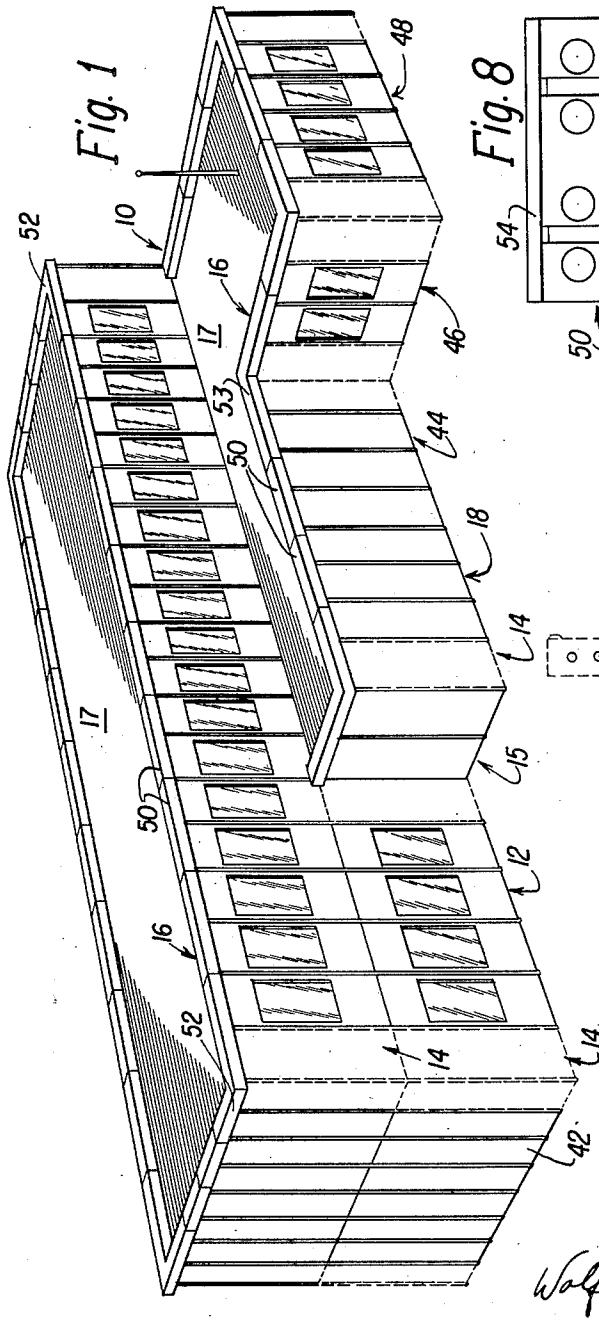
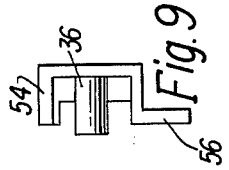
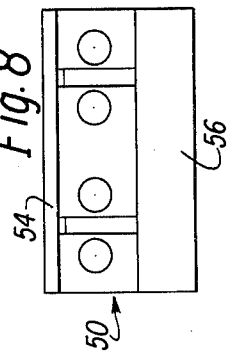
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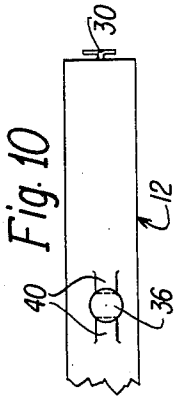
CONSTRUCTION SET

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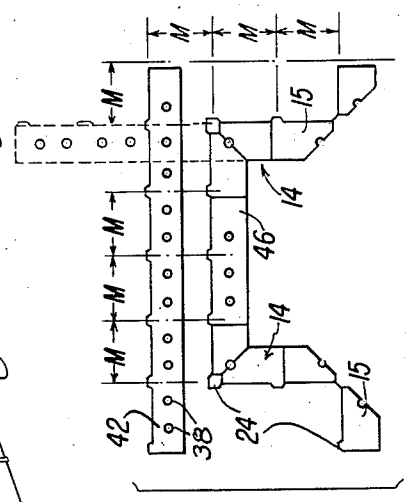


