Jan. 17, 1956 D. W. HANNABLE ET AL 2,730,735

MACHINES FOR PREPARING SOLES FOR ATTACHMENT

Filed July 6, 1953 4 Sheets-Sheet 1

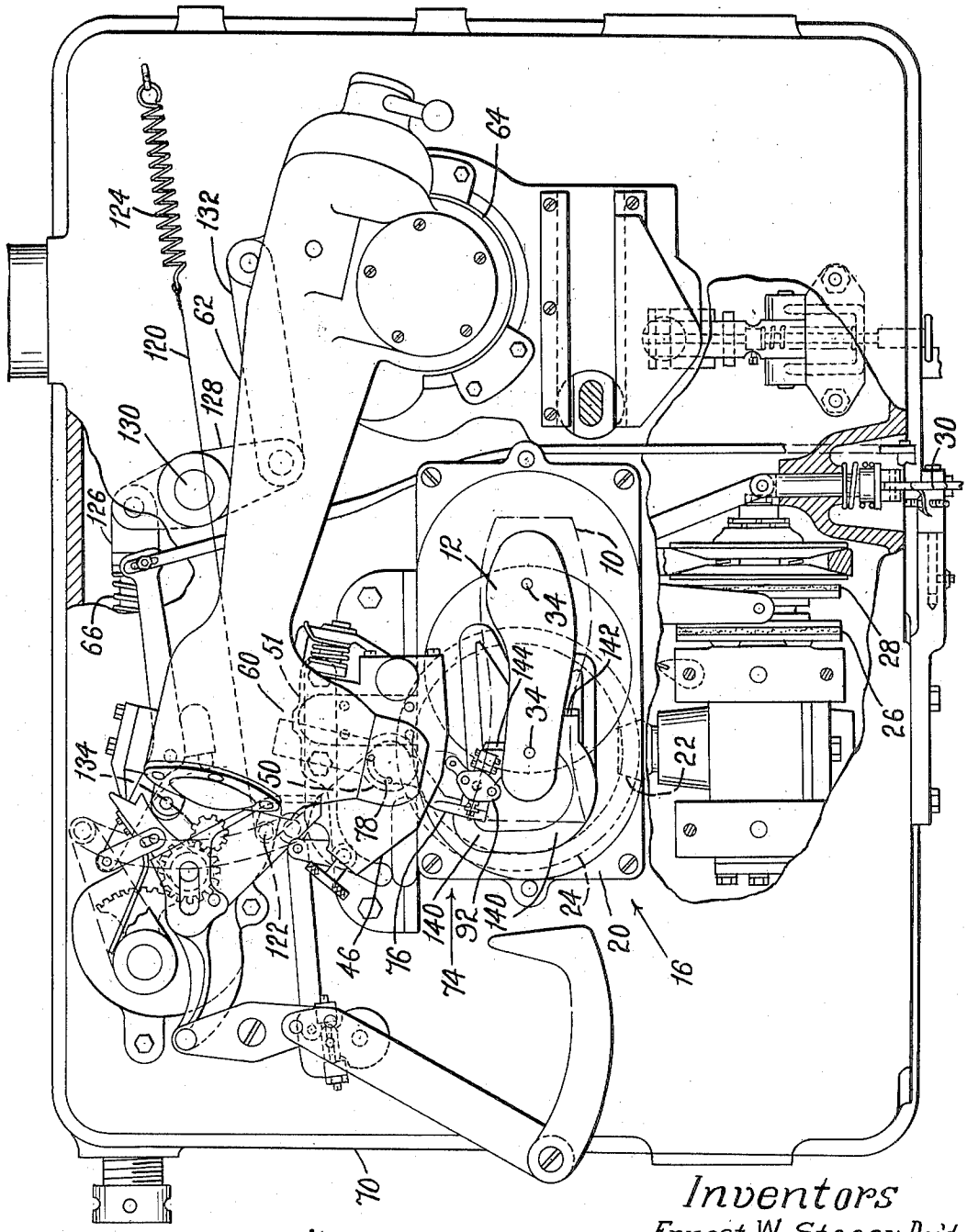


Fig. 1.

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Fig. 2.

