A. N. HALL.

TOY CONSTRUCTING MATERIAL.

APPLICATION FILED NOV. 2, 1915.

1,336,626.

Patented Apr. 13, 1920.

3 SHEETS—SHEET 1.

Fig. 1.



Fig. 2.

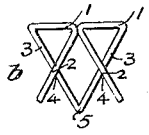
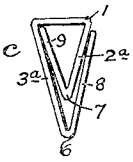


Fig. 3.



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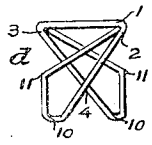

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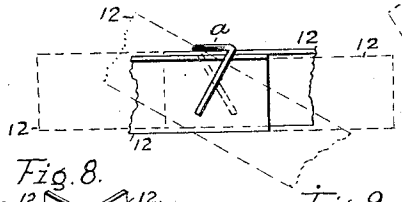

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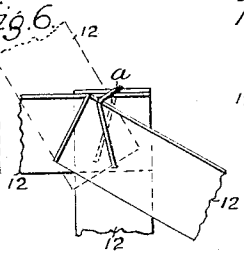

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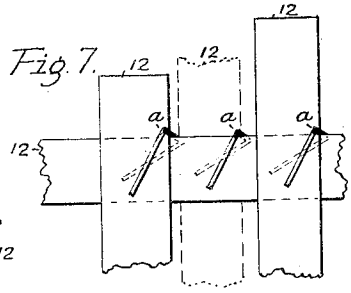

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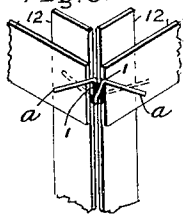

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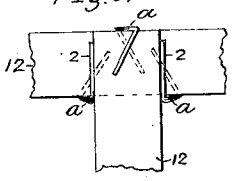

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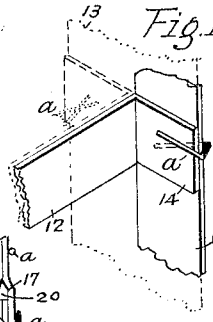

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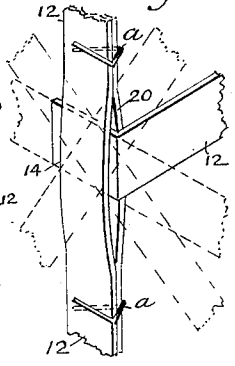
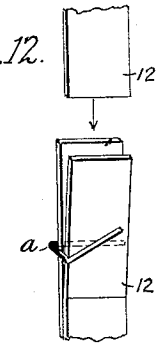


Fig. 12.



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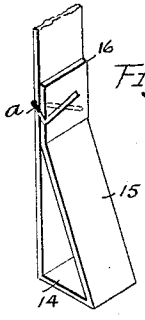

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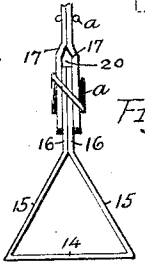

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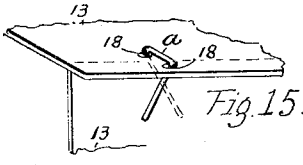

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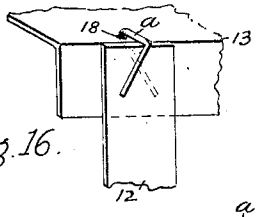

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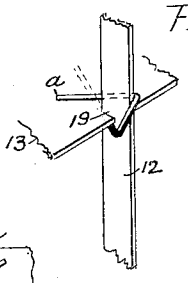

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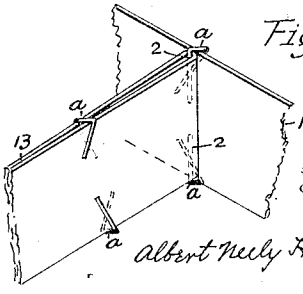

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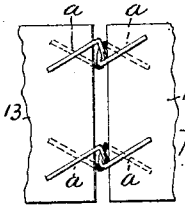

Witnesses

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3 SHEETS—SHEET 2.

