United States Patent

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[72] Inventor **Jerome H. Lemelson**
85 Rector St., Metuchen, N.J. 08840

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[54] **METHOD OF PRODUCING AN ASSEMBLY PUZZLE**
4 Claims, 11 Drawing Figs.

[52] **U.S. Cl.** **273/157,** 46/25; 264/132
[51] **Int. Cl.** **A63f 9/10**
[50] **Field of Search** ..... 273/157; 264/129, 132, 328; 46/17, (Cursory), 30

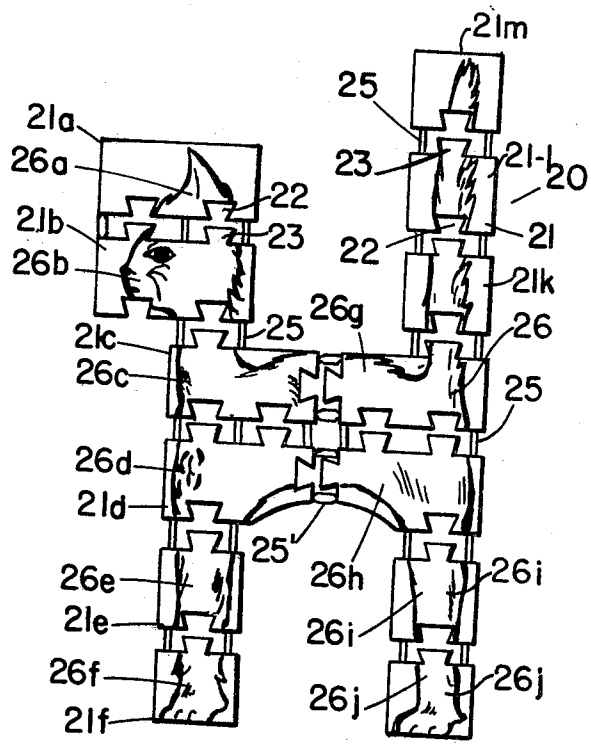
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Primary Examiner—Anton O. Oechsle

ABSTRACT: An assembly puzzle toy having separate components shaped to permit edgewise abutment assembly thereof. The components are molded in an exploded arrangement of the figure which is to be assembled with gates holding the components in place. Decorating material is applied to the exploded figure so that when the gates are removed and the components are assembled, the decorating material cooperates to form a recognizable figure. The exploded arrangement of the figure serves as an assembly aid for the person who is to assemble the components.



