United States Patent

Miller et al.

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[54] **THREE DIMENSIONAL PUZZLE**

[72] Inventors: **Edmund S. Miller; Nancy W. Miller,** both of 127½ N. **Main Street, Urbana, Ohio 43078**

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[52] **U.S. Cl.** .....**273/157 R**

[51] **Int. Cl.** **A63f 9/12**

[58] **Field of Search** .....273/157 R, 157 A

[56] **References Cited**

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Primary Examiner—Anton O. Oechsle

Attorney—Marechal, Biebel, French & Bugg

[57] **ABSTRACT**

A three dimensional puzzle formed of several, similarly or differently colored, stacked layers of interlocked puzzle segments with each layer containing one or more voids through which portions of the layers beneath it and the interior surface of a supporting tray are visible to produce a pleasing visual effect.

12 Claims, 6 Drawing Figures

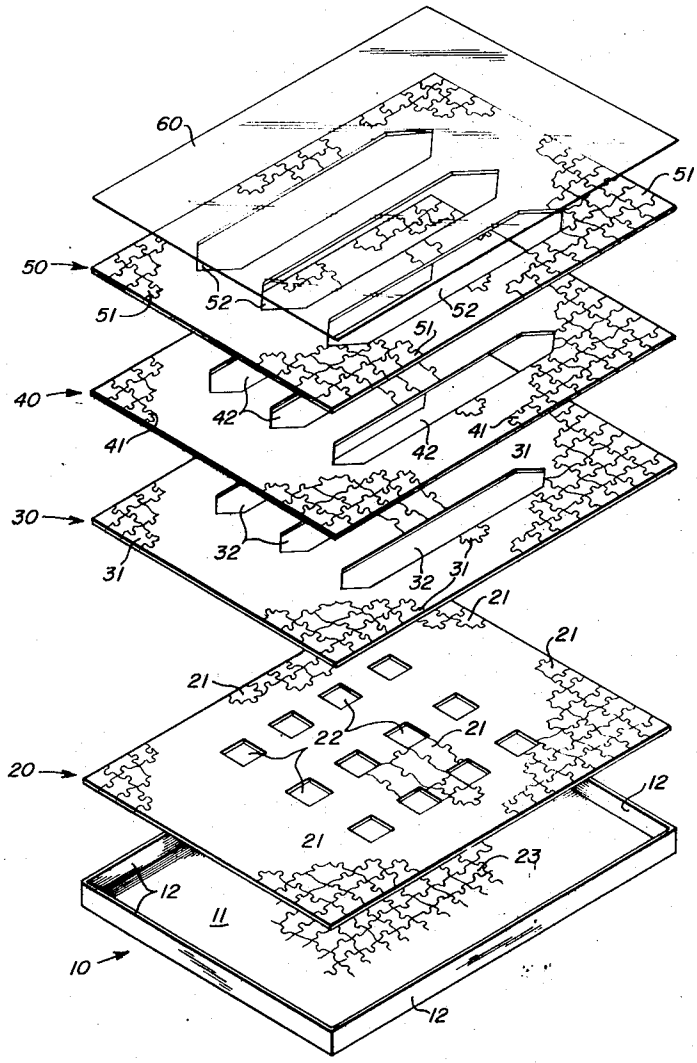


FIG-1

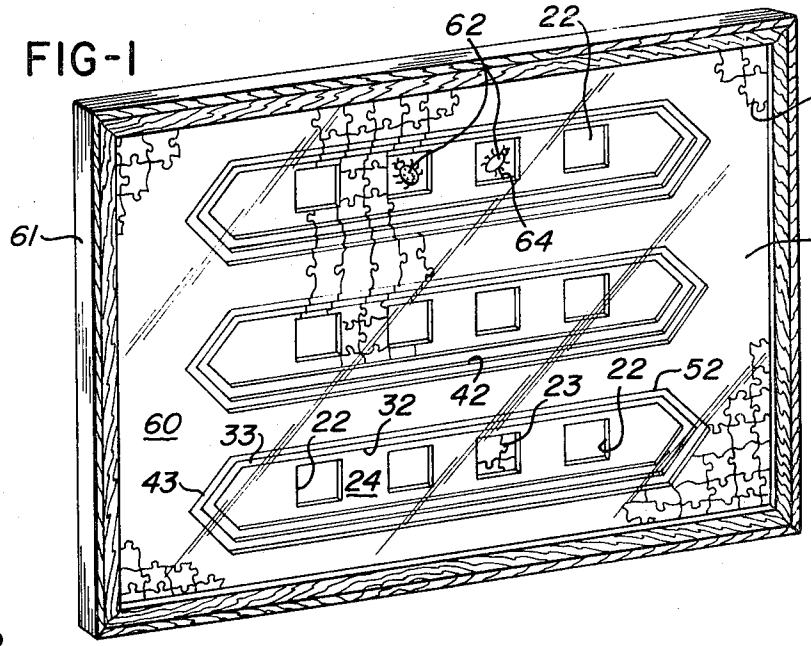
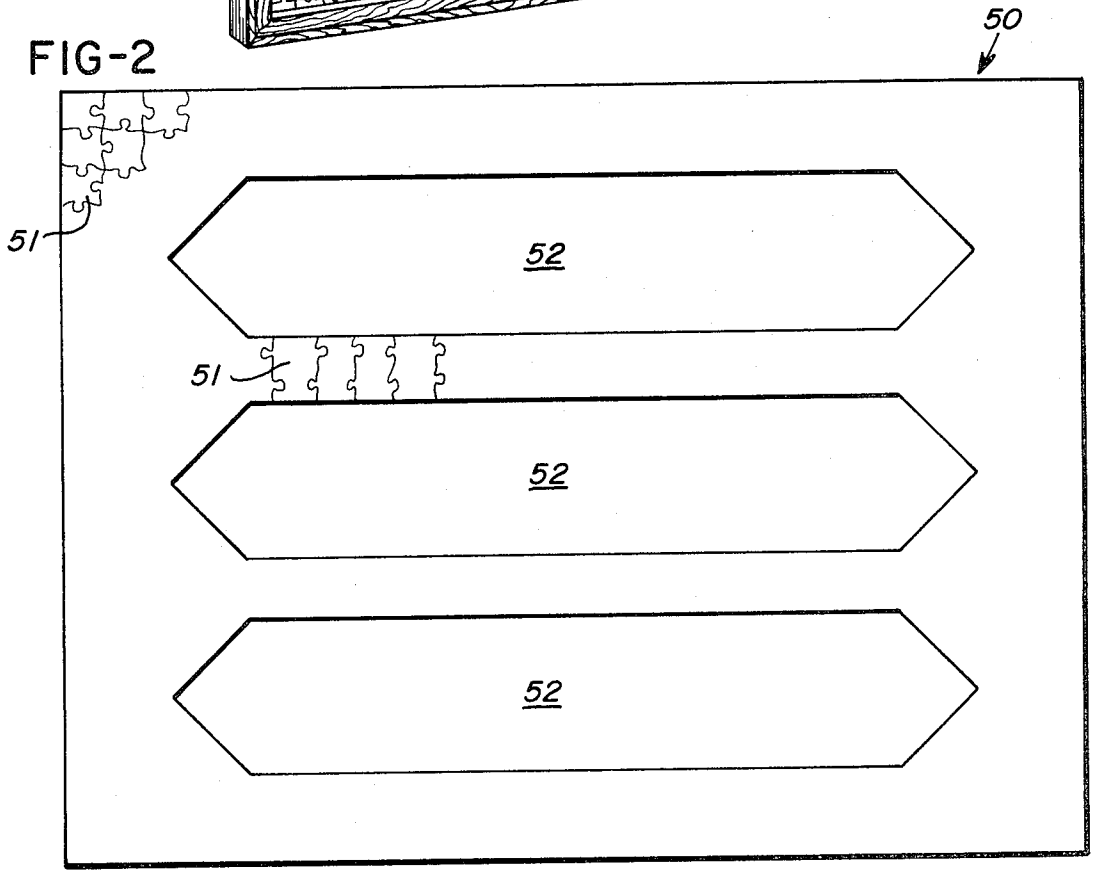


