

Nov. 8, 1960

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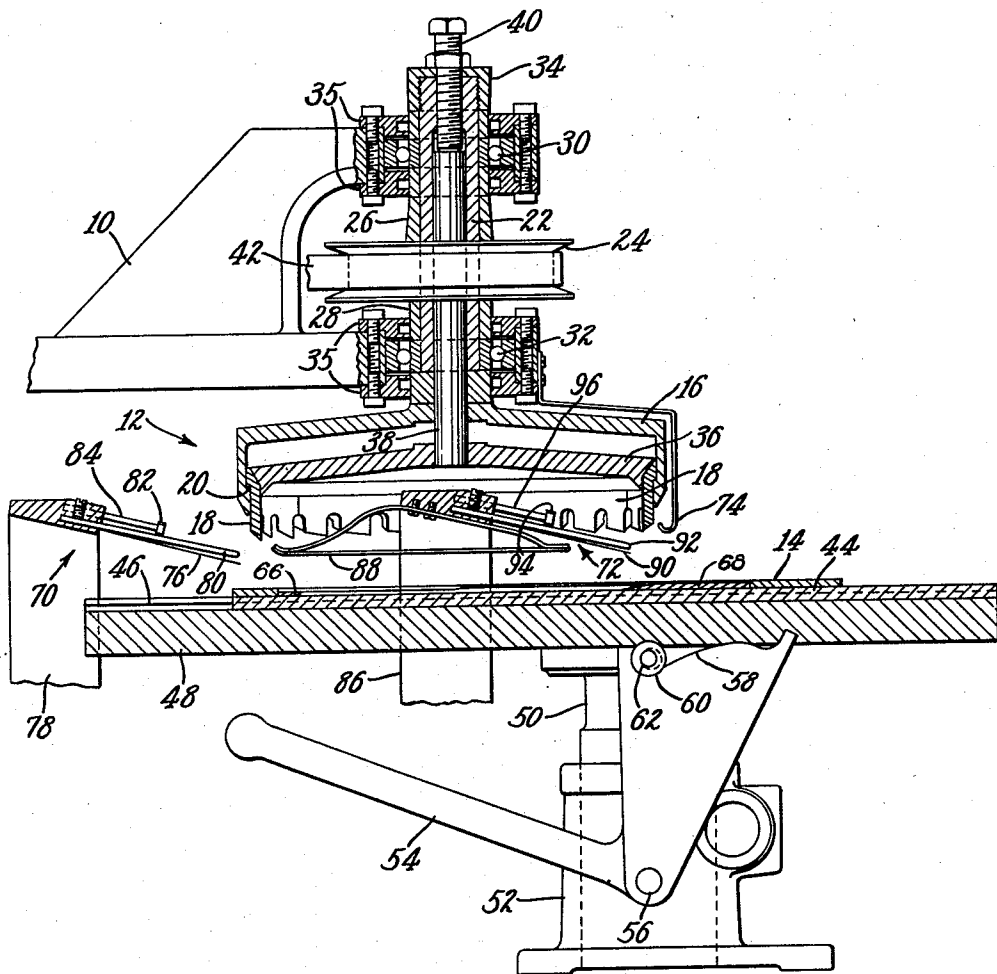
2,958,879

