

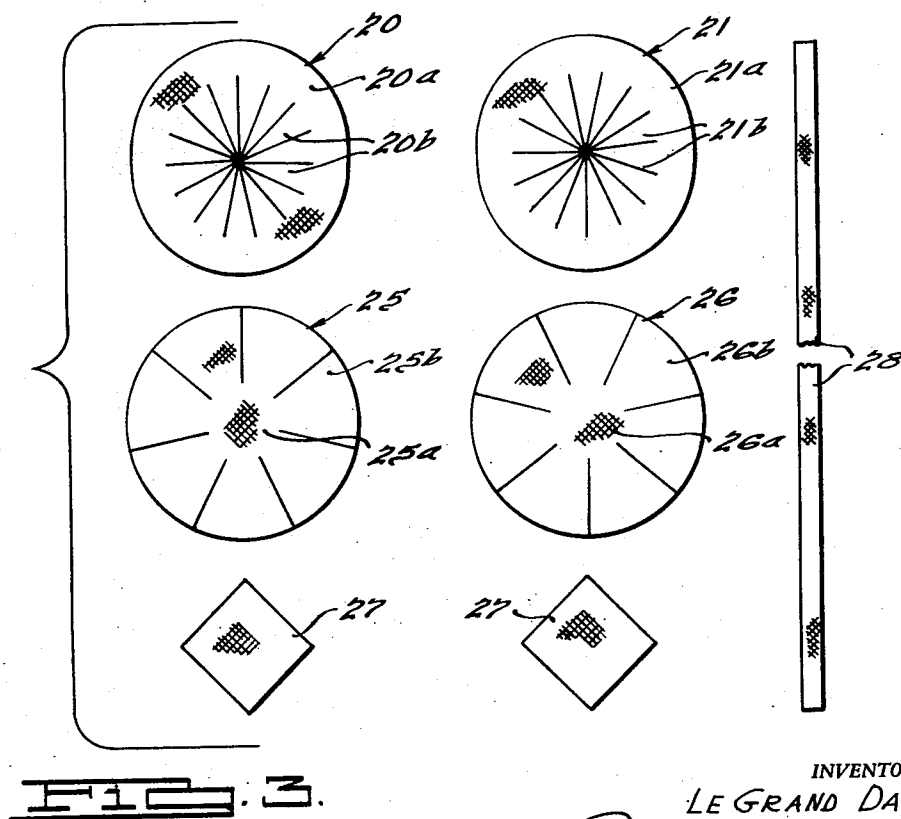
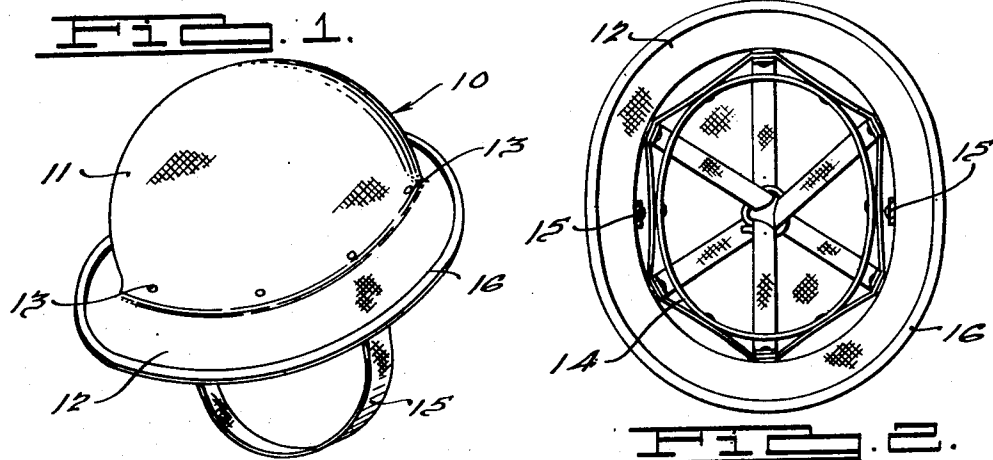
Sept. 16, 1952

