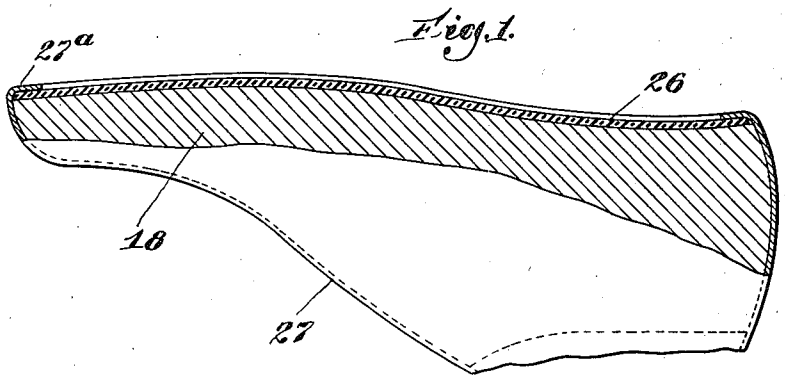
Nov. 5, 1935. C. M. RIDDOCK 2,019,544

PROCESS FOR MAKING SHOES

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Fig. 1.



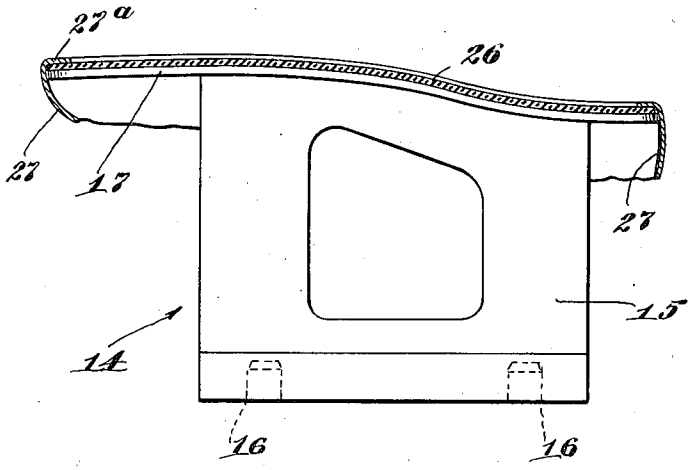
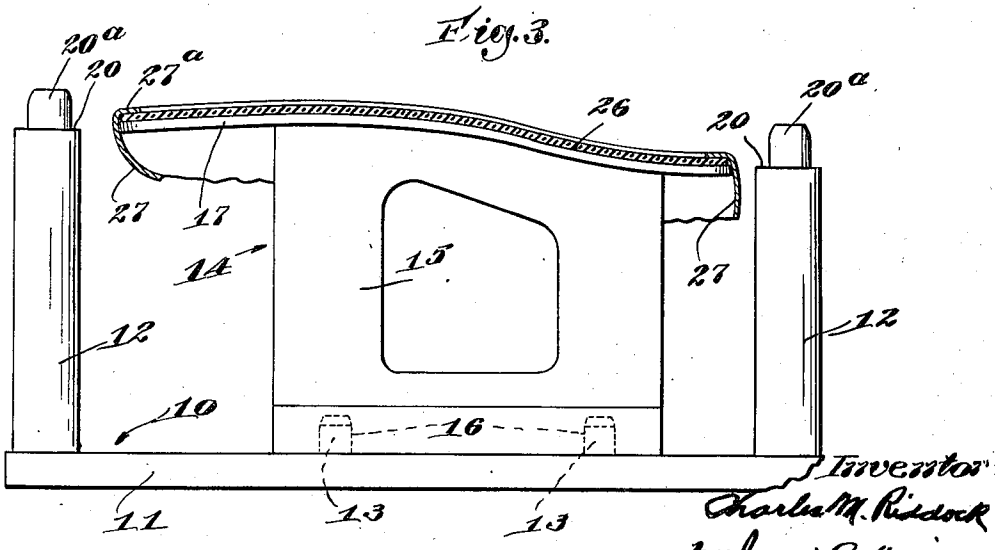


Fig. 2.

Fig. 3.



