

[54] **FACE MASK AND PROCESS FOR MAKING FACE MASKS**

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[22] Filed: **Apr. 30, 1973**

[21] Appl. No.: **355,435**

[30] **Foreign Application Priority Data**

May 4, 1972 France 72.15892

[52] **U.S. Cl.**..... 2/206; 128/139

[51] **Int. Cl.**..... A61b 19/00; A42b 1/18

[58] **Field of Search** 2/206, 9, 174, 49; 128/146, 139

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[57] **ABSTRACT**

A face mask is made from a blank of elongated foam plastic sheet material with slits or openings at each end defining a pair of handles, or loops, to be placed over the ears of a user. Lines of weakening can be stamped in the blank to define portions of sheet material to be removed to provide the loops, and the masks can be stamped in quantity in succession on long rolls of sheet material with lines of weakening to permit removal of individual blanks from the supply role as needed.

10 Claims, 16 Drawing Figures

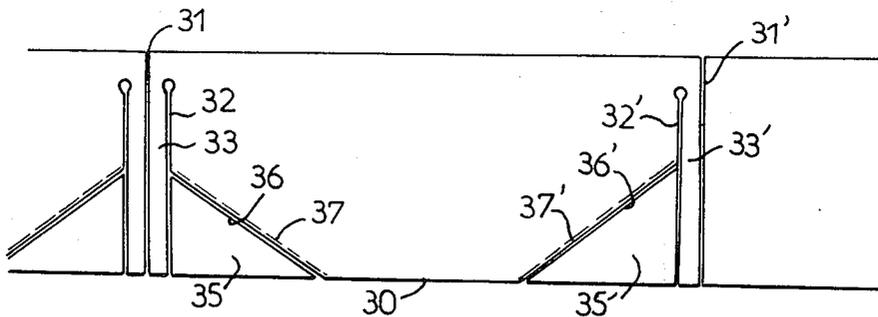


FIG.1

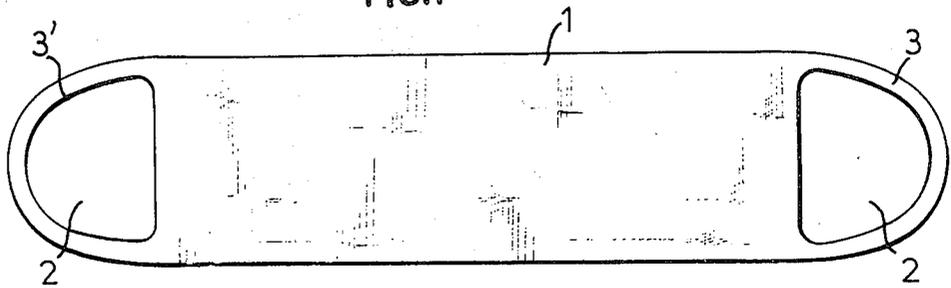


FIG.2A

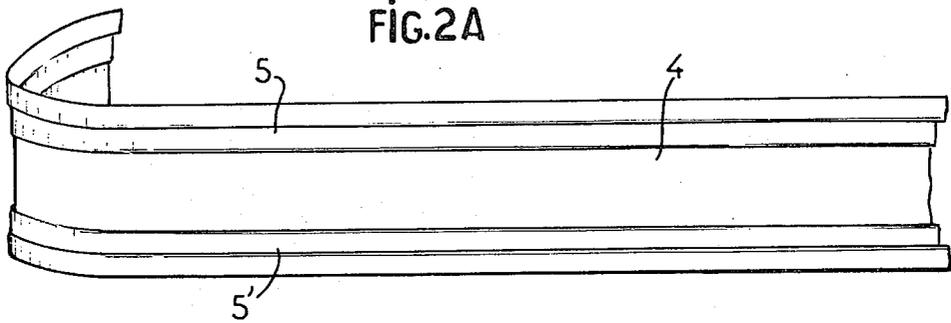


FIG.2B

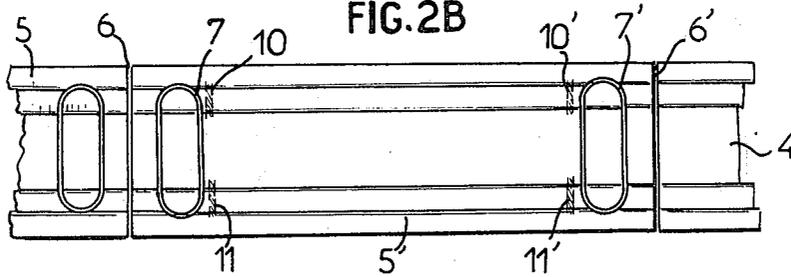
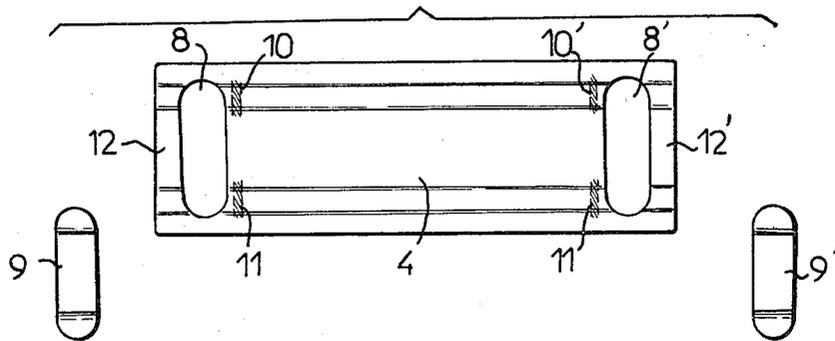