FIG-2



INVENTORS
EDMUND S. MILLER &
NANCY W. MILLER

BY
Marechal, Biebel, French & Bugg
ATTORNEYS

FIG-3

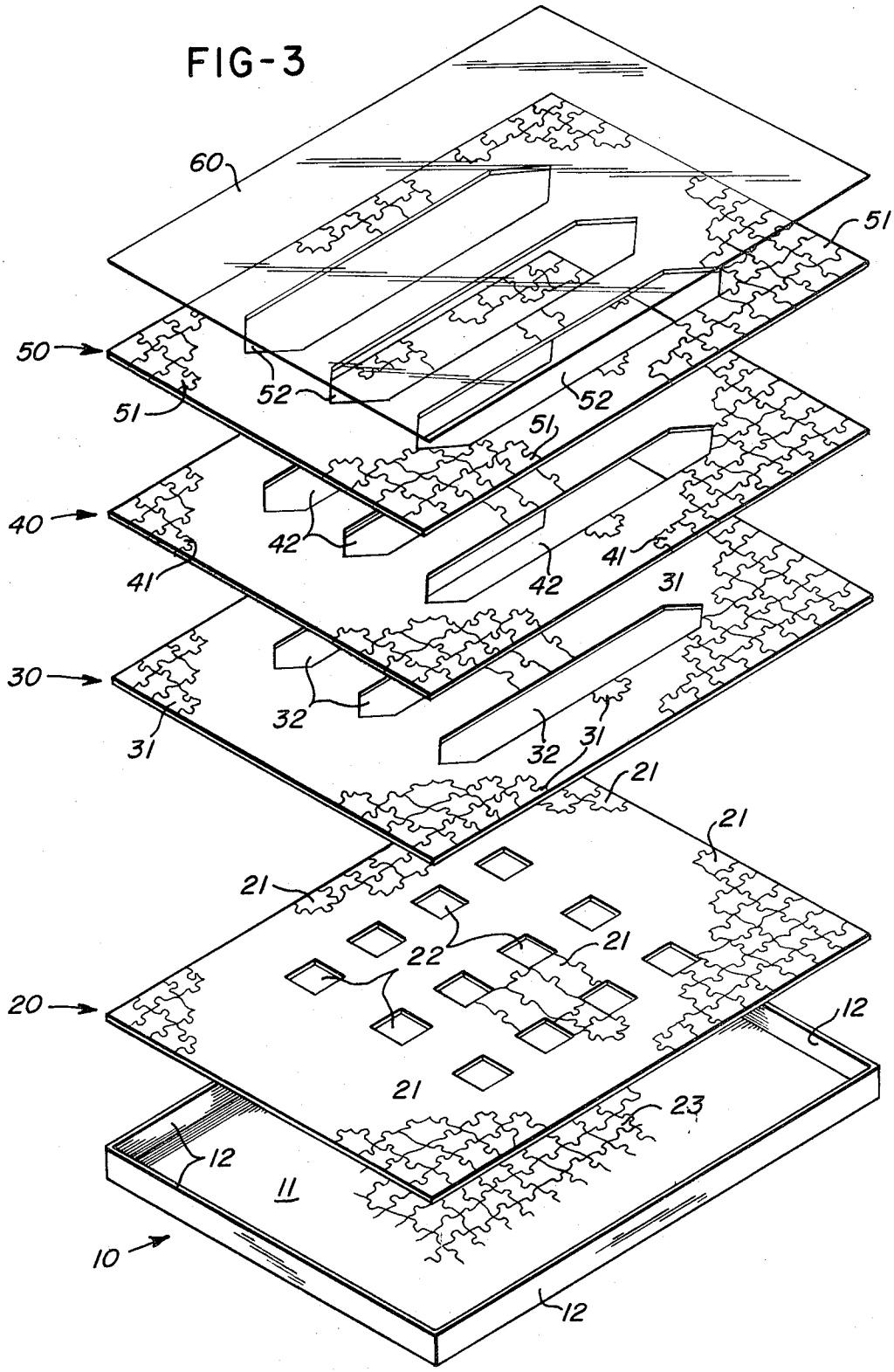

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FIG-4

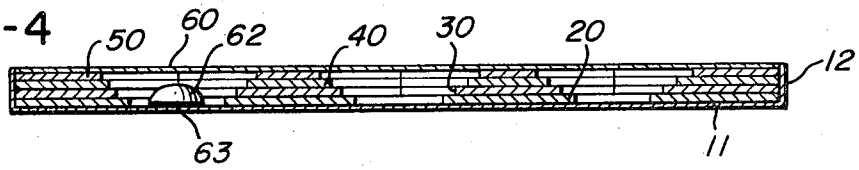


FIG-5

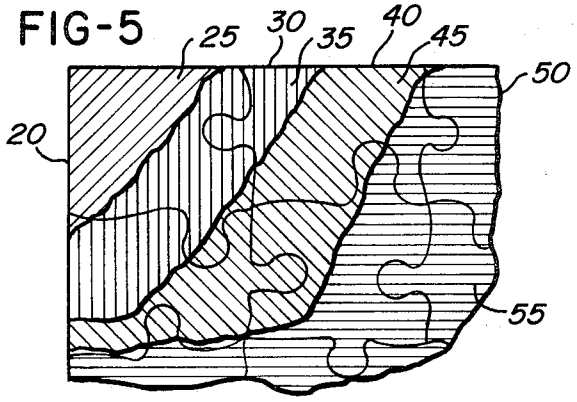
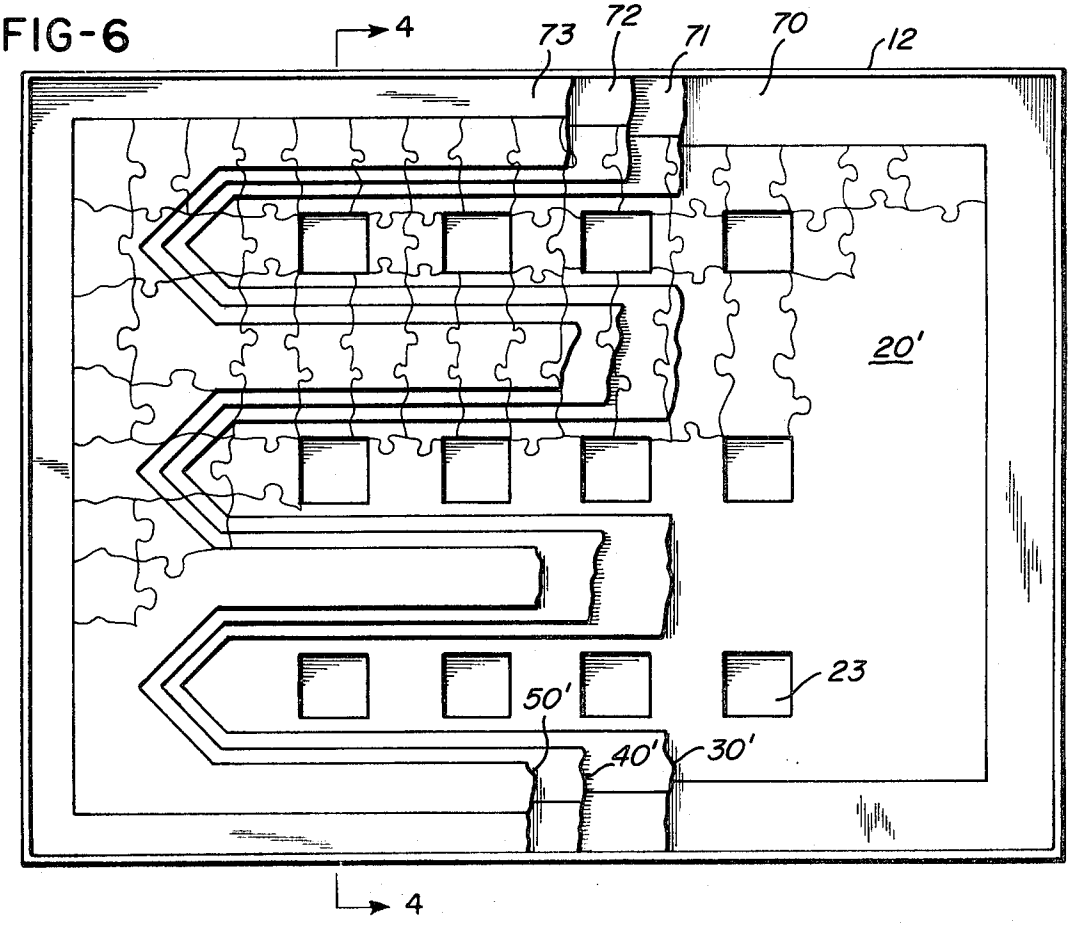


FIG-6



THREE DIMENSIONAL PUZZLE

BACKGROUND OF THE INVENTION

The most common type of jigsaw puzzle is the two dimensional type in which a series of complementarily configured interlocking puzzle segments are assembled to produce a planar surface which is usually imprinted with a pictorial representation. While this type of puzzle is undoubtedly the most widely used, it will be apparent that the decorative effects obtainable with the completed puzzle are limited to two dimensional images. Additionally, more experienced puzzle assemblers may feel a lack of challenge with a two dimensional puzzle since the principal way of increasing the complexity of the puzzle is to increase the number of puzzle segments.

