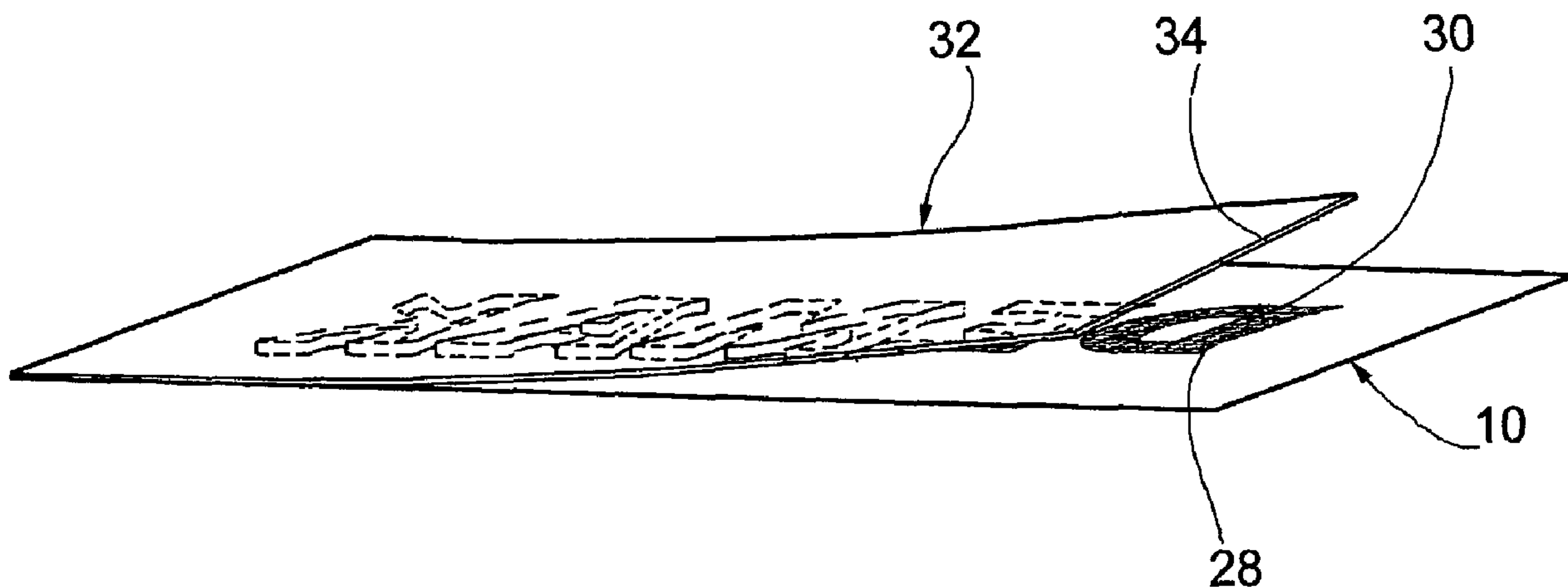




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(57) Abrégé/Abstract:

The method for producing one or more decorative elements, particularly insignia (38), comprises the stages of: thermoforming a multiple-layer film (10) comprising a first transparent protective layer (12), a second decorative layer (14) containing at least one pigment and a third supporting layer (16) of thermoformable plastics material, in such a way as to form recesses (28) in the film (10); pouring into the recesses (28) a hardening resin (30) which adheres to the third layer (16) of the film (10); applying a covering sheet (32) to the third layer (16) of the film (10) so as to enclose the poured resin (30) which undergoes a hardening process; and cutting the film (10) around the recesses (28), thus producing a stratified decorative element comprising a portion of the film (10), a layer of resin (30) and a portion of the sheet (32).

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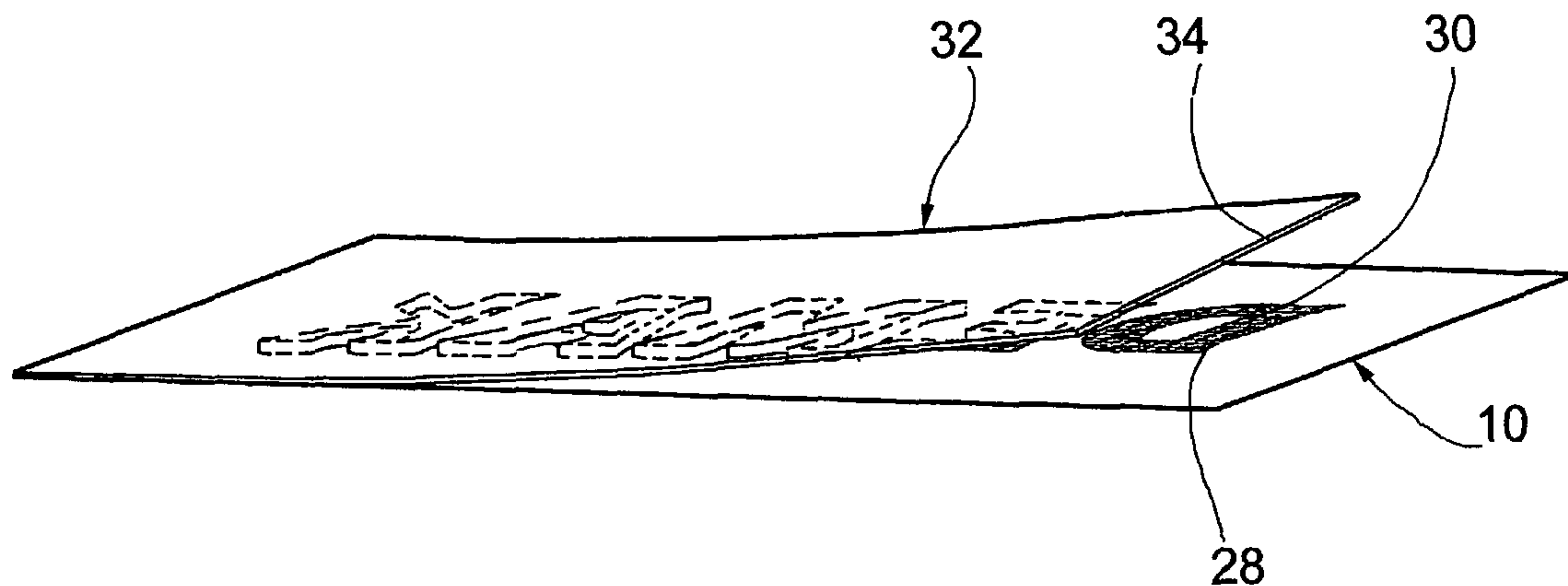
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(54) Title: METHOD FOR PRODUCING DECORATIVE ELEMENTS, PARTICULARLY INSIGNIA



(57) Abstract: The method for producing one or more decorative elements, particularly insignia (38), comprises the stages of: thermoforming a multiple-layer film (10) comprising a first transparent protective layer (12), a second decorative layer (14) containing at least one pigment and a third supporting layer (16) of thermoformable plastics material, in such a way as to form recesses (28) in the film (10); pouring into the recesses (28) a hardening resin (30) which adheres to the third layer (16) of the film (10); applying a covering sheet (32) to the third layer (16) of the film (10) so as to enclose the poured resin (30) which undergoes a hardening process; and cutting the film (10) around the recesses (28), thus producing a stratified decorative element comprising a portion of the film (10), a layer of resin (30) and a portion of the sheet (32).