MACHINES FOR REDUCING AND ROUGHING SHOE SOLES

Filed June 5, 1959

3 Sheets-Sheet 1

Fig. 1



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Fig. 2

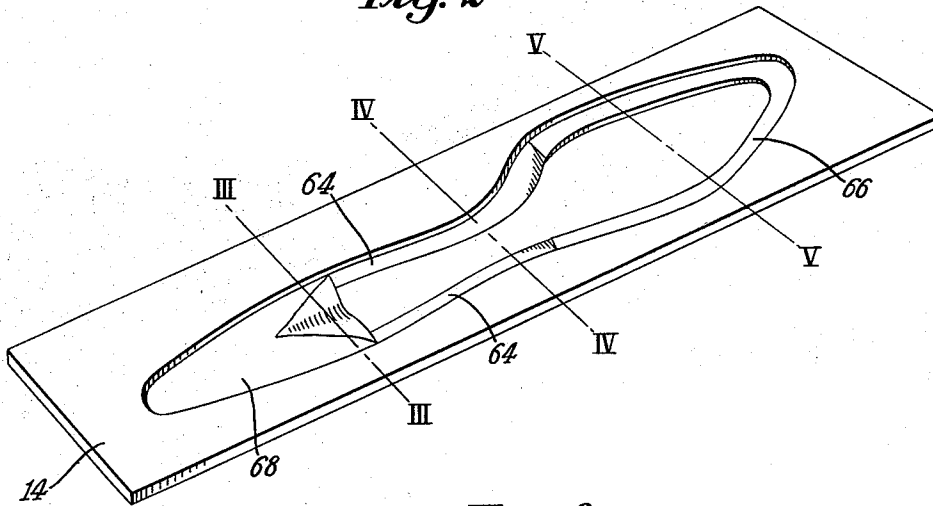


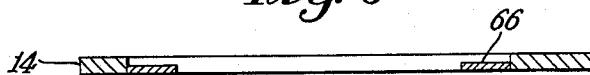
Fig. 3



Fig. 4



Fig. 5



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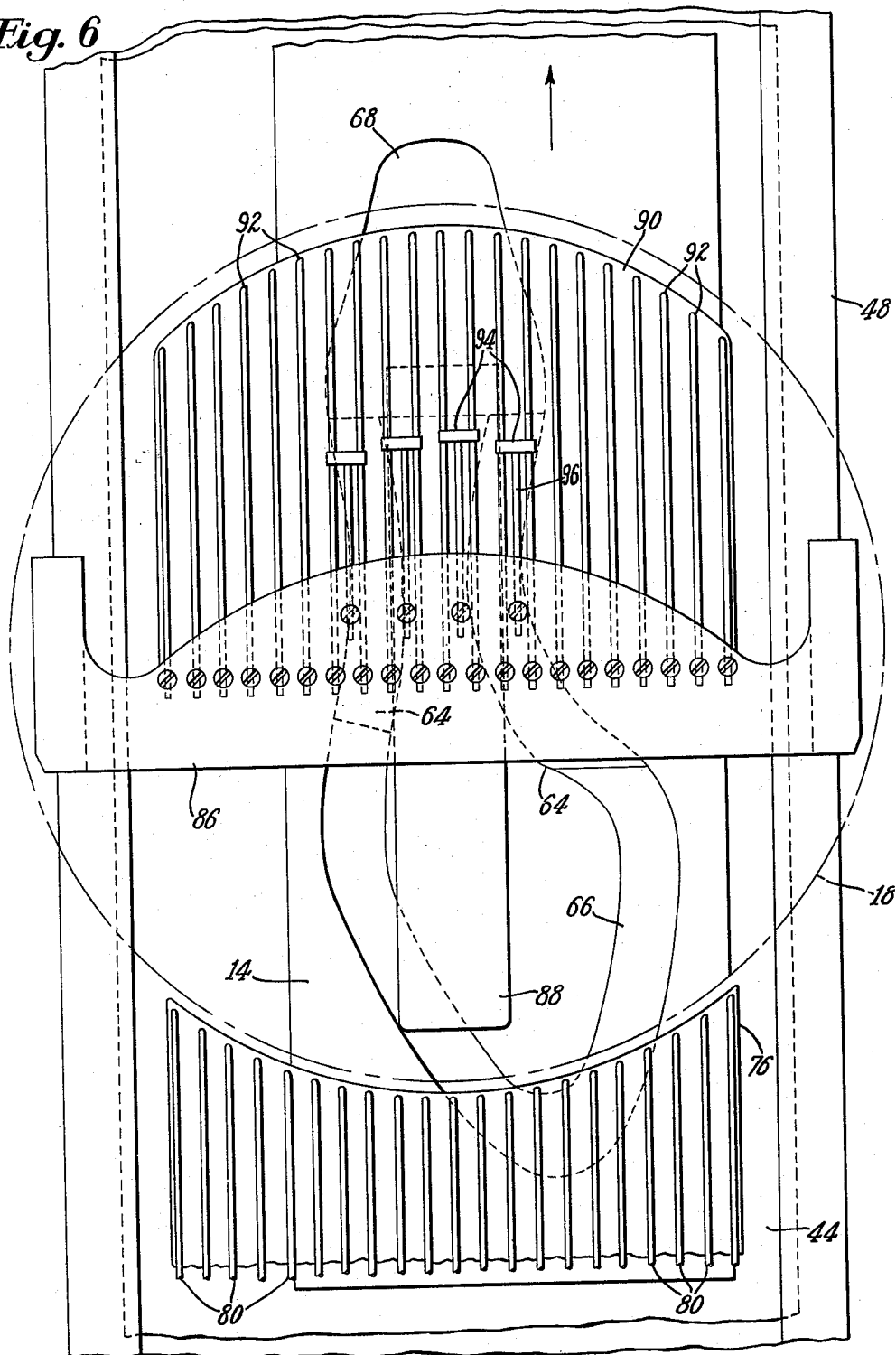
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Fig. 6