U.S. Pat. No. 2,987,318 shows a second type of puzzle in which the puzzle segments are curved so that upon attachment to a core member a three dimensional object is formed. While this approach provides more interesting images, it will be seen that again, only the surfaces of the puzzle segments are actually used.

A third type of jigsaw puzzle is shown in U.S. Pat. No. 1,964,007. In puzzles of this type, layers of puzzles are stacked to produce three dimensional objects. Of course, only the top surface of the uppermost layer and the outermost edges of the underlying layers are visible and the uppermost surfaces of the lower layers add nothing to visual effect obtained.

SUMMARY OF THE INVENTION

The present invention provides a three dimensional puzzle in which layers of interlocked puzzle segments are stacked in superimposed relationship in a supporting tray having a base and upstanding side walls. Each of the layers is provided with one or more voids of geometric or irregular shape which relate to the voids contained in the other layers to produce a pleasing or stimulating visual effect.

It will thus be seen that a puzzle is provided which, through the use of multiple layers having interrelated voids formed therein, not only provides more interesting visual effects but presents a greater challenge to more experienced puzzle assemblers.

Of course, if it is desired to render assembly less difficult various aid to assembly may be provided. For example, each of the segments in each layer may be provided with identifying markings to distinguish it from segments of other layers. Additionally, a series of starter frames may be provided for each layer with the openings through each frame of progressively larger size toward the top of the stack.

It will be seen that by forming voids through the puzzle layers, a more intricate design is produced than where merely the top surface of one layer and the edges of underlying layers are utilized, and the decorative effects obtained by positioning portions of the underlying layers beneath the voids formed in the layers thereabove may be enhanced by suitable color combinations applied to the visible portions of the layers and the supporting tray.

Further, it will be seen that through appropriate shaping and positioning of the voids in each layer, the degree of difficulty which will be encountered in assembling the puzzle may be varied at will while at the same time, for less experienced puzzle assemblers, the puzzle can also be simplified to some extent.

It will also be seen that the voids through the layers may be so formed as to provide in the assembled puzzle one or more display compartments for mounting any of a variety of objects such as gems and other stones, insects, or other articles. Thus, the puzzle of the present invention may have a utilitarian as well as an entertainment and decorative aspect.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view showing a puzzle assembled and utilized as a display case;

FIG. **2** is a plan view of typical layer of interlocked puzzle segments, the uppermost layer being shown for purposes of illustration;

FIG. **3** is an exploded perspective view of the supporting tray, layers of puzzle segments and a transparent cover member;

FIG. **4** is a cross-sectional view taken on line **4—4** of FIG. **6**;

FIG. **5** is a partial bottom plan view with portions of superimposed layers broken away for purposes of clarity; and

FIG. **6** is a plan view of the puzzle layers and supporting tray.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference to FIGS. **3** and **4**, it will be seen that a three dimensional puzzle in accordance with the present invention includes a supporting tray **10** having a planar base **11** and upstanding side walls **12**. Mounted within the tray **10** in stacked, laminar relationship are a plurality of layers of interlocked puzzle segments. Bottom layer **20**, formed of puzzle segments **21**, only some of which are shown, is mounted in the lowermost position immediately upon the base **11** of the tray **10**. Layer **20** is provided with a series of voids **22** which, as shown, may be of rectangular configuration and through which a pattern **23** imprinted on portions of base member **11** situated beneath the voids **22** is visible. Any desired pattern may be utilized and one simulating an interlocked puzzle design is shown for purposes of illustration.

Immediately above layer **20** a second layer **30** is positioned with layer **30** being comprised of a series of interlocked puzzle segments **31**. Voids **32**, which are of different configuration than voids **22** are formed in layer **30** and cover a greater area than the voids **22** so that portions of layer **20** are visible through the voids **32**.

