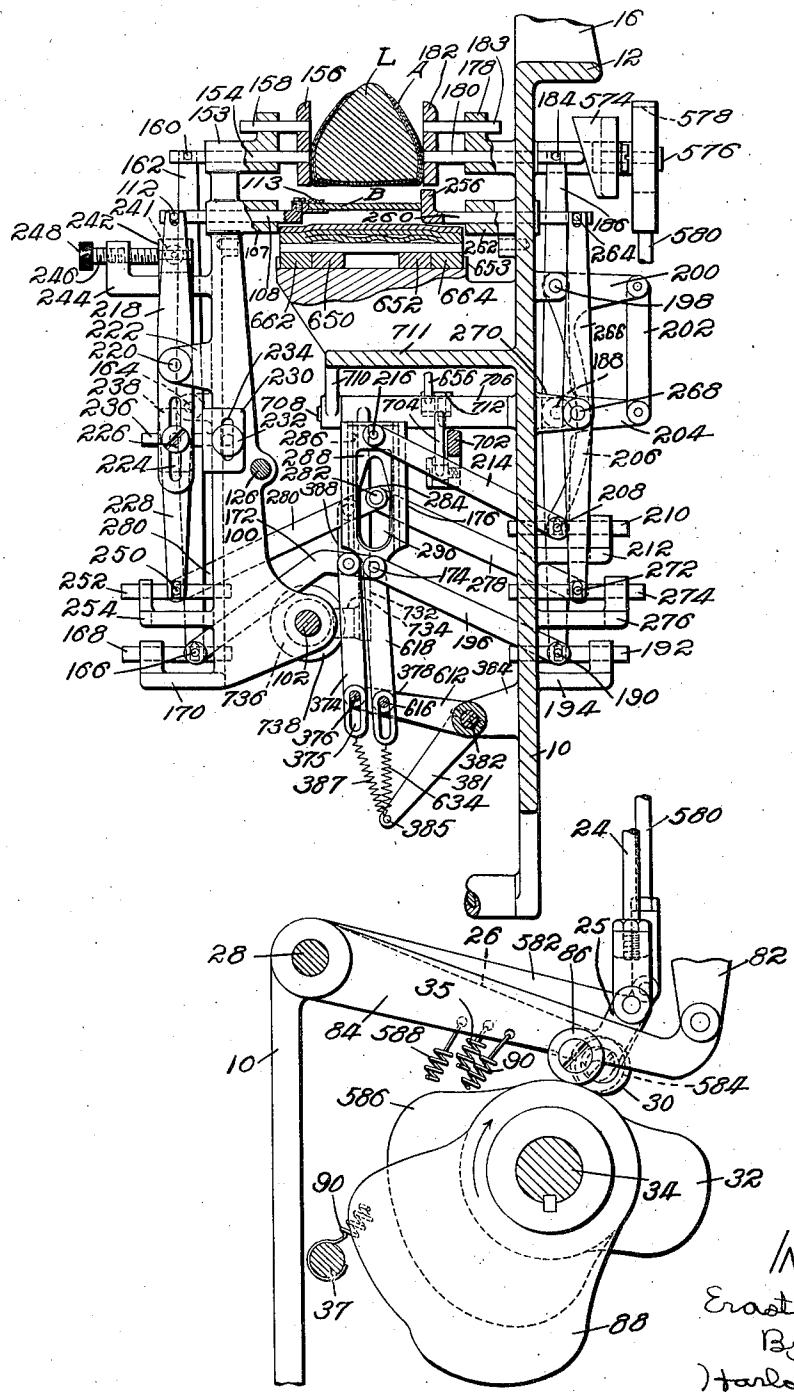
INVENTOR.
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Nov. 24, 1936. E. E. WINKLEY 2,061,690

METHOD AND MACHINE FOR ATTACHING SOLES TO SHOES

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Fig. 4.



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METHOD AND MACHINE FOR ATTACHING SOLES TO SHOES

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Fig. 6.

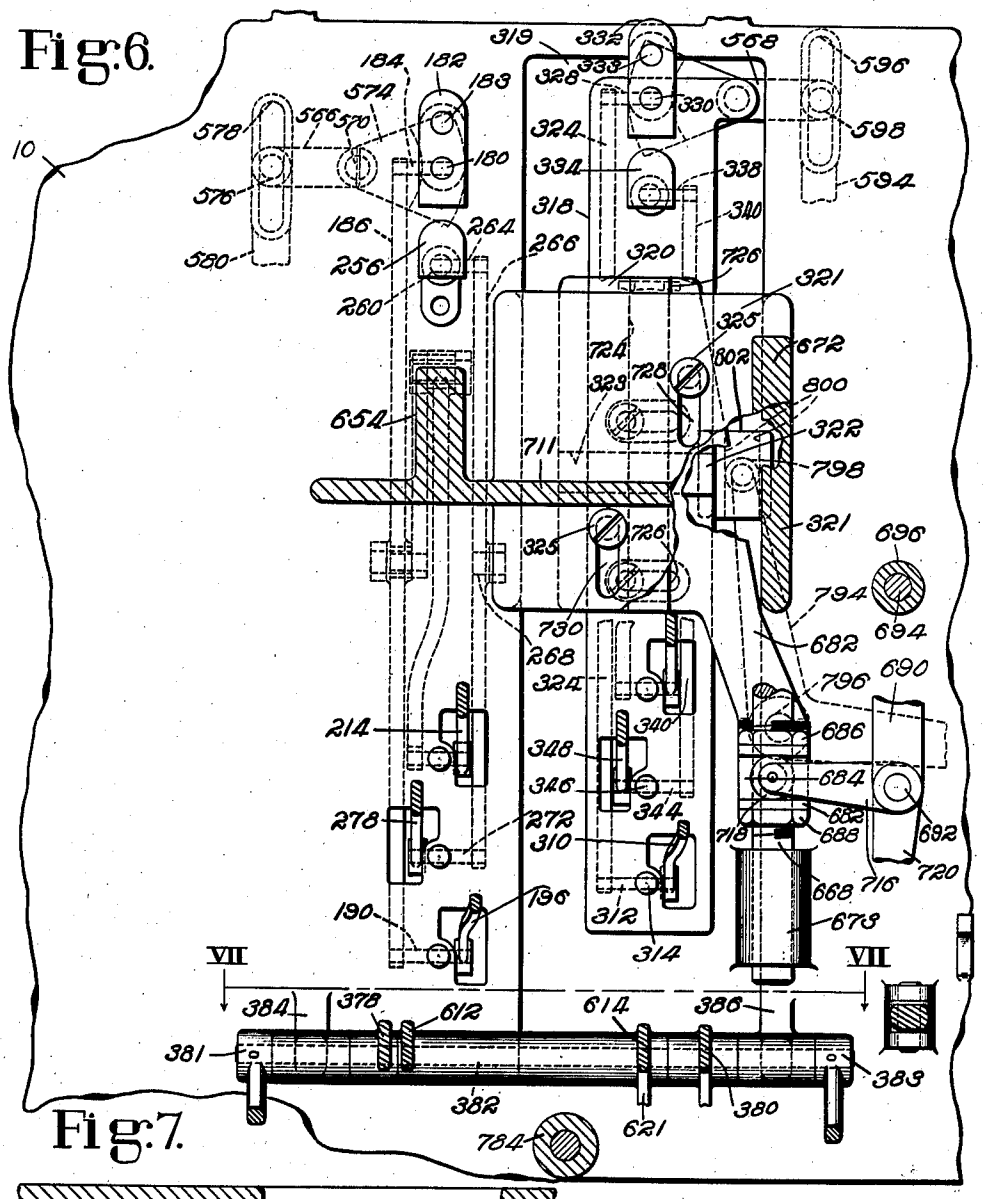
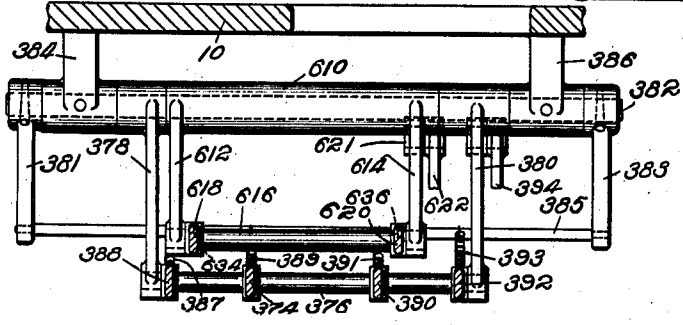


Fig. 7.



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METHOD AND MACHINE FOR ATTACHING SOLES TO SHOES

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Fig. 8.

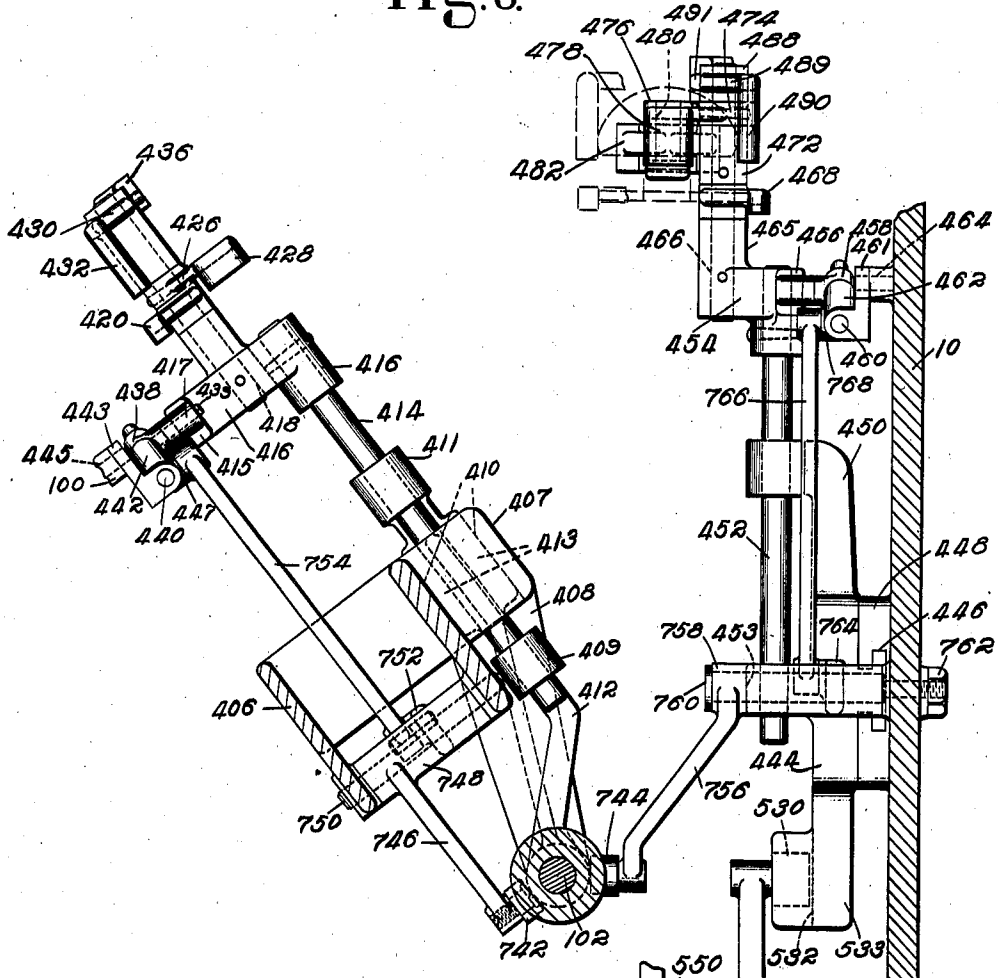
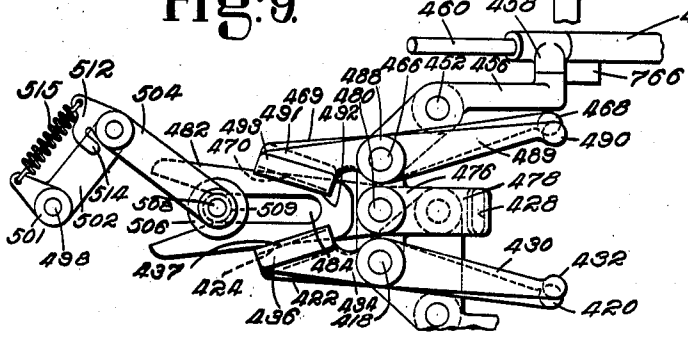


Fig. 9.



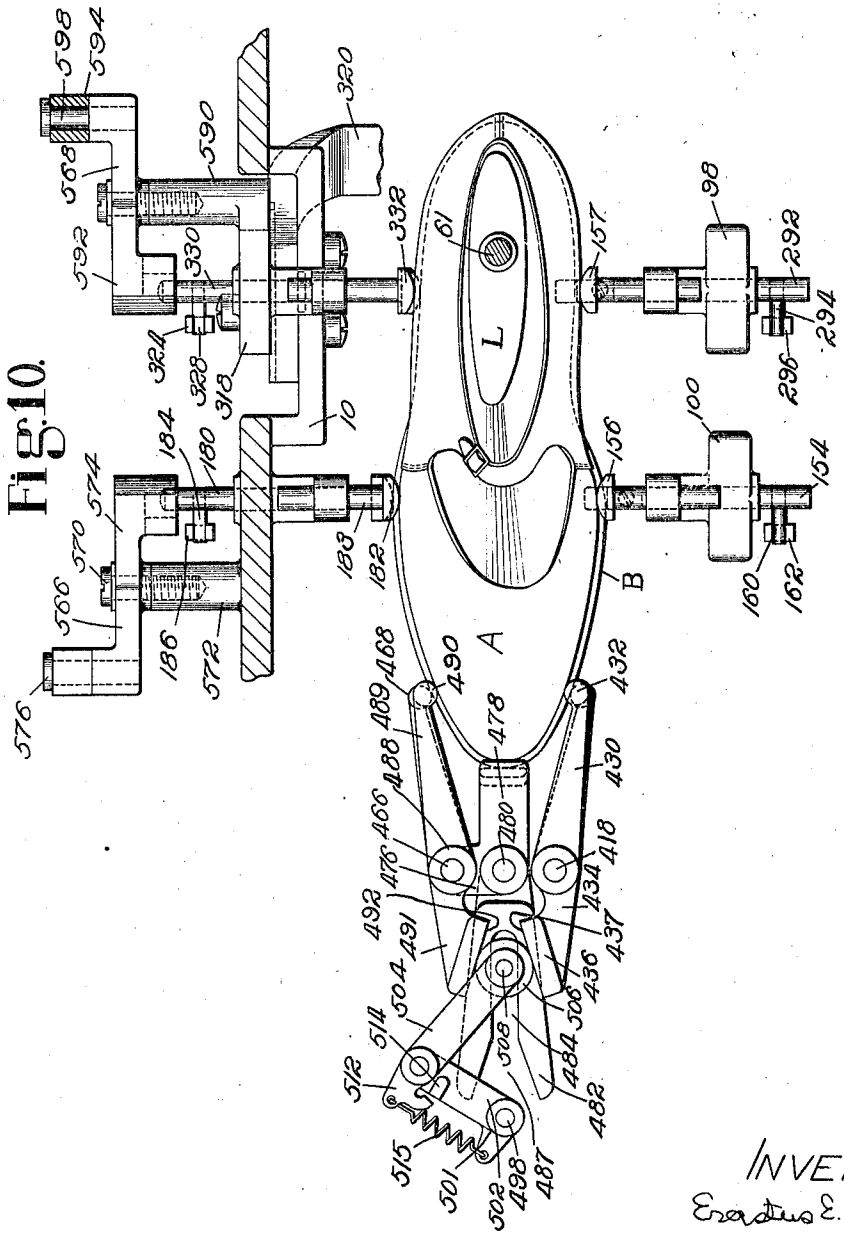
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METHOD AND MACHINE FOR ATTACHING SOLES TO SHOES

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Fig. 10.



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METHOD AND MACHINE FOR ATTACHING SOLES TO SHOES

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Fig. 12.

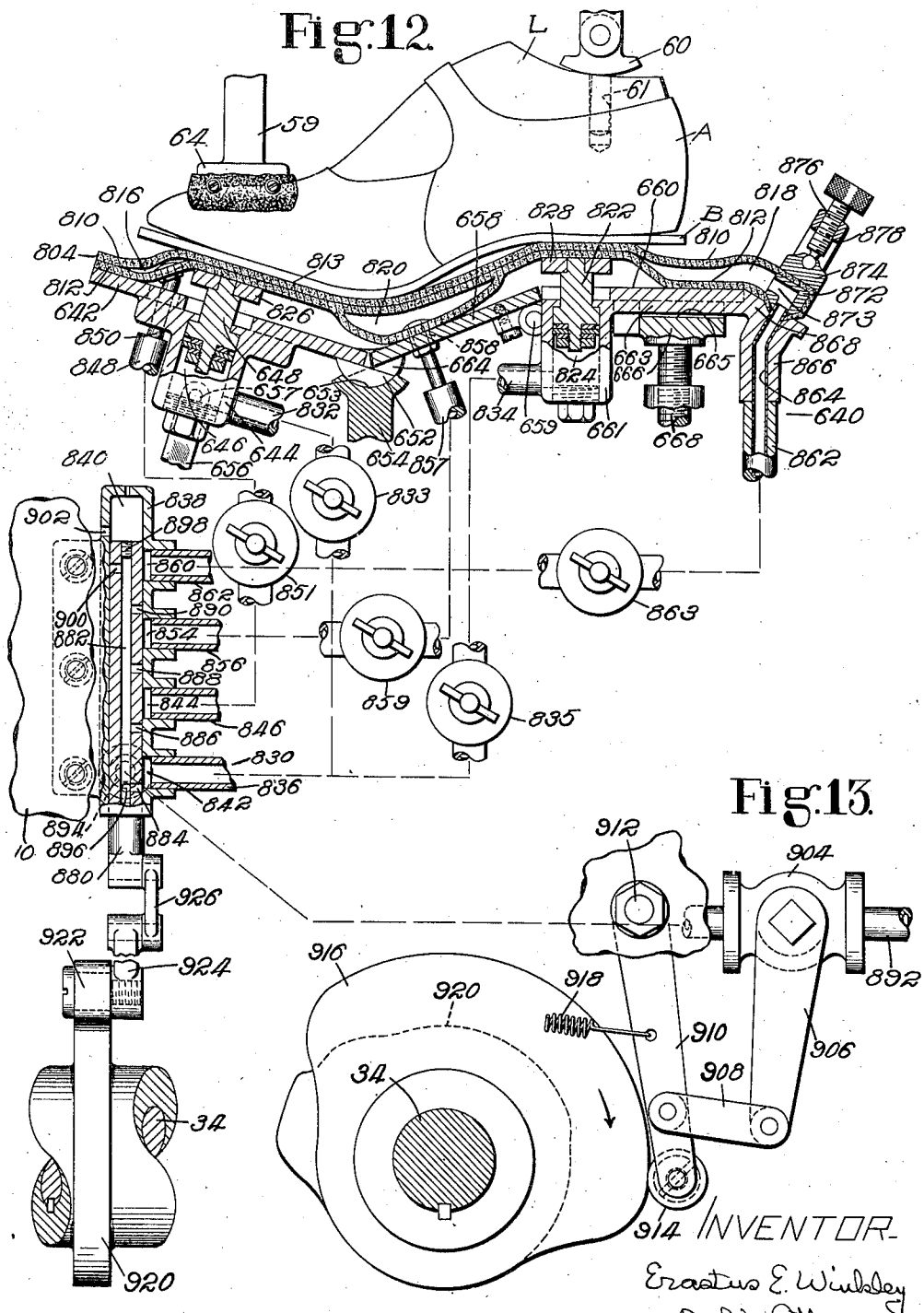


Fig. 13.

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METHOD AND MACHINE FOR ATTACHING SOLES TO SHOES

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Fig. 14.

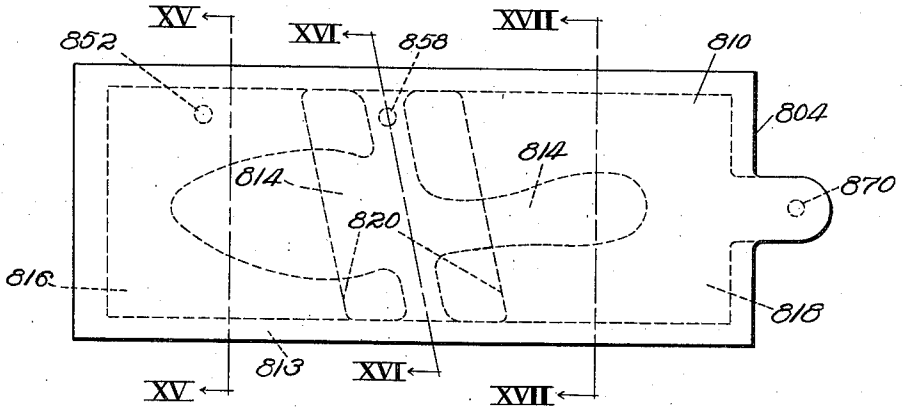


Fig. 15.

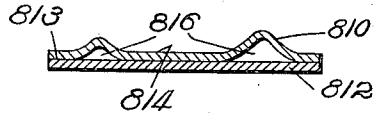


Fig. 16.

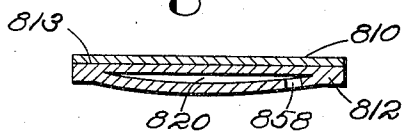
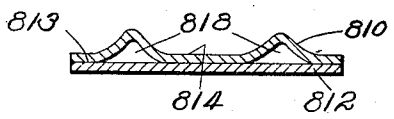


Fig. 17.



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METHOD AND MACHINE FOR ATTACHING SOLES TO SHOES

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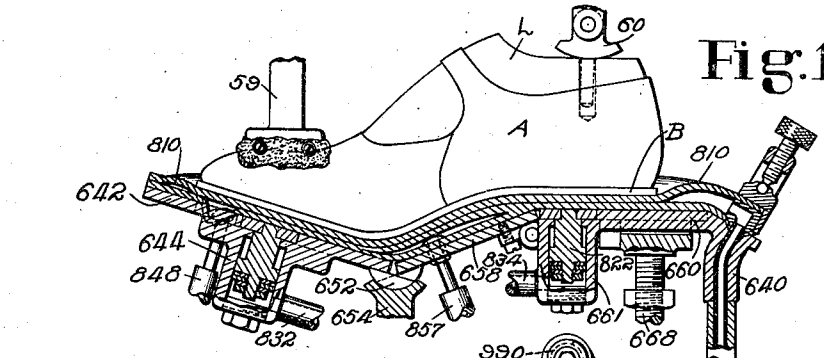


Fig. 18.

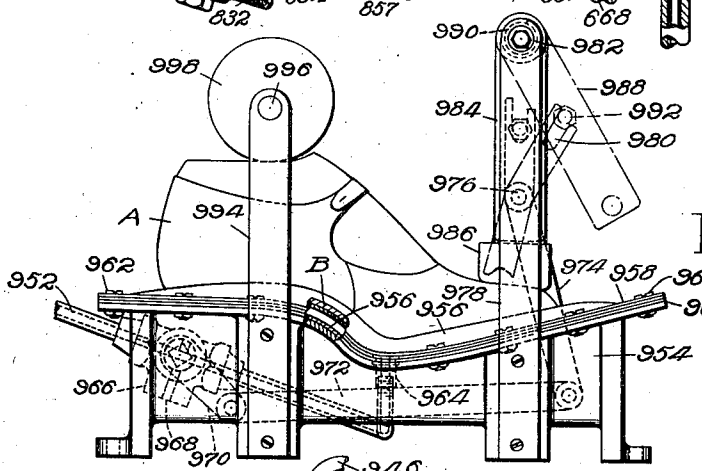


Fig. 20.

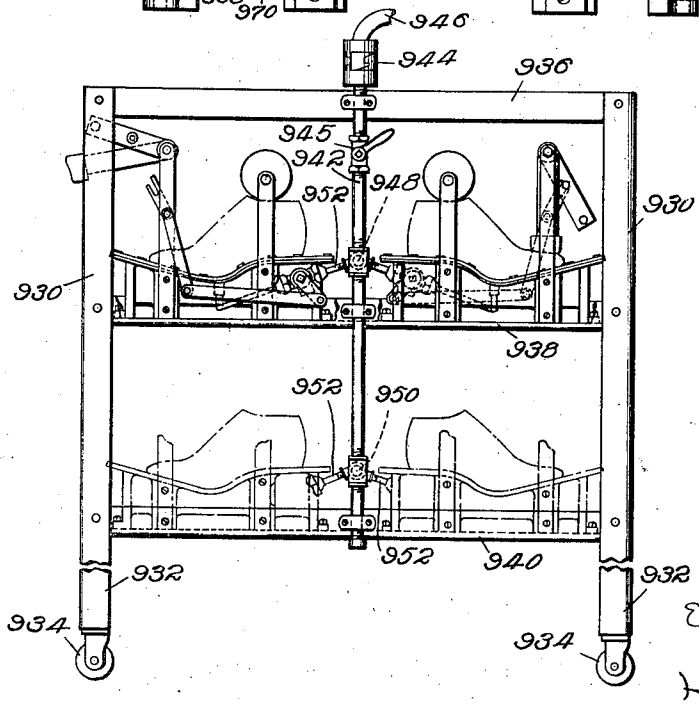


Fig. 19.

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Patented Nov. 24, 1936 2,061,690

UNITED STATES PATENT OFFICE

2,061,690

METHOD AND MACHINE FOR ATTACHING SOLES TO SHOES

Erastus E. Winkley, Lynn, Mass., assignor to United Shoe Machinery Corporation, Paterson, N. J., a corporation of New Jersey

Application December 6, 1933, Serial No. 701,174

193 Claims. (Cl. 12—33)

This invention relates to methods and machines for use in the manufacture of shoes and is herein illustrated as embodied in a machine for cement-attaching soles to shoes.

Objects of the invention are to provide in a cement sole attaching machine improved means for receiving and supporting shoes and soles and for introducing them to the operating instrumentalities of the machine, to provide improved mechanism for positioning an outsole in proper transverse relation to the bottom of a shoe in accordance with the width of the shoe before pressure is applied thereto, and to provide improved means for locating the sole longitudinally of the shoe and for positioning the toe end of the sole forwardly of the tip line relatively to the corresponding portion of the shoe bottom. Further objects of the invention are to provide improved pressure applying means whereby a predetermined pressure can be applied to central portions of the forepart and heel portions of a shoe and sole and substantially greater pressure can thereafter be applied to their marginal and shank portions, and to provide a novel method and improved means for applying pressure to the marginal and shank portions of the shoe and sole progressively from the toe to the heel end of the shoe.

In the illustrated construction the sole-receiving and introducing means comprises a pair of gripping members which have also a sole gaging function and which are arranged to engage a sole at its forepart and heel portion and to move it into a predetermined heightwise position between the shoe bottom and the pressure-applying means. The grippers swing about an axis which is located below the pressure-applying means and, when the machine is at rest, the grippers are inclined outwardly toward an operator so that the sole can be conveniently presented thereto. The shoe engaging and supporting means, as illustrated herein, comprises a member having abutments thereon for engaging a shoe and holding it with its side toward the operator, this member being arranged to be moved from an outwardly inclined position, in which the operator can conveniently mount the shoe thereon, into a substantially vertical pressure-receiving position.

As illustrated herein, the improved mechanism for positioning and maintaining the sole in proper transverse relation to the bottom of the shoe before and during the application of pressure comprises a plurality of gages for engaging the shoe and sole, the shoe gages being arranged to be brought yieldingly against opposite sides of the shoe at the forepart and heel portion to measure or caliper the width of the shoe at such portions. The sole gages, which are similar to the shoe gages, cooperate with the sole-gripping members and are arranged to engage the inner edge of the sole at the forepart and heel portion substantially opposite the gripping members. The sole gages and grippers are then centralized relatively to the shoe gages by mechanism operating independently of the means for swinging the grippers into operative position, thereby shifting the sole laterally of the shoe until the former is located in proper transverse relation to the shoe bottom in accordance with the width of the shoe which has previously been determined by the shoe gages. The sole-positioning mechanism is adapted to operate either upon flat soles, molded soles or upon soles which have been shaped to conform to the longitudinal contour of the shoe bottom, for example, by the method and apparatus disclosed in United States Letters Patent No. 1,772,038, granted August 5, 1930, upon the application of H. A. Davenport and N. F. Hopkins and further disclosed in Letters Patent of the United States No. 1,939,750, granted Dec. 19, 1933, upon an application filed in my name.

