METHOD AND ASSEMBLY FOR PERSONALIZED THREE-DIMENSIONAL PRODUCTS

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ABSTRACT

A method of making a personalized three-dimensional product is provided. The method includes identifying a personal graphic. A sheet is provided having a convex lens layer with an array of identical semi-spherical convex lenses formed on the top surface thereof wherein each convex lens has a focal distance, a transparent plate layer disposed at a bottom surface of the convex lens layer and having a thickness corresponding to the focal distance of each convex lens, and a focal distance printed layer disposed at a bottom surface of the transparent plate layer. The personal graphic is applied to the sheet in a non-focal relationship relative to the convex lenses.
METHOD AND ASSEMBLY FOR PERSONALIZED THREE-DIMENSIONAL PRODUCTS

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Provisional Patent Application No. 61/080,800, filed Jul. 15, 2008, which application is incorporated herein by reference in its entirety.

FIELD OF THE INVENTION

[0002] The present invention relates to methods and assemblies for three-dimensional products, and more particularly, to a personalized three-dimensional product.

BACKGROUND

[0003] Generally, a three-dimensional plastic sheet is formed of a lenticular screen that has an array of semi-cylindrical lenses each having a pitch of about 0.5 mm formed on the top surface of the sheet. In case of a three-dimensional photographic printing, the images of an object seen by left and right eyes are each printed on a sheet of lenticular screen, thereby obtaining a three-dimensional image where the object looks like floating in the space or going away into the space when seen through the two eyes.

[0004] In this case, the lenticular screen that has the plurality of semi-cylindrical lenses serially arranged on the top surface of the plastic sheet gives the three-dimensional effect just to the left and right sides with respect to the length direction of each lens, but does not give any three-dimensional effect to the upper and lower sides thereof, such that there is a defect in that the viewing angle for the three-dimensional image is limited.

[0005] On the other hand, a conventional three-dimensional plastic sheet is formed in such a fashion that a printed surface seen through a lens layer having an array of lenses formed thereon is recognized thus to observe a designed three-dimensional image, wherein the printed surface is processed by means of general offset printing, for production in great quantities. At this time, there occurs a problem that since the conventional plastic sheet does not have any high resolution due to the embossing effect of the lenses seen through the lens layer, the printed screen cannot be vivid and clear.

[0006] On a general offset printing screen, moreover, numerous dots constituting the printed screen are refracted on the lens layer to cause the generation of moire patterns or dizzy illusion due to the interference of the dots, so that much more vivid three-dimensional screen cannot be provided.

[0007] With the conventional three-dimensional plastic sheet processed by means of the offset printing, therefore, a simple pattern of three-dimensional image should be displayed through one-color printing, which makes it difficult to display a three-dimensional effect through four-primary color printing or special effects (for example, two-way transformation, motion, and morph effects) in a lenticular technique.

[0008] Furthermore, it is desirable to provide a product that is not limited to mass production, but also can be utilized to create personalized products having a personal graphic applied relative to a special effect printed surface.

SUMMARY OF THE INVENTION

[0009] In one embodiment, the present invention provides a method of making a personalized three-dimensional product. The method comprises the steps of identifying a personal graphic. The method can further comprise providing a sheet having a convex lens layer with an array of identical semi-spherical convex lenses formed on the top surface thereof wherein each convex lens has a focal distance, a transparent plate layer disposed at a bottom surface of the convex lens layer and having a thickness corresponding to the focal distance of each convex lens, and a focal distance layer disposed at a bottom surface of the transparent plate layer. The method can further comprise applying the personal graphic relative to the sheet in a non-focal relationship relative to the convex lenses.

[0010] In one exemplary embodiment, the method can comprise printing the personal graphic on a vinyl substrate and applying the vinyl substrate to a portion of the top surface of the convex lens layer.

[0011] In yet another embodiment, the method can comprise applying an ink base surface onto at least a portion of the convex lens layer to create a substantially smooth printing surface. The method can further comprise printing the personal graphic on the ink base surface.

