

Oct. 17, 1939.

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2,176,161

ELEMENTS OF TOY STRUCTURES

Filed June 11, 1937

2 Sheets-Sheet 1

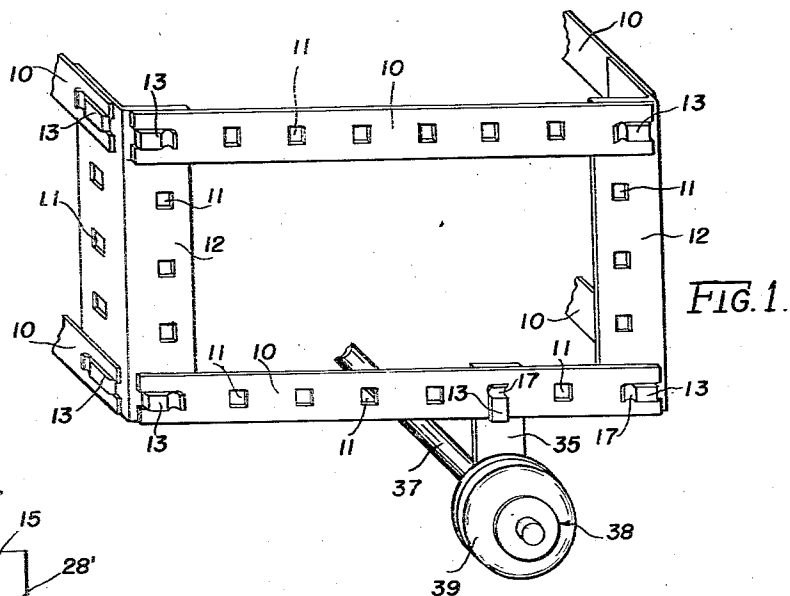


FIG. 1.

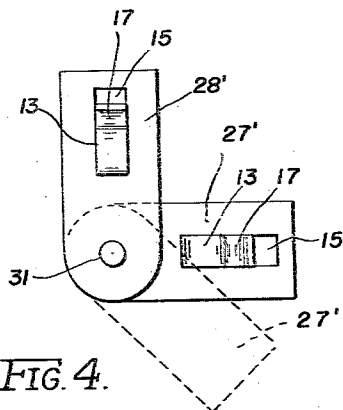


FIG. 4.

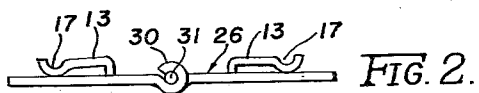


FIG. 2.

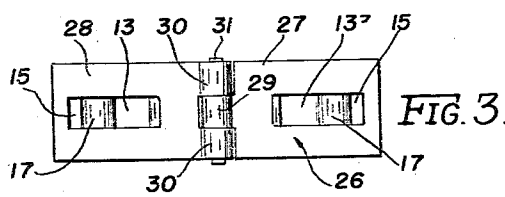


FIG. 3.

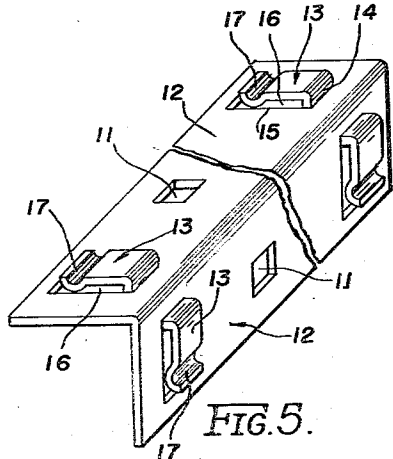


FIG. 5.

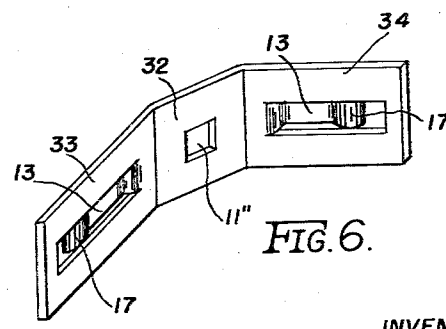


FIG. 6.