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MACHINES FOR REDUCING AND ROUGHING SHOE SOLES

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11 Claims. (Cl. 12-17)

This invention relates to means for operating upon blanks, such as shoe soles, and is illustrated herein as embodied in a machine for reducing selected portions of a sole and roughing the portion of the sole which is reduced.

In the preparation of a sole for its attachment to a shoe, it commonly receives a reducing operation by which the thickness of the margin of the sole is reduced along the sides of its shank portion or around its forepart. Certain shoe making requirements may necessitate either or both of these reducing operations and, in addition, a further reducing operation carried out upon the heel end of the sole to form a thin flap for covering a heel breast. Moreover, in such instances as when the attachment of the sole to the shoe is effected by an adhesive, it is necessary that the surface of the sole where it has been reduced be roughened to improve the holding power of the adhesive.

The illustrated machine is adapted for performing such reducing and roughing operations on a sole by virtue of the provision, with a rotary cutter to which a sole on a matrix is presented, of novel holddown means for pressing the sole into and against the matrix as it is operated upon, as well as provision for moving the matrix to present the sole to opposite sectors of the rim of the cutter and to control the depth of the cut made by the cutter.

More specifically, and in accordance with one feature of the invention, the illustrated holddown means comprises presser members which are mounted in juxtaposition to the rim of the cutter at the sides of each of its said sectors toward which the feeding movement of the blank and matrix is directed, whereby the sole will be held in intimate contact with the matrix where it is operated upon by the cutter, and hence that the operation of the cutter upon the sole will be limited to the area which is desired to be reduced. In accordance with a further feature of the invention, the combination of a holddown means with a cutter in the manner indicated above is facilitated by the use of a cutter which is hollow and by mounting one of the above-mentioned presser members within the cutter adjacent to the side of that sector of the rim of the cutter toward which the feeding movement is directed, the other presser member being mounted outside the cutter adjacent to the other operative sector thereof.

Invention is also to be recognized in the provision of means for moving the support toward and away from the cutter into and out of operative relation thereto through a variable range of movement whereby the depth of the cut is controlled. As a concomitant of this provision, the above-mentioned pressing members, in accordance with a further feature of the invention, are mounted within the path of movement of the blank and matrix into operative relation to the cutter and also are yieldable so that the holddown means is rendered effective in response to the movement of the sole into operative

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relation to the cutter but before the sole is engaged by the cutter.

Invention is further to be recognized in the illustrated holddown means in respect to the provision of a shoe which spans the interior of the cutter between the above-mentioned presser members and, if desired, an additional presser member for holding the blank against the matrix as it emerges from the cutter.

The above and other objects and features of the invention will now be more fully described, with reference to the drawings, in the following specification and will be set forth in the appended claims.