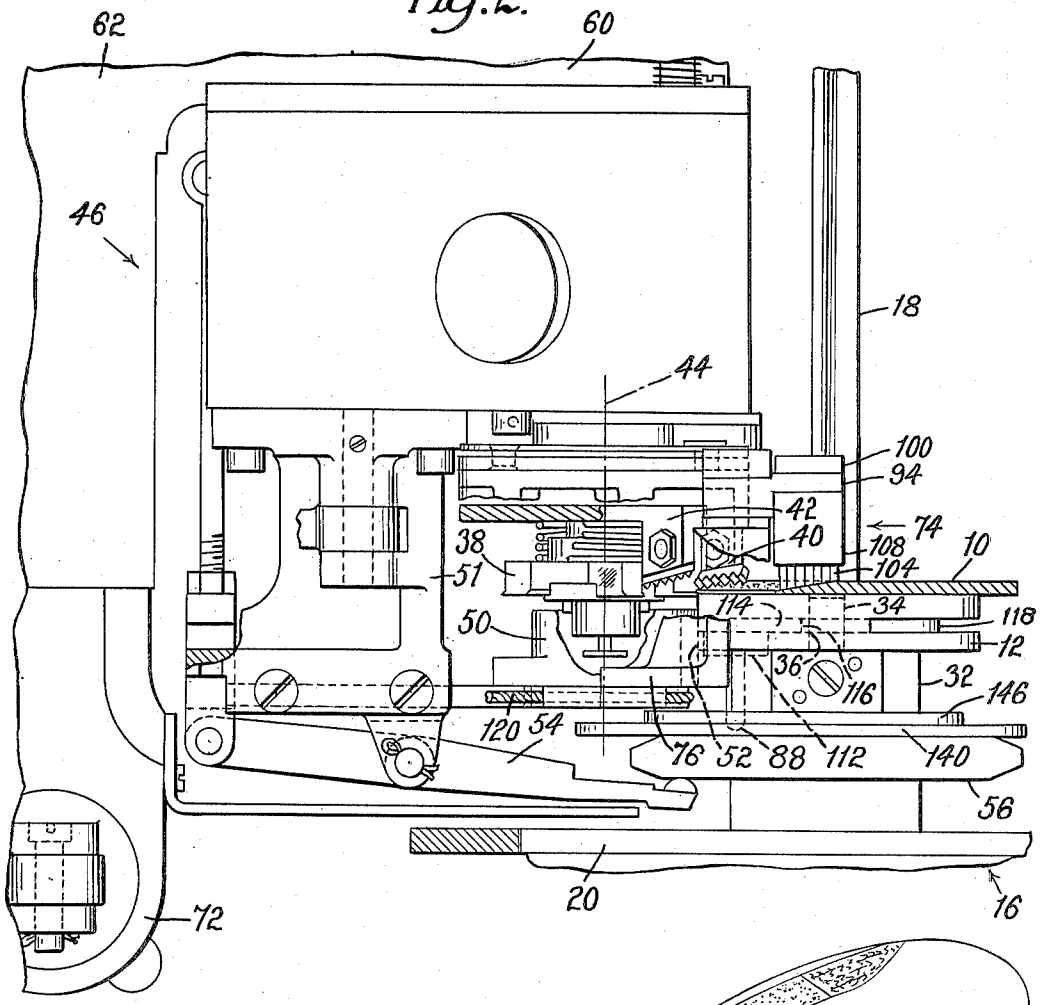
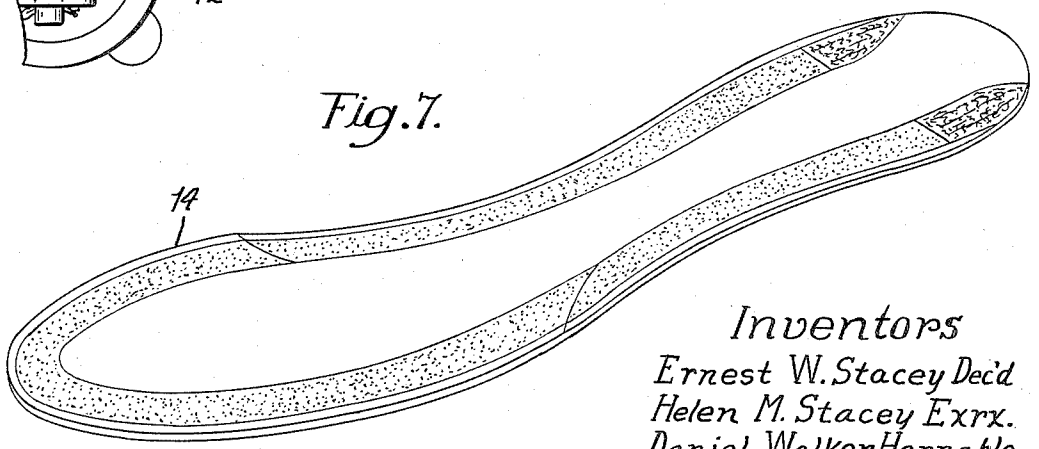


Fig. 7.



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Fig. 4.