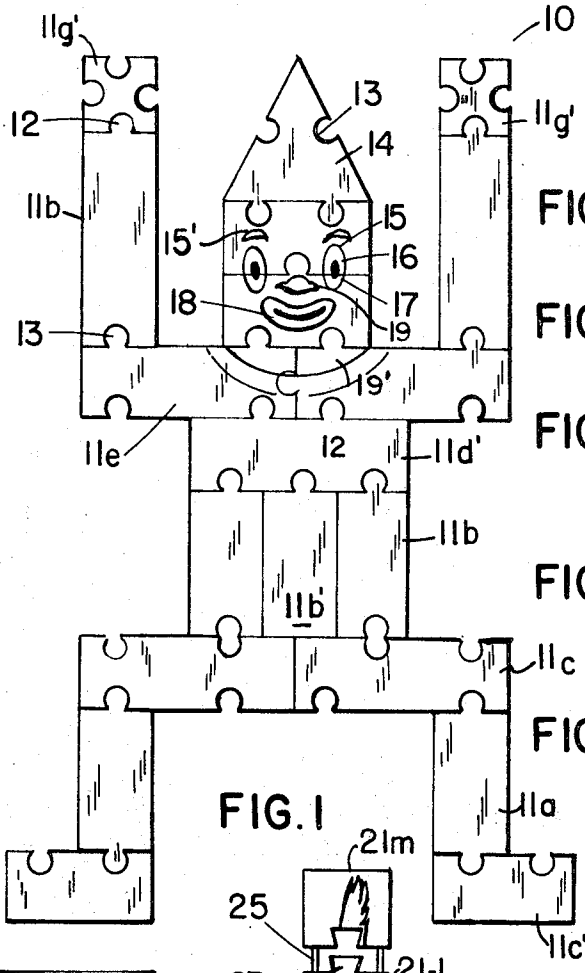


FIG. 1

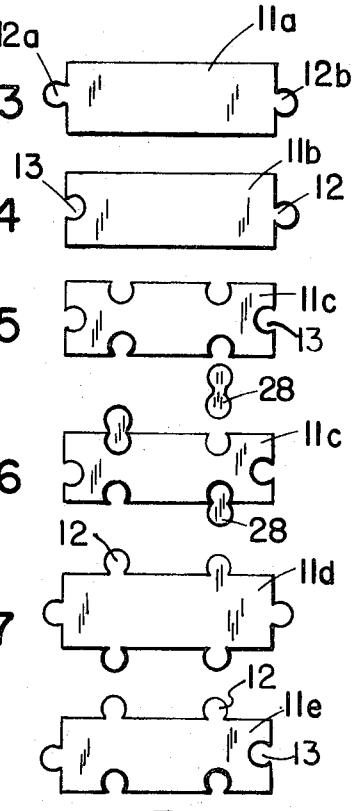


FIG. 3

FIG. 4

FIG. 5

FIG. 6

FIG. 7

FIG. 8

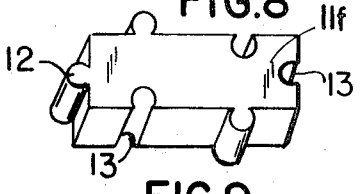


FIG. 9

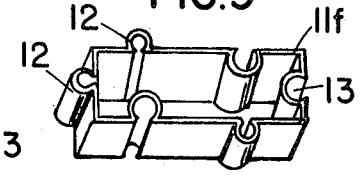


FIG. 10

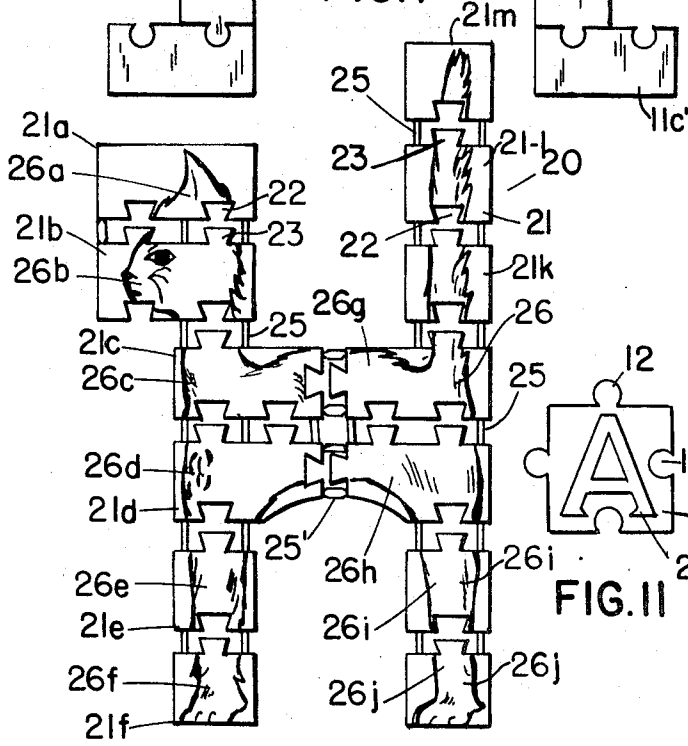


FIG. 2

FIG. 11

INVENTOR.
JEROME H. LEMELSON

METHOD OF PRODUCING AN ASSEMBLY PUZZLE

RELATED APPLICATIONS

The applicant of the instant invention hereby claims priority as a result of a provisional application filed in Great Britain on or about Sept. 6, 1967.