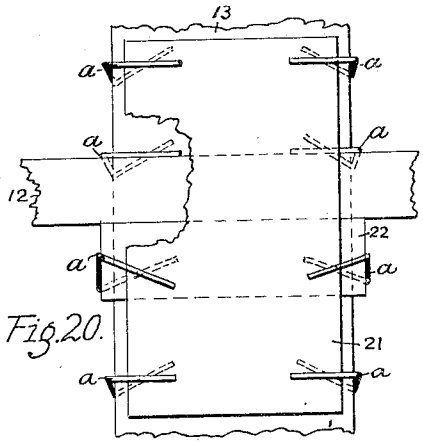
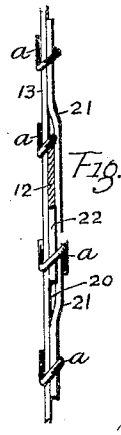


Fig. 20.



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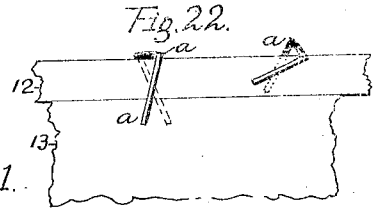

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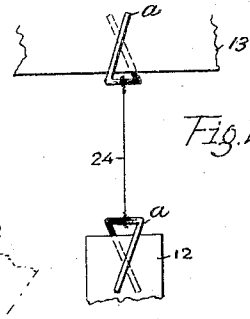

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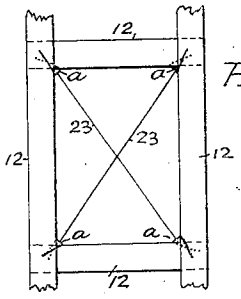

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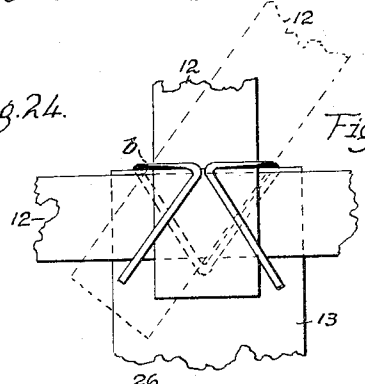

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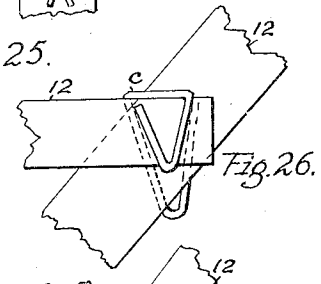

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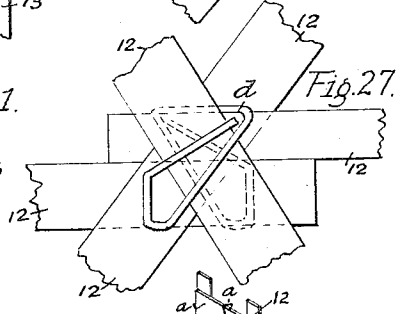

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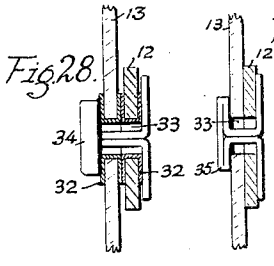

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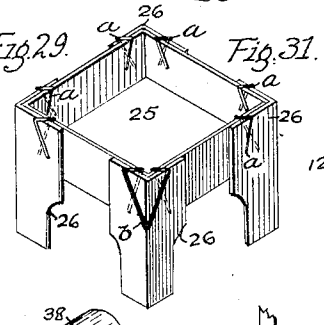
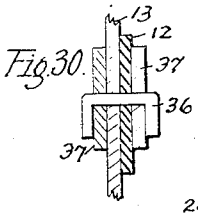


Fig. 29.

