

Jan. 2, 1940.

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2,185,941

APPARATUS FOR MAKING SHOES

Filed Sept. 10, 1937

3 Sheets-Sheet 1

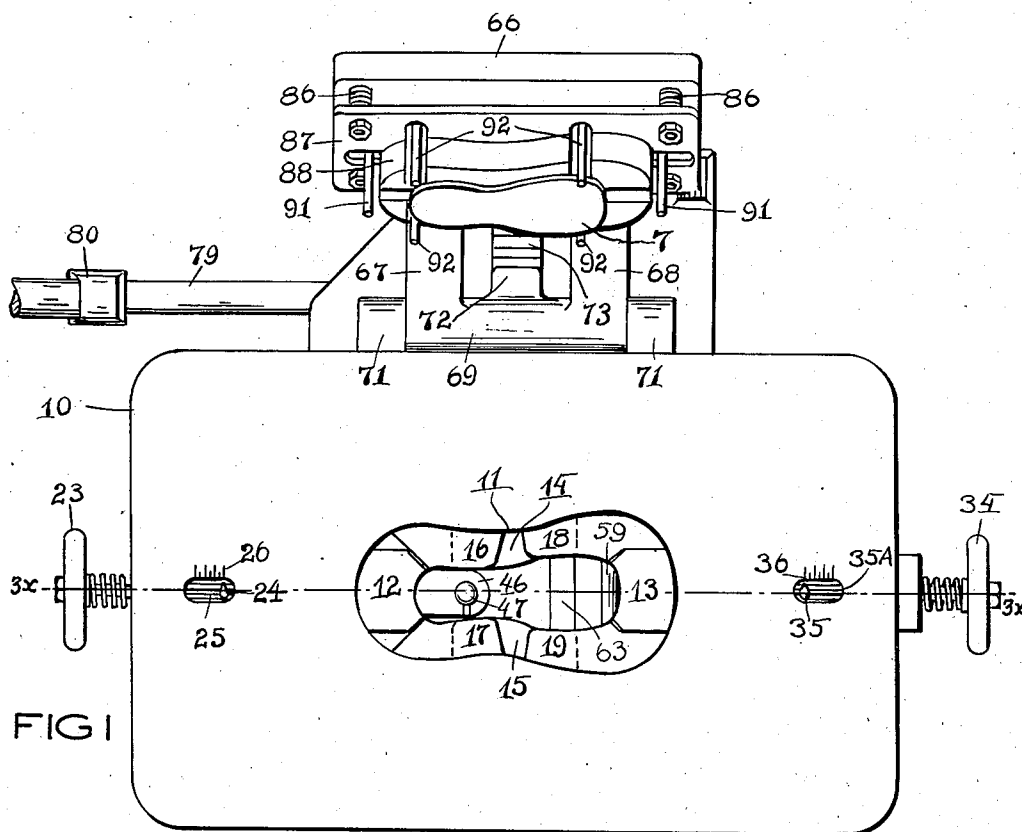


FIG 1

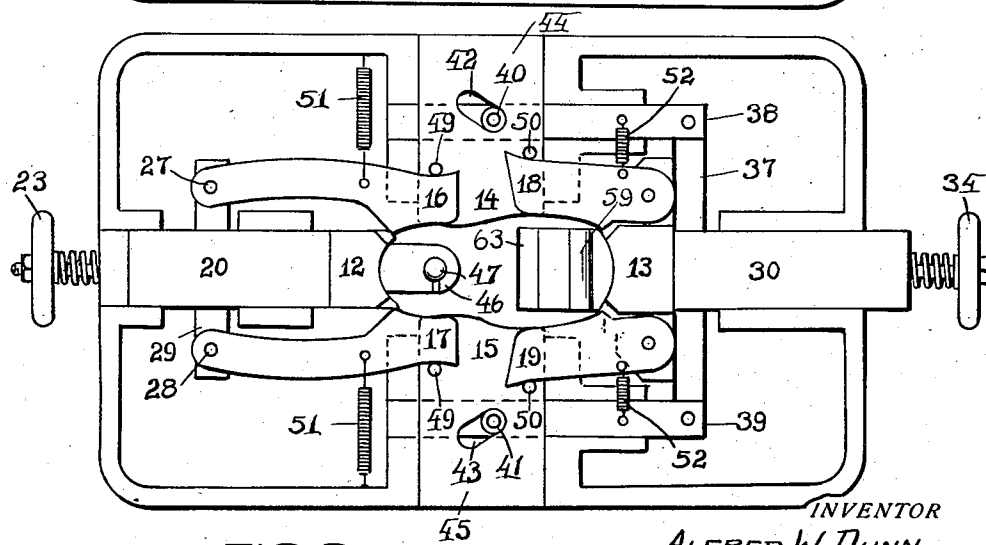


FIG 2

BY

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3 Sheets-Sheet 2

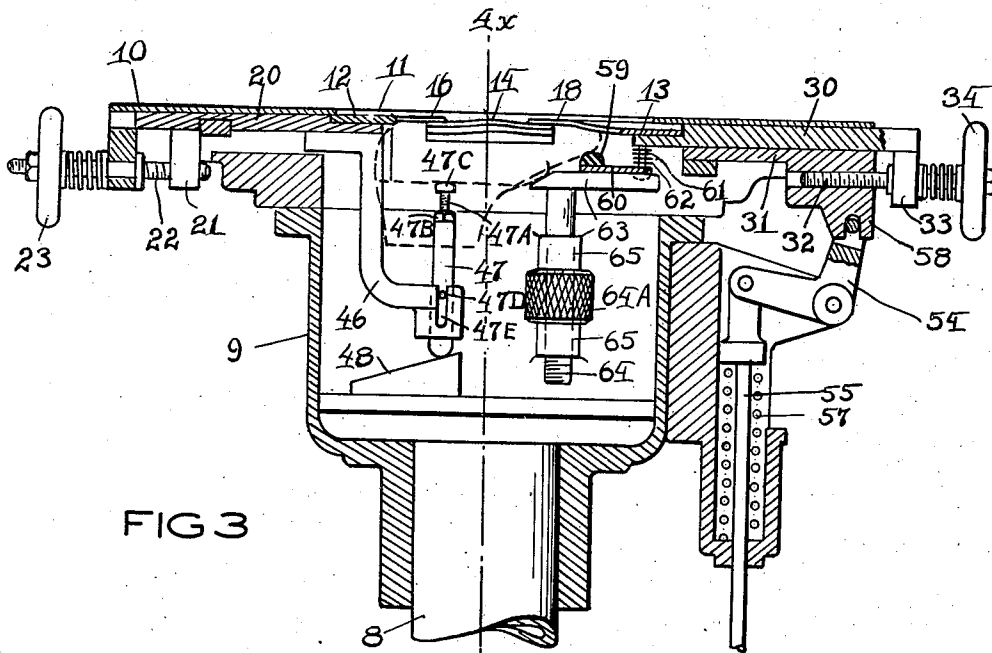


FIG 3

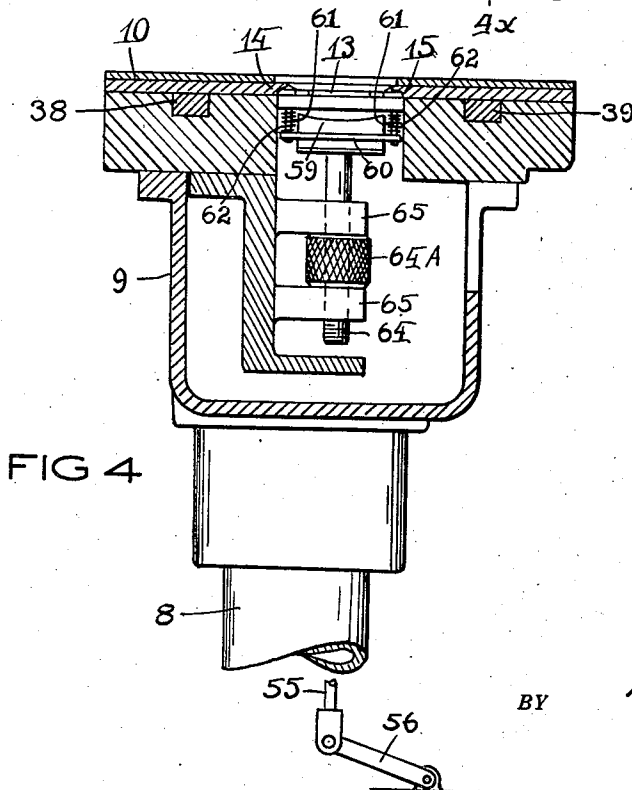


FIG 4

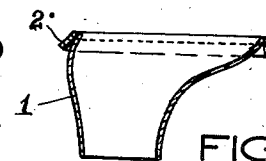


FIG 9

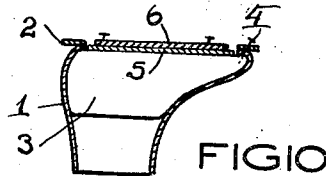


FIG 10

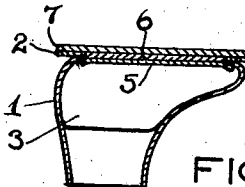


FIG 11

BY

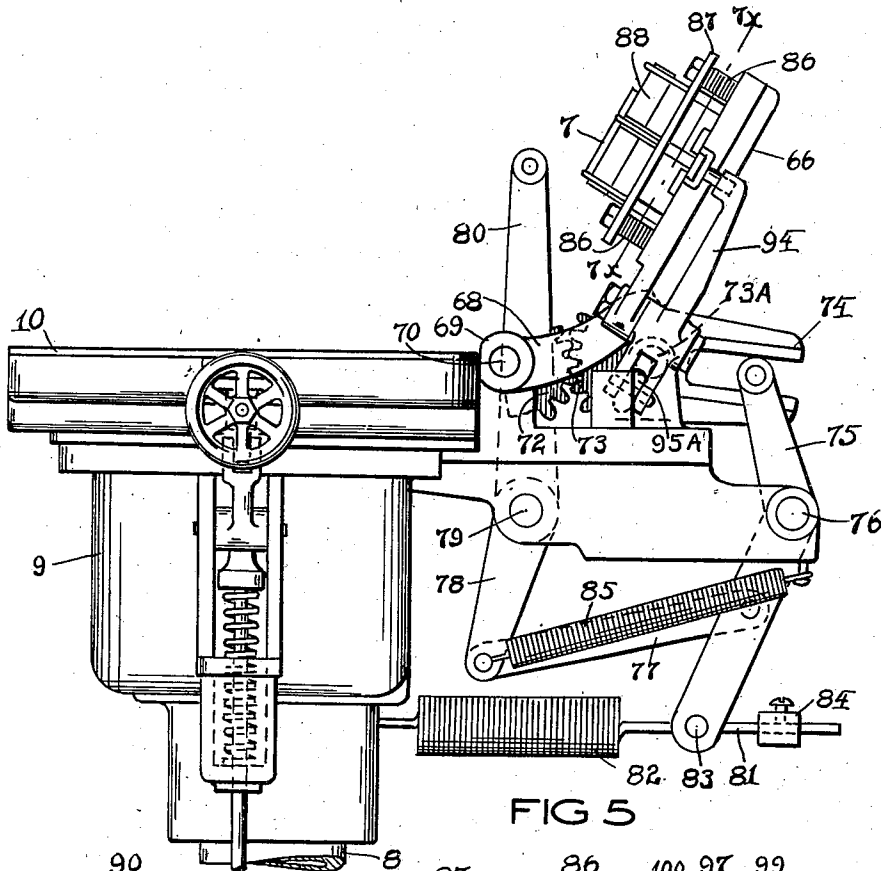
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APPARATUS FOR MAKING SHOES

Filed Sept. 10, 1937

3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

2,185,941

APPARATUS FOR MAKING SHOES

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Application September 10, 1937, Serial No. 163,213

6 Claims. (Cl. 12-7)

This invention relates to the manufacture of shoes and has for its principal object to provide a simple and easily operated apparatus with which the sole is quickly and efficiently applied at a low cost to the upper of the shoe.

Another object of this invention is to provide an apparatus which is especially adapted for the attachment of a sole in the manufacture of so called "prewelt" shoes, in which the welt is stitched to the upper, then lasted and supported on the last while the outer sole is cemented or otherwise fastened to the welt.

A further object of this invention is to provide the apparatus with a novel sole applying mechanism with which the sole is automatically placed and quickly applied to the welt.

A still further object of this invention is to provide a sole applying apparatus which may be quickly and easily adjusted for use with varying sizes of shoes.

All these and other objects of this invention will become more readily apparent from the detailed description thereof which follows, reference being had to the accompanying drawings in which

Figure 1 is a top plan view of the apparatus.

Figure 2 is a top plan view of the lasting table of the apparatus with the table top removed therefrom.

