May 14, 1935. J. B. STRAUSS 2,001,162

SYSTEM OF BUILDING CONSTRUCTION

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Fig. 1

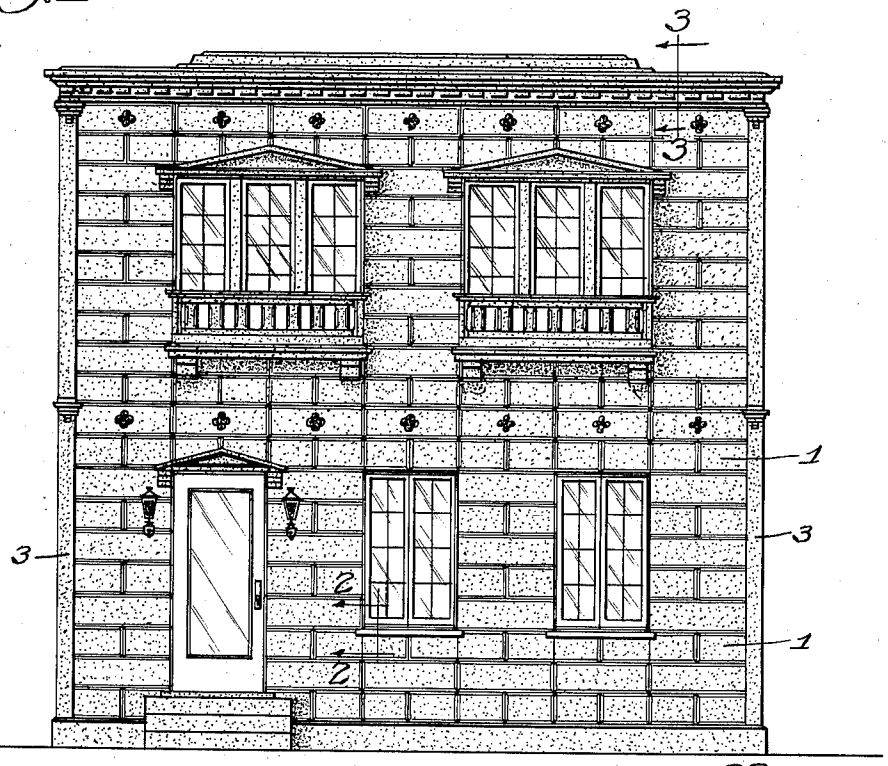


Fig. 3

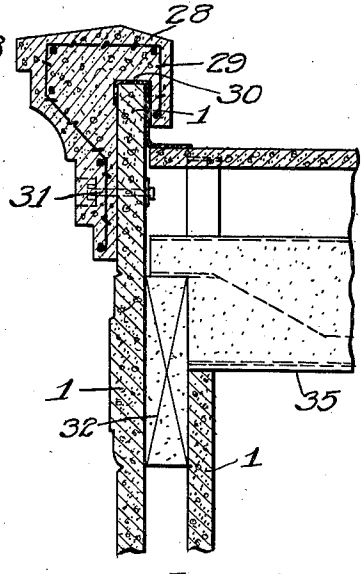
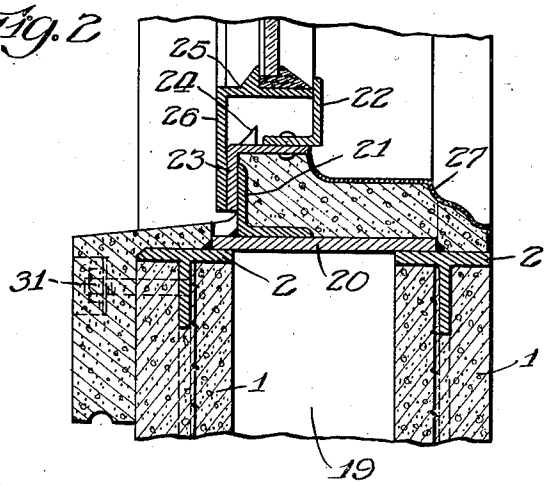