FIG.2C



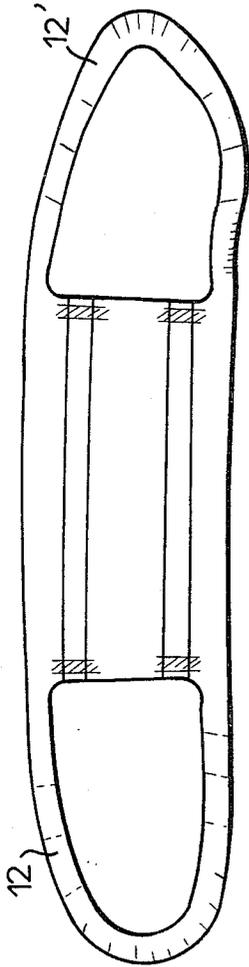


FIG. 2D

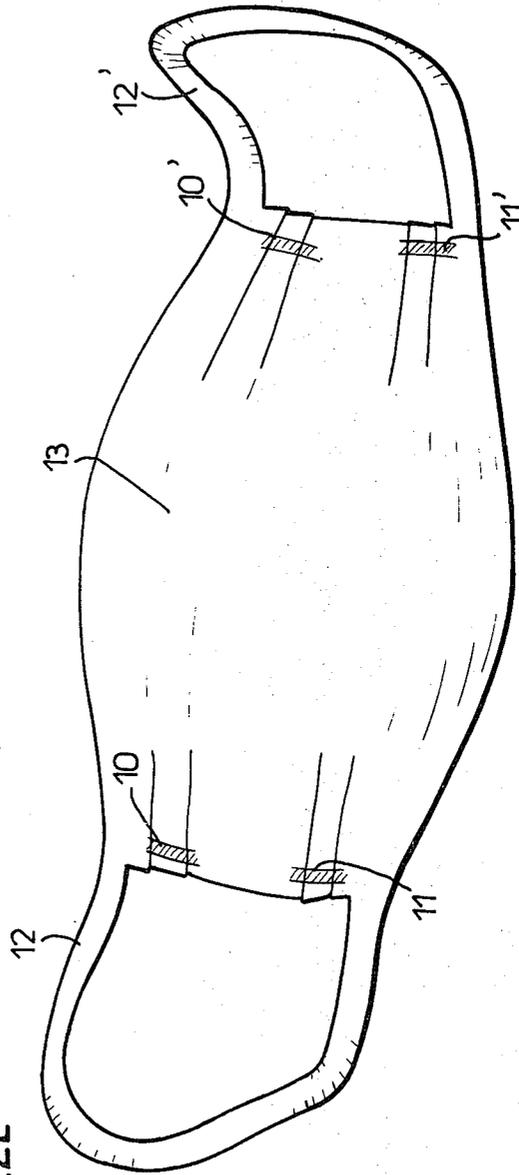


FIG. 2E

FIG.3A