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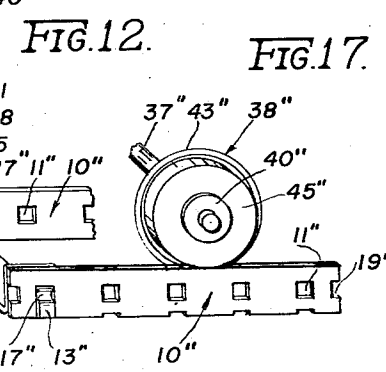
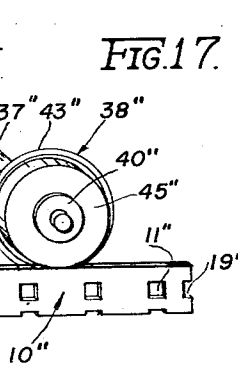
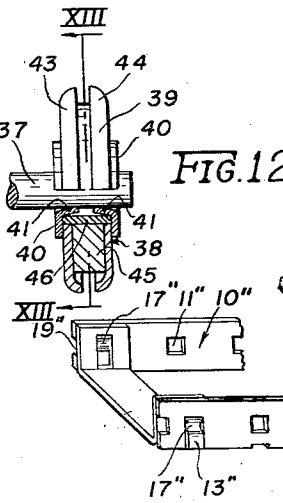
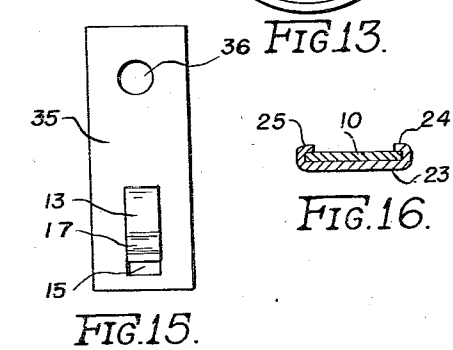
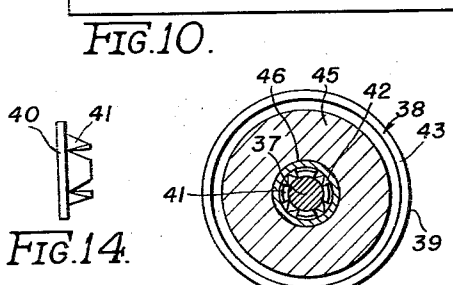
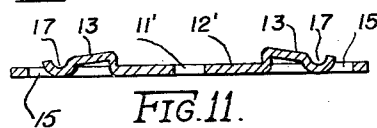
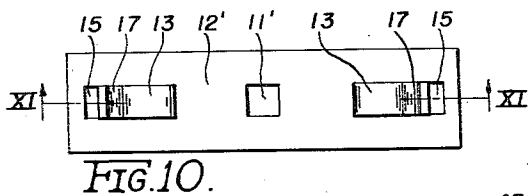
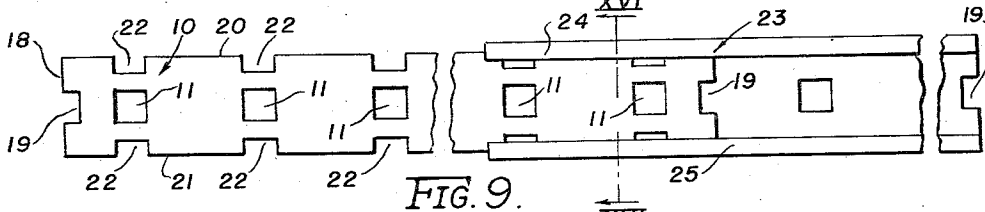
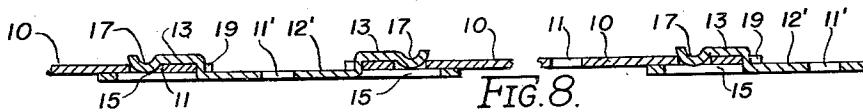
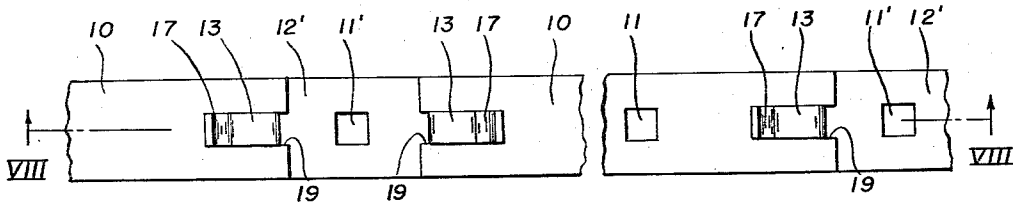
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ELEMENTS OF TOY STRUCTURES

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FIG. 7.