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**METHOD FOR PRODUCING DECORATIVE ELEMENTS, PARTICULARLY
INSIGNIA**

Field of the Invention

The present invention relates to the production of decorative elements, particularly shiny insignia which can be applied to various articles, such as the bodywork of motor cars and motorcycles, domestic appliances, bicycles, boats and the like. Typical examples of these insignia are badges identifying the model, applied to the back of a motor car.

Background of the Invention

In a known method, a shiny insignia of this type is produced by a process which has two distinct¹ stages. In the first stage, a core having the desired profile is produced by the injection moulding of plastics material, for example ABS. In the second stage, this core is immersed in a chromium plating bath so that it is covered with a bright coating layer which imparts a shiny reflective appearance to it.

However, this known method has a number of drawbacks. This is because the execution of the injection moulding and chromium plating stages requires skills of markedly different kinds, which are rarely present in a single business. These stages are therefore typically executed in different locations, resulting in complications in terms of logistics and organization. The chromium plating stage also requires the use of chemical products which constitute a health risk, and the handling of these products therefore requires compliance with burdensome safety regulations, and their disposal in an environmentally compatible way is difficult in all circumstances. On the other hand, the stage of injection moulding requires the availability of moulds which can withstand the high pressures required by this kind of technology. These moulds are therefore very costly, making their preparation economically justifiable only in the case of large mass production.

Summary of the Invention

One object of the present invention is therefore to overcome the aforementioned drawbacks of the known art.

According to one aspect of the present invention there is provided method for producing one or more decorative elements, comprising the stages of: thermoforming a multiple-layer film comprising a first transparent protective layer, a second decorative layer containing at least one pigment, and a third supporting layer of thermoformable plastics material, so as to form at least one recess in the film, wherein the three layers are superimposed on each other; pouring into the at least one recess a hardening resin which adheres to the third layer of the film, the thermoformed film acting as a self-supporting vessel into which the hardening resin may be poured; applying a covering sheet to the third layer of the film so as to enclose the poured hardening resin, which undergoes a hardening process; and cutting the film around the at least one recess, thus producing a stratified decorative element comprising a portion of the film, a layer of resin and a portion of the sheet.

The method according to the invention has a series of stages which can easily be executed in a sequential way in a single installation, without the use of injection moulding and chromium plating methods. It is therefore easily applied, equally suitable for short and long production runs, inexpensive, and has virtually no environmental impact.

A further object of the present invention is a decorative element which can be produced by using the aforementioned method.

According to a further aspect of the present invention there is provided a stratified decorative element, the decorative

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element comprising a film layer, a layer of poured resin and a covering sheet layer superimposed on each other, the film layer containing at least a first transparent protective layer, a second decorative layer containing at least one pigment and a third supporting layer of plastics material, wherein the first, second and third layers are superimposed on each other.

This decorative element has the advantageous property of being highly flexible. It can therefore be adapted to curved surfaces at the time of its application, without having to be produced with a corresponding specified curvature in advance.

By contrast, the decorative elements of the known art are markedly rigid, and must already have a corresponding curved profile before they are applied to curved surfaces.

Brief Description of the Drawings

Further advantages and characteristics of the invention will be made clear by the following detailed description, provided by way of example and without restrictive intent, with reference to the attached drawings, in which:

Figures 1 to 12 are schematic illustrations of successive stages of a method for producing decorative elements according to the invention, including

Figure 1 which illustrates a multiple-layer film used in the method;

Figure 2 illustrates a holder into which a portion of the multiple-layer film is inserted;

Figure 3 illustrates the holder in a closed position;

Figure 4 illustrates the holder being heated;

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Figure 5 illustrates the holder being clamped between a die and a matrix for thermoforming;

Figure 6 illustrates the thermoformed portion of the multi-layered film showing the formed recesses;

Figure 7 illustrates a subsequent stage where a hardening resin is poured into the formed recesses;

Figure 8 illustrates the thermoformed film after the hardening resin is poured;

Figure 9 illustrates the step of applying a covering sheet to the multi-layered film;

Figure 10 illustrates the multi-layered film and resin covered by the covering sheet;

Figure 11 illustrates the step of cutting the film around the various recesses, and

Figure 12 illustrates an example of insignia produced by the method of the present invention.

Detailed Description of the Preferred Embodiment

In a method for producing decorative elements, particularly insignia, the starting material (Fig. 1) is a multiple-layer film 10 comprising a first transparent protective layer 12, a second decorative layer 14 containing one or more pigments, and a third supporting layer 16 of thermoformable plastics material.

The first transparent protective layer 12 can consist, for example, of polyester, polyvinylidene fluoride or poly(meth)acrylate. The second layer 14 contains, for example, metallic pigments, while the third layer 16 can consist of a material such as ABS or polyurethane. The metallic pigments, preferably of the aluminium and/or magnesium type, of the second layer 14 give the film 10 a brilliant reflective appearance, a satin appearance, or any other known type of metallized appearance. However, it is also possible to use non-metallic pigments which give the film a coloured or patterned appearance, for example by reproducing a carbon fibre effect. The total thickness of the film 10 can typically be in the range from 200 to 500 μm .

A rectangular portion of the multiple-layer film 10 described above is inserted (Fig. 2) into a holder formed by two substantially rectangular frames 18 hinged in a book-like way on one longer side 20. The two frames 18 are then closed on to each other (Fig. 3), thus securing the portion of film 10 along its perimeter. The film is then heated (Fig. 4) to a temperature preferably in the range from 150 to 200°C by exposing it to the radiation of a lamp 22, and it is then (Fig. 5) clamped between a die 24 and a matrix 26 having, respectively, projections and recesses of the desired shape, so that it is thermoformed. The thermoforming produces a plurality of recesses 28, whose shape corresponds to that of the insignia to be produced, in the portion of film 10 (Fig. 6). In Figure 6, the recesses 28 are shown as having the

shape of the letters making up the word "DEMAK". Clearly, the shapes of the recesses could all be identical to each other and/or could be different from the shapes of letters of the alphabet, and there could be virtually any number of recesses, or only one of them, thus enabling a single large insignia to be produced.