Fig. 31.



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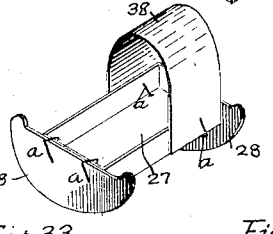

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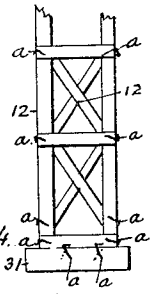

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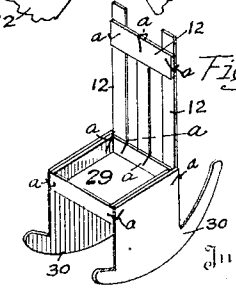

Fig. 32.

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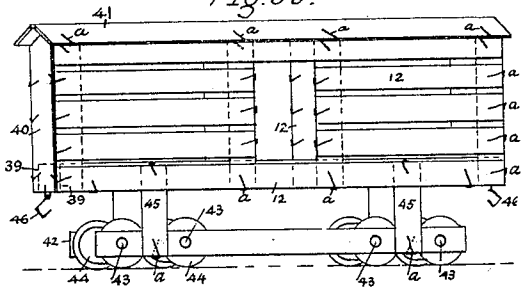
3 SHEETS—SHEET 3.

Fig. 35.



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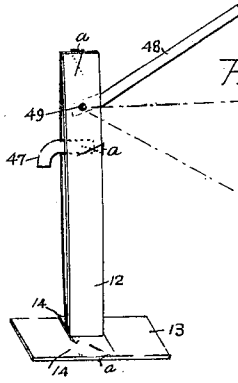

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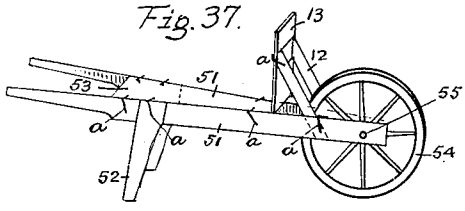

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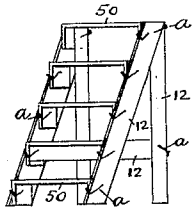

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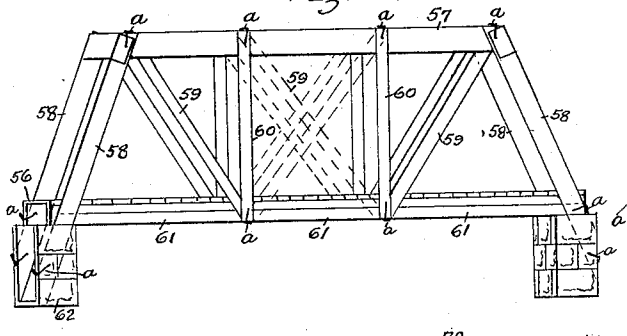

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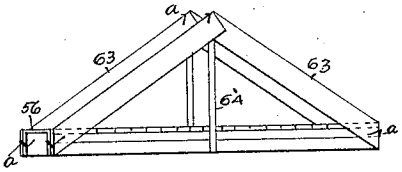

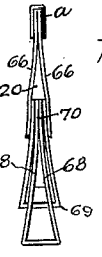

Fig. 42.

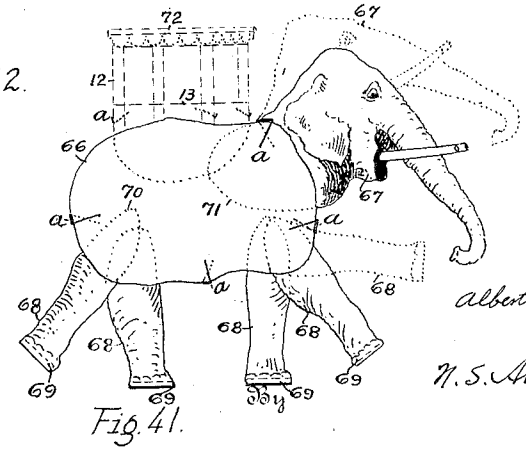

Fig. 41.