In the drawings,

Fig. 1 is a sectional front elevation of an illustrative machine embodying the invention;

Fig. 2 is a perspective view of a matrix used in the machine;

Figs. 3, 4 and 5 are sectional views of the matrix, the sections being taken along the lines III—III, IV—IV and V—V, respectively, in Fig. 2; and

Fig. 6 is a plan view of holddown means for pressing a blank against the matrix when the blank is being operated upon.

The illustrative machine comprises a frame 10 in the head of which there is mounted, for rotation about a vertical axis, an inverted cup-shaped cutter 12 to which a blank, such as a sole for a shoe, is presented on a matrix 14. The cutter comprises a holder 16 for a plurality of toothed segments 18 having annular shoulders on their outer peripheries which seat against a complementary shoulder 20 formed upon the inside of the holder. The holder has a hollow shank 22 upon which is mounted a pulley 24, sleeves 26, 28, ball bearings 30, 32 and a cap 34 which is threaded on the upper end of the shank and holds all the above-mentioned elements in assembled relation upon the shank. The outer race of each of the bearings 30, 32 is clamped to the head 10 between a pair of disks 35 which are secured to the frame 10 by screws. The segments 18 are rigidly held in the cutter between the holder 16 and a circular clamping member 36 which bears against a chamfered surface formed on the inner sides of the segments and is fixed upon a shaft 38 which is received in the shank 22 coaxially thereof. The shaft 38 is free to slide within the shank 22 and is engaged at its upper end by a screw 40 which is threaded into the shank and, upon being tightened, causes the member 36 firmly to press the segments 18 against the holder 16. The cutter is to be continuously rotated by any suitable means, such as a motor, which drives the pulley 24 by a belt 42.

The rim of the cutter 12, formed by the segments 18 as a group, is approximately eight inches in diameter, each segment having about eight teeth. The lower surface of each tooth slopes upwardly radially and circumferentially of the cutter so as to form a sharp point upon each tooth which will readily cut into the work and raise the fibers thereof whereby the surface of the work which is formed by the cutter is roughened.

The matrix 14 is carried by a slide 44 which is mounted in a slideway 46 in a table 48 so as to permit the matrix to be moved (by hand or any suitable mechanism), lengthwise of the matrix, across the rim of the cutter and parallel thereto. The table is carried by a post 50 which is mounted for vertical sliding movement within a bearing 52 which is fixed to the frame 10. To permit a blank on the matrix 14 to be readily brought into a predetermined operative relation to the cutter and also to be withdrawn therefrom, the machine is provided with a hand lever 54 which is pivoted at 56 upon the bearing and has formed thereon a cam 58 which runs upon a roll 60, the latter being rotatably mounted upon an eccentric stud 62 which is fixed in the post 50 and is

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adapted to be adjusted to vary the height to which the matrix 14 is brought by the operation of the hand lever 54.

The above-mentioned matrix 14 comprises a rectangular plate, about one-quarter of an inch thick, which is fastened to the slide 44 by any suitable means and has formed therein an opening of such size and shape as closely to receive a blank, e.g., a shoe sole, to be operated upon. The matrix is also adapted to hold, interchangeably, packing pieces disposed in selected portions of the matrix and held therein by pins or dowels (not shown). The number and shape of the packing pieces, which cause such portions of the sole as are to be operated upon to be elevated above the rest of the sole, will vary with the type of operation to be performed.

One such operation is that of reducing and roughing only the margins of the shank of a sole at each side thereof. When a sole is to be treated in this manner, the matrix will have only two packing pieces 64, 64 (Figs. 2 and 4) which lie along opposite sides of the shank portion of the matrix. The outer edge of each packing piece 64 is slightly thinner than the matrix plate and each packing piece is tapered from its outer edge toward the center of the matrix to a relatively thin inner edge, as illustrated in Fig. 4. Accordingly, when a sole is pressed into the matrix and presented to the cutter, as will be described later, the margins of the shank of the sole above the packing pieces 64 will project above the upper surface of the matrix and be operated upon by the cutter. However, the forepart and heel part of the sole will be pressed within the matrix and will not be operated upon.