[0012] Additional advantages will be forth in part in the description which follows, and in part will be obvious from the description, or can be learned by practice of the invention. The advantages of the invention will be realized and attained by means of the elements and combinations particularly pointed out in the appended claims. It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only and are not restrictive of the invention, as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The above and other objects, features and advantages of the present invention will be apparent from the following detailed description of the preferred embodiments of the invention in conjunction with the accompanying drawings, in which:

[0014] FIG. 1 is a perspective view showing a product including a three-dimensional sheet according to one embodiment;

[0015] FIG. 2 is a perspective view showing a three-dimensional sheet according to another embodiment;

[0016] FIG. 3 is an exploded perspective view showing the three-dimensional sheet of FIG. 2;

[0017] FIG. 4 is a sectional view showing the three-dimensional sheet of FIG. 2;

[0018] FIG. 5 is a partial sectional view showing the three-dimensional sheet of FIG. 2;

[0019] FIG. 6 is an exploded perspective view showing a three-dimensional sheet according to another embodiment;

[0020] FIG. 7 is a partial sectional view showing the three-dimensional sheet of FIG. 6;

[0021] FIG. 8 is a view showing the image of the special effect printed surface on a focal distance printed layer is separated through a computer graphic process;
FIG. 9 is an enlarged view showing a part of FIG. 8, wherein the structure of dots by means of offset printing is enlarged;

FIG. 10 is illustrates convex lenses arranged at an inclination of 45° on a convex lens layer of an exemplary three-dimensional sheet;

FIG. 11 is illustrates convex lenses arranged at an inclination of 60° on a convex lens layer of an exemplary three-dimensional sheet;

FIG. 12 is a partial sectional view showing a three-dimensional sheet according to one embodiment;

FIG. 13 is a perspective view showing the underside of the three-dimensional sheet of FIG. 12;

FIG. 14 is an exploded top plan view illustrating the three-dimensional sheet registered with respect to the base material;

FIG. 15 is a schematic view illustrating an exemplary roller laminating process in accordance with an embodiment of the invention;

FIG. 16 is a perspective view showing a three-dimensional sheet according to another embodiment;

FIG. 17 is a sectional view showing the three-dimensional sheet of FIG. 16;

FIG. 18 is a perspective view showing an adhesive-backed vinyl substrate with the personal graphic printed thereon prior to application to the three-dimensional sheet;

FIG. 19 is a sectional view showing the adhesive-backed vinyl substrate with the personal graphic printed thereon of FIG. 18 prior to application to the three-dimensional sheet;

FIG. 20 is a plan view of an exemplary personalized product;

FIG. 21 is a plan view of a three-dimensional sheet prepared for application of a personal graphic in accordance with another embodiment;

FIG. 22 is a sectional view of the three-dimensional sheet of FIG. 21;

FIG. 23 is a plan view of an exemplary personalized product;

FIG. 24 is a plan view of a three-dimensional sheet prepared for application of a personal graphic positioned on an image carrier in accordance with another embodiment of the invention;

FIG. 25 is a sectional view of the three-dimensional sheet according to an embodiment;

FIG. 26 is a plan view of an exemplary personalized product;

FIG. 27 is a sectional view of the exemplary personalized product of FIG. 26; and

FIG. 28 is a sectional view of a three-dimensional sheet according to another embodiment.

FIG. 29 is a sectional view of a three-dimensional sheet having a surface layer applied thereon, according to another embodiment.

DETAILED DESCRIPTION OF THE INVENTION

FIG. 9 is an enlarged view showing a part of FIG. 8, wherein the structure of dots by means of offset printing is enlarged;

FIG. 10 is illustrates convex lenses arranged at an inclination of 45° on a convex lens layer of an exemplary three-dimensional sheet;

FIG. 11 is illustrates convex lenses arranged at an inclination of 60° on a convex lens layer of an exemplary three-dimensional sheet;

FIG. 12 is a partial sectional view showing a three-dimensional sheet according to one embodiment;

FIG. 13 is a perspective view showing the underside of the three-dimensional sheet of FIG. 12;

FIG. 14 is an exploded top plan view illustrating the three-dimensional sheet registered with respect to the base material;

FIG. 15 is a schematic view illustrating an exemplary roller laminating process in accordance with an embodiment of the invention;

FIG. 16 is a perspective view showing a three-dimensional sheet according to another embodiment;

FIG. 17 is a sectional view showing the three-dimensional sheet of FIG. 16;

FIG. 18 is a perspective view showing an adhesive-backed vinyl substrate with the personal graphic printed thereon prior to application to the three-dimensional sheet;

FIG. 19 is a sectional view showing the adhesive-backed vinyl substrate with the personal graphic printed thereon of FIG. 18 prior to application to the three-dimensional sheet;

FIG. 20 is a plan view of an exemplary personalized product;