Superimposed on layer **30** are a third layer **40** and a fourth layer **50**, each formed of a plurality of interlocked puzzle segments **41** and **51**, respectively, and provided with voids **42** and **52** therethrough. Openings **42** are larger than and concentric with openings **32**, while openings **52** are larger than and concentric with openings **42**, so that portions of each underlying layer are visible through the voids in the layers thereabove. While the openings **32**, **42** and **52** are shown as of substantially the same configuration, it will be apparent that they may be varied to obtain the particular aesthetic effect desired as well as the particular configuration of display case if the assembled puzzle is intended for this use.

Superimposed on the uppermost layer **50** is a cover sheet **60** of transparent material and, as seen in FIG. **1**, the entire assembly may be mounted in a suitable frame **61**. With continued reference to FIG. **1**, it will be seen that not only is the patterned portion **23** of the base **11** visible through the openings **22** but portions **24** of layer **20**, portions **33** of layer **30**, and portions **43** of layer **40** are also visible.

To enhance the decorative effect obtained with the three dimensional puzzle of the invention, the various layers may be differently colored to produce blends or contrasts between visible portions of adjacent layers. For example, a cathedral effect might be obtained through the use of alternating layers of black and white. Additionally, both surfaces of each layer may be colored, for example, one side black and one side white, or any desired combination, so that the puzzle may, at the option of the assembler, be assembled with either side up.

It will also be noted from FIG. **1** that the puzzle of the present invention may have utilitarian as well as decorative and entertainment aspects. Thus the voids formed in the superimposed layers may be utilized for display purposes for exhibiting gems and other stones, insects, jewelry and the like. For purposes of illustration insect shaped jewelry, as at **62**, is positioned in the upper portion of the puzzle, and this may be accomplished by adhesively securing the display item to the tray surface, as at **63** (FIG. **4**), or by providing the item with a mounting pin, as at **64** (FIG. **1**) which may be inserted in the edge of any one of the layers to further enhance the three dimensional effect.

As noted above, the degree of complexity obtainable with a puzzle produced in accordance with the present invention should readily satisfy even the most experienced puzzle assembler. However, if it is desired to provide a puzzle of a lesser degree of difficulty, various modifications may be made as an aid to the assembly process. Thus, as seen in FIG. **5**, the bottom surface of each of the layers may be provided with some means for identifying the layer in which each puzzle segment should be positioned in the final assembly. This may take the form, for example, of color coding or any other convenient indicia for identifying the segments from each layer, such coding or indicia being diagrammatically represented by the cross hatching **25**, **35**, **45** and **55** shown on the lower surfaces of the segments **20**, **30**, **40** and **50**, respectively. With this assembly aid provided, the assembler merely segregates the segments formed from each layer into separate groups and thus appreciably narrows the number of pieces being worked with at any one time.

With reference to FIG. **6**, a further aid to assembly will be described. As seen in FIG. **6**, in addition to the superimposed layers **20'**, **30'**, **40'** and **50'**, a series of stacked frames **70**, **71**, **72** and **73** are provided. Preferably, each frame has an opening therein smaller than the opening in the frame immediately thereabove and having internal dimensions complementary to the external dimensions of the layer of puzzle segments received therein in coplanar relationship therewith.

Thus, when utilizing the frames, preferably in connection with the identifying means shown in Fig. **5**, the first frame **70** is inserted in the tray **10** with its periphery engaged by the upstanding side walls **12** of the tray and the first layer **20'** of puzzle segments is assembled within the frame. Upon completion of the layer **20'** the second frame **71** having a slightly larger opening therethrough, is stacked on top of the frame **70** and the second layer **30'** is assembled within the opening in the frame **71**. The same process is then repeated with frames **72** and **73** to provide the completed puzzle, substantially as shown in FIG. **1**.

From the above it will be apparent that a three dimensional puzzle according to the present invention not only provides a puzzle for entertainment purposes, the degree of difficulty of assembly of which may be varied to provide a challenge to assemblers of varying degrees of experience, but through the use of variously colored, superimposed layers having voids of geometric or irregular configuration, a pleasing decorative effect is produced which may also serve the utilitarian purpose of a display case.

