

Jan. 21, 1947.

L. E. CARSON

2,414,716

MECHANICAL TOY

Filed Dec. 15, 1944

2 Sheets-Sheet 1

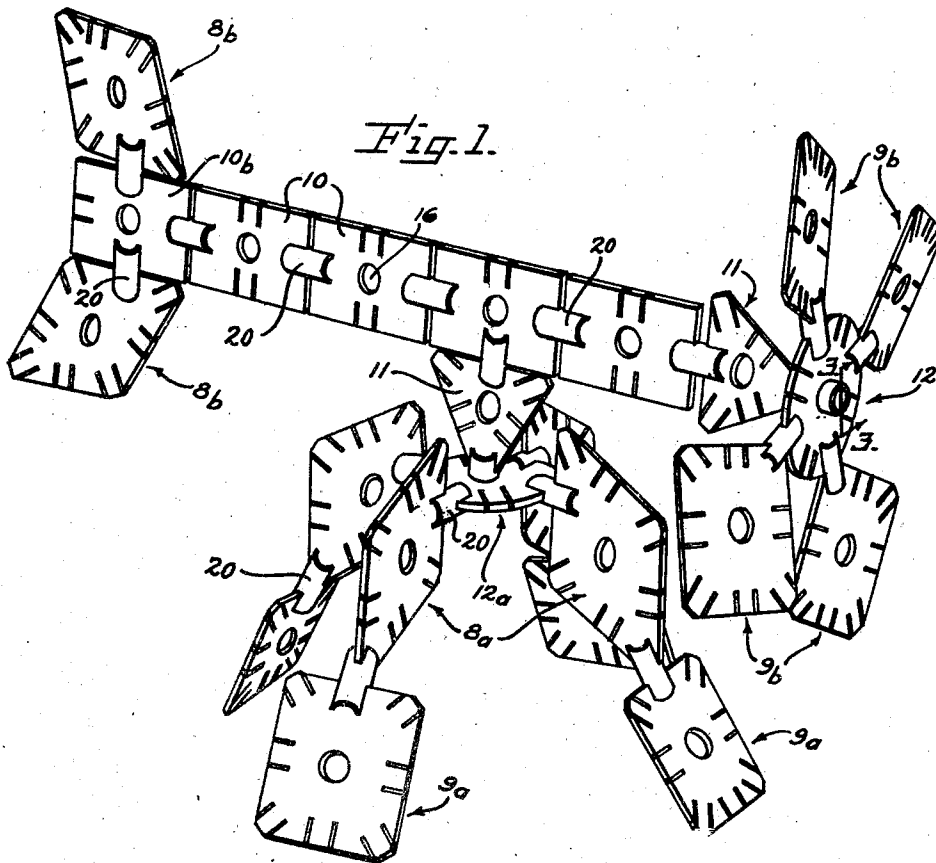


Fig. 2.

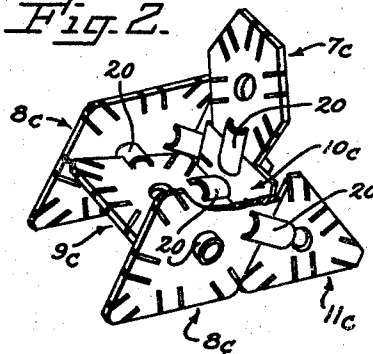
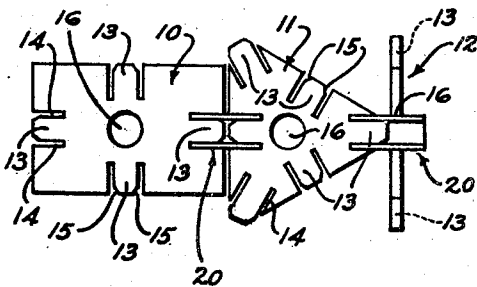


Fig. 3.



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Fig. 4.

