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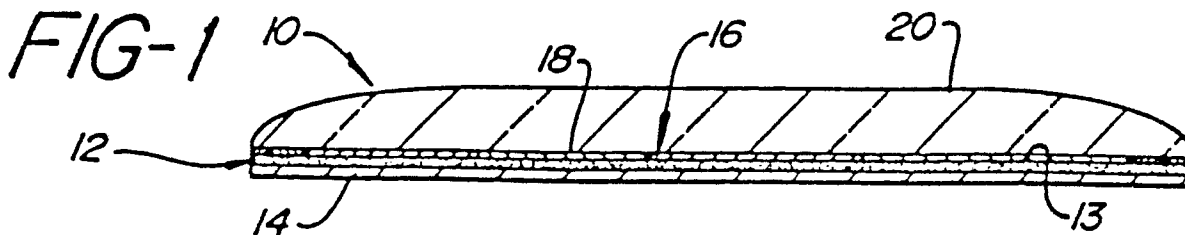
(71) Applicant: **THE D.L.AULD COMPANY**
1209 North Fifth Street P.O. Box 8459
Columbus Ohio 43201(US)

(72) Inventor: **Waugh, Robert E.**
c/o The D.L. Auld Company P.O. Box 8459
Columbus Ohio 43201(US)
Inventor: **Nannig, Urban R.**
c/o The D.L. Auld Company P.O. Box 8459
Columbus Ohio 43201(US)
Inventor: **Rockwood, Clyde R.**
c/o The D.L. Auld Company P.O. Box 8459
Columbus Ohio 43201(US)

(74) Representative: **Warren, Anthony Robert et al**
BARON & WARREN 18 South End Kensington
London W8 5BU(GB)

(54) **Substrateless decorative emblem and method of making the same.**

(57) A method of making a substrateless decorative emblem (10) is provided. A first surface (13) of a layer of pressure sensitive adhesive (12) is treated to render that surface at least partially tack-free. The surface (13) is then decorated, and a plastic layer (20) is coated over the decorated surface to form the emblem (10).



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SUBSTRATELESS DECORATIVE EMBLEM AND METHOD OF MAKING THE SAME

This invention relates to decorative emblems and the like and methods for their manufacture, and more particularly to capped emblems having decorative indicia printed directly onto an adhesive layer and/or a decorative embedment placed on the adhesive layer and methods for their manufacture.

Decorative plaques and emblems are widely used throughout a number of industries, including the automotive and appliance industry. Many of these decorative emblems are formed on metal or plastic substrates onto which a liquid plastic resin is cast. The plastic resin cures to form a convex or positive meniscus-shaped cap over the substrate which gives a lens effect to the printed decorative indicia on the substrate. Such emblems are conventionally adhered to their intended surface, such as an automobile or appliance body, utilizing a pressure sensitive adhesive coated on the back of the emblem substrate.

For example, Waugh, U.S. Patent No. 4,100,010, discloses a method for the manufacture of plastic-capped decorative emblems which utilizes a flat, decorated foil substrate which can be either metal, paper, or plastic. Onto this decorated foil substrate, a liquid plastic resin is cast which flows to the peripheral side walls of the substrate and forms a positive meniscus or lens cap over the substrate. Likewise, Reed, U.S. Patent No. 4,259,388, also describes a plastic-capped medallion which is formed on a flexible plastic substrate. Both Reed and Gilleo et al, U.S. Patent No. 4,409,264, describe the use of a non-wetting material or so-called low surface energy dams to confine the flow of liquid plastic resin during casting.

However, the need for thin metal or plastic substrates to provide a surface for printing the decorative indicia and for supporting the cap poses a number of problems in the manufacture of such decorative emblems. The cost of such substrates represents a significant portion of the cost of the emblem. Typically, such substrates have an adhesive backing and are carried on a release liner or other support sheet. The individual emblems are formed by a die cutting operation, termed "kiss cutting", where the substrate is cut by the die but the underlying support sheet is not. A considerable portion of the substrate material must then be stripped off of the support sheet ("weeding") and discarded as scrap. This weeding operation introduces a significant labor and time expense to the manufacturing process in addition to producing large amounts of scrap.

Such die cutting operations, as well as embossing of the substrate, may also cause deformation of the substrate or a burring of the edges of the cut out substrates. Such deformation and burred edges introduce problems during the casting of liquid plastic resin onto the substrate and may cause overflow of the resin over the edges of the substrate. Also, kiss cutting sometimes accidentally results in partial severing of the underlying support sheet. If that support sheet is held down by vacuum as in Waugh patent no. 4,100,010, then, during resin casting the vacuum may "pull at" the resin through the severed support sheet, causing overflow.