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PROCESS FOR MAKING SHOES

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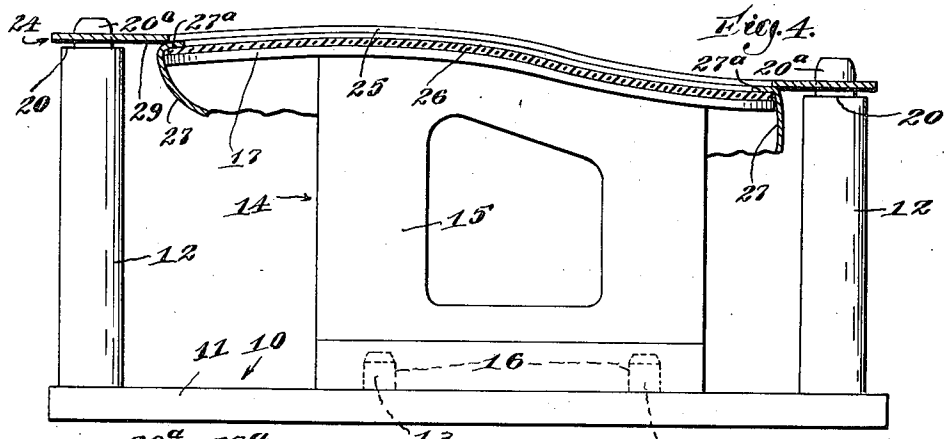


Fig. 4.

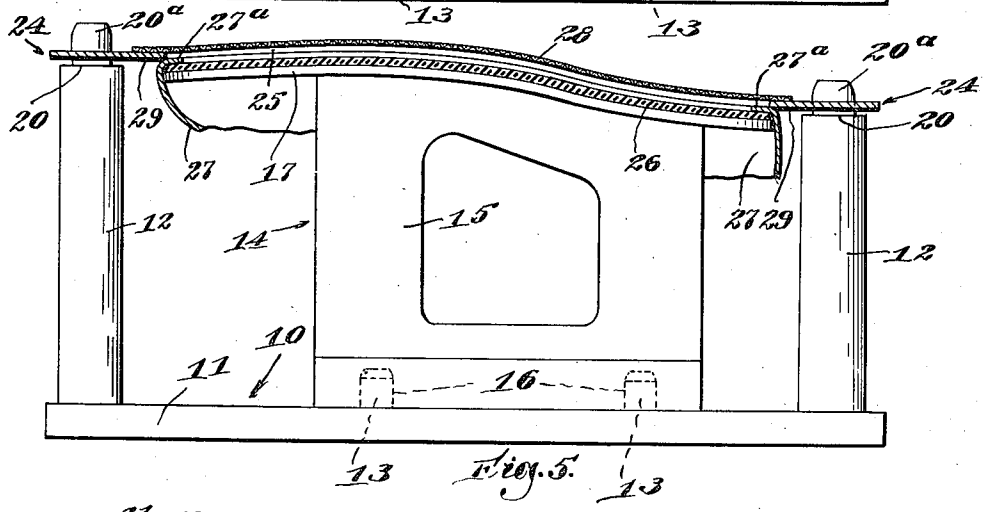


Fig. 5.

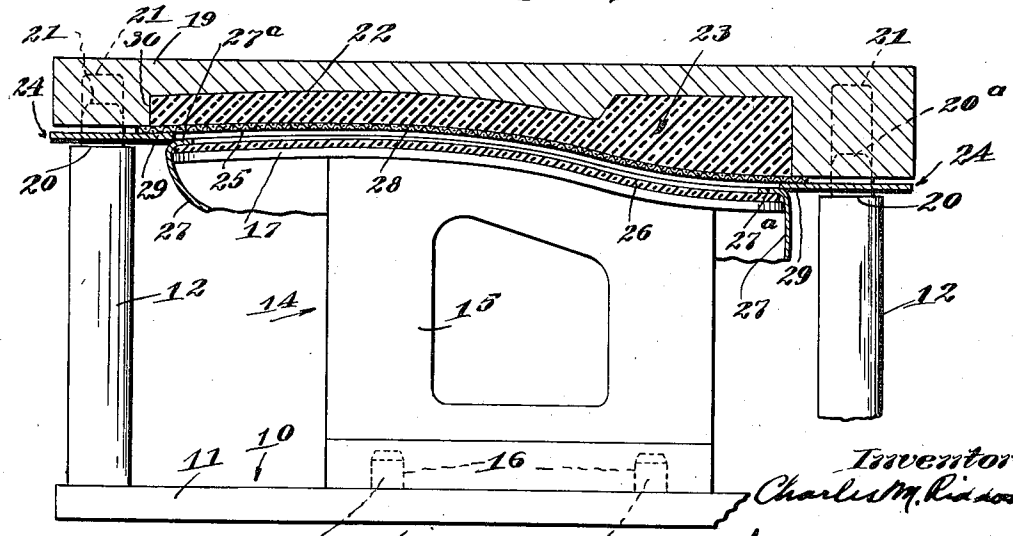


Fig. 6.