SUMMARY OF THE INVENTION

This invention relates to a constructional toy made of a plurality of molded plastic components which may be assembled in a multitude of different arrays to provide an assembly toy and which, when assembled in a particular manner, will provide a particular, surface-decorated article or toy, thereby permitting the assembly toy to serve also as a puzzle regarding the user with said surface-decorated article or toy when proper assembly is accomplished. Thus, the instant invention also serves as an educational toy.

It is known in the art to provide picture puzzles commonly known as jigsaw puzzles which consist of a plurality of flat components, usually die cut from sheet cardboard and each containing a portion of a total illustration or picture. Such puzzles or toys generally have the singular use of providing a picture or illustration when properly assembled.

It is a primary object of the instant invention to provide an improved method for producing a puzzle or assembly toy.

Another object is to provide a new and improved method for producing articles of manufacture of molded components which are decorated while retained in the relative attitudes thereof as molded.

With the above and such other objects in view as may hereinafter more fully appear, the invention consists of the novel constructions, combinations and arrangements of parts as will hereinafter be more fully described, and illustrated in the accompanying drawings, but it is to be understood that changes, variations and modifications may be resorted to which fall within the scope of the invention as claimed.

In the drawings:

FIG. 1 is a plan view of a constructional toy shown assembled and made in accordance with the teachings of the instant invention;

FIG. 2 is a plan view of a constructional toy in accordance with the instant invention and made of a plurality of separate assemblable components which are shown retained on gate portions as molded therewith and separately decorated while so retained and prepositioned by said gate portions;

FIG. 3 is a plan view of one form of assembly toy component or block having end male protrusions;

FIG. 4 is a plan view of a modified form of FIG. 3 having male and female connection means at respective ends thereof;

FIG. 5 is a plan view of a modified form of the block of FIG. 3 having female connection means associated with each edge thereof;

FIG. 6 is a plan view of the block of FIG. 5 showing separate connectors assembled with opposite faces thereof;

FIG. 7 is a plan view of a modified form of block having a plurality of male connection means associated with four connecting sides thereof;

FIG. 8 is a plan view of a block having male and female connection means associated with respective opposite sides of the block;

FIG. 9 is an isometric view of FIG. 8;

FIG. 10 is a rear view in isometric of the block of FIG. 9; and

FIG. 11 is a plan view of a block which is a modified form of that shown in FIG. 8.

In FIG. 1 is shown a toy assembly 10 made up of a plurality of separate blocklike units 11 which are preferably solid or hollow plastic. Rectangular parallelepiped moldings each representing a separate toy component and each having at least two connection formations at respective opposite ends of the block for assembly with respective other block components. The assembly 10 is made up to represent a mock figure such as a toy clown and the block units composing said mock figure are chosen from a number of different assembly components such as those illustrated in FIGS. 3—11.

Turning first to the components shown in FIGS. 3—11, in a preferred form of the invention, it is noted that the toy components or blocks 11 may each comprise a hollow or solid injection molding or a hollow blow molding which is substantially rectangular parallelepiped in shape, although by no means is limited to said shape. By providing a rectangular parallelepiped block together with a few odd-shaped blocks, it is noted that the assembly toy provided herein be utilized, in addition to a toy for constructing toy figures and the like, as a conventional block constructional toy of which toy buildings, bridges and other structures may also be assembled by the child. The toy thus provided is actually a three-way toy enabling the user to construct conventional structures, mock comic figures and also as a puzzle in which a particular figure or scene may be derived upon proper assembly of the components.