Figure 3 is a vertical longitudinal section of the lasting table taken on the line 3x-3x of Figure 1.

Figure 4 is a vertical cross section of the lasting table, the section being taken on the line 4x-4x of Figure 3.

Figure 5 is an end elevation of the apparatus.

Figure 6 is a plan view of the sole locating and applying mechanism.

Figure 7 is a sectional view of the sole locating and applying mechanism taken on the line 7x-7x of Figure 5.

Figure 8 is a sectional view of one of the fingers of the sole locating and applying mechanism the section being taken on the line 8x-8x of Figure 7.

Figure 9 is a longitudinal sectional view of the upper of a shoe with the welt stitched thereto prior to being lasted.

Figure 10 is a similar sectional view of the upper and welt after being temporarily lasted and supported on the last with an insole and filler covering the bottom of the last.

Figure 11 is a sectional view of the upper as it appears on the last after the upper is lasted by the apparatus and the outer sole fastened to its

welt and the combined insole and filler fastened to the sole.

In the several figures of the drawings like reference numerals indicate like parts.

The apparatus, forming the subject matter of my present invention, is especially adapted for use in the manufacture of "prewelt" shoes in which, as illustrated in Figure 9, the upper 1 has stitched thereto the welt 2 before the shoe is lasted. After the welt has been applied, the last 3 is inserted into the upper and the "prewelted" edge drawn up thereon so as to have the welt project outwardly from the upper, in which position it is temporarily fastened to the last by means of a tack 4. An insole 5 has been previously tacked to the bottom of the last to have the filler 6, which is attached to the insole, surrounded by the inner edge of the welt and insole. With the upper welt temporarily tacked thereto and supported thereon and the insole and filler separately attached thereto, the last is placed and supported in my apparatus to have the upper operated upon by having clamping members or wipers engage it under the welt to permit the withdrawal of the tack 4 and then uniformly drawing the prewelted edge of the upper over the bottom edge of the last and the edge of the insole 5 and holding the upper in this lasted position. The tacks which hold the insole and filler to the bottom of the last are then withdrawn and the outer sole 7 positioned over the upper against the welt for its attachment thereto and to the filler 6.

The mechanism, which is operated to do this work quickly and efficiently, is supported on the upright 8 which in turn is suitably mounted on a base (not shown) provided at the bottom thereof. A housing 9 at the top of the upright encases the mechanism and its cover plate 10 provides a table top for the apparatus. Centrally located in the table top is an opening 11 which has substantially the outline of an enlarged sole of the type which is applied to the shoes. Within and directly below the table top are located and grouped a series of clamping members or wipers which, in their outline, complement each other to provide a normally enlarged but otherwise substantially true outline of the bottom of the last so as to receive the temporarily lasted shoe upper and by movement of all but one of the members or wipers is reduced to have the clamping members or wipers engage under the welt and draw the upper over the last to its proper size and hold them in this contracted position while an outer sole is attached thereto.

The clamping members or wipers include the adjustable but otherwise fixed heel engaging member 12, the adjustable and sliding toe engaging member 13, the sliding side engaging members 14 and 15 which are moved by a treadle which also affords a common drive for the toe engaging member, the swinging heel engaging members 16 and 17 which are carried by and adjustable with the normally stationary heel engaging member 12 but are operated by the side engaging members 14 and 15, and the swinging toe engaging members 18 and 19. The latter are carried by and adjusted with the toe engaging member 13 and move therewith in addition to being moved by the side engaging members 14 and 15.

The heel end engaging member 12 comprises a plate with a segmental recess formed in the end thereof and the edge of the recess tapered for engagement into the V groove formed around the upper by the attachment of the welt thereto. The heel engaging member is carried by the slide member 20 which is adjustable endwise in the top of the housing 9 below the cover plate 10. A lug 21 is carried on the under side of the slide member and has the feed screw 22 threaded therethrough while it is suitably journaled on the housing and is rotated by the hand wheel 23 to provide for a ready adjustment of the heel end engaging member 12 for the predetermined location of this member for the various sizes of shoes that are to be operated upon in the apparatus. A pointer 24 is carried by the slide member 20 within the opening 25 in the cover plate and a suitable scale 26 provided along one edge of this opening cooperates with the pointer to indicate the size for which the heel end engaging member is adjusted.