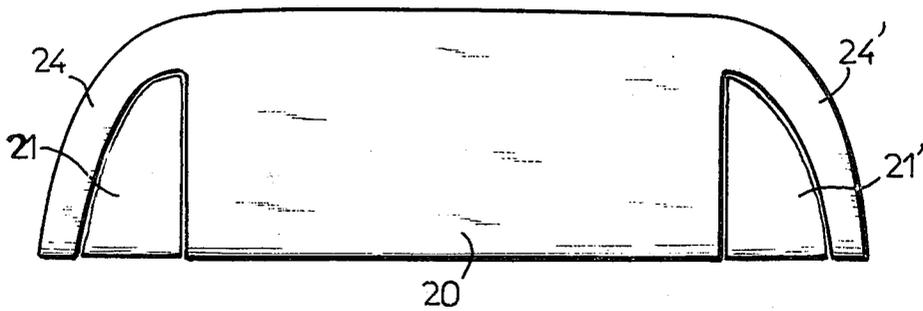


FIG.3B

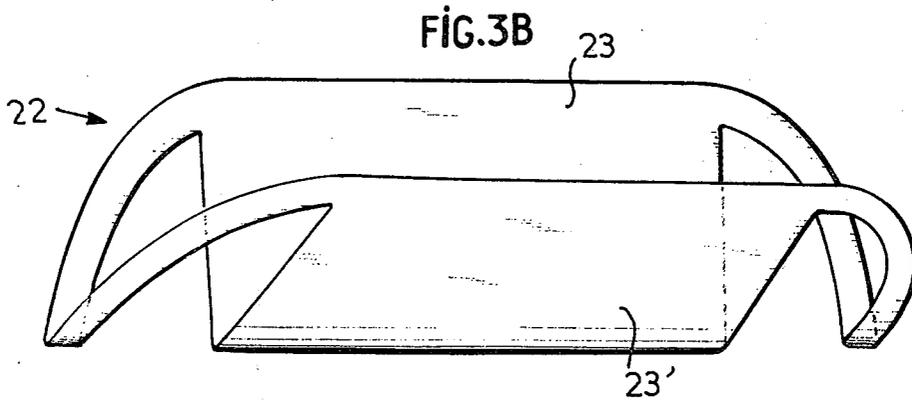
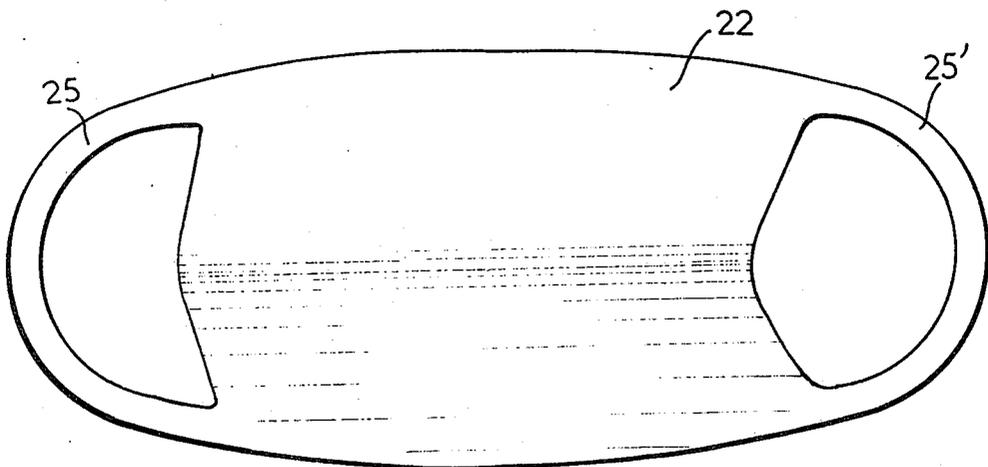
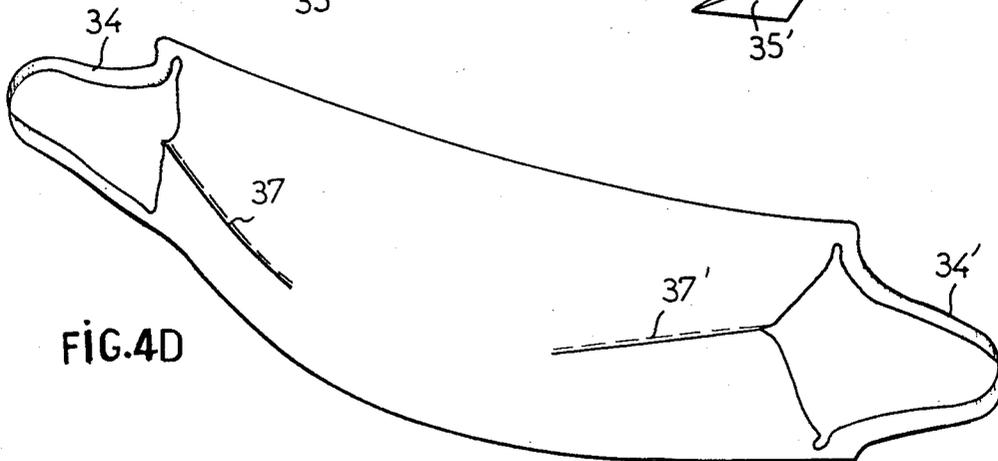