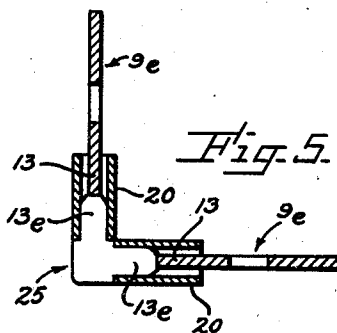
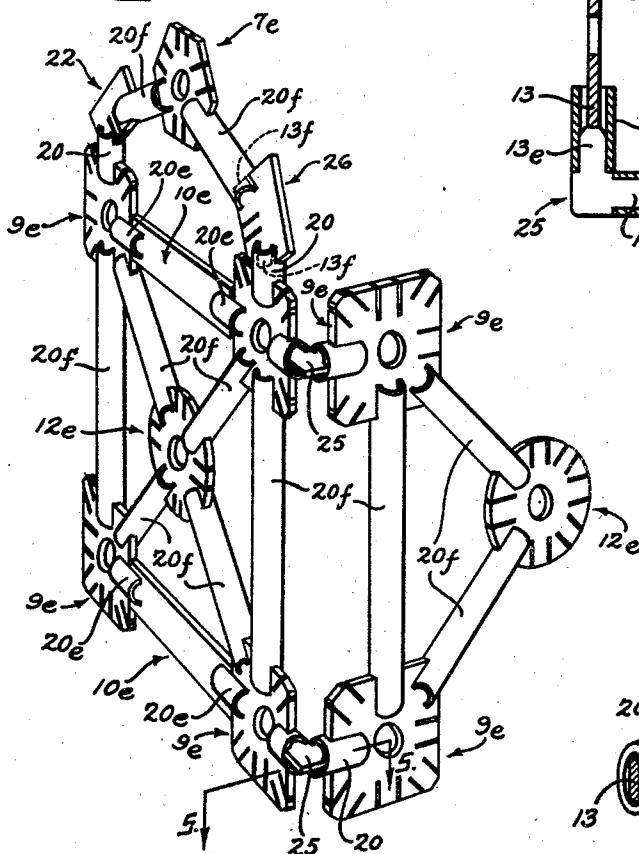


Fig. 7.

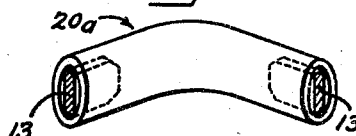
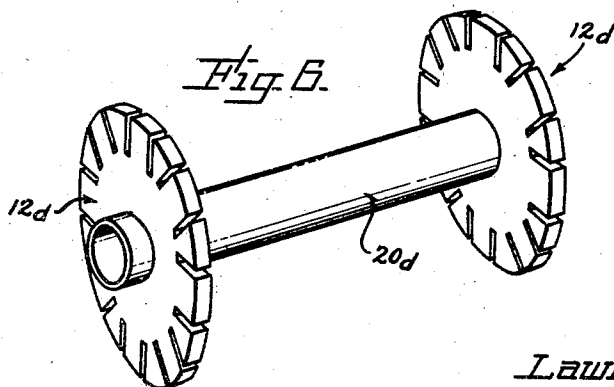


Fig. 6.



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UNITED STATES PATENT OFFICE

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MECHANICAL TOY

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2 Claims. (Cl. 46—31)

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This invention relates to mechanical toys of the type in which various forms and structures are assembled with preformed pieces of different shapes and sizes; and the general purpose of the invention is to provide a combination of pieces and connectors of maximum simplicity and capable of easy and simple assemblage in a large variety of forms. More specifically, the invention relates particularly, among other things, to connective formations and members, to provide a connective unit which is extremely simple and capable of assembly in a large variety of relative arrangements so as to allow assembly of adjacent pieces in a great variety of relative positions.

The invention will be best understood from the following description and the accompanying illustrations of preferred embodiments, reference being had to the accompanying drawings in which

Fig. 1 is a perspective of a typical assemblage utilizing my connective unit;

Fig. 2 is a perspective of another typical assemblage;

Fig. 3 is a detail section taken as indicated by line 3—3 on Fig. 1;

Fig. 4 is a perspective illustrating a fragment of another typical assemblage;

Fig. 5 is a detail section as indicated by line 5—5 on Fig. 4;

Fig. 6 is a perspective illustrating another typical assemblage, and

Fig. 7 is a fragmentary perspective illustrating a modified connector formation.

The assemblage elements which I here term pieces may be provided in a great variety of forms and in any suitable number. The number of different forms, and the number of pieces of each of those forms which go to make up a building set may be greatly varied. In the accompanying drawings I do not attempt to show all of the possible forms which the pieces may take, but only enough to show their general characteristics and to illustrate a few of the possible typical assemblages.