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PROCESS FOR MAKING SHOES

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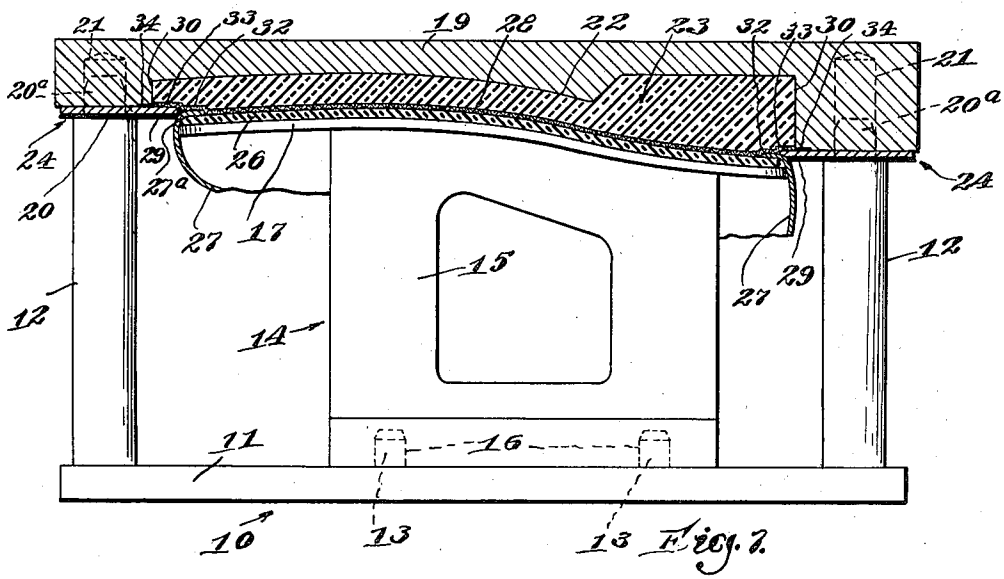


Fig. 7.

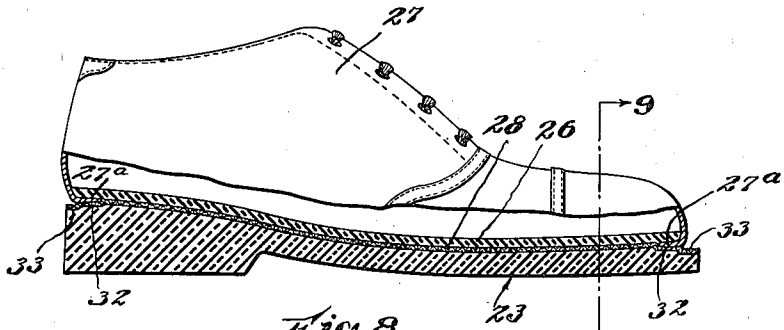


Fig. 8.

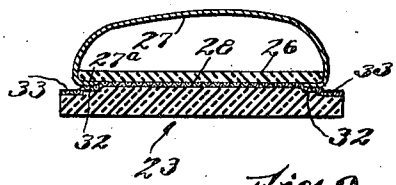


Fig. 9.

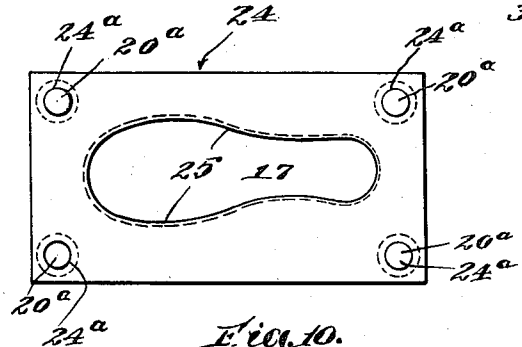


Fig. 10.

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Patented Nov. 5, 1935

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UNITED STATES PATENT OFFICE

2,019,544

PROCESS FOR MAKING SHOES

Charles M. Riddock, Andover, Mass.

Application March 17, 1933, Serial No. 661,274

2 Claims. (Cl. 12—142)

My present invention relates to an improved process for manufacturing shoes and more particularly to a process utilizing a center plate member in combination with an inner sole anvil member whereby certain pressure and forming effects are developed and coordinated which serve to provide a new and very durable type of shoe construction.