If it is desired to reduce and rough the margin of the sole around its forepart only, a suitable packing piece 66 (Figs. 2 and 5), extending around the marginal portion of the forepart of the matrix, will be placed in the matrix, the remainder of which contains no packing piece. The packing piece 66 is of a uniform thickness such as to cause the upper margin of the forepart only of the sole to be slightly elevated above the upper surface of the matrix. Accordingly, only the margin of the forepart of a sole pressed into the matrix is operated upon when the sole is presented to the cutter, since the central portion of the forepart and all of the shank and heel part of the sole are fully received by the matrix.

To adapt the illustrated machine for forming a thin breast flap upon a sole, a packing piece 68 is assembled in the heel portion of the matrix. This packing piece is thick enough to permit only the sole material which is to constitute the flap to lie within the matrix when the sole is presented to the cutter. The forward portion of the packing piece 68 may be formed with a depression, if desired, so that the breast flap will have a thickened central portion which tapers into the thinner portion of the flap toward each side and the heel end of the sole.

It is evident that any one of the above-mentioned operations, or any combination of them, may be performed during a single traverse of the matrix past the cutter, according to the selection of packing pieces which are used in the matrix.

The matrix 14 and the slide 44 are moved to the right of the position in which they are illustrated in Fig. 1 to facilitate the loading of a sole upon the matrix. The loaded matrix is then slid to the left into a position somewhat to the left of that shown in Fig. 1, so that the heel end of the sole lies directly below the cutter and the end of the forepart of the sole extends to the left beyond the adjacent portion of the cutter and outside thereof. Upon swinging the lever 54 counterclockwise, the matrix is elevated into a predetermined operative relation to the cutter, according to the adjustment of the eccentric stud 62. However, before this movement of the matrix is completed, the sole is engaged by holddown means normally disposed below the rim of the cutter, which means is designed to press and hold the sole against the matrix

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while the matrix and slide 44 are moved to the right to present the sole to opposite sectors of the cutter.

This holddown means comprises a presser device 70 disposed adjacent to the outside of the left-hand sector of the cutter, a presser device 72 which is disposed within the cutter and spans the interior of the cutter between its left-hand sector and its right-hand sector, and also a holddown 74 which is disposed at the right-hand sector of the cutter outside thereof.

The presser device 70 comprises a thin resilient plate 76 which is secured at its left-hand end to a support 78, the latter being fixed upon the frame 10 so as to permit unobstructed movement of the table 48. The plate 76 slopes downwardly toward its operative right-hand edge which is shaped in conformity to the rim of the cutter 12, and is disposed closely adjacent thereto. Immediately above the plate, a plurality of resilient rods 80 are fixed in the support 78, the right-hand ends of the rods being adapted to bear against the plate 76 close to operative edge thereof when the work is brought into operative relation to the cutter. Above each of four pairs of rods 80, in the middle of the presser device 70, is a bar 82 which is carried by a yielding rod 84, the latter being mounted for adjustment axially thereof in the support 78, whereby the resistance of the four central pairs of rods 80 to upward deflection can be varied and the central portion of the plate 76 is capable of applying greater pressure to the sole than that provided by the plate where it is supported by the rods 80 only.

The presser device 72 comprises a support 86 which is fixed upon the frame 10, straddles the table 48 and extends into the interior of the cutter 12 through fore and aft sectors thereof between its operative sectors. Fixed upon the mid portion of the support is a yielding shoe 88 the left-hand end of which is adjacent to the inside of the left-hand sector of the cutter 12. The shoe is disposed over the central portion of the matrix and spans the greater portion of the diameter of the cutter between its operative sectors. A yielding plate 90, having a curved edge adjacent to and conforming to the inner side of the right-hand sector of the cutter, is fixed upon the support 86 in which there are mounted a plurality of yielding rods 92 immediately above the plate 90, the ends of the rods terminating close to the edge of the plate 90. As in the case of the presser 70, over each of four central pairs of rods 92 there is a bar 94 fixed upon a yielding rod 96 which is mounted for adjustment axially thereof in the support 86. Provision is thus made for holding the sole, after it leaves the shoe 88 and as it is presented to the left-hand sector of the cutter, firmly against the matrix, and especially against the mid portion thereof.