The preferred common characteristics of each of the pieces include the following: The pieces, for instance the pieces designated 10, 11, 12 in Fig. 3, are made from a relatively flat thin piece of any suitable material; for instance, of wood or composition material, fibrous material or molded plastic. At its side edges, and/or at its ends, each piece has assembly tongues 13 which are typically formed between two slots 14 that may be formed by slotting or sawing or molding operations. Preferably the tongues have their outer corners beveled as illustrated at 15 to facilitate

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assemblage operations. Likewise the tongues may be tapered from their bases to their tips if desired. And preferably, although not necessarily, the tongues have a width dimension (as seen in the aspect of the left-hand piece 10 in Fig. 3) considerably greater than their thickness dimension, which is the thickness of the piece (as seen in the sectional showing of the right-hand piece 12 in Fig. 3). And preferably all of the pieces, or most of them, have central holes 16.

The described tongues form one element of a connective unit, the other element of which is formed by a flexible tubular member 20, of suitable length, and composed of some relatively flexible and preferably somewhat resilient material, such as a pliable plastic. Pliable tubing of the material known as Tenite (a cellulose acetate) or Vinylite (a vinyl resin) is suitable. It is readily pliable and has a low resiliency and modulus of elasticity. A material of that nature is the preferred material, although a pliable material with high resiliency such as rubber tubing can be used. The primary requisite is pliability, preferably with some resiliency. The tubing is here shown as cylindric, but it may be elliptic, or polygonal (e. g. square or hexagonal) in sectional form. As will be seen, it is deformed and stretched in cross-section when applied to the tongues, so although cylindric tubing is preferable it is not necessary.

For making such connections as are shown in Fig. 3 connective elements 20 comprising short pieces of such tubing are used, the length of the pieces being approximately, or more or less exactly, twice the length dimensions of tongues 13, so that when the parts are assembled, as shown in Fig. 3, the adjacent edges of the pieces will either contact each other or come quite close to each other. The connector 20 shown at the left in Fig. 3 is shown as connecting two adjacent pieces in the same plane and in edge abutting relation. At the right hand side of Fig. 3 the connecting element 20 is shown as fitted over a tongue 13 at one apex of the triangular piece 11 and as extending through the central hole 16 of circular piece 12.

As I have stated, tongues 13 are preferably wider than they are thick. In any case they are rectangular in cross-sectional configuration; and their transverse dimensions are such that the flexible tubing is stretched and deformed from its normal circular form when the tubing element is forced over the tongue. An illustration of this is given in Fig. 7. There the tongue is shown at 13 in the preferred form—considerably wider

than it is thick. The flexible tubing element 20a is shown flattened in the plane of the tongue, stretched out in that plane by being forced upon the tongue. In other words, the effective width dimension of the tongue is greater than the internal diameter of the pliable tubing, so that the pliable tubing must be stretched and flattened to fit it over the tongue. Consonantly, if the tongue were relatively thicker but still rectangular in cross sectional configuration, the diagonal dimension of the tongue cross section will be greater than the internal diameter of the pliable tubing, so that the tubing must be distorted in fitting it over the tongue.

The foregoing provisions, the relation between the dimensions of the tongue and those of the pliable tubing, is one of the characteristics which is conducive to ease of assembly, to assembly of adjacent pieces in any desired relation, and particularly conducive to doing away with any great required accuracy in the manufacture of the parts, and with their manufacture from high grade materials. As will be readily understood, no great accuracy is required in the relation between the dimensions of the tongue and those of the flexible tubing, because of the range through which the tubing can be stretched and flattened in fitting it over the tongue. Consequently, within reasonable limits, relatively poor materials can be used for the several tongued pieces, and no great accuracy is required in forming the tongues.

The material of the tubing element 20, of such materials as described, is not only flexible but also compressible and extensible. The central holes 16 in the several pieces are made to a size which will diametrically compress the tubing element 20 but at the same time be not difficult to force over that element. Here again, no great accuracy is necessary in the dimensioning of holes 16.