Finally, deformation and curling of the substrate during curing of the plastic resin may also occur because of differences in expansion and contraction rates of the plastic resin and substrate material. For example, as the plastic resin cures, some shrinkage may occur which causes substrate curling.

Also known generally is the concept of encapsulating an article in plastic by casting, partially curing, inserting the article, casting again, and completing the cure. For example, in Brody, U.S. patent No. 3,660,211, the article is a metal foil of a multicolored iridescent body embedded between two layers of a polyester resin; in Smith, U.S. Patent No. 3,312,197, the article is a facsimile of a coin embedded between a transparent and an opaque, colored plastic resin material; and in Miori, U.S. patent No. 4,067,947, the article is embedded between two different layers of plastic resin material. Also, Bree, U.S. patent No. 4,481,160, discloses a method of encapsulating a decorative foil shape in a preformed bezel by casting a plastic resin material over the foil shape.

However, previous encapsulation processes resulted in relatively thick inflexible articles and involved several manufacturing steps which were relatively costly. Conventional plastic-capped decorative emblems require a self-supporting substrate of metal, paper, or plastic onto which the plastic resin is cast. The cost of such substrates represents a significant portion of the cost of the emblem. Additionally, many procedures form the emblems using die cutting operations which results in the waste of large portions of the substrate material which is discarded as scrap.

Accordingly, the need exists in the art for a decorative emblem and method of manufacture which avoids the problems of the prior art and yet which is relatively inexpensive to manufacture.

The present invention provides a plastic-capped decorative emblem and process of manufacture in which decorative indicia are printed directly onto an adhesive layer and/or a decorative embedment is placed on the adhesive layer. According to one aspect of the present invention, a substrateless decorative emblem is made by the steps of providing a layer of a pressure sensitive adhesive on a support sheet. The pressure sensitive adhesive surface is treated to render the upper surface of the adhesive substantially tack free and suitable for silk screening or otherwise printing directly on the treated upper surface. In addition, in one embodiment a raised annular boundary may be formed on one surface of the pressure sensitive adhesive to form at least one enclosed decorative area thereon either before or after the pressure sensitive adhesive surface is then treated to render the upper surface of the adhesive tack free.

In another embodiment, a series of emblem designs are formed on the treated upper surface as a decorative surface without formation of a raised annular boundary.

In yet another embodiment, a preformed decorative embedment is placed on the upper surface of the adhesive to both produce a decorative surface and render that portion of the adhesive surface tack free.

A measured amount of a curable liquid plastic resin may be cast onto the decorated surface. When a raised edge annular boundary is used, the resin forms a positive meniscus over the decorated area without overflowing the raised annular boundary. The resin is then cured and hardened to provide a substrateless decorative emblem having a plastic lens cap. Alternatively, when no raised annular boundary is used, a relatively flat cap may be applied by flow coating, spraying or laminating. In that instance, a die cutting operation can be used to separate individual emblems from the assembly.

Preferably, the article assembly also includes a release liner. Thus, a preferred method of forming the decorative article of the present invention includes providing a layer of pressure sensitive adhesive supported on a sheet of release liner. The adhesive may be applied to the release liner in a conventional manner such as by spraying or roll coating. A plurality of article designs may be formed on the adhesive layer by suitable silk-screening techniques or by applying a series of decorative embedments. After the articles have been formed and the plastic caps applied, this sheet now bearing a plurality of articles, may be shipped to the user where the individual article may be readily peeled off of the release liner and is ready to be adhered to an intended surface such

as the surface of an automobile body or appliance. When a raised boundary is used, that boundary, which may be formed by the cut edges of a cover sheet, acts as a knife edge of sorts such that when the emblem is peeled from the assembly, the underlying adhesive will break sharply at those edges resulting in an emblem having crisp edges. A die cutting operation can also be used to separate individual emblems (with release liner attached) from the overall assembly.

The present invention thus provides a decorative emblem without the need for the metal, plastic, or paper substrate required by prior art emblems and without the concomitant problems associated with forming and curing such emblems. Accordingly, it is an object of the present invention to provide a substrateless decorative emblem and process of manufacture. This, and other objects and advantages of the invention, will become apparent from the following detailed description, the accompanying drawings, and the appended claims.

Fig. 1 is a cross-sectional view of an emblem produced by the process of the present invention--as die cut from the assembly;

Fig. 2 is an exploded perspective view in partial section of the decorated layer of pressure sensitive adhesive with cover sheet thereon;

Fig. 3 is a cross-sectional view of the emblem prior to casting of the plastic resin;

Fig. 4 is a cross-sectional view of the emblem assembly the plastic resin has been cast;

Fig. 5 is a cross-sectional view of an emblem produced by the process of the present invention--as peeled from the assembly of Fig. 4;

Fig. 6 is an exploded perspective view in partial section of an alternative embodiment of the present invention;

Fig. 7 is a cross-sectional view of an article produced by that alternative embodiment--as die cut from the assembly of Fig. 6;

Fig. 8 is a cross-sectional side view of a plastic-capped decorative article produced by another alternative embodiment of the present invention; and

Fig. 9 is a cross-sectional side view of a plastic-capped decorative article having a detachified adhesive surface which has been decorated, produced by another embodiment of the process of the present invention.