The swinging supplementary heel end engaging members 16 and 17 are pivotally mounted at 27 and 28 on the cross bar 29. The latter is suitably carried by the slide member 20 so as to move therewith and keep the members 16 and 17 in the same relative position to the member 12 for any adjustment thereof. The clamping edge of the members 16 and 17 is thin and has a contour which provides a continuation of the segmental recess in the heel end engaging member 12 and with said member substantially encircles the heel end of a shoe between the welt and the upper when inserted into the apparatus.

As above described, the toe end engaging member 13 is adjustable as well as otherwise movable. The toe end engaging member comprises a plate with a segmental recess at the outer edge for engagement into the V groove formed around the upper by the attachment of the welt. This plate is suitably attached to the slide 30 so as to form a part thereof. The slide 30 is mounted on top of the guide member 31 so as to move therewith when the latter is moved in the end of the housing 9. An adjustment of the slide 30 on the guide member is provided by the feed screw 32 which is journaled and held against endwise movement in the lug 33 carried by the slide and is threaded into the guide member so that the rotation of the feed screw by means of the hand wheel 34 causes the slide to move on the guide member for adjustment of the toe end engaging member 13 and its supplementary clamping members 18 and 19 to the particular size shoe which is to be operated upon in the apparatus.

A pointer 35 is carried by the slide 30 and

projects thru the opening 35A in the cover plate so that by means of the scale 36 along one side of the opening the pointer will indicate the size to which the toe end engaging members are adjusted. The adjustment is made so that its indication corresponds to that given by the pointer 24 on the scale 26 in order to have both the heel end and toe end engaging members adjusted for operation on the same size shoe.

The clamping members or wipers 14 and 15 which engage the side of the shoe in lasting the upper are jointly operated by the movement of the guide member 31. For this purpose a cross member 37 is carried by the guide member and has fastened to the outer ends the rods 38 and 39. These rods are each suitably guided in a straight line motion and carry the rollers 40 and 41 which project into the angular cam slots 42 and 43 respectively provided in the transversely moving slides 44 and 45. In this way the endwise movement of the rods 38 and 39 by the guide member 31 to the left in Figure 2 causes the transversely moving slides 44 and 45 and with them the side clamping or engaging members 14 and 15 to move inwardly for the engagement of the upper and release the upper on the return movement of the rods 38 and 39 by the guide member 31 to the right in Figure 2.

To support the last with the upper in the apparatus for the lasting operation, the slide member 20 carries on its under side the bracket 46. This bracket extends into the housing 9 and its outer free end is adapted to have a supporting pin 47 move vertically up and down therein. The lower end of this pin which projects below the bracket rests on the inclined stationary cam 48 which is located within the housing so that as the bracket 46 is moved in the adjustment of the slide member 20 the supporting pin rides up or down the inclined cam 48 to have its upper supporting end raised or lowered for the support of different sizes of lasts and their uppers. Thus when the heel clamping member 12 is moved to the left in Figures 1 and 2 for the operation on a larger size last and upper, the supporting pin rides down the incline of the cam 48 to correspondingly increase the space between its upper supporting end and the clamping members. In this way a correspondingly larger last can then be supported on top of the supporting pin.

In order to compensate for any variations in the height of lasts, the top of the pin 47 is made adjustable so that its length may be increased or decreased. For this purpose the screw extension 47A is threaded into the top of the pin 47 and is adjustably locked thereto by means of the locknut 47B. At the top of this screw is provided the supporting head 47C on which the last is adapted to rest. In order to keep the pin 47 from turning when the extension is threaded up or down thereon on the adjustment thereof, a guide pin 47D projects from the side thereof into the vertical guide slot 47E to thus permit but a vertical movement of the pin 47 in the bracket 46.

Each of the side clamping members 14 and 15 carries a pair of pins 49 and 50 and the swinging clamping members 16 and 18 on top of one of the side clamping members, and the swinging clamping members 17 and 19 on top of the other side clamping members are normally drawn outwardly by suitable springs 51 and 52 respectively to have the rear of these clamping members yieldingly engage these pins. In this way the inward

movement of the side clamping members 14 and 15 causes the swinging members 16 to 19 inclusive to be jointly swung in by the movement of the pins 49 and 50 against the back of these swinging clamping members. The rear of these clamping members are cam shaped in order to produce the proper swinging movement of these members by their engagement with the moving pins 49 and 50 and thus have the clamping edges of these clamping members in their movement combine with the edges of the heel, toe and side clamping members to retain a substantially continuous contour for uniformly engaging into the groove between the welt and upper and effect an even clamping and drawing of the upper on the last on the inward movement of these members. In the outward movement the swinging clamping members 16 to 19 are caused to follow the outward movement of the side clamping members 14 and 15 by the action of the springs 51 and 52 to thus simultaneously release the upper and welt on the withdrawal of the side and toe clamping members.