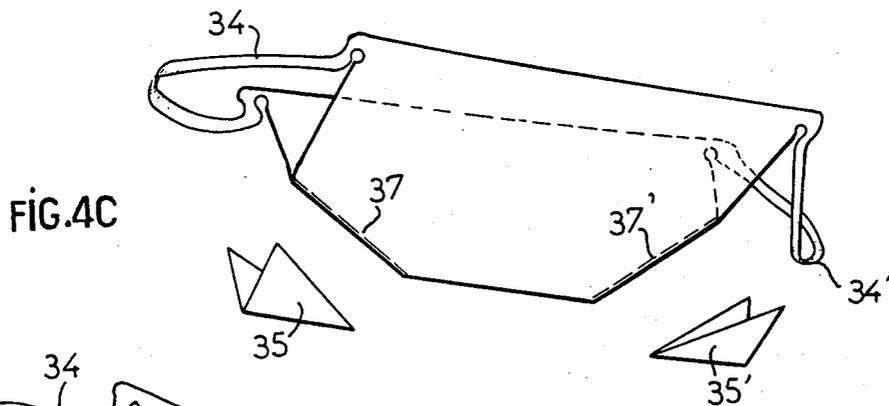
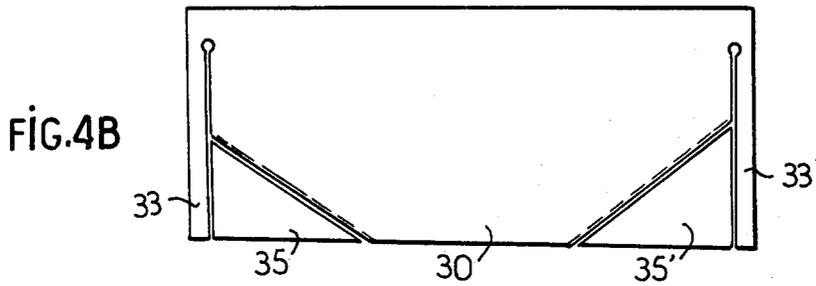
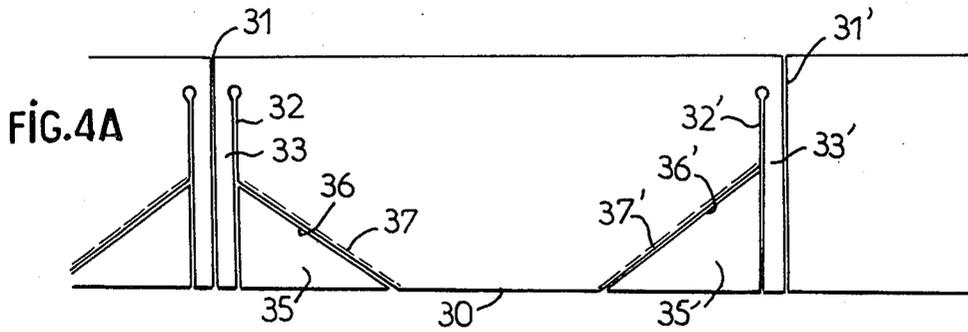