Figs. 1 and 5 illustrate in cross section substrateless decorative emblems made in accordance with the process of the present invention. Fig. 1 illustrates the situation which exists when the emblem is die cut from the assembly and the release liner remains on the back of each individual emblem until the emblem is put in use. Fig. 4, then, illustrates the situation which exists when a plurality of emblems are located on the release liner until

peeled off, producing an emblem ready for use as shown in Fig. 5. Emblem 10 has a layer of pressure sensitive adhesive 12 having an upper and a lower surface. Pressure sensitive adhesive 12 can be any of a number of commercially available adhesives such as, for example, an acrylic pressure sensitive adhesive. The lower surface of adhesive 12 is adhered to a release liner 14. Liner 14 is preferably coated with a release material such as a silicone-based polymer which permits ready removal of emblem 10 when it is desired to adhere the emblem to an intended substrate such as an automobile body, appliance, or the like.

The upper surface 13 of adhesive 12 has been treated, as explained in further detail below, to render it tack free. As shown in the figures, a non-tacky surface 16 covers the upper surface of adhesive 12. Non-tacky surface 16 is preferably a clear lacquer one, but may also be a particle layer (such as talc or mica). Alternatively, a thin bright metallic layer, approximately 0.0001 inch thick or less, may be applied by hot stamping or spray metallizing, and serves to provide a bright or colored background for indicia 18 printed thereon. Indicia 18 may be any desirable decoration including words, numbers, symbols, pictures, or combinations thereof. Adhesive 12 may itself be colored, by any number of means, to serve as a background for indicia 18.

In the preferred embodiment, a cured, clear plastic lens cap 20 overlies and encapsulates indicia 18. As can be seen from Figs. 1 and 5, the edges of lens caps 20 are contiguous with the layer of adhesive 12, and form a positive-shaped meniscus. This meniscus contributes to the lens effect of cap 20, enhancing the beauty of the printed indicia 18 while at the same time providing a tough, weather-resistant protective covering. Cap 20 may be formed of any castable plastic resin which is curable to a clear, tough compound. Preferably, a two-part polyurethane resin is used; although, other castable plastics may also be used. Such resins may be cured by either heat or exposure to ultraviolet or other radiation.

Referring now to Figs. 2, 3, and 4, the substrateless decorative emblem of the present invention is preferably produced by the following steps. Initially, a layer of pressure sensitive adhesive 12 is coated onto release liner 14. Adhesive 12 may be applied to liner 14 by any suitable means such as by spraying or roll or dip coating. Preferably, adhesive layer 12 is applied in a thickness of from between about 0.002 to 0.010 inches.

A raised annular boundary is formed on the upper surface 13 of adhesive 12 forming an enclosed area thereon. The upper surface 13 is then treated, as described in further detail below, to render it tack free and suitable for printing directly on

the treated surface. In a preferred embodiment of the invention as illustrated in Figs. 2, 3, and 4, the raised annular boundary is formed by laminating a cover sheet 22 over adhesive surface 12.

As shown, one or more areas 24 of cover sheet 22 have been removed, such as by die cutting, to leave the corresponding area or areas of adhesive 12 exposed. The periphery of cut out areas 24 of cover sheet 22 correspond to the final shape of emblems 10 which are produced. Areas 24 may be circular, oval, square, rectangular, or any other desired shape. Cover sheet 22 may be of metal, cardboard, paper, or plastic. However, it is preferred that cover sheet 22 be of a nonabsorbing material or be treated to be nonabsorbing. Suitable plastics include styrene or polyester having a thickness of approximately 0.004 to 0.008 inches.

In a preferred embodiment, cover sheet 22 is treated to render its surface substantially nonwetting to the liquid plastic resin which is to be cast. Suitable treating agents, which may be applied to cover sheet 22 either prior to or after areas 24 have been removed, include fluorocarbon compounds such as polytetrafluoroethylene and silicones. A preferred treating agent for a polyester cover sheet comprises a mixture of polytetrafluoroethylene and Hypalon (trademark of duPont). Hypalon, which is a chlorinated rubber material, improves the adhesion of the treating agent to the polyester substrate and increases the ductility of the coating. The treating agent may be applied in any suitable manner such as by screen printing, spraying, or roll coating.

