

Nov. 24, 1964

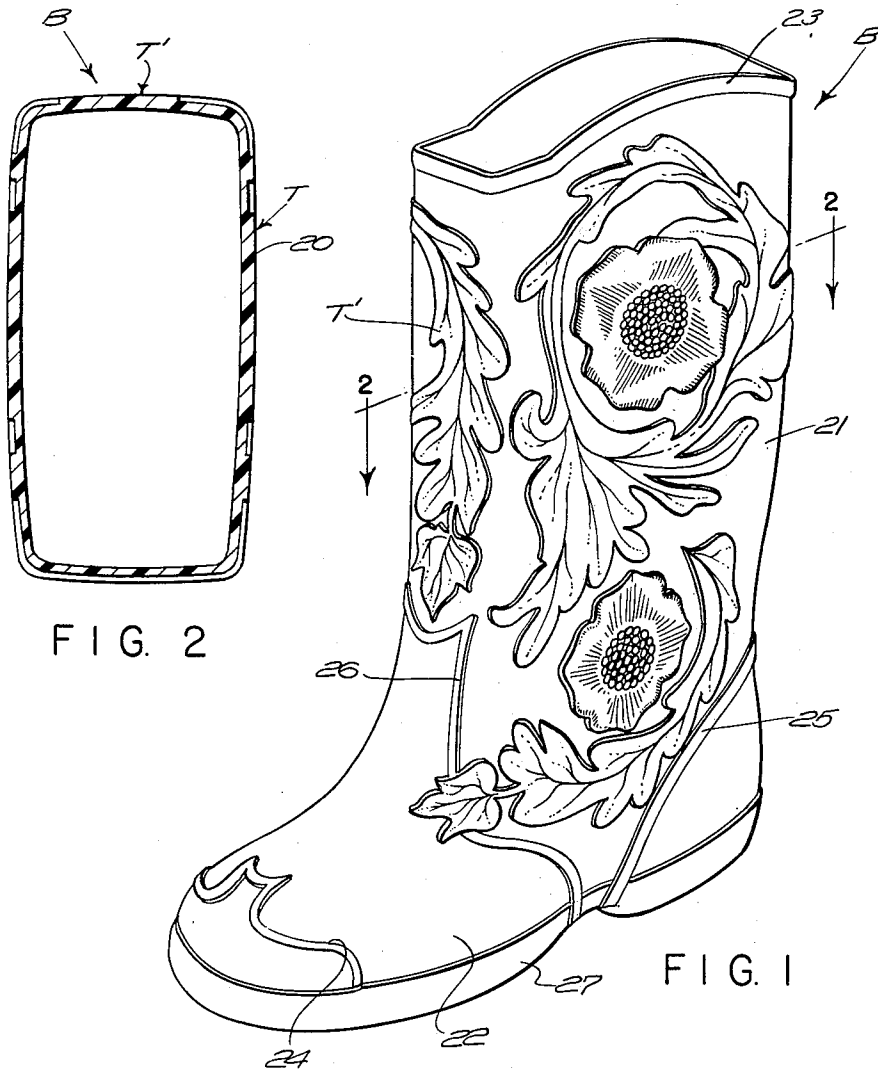
G. H. BINGHAM, JR

3,158,558

METHOD OF MAKING A HOLLOW MOLD

Filed Jan. 23, 1962

2 Sheets-Sheet 1



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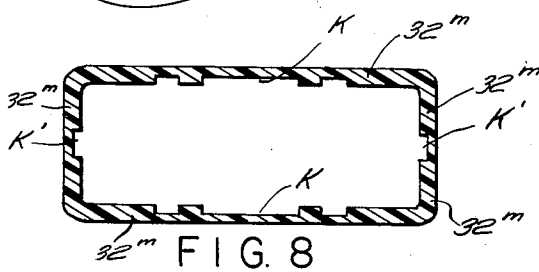
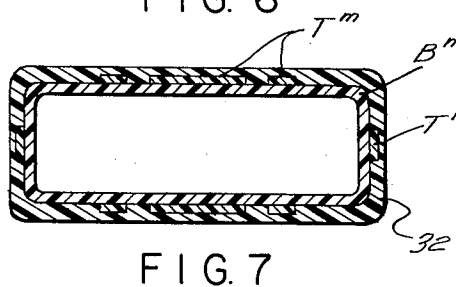