FIG.3C





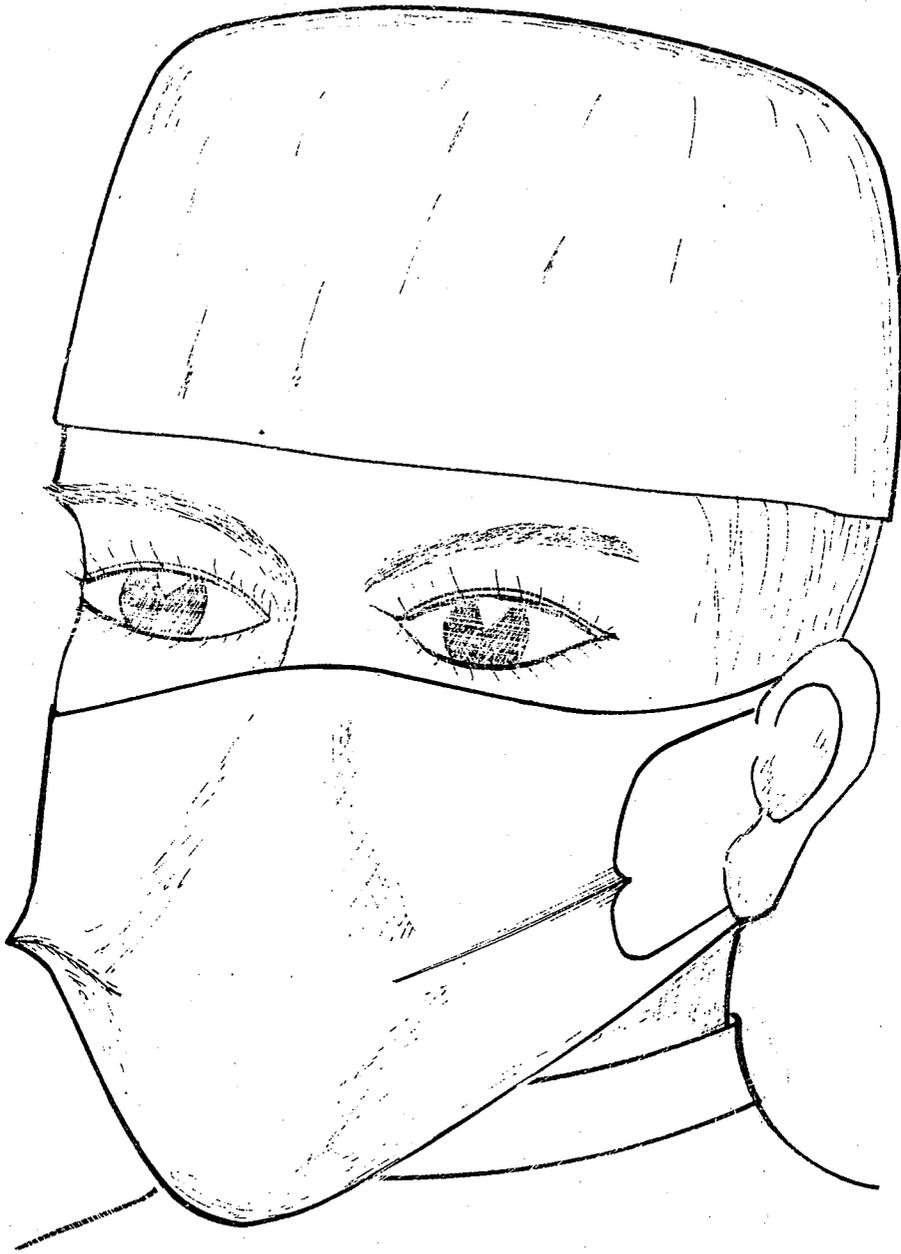


FIG.4E

FIG. 5A

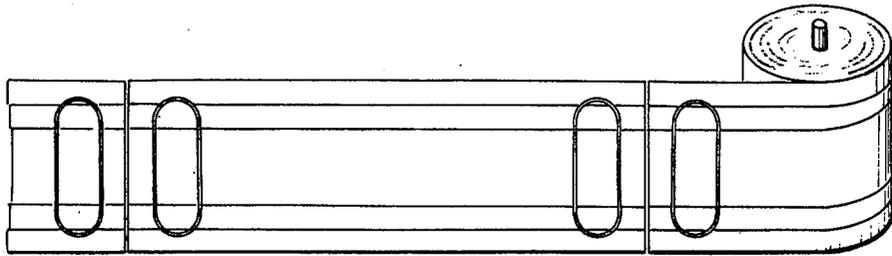
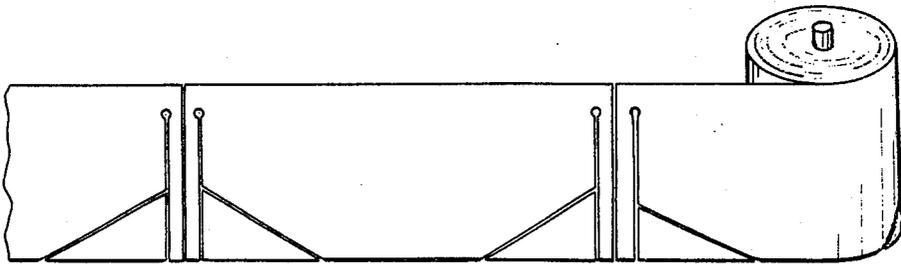


FIG. 5B



FACE MASK AND PROCESS FOR MAKING FACE MASKS

The invention relates to a new method for the manufacture of face masks such as those used in medicine, surgery for the purpose of masking of the opening of the respiratory tracts of medical practitioners, surgeons or assistants, for the protection of such practitioners and their patients. The invention also relates to masks produced according to the method.

According to the invention there is provided a method of making of face masks, for example for surgical medical or protective use, wherein there is removed from or defined by lines of weakening so that it can be removed from foam plastics sheet material having open cells, a blank corresponding to the outer outline of the mask to be made and provided with a general elongated shape, and there is made in the proximity of each of the ends of the blank a slit, or opening or line of weakening enabling the formation of a slit or opening intended to separate from the central part forming the body of the mask two lateral small tongues or handles connected to the central part or body of the mask at their ends so that these two small tongues forming fixing handles of the mask can be looped over the ear of the wearer.

Also according to the invention there is provided a face mask, for example for surgical or medical use, comprising a blank formed of, or defined in by lines of weakening, foam plastics sheet material, the blank being of a general elongated shape and having in the proximity of each end a slit or an opening, or a line of weakening defining a slit or a portion which can be removed to form an opening for the formation at each such end of a tongue or handle of the mask, which tongues or handles can be looped over the ears of the user of the mask to keep same in position.

By using foam plastics material, for example polyurethane foam, will permit, by suitable choice of the size of the cells, and generally by the choice of the physical features of the foam material, a filtering of the air adapted exactly to the particular needs can be obtained. The foam material also permits of the making of a mask in a single size which can be adapted by extension to all sizes of faces. Other advantages and features of the invention will be appreciated from the following description of the specific embodiments of the invention which are illustrated in the accompanying drawings.

