



US006508488B1

(12) **United States Patent**
Becker

(10) **Patent No.:** **US 6,508,488 B1**
(45) **Date of Patent:** **Jan. 21, 2003**

(54) **BOOK CONTAINING MODEL COMPONENTS COMBINABLE TO FORM A THREE DIMENSIONAL MODEL**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(21) Appl. No.: **09/989,959**

(57) **ABSTRACT**

(22) Filed: **Nov. 21, 2001**

(51) **Int. Cl.**⁷ **B42D 1/00**

The invention provides a book containing a three dimensional model assembly made from a plurality of model components attached to respective pages in the book. The model can be a human body or anything desired. When the book is closed, the model components combine to form a completely assembled model assembly that is thinner than the book. Thus, the book can lie flat on either its front or back cover on a flat surface. When the book is open, and as a reader turns each page, the model components attached to the respective page separate from the model assembly revealing other components that remain combined to form a partially assembled model assembly. The components can be fixedly or hingedly attached to respective pages with bars, flaps or both. If hingedly attached, the model components can be separated from the model assembly without turning a respective page.

(52) **U.S. Cl.** **281/38**; 281/15.1; 434/267; 434/269; 434/274; 434/317; 446/147

(58) **Field of Search** 281/15.1, 22, 38, 281/51; 273/157 R; 434/262, 267, 269, 272, 274, 317; 446/71, 72, 73, 75, 146, 147