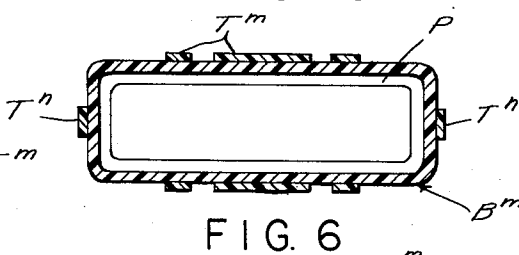
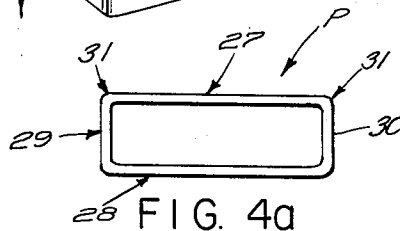
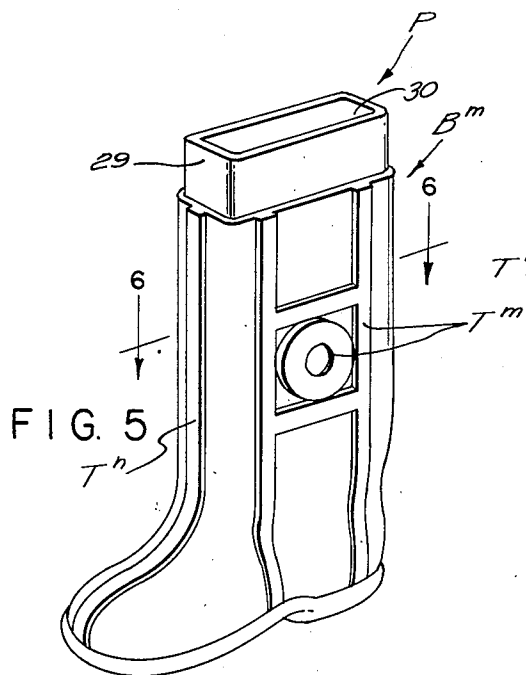
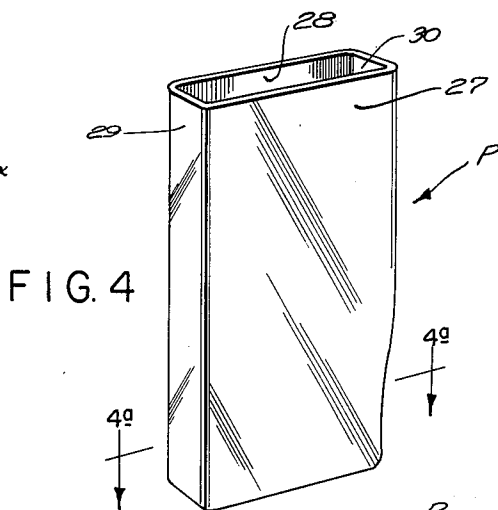
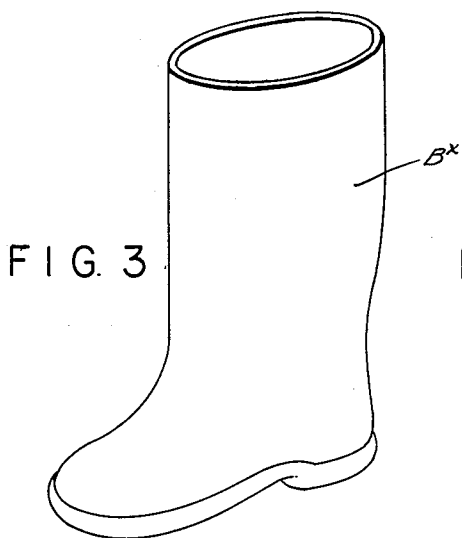
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METHOD OF MAKING A HOLLOW MOLD