In the drawings:

FIG. 1 is a plan view of a first embodiment of a mask according to the invention;

FIG. 2A is a plan view of a continuous band for the cutting of a mask according to a second embodiment of the invention;

FIG. 2B shows how the band on FIG. 2A is cut;

FIG. 2C shows the mask after its separation from the continuous band;

FIG. 2D shows the mask after spreading out the handles;

FIG. 2E shows the same mask after shaping of the central part;

FIG. 3A shows a plan of a cut-out according to a third embodiment of the invention in a folded sheet or band;

FIG. 3B shows the cut-out of the preceding figure in course of spreading out;

FIG. 3C shows the cut-out of the preceding figures in the spread out position;

FIG. 4A shows a plan view of a cut-out in a continuous band according to a fourth embodiment of the invention;

FIG. 4B shows the cut-out of FIG. 4A detached from the continuous band.

FIG. 4C shows the cut-out in spread out position to form the mask;

FIG. 4D shows the same mask in a subsequent stage of its formation;

FIG. 4E shows the mask in place on the face of a wearer; and

FIG. 5A and 5B show respectively continuous bands bearing cuts or lines of weakening with a view to making the masks in accordance with the embodiments shown in FIGS. 2C and 4B.

Referring to FIG. 1, which shows a most simple embodiment of the invention, the assembly of the mask is constituted by a single cut effected in sheet of foamed material, the cut permitting, in a single operation and for example by means of a punch of obtaining a yoke comprising a central part 1 and 2 rounded ends each provided with an opening 2 and 2' whereby there are two formed marginal handles 3 and 3' which permit the positioning and fixing of the mask on the face of the wearer by putting in place the handles behind the ears.

Referring to FIGS. 2A and 2E, the mask is cut from a continuous sheet or band 4 having a succession of longitudinal folds 5, 5'.

In the band of sheet 4 continuous transverse cuts 6 and 6' are made to cut the band into single elements each forming a mask and in addition each mask is provided with marginal cuts 7 and 7' forming respective openings 8, 8', after removal, as shown in FIG. 2C, of the cut-out pieces 9 and 9'. In a modified form of this embodiment instead of cut lines 7, 7' defining removable portions 9, 9' the cut lines may be slits which are widened manually to enable the ears to be passed therethrough.

Disposed in the proximity of the lateral openings 8 and 8' and on the inner edges of these openings are fixing or sticking locations 10, 10', 11, 11', whereat there is a joining of the folds on one another.

As shown in FIG. 2D, the lateral handles 12, 12' may be spread out by opening of the folds 5, 5'.

At the time of putting the mask in place and as can be seen in FIG. 2E, the handles 12, 12' can be adjusted behind the ears and the central face of the mask 13 can be spread out by opening of the folds as far as possible or as desired. The folds are of course held at weld or sticking locations 10, 10', 11, 11' so that the front face 13 of the mask taking up a desired shaped to conform to the portion of the face which it is to cover.

In another variation, a continuous band having longitudinal folds is used, the width of the band being calculated to correspond to the length or large side of the mask. This band is cut transversely to form single cut-outs each corresponding to a mask in which the folds appear parallel to the short sides.

In the embodiment shown in FIGS. 3A, 3B, the mask is cut from a sheet or band folded along an edge 20. In this folded sheet, there is made two marginal cuts 21, 21' of generally triangular but curved shape, the base of each of which is defined by the line of the fold. After removal of the cut-outs 21 and 21' the mask 22 is unfolded into two symmetrical halves 23, 23' and the tabs

24, 24' defined by the cutting are also unfolded to form two lateral handles 25, 25' (for positioning over the ears permitting the fixing of the front face or central part of the mask 22 onto the face.

In the embodiment shown in FIGS. 4A to 4E, the mask is cut as in the preceding example from a sheet or band which is folded along an edge 30, the band being cut into lengths along transverse cut lines 31, 31'. Each length cut-out has itself a marginal cut 32, 32' intended to separate from the central part of the mask the tabs 33, 33' which will form the lateral handles 34, 34'. A cut is effected at each end of the length to enable the separating of triangular pieces 35, 35'. At the same time as cutting said pieces 35, 35' the two halves of the folded sheet are fixed along the edges 36 and 36' co-incident with the edges of the cut outs 35, 35'.

To enable this to be done, for example, in a preferred embodiment of the invention, the folded band is treated by automatic machine and the bands are made of thermo-plastics material and/or thermal formable or weldable material and the cuts and/or welds are effected by the thermal cutting and welding means which are cutting and/or welding bars. The cutting of the pieces 35, 35' is effected by a cutting bar adjacent to a welding bar permitting of effecting the weld lines 37, 36' the cutting and welding operations being obtained in the same step and more or less simultaneously.