In a subsequent stage of the operation (Fig. 7), a hardening resin 30 - typically of the polyurethane type - is poured into the recesses 28, so that it fills them and adheres to the third layer 16. The thermoformed film 10 (Fig. 8) is strong and substantially self-supporting, and therefore does not require dedicated supporting devices during the pouring stage, in which it acts as a containment vessel for the resin, or afterwards.

A covering sheet 32 is then applied (Fig. 9) to the third layer 16 of the film 10, so as to enclose the resin 30 in the various recesses 28 (see Fig. 10, in which the formed portion of film 10 is shown in an inverted configuration with respect to the preceding figures). Advantageously, the covering sheet 32 is of the double-sided adhesive type and has a protective liner 34 on the side facing away from the film 10, this liner being removable at the moment of application of the decorative element.

The resin 30 enclosed in the recesses 28 then undergoes a hardening process, which can be accelerated by heating in a kiln. This kiln heating can be carried out, if necessary, even before the application of the covering sheet 32 to the third layer 16 of the film 10.

Finally (Fig. 11), a cutting device such as a punching machine or a laser beam machine 36 is used to cut the film 10 around the various recesses 28 filled with resin 30 and

sealed by the sheet 32, thus producing (Fig. 12) insignia 38 of the desired shape. These insignia have a stratified structure comprising a layer of film 10, a layer of poured resin 30, and a covering sheet layer 32, superimposed on each other. In its turn, the layer of film 10 comprises a first transparent protective layer 12, a second decorative layer 14 containing at least one pigment, and a third supporting layer 16 of plastics material to which the poured resin 30 adheres.

Clearly, provided that the principle of the invention is retained, the details of construction and the embodiments can be varied widely from what has been described purely by way of example, without departure from the scope which has been claimed. In particular, the method according to the invention can theoretically be used to produce any number of decorative elements in any shape.

WHAT IS CLAIMED IS:

1. Method for producing one or more decorative elements, comprising the stages of:

thermoforming a multiple-layer film (10) comprising a first transparent protective layer (12), a second decorative layer (14) containing at least one pigment, and a third supporting layer (16) of thermoformable plastics material, so as to form at least one recess (28) in said film (10), wherein the three layers (12, 14, 16) are superimposed on each other;

pouring into said at least one recess (28) a hardening resin (30) which adheres to the third layer (16) of the film (10), said thermoformed film acting as a self-supporting vessel into which the hardening resin (30) is poured;

applying a covering sheet (32) to the third layer (16) of the film (10) so as to enclose the poured hardening resin (30), which undergoes a hardening process; and

cutting the film (10) around said at least one recess (28), thus producing a stratified decorative element comprising a portion of said film (10), a layer of resin (30) and a portion of said sheet (32).

2. A method according to claim 1, in which said first transparent protective layer (12) of the multiple-layer film (10) consists of a plastics material selected from the group consisting of polyesters, polyvinylidene fluoride and poly(meth)acrylates.

3. A method according to claim 1 or 2, in which said second layer (14) of the multiple-layer film (10) contains metallic pigments, which provides the film (10) a brilliant reflective or satin appearance.

4. A method according to claim 1, 2 or 3, in which said third layer (16) of the multiple-layer film (10) consists of a

material selected from the group consisting of ABS and polyurethane.

5. A method according to any one of claims 1 to 4, in which said multiple-layer film (10) has a thickness in the range from 200 to 500 μm .

6. A method according to any one of claims 1 to 5, in which said multiple-layer film (10) is thermoformed at a temperature in the range from 150 to 200°C.

7. A method according to any one of claims 1 to 6, in which a plurality of recesses (28) is formed in said film (10) in the thermoforming stage.

8. A method according to any one of claims 1 to 6, in which a single recess (28) is formed in said film (10) in the thermoforming stage.

9. A method according to any one of claims 1 to 8, wherein said hardening resin (30) is a polyurethane and is subjected to a heating stage to accelerate its hardening.

10. A method according to claim 1, in which a heating stage takes place before and/or after the stage of application of the covering sheet (32).

11. A method according to any one of claims 1 to 10, in which the covering sheet (32) includes a double-sided adhesive and has a protective liner (34) on the side facing away from the film, this liner being removable at the moment of application of the decorative element.

12. A method according to claim 1, in which the cutting stage is carried out by means of a punching machine.

13. A stratified decorative element, said decorative element comprising a film layer (10), a layer of poured resin (30) and a covering sheet layer (32) superimposed on each other, said film layer (10) containing at least a first transparent protective layer (12), a second decorative layer (14) containing at least one pigment and a third supporting layer (16) of plastics material, wherein said first, second and third layers are superimposed on each other.