Upon the emergence of the sole from the cutter, the sole is prevented from rising off the matrix by the above-mentioned holddown 74 which is mounted upon the frame 10 and is arranged to engage the sole just outside of the rim of the cutter.

The use and operation of the illustrated machine will now be briefly summarized. Assuming that the desired selection of packing pieces will have been inserted into the matrix 14, according to the type of operation which is to be performed, and that the matrix will have been moved to the right into its loading position, a sole to be operated upon is placed in the matrix. The slide 44 and matrix are next moved to the left, along the table 48, to bring the heel part of the sole below the inside of the cutter 12 and, at this time, a portion of the forepart of the sole will be disposed outside of the left-hand sector of the cutter underneath the presser device 70. The operator next depresses the hand lever 54, causing the matrix 14 to be brought close to the rim of the cutter 12 and the sole to be brought into engagement with the presser devices 70, 72 which will have pressed the sole into and against the matrix before the sole is brought into operative relation to the cutter.

The slide 44 and matrix 14 are now moved to the

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right across the rim of the rotating cutter 12 which, at its right-hand sector, operates upon the heel part of the sole and, at its left-hand sector, simultaneously operates upon the forepart of the sole. Where the sole is brought into engagement with the cutter, it is held firmly against the matrix by the plate 90, adjacent to the inside of the right-hand sector of the cutter, and by the plate 76, at the outside of the left-hand sector of the cutter. The sole is prevented from rising off the matrix as it emerges from the left-hand sector of the cutter by the shoe 88 which continues to hold the central portion of the sole against the matrix until it is subjected to the action of the plate 90. Upon the emergence of the sole from the cutter, outside of its right-hand sector, the sole is also held against the matrix by the holddown 74. It is evident that since the matrix is moved parallel to the rim of the cutter the portions of the sole which already will have been operated upon by the left-hand sector of the cutter will pass beneath the right-hand sector of the cutter without being operated upon. At the end of the movement of the matrix to the right and upon raising the hand lever 54, the matrix is returned to its loading position to facilitate the removal of the sole which has just been operated upon.

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

1. In a machine of the class described, a hollow rotary cutter, a matrix for holding a blank to be operated upon, said matrix being mounted for feeding movement radially of said cutter to present the blank to opposite sectors of the rim of said cutter, and holddown means for pressing the blank against said matrix, said means comprising presser members one of which is mounted outside of and the other of which is mounted inside of said cutter, said members being disposed in juxtaposition to the rim of said cutter at the sides of said sectors toward which the blank is advanced.

2. In a machine of the class described, a rotary cutter, a matrix for holding a blank to be operated upon, a support upon which said matrix is mounted for feeding movement radially of said cutter to present the blank to opposite sectors of the rim of said cutter, said support being movable toward and away from said cutter axially thereof to bring the blank into operative relation to said cutter, and holddown means for pressing the blank against said matrix, said means comprising yielding presser members disposed normally in the path of movement of said blank into operative relation to said cutter, one of said members being disposed adjacent to the rim of said cutter at the side of each of said sectors toward which the feeding movement of said matrix is directed.

3. In a machine of the class described, a hollow rotary cutter, a matrix for holding a blank to be operated upon, said matrix being mounted for feeding movement radially of said cutter to present the blank to opposite sectors of the rim of said cutter, and holddown means for pressing the blank against said matrix as the blank is presented to each of said sectors, said means comprising a presser device having a yielding presser member disposed inside of said cutter adjacent to one of said sectors, and a yielding shoe which spans the interior of said cutter between said yielding member and the other of said sectors.