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27 Claims, 4 Drawing Sheets

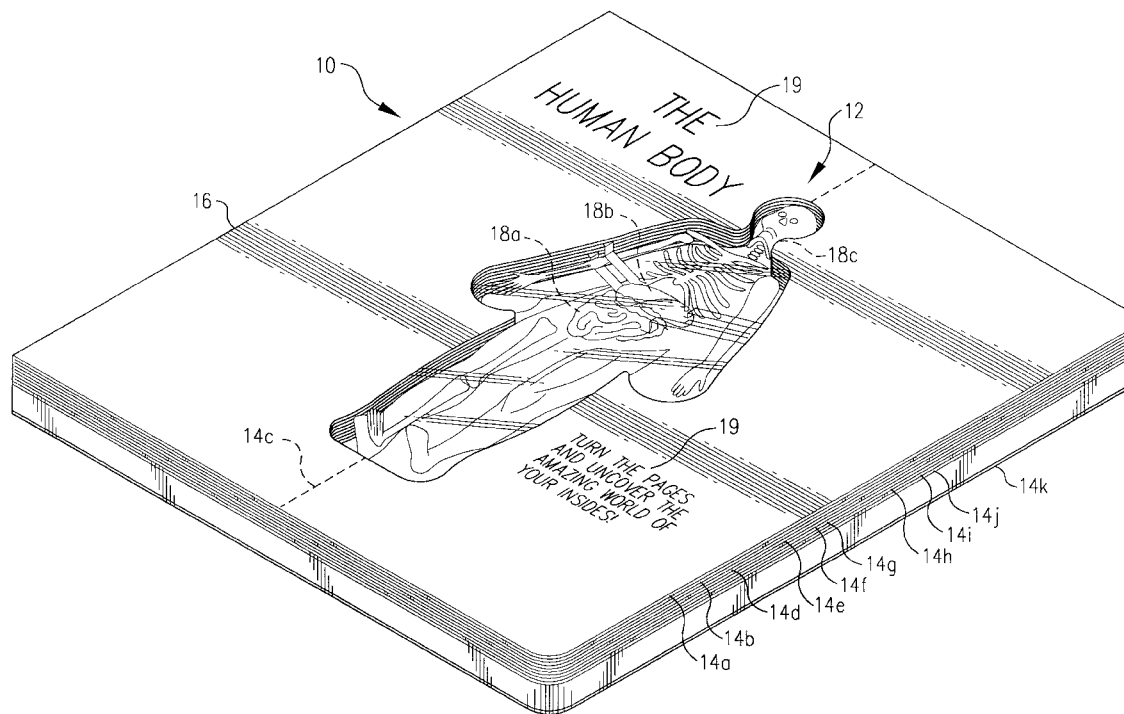