In order to locate the sole longitudinally of the shoe before the sole is moved into pressure-receiving position, separate mechanism is provided which, as herein illustrated, is positioned by the shoe and is arranged to be moved into and out of operative position in a predetermined path extending parallel to the longitudinal axis of the shoe. An abutment is provided which is adapted to engage the toe end of the shoe and thereby to locate the mechanism in such a position that a second abutment thereon can be utilized for determining the position of the sole longitudinally of the shoe. This mechanism is also provided with gages or fingers constructed and arranged to engage the shoe and sole at points corresponding approximately to the tip line of the shoe to position the portion of the sole forwardly of the tip line laterally of the shoe bottom, the construction of the mechanism being such that engagement of the shoe-engaging fingers with the shoe controls the subsequent positioning movement of the sole-engaging fingers. In accordance with a feature of the invention, the fingers which engage the sides of the shoe and sole nearest the operator are arranged to be rotated with the sole-gripping members about a common axis so that the abutment asso-

ciated with the sole-engaging fingers will be in a position to determine the location of the sole longitudinally of the shoe as the sole is presented to the gripping members.

The pressure-applying means of the illustrated construction comprises an inflatable pad mounted on a sectional supporting member and adapted to apply pressure to the sole and shoe. The inner or central portion of the pad is considerably thicker than the surrounding portions thereof and consequently is relatively solid, this portion being constructed and arranged to apply a limited pressure to the central portions of the shoe and sole. The marginal portions of the illustrated pad are provided with a plurality of separate chambers or compartments which may be inflated by fluid under pressure. An inflatable compartment also extends under that section of the pad which underlies the shank portion of the shoe and these compartments, when inflated, displace the marginal and shank portions of the pad sufficiently to apply substantial pressure to corresponding portions of the sole and shoe, this action taking place after pressure has first been applied to the central portions of the shoe and sole by relative movement of the pad and the shoe and sole. Preferably, and as illustrated, the shoe and the central portion of the pad are moved relatively to each other to grip the sole with a force sufficient to maintain it in position while the sole gripping members are withdrawn therefrom, fluid-pressure-operated means being provided to effect this relative movement. The pressure exerted by the fluid-pressure-operated means may be regulated and controlled as desired by pressure regulating means to insure that the sole will be gripped firmly between the shoe and the pad and also to determine the amount of pressure which will subsequently be applied to the central portions of the shoe and sole. Further relative movement of the shoe and pad operates to return the central portion of the pad substantially to its original position and to apply limited sole attaching pressure to central portions of the forepart and heel portions of the shoe and sole.

In applying sole attaching pressure to the marginal and shank portions of the shoe and sole, novel means comprising a slide valve and pressure regulating means are provided for automatically inflating the compartments of the pad independently of each other commencing with the marginal compartment in the forepart of the pad and then successively inflating the shank compartment and marginal compartment at the heel portion of the pad. The pressure at the marginal and shank portions of the sole is thus applied progressively from the toe to the heel end of the sole, thereby eliminating any tendency of the forepart and heel portions to move relatively to each other lengthwise of the shoe bottom during the pressure-applying operation and thereby displace the sole relatively to the shoe bottom as might be the case if pressure were applied to the shank portion of the sole simultaneously with, or after, the application of pressure to its forepart and heel portions. The pressure regulating or controlling means for each compartment permits the pressure at different portions of the sole to be applied in different amounts depending, for example, on the type of shoe being operated upon or upon the manner in which it is desired to have a particular sole conform to the shoe bottom.

In its method aspects the invention consists broadly in cement attaching soles to shoes by first applying a predetermined pressure to central portions of a sole, in order to level the sole against the shoe bottom without producing irregularities in the outer surface of the sole, and thereafter applying a substantially greater pressure progressively to the marginal and shank portions of the sole to secure a firm attachment of the sole to the shoe bottom. In accordance with an important aspect of the method the pressure at the marginal and shank portions of the sole may be regulated so that the force exerted on either the forepart, shank or heel portion of the sole may be increased or reduced relatively to the pressure at the other portions or, if desired, the pressure applied to all of these portions may be equalized. The application of pressure progressively and in different amounts to different portions of the shoe bottom will not only eliminate any undesirable relative movement of the sole and shoe during the pressing operation but will also insure that the sole is pressed firmly against the shoe bottom at those portions where pressure is most needed, for example, at the shank and marginal portions of the sole.

The above and other objects and features of the invention, including novel means for maintaining the shoe in pressure-receiving position while it is being moved relatively to the pad, means for effecting heightwise and lengthwise adjustments of the different gages and positioning devices, and means for simultaneously effecting corresponding adjustments of the sectional pad support, as well as other novel details of construction and combinations of parts, will now be more particularly described with reference to the accompanying drawings and will be pointed out in the appended claims.

In the drawings,

Fig. 1 is a front elevation, partly in section, of the right-hand side of the machine embodying the present invention, part of the mechanism being shown in an operated position;

Fig. 2 is a side elevation of the portion of the machine shown in Fig. 1 with parts of the machine broken away and in section;

Fig. 3 is a fragmentary view taken on the line III—III of Fig. 1 showing the pad support, jack, and a portion of the sole-supporting mechanism, the parts being shown in their initial positions;

Fig. 4 is a sectional view of the forepart gaging and positioning mechanism showing a sole before it has been located relatively to the shoe;

Fig. 5 is a detail view of the lower end of the outer heel gage lever and its supporting means;

Fig. 6 is a sectional view taken on the line VI—VI of Fig. 2 showing the inner gages in front elevation and illustrating in more detail the manner in which the plate for supporting the inner heel gage is mounted;

Fig. 7 is a plan view of a portion of the mechanism which operates the shoe gages and the sole locating means;

Fig. 8 is a sectional view, looking from the right in Fig. 1, of the toe positioning mechanism and its supporting means, the mechanism being shown in its initial position;

Fig. 9 is a plan view of the toe positioning mechanism and its actuating means;

Fig. 10 is a plan view of the shoe gages and the sole engaging means contacting with a shoe and sole;

Fig. 11 is a detail view in side elevation of the mechanism for moving the toe gages longitudinally of the shoe;

Fig. 12 is a sectional view of the pad and its support with a shoe and sole mounted thereon, the view illustrating the valve mechanism which supplies fluid under pressure to the pad and support;

Fig. 13 is a side elevation of the fluid pressure supply valve and its actuating mechanism;

Fig. 14 is a plan view of the pressure applying pad;

Figs. 15, 16 and 17 are sectional views of the pad taken respectively through its toe, shank and heel portions on the section lines XV—XV, XVI—XVI, and XVII—XVII;

Fig. 18 is a view similar to Fig. 12 but on a reduced scale showing the shoe under full pressure;

Fig. 19 is a view of the pressing device or rack in which the shoes are mounted to receive lighter pressure while the cement is setting; and

Fig. 20 is a detail view in side elevation of a shoe under pressure in one of the pressing devices of the rack.

The illustrated machine for cement attaching soles to shoe bottoms is a duplex machine having two substantially duplicate sets of mechanism, the mechanism at the right-hand side of the machine being reversed relatively to that at the left so that the former will be operating on a right shoe while the mechanism at the left is releasing a left shoe and receiving another. Since these mechanisms operate in substantially the same manner it will not be necessary to illustrate both for a complete understanding of the invention. Accordingly, only the mechanism at the right-hand side of the machine has been shown in the drawings.

A shoe which is to have its sole attached by cement is first prepared by roughening the overlasted portion of the upper and coating it with cement. The shoe is then presented to the machine together with an outsole the marginal portion of the attaching face of which has also been roughened and coated with cement. Preferably, the outsole is shaped to conform substantially to the longitudinal contour of the shoe bottom although conforming the outsole to the shoe bottom is not essential since the machine is adapted to operate upon either flat or conformed soles. A method and apparatus by which soles may be conformed to the longitudinal contour of the shoe bottom, upon which soles the present machine is designed to operate, are disclosed in the Davenport and Hopkins patent and in Patent No. 1,939,750 referred to above. The machine operates to position the shoe and sole relatively to each other and to apply pressure sufficient to attach the sole either temporarily or permanently to the shoe bottom depending on the nature of the cement used in attaching the sole to the shoe. If the cement is of a quick drying type, such as are many of the cements in use today, for example, rubber cement, the sole will be permanently attached to the shoe bottom by maintaining the pressure of the machine for about 15 or 20 seconds which is the speed at which the machine normally operates. With such cements, therefore, the machine can be operated at full capacity while attaching soles permanently to shoe bottoms. When a cement is used such as pyroxylin cement, which requires a considerably longer period in which to set, the machine is adapted to apply the usual pressure of between 60 and 80 pounds to the square inch for a short period of time, as indicated above, in order to stick the sole temporarily to the shoe bottom. The shoe is then removed and placed in a pressing device similar to a shoe rack and constructed and arranged to apply lighter pressure to the sole and shoe while the pyroxylin cement is setting. This aspect of the invention will be explained in more detail after the machine has been described and the method of attaching soles to shoes permanently with a quick drying rubber cement has been fully explained.

As illustrated in Fig. 1, the machine comprises a frame having vertical rear and side walls 10 (only one of the latter being shown in Fig. 1) and an upper portion 12 in the form of a relatively narrow shelf which connects the side walls and carries at the right-hand side of the machine a pair of upwardly extending brackets 14 and 16. In the upper ends of the brackets 14 and 16 (Fig. 2) is mounted a horizontal shaft 18 which extends widthwise of the machine and is secured in the bracket 14 by a taper pin 15. Fulcrumed on the fixed shaft 18 is a lever 20 one arm of which extends rearwardly and is pivotally connected to a yoke piece 22 threaded on the upper end of a vertical rod 24. The lower end of the rod 24 (Fig. 4) is pivotally connected to a lug 25 extending upwardly from the outer extremity of a lever 26 fulcrumed on a fixed shaft 28 which is mounted in the lower portion of the frame 10. The lever 26 carries a roll 30 which rides on the periphery of a cam 32 keyed to a cam shaft 34 journaled in bearings formed on the opposite side walls of the frame, the roll 30 being held against the cam by means of a spring 35, one end of which is connected to the lever 26 and the other end to a horizontal rod 37 mounted in the frame. The cam shaft 34 is rotated by means of a pulley (not shown) driven by a belt from any usual source of power or the pulley may, if desired, be motor driven. A one-revolution clutch similar, for example, to that disclosed in United States Letters Patent No. 1,549,243, granted August 11, 1925, upon an earlier application of mine may be utilized for operating the machine, although other types of clutches may be used if preferred, the invention not being limited to the particular clutch referred to.

The clutch is also provided with any usual or conventional means by which it is automatically thrown out of driving operation after a part of the cycle has been completed, the operator tripping the clutch again to complete the cycle of the machine.

The lever 20 referred to above has a forwardly extending arm which is provided at its outer end with a circular lug 36 (Figs. 2 and 3) which projects laterally from the side of the lever and is arranged to engage the flat side of a semi-cylindrical lug 38 formed on a projection 41 extending rearwardly from an elongated hub portion 42 (Figs. 1 and 2) of a downwardly projecting arm 40. The hub portion 42 is rotatably mounted on a rock shaft 44 journaled in bearings formed in a pair of forwardly extending arms 46, 48 (Fig. 1) of a yoked lever 50 (Fig. 2) which is fulcrumed on the fixed shaft 18. The lug 36 is held in contact with the semi-cylindrical lug 38 by means of a torsion spring 51 which encircles the hub of the lever 20 and has one end curved to engage the lug 36 and the other end engaging the lug 38, thus normally holding the adjacent surfaces of the lugs together. This arrangement provides a yielding connection between the cam-operated lever 20 and the arm 40 so that the latter will be rotated about the shaft 44 in a counter-clockwise

direction, as viewed in Fig. 2, by clockwise movement of the lever 20, reverse movement of the arm being effected by counter-clockwise movement of the lever 20. When the hub 42 is rotated in a counter-clockwise direction the arm 40 is arranged to contact with a fixed abutment 53 formed on the frame in order to limit the rotation of the hub 42 and the rock shaft 44, which turns with the hub as will be hereinafter explained. The arrangement is such that the arm 40 will always contact with the abutment 53 before the forward end of the lever 20 is rotated by the cam 32 into its highest position, the yieldable connection between the lever and the arm permitting the lever to continue its rotation for the full throw of the cam after the arm 40 has contacted with the fixed abutment 53.

The rock shaft 44 has right- and left-hand screw threads formed therein (Fig. 1) which extend in opposite directions from the central portion of the shaft to its bearings in the arms 46, 48, the bearings being split to facilitate assembling the parts and being held together by clamping screws 49. The elongated hub 42 of the arm 40 occupies the entire space between the bearings 46 and 48 and has a substantially cylindrical opening or recess 52 formed therein which terminates a short distance from the left-hand end of the hub and, at the under side of the hub, forms a T-shaped slot 54 (Figs. 1 and 2) which extends across the full width of the hub.

Mounted on the right- and left-hand threaded portions of the rock shaft 44 are last- and shoe-engaging members 56, 58 which furnish means for engaging and holding a shoe in a substantially upright position during the operation of the machine, this mechanism being hereinafter referred to as the "shoe-jacking mechanism" or the "jack." The members 56 and 58 extend downwardly from the shaft 44 and are provided with T-shaped portions which enter the slot 54 and maintain the members in predetermined positions relatively to the hub 42 and also cause the shaft 44 to rock when the hub is rotated. The member 56 carries a downwardly extending arm 57 which is forked at its lower end and has pivotally secured thereto a last pin holder 60 having a convex face from which projects downwardly a last pin 61 adapted to enter the hole in the cone of a shoe last. The holder 60 fulcrums about a pivot pin 63 extending through the forked end of the arm 57 and encircling the pin is a torsion spring 62 which tends normally to urge the last pin 61 toward the left, as viewed in Fig. 1.

The shoe-engaging member 58 is also provided with a downwardly extending arm 59 the lower end of which carries a substantially horizontal plate 64 which acts as a shoe rest adapted to engage the forepart of a shoe. The under side of the plate is shaped to conform substantially to the transverse curvature of the forepart of a shoe and is covered with felt or leather to prevent scarring the shoe upper. The right-hand end of the rock shaft 44, as viewed in Fig. 1, is reduced in diameter and has secured thereto a hand wheel 66 by which the shaft can be rotated manually to adjust the shoe-engaging members 56, 58 toward or away from each other along the threaded portions of the shaft and thus position the shoe-engaging members in accordance with the size of shoe being operated upon. In jacking a shoe A (Fig. 1) the last pin 61 is inserted in the hole in the cone of the last L and the toe end of the shoe is pressed downwardly until it can be moved under the toe rest 64. The operator then releases the shoe and the spring 62 forces the toe of the shoe against the toe rest, thereby holding the shoe firmly in jacked position.

The yoked portion of the lever 50 extends rearwardly as viewed in Fig. 2 and has a lug 68 formed thereon to which is pivotally connected a yoke member 70 into the lower end of which is threaded a short stud 72. The stud 72 extends downwardly and enters a vertical opening in a casting 74, the lower end of the stud having a head which fits an enlarged portion of the opening and thus prevents the stud from being pulled upwardly out of the casting. A compression spring 76 is interposed between the casting and the yoke to provide a yield between the lever 50 and the casting the purpose of which will be hereinafter explained. The central portion of the casting 74, as shown in Fig. 2, is hollow and its lower portion 75 is cylindrical in shape and is provided with a vertical bore to receive the upper end of a relatively large shaft 78 which extends into the hollow portion and is held therein by a collar 80 so that the casting 74 forms the means of connecting the lever 50 to the vertical shaft 78. At its lower end the shaft 78 is adjustably connected by means of a yoke piece 82 to the outer end of a lever 84 fulcrumed on the fixed shaft 28 (Fig. 4). The lever 84 carries a roll 86 which rides on the periphery of a cam 88 keyed to the cam shaft 34, the roll being held against the cam by a tension spring 90 extending between the lever 84 and the fixed rod 37. A heavy compression spring 94 (Fig. 2) encircles the intermediate portion of the shaft 78, the lower end of the spring bearing against a collar 96 pinned to the shaft and the upper end of the spring bearing against the lower end of the casting 74. The mechanism just described is for raising and lowering the jack and shoe and its operation will be explained more fully in connection with the pressure applying operations later to be described.

When the shoe is jacked the jacking mechanism is positioned as shown in Fig. 3 with the arm 40 and the shoe engaging members 56 and 58 extending forwardly at an angle of about 45°. After the operator has jacked the shoe and has tripped the clutch, the cam 32 (Fig. 4) is rotated in a clockwise direction to lower the roll 30 (which is then on the high part of the cam) and to cause the rod 24 to descend and swing the forward arm of the lever 20 upwardly to the position shown in Fig. 2. The hub 42 is thereupon rotated about the shaft 44 in an opposite direction until the arm 40 contacts with the fixed abutment 53, thereby locating the last and shoe in a substantially upright position, as shown in Fig. 2. After the arm 40 contacts with the abutment 53 the spring 51 will yield as explained above to permit the lever 20 to continue its rotation until the roll 30 is riding on the low part of the cam 32.

The mechanism for introducing the sole between the pressing means and the shoe bottom and for supporting it in such position before pressure is applied to the shoe and sole will now be described. This mechanism comprises a pair of upwardly extending arms or levers 98 and 100 (Fig. 1) mounted for swinging movement about a horizontal shaft 102 secured in bearings formed on the opposite side walls of the frame 10. In their initial positions the swinging levers 98, 100 are inclined outwardly at an angle of about 45° and when operating are swung into a substantially vertical position by a cam 104 mounted on the cam shaft 34 (Fig. 2). Fig. 3 shows the position of the upper end of the lever 98 relatively

to the shoe-jacking mechanism when the parts are in their initial or inoperative positions.

The lever 98 is arranged to operate on the heel portion of the shoe and accordingly is somewhat longer than the lever 100 which is arranged to operate on the forepart and is located approximately at the ball line of the shoe. Projecting inwardly a short distance from the upper end of the lever 98 (Fig. 2) is a boss 105 which is bored horizontally, and slidably mounted in this boss is a sole gripping member 106. Near the upper end of the lever 100 is a similar boss 107 which carries another sole-gripping member 108 (Fig. 4). Each of these gripping members comprises a cylindrical shank portion having at its inner end a raised projection (see Figs. 2 and 4) which has extending inwardly from its under side a horizontal lip or finger arranged to engage and support the under side of the outsole. Leaf springs 111, 113 secured respectively by screws to the upper surfaces of the raised portions of the members 106, 108, extend inwardly over the fingers to form two pairs of gripper members between which the edge of the sole may be readily inserted. The leaf springs are strong enough to press the edge of an outsole B firmly against the supporting fingers, as shown in Fig. 4, so that the outsole will be maintained in a substantially horizontal position after the levers 98, 100 have been swung into operative positions. The shank portions of the gripping members 106, 108 extend through the bosses and the levers 98 and 100 and, near their outer ends, are provided respectively with laterally projecting pins 110, 112.

The lever 98, which is opposite the heel portion of the shoe, is arranged to be rotated into and out of operative position about the shaft 102 by means of an elongated plate 114 (Fig. 5) upon which the lever is slidably mounted by a pair of horizontal pins 116, 118 fastened in the lever 98 and extending through vertical slots 120, 122 in the plate. Projecting from the inner edge of the plate 114 is a spool-shaped lug 124 provided with a hole through which the shaft 102 passes. This arrangement permits the lever 98 to rotate about the shaft 102 and yet permits vertical adjustment of the lever relatively to the shaft by reason of the vertical slots in the plate 114. A horizontal pin 126 projects laterally from the upper end of the plate 114 and enters a hole in the lever 100 (Fig. 1), thereby connecting the two levers in such a manner that rotation of the lever 98 about the shaft 102 will effect a corresponding rotation of the lever 100 which is mounted directly on the shaft 102, as shown in Fig. 4.

In order to rotate the levers 98 and 100 into and out of operative position about the shaft 102 there is formed in the side of the lever 98 a recess 128 (Fig. 1) which is arranged to receive a rounded end formed on an upper arm of a bell crank lever 130. The bell crank lever 130 is pivotally mounted on a horizontal pin 129 carried in the outer end of a laterally extending arm 131 of another lever 132 rotatably mounted on the shaft 102. The lever 132 has a rearwardly extending arm 134 (Fig. 2) which is arranged to engage a lug 136 projecting from the frame and thus to limit rotation of the lever 132 in a clockwise direction. A lower arm 138 of the bell crank lever 130 carries a roll 140 (Fig. 1) which enters a circumferential slot 142 formed in a spool-shaped collar 144 loosely mounted on the shaft 102, this collar also having another circumferential slot 143 formed therein, the function of which will be explained hereinafter. Pivotally secured to the arm 134 (Fig. 2) is a downwardly extending link 146 the lower end of which is connected to a lever 148 fulcrumed on the shaft 28 and carrying at its outer end a cam roll 150. The roll 150 rides on the periphery of the cam 104 previously mentioned and is held against the cam by a heavy tension spring 152, the lower end of which is fastened to the fixed shaft 37.

After the outsole B has been introduced between the fingers of the gripper members 106, 108 and the clutch has been tripped to rotate the jack and shoe into a substantially vertical position, the roll 150, which is then on the high part of the cam 104, rides off the high portion of the cam and permits the cam lever 148 to descend under the tension of the spring 152, thereby causing the arm 134 to be lowered until it engages the fixed stop 136. Movement of the lever 132 about the shaft 102 causes the bell crank lever 130, which is carried by the lever 132 and which has its upper arm located in the recess 128, to rotate the lever 98 about the shaft 102 until the lever assumes the substantially vertical position shown in Fig. 2. Since the lever 100 is connected to the lever 98 by the horizontal pin 126 aforementioned, the former will be rotated about its axis into a similar position.

In placing the outsole between the fingers of the gripping members 106, 108 it is located longitudinally of the machine by means of a gage carried by the toe positioning mechanism previously referred to. This toe positioning mechanism operates not only to position the sole longitudinally of the shoe but also to position the toe end of the sole laterally with respect to the toe end of the shoe. It is comprised of two different sets of mechanism, one set being located at each side of the shoe. The mechanism which engages the inner sides of the shoe and sole (Fig. 8) is carried by further mechanism which is arranged to remain in a substantially vertical position while the mechanism which engages the outer sides of the shoe and sole is arranged to swing from an outwardly inclined position into a vertical position together with the swinging levers 98 and 100, as will be hereinafter explained. Before the levers 98 and 100, and the swinging portion of the toe positioning mechanism, are swung upwardly into a vertical position, however, the positioning mechanism is moved as a unit longitudinally of the shoe toward the toe end thereof by power-operated mechanism provided for this purpose. This longitudinal movement continues until a shoe engaging abutment carried by the inner positioning mechanism comes into engagement with the toe end of the shoe mounted on the jack, thereby locating the toe positioning mechanism relatively to the shoe. The swinging portion of the toe positioning mechanism, which carries a gage for locating the sole longitudinally of the shoe, is thus brought into a position that will determine the proper position of the sole longitudinally of the shoe when the sole is inserted between the gripper members 106, 108.

Since the toe positioning mechanism does not operate to position the forepart of the sole with respect to the shoe until after means for caliper-ing or measuring the width of the shoe and for positioning the shank and heel portions of the sole transversely of the shoe have been operated, a more detailed description of this mechanism and its mode of operation will be left until after

the measuring and positioning means referred to have been described.

The levers 98 and 100 each extend upwardly some distance beyond the sole-gripping members 106, 108, and at their upper ends are provided with bosses which extend inwardly and then upwardly. Slidably mounted in these L-shaped bosses are shoe engaging members or gages 156, 157 the inner surfaces of which are arranged to contact respectively with the outer side of the shoe in the vicinity of the ball line and the heel breast line, as shown in Fig. 1. The mechanism for measuring or calipering the width of the shoe at the ball line operates practically the same as the mechanism for measuring the shoe at the heel breast line. In order, however, to permit certain adjustments to be made in the mechanism which operates on the heel portion of the shoe which are unnecessary at the forepart, this mechanism is somewhat different in construction from the gage mechanism located at the forepart of the shoe. The gage mechanism at the forepart of the shoe will be described in detail, therefore, before considering the mechanism located at the heel portion of the shoe.

The upper boss on the lever 100 (Fig. 4), indicated by the numeral 153, has slidably mounted therein the shank portion 154 of the shoe gage 156 previously mentioned, this gage comprising a vertical plate several inches in length and having an inner surface arranged to engage the outer side of the shoe A directly above the sole-gripping member 108. The gage 156 has a horizontal guide pin 158 projecting from its upper portion and arranged to slide in a hole formed in the upwardly projecting portion of the boss 153 so that the gage will be maintained in an upright position during its sliding movement. The shank portion 154 of the gage extends through the boss 153 and carries in its outer end a laterally projecting pin 160 which is engaged by the forked upper end of a substantially vertical lever 162 fulcrumed on a horizontal pin 164 mounted in a boss formed on the forward side of the lever 100. The lower end of the lever 162 is also forked and engages one end of another pin 166 which extends transversely through a horizontal rod 168. The rod 168 is slidably mounted in a lug 170 projecting forwardly from the lower end of the lever 100 and the inner end of the pin, as shown in Fig. 4, has a bearing in the body portion of the lever.

The other end of the transverse pin 166 forms a pivot for a toggle link 172 which extends upwardly at an angle of about 40° and has its upper portion bent toward the horizontal. The upper end of the toggle link 172 is pivotally connected by a pin 174 to a boss which extends downwardly from the lower end of a rectangular member 176, hereinafter referred to as the "block". The block 176 is cut out at its central portion and is supported in a substantially vertical position by means of a toggle of which the link 172 is a part and a third link located above the toggle, the toggle links forming the means whereby the block is connected to the gages which contact with opposite sides of the shoe. The construction and operation of the block will be explained more fully after the means for maintaining it in a freely floating vertical position has been described.

Projecting forwardly from the rear wall which connects the vertical side walls of the frame 10, and located opposite the outer shoe gage 156, is a boss 178 similar to the boss 153 on the lever 100. Slidably mounted in this boss is the shank portion 180 of another shoe-engaging member 182 consisting of a vertical plate adapted to engage the inner side of the shoe substantially at the ball line and opposite the gage 156. The plate 182 is held in position by means of a horizontal pin 183 extending through a hole in the boss directly above the shank portion 180, this shank portion extending through an opening in the wall 10 and having a rounded outer end. A transverse pin 184, mounted in the rear or outer portion of the shank 180, extends between a fork formed at the upper end of a substantially vertical lever 186 fulcrumed on a pin 188 mounted in a lug projecting rearwardly from the frame. The lower end of the lever 186 also has a fork which engages a pin 190 mounted transversely in a stud or rod 192 which is slidably mounted in a lug 194 projecting from the frame, the other end of the rod being supported in an opening in the frame. Pivotally secured to the opposite end of the pin 190 is the lower end of another toggle link 196 which extends upwardly and forwardly and is connected at its upper end to the pin 174 projecting from the block 176, the links 196 and 172 forming the toggle which supports the block 176.

The shoe gages 156, 182 are moved inwardly toward the shoe by power-operated mechanism, including a cam and mechanism connecting the cam with the block 176, which lowers the block to straighten the toggle and rotate the vertical levers 162 and 186 in opposite directions about their respective fulcrums, thereby forcing the upper ends of these levers toward the shoe until the side gages contact with the opposite sides of the shoe. When one gage contacts with the shoe so that movement of the vertical lever associated therewith is arrested, the toggle link connected to this lever will pivot about the lower end of the lever and cause the block 176 to move downwardly in an arc rather than in a vertical direction as the opposite shoe gage moves inwardly toward the shoe. It will be clear from the above that, unless both gages contact simultaneously with the shoe, the block 176 will be swung either to the right or to the left as it is lowered by the power-operated mechanism to bring both gages against the shoe. This action will centralize the block 176 relatively to the shoe or, in other words, will position the block laterally in accordance with the width of the shoe as measured by the shoe gages.

In order that the sole-positioning mechanism may function properly, it is desirable, as stated above, that the block 176 be maintained in a vertical position while the gages are being moved into and out of engagement with the sides of the shoe. Means is provided, therefore, for moving the upper end of the block with its lower end so that it will be maintained in a vertical position irrespective of the amount of movement of the vertical levers 162, 186. To this end there is pivotally mounted on a pin 198 (Fig. 4), carried by ears projecting rearwardly from the frame, a bell-crank-lever 200 having an upper arm to which is connected a downwardly extending link 202. The lower end of the link 202 is pivotally connected to a horizontal arm 204 projecting from the central portion of the lever 186, the arm 204 being about the same length as the upper arm of the bell-crank-lever 200. The lever 200 has a curved arm 206 which extends downwardly for a distance substantially

equal to the length of the lower arm of the vertical lever 186. The arm 206 is forked at its lower end and engages a pin 208 which is transversely mounted in a rod 210 adapted to slide in a lug 212 projecting rearwardly from the frame 10, the forward end of the rod bearing in an opening in the frame.