LE GRAND DALY
HELMET

2,610,322

Original Filed Feb. 5, 1943

2 SHEETS—SHEET 1



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2 SHEETS—SHEET 2

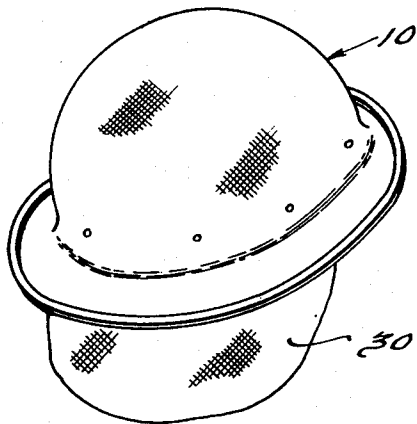
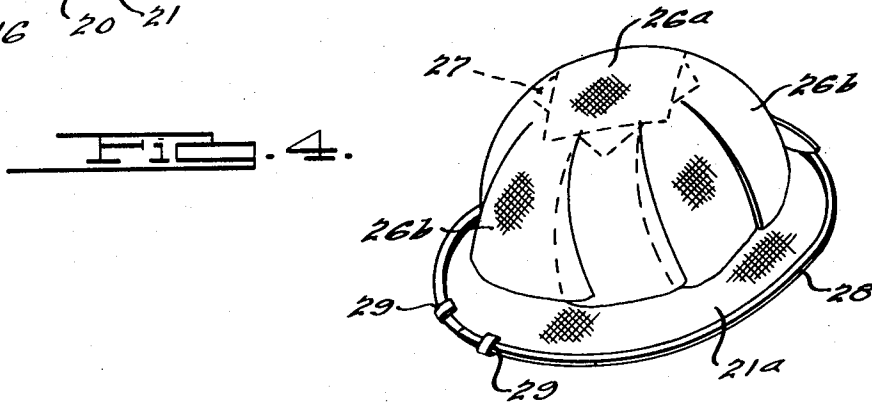
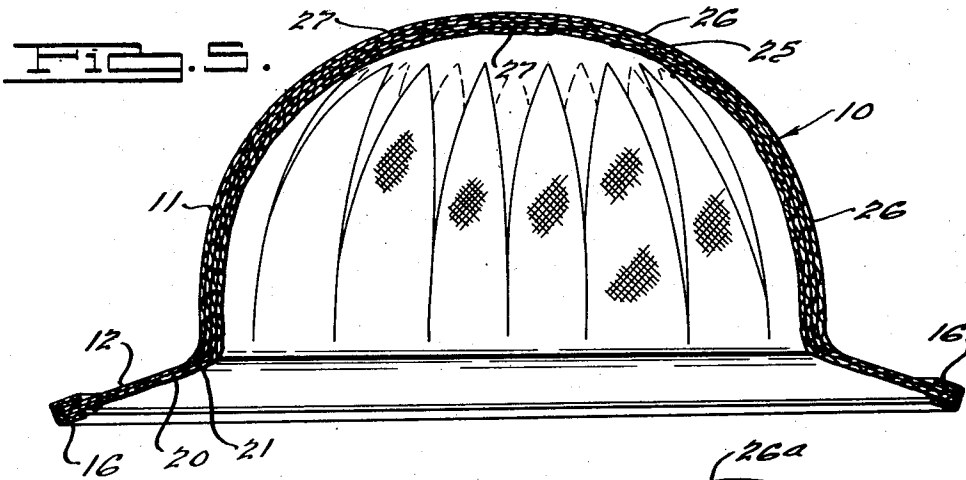


FIG. 6.

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UNITED STATES PATENT OFFICE

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HELMET

Le Grand Daly, Birmingham, Mich.

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2 Claims. (Cl. 2-3)

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This invention relates to helmets made from plastic impregnated cloth, paper or fabric, and more particularly to an improved method of making safety helmets such as may be used by firemen or air raid wardens. The present application is a division of my co-pending application for Helmet, Serial No. 474,867, filed February 5, 1943, now U. S. Patent No. 2,423,076, which application was filed as a continuation-in-part of my co-pending application Serial No. 433,943, filed on March 9, 1942, now U. S. Patent No. 2,420,522.

One of the objects of the present invention is to provide an improved method for making safety helmets from plastic impregnated fabrics in a speedier and more convenient manner.

Another object of the invention is to provide an improved method of making safety helmets built up to approximate shape from a plurality of plastic treated pieces of fabric and thereupon molded to final shape under the action of heat and pressure, or pressure only.

A further object of the invention is to provide an improved method of making helmets specified in the preceding paragraph, in accordance with which a helmet is made up of as few pieces as possible, is light and strong, and in which helmet the sections liable to be subjected to higher stresses and strains are correspondingly reinforced.

A still further object of the invention is to provide an improved method of making helmets, in accordance with which a helmet is molded from a plurality of plastic treated pieces of fabric, has a crown strong enough at its top to withstand a maximum impact load which the helmet wearer's neck can take, the sides of the crown being strong enough to support the crown top under such load and to transmit the load to the head-contacting supporting structure of the helmet.

A still further object of the present invention is to provide an improved method of making safety helmets from a plurality of plastic treated fabric pieces, the number of said pieces being reduced to a minimum to effect saving in dies and to facilitate manufacture, the individual pieces being of such respective shapes that waste of material is prevented.