Turning now to FIG. **2** of the drawings, it will be noted that the puzzle segments **51'**, that is, those segments located at the periphery of a void, are provided with straight edges coinciding with this periphery. This illustrates one method by which the formation of small irregularly sized pieces, which could be easily lost, can be avoided in cutting the puzzle. Of course, in some instances an irregularly shaped void might be desired, in which case this expedient would be unnecessary.

While the forms of apparatus herein described constitute preferred embodiments of the invention, it is to be understood that the invention is not limited to these precise forms of apparatus, and that changes may be made therein without departing from the scope of the invention.

What is claimed is:

1. A multi-layer three dimensional unit comprising:

a. a plurality of planar layers of interlocked puzzle segments,

b. each of said layers being of substantially the same size and shape and having substantially planar upper and lower faces and substantially continuous peripheral edges,

c. said layers being assembled in laminar relationship to each other with their peripheral edges substantially continuous and forming a stack having a substantially continuous peripheral edge defined by said peripheral edges of said layers,

d. at least the layers above the lowermost layer in said stack having portions defining voids therethrough,

e. each of said voids being positioned wholly within the boundary of the layer in which it is formed in non-intersecting relationship to the peripheral edge thereof, and

f. said voids being of progressively decreasing area from the uppermost layer toward the bottom of said stack,

g. said voids in each layer being positioned with respect to the voids in the other layers such that each void and a portion of the layer in which it is located are visible from the top of said stack when said stack is fully assembled; whereby a pleasing visual effect is thereby obtained.

2. The puzzle of claim **1** wherein:

a. said visible portions of a layer are a different color than visible portions of an adjacent one of said layers.

3. The puzzle of claim **1** further comprising:

a. a tray supporting said layers of puzzle segments,
b. means defining a void through said lowermost layer, and
c. portions of said tray being visible through said void in said lowermost layer.

4. The puzzle of claim **1** further comprising:
a. means associated with each of said puzzle segments for distinguishing segments of each layer from other puzzle segments.

5. The puzzle of claim **4** wherein:
a. said distinguishing means comprises color coding.

6. The puzzle of claim **4** wherein:
a. said distinguishing means comprises identifying indicia.

7. The puzzle of claim **4** wherein:
a. said distinguishing means is applied to the lower surface of said puzzle segments.

8. The puzzle of claim **1** wherein:
a. opposite sides of each puzzle segment are differently colored.

9. A multi-layer, three dimensional unit comprising:
a. a plurality of layers of interlocked puzzle segments,
b. each of said layers having substantially planar upper and lower faces and substantially continuous peripheral edges,
c. a plurality of frames of substantially the same exterior configuration each having means defining an opening therethrough,
d. each of said layers being positioned in an opening in one of said frames with the boundaries of a frame and the periphery of the layer associated therewith complementary,
e. each associated layer and frame being assembled in laminar relationship to the other associated layers and frames,
f. means defining voids in said layers positioned wholly within the boundaries of the layers in non-intersecting relationship to the peripheral edges of the layers,
g. said voids being of progressively decreasing area from the uppermost layer toward the bottom most layer,
h. said voids in each layer being positioned with respect to the voids in the other layers such that each void and a portion of the layer in which it is located are visible when said layers and frames are assembled to provide a pleasing visual effect.

10. The puzzle of claim **9** wherein:
a. the opening through each of the uppermost frames is larger than the opening through the frame beneath it.

11. The puzzle of claim **9** wherein:
a. said layers are colored, and
b. each of said frames are the same color as the layer with which it is associated.

12. A three dimensional puzzle comprising:
a. a tray having a planar base and upstanding side walls,
b. a plurality of frames of contrasting colors stacked in said tray,
c. each of said frames having an opening formed in a central portion thereof with the opening in each of the lowermost frames being smaller than the openings in the frame thereabove,
d. a layer of interlocked puzzle segments positioned in each of said frame openings with each of said layers being of substantially the same thickness and color as the frame in which it is positioned,
e. means defining a void of geometric shape through each of said layers,
f. portions of each of the lowermost layers underlying the area defined by the void in the layer immediately thereabove,
g. means imprinting a simulated, interlocked puzzle segment design on a portion of said planar base underlying the area defined by the void in the lowermost one of said layers, and
h. means associated with the lower surface of each segment in each layer for identifying the layer in which each segment should be positioned.

* * * * *