FIG. 21 is a plan view of a three-dimensional sheet prepared for application of a personal graphic in accordance with another embodiment;

FIG. 22 is a sectional view of the three-dimensional sheet of FIG. 21;

FIG. 23 is a plan view of an exemplary personalized product;

FIG. 24 is a plan view of a three-dimensional sheet prepared for application of a personal graphic positioned on an image carrier in accordance with another embodiment of the invention;

FIG. 25 is a sectional view of the three-dimensional sheet according to an embodiment;

FIG. 26 is a plan view of an exemplary personalized product;

FIG. 27 is a sectional view of the exemplary personalized product of FIG. 26; and

FIG. 28 is a sectional view of a three-dimensional sheet according to another embodiment.

FIG. 29 is a sectional view of a three-dimensional sheet having a surface layer applied thereon, according to another embodiment.

DETAILED DESCRIPTION OF THE INVENTION

Embodiments of the present invention may be understood more readily by reference to the following detailed description. It is to be understood that the terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting.

As used herein, the singular forms "a," "an," and "the" include plural referents unless the context clearly dictates otherwise. Thus, for example, reference to a "convex lens" includes embodiments having two or more such convex lenses unless the context clearly indicates otherwise.

Ranges can be expressed herein as from "about" one particular value, and/or to "about" another particular value. When such a range is expressed, another embodiment includes from the one particular value and/or to the other particular value. Similarly, when values are expressed as approximations, by use of the antecedent "about," it will be understood that the particular value forms another embodiment. It will be further understood that the endpoints of each of the ranges are significant both in relation to the other endpoint, and independently of the other endpoint.

As briefly summarized above, embodiments of the present invention provide a method of making a personalized three-dimensional product having a personal graphic applied thereto. As used herein, the term "personal graphic" is intended to include, but is not limited to, a picture, photograph, icon, image, text, or a combination thereof. The term "personal graphic" can also include, but is not limited to, any substantially two-dimensional item, such as but not limited to a photograph, business card, piece of paper, and other such two-dimensional items capable of having images or text printed or written thereon.

Referring to FIG. 1, an exemplary product 1 having a three-dimensional surface in accordance with an embodiment of the present invention is shown. Products 1 can include, but are not limited to cards (such as but not limited to phone cards, business cards, membership cards, loyalty cards, credit cards and the like), cups, containers or boxes and the like, or postcards, greeting cards and the like. The product 1 as described herein can be an end product or can be a component of a larger product, for example, an insert for a cup as described in U.S. Pat. No. 7,153,555, which is incorporated herein in its entirety. Additionally, the product 1 can be applied to any one of a variety of end products, such as cards, containers, boxes, cards, etc. Thus, it is contemplated that product 1 as described herein can include any end product and/or can be applied to a variety of existing products, and is not intended to be limited to the examples provided herein.

In at least one embodiment, the product 1 includes a three-dimensional sheet 5 secured to a base material 50 via an adhesive layer 40. The base material 50 can be, for example, paper, plastic, glass, rubber, metal, or combinations thereof. Furthermore, the base material 5 can be, for example, polystyrene, polyvinyl chloride (PVC), PVC laminated polystyrene, compression laminated polystyrene, compression laminated PVC, polyester, polyolefins such as polyethylene, polypropylene, and the like, ABS, acrylics, epoxies, polyurethanes, polycarbonates, or combinations or laminates thereof. Additionally, the base material 5 can be, for example, opaque, transparent or semi-transparent. The base material 5 can be configured in the processing machinery as a continuous web or otherwise and has a desired thickness, whether constant or variable, for a given product 1. Alternatively, the base material 5 can be in the form of a single unit to create a customized product.

The adhesive layer 40 can take various forms, including but not limited to, a pressure sensitive adhesive (PSA), a moisture cure adhesive, radiation curable adhesive, UV curable adhesive, a photo-cure adhesive, a thermo-setting resin, glue, or like materials. The adhesive can be applied to either or both the three-dimensional sheet 5 or the base mate-
rial 50 with any suitable means, for example, a roll coater, spray coater, a curtain coater, a screen press through a screen and like devices.

[0050] The three-dimensional sheet 5 has a convex lens layer 10 disposed on the uppermost surface of the three-dimensional sheet 5. The three-dimensional sheet 5, in some exemplary embodiments, can be manufactured in accordance with the methods disclosed in U.S. Pat. No. 7,130,126, which is incorporated herein by reference in its entirety, but can be made in other manners and have different configurations than described therein.