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A. M. Schertzer.

Inventor
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N. S. Amstutz
Attorney

UNITED STATES PATENT OFFICE.

ALBERT NEELY HALL, OF OAK PARK, ILLINOIS.

TOY CONSTRUCTING MATERIAL.

1,336,626. Specification of Letters Patent. Patented Apr. 13, 1920.

Application filed November 2, 1915. Serial No. 59,309.

To all whom it may concern:

Be it known that I, ALBERT NEELY HALL, citizen of the United States, residing at Oak Park, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Toy Constructing Materials, of which the following is a specification.

My invention relates to improvements in toy constructing materials and it consists more especially of the features hereinafter pointed out in the annexed claims.

The purpose of my invention is to provide for the use of children, etc., a line of toy constructing elements that shall have an almost universal applicability; that comprise simple and inexpensive units; that may be combined in unlimited forms; that are flexible in their structural combinations or quite rigid, as desired; that may be utilized in kindergartens, the home or school; that shows how rigidity is secured through the placing of members in diagonal bracing relation; that admits of coloration by the child in entirety, following a limited printed outline or presents a fully embellished *ensemble;* that may admit of fixed pivotal relation of parts and provides easily attachable and detachable fastening members which serve in multitudinous ways to hold the elements in various "built up" positions to constitute, toy chairs, locomotives, animals, houses, bridges, etc., and further that may serve to hold flexible or more rigid materials assembled in strip or sheet form and that permits of limitless adjustments of the "component parts" of animals, etc., permitting of grotesque and comical changes without taking any of the elements apart.

With these and other ends in view I illustrate in the accompanying drawings such instances of adaptation as will disclose the fundamental features of my invention without limiting myself to the specific details shown.

Figure 1, is an elevation of a single wire clip.

Fig. 2, is an elevation of a double clip.

Fig. 3, is an elevation of a double V clip.

Fig. 4, is an elevation of a single clip with angular return ends.

Fig. 5, is a side and top view showing how two narrow unit strips are held together near their ends and the dotted lines show how they may be shifted endwise or disposed at different angles with respect to each other.

Fig. 6, is a view similar to Fig. 5 showing how three strips are held together, whether at an angle to each other or parallel being immaterial.

Fig. 7, is a side elevation of a plurality of units held perpendicular to each other.

Fig. 8, is an isometric view showing how two sets of units may be supported the one by the other at different angles.

Fig. 9, is an elevation showing how two strips are held perpendicular to each other in a rigid manner.

Fig. 10, shows in an isometric view strips supported by means of "feet."

Fig. 11, is an isometric "perspective" showing how strips with "feet" or straight strips may be held between two supporting units at any angle.

Fig. 12, is a combined view disclosing how an element may be supported in a separable manner without loosening the clip.

Fig. 13, shows a method of side bracing by utilizing a single strip.

Fig. 14, is an elevation showing a double side brace, combining a "foot" therewith.

Fig. 15, is a perspective view showing the use of a single clip in two holes to secure one piece perpendicular to another.

Fig. 16, shows a body strip with a flange and a unit strip held on the flange by means of a clip and a single hole.

Fig. 17, is a "perspective" of two units held edge to edge perpendicular to each other.

Fig. 18, is an isometric presentation of a method of hinging two parts to each other by forming one part into a loop.

Fig. 19, is another method of hinging two units together by means of the clips themselves.

Fig. 20, is an elevation disclosing how a sliding member may be held in guides formed by one of the projecting stems of single clips or by the edges of special guide strips.

Fig. 21, is an edge elevation of Fig. 20.