In FIG. 3, a rectangular block unit 11*a* is oblong in shape, although it may also be of square shape. Formed at the far ends of the block unit 11*a* are respective protruding formations 12*a* and 12*b* which are somewhat cylindrical in shape and are adapted to slide or snap-fit with a cylindrical channel such as 13 shown in FIG. 4 and formed in the end wall of another block 11*b* to be assembled with 11*a*. The protrusion 12 at the other end of block 11*b* is similar in shape to the protrusions 12*a* and 12*b* of FIG. 3.

In FIG. 5 the block 11*c* has cylindrically shaped cavities 13 in each of its end walls and at least two cavities in each of its sidewalls for assembly purposes.

In FIG. 6 the block 11*c* of FIG. 5 is shown having fasteners 28 assembled in respective cavities of the sidewalls and shaped to protrude beyond the outer surfaces of said sidewalls and to slidably assemble with cylindrical cavities shaped in an adjacent block.

In FIG. 7, each of the sidewalls of a block 11*d* have cylindrically shaped protruding formations formed of the material thereof, there being two such formations 12 protruding from each of the sidewalls and one from each of the end walls in the block 11*d*.

In FIG. 8, three protruding formations 12 are formed in a respective sidewall and end wall and three cylindrical cavities 13 are formed in the other sidewall and end wall.

FIGS. 9 and 10 illustrate details of a block 11*f* having a protruding formation 12 in one end wall, a cavity 13 in the other end wall, a cavity and protruding formation in one sidewall and opposed protruding formation and cavity in the other sidewall.

In FIG. 10 a block 11*f* is shown from the rear side thereof illustrating that it is hollow. It is noted that two formations of which 11*f* is one half, may be utilized to form a totally enclosed hollow block by bonding or frictional assembly of two of said block formations after they have been molded to shape.

In FIG. 11, a square block 11*g* is molded having respective protruding formations 12 in adjacent sidewalls and respective cylindrically shaped cavities or channels 13 in the other two adjacent sidewalls. Indicia 26A in the form of a number or letter may be printed on one face of the block 11*g* to permit it to be used to form words or sentences.

Returning now to the assembly 10 of FIG. 1 which utilizes a number of the components shown in FIGS. 3—11, it is noted that the head 11*h* of the figure is made up of two block formations, the upper one of which has three cylindrical channels, two in one sidewall and one in the other, while the lower block formation has two channels in one wall and a protruding formation in the other which snap or slide assemblies with said channel in the sidewall of the other block formation. A triangular block unit 14 has a pair of cylindrical protrusions extending from one sidewall thereof which frictionally assemble in the cylindrical grooves or channels in the upper sidewall of the upper block formation defining defining the head of the figure.

The head of the mock figure assembly 10 of FIG. 1 is shown having facial features printed on the faces of the two assembled blocks. Eyes 15 are composed of a printed portion 16 on the upper block and a printed portion 17 on the lower block which printed portions come into registration upon assembly of the two blocks and indicate the correct mode of assembling said blocks. Eyebrows 15' are printed only on the upper block while a mouth 18 and nose are printed on and confined to the lower block. The shoulders and upper arm portions of the mock figure are composed of blocks 11*e* of the type shown in FIG. 8, while the forearm portions are composed of respective blocks 11*b* of the type shown in FIG. 4. Although not illustrated, the upper arm and forearm blocks may contain printed illustrations designed to be representative of an extension of the head and neck of the mock figure, as well as illustrations representative of the upper and forearms of the mock figure. Blocks 11*g'* which are a modified form of the block shown in FIG. 11 an containing four, instead of two, cylindrically shaped channels in the sidewalls thereof, are shown assembled at the ends of the forearm blocks 11*b* to represent the hands of the figure. The torso portion of the figure is composed of an oblong block 11*d'* which is a modified form of the block shown in FIG. 7 and three additional blocks including two 11*b* of the type shown in FIG. 4 and 11*b'* which has but one protruding formation 12 at one end thereof. The upper portions of the legs are each formed by a block 11*c* as shown in FIG. 5 and are connected to the ends of the blocks 11*b* of the torso by means of the connection means or pins 28 shown in FIG. 6 which slidably engage in the cylindrical channels of the blocks 11*b* and 11*c*. The lower legs are each formed of blocks 11*a* of the type shown in FIG. 3 and each connect to a block 11*c'* which is modified form of the block 11*c* of FIG. 5 having cylindrical channels provided in but one sidewall thereof.

