Feb. 24, 1959 J. L. JOSEPH ET AL 2,874,512

FOLDED BLANK STRUCTURE FOR INTERLOCKING TOY CONSTRUCTION ELEMENTS

Filed Dec. 27, 1956 3 Sheets-Sheet 1

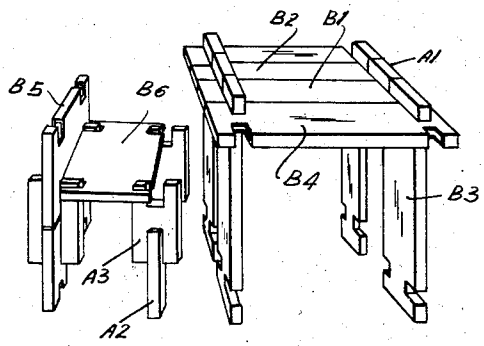


FIG. 1

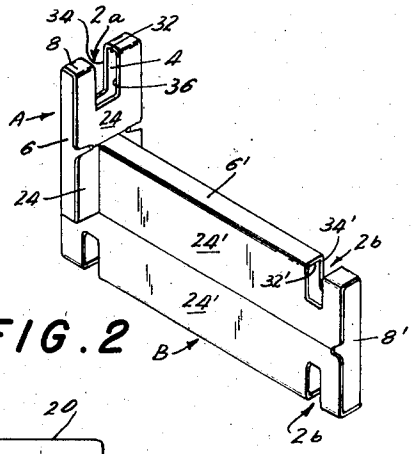


FIG. 2

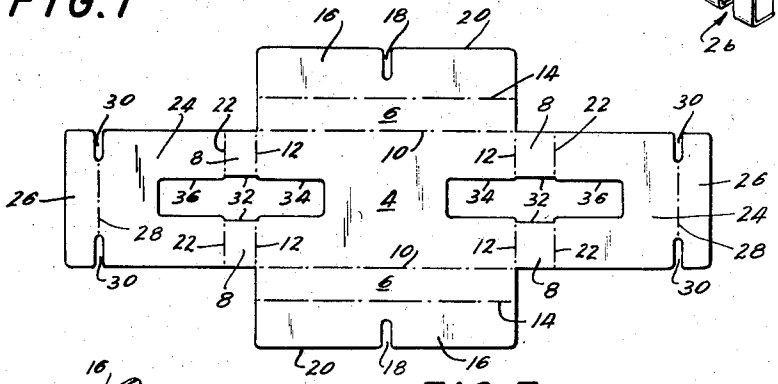


FIG. 3

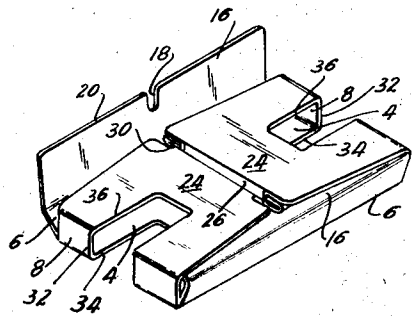


FIG. 4

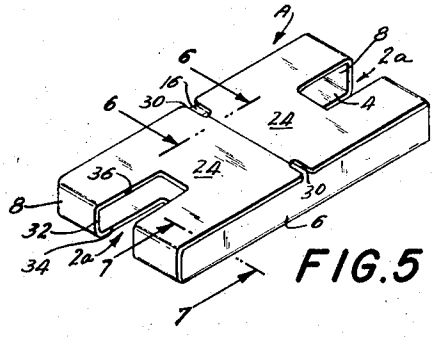


FIG. 5

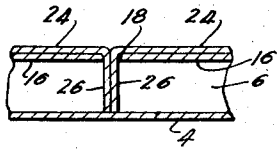


FIG. 6

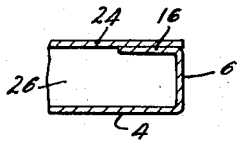


FIG. 7

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FOLDED BLANK STRUCTURE FOR INTERLOCKING TOY CONSTRUCTION ELEMENTS

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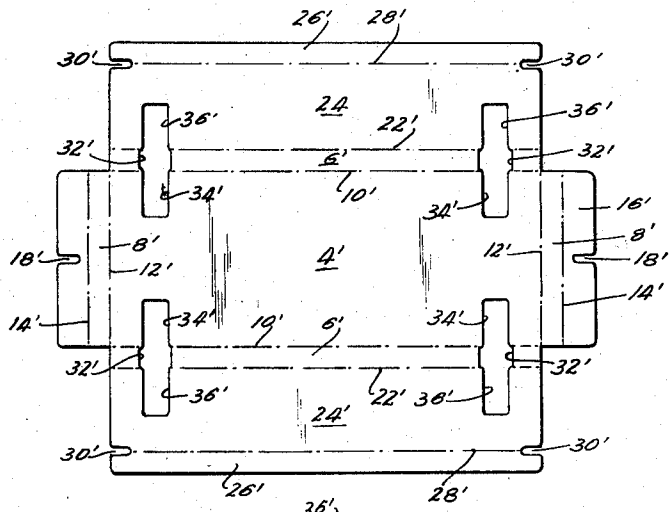