FIG. 1

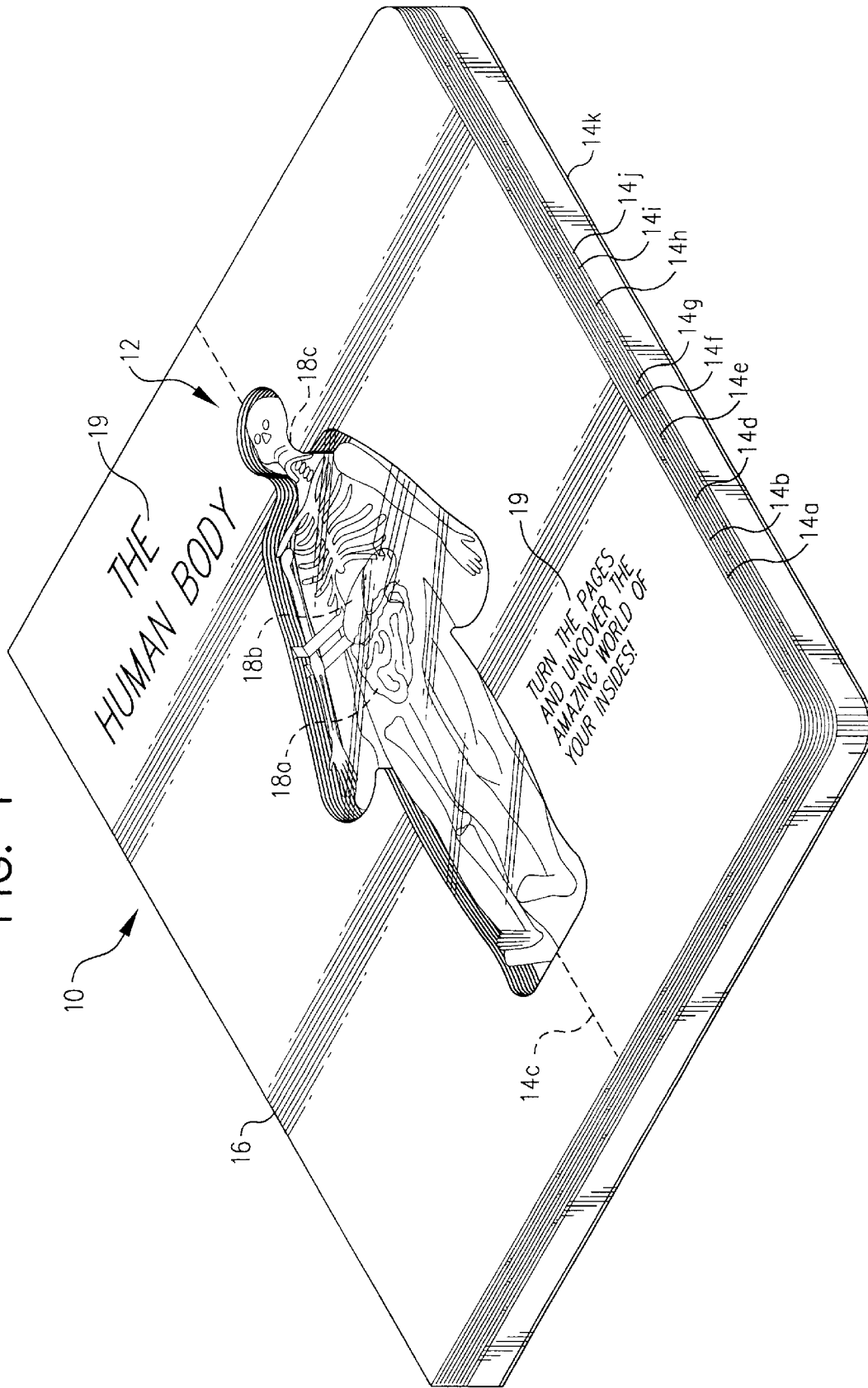
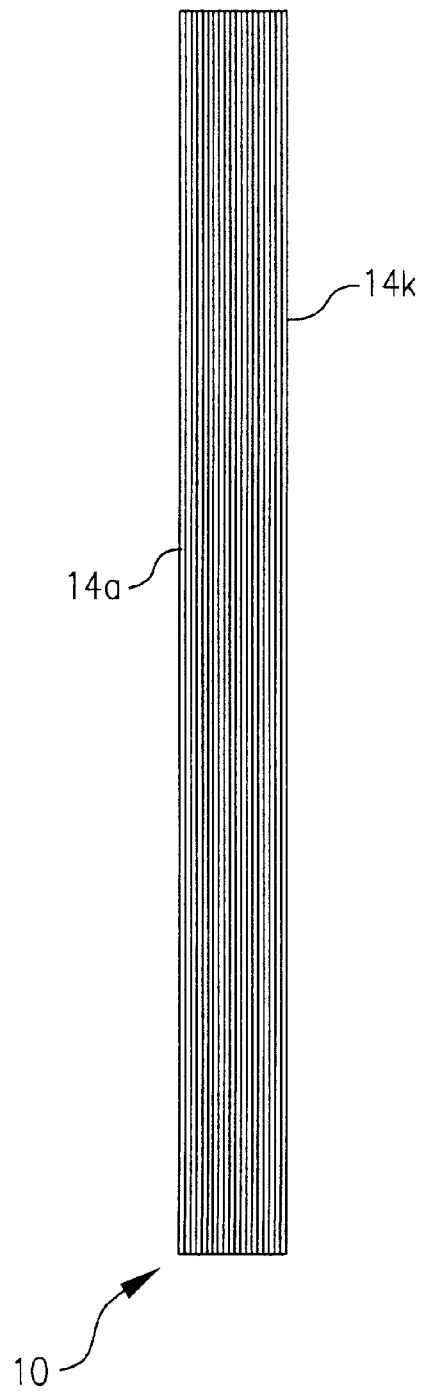