Fig. 1 shows a typical assemblage of several pieces of different shapes, interconnected by the tubular connector elements 20 in the manners which have been described. The assemblage includes rectangular pieces 10, triangular pieces 11, circular pieces 12, square pieces 9, and diamond shaped pieces 8. The general method and manner of assembly will be understood, without further explanation, from what has been said in connection with Fig. 3. Fig. 1 however illustrates one assemblage feature which is inherent in the structure of the connector unit and which is not shown in Fig. 3; namely, that two adjacent pieces which have their connector tongues interconnected by a tubular element 20 may be assembled to lie in any desired relative plane. For instance the diamond pieces 8a which are shown assembled around the circular piece 12a in Fig. 1, are assembled in planes which are at right angles to the plane of 12a. And the square pieces 9a which are assembled directly adjacent diamond pieces 8a are in relatively right-angled planes. The two diamond pieces 8b which are assembled adjacent the rectangular piece 10b are shown as lying in planes somewhat oblique to the plane of piece 10b; and the square pieces 9b which are shown as assembled around the central circular piece 12 (in representation of a windmill) are shown assembled in planes oblique to the plane of circular piece 12. In general, any two adjacent pieces which have their tongues interconnected by a tubular element 20 can be assembled to lie in any of two relative planes which intersect each other on the axis of the tubular element.

Fig. 2 illustrates another one of many typical assemblages, in this case to simulate a chair. A square piece 9c forms the seat and two diamond pieces 8c form the sides, with connector elements 20 fitted over side tongues of the seat piece and through the central holes of the side pieces. The lower part of the chair back is formed by a rectangular piece 10c, secured to the back edge of the seat by connector element 30 which fits over a tongue on the back edge of the seat piece and through the central hole of piece 10c. The upper part of the back is formed by a hexagonal piece 7c which is affixed to the upper edge of 10c by a connector element 20 fitted over tongues of the two pieces; and rear brace pieces are formed by triangular pieces 11c connected by other connector elements 20 fitted over tongues of pieces 11c and 8c.

Fig. 6 shows a simple assemblage utilizing a tubular connector element 20d longer than those previously described. Here the assemblage simulates a pair of wheels and an axle; a pair of circular pieces 12d with the long tubular connector element 20d inserted through their two central holes.

The longer tubular connector elements may be used not only as connectors but also as long structural elements. See Fig. 4 which illustrates a fragment of an assemblage simulating a framed and braced structure. Lower square pieces 9e are connected by a long rectangular piece 10e and two short tubular connectors 20e which fit over tongues on 9e and 20e. Upper square pieces 9e are similarly interconnected. Pairs of upper and lower square pieces 20e are interconnected by long tubular connectors 20f fitted over their tongues.

Diagonal bracing is supplied by a circular piece 12e and diagonally disposed long tubular connectors 20f fitted over corner tongues of the squares and the radial tongues of the circle. The assemblage so far described forms one of say four structural panels which may be arranged in vertical planes to form a hollow cubical structure. Only one complete panel and a part of another are shown in Fig. 4. At the corners of the assembled structure, corner connections may be formed as shown in Figs. 4 and 5, utilizing a special angle piece 25 which has tongues 13e. A pair of short tubular connectors 20 are fitted over tongues 13e and over appropriate tongues 13 on the square pieces 9e.

In the upper part of Fig. 4 a sub-assemblage is shown consisting of a hexagonal piece 7e, two long tubular connectors 20f, two special pieces 26 and two short tubular connectors 20, assembled as illustrated. Special pieces 20 have tongues 13f at their ends, the axes of the two tongues of each piece making a mutual angle of about 45°.

Fig. 7 illustrates another use of a relatively long tubular connector. The tube being flexible, it can easily be bent, particularly in a plane at right angles to the planes in which it is flattened by fitting over tongues 13. Thus such a long connector may be used as an angular connector between tongues 13 which are arranged in such an angular arrangement as is shown in Fig. 7.

I claim:

1. A mechanical toy of the assemblage type, comprising a plurality of pieces of predetermined shapes, and connective units for connectively assembling the pieces, each connective unit consisting of tongues of non-circular cross-section formed on the edges of two pieces, and a tubular connective element of deformable material and

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of internal diameter less than the greatest cross-section diagonal of the tongues, the thickness dimension of the tongues being substantially less than the internal diameter of the tubular element, the tubular element being of such material and thickness as to be adapted to be forced over the tongues and thereby deformed in cross-section so as to grip the tongues.

2. A mechanical toy of the assemblage type, comprising a plurality of flat pieces of predetermined shapes, and connective units for connectively assembling the pieces, each connective unit

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consisting of relatively thin flat tongues formed on the edges of two pieces, and a tubular connective element of deformable material and of internal diameter less than the effective width of the tongues, the thickness dimension of the tongues being substantially less than the internal diameter of the tubular element, the tubular element being of such material and thickness as to be adapted to be forced over the tongues and thereby deformed in cross-section so as to grip the tongues.

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