Fig. 2



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Fig. 4

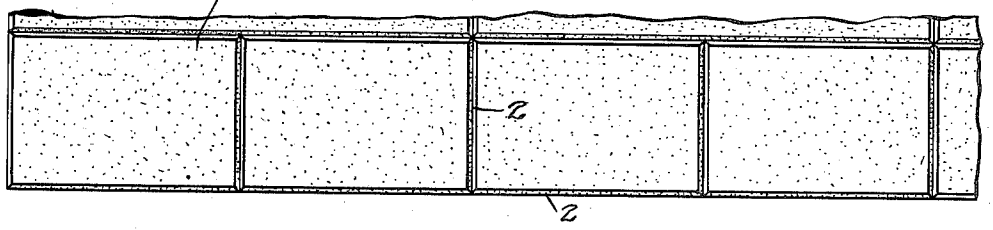


Fig. 5

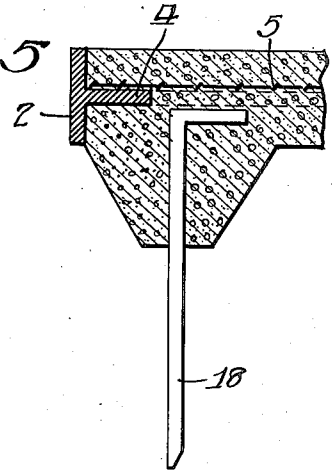


Fig. 6

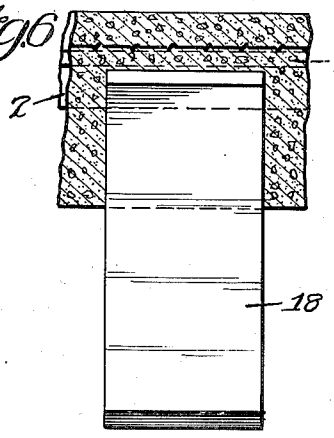


Fig. 7

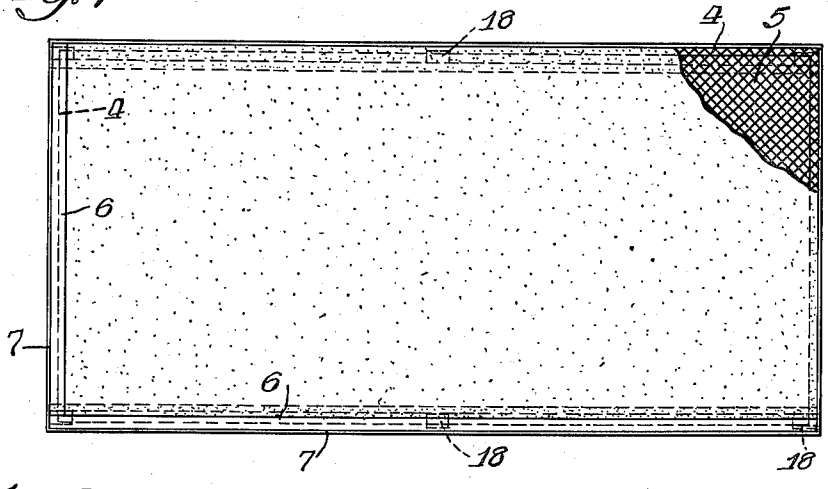
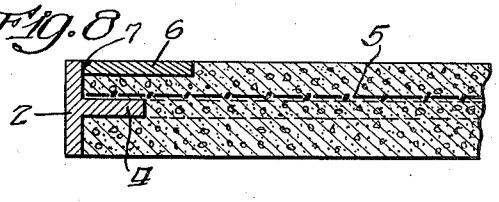