Fig. 11

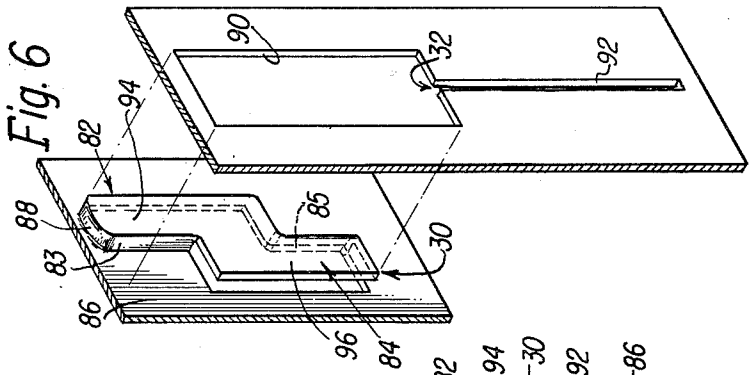
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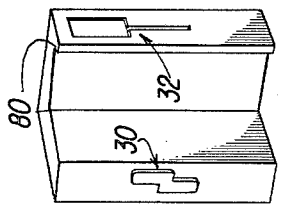
BY Wolfe, Hubbard, Voit & Osann
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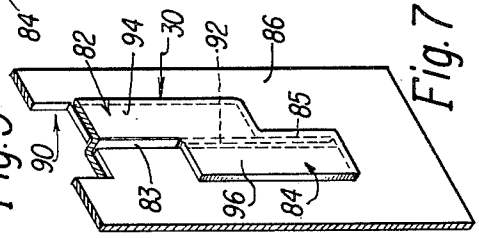
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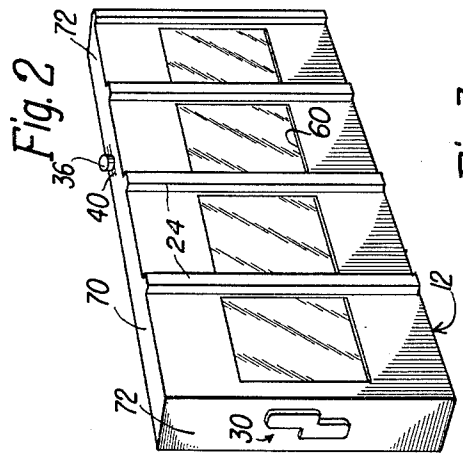
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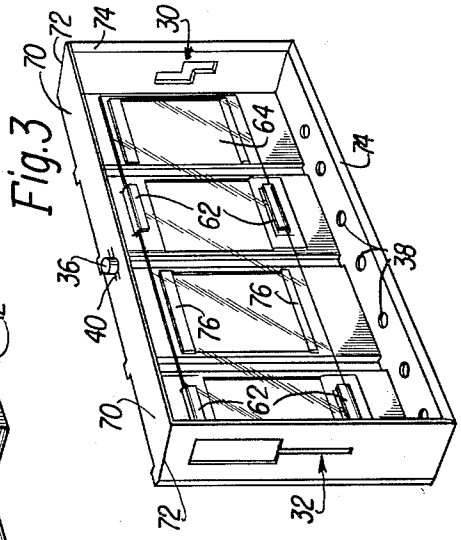
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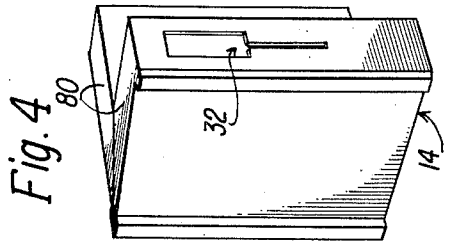












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CONSTRUCTION SET

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6 Claims. (Cl. 46—25)

This invention relates to a construction set type toy for erecting model size bulidings.