Filed Jan. 23, 1962

2 Sheets-Sheet 2



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3,158,558

METHOD OF MAKING A HOLLOW MOLD

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3 Claims. (Cl. 204--8)

This invention pertains to the manufacture of plastic boots by the slush-molding process, more particularly to a mold for use in making a boot whose upper is externally ornamented with widely distributed relief designs which may be in color; to a method of making such a mold; and to a boot made by the use of such a mold.

In accordance with a method more fully described in the copending application for United States Letters Patent, Serial No. 167,389, filed January 19, 1962, by George H. Bingham, Jr., now abandoned, there is described a procedure whereby it is readily possible to provide an article of footwear, for instance a boot, with simple external ornaments in relief, the elements of ornament being integrally united to the material constituting the wall proper of the article, and, if desired, being of a material different from that of the boot proper, or of a color or colors contrasting with that of the boot proper.

While the method described in the aforesaid application is useful and practical for the application of ornamental designs of limited extent, it is not wholly acceptable for the application of designs which extend over wide areas of the periphery of the boot leg since, in accordance with that method, and, in particular, when the designs involve the employment of contrasting colors, the method involves the step of flowing a fluid into cavities or along grooves or channels formed at the interior of the mold. Because, at almost every transverse section, the leg of the conventional boot, and thus the mold, is curved, the cavities or channels in the mold may not be confined to the same plane, and thus great skill is required in tilting the mold, in one direction or another, to cause the fluid to flow throughout the entire pattern area without overflowing the cavities or channels at some point and thus fouling the adjacent area of the boot.

The present invention has for an object the provision of a mold whereby it is made possible to flow a fluid, for example coloring material, without danger of overflow, into channels or cavities forming designs which cover very substantial areas of the boot top. A further object is to provide appliances useful in the practice of the invention. A further object is to provide a moisture-impervious boot having extended areas of its outer surface ornamented by designs, in relief and/or in color.

In the attainment of the above objects, the invention comprises the step of so deforming the basic boot, which is used in the preparation of a model for use in making a mold, that those areas to which the ornamentations are to be applied become approximately flat. For this purpose, there is provided what may be termed a "last" (or more correctly a "plug," since it would not ordinarily comprise a part shaped to the foot portion of the boot), which is substantially rectangular in transverse horizontal section and which is of such dimensions that, when forced down into the upper of the basic boot which is to be used in preparing the model, it stretches the upper of the boot in the front-to-rear direction while narrowing it transversely, so that the opposite sides of the boot upper are approximately flat and, likewise, the front and rear surfaces of the upper may be also approximately flat, although narrower than the sides.

Having introduced such a last or plug into the basic boot, the selected elements of ornaments are then applied to these approximately flat surfaces of the boot and

firmly secured in place as by adhesive or otherwise. Then the "model" or "prototype" thus prepared is electroplated for the formation of a hollow mold for use in manufacturing the desired boots.

By the above procedure it is possible to decorate substantially the entire side surface of the boot top with elaborate ornamentation, and likewise, if desired, to provide the front and rear of the boot with all-over ornamentation. While the resultant boot, after molding, appears unusually narrow, transversely, its peripheral extent, nevertheless, is as great as that of the basic boot which was used in preparing the model. However, the boot upper is flexible and thus, in donning the boot, it is merely necessary to stretch it transversely to bring it back to the customary shape for the reception of the foot and leg, and when it is on the foot it readily conforms to the foot and leg so that it does not appear substantially different from the ordinary boot, except for the fact that it has a highly ornamental appearance.