14. A method according to claim 1, wherein the one or more decorative elements are insignia (38).

15. A method according to claim 3, wherein the metal pigments are aluminium or magnesium.

16. A method according to claim 1, wherein the cutting stage is carried out by means of a laser cutting machine (36).

17. A stratified decorative element according to claim 13, wherein the element is an insignia (38).

FIG.1

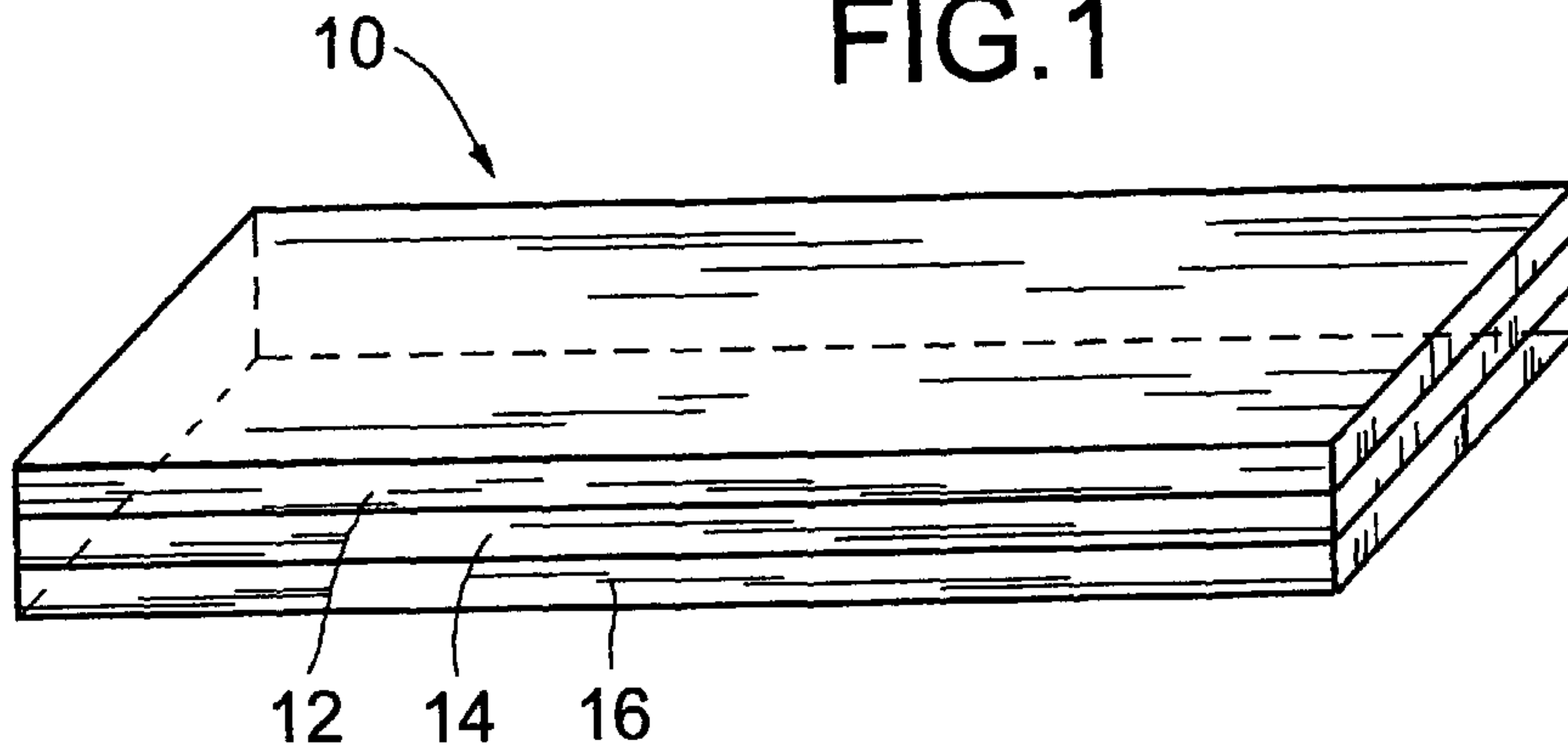


FIG.2

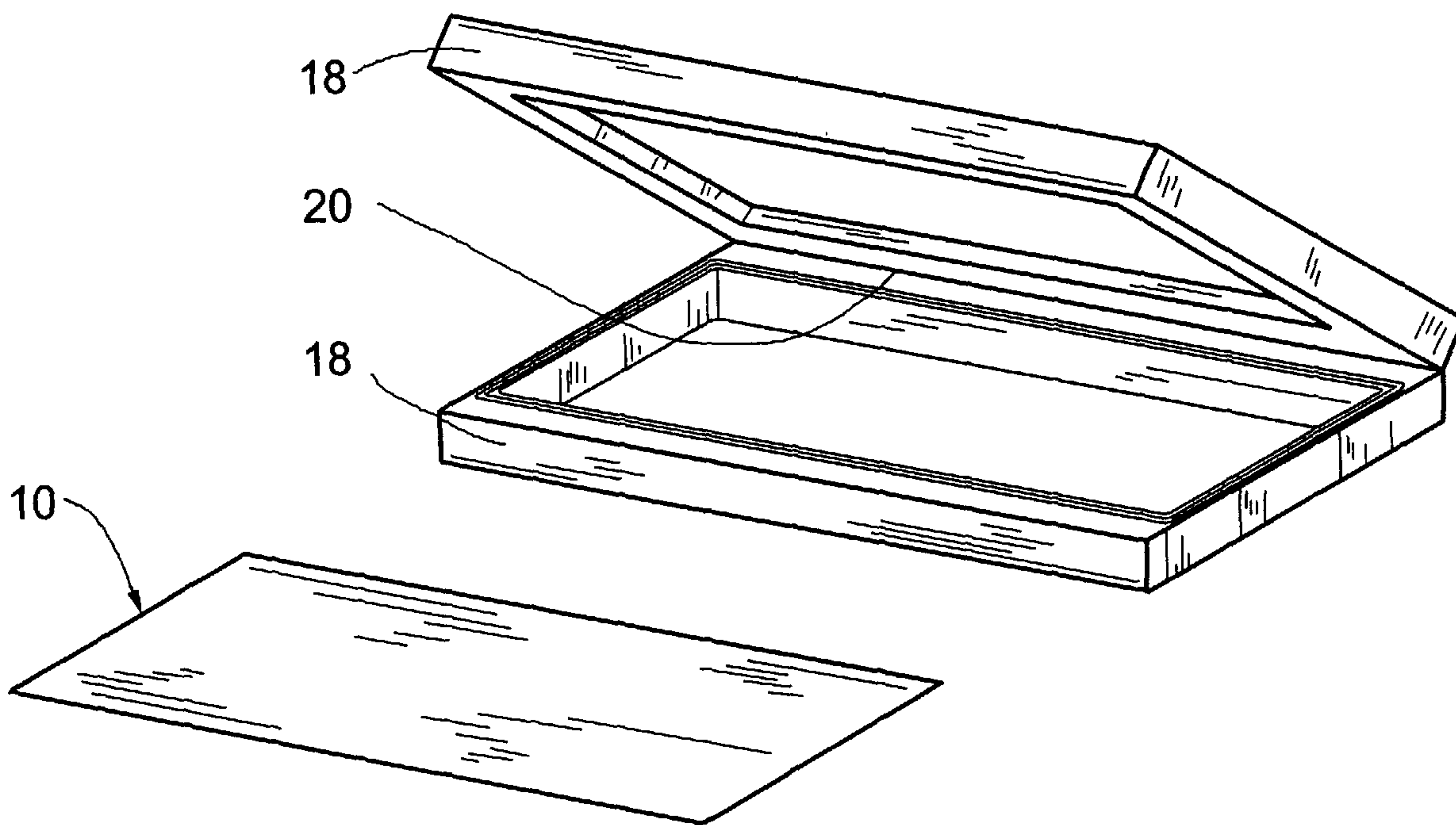


FIG.3

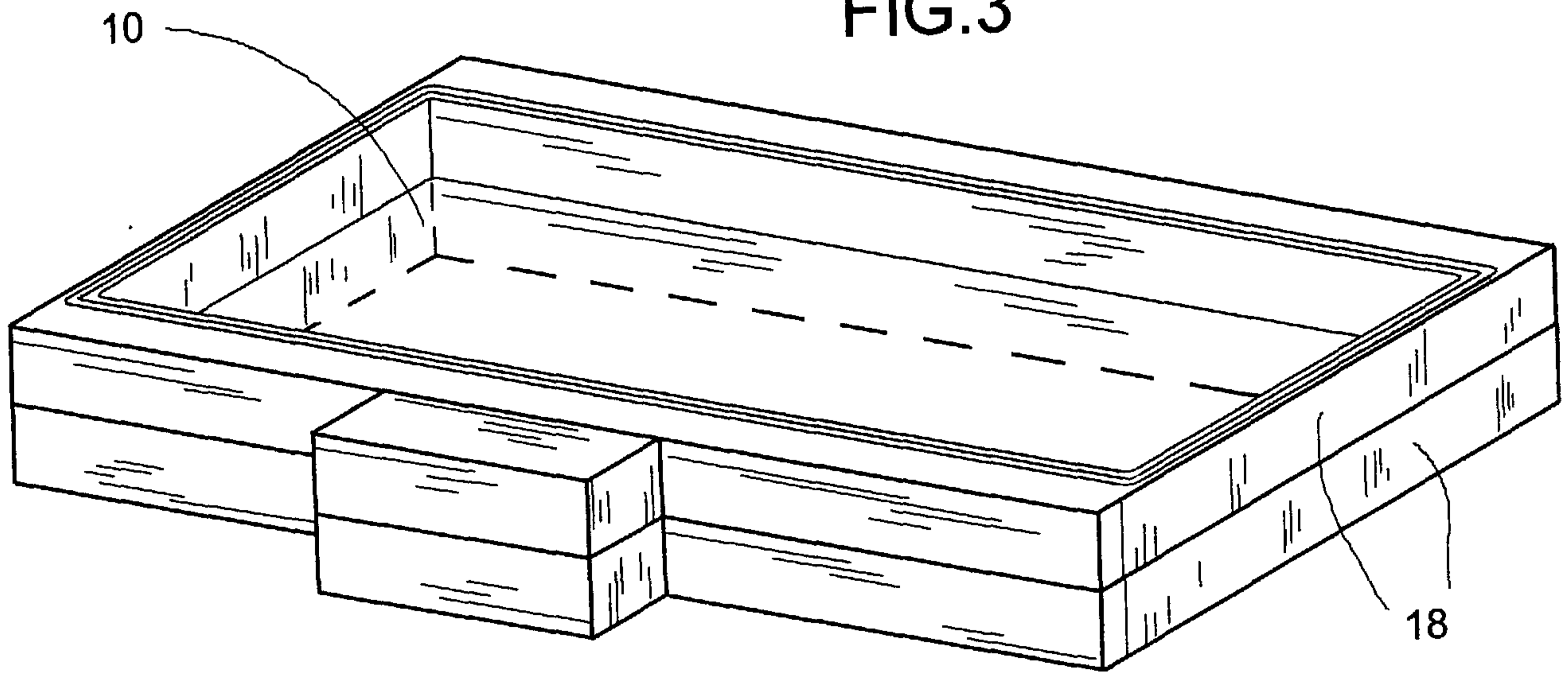


FIG.4