Fig. 8



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Fig. 9

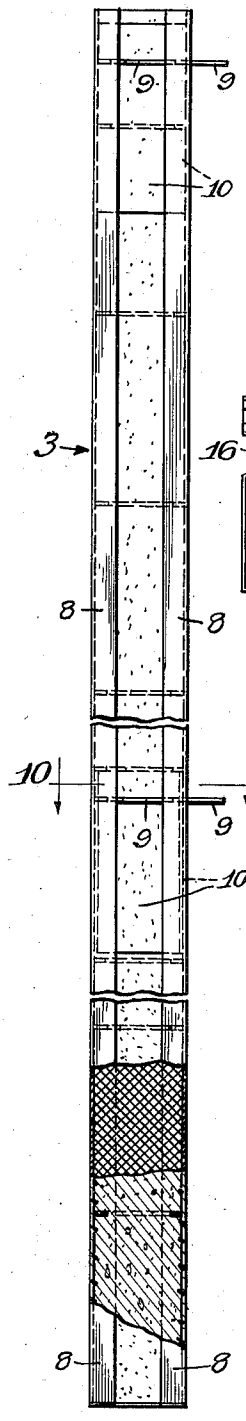


Fig. 10

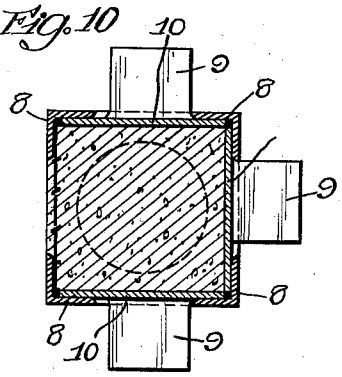


Fig. 11

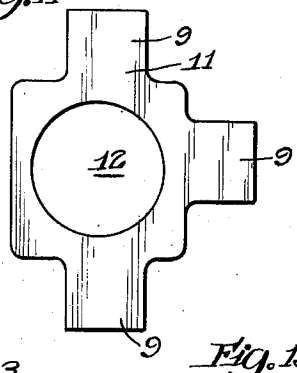


Fig. 12

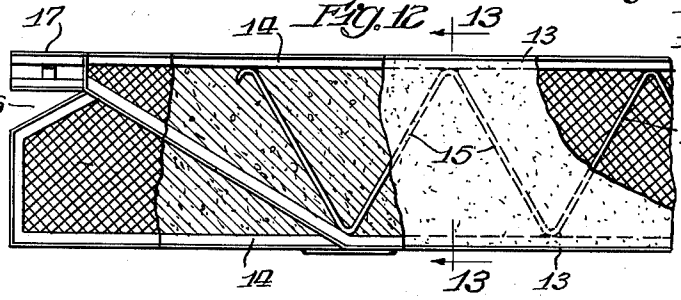


Fig. 13

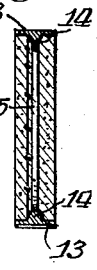


Fig. 14

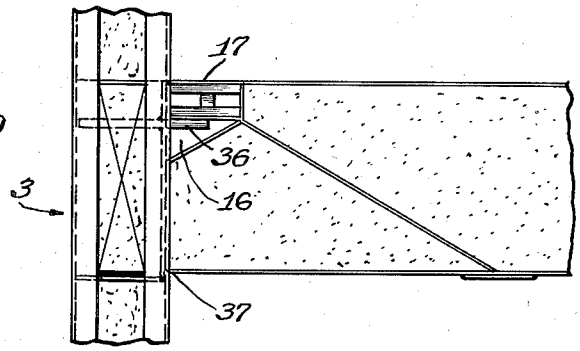
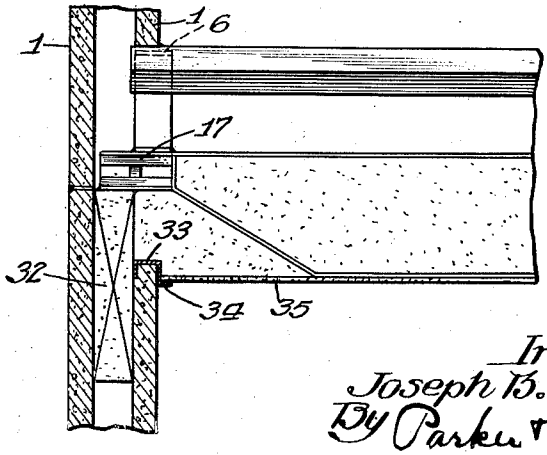


Fig. 15



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UNITED STATES PATENT OFFICE

2,001,162

SYSTEM OF BUILDING CONSTRUCTION

Joseph B. Strauss, Chicago, Ill.

Application September 23, 1931, Serial No. 564,560

6 Claims. (Cl. 72—1)

This invention relates to systems of building construction and has for its object to provide a new and improved system of this description. The invention has as a further object to provide a system of concrete building elements that can be erected with the ease and facility of the steel frame construction now in use. The invention has as a further object to provide a system of building construction where the concrete members from which the building is constructed are provided with metal bounding elements, the concrete members being fastened together by riveting, bolting or welding the metal bounding elements of the members together to form the complete structure. The invention has further objects which are more particularly pointed out in the accompanying description.