In the accompanying drawings:

FIG. 1 is a perspective view showing a boot having such extended ornamentation in relief form;

FIG. 2 is a section substantially on the line 2-2 of FIG. 1, showing the general shape of the boot when off of the foot;

FIG. 3 is a diagrammatic perspective view illustrating the general appearance of a "basic" boot, substantially devoid of ornamentation, but which, in practice would be of the same general style and size at that of the boot of FIG. 1, and which may be employed in the preparation of a model or prototype boot useful in the making of a mold for use in the manufacture of a boot like that of FIG. 1;

FIG. 4 is a perspective view of a last or "plug" useful in temporarily deforming the boot of FIG. 3;

FIG. 4a is a section on the line 4a-4a of FIG. 4;

FIG. 5 is a diagrammatic, perspective view of the basic boot of FIG. 3, with the plug within it, showing the boot stretched from front-to-rear while narrowed transversely and, by way of example, showing very simple elements of ornament as having been attached to a side area and front of the leg of the basic boot which has been deformed by the introduction of the plug to lie substantially in a plane;

FIG. 6 is a diagrammatic section on a plane such as indicated by the line 6-6 of FIG. 5, showing the plug within the basic boot and having elements of ornament attached to each of its flattened faces, thus constituting a "model" for use in making a mold; the thickness of the wall of the boot being exaggerated relatively to the transverse dimensions of the boot;

FIG. 7 is a section like that of FIG. 5, but showing the "model" as having been electroplated to form a thin metal shell useful, after removal of the model, as a mold in the slush-molding of ornamented boots and

FIG. 8 is a transverse section showing the hollow shell of FIG. 7, in readiness for use as a mold in the manufacture of boots having simple external relief ornamentation. It will be observed that this hollow mold has cavities or channels in its inner surface corresponding in location to the location of the elements of ornamentation illustrated in FIGS. 5 and 6, these cavities or channels being replicas, but in reverse, of said elements, and in each instance, extending over a substantially flat area of the wall of the mold.

When herein reference is made to a "boot," that term is not to be considered as limiting, since the present method of preparing a mold may be employed in making molds for use in the manufacture of other articles of footwear, other wearing apparel or, in fact, in general, flexible articles made by the slush molding operation, wherein the surface to which the ornamentation is to be

applied is normally curved such that the operation of applying color, in providing an extended area of ornamentation, would ordinarily be difficult.

Moreover, when the term "element of ornament" is herein employed, such expression is intended to include not only independent or isolated shapes, but also component portions of more-or-less complex figures.

Referring to FIGS. 1 and 2 of the drawings, the character B indicates a boot or bootee primarily intended for children's wear and made, for example, by the slush-molding process from a suitable plastisol 20, as indicated in the section in FIG. 2. This boot, as shown, has the leg portion 21 and the foot portion 22, being, in fact, conventional except for the fact that it has extended areas of ornamentation (FIG. 2) on its right and/or left sides as indicated in general, at T and likewise, if desired, extended areas of ornamentation T¹ at its front and/or its rear. As will be noted from inspection of FIG. 1, the ornamentation is in relief and, as shown, is a decoration of pleasing but complex character covering almost the entire outer surface of the leg of the boot. While the ornamentation may be of the same material and/or color as the plastisol of which the boot proper is made, it is possible, in accordance with the present invention, to make it of another material or color. No attempt to indicate color is here made.

As shown, the boot has other elements of ornamentation of more-or-less conventional type, such as the binding strip 23 at the top of the boot; an ornamental strip 24 at the toe, suggestive of a toe cap; a strip 25 at the quarter portion, suggesting a heel stiffener; and a strip 26 at the forepart, suggestive of the upper edge of a vamp. Likewise, there is a strip 27 extending around the periphery of the boot at its bottom and representing a foxing. However, these latter elements of ornamentation (although they may be provided for in the same mold as the other ornamental features) are not essential with respect to the present invention.