The other end of the transverse pin 208 is pivotally connected to a link 214 which extends upwardly at the same angle as the toggle link 196 and is pivotally connected to the upper end of the block 176 by a pin 216. When the lever 186 is rotated about its pivot 188 by movement of the toggle link 196, the link 214 (which is parallel to the link 196) will be moved an equal amount in the same direction by reason of the mechanism just described. Consequently, the block 176 will be maintained in a substantially vertical position regardless of the positions of the toggle links 172, 196.

The mechanism for positioning the outsole laterally or widthwise of the shoe bottom at the forepart of the shoe includes the gripping member 108 the shank portion of which is provided near its outer end with the laterally projecting pin 112. The pin 112 (Fig. 4) is engaged by the forked upper end of a vertical lever 218 fulcrumed on a pin 220 which is mounted in a lug 222 formed on the lever 100. The lower arm of the lever 218 is provided with an elongated vertical slot 224. Pivotally secured to the farther side of the lever 218, by means of a headed screw 226 which extends through the slot 224, is another vertical lever 228. The screw 226 is adjustable in the slot 224 so that the ratio of leverage between the levers 218 and 228 may be varied as desired, this variation being accomplished by the following construction.

An angle plate 230 is adjustably secured to the lever 100 about midway of its length by means of a screw 232 passing through a vertical slot 234 in the plate 230. One portion of the angle plate overlies the forward side of the lever 100 (the left-hand side as viewed in Fig. 4) and carries a horizontal pin 236 which extends forwardly and has loosely mounted thereon a block 238 (Figs. 1 and 4). The lever 228 is pivotally secured to the block 238 by means of the headed screw 226 which passes through a vertical slot 240 (Fig. 1) in the lever 228, the slot 240 being of the same dimensions as the slot 224 in the lever 218. The lever 228 is fulcrumed at its upper end on a cylindrical lug 241 projecting from a rectangular block 242. Threaded horizontally through an upwardly projecting portion of a lug 244 (Fig. 4) formed on the lever 100 is a screw 246, the inner end of which is reduced in size and is rotatably secured in an opening in the block 242. The screw 246 is provided with a knurled head 248 by which it may be turned to change the position of the fulcrum 241 of the lever 228. The lower end of the lever 228 is forked to engage a pin 250 extending transversely through a rod 252 mounted for sliding movement in the lever 100 and in a lug 254 projecting from the lower portion of the lever.

The purpose of the mechanism just described is to furnish means for adjusting the sole-gripping member 108 when operating on different styles of shoes. In some types of shoes the positions of the edges of the outsole widthwise relatively to the widest parts of the shoe varies somewhat due to the fullness of the lasts required in such shoes. Because of this, the gripping member 108 may have to travel a greater or a less distance relatively to the lower end of the lever 228, in order to introduce the outsole in a proper position with respect to the opposite edges of the shoe bottom. When operating on a shoe mounted on a last having a full inner portion, for example, the operator will loosen the screw 226 and move the angle piece 230 into a different vertical position, as determined by the shape of the last upon which the shoe is mounted. In making this adjustment he has changed the ratio of leverage between the upper and lower arms of the lever 218. Consequently, when the sole-positioning mechanism is operated in a manner to be later described, and sliding movement is imparted to the rod 252 to cause the lever 228 to rotate about its pivot 241, the screw 226, being now located a different distance from the fulcrum 220 of the lever 218 so that the length of the lower arm of this lever is changed, will cause the upper end of the lever 218 to be moved a greater or a less distance by a given amount of swinging movement of the lever 228, thereby causing the sole-gripping member 108 to be moved inwardly a proper amount for the style of last being utilized. If it is desired still further to vary the relation between the levers 218, 228, the fulcrum 241 may be moved to a different position by adjusting the block 242 through the screw 246.

It will be apparent from Fig. 4 that the sole-gripping member 108 constitutes a part of the positioning mechanism which locates the forepart of the sole relatively to the shoe bottom. The inner member of the sole-positioning mechanism comprises an abutment or gage 256 slidably mounted opposite the gripping member 108 in a lug 262 formed on the frame 10, the gage 256 being adapted to cooperate with the gripping member to position the forepart of the sole relatively to the shoe bottom. The gage 256 has a shank portion 260 mounted for sliding movement in the lug 262 and the forward end of the gage projects upwardly and has a vertical surface adapted to engage the inner edge of the sole opposite the gripping member 108. The opposite end of the shank 260 carries a horizontal pin 264 projecting laterally therefrom and extending between the forked upper end of a vertical lever 266 which is substantially the same length as the total length of the interconnected levers 218 and 228 which actuate the member 108. The lever 266 is fulcrumed on a pin 268 extending through ears on a lug 270 which projects rearwardly from the frame.

The lower end of the lever 266 is forked to engage one end of another horizontal pin 272 extending transversely through a rod 274 slidably mounted in the frame and in a lug 276 projecting rearwardly from the frame. The pin 272 has pivotally secured to its opposite end a toggle link 278 which extends upwardly at an angle and is pivotally connected at its upper end to another toggle link 280 by means of a pin 282. The link 280 is pivotally connected at its lower end to the transverse pin 250, aforementioned, mounted in the slide rod 252.

As viewed in Fig. 4 the toggle links 278, 280 are located rearwardly of the rectangular block 176. The connecting pin 282 projects laterally from the links 278, 280 and carries a roll 284. The rear side of the block 176 is provided with a vertical T-shaped slot forming a guideway 286 which extends centrally of the block and in this guideway

is mounted for reciprocating movement a slide member 288. The slide member also has a vertical slot 290 formed therein which is located centrally of the slide member and of the block 176, and the roll 284 extends into this vertical slot. The lower portion of the slot 290 is considerably wider than the roll so that the latter is free to move laterally or widthwise thereof. The sides of the slot converge toward the upper portion of the slide so that if the roll 284 is not located centrally thereof as the slide 288 is moved downwardly, the roll will engage one or the other of these converging side walls and will be forced over until its axis coincides with the vertical center line of the slide member. When the roll is in this latter position its axis will also coincide with the vertical center line of the block 176, since the slide 288 is located centrally of the block. In this way the toggle links 278, 280, which are connected respectively to the levers 266 and 228, and which, through these connections, control the positions of the sole-engaging members 108, 256, are thus centralized relatively to the block 176 and to the shoe gages 156, 182. After the shoe gages 156, 182 have been brought into engagement with the sides of the shoe, the toggle links 172, 196, the parallel link 214, and the block 176 will all be located in a predetermined position laterally of the shoe bottom which position is determined by the width of the forepart of the shoe. When the sole-positioning mechanism is operated, therefore, to locate the sole transversely or widthwise of the shoe bottom, the sole-engaging members 108 and 256 will be moved, through the operation of the slide 288, in such a manner as to position the forepart of the sole in a predetermined transverse position in accordance with the width of the shoe so that the periphery of the sole will extend the desired distance beyond the edge of the shoe bottom at each side of the shoe.

As stated, the gages for measuring or calipering the width of the shoe at the heel portion are operated in substantially the same manner as the gages for measuring the forepart of the shoe. The sole-gripping member 106 (Fig. 2) and the inner gage cooperating therewith are likewise operated similarly to the members 108 and 256 which contact with the forepart of the sole. The two sets of gages at the heel portions of the shoe and sole, however, are carried respectively by movable members located at each side of the shoe.

As already pointed out, the swinging lever 98 at the outer side of the shoe is rotatably mounted on the shaft 102 in such a manner that it can be adjusted heightwise of the shoe, this adjustment being provided to permit the gages to operate upon shoes having high heels and deeply arched shank portions as well as upon shoes having bottoms which are relatively flat from toe to heel. The shoe gage 157 (Fig. 2) has a shank portion 292 and mounted in the outer end of this portion is a laterally projecting pin 294. The pin 294 is engaged by the forked upper end of a vertical lever 296 pivoted on a pin 298 carried by a boss projecting from the lever 98. The lower end of the lever 296 is also forked to engage another pin 300 transversely mounted in a horizontal rod 302 which slides in an outwardly projecting lug 304 formed on the lower portion of the lever 98 and is guided at its inner end in the body portion of the lever. The opposite end of the transverse pin 300 forms the pivot for an inwardly and upwardly extending toggle link 306 which at its upper end is pivoted at 307 to the lower end of a substantially vertical rectangular block 308 similar in construction and operation to the block 176 of the forepart positioning mechanism. Extending downwardly at an angle from the pivot 307 on the block 308 is another link 310 which is pivotally connected at its lower end to a horizontal rod 314 by a pin 312 transversely mounted in the rod. The rod 314 is slidably mounted in a lug 316 projecting rearwardly from the lower end of an elongated vertical plate 318 (Fig. 6) which is located in a large opening 319 formed in the rear wall of the frame 10. The plate 318 is carried by a slide member 320 (Figs. 2 and 6) and is arranged for horizontal adjustment along the slide member on a tongue 322 which fits a horizontal groove 323 formed on the rear side of the slide member 320. The slide member 320 is secured to a forwardly projecting yoked portion 321 of the frame by screws 325 located in vertical slots formed in such portion, thus allowing the slide member to be adjusted vertically by means of another tongue and groove arrangement which will be more fully explained hereinafter.

The transverse pin 312 in the horizontal rod 314 (Fig. 2) is engaged by the forked lower end of a vertical lever 324 pivoted on a pin 326 in a lug projecting from the rear side of the vertical plate 318. The upper end of the lever 324 is forked to engage a horizontal pin 328 fastened in the shank portion 330 of another shoe-engaging member 332 which extends through an upwardly projecting lug formed on the forward side of the plate 318. The shoe gage 332 is of the same construction as the other shoe gages, having an elongated plate of substantial length for engaging the inner side of the heel portion of the shoe, this plate being maintained in vertical position by a horizontal guide pin 333 projecting rearwardly from the plate and sliding in a hole in the lug on the plate 318.

Slidably mounted in a boss on the plate 318, below the shoe gage 332 and directly opposite the sole-gripping member 106, is a sole gage 334 having a shank 336 which is provided with a horizontal pin 338. The pin is engaged by the forked upper end of a vertical lever 340 fulcrumed on a pin 342 which is carried by a lug on the rear side of the plate 318. The lower end of the lever 340 is forked to engage one end of a transverse pin 344 carried by a horizontal rod 346 slidably mounted in a lug projecting from the lower end of the plate 318. The other end of the transverse pin 344 forms a pivot for an upwardly inclined toggle link 348 which is pivotally connected at its upper end by a pin 350 to another toggle link 352, the link 352 extending downwardly and at its lower end being pivotally secured to a horizontal rod 354 by a pin 356 which is transversely mounted in the rod, the rod 354 being slidably mounted in a lug formed on the lever 98. The opposite end of the pin 356 is engaged by the forked lower end of still another vertical lever 357 which is fulcrumed on a cylindrical lug 358 projecting from the side of an adjustable block 360 which is adjusted by means of a horizontal screw 362 threaded through a lug 363 projecting forwardly from the lever 98.

Adjustably secured to the lever 357 is a lever 364 pivoted at 366 on a lug on the lever 98 and having a vertical slot 367 in its lower arm through which a stud 368 passes to secure both levers to a slide block 371 (Fig. 1) mounted on a horizontal pin 369, which pin is carried by an

angle plate 370 mounted on the lever 98 and may, by means of the angle plate, be adjusted heightwise relatively to the lever 98 to change the effective length of the lower arm of the lever 364, and thereby to vary the amount of swinging movement imparted to the upper end of this lever in the manner already described in connection with tl e levers 218 and 228. The upper end of the lever 364 is forked to engage the pin 110 previously mentioned as being mounted transversely in the shank portion of the sole-gripping member 106. The pin 350 (Fig. 2), which connects the toggle links 348, 352, projects laterally beyond the links and carries a roll 372 which enters a vertical slot in a slide member (not shown) mounted for reciprocative movement in the vertical block 308. The arrangement of the block, slide, and the means for supporting these members in an operative position need not be described in detail since it is practically the same as the mechanism previously described for supporting the block 176 and slide 288 which actuate the gages at the forepart of the shoe. The power-operated means referred to for bringing the various sole and shoe gages into engagement respectively with the sole and shoe, and for causing the sole gages to operate to position the sole laterally of the shoe bottom will next be described.

The toggle link 172 (Fig. 4), which is pivoted at 174 to the block 176, has pivotally secured to its upper portion, adjacent to the block 176, a downwardly extending link 374. The lower end of this link 374 is provided with a vertical slot 375 through which passes a horizontal rod 376 (Figs. 4 and 7). One end of the rod 376 is mounted in the outer extremity of an arm 378 and the opposite end is mounted in the upper arm of a bell-crank-lever 380 (Fig. 7), the arm 378 and the lever 380 being rotatably mounted on a fixed shaft 382 carried by a pair of lugs 384, 386 projecting forwardly from the frame 10. Fixed on opposite ends of the shaft 382, outside the lugs 384, 386, are downwardly projecting stationary arms 381, 383, which carry at their lower ends a rod 385. The toggle links 278, 280, which are connected to the gages that operate on the forepart of the sole and which carry the roll 284, have secured to the link 280 a substantially vertical link 388 (Figs. 4 and 7), which is also provided at its lower end with a vertical slot similar to the slot 375 and through which the rod 376 passes. The vertical links 374 and 388 are held downwardly so that the rod 376 will normally be positioned at the upper ends of the vertical slots by means of tension springs 387, 389, which extend from the lower ends of the links to the rod 385, as shown in Fig. 4.

The toggle links 306 and 310 (Fig. 2), which actuate the shoe gages located at the heel portion of the shoe, have connected thereto a downwardly extending link 390 (best shown in Fig. 7) which is provided in its lower end with a vertical slot through which the rod 376 passes and the upper pair of links 348, 352, which carry the roll 372, are likewise provided with a vertical link 392 having a slot through which the rod 376 passes. Each of these vertical links is urged downwardly so that the rod is normally positioned at the tops of the slots by means of tension springs extending between the lower ends of the links and the rod 385, these springs being indicated in Fig. 7 by the numerals 391 and 393. The lower arm of the bell-crank-lever 380 (Fig. 2) is pivotally connected by an intermediate link 394 to an upwardly extending arm of a large bell-crank-lever 396 fulcrumed on the shaft 28 and having a lower arm 397 provided with a roll 398. The roll 398 rides on the periphery of a cam 400 keyed to the cam shaft 34 and a tension spring 402, connected at one end to the bell-crank-lever 396 and at the other end to the fixed shaft 37, acts to hold the roll against the cam.

After the shoe has been mounted on the jack and swung downwardly into an upright position and the sole has been carried up and introduced between the shoe and the pad by the action of the cams 32 and 104, and after an interval has elapsed during which other mechanism yet to be described is operating, a depression on the cam 400 permits the roll 398 to descend under the influence of the spring 402 to rotate the bell-crank-lever 396 about the shaft 28 in a clockwise direction as viewed in Fig. 2. Rotation of the lever 396 causes the bell-crank-lever 380 to rotate in an opposite direction to lower the horizontal rod 376 in the vertical slots of the several vertical links. As the rod descends the springs connected to these links will pull the links downwardly thereby lowering the rectangular blocks 176 and 308 and moving the two sets of toggle links connected to the blocks into more nearly straightened positions. This movement of the toggle links causes the vertical levers which are connected at their upper ends to the various shoe-engaging and sole-positioning gages to be rotated more or less about their respective pivots until the shoe gages contact yieldingly with the opposite sides of the shoe and the inner sole gages contact with the inner edge of the sole. In bringing the shoe gages against the side of the shoe, the blocks 175, 308 will not only be moved downwardly but, as explained above, will also be moved laterally if necessary until they are located approximately centrally of the shoe bottom. The rolls 284 and 372, which are then located in the wide portions of the vertical slots in the slide members, and which are therefore free to move widthwise of the slots, may be moved either to the right or to the left by their respective toggles depending upon the distances which the sole-engaging or gripping members have to travel before the sole gages 256, 334 contact with the inner edge of the sole.

After the above action has taken place and the shoe gages and sole gages are all contacting with the shoe and sole, further means is provided for moving the sole-engaging members, that is, the sole-gripping members and the inner gages, transversely of the shoe bottom to position or centralize the sole laterally or widthwise of the shoe. Before entering upon a description of this mechanism, however, it will be well to describe the toe-positioning mechanism by which the machine automatically positions the toe end of the sole widthwise of the shoe and by which the sole is located longitudinally of the shoe bottom, since this mechanism is arranged to operate simultaneously with the mechanism described above for bringing the shoe gages and sole gages yieldingly into engagement with the shoe and sole.

The toe-positioning mechanism comprises a plurality of feelers or fingers (Figs. 8, 9 and 10) which are arranged to engage the toe ends of the shoe and sole and to locate these portions relatively to each other as the shoe gages and sole gages are locating the opposite sides of the sole relatively to the shoe. The positioning fingers or gages which engage the sole and shoe at their outer sides, that is, the sides nearest the operator, are arranged to swing outwardly (Fig. 8)

away from operative position together with the shoe gages and sole-gripping members which engage the shoe and sole at their outer sides and which, as described, swing into and out of operative position about the shaft 102. The swinging movement of the outer toe gages is accomplished by rotatably mounting the mechanism which supports these gages on the shaft 102 and by having this supporting mechanism extend through an opening or guideway in a bracket 406 (Figs. 1 and 8) extending laterally from the side of the swinging lever 100 which carries the outer shoe gage 156 and gripping member 108. As the lever 100 is swung toward and away from operative position by reason of its connection at 126 with the lever 98, the bracket 406 will carry the mechanism which supports the toe-positioning gages forwardly and rearwardly with these levers.

The bracket 406 extends toward the left, as viewed in Fig. 1, and is supported at its outer end by a downwardly extending arm 408 loosely mounted on the shaft 102. On the farther side of the bracket is a projection 407 (Fig. 8) provided with a vertical guideway 410 through which extends the upper portion of another bracket or arm 412 loosely mounted on the shaft 102 and provided with a pair of cylindrical bosses 409 and 411 located respectively below and above the bracket 406. The portion of the bracket 412 which is located within the guideway 410 has formed on opposite sides thereof a pair of projections or lugs 413 which slidably engage the side walls of the guideway and thus prevent the bracket from moving laterally therein. Mounted for sliding movement in the bosses 409, 411 is a shaft 414 which extends some distance beyond the upper boss 411 and has secured to its upper end a carrier member 416. The carrier member 416 has a projection formed thereon which extends upwardly and is bored lengthwise to receive a stationary rod 418 which is pinned in the carrier and projects upwardly beyond the carrier member, the rod having a plurality of laterally extending fingers or gages mounted thereon and arranged to engage the toe portions of the shoe and sole substantially at their tip lines.

The lower finger or gage 420 is pivotally mounted on the rod 418 and extends forwardly toward the shoe. This finger is provided with an enlarged end for engaging the edge face of the outsole substantially at the tip line when the positioning mechanism is in operative position. A rearwardly extending arm 422 (Figs. 1 and 9) of the finger 420 is provided with a downwardly extending portion having at its inner side a ground vertical surface 424 which is disposed at an angle of about 25 or 30 degrees to the longitudinal center line of the finger and which diverges outwardly toward the rear end of the arm. The gage member or finger mounted next above the finger 420 is pinned to the rod 418 and comprises a shorter arm 426 which projects inwardly relatively to the finger 420 and then extends forwardly toward the sole. This arm 426 has formed on its outer end a downwardly projecting lug 428 which is arranged to engage the tip end of the sole to locate it longitudinally of the shoe.

Pivotally mounted at the upper end of the rod 418 is a shoe-engaging finger 430 comprising a forwardly extending arm at the outer end of which is formed a downwardly projecting portion 432 of considerable length which is adapted to engage the toe portion of the shoe substantially at the tip line. The finger 430 has another arm 434 projecting rearwardly or toward the left, as viewed in Fig. 1, and having formed on its inner side an upstanding lug 436. An inner surface 437 (Fig. 9) of the lug 436 diverges outwardly toward the rear of the arm 434 at substantially the same angle as the inner surface on the rear arm of the finger 420.

The carrier member 416 is provided with a substantially horizontal arm 415 which extends toward the lever 100 and is provided at its end with a laterally projecting boss 417. The boss 417 carries a horizontal pin 439 upon which is pivotally mounted a connecting member or coupling 438. An outer cylindrical portion of the coupling 438 is perpendicular to the pin 439 and has an opening in which is slidably mounted a rod 440 which extends for some distance beyond the opening at either end of the coupling. The portion of the rod 440 which extends toward the lever 100, as viewed in Fig. 1, is secured in an elongated bushing 442 the inner end of which is provided with an upstanding lug 443. A pin 445 passing through the lug 443 pivotally secures the bushing to a boss on the inner side of the swinging lever 100. The bushing 442 is also provided at its under side with a circular lug 447 by means of which the bushing is connected to adjusting mechanism to be described later.

The positioning fingers or gages which contact with the inner sides of the sole and shoe and which, unlike the gage fingers just described, always remain in a vertical position, are carried by a member 444 (Fig. 8) mounted for horizontal sliding movement in a T-shaped slot 446 formed in the central portion of a projection or lug 448 which projects forwardly from the rear wall of the frame 10. The sliding member 444 is provided with an upstanding arm 450 at the upper end of which is a horizontal boss having a vertical hole formed therein. Mounted for sliding movement in this hole is a shaft 452, the lower end of which passes through a vertical opening in another horizontal boss 453 located at the central portion of the slide member 444. Secured on the upper end of the shaft 452 is a carrier member 454 having an arm 456 which projects forwardly, as viewed in Fig. 8, and which has pivotally mounted thereon a connecting member or coupling 458 similar to the coupling 438 on the member 416. The coupling 458 has slidably mounted therein a rod 460 which extends for some distance beyond the ends of the coupling. The portion of the rod 460 which extends forwardly or toward the shoe is fastened in an elongated bushing 462 provided at its inner end with an upwardly projecting lug 461 which is pivotally connected to a boss on the frame by means of a pin 464. The mechanism which connects the carrier member 454 to the frame 10 is practically the same in construction as the corresponding mechanism which connects the outer half of the toe-positioning means to the lever 100 and these mechanisms provide the means through which a vertical adjustment of the positioning fingers is obtained.

The carrier member 454 also has an upwardly projecting portion 465 which is bored vertically and has secured therein a rod 466 the upper portion of which projects for a considerable distance above the member 454 and provides supporting means for a plurality of positioning fingers arranged to engage the inner sides of the sole and shoe opposite the gage fingers 420, 430. A lower or sole-engaging finger 468 (Figs. 8 and 9), similar in construction to the finger 420, has a rearwardly projecting arm 469 provided with a ground surface 470 which is disposed at an angle of about

25 or 30 degrees in an opposite direction to the angle of the surface 437 on the rear or outer arm of the finger 420. Secured to the rod 466, above the finger 468, is a spacing bushing 472 and pinned to the rod above this bushing is a toe-engaging member 474 (Figs. 8 and 10) having a laterally extending portion 476 from which an arm 478 projects toward the shoe. The inner end of the arm 478 extends downwardly and is arranged to engage the toe end of the shoe. Rotatably mounted on a vertical pin 480 (Fig. 10) beneath the laterally extending portion 476 of the member 474 is a substantially horizontal arm 482 which extends rearwardly or away from the shoe and is provided with a centrally located slot 484. The sides of the slot at the inner portion of the arm 482 are substantially parallel and, toward the outer end of the arm, these sides diverge to form a wedge-shaped opening indicated in Fig. 10 by the reference numeral 487. The arm 482 is loose on the pin 480 so that it will be free to swing in either direction about the pin.

Pivotally mounted on the upper portion of the vertical rod 466, above the toe-end-engaging member 474, is a shoe-engaging member 488 having a forwardly projecting finger 489 with a lug 490 which projects downwardly for several inches and is adapted to engage the inner side of the shoe at about the tip line. A rearwardly extending arm 491 (Fig. 9) of the member 488 is provided with an upstanding lug 493 the inner surface 492 of which is ground and, as viewed in Fig. 9, diverges outwardly of the arm at an angle of about 25 or 30 degrees to the longitudinal center line of the finger 489.

The carrier member 454 has projecting horizontally from its lower portion a substantially rectangular bar 494 (Fig. 1) and mounted on this bar is a slide member 496. A portion of the slide member 496 projects upwardly and supports a vertical rod 498. Loosely mounted on the rod 498 is an elongated bushing 500 provided with a horizontal arm which extends at an angle toward the rear wall of the machine. This arm forms part of the mechanism which actuates the lower or sole-engaging fingers of the toe-positioning mechanism and since this mechanism is identical with the mechanism for actuating the upper or shoe-engaging fingers of this toe-positioning mechanism, a description of the latter mechanism, which is illustrated in Figs. 9 and 10, will be sufficient for a clear understanding of both mechanisms.

Loosely mounted on the rod 498, above the bushing 500, is another bushing 501 (Figs. 1, 9 and 10) having a horizontal arm 502 which extends inwardly of the machine at the same angle as the horizontal arm on the lower bushing 500. The outer end of the arm 502 pivotally supports another horizontal arm 504 which is normally located substantially at right angles to the arm 502 and carries at its forward end a roll 506 mounted on a stud 508. The lower portion 509 of the stud is enlarged and extends downwardly beyond the roll 506 into the slot 484 formed in the freely swinging arm 482 on the pivot 480.

The roll 506 is arranged to enter the wedge-shaped opening between the inclined vertical surfaces on the outer or rear arms of the shoe-engaging fingers 430, 489. The horizontal arms 502, 504 are maintained substantially at right angles to each other by means of a lug 512 formed on the outer end of the arm 504 and adapted to engage an upstanding projection 514 on the arm 502, a tension spring 515, secured at one end to a lug on the bushing 501 and at its other end to the lug 512, tending to force the lug against the projection 514 and thus to keep the arms normally at right angles to each other. As the slide member 496 is moved along the bar 494, the roll 506 is guided into the wedge-shaped opening between the inclined surfaces of the fingers 430, 489 by reason of the enlarged portion 509 of the stud 508 which contacts with one or the other of the converging side walls of the slot 484 in the swinging arm 482 and the roll 506, therefore, is centered relatively to the gage fingers as it reaches the narrow portion of the slot. As the slide member 496 continues its movement toward the shoe, the roll 506 will contact with one or the other of the inclined surfaces on the outer arms of the shoe-engaging fingers and will cause such finger to rotate about its pivot until it contacts with the side of the shoe which prevents its further movement. The roll 506 will then be caused to ride along the inclined vertical surface of this now stationary finger until it engages the surface on the opposite shoe-engaging finger. This finger will then be rotated until its forward end contacts with the side of the shoe substantially opposite the portion engaged by the first finger, thus bringing both fingers positively against the shoe.

While the above action is taking place, the lower toe gage operating mechanism, comprising two similar arms which are likewise held at right angles to each other by a spring, is being moved forwardly toward the shoe until the roll carried by the inner arm engages the inclined surfaces on the outer portions of the sole-engaging fingers 420 and 468. The lower roll, indicated in Fig. 1 by the numeral 516, is guided toward the inclined surfaces by means of a collar 517 arranged to enter the lower portion of the slot 484 in the freely swinging arm 482. After the shoe-engaging fingers 430, 489 have both contacted with the sides of the shoe, however, the arm 482 and, consequently, the slot 484 become temporarily fixed because the shoe-engaging fingers are stationary after contacting with the sides of the shoe. This causes the lower actuating mechanism, the position of which is controlled by the slot 484 by reason of the collar 517, to become centralized relatively to the upper actuating mechanism. Consequently, after the sole-positioning fingers have both contacted with the edges of the sole, they will be moved transversely of the upper mechanism until they are centralized relatively to the stationary shoe-engaging fingers, thereby positioning the toe end of the sole relatively to the toe portion of the shoe.