A still further object of the present invention is to provide an improved helmet molded from a plurality of plastic treated fabric pieces, the shape of individual pieces and their arrangement in the helmet being such that seams are mutually staggered and yet no thick portions having excess of material are formed in the helmet.

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A still further object of the present invention is to provide an improved helmet molded from a plurality of plastic treated fabric pieces, which helmet has a relatively wide brim, the character of the individual pieces being such that no seams are present in the brim and moreover no distortion of the material of the brim and changes in the size thereof take place in molding, whereby the necessity of trimming of the helmet blank after molding is eliminated.

A still further object of the present invention is to provide an improved helmet molded from a plurality of plastic treated fabric pieces, the character of the individual pieces and their arrangement in the helmet being such that in addition to satisfying the objects and requirements listed above, they also insure easy handling of "pre-forms," i. e., assembled but not yet molded helmets, as well as going of said "pre-forms" into the molding dies without bending or moving any pieces from their respective places in "pre-forms," thereby preventing formation of wrinkles and folds.

It is an added object of the present invention to provide an improved helmet of the foregoing character which is of a strong and dependable construction, which is safe and comfortable in use, and is relatively inexpensive to manufacture.

Other objects and advantages of the present invention will be apparent from the following description and the appended drawing forming a part of the present specification, in which drawing similar numerals refer to similar parts throughout the several views.

In the drawings:

Figure 1 is a perspective view illustrating a helmet embodying the present invention.

Figure 2 is a bottom view of the helmet of Figure 1.

Figure 3 is an exploded view showing a set of pieces of material for one helmet.

Figure 4 is a perspective view of a "pre-form," i. e., assembled set of fabric pieces before molding.

Figure 5 is a longitudinal sectional view of a helmet shell after molding, the thickness of fabric being somewhat exaggerated for the sake of clarity, and

Figure 6 is a perspective view illustrating a helmet with a neck protecting apron.

Before explaining in detail the present invention, it is to be understood that the invention is capable of other embodiments and modifications within the scope of the appended claims.

In the drawings there is shown, by way of example, an improved helmet embodying the pres-

ent invention. The helmet construction herein illustrated and described is particularly suitable for air-raid warden duty; however, it will be understood that the present invention can also be embodied into helmets intended for other uses, such as for work in mines, quarries, building constructions, in farm work, and in various sports. It should also be understood that the term "plastic" as used herein includes various thermosetting and thermoplastic materials which may be used in connection with fabric or fabric reinforcements and molded by application of heat and pressure or pressure alone.

Referring more particularly to the drawings, the helmet illustrated therein comprises generally a shell 10, having a crown 11 and a brim 12 merging smoothly into each other. To the shell 10 there is secured in any suitable way, such as with the aid of rivets 13, a head-contacting structure, generally indicated by the numeral 14. Said structure 14 is made of a plurality of interconnected straps and is adapted to support said shell 10 on the wearer's head without permitting the shell to contact the head of the wearer. An adjustable chin strap 15 is provided as shown in the drawings. The edges of the brim portion 12 may be provided with a trimming strip 16.

Figure 3 illustrates a set of plastic treated pieces from which the shell 10 is molded, said pieces being shown flat, i. e., as they come out of the cutting dies and before they are assembled together on a form block into an approximate shape of the helmet, as shown in Figure 4. Said set comprises, first, two brim pieces 20 and 21 of a rounded configuration and having integral peripheral portions 20a and 21a, and a plurality of converging tongues or sectors 20b and 21b, projecting inwardly from said portions 20a and 21a, respectively, and made by slitting the material as illustrated.

The set further includes two crown pieces 25 and 26 also of a substantially rounded configuration and comprising central integral portions 25a and 26a and a plurality of diverging tongues 25b and 26b projecting outwardly from said portions 25a and 26a, respectively, and made by slitting the material of the peripheral portions of the pieces as shown.

It is preferable to use two brim pieces and two crown pieces. However, under certain conditions using only one brim piece and one crown piece, or more than two of each may be advantageous.

The set illustrated in Figure 3 includes further two dome reinforcing pieces both designated by the numeral 27, since they may be identical in size and shape. It is preferable to make them of square outline to prevent waste of material. A single strip 28 of the length equal to length of the peripheral edge of the brim 12 may also be provided if it is desirable to have a trimmed edge on the brim as illustrated at 16 in the drawings.

The pieces of Figure 3 may be cut out in any suitable manner. For quantity production they may be stamped out in several layers in suitable dies.