It is a general object of this invention to provide a construction set the elements of which may be used for assembling or erecting model buildings utilizing the curtain-wall form of construction. The set may, for example, be scaled to the H-O gauge for model trains and by faithfully adhering to the correct proportions for the building structure details, provides means for erecting a properly proportioned, architecturally sound and realistic appearing structure.

Another object of the present invention is to provide a construction set the elements of which comprise a novel arrangement of panels which interconnect so as to form a wide variety of architectural structures of both single and multi-story type. Another object is to provide a novel arrangement of panels which may be readily interconnected to form a rigidified structure and also may be readily disconnected, so that the set constitutes an educational type toy for children of a wide range of ages who may use the set to erect the different possible types and forms of buildings.

It is another object of the present invention to provide a construction set having a variety of panels and other forms of elements dimensionally following a modular pattern so as to provide for the erection of a wide variety of sizes and types of buildings with a relatively few basic elements. Further, it is an object to provide a number of different panels having realistic appearing building structure details, for example, the set may include wall panels, window wall panels, panels including doors, corner elements, and roof elements, all of which may be interconnected to assemble building structures.

It is another object of the present invention to provide novel means for locking the elements or panels in edge-to-edge relation, both sidewise and vertically, to form walls joined together to form a rigid structure not liable to collapse.

A further object is to provide a novel means for locking the elements together which are sufficiently easy to manipulate so as to be mastered by a young child, yet which forms a connection strong enough and rigid enough to withstand the rough usage that children may be expected to give the set. A related object is to provide a building set, the elements of which themselves are constructed so as to be sufficiently strong to resist the constant usage that things of this type receive. A further related object is to provide a novel means for locking the elements together the parts of which connecting means are strong enough to withstand the rough usage that the set is likely to receive.

A further, more specific object of the present invention is to provide novel means for locking the elements in edge-to-edge sidewise relation which prohibits both bending of the panel elements relative to each other, or twisting of the elements relative to each other, and thus permits the erection of a rigidified structure.

Other objects and advantages of the invention will become apparent upon reading the attached detailed description and upon reference to the drawings in which:

FIGURE 1 is a perspective view of a building constructed with the elements of the construction set of the present invention;

FIG. 2 is a perspective view of a window wall panel section;

FIG. 3 is a rear view of the window wall panel section shown in FIG. 2;

FIGS. 4 and 5 are perspective views of outside corner and inside corner elements, respectively;

FIG. 6 is an exploded view showing in enlarged fragmentary form the elements of the locking means for joining the panels edge-to-edge;

FIG. 7 is an enlarged fragmentary view of the elements of the locking means in connected relation;

FIGS. 8 and 9 are views in elevation illustrating a straight section of cornice;

FIG. 10 is a fragmentary plan view showing the upper edge of a wall panel; and

FIG. 11 is a schematic view of an assembled wall showing the modular construction.

While the invention is susceptible of various modifications and alternative constructions, there is shown in the drawings and will be herein described in detail a preferred embodiment of the invention. It is to be understood, however, that it is not thereby intended to limit the invention to the specific form disclosed, but, on the contrary, it is intended to cover all modifications, alternative constructions and equivalents falling within the spirit and scope of the invention as expressed in the appended claims.