It has already been pointed out that the toe-positioning mechanism is moved longitudinally of the shoe toward the shoe and sole immediately after the shoe has been jacked and swung downwardly into an upright pressure-receiving position and before the swinging portion of the toe-positioning mechanism has been swung into operative position, this longitudinal movement permitting the shoe-engaging abutment 478 to contact with the toe end of the shoe and thereby to position the sole gage 428 so that the sole may be placed in engagement therewith as it is inserted between the outwardly inclined sole grippers 106, 108. In order to move the toe-positioning mechanism longitudinally toward the shoe there is provided an upwardly extending lever 520 (Fig. 1) pivotally mounted on a stud

518 in the frame and having at its upper end a roll 522 which enters a circumferential slot 524 formed in a spool-shaped portion 526 of the hub of the bracket 412 which supports the toe-positioning mechanism and is loosely mounted on the shaft 102. The lever 520 is provided with a yoked portion 528 (Figs. 1 and 11) and at the upper end of an arm 529 extending from the yoked portion is mounted a roll 530 (Figs. 8 and 11) which enters a vertical slot 532 in a forwardly projecting lug on a lower arm 533 of the slide member 444 previously referred to as carrying the inner toe-positioning mechanism and which, as stated, is arranged to slide in a T-shaped slot 446 formed in a projection on the frame. Pivotally mounted on the stud 518, inwardly of the lever 520, is a downwardly projecting lever 534 (Figs. 1 and 11) having an upper arm 536 which is arranged to contact with the horizontal crosspiece 528 of the yoked lever 520 when the lever 534 is rotated in a counter-clockwise direction, as viewed in Fig. 1. The downwardly extending arm of the lever 534 is provided at its lower end with a roll 538 which rides on the surface of a cam 540 mounted on the cam shaft 34. When the mechanism is in its initial position the roll 538 is located on a projection 542 of the cam and is held against the surface of the cam by a tension spring 544 extending between the lever 534 and the frame 10, the spring tending to rotate the lever in a clockwise direction. As the cam is rotated the roll 538 rides off the projection 542 and swings the upper arm 536 away from the yoked lever 520, thereby permitting this lever to be rotated in a clockwise direction by means of a spring-pressed plug 546 slidably mounted in a vertical opening in a projection formed on the side of the lever 534 and urged upwardly against a lug 548 on the lower portion of the lever 520 by a compression spring 549. As the lever 520 is rotated in a clockwise direction by the spring-pressed plug 546, the roll 522 causes the bracket 412 to be moved along the shaft 102 toward the shoe. The bracket 444 (Figs. 8 and 11) is also moved in the T-shaped slot 446 in the same direction as the bracket 412 by reason of the roll 530 on the arm 529 until the shoe-engaging abutment 478 on the inner or vertical portion of the toe-positioning mechanism contacts with the toe end of the shoe, after which, movement of the entire mechanism toward the shoe ceases. As shown in Fig. 1, the drop on the face of the cam 540 is sufficient to move the arm 536 far enough away from the lever 520 to permit the shoe-engaging abutment 478 to contact with the shoe irrespective of the size of the shoe.

The means for operating the slide member 496 and the mechanism carried thereby to actuate the toe-positioning mechanism comprises a long substantially vertical lever 550 (Fig. 1) pivotally mounted on a fixed stud 552 projecting forwardly from a boss on the frame. The upper end of the lever 550 carries a roll 554 which enters a vertical slot 556 formed in a lug 558 projecting downwardly from the under side of the slide member 496. The lower end of the lever 550 is also provided with a roll 560 which engages the face of a cam 562 mounted on the cam shaft 34, the roll 560 being held against the cam by means of a spring 564 connected at one end to the upper arm of the lever 550 and at the other end to the frame of the machine. The acting face of the cam 562 has a lateral projection 563 upon which the roll 560 rides as the cam is rotated, thus rotating the lever 550 in a clockwise direction, as viewed in Fig. 1, and swinging the upper end of the lever toward the shoe. This movement causes the slide member 496 to be moved along the horizontal bar 494 to carry the two pairs of horizontal arms toward the shoe until the rolls 506, 516 carried thereby contact respectively with the inclined vertical surfaces on the rear arms of the shoe-engaging and sole-positioning fingers. The projection 563 on the cam 562 is large enough so that this clockwise movement of the actuating mechanism will be sufficient to cause the fingers always to contact with the shoe and sole and to cause the sole-positioning fingers to be centralized relatively to the shoe-engaging fingers in the manner described, thereby positioning the toe end of the sole relatively to the toe end of the shoe.

It will be noted in Figs. 1 and 4 that after the side gages have been brought into engagement with the sole and shoe, as previously described, and the toe-positioning mechanism has been operated to position the toe end of the sole relatively to the shoe, the shoe is still located some distance above the sole. It will be apparent, therefore, that before any pressure can be applied to the shoe and sole they must first be moved into engagement with each other. The lowering of the jack and shoe until the latter engages the sole is accomplished through the rotation of the yoked lever 50 (Fig. 1) by the cam 88, as will be more fully explained hereinafter.

Since the forward ends of the arms 46 and 48 of the yoked lever 50 will travel in an arc as they move downwardly, they will carry the jack and shoe downwardly in an arc unless the jack is guided or supported in such manner that it will be obliged to move in a vertical path as the arms 46 and 48 descend. The arm 40 will cause the jack to move in a vertical plane as it is lowered by the lever 50. In order, however, to insure that the shoe itself will be maintained in a substantially vertical position as it is moved downwardly to engage the sole, the machine is provided with means for locking the inner or rear shoe gages 182, 332 (Fig. 6) in the positions they occupy after they have come into engagement with the inner side of the shoe so that they will act as a means for guiding and steadying the shoe in a fixed position relatively to the sole as the shoe moves downwardly. This locking means comprises a pair of substantially horizontal levers 566 and 568 (Figs. 6 and 10) fulcrumed for rotation into and out of the paths of movement of the shank portions of the inner shoe gages 182 and 332.

The locking lever 566 is pivotally mounted on a screw 570 threaded into a boss 572 projecting rearwardly from the frame. An inner arm 574 of the lever 566 is fan-shaped as seen in front elevation and is arranged to be moved into the path of movement of the shank 180 of the shoe gage 182. The acting surface of the fan-shaped arm slopes rearwardly from top to bottom to form a wedge-shaped section, as illustrated in Fig. 4. When this wedge-shaped section is rotated into the path of the shank 180 the inclined surface moves downwardly until it contacts with the rounded end of the shank so that the gage 182, which is at this time contacting with the shoe, will be locked against rearward movement until the arm 574 is rotated out of the path of the shank portion 180.

In order to rotate the locking lever 566 into

and out of operative position its outer end is provided with a pin 576 (Fig. 6) which extends into an elongated slot 578 in the upper end of a vertical rod 580 the lower end of which is pivotally connected to a cam lever 582 (Figs. 1 and 4) fulcrumed on the shaft 28. The lever 582 carries a roll 584 which rides on the periphery of a cam 586 and is held against the cam by means of a spring 588 extending between the lever 582 and the fixed shaft 37. Before the locking means is actuated the roll 584 is located on the low portion of the cam so that the fan-shaped portion of the lever will be held upwardly out of the path of movement of the shank portion 180 of the gage 182, the pin 576 at this time bearing against the top of the slot 578. As the cam is rotated to operate the locking means the roll rides up on a projection on the cam and elevates the link 580 to permit the locking lever 566 to rotate about its pivot 570 by reason of the weight of its fan-shaped portion. The projection on the cam 586 will raise the link 580 high enough so that the upper end of the slot 578 will travel a sufficient distance beyond the pin 576 to permit the lever 566 to rotate until its wedge-shaped portion engages with the rounded end of the shank portion 180 of the shoe gage 182 regardless of the position of such gage.

The locking lever 568, which is adapted to lock the inner side gage 332 in position against the heel portion of the shoe and which is similar in construction and operation to the lever 566, is fulcrumed on a lug 590 (Fig. 10) projecting from the inner side of the gage-supporting plate 318. A fan-shaped section 592 of this lever has a wedge-shaped end for engaging the shank 330 of the gage 332. The lever is connected to a vertical link 594 having a slot 596 in its upper end in which a pin 598 is located. The lower end of the link 594 is pivotally connected by means of a double pivotal arrangement 600 (Fig. 2) to the outer end of a cam lever 602 fulcrumed on the fixed shaft 28. The lever 602 carries a roll 604 which rides on the periphery of a cam 606 keyed to the cam shaft 34, the roll being held against the cam by a tension spring 608 connected to the lever 602 and the fixed shaft 37.

The operation of the locking lever 568 is the same as that of the lever 566, the roll 604 normally being located on a low portion of the cam 606 and, when the locking mechanism is actuated, riding up on a high portion of the cam to elevate the link 594 and permit the fan-shaped section of the lever 568 to swing downwardly behind the shank portion of the gage 332 until the inclined surface of the lever contacts with the rounded end thereof and thereby locks the gage against rearward movement.

Returning now to the mechanism for positioning the sole laterally of the shoe bottom, the machine is provided with power-operated means for moving the vertical slide members in the rectangular blocks 176, 308 downwardly in the blocks to centralize the sole-gripping and engaging members relatively to the shoe gages and thus position the sole widthwise of the shoe bottom. This means comprises an elongated bushing 610 (Fig. 7) loosely mounted on the shaft 382 between the arms 378 and 380 and carrying at one end a forwardly projecting arm 612 and at its opposite end a bell-crank-lever 614. The arm 612 and the upper arm of the bell-crank-lever 614 have mounted in their outer ends a rod 616. Located at each end of this rod, inside the arms 612, 614, are vertical links 618, 620 which, at their upper ends (Figs. 2 and 4), are connected respectively to the lower ends of the vertical slide members which are mounted in the blocks 176 and 308. The bell-crank-lever 614 has a downwardly projecting arm 621 (Figs. 2 and 6) to which is pivotally connected a forwardly extending link 622. The outer end of the link 622 is connected to the upper arm of a large bell-crank-lever 624 (Fig. 1) pivotally mounted on the fixed shaft 28 adjacent to the bell-crank-lever 396. A lower arm 626 of the bell-crank-lever 624 extends rearwardly and carries a roll 628 which rides on a cam 630. A tension spring 632 (Fig. 2) extending between the arm 626 and the rod 37 tends normally to keep the roll 628 against the periphery of the cam. The vertical links 618 and 620 aforementioned are provided at their lower ends with vertical slots through which the rod 616 passes, the links being held downwardly so that the rod 616 is normally positioned at the tops of the slots by means of tension springs 634 and 636 (Fig. 7) connected at their lower ends to the stationary rod 385. When the cam 630 is rotated in a clockwise direction, as viewed in Fig. 2, the roll 628, which is initially located on a high part of the cam, rides into a depression and rotates the bell-crank-lever 624 and, through the link 622, rotates the elongated collar or hub 610 about the shaft 382 to lower the forwardly extending arms 612 and 614. This permits the vertical links 618 and 620 to descend under the influence of the springs 634, 636 to lower the slide members in the blocks 176, 308. As the slides descend the rolls 284, 372 on the toggle links, which control the movements of the sole-gripping and engaging members at the forepart and heel portions of the sole, are moved by the converging side walls at the upper portions of the vertical slots in the slide members until the rolls are located at the centers of the slides, that is, until the axes of the rolls coincide with the longitudinal center lines of the slide members. The action of the slide members in thus centralizing the rolls relatively to the rectangular blocks which carry the slide members causes the sole-engaging members at the forepart and heel portions of the sole to become centralized relatively to the shoe-engaging members which, as explained above, have already positioned or centralized the blocks widthwise relatively to the shoe. Thus it will be seen that downward movement of the slide members operates to position the sole-engaging members relatively to the shoe-engaging members and in so doing positions the sole widthwise of the shoe.

In order to withdraw or retract the grippers, sole gages and outer shoe gages from engagement with the sole and shoe after the sole has been located widthwise of the shoe bottom and before the sole-attaching pressure is applied, the central portion of the sole is gripped between the shoe bottom and the pressure-applying means in a manner to be explained hereinafter, the inner or rear shoe gages, which have been locked against rearward movement, remaining, of course, against the shoe as the latter is lowered into engagement with the sole. When the sole has been thus gripped so that it cannot be displaced relatively to the shoe bottom, the cams 400 and 630 cause the bell-crank-levers 380 and 614 to be rotated in a reverse or clockwise direction, as viewed in Fig. 2, to elevate the vertical links to break the toggles and thus positively to retract the grippers, sole gages and the outer or free shoe gages. The floating arrange-

ment of the actuating means permits this retracting action to take place as well with the inner shoe gages locked as it would if they were free to be retracted, the only difference being that the mechanism will now operate about fixed centers or pivots provided by the stationary portion of the gages.

The description thus far has related chiefly to various means for engaging and positioning the shoe and sole. In order to include, with the description of these engaging and positioning means, mechanism with which the machine is provided for relatively adjusting certain parts thereof, it is necessary at this point to describe briefly the manner in which the shoe and sole are supported during the application of pressure thereto. Accordingly, the supporting member for the pad which applies pressure to the sole and shoe will now be described.

This pad-supporting member, indicated generally by the reference numeral **640** (Fig. 12), is made up of three relatively movable sections pivotally arranged in such a manner that adjustments may be made lengthwise of the support to bring its upper surface more nearly into conformity with the contours of different types or styles of shoes. The forepart or toe-supporting section of the support comprises a plate-like member **642** somewhat longer than the forepart of a shoe and provided on its under side with a downwardly projecting cylindrical portion **644**. This lower portion has formed therein, at right angles to the plate, a cylindrical opening **646** in which is mounted for reciprocative movement a piston or plunger **648**, the purpose of which will be explained later. The inner end of the plate **642** extends approximately to the ball line of the shoe and has formed on its lower side a pair of segmental lugs **650**, **652** (Figs. 4 and 12), the curved peripheries of which fit a correspondingly curved depression **653** formed in the upper end of a vertical wall **654** which projects outwardly from the rear wall **10** and furnishes a fixed pivot for the inner end of the plate **642**. A downwardly extending link **656** is pivotally connected by a pin **657** to the rear side of the cylindrical portion **644**, the lower end of the link being connected to the adjusting mechanism referred to, as will appear hereinafter.

The central section of the pad support is located approximately under the shank portion of the shoe and comprises another plate **658** pivotally secured adjacent to the heel end of the support by a pin **659** to the third section thereof which is located under the heel portion of the shoe. This third section comprises another plate-like member **660** having a pair of cylindrical lugs projecting downwardly from its under side, one of the lugs **661** (Fig. 12) containing a cylindrical chamber in which is slidably mounted another plunger similar in construction to the plunger **648** in the projection or lug **644**. The forward end of the middle section **658** carries a pair of segmental lugs **662**, **664** (Figs. 4 and 12) located outside of the lugs **650**, **652** and having arcuate lower surfaces which fit into the curved depression **653** mentioned above, the depression providing a stationary pivot for the middle section or plate **658**. The rear or heel supporting plate **660** is slidably mounted in a carrier member **666** by means of a longitudinal tongue **663** which fits into a horizontal slot **665** (Figs. 3 and 12) formed in the carrier member. The carrier member **666** is formed on the upper end of a vertical shaft **668** which is threaded into stationary arms **670** and **671** (Fig. 2) extending forwardly from the projection **321** on the frame **10**, this projection also supporting the slide member **320** which carries the gage-supporting plate **318**, as previously explained. The lower end of the shaft **668** is slidably mounted in a lug **673** (Figs. 1 and 2) which projects forwardly from the rear wall of the frame.

It will be apparent from the above that the construction of the pad support **640** is such that its forward or toe supporting portion **642** can be swung about the fixed pivot **653** in order to position this portion at an angle which will correspond to the angle of the forepart of the last in the shoe being operated upon. The heel section **660** of the pad support, through its threaded supporting shaft **668**, is arranged to be adjusted vertically or heightwise of the shoe to position it properly for shoes having different heel heights. As the heel section of the support is raised or lowered by means later to be described, the middle section **658**, by reason of its pivotal connection with the heel section, will be rotated into a greater or a less angle about its pivot in the curved depression **653**.

It will be noted that when the heel plate **660** is raised or lowered to position it in accordance with the shape of the shoe being operated upon, it is necessary that the shoe and sole positioning members or gages at this end of the shoe should also be raised or lowered a corresponding amount in order that their positions will not vary relatively to the pad support or the pad mounted thereon. Also, when the forward section **642** of the support is adjusted into a different angle, the toe positioning mechanism, which is located in a predetermined heightwise position with respect to the toe end of the support, must also be raised or lowered in accordance with such adjustment.

In order to effect these adjustments of the different sections of the pad support without changing the relative positions of the support and the different measuring and positioning gages, the machine is provided with a hand wheel **674** (Figs. 1 and 2), threaded on the vertical shaft **668** and located between the stationary arms **670**, **671** aforementioned, the wheel being thus maintained in a fixed position relatively to the shaft by reason of the stationary arms. By turning the hand wheel **674** the shaft **668** may be threaded upwardly or downwardly in the arms **670**, **671** so that any position of heightwise adjustment can be obtained as determined by the shape of the last or by the height of the heel desired on the finished shoe. This movement of the shaft **668** raises or lowers the carrier member **666** and the rear supporting plate **660** until the position of the latter corresponds to the height of the heel portion of the last.

Threaded on the shaft **668**, just below the arm **670**, is a spool-shaped collar **676** (Fig. 1) which is held in position by lock nuts **678** and **680**. The slide member **320**, which, it will be remembered, is mounted for vertical sliding movement in the projection **321** on the frame and which carries the inner gage-supporting plate **318**, has a downwardly extending arm **682** (Figs. 2 and 6) which projects forwardly at its lower end. This arm is provided with a vertical opening through which the lower portion of the shaft **668** is threaded, the arm engaging the shaft a considerable distance below the spool-shaped collar **676** and being secured thereto by lock nuts **686** and **688**. On its

forward extremity the arm is provided with a horizontal slot 684.

The lower stationary arm 670 (Fig. 1 and 2) of the projection 321 has secured by screws to its forward end another arm 690 which extends toward the right, as viewed in Fig. 1, and then curves downwardly. At its lower extremity the fixed arm 690 supports the outer end of a horizontal shaft 692 which extends inwardly and is supported at its inner end in a boss formed on the frame. Above the shaft 692 and substantially opposite the spool-shaped collar 676 the arm 690 supports the outer end of another horizontal shaft 694 which also extends inwardly and is supported in a bearing in the frame. This upper shaft 694 has loosely mounted thereon an elongated collar 696 which is provided at its forward end, opposite the shaft 668, with a substantially horizontal yoked arm 698. The yoke 698 straddles the spool-shaped collar 676 and is provided with cylindrical lugs which enter the circumferential slot in the collar.

Farther inwardly on the elongated collar 696 is a shorter arm 700 which extends downwardly and has pivotally connected to its lower end a slightly curved link 702 which extends toward the left, as viewed in Fig. 1, and is pivotally connected at its other end to a downwardly extending arm 704 formed on another elongated collar 706 (Fig. 4). The collar 706 is loosely mounted on a horizontal shaft 708 supported by a fixed arm 710 projecting downwardly from a horizontal shelf or ledge 711 which extends between the stationary arm 670 and the vertical wall 654 which forms the fixed pivot for the forepart and shank sections of the pad support 640, the inner end of the horizontal shaft 708 having a bearing in the frame. The collar 706 has a substantially horizontal arm 712 (Figs. 1 and 4) which extends toward the left and is pivotally connected to the lower end of the downwardly extending link 656 previously described as being pivotally connected to the cylindrical projection 644 on the supporting plate 642 and connecting this plate with adjusting mechanism.

As the hand wheel 674 is rotated to elevate or lower the heel section or plate 660 to accommodate a shoe having a heel of a certain height, the yoked arm 698 will be rotated about its pivot 694 and the lower arm 700 will move the link 702 to cause the arm 704 to swing an equal amount in the same direction. This causes the horizontal arm 712 to raise or lower the link 656 and thereby to rotate the supporting plate 642 into a different angular position about the fixed axis 653. Thus, a heightwise adjustment of the heel section 660 of the pad support and an angular adjustment of the forward section 642 are accomplished simultaneously through the operation of the single hand wheel 674.

It will be clear that when the rear or heel section of the pad support is elevated or lowered, the shoe gages and sole engaging members located at this portion of the shoe and carried by the swinging lever 98 and the vertical plate 318, must also be raised or lowered a corresponding amount if their heightwise positions relatively to the support are to remain the same. Moreover, the positioning fingers which locate the toe end of the sole relatively to the shoe must be raised or lowered in accordance with the amount which the forward end of the supporting plate 642 is swung about its pivot 653 to position it at a proper angle to accommodate the shoe.

In order, therefore, that the sole and shoe gages at the heel end of the shoe and the toe gages may be adjusted heightwise of the support distances which are proportional to the heightwise movements of the supporting sections or plates 642 and 660, there is loosely mounted on the horizontal shaft 692 (Figs. 2 and 6) an elongated collar 714 having near its forward end a pair of arms 716 and 720 located substantially at right angles to each other. The arm 716 extends toward the threaded shaft 668 and is provided with a roll 718 which enters the horizontal slot 684 formed in the forward end of the arm 682 projecting from the lower end of the slide member 320. The arm 720 extends downwardly and carries at its lower end a roll 722 (Fig. 1) which rides in the second circumferential slot 143 formed in the spool-shaped collar 144 previously described as being slidably mounted on the shaft 102.

When the vertical threaded shaft 668 is adjusted up or down, the slide member 320 (the lower arm 682 of which is secured on the shaft by the lock nuts 686, 688) is moved an equal amount in the same direction by reason of a vertical groove 724 (Fig. 6) in the projection 321 in which a tongue 726 formed on the forward side of the slide member is located. Movement of the slide member in the groove 724 is permitted by vertical slots 728, 730 in the projection 321 and in which are located the headed screws 325 that support the slide member in the projection. As already pointed out, the vertical plate 318 is carried by the slide member 320. Consequently, when the threaded shaft 668 is adjusted heightwise to raise or lower the pad supporting plate 660, the inner shoe and sole engaging members 332 and 334 on the plate 318 are raised or lowered an amount which is proportional to the heightwise movement of the plate 660 by reason of the vertical movement of the slide member 320 which carries the plate 318.

The shoe gage 157 (Figs. 1 and 2) and the gripping member 106, which are mounted on the lever 98 and which engage the outer sides of the shoe and sole at the heel portions thereof, are moved heightwise with the pad supporting plate 660 through the arrangement of the arms 716 and 720, on the elongated collar 714, and the bell crank lever 130, which has the rounded end of its upper arm located in the recess 128 formed in the side of the lever 98. It will be remembered that the lever 98 is not mounted directly on the shaft 102 but, as shown in Fig. 5, is adjustably secured to the vertical plate 114 so that the lever is free to be adjusted vertically or heightwise of the shaft 102 about which it rotates. Consequently, when the threaded shaft 668 is, for example, adjusted upwardly to raise the supporting plate 660, the arm 716 (Fig. 6), which carries the roll 718 located in the horizontal slot 684 of the arm 682, is rotated about its pivot 692 in a clockwise direction to move the lower arm 720 toward the left. The spool-shaped collar 144 is thereupon moved along the shaft 102 and the arm 138 is rotated in a clockwise direction to elevate the arm 130, thereby causing the lever 98 to slide upwardly on its supporting plate 114 to raise the sole and shoe engaging members 106 and 157 an amount proportional to the movement of the shaft 668. The arrangement of the mechanism is such that the lever 98 and the plate 318 will be moved equal distances so that the opposite gages will be maintained in the same horizontal plane in any position of adjustment.

In order to effect a heightwise adjustment of the toe positioning fingers as the forepart section

642 is swung into different angles to conform to the bottom contours of different shoes, there is provided on the elongated collar 706, aforementioned, a downwardly extending arm 732 (Figs. 1 and 4) of considerable length which carries on its lower end a roll 734. The roll enters a peripheral slot 736 in a spool-shaped collar 738 slidably mounted on the shaft 102. The collar 738 has a second peripheral slot 740 formed therein in which ride two more rolls 742 and 744 (Figs. 1 and 8), the roll 742 being located at the forward side of the spool and the roll 744 at its rear side. The roll 742 is carried by a downwardly extending arm 746 formed on a bushing or hub 748 which is loosely mounted on a shaft 750 secured in bearings on the opposite side walls of the yoked portion of the bracket 496 which, as stated above, projects laterally from the side of the gage-supporting lever 100. Another arm 752 on the hub 748 extends horizontally and substantially at right angles to the arm 746 and is pivotally connected to the lower end of an upwardly extending link 754. The upper end of this link is pivotally secured to the circular lug 447 formed on the under side of the elongated bushing 442 which is secured by the pin 445 to the swinging lever 100 and which carries the rod 440 on which the connecting member 438 slides, the latter, as stated, being pivotally mounted on the horizontal arm of the carrier member 416.

The inner roll 744 in the slot 740 is carried by the lower end of an inclined arm 756 (Fig. 8) which projects downwardly from an elongated hub 758 loosely mounted on a fixed horizontal stud 760 the reduced inner end of which extends through an opening in the frame and is secured thereto by a nut 762. The hub 758 is provided with a laterally extending arm 764 which is located substantially at right angles to the arm 756 and has pivotally secured to its outer end a link 766 which extends upwardly and is pivotally connected to a circular lug 768 formed on the under side of the elongated bushing 462 located opposite the bushing 442 and pivotally connected by the pin 464 to a boss on the frame.

When the pad supporting plate 642 at the forepart of the shoe is rotated about its pivot 653, the mechanism just described accomplishes a corresponding heightwise adjustment of the toe positioning mechanism in the following manner. Rotation of the arm 704 by movement of the connecting link 702 causes the long arm 732 (Figs. 1 and 4), which is on the same hub as the arm 704, to swing about the shaft 708. If, for example, the supporting plate 642 is to be adjusted into a greater angle to the horizontal by the hand wheel 674, the arm 732 will be swung toward the left, as viewed in Fig. 1, thereby moving the spool-shaped collar 738 toward the left along the shaft 102 and swinging the arms 746 and 756 in a clockwise direction to elevate the horizontal arms 752, 764. The connecting links 754, 766 are thereupon moved upwardly to rotate the free ends of the elongated bushings 442, 462 and the rods 440, 460 carried thereby, upwardly about the centers 445, 464. The toe gage carriers 416, 454, the horizontal arms of which are connected by the couplings 438, 458 to the rods 440, 460, are thus moved upwardly by the swinging movement of the rods. Since the toe gage carrier members 416, 454 are pinned on the shafts 414, 452 which slide in the brackets 412, 444, upward movement of the carrier members must be in a vertical direction, this movement being permitted by the fact that the couplings 438, 458 are free to slide along the rods 440, 460 as the rods swing upwardly about the centers 445, 464. Thus it will be seen that when the hand wheel 674 is rotated to adjust the heel end supporting plate 660 heightwise of the shoe and to swing the forepart supporting plate 642 into a different angle relatively to the horizontal, not only are the sole and shoe gages at the heel portion of the shoe moved in a vertical direction an amount equal to the movement of the supporting plate 660, but the toe positioning fingers are also adjusted heightwise in accordance with the heightwise movement of the forward end of the supporting plate 642.

It may be necessary, especially in a shoe which is to have a high heel and in which the steep incline of the arch at the shank portion substantially reduces the length of the shoe, to adjust the heel gages longitudinally of the shoe in order to permit them to contact with the sides of the shoe and sole at the desired position, this position preferably being located approximately at the heel breast line. In order to permit such an adjustment to be made, the machine is provided with manually operable means comprising a forwardly extending lever 770 (Figs. 1 and 2) pivotally mounted for horizontal swinging movement about a pivot pin 772 carried by ears 774 formed on the rear wall of the frame, the lever 770 being provided with a handle 776 by which it can be manually rotated about its pivot 772.

Formed on one side of the hand lever 770, about two thirds of its length forwardly of its pivot, is a lug 778 to which is pivotally secured a horizontal link 780 (Fig. 1). This link is connected to the central portion of a crooked arm 782 projecting upwardly from an elongated collar or hub 784 (Fig. 2) which is loosely mounted on a horizontal shaft 786, the upper portion of the arm 782 being substantially vertical. The shaft 786 extends through an opening in the frame and, at the rear side thereof (Figs. 1 and 2), carries an arm 788 which extends toward the right, as viewed in Fig. 1. The upper portion of the upwardly projecting arm 782 is forked, as shown in Fig. 5, and engages a circumferential slot 790 formed in the spool-shaped lug 124 on the vertical plate 114.