Fig. 22, is an elevation showing how a clip may be used to lock two parts to each other.

Fig. 23, is an elevation which shows how one member may be suspended from another.

Fig. 24, shows in an elevation a method of diagonal bracing with threads and clips.

Fig. 25 is an elevation showing various adaptations of the clip shown in Fig. 2.

Fig. 26 is a view similar to Fig. 25 showing adaptations of the disclosure of Fig. 3.

Fig. 27 is a further amplification of some of the various uses to which the clip shown in Fig. 4 may be put.

Fig. 28 is an elevation in section showing a means of forming a fixed pivot by capped brass fasteners by bending them against the eyeleted side of the strips.

Fig. 29 shows an adaptation of structure that may be used to form fixed pivots without eyeleted holes and capped fasteners.

Fig. 30 is a view similar to Fig. 29 showing a simplified pivot formed by means of a soft wire with bent ends.

Fig. 31 is a "model" stool built of a common shallow square box adapted to hold a cushion.

Fig. 32 is a "parlor" rocker also made of a "seat box."

Fig. 33 is a view of an improvised toy cradle.

Fig. 34 shows the elements of a toy tower.

Fig. 35 shows a toy freight car that very nicely simulates the regulation structure by means of the unit elements and spool wheels.

Fig. 36 is a made up "town pump."

Fig. 37 is a wheel barrow with a solid wheel showing the spokes printed thereon.

Fig. 38 is a simulated step ladder.

Fig. 39 is a panel truss bridge.

Fig. 40 is a simple shear type of bridge.

Fig. 41 is one of numberless animal types suggestive of the many changes which can be made by means of unit elements.

Fig. 42 is a transverse elevation showing how the feet of animals, etc., are formed to enable them to stand up and how the "joints" are constructed by reason of which they may be articulated into grotesque positions at will or dismembered and recombined in any desired way.

Throughout the drawings the single clips are represented by *a;* the double clips by *b;* the double V form by *c;* and the return stem single type by *d*. It is of course immaterial whether the specific forms shown are used or not so long as a simple and readily attachable and detachable means is utilized to hold a plurality of structure elements in any desired combinations or positions. In the types instanced 1 is a joining section from which two stems project—a forward one 2 and an underneath one 3. Where these cross at 4 the point of clamping is formed.

The double type *b* shown in Fig. 2 is substantially a combination of two single clips *a*, joined at 5. The double V form *c* shown in Fig. 3 consists of outgoing stems 2^a and 3^a respectively connected to return portions 9 by junction 7 and 8 by junction 6, both being united to the same form of joining section 1. The modified single type *d*, shown in Fig. 4 has the outgoing stems 2 and 2 joined to 1 and angular return portions 11 joined at 10 to stems 2 and 3.

In the use of my constructing material unit narrow strips 12 and wide strips 13 may be used of any desired length or material, so long as it may be readily bent into various shapes without breaking and also has a certain amount of elasticity, so that when two strips are placed side by side as shown in Fig. 11 an opening 20 will be formed to receive "feet" 14 or any other combinations of strips or specially contoured parts and enough tension will remain to hold the parts in any assembled relation.

The bendable quality permits the formation of braces as shown in Figs. 13 and 14. When so used the free end 16 of the bent up portion is "clipped" to the main part of a unit 12. When irregular shaped pieces 17 are used in parts, as for instance pieces 66 of Fig. 41 the opening 20 between them serves, as stated, to hold other parts therebetween in assembled relation.

When it is desired to support the edge of one member against the flat face of another as shown in Fig. 15 two holes 18 are formed by a bodkin or darning needle—one on each side of the edge to which the flat piece is to be secured so as to receive the stems of a single clip *a*, in which case they hold the projecting part between them. Whenever a narrow strip is to be secured to the bent up edge of a box with the end and body portion flush as shown in Fig. 16 then a single hole 18 may be made to receive one of the stems, the other one passing on the outside of strip 12. In cases where the edge of one strip is to be fastened against the edge of another one, perpendicular to each other, the expedient shown in Fig. 17 wherein a slot 19 is formed for the strip 12 to set in, is utilized.