FIG. 8

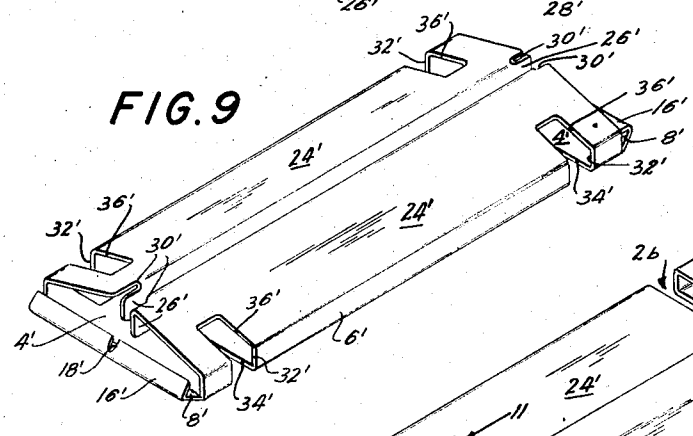


FIG. 9

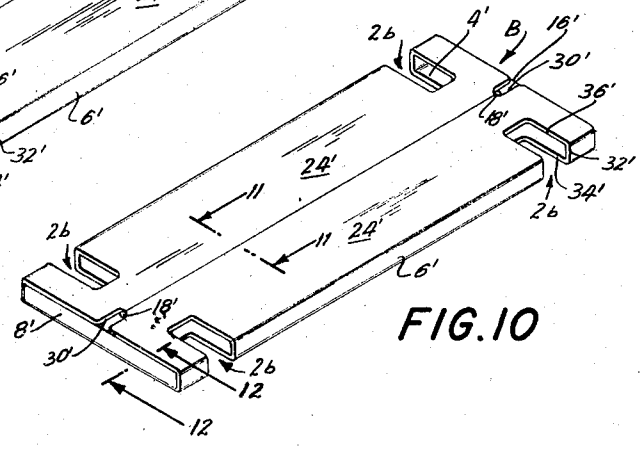


FIG. 10

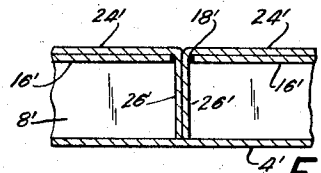


FIG. 11

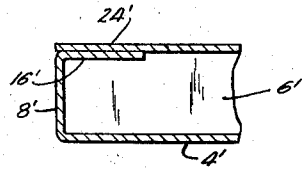


FIG. 12

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3 Sheets-Sheet 3

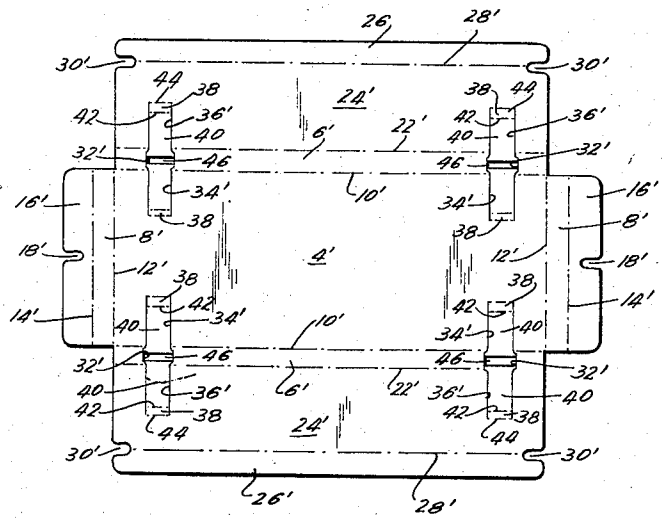


FIG. 13

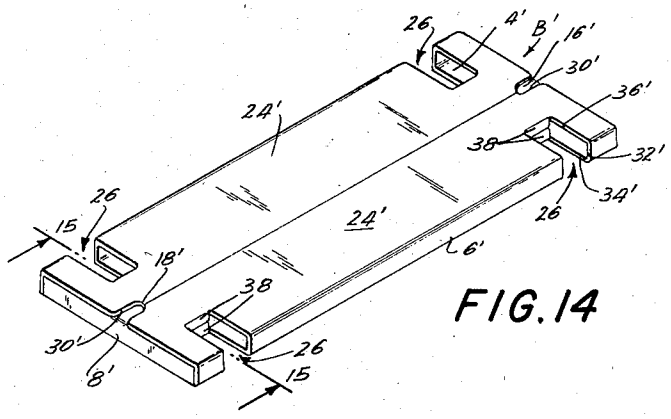


FIG. 14

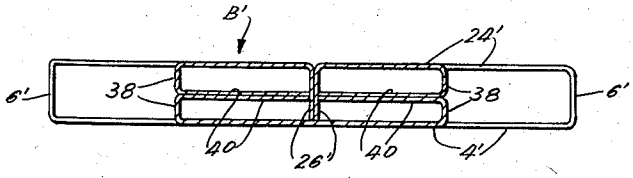


FIG. 15

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2,874,512

FOLDED BLANK STRUCTURE FOR INTERLOCKING TOY CONSTRUCTION ELEMENTS

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Application December 27, 1956, Serial No. 630,931

20 Claims. (Cl. 46—25)

The present invention relates to toy construction elements adapted to interlock or mesh so as to be capable of producing structures of various types and designs, thereby to afford both amusement and education to the users thereof, said elements being formed from folded blanks of corrugated paperboard or similar constructional material.

Interlocking or intermeshing constructional elements have long been used. For reasons of economics and safety they are customarily of extremely small size, so that only miniature structures can be created. Such structures, while esthetically satisfying, have but limited play value in and of themselves. To increase the size of such conventional structural elements in order that edifices can be constructed which are useable as such by the children who assemble the structural elements is not practical, particularly for home use. The cost of such enlarged structural elements would be far beyond the capabilities of all but the most liberal household budgets, and would even represent a substantial cost problem to most nursery schools. In addition, such structural elements, if they were to be strong enough to withstand the use and abuse to which it must be expected that they will be subjected, would of necessity be so heavy as to constitute a serious safety hazard, particularly when it is considered that it is of their very nature they be assembled to form walls consisting of a large number of such elements. If such a wall were to fall on a child it would almost literally be like a "ton of bricks."