It is noted that additional decorative material may extend across a plurality of those blocks comprising the mock figure of FIG. 1 which are not illustrated as being decorated if not all of the blocks to define, in much the manner of a jigsaw puzzle, how the components are intended to be properly assembled together. For example, the blocks 11*b*, 11*b'* and 11*d'* comprising the torso may be decorated with buttons, pockets and other illustrations representative of the torso of the mock figure. The blocks 11*c* comprising the upper legs may be decorated with indicia such as printed matter representative of the upper legs or pants of the mock figure while the blocks 11*a* may be printed or spray decorated to represent the lower leg portions of the figure. The blocks 11*c'* may be surface decorated to represent shoes or feet.

In FIG. 2 is shown an assembly toy 20 composed of a plurality of substantially rectangular blocks denoted generally by the notation 21 and each molded onto a plurality of gates or runners 25 extending between the sidewalls of adjacent blocks which gates are retained thereon after the blocks are removed from the mold so as to hold said blocks in predetermined assembly such that they may be easily decorated once the assembly is predeterminately located with respect to a printing device such as a roll printing means, a reciprocating plate printing means, screen printing means, a mask for spray painting one or more of the blocks or other suitable means.

Each of the blocks 21 of FIG. 2 is substantially a rectangular parallelepiped having one or more sidewalls thereof provided with dovetailed protrusions 23 and one or more of the opposite or same sidewalls containing undercut channel formations 22 of substantially the same shape as the dovetail protrusions to permit sliding engagement of the protrusions of one block with the walls of the channel of the other block and prevent disassembly of the two blocks unless they are laterally moved to disengage the protruding formation from the channel formed in the mating sidewall. Blocks 21*a* and 21*b* are shown having respective illustrations 26*a* and 26*b* which, upon assembly of the blocks, define the head and face of the mock figure or animal denoted 26. A respective pair of dovetail-shaped protrusions 23 formed in the upper sidewall of the block 21*b* are adapted to be frictionally secured in the dovetail shaped channels or cavities in the lower sidewall of the block 21*a*. The components 21*a* and 21*b* are so gated and decorated that the person purchasing or receiving the gated assembly immediately may see the manner in which the block components are to be assembled.

The torso of the mock animal toy of FIG. 2 is composed of four blocks denoted 21*c*, 21*d*, 21*g*, and 21*h* which are held in predetermined assembly with each other by respective gate portions of the molding. Legs are defined by block formations 21*e*, 21*f* defining the front legs, while formations 21*i* and 21*j* define the rear leg or legs of the figure. The four blocks 21*c*, 21*d*, 21*g* and 21*h* which define the torso of the figure are each surface decorated to represent respective portions of the torso of the figure which, upon assembly of the blocks, properly simulate the decorated torso. Said decorations are denoted respectively by the notations 26*c*, 26*d*, 26*g*, and 26*h*.

The blocks 21*e* and 21*f* representing the front leg or legs of the figure each contain a respective decoration 26*e* and 26*f* which is representative of the upper portion of the leg or legs of the figure and the lower portion thereof. The blocks 21*i* and 21*j* representing the rear leg or legs of the figure are each decorated with illustrations 26*i* and 26*j* representative of the upper and lower leg portions of the figure. A series of blocks 21*k*, 21*l*, and 21*m* are disposed on respective gate portions of the molding and contain illustrative material printed or otherwise deposited on their outer surfaces which represent, upon proper assembly of said blocks, the tail of the mock figure. Notation 22 refers to the dovetail shape channels or cavities molded in the sidewalls of the blocks to permit frictional assembly with the dovetail-shaped protrusions 23 of adjacent blocks.