Frequently when the boy child desires to make up mechanical machines in which sliding parts are to be used he may do so by following Fig. 20. In this the body strip 13 has secured flatwise thereon a guide cap 21 by means of clips *a*. Between it and the body 13 an opening 20 is formed in which the sliding member 12 may have movement. The path of such movement may be confined to one plane by placing stems 3 of clips *a* parallel to the desired line of movement. These will serve as guides when placed alongside the movable piece, or a strip 22 may be placed along the edges to serve the same purpose. The figure shows both forms. In this way sliding connections can be made of remarkable serviceability.

If diagonal bracing is desired this may be secured by means of threads 23 of Fig. 24 or strips 12 as shown in Fig. 34. Threads secured to clips *a* may serve to suspend another part as suggested in Fig. 23.

In many of the adaptations ordinary boxes, covers, etc., may be used as a basis around which to build various structures, among others Figs. 31, 32, 33, 35, 39 and 40 show such instances. In Fig. 31, the seat 25, is so formed. It has angular corner legs 26 clipped to its sides. The open space between the sides may readily be used for cushioning material such as cotton batting, etc. The cradle "box" 27 of Fig. 33 has ends shaped as rockers 28 secured thereto and a hood 38 at one end, all held, by clips *a*.

The rocking chair seat 29 has attached thereto sides 30 which combine rockers therewith. The back is made up of strips 12 similar to Fig. 7. Another box or cover 31 is used as a base for the tower started in Fig. 34. This is made up of four sides joined to each other by clips which hook over each other as shown in Fig. 8.

Whenever any of the parts of special objects are to be articulated to have movement around a fixed center or pivot, strips 12 or parts 13, etc., may have eyelets 32 placed at such points to reinforce the material of which the strips are made. The holes 33 through the eyelets or formed directly in the strips serve to receive capped brass fasteners 34 or uncapped fasteners 35 as instanced in Figs. 28 and 29. An alternative fastening is suggested in Fig. 30 in which a soft wire pin 36 may have its ends bent to hold parts 12, 13 and 37 together. The latter may be gummed "washers" or they may be other portions of the built-up mechanism.

The freight car shown in Fig. 35 illustrates the great range of adaptability of these toy constructing units. Since the strips 12 and 13 may be provided in various widths, lengths, etc., the child is not handicapped in giving expression to its creations by cut and dried forms or a limited type of materials which form the very nature of their composition, design, etc., inculcate ideas of the unnatural in the child, greatly to its injury and loss of future resourcefulness and adaptability.

The base of the car may be the box here designated by 39. It has end 40 secured to the sides as shown in Fig. 8. The roof 41 may be similarly fastened. Truck strips 42 support axles 43 whereon spool wheels 44 are placed. The truck frame 42 is attached to the body by strips 45. Coupling hooks 46 complete the utility feature. The door openings are formed by vertical strips 12 as are the ends of each side. With the units, water colors or crayons a child may build and color a car throughout or the parts may be printed in color and cut to required sizes.

The pump adaptation of Fig. 36 utilizes the details of Figs. 10, 11 and 30. A spout 47 and handle 48 pivoted at 49 completes the representation. In the step ladder Fig. 38 steps 50 supported by side pieces and standards 12 forms an interesting adaptation. The wheel barrow of Fig. 37 makes a unique structure. Its sides 51, feet 52, connected to a body or base 53 and upturned front of wide material 13 suitably braced by narrow strips 12 forms an attractive subject. The wheel 54 pivoted at 55 may have the spokes and fellies printed on in outline only or fully shaded and colored as desired.