The exposed areas of adhesive 12 are then treated to render the upper surface 13 of the adhesive tack free and suitable for printing indicia 18 directly thereon. The lower surface of adhesive 12 remains tacky so that the finished article may be adhered to an intended surface. The treatment of upper surface 13 of adhesive 12 to render it tack free may be accomplished by a number of different procedures. Preferably, upper surface 13 may be overcoated with a clear or colored lacquer which forms non-tacky layer 16 and seals the upper surface of the adhesive. Alternatively, upper surface 13 may be dusted with a fine powder of inert particles such as mica.

In yet another alternative procedure, a bright metallic surface may be applied to upper surface 13. This can be accomplished by applying a bright metal hot stamp foil to upper surface 13 by means of a pressure roll or the like. The foil is accompanied by a carrier film which is then stripped away leaving bright metal non-tacky surface 16. A metallic non-tacky surface may have a silver or gold color, or other colors may be used as desired. The overall thickness of a bright metallic surface is desirably 0.001 inches or less.

Once upper surface 13 of adhesive layer 12 has been rendered tack free, any suitable indicia 18 may be printed directly thereon. These indicia may include letters, numbers, words, symbols, pictures, or other decoration. The printing may be accomplished by any of a number of printing techniques which are known in the art, including silk screen printing. Adhesive layer 12 may itself be colored by the addition of suitable pigment or dye to the composition. If layer 12 is already colored, the need for printing a colored background is eliminated. Likewise, if layer 12 is clear, areas of the upper surface may be left undecorated by indicia 18 so that when applied to a substrate (such as a chrome plated surface) the color or brightness of the substrate shows through in those areas. After printing, a liquid plastic resin is cast onto the decorated surface and flows to the sides of cover sheet 22 which define open area 24. In the preferred embodiment, the amount of liquid resin applied is controlled so that the resin forms a positive meniscus but does not overflow onto the cover sheet 22. As mentioned, it may also be controlled so as to produce a relatively flat cap should the lens not be desired. Also as preferred, the nonwetting fluorocarbon coating which has previously been applied aids in controlling the flow of plastic. Apparatus suitable for performing the casting operation is more fully described in Waugh, U.S. Patent No. 4,100,010, the disclosure of which is hereby incorporated by reference.

The plastic resin utilized is preferably a clear thermosetting material which is resistant to abrasion and impact. A number of plastics can be used for this purpose, but one which is particularly advantageous is an impact-resistant polyurethane. Polyurethanes useful in the practice of the present invention are two-part compositions which are the reaction product of a glycol, such as a polyether or polyester glycol, and an aliphatic diisocyanate.

The cast plastic resin is cured or otherwise hardened to form a lens cap 20. The resin is preferably cured by heating or ultraviolet radiation. However, depending on the particular composition utilized, other methods such as radio frequency heating, hot air drying, or even the heat of an exothermic curing reaction may be utilized.

The process described above is preferably used to form a sheet-sized assembly having a plurality of emblems on it. That assembly may, then, be sent in sheet form to the user. The user will peel individual emblems from the assembly at the time of use. As mentioned previously, the edges of cover sheet 22 surrounding each individual emblem act as a knife edge of sorts to sharply cut the adhesive layer as the capped, decorated emblem, as shown in Fig. 5, is separated from the

release liner. The polyurethane cap has firmly bonded to the indicia bearing adhesive and the capped emblem is, thus, cleanly separate from the assembly by this peeling procedure.

In an alternative embodiment, individual emblems may be die-cut from the assembly. In that instance, it is not necessary to use a cover sheet 22 and other methods may be used to form the raised boundary. These include the methods taught in Reed, U.S. Patent No. 4,259,388, and Gilleo, U.S. Patent No. 4,409,264, which are incorporated herein by reference. Likewise, a raised boundary may be formed by an embossing operation. In this embodiment, it is desirable to render the upper adhesive surface tack-free prior to formation of the raised boundaries. The remaining steps are, then, the same as in the preferred embodiment. After die cutting, the individual embodiment emblems will have the cross-section shown in Fig. 1.

In the embodiment shown in Fig. 7, article 30 has a layer of pressure sensitive adhesive 32 having an upper and a lower surface. Pressure sensitive adhesive 32 can be as previously described. The lower surface of adhesive 32 is adhered to a release liner 34.

The upper surface 33 of adhesive 32 has been treated, as explained in further detail above, to render it substantially tack free. As shown in the figures, a non-tacky surface 36 covers the upper surface of adhesive 32.

In one method of manufacture of the embodiment of Fig. 7, a plurality of individual decorated articles may be supported on a single larger sheet or web of release liner 34. Liquid plastic resin may then be cast, coated, sprayed, extruded or otherwise applied over the entire sheet or web. Such a procedure produces a relatively flat plastic cap over the entire sheet. Then, individual articles may be die cut, stamped out, or otherwise separated from the larger sheet. Thus, the individual articles may be kiss-cut (i.e., cut through to release liner 34) and left on the larger sheet. In this manner, they may be shipped and sold to ultimate users who may then readily peel individual articles from the release liner 34 for adherence to intended substrates.