Turning now to the drawings, there is shown in FIGURE 1 a typical completed building structure which may be erected using a construction set the elements of which are fashioned in accordance with the invention. The structure, indicated at 10, includes a generally rectangular arrangement of interconnected walls, each made up of wall panels 12, and the walls being interconnected at the corners of the building by means of corner elements 14, 15, shown in detail in FIGS. 4 and 5. In this case the main section of the building has two stories constructed by connecting walls by means of interconnecting means to be later described in detail, formed on the individual wall panels 12. To complete the building, a cornice 16 is received on the upper edge of the walls, which provides means for supporting a flat roof 17 made of sheet material such as plastic or paper. Therefore, a construction set for erecting buildings such as shown in FIGURE 1, comprises a plurality of basic elements which may include, for example, window wall panels 12 as illustrated in FIGS. 1–3, outside corner elements 14, as shown in FIG. 4, inside corner elements 15, as shown in FIG. 5, solid wall panels 18, as shown in FIGURE 1, cornice elements 16, as shown in FIGS. 8–10, and other incidental elements as may be desired such as panels including doors (not shown), and the like. It is one of the major features of the invention that with these few basic elements it is possible to make a wide variety of types and forms of building structures of which the simple building 10, shown in FIGURE 1, is merely exemplary.

Further in carrying out the invention, in the fashion of these construction set elements, a basic dimensional unit or module M is employed, comprising the distance between center lines of the vertical mullions 24 formed in the wall panels. In FIG. 11 a schematic of connected wall panels and corner elements reveals the modular construction. Referring to the window wall panel depicted in FIGS. 2 and 3, for example, the width of this panel element is 4 modules. For convenience, this element of the set will be termed a 4-section window wall panel. The height of the wall panels and other elements is chosen in proportion to the width of the module M, and both height and width are determined by a scale, which may, for example, be the H-O scale to which model trains are constructed. Following the H-O scale the module M is ½ inch.

In keeping with the invention, locking or connecting means is provided for locking together the construction set elements in edge-to-edge relation, which means also assists in providing a rigidified integral structure with the assembled elements. This locking or connecting means provides for erecting the walls of a building structure by the interconnection of a succession of wall panels, which completed wall may have offsets therein, as shown in FIGURE 1, by employing right angular inside and outside corner elements shown in detail in FIGS. 4 and 5 in the erection of the wall. It will be evident that corner elements providing for joining walls at some other angle than 90° may also be provided, if desired. In general, the locking or connecting means which are provided on the wall panels and corner elements, comprises a lug **30** which constitutes a male connecting element, on one end of each panel, and a slot **32** adapted to receive the lug and lock the parts together, formed in the opposite end of each of the panels. Thus the building structure is erected by assembling the panels and corner elements into walls utilizing the locking means to secure the parts in side-edge to side-edge relation.

Further in keeping with the invention, the module M which is the basic unit of dimension, is also employed to determine the location of interconnecting means provided on each panel for joining the same vertically. Referring to FIG. 3, for this purpose the upper edge of the window wall panel **12** carries a short vertical rod **36**, which may be made of resilient material such as polyethylene, while the lower edge of the panel is provided with a series of openings **38** of a size to receive the rod with a snug fit. The rods **36** are held in place by oppositely facing prongs **40** struck from the web and attached thereto, the ends of the prongs being buried in the sides of the rods. While one rod **36** is shown on the 4-section panel of FIG. 3, for longer panels it may be desirable to have two or more rods, as for example on the 6-section wall panel **42** in FIGURE 1. In either case, the spacing of the rod **36** or rods with respect to the ends of the panel, and the spacing and location of the holes **38** in the lower edge of each panel is such that when panels are set one above the other and interconnected by means of the rods and openings, the vertical mullions **24** on the face of the panels shall be in alinement. For this purpose the holes **38** are on the center line of the lower web, as shown in FIGS. 3 and 11. The holes are spaced from the module lines the same distance as from the face of the panels. Thus offsets and overhanging wall sections can be built for forming upper stories of a building, and buildings can be erected in which walls of adjacent stories cross over or intersect each other (as shown diagrammatically in FIG. 11 where in dotted lines a wall is shown crossing the straight wall panel). Without any interference with the rods **36**, giving greater flexibility in the choice of building designs.