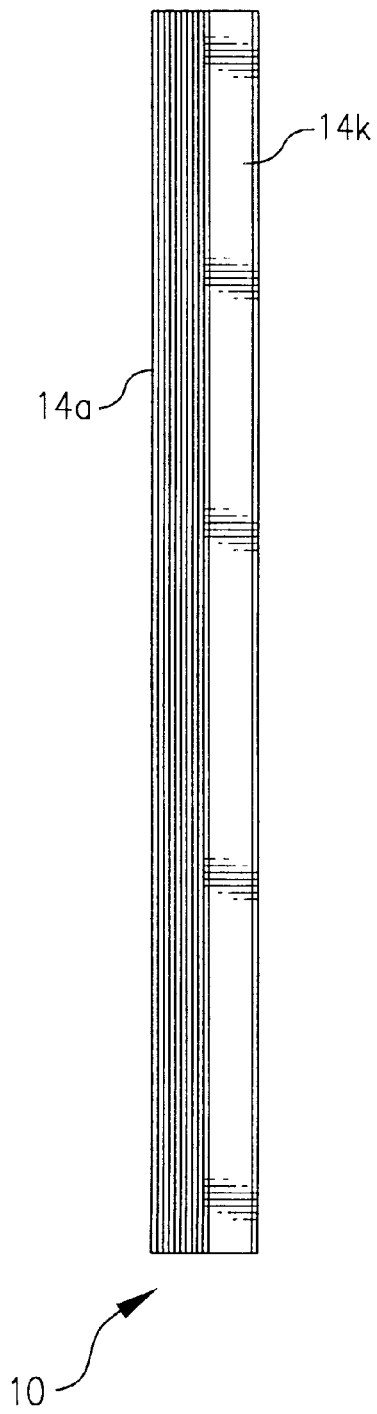
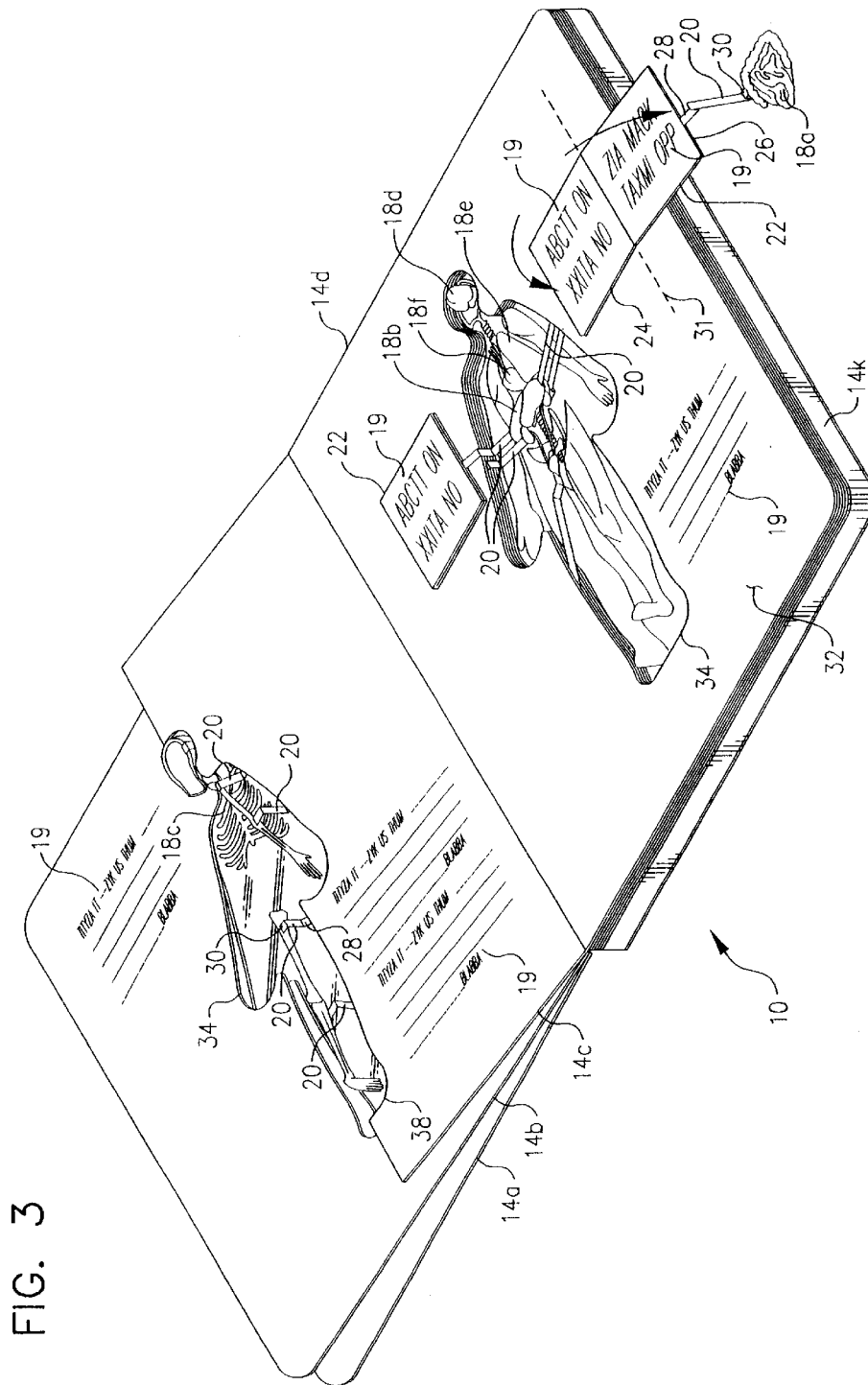
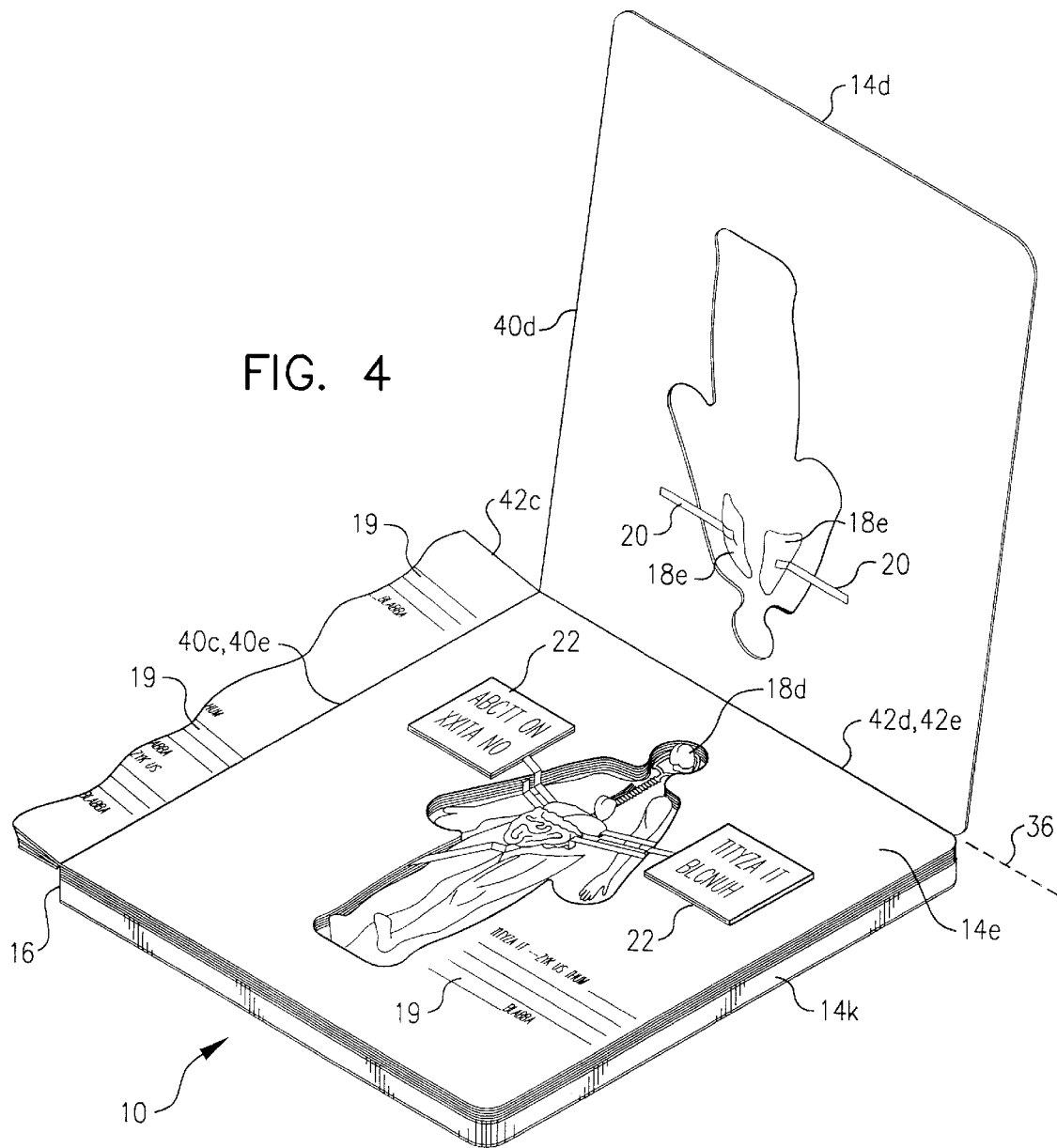