[0051] Referring to FIGS. 2-5, in the illustrated embodiment, the convex lens layer is formed of a transparent synthetic resin by means of molding in such a manner as to have an array of identical semi-spherical convex lenses 11 formed vertically and horizontally on the top surface thereof. The convex lenses 11 of the convex lens layer 10 can be arranged, as shown in FIG. 10, at an inclination of 45°, in such a manner that the imaginary lines passing the centers of the convex lenses 11 have a crossing angle of 90°.

[0052] In some cases, the convex lenses 11 can be arranged at different angles, for example, as shown in FIG. 11, at an inclination of 60°, in such a manner that the imaginary lines passing the centers of the convex lenses 11 have a crossing angle of 60°. Thus, although described primarily herein as being arranged at an inclination of 45°, such exemplary embodiments are not intended to be limiting.

[0053] A transparent plate layer 20, which can be formed of a transparent synthetic resin, is disposed on the bottom surface of the convex lens layer 10. According to various embodiments, the transparent plate layer 20 can have a thickness that is substantially equal to a focal distance of each convex lens 11.

[0054] A non-focal distance printed layer 31 can be disposed on the top surface of the transparent plate layer 20 by means of offset printing for providing a real picture screen thereon. The printing of the real picture screen image 35 is performed using a desired registration of the transparent plate layer 20 such that the image 35 has a registration relative to the transparent plate layer 20, and thereby, the three-dimensional sheet 5.

[0055] The non-focal distance printed layer 31 has a general printed surface that is a part placed on the special effect printed surface of a focal distance printed layer 32 for providing a three-dimensional screen thereon, as will be discussed. The general printed surface is displayed with the desired image, for example, subject pictures, product photographs, various patterns, and so on.

[0056] The special effect printed surface of the focal distance printed layer 32 is used for displaying the three-dimensional effect or the special effect of the pattern formed continuously from the top to the bottom thereof and from the left to the right thereof.

[0057] As a result, the differences of depth senses and the visual differences of special effects can be recognized between the special effect printed surface (having a non-three-dimensional effect, a three-dimensional effect, a motion effect, a transformation effect, and the like) of the focal distance printed layer 32 and the general printed surface of the non-focal distance printed layer 31.

[0058] A focal distance layer, such as the focal distance printed layer 32, can be disposed on the bottom surface of the transparent plate layer 20 by means of the offset printing for providing the three-dimensional screen through four-color dot printing computed and image-segmented by a computer graphic process, such that the three-dimensional screen can be seen through the convex lens layer 10.

[0059] The focal distance printed layer 32 is formed by means of the four-color dot printing having the same intervals and arrangements as the convex lenses 11, and as shown in FIGS. 8 and 9, it is made through the image segmentation in the computer graphic process. The manner of printing on the two layers 31 and 32 is preferably as described in U.S. Pat. No. 7,130,126, but other methods can also be utilized.

[0060] According to other embodiments, such as shown in FIGS. 12 and 13, a focal distance layer comprising an array of embossing patterns 33 can be formed on the bottom surface of the transparent plate layer 20. A plurality of grooves 33a, which are formed between the respective embossing patterns 33, can be disposed at the focal positions of the respective convex lenses 11. Thus, it is contemplated that, according to various exemplary embodiments, a focal distance layer can comprise a focal distance printed layer, a focal distance embossed layer, a combination of a focal distance printed and embossed layer, or can comprise other effects positioned at a focal distance with respect to the convex lenses.

[0061] In one embodiment, the convex lens layer 10 can be bonded to the transparent plate layer 20 with the printed layers 31 and 32 disposed thereon by means of laminating or adhesive.

[0062] Since the special effect printed surface of the focal distance printed layer 32 and the general printed surface of the non-focal distance printed layer 31 are disposed at the top and bottom surfaces of the transparent plate layer 20, the effects that can be seen through the convex lens layer 10 are differently displayed. That is to say, the product pictures or subject pictures printed on the general printed surface look like floating in the space or going away into the space on the background having lots of figures printed on the special printed surface, thereby providing a high quality of three-dimension effect to the three-dimensional sheet 5.

[0063] As described in U.S. Pat. No. 7,130,126 and shown in FIGS. 6 and 7, a generally flat viewing window 12 can be partially formed on the convex lens layer 10, and the non-focal distance printed layer 31 is partially formed on the focal distance printed layer 32 in such a manner as to be disposed just below the viewing window 12.