Following this modular construction of the panels and interconnection means, a different building layout may be achieved with the use of different size panels. Referring again to FIGURE 1, it will be noted that the left end wall of the main section of the building is made up of a single 6-section wall element **42**, joined to the front and rear walls by outside corner elements **14**. Furthermore, the front wall of the first single story offset toward the front of the main part of the building includes a 6-section panel **18** joined to a similar panel **44** on one side and a corner element **14** on the other. A 2-section window wall panel **46** is included in the foremost building section which also includes a 4-section window wall panel **48** of the type shown in detail in FIGS. 3 and 4.

Likewise, in the construction of the cornice **16** which rests on the upper edge of the walls, the same dimensional unit M is employed. This cornice is made up of a succession of straight elements **50** connected by outside corner cornice elements **52**, and inside corner cornice elements **53**. The cornice elements **50**, **52** are formed of an inverted channel **54** having a lateral extension **56** from one leg of the channel forming a ledge to receive the roof which may be a sheet of plastic or paper, cut to fit the outline of the building. The channel **54** rests on the tops of the rods **36** carried by the walls, as shown in FIG. 9, and fits relatively tight on the top edge of the wall so as to be easily placed thereon in the process of erecting a building structure with the set, yet the tight fit holds the cornice elements **52** enough to prevent them from being accidentally dislodged. The cornice elements may be made of various materials, however it has been found that a resilient material such as polyethylene provides a cornice which easily fits in place, and therefore such a material is preferred.

Referring now to the details of the method of making the construction set elements, in carrying out the invention the 4-section panel **12** shown in FIGS. 2 and 3 is formed of sheet material to the configuration of a shallow rectangular box structure, open to the rear of the panel as shown in FIG. 3. The face of the panel **12** includes window openings **60** between the formed upright mullions **24**. These mullions **24** are raised ridges or ribs extending the full height of the panel, and in addition to adding interest to the design of the face of the panel, also lend additional rigidity to the panels since they constitute stiffeners. Lugs or tabs **62** struck from the sheet material may provide clips, as shown in FIG. 3, to hold a thin transparent sheet **64** behind the window opening to give the realistic appearance of window glass.

Various methods may be used in the manufacture of the wall panel element shown in FIGS. 2 and 3, however, as a preferred method the panels are continuously formed by means of dies operated, for example, in a punch press, using material such as tin-plated sheet steel in the form of coil stock of an overall thickness of about .014". With this method, the coil is first lithographed to produce the desired color design on the finished parts. For example, the coil stock may be painted with designs of window wall panels so that when finished each window wall panel of FIGS. 2 and 3 has a solid color in the areas between the mullions **24** above and below the window, while the mullions themselves are left the bright plating. Other color or design arrangements are, of course, possible. To form each panel **12** the coil stock is sheared into a substantially cruciform blank with or without the window openings, depending on whether the panel being made is a window wall panel **12** or a solid wall panel **42**, and the mullions **24** are formed. The opposite arms of the blank are bent 90° to form flanges **70** joined at neat corners **72**. It will be noted that the flanges **70** are folded over at the rearward edges **74** so as to eliminate sharp edges, and in a similar way at the exposed upper and lower edges **76** of the window openings, the stock may be folded over to form a smooth edge. The flanges **70** impart strength to the material making the manufacture of a relatively stiff panel possible with thin, relatively flexible sheet material. The upright mullions **24** also add to the stiffness as well as the appearance of the panels. It will be apparent that a panel may be formed in a series of operations with separate dies, or in a single progressive type die, as may be preferred, and the steps described above may be carried out in a different order, as preferred.

Both outside and inside corner elements **14**, **15** are shown in the drawings, in FIGS. 4 and 5, respectively. The corner elements are made in a similar box-like configuration to secure greater strength, and include an outer wall surface unbroken by window or other openings and having a raised vertical mullion **24** at one side edge. From the schematic view FIG. 11, it will be seen the unit dimension or module M, which is followed in the construction of the panels, is also followed in the construction of both the inside and outside corner elements such that when corner elements and wall elements are assembled, each outside wall dimension of the combined structure is a whole number multiple of the module M.