FIG. 2A

FIG. 2B







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**BOOK CONTAINING MODEL
COMPONENTS COMBINABLE TO FORM A
THREE DIMENSIONAL MODEL**

TECHNICAL FIELD

The present invention relates to the field of books. More particularly, this invention relates to books containing a multi-part three dimensional model.

BACKGROUND

A multi-part three dimensional model is worth a thousand words. A person typically learns more, quicker, when he/she can observe, touch, study the parts of a model in three dimensions. With a quick study of model parts, a person gains information that typically requires paragraphs if not pages of text to develop and explain. For example, a three dimensional model of the parts of a human body can quickly convey to a person the numbers and shapes of bones in the arms, legs, hands, and fingers, as well as the proportional sizes of the arms to the legs, the hands to the feet, the fingers to the toes, and the hands to body. To receive this same information from text, a reader typically has to read one or more pages. In addition, studying a three dimensional model typically increases a person's attention and thus increases the person's comprehension. When combined with text to convey information, a three dimensional multi-part model becomes even more powerful.

The prior art contains books that include three dimensional multi-part models within a book; however the books contain models that are thicker than the book. Thus, a portion of the model protrudes through the front cover or back cover or both. This can be expensive to a manufacturer when he/she ships the book to a vendor because to secure the books within a box, special packing inserts or packing material must be placed between each book. A model protruding from one or both of the covers of a book can also be frustrating to a vendor or purchaser of the book because the book can not be stacked with other books and will not fit neatly on a shelf. Thus, a book containing a three dimensional multi-part model that does not protrude from the front cover, back cover or both is very desirable.

In addition, the books found in the prior art include components that are not attached to other components of the model or any page in the book but rather are stored in one or more pockets in one or more pages. To assemble the model, the reader must first find and retrieve the loose component and then combine it with another component using written instructions provided on a page. Unfortunately, these books suffer three drawbacks. First, the reader may inadvertently combine the components of the model incorrectly by misunderstanding the written instructions, and thus, misunderstand some of the information conveyed by the components and assembled model. Second, the reader typically has to hold the components in their proper location and thus can not typically assemble more than two components together. Finally, in these books, the components can be easily lost depriving subsequent readers of the informational value of the lost component as well as the assembled model.

Therefore there is need for a book that contains a three dimensional multi-part model that does not protrude from the front or back cover. There is also a need for a book that contains a three dimensional model made from components attached to the book that can be combined with other components to assemble the model or can be separated from

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the model. Such a book would allow the reader to study the individual components as well as how the components combine to make the model. This allows the user to better understand and fully comprehend the information the model and the components convey.

SUMMARY

In one aspect of the present invention, a book includes a plurality of pages bound together with each page having a page thickness, and a plurality of model components including a first model component attached to a page and a second model component attached to another page such that, when the book is closed, the model components combine with each other to form a model assembly. The model assembly has an assembly thickness less than or equal to the sum of the page thicknesses, thus, allowing the book to lie substantially flat on a surface when either the cover or back of the book contacts the surface. In addition, the book can be shipped, displayed and stored much easier and more efficiently than a book having a portion of its three dimensional model protruding from one of its covers. When the book is opened, because components are attached to different pages, the model assembly is partially unassembled and, by turning successive pages, the model assembly becomes increasingly disassembled. This allows a reader to maintain interest in the subject matter and also provides the reader with information that is typically difficult to comprehend without seeing how the components combine.

In another aspect of the invention, the book includes a plurality of model components each having a component thickness greater than the page thickness of the component's respective page. At least one component is hingedly attached to a page and movable about a component axis disposed on a surface of the page to an assembled position where the component is combined with another component to form a model assembly when the book is closed. By hingedly attaching at least one component to a page, a reader can remove the hinged component from the model assembly without having to turn the page and without disconnecting the component from the book.

In another aspect of the invention, the book includes at least one page hingedly attached to another page to form a binding axis which is not located on a spine of the book. In this and certain other embodiments, each page of the book includes a first edge and a second edge. The spine is formed by binding the first edges of most of the pages to each other, and the binding axis is formed by binding the second edge of at least one page to the second edge of another page.

BRIEF DESCRIPTION OF THE FIGURES

FIG. 1 is a perspective view of a book with a three dimensional model according to an embodiment of the invention.

FIG. 2A is a side view of the book in FIG. 1 according to an embodiment of the invention.

FIG. 2B is a side view of a book with a three dimensional model according to another embodiment of the invention.

FIG. 3 is a perspective view of the book in FIG. 1 opened and showing components of the model attached to the pages of the book according to the embodiment of the invention.

FIG. 4 is a perspective view of a book with a three dimensional model according to another embodiment of the invention.