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ELEMENTS OF TOY STRUCTURES

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Application June 11, 1937, Serial No. 147,598

11 Claims. (Cl. 46—28)

This invention relates to sectional elements and more particularly to elements for building toy structures, although certain features thereof may be employed with equal advantage for other purposes.

It contemplates more especially the provision of toy building parts or sections adapted for building structures of varied design, purpose and configuration by resort to the ingenuity and constructive thinking of children and adults.

One object of the present invention is to provide complementary members for building different structures without resort to any requirement to form special parts or resort to extraneous fastening expedients.

Another object is to provide complementary elements that are capable of ready attachment and detachment for assembly into varied structures to develop harmless amusement, constructive thinking, and technical training for children.

Still another object is to provide simple, inexpensive and inter-fitting elements to enable their assembly into varied building structures and their ready dismantling without entailing any appreciable time or physical labor.

A further object is to provide toy building elements that are notched to fit spring clips with integral parts thereof enabling varied assembly and ready dismantling.

A still further object is to provide a novel clamping bracket that has resilient prongs stamped from the material thereof to temporarily join elements of a toy structure.

Still a further object is to provide novel fastening expedients for toy elements to enable their ready assembly and dismantling without resort to extraneous fastening expedients.

An additional object is to provide complementary parts that are extensible and capable of ready attachment and detachment.

Other objects and advantages will appear from the following description of an illustrative embodiment of the present invention.

In the drawings:

Figure 1 is a fragmentary perspective view of a toy structure illustrating the manner of assembly of the elements into one of innumerable forms by resort to the teachings of the present invention.

Figure 2 is a plan edge view of a pivotal fastening expedient embodying features of the present invention.

Figure 3 is a front view in elevation of the pivotal fastening bracket shown in Figure 2.

Figure 4 is a plan view of a form of pivotal

fastening expedient embodying features of the present invention.

Figure 5 is a perspective view of a rigid fastening bracket for use in corners or wherever parts intersect in normal planes.

Figure 6 is a perspective view of another form of bracket for the corner attachment of intersecting parts.

Figure 7 is a fragmentary plan view of elongated plate members connected together by means of fastening bracket expedients embodying features of the present invention.

Figure 8 is a sectional view taken substantially along line VIII—VIII of Figure 7.

Figure 9 is a fragmentary plan view of an extensible plate member embodying features of the present invention.

Figure 10 is a plan view of a straight bracket plate of the type shown in Figure 7.

Figure 11 is a sectional view taken substantially along line XI—XI of Figure 10, the clips being disposed within the apertures defined by the formation of the clips.

Figure 12 is a fragmentary quarter section of a wheel assembly embodying features of the present invention.

Figure 13 is a sectional view taken substantially along the line XIII—XIII of Figure 12.

Figure 14 is an edge view in elevation of a disc type of clip for assembling a wheel of the type shown in Figures 12 and 13.

Figure 15 is a plan view of a fastening bracket of the type employed in mounting a wheel assembly to a wagon body as illustrated in Figure 1.

Figure 16 is a sectional view taken substantially along line XVI—XVI of Figure 9.

Figure 17 is a perspective view showing the adaptation of applicant's invention to a rail and tie assembly.

The structure selected for illustration comprises a plurality of elongated plate members substantially of rectangular configuration and stamped or otherwise shaped from sheet material to present a light, rigid and comparatively thin flat plate to serve as an element of a toy structure of varied design, appearance, and purpose depending upon the character of their assembly. The plate 10 is preferably though not essentially of metallic construction and is provided with a longitudinal series of spaced apertures 11 preferably though not essentially of square shape. The length of the plate 10 and the number of apertures 11 as well as their size may be varied within a wide range depending upon the dictates of commercial practice.