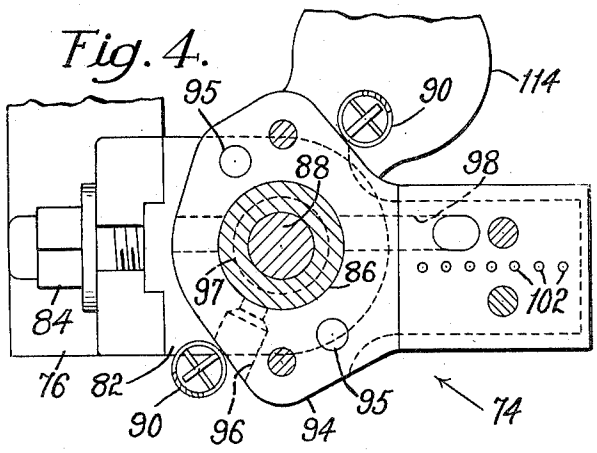


Fig. 3.

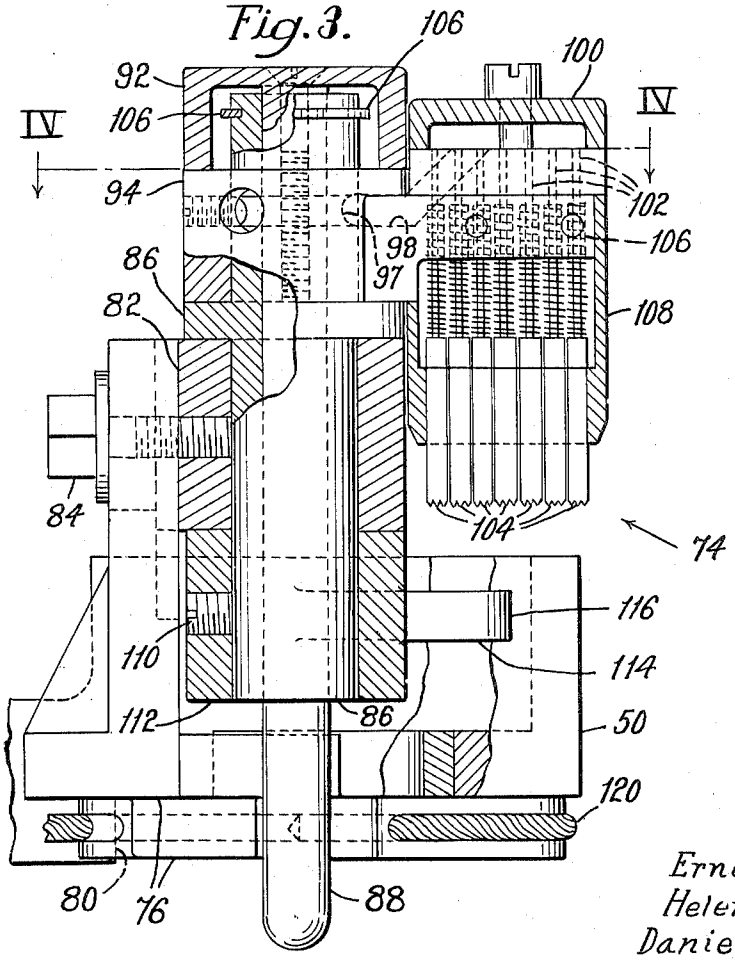
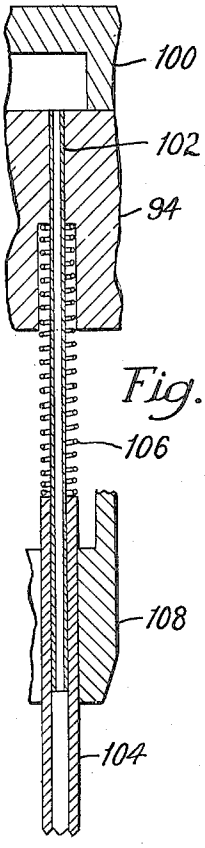


Fig. 5.