4. In a machine of the class described, a rotary cutter, a matrix for holding a blank to be operated upon, a support upon which said matrix is mounted for feeding movement across the rim of said cutter to present the blank to opposite sectors of said rim, said support also being movable toward and away from said cutter to bring the blank into and out of operative relation to said cutter, presser members disposed adjacent to the rim of said cutter at the side of each of said sectors toward which said feeding movement is directed, said presser members being disposed normally in the path of movement of said blank into operative relation to said cutter, and means for moving said support toward said

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cutter whereby the blank is brought successively into engagement with said presser members and into operative relation to said cutter.

5. In a machine of the class described, a rotary cutter, a matrix for holding a blank to be operated upon, a support upon which said matrix is mounted for feeding movement across the rim of said cutter to present the blank to opposite sectors of said rim, said support being movable toward and away from said cutter to bring the blank into and out of operative relation to said cutter, presser members disposed adjacent to the rim of said cutter at the side of each of said sectors toward which the feeding movement of said cutters is directed, said presser members being disposed normally in the path of movement of said blank into operative relation to said cutter, means for moving said support toward and away from said cutter to bring the blank into and out of operative relation to said cutter, and means for varying the range of movement of said support into operative relation to said cutter whereby the depth of the cut made upon the blank is varied.

6. In a machine of the class described, a hollow rotary cutter, a matrix for holding a blank to be operated upon, said matrix being mounted for movement transversely of the rim of said cutter to present the blank to the cutter at opposite sides thereof, and holddown means for pressing the blank against said matrix, said means comprising presser members disposed in juxtaposition to the outside of said cutter at its said opposite sides, and presser means spanning the interior of said cutter between said presser members for holding the portion of the blank inside of the cutter against said matrix.

7. In a machine of the class described, a hollow rotary cutter, a matrix for holding a blank to be operated upon, said matrix being movable radially of said cutter from one side to the other to present the blank to the rim of said cutter, presser members facing said matrix outside of said cutter adjacent to its rim at opposite sides thereof, and means disposed within the hollow of said cutter for pressing the portion of the blank within said cutter against said matrix.

8. In a machine of the class described, a hollow rotary cutter, a matrix for holding a blank to be operated upon, said matrix being movable radially of said cutter to present the blank to opposite sectors of the rim of said cutter, and holddown means for pressing the blank against said matrix, said means comprising presser members outside of said cutter for holding the blank against said matrix as the blank is presented to one of said sectors and is removed from the other of said sectors, and presser means between said sectors for holding the portion of the blank within said cutter against said matrix.

9. In a machine of the class described, a hollow rotary cutter, a matrix for holding the blank to be operated upon, said matrix being movable radially of said cutter progressively to present the blank to opposite sectors of the rim of said cutter, holddown means for pressing the blank against said matrix, said means comprising presser members shaped in conformity to said sectors and disposed adjacent to said cutter, one member being inside said cutter and the other being outside thereof, and a second pair of presser members one of which is disposed inside said cutter between said sectors and the other of which is disposed outside of said cutter within the path of movement of the blank.

10. In a machine of the class described having a cutter to which a blank on a matrix is presented to opposite sectors of the rim of the cutter, holddown means for pressing the blank against said matrix, said means comprising presser devices mounted opposite to said sectors of the said cutter, one of said devices being inside the cutter and the other device being outside thereof, one of said devices comprising a yielding plate shaped in conformity to and being mounted adjacent to the rim

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of said cutter, and a plurality of resilient rods for resisting deflection of said plate at the edge thereof adjacent to said cutter.

11. In a machine of the class described having a cutter to which a blank on a matrix is presented to opposite sectors of the rim of the cutter, holddown means for pressing the blank against said matrix, said means comprising presser devices mounted opposite to said sectors of the said cutter, one of said devices being inside the cutter and the other device being outside thereof,

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one of said devices comprising a yielding plate shaped in conformity to and being mounted adjacent to the rim of said cutter, a cluster of resilient members for supporting said plate at the edge thereof adjacent to said cutter, and means for resisting deflection of a group of said members.

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