The present application is to be identified as relating to subject matter disclosed in my previous application for Method of manufacturing shoes, filed May 26, 1931, Serial Number 540,098. A brief statement therein deals with the difficulties existing in the particular field and the improvements sought for generally. In the course of further development work under actual production conditions there have been discovered certain new operations and elements whereby an improved product can be made in a more efficient manner of which the following purports to be an exact description.

The principal object of my invention is therefore an improved process for manufacturing shoes.

Another object is a process utilizing a center plate member adapted to induce certain bonding formations in the shoe sole construction.

Another object is a process of the above described characteristics in which an inner sole anvil member is utilized adapted to co-operate with said center plate member.

Still another object is a process of shoe manufacture for fixing a shoe upper skirt in association with an outer sole member without any stitching operation.

Still another object is a process of shoe manufacture adapted to secure an inner sole, an upper skirt, and an outer sole together without the use of any stitching means.

Still another object of my invention is a randed shoe sole construction with which a fabric member is incorporated without any stitching step adapted to act as a welt sole member and also adapted to prevent rand distortion when pressure and heat are applied on vulcanization.

Other objects and novel features comprising the construction and operation of my invention will appear as the description of the same progresses.

In the drawings illustrating the preferred embodiment of my invention

Fig. 1 shows an insole with a shoe upper skirt attached thereto in cross section and mounted on a wooden forming last partly shown in cross section.

Fig. 2 shows the upper and insole in cross section with the upper partly broken away and with the wooden last of Fig. 1 removed and a metal anvil member inserted in place thereof whose periphery is slightly larger than that of the inner sole member.

Fig. 3 is a similar showing of the inner sole and upper in cross section with the metal anvil member mounted on a base plate.

Fig. 4 is a view similar to Fig. 3 and further showing a center plate member in cross section disposed over the engaging upper.

Fig. 5 is a view similar to Fig. 4 and further showing a fabric member in cross section disposed over said center plate and loosely adjacent the bottom of the inner sole member.

Fig. 6 incorporates all of the elements shown in Fig. 5 with the addition of a top die plate shown in cross section which provides a cavity for an outer sole and has been filled with a rubber composition and the whole die assembly and shoe elements as shown are illustrative of the position of said members just prior to the application of pressure and heat for the final forming of the shoe.

Fig. 7 is similar to Fig. 6 with the exception of showing the shoe and die units after pressure and heat have been applied and the shoe forming operation completed.

Fig. 8 shows a fragmentary cross section and elevation of a finished shoe having been produced by this method with the die members shown in Figs. 2–7 inclusive.

Fig. 9 is a longitudinal section taken on the line 9—9 of Fig. 8 and particularly showing the association of the inner sole, upper skirt and fabric with the outer sole as produced by this method.

Fig. 10 shows a reduced scale plan view of the die assembly as shown in Fig. 4 with the inner sole and upper portion of the shoe eliminated and particularly showing the sole portion of the anvil member as indicated by the dotted lines, extending beyond the under edges of the opening in the center plate.

Referring more in detail to the drawings, I have preferred to show my improved method of shoe manufacture in successive steps and the description of the same will be accordingly dealt with but, prior to showing the actual formation of the shoe, I will first describe the die in which the shoe is formed. 10 indicates the base member of the die which comprises a rectangular plate 11 provided at each corner with dowel pins 12 which are shouldered at 20 and have beveled upper end portions 20a and provided at its central portion with dowel pins 13. An inner sole anvil member

14 comprising a vertically disposed supporting member 15 is provided with two vertically and centrally located dowel pin holes 16 which are adapted to engage over the dowels 13 located in the lower base plate 11. The top of the anvil 14 is constructed in the form of a sole shaped plate member 17. This plate member 17 corresponds with the shape of the bottom of the wooden last 18 shown in Fig. 1, in all respects except that it is slightly larger in periphery.

There has further been provided a center plate member 24 constructed with openings 24a in each of its four corners which are adapted to effect the engagement of the plate 24 over the dowel pin portions 20a and provide for the seating of the said plate 24 upon the shoulders 20. When the center plate 24 is firmly seated upon the shoulders 20, there will be provided a vertical clearance of approximately .035 of an inch between its lower edge and the upper edge of the anvil plate member 17 which will be maintained at all points along the two respective peripheries. Attention is particularly directed to the center plate 24 which is provided with an opening 25 whose periphery coincides with the contour of the plate 17, the only difference being that the periphery of the opening 25 is slightly smaller than that of the plate member 17. The purpose of these respective proportions will be referred to further along in the recital of the process.