The movement of the guide member 31 which, as above pointed out, brings about the movement of the clamping members or wipers, except that of the heel member 12, for the purpose of drawing the upper and welt in place over the last prior to the attachment of the outer sole to the welt, is provided by the bell crank 54, link 55 and treadle 56. The latter is suitably mounted at or near the base of the upright 8 so that by stepping on it, the link 55 is pulled down against the pressure of the spring 57 which surrounds the upper end thereof and acts to return the mechanism to its normal starting position after the treadle is released. The link 55 is pivotally attached to one end of the bell crank 54 while the other end of the bell crank slidably engages into the bifurcated end of the lug 58 which depends from the guide member 31. Depressing the treadle thus swings the bell crank to move the guide member and causes it to operate the clamping members to engage under the welt of a shoe placed into the apparatus and draws the upper over the edge of the last on which it is supported. The treadle is held depressed to hold the upper in this position until an outer sole is applied to the welt as will presently appear.

The rear or heel portion of the last is supported in the apparatus on the supporting pin 47 as above pointed out in order to support the back of the upper and welt in the proper elevation with relation to the clamping members which engage under the welt. To supplement this support at the front or toe end of the shoe, a toe supporting cushion 59 is located in front and below the toe engaging member 13. This cushion is mounted on a supporting plate 60 which in turn is suspended from the under side of the plate 13 by means of a pair of pins 61, 61 and yieldingly forced downwardly thereon by means of springs 62 which surround the pins and rest on the supporting plate 60.

An adjustable but otherwise fixed supporting rest for the cushion 59 is provided by the bracket 63 which is carried on top of the threaded stem 64. The latter is movable vertically in the spaced lugs 65, 65 and a knurled nut 64A is threaded on the stem between the lugs so that rotation thereof causes the stem to be raised and lowered to move the bracket up and down in contact with the under side of the supporting plate of the cushion 59. In this way the cushion may be raised and lowered for the purpose of supporting the toe

end of varying sizes of uppers supported on their last and holding the upper and welt elevated for engagement by the clamping members which operate on the toe end of the upper and welt. An adjustment to compensate for varying thicknesses in the last is also provided by this movable supporting cushion.

After the upper is drawn over the last by the clamping members, as above described, it is held in the lasted position while the outer sole is applied to the welt. As previously pointed out an insole and filler is temporarily tacked to the bottom of the last so that in drawing the upper over the last it is also drawn over the edge of the insole. The filler on top of the insole then substantially fills the space surrounded by the inwardly facing edges of the upper and welt. In this way the top of the filler is substantially level with the upper face of the welt causing the outer sole to be attached to both the filler and the welt when placed thereover with a cement coating.

The automatically locating and cementing of the outer sole to the lasted upper held in the apparatus is performed by the sole placing and applying mechanism which forms part of the apparatus and is suitably mounted to the housing on one side thereof as illustrated in Figures 1 and 5. This mechanism comprises a pressure plate 66 which is supported on a pair of arms 67 and 68 that project from the hub 69. The latter is mounted to oscillate on the pivot shaft 70 which is held between the brackets 71, 71. A segmental gear 72 is formed on the hub between the arms 67 and 68 and meshes with another segmental gear 73 mounted to swing on the pivot shaft 73A in back of the pressure plate 66. The segmental gear 73 is provided with a bifurcated radial arm 74 by means of which the segmental gear is operated to oscillate the segmental gear 72 and swing the pressure plate 66 forward and back to apply a sole to the lasted upper as will hereinafter appear. For this purpose the upper end of the swinging lever arm 75 engages the bifurcated arm 74 and on its swinging movement slides back and forth therein effecting a variable movement for the segmental gears 72 and 73 in swinging the pressure plate 66 toward the prewelted upper.

This is made possible because the active leverage of the bifurcated arm 74, which is at its maximum at the beginning of its movement, is shortened as the connecting end of the lever arm 75 moves in the bifurcation toward the center of rotation of the arm 74 and increases again as the point of connection moves away from the center of rotation of the arm 74 during the final movement of the lever arm 75 in the same direction in its operation of the pressure plate toward the prewelted upper.