Referring now to Fig. 6, another method of manufacture is shown. Initially, a layer of pressure sensitive adhesive 32 is coated onto release liner 34. The adhesive 32 is then treated to render the upper surface 33 of the adhesive substantially tack free and suitable for printing indicia 38 directly thereon. The lower surface of adhesive 32 remains tacky so that the finished article may be adhered to an intended surface. Once upper surface 33 of adhesive layer 32 has been rendered substantially tack free, any suitable indicia 18 may be printed directly thereon. Adhesive layer 32 may itself be

colored by the addition of suitable pigments or dyes to the composition. If layer 32 is already colored, the need for printing a colored background is eliminated. Likewise, if layer 32 is clear, areas of the upper surface may be left undecorated by indicia 38 so that when applied to a substrate (such as a chrome plated surface) the color or brightness of the substrate shows through in those areas. After printing, a clear or colored plastic sheet 40 is laminated to the assembly. Any of a number of different plastics may be utilized depending upon the effect desired, and the intended environment for the article. To insure that the plastic layer adheres permanently to the decorated assembly, the lower surface of layer 40 may have an adhesive thereon to bond to the assembly. Again, individual articles 30 may be die cut, stamped out, or otherwise separated from a larger sheet to produce individual articles as shown in Fig. 6.

Figs. 8 and 9 illustrate, in cross-section, plastic-capped adhesive articles produced by yet other alternative embodiments of the present invention. Article 50 has a layer of pressure sensitive adhesive 52 having a first upper surface 53 and a second lower surface. The lower surface of adhesive 52 is adhered to a release liner 54 or other releasable support surface. Decorative embedment 55 is then positioned on adhesive 52. Embedment 55 is illustrated, for purposes of description, as a relatively thin, flat foil shape. However, embedment 55 may take any convenient form. Alternatively, a plurality of embedments may be positioned on a single article. As illustrated, the embedment does not extend to the peripheral edges of the article. Embedment 55 may be made of metal, paper, plastic, or the like. Preferably, it is prepared from an aluminum or aluminum alloy sheet which is brushed, decorated or printed by either a silk-screen or lithographic printing process, and then cut to size and desired shape. Optionally, embedment 55 may be embossed to yield a three-dimensional appearance. Preferably, the height of such an embossment is in the range of 0.01 inches.

As shown in Fig. 9, the adhesive 52 may then be treated to render the upper surface 53 of the adhesive substantially tack free and suitable for printing indicia 58 directly thereon. The lower surface of adhesive 52 remains tacky so that the finished article may be adhered to an intended surface.

Once upper surface 53 has been treated and rendered substantially tack free, any suitable indicia 58 may be printed directly thereon. After embedment 55 has been positioned, either directly on adhesive 52 as shown in Fig. 8 or on decorated surface 56 as shown in Fig. 9, a curable liquid plastic resin is applied onto the structure. In one embodiment, where it is desired to form individual

articles separately, the liquid plastic resin is cast onto the structure and flows to the edges of the structure forming a positive-shaped meniscus. This meniscus contributes to the lens effect of the plastic cap which is formed when the resin is cured.

Alternatively, a relatively flat cap, such as is illustrated in Figs. 8 and 9, may be applied as previously described. Once plastic cap 60 has been cured, individual articles may then be die cut, stamped out, or otherwise separated from the larger sheet. In one embodiment, the individual articles may be kiss-cut (i.e., cut through to release liner 54) and left on the larger sheet or roll. In this manner, they may be shipped to ultimate users who may then readily peel the individual articles from release liner 54 for adherence to intended substrates.

While the invention has been described in detail and by reference to specific embodiments thereof, it will be apparent that numerous modifications and variations are possible without departing from the scope of the invention, which is defined in the appended claims.

Claims

1. A method of making a substrateless decorative emblem (10), characterized by the steps of:

a) providing a layer of pressure sensitive adhesive (12) having first surface (13),

b) treating said first surface (13) to render said first surface at least partially tack-free;

c) decorating said first surface (13) of said pressure sensitive adhesive (12), and

d) coating a plastic layer (20) over said decorated surface to form a substrateless decorative emblem (10).

2. The method of claim 1 wherein said decorating step includes the step of printing indicia (18) onto said first surface.

3. The method of claim 1 wherein said treating step includes the step of placing a preformed decorative embedment (55) on said first surface.

4. The method of claim 1 wherein said decorating step includes the step of placing a preformed decorative embedment (55) on said first surface - (13) of said adhesive layer (12).

5. The method of claim 1 wherein said coating step includes casting a curable liquid plastic resin onto said first surface of said adhesive layer and curing said resin to harden it.