An upper die plate 19 has finally been provided which is constructed with recessed openings 21 into which the upper end portions 20a of the dowel pins 12 may extend, provision being made for the plate 19 to contact upon the center plate 24. In the lower surface of the upper die plate 19 is located a cavity 22 in which the outer sole and heel portion of the shoe is formed, a detailed account of which will now be described.

Fig. 1 which shows the first step of my process illustrates a common wooden last 18 upon which is mounted an inner sole member 26 which is preferably a fabric material and which has its inner surface provided with a fabric topping and its outer surface provided with a rubber film. A shoe upper member 27 is now attached to the inner sole with the engaging skirt portion 27a secured to the exterior surface of the inner sole as viewed on the wooden last by adhesion or similar agency as the upper is lasted.

The next step in my process consists in removing the wooden last 18 and mounting the inner sole and shoe upper on the inner sole anvil plate 17 of the anvil member 14. As previously mentioned this anvil member plate 17 conforms in contour to the sole surface of the wooden last 18 but is of slightly larger periphery and since the wooden last contour at its base agrees exactly with the periphery of the inner sole, the anvil plate 17 is correspondingly larger in periphery than the inner sole. The anvil member 14 is now mounted on the dowels 13 located in the top of the plate 11 of the base 10 of the die as shown in Fig. 3.

The succeeding step consists in positioning the center plate 24 on over the dowel pins 12 so that their upper end portions 20 engage through the openings 24a of the center plate 24 and allow the edges of the opening 25 in the center plate 24 to rest upon the outer edge of the engaging portion 27a of the upper 27. This step results in the assembly illustrated in Fig. 4.

A further step is shown in Fig. 5 which comprises the mounting and also the positioning of a rubberized fabric member 28 on the center plate 24. The outer edge of the fabric 28 extends beyond the opening 25 in the plate 24 all the way around the said opening approximately as shown in Fig. 5, and the rubberized surface of the fabric 28 is disposed adjacent the inner sole 26.

Provision for the outer sole and heel member is next made and this comprises the filling of the cavity 22 in the upper die portion 19 with a rubber compound which is adapted to form a unitary member and for this reason is generally referred to as the outer sole 23. The upper die portion 19 is now positioned so that the openings 21 in its corners are brought into engagement with the dowel pin portions 20a and the inner bottom surface 30 adjacent the cavity 22 contacts with the extreme outer edge of the fabric member 28 as shown in Fig. 6, just prior to the application of heat and pressure.

Application of heat and pressure is now made to the die assembly as shown in Fig. 6, and the resulting formation and re-arrangement of the die parts is shown in Fig. 7 which will now be discussed in detail.

Subsequent to the application of heat and pressure it will be noted that the center plate 24 has become firmly seated on the shoulder 20 of the dowel pins 12 and with this re-arrangement the inner sole 26 and engaging skirt portion 27a have been entered into the opening 25 in the center plate 24, the full extent of which has been slightly minimized in order to maintain an exaggerated showing of the thickness of the fabric 28. As a means of more clearly analyzing this result, attention is directed to a consideration of the previously discussed proportions of the peripheries of the center plate opening 25, the inner sole 26, and the anvil plate 17 with respect to each other where it is to be noted that the anvil plate 17 is slightly larger peripherally than the opening 25 of the center plate 24 and the opening 25 is slightly larger peripherally than the inner sole 26 thus allowing such an entering action to be induced on closer association of the center plate 24 and anvil plate 17.

It will be further noted that die plate 19 has become seated upon the center plate 24 with the re-arrangement of the fabric member 28 and the rubber compound sole 23 being of such a character that that portion of the fabric 28 located between the center plate 24 and rubber compound 23 of Fig. 6, has become embedded upwardly in the rubber composition 23 as shown in Fig. 7. Inasmuch as this compressing action takes place along the periphery of all of the rubber composition 23, there must be a downward intumescing of the inner rubber composition under the given heat conditions and this downward movement of the inner rubber composition 23 meets the upward movement of the inner sole and engaging upper with the result that the inner sole and fabric 28 become partly embedded in the rubber composition and the engaging upper, corresponding inner sole area and corresponding fabric area become more definitely embedded.

A further observation is to be made dealing with the purpose of the vertical clearance previously cited as provided for between the center plate 24 and the anvil plate 17 and must be considered with the induced pressure just described in mind.

