

July 8, 1969

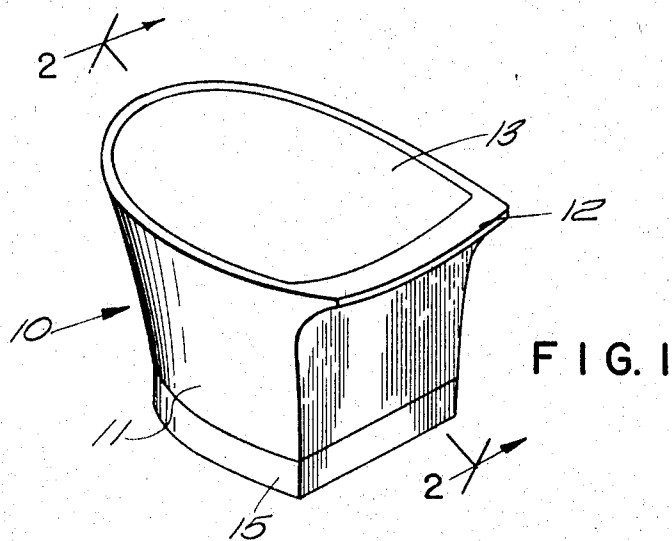
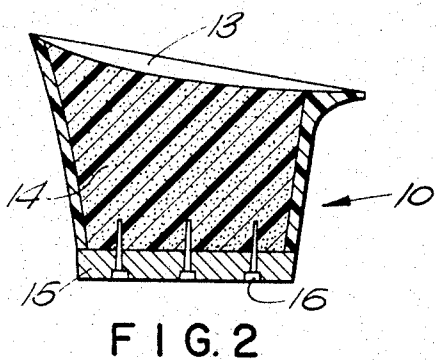
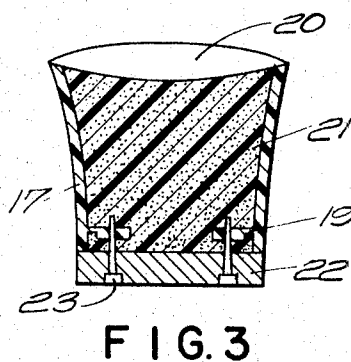
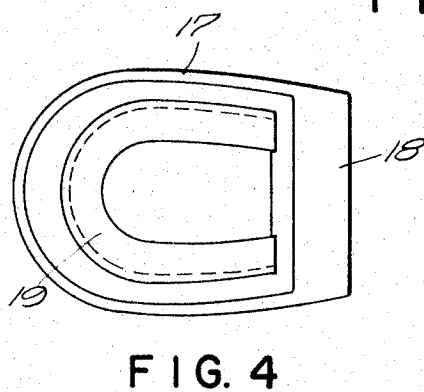
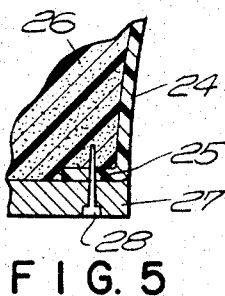
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3,453,754

COMPOSITE HEEL AND METHOD OF MANUFACTURE

Filed Feb. 28, 1967

Sheet 1 of 2



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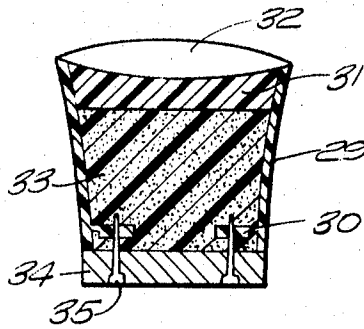