The bulk and weight of enlarged conventional constructional elements also presents a very substantial merchandising problem. Items of this type are sold to the general consumer largely through small neighborhood toy stores or else are shipped or transported to the ultimate user from mail order houses or large department stores. The neighborhood store does not have the space to stock a sufficient supply of such enlarged items and the normal purchaser will be loath to carry home such a heavy package as would be constituted by a set of such items. Storage problems are also present, although perhaps to a less critical degree, in mail order houses and large department stores, and even there the cost of transporting or mailing heavy items is an appreciable factor.

According to the present invention large size interlocking toy construction elements are made from blanks of corrugated paperboard or the like. The use of this type of material for large size play equipment has numerous advantages, as is pointed out in Patent 2,751,705 of June 26, 1956 entitled, "Giant-Size Toy Block or the Like," the invention of John L. Joseph, one of the co-inventors here. The structures produced through the use of this material, even when of extremely large size, are sufficiently light so as to constitute no safety hazard whatsoever. Moreover, they may be sold and shipped in blank form, to be erected at the point of use, thus greatly simplifying storage and shipping problems.

It is essential that such structures, when they are finally erected, should be so strong as to be capable of withstanding the force of heavy weights without distortion or damage. It is impractical to utilize conventional structures for this purpose, and to attempt to make up for their inherent weakness by using exceedingly strong sheet material, since if the sheet material is sufficiently strong for that purpose it will itself be too heavy and inflexible.

Accordingly it has been found necessary for each application where such material is used to device special structures capable of accomplishing the desired recreational or educational objectives and having parts so arranged, related and cooperatively interconnected as to impart to the structures erected from the corrugated board blanks sufficient structural rigidity to withstand the rather severe use to which they may be put. Moreover, taking into account the limited facilities available in the average home for the erection of folded blank structures, as well as the innate curiosity, and quite often the destructive tendencies, of the youthful users of these devices, the parts of the device must be so constructed and arranged that the device can readily be erected by persons with only a limited degree of mechanical ability and without having to utilize tools or auxiliary devices, the structures when once erected having their parts so interengaged as to forcefully resist disengagement by a curious child.

The structure of the toy construction elements of the present invention has been specially designed to facilitate the use of such elements in a variety of different sizes to produce structures which may be either simple or exceedingly complex, depending upon the ingenuity and bent of the particular child, and at the same time to exhibit the required degree of sturdiness and rigidity.

To the accomplishment of the above, and to such other objects as may hereinafter appear, the present invention relates to the structure of a toy construction element and to the blank from which such toy construction may be erected as defined in the appended claims and as described in this specification, taken together with the accompanying drawings, in which:

Fig. 1 is a three-quarter perspective view of a table and chair constructed from the elements of the present invention, this being but typical of an almost infinite number of structures which might be illustrated;

Fig. 2 is a three-quarter perspective view showing one manner in which two of the structural elements may be interconnected;

Fig. 3 is a top plan view of a blank from which one type of illustrated structural element may be formed;

Fig. 4 is a three-quarter perspective view of the blank of Fig. 3 shown in an intermediate stage of erection;

Fig. 5 is a three-quarter perspective view of a fully erected element formed from the blank of Fig. 3;

Figs. 6 and 7 are cross sectional views taken along the lines 6—6 and 7—7 respectively of Fig. 5;

Fig. 8 is a top plan view of a blank from which a second type of element may be formed;

Fig. 9 is a three-quarter perspective view of the blank of Fig. 8 in an intermediate stage of erection;

Fig. 10 is a three-quarter perspective view of a fully erected element formed from the blank of Fig. 8;

Figs. 11 and 12 are cross sectional views taken along the lines 11—11 and 12—12 respectively of Fig. 10;

Fig. 13 is a view similar to Fig. 8 but showing an alternative embodiment;

Fig. 14 is a view similar to Fig. 10 but of said alternative embodiment; and

Fig. 15 is a cross sectional view taken along the line 15—15 of Fig. 14.

In the form here specifically disclosed two construction elements of different size and shape, generally designated A and B, are disclosed. Element A is shorter than element B and is provided with a single slot 2*a* in each end, whereas the longer element B is provided on

each long side with a pair of slots 2*b*. The use of at least two types of elements A and B of different dimensions facilitates the erection of widely different types of structures and permits the child to exercise his imagination and ingenuity.

The element A is erected from the blank shown in Fig. 3, that blank being formed of corrugated paperboard or the like. It comprises a bottom wall panel 4 of generally rectangular shape having long and short side walls 6 and 8 respectively connected thereto by foldlines 10 and 12 respectively. Secured to the long side walls 6 by means of foldines 14 are flaps 16 extending the full length of the side walls 6 and having narrow slots 18 centrally disposed thereon and extending inwardly from their free edges 20. Connected to the short side walls 8 by means of foldlines 22 are top wall panels 24, each here shown as having a length equal to half the length of the bottom wall panel 4. End flaps 26 are connected thereto by means of foldlines 28, slots 30 extending inwardly into the foldlines 28 from their ends. Wide slots 32 are formed centrally of the short side walls 8 and extend the full height thereof, and these slots 32 communicate with slots 34 and 36 in line therewith and extending into the bottom wall panel 4 and top wall panels 24 respectively. The width of the slots 32—36 is substantially equal to the height of the side walls 6 and 8. In the form here specifically disclosed the slots 32 are somewhat wider than the slots 34 and 36. When the blank is erected the panel slots 32—36 collectively define the element slots 2*a* previously mentioned, the additional width of the panel slot 32 forming, in the erected element, a slightly wider mouth for the erected slot 2*a* so as to facilitate the interengagement of elements.

To erect the blank of Fig. 3 to form the structural element A, the short side walls 8 are bent up, the top wall panels 24 are bent over so that their foldlines 28 meet, and the flaps 26 are bent down. The long side walls 6 are bent up and the flaps 16 are bent so as to extend under the top wall panels 24, the slots 18 in the flaps 16 engaging with the slots 30 between the top wall panels 24 and their respective flaps 26, so as to firmly interlock and connect all of the panels and flaps into a substantially hollow rectangular parallelepiped structure which has the element slots 2*a* at its ends.

The height of the flaps 26 is substantially equal to the height of the side walls 6 and 8, so that the free ends of the flaps 26 rest upon the upper surface of the bottom wall panel 4, thus internally rigidifying the erected element.

The height of the flaps 16 is no greater than, and preferably is substantially equal to, the distance between the corresponding foldline 12 and the proximate side edge of the registering slots 34 and 36. Hence the flaps 16 do not interfere with the element slots 2*a*, but nevertheless provide for structural reinforcement of a substantial portion of the top wall along its side edges, the interengagement between the flaps 16 and the flaps 26 ensuring that the flaps 16 will remain in position substantially underlying portions of the top wall panels 24. The same interlocking engagement helps to ensure that the flaps 26 will be vertical, and thus in their internally rigidifying positions.

The structural element B is essentially similar to the structural element A insofar as the interaction between its various panels and flaps is concerned, but differs therefrom in size, proportion, and location and number of slots. In describing the structural element B and the blank from which it is formed, as shown in Fig. 8, reference numerals similar to those employed with structural element A will be used for comparable parts, but differentiated by being primed.

The blank of Fig. 8 comprises a bottom wall 4', long side walls 6', and short side walls 8', together with foldlines 10' and 12'. The flaps 16' are shown as connected to the short side walls 8' by means of foldlines 14',

whereas the top wall panels 24' are shown connected to the long side walls 6' by means of foldlines 22', thus reversing the arrangement in the structural element A. Flaps 26' are connected to the top wall panels 24' by means of foldlines 28', and the slots 18' and 30' in the panel 16' and foldlines 28' are present as in the element A. In the element B the slots 32' are formed in the long side walls 6', each side wall 6' being provided with a pair of wide slots 32', each adjacent an end thereof. As before slots 34' and 36' are formed in the bottom wall panel 4' and top wall panels 24' in line and communicating with the slots 32'.

As may be seen from a comparison of Figs. 9 and 10 with Figs. 4 and 5, and by comparing the respective cross sectional views, the blank of Fig. 8 is erected to define the element B in a manner analogous to that previously described with respect to the blank of Fig. 3 and the element A. When thus erected the element slots 2*b* are defined by the panel slots 32'—36'.

In view of the stiffness of the material from which the blanks are formed, once the various panels and slots are interlocked they will reliably and forcibly resist disengagement. Engagement is accomplished only when accompanied by distortion of the various parts and the inherent rigidity of those parts will cause them to snap into assembled and interlocked position and strongly resist subsequent distortion attendant upon disassembly.

The elements A and B may be interconnected in various ways in order to make composite structures of desired shape and form. The elements A can be employed to connect elements B together by causing adjacent elements A and B to interlock through engagement of their slots 2*a* and 2*b* respectively. For example, having reference to Fig. 1, element A1 connects element B1 and B2. It will be noted in this regard that the depth of the element slots 2*a* and 2*b* are together equal to substantially half the width of the element B and substantially half the length of the element A. Alternatively, an element B may be used to secure two adjacent elements together, as is the case with the element B3 in connection with elements B1 and B4, the element B3 there functioning as a table leg. Legs may also be constructed by interlocking longitudinally arranged elements A, as with the elements A2 and A3. The element B5 is used to connect a pair of chair legs together, as defined by the interconnected elements A2 and A3, the element B5 further comprising a chair back. Another element B6 is utilized as a chair seat by frictionally engaging (without interlocking) portions of the elements defining the chair legs. These assemblies are but illustrative of the many ways in which the structural elements of the present invention may be used.

Figs. 13–15 illustrate an alternative construction which provides for greatly improved internal rigidification of the toy elements. This alternative structure is specifically illustrated as embodied in an element similar to that shown in Figs. 8–12, and consequently generally designated B', parts corresponding to those of the element B being provided with similar reference numerals. It will be understood, however, that the same modification could be employed with the element A illustrated in Figs. 3–7.