The arm 788 is pivotally connected to the lower end of an upwardly inclined link 792 which is pivotally secured at its upper end to a horizontal arm of a bell-crank lever 794 (Figs. 1 and 6), the lever 794 being pivoted on a stud 796 mounted in a lug projecting rearwardly from the wall of the frame, as shown in Fig. 2. The upper arm of the bell-crank lever 794 carries a roll 798 (Figs. 2 and 6) which rides in a vertical slot 800 formed in a lug 802 projecting laterally from the side of the vertical gage-supporting plate 318. When the hand lever 770 is moved, for example, toward the left, as viewed in Fig. 1, to move the heel gages into position to operate on a shoe requiring a high heel and having a relatively short shank portion, the forked arm 782 is swung toward the left to slide the gage-supporting lever 98 along the shaft 102 toward the toe of the shoe. The bell-crank lever 794, through the arm 788 and inclined link 792, is rotated about its pivot 796 in a counterclockwise direction to move the roll 798 toward the left and thus slide the gage-supporting plate 318 toward the left in the horizontal groove 323 in which the plate is slidably mounted by the tongue 322 aforementioned, this sliding movement being equal to the lateral movement of the lever 98. In this way the gage members which operate on the heel portions of the shoe and

sole may be adjusted longitudinally or lengthwise of the shoe until they are located substantially at the heel breast line.

The means illustrated herein for applying the sole-attaching pressure to the sole and shoe and for supporting the sole during the application of such pressure, comprises a substantially rectangular bag or pad **804** (Fig. 12) adapted to accommodate either a right shoe or a left shoe, as the case may be, and composed of rubber or a composition thereof which can be readily distorted by the application of pressure thereto. The pad is adapted to fit the upper surface of the sectional support **640** with the longitudinal median line of the pad registering with the median line of the support and the periphery of the pad registering with the edges of the support, the pad being maintained in this position by two pairs of small clamping plates **806** and **808** (Figs. 1 and 2), screwed respectively to the forward section or plate **642** and to the rear plate **660**. The pad has an upper layer **810** of material (Figs. 12 and 14) and a lower layer **812** which are vulcanized or cemented together at the marginal portion **813** of the pad to form an air-tight chamber or compartment.

The upper and lower layers of the pad are also cemented or vulcanized together throughout a limited area at the central portion of the pad to form a solid layer of material of substantial thickness at this portion which conforms in shape to the periphery of a sole but is somewhat smaller than an ordinary sole, as indicated by the dotted line area denoted by the numeral **814** in Fig. 14. The portions of the upper layer **810** which are located between the opposite lateral margins of the pad and the solid central portion are comparatively full, as shown in Figs. 15 to 17, inclusive and are flexible so that they will bulge up to provide an air-tight compartment or chamber between the upper and lower layers of the pad. The layers are also secured together at each side of the solid central portion at small areas which extend transversely of the pad at about the ball line of the shoe, these areas terminating at the opposite marginal portions of the pad and thereby separating the large marginal compartment into a forward compartment **816** and a rear compartment **818**. The inner boundaries of these two compartments are, of course, formed by the solid material at the central portion of the pad, which, as stated, conforms in shape to the periphery of a sole, and the outer edges of the compartments extend to the margins of the pad.

The lower layer of material **812** of the pad has still another compartment or chamber **820** formed on its under side, this compartment extending transversely of the pad (Figs. 12 and 14) and being located so that its longitudinal center line will lie about under the ball line of a shoe mounted thereon. The lower compartment **820** is wide enough to permit the portions thereof which are located at opposite sides of its longitudinal center line to overlap the adjacent portions of the separate compartments **816** and **818** for considerable distances, as shown in Fig. 14, so that the compartment **820** will underlie the greater part of the shank portion of the shoe. Each of these three compartments is provided with a separate opening through which fluid under pressure may be admitted to inflate such compartment and apply pressure to the shoe and sole after they have first been pressed against the pad. Before fluid under pressure is admitted to the marginal compartments or the shank compartment, however, the deflated pad is elevated at its solid central portion, as will be presently explained, to bring this portion into engagement with the bottom of the sole which is at this time being supported by the gripper members **106**, **108** and the gage members **256**, **334** between the pad and the bottom of the shoe. While the central portion of the pad is being moved against the bottom of the sole the shoe is being lowered into engagement with the upper side thereof so that the sole is now gripped between the pad and the shoe bottom with a pressure sufficient to prevent the sole from thereafter becoming displaced relatively to the shoe bottom. The shoe is then pressed forcibly against the sole to force the solid central portion of the pad downwardly again against the upper surface of the pad supporting member **640**.

The central portion **814** of the pad is elevated to bring it into engagement with the sole by reciprocation of the plunger member **648** (Fig. 12) and a similar plunger **822**, which are mounted respectively for reciprocative movement in the cylindrical chamber **646** in the projection **644** and a cylindrical chamber **824** in the projection **661** which was previously described as projecting downwardly from the under side of the heel-supporting plate **660**. The plungers **648** and **822** are provided respectively at their upper ends with circular disks **826**, **828** somewhat larger in diameter than the body portion of the plungers for engaging the under side of the solid portion of the pad and holding such portion in an elevated position, the disks being located in recesses formed in the supporting plates when the plungers are in their initial positions so that the upper surfaces of the disks will register with the upper surface of the supporting member. The lower portions of the plungers **648**, **822** fit slidingly in the cylindrical chambers **646**, **824** and have small threaded stems projecting downwardly from the enlarged portions. Mounted upon each of these stems between a pair of collars is a fiber washer which renders the lower portion of the chamber substantially air tight, the collars and washers being fastened to their respective stems by nuts. The upper surfaces of the enlarged lower portions of the plungers are arranged to contact with the upper walls of their respective chambers when the plungers are reciprocated upwardly, thereby limiting the upward movement of the plungers and of the central portion of the pad.

The plungers **648**, **822** are reciprocated in the chambers by fluid introduced under pressure into the lower portions of the chambers through tubes connected to a power-operated slide valve mechanism, indicated generally in Fig. 12 by the reference numeral **830**. This slide valve mechanism is adapted to supply fluid under pressure, for example, compressed air, to the chambers to operate the plungers at a certain time in the cycle of the machine and, at a later time, to admit fluid under pressure to the marginal and shank compartments as will be presently explained. The plunger chambers **646** and **824** are provided with openings in their lower portions in which are secured respectively air tubes **832** and **834**. These tubes extend downwardly in paths indicated by broken lines in Fig. 12 and at their lower ends connect with a short length of flexible tubing **836** which extends to the slide valve mechanism **830**, the flexible tubing permitting heightwise adjustment of the forepart and heel-supporting plates **642** and **660** without interfering with the connec-

tions between the chambers and the slide valve. At convenient locations on the tubes 832, 834 are mounted a pair of manually-operated pressure regulating valves 833 and 835 for controlling the pressure of the air admitted to the plunger chambers 646 and 824, these valves being of any well known construction and adapted to be adjusted by hand to admit a predetermined pressure into the chambers.

The slide valve mechanism 830 comprises an elongated hollow casing 838 secured in a substantially vertical position to the frame 10 by screws, the casing being open at its lower end. Projecting laterally from the right-hand side of the casing, as viewed in Fig. 12, are four cylindrical bosses located one above the other and spaced equidistantly from each other. Each boss has a horizontal opening or port which opens into the hollow space 840 inside the casing. The flexible tube 836 aforementioned is secured in the lowest boss which has a cylindrical opening or port 842.

An opening 844 in the boss next above the port 842 has secured therein a similar flexible tubing 846 connecting with a rigid tube 848 which is telescopically connected to a smaller tube 850. The tube 850 passes through a hole in the supporting plate 642 and, through a perforation 852 (Fig. 14) in the bottom of the pad, enters into the forward marginal compartment 816, the tube 850 being fastened to the lower wall of the pad by a pair of clamping nuts so that no compressed air can pass into or out of the compartment except through the tube. At some point along the rigid tube 848 is connected another pressure regulating valve 851 for controlling the air pressure admitted to the compartment 816. The next opening or port 854 in the casing 838 is provided with a flexible tube 856 which is connected by a rigid tube 857 to a small opening 858 in the lower chamber 820, which extends transversely across the shank portion of the pad. The tube 857 is also provided with a regulating valve 859 so that only the desired pressure will be admitted to the chamber 820. An opening 860 in the uppermost boss carries a tube 862 which extends longitudinally of the support and is telescopically connected to the lower portion of a smaller tube 864 which extends downwardly from a cylindrical boss 866 formed on a lug or ear 868 projecting from the rear or heel-supporting plate 660. The tube 862 has a regulating valve 863 thereon for controlling the amount of fluid pressure admitted to the heel compartment 818. The tube 864 passes through a central opening in the boss 866 and a hole 870 (Fig. 14) in the rear end of the pad and enters the marginal compartment 818 which, as stated, underlies the heel and a part of the shank portion of the shoe.

In order to insure against leakage at the point where the small tube 864 enters the compartment 818, that portion of the pad adjacent to the hole 870 is clamped against a conical recess in the upper surface of the plate 660 by means of a cone-shaped clamping member 872 provided with a hole 873 into which the tube 864 enters, the clamping member 872 being located inside the compartment 818. The clamping member is forced into the conical recess by a clamping foot 874 which is forced against the former member by a screw 876 connected to the clamping foot by a ball and socket arrangement, as shown in Fig. 12. The screw 876 is threaded into a yoked member 878 which is pivoted on the end of the plate 660, as shown in Figs. 1 and 2, so that the clamping foot 874 can be swung downwardly away from the member 872 when it is desired to remove the pad from the supporting plate 660.

Mounted for vertical reciprocating movement inside the hollow casing 838 is a slide valve 880 which is bored longitudinally to form an inner passage or opening 882 which extends from the top of the valve to a point a little below the port 842 at the bottom of the casing 838. The slide valve 880 also has four horizontal openings or ports formed therein adjacent to the openings in the casing 838, these ports being spaced equidistantly from each other heightwise of the valve in such a manner that when the valve is reciprocated upwardly in the casing its lowest port 884 will register with the lower opening 842 and admit compressed air to the plunger chambers 646 and 824 before the other ports register with the openings higher up on the valve casing. The regulating valves 833 and 835 on the tubes 832 and 834 will, of course, be set beforehand so that only the desired pressure will be admitted to the plunger chambers, this pressure preferably being sufficient to force the plungers to their uppermost positions and thus bring the solid central portion of the pad 804 into engagement with the under side of the sole without pressing forcibly against the sole.

As the slide valve is reciprocated a little higher a port 886, which is next above the port 884, will register with the passage 844 and admit compressed air to the marginal compartment 816 at the forepart of the pad and, by still further movement of the slide valve, a third port 888 therein will come into line with the opening 854 in the valve casing, thereby admitting compressed air into the lower compartment 820 which underlies the shank portion of the shoe. As the slide valve 880 nears the end of its upward movement, a port 890 still higher up on the valve is brought into line with the upper passage 860 in the casing to admit fluid under pressure finally to the marginal compartment 818 which is located at the rear or heel portion of the pad. Since all the inlet ports of the slide valve mechanism 830 are now open, the plungers will have been operated, the shoe and sole will have been lowered against the plungers to apply pressure to the central portions of the sole, and the compartments of the pad will have been inflated to apply pressure to the marginal and shank portions of the sole and shoe. Figure 18 shows the shoe after it has been lowered against the plungers and the forepart, shank and heel compartments have been inflated in the manner described to apply the full pressure to the shoe and sole.

The amount of air pressure which is supplied to these compartments will be governed by the manner in which the different pressure regulating valves are set and this, of course, will depend to a great extent on the type of shoe being operated upon. In most cases, however, the pressure in the forepart compartment 816 will be sufficient to conform the sole, especially at the margins, to the shape of the shoe bottom. The pressure applied across the shank of the shoe will necessarily be somewhat greater than the forepart pressure since the sole at this portion must be pressed into close engagement with the curve in the shank of the shoe. The pressure at the heel portion of the sole need not be very great since there is no necessity of conforming the heel end of the sole to the shape of the shoe bottom. If it is desired, however, to apply a substantially great pressure to the heel end of the sole as, for example, when cement is used at the

heel seat or in a sole leveling operation, this can be readily accomplished by a proper adjustment of the regulating valve associated with the heel compartment.

It will be apparent from the above that the arrangement of the ports of the valve mechanism is such that the plungers 648 and 822 will be operated to elevate the solid central portion of the pad against the bottom surface of the sole before any of the compartments are inflated. After this has happened the port 886 comes into line with the passage 844 and admits fluid under pressure to the marginal compartment 816 which is located under the forepart of the shoe. Before the forepart compartment 816 is inflated, however, the shoe and sole, as previously explained, must be pressed downwardly against the elevated central portion of the pad to return this portion substantially to its original position against the support so that when the forepart compartment is inflated the pad will expand under the marginal portion of the forepart of the sole and thus apply a pressure thereto which will be considerably greater than the pressure being applied to its central portion. This method of applying pressure to the shoe and sole will tend to wrap the sole around the shoe bottom and consequently to force the sole margins firmly into engagement with the marginal portions of the shoe bottom. In shoes in which the transverse curvature of the shoe bottom is relatively great, therefore, the sole will be slightly flexed or rounded transversely so that it will lie closely against the marginal portion of the shoe bottom. This method of applying pressure also insures that the sole will become securely attached to the shoe bottom at the marginal portion thereof regardless of the shape of the bottom surface of the shoe. It also permits the sole to become securely attached to the shoe bottom without pressing the inner or central portion of the sole against the shoe with such force that impressions of the irregularities of the central portion of a shoe bottom will be reproduced on the surface of the outsole to mar its smoothness and thus detract from the appearance of the shoe.

Since the forepart compartment 816 is inflated to apply pressure to the shoe and sole before the shank compartment 820 is inflated, it will be clear that the marginal portions of the forepart of the sole will be pressed solidly against the shoe before any pressure is applied to its shank or heel portions. Inflation of the shank and heel compartments successively causes the corresponding portions of the sole to be pressed progressively against the shoe bottom. By applying the pressure progressively from the toe to the heel end of the shoe the tendency of different sections of the sole, for example, the forepart and heel portion, to move relatively to each other longitudinally of the shoe and thus to become displaced lengthwise of the shoe bottom or to weaken the cement bond between the shoe and sole during the application of pressure is eliminated. Moreover, since the pressure will be applied to the shank portion of the sole while at least one portion is still relatively free to yield somewhat to permit the sole to be forced into the curve at the shank, that is, before substantial pressure has been applied to the margins of this portion to cause the adhesive to start to grip, a close fitting attachment of the sole at the curve in the shank portion of the shoe is always insured.

Fluid under pressure is supplied to the slide valve mechanism 830 by means of a supply pipe 892 (Fig. 13) connected at one end with any suitable source of supply such, for example, as a rotary pump, the supply pipe 892 being connected at its opposite end to the rear side of the valve casing 838 at 894 by any usual pipe connection. The reciprocating valve member 880 has an opening or inlet port 896 formed therein at the same heightwise position as its lowest port 884 and at right angles to such port, the port 896 opening into the central bore 882 of the valve and being in a position to register with the air supply opening 894 in the back of the casing when the lowest port 884 comes into alinement with the passage 842 in the valve casing 838. The upper end of the vertical bore or passage 882 in the valve member 880 is plugged by a screw 898. The valve 880 has another horizontal opening or port 900 formed therein at the side opposite the four supply ports previously mentioned, this port connecting with the central passage 882 and being located some distance above the highest air supply port 890. The port 900, which is the exhaust port, is arranged to register with an opening 902 formed at the top of the casing when the valve 880 has reached the upward limit of its reciprocating movement.

The construction of the valve mechanism is such that the inlet port 896 in the slide valve 880 will remain in communication with the air supply passage 894 at the back of the casing until after the top port 890 of the valve has come fully into alinement with the passage 860 which leads to the rear or heel compartment 818. After this compartment has been inflated, the inlet port 896 passes upwardly beyond the air supply opening 894 to shut off the supply of fluid under pressure to the slide valve 880. Consequently, the pressure remains on in the plunger chambers and in the compartments until the slide valve 880 has been reciprocated high enough to permit the exhaust port 900 to register with the opening 902 in the casing 838. Since the vertically alined ports in the slide valve 880 will still register with their corresponding openings in the casing as the exhaust port 900 comes into alinement with the opening 902 on account of the much greater diameter of the openings in the casing, the fluid pressure will be exhausted from the pad compartments and the plunger chambers simultaneously.

Mounted on the supply pipe 892 (Fig. 13), rearwardly of the cam shaft 34, is a two-way supply control valve 904 operated by an arm 906 extending downwardly from the valve. At its lower end the arm 906 is connected by a short link 908 to a cam lever 910 pivotally mounted on a stud 912 secured in a lug on the frame. The cam lever 910 carries a roll 914 which rides on the periphery of a cam 916 keyed to the shaft 34, the lever 910 being urged forwardly to hold the roll against the cam by a tension spring 918 secured at its other end to the frame of the machine. As the shaft 34 is rotated the cam 916 swings the lever 910 to the right, as viewed in Fig. 13, to open the control valve 904. Compressed air then travels through the supply pipe until it reaches the opening 894 in the casing 838 which is at that time closed by reason of the position of the slide valve 880. Later in the cycle the cam 916 automatically closes the control valve 904 and thereby shuts off the supply of compressed air to the slide valve 880, this action occurring while the slide valve is moving downwardly to its initial position during a portion of

which time the passage 894 to the source of supply will, of course, be open.

The slide valve 880 is reciprocated by a cam 920 mounted on the cam shaft 34 and actuating a roll 922 carried on the outer end of a cam lever 924 (Figs. 12 and 13) which is pivotally mounted on the shaft 28. The cam lever 924 is connected by a link 926 to the lower end of the slide valve 880. The periphery of the cam 920 is shaped so that the valve 880 will be reciprocated upwardly from its initial position after the supply valve 904 has been opened by the cam 916. As stated, when the port 896 registers with the passage 894 in the valve casing, compressed air fills the central passage 882 of the valve and passes out through the port 884 into the plunger chambers 646 and 824, the amount of pressure being reduced to the desired amount by the regulating valves on the inlet pipes 382, 384. The plungers 648, 822 are forced upwardly to lift the solid central portion of the pad upwardly away from the support 640. The distance which the plungers travel before their upward limit at the tops of the chambers is reached is a little greater than is necessary to bring the pad into engagement with the outsole B so that the pad will press lightly against the under side of the outsole which is being held above the pad by the sole-gripping members 106, 108. Fig. 12 shows the plungers operated and the middle or central section of the pad 804 contacting lightly with the under side of the outsole.

After the central portion of the pad has been raised from the support into engagement with the sole, the shoe A, which at this time is still in an elevated position some distance above the sole, must be lowered into engagement with the upper side of the sole so that the sole will be gripped between the pad and the shoe to permit the withdrawal of the gripper members and gages without displacing the sole. In order to lower the shoe the cam 88 (Fig. 4) causes the lever 84 to be rotated upwardly about its pivot 28 to elevate the vertical shaft 78 (Fig. 2) which, through the yoked member 74 and mechanism associated therewith, is connected to the inner yoked arm of the lever 50. When the yoked lever 50 is rotated about the shaft 18, the jack and shoe are lowered until the bottom surface of the shoe comes into engagement with the sole and exerts a pressure on the central parts of the forepart and heel portion of the sole sufficient to clamp the sole firmly in position, the shoe being maintained in pressure-receiving position during this movement by its engagement with the rear shoe gages 182 and 332 which are at this time locked in position.

In order to allow time for the rear shoe gages to be unlocked and for the outer shoe gages and the grippers and sole gages to be retracted after the shoe has been lowered to the sole, a yield is provided so that the shoe will not force the sole immediately against the central portion of the pad. This yield is furnished by the light spring 76 (Fig. 2) interposed between the yoke piece 73 and the top of the member 74, the spring being adapted to yield after the shoe engages the sole and thus permit upward movement of the shaft 78 without forcing the shoe and sole downwardly against the raised portion of the pad. While the back gages are still locked, the outer shoe gages, grippers and the sole gages are withdrawn positively from the shoe and sole through the reverse operation of the rectangular blocks, slides, and toggle arrangements in the manner previously described. The cam 88 then elevates the vertical shaft 78 still farther and, through the action of the heavy spring 94 against the member 74, causes the lever 50 to be rotated to press the shoe and sole forcibly against the pad, thereby lowering the plungers 648, 822 until the disks 826, 828 thereon are again located respectively in the circular recesses in the supporting plate section 642 and 660. The compression spring 94 is arranged to yield after a certain pressure has been applied to the shoe and sole, thereby permitting further rotation of the cam 88 without pressing the shoe too forcibly against the pad and its supporting member. After the shoe and sole have been pressed against the pad, the slide valve mechanism 830 is further operated to inflate the different compartments of the pad, starting first with the forepart marginal compartment 816 and then successively inflating the shank compartment 820 and the rear marginal compartment 818, thereby applying pressure progressively to the marginal and shank portions of the shoe and sole, this pressure being controlled in each case by the regulating valves so that the proper amounts of pressure will be exerted at different portions of the shoe and sole.

In the operation of the machine, briefly summarized, the operator, after making whatever mechanical and valve adjustments may be necessary or desirable for the particular shoe to be operated upon, mounts the shoe on the jack and trips the clutch to rotate the cam shaft 34. The cam 32 (Fig. 4) will thereupon cause the lever 20 at the top of the machine to rotate in a clockwise direction, as viewed in Fig. 2, and, through its connection with the jack supporting member 42, to swing the jack and shoe into a substantially vertical pressure-receiving position. The toe gage mechanism is next moved longitudinally of the shoe toward the toe end thereof by the operation of the cam 540 and the spring-pressed plug 546 (Fig. 1), thereby bringing the shoe-engaging abutment 478 into engagement with the toe end of the shoe. After the toe gage mechanism has moved forwardly the clutch is automatically thrown out of operation to permit the operator to insert a sole which, as stated, may be either a flat sole or a sole shaped to conform to the longitudinal contour of the shoe bottom, between the sole-gripping members 106 and 108, the operator placing the toe end of the sole against the abutment 428 so that the sole will be properly located lengthwise of the shoe. He then trips the clutch a second time to rotate the cam shaft 34 and complete the cycle of the machine.

As the shaft 34 continues to rotate, the swinging gage-carrying levers 98 and 100 and the outer portion of the toe-positioning mechanism are together swung upwardly about the shaft 102, through the action of the cam 104, until the arm 134 (Fig. 2) contacts with the fixed stop 136, thereby locating the sole-introducing mechanism in a substantially upright or vertical position. The vertical blocks 176 and 308 are next moved downwardly through the operation of the cam 400 (Figs. 2 and 4) to lower the horizontal rod 376 on the arms 378 and 380 and thus permit the tension springs to lower the vertical links which are connected to the different sets of toggles that actuate the shoe gages and the sole-positioning gages. The shoe gages are moved into engagement with each side of the shoe at the forepart and heel portions and the sole gages 256, 334 are moved into engagement with the sole.

Simultaneously with the actuation of the shoe and sole gages, the cam 562 (Fig. 1) moves the toe-gage-operating mechanism longitudinally of the shoe, along the slide bar 494, to actuate the shoe-engaging fingers 430, 489 and the sole-engaging fingers 420, 468 which are now brought into engagement respectively with the toe ends of the shoe and sole substantially at the tip line to position the toe end of the sole transversely with respect to the toe end of the shoe. The rear gage locking levers 566 and 568 are next rotated about their pivots by the cams 586 and 606 to lower the wedge-shaped portions of these levers until they engage the rounded ends of the shanks of the rear shoe gages 182 and 332, thereby locking these gages against rearward movement.

The slide members in the vertical blocks 176, 308 are reciprocated downwardly through the operation of the cam 630 (Figs. 1 and 2) to position the rolls 284 and 372 centrally with respect to the slide members and thus to cause the sole gages to move the sole laterally or widthwise of the shoe bottom until it is centralized in accordance with the width of the shoe. After the centralizing action has taken place, the valve 904 is opened by the cam 916 (Fig. 13) to permit fluid under pressure to pass through the supply pipe 892 to the inlet passage 894 in the valve casing 838. At the same time, the cam 920 causes the slide valve 880 to move upwardly until the inlet port 896 registers with the passage 894 so that fluid under pressure will enter the valve 880 and pass through the port 884 into the plunger chambers 646, 824, the amount of fluid pressure being controlled as desired by the pressure regulating valves on the inlet pipes which have been adjusted beforehand. The plungers 648, 822 are thus elevated from their initial positions to raise the solid central portion of the pad above the upper surface of the supporting member 640 and into engagement with the under side of the sole, the upward movement of the plungers, as stated, being limited by the top walls of the chambers so that the pad is brought only lightly into engagement with the sole. The cam 88 now rotates the yoked lever 58 to lower the jack and bring the shoe yieldingly into engagement with the opposite side of the sole, thereby gripping the sole between the pad and the shoe bottom so that it will be maintained in proper relation to the shoe when the grippers and sole gages are withdrawn. The spring 76 on the rod 72 yields to permit rotation of the cam 88 after the shoe has contacted with the sole.

After the shoe has been lowered into engagement with the sole so that the latter is gripped lightly between the pad and the shoe bottom, the gage-operating cams aforementioned raise the vertical blocks 176 and 308 and the slides carried thereby to retract the sole-gripping members, sole gages, and outer shoe gages from their engagement with the sole and shoe, the rear shoe gages, however, remaining fixed in position since they have been locked against rearward movement by the levers 574 and 592. The gages having been retracted the present method of putting the shoe under pressure consists in having the cam 88 further elevate the vertical shaft 78 to press the shoe and sole forcibly against the raised central portion of the pad to lower this portion substantially to the surface of the supporting member 640 against the resistance of the plungers 648, 822. In this manner a predetermined pressure is applied to the central portions of the forepart and heel portions of the shoe and sole. As the valve 880 continues its upward movement the port 886 comes into alinement with the second passage 844 to admit fluid under pressure to the forward marginal compartment 816 thereby inflating this compartment to apply a pressure to the marginal portion of the forepart of the shoe and sole which is considerably greater than the pressure being applied to the central portions thereof. The compartment 820 is next inflated to apply increased pressure to the shank portions of the shoe and sole, thus forcing the sole positively against the curved portion of the shoe bottom at the shank of the shoe before any marginal pressure has been applied to the heel portion of the sole. This method of applying pressure at the shank eliminates any tendency of the sole to move longitudinally of the shoe bottom after the sole has once been positioned. The upper port 890 now comes into alinement with the passage 860 to supply a considerably less amount of fluid under pressure to the rear marginal compartment 818 to cause a fairly light pressure to be applied to the margins of the shoe and sole at the heel portions thereof. The pressure in this compartment can, as stated, be increased if desired by proper adjustment of the pressure regulating valve. The shoe will remain under full pressure for a short period of time by reason of a dwell on the slide valve cam 920 after which the exhaust port 900 in the valve 880 will register with the outlet port 902 in the valve casing 838, to permit the pressure to be released simultaneously from the different pad compartments and from the plunger chambers, the ports in the slide valve 880 being still in line with the enlarged openings in the valve casing 838.

The cam 88 (Fig. 4) now permits the roll 86 to descend so that the jack and shoe with the outsole attached thereto will be lifted away from the deflated pad and the cam 32 causes the lever 20 to rotate in a counterclockwise direction to swing the jack and shoe outwardly toward the operator. The shoe gage locking levers 566 and 568 are next rotated out of the paths of the rear gages 182, 332 leaving the latter free to be moved rearwardly either by hand or by engagement with the inner side of the next shoe operated upon as the jack and shoe are swung downwardly into operative position. The outer shoe- and sole-engaging members on the levers 98 and 100, and the swinging portion of the toe-positioning mechanism, are now returned to their outwardly inclined initial positions by the cam 104 and the intermediate mechanism through which the cam actuates, and the toe-positioning mechanism is moved laterally of the machine into its original position. The different mechanisms of the machine having now all been returned to their initial positions, the shoe with its sole cement attached thereto may be removed from the jack and another shoe immediately mounted thereon, after which the cycle will be repeated.

As pointed out above, if the sole of the shoe which has just been removed from the machine was attached to the shoe by tacky rubber cement, it will now be permanently attached to the shoe bottom since cement of this type takes hold at once. If a slow drying cement, such as pyroxylin cement, was used in attaching the sole to the shoe, the latter is now mounted in the pressing device or rack previously referred to as being adapted to apply lighter pressure uniformly to the bottom of the sole until the cement has completely set. This rack or pressing device, as illustrated in Figs. 19 and 20, comprises a substantially rectangular frame 930 supported by legs 932 of a

length convenient for the operator and having casters 934 on their lower ends so that the rack can be moved from one location to another. At the upper portions of the legs are secured a series of horizontal crosspieces which support the ends of the frame and divide the latter into a plurality of compartments for receiving shoes and soles. Fig. 19, which is an end view of the rack, shows the front crosspiece 936 which connects the upper ends of the legs 932 and lower crosspieces 938 and 940 which are the front members of the plurality of crosspieces which divide the rack into upper and lower sections, each section having a separate row of compartments at each side of the frame. In cross-section the crosspieces 938 and 940 are L-shaped and the lower portions thereof form horizontal shelves which support pressure-applying units, the latter being securely fastened to the crosspieces by screws. The frame 930 is long enough to contain at least twelve compartments in each section and it may, of course, be constructed to accommodate as many more shoes as desired.