FIG. 6

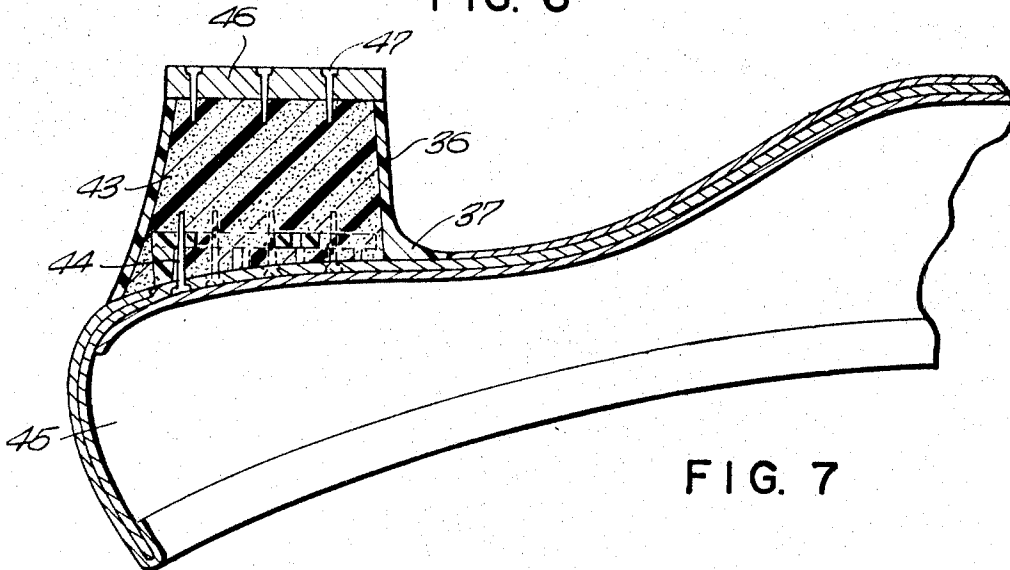


FIG. 7

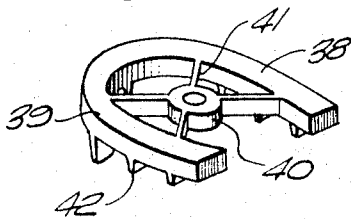


FIG. 8

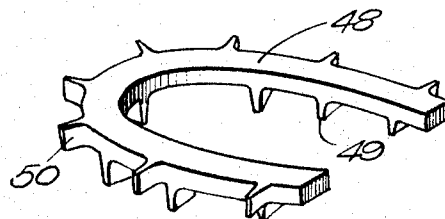


FIG. 9

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COMPOSITE HEEL AND METHOD OF MANUFACTURE

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6 Claims

ABSTRACT OF THE DISCLOSURE

An article and method of manufacture of a heel for a woman's shoe in which a thin shell of thermosetting plastic material is molded to the shape of the heel to provide the solid outer surface. The shell is filled with a light material such as a foam plastic which will solidify. Inserts are embedded therein for receiving the cobbler's nails for mounting the heel and the tap.

My present invention relates to the shoe art and more particularly to a novel construction of a woman's heel and a novel method of making the same.

The principal object of the present invention is to provide a heel for a woman's shoe which will provide a considerable saving in weight without sacrificing strength.

Another object of the present invention is to provide a novel method of manufacturing a heel for a woman's shoe.

A further object of the present invention is to provide a composite heel for a woman's shoe which is light and strong and can be readily attached to a shoe.

Another object of the present invention is to provide a composite heel for a woman's shoe which affords a considerable saving in the manufacturing operation.

A further object of the present invention is to provide a composite heel for a woman's shoe and a novel method of making the same which is simple in construction and operation and easy and economical to practice.

With the above and other objects and advantageous features in view, my invention consists of a novel arrangement of parts and a novel method of manufacture, more clearly disclosed in the detailed description following, in conjunction with the accompanying drawings, and more particularly defined in the appended claims.

In the drawings,

FIG. 1 is a perspective view of a heel for a woman's shoe embodying my present invention.

FIG. 2 is a section taken on line 2—2 on FIG. 1.

FIG. 3 is a transverse section of a modified form of my invention.

FIG. 4 is a top plan view of the outer shell of the form shown in FIG. 3.

FIG. 5 is a fragmentary transverse section of a modification of the form shown in FIG. 3.

FIG. 6 is a view similar to FIG. 3 showing still another form of my invention.

FIG. 7 is a longitudinal section of a woman's shoe having a heel made in accordance with the present invention.

FIG. 8 is a perspective view of the heel seat insert of the type illustrated in FIG. 7.

FIG. 9 is a perspective view of another form of heel seat insert.

In recent years women's shoes have been provided with narrow heels molded of solid plastic material and provided with reinforcing means such as steel dowels. Such constructions have provided smooth chip-proof outer surfaces which could be provided with any desired color and could even have leather covering cemented to it. The

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shoe industry has found that the plastic material was much safer and easier to handle than the old wooden heels and provided less breakage and more versatility. However, there has been a style change which has emphasized a heavier type of heel such as a Cuban heel. It has been found that when such heels are molded of the same plastic material they present several problems. First of all, they, are extremely heavy. Secondly, they are costly because the plastic material is priced by the ounce. While the original narrow heels did not have a sufficient quantity of plastic material to make a big difference, the so-called Cuban heel greatly increases the cost of the plastic in the heel.

Attempts have been made to reduce the weight of such heels by various methods. Light spongy material has been provided with a hard surface. Also, in one method, an extremely thin flexible shell has been inserted in a die and an expansible foam material has been molded into the shell. In a similar construction the die has been sprayed with a thin hard material and then the expansible spongy material has been molded into it. It has been found that all these various methods have two extremely important defects. First of all, the weight of the woman walking on the heel tends to loosen the nails holding the tap in the spongy material. Secondly, and possibly more important, the manufacturing operation is very costly and time consuming. Since shoe manufacturers turn out shoes by the millions and the heels are also required in millions, it is essential that the manufacturing operation be such that it be cheap and extremely rapid.