In preparing a mold for use in the manufacture of boots, such as that shown in FIG. 1, the general procedure may be similar to that described in the aforesaid copending application, comprising the first step of selecting a basic boot Bx (FIG. 3) of the general style and size of the boot B (FIG. 1) which is to be manufactured by the use of the mold to be prepared in accordance with the present invention. The boot Bx is desirably one which has a simple, that is to say, substantially plain outer surface devoid of ornamentation such as might interfere with that which is to be applied.

There is then provided a last or plug P (FIG. 4) which may, for example, be of wood or of some light metal such as an aluminum or magnesium alloy and which is substantially rectangular in horizontal transverse section, having the substantially parallel flat side faces or surfaces 27 and 28 and the substantially plain front and rear edge faces 29 and 30. However, the plug preferably has rounded corners of short radius, as shown at 31, where the side and front faces are joined together. If this plug be made of metal, it is preferable to make it hollow, as shown in FIGS. 4 and 4a, so as to reduce the weight. As shown in FIG. 4, it may be tapered more-or-less from front-to-rear so that its rear face 30 will follow the contour of the rear part of the basic boot when introduced into the leg of the boot. The plug is of such dimension that when pushed down into the leg of the basic boot, as shown in FIG. 5, it stretches the boot-top from front-to-rear while narrowing it transversely. Desirably, the peripheral extent of the plug is slightly greater than the inner periphery of the basic boot Bx, so that when the plug is pushed down into the boot, the boot-top is stretched slightly so as to place the material under tension. Because of the shape of the plug, the side surfaces of the boot top are now substantially flat and parallel and, likewise, its front and rear edge surfaces. Having thus deformed the boot Bx, as shown at Bm (FIG. 5), by the introduction of the plug P, elements of

ornament Tm may now be applied as, for example, by use of adhesive to the exposed approximately flat side surfaces of the boot and, if desired, to its front and rear faces, as indicated at Tn. The elements thus applied to the boot top may be prepared in any desired manner from material of approximately the thickness of the desired relief pattern on the completed boot. Such elements of ornament may comprise pieces of plain sheet material; embossed material; material produced by a molding operation; narrow ribbons or strips cut from sheet material, or in fact any desired objects, and may be combined, in applying them to the surfaces of the boot, so as to form complex and/or extended designs, but, in applying said elements, confining the ornamentation to areas of the boot which are substantially flat. For simplification in illustration, but without limitation, the elements of ornament shown in FIGS. 5 and 6 are of the simplest.

Having prepared the "model" boot Bm illustrated in FIGS. 5 and 6, by attaching elements of ornament to the flattened basic boot, the resultant model is electroplated according to any desired or conventional procedure to form the metallic shell 32, shown in FIG. 7. After a shell of the desired thickness has been built up upon the mold, the model Bm is removed, thus providing the hollow mold 32m (FIG. 8). The mold, as shown, is substantially rectangular in shape in transverse section and has grooves or channels K and K' in its inner surface corresponding to the elements of ornament Tm, Tn which were attached to the deformed basic boot. This mold may now be employed in manufacturing boots such as that of FIG. 1, by the slush-molding operation. If the ornament is to be of a material different from or of a color contrasting with that of the boot proper this involves the introduction of an appropriate material, usually a fluid into the cavities or channels K and K' in the mold.

Since these parts of the mold 32m (FIG. 8) wherein these cavities are located are substantially flat, it is readily possible to introduce fluid to fill the grooves or channels K, even though the grooves or channels may cover a major portion of the interior surface of the mold. For example, the mold, when in the position shown in FIG. 8, may have the channels K in its lower horizontal wall filled or partially filled with a fluid, for instance a colored plastisol, and when this has been gelled by heat, it is possible to turn the mold so that another of its grooved sides is horizontal and the channels or cavities in that wall filled or partially filled with colored plastisol and gelled and so on until all of the channels have been filled to the desired extent. Thereafter, the mold is turned to upright position and filled with the plastisol which is to form the body of the boot and after pouring off surplus liquid, the mold is heated so as completely to fuse all of the plastisols which have been introduced, with the result that when the boot is removed from the mold, the relief ornamentation is in a color or colors contrasting with the color of the plastisol forming the body of the boot. For example, the ornamentation may be red while the body of the boot is black, or the ornamentation may be of varied colors, while the body of the boot is white.