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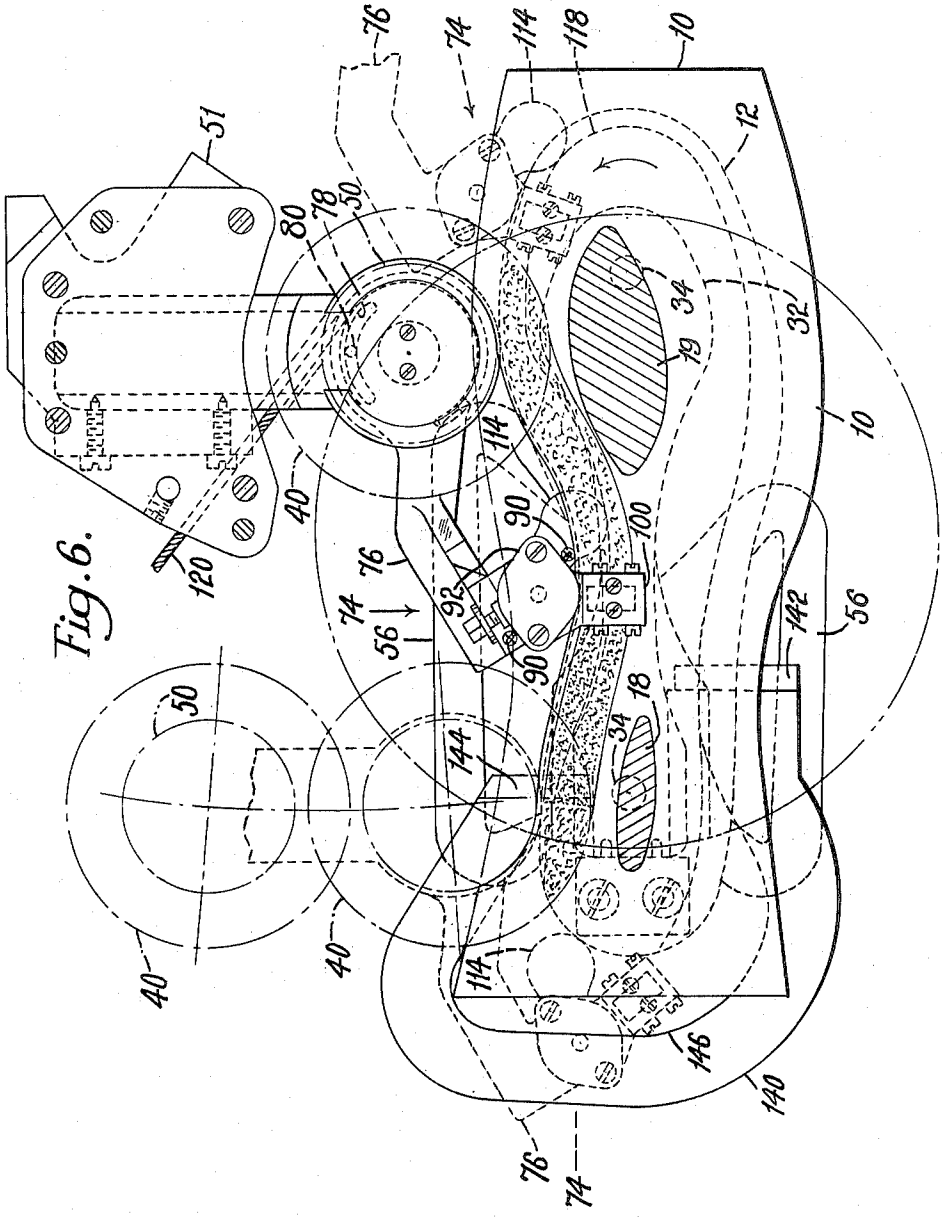


Fig. 6.

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United States Patent Office

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MACHINES FOR PREPARING SOLES FOR ATTACHMENT

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Application July 6, 1953, Serial No. 366,254

11 Claims. (Cl. 12—35.1)

This invention relates to machines for performing operations progressively upon the marginal portions of workpieces of irregular contour. More particularly the invention pertains to machines for forming, shaping and/or otherwise treating selected marginal portions of a substantially flat workpiece, such as a shoe part, and for then cementing such portions to prepare the workpiece for attachment. As herein illustrated, the invention is embodied in a machine for operating on block soles which is of a general type disclosed in United States Letters Patent No. 2,498,771, granted February 28, 1950, on an application filed in the name of E. W. Stacey. It will be appreciated that use of the invention is not so limited but that the invention may have application to other types of work and in other machines.

In the sole fitting machine described in said patent a pattern and a block sole clamped thereon alternately slide and rotate to traverse the periphery of both past rounding, shank reducing, and roughing cutters. After being operated upon in such a machine a sole is in condition to receive a cement coating by means of which attachment to a shoe bottom may be effected. With the advent of newer type adhesives, and in the interest of saving time and expense, it is recognized as highly desirable to have a single machine, sole fitting or otherwise, capable of preparing a workpiece margin and then, in addition, coating the margin in readiness for attachment as thus prepared. It accordingly is an object of this invention to provide a compact, novel and improved machine of this type. In keeping with this object a feature of this invention resides in the combination with a tool or tools operative marginally on a workpiece mounted for relative movement, and a pattern by which said workpiece is guided with respect to the operative position of the tool or tools, of a coating device spaced from said tool or tools and mounted to act successively on marginal portions treated thereby, and means cooperative with said pattern for orienting said device with respect to the workpiece periphery as it is relatively traversed to assure accurate and uniform positioning of the coating.