The present invention is designed to provide a quick and inexpensive method for providing a heavy type of plastic shoe in a lighter material. By utilizing a foam plastic material such as a foam urethane or a polypropylene, a suitable light, rigid and strong heel material can be provided. However, these materials take fifteen to twenty minutes to set. This means that if a mold is built, each cavity can only produce three to four finished heels per hour. Such a pace could never keep up with demand. In accordance with the present invention, applicant has found that he can produce an extremely thin, rigid, strong shell made of a thermosetting plastic material such as a rigid vinyl, impact plastic or a Cycloc material. Such a shell can be injection molded at the rate of three or more per minute. Now when the shell is used as the mold, the foam plastic material can be poured into the shell and left for fifteen to twenty minutes until it sets. However, this does not occupy the mold cavity, since the mold cavity is formed by the shell itself. Such a process can be extremely rapid, cheap and result in a highly satisfactory heel which is from fifty percent or more lighter than a solid plastic heel.

There are two nailing problems related to this heel. The heel itself must be fastened to a shoe either by nailing or glueing or both, and a tap must be nailed to the bottom of the heel. Where the foam material is such that it will hold the standard shoemaker's nail no problems arise. However, in most cases it will be found that the foam plastic material is not a good gripping agent for such nails. In such cases inserts can be provided of the same material as the outer shell which will more effectively hold the nails.

Referring more in detail to the drawings, FIGS. 1 and 2 illustrate the basic invention hereinabove described. The heel 10 comprises an outer shell 11 in the desired shape and injection molded out of a rigid thermosetting plastic material as hereinabove described. The shell 11 is open top and bottom and is provided at its forward edge with the tapered portion 12 for fitting to the shoe. After the molding of the shell 11, it is positioned upside down over a suitable mold for shaping the heel seat portion 13 shown in FIG. 2. The filler material 14 is the plastic foam

hereinabove referred to and is poured into the shell as it sits over the heel seat mold. In setting, it will be found that the material 14 may bulge slightly and it will then be necessary to finish it and grind it off level so that the tap 15 can be nailed to it at 16 with standard cobbler's nails. The heel seat portion 13 is then fitted to the shoe and either glued, or nailed, or both to the body of the shoe by the shoe manufacturer. The above method is thus rapid and simple to operate and produces an extremely light but bulky looking heel having a rigid foam plastic interior and a thin hard outer shell which gives the appearance of a solid plastic heel. The shell 11 may be varied in thickness from .050" to .070".

FIGS. 3, 4 and 5 illustrate a construction in which additional holding area is provided for retaining the nails for the tap 15. It should be noted that in the manufacture of shoes, the taps are nailed to the heels by machines which simultaneously insert all the nails in a horseshoe shape, there being no nails in the front portion. Accordingly, the form shown in FIGS. 3 and 4 provide an insert of the same material as the outer shell for holding the nails. In this form the shell 17 is molded similarly to the shell 11 shown in FIGS. 1 and 2 with the integral forwardly extending portion 18. However, adjacent the bottom end but slightly raised therefrom is a horseshoe-shaped strip 19 molded integrally with and of the same material as the shell. Now when the shell is inverted to form the heel seat portion 20 and the foam material 21 is poured in, the horseshoe-shaped strip 19 becomes embedded in the material 21. Now when the tap 22 is nailed at 23, the nails penetrate the material 21 into the horseshoe-shaped strip 19.

In the form shown in FIG. 5, the shell 24 looks very similar to the shell shown in FIG. 4 except that the horseshoe-shaped portion 25 is an integral strip turned inwardly around the bottom edge. Now when the foam material 26 is inserted, the bottom strip 25 does not become embedded within it. In this form the tap 27 is nailed at 28, and the nails extend through the strip 25 into the foam material 26.

In the forms illustrated in FIGS. 3, 4 and 5 it is assumed that there is sufficient holding power in the heel seat portions 20 to attach the heel to a shoe without further reinforcement. However, it is occasionally necessary to also have means for holding the nails from the shoe into the heel. In such cases the form shown in FIG. 6 can be used. This form is essentially similar to the form shown in FIG. 3. The shell 29 is injection molded with the horseshoe-shaped strip 30 extending spaced from the bottom edge. It may also be provided, alternately, with the strip shown in FIG. 5. However, during the manufacturing operation, when the shell 29 is inverted over the heel seat mold, a layer of rigid thermosetting plastic material 31, of the same material as the shell 29, is first poured in to form the upper heel seat portion 32. This is followed by the foam material 33. Now the tap 34 is nailed at 35 in the same manner as the form shown in FIG. 3. However, this form is now provided with a layer of hard plastic material at the heel seat 32 for receiving the nails for attaching the heel to the shoe. This form of heel is slightly heavier than the form shown in FIG. 3 because of the layer of material 31.