Fluid under pressure is supplied to the pressure-applying unit in each compartment by means of a pipe 942 connected at 944 to a supply pipe 946 coming from any usual source of fluid pressure supply such, for example, as an air compressor. The pipe 942 is securely fastened to the crosspieces at the forward end of the frame and has leading off therefrom at suitable locations substantially horizontal pipes 948 and 950 which extend across the length of the device midway between the opposite pressing units in the upper and lower sections. Each horizontal pipe is provided with a plurality of openings or passages for supplying fluid under pressure to the various pressing units and a short inlet pipe 952 extends between each opening and its corresponding unit. Between the connection 944, by which the rack is connected to the source of pressure supply, and the pressing devices is a cock 945 which is opened when the rack is connected to the supply pipe 946 and is closed when the rack is disconnected from the source of supply.

Each pressing device or unit, one of which is mounted in each compartment of the rack, comprises an elongated box-like member 954, open at the bottom and having top and side walls the upper surfaces of which are shaped to conform substantially to the longitudinal contour of the bottom of a medium-sized shoe. Extending across the top of the box 954 is a rubber diaphragm or pad 956 which comprises upper and lower layers secured together at their edges to form an air-tight bag which may be inflated to apply pressure to the shoe and sole. The bag is secured to a portion 960 extending outwardly from the top wall of the box by a narrow clamping plate 958 which conforms in shape to such wall and is fastened by screws 962 to said portion. These bags are stretched fairly tightly across the tops of the boxes of the pressing units so that very little pressure will cause them to become inflated to apply pressure to the shoes mounted thereon.

At about the center of the lower side of the bag or pad 956 is an opening in which is vulcanized or otherwise secured an inlet pipe 964 which extends downwardly and then rearwardly along the side of the box and is provided near the heel end of the box with a three-way valve 966 which is connected at its other end to the short supply pipe 952 previously mentioned. The valve 966 has a cylindrical plug or rotary member provided with a T-shaped passage which, when located in the position shown in dotted lines in Fig. 20, will connect the inlet pipe 964 with the short supply pipe 952 and thus permit fluid under pressure to enter the pad 956. When the cylindrical member is rotated a quarter of a turn in the opposite direction the inlet passage is closed and a connection is formed between the inlet pipe 964 and an outlet opening or port 968 formed in the lower side of the valve. The valve is operated by means of a short arm 970 the lower end of which is connected by a link 972 to a lever 974 rotatably mounted on a pin 976 secured in an upright post 978 fastened by screws to a lug on the side of the box. The lever 974 extends upwardly beyond its pivot for a short distance to form another arm which has a slot 980 formed in its upper end. An upright post equal in length to the post 978 is secured to the opposite side of the box and a rod 982 extends horizontally between the upper ends of these two posts. Pivotally mounted on the rod 982, approximately over the longitudinal median line of the pad, is a shoe engaging member 984 comprising a downwardly extending arm having secured on its lower end a member 986 shaped to engage the forepart of the upper side of a shoe, the member 986 having a covering of leather or fabric so that it will not scar the shoe upper. A handle 988 is mounted on the rod 982 adjacent to the member 984 and is held firmly against the latter member by means of a compression spring 990 so that the friction between the parts will cause movement of the shoe engaging member whenever the handle is moved. This spring arrangement is provided so that after the handle has moved the shoe engaging abutment 986 against the forepart of the shoe it can then be moved further to open the three-way valve 966 by means of a pin 992 carried by the handle and arranged to enter the slot 980 formed in the end of the upper arm of the pivoted lever 974. Fig. 20 shows the handle in broken lines located in its initial or inoperative position and, in solid lines, located in the position which it assumes after it has opened the valve 966.

Toward the rear end of the box, substantially in line with the heel breast line of the shoe, is another pair of upright posts 994 securely fastened to lugs on opposite sides of the box and carrying at their upper ends a horizontal shaft 996 which has mounted thereon, about midway between the posts, a roll 998. The roll is mounted eccentrically on the shaft 996 and is arranged to engage the cone portion of the last in a shoe as the latter is introduced on the pad of the pressing unit.

A shoe, for example the shoe A, which has had the outsole B temporarily attached thereto by pyroxylin cement in the manner previously described, is introduced heel end foremost into one of the pressing units in a compartment of the rack, and the roll 998 engages the cone of the last and is rotated about the shaft 996 until the shoe can be moved no further rearwardly owing to the roll having engaged the high portion of the cone of the last at the forward end thereof, thus locating the shoe properly on the pad of the pressing unit. The handle 988 is then moved downwardly about the pivot 982 until the shoe engaging member 986 contacts with the forepart of the shoe so that the shoe will now be supported both at the heel and at the toe portion against pressure applied upwardly against the bottom surface of the shoe. The handle 988 is then moved further about its pivot until the pin 992 enters the slot

980 and rotates the lever 974 in a counterclockwise direction to open the three-way valve 953 and thus admit fluid under pressure to inflate the pad 956. Inflation of the pad continues until pressure in the pad becomes equal to that at the source of supply, which preferably is about twenty pounds to the square inch. This pressure, which is uniform over the entire bottom of the sole, is not sufficient to cause any irregularities to be produced upon the tread surface of the sole and can, therefore, remain on until a shoe has been mounted in each compartment of the rack. The cock 945 may then be closed and the rack disconnected at 944 from the source of supply and wheeled away so that another rack can be brought up to receive more shoes, the shoes in the first rack still remaining under pressure. In this way the sole pressing machine can be operated at full capacity even when a slow-drying cement such as pyroxylin cement is used for attaching the soles to the shoe bottoms.

After the shoes have remained under pressure in the rack long enough for the cement to set thoroughly, they may be taken out of the compartments one at a time by moving the handle 988 on each pressing unit to its initial position, thereby opening the three-way valve and permitting the pad to exhaust through the outlet passage 968 previously referred to. When the pad is deflated the operator can easily remove the shoe from under the roll 988 since the pad will not be pressing the shoe upwardly against the roll 998. If desired the cock 945 may be opened and the pressure on all the shoes in the rack relieved at once.

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 for cement-attaching soles to shoes, the combination of means for engaging a shoe, a resilient pad for pressing a sole against the bottom of the shoe, and means for introducing and supporting the sole between the pad and the shoe bottom.

2. In a machine for cement-attaching soles to shoes, the combination of shoe engaging means, a pad for applying pressure to a sole to force it against the bottom of the shoe, and means movable substantially parallel to the shoe bottom for supporting the sole between the shoe and the pad.

3. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a flexible pad arranged to press a sole against the shoe bottom, and means for automatically introducing and holding the sole between the pad and the shoe bottom.

4. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a flexible pad for pressing a sole against the bottom of the shoe, means for automatically introducing the sole between the shoe bottom and the pressing surface of the pad, and means for distorting the pad to apply pressure to the sole.

5. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a flexible pad for pressing a sole against the shoe bottom, means independent of the pad for supporting the sole between the shoe bottom and the pad, means for moving the shoe and sole into engagement with the pad, and means for distorting the pad to apply pressure to the shoe and sole.

6. In a machine for cement-attaching soles to shoes, the combination of means for supporting a shoe, a flexible pad arranged to press a sole against the bottom of the shoe, means for supporting the sole between the shoe bottom and the pad, and means for effecting relative movement of the pad and the shoe to bring the pad into engagement with the sole.

7. In a machine for cement-attaching soles to shoes, the combination of a jack for a shoe, a flexible pad for pressing a sole against the shoe bottom, power-operated means for introducing the sole between the shoe bottom and the pad, means for bringing the pad into engagement with the sole, and mechanism for moving the shoe into engagement with the sole and for thereafter pressing the shoe and sole against the pad, thereby returning the latter to substantially its original position.

8. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a flexible pad for pressing a sole against the bottom of the shoe, power-operated means for moving the sole laterally of the shoe in a horizontal plane to introduce it between the pad and the shoe bottom, means for bringing a portion of the pad into engagement with the sole, mechanism for moving the shoe into engagement with the sole and for thereafter pressing the shoe and sole against the pad, thereby returning the pad substantially to its initial condition, and means for distorting the pad to apply pressure to the shoe and sole.

9. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a flexible pad for pressing a sole against the shoe bottom, means for moving the central portion of the pad into engagement with the sole, mechanism for moving the shoe into engagement with the sole and for thereafter pressing the shoe and sole against the pad until said central portion has been returned substantially to its original position, thereby causing pressure to be applied to the central portions of the shoe and sole, and fluid pressure means for distorting the marginal portions of the pad to apply pressure to corresponding portions of the shoe and sole.

10. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe in upright position, a flexible pad having an exposed wall for applying pressure to a sole to attach it to the bottom of the shoe, means for bringing the inner portion of said wall into engagement with the sole, mechanism for simultaneously moving the shoe against the sole and for thereafter pressing the shoe and sole against the central portion of said exposed wall, thereby returning the wall substantially to its initial position and applying pressure to the central portions of the shoe and sole, and fluid-pressure-operated means for distorting the margins of said wall to apply pressure to the marginal portions of the shoe and sole.

11. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a flexible pad for applying pressure to a sole to attach it to the bottom of said shoe, fluid-pressure-operated means for moving the central portion of the pad into engagement with the sole, mechanism for simultaneously moving the shoe toward the sole and for thereafter pressing the shoe and sole against the pad, thereby returning the central portion of the pad substantially to its original position, and means for inflating the pad to apply further pressure to the shoe and sole.

12. In a machine for cement-attaching soles to

shoes, the combination of means for engaging a shoe, a pad for pressing a sole against the bottom of the shoe, means for calipering the width of the shoe, and means operating independently of said calipering means for positioning the sole relatively to the shoe in accordance with such width.

13. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad for pressing a sole against the bottom of the shoe, means for calipering the width of the shoe, means for calipering the width of the sole, and means for moving the sole means relatively to the shoe calipering means to position the sole laterally of the shoe bottom.

14. In a machine for operating on soles and shoes, the combination of means for calipering the width of the shoe, means for calipering the sole, and means for centralizing said shoe calipering and sole calipering means relatively to each other to position the sole widthwise of the shoe.

15. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad for pressing a sole against the bottom of the shoe, means movable to measure the width of the shoe at its forepart and heel portions, members mounted independently of said measuring means for engaging the opposite sides of the sole at its forepart and heel portions, and means for moving the sole-engaging members laterally of the shoe an amount determined by the widthwise position of said measuring means.

16. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a pad for pressing a sole against the bottom of said shoe, means for measuring the widest portions of the shoe at the forepart and heel portion, means for engaging the sole at the forepart and heel portion, and power-operated means for centralizing said measuring means and said engaging means relatively to each other thereby to position the sole widthwise of the shoe.

17. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a pad for pressing a sole against the bottom of the shoe, means for calipering the width of the shoe at the forepart and heel portion, means for calipering the sole at the forepart and heel portion, and power-operated means for moving the sole calipering means laterally of the shoe calipering means an amount controlled by the positions of said shoe calipering means when contacting with the shoe, thereby to centralize said calipering means relatively to each other to position the sole widthwise of the shoe bottom.

18. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a pad for pressing a sole against the shoe bottom, means for introducing the sole automatically between the pad and the shoe bottom, and means for relatively positioning the shoe and sole.

19. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a pressure-applying pad, means for introducing a sole between the pad and the shoe bottom, means for relatively positioning the shoe and sole, and mechanism for effecting relative movement of the pad and the shoe thereby to apply pressure to the shoe and sole.

20. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a flexible pad for pressing a sole against the bottom of the shoe, means movable toward and away from the shoe for introducing the sole between the pad and the shoe bottom, means for positioning the shoe and sole relatively to each other, and mechanism for pressing the shoe and sole against the pad.

21. In a machine for cement-attaching soles to shoes, the combination of a jack for a shoe, a flexible pad for applying pressure to a sole which is to be attached to said shoe, means for relatively positioning the shoe and sole, and power-operated mechanism for moving the shoe into engagement with the sole and for thereafter pressing the shoe and sole against the pad.

22. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe in pressure-receiving position, a pad for pressing a sole against the bottom of the shoe, means for automatically introducing the sole between the pad and the shoe bottom, and means for positioning the sole in accordance with the width of the shoe.

23. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe in upright position, a flexible pad for pressing a sole against the bottom of said shoe, power-operated means for introducing the sole between the pad and the shoe bottom, and means controlled by the size of the shoe for locating the sole relatively to the shoe bottom.

24. In a machine for cement-attaching soles to shoes, the combination of a jack for a shoe, a pad for applying pressure to the shoe and to a sole which is to be attached to said shoe, mechanism for holding the sole and for moving it between the shoe bottom and a surface of the pad, and means cooperating with said mechanism for positioning the sole laterally of the shoe bottom, said means being constructed and arranged first to caliper the width of the shoe and then to shift the sole laterally in its own plane an amount determined by such width.

25. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a pad for pressing a sole against the bottom of the shoe, means movable transversely of the shoe for introducing the sole between the pad and the shoe bottom, and means for locating the sole relatively to the shoe bottom, said means operating first to caliper the width of the shoe and then to move the sole in its own plane an amount which is controlled by the width of the shoe.

26. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a pad for pressing a sole against the bottom of said shoe, gages for measuring the width of the shoe at the forepart and heel portion, power-operated means for introducing the sole between the shoe and the pad, and means for positioning the sole relatively to the shoe bottom, the operation of said means being controlled by the positions of the width gages after they have contacted with the shoe.

27. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe in pressure-receiving position, a flexible pad for pressing a sole against the shoe bottom, power-operated means movable transversely of the pad for introducing the sole between the pad and the shoe, and means for positioning the sole laterally of the shoe bottom, said means operating first to measure the width of the shoe at the forepart and heel portion and then to shift the sole laterally of the shoe bottom in a

direction and for a distance which are controlled by the width of the shoe.

28. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a pad for pressing a sole against the shoe bottom, sole-gripping means movable laterally of the shoe for introducing the sole between the shoe and the pad, gages for calipering the width of the shoe at the forepart and heel portion, and means cooperating with the sole-gripping means to move the sole laterally of the shoe bottom and thereby position the sole widthwise of the shoe, the positioning movement of the sole-gripping and cooperating means being determined by the positions of the shoe gages after they have contacted with the sides of the shoe.

29. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a yieldable pad for pressing a sole against the shoe bottom, sole gripping members movable to carry the sole between the shoe and the pad, a plurality of shoe gages movable into and out of engagement with opposite sides of the shoe substantially at the ball line and heel breast line to determine the width of the shoe at such points, sole gages cooperating with the gripping members to position the sole laterally of the shoe bottom, and connections between the shoe gages and the sole positioning members whereby said members are moved laterally an amount depending upon the positions of the shoe gages after the latter have contacted with the sides of the shoe.

30. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a pad for pressing a sole against the bottom of the shoe, grippers for introducing the sole between the pad and the shoe bottom, shoe gages for measuring the width of the shoe at its forepart and heel portion, means opposite the sole grippers and cooperating therewith for moving the sole laterally of the shoe and thereby positioning the sole in proper transverse relation to the shoe bottom, connections between the shoe gages and the sole positioning means whereby the latter is moved laterally an amount determined by the positions of the shoe gages, thereby positioning the sole in accordance with the width of the shoe, and means for operating the shoe gages and sole positioning means.

31. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe in upright position, an upwardly facing pad for pressing a sole against the bottom of the shoe, sole gripping members for presenting the sole between the shoe bottom and the upper face of the pad, shoe gages movable yieldingly into engagement with opposite sides of the shoe at the heel and forepart for calipering the width of the shoe at such positions, sole positioning mechanism comprising gages cooperating with the sole gripping members for positioning the sole transversely of the shoe bottom, said positioning mechanism being constructed and arranged to move yieldingly during its positioning movement, connections between the shoe gages and the sole positioning mechanism whereby movement of the shoe gages in contacting with the shoe determines the amount and the direction of movement of the sole positioning mechanism when positioning the sole so that the sole will be positioned in accordance with the width of the shoe, and power-operated means for moving the shoe gages and sole positioning mechanism relatively to each other.

32. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a resilient pad for pressing a sole on the bottom of the shoe, means movable into and out of operative position laterally of the shoe for introducing and supporting the sole between the pad and the shoe bottom, and means for operating said introducing and supporting means.

33. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a pad for pressing a sole on the shoe bottom, means for introducing the sole between the pad and the shoe, said means being movable into and out of operative position about an axis parallel to the longitudinal median line of the pad, means for pressing the shoe and sole forcibly against the pad, and means for withdrawing the introducing means from the sole before the shoe and sole are pressed forcibly against the pad.

34. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a flexible pad for pressing a sole on the shoe bottom, grippers for introducing the sole between the pad and the shoe bottom, said grippers being arranged to swing into and out of operative position about an axis extending lengthwise of the pad, mechanism for swinging the grippers into and out of operative position, means for pressing the shoe and sole forcibly against the pad, and means acting independently of the gripper swinging mechanism for withdrawing the grippers from engagement with the sole before it is pressed forcibly against the pad.

35. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a yieldable pad for pressing a sole against the bottom of the shoe, gripper members for receiving the sole and introducing it between the pad and the shoe bottom, said members being carried by levers arranged to swing about an axis parallel to the longitudinal median line of the pad, mechanism for swinging said levers about said axis, means for pressing the shoe and sole forcibly against the pad, and power-operated means operating independently of the lever actuating mechanism for withdrawing the gripper members from engagement with the sole before the latter is forced against the pad.

36. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe in upright position, an upwardly facing pad for pressing a sole against the shoe bottom, members for gripping a sole and presenting it between the pad and the shoe bottom, gages cooperating with the gripping members to position the sole transversely of the shoe bottom, means for actuating said gripping members and gages, means for effecting relative movement of the sole and shoe and the pad to bring the sole against the upper surface of the pad, and power-operated means for retracting the sole gripping members and gages simultaneously.

37. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a flexible pad for pressing a sole against the shoe bottom, gripper members for receiving a sole and introducing it automatically between the shoe bottom and the pad, power-operated levers for carrying said gripper members, said levers being arranged to swing from sole receiving into sole introducing position, shoe gages for measuring the width of the shoe at the forepart and heel portion, sole gages cooperating with the gripper members to position the sole relatively to

the shoe bottom in accordance with the positions of the shoe gages after the latter have contacted with the shoe, means for moving said shoe and sole gages into engagement respectively with the shoe and sole, means for preventing relative movement of the shoe and sole after they have been positioned, means for thereafter withdrawing the shoe gages, gripper members and sole gages, and power-operated means for pressing the shoe and sole forcibly against the pad.

38. In a machine for cement-attaching soles to shoes, the combination of a pad for pressing a sole on the bottom of a shoe, a jack for supporting the shoe during the pressure-applying operation, said jack being arranged to swing into and out of operative position relatively to the pad, mechanism for relatively moving the pad and the shoe and sole to press the sole against the shoe bottom, and means for maintaining the shoe in pressure-receiving position during the said relative movement.

39. In a machine for cement-attaching soles to shoes, the combination of a flexible pad for applying pressure to a shoe and sole, a jack for supporting the shoe during the pressing operation, said jack being arranged to swing from an outwardly inclined position into a substantially vertical operative position, means for moving the jack and shoe toward the pad to cause the sole to be pressed against the shoe bottom, means for maintaining the jack in said operative position during said movement, and means engaging the shoe independently of the jack for holding the shoe in pressure-receiving position.

40. In a machine for cement-attaching soles to shoes, the combination of a pad for applying pressure to a shoe and sole, a jack for supporting the shoe during the pressure-applying operation, said jack being arranged to swing in a predetermined path from an outwardly inclined position into pressure-receiving position, power-operated means for swinging the jack and shoe into and out of pressure-receiving position, means for introducing the sole between the shoe and the pad, power-operated means for moving the shoe into engagement with the sole and for thereafter pressing the sole and shoe against the pad, and means for maintaining the shoe in pressure-receiving position during said movement.

41. In a machine for cement-attaching soles to shoes, the combination of a pad for applying pressure to a shoe and sole, a jack for supporting the shoe during the pressure-applying operation, said jack being arranged to swing about a horizontal axis from an outwardly inclined position into a substantially vertical position, power-operated means for introducing the sole between the pad and the shoe bottom, means for moving the jack toward the pad to grip the sole between the shoe and the pad, said means being arranged to rotate about an axis located rearwardly of the jack, and means for maintaining the shoe in a vertical position during said movement.

42. In a machine for cement-attaching soles to shoes, the combination of a flexible pad for applying pressure to a shoe and sole, a jack for supporting the shoe with its side toward the operator while pressure is being applied thereto, said jack being arranged to rotate from an outwardly inclined position into a substantially vertical pressure-receiving position, grippers for introducing the sole between the shoe bottom and the pad, shoe gages for engaging opposite sides of the shoe at the forepart and heel portion to measure the width of the shoe at such portions, sole gages cooperating with the sole grippers to position the sole transversely of the shoe bottom, a lever for moving the shoe toward the pad to grip the sole between the pad and the shoe bottom after the sole has been positioned, said lever rotating about an axis located rearwardly of the jack, means for locking the shoe gages at the inner side of the shoe so that the shoe will be maintained in a substantially vertical position during said movement, and means for pressing the shoe and sole against the pad.

43. In a machine for cement-attaching soles to shoes, the combination of a flexible pad for applying pressure to a shoe and sole, a jack for supporting the shoe with its side toward an operator during the pressing operation, said jack being arranged to rotate from an outwardly inclined position into a substantially vertical pressure-receiving position, gages for calipering the width of the shoe at the forepart and heel portion, means for moving the shoe toward the pad to bring it against the sole, means for locking the gages at the side of the shoe remote from the operator prior to the movement of the shoe, thereby providing means for guiding the shoe during said movement, means for retracting the gages at the opposite side of the shoe after the shoe has engaged the sole, and means for unlocking the first-mentioned gages before the cycle is completed.

44. In a machine for cement-attaching soles to shoes, the combination of a flexible pad for applying pressure to a shoe and sole, a jack for supporting the shoe with its side toward an operator while pressure is being applied thereto, said jack being arranged to rotate from an outwardly inclined position into a substantially vertical pressure-receiving position, grippers for introducing the sole between the pad and the shoe bottom, shoe gages for engaging opposite sides of the shoe at about the ball line and the heel breast line to measure the width of the shoe at such points, sole gages cooperating with said grippers to position the sole transversely of the shoe bottom, the operation of said gages and grippers being controlled by the positions of the shoe gages, power-operated means for moving the shoe gages yieldingly against the sides of the shoe, said means acting also to bring the sole gages yieldingly against the sole and, upon further operation, to cause the grippers and sole gages to position the sole transversely of the shoe bottom, a lever for lowering the jack to move the shoe against the sole after it has been positioned, means for locking the shoe gages which engage the inner side of the shoe to maintain the shoe in a vertical position during the lowering movement, power-operated means for retracting the grippers, sole gages and the outer shoe gages after said movement of the jack, and means for unlocking said inner shoe gages before the cycle is completed.

45. In a machine for cement-attaching soles to shoes, the combination of a jack for a shoe, a pad for pressing a sole against the bottom of the shoe, means for introducing the sole between the pad and the shoe bottom, gages for calipering the width of the shoe at the forepart and heel portion, and means for relatively locating the sole and shoe widthwise, the operation of said means being controlled by the positions of the shoe gages after the latter have contacted with the shoe.

46. In a machine for cement-attaching soles to shoes, the combination of means for supporting a

shoe, a pad for pressing a sole against the bottom of the shoe, gages for measuring the width of the shoe at the forepart and heel portion, gages at the forepart and heel portion of the sole for positioning it in accordance with the width of the shoe as determined by the shoe gages, and means for simultaneously adjusting the sole and shoe gages at opposite sides of the heel portion of the shoe to accommodate shoes which are to have heels of different heights.

47. In a machine for cement-attaching soles to shoes, the combination of a pad for applying pressure to a shoe and sole, means for supporting the shoe during the pressing operation, gripper members for engaging the sole at the forepart and heel portion and introducing it between the shoe bottom and the pad, gages for determining the width of the shoe at the forepart and heel portion, sole gages cooperating with said gripper members for positioning the sole widthwise of the shoe bottom in accordance with the widths determined by the shoe gages, and means for adjusting the shoe gages at the heel portion of the shoe to accommodate shoes that are to have heels of different heights.

48. In a machine for cement-attaching soles to shoes, the combination of a flexible pad for applying pressure to a shoe and sole, a jack for supporting the shoe during the pressing operation, members for gripping the sole at the forepart and heel portion and automatically introducing it between the shoe bottom and the pad, gages for measuring the width of the shoe at said forepart and heel portion, sole gages cooperating with the gripping members to position the sole transversely of the shoe bottom in accordance with the widths determined by the shoe gages, and means for adjusting the shoe gages and the sole gripping and gaging members at the heel portion of the shoe to position them for shoes that are to have heels of different heights.

49. In a machine for cement-attaching soles to shoes, the combination of a flexible pad for applying pressure to a shoe and sole, a jack for supporting the shoe during the pressing operation, gripper members for engaging the sole at the forepart and heel portion and introducing it between the shoe bottom and the pad, gages for calipering the width of the shoe at about the ball line and the heel breast line, sole gages cooperating with said gripper members to position the sole widthwise of the shoe bottom in accordance with the widths determined by the shoe gages, and manually-operated means for simultaneously effecting a heightwise adjustment of the shoe gages and the sole grippers and gaging members at the heel end of the shoe to permit them to operate on differently shaped shoes.

50. In a machine for cement-attaching soles to shoes, the combination of a flexible pad for applying pressure to a shoe and sole, a swinging jack for supporting the shoe during the pressing operation, gripping members for introducing the sole between the shoe bottom and the pad, gages for measuring the width of the shoe at the forepart and heel portion, sole gages cooperating with said gripping members to position the sole widthwise of the shoe bottom in accordance with the widths determined by the shoe gages, and manually-controlled means for simultaneously effecting a heightwise adjustment of the shoe gages and the sole gripping and gaging members at the heel portion of the shoe to accommodate shoes having differently shaped shank portions, said means being also constructed and arranged to effect a corresponding heightwise adjustment of the heel end of the pad.

51. In a machine for cement-attaching soles to shoes, the combination of a jack for holding a shoe with its side toward an operator, a pad for pressing a sole against the shoe bottom, means for introducing the sole between the pad and the shoe bottom, gages for engaging opposite sides of the shoe at the forepart and heel portion to measure the width of the shoe at such portions, levers for supporting the gages adjacent to the operator, said levers being mounted for swinging movement about an axis parallel to the longitudinal center line of the pad, a plate for carrying the gage which is remote from the operator at the heel portion of the shoe, means for swinging the supporting levers about their axis, and mechanism acting independently of the lever swinging means for simultaneously adjusting the plate and the supporting lever at the heel portion of the shoe heightwise to position the gages for shoes the lasts of which have different springs, said means acting also to effect a corresponding heightwise adjustment of the heel end of the pad.

52. In a machine for cement-attaching soles to shoes, the combination of a jack for a shoe, a pad for pressing a sole against the bottom of the shoe, gages for calipering the width of the shoe at the heel portion, means for calipering the width of the sole at the heel portion, said means acting also to position the heel portion of the sole transversely of the shoe in accordance with the width thereof, means for adjusting the shoe gages and sole calipering means heightwise and lengthwise of the shoe, and connections between the gages and calipering means at opposite sides of the shoe whereby they are adjusted simultaneously.

53. In a machine for cement-attaching soles to shoes, the combination of a jack for a shoe, a flexible pad for pressing a sole on the bottom of the shoe, shoe gages for calipering the width of the shoe at the forepart and heel portion, sole engaging means for calipering the sole at the forepart and heel portion, means for effecting movement of the sole engaging means relatively to the shoe gages to position the sole transversely of the shoe in accordance with the width of the shoe, means for simultaneously adjusting the shoe gages and sole engaging means at opposite sides of the heel end of the shoe heightwise of the shoe, and means for adjusting said gages and engaging means longitudinally of the shoe.

54. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a pad for pressing a sole against the bottom of the shoe, mechanism for introducing the sole between the pad and the shoe bottom, and means for positioning the toe end of the sole transversely of the shoe bottom.

55. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad for pressing a sole against the bottom of the shoe, and means positioned longitudinally of the shoe by engagement with the shoe for locating the toe end of the sole transversely of the shoe bottom.

56. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad for pressing a sole against the bottom of the shoe, and means positioned by the toe end of the shoe for locating the sole longitudinally of the shoe.