DETAILED DESCRIPTION

All terms used herein, including those specifically described below in this section, are used in accordance with

their ordinary meanings unless the context or definition indicates otherwise. Also, unless indicated otherwise, except within the claims, the use of “or” includes “and” and vice-versa. Non-limiting terms are not to be construed as limiting unless expressly stated (for example, “comprising” means “including without limitation” unless expressly stated otherwise).

FIG. 1 is a perspective view of a book 10 that includes a model assembly 12 according to an embodiment of the invention. The book 10 includes a plurality of pages 14a–14k that are bound together to form a spine 16, and a plurality of model components 18a–18c (18d–18f not shown) attached to respective pages 14a–14k and combinable to form the model assembly 12. Zero or one or more model components can be attached to a single page. When the book 10 is closed as shown in FIG. 1, the model assembly 12 is completely contained within the book 10. More particularly, the book 10 can lie flat on either page 14a or 14k—typically the book’s front cover and back cover, respectively. This allows one to ship, display and store the book much easier and more efficiently than a book having a portion of its three dimensional model protruding from one of its covers.

In addition, the model components 18a–18f combine to form the model assembly 12 in a completely assembled state. When the book is opened (for example, as shown in FIG. 3), one or more model components 18a–18f (for example, 18c as shown in FIG. 3) are separated from the model assembly 12, while one or more other model components 18a–18f (for example, 18a, 18b, 18d–18f as shown in FIG. 3) remain combined to form the model in a partially assembled state. As a reader turns the pages 14a–14k, one or more model components 18a–18f are separated from the model assembly 12 to reveal the model assembly in partially assembled states that progressively include fewer and fewer combined model components. Thus, as the reader turns each page 14a–14k, the reader is able to study the one or more components 18a–18f attached to the turned page 14a–14k, the remaining partially assembled model, and the differences between the partially assembled model before and after turning each page 14a–14k. This increases the readers attention to and comprehension of the information conveyed by the book.

The model assembly 12 can represent any desired machine, organism, structure or system. In the depicted embodiment and certain other embodiments, the model assembly represents a human body and the model components 18a–18f include representations of the intestines 18a, the liver 18b, a portion of the skeletal system 18c and the brain 18d shown in FIG. 3. The components 18a–18f are attached to respective pages 14a–14k so that as a reader turns succeeding pages 14a–14k, the model is disassembled in layers progressing from the anterior side of the model to the posterior side. For example, as shown in FIG. 3 starting with page 14c, the first model component separated from the model assembly 12 is a portion of the skeletal system 18c. Then, as the reader turns the next page 14d the next model components separated from the model assembly 12 are the intestines 18a and liver 18b.

In other embodiments, the model assembly can represent a race car with the model components representing the body, engine, wheels, chassis and any other desired part of a race car. Or, the model assembly can represent an internal combustion engine with the model components representing the cam shaft, the head, the valves, the springs, the crankshaft, the carburetor and any other desired parts of an engine. In still other embodiments, the book can include two or more

model assemblies, for example, one model assembly can represent a car and another model assembly can represent the engine of the car, or one model assembly can represent one car and another model assembly can represent a different car.

Still referring to FIG. 1, in this and certain other embodiments, the model components 18a–18f are three dimensional components each having a thickness that is typically greater than the thickness of the page it is attached to. However, the model components 18a–18f can be thinner than the respective pages 14a–14k they are attached to. For example, the last page 14k is typically thicker than the model component (not shown) attached to it. Alternatively, any one or more of the pages or all of the pages can be fabricated to be exceptionally thick to achieve the desired total thickness of the book. But, as discussed above, the thickness of the model assembly 12 in the completely assembled state is less than the thickness of the book when closed. The model components 18a–18f are typically made from any desired material such as conventional plastic, metal or fabric and can be formed using conventional molding techniques such as die casting or injection molding, or they can be formed by stuffing and stitching fabric, assembling sub-components together or any other desired manufacturing technique.

Still referring to FIG. 1, in this and certain other embodiments, the pages 14a–14k include text 19 and are hingedly bound together to form the spine 16 using conventional binding techniques. For example, the pages 14a–14k can be stitched together, glued together, stitched or glued to an additional backing material (not shown), hole punched and inserted into binder rings or a spiral, or bound together in any desired manner that allows a reader to turn one or more pages 14a–14k at time. The pages 14a–14k also have a page thickness that can vary, for example, page 14k is thicker than the other pages 14a–14j as shown in FIGS. 1 and 2a. In other embodiments, each of the page’s thickness is the same or approximately the same as shown in FIG. 2b. The pages 14a–14k can be made from any conventional material such as cardboard, paper, laminated paper and foam, plastic, fabric or any other desired material. The text 19 can convey information relating to the model components 18a–18f, to the model assembly 12, or any other desired information.