While one desirable procedure in the preparation of a mold appropriate for forming a boot such as that of FIG. 1, the characteristics of the mold so formed, and a boot made by the use of the mold, have herein been described by way of example; it is to be understood that the method and articles so described are by way of example and that any and all modifications falling within the scope of the appended claims, are to be regarded as embraced in the invention.

I claim:

1. That method of preparing a mold to be used in the manufacture, by the slush-molding procedure, of a boot, one side, at least, of whose leg has an all-over ornamental design, said method comprising as steps: providing a basic boot of approximately the size and shape of the boot to be manufactured by the use of the intended mold

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but which is substantially devoid of ornamentation, stretching the leg portion of the boot in the front-to rear direction while narrowing it transversely so that it becomes substantially rectangular in horizontal section, the outer surfaces of the right and left walls of the boot leg being substantially parallel and flat, while its front and rear surfaces are narrower than the side wall surfaces, each of the flat side surfaces being of adequate extent to receive and support an all-over design of extended area, appliqueing, to at least one of said flat side surfaces, elements of ornament of selected thickness and which collectively form the desired design thus constituting a model boot having, on one side wall at least, the desired ornamental design in relief, electroplating the model boot thus prepared to form a thin metallic shell, and removing the model boot from the shell thereby producing a hollow metallic mold whose side walls are approximately flat, while the inner surface of at least one of said side walls has cavities corresponding in shape, size and location to the elements of ornament which were applied to the basic boot.

2. That method of preparing a mold to be employed in the manufacture, by the lush-molding procedure, of a boot whose leg portion has an all-over design covering an extended area of its outer surface, said method comprising as steps: providing a basic boot of approximately the size and shape of the boot to be manufactured by the use of the intended mold but which is substantially devoid of ornamentation, so deforming the leg portion of said basic boot, by stretching it from front-to-rear, that it becomes substantially rectangular in horizontal section and so that its opposite side surfaces are substantially parallel and flat while its front and rear surfaces are likewise substantially parallel and flat but narrower than the side surfaces, appliqueing to each of said flat surfaces elements of ornament of selected thickness to form a design on each of said flat surfaces thereby producing a model boot having flat surfaces, each covered by a desired ornamental design in relief-electroplating said model boot to form a thin metallic shell, and removing the model boot from said shell thus producing a hollow metallic

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mold whose wall has approximately flat side and front and rear portions in whose inner surfaces are cavities corresponding in shape, size and location to the elements of ornament which were applied to the basic boot.

3. The method according to claim 1, further characterized in that for stretching the boot from front-to-rear there is provided a rigid plug which in horizontal section is substantially rectangular but narrower, from side-to-side than from front-to-rear, and which is of a size substantially to fill the leg portion of the basic boot when forced downwardly into the latter and which, when so forced down into the leg of the basic boot, deforms the leg portion of the boot so that the peripheral wall of the leg now comprises relatively wide, substantially flat side areas and relatively narrow, substantially flat front and rear areas, appliqueing elements of ornament so as to cover and conceal a substantial extent of a selected one, at least, of said flat areas thereby forming a model boot, employing this model boot in the manufacture of a mold by electroplating the model boot, and subsequently withdrawing the model boot, including the plug, from the metallic shell resultant from electroplating.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,158,558

November 24, 1964

George H. Bingham, Jr.

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 5, line 39, after "relief" insert a comma.

Signed and sealed this 6th day of April 1965.

(SEAL)

Attest:

ERNEST W. SWIDER
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents