July 5, 1955 H. S. DEARLING 2,712,200

SHAPE-RETAINING INTERLOCKING TOY ELEMENT

Filed Sept. 24, 1952

Fig. 1.

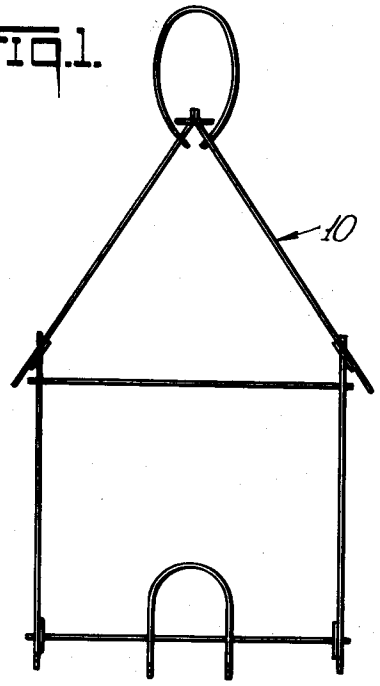


Fig. 2.

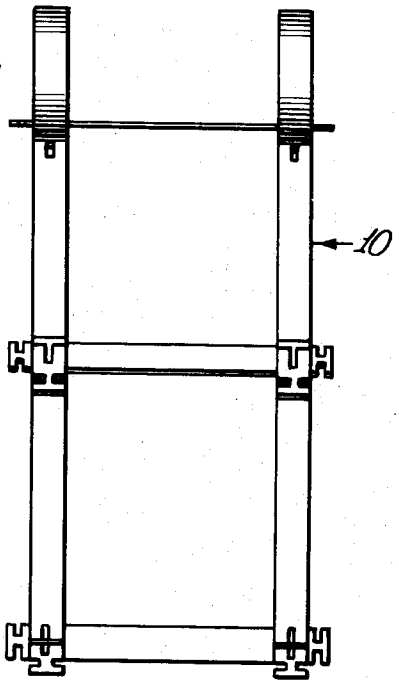


Fig. 3.

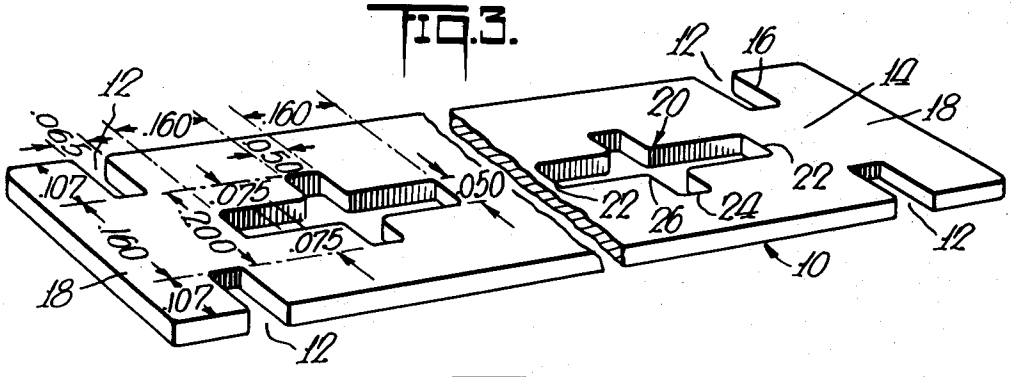


Fig. 4.

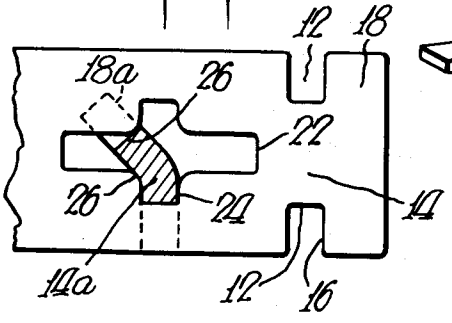
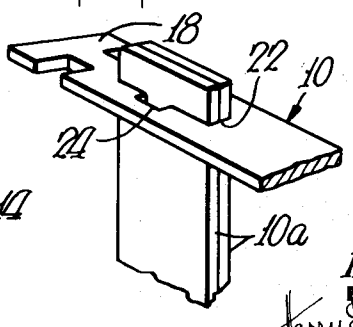


Fig. 5.



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SHAPE-RETAINING INTERLOCKING TOY ELEMENT

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1 Claim. (Cl. 46—28)

My invention relates to a toy element possessing complementary attaching means at each end thereof to permit construction by multiple interlocking into various forms such as toy buildings, vessels, bridges, aircraft, and the like.

Elongated wood or metal toy elements that interlock have been made available to children to develop their creative talents. Many parents however have found these construction toys objectionable because of the inherent danger to a child accidentally falling on rigid structural parts.

It is therefore an object of my invention to provide a structural element made of a non-rigid material which is flexible enough to permit bending when unduly pressed, and yet capable of maintaining itself stiffly in position under normal load in a toy structure of similar parts. I have found that these characteristics can be controlled by suitably proportioning the parts, and the determination of these proportions constitutes yet another object of my invention.

A difficulty arises however in employing a material which readily flexes or bends, for such a material is difficult to interlock and to maintain in locked condition, especially when under flexure or tension. The resiliency and springiness of such a material, however, I have found can be used to advantage in forming a type of lock which utilizes the springiness and resiliency to retain the interlock parts in secured position. Accordingly, a further object comprises the provision of an interlock which will permit the structure to possess sufficient "give" if collapsed without loosening the individual elements.

Further objects consist in providing a type of flexible interlock which may be formed by stamping out the part including the interlock; which may be stamped with complementary interlocks at each end of the elongated part; to provide parts made of relatively inexpensive material not requiring a finish, which is practically indestructable, and which material is non-toxic to children.

I accomplish these and other objects and obtain my new results as will be apparent from the device described in the following specification, particularly pointed out in the claim, and illustrated in the accompanying drawing, in which:

Fig. 1 is a front elevational view of a toy structure that may be made of elongated elements of my invention.

Fig. 2 is a side elevation of the same.

Fig. 3 is a perspective view of a single elongated element a plurality of which are used for making up structures of any character.

Fig. 4 is a sectional view of two elements in the process of resilient accommodation to each other to permit passage from the open to interlocked position.

Fig. 5 is a perspective view of two elements positioned in the slot of a third element.

I have found the polyethylene resins most useful in making the elongated toy element of my invention. These resins possess the requisite flexibility and stiffness to enable me to carry out the objects of my invention. The material is preferably extruded into sheet form and stamped into the desired shape.

An example of such shape is shown in Fig. 3. Because the material is flexible it will sag if the parts are made out of proportion. The overall dimensions 3.750 x .375 x .050 inches are of a part as presently manufactured, the further dimensions shown on Fig. 3 being illustrative thereof. These have been tested by assembly into a large number of structures and found satisfactory.

It will be understood that the parts may be increased in size maintaining the proportions, and that small changes can be made in the proportions without losing the necessary flexibility, resiliency, and shape-retaining properties of my device.

Each element **10** is preferably notched as **12** at each side of each end, to form a neck **14**, shoulder portion **16**, and tongue **18**, the latter of the same width and thickness as the element itself.

Adjacent each neck, a cross **20** is stamped out of the material of the element, one slot **22** of the cross extending longitudinally of the element for accommodating the width and thickness of an inserted element, and the transverse slot **24** corresponding to the width and thickness of the neck **14**. Another part **10***a* may be inserted into slot **22** until one edge of neck **14***a* reaches the opening of slot **24**, after which the neck is twisted. The parts if made of metal or other rigid material such as wood, would not be rotatable unless the parts fitted loosely, but polyethylene being compressible and deformable, the two parts may be forced, the material compressing or buckling under pressure until the neck **14***a* of the inserted part is seated within the transverse slot **24**. The intermediate position is shown in Fig. 4. The corners of the slots may be trimmed or rounded as at **26** to assist small children in rotating the parts under compression. The effort needed to compel the parts to give, as shown in Fig. 4, is within the strength of a child mentally capable of fabricating the parts into the simulation of known objects.

The slots and notches are spaced from the edges and from each other so as not to weaken the part structurally. The slot **22** is sized to permit frictional passage of the tongue **18***a* of another element, and when the neck **14***a* is twisted into position in slot **24** the natural stiffness of the material and the tightness in the slots prevents accidental return. In addition the shoulders **16** prevent removal when in the seated or locked position. Dimensions of the parts as actually tested are given in Fig. 3 and are satisfactory for providing the resilient accommodation necessary to insure operability. These dimensions may be varied, dependent upon the degree of resiliency desired.

The material polyethylene lends itself to astonishing forms when structurally applied in the form of toy elements. The material may be doubled back upon itself and the tongue of one end twisted and placed in the slot of the other end. Each longitudinal slot will actually accommodate two thicknesses of material as shown in Fig. 5, where two elements **10***a* are shown in slot **22** of element **10**. Moreover, if the material is folded under sufficient pressure to form a crease, the material may be restored by immersion in boiling water and pressing the element immediately thereafter between the leaves of a book.

Polyethylene is a straight-chain aliphatic paraffin-like hydrocarbon of high molecular weight, sometimes containing fillers to impart increased stiffness to the material.

The material is non-toxic, age and moisture resistant. It is sufficiently stiff to permit its use for forming structural shapes, sufficiently tough as to be indestructible to children, and sufficiently soft to prevent injury to a child. It is heat resistant to permit sterilization when desired,

and the material will retard the growth of molds or fungi thereon.

While polyethylene possesses all these qualities, the copolymer of vinyl chloride, vinyl acetate, or vinylidine chloride may be substituted therefor.

I have thus described my invention, but I desire it understood that it is not confined to the particular forms or uses shown and described, the same being merely illustrative, and that the invention may be carried out in other ways without departing from the spirit of my invention, and, therefore, I claim broadly the right to employ all equivalent instrumentalities coming within the scope of the appended claim, and by means of which, objects of my invention are attained and new results accomplished, as it is obvious that the particular embodiments herein shown and described are only some of the many that can be employed to attain these objects and accomplish these results.

I claim:

A substantially prismatic shaped toy element for connection to a counterpart toy element, said element having a length greater than the width and a width greater than its depth, both longitudinal ends of the element being notched from each side thereof to form a tongue at each end with a neck at the notched portion; and a pair of sets of crossed substantially rectangular shaped slots formed in the element adjacent each end, one slot in each set extending longitudinally of the element and having a length and width sufficient to accommodate the tongue of a counterpart element, the other slot extending across the width of the element and having a length and width approximately that of the neck of the inserted tongue to form a tight resilient seat therein preventing accidental separation of the two connected elements; said set of cross slots being interconnected by a passageway of such size as to produce a snap action of the neck of a counterpart element therethrough upon relative rotation of the elements by resilient compression of the contacting surfaces, said toy element being made of a stiffly flexible plastic material suitable for forming an interconnected toy structure and being sufficiently resilient to accommodate the neck when it is snap fitted through the passageway between slots.

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