In a preferred form of the instant invention, blocks of the type shown in FIGS. 2 or 3—11 or modified forms of said blocks may be molded in predetermined assembly or respective gates or runners such as that denoted 20 in FIG. 2, retained together on said gates during the decoration process and furthermore, retained together during packaging of said blocks such as underneath a blister or shrink film wrap to indicate to the purchaser the manner in which the components are assembled and furthermore to indicate, rather approximately, the shape of the puzzle upon proper assembly. For example, it is quite obvious that the illustration provided in FIG. 2 is intended to be representative of a cat even though the blocks are separated from each other by respective gate portions 25 as in an exploded drawing. Upon purchase and use of the puzzle, the blocks may be separated from each other by cutting or bending so as to remove the gate portions 25 from the sidewalls of each block, after which the purchaser may either assemble the particular puzzle figure or construct other assemblies of said blocks.

It is to be noted that the block designs illustrated in FIGS. 1—11 may be subject to many different variations in general shape as well as variations in the illustrated means for assembling said blocks together. In addition to mock figures and animals, various other assemblies may be presented including certain representing scenes, houses and other structures containing surface-decorated illustrations which, upon proper assembly of the blocks, provide a picture or object in which the illustrated surface portions match up or are provided in an orderly or predetermined array.

Various articles of manufacture which require decoration upon assembly of a plurality of components may be produced by the means shown in FIG. 2 of the drawings in which the individual molded components of the assembly are retained gated during the decoration process so that if the gated molding is prepositioned relative to the decoration apparatus, each component will also be so prepositioned and a printing means such as a roller, silk screen cut, mask or other means when predeterminately located with respect to one or more of the blocks will provide illustrative material which is prepositioned with respect to the other blocks in the gated assembly in such a manner that, upon proper assembly of the blocks, all of the illustrated material on the various blocks comes into registration or is otherwise properly located to define an article hav-

ing predetermined shape and decoration upon said assembly. Furthermore, if the gated assembly is retained and prepositioned with respect to an automatic assembly apparatus, said automatic assembly apparatus may be operative to automatically degate or remove the runners from the various components and thereafter predeterminately assemble the components to form articles of predetermined shape which are predeterminately surface-decorated.

I claim:

1. A method of fabricating a plurality of molded components adapted to be assembled into an article which article contains predeterminately located surface decorations comprising the steps of:

molding separate components representative of an article made by assembling said components with said components being shaped to permit the edgewise abutment assembly of the components in a single molding operation with said components predeterminately retained together as molded by a plurality of gates or runners;

retaining said components on said gates as molded and predeterminately aligning the gated assembly of components with a surface-decorating means;

while so predeterminately retained together and predeterminately aligned with said decorating means, selectively applying decorating material by coating predetermined areas of at least certain of said components to decorate same; and

thereafter separating said gates from said components and edgewise abutting same to predeterminately assemble said components into an article having outwardly facing surface decorations defined by said decorating material predeterminately positioned on the surface of said assembled article.

2. A method in accordance with claim 1, whereby the components are arranged and held together as molded on said gates in an array defining substantially an exploded view of the article to be assembled thereof to indicate to the assembler of said components substantially the locations of the components upon assembly.

3. A method in accordance with claim 1, whereby portions of the decorating material on adjacent components are designed to extend together upon assembly of the components and form a common decoration, said method comprising locating the decorating material on the gate-separated components, so as to effect the alignment of the decorating material on one component with the decorating material disposed on an adjacent component when the two components are predeterminately edgewise abutted and secured together.

4. A method in accordance with claim 1, including shaping the components to define separate portions of a simulated mock figure and molding the components on said plurality of gates in an array representative of substantially an exploded arrangement of the components so as to indicate to the person who is to assemble the components, the approximate relative positions of the components prior to assembly of said article.