As shown in the lower part of FIG. 11, a wall made up of an outside and an inside corner element plus a 2-panel wall section 46, has the same overall length as a 6-panel wall section shown in the upper part of FIG. 11. Referring to this figure it will be noted that the face at the right side of the 2-section wall panel 46 includes only a portion of the complete module section between the module lines. The complementary portion of the module section is carried by the adjacent corner element 14. Similarly, the left edge of the wall panel 46 has the complementary portion of the module section face carried by the adjacent corner element 14.

The box-like structure of the corner elements is formed by flanges 80 bent at 90° to the plane of the wall surface. Preferably, as described hereinbefore in connection with the manufacture of the wall panels 12, the corner elements may be made with the use of stamping dies from coil stock. Thus as in the case of the wall elements, the edges are preferably folded over or finished in some other way to eliminate sharp edges, and burrs, which might cause injuries. One of the features of the construction set of this invention is that all exposed edges are protected in this manner so that the set is completely safe, even for use by children.

In accordance with one of the major features of the invention, the opposite side edges of each of the elements of the set are provided with novel means for locking or connecting the elements to one another to assemble the latter in a rigid condition. More specifically, a preferred form of such locking or connecting means is shown in FIGS. 6 and 7 to comprise the lug 30 carried by one side of each panel or corner piece constituting a male connecting element, and the slot 32 in the opposite side of each panel or corner piece, constituting a female element, into which the lug may be inserted and held securely. In the present case the lug 30 is formed integral with the inturned flange forming the right edge of the panels, and may be formed with a die from the sheet steel material comprising the stock from which the panels are made. The lugs are preferably in the form of a pair of oppositely offset angles 82, 84 secured along the sides which constitute aligned webs 83, 85 to the stock of the panel flange 86 on the center line of the latter. The angles 82, 84 are connected so as to form a pair of integral plates supported parallel to and spaced from the panel flange at about the stock thickness. It will be noted that the top edge 88 of the upper angle 82 is left connected to the panel flange 86 which provides an additional point of support for the plates relative to the panel flange, so that the plates are held rigidly and substantially proof against bending.

As shown in FIG. 6 the large rectangular opening 90 on the opposite side edge of each element is of a size to receive the lug 30 so that adjacent panels or corner elements may be brought into contact with each other with the lug being received in the rectangular opening. To lock adjacent panels or panels and corner elements together, the part bearing the lug 30 is slid downwardly relative to the adjacent part having the slot 32, so that the webs or sides 83, 85 of the angles which extend perpendicular to the panel flange 86 slide into the narrow portion 92 of the slot. When in interconnected relation, due to the spacing of the plate being about the stock thickness, the opposite plates or flanges 94, 96 of the angles 82, 84 lie flat as shown in FIG. 7, behind the end wall of the adjacent panel. Twisting or bending of the panels relative to each other, is effectively prohibited by this locking means. Twisting is prohibited by the lengths of the webs or sides 83, 85 of the angles 82, 84, received in the narrow slot 92. The relative vertical position of adjacent panels is also determined by the web or lower edge of the side 85 of the bottom angle 84 abutting the end of the slot 92. Relative bending of the panels out of the same plane is effectively prohibited by the oppositely offset plates or flanges 94, 96 of the angles which butt against the inside wall of the panel flanges adjacent the slot.