Prior to molding, the pieces shown in Figure 3 are first assembled together on a form block into a "pre-form" i. e., an approximate shape of the helmet. Such a "pre-form" is shown in Figure 4. In assembling the pieces, the brim pieces are first put on the block which has the shape of the helmet, the crown of the block bending the wedges 20b and 21b upwardly. Thereupon one of the pieces 25 or 26 is placed on the form block, with its central portion arranged on the top of the

block crown, and the tongues thereof are bent downwardly and arranged to overlap each other at their lower portions. The dome reinforcing pieces 27 are then laid down on the top of the crown piece in a star-like arrangement, as shown in dotted lines in Figure 4. Such an arrangement gives double layer reinforcement which tapers into single layer tongues, thereby insuring better transition from thicker to thinner sections of the shell, smoother surfaces and better distribution of stresses in a helmet. Thereupon the second crown piece is laid on the dome-reinforcing pieces 27 arranged as explained, and its tongues are also bent downwardly. The pieces so assembled are loosely connected in any suitable manner to insure their remaining in place during transfer of the "pre-form" into the molding dies. It is preferable to effect such connecting by touching the "pre-form" in places with a hot soldering iron. If a trimming strip such, for instance, as one shown at 28 is provided, the same is bent longitudinally and is arranged around the edges of the brim; it may be temporarily held in place with the aid of clips 29 for more convenient handling.

It is desirable that seams formed at the places of juncture of tongues 20b, 21b, 25b and 26b do not register with each other but are staggered to produce a stronger construction. This may be achieved in several ways. For instance, the pieces 20 and 21, as well as pieces 25 and 26, may be slightly offset in the process of assembling the "pre-form." Also, the number of tongues on a piece may be made odd and one of the identical pieces produced in the same die turned over before being superimposed on another piece.

Molding of the "pre-form" may be effected in a number of ways and apparatus. It is preferable to use the method and the apparatus described in detail in said co-pending application Serial No. 433,943. Briefly, such molding comprises subjecting a "pre-form" to forming pressure in a heated mold. The female part of the mold may be made of a pressed sheet metal sample helmet, while the male part or "punch" thereof may be in the form of an expandable rubber member.

Figure 5 illustrates a helmet shell after the same is molded, the thickness of separate fabric layers being somewhat exaggerated for the sake of clarity. With the process and the apparatus as mentioned, the outside surface of the shell comes out very smooth and glossy, while the unevenness in the thickness of the shell is taken care of not by crushing the high spot but by permitting them to project somewhat from the inside surface of the shell.

After the molding operation, the supporting structure 14 and the chin strap 15 are riveted to the shell. Thereupon the shell may be painted in a desired color. For air raid warden use, it is preferable to spray the shell with white enamel and to paint desired insignia thereon.

Due to the fact that the integral peripheral portions 20a and 21a of the brim pieces 20 and 21 are not distorted or bent in the process of forming and molding, trimming of the edges of the brim of the finished shell is not necessary, which is a great advantage in manufacturing. In fact, the provision of the trimming strip 16 may be dispensed with under certain conditions, and the edges of the brim be finished simply by sanding.

Due to the fact that tongues 20b and 21b of the brim pieces are arranged on the inside surface of the shell and are bent toward the top

of the crown, while the tongues 25b and 26b of the crown pieces are arranged on the outside surface of the shell and are bent away from the top of the crown, handling of the "pre-form" in molding is greatly facilitated, and the action of the die and punch members of the molding die operates to smoothen and to wipe down said tongues and to distribute them evenly in the shell, rather than to bend their tips or to form wrinkles near their roots. The above feature constitutes an important improvement.

Figure 6 shows a helmet substantially identical with that shown in Figures 1-5, but provided with a neck protecting apron 30. Said apron may be made of any suitable material, such as water-proof canvas or oil cloth and secured to the shell similarly or even in the same operation with the supporting structure 14. The function of the apron is to protect the neck of the wearer from water, heat and sparks. It is preferable to make the apron 30 of such a size and outline that, if desired, it may be bent into the shell and so arranged therein and the helmet may be worn with said apron forming an additional protection to the wearer's head.

By virtue of the above described improved helmet construction the above listed objects of the present invention, as well as numerous additional advantages, are attained.

I claim:

1. A helmet molded from a plastic treated substantially unstretchable flat material, said helmet comprising a crown and a brim portion, a brim piece moldably embedded into the helmet structure, said piece having a substantially round and continuous outer edge.

2. A helmet molded from a plurality of plastic impregnated pieces of substantially unstretchable fabric, said helmet having moldably embedded into its unitary structure at least one crown piece forming the helmet crown, and at least one substantially round brim piece having a radially slitted central portion overlapping said crown piece for a substantial distance and having a continuous outer edge.

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