[0064] As described above, according to some exemplary embodiments, the three-dimensional sheet can have a convex lens layer 10 that is adhered, laminated, secured, formed on, or otherwise affixed to the top surface of the transparent plate layer 20. The focal distance layer, such as a focal distance printed layer or focal distance embossed layer, can similarly be adhered, laminated, secured, formed on, printed on, or otherwise affixed to the bottom surface of the transparent plate layer 20.

[0065] Optionally, according to various exemplary embodiments and such as shown in FIG. 28, the three-dimensional sheet 105 can be formed as an integral sheet having a convex lens layer 110, transparent plate layer 120, and a focal distance layer 132 formed integrally therein. For example, in one embodiment, a transparent sheet can be provided having a specified thickness. The convex lens layer 110 can be extruded or otherwise formed in the top surface of the transparent sheet to form semi-spherical convex lenses 111, each having a focal distance. The focal distance layer 132 can be formed on the bottom surface of the transparent sheet. For example, a focal distance printed layer can be printed on the
bottom surface of the transparent sheet. Optionally, a focal distance embossed layer can be formed on the bottom surface of the transparent sheet. It is contemplated in one embodiment that the focal distance layer can be formed substantially simultaneously with the extrusion or formation of the convex lens layer on the top surface of the transparent sheet. Optionally, the focal distance printed layer can be formed prior to or after the formation of the convex lens layer.

As illustrated in FIG. 17, the three-dimensional sheet 5 in one embodiment does not include a non-focal distance layer. However, in the exemplary embodiment illustrated in FIGS. 19 and 20, a non-focal distance layer image 31 is provided on the top surface of the transparent plate layer 20. This non-focal distance layer image 31 can provide a non-personalized, non-effect image which complements the personal graphic 31". For example, as illustrated in FIG. 20, the non-focal distance layer image 31 provides a visual picture frame border for the product 1'.

Once the personal graphic 31" has been identified, a graphic artist or the like creates a contoured cut that follows the outline of the personal graphic 31". Optionally, as can be appreciated, a machine or automated cutting device can be used to create the contoured cut. The contoured cut corresponding to the personal graphic 31" establishes a desired cut path (the mask) on the graphic source 31'. A printout printer (not shown) can be used to output the personal graphic 31" on a vinyl substrate 71, such as but not limited to a vinyl substrate having an adhesive backing 72 or the like. The printer can automatically identify and apply the mask as a template to create the final cut-out 70 with the personal graphic 31" on the vinyl substrate 71. While a printout printer is preferable to minimize steps, the cutting and printing steps can be performed as separate steps with the same or different devices.

The printed vinyl cut-out 70 can then be applied to the convex lens layer 10 of the three-dimensional sheet 5' with the focal distance printed layer 32 printed thereon. The printed vinyl cut-out 70 is applied onto the convex lenses 11 and therefore the personal graphic 31" is not subject to visual distortion based on the lenses 11. However, because the focal distance printed layer 32 is seen through the lenses 11 at the focal distance thereof, the personal graphic 31" appears to float relative to the special effect layer created by the focal distance printed layer 32.

Referring to FIGS. 21-23, an alternative method of creating a personalized product 1' will be described. In the present embodiment, an area 80 (the mask) for the personal graphic 31" can be defined on the three-dimensional sheet 5'.
The mask area 80 can be configured to correspond directly to the configuration of the intended personal graphic 31" as shown in FIG. 21, or alternatively, the mask area 80 can have a generalized shape, for example, a rectangle or oval. Following the defined mask area 80, an ink base surface 82 can be applied directly on the convex lens layer 10 of the three-dimensional sheet 5'. The ink base surface 82 serves as a barrier between the three-dimensional sheet 5' and the personal graphic 31" and functions to create a smooth printing surface to apply the personal graphic 31" as shown in FIG. 22. The ink base surface 82 is preferably white, but can have other colors.

[0077] The ink base surface 82 can be applied in various manners. For example, the ink base surface 82 can be silk screened onto the three-dimensional sheet 5'. The silk screening can be performed by the manufacturer wherein the three-dimensional sheet 5' is delivered with the ink base surface 82 already applied. Alternatively, an end user can use a silk screening process to apply the ink base surface 82. As an alternative, the ink base surface 82 can be printed directly onto the convex lens layer 10 of the three-dimensional sheet 5', for example, using offset printing or the like.