For rounding, shank reducing and roughing soles in the machine of the patent cited, the respective cutters rotate about a common axis and are carried by a head or carrier. The operative position of the latter is determined by an edge gage in the form of an abutment portion thereof engageable with an edge face on the above-mentioned pattern. Now in uniformly coating the roughened margin of the sole just after it is formed to predetermined outline, it is highly desirable to maintain the line of nozzle outlets of a cement applying device in an approximately fixed angular relation to tangents at successive peripheral points of the workpiece. As herein shown and preferred the outlets are oriented in a normal or radial position with respect to the periphery of the sole. Another consideration of importance to effective and neat sole attachment, and whereby unsightly cement on a sole edge face is avoided, is that the device should be guided so as to apply a band of cement extending peripherally but leave uncoated a narrow marginal strip adjacent to the sole edge of the order of not less than 1/16 of an inch in width. In meeting these requirements for work on soles or other workpieces, and as a further feature of the invention, the lilustrative machine is provided with a holder for the cement applying device supported by the above-mentioned cutter carrier abutment and urged to move an edge gage portion of the device into engagement with a portion of the edge face of said pattern that has been formed with a peripheral cam groove of predetermined varying depth. Pivotal movement of the device in its holder automatically to maintain the nozzle outlets disposed radially as the coating and roughing progresses is attained by an advance guide finger projecting therefrom and extending into the cam groove for cooperation therewith. Accordingly, the arrangement is such that successive peripheral portions of a workpiece, after being engaged and operated upon by the cutters, are carried tandem fashion by the pattern, past said guide finger, and into tangential relation with an edge gage portion of the device, the outlets being fixedly spaced inwardly from said edge gage, i. e., inside the sole edge, by the desired and predetermined width of the marginal strip to remain uncoated.

In some respects the coating device herein shown as applied to the illustrated machine resembles the nozzle disclosed in detail in United States Letters Patent No. 2,544,173, granted March 6, 1951, upon an application filed in the name of W. E. Naugler. Means are provided for automatically causing the device to commence coating a workpiece at a predetermined peripheral point and then cease coating at another point. As herein shown, it is assumed the heel end of a sole will not require coating. Accordingly, the device is provided with a fluid control shut off valve that is operated by a plunger arranged to cooperate with a plate cam disposed around the heel end of the pattern. The plunger thus functions to raise the device from sole or operatig level and to stop the flow of coating fluid just prior to reaching the area of the heel breast line. Similarly the plunger is permitted by the cam to return to normal operating level with fluid flow restored just prior to the arrival of the outlets at the opposite extremity of the heel breast line. Coating is thereby terminated and started at the desired predetermined points, i. e. at the extremities of the heel breast line.

The above and other features of the invention, together with novel combinations and arrangements of parts, will now be described in greater detail in connection with one embodiment of the invention and will best be understood when considered in connection with the accompanying drawings, in which

Fig. 1 is a plan view, frame portions being partly broken away, of operating mechanism and work engaging portions of a sole fitting machine illustrative of the invention, the view corresponding largely with Fig. 11 of the above-mentioned Stacey patent and showing the parts in initial position;

Fig. 2 is a left side view, partly broken away, of a cutter head of the machine shown in Fig. 1 and indicating a cement applying device in operative position on a sole;

Fig. 3 is a view in elevation, largely in vertical section, and on an enlarged scale, of the cement applying device, showing its mounting;

Fig. 4 is a section taken on the line IV—IV of Fig. 3;

Fig. 5 is a vertical section of an outlet portion of the cement applying device shown on a further enlarged scale;

Fig. 6 is a plan view, on a larger scale, of part of the mechanism shown in Fig. 1; and

Fig. 7 is a perspective view of the formed and cemented sole ready for attachment as produced in the illustrative machine from a block sole.

Since the illustrative machine for the most part resembles the sole fitting machine fully disclosed in Patent No. 2,498,771 and in United States Letters Patent No. 2,081,961, granted June 1, 1937, also on an application filed in the name of E. W. Stacey, it will suffice to describe briefly and generally the features held in common, giving a more detailed consideration to novel aspects herein disclosed.

A block sole 10 (Figs. 1 and 2) is mounted in the machine on a pattern 12 in order to be rounded to predetermined outline to form a sole 14 (Fig. 7) ready for attachment and having a margin that has been roughened and cemented, as well as reduced in its shank and perhaps other portions. For moving the work piece in a cycle (counterclockwise as viewed in Figs. 1 and 6) so that successive portions of its periphery are fed progressively relatively to operating instrumentalities, the sole 10 and the pattern 12 are clamped together by a jack 16 (Figs. 1 and 2) and a C-shaped treadle-actuated clamp comprising two clamping posts 18 (Figs. 2 and 6) and 19 which are spaced lengthwise of the sole and adjustable for effective action on rights and lefts. The jack 16 and clamping means are rotatably mounted in a slidable support comprising a hollow carriage 20 which is movable in translation by mechanism fully disclosed in the Stacey patents above cited. It may be here stated that the carriage 20 has an internal rack (not shown) the sides of which are straight and the ends of which are semi-circular, and a gear (not shown) meshing with this rack is driven by bevel gears 22, 24 operated by a main drive of the machine upon release of a brake 26 (Fig. 1) and the engagement of a one-revolution clutch 28 in response to forward swinging movement of a hand lever 30 (Fig. 1). The jack 16 comprises a pattern holder 32 (Figs. 2 and 6) having a flat upper face on which the pattern 12 is placed and a pair of upstanding pins 34 which extend through the bores 36 (Fig. 2) in the pattern. Though the patterns 12 be of different sizes, the bores 36 are positioned an equal distance from the lengthwise median points of the patterns.