As disclosed in Figs. 13–15, the material of the blank in the spaces defined by the slots 32', 34' and 36' is not completely excised. Instead, reinforcing flaps are formed from that material, those flaps comprising first sections 38 and second sections 40 separated by foldlines 42. The first flap sections 38 are connected at their ends by means of foldlines 44 to the bottom wall panel 4' or to the top wall panels 24' as the case may be. The distance between the foldlines 42 and 44 is approximately equal to half the height of the side wall panels 6'. The length of the flap sections 40 is approximately equal to the distance between the foldlines 44 and the foldlines 28' between the top wall panels 24'

and their flaps 26'. As may clearly be seen from Fig. 13, this may involve the excising of a small amount of the blank material so as to leave a space 46 between the ends of opposed flap sections 40. The flap sections 38 and 40, along their sides, are separated from the remainder of the blank by means of cuts.

When the blank is erected, as shown in Figs. 14 and 15, the first flap sections 38 are folded into the erected structure so that they meet substantially midway of the height thereof, while the flap sections 40 lie alongside one another and extend into the erected structure widthwise thereof, the tips of the flap sections 40 engaging the flaps 26' which extend downwardly from the top cover panels 24'.

The first flap sections 38 not only improve the appearance of the erected structure by closing the inner end of the slots 26 but also, because they meet, produce additional vertical rigidification of the erected structure, thus permitting that structure better to withstand forces exerted from the top wall panels 24' to the bottom wall panel 4'. The flap sections 40, by engaging the flaps 26', ensure that the flaps 26' will remain vertical and thus perform their internal rigidification function. When the element B' is interlocked with another element, and preferably another element similarly constructed, by receiving that other element within the slots 26, the presence of that other element will prevent the flap sections 38 from moving out into the slots 26, thus adding to the security of rigidification of the element B'.

While but two different styles of construction elements have been here specifically disclosed, it will be apparent that many variations may be made in the specific details thereof, all within the spirit of the invention as defined in the following claims.

We claim:

1. A blank for a toy construction element comprising a bottom wall panel, opposed pairs of side wall panels foldably secured thereto, top wall panels foldably secured to one opposed pair of side wall panels and having a combined width substantially equal to the corresponding dimension of said bottom wall panel and adapted to meet across the top of said element, first flaps foldably secured to the meeting edges of said top wall panels and adapted to be bent down into said element, second flaps foldably secured to the upper edges of another opposed pair of side wall panels and adapted to be received under said top wall panels, at least one opposed pair of side wall panels having slots formed therein and extending from top to bottom thereof, said bottom wall panel and said top wall panels having slots of comparable width communicating and substantially in line with said first mentioned slots.

2. The blank of claim 1, in which the width of said second flaps is substantially equal to the distance between the proximate edge of said slot in said top wall panel and the corresponding end of said top wall panel.

3. A blank for a toy construction element comprising a bottom wall panel, opposed pairs of side wall panels foldably secured thereto, top wall panels foldably secured to one opposed pair of side wall panels and having a combined width substantially equal to the corresponding dimension of said bottom wall panel and adapted to meet across the top of said element, first flaps foldably secured to the meeting edges of said top wall panels and adapted to be bent down into said element, second flaps foldably secured to the upper edges of another opposed pair of side wall panels and adapted to be received under said top wall panels, at least one opposed pair of side wall panels having slots formed therein of a width substantially equal to the height of said wall panels and extending from top to bottom thereof, said bottom wall panel and said top wall panels having slots of comparable width communicating and substantially in line with said first mentioned slots.

4. The blank of claim 3, in which the width of said second flaps is substantially equal to the distance between the proximate edge of said slot in said top wall panel and the corresponding end of said top wall panel.

5. A blank for a toy construction element comprising a bottom wall panel, opposed pairs of side wall panels foldably secured thereto, top wall panels foldably secured to one opposed pair of side wall panels and having a combined width substantially equal to the corresponding dimension of said bottom wall panel and adapted to meet across the top of said element, first flaps foldably secured to the meeting edges of said top wall panels and adapted to be bent down into said element, second flaps foldably secured to the upper edges of another opposed pair of side wall panels and adapted to be received under said top wall panels, means for causing interlocking engagement between said first and second flaps, at least one opposed pair of side wall panels having slots formed therein and extending from top to bottom thereof, said bottom wall panel and said top wall panels having slots of comparable width communicating and substantially in line with said first mentioned slots.

6. The blank of claim 5, in which the width of said second flaps is substantially equal to the distance between the proximate edge of said slot in said top wall panel and the corresponding end of said top wall panel.

7. The blank of claim 6, in which said means for causing interlocking engagement comprises said blank having slots extending inwardly from the ends of the foldlines between said top wall panels and said first flaps, said second flaps having correspondingly positioned slots extending inwardly from the free edge thereof.

8. The blank of claim 5, in which said means for causing interlocking engagement comprises said blank having slots extending inwardly from the ends of the foldlines between said top wall panels and said first flaps, said second flaps having correspondingly positioned slots extending inwardly from the free edge thereof.

9. A blank for a toy construction element comprising a bottom wall panel, opposed pairs of side wall panels foldably secured thereto, top wall panels foldably secured to one opposed pair of side wall panels and having a combined width substantially equal to the corresponding dimension of said bottom wall panel and adapted to meet across the top of said element, first flaps foldably secured to the meeting edges of said top wall panels and adapted to be bent down into said element, second flaps foldably secured to the upper edges of another opposed pair of side wall panels and adapted to be received under said top wall panels, means for causing interlocking engagement between said first and second flaps, at least one opposed pair of side wall panels having slots formed therein of a width substantially equal to the height of said side wall panels and extending from top to bottom thereof, said bottom wall panel and said top wall panels having slots of comparable width communicating and substantially in line with said first mentioned slots.

10. The blank of claim 9, in which the width of said second flaps is substantially equal to the distance between the proximate edge of said slot in said top wall panel and the corresponding end of said top wall panel.

11. The blank of claim 10, in which said means for causing interlocking engagement comprises said blank having slots extending inwardly from the ends of the foldlines between said top wall panels and said first flaps, said second flaps having correspondingly positioned slots extending inwardly from the free edge thereof.

12. The blank of claim 9, in which said means for causing interlocking engagement comprises said blank having slots extending inwardly from the ends of the foldlines between said top wall panels and said first flaps,

said second flaps having correspondingly positioned slots extending inwardly from the free edge thereof.

13. A toy construction element adapted to interlock with other elements comprising foldably related walls formed of corrugated paperboard or the like and comprising a bottom wall, opposed pairs of side walls and a top wall connected together to define a substantially closed rectangular parallelepiped, said bottom and top walls and at least one pair of opposed side walls having communicating and aligned slots of a width substantially equal to the height of said side walls.

14. In the element of claim 13, flaps secured to said bottom and top walls along edges of said slots and extending toward and meeting one another between said bottom and top walls.

15. The element of claim 13, in which said top wall is defined by two panels foldably connected to an opposed pair of side walls and meeting intermediate of the width of said top wall, first flaps on said panels extending substantially the full length of said element and folded down into said element, second flaps foldably connected to another opposed pair of side walls and underlying said top wall panels, said element having interlocking slots formed respectively in said second flaps and substantially in the foldlines between said first flaps and said top wall panels.

16. In the element of claim 15, third and fourth flaps secured to said top and bottom walls at the inner ends of said slots and extending toward and meeting one another between said bottom and top walls, and extensions on said third and fourth flaps extending widthwise of said element to and engaging said first flaps inside said element.

17. The element of claim 13, in which said top wall is defined by two panels foldably connected to an opposed pair of side walls and meeting intermediate of the width of said top wall, first flaps on said panels extending substantially the full length of said element and folded down into said element, said first flaps having a height substantially equal to the height of said side walls, second flaps foldably connected to another opposed pair of side walls and underlying said top wall panels, said element having interlocking slots formed respectively in said second flaps and substantially in the foldlines between said first flaps and said top wall panels.

18. In the element of claim 17, third and fourth flaps secured to said top and bottom walls at the inner ends of said slots and extending toward and meeting one another between said bottom and top walls, and extensions on said third and fourth flaps extending widthwise of said element to and engaging said first flaps inside said element.

19. In the blank of claim 1, third and fourth flaps formed in said blank in the space defining one of said slots, said third and fourth flaps being provided with foldlines separating them into first and second sections, said first flap sections being foldably secured to said top and bottom wall panels respectively, the combined length of said first flap sections being substantially equal to the height of said side wall panels.

20. In the blank of claim 1, third and fourth flaps formed in said blank in the space defining one of said slots, said third and fourth flaps being provided with foldlines separating them into first and second sections, said first flap sections being foldably secured to said top and bottom wall panels respectively, the combined length of said first flap sections being substantially equal to the height of said side wall panels, the length of said second flap sections being substantially equal to the distance between the lines of securement between said top wall panel and said first flap section and said first flap respectively.

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