6. The method of claim 5 including the step of forming a raised annular boundary (22) on said first surface (13) of said layer of pressure sensitive adhesive (12) to form an enclosed area thereon prior

to said coating step, and casting said liquid plastic resin so that it flows to the edge of said raised annular boundary.

7. The method of claim 1 wherein said coating step includes laminating a transparent plastic layer (40) to said first surface (13) of said pressure sensitive adhesive (12). 5

8. The method of claim 1 wherein said coating step includes extruding a transparent plastic layer - (40) onto said first surface of said pressure sensitive adhesive. 10

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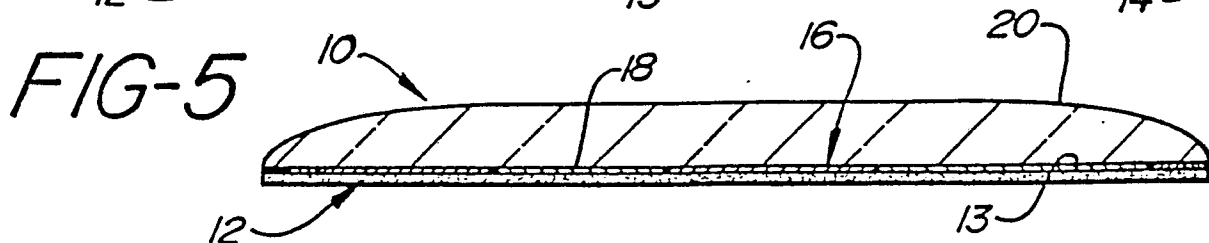
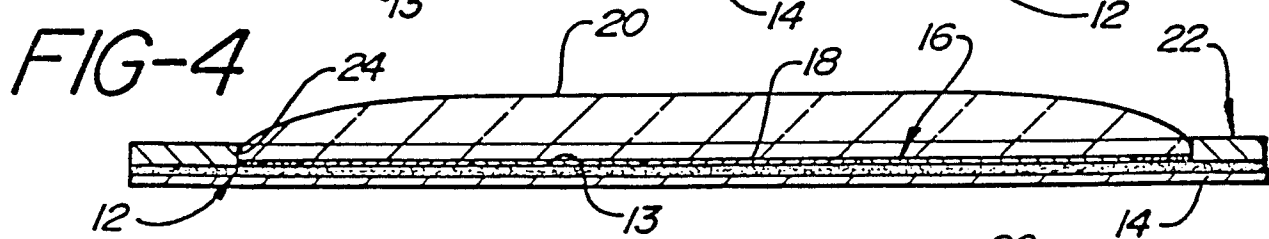
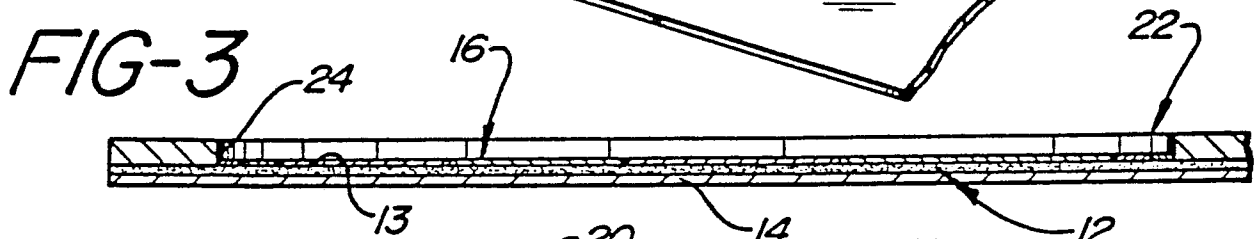
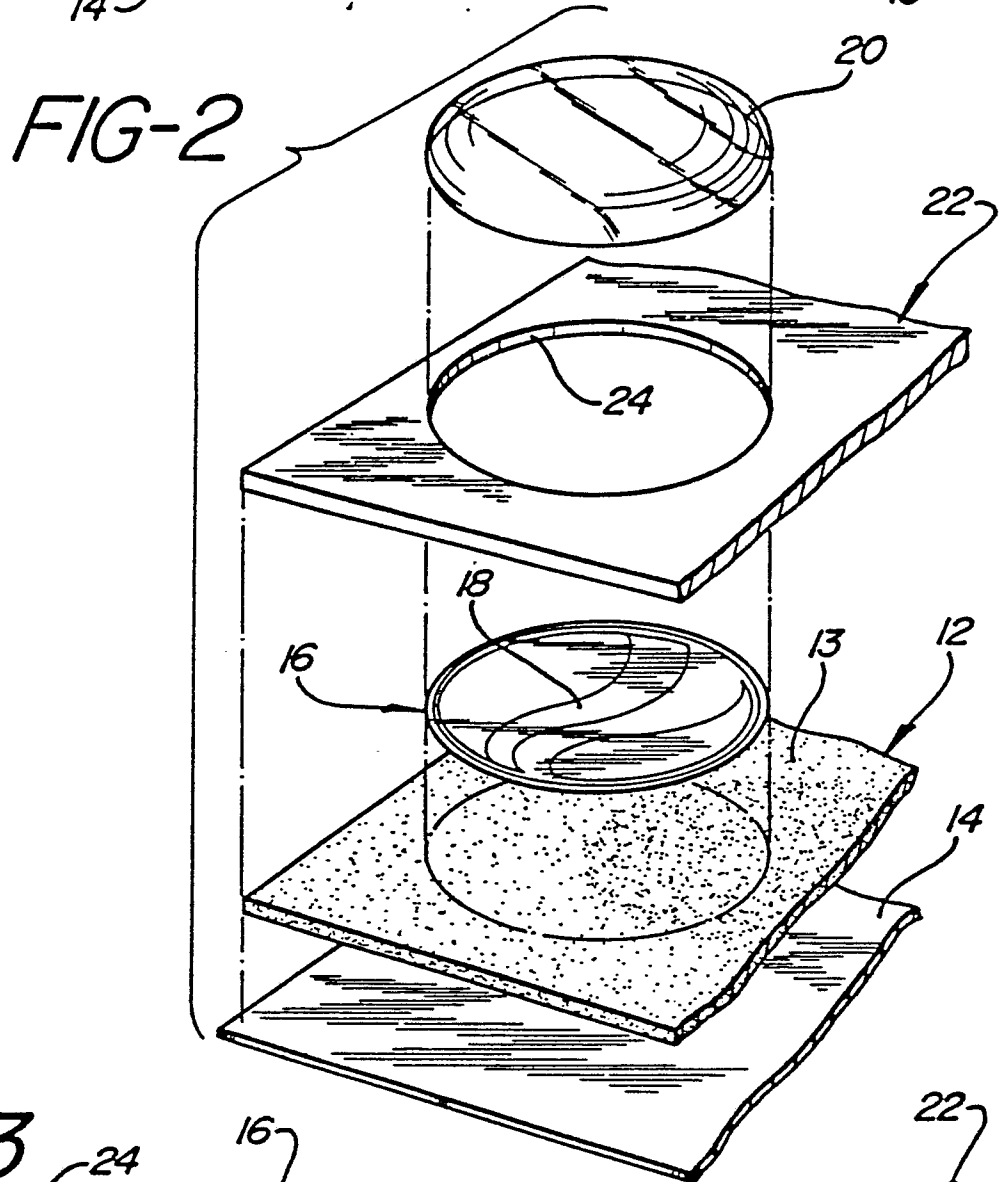
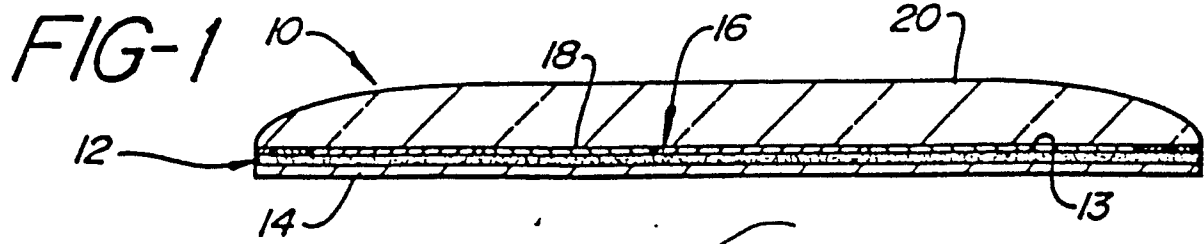