For preparing a sole margin for the reception of cement, a rounding cutter 38 (Fig. 2), a shank reducing cutter 40, and a roughing cutter 42 are rotatable about a common axis 44, and are carried by a tool or cutter head or carrier 46. As explained in Patent No. 2,498,771, the shank reducing cutter 40 also roughens the shank portion of the sole, and the roughing cutter 42, in addition to roughing the forepart and the heel seat margins, reduces the thickness of said margins to a slight extent. The operating position of the carrier 46, as in the machine of that patent, is controlled by the engagement of a cylindrical abutment 50 (Fig. 2) adjustably carried by a depending bracket 51 of the carrier with an edge or edge face 52 of the pattern. The cutter 40 is moved axially downward into operative position shown in Fig. 2 by means not here fully shown but comprising a lever 54 pivoted to the carrier 46 and a cam 56 secured on the jack 16. The carrier 46 is secured to a gear housing 60 of a hollow arm 62 formed integral with a hollow post 64 mounted for swinging movement about a vertical column (not shown) secured to a stationary main frame 70 of the machine. The carrier is constantly urged by a spring 66 (Fig. 1) hereinafter referred to, and other means (not shown) toward the jack 16, but to prevent the abutment 50 striking the pattern 12 with too much force during swinging of the arm 62, the carrier is provided with a dashpot 72 (Fig. 2).

For supporting a cement applying device 74 (Figs. 1 and 3) an arm 76 is pivotally mounted at one end to the base of the cylindrical abutment 50 aforementioned, and is provided with an arcuate slot 78 (Fig. 6) for receiving a pin 80 projecting from the abutment, thereby limiting their relative pivotal movement. The other end of the arm 76 has an upstanding vertically slotted and rabbetted portion for adjustably holding a lug 82 secured by a clamping bolt 84. The device 74 is pivotally mounted in a vertical bore formed in a cylindrical sleeve 86 extending through and

rotatable in a bore of said lug and having a flange normally bearing upon the top of the lug. The device is yieldingly held down and in engagement with the top of said flange by means of a pair of tension springs 90 connecting that flange portion of the sleeve 86 with a cap 92 screwed to a head 94. The head 94 is movable heightwise on the upper portion of the sleeve and they are conected for joint turning movement about a vertical axis by means of upstanding pins 95 integral with the sleeve and received by bores formed in the head 94. Integral with said cap 92 is a central stem 88 projecting downwardly through the sleeve 86 for a purpose later explained. An inlet 96 formed in the head 94 is arranged to conduct cement in fluid form and under pressure, when the device is in its down position, into an annular passageway or groove 97 formed in the sleeve 86, and then through a duct 98 extending through the head to a nozzle block reservoir cap 100 (Figs. 3 and 5), secured thereto. The cement may flow from the reservoir beneath the cap through a series of parallel vertical tubes 102 of small diameter fixedly fitted in the head 94. Each of the tubes 102 is provided at its lower end with a work engaging nozzle finger 104 having a serrated outlet end face. For enabling the device to operate over irregular surfaces to be coated, each of the fingers is yieldable upward against the resistance of a spring 106 seated in the head. When the stem 88 is raised, as by means hereinafter described, cement cannot flow from the inlet 96 into the groove 97 since the head 94, in moving upward relatively to the sleeve 86, cuts off communication between the inlet 96 and the groove 97. A snap ring 106 fitted into an annular groove formed in the sleeve 86 limits the relative upward movement of the head 94. A cover plate 108 screwed to the head 94 encloses the vertically slidable fingers 104 to exclude dust and foreign matter, and is provided with a lower end portion upon which T-shaped tops of the fingers bear to be thus limited in their downward movement.