This provides for more extensive support than a simple interlock and contributes considerably toward one of the major objects of this invention, namely, to provide means for assembling a rigid building structure with the parts making up the construction set. It is accordingly preferred that the webs or sides 83, 85 of the lug angles 82, 84 should be of a width and so aligned vertically as to fit tightly in the narrow portion of the slot 92 and so as to be frictionally held by both edges of the slot. However, the fit should not be so tight as to require a great deal of force in order to assemble the parts or to require a considerable force to separate them. It will moreove rbe noted that it is desired to have as narrow a flange 86 on the edges of the panel as is possible, to save material, and to keep the overall depth of the panel as small as possible. Accordingly, with the interconnection means shown, by having the angles 82, 84 arranged so that the webs or sides 83, 85 of the latter are in alinement along the center line of the panel flange 86, the width of the panel flange can be maintained as narrow as is compatible with the need for a sufficient width on the flanges of the angles to form an adequate bearing to limit the bending of the panels relative to one another.

It has been found that this type of engagement holds the panels in position so that the erected building has all the structural properties of a box. Since the lugs are capable of supporting a considerable load, it is possible for the completed structure to support the weight of relatively heavy objects or persons even when made of thin material such as sheet metal.

We claim as our invention:

1. Model size construction set elements formed of sheet metal, comprising wall panels adapted to be assembled in edge-to-edge relation, each panel formed as a shallow rectangular box with a rectangular face defining the wall surface, said box including sheet metal flanges extending substantially at right angles to the face at each edge of the panel, a male locking member including a web for assembling adjacent panels in side edge to side-edge relation with the faces thereof in substantially the same plane carried by the flange on one side of each said panel, said flange on the opposite side of each panel having a vertical slot with a narrow lower section to receive the web of said male member on the adjacent panel, said male member including vertically spaced angle means struck from the sheet metal of said panel flange, said angle means including said web extending perpendicular to the flange substantially along the center line of the latter, and a pair of oppositely extending plates carried by the web so as to be supported parallel to and spaced from the panel flange at about the sheet metal thickness, said plates extending in opposite directions from the center line of the supporting flange for engaging the flange of an adjacent panel through the slot therein and coacting therewith to urge the panels into tight contact, said vertical slot further having a wide upper section through which the male member is inserted and then slid down into the narrow section of the slot for assembling adjacent panels.

2. Model size construction set elements formed of sheet metal, comprising wall panels adapted to be assembled in edge-to-edge relation, each panel formed as a shallow rectangular box with a rectangular face defining the wall surface, said box including sheet metal flanges extending substantially at right angles to the face at each edge of the panel, a male locking member for assembling adjacent panels in side-edge to side-edge relation with the faces thereof in substantially the same plane carried by the flange on one side of each said panel, said flange on the opposite side of each panel having an opening located to receive said male member on an adjacent panel, said opening having a first portion larger overall than said male locking member so as to provide for bringing the

flanges of adjacent panels into contact, and a narrow vertical slot connected to said first portion, said male member including vertically spaced angle means struck from said sheet metal and attached to said panel flange, each of said angle means including a vertical web extending perpendicular to the panel flange adapted to be slidably received in the narrow vertical slot of an adjacent panel flange, the male locking member of one panel being inserted through the larger opening portion in the flange of an adjacent panel and then slid down into the narrow vertical slot for assembling said adjacent panels, and a plate carried by the web parallel to and spaced from the flange at about the sheet metal thickness, said plates of each of said angle means extending in opposite directions from the supporting web for engaging the flange on an adjacent panel through the narrow slot therein and coacting therewith to maintain said adjacent panels in contact.