FIGS. 7, 8 and 9 illustrate an alternative method of providing a nailing insert for attaching the heel to a shoe. First of all, the shell 36 is molded similarly to the shell shown in FIGS. 1 and 2 with the forwardly extending integral portion 37. To form the heel seat portion, the shell 36 is now inverted into the position shown in FIG. 7, but over a heel seat mold. An insert 38, see FIG. 8, is provided with a general horseshoe shape 39 and a central eyelet opening portion 40 retained by the integral cross bars 41. The bottom face of the portion 39 is provided with integral depending lugs 42. To center the insert 38, the heel seat mold is provided with a central pin and the portion 40 slides over the pin while the lugs 42 hold the

insert spaced above the surface of the mold. Now when the foam plastic material 33 is poured into the shell 36 it will surround the portion 39 and embed it within it as shown in FIG. 7. The nails 44 from the shoe 45 will now attach the heel to the shoe through the strip 39. The tap 46 is attached by nails 47. In the form shown in FIG. 7, the insert shown in FIG. 8 is used to attach the heel to the shoe. To attach the tap 46 to the shoe, the various means shown in FIGS. 3, 5 and 6 may also be used.

Instead of the centering means shown in FIG. 8, the insert may be provided with the centering means shown in FIG. 9. In this form the horseshoe-shaped plastic member 48 is provided with lugs 49 at the bottom for resting on the heel seat mold, and lugs 50 extending laterally to engage the inner walls of the shell 36 to properly space the member 48 from the shell walls and permit the member to become completely embedded in the plastic material.

The method of manufacture is now apparent. A hard strong thin plastic shell is injection molded at high speed with great frequency. These injection molded shells are now themselves used as molds. They may be placed in a suitable jig and inverted over a heel seat mold having a surface shaped to provide the heel seat portion. The foam plastic material can then be poured in by hand or machine and the shell can be put aside for fifteen to twenty minutes to allow the foam plastic to set. During this time the expensive injection mold is not idled and production continues. Each shell therefore acts as its own mold for molding the insert material. In addition, various means may be provided for holding the nails. In the forms shown in FIGS. 3, 4, 5 and 6, the horseshoe-shaped portions to which taps are nailed are molded integrally with the shell. In the forms shown in FIGS. 7, 8 and 9, inserts are provided for nailing the heel to the shoe. In any event, the finished heel comprises a rigid outer shell shaped and molded to the final form of the heel in the desired color and a filling of a light foam plastic material. If the inserts are used for holding the nails for the tap and the shoe, the expanded light material used as the filler may be any desired material which will provide lightness and rigidity. The foam plastic shown herein is for illustrative purposes only and various other suitable materials can be used. It being understood, that if the material within the shell will hold the nails, then all that is necessary is the form shown in FIGS. 1 and 2. If not, then the forms shown in FIGS. 3 to 9 may be used. Other advantages of the present invention will be readily apparent to a person skilled in the art.

I claim:

1. A heel for a shoe comprising a rigid thin-walled shell of a thermosetting plastic material molded to the shape of the heel and having an open top and bottom, and a rigid filler material in said shell, said filler being of a lighter material than said shell, said filler material being shaped to form the heel seat portion of said heel, said filler being horizontally levelled at the lower end to receive a tap, and an insert embedded in said filler material adjacent the heel seat end for receiving the cobbler's nails for attaching the heel to a shoe, said insert comprising a horseshoe-shaped strip having depending spacing lugs and an integral central collar having a central opening for positioning said insert in said shell during the manufacture of said heel.

2. A heel as in claim 1, wherein said horseshoe-shaped strip is integral with said shell and extends around the inner surface of said shell and spaced from the bottom end thereof, said filler material surrounding said strip, whereby the cobbler's nails for holding the tap on said heel will pass through said strip.

3. A heel as in claim 1, wherein said horseshoe-shaped strip is integral with said shell and extends inwardly from the bottom edge of said shell, whereby the cobbler's nails for holding the tap on said heel will pass through said strip.

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4. A heel as in claim 2, wherein said insert has laterally extending spacing lugs for positioning said insert in said shell during the manufacture of said heel.

5. The method of making a shoe heel comprising the steps of molding a thin rigid shell of thermosetting material in the shape of the heel with the top and bottom open, filling the shell with a light expanded material, shaping the upper end of the filler material to form a heel seat and the lower end to receive a tap, and allowing the filler material to set within the shell to form a light rigid filler, molding a horseshoe-shaped strip with spacing lugs at the bottom and sides, and inserting said strip into said shell spaced from the heel seat end prior to the insertion of the filler material.

6. The method as in claim 5, wherein said horseshoe-shaped strip is molded with spacing lugs at the bottom and a centering collar in the middle.

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U.S. Cl. X.R.