In order to maintain a plurality of plate members in parallel and intersecting relation, corner brackets 12 are provided with fastening expedients such as spring clips 13 that are pressed from the material thereof to extend slightly beyond the surface. Any number of spring clips 13 may be provided in the angular bracket member and in the present embodiment the clip 13 is bent or otherwise shaped from the bracket 12 in the corners thereof to enable the attachment and temporary joinder of normally disposed plate members 10.

To this end, the resilient clips 13 are pressed from the material of the brackets 12 to present a substantially L-shaped configuration with the short arm 14 thereof defining the extent to which the clip 13 is raised from the surface of the bracket 12. The long arm of the substantially L-shaped spring clip 13 is externally disposed beyond the apertures 15 from which the clip 13 has been bent or formed to present a resilient clip spaced from the surface of the bracket 12 to receive a plate 10 in the space 16 defined therebetween.

It is worthy of note that the space 16 between the surface of the bracket 12 and the clip 13 is diminished in the region of the free extremity of the clip 13 by virtue of a concave or arcuate ridge 17 pressed or otherwise formed on the extremity of the clip 13 to frictionally engage the plate disposed therein and in surface contact with the bracket 12. When the plate 10 is disposed against the concave extremity 17 of the clip 13 for reception in the space 16 against the short arm 14 of the clip 13, the latter will yield sufficiently to permit the displacement of the plate 10 therebetween. In so doing, the clip 13 will also impart a resilient urge against the surface of the plate 10 that has apertures 11 therein for registry with the concave extremity 17 of the clip 13. In consequence thereof, the clip 13 will have its extremity 17 resiliently engaged within the aperture 11 provided in the plate 10 to establish a temporary joinder therebetween. It is worthy of note that the plate 10 and the clip plate 12 may be stamped or otherwise shaped from thin spring steel, and that the clips 13 preferably though not essentially are lodged within the apertures 15 as shown in Figure 11. When thicker metallic plates are used for stamping the clip plate 12, 26' or 27', the clips 13 may extend slightly beyond the surface from which they are stamped as shown in Figures 2 and 5. The position of the clips 13 may be varied depending upon the type of material and the dictates of commercial practice.

In order to provide a more rigid association between the plate members and the angle bracket 12, the plates 10 have the ends 18 (Figure 9) provided with a rectangular notch 19 to serve as a complement to the short arm 14 of the clip 13 that is lodged in the notch 19 with the clip extremity 17 engaging the ends adjacent the aperture 11 in the plate 10 (Figures 1 and 9). Then too, the side edges 20 and 21 of the plate 10 (Figure 9) may be provided with rectangular notches 22 to serve as a complement for the clips 13. As a result, the brackets with clips 13 may be attached to the plate 10 transversely as well as longitudinally thereof as occasion may require or be convenient in order to assemble the plates 10 into varied building structures and to render such flexible in character.

In order to render the plates 10 adjustable in length, such may be advantageously provided

with a complemental extension plate 23 (Figure 9) having flanged edges 24 and 25 to receive the edges 20 and 21 of the plate 10 in telescopic association. The plate extension 23 is provided with notches corresponding with the notches 11 in the plate 10 and these may be held in extensible association to any adjusted length by virtue of their frictional association or by resort to a clip 13 formed on any suitable bracket such as the plate 12', (Figure 10). It is worthy of note, however, that the plates 10 are also rendered extensible by providing a plurality in longitudinal alignment with a clip plate 12' disposed therebetween. The clip plate 12' is provided with extending clips 13 that register with the end notches 19 provided in the plates 10 so that the arcuate clip extremity 17 will engage the apertures 11 adjacent to the end notches 19 (Figure 7).