3. In a construction set for erecting model size building structures, a plurality of wall panels adapted to be joined in edge-to-edge relation each comprising a rectangular modular face having at least one module section plus a portion of a module section with the module section portions on adjacent panels complementing to form a full module section, means for interconnecting said wall panels in side-by-side relation with faces of adjacent panels in substantially the same plane, said last-named means including a male locking member on one side and means defining a locking member receiving element on the opposite side of each of said wall panels, means for interconnecting sets of side-by-side panels in vertical relation including a projection carried by one of the upper and lower ends of each panel spaced the same distance from the face of the panel carrying said projection as from the margin of one of said panel module sections, means on the opposite end of each panel defining a pair of projection receiving openings between the margins of each module section with each opening spaced corresponding to said projections the same distance from the face of said panel as from a module margin, a plurality of corner elements comprising right-angularly disposed rectangular modular faces each having a complementary portion of a module section, means for interconnecting said wall panels and corner elements in side-by-side relation with one face of a corner element and the face of an adjacent wall panel in substantially the same plane and complementing to form at least one complete module section, and means on one end of each corner element defining a projection receiving opening equally spaced corresponding to said projections from both faces of the latter corner element so as to receive projections carried by vertically related intersecting wall panels.

4. In a construction set for erecting model size building structures, a plurality of wall panels each formed as a shallow rectangular box with a modular face defining the wall surface, said box including rigid flanges extending normal to the face at the edges of the panels and adapted to be disposed in abutting relation with flanges of adjacent panels, means for interlocking adjacent panels in side-edge to side-edge relation with the faces thereof in the same plane including a rigid male locking lug comprising vertical angle means carried by the flange on one side of each panel extending outwardly therefrom, said angle means having an elongated vertically extending side arranged normal to the flange and further having a plate supported by said side parallel to and spaced from the flange, means defining a vertical slot in the flange on the opposite side of each panel having a narrow lower section for receiving the elongated side of said angle means of the male lug of an adjacent panel in assembled relation therewith and coacting with said elongated side to maintain said adjacent panels against relative twisting movement, the vertical slot further having a wide upper section through which the male lug is inserted and then slid down into the narrow section of the slot for assembling adjacent panels.

5. In a construction set for erecting model size building structures, a plurality of wall panels each formed as a shallow rectangular box with a modular face defining the wall surface, said box including rigid flanges extending normal to the face at the edges of the panels and adapted to be disposed in abutting relation with the flanges of adjacent panels, means for interlocking adjacent panels in side-edge to side-edge relation with the faces thereof in the same plane including a rigid male locking lug comprising vertical angle means carried by the flange on one side of each panel extending outwardly therefrom, said angle means including a pair of vertically disposed angles having aligned vertical sides arranged normal to the flange, said angles having oppositely extending plates supported by said sides parallel to and spaced from the flange, means defining a vertical slot in the flange on the opposite side of each panel having a narrow lower section for receiving the sides of the angle means of the male lug of an adjacent panel in assembled relation therewith and coacting with said sides to maintain said adjacent panels against relative twisting movement, the vertical slot further having a wide upper section through which the male lug is inserted and then slid down into the narrow section of the slot for assembling adjacent panels.

6. In a construction set for erecting model size building structures, a plurality of wall panels each formed as a shallow rectangular box with a modular face defining the wall surface, said box including rigid flanges extending normal to the face at the edges of the panels and adapted to be disposed in abutting relation with the flanges of adjacent panels, means for interlocking adjacent panels in side-edge to side-edge relation with the faces thereof in the same plane including a rigid male locking lug comprising vertical angle means carried by the flange on one side of each panel extending outwardly therefrom, said angle means having an elongated vertically extending side arranged normal to the flange and further having a plate supported by said side parallel to and spaced from the flange, means defining a vertical slot in the flange on the opposite side of each panel spaced from the edges thereof having a narrow lower section for receiving the side of said angle means of the male lug of an adjacent panel in assembled relation therewith and coacting with said side to maintain said adjacent panels against relative twisting movement, said vertical slot further having a wide upper section through which said male lug is inserted and then slid down into the narrow section of the slot for assembling adjacent panels, means on the upper and lower edges of each panel for interconnecting adjacent panels vertically including at least one vertically extending resilient projection carried by the upper flange of each panel and a series of openings in the lower flange of each panel adapted to frictionally receive said projections, and spaced to maintain the sections of adjacent wall panels in vertical alignment.

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