With these elemental units it is possible to stimulate child activities along engineering lines without sacrificing the natural child-like period of spontaneous imagination. Figs. 39 and 40 show how easily bridges can be built of these materials in which the effects of bracing tension and compression, stresses, etc., will be unconsciously absorbed, thus laying the best possible foundation for future greatness. A "floor box" 56 forms the basis on which the bridges are built. The panel truss bridge of Fig. 39 has top members 57, end members 58, diagonal members 59, vertical ones 60 and chords 61, the whole form resting on abutments 62. In Fig. 40 a simpler form is instanced. It is a truss bridge of the "shear" type, in which shear or rafter members 63 are secured by king rods 64 to tie strips 65 similar to the chord strips 61 shown in Fig. 39.

A most interesting and humorous adaptation is found in the animal study of Fig. 41. It has a body portion of two parts 66 held together by clips as shown. Between clips *a* and inserted between the two sides 66 the head portion 67 may by its extension be inserted in any desired angle. The legs 68 are formed of a single strip that is bent up at two points so as to leave a straight part 69 as a base between the bends for the legs to stand on. The upper ends 70 are held between the sides of the body 66 similar to the head 67 or the howdah 72, by reason of clips *a*, serving to hold these two halves of the body together at points adjacent where the detachable parts 67, 68 and 72 are inserted. Fig. 42 shows how a pair of legs are so secured. The insertible howdah 72 completes the "copy." Dotted lines show how the attitude may be altered at will.

In case any parts are to be locked and unlocked they can be arranged as shown in Fig. 22. The utility of Figs. 25, 26 and 27 is almost self explanatory, in which units may be assembled in various combinations which may be utilized to exemplify any object desired. Figs. 5 and 6 show the elemental relation of unit parts to each other. The adaptation shown in Fig. 9 would serve to hold the car supports 45 of Fig. 35 rigidly to the body. In cases where single

strips are to be removably insertible without disturbing the clips the structure shown in Fig. 12 is available. Should car doors be desired in Fig. 35 or doors to simulated houses, etc., the hinged forms of Figs. 18 and 19 would prove a solution of the problem.

In its most elemental form the materials which form the units of the elements described may be a good grade of card board that will not readily break where bent. Other kinds of materials can be substituted as desired.

It should be understood that the various forms, adaptations, etc., are merely suggestive of the unlimited combinations attainable. Locomotives, Eiffel towers, cranes, ships, household articles, furniture, flower studies, kitchen utensils, handicraft articles, etc., suggest themselves and many others are equally obvious.

It should be understood that the term flexible comprises materials having a relatively low elasticity in contrast to units having a high elasticity characteristic. Metallic units sufficiently soft to admit of right angled bends being made without the use of pliers or tools of any kind would obviously come within the scope specified. When a constructing material of this kind is used the practical advantages of bracing, suspension, etc., are instantly shown, but if the units are made of very strong materials such object lessons are lost entirely.

What I claim is,

1. In toy constructing materials, flexible unit members, angular shaped spring wire fasteners, and means for holding a plurality of such members in detachable pivoted relation by means of said fasteners so that said means may be placed in various positions as desired with respect to each other.

2. In toy constructing materials, flexible unit members, angularly formed spring wire fasteners, and means adapted to interlink such fasteners while secured to separate members to form a hinged connection between such members.

3. In toy constructing materials, flexible unit members, angular shaped spring wire fasteners, and means for holding a plurality of such members pivoted to each other by means of said fasteners.

4. In toy constructing materials, flexible unit members, a pair of angularly formed spring wire fasteners secured to a unit member with one free end of each fastener in approximate line with each other on the same surface of the flexible member, another flexible member folded on itself and placed with its edges at the fold under the respective alined elements of the fasteners to form a hinge, etc., and other similar fasteners to hold the folded parts against each other in detachable relation.

In testimony whereof I affix my signature in presence of two witnesses.

ALBERT NEELY HALL.

Witnesses:
SARA N. HALL,
NORMAN P. HALL.