Referring to FIGS. 4B to 4E the different stages of the shaping of the mask thus realised and its placing on the face of the wearer are illustrated. These figures are self explanatory.

Referring to the FIGS. 5A and 5B, it will be seen that one may utilise the methods described above to fabricate continuously and from an uninterrupted band, masks successively cut in a machine operating step by step and fed with rolls constituting the base material for the cutting and welding operations described above.

In such case, the cut lines intended for separating each mask from the preceding one or from the following one are made in the form of lines of weakening permitting masks to be kept one after the other in a roll but permitting their easy separation by tearing away by simple pulling at the time of putting into service. Likewise, the cuts intended to form the openings may also be in the form of lines of weakening which permit easy separation of the portions of sheet material located within such lines to be removed for throwing away at the time of putting the mask into service. This arrangement permits in particular the continuous manufacture of such masks whilst permitting their packing and their delivery in the form of continuous rolls or the accordion like form used for continuous stationery, and in such rolled or folded form the masks are suitable for dispensing from an automatic dispensing machine.

The preceding description, having been given only by way of example of embodiments of the invention, is not intended to have any limiting effect on the scope of the invention other than that being consistent with the limits of the invention as defined in the appended claims.

What I claim is:

1. A method of making face masks for surgical, medical or other protective use comprising the steps of:
folding a rectangular blank of porous thermoplastic material about a line parallel to a pair of the opposite margins of said blank to form a double thickness of the material;

severing by die cutting said two thicknesses of folded material adjacent the respective end margins transverse to said first mentioned margins along respective pairs of lines of severance;

one of each of said respective pairs of lines of severance being parallel with and spaced from a respective transverse margin to define a pair of handles to engage the ears of a wearer when the blank is unfolded;

the other of each of said respective pairs of lines of severance intersecting said line of folding at a point spaced inwardly from the first line of severance and also intersecting the first line of severance at a point spaced from the line of folding to define an area of material to be removed;

joining said two thicknesses of material together along at least a portion of the second line of severance by thermal welding.

2. The method of claim 1 which includes the step of die cutting along said two pairs of lines and thermal welding along the respective two lines in a single operation.

3. The method of claim 2, wherein all of the lines of severance at straight lines which define two triangular areas of material to be removed.

4. The method of claim 3, wherein the respective second lines of severance intersect the first lines of severance at points spaced from the extremities thereof.

5. The method of claim 2, which includes the steps of forming a plurality of said blanks from a single continuous length of said porous thermoplastic material by forming successively spaced transverse lines of weakening in said continuous length of material to define the respective opposite transverse margins of each blank.

6. The method of claim 5, which includes the steps of performing said die cutting and thermal welding steps on successive blanks without separating the blanks one from another.

7. The method of claim 6, which includes the step of accumulating a plurality of said unseparated blanks for storage.

8. The method of claim 7, which includes the step of accumulating said unseparated blanks in the form of a continuous roll.

9. A porous face mask for surgical, medical or other protective use, comprising a single rectangular blank of porous cellular thermoplastic sheet material only doubled upon itself along a medial folding line parallel to a pair of opposite side margins of the blank, the respective opposite ends of the mask being provided with handles integrally formed from said thermoplastic sheet material to encircle the ears of a user, said handles being defined by separation of strips of the respective end portions of the blank from the body of the blank along cutting lines which extend from said folding line of the doubled over blank toward the opposite side margins parallel to and spaced from the respective end margins, the two thicknesses of the body of said doubled over blank also being thermally welded together along two separate lines extending angularly from said folding line to respectively intersect each of said first-mentioned cutting lines, the material between said cutting lines and thermal welding lines being removed whereby, said blank when opened forms a concave surface to cover the nose and mouth.

10. The invention defined in claim 9, wherein a plurality of said face masks are temporarily joined to each other at respective opposite ends of the blanks by lines of weakening provided in said thermoplastic material.