Any number of such extensions may be provided for inter-fitting engagement. It is to be noted that the clip bracket 12' may be provided with a central aperture 11' to afford the attachment of another clip bracket member in a direction normal thereto. In order to assemble plates 10 at any adjustable angle or in varied angular relation relative to each other, another form of bracket 25 (Figure 2) may be provided to consist of sectional plates 27 and 28 having complemental hinge loops 29-30 with a pin 31 extending therethrough to effect their pivotal connection. Clips 13 are pressed or otherwise formed into the body of the bracket elements 27 and 28 in a manner described supra, the clips 13 having the usual arcuate extremities 17 to effect the attachment of the plate members 10 in a similar manner. It is obvious, therefore, that elements of varied structures consisting of plates 10 may be assembled to present rectangular forms as well as angular extensions so that the structure may assume varying shapes, sizes and character.

A still further modified form of pivotal bracket clip is shown in Figure 4 wherein the pivotal pin 31 extends transversely through the plane of the bracket elements 27' and 28' so as to be pivotal in a plane opposite to the bracket elements 27 and 28 (Figure 3). The usual clips 13 are provided in the elements 27'-28', and this affords the assembly of plate members 10 with the surface thereof disposed normally to those in Figure 1. In order to secure plate members 10 in normal relation as shown in Figure 1 as well as provide a vertically erect corner member, a fastening bracket as shown in Figure 6 may be modified by providing a flat corner portion 32 rather than the sharp angle bracket illustrated in Figure 5.

In the modified bracket (Figure 6) the angular sides 33 and 34 are still normal relative to each other and are provided with the usual spring clips 13 having arcuate extremities 17 impressed therein. The aperture 11' may be provided in the flat corner portion 32 of the modified bracket shown in Figure 6 so as to enable the attachment of the flat bracket plate 12' of the type shown in Figure 10. Innumerable forms of brackets may be devised to render the plate members 10 capable of ready assembly into innumerable forms of building structures depending upon the vision, imagination, ingenuity and skill of those participating in the use thereof for amusement and mental training purposes.

In order to attach wheels to a wagon assembly of the type shown in Figure 1, it is only necessary

to provide a flat plate 35 (Figure 15) having a single clip 13 impressed therein proximate to one edge thereof. A circular aperture 36 is formed proximate to the free end thereof to receive a wheel supporting shaft 37 therethrough. The flat bracket 35 is attached transversely to the lower plate members (Figure 1) to sustain the shaft 37 in spaced relation therewith. A wheel 38 is assembled by providing a disc 39 with circumferentially disposed prongs 41 pressed from the material of the circular plate 40 to frictionally engage the shaft 37.

A pair of plates 40 confront each other with their prongs 41 disposed in the bore 42 of the wheel disc 39. The wheel disc 39 may be formed of a single piece of metal or such may be composed of complemental sections including cup-shaped confronting members 43 and 44 having a cylindrical spacer 45 disposed therebetween. An axial bushing 46 may be provided interiorly of the bore formed in the complemental cup-shaped members 43-44 of the interior spacer 45, these being held in assembled relation by means of circular confronting clips 40 having their resilient prongs 41 in telescopic association with the bushing 46 (Figure 12). The bushing 46 may be dispensed with in that the circular formation of resilient prongs 41 may directly engage the shaft 37.

It is to be noted that the wheel 38 may function as a pulley and receive a belt over the periphery thereof to serve as an element of a machine structure that may be assembled from the elements described supra. To this end, the cup shaped confronting members 43 and 44 are somewhat larger in diameter than the intermediate disc 39 to define a peripheral groove along the edge where the belt is confined to preclude the accidental removal therefrom. One of the wheel discs 44 may be dispensed with as shown in Figure 7 to provide a rail wheel 38' having a single dish side plate 43' to retain the wheel 38' on the top edge of the plate 10''. In all other respects, the shaft 37' including the prong plates 40'' and the spacer member 45'', are precisely the same and assembled in the manner disclosed and described in connection with Figure 12.

With the arrangement of parts above described, it will be apparent that simple, inexpensive and very efficient structural elements have been provided that are capable of being speedily assembled and dismantled without entailing much time, labor or expense, these being highly flexible in their adaptations. Various changes may be made in the embodiment of the invention herein specifically described without departing from or sacrificing any of the advantages of the invention or any features thereof, and nothing herein shall be construed as limitations upon the invention, its concept or structural embodiment as to the whole or any part thereof except as defined in the appended claims.