Affixed by a setscrew 110 (Fig. 3) to the lower end of the sleeve 86 is a cylindrical edge gage 112 which has an integral advance feeler projection or follower 114. The latter is of rounded contour and provided with a narrow, flat edge face 116 adapted to be received by a groove or cam track 118 recessed in the edge face of the pattern 12. The track 118 is of predetermined varying depth to impart a correspondingly variable turning or oscillatory movement to the sleeve 86 and hence to the head 94 about a vertical axis. Thus the alined nozzle outlets of the device are maintained in radial formation with respect to successive portions of the sole being coated as they engage the vertical face of the edge gage 112. It will be noted that the work engaging surface of the latter is spaced widthwise of the sole with respect to the line of nozzle outlets by the fixed width of the marginal strip adjacent to the sole edge which is to remain uncoated. In order to assure a continuity of engagement of the edge gage 112 and the follower 114 with successive marginal portions of the pattern 12 as the shaped and roughened sole margin is being coated by the cement-applying device 74, a cable 120 (Figs. 1 and 2), affixed at one end to the arm 76, extends in a circular groove formed therein, around a roll 122 (Fig. 1) rotatably mounted on a pivot pin journaled in the frame 70, and is maintained under tension by a spring 124 secured to the frame. The above-mentioned spring 66 is under adjustable compression similarly to urge continuity of engagement of the abutment 50 with the edge 52 of the pattern 12 throughout its cycle. For this purpose, the spring 66 is interposed between a fixed hollow guide (not shown) and a shoulder of a rod 126 extending into said guide and pivoted to the lower arm of a bell-crank lever 128 which is secured to a pin 130 journaled in the frame. A link 132 pivoted to an upper arm of the lever 128 is connected to a rearward extension of the post 64, thus to urge the requisite movement (counterclockwise as viewed from above) of the abutment 50. It will accordingly be appreciated that the combination pattern and sole feeding mech-

anism acts in a cycle to present successive portions of a pattern to two spaced gages, **50** and **112**, one (**50**) of which is associated with the forming and roughing cutters and the other (**112**) of which is closely associated with said cement applying device **74**, and that hence the corresponding successive portions of the sole edge are moved in a predetermined path relative to the operative portions of said cutters and then with respect to the outlets of said device. Upon the completion of a cycle of the clutch and movement of the jack **16**, as explained in said Patents Nos. 2,498,771 and 2,081,961, a shaft **134** (Fig. 1) is rotated counterclockwise, as seen from above, to effect rearward movement of the cutter head to its retracted or starting position away from the jack **16**, as indicated in phantom in Fig. 6, until the hand lever **30** is again actuated.

While in many respects the general principles of operation of the sole fitting machine disclosed in said patents are essentially the same as those of the present machine, they differ in one aspect, namely, the starting positions of the sole and pattern **12** in the instant case are reversed end for end. As previously arranged, the cutters started at the heel breast line and progressed around the heel end, whereas now it is preferable to start cutting at the heel breast line and proceed to the shank and forepart before returning to the heel breast line. This revised course, as will become apparent, permits a cycle to end with the flow of cement automatically stopped. Since the heel end of the sole is not to be marginally cemented, a U-shaped cam plate **140** is fixedly mounted adjacent thereto on the pattern holder **32** for cooperation with the rounded lower end of the stem **88**. The longer leg of the cam **140** has a beveled portion **142** (Fig. 6) arranged beyond the heel breast line to lift the stem **88** and thus the head **94** and the fingers **104**, cutting off the flow of cement to the sole just before its heel breast line is reached. The shorter leg of the cam **140** has a beveled portion **144** arranged to permit the springs **90** to lower the stem **88** just prior to the start of a new cycle, thereby permitting the flow of cement to be restored and assuring the application of a coating as the nozzle fingers **104** are lowered to engage the heel breast area. Toward the close of a cycle and after the stem **88** rides up the inclined portion **142**, a vertical face **146** formed on the cam **140** engages a side of the lower end of the stem **88** to pivot the arm **76** clockwise, as viewed from above, thus to carry the cement applying device **74** laterally away from the heel end against the resistance of the spring **124**.

From the above description it will be seen that this invention affords a compact machine capable of fully preparing unattached soles in a uniform manner for effective attachment to shoe bottoms and that the novel incorporation of cement applying means may, with perhaps minor modification, enable the machine to operate equally well on other types of work pieces.

The invention having thus been described what is claimed as new and what it is desired to secure by Letters Patent of the United States is:

1. In a machine for preparing soles for attachment, sole supporting means, tool carrying means, a tool rotatably carried thereby, a cement applying device spaced from said tool carrying means, and means for relatively moving and guiding said sole supporting means in a closed path adapted to traverse peripheral portions of a sole thereon successively past said tool and cement applying device to be successively treated thereby.

2. In a sole fitting machine having a rotary roughing tool and pattern means for progressively guiding the margin of a sole relatively thereto, a coating device including a nozzle spaced from said tool, means urging the device into operative relation with successive marginal sole portions roughened by said tool, and an edge gage cooperative with said pattern means and carried by said device to space the nozzle inwardly from the sole edge.