FIG. 3 is a perspective view of the book 10 in an open position according to an embodiment of the invention. In this and certain other embodiments, the book also includes bars 20 and flaps 22 that attach one or more model components 18a–18f to respective pages 14a–14k. Each flap 22 includes a flap-attachment portion 24 attached to one of the pages 14a–14k, and a flap portion 26 both of which can include text 19. Each bar 20 includes a first end 28 attached to either one of the pages 14a–14k or one of the flap portions 26, and a second end 30 attached to one or more of the components 18a–18f. The bars 20 and flaps 22 can be located anywhere on respective pages 14a–14k that allows respective model components 18a–18f to combine with other model components 18a–18f when the book 10 is closed and allows respective model components 18a–18f to be separated from the model assembly 12 as a reader either turns the pages 14a–14k or moves the component which hinges on its flap or bar end.

In this and certain other embodiments, the flaps 22 are hingedly attached to respective pages 14a–14k to allow a reader to separate one or more of the model components 18a–18f from the model assembly 12 without turning one of the pages 14a–14k. To hingedly attach one or more of the flaps 22, one can attach the respective flap-attachment

portions **24** to respective surfaces **32** of the respective pages **14a–14k** using conventional techniques, such as gluing, taping, stapling, or any other desired technique, and then folding the flap-attachment portions **24** to establish respective model component axes **31**. As a reader moves one or more of the model components **18a–18f** attached to respective flaps **22**, the flap portion **26** hinges about its respective component axis **31**. Typically, the component axes **31** lie within the same plane as the page's surface **32** and are located a substantial distance away from the spine **16**. However, one or more of the component axes **31** can lie in other planes inclined away from surface **32** of the one or more pages **14a–14k** and can be located in any desired location on the page conducive to separating and combining the model components **18a–18f**. In other embodiments, the flaps **22** can be hingedly attached to one of the pages **14a–14k** by attaching the flap-attachment portion **24** to a hinge made of conventional metal, plastic or fabric. In still other embodiments, one or more of the model components **18a–18f** can be hingedly attached directly to one or more of the pages **14a–14k**, for example one or more bars **20** can be hingedly attached to respective pages **14a–14k**.

In this and certain other embodiments, one or more bars **20** are made from conventional resilient plastic that is transparent to allow the reader to see the model components **18a–18f** attached to succeeding or preceding pages **14a–14k**. This provides the reader with a better view of the remaining model components **18b–18f** that are combined to form the model assembly **12** in a partially assembled state as well as the underside of the model components **18a–18e** that are separated from the model assembly **12**. In other embodiments, one or more bars **20** can be made from any conventional material such as metal wire or rod, resilient rubber or plastic, or any other desired material strong enough to support one or more of the components **18a–18f** that the bars **20** attach to respective pages **14b–14k**. One or more flaps **22** can be made from any conventional material such as cardboard, paper, laminated paper, plastic, fabric or any other desired material.

Still referring to FIG. **3**, in this and certain other embodiments, some or all of the pages **14a–14k** include a profiled edge **38**. The profiled edge **38** allows the book **10** to lie flat on either page **14a** or **14k**, respectively, when the book is closed. In other words, one or more model components **18a–18f** do not protrude from the front cover—page **14a**—or back cover—page **14k**—of the book **10**. Typically, the profiled edge **38** is a continuous profiled edge **34** that defines a hole in the page and lies adjacent and surrounds a portion of the model assembly **12** when the book **10** is closed. However, the profiled edge **38** can define a cut-out that lies adjacent to but does not surround a portion of the model assembly **12**. For example, page **14c** has a surface area that is approximately half of the surface area of pages **14a**, **14b**, and **14d–14k**. In other embodiments, one or more pages **14a–14k** can have a profiled edge **38** that defines a cut-out and have a surface area that is greater than or less than half of the surface area of one or more of the other pages **14a–14k**. In addition one or more pages **14a–14k** can have more than one profiled edge **38**, profiled continuous edge **34** or a combination of both shapes of edges. All of the pages can have a profiled edge such that the model is located at the edge of the book (and each page) and is not surrounded by any page. Furthermore, the profiled edge **32** can be located a substantial distance away from the model assembly **12** when the book is closed.

FIG. **4** is a perspective view of a book **10** according to another embodiment of the invention. The book includes one

or more pages **14d** that are not bound to the other pages **14k** at the spine **16**, but rather, are bound to respective one or more other pages **14e** at a binding axis **36** that is not at the spine. In this and certain other embodiments, each page **14a–14k** includes a first edge **40a–40k** (**40a**, **40b**, **40f–40k** not shown) and a second edge **42a–42k** (**42a**, **42b**, **42f–42k** not shown). The first edges **40a–40c** and **40e–40k** of the pages **14a–14c** and **14e–14k** are hingedly attached to each other to form a spine **16** as previously discussed in conjunction with FIG. **1**. The second edges **42d** and **42e** of the respective pages **14d** and **14e** are hingedly attached to each other to form a binding axis **36** that is substantially perpendicular to the spine **16**. The second edge **42d** can be hingedly attached to the second edge **42e** using conventional binding techniques such as stitching, gluing, or folding one large piece of material that comprises the two pages **14d** and **14e** to form the two pages **14d** and **14e** or any other desired technique. In other embodiments, the binding axis can be oriented relative to the spine **16** at any desired angle other than 90 degrees.