[0078] With the three-dimensional sheet 5' having the ink base surface 82 applied thereto and the focal distance printed layer 32 printed thereon, the end user can simply print the personal graphic 31" onto the ink base surface 82, as shown in FIG. 23. In the embodiment wherein the ink base surface 82 is printed directly onto the three-dimensional sheet 5', the personal graphic 31" can be printed thereon immediately after printing of the ink base surface 82. For example, the four process color inks are applied on top of the initial ink base surface 82 to complete the personal graphic 31" directly onto the three-dimensional sheet 5' to create the personalized product 1'. Since the personal graphic 31" is applied onto the convex lenses 11, it is not subject to visual distortion based on the lenses 11. However, because the focal distance printed layer 32 is seen through the lenses 11 at the focal distance thereof, the personal graphic 31" appears to float relative to the special effect layer created by the focal distance printed layer 32.

[0079] Referring to FIGS. 24-27, an alternative method of creating a personalized product 1' will be described. In the present embodiment, an area 90 (the mask) for the personal graphic 31" is defined on the three-dimensional sheet 5'. The mask area 90 can be configured to correspond directly to the configuration of the intended personal graphic 31"; or alternatively, the mask area 90 can have a generalized shape, for example, an oval as shown in FIG. 24. Following the defined mask area 90, the three-dimensional sheet 5' is die or otherwise cut to define one or more through holes or windows 92 through the three-dimensional sheet 5'. As illustrated in FIG. 25, such cutting also removes the associated portion of the focal distance printed layer 32.

[0080] The three-dimensional sheet 5' can be adhered to an image carrier 94. The image carrier 94 can have various forms, for example, a greeting card, and can be configured to have the personal graphic 31" printed thereon. The window(s) 92 are configured to align with the personal graphic 31" which is printed on an image carrier 94. The personal graphic 31" can be printed on the image carrier 94 prior to application of the three-dimensional sheet 5' to the image carrier 94, or can be printed on the image carrier 94 after application through the windows. The windows are free of lenses 11 such that the personal image 31" can be seen without distortion. However, because the focal distance printed layer 32 surrounds the window(s) 92 and is seen through the lenses 11 at the focal distance thereof, the personal graphic 31" appears to float relative to the special effect layer created by the focal distance printed layer 32.

[0081] According to yet another embodiment, such as shown in FIG. 29, a surface layer 86 can be applied to the convex lens layer of the three-dimensional sheet 5'. For example, in one embodiment, a surface layer can be applied to or over all or a portion of the convex lens layer 10 to create a smooth top surface of the three-dimensional sheet 5'. In a further embodiment, the surface layer 86 can be formed of polystyrene, polyvinyl chloride (PVC), PVC laminated polystyrene, compression laminated polystyrene, compression laminated PVC, polyester, polycarbonates such as polyethylene, polypropylene, and the like. ABS, acrylcs, epoxies, polyurethanes, polycarbonates, or combinations or laminates thereof. According to another embodiment, the surface layer 86 can be formed of any transparent or substantially transparent material that can be placed over the convex lens layer to provide a substantially smooth surface layer.

[0082] According to a further aspect, it is contemplated that after the surface layer 86 has been applied or otherwise formed on the three-dimensional sheet 5', a personal graphic can be applied on top of the surface layer. As described above, the personal graphic can be applied using a variety of exemplary means, including printing directly onto the surface layer, printing onto a vinyl substrate which can be applied to the surface layer, providing an ink base surface on the surface layer, etc. In yet another embodiment, it is contemplated the personal graphic can also be printed or applied directly on the surface layer using manual printing means, such as a marker (which can be permanent, non-permanent, erasable, or the like), pen, crayon, paintbrush, or other manual printing means. As discussed above, because the personal graphic is applied above the convex lens layer, and because the focal distance layer is seen through the convex lenses at the focal distance thereof, the personal graphic applied on the surface layer appears to float relative to the special effect layer created by the focal distance layer.

[0083] Lastly, it should be understood that while the present invention has been described in detail with respect to certain illustrative and specific embodiments thereof, it should not be considered limited to such, as numerous modifications are possible and contemplated, without departing from the broad spirit and scope of the present invention as defined in the appended claims.