3. In a machine having a roughing tool and means for guiding the periphery of a workpiece progressively relatively to said roughing tool, a coating device having a line of outlets mounted for movement about an axis extending heightwise of the workpiece and for axial movement to and from effective engagement with the workpiece margin to be coated, an edge gage associated with said device and arranged progressively to engage said workpiece guiding means adjacent to an endmost outlet of the line, and means urging said device into operative relation to the successive marginal portions of said workpiece when they have been roughened.

4. In a machine for preparing a flat workpiece of irregular contour for attachment, the combination of a tool head, a tool carried by the head for operating on the workpiece, a pattern on which the workpiece is mounted for cooperating with said head relatively to position the tool and workpiece, means for traversing corresponding peripheral portions of the pattern and workpiece with respect to the tool, a coating device supported by said tool head but spaced from said tool, a follower associated with said device, and means urging said follower into cooperative relation with said pattern to guide the device peripherally of the workpiece thereby coating those portions treated by the tool.

5. In a machine for operating on a flat workpiece of irregular contour, a pattern against which the workpiece is clamped, a cutter head with a plurality of cutters rotatable about an axis therein, means for sliding and rotating the pattern to cause the margin of the workpiece to be acted on by one or more of said cutters, a holder mounted on said head, a coating device pivotally supported by said holder and arranged to operate widthwise of the workpiece margin when it has been formed, and means cooperative with said pattern for maintaining said device in radial relation to the workpiece.

6. In a machine for operating on a flat workpiece of irregular contour, a pattern on which the workpiece is fixedly supported, a cutter head having a plurality of rotary cutters, means for moving the pattern and workpiece in unison to traverse the periphery of the latter relatively to said cutters, a holder pivotally supported by said head, a cement applying device supported by the holder for oscillatory movement about an axis extending heightwise of the workpiece, said device having outlets arranged to extend widthwise of the margin of the workpiece to be cemented, a cam formed in the edge face of said pattern, and advance feeler means projecting from said device for cooperating with said cam to maintain said outlets in radial relation to the workpiece.

7. In a machine having a roughing tool and means for guiding the periphery of a workpiece progressively relatively to said roughing tool, a holder mounted for swinging movement relatively to said roughing tool, a coating device carried by said holder for movement toward and from successive marginal portions of the workpiece when roughened, said device comprising an outlet and means for controlling the flow of cement thereto, an edge gage spaced laterally of the workpiece with respect to said outlet and movable into operative position by said holder, means yieldingly urging the holder to carry the device into operative position as determined by said edge gage, yieldable means associated with said holder for normally maintaining the outlet of said device in heightwise operative relation to successive portions of the roughened margin, and means for moving the outlet of said device from operative relation at predetermined portions of the workpiece, said last mentioned means actuating said cement control means to shut off flow to said outlet.

8. A machine for operating on a flat workpiece of irregular contour comprising a cutter head having a rotary cutter, a pattern on which the workpiece is supported, said pattern having a cam groove formed therein, means for moving the pattern peripherally against said head to traverse the margin of the workpiece progressively relatively to said cutter, a holder pivotally supported by said head for movement toward and from the workpiece periphery, a coating device mounted on the holder for

pivotal movement about an axis extending heightwise of the workpiece, said device having a nozzle yieldable heightwise relatively to the workpiece, an edge gage carried by the holder and arranged progressively to engage the periphery of the pattern adjacent to the engagement of said nozzle with the workpiece margin, means for urging the holder to carry the coating device inwardly over the workpiece to an extent determined by said edge gage, and feeler means projecting from said edge gage for cooperation with the cam groove of said pattern to maintain said nozzle in radial relation to the workpiece.

9. A machine as set forth in claim 8 further characterized in that the cam groove of said pattern is formed in its edge face and is of predetermined varying depth to maintain said nozzle in fixed angular relation to tangents at successive peripheral points of the workpiece.

10. In a machine for preparing soles for attachment, a pattern on which a sole is mounted, a carrier, a rotary cutter supported by said carrier, a holder, a cementing device supported by said holder, said carrier and said holder each supporting an edge gage, said holder being pivotally related to said carrier, means for traversing the periphery of said pattern successively past the edge gages to cause the margin of the sole to be successively acted on by the cutter and cementing device, yieldable means urging the carrier and holder, respectively, to move the cutter and cementing device into operative positions relatively to

the sole during movement of said pattern in a cycle, and means operative at the end of the cycle to retract the cutter and cementing device from the sole.

11. In a machine for preparing soles for attachment, the combination of means to trim, reduce, and roughen the margin of a sole, a cement applying device spaced from said means and having an outlet portion pivotal about an axis extending heightwise of the sole, a pattern to support the sole in a cycle wherein successive marginal portions thereof are presented first to said trimming, reducing and roughening means and then to said device, said pattern having a groove therein of predetermined varying depth, and means cooperating with said groove to locate said outlet portion of the cement applying device in fixed angular relation to tangents at successive peripheral points of the sole.

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