Although the book has been described in considerable detail with reference to certain embodiments for purposes of illustration, other embodiments are possible, therefore the spirit and scope of the appended claims should not be limited to the above description of the embodiments; the present inventions include suitable modifications as well as all permutations and combinations of the subject matter set forth herein.

What is claimed is:

1. A book with a three dimensional model, comprising:
 - a plurality of pages bound together, each page having a page thickness;
 - a plurality of model components including a first model component attached to a page and a second model component attached to another page such that, when the book is closed, the model components combine with each other to form a model assembly having an assembly thickness less than or equal to a sum of the page thicknesses.
2. The book of claim **1** wherein at least one of the model components is hingedly attached to a page and is separable from another model component by moving the hinged model component relative to the page to which it is attached.
3. The book of claim **1** wherein one or more of the pages include a profiled edge located such that, when the book is closed, the profiled edge is adjacent the model assembly.
4. The book of claim **1** wherein at least one of the pages includes one continuous profiled edge defining a hole in the page and located such that, when the book is closed, the continuous profiled edge surrounds a portion of the model assembly.
5. The book of claim **1** wherein each page has a first edge and all the first edges are bound together.
6. The book of claim **1** wherein each page has a first edge and a second edge, the first edge of a at least one page is hingedly attached to the first edge of another page, and the second edge of the at least one page is hingedly attached to the second edge of yet another page.
7. The book of claim **1** wherein the plurality of pages includes a last page having a page thickness greater than any of the other page thicknesses and wherein one of the model components is attached to the last page.
8. The book of claim **1** wherein at least one page includes text.
9. The book of claim **1** wherein the model assembly includes a model of a human body.

10. The book of claim 1 wherein:
the first model component is a human skeletal system component;
the second model component is a human liver component;
a third model component is a human brain component;
and
the model assembly is a model of a human body.

11. The book of claim 1 wherein:
the first model component is a human liver component hingedly attached to one of the pages;
the second model component is a human intestines component hingedly attached to the same page; and
the model assembly is a model of a human body.

12. The book of claim 1 further comprising:
a flap including an attachment portion hingedly attached to one of the pages and a flap portion; and
a bar including a first end attached to the flap portion and a second end attached to a component.

13. The book of claim 1 further comprising:
a flap including an attachment portion hingedly attached to one of the pages, a flap portion, and text; and
a bar including a first end attached to the flap portion and a second end attached to a component.

14. The book of claim 1 further comprising:
a flap including an attachment portion hingedly attached to one of the pages and a flap portion; and
a bar transparent to light and including a first end attached to the flap portion and a second end attached to a component.

15. A book with a three dimensional model, comprising:
a plurality of pages hingedly bound together to form a spine, each page having a page thickness; and
a plurality of model components each attached to a page and each having a component thickness greater than the components respective pages thickness wherein at least one of the components is hingedly attached to its respective page and movable about a component axis disposed on a surface of the page to an assembled position where the component is combined with another component to form a model assembly when the book is closed; and
the component axis is separated from the spine by a substantial distance.

16. The book of claim 15 wherein some of the pages include a profiled edge located such that, when the book is closed, the profiled edges are adjacent the model assembly.

17. The book of claim 15 wherein at least one of the pages includes one continuous profiled edge defining a hole in the page and located such that, when the book is closed, the continuous profiled edge surrounds a portion of the model assembly.

18. The book of claim 15 wherein each page includes a first edge and all the first edges are bound together to form the spine.

19. The book of claim 15 wherein each page includes a first edge and a second edge, the second edge of a first page is hingedly attached to the second edge of a second page thereby defining a binding axis, and the first edges of the first page and the remaining pages other than the second page are hingedly attached to each other to form the spine.

20. The book of claim 15 wherein the page thickness of each page is approximately the same.

21. The book of claim 20 wherein the page thickness of each page is the same.

22. The book of claim 15 wherein at least one page includes text.

23. The book of claim 15 wherein the model assembly includes a model of a human body.

24. The book of claim 15 wherein:
the model components include a human brain component, a human skeletal system component, a human liver component hingedly attached to one of the pages, and a human intestines component hingedly attached to the same page; and
the model assembly is a model of a human body.

25. The book of claim 15 further comprising:
a flap including an attachment portion hingedly attached to one of the pages and a flap portion; and
a bar including a first end attached to the flap portion and a second end attached to one of the components.

26. The book of claim 15 further comprising:
a flap including an attachment portion hingedly attached to one of the pages and a flap portion; and
a bar transparent to light and including a first end attached to the flap portion and a second end attached to a component.

27. The book of claim 15 further comprising:
a flap including an attachment portion hingedly attached to one of the pages, a flap portion and text; and
a bar including a first end attached to the flap portion and a second end attached to one of the components.

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