FIG-6

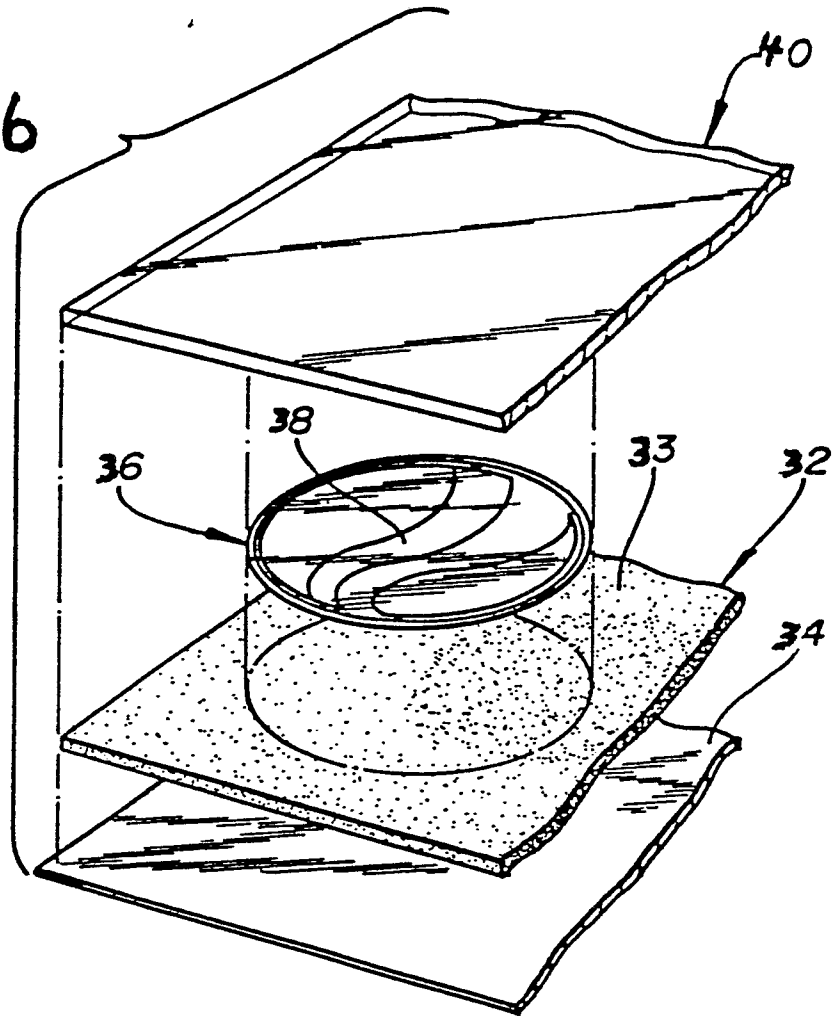


FIG-7

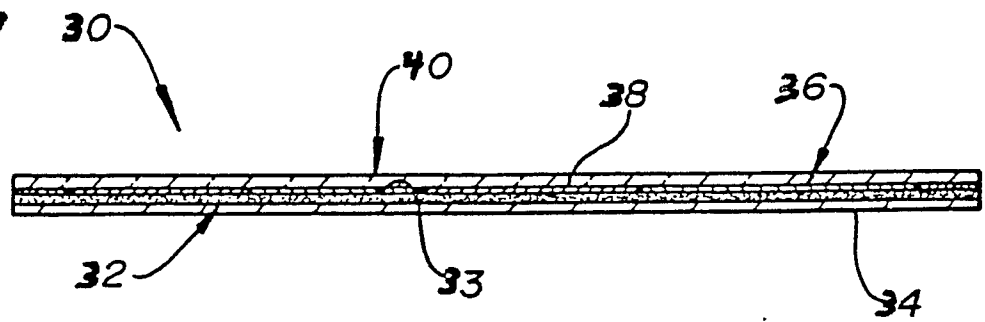


FIG-8

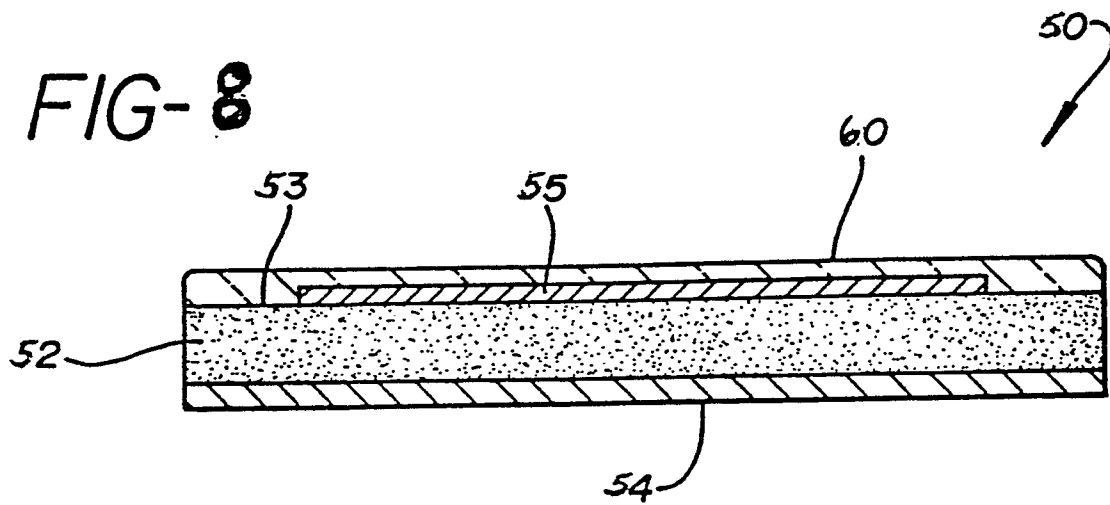


FIG-9