In the operation of the pressure plate it is thus moved with a maximum leverage and a correspondingly slow motion to facilitate the starting of the pressure plate and the speed of its movement is gradually increased to gain momentum for the pressure plate before it applies the sole as will hereinafter appear. The momentum of the pressure plate carries it to the end of its movement while the leverage of the arm 74 is again increased so that a maximum pressure is exerted on the pressure plate and in turn the sole applied thereby at the end of the movement of the crank handle 80. For the return movement the starting of the pressure plate is again facilitated by the increased leverage of the arm 75

74 at the beginning of its return movement by the lever arm 75 as set forth above.

The swinging arm 75 is pivoted at 76 and a link 77 connects the lower portion of the arm with the swinging arm 78 keyed to the shaft 79. The latter is suitably journaled and extends to one side of the pressure plate and the table top 10 where it has the crank handle 80 keyed thereto for the oscillation thereof. In this way the forward swinging of the handle by the operator causes the pressure plate 66 to be swung forward and apply a sole with a heavy blow and maximum pressure. The end of the forward movement of the pressure plate is cushioned and for this purpose the extension 81 of the tension spring 82 passes thru the pin 83 carried by the lower end of the swinging arm 78. On this extension is adjustably fastened a stop 84 so that as the pin 83 slides on the extension 81 it encounters the stop so that a further movement of the arm causes an expansion of the spring with a resultant cushioning effect on the last part of the forward movement of the pressure plate. The stretching of the spring also causes it to start the return movement of the pressure plate and assists the operator to move the handle crank for the return movement of the pressure plate to its starting position. The end of the return movement is cushioned by the spring 85 which is stretched between the swinging arm 78 and a stationary part of the mechanism so that this spring is expanded on the return movement of the pressure plate by the crank handle.

The pressure plate has yieldingly supported thereon by means of the springs 86 the plate 87 and on this plate is mounted the yielding pressure block 88. In the plate 87 and partially extending into the pressure block 88 are the two longitudinal slots 89, 89 and the four transverse slots 90, 90. Thru these slots project the holding fingers 91 and 92 respectively which are adapted to engage and hold the ends and the sides of the sole before and during its application to the welt. The holding fingers 91, 91 are mounted on the longitudinal slide members 93, 93 and the latter are engaged to be moved back and forth in the pressure plate 66 by means of the swinging levers 94 and 95. The lever 95 carries at its lower free end an antifriction roller 95A which, when the pressure plate is swung back from its sole applying position to its normal starting position, rolls down the stationary inclined cam 97 and rocks the lever 94 to cause it to move the slide member 93 with which it is connected to the right in Figures 1 and 6. The lever 94 is connected with the lever 95 by the link 96 in such a manner that the outward swinging of the lever 94 will also effect an outward swinging of the lever 95 and move its slide member 93 to the left in Figures 1 and 6 so that both fingers 91, 91 are simultaneously moved to opposite sides of the pressure blocks 88.

The longitudinally moving slide member 93, at the right in Figure 7, has a cam extension in which are provided the angular cam slots 97 and 98. Each of the transversely moving sliding members 99, 99 carries a suitable roller 100 at the under side for engagement with the cam slots 97 and 98 respectively so that the endwise or longitudinal movement of the slide member 93 causes a transverse movement of the slide members 99, 99 toward or away from each other. The holding fingers 92 are mounted on cross bars 101 carried by the transverse sliding members so that the opposing fingers 92 simultaneously move toward or away from each other on the movement of the

slide members 93. In this way all of the holding fingers are simultaneously operated to either move toward or away from the pressure block 88.

Each of the holding fingers is yieldingly collapsible and for this purpose has a plunger 102 formed thereon and slidably mounted in the socket 103 formed in the base of the finger. A spring 104 surrounds the lower portion of the finger and expands against the bottom of the plunger to yieldingly hold the finger in a normally extended position.