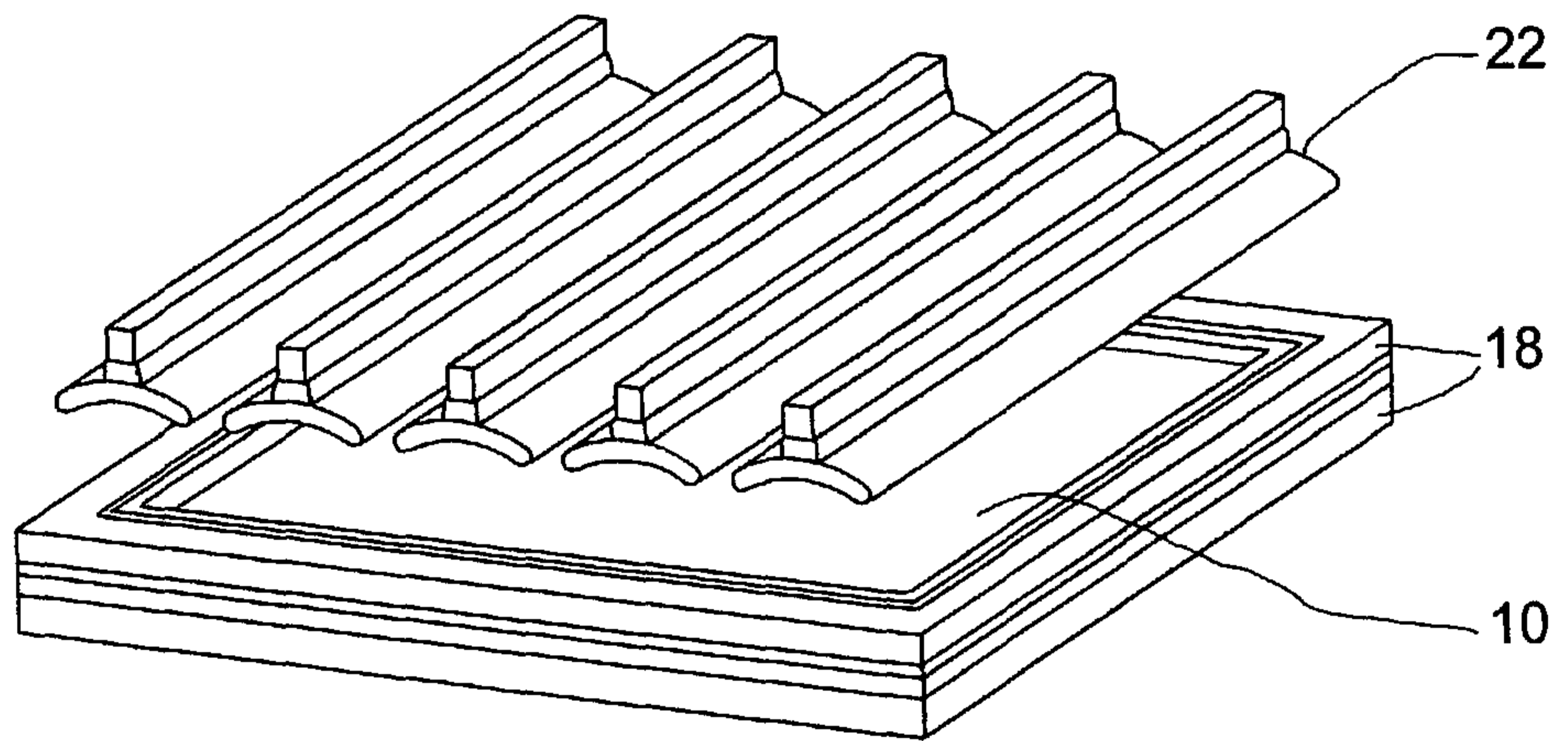


FIG.5

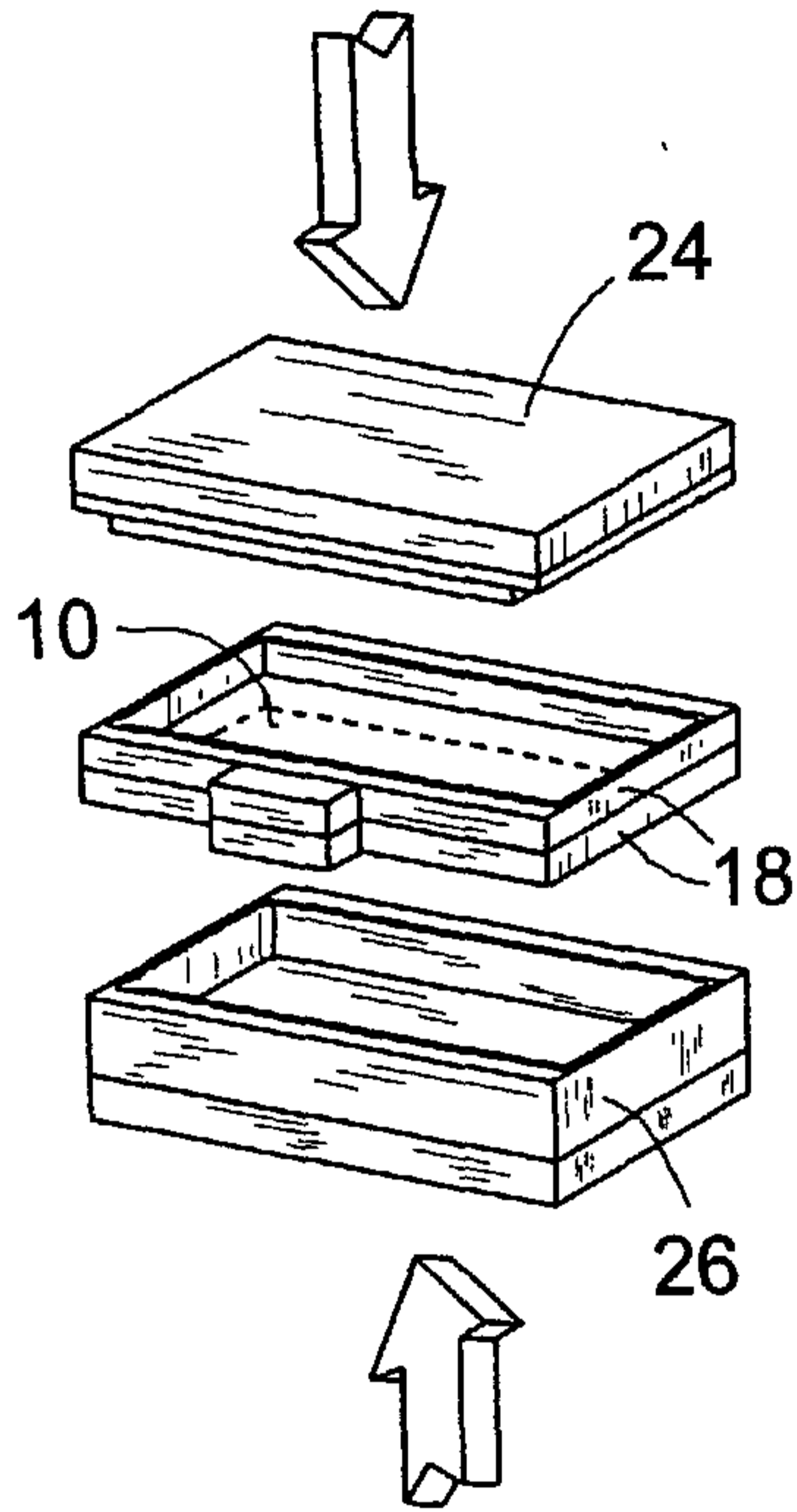


FIG.6

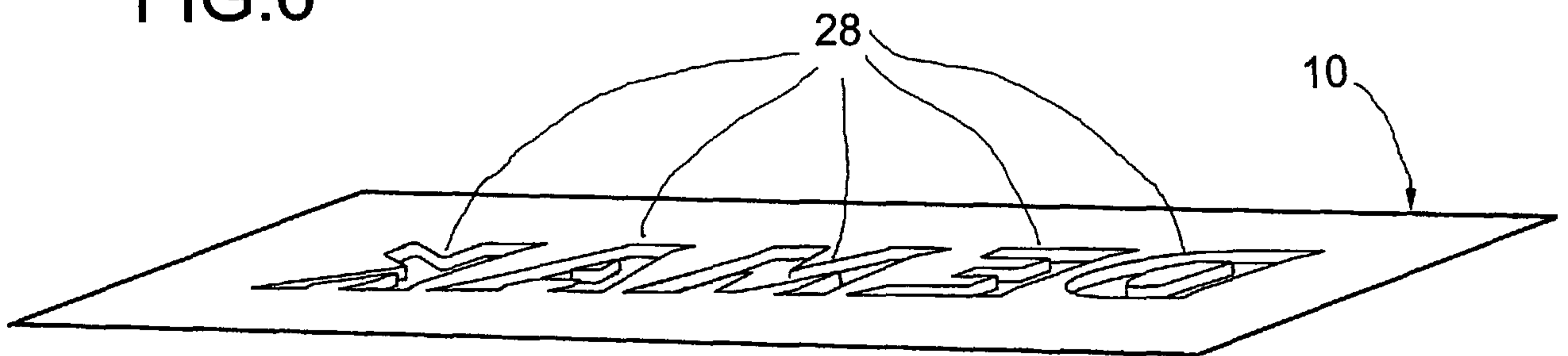


FIG.7

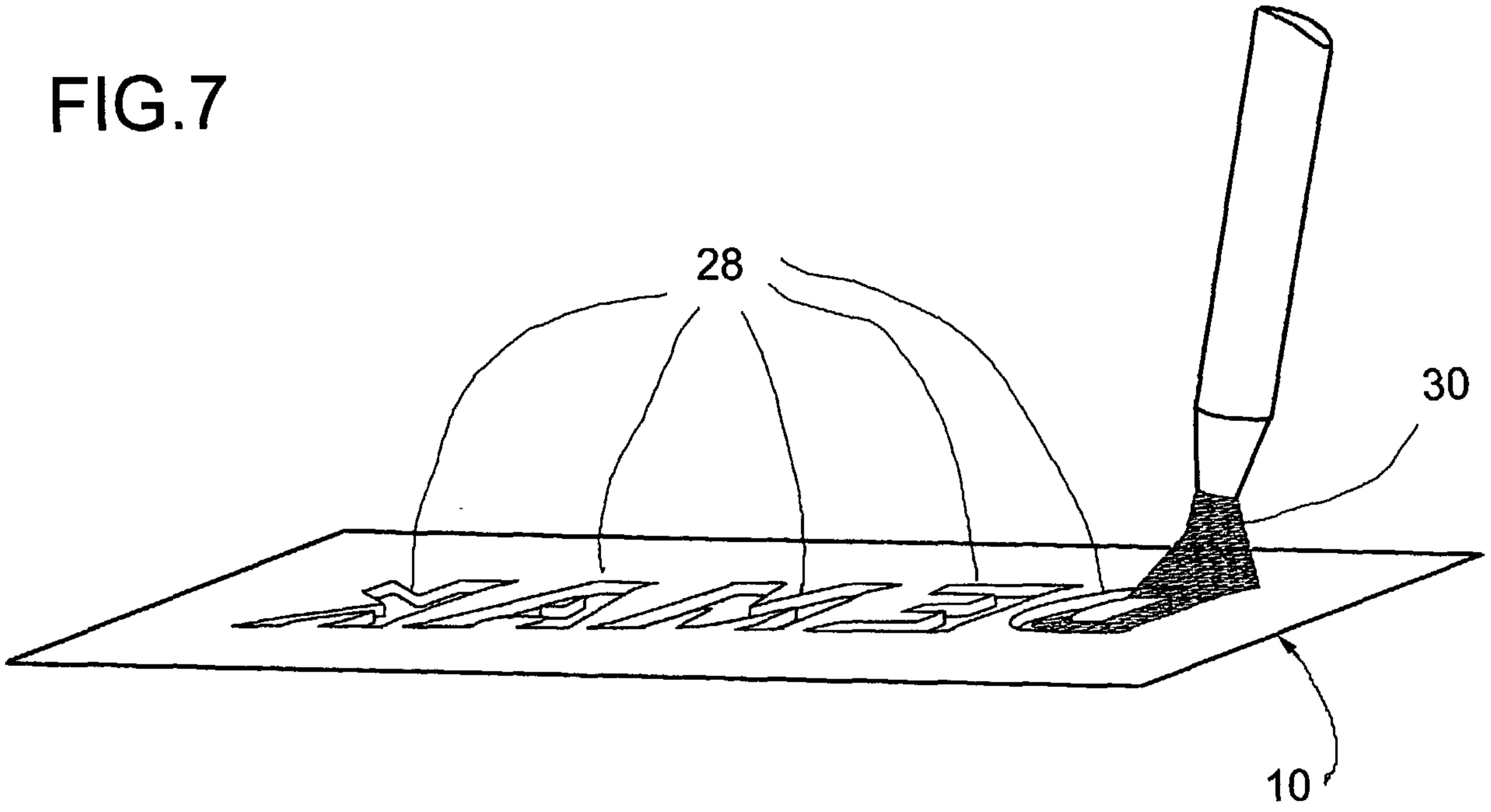


FIG.8