What is claimed:
1. A method of making a personalized three-dimensional product comprising:
   identifying a personal graphic;
   providing a sheet comprising a convex lens layer having an array of identical semi-spherical convex lenses formed on the top surface thereof wherein each convex lens has a focal distance, a transparent plate layer disposed at a bottom surface of the convex lens layer and having a thickness corresponding to the focal distance of each convex lens, and a focal distance printed layer disposed at a bottom surface of the transparent plate layer; and
   applying the personal graphic relative to the sheet in a non-focal relationship relative to the convex lenses.
2. The method of claim 1 wherein the sheet further comprises a non-focal distance printed layer disposed on a top surface of the transparent plate layer.
3. The method of claim 1 wherein the personal graphic is a picture, photograph, icon, image, text or a combination thereof.

4. The method of claim 1 wherein the personal graphic is identified from a graphic source.

5. The method of claim 1 wherein applying the personal graphic relative to the sheet comprises printing the personal graphic on a vinyl substrate and applying the vinyl substrate to a portion of the top surface of the convex lens layer.

6. The method of claim 5 further comprising cutting the vinyl substrate to a selected shape corresponding to the personal graphic substantially simultaneously with printing the personal graphic on the vinyl substrate.

7. The method of claim 5 further comprising cutting the vinyl substrate to a selected shape corresponding to the personal graphic after the personal graphic has been printed on the vinyl substrate.

8. The method of claim 5, wherein the vinyl substrate is an adhesive-backed vinyl substrate.

9. The method of claim 1 further comprising selectively defining a mask area on the sheet.

10. The method of claim 9 wherein selectively defining the mask area comprises selectively defining a shape of the mask area that is based on the configuration of the personal graphic.

11. The method of claim 9 wherein selectively defining the mask area comprises applying an ink base surface onto at least a portion of the convex lens layer to create a substantially smooth printing surface.

12. The method of claim 11 wherein applying an ink base surface comprises applying white ink to at least a portion of the convex lens layer.

13. The method of claim 11 wherein applying the personal graphic relative to the sheet comprises printing the personal graphic on the ink base surface.

14. The method of claim 13 wherein printing the personal graphic on the ink base surface comprises printing the personal graphic substantially immediately after applying the ink base surface onto at least a portion of the convex lens layer.

15. The method of claim 11 wherein applying an ink base surface comprises silk screening the ink base surface onto at least a portion of the convex lens layer.

16. The method of claim 9 wherein selectively defining the mask area comprises creating one or more cuts through the sheet to define at least one window.

17. The method of claim 16 further comprising adhering the sheet to an image carrier.

18. The method of claim 17 wherein applying the personal graphic relative to the sheet comprises printing the personal graphic on the image carrier such that the personal graphic is aligned with the at least one window when the sheet is adhered to the image carrier.

19. The method of claim 18 further comprising printing the personal graphic on the image carrier prior to adhering the sheet to the image carrier.

20. The method of claim 1, further comprising applying a substantially transparent surface layer to the convex lens layer, to create a substantially smooth surface layer, wherein applying the personal graphic relative to the sheet in a non-focal relationship relative to the convex lenses comprises applying the personal graphic on the surface layer.

21. A method of making a personalized three-dimensional product comprising:
   identifying a personal graphic;
   providing a sheet comprising a convex lens layer having an array of identical semi-spherical convex lenses formed on the top surface thereof wherein each convex lens has a focal distance, a transparent plate layer disposed at a bottom surface of the convex lens layer and having a thickness corresponding to the focal distance of each convex lens, and a focal distance printed layer disposed at a bottom surface of the transparent plate layer;
   printing the personal graphic on a vinyl substrate; and
   applying the vinyl substrate to a portion of the top surface of the convex lens layer such that the personal graphic is in a non-focal relationship relative to the convex lenses.

22. The method of claim 21, wherein the vinyl substrate is an adhesive-backed vinyl substrate.

23. A method of making a personalized three-dimensional product comprising:
   identifying a personal graphic;
   providing a sheet comprising a convex lens layer having an array of identical semi-spherical convex lenses formed on the top surface thereof wherein each convex lens has a focal distance, a transparent plate layer disposed at a bottom surface of the convex lens layer and having a thickness corresponding to the focal distance of each convex lens, and a focal distance printed layer disposed at a bottom surface of the transparent plate layer;
   applying an ink base surface onto at least a portion of the convex lens layer to create a substantially smooth printing surface; and
   printing the personal graphic on the ink base surface.