It will be apparent that such pressure will tend to either force the rubber composition 23 between the fabric 28 and the bottom surface of

the upper die 19 or to force rubber composition and fabric between the center plate 24 and the engaging upper portion 27a. The first condition is taken care of due to the fact that the outwardly extending fabric which has been indicated as 34 in Fig. 7, of the drawings, is uniformly compressed and to some extent pinched by die portion 30 of plate 19 the edge of which may be considered to act somewhat as a fulcrum against a certain amount of upward flexing action of the tempered steel center plate 24 developing when the center plate is reacted upon by the anvil member 17 from below. The second condition is taken care of due to the fact that the engaging upper is pinched between the center plate 24 and the anvil plate 17 sufficiently to prevent such bulging between the center plate 24 and the engaging upper 27a with just sufficient clearance being provided to prevent shearing of the upper itself and the rubber composition and fabric actually swell up around and just to this point of pinching which effect has again been slightly min'mized in the drawings due to the exaggerated fabric showing.

The shoe as finally formed and viewed in elevation would appear as having a randed outer sole with the upper skirt engaging with the randed area. In using the word "rand" as descriptive of this sole formation, it may be stated applicant discussed the definition of this word with respect to its application to his formation in his previous application for a process of shoe manufacture identified elsewhere, and with respect to which the present matter is to be considered as a continuing appl'cation. The word was used as referring to an inner raised portion formed on the upper side of the outer sole and is so to be considered here subject to slight modifications which would appear on taking a cross section through the present randed sole. In cross section the final formation of the outer sole appears with a central portion in which the inner sole and fabric are partly embedded with a stepped up portion 32 corresponding to the portion directly over the skirt 27a and a further stepped up portion 33 directly over that portion of the center plate 24 indicated at 29 which projects inwardly beyond the outer edge 30 of the recess 22 in the upper die plate 19. This last stepped up portion forms the rand 33 on the upper sole which is seen when the shoe is viewed in elevation and is continuous around the entire shoe. When considering the stepped up portions as such, Fig. 7 is to be used. These formations as shown in Figs. 8 and 9 would be more properly designated as stepped down portions but a description of the shoe in an inverted position has been maintained throughout the specification.

When all of the formations just discussed and shown in Fig. 7 have been effected and vulcanization is completed, the shoe is in condition for the removal of the top die plate 19. This is now done and a final finishing step is performed on the shoe. This step is the trimming of excess fabric 34 which projects out beyond the edge of the outer sole and is done with the center plate still in place in order that it may serve as a base for cutting, any suitable agent such as a knife being used.

With the completion of the cutting step, the final demounting operations are concluded comprising the stripping of the shoe from the anvil member 14 and then withdrawing the shoe upper 27 through the opening 25 in the center plate 24 and the shoe is completed as shown in section in Fig. 8.

While I have shown a preferred embodiment of my invention, it is to be understood that various modifications in the construction thereof may be resorted to in keeping with the spirit of my invention.

Having thus described my invention what I claim is:

1. An improved process of shoe manufacture comprising the producing of a shoe assembly by locating an inner sole member and upper about a wooden last and lasting said upper member and attaching the skirt of said upper to the said inner sole, the mounting of said shoe assembly in a die having a sole shaped anvil portion to receive said inner sole member and a die head portion recessed to receive a rubber composition outer sole member, the interposing of a fabric member adjacent a center plate member of said die located above said inner sole and having a sole shaped opening cut therethrough, the forcing of said shoe assembly against the said rubber composition to form a rand from compressing a portion of said rubber composition and said fabric member into the opening in the said center plate and applying heat to vulcanize said shoe assembly and said rubber composition together while in a compressed state.

2. An improved process of shoe manufacture comprising the producing of a shoe assembly by locating an inner sole member and upper about a last and lasting said upper member and attaching the skirt of said upper to the said inner sole, the mounting of said shoe assembly removed from said last in a die having an anvil portion sole-shaped to receive said inner sole member and a die head portion recessed to receive a rubber composition outer sole member, the interposing of a welt sole member adjacent a center plate element of said die located over said engaged skirt portion of the said upper and having a sole shaped opening cut therethrough, the forcing of said shoe assembly against the rubber composition to form a rand which fills in a portion of said rubber composition and a portion of said welt sole in the center plate opening and around said engaged upper skirt portions, and the applying of heat to vulcanize said shoe assembly and said rubber composition in its extruded state together.

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