In the operation of the sole applying mechanism the cement coated outer sole 7 to be applied is placed against the pressure block 88 with its coated side facing outwardly and its edge resting on and between two of the holding fingers 92 as illustrated in Figures 1, 5 and 6. This done, the operator draws the crank handle 80 forward to swing the pressure plate over the table top and the lasted upper held in place therein. During the first portion of this movement of the pressure plate the roller 95A moves up on the incline of the cam 97 so that the spring 106, which yieldingly connects the levers 94 and 95 can swing these levers inwardly toward each other and move the spring fingers 91 against the heel and toe end of the sole 7 while the spring fingers 92 move in against the sides so as to move and center the sole on the pressure block and hold it centered thereon. In this way the sole is centered and held on the pressure block before the pressure plate has been moved from its rearwardly angular starting position to a vertical position in order to prevent the sole from dropping off the pressure block.

When the sole is centered on the pressure block it is also centered with relation to the upper and welt held in place in the table top of the apparatus. In swinging down over the table top the pressure plate thus deposits the sole in its proper position on the welt and causes the pressure exerted by the pressure block to uniformly force the cemented surface of the sole into contact with the cemented surface of the welt and the filler. The adhesion between the sole and the welt and filler is thus made uniform and practically instantaneous so that on the withdrawal of the pressure plate the sole will slip from between the holding fingers and remain fastened to the welt. The holding fingers will again move away from the pressure block on the last portion of the return movement to permit the placing of the sole for the next operation.

The lasting machine forming part of the disclosure not claimed herein is the subject matter of a divisional application Serial No. 261,394, filed March 11, 1939.

I claim:

1. In an apparatus of the class described, the combination of an adjustably movable end clamping member, an adjustably movable and operatively movable end clamping member opposite to and movable toward and away from said first end clamping member, operatively movable side clamping members, means for operatively moving said side clamping members and said second end clamping member in unison, supplementary clamping members operatively connected with said first end clamping members for adjustment therewith and operatively connected with said side clamping members for movement thereby and supplementary clamping members operatively connected with said second end clamping member for adjustment therewith and operatively connected with said side clamping members for

movement thereby, a supporting bracket carried by said adjustably movable clamping member, a fixed cam, a last supporting pin carried by said bracket and movable over said cam on the adjustment of said adjustably movable clamping member so as to simultaneously raise and lower said supporting pin relative to said clamping members.

2. In an apparatus of the class described and including a table top with an opening therein and clamping members movably grouped in said opening for holding a lasted upper in a predetermined position, the combination of a pressure member mounted to swing toward and away from said opening, gripping fingers movable on said pressure member to receive, center and grip a sole between them and means operated on the movement of said pressure member for the movement of said fingers.

3. In an apparatus of the class described including a sole applying mechanism comprising a table top and shoe upper holding means provided in a predetermined position relative to said table top, an arm mounted to swing toward and away from said holding means, a segmental gear carried by said arm, a second segmental gear adapted to mesh with said first segmental gear, a bifurcated radial arm carried by said second segmental gear, a lever arm engaging into the bifurcation of said radial arm and mounted to swing so as to move toward and away from the center of rotation of said second segmental gear in its movement in one direction and means for swinging said arm.

4. In an apparatus of the class described the combination of a sole applying mechanism comprising a table top and shoe upper holding means provided in a predetermined position relative to said table top, a pressure plate mounted to swing toward and away from said shoe upper holding means, a pressure block yieldingly supported on

said pressure plate, gripping fingers movable longitudinally and transversely on said pressure plate toward and away from said pressure block, means carried by said pressure plate for moving said fingers so as to engage, center and hold a sole placed against said pressure block and fixed cam means for operating said moving means when swinging said pressure plate toward said shoe upper holding means.

5. In an apparatus of the class described the combination of a table top and shoe upper holding means located on said table top, a pressure plate mounted to swing toward and away from said shoe upper holding means, oppositely and longitudinally moving and oppositely and transversely moving sliding members carried by said pressure plate, a pair of swinging levers for operating said longitudinally moving sliding members and means connecting said transversely moving sliding members with said longitudinally moving sliding members for the operation thereof by said pair of swinging levers, a stationary cam for engagement by one of said swinging levers on the movement of said pressure plate for the simultaneous operation of all of said sliding members, and holding fingers carried by said sliding members so as to project from said pressure plate.

6. In an apparatus of the class described including a sole applying mechanism comprising a table top and shoe upper holding means provided in a predetermined position on said table top, a pressure plate mounted to swing toward and away from said shoe upper holding means, holding fingers movable laterally on said pressure plate and yielding supporting means for said holding fingers to cause them to yield when brought into contact with the shoe upper holding means.

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