57. In a machine for cement-attaching soles to

shoes, the combination of a jack for a shoe, a pad for pressing a sole against the bottom of the shoe, mechanism for introducing the sole between the pad and the shoe bottom, and means positioned by the shoe for locating the sole longitudinally of the shoe.

58. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a pad for pressing a sole against the bottom of the shoe, mechanism for automatically introducing the sole between the pad and the shoe bottom, and means movable longitudinally of the shoe for positioning the toe end of the sole widthwise of the shoe.

59. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a pad for pressing a sole against the bottom of the shoe, power-operated mechanism for introducing the sole between the pad and the shoe bottom, and means movable lengthwise of the shoe for positioning the sole longitudinally of the shoe bottom, said means operating also to position the toe end of the sole laterally of the shoe.

60. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a flexible pad for pressing a sole against the bottom of the shoe, means for introducing the sole between the pad and the shoe bottom, and means for determining the position of the sole longitudinally of the shoe as the sole is presented to said introducing means.

61. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a flexible pad for pressing a sole against the bottom of the shoe, means for introducing the sole between the pad and the shoe bottom, and means for locating the sole longitudinally of the shoe as the sole is presented to said introducing means, the position of said locating means being controlled by the size of the shoe.

62. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a flexible pad for pressing a sole against the bottom of the shoe, power-operated means for introducing the sole between the pad and the shoe bottom, and power-operated means for determining the position of the sole longitudinally of the shoe as the sole is presented to said introducing means, said positioning means being also arranged to position the toe end of the sole transversely of the shoe bottom.

63. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a pad for pressing a sole against the bottom of the shoe, and power-operated gages movable lengthwise of the shoe for positioning the sole longitudinally of the shoe and for locating the toe end of the sole relatively to the toe end of the shoe.

64. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe with its side toward an operator, a pad for pressing a sole against the bottom of the shoe, mechanism for introducing the sole between the pad and the shoe bottom, and means including inner and outer gages movable longitudinally of the shoe for positioning the toe end of the sole in proper transverse relation to the shoe, said outer gages being arranged to swing into operative position laterally of the shoe after said longitudinal movement has been effected.

65. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe with its side toward an operator, a pad for pressing the sole against the bottom of the shoe, power-operated mechanism for introducing the sole between the pad and the shoe bottom, and inner and outer gages movable lengthwise of the shoe for positioning the sole longitudinally of the shoe and for locating the toe end of the sole widthwise of the shoe bottom, said outer gages being arranged to swing laterally of the shoe into position to operate on the sole after said lengthwise movement has been effected.

66. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe with its side toward an operator, a pad for pressing a sole against the bottom of the shoe, means for introducing the sole horizontally between the pad and the shoe bottom, gages for calipering the width of the shoe at the forepart and heel portion, sole gages cooperating with said introducing means to position the sole transversely of the shoe bottom, and means movable lengthwise of the shoe for determining the position of the sole longitudinally of the shoe before the sole gages and introducing means position the sole transversely of the shoe bottom.

67. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a flexible pad for pressing a sole against the bottom of the shoe, grippers for holding the sole between the pad and the shoe bottom, shoe gages for determining the width of the shoe at the forepart and heel portion, sole gages cooperating with said grippers to position the sole laterally of the shoe bottom in accordance with the width of the shoe, and power-operated means positioned by the shoe for locating the sole longitudinally of the shoe prior to the operation of said grippers and sole gages.

68. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe with its side toward an operator, a pad for pressing a sole against the shoe, power-operated grippers for introducing the sole between the pad and the shoe bottom, inner and outer gage fingers movable lengthwise of and positioned by the shoe for positioning the sole longitudinally of the shoe and for positioning the toe end of the sole in transverse relation to the toe end of the shoe, said outer fingers being arranged to move into operative position laterally of the shoe after said lengthwise movement has taken place, and means for moving said outer fingers into said operative position.

69. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe with its side toward an operator, a pad for pressing a sole against the shoe, power-operated grippers for introducing the sole between the pad and the shoe bottom, inner and outer gage fingers movable lengthwise of the shoe for determining the position of the sole longitudinally of the shoe and for positioning the toe end of the sole in proper transverse relation to the toe end of the shoe, said outer fingers being arranged to move into and out of operative position laterally of the shoe after said lengthwise movement has taken place, and means for actuating the inner and outer gage fingers to position the toe end of the sole relatively to the shoe after the outer fingers have been moved into operative position.

70. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe with its side toward an operator, a pad for pressing a sole against the shoe, power-operated

grippers for introducing the sole between the pad and the shoe bottom, inner and outer gage fingers movable lengthwise of the shoe for determining the position of the sole longitudinally of the shoe and for positioning the toe end of the sole in proper transverse relation to the toe end of the shoe, said outer fingers being arranged to move into and out of operative position transversely of the shoe after said lengthwise movement has been effected, power-operated means for moving said outer fingers into operative position, and means for thereafter actuating said inner and outer fingers to position the toe end of the sole relatively to the toe end of the shoe.

71. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe in upright position, a flexible pad for pressing a sole against the shoe bottom, grippers for introducing the sole horizontally between the pad and the shoe bottom, power-operated means for actuating said grippers, gages for measuring the width of the shoe at the forepart and heel portion, sole gages cooperating with said grippers to position the sole in proper transverse relation to the shoe bottom and in accordance with the positions of the measuring gages, and means positioned by the shoe for determining the position of the sole longitudinally of the shoe as the sole is presented to said grippers, said means operating in timed relation to the gripper actuating means.

72. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a flexible pad for pressing a sole against the shoe bottom, grippers for engaging the sole at about the ball line and the heel breast line and introducing it between the pad and the shoe bottom, gages located above the grippers for measuring the width of the shoe at the ball line and heel breast line, sole gages opposite the grippers for engaging the side of the sole opposite to said grippers, said gages being constructed and arranged to cooperate with the grippers in positioning the sole widthwise of the shoe at the ball line and heel breast line, and means movable lengthwise of the shoe for positioning the portion of the sole forwardly of the tip line relatively to the corresponding portion of the shoe.

73. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe in pressure-receiving position with its side toward an operator, a flexible pad for pressing a sole against the bottom of the shoe, grippers for engaging the sole at about the ball line and the heel breast line and introducing it between the pad and the shoe bottom, levers for carrying said grippers, said levers being arranged to rotate about an axis located below the pad from an inclined position into a substantially vertical position, shoe gages for measuring the width of the shoe at the breast line and ball line while the shoe is supported by the jack, positioning gages cooperating with said grippers to locate the forepart and heel portions of the sole in accordance with the width of the shoe as determined by the shoe gages, means for actuating said grippers and positioning gages, and means movable lengthwise of the shoe and operating simultaneously with the last-mentioned means for positioning the toe end of the sole relatively to the toe end of the shoe.

74. In a machine for cement-attaching soles to shoes, the combination of a jack for holding a shoe in a fixed position with its side toward an operator, a flexible pad for pressing a sole against the bottom of said shoe, gripping members movable into and out of operative position about a horizontal axis located below the pad for introducing a sole between the pad and the shoe bottom, gages cooperating with said gripping members to position the shank and heel portions of the sole transversely of the shoe bottom, and means for positioning the toe end of the sole transversely of said shoe bottom, said means acting also to position the sole longitudinally of the shoe.

75. In a machine for cement-attaching soles to shoes, the combination of a swinging jack for holding a shoe in a fixed position with its side toward an operator, a flexible pad for pressing a sole against the bottom of said shoe, sole gripping members movable into and out operative position about a fixed axis located below the pad for introducing the sole between the pad and the shoe bottom, gages cooperating with said gripping members for positioning the shank and heel portions of the sole transversely of the shoe bottom, single means for locating the sole longitudinally of the shoe and for positioning the toe end of the sole laterally of the shoe bottom, said means being arranged to move yieldingly toward the shoe in a predetermined path extending longitudinally thereof until it engages the toe end of the shoe and thereby positions itself properly for locating the sole lengthwise of the shoe, and means for moving said positioning means toward the shoe.

76. In a machine for cement-attaching soles to shoes, the combination of a jack for holding a shoe with its side toward an operator, a flexible pad for pressing a sole against the bottom of the shoe, sole-gripping members movable into and out of operative position with respect to the pad for introducing the sole between the pad and the shoe bottom, gages cooperating with said gripping members to position the shank and heel portions of the sole transversely of the shoe bottom, means for positioning the sole lengthwise of the shoe and for positioning the toe end of the sole widthwise of said shoe bottom, said means being arranged to move yieldingly toward the shoe and sole in a predetermined path extending longitudinally of the shoe until it engages the toe end of the shoe and thereby locates itself properly for positioning the sole lengthwise of the shoe, and power-operated means for moving said positioning means into engagement with the shoe.

77. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe in upright position with its side toward an operator, a flexible pad for pressing a sole against the shoe bottom, grippers for engaging the sole at about the ball line and the heel breast line and introducing it automatically between the pad and the shoe bottom, levers for carrying said grippers, said levers being arranged to rotate about an axis located below the pad, sole gages cooperating with said grippers to position the forepart and heel portions of the sole widthwise of the shoe bottom, power-operated means for actuating said sole gages and grippers, and means for positioning the toe end of the sole relatively to the toe end of the shoe, said means comprising a plurality of fingers for engaging opposite sides of the shoe and sole adjacent to the tip lines, the shoe-engaging fingers becoming fixed against further movement upon engagement with the shoe so that the sole-engaging fingers may be centralized with respect thereto and thereby position the toe end of the sole relatively to the toe end of the shoe.

78. In a machine for cement-attaching soles to shoes, the combination of a swinging jack for holding a shoe in a fixed pressure-receiving position with its side toward an operator, a flexible pad for pressing a sole against the bottom of said shoe, sole-gripping members movable into and out of operative position about a horizontal axis and arranged to introduce a sole between the pad and the shoe bottom, gages cooperating with said gripping members for positioning the shank and heel portions of the sole transversely of the shoe bottom, means for positioning the toe end of the sole widthwise of the shoe bottom, said means comprising fingers for engaging opposite sides of the shoe and sole, the fingers at the side of the shoe adjacent to the operator being arranged to move laterally into and out of operative position together with the sole-gripping members, and power-operated means for centralizing said shoe and sole-engaging fingers relatively to each other when the former have engaged the shoe, thereby to position the toe end of the sole widthwise of the shoe bottom.

79. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe with its side toward an operator, a flexible pad for pressing a sole against the bottom of the shoe, means for introducing the sole between the pad and the shoe bottom, sole gages for positioning the sole widthwise of the shoe bottom, toe-locating gages for engaging opposite sides of the shoe and sole at about the tip line, the gages on the side of the shoe nearest the operator being arranged to swing into and out of operative position and the gages at the inner side of the shoe remaining fixed against swinging movement, an abutment associated with the inner gages for contacting with the toe end of the shoe, and an abutment associated with the outer gages which provides a stop against which the sole may be placed when presenting it to the gripping members thereby to position the sole longitudinally of the shoe.

80. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad arranged to press a sole against the bottom of the shoe, means for relatively moving the shoe and the central portion of the pad to apply pressure to the central portion of the sole, and means for relatively displacing the marginal portion of the pad and the margin of the sole to apply pressure to said sole margin.

81. In a machine for cement-attaching soles to shoes, the combination of shoe-engaging means, a flexible pad arranged to apply pressure to the shoe and to a sole to be attached to said shoe, means for relatively moving the shoe and the central portion of the pad to apply pressure to the central portions of the shoe and sole, and means for displacing the marginal portions of the pad to apply pressure to the marginal portions of the shoe and sole.

82. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a flexible pad arranged to apply pressure to the shoe and to a sole to be attached thereto, means independent of the shoe for displacing the central portion of the pad, and means for thereafter displacing the central and marginal portions of the pad relatively to each other to apply pressure to corresponding portions of the sole and shoe.

83. In a machine for cement-attaching soles to shoes, the combination of shoe-engaging means, a flexible pad arranged to apply pressure to a sole to be attached to the shoe, means for relatively moving the shoe and the central portion of the pad, and means for relatively displacing the central and marginal portions of the pad to apply pressure to the central and marginal portions of the sole.

84. In a machine for cement-attaching soles to shoes, the combination of shoe-engaging means, a flexible pad arranged to apply pressure to a sole and shoe, means for displacing the central portion of the pad relatively to the shoe, and means for relatively displacing the central and marginal portions of the pad successively to apply pressure first to the central portions of the sole and shoe and then to their marginal portions.

85. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a flexible pad arranged to press a sole against the bottom of the shoe, means for relatively displacing the shoe and the central portion of the pad to press the central portion of the sole against the shoe bottom, and means for thereafter displacing the marginal portion of the pad relatively to the sole to apply pressure to the marginal portion of the sole.

86. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a flexible pad arranged to press a sole against the bottom of the shoe, means for relatively moving the shoe and the central portion of the pad to apply pressure to the central portions of the sole and shoe, and means for thereafter relatively displacing the sole and the marginal portions of the pad to apply pressure to the marginal portions of the sole and shoe.

87. In a machine for cement-attaching soles to shoes, the combination of shoe engaging means, a flexible pad for applying sole attaching pressure to a shoe and sole, means for relatively displacing the shoe and the central portion of the pad to press the central portion of the sole against said shoe, and means for thereafter relatively displacing the central and marginal portions of the pad to apply attaching pressure to the central portion of the sole and increased attaching pressure to its marginal portion.

88. In a machine for cement-attaching soles to shoes, the combination of shoe-engaging means, an inflatable pad for pressing a sole against the bottom of the shoe, means for relatively displacing the shoe and the central portion of the pad to apply pressure to the central portion of the sole, and means for inflating the pad to apply pressure to the marginal portion of the shoe.

89. In a machine for cement-attaching soles to shoes, the combination of shoe-engaging means, an inflatable pad for pressing a sole against the bottom of the shoe, means for effecting a relative displacement of the shoe and the central portion of the pad to apply pressure to the central portions of the shoe and sole, and means for thereafter inflating the marginal portion of the pad to apply pressure to the marginal portions of the shoe and sole.

90. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a flexible pad for pressing a sole against the bottom of the shoe, means for distorting the pad to apply pressure to the sole, and means for controlling the amount of distortion at the central and marginal portions of the pad thereby to apply different pressures to corresponding portions of the sole.

91. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, an inflatable pad for pressing a sole against the bottom of the shoe, said pad being divided into separate compartments arranged to underlie only the marginal and shank portions of the sole, means for inflating the different compartments separately thereby to apply different pressures to the marginal and shank portions of the sole, and means for controlling the maximum pressure applied to each compartment.

92. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad for pressing a sole against the bottom of the shoe, said pad having inflatable marginal compartments at the forepart and heel portions of the shoe, means for inflating said compartments independently thereby to apply pressure separately to the sole margins at the forepart and heel portions of the sole, and means for controlling the pressure in each compartment.

93. In a machine for cement-attaching soles to shoes, an inflatable pad for pressing a sole against the bottom of the shoe, said pad having a separate compartment located at the forepart, shank and heel portions of the shoe, means for inflating said compartments separately to apply pressure to corresponding portions of the sole and shoe, and means for automatically controlling the amount of pressure in each compartment.

94. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a flexible pad for pressing a sole against the bottom of the shoe, said pad having a plurality of compartments separated from each other at the forepart and shank portions of the pad, and means for distorting each compartment independently of the other compartments thereby to apply pressure to corresponding portions of the sole and shoe.

95. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad for pressing a sole against the bottom of the shoe, said pad having upper and lower walls which are secured to each other at different places to form a plurality of air-tight compartments, and means for inflating each compartment separately thereby to permit different pressures to be applied to different portions of the sole.

96. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad for pressing a sole against the bottom of the shoe, said pad having a plurality of inflatable compartments separated from each other, and automatic means for inflating each compartment independently of the other compartments thereby to apply pressure at different times to different portions of the sole.

97. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad for pressing a sole against the bottom of the shoe, said pad having inflatable compartments at the forepart, shank and heel portions of the shoe, and means for automatically controlling the pressure in each of said compartments so that a predetermined pressure will be applied to the forepart, shank and heel portions of the shoe and sole.

98. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, an inflatable pad for pressing a sole against the bottom of the shoe, means for displacing the central portion of the pad relatively to the shoe bottom, means for returning said central portion thereby applying pressure to the central portions of the shoe and sole, and means for inflating the marginal portion of the pad to apply pressure to the marginal portions of the shoe and sole.

99. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, an inflatable pad for pressing a sole against the bottom of the shoe, means for moving the central portion of the pad toward the sole and shoe to apply pressure to the central portions thereof, and means for admitting fluid under pressure to the marginal portions of the pad to apply pressure to corresponding portions of the shoe and sole.

100. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad for pressing a sole against the bottom of the shoe, the marginal portion of said pad being inflatable, means for moving the central portion of the pad into engagement with the sole, means for moving the shoe relatively to the pad to press the sole against the central portion of the pad, and means for thereafter inflating the marginal portion of the pad to apply greater pressure to the marginal portion of the sole.

101. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad for pressing a sole against the bottom of the shoe, said pad having a solid central portion and a flexible marginal portion, means for relatively moving the shoe and the central portion of the pad to apply pressure to the central portion of the sole, and means for distorting the flexible portion of the pad to apply pressure to the sole margins.

102. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad for pressing a sole against the bottom of the shoe, said pad having a solid portion surrounded by an inflatable portion, means for relatively moving the shoe and pad to press the sole against the solid portion of the pad, and means for admitting fluid under pressure to the inflatable portion of the pad to cause said portion to exert pressure against the sole.

103. In a machine for cement-attaching soles to shoes, the combination of a jack for a shoe, a pad for pressing a sole against the bottom of the shoe, said pad having a relatively solid central portion corresponding in shape to the bottom of a shoe and surrounded by a more flexible portion, said flexible portion being divided into compartments, means for moving the central portion of the pad relatively to the flexible portion to bring said central portion into engagement with the sole, mechanism for moving the shoe and sole against said central portion to apply pressure to the central portions of the shoe and sole, and means for thereafter distorting the compartments in the flexible portion to apply pressure to the marginal portions of the shoe and sole.

104. In a machine for cement-attaching soles to shoes, the combination of shoe engaging means, a flexible pad arranged to press a sole against the bottom of the shoe, means for relatively displacing the shoe and the central portion of the pad to apply pressure to the sole, and means for further displacing the shank portion of the pad to apply additional pressure to the shank portion of the sole.

105. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a flexible pad arranged to press a sole against the bottom of the shoe, said pad having a solid central portion overlying an inflatable chamber at the shank portion of the shoe, means for

relatively displacing the shoe and the central portion of the pad to apply pressure to the central portion of the sole, and means for inflating said chamber to apply greater pressure to the shank portion of the sole.

106. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a flexible pad for pressing a sole against the bottom of the shoe, said pad having a solid central portion and an inflatable chamber located at the shank portion of the shoe, means for moving the shoe and sole against the central portion of the pad to apply pressure to the central portions of the shoe and sole, and means for thereafter inflating the chamber at the shank portion of the shoe to apply additional pressure to the shank portions of the shoe and sole.

107. In a machine for cement-attaching soles to shoes, the combination of shoe engaging means, a pad for pressing a sole against the bottom of the shoe, said pad having a solid central portion, an inflatable marginal portion, and an inflatable chamber extending transversely of its shank portion, means for relatively displacing the shoe and the central portion of the pad to apply pressure to the central portion of the sole, and means for inflating said marginal portion and said chamber to apply pressure to the marginal portion of the sole and additional pressure to its shank portion.

108. In a machine for cement-attaching soles to shoes, the combination of a jack for a shoe, a pad for pressing a sole against the bottom of the shoe, said pad being provided with a solid central portion conforming in shape to the bottom of a shoe, an inflatable marginal portion comprising separate compartments at the forepart and heel portions of the shoe, and an inflatable compartment extending transversely of the pad at the shank portion of the shoe, said shank compartment overlapping the adjacent edges of the marginal compartments, means for effecting relative movement of the shoe and the central portion of the pad to apply pressure to the central portion of the sole, and means for thereafter inflating the marginal compartments to apply pressure to the marginal portion of the sole, said means operating also to inflate the shank compartment so that the pressure applied to the shank portion of the sole will be greater than that applied to the other portions thereof.

109. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a flexible pad for pressing a sole against the shoe bottom, said pad having a central portion of substantial thickness, an inflatable compartment at its marginal portion and an inflatable compartment extending transversely of its shank portion and under said central portion, mechanism for moving the shoe toward the pad to press the sole against the central portion thereof, and means operating in timed relation to said mechanism for inflating the marginal and shank compartments to apply pressure to corresponding portions of the sole.

110. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a flexible pad for pressing a sole against the bottom of the shoe, said pad having a solid central portion, an inflatable marginal compartment surrounding said central portion at the forepart of the shoe, and an inflatable compartment extending under the shank portion of the shoe, means for relatively moving the shoe and the central portion of the pad to apply pressure to the central portion of the sole, and means for inflating the compartments at the forepart and shank portion of the shoe to apply pressure to the marginal and shank portions of the sole.

111. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a flexible pad for pressing a sole against the bottom of the shoe, said pad having a solid central portion of substantial thickness, an inflatable marginal portion at the forepart of the shoe, and an inflatable portion under the shank of the shoe, means for relatively moving the shoe and the central portion of the pad to apply pressure to the central portion of the sole, and means for successively inflating the marginal portion of the pad at the forepart of the shoe and the portion of the pad under the shank of the shoe thereby to apply pressure progressively to corresponding portions of the sole.

112. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a yieldable pad for pressing a sole against the bottom of the shoe, said pad comprising a plurality of layers of material which are secured together at the central portion of the pad to form a relatively inflexible portion surrounded by hollow marginal portions, said marginal portions having compartments formed therein which can be inflated to distort said portions, means for introducing the sole between the pad and the shoe bottom, fluid-pressure-operated means for elevating the inflexible central portion of the pad into engagement with the sole, power-operated mechanism for lowering the shoe toward the sole and for thereafter pressing both shoe and sole against the pad to return the elevated portion to its original position thereby applying pressure to the central portions of the shoe and sole, and means for inflating the compartments at the marginal portions of the pad to apply pressure to the margins of the shoe and sole.

113. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad for pressing a sole against the bottom of the shoe, said pad having a solid central portion and inflatable compartments at its marginal and shank portions, fluid-pressure-operated plungers arranged to move the solid central portion of the pad into engagement with the sole, and means acting thereafter to inflate the marginal and shank compartments separately to apply pressure to the marginal and shank portions of the shoe and sole.

114. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad for pressing a sole against the bottom of the shoe, means for engaging opposite edges of the sole to position it relatively to the shoe bottom, means cooperating with the shoe engaging means for gripping the sole in such position, and means for thereafter withdrawing the positioning means from engagement with the sole.

115. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad for pressing a sole against the bottom of the shoe, gages for engaging opposite edges of the sole at the ball line and heel breast line to position it laterally of the shoe bottom, means for causing the central portion of the sole to be gripped between the pad and the shoe bottom to hold the sole in such position, and means for thereafter withdrawing the gages from the edges of the sole.

116. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, means for pressing a sole against the bottom of the shoe, grippers for introducing the sole between the pressing means and the shoe bottom, gages cooperating with said grippers to locate the sole transversely of the shoe bottom, means for moving the pressing means and the shoe relatively to the sole to bring said means and shoe into engagement with the sole and thereby hold the latter in position relatively to the shoe bottom, and means for withdrawing the grippers and gages from the sole while so held.

117. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad for pressing a sole against the bottom of the shoe, said pad having a solid central portion, grippers for introducing the sole between the pad and the shoe bottom, gages cooperating with said grippers to locate the sole transversely of the shoe, means for thereafter moving the central portion of the pad into engagement with the sole, means for moving the shoe against the sole and pad thereby to grip the sole between the pad and the shoe bottom, and means for withdrawing the grippers and sole gages from the sole while the latter is gripped between the pad and the shoe.

118. In a machine for cement-attaching soles to shoes, the combination of a jack for a shoe, an inflatable pad for pressing a sole against the bottom of said shoe, gages for positioning the sole widthwise of the shoe bottom, means for causing the sole to be gripped between the pad and the shoe bottom after it has been positioned, means for withdrawing the gages from the sole, and means for thereafter inflating the pad to apply pressure to the sole.

119. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a pad for pressing a sole against the bottom of said shoe, said pad having a solid central portion and an inflatable marginal portion, gage members for engaging opposite edge faces of the sole and positioning the sole widthwise of the shoe bottom, means for causing the central portion of the sole to be gripped between the pad and the shoe bottom, means for withdrawing the gage members after the sole has been gripped, and means for inflating the marginal portion of the pad to apply pressure to the marginal portion of the sole.

120. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a pad for pressing a sole against the bottom of the shoe, said pad having a solid central portion and inflatable compartments at its marginal and shank portions, gages for positioning the sole widthwise of the shoe bottom, means for causing the sole to be gripped at its central portion between the pad and the shoe bottom, means for withdrawing the gages from the sole after it has been gripped, and means for thereafter inflating the compartments of the pad to apply pressure to the marginal and shank portions of the sole.

121. In a machine for cement-attaching soles to shoes the combination of a jack for supporting a shoe with its side toward an operator, a pad for pressing a sole against the bottom of the shoe, said pad having a solid central portion in the shape of a sole and inflatable compartments at its marginal and shank portions, grippers for introducing the sole between the shoe bottom and the pad, gages movable toward opposite sides of the shoe for measuring the width of the shoe at its forepart and heel portion, sole gages cooperating with said grippers to position the sole widthwise of the shoe in accordance with the positions of the shoe gages, fluid-pressure-operated plungers for moving the solid central portion of the pad against the sole, means for locking the shoe gages which contact with the side of the shoe remote from the operator, power-operated mechanism for moving the shoe into engagement with the sole and for thereafter pressing the shoe and sole against the solid portion of the pad to apply pressure to the central portions of the shoe and sole, means for withdrawing the shoe gages adjacent to the operator and the grippers and sole gages respectively from the shoe and sole before the latter are pressed against the pad, and means for thereafter inflating the compartments separately to apply pressure to the marginal and shank portions of the sole.

122. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad for pressing a sole against the bottom of the shoe, said pad having a solid area in the shape of the central portion of a shoe sole, a separate compartment located peripherally of its forepart and a separate compartment located under its shank portion, the shank compartment extending across the pad and overlapping the adjacent portion of the peripheral compartment, and means for inflating said compartments to apply pressure to the sole and shoe.

123. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad for pressing a sole against the bottom of the shoe, said pad having a central area for engaging the central portion of the sole and an area flexible relatively to its central area for engaging the marginal portion of the sole, and means for causing a substantially greater pressure to be exerted by the pad against said marginal portion of the sole than is exerted against its central portion.

124. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad for pressing a sole against the bottom of the shoe, said pad having a solid portion underlying the central portion of the sole and arranged to exert a predetermined pressure on a limited area thereof, and inflatable chambers underlying the marginal and shank portions of the sole, said chambers being arranged to be distorted by fluid under pressure to apply a substantially greater pressure to the marginal and shank portions of the sole than is applied to its central portion.

125. In a machine for cement-attaching soles to shoes, the combination of a jack for a shoe, means for holding a sole in position to be attached to the shoe, a pad for pressing the sole against the shoe bottom, said pad having a displaceable central portion for applying pressure to the central portion of the sole and inflatable material and shank portions for applying greater pressure to the marginal and shank portions of the sole, and means for inflating said marginal and shank portions.

126. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, means for holding a sole in position to be attached to said shoe, sole-pressing means comprising a pad having a flexible marginal portion and a less flexible central portion, means for relatively moving the shoe and sole and the central portion of the pad to apply a predetermined pres-

sure to the central portions of the sole and shoe, and fluid-pressure-operated means for distorting the marginal portion of the pad to apply a substantially greater pressure to the marginal portions of the sole and shoe without increasing the pressure applied to said central portions.

127. In a machine for cement-attaching soles to shoes, the combination of a jack for a shoe, means for supporting a sole in position to be attached to the shoe, sole-pressing means comprising a yieldable pad having at its central portion a solid area for applying pressure to the central portion of the sole, and inflatable compartments at its marginal portion for applying pressure to the marginal portion of the sole, means for moving the central portion of the pad into engagement with the sole, means for pressing the shoe against the sole to force the latter against the central portion of the pad, and means for thereafter inflating the compartments to apply pressure to the marginal portions of the sole while maintaining unchanged the pressure applied to its central portion.

128. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, grippers for holding a sole, and pressure-applying means comprising a pad having a solid central portion corresponding in shape to that of a sole and having separated compartments surrounding the central portion and adapted to be inflated by fluid under pressure, said compartments extending substantially to the edges of the pad, said pad also having a transverse compartment underlying its shank portion, a support for said pad, fluid-pressure-operated plungers mounted on the support and arranged to move the central portion of the pad into engagement with the sole, power-operated mechanism for pressing the shoe and sole against said plungers thereby moving the central portion of the pad back into its original position and applying a predetermined pressure to the central portions of the shoe and sole, and means for admitting fluid under pressure to the compartments to apply greater pressure to the marginal and shank portions of the shoe and sole.

129. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad for pressing a sole against the bottom of the shoe, means for supporting said pad, said means comprising relatively adjustable sections under the forepart, shank and heel portions of the shoe, and single means for adjusting said sections.

130. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad for pressing a sole against the bottom of the shoe, means for supporting said pad, said means comprising separate sections located under the forepart, shank and heel portions of the shoe and arranged to be adjusted relatively to each other to conform more closely to the shape of the shoe bottom, and means for adjusting said sections simultaneously.

131. In a machine for applying pressure to shoe bottoms, the combination of an inflatable pad for receiving a sole and shoe, separate members for supporting the forepart, shank and heel portions of said pad, and single means for adjusting said members angularly relatively to each other to conform the pad to the longitudinal contour of a shoe bottom.

132. In a machine for applying pressure to shoe bottoms, the combination of an inflatable pad, means for inflating the pad to apply pressure to a sole and shoe mounted thereon, separate members for supporting the forepart, shank and heel portions of the pad, connections between said members permitting angular adjustment thereof relatively to each other to conform the pad approximately to the longitudinal contour of the shoe bottom so that a relatively slight inflation of the pad will cause it to apply pressure to the shoe bottom, and single means for effecting simultaneous adjustment of said members.

133. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad for pressing a sole against the bottom of the shoe, means for supporting said pad comprising separate sections located at the forepart, shank and heel portions of the shoe and pivotally arranged so that they can be adjusted relatively to each other to conform more closely to the longitudinal contour of the shoe bottom, and mechanism acting on the forepart and heel sections whereby all of said sections are adjusted.

134. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad for pressing a sole against the bottom of the shoe, and means for supporting said pad, said means comprising relatively movable sections located respectively at the forepart, shank and heel portions of the shoe and being pivoted at their adjacent ends so that they can be made to conform more closely to the shape of the shoe bottom, and means for maintaining said heel section in a horizontal plane, said heel section being arranged for adjustment heightwise and lengthwise of the shoe, and the forepart and shank sections being rotatable about a permanently fixed axis.

135. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad for engaging a sole and pressing it against the bottom of the shoe, means for supporting said pad in position to operate on the shoe, said means comprising a plurality of sections pivoted about a permanently fixed center, another section pivotally connected to the first-named sections and movable lengthwise and heightwise of the shoe, and means for maintaining said last-named section in a horizontal plane during such movement.

136. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad for pressing a sole against the bottom of the shoe, and means for supporting said pad, said means comprising relatively movable sections located respectively at the forepart, shank and heel portions of the shoe and being pivotally mounted at their adjacent ends so that they can be made to conform more closely to the shape of the shoe bottom, said heel section being connected directly to said shank section and being arranged for movement heightwise and lengthwise of the shoe, and said forepart and shank sections being arranged to pivot about a stationary axis located substantially at the ball line of the shoe whereby said sections are maintained in a predetermined position longitudinally of the shoe.

137. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad for pressing a sole against the bottom of the shoe, a support for holding said pad in operative position, said support comprising sections arranged for relative angular movement about a permanently fixed pivot and supporting the pad under the forepart and shank portions of the shoe, and a heel section pivotally connected to

said shank section and arranged for movement lengthwise and heightwise of the shoe, means for supporting said heel section against the pressure of the shoe, and mechanism for adjusting said supporting means heightwise thereby to position said heel section properly for the heel portion of the shoe and simultaneously to effect the proper angular adjustment of the shank section about its fixed pivot to cause said section to conform more closely to the shank portion of the shoe.

138. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a flexible pad for pressing a sole against the bottom of the shoe, means for supporting said pad, said means comprising relatively movable sections under the forepart, shank and heel portions of the shoe, said heel section being movable heightwise of the shoe and being pivotally connected to the shank section, and said forepart and shank sections being arranged to pivot at their adjacent ends about a permanently fixed center extending transversely of the pad, thereby permitting relative angular movement of said forepart and shank sections to conform the pad to the spring of the shoe bottom but presenting lengthwise movement of said sections relatively to said center, means for moving the heel section heightwise of the shoe to position said section in accordance with the heel portion of the shoe, thereby causing pivotal movement of the shank section, and means for permitting endwise movement of said heel section lengthwise of the shoe as the position of the shank section changes.

139. In a machine for cement-actuating soles to shoes, the combination of means for engaging a shoe, a pad for pressing a sole against the bottom of the shoe, a support for said pad, said support having relatively movable sections under the forepart, shank and heel portions of the shoe, said heel section being arranged for movement heightwise of the shoe and said shank and heel sections being pivotally connected to each other so that heightwise movement of the heel section will cause pivotal movement of the shank section about a permanently fixed center located substantially under the ball line of the shoe, means for effecting heightwise movement of said heel section, and means for maintaining said section in a horizontal plane during such movement.

140. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad for pressing a sole against the bottom of the shoe, a support for said pad, said support having relatively movable sections at the forepart, shank and heel portions of the shoe, the shank and heel sections being pivotally connected to each other and the forepart and shank sections being arranged to pivot about a permanently fixed axis extending transversely of the pad substantially under the ball line of the shoe, and manually-controlled means for supporting the heel section of the support and for moving it heightwise of the shoe to position the heel portion of the pad properly for the shoe being operated upon, said means also causing said shank section to pivot about its fixed axis to position the shank portion of the pad in a proper angular relation to the shank portion of the shoe without lengthwise movement relatively to said axis.

141. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a flexible pad for pressing a sole against the bottom of the shoe, means for supporting said pad, said means comprising relatively movable plates located under the forepart, shank and heel portions of the shoe, said shank and heel plates being pivotally connected to each other at their adjacent ends and said forepart and shank plates being arranged to pivot about a permanently fixed axis located substantially under the ball line of the shoe, means for supporting said heel plate in a horizontal plane, and means for effecting a heightwise adjustment of said supporting means to locate the heel plate and the heel portion of the pad in a proper position heightwise and lengthwise of the shoe for engaging the heel portion of the shoe, said adjusting means also causing the shank plate to pivot about its fixed axis and position the shank portion of the pad in closer relation to the shoe bottom without movement lengthwise of said axis.

142. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a flexible pad for pressing a sole against the bottom of the shoe, means for supporting said pad, said means comprising relatively movable plates located under the forepart, shank and heel portions of the shoe, said shank plate being pivotally connected to said heel plate and said forepart and shank plates being arranged for pivotal movement about a fixed axis located substantially under the ball line of the shoe, and means for moving the heel plate heightwise of the shoe to position the heel portion of the pad in accordance with the height of the heel portion of the shoe, said movement causing said shank plate to pivot about its fixed axis to move the shank portion of the pad into proper angular relation to the shank of the shoe, said means also operating to effect a pivotal movement of the forepart plate about said fixed axis to position said forepart plate in accordance with the toe spring of the shoe.

143. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad for pressing a sole against the bottom of the shoe, a support for said pad, said support comprising a plurality of relatively movable sections located respectively at the forepart, shank and heel portions of the shoe, the forepart and shank sections being arranged to pivot about a fixed center located substantially at the ball line of the shoe and the shank section being pivotally connected to the heel section which is arranged for movement heightwise of the shoe without changing its angular relation to the shoe, means for moving the heel section of the support heightwise to position it in accordance with the heel portion of the shoe thereby moving the shank section about said fixed center into a position which conforms more closely to the shank portion of the shoe, and means for moving the forepart section about said fixed center to cause said section to conform more closely to the spring of the toe portion of the shoe.

144. In a machine for cement-attaching soles to shoe, the combination of means for engaging a shoe, a pad for pressing a sole against the bottom of the shoe, a support for said shoe, said support comprising separate sections at the forepart, shank and heel portions of the shoe, the heel section being arranged for movement heightwise aand lengthwise of the shoe while said section is maintained in its original angular relation to the shoe, and said shank section being pivotally supported by said heel section and by a fixed axis located substantially at the ball line of the shoe, and means for moving said heel section heightwise of the shoe to position it in ac-

cordance with the heel portion of the shoe, said movement causing said shank section to pivot about its fixed axis into an angle which conforms more closely to the shape of the shank portion of the shoe.

145. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad for pressing a sole against the bottom of the shoe, a support for said pad, said support having separate sections at the forepart, shank and heel portions of the shoe, the heel section being arranged for movement heightwise and lengthwise of the shoe, and the shank section being pivotally connected to said heel section and to a fixed axis located substantially at the ball line of the shoe, and means for moving the heel section heightwise to position it properly for the heel portion of the shoe, said movement causing pivotal movement of the shank section about its fixed axis thereby to position said section properly for the shank portion of said shoe.

146. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad for pressing a sole on said shoe, shoe gages for measuring the width of the shoe at the forepart and heel portion, sole gages for positioning the sole in accordance with the width of the shoe as determined by the shoe gages, and means for effecting a heightwise adjustment of the gages which are located at the heel portion of the shoe, said means operating also to effect a corresponding heightwise adjustment of the heel portion of the pad.

147. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a pad for pressing a sole on the bottom of the shoe, gages for measuring the width of the shoe at the forepart and heel portion, gages at the forepart and heel portion of the sole for positioning the latter in accordance with the widths of the shoe at such portions, and means for effecting a heightwise adjustment of the sole and shoe gages at the heel portion of the shoe to accommodate shoes which are to have heels of different heights, said means acting also to effect a corresponding heightwise adjustment of the heel portion of the pad.

148. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a pad for pressing a sole on the bottom of of the shoe, gripper members at the forepart and heel portion of the sole for introducing it between the pad and the shoe bottom, gages for measuring the width of the shoe at the forepart and heel portion, sole gages cooperating with said grippers to position the sole in accordance with the width of the shoe as determined by the shoe gages, and means for adjusting the gripper, sole gage and shoe gages at the heel portion of the sole and shoe heightwise of the shoe, said means operating also to effect a corresponding heightwise adjustment of the heel portion of the pad.

149. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a pad for pressing a sole on the bottom of the shoe, a support for the pad, said support comprising a plurality of sections pivotally arranged so that the upper surface of the support may be made to conform more closely to the longitudinal contour of the shoe bottom, gages for determining the width of the shoe at the forepart and heel portion, sole gages for locating the sole transversely of the shoe bottom, and means for adjusting the shoe gages and sole gages located at the heel portion of the shoe heightwise of the shoe, said means also operating to vary the position of the heel end of the sectional support in accordance with such adjustment.

150. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, grippers for engaging a sole at the forepart and heel portion and introducing it under the shoe bottom, a pad for applying pressure to the shoe and sole, a support for said pad, said support comprising forepart, shank and heel sections pivotally arranged so that the upper surface of the support may be made to conform more closely to the shape of the shoe bottom, shoe gages for calipering the width of the shoe at the ball line and heel breast line, sole gages cooperating with the grippers to position the sole transversely of the shoe bottom in accordance with the width of the shoe, and manually-controlled means for effecting a heightwise adjustment of the shoe gages, sole gage and gripper at the heel breast line to position them properly for the shoe being operated upon, said means operating simultaneously to effect a corresponding heightwise adjustment of the section of the support at the heel portion of the shoe.

151. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a pad for pressing a sole against the bottom of the shoe, a support for said pad, said support comprising sections at the forepart, shank and heel portions of the shoe which may be adjusted relatively to each other to conform the support to the shape of the shoe bottom, gages for measuring the width of the shoe at the forepart and heel portion, gages for calipering the sole at the forepart and heel portion and positioning the sole widthwise of the shoe, mechanism positioned by the shoe for locating the sole longitudinally of the shoe, and means for adjusting the shoe and sole gages at the heel portion of the shoe heightwise and for adjusting the heel section of the support heightwise a corresponding amount, said means acting also simultaneously to adjust both the mechanism for positioning the sole longitudinally of the shoe and the forepart section of the support properly to operate on the forepart of the shoe.

152. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, a pad for pressing a sole against the shoe bottom, grippers for introducing the sole between the pad and the shoe bottom, a support for said pad, said support being made in sections at the forepart, shank and heel portions of the shoe so that the upper surface of the support will conform more closely to the longitudinal contour of the shoe bottom, shoe gages for calipering the width of the shoe at the forepart and heel portion, sole gages cooperating with the grippers to position the sole widthwise of the shoe, toe positioning mechanism movable lengthwise and heightwise of the shoe and positioned by the shoe for locating the toe end of the sole longitudinally and widthwise of the shoe, and manually-controlled means for effecting a heightwise adjustment of the shoe gages and the sole gage and gripper at the heel portion of the shoe and a corresponding heighwise adjustment of the heel section of the support, said means also operating simultaneously to adjust both the forepart section of the support and the toe positioning mechanism so that said section and positioning mechanism will always remain in a predetermined relation to each other.

153. In a machine for pressing soles on the bottoms of shoes, the combination of means for engaging a shoe, sole pressing means comprising a pad having inflatable compartments arranged to apply pressure to different portions of a sole on the shoe, and power operated means for automatically inflating said compartments.

154. In a machine for pressing soles on the bottoms of shoes, the combination of means for engaging a shoe, sole pressing means comprising a pad provided with a plurality of inflatable compartments at its marginal portion, and means for inflating said compartments different amounts so that different pressures may be applied to different portions of the sole margin.

155. In a machine for pressing soles on the bottoms of shoes, the combination of means for engaging a shoe, sole pressing means comprising a pad provided with a plurality of inflatable compartments at its marginal and shank portions, and means for inflating the compartments successively so that pressure will be applied progressively to corresponding portions of the sole.

156. In a machine for pressing soles on the bottoms of shoes, the combination of means for engaging a shoe, means for pressing a sole on the bottom of the shoe comprising a pad having inflatable compartments at the forepart and shank portions of the sole and arranged to apply pressure to said portions, and means for first inflating the forepart compartment and thereafter inflating the shank compartment.

157. In a machine for pressing soles on the bottoms of shoes, the combination of means for engaging a shoe, means for pressing a sole on the bottom of the shoe comprising a pad having inflatable compartments located at the forepart, shank and heel portions of the sole and arranged to apply pressure to such portions, and means for inflating the compartments seriatim.

158. In a machine for pressing soles on the bottoms of shoes, the combination of means for engaging a shoe, a pad for pressing a sole on the shoe and having inflatable compartments at the forepart, shank and heel portions of the sole, and means for inflating said compartments progressively from one end of the pad to the other thereby to insure that one end of the sole will be substantially free from pressure while pressure is being applied to its shank portion.

159. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad for pressing a sole against the bottom of the shoe, said pad being solid at the central portion of the sole and having inflatable compartments at the shank and marginal portions of the sole, means for relatively moving the shoe and the central portion of the pad to apply pressure to the central portion of the sole, and means for thereafter inflating the marginal and shank compartments successively.

160. In a machine for cement-attaching soles to shoes, the combination of means for engaging a shoe, a pad for applying pressure to the shoe and to a sole to be attached thereto, said pad having a solid central portion in the shape of a sole with an inflatable compartment extending transversely thereof at the shank portion of the shoe and inflatable marginal compartments at the forepart and heel portions of the shoe, means for pressing the shoe and sole against the central portion of the pad to apply pressure to the central portion of the sole, and means for first inflating the marginal compartment at the forepart of the shoe and thereafter successively inflating the shank and heel compartments thereby to apply pressure to the marginal and shank portions of the sole progressively from toe to heel.

161. In a cement sole-attaching machine, the combination of a jack for a shoe, sole-pressing means comprising a flexible pad having a solid central portion and marginal and shank compartments which are arranged to be inflated by fluid under pressure, mechanism for moving the jack toward the pad to apply pressure to the central portions of the sole, and means for inflating the marginal and shank compartments to apply pressure to corresponding portions of the sole, said means being arranged to inflate the compartments progressively from the toe to the heel end of the pad.

162. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, sole-pressing means comprising a flexible pad having separate inflatable compartments, means for bringing the shoe and sole against the pad, and means for inflating the compartments separately from the toe to the heel end of the pad thereby to apply pressure to the sole progressively from toe to heel.

163. In a machine for cement-attaching soles to shoes, the combination of pressing means comprising a flexible pad having a relatively inflexible central portion and separate marginal compartments at its forepart and heel portion, said compartments being arranged to be inflated by fluid under pressure to apply pressure to the marginal portions of a shoe and sole, and means for inflating said forepart and heel compartments separately.

164. In a machine for cement-attaching soles to shoes, the combination with sole-pressing means comprising a flexible pad having marginal compartments located at its forepart and heel portion and arranged to be inflated by fluid under pressure to apply pressure to the marginal portion of a sole, and having an inflatable compartment overlapping said marginal compartments at the shank portion of the sole, of means for supplying fluid under pressure to said forepart, shank and heel compartments separately and in the order named thereby to apply pressure progressively from the toe to the heel end of the sole.

165. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe in upright position, pressure-applying means comprising a flexible pad having inflatable compartments at its marginal and shank portions and having a wall of substantial thickness at its central portion, mechanism for supporting a sole between the pad and the shoe bottom, means for moving the central portion of the pad yieldingly into engagement with the sole, mechanism for pressing the shoe and sole against said central portion to apply a predetermined pressure to the central portion of the shoe and sole, and means for thereafter inflating said marginal and shank compartments progressively from the toe to the heel end of the pad thereby to apply pressure independent of the pressure on the central portion to the marginal and shank portions of the shoe and sole.

166. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe, pressure-applying means comprising a flexible pad having inflatable compartments at its marginal portion and across its shank portion, and having a substantially thicker central

portion, means for supporting a sole between the shoe and the pad, power-operated means for pressing the shoe and sole against the central portion of the pad to apply pressure to the central portions of the shoe and sole, and means for inflating the marginal and shank compartments in succession to apply a pressure progressively to corresponding portions of the shoe and sole.

167. In a machine for pressing soles on the bottoms of shoes, the combination of shoe-holding means, sole-pressing means comprising a yieldable pad having an uninflatable central portion in the shape of a sole and an inflatable marginal portion, means for relatively moving the central portion of the pad and the sole to bring said portion into engagement with the sole, and means for inflating the marginal portion of the pad to apply pressure to the marginal portion of the sole.

168. In a machine for cement-attaching soles to shoes, the combination of a jack for supporting a shoe in upright position, a pad for pressing a sole against the bottom of the shoe, said pad having a relatively inflexible central portion shaped like the central portion of a sole and inflatable compartments at the forepart, shank and heel portions of the sole, said forepart and heel compartments extending to the periphery of the central portion and said shank compartment extending transversely of the pad under said central portion, mechanism for introducing a sole between the pad and the shoe bottom, means for bringing the shoe and sole against said central portion to apply a predetermined pressure to corresponding portions of the shoe and sole, and means for inflating the forepart, shank and heel compartments successively to apply pressure progressively to the marginal and shank portions of the shoe and sole without substantially increasing the pressure at the central portions thereof.

169. In a machine for cement-attaching soles to shoes, a pad for applying pressure to a sole and shoe, said pad having a solid central portion for applying pressure to the central portions of the sole and shoe and an inflatable marginal portion for applying pressure to the marginal portions of the sole and shoe, and means for inflating the marginal portion of the pad.

170. In a machine for cement-attaching soles to shoes, a pad for pressing a sole against the bottom of a shoe, said pad having inflatable margins at its forepart and heel portion, and means for automatically inflating the margins of said forepart and said heel portion to different extents.

171. In a machine for cement-attaching soles to shoes, a pad for pressing a sole against the bottom of a shoe, said pad having an inflatable forepart and an inflatable shank portion separate from said forepart, means for inflating said forepart and said shank portion, and means for controlling the pressure in said forepart and said shank portion so that different pressures may be applied to corresponding portions of the sole.

172. In a machine for cement-attaching soles to shoes, a pad for pressing a sole against the bottom of a shoe, said pad having a solid central portion for applying pressure to the central portion of the sole, separate inflatable compartments surrounding said central portion at the forepart and heel portions of the sole, and a separate inflatable compartment underlying said central portion at the shank portion of the sole, means for inflating said compartments separately to apply pressure to the marginal and shank portions of the sole, and means for controling the amount of pressure in each compartment.

173. In a machine for cement-attaching soles to shoes, a pad for applying pressure to a sole and shoe, said pad having a solid portion shaped to engage only the central portion of the forepart of a sole and apply pressure thereto and a compartment surrounding said solid portion, and means for inflating said compartment to expand the marginal portion of the pad and thereby apply pressure to the marginal portions of the shoe and sole.

174. In a machine for cement-attaching soles to shoes, a rubber pad for applying pressure to a shoe and sole, said pad having a solid portion for applying pressure to the forepart of the shoe and sole, and an inflatable compartment extending transversely of the pad for applying pressure to the shank portion of the shoe and sole.

175. In a machine for cement-attaching soles to shoes, a rubber pad for applying pressure to a shoe and sole, said pad having at its central portion a relatively thick section conforming substantially to the periphery of a sole and adapted to apply pressure to the central portions of the shoe and sole, inflatable compartments surrounding said thick section and arranged to apply pressure to the margins of the shoe and sole at the forepart and heel portions thereof, and a separate inflatable compartment extending under said section at the shank portion of the shoe and adapted to apply pressure to the shank portion of the shoe and sole, and means for admitting fluid under pressure separately to said compartments.

176. In a machine for cement-attaching soles to shoes, the combination of a yieldable pad for applying pressure to a shoe and sole, said pad having a series of separate inflatable compartments extending from its toe-engaging portion to its heel-engaging portion, and means for inflating said compartments successively from the toe to the heel end of the pad so that pressure will be applied progressively to the shoe and sole.

177. In a machine for cement-attaching soles to shoes, the combination of a pad for applying pressure to a shoe and sole, said pad having a solid central portion the periphery of which is arranged to lie within the periphery of a sole and inflatable compartments at its toe and shank portions, said toe compartment surrounding said central portion and said shank compartment extending across said central portion transversely of the pad, and valve means for admitting fluid under pressure first to the toe compartment and then to the shank compartment thereby to apply pressure progressively to the toe and shank portions of the shoe and sole.

178. In a machine for cemcnt-attaching soles to shoes, the combination of a rubber pad for applying pressure to a shoe and sole, said pad having a solid central area shaped substantially like a sole and arranged to apply pressure to the central portions of the shoe and sole and having separate inflatable chambers at the margins of its forepart and heel portions and across its shank portion, the inflatable chambers being adapted to apply greater pressure to the marginal and shank portions of the shoe and sole than is applied by said solid area to their central portions, and a power-operated valve for inflating said compartments successively from the toe to the heel end of the pad so that this pressure will be applied progressively to the shoe and sole.

179. In a machine for cement-attaching soles

to shoes, a pad for pressing a sole on the bottom of a shoe, said pad having a solid central portion conforming substantially to the periphery of a sole and arranged to apply pressure to the central portion of the forepart and shank portion of the sole, an inflatable compartment surrounding said central portion at the forepart of the sole and adapted to apply pressure to the margin of the forepart of the sole, and a separate inflatable compartment underlying said central portion and adapted to apply pressure to the shank portion of the sole, valve means for separately inflating the compartments in succession from the toe to the shank portion of the shoe thereby to apply pressure progressively to the margins of the forepart and to the shank portion of the sole, and means for controlling the amount of pressure in each compartment.

180. In a machine for cement-attaching soles to shoes, a pad for pressing a sole on the bottom of a shoe, said pad having a solid central portion conforming substantially to the periphery of a sole and arranged to apply pressure to the central portion of the sole, separate inflatable compartments surrounding said central portion and adapted to apply pressure to the margins of the forepart and heel portion of the sole, and a separate inflatable compartment underlying said central portion and adapted to apply pressure to the shank portion of the sole, valve means for separately inflating each compartment in succession from the toe to the heel end of the pad thereby to apply pressure progressively to the marginal and shank portions of the sole, and means for controlling the amount of pressure applied by each compartment.

181. That improvement in methods of cement-attaching soles to shoes which consists first in applying pressure only to central portions of the forepart and heel portions of a shoe and sole and then to their marginal portions.

182. That improvement in methods of cement-attaching soles to shoes which consists in applying pressure first only to the central portion of the forepart of a sole to force said portion against the bottom of a shoe while leaving the marginal portion of said forepart entirely free from pressure, and thereafter applying pressure to the marginal portion of said forepart.

183. That improvement in methods of cement-attaching soles to shoes which consists first in applying pressure to limited areas at the central portion of the forepart and heel portions of a sole which has been conformed to the contour of a shoe bottom without applying any pressure to the remaining portions of the sole, and thereafter applying substantially greater pressure to the marginal portions of said forepart and heel portion.

184. That improvement in methods of cement-attaching soles to shoes which consists in pressing a sole which has been conformed substantially to the contour of a shoe bottom against said shoe bottom by pressure applied first to the central portions only of the forepart and heel portions of the sole, and thereafter applying considerably greater pressure to the margins of said forepart and heel portions and to the shank portion of the sole, said marginal and shank pressure being applied progressively from the toe to the heel end of the sole.

185. That improvement in methods of cement-attaching soles to shoes which consists in applying pressure first to the central portions of the forepart and heel portions of a shoe and sole while leaving substantial marginal areas of said portions entirely free from pressure, and thereafter applying pressure to said marginal areas and to the shank portions of the shoe and sole.

186. That improvement in methods of cement-attaching soles to shoes which consists first in applying pressure only to the central portions of a shoe and sole, and thereafter applying greater pressure to their marginal portions without engaging the side portions of the shoe upper or increasing the pressure at the central portions of the shoe and sole.

187. That improvement in methods of cement-attaching soles to shoes which consists in applying pressure to the central portions only of the forepart and heel portion of a sole to force it against the shoe bottom, and thereafter applying pressure to the peripheries of said forepart and heel portion and to the shank portion of the sole without increasing the pressure applied to the central portions thereof.

188. That improvement in methods of cement-attaching soles to shoes which consists in applying pressure simultaneously to central portions of a shoe and sole, and then applying pressure to their marginal portions progressively from the toe to the heel end of the shoe.

189. That improvement in methods of cement-attaching soles to shoes which consists in applying pressure first to the central portions of the forepart and the heel portions of a shoe and sole and thereafter to the peripheries of said forepart and heel portions, the peripheral pressure being applied progressively from the toe to the heel ends of the shoe and sole.

190. That improvement in methods of cement-attaching soles to shoes which consists in applying pressure first to central portions of the forepart and heel portions of a shoe and sole, and thereafter applying greater pressure to the margins of said forepart and heel portions and to the shank portions of the shoe and sole, said marginal and shank pressure being applied progressively from the toe to the heel ends of the shoe and sole without increasing the pressure at said central portions.

191. That improvement in methods of cement-attaching soles to shoes which consists in applying a predetermined pressure to central areas of the forepart and heel portions of a shoe and sole, and thereafter applying greater pressure to the peripheries of said forepart and heel portions and to the shank portion of the shoe and sole without relieving the pressure at said central areas, the peripheral and shank pressure being applied progressively from the toe to the heel end of the shoe thereby to prevent longitudinal movement of the sole relatively to the forepart of the shoe during the pressing operation.

192. Mechanism for relatively positioning soles and shoes comprising, in combination, means for calipering the width of a shoe, means for calipering the width of a sole, and means for thereafter moving said sole calipering means as a unit widthwise of the shoe calipering means to position the sole and shoe relatively to each other widthwise.

193. Mechanism for relatively positioning soles and shoes comprising, in combination, means for calipering the width of a shoe, means for calipering the width of a sole which is to be attached to said shoe, and means for automatically effecting widthwise movement of said sole calipering means relatively to said shoe calipering means to position the sole laterally of the shoe bottom.

ERASTUS E. WINKLEY.

CERTIFICATE OF CORRECTION.

Patent No. 2,061,690. November 24, 1936.

ERASTUS E. WINKLEY.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 24, first column, line 13, claim 13, before the word "means" second occurrence, insert calipering; page 29, second column, line 17, claim 75, after "out" insert of; page 33, second column, line 64, claim 125, for "material" read marginal; page 35, first column, line 34, claim 139, for "cement-actuating" read cement-attaching; and second column, line 63, claim 144, for "shoe" read shoes; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 9th day of March, A. D. 1937.

(Seal)

Henry Van Arsdale
Acting Commissioner of Patents.