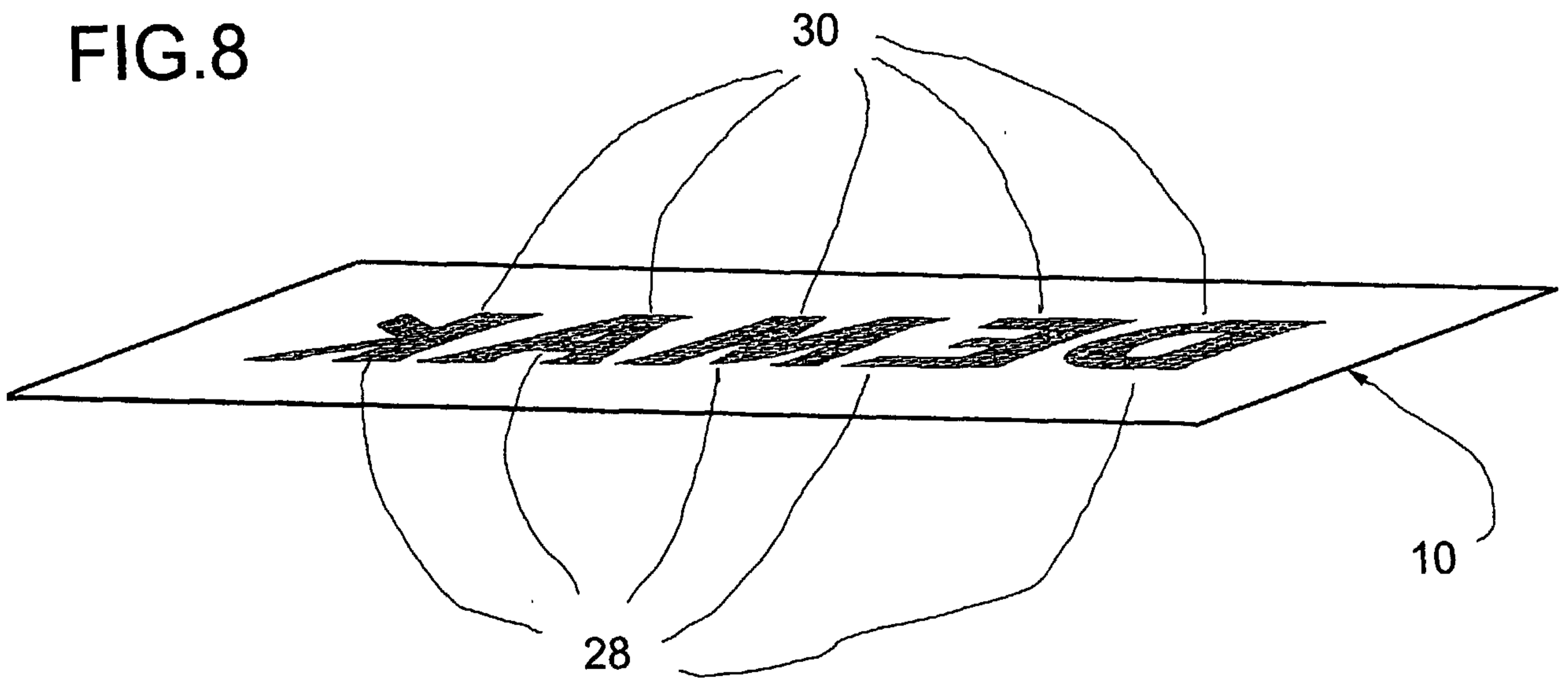


FIG.9

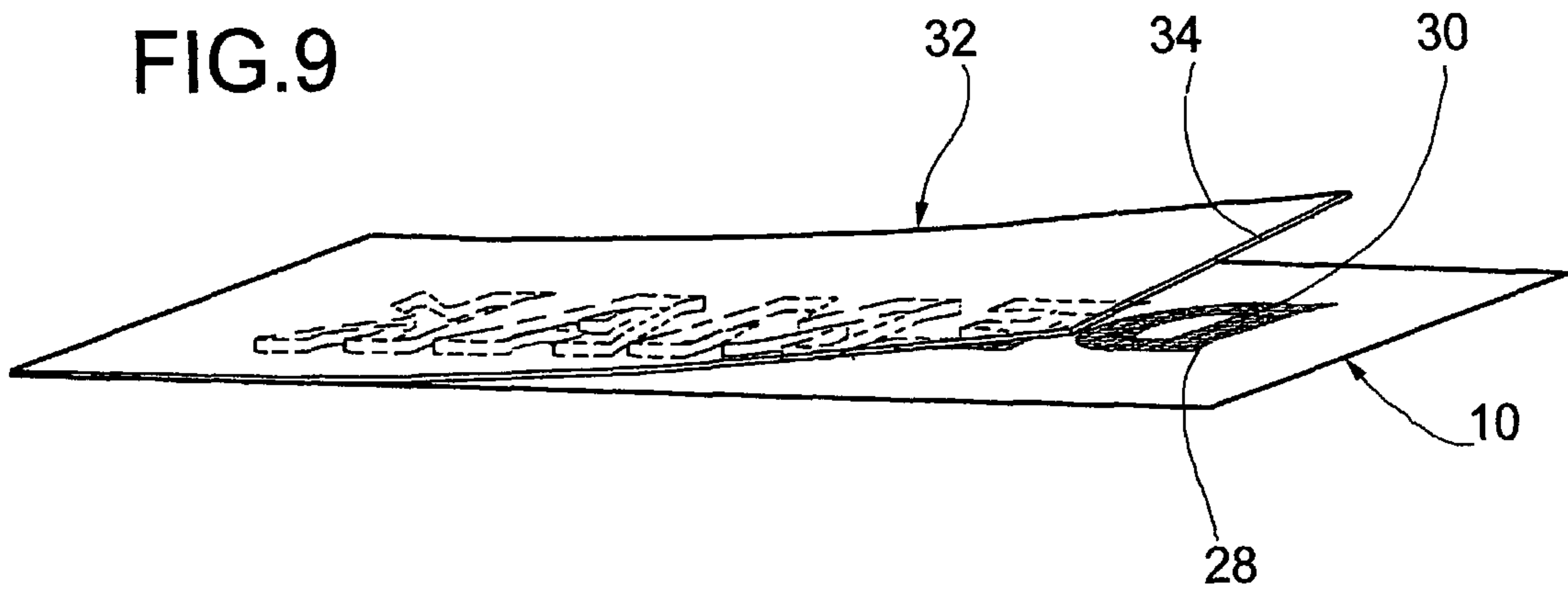


FIG.10

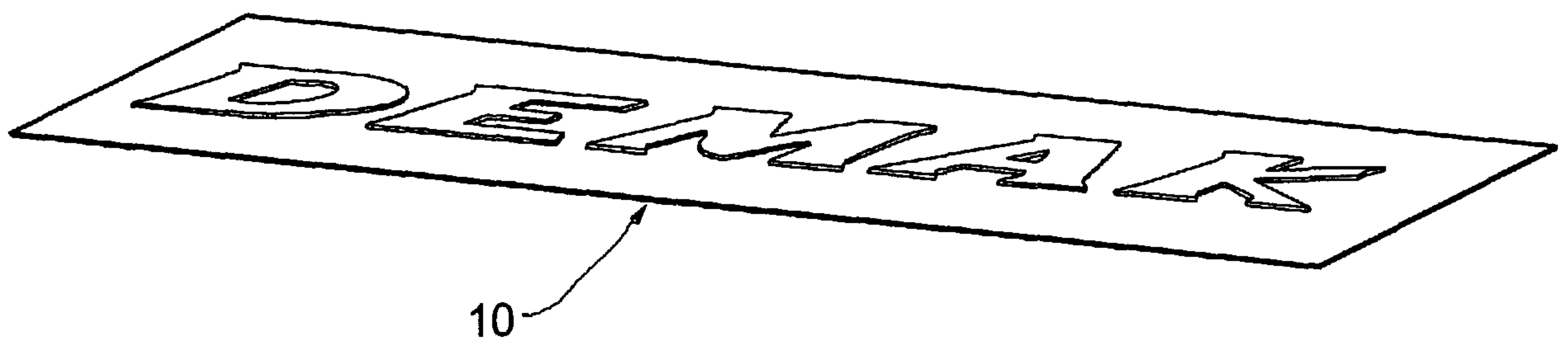


FIG.11

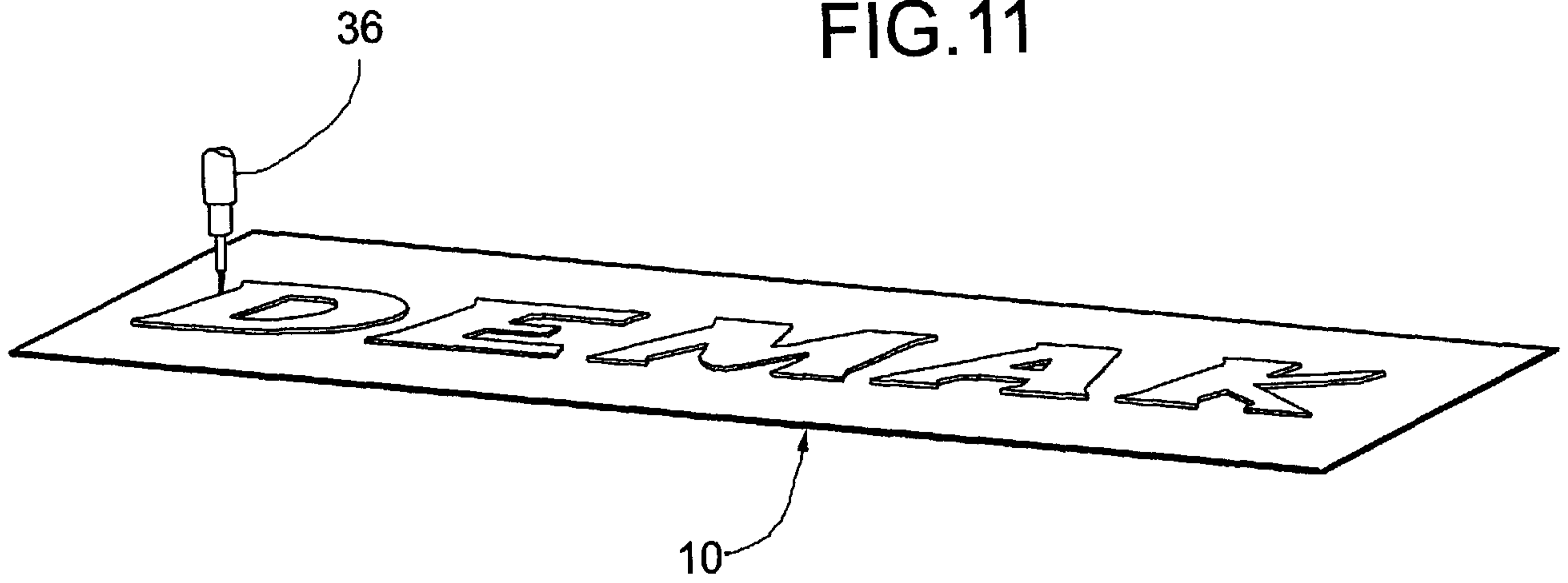


FIG.12