I claim:

1. Elements of toy structures comprising a rigid plate member having spaced apertures therein, a bracket member, and spring clips punched from the material of said bracket member to extend above the surface thereof for registry with notches in a complemental plate member, said spring clips having laterally curved extremities extending toward the surface from which the spring clips are punched to enable the slidable reception and frictional grasp of any one of a series of openings in said plate member be-

tween said bracket and clips for registry with an aperture in said plate member, there being clip aligning notches in the edges of said plate member.

2. Elements of toy structures comprising a rigid extensible plate member having spaced apertures therein, a bracket member, and spring clips punched from the material of said bracket member to extend above the surface thereof for registry with and frictional grasp of any one of a series of notches in a complemental plate member, said spring clips having laterally curved extremities extending toward the surface from which the spring clips are punched to enable the slidable reception of said plate member between said bracket and clips for registry with an aperture in said plate member.

3. Elements of toy structures comprising an elongated plate member, there being a plurality of longitudinally spaced apertures in said plate member, rigid connecting members, and spring clips punched from said rigid plate members to serve as a complement of the apertures in said plate members to effect detachable joinder between adjacent plate members serving as elements of a toy structure.

4. Elements of toy structures comprising an elongated plate member, there being a plurality of longitudinally spaced apertures in said plate member, rigid connecting members, and spring clips punched from said rigid plate members to serve as a complement of the apertures in said plate members, said apertures being square in shape for clip engagement longitudinally or transversely of said plate members to effect detachable joinder between adjacent plate members serving as elements of a toy structure.

5. Elements of toy structures comprising an elongated plate member, there being a plurality of longitudinally spaced apertures in said plate member, rigid connecting members, and spring clips punched from said rigid plate members to serve as a complement of the apertures in said plate members, said apertures being square in shape for clip engagement longitudinally or transversely of said plate member to effect detachable joinder between adjacent plate members serving as elements of a toy structure, and clip aligning notches in the edges of said plate members.

6. Elements of toy structures comprising an elongated extensible plate member, there being a plurality of longitudinally spaced apertures in said plate member, rigid connecting members, and spring clips punched from said rigid plate members to serve as a complement of the apertures in said plate members to effect detachable joinder between adjacent plate members serving as elements of a toy structure.

7. Elements of toy structures comprising an elongated extensible plate member, there being a plurality of longitudinally spaced apertures in said plate member, rigid connecting members, and spring clips punched from said rigid plate members to serve as a complement of the apertures in said plate members, said apertures being square in shape for clip engagement longitudinally or transversely of said plate members to effect detachable joinder between adjacent plate members serving as elements of a toy structure.

8. Elements of toy structures comprising an elongated plate member, there being a plurality of longitudinally spaced apertures in said plate member, rigid connecting members, and spring clips punched from said rigid plate members to

serve as a complement of the apertures in said plate members to effect detachable joinder between adjacent plate members serving as elements of a toy structure, and a spring clip pressed from the material of said plate member to effect the detachable joinder of said plate member with another plate member.

9. Elements of toy structures comprising an elongated plate member, there being a plurality of longitudinally spaced apertures in said plate member, rigid connecting members, and spring clips punched from said rigid plate members to serve as a complement of the apertures in said plate members, said apertures being square in shape for clip engagement longitudinally or transversely of said plate member to effect detachable joinder between adjacent plate members serving as elements of a toy structure, and a spring clip pressed from the material of said plate member to effect the detachable joinder of said plate member with another plate member.

10. Elements of toy structure comprising an elongated plate member, there being a plurality

of longitudinally spaced apertures in said plate member to serve as a complement of a spring clip, said apertures being square in shape for clip engagement longitudinally or transversely of said plate member to effect detachable joinder between adjacent elements of a toy structure, clip aligning notches in the edges of said plate member, and a spring clip pressed from the material of said plate member to effect the detachable joinder and frictional grasp of said plate member with another plate member.

11. Elements of toy structure comprising an elongated extensible plate member, there being a plurality of longitudinally spaced apertures in said plate member to serve as a complement of a spring clip to effect detachable joinder between adjacent elements of a toy structure, and a spring clip pressed from the material of said extensible plate member to effect the detachable joinder and frictional grasp of said plate member with another plate member.

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