Referring now to the drawings, Fig. 1 is a front elevation of a building embodying the invention;

Fig. 2 is a sectional view through a typical window sill taken on line 2—2 of Fig. 1;

Fig. 3 is a sectional view through a typical roof cornice taken on line 3—3 of Fig. 1;

Fig. 4 is an enlarged view of several wall slabs fastened together;

Fig. 5 is an enlarged detailed sectional view showing the welding lug attached to the bounding elements;

Fig. 6 is a view similar to Fig. 5 viewed at right angles thereto;

Fig. 7 is an enlarged plan view of a floor or wall slab or unit;

Fig. 8 is an enlarged sectional view of the corner of a floor slab or unit;

Fig. 9 is a view of a column with parts broken away;

Fig. 10 is a sectional view taken on line 10—10 of Fig. 9;

Fig. 11 is a view of a diaphragm girder support for an intermediate column;

Fig. 12 is a view showing the construction of a typical joist or girder;

Fig. 13 is a sectional view taken on line 13—13 of Fig. 12;

Fig. 14 is a view showing the method of fastening a joist or girder to a column; and

Fig. 15 is a view showing the floor and ceiling connection to the column at the second, or higher floor.

Like numerals refer to like parts throughout the several figures.

Referring now to the drawings, which are more or less diagrammatic to show typical constructions, I have shown a building construction embodying the invention and comprising outer walls made up of concrete members or slabs having metal bounding elements 2 connected together and to columns 3. These metal bounding elements are preferably of T section for the wall units and girders. For the column sections the L section or angle section is preferred.

In Figs. 4, 7 and 8 is shown the construction of the wall and floor units. They consist of the metal bounding element of any desired cross section, shown as of T section having the inwardly projecting portion 4. A wire mesh 5 is fastened to the part 4 in any desired manner. This forms a rectangular metal frame with a wire mesh extending across the middle thereof. Concrete is then poured into this frame to fill it and enclose the wire mesh or network reinforcing the concrete, being preferably flush with the metallic frame. The member or unit is then preferably vibrated, or otherwise treated, to secure density and high strength. A jarring machine may, for example, be used for this purpose.

The corner floor sections may be connected with the sill 6, see Fig. 8, which is welded to the outer metal frame, as shown at 7.

The columns may be formed with angles or L shaped elements 8 at the corners, Figs. 9 and 10, filled with concrete as shown. At the points where the joists or girders are connected to the columns, the columns are provided with the metal supporting members 9, Figs. 9 and 10. These supporting members are connected to the metal plates 10 inside the corner members. I may also provide diaphragm plates 11, Fig. 11, which fit into the space between the corner pieces 8, and which have the projecting supporting members 9 which project from between the corner members. These diaphragms have openings 12 in the center for the concrete.

The girders or joists are provided with the metal bounding elements 13, see Figs. 12 and 13, preferably of T section, having the inwardly projecting parts 14 to which the wire mesh 5 is connected. Additional reinforcement, consisting of metal rods 15, are provided which are attached in any desired manner to the projections 14, and which are laced back and forth, as shown in Fig. 12.

These joists or girders are provided at their ends with the recesses 16 and the projections 17 to facilitate their connections to the columns. In connecting them to the columns they are brought in position so that the supports 9 on the columns are in the recesses 16 and the projections 17 rest upon the supports 9. The supports 9 and projections 17 are then connected together by riveting

or welding, or any other suitable manner. The metal edges may also be welded to the columns. The wall or floor slabs, or slabs for any other purpose, may be provided with welding or fastening lugs 18 connected with their metal frames, Figs. 5 and 6, and by means of which they may be fastened together or to any other part. These wall and floor members may be fastened together by bringing their metal members in abutting relation and then welding or riveting them together.

I prefer to have the building made of two walls of slabs separated by an air space 19, as shown in Fig. 2. This figure also shows one form of window construction wherein the window frame 20 of metal is fastened to the bounding members 2 of the surrounding slabs by welding or other means. Angle members 21 are attached to the frame 20. Attached to these angle members are the two angle members 22 and 23, the members 21 having the projections 24. The window sash 25 engages the member 22 and has an angle member 23. The member 21 is embedded in concrete and a metal member 27 encloses this concrete.

In Fig. 3 I have shown a cornice construction consisting of a metal bounding member 28, having the wire mesh 29 therein embedded in concrete. There is a metal lined recess 30 which fits over the upper edge of the upper row of slabs 1. The cornice is fastened to the slabs by bolts or other fastening devices.

In Fig. 15 I have shown a typical method of a floor and ceiling construction, wherein the floor slabs project beyond the interior wall slabs 1 and are welded or otherwise fastened thereto by means of the fastening strip 6 of Fig. 3. The floor joist projection 17 is fastened to the girder 32 located between the exterior and interior wall slabs by welding or any other means. The upper edges of the interior wall slabs below the girder are provided with the supporting hooked member 33 which has a projection 34 upon which is supported the ceiling slabs 35.

In Fig. 14 I have shown the method of connecting joists or girders to the walls between the posts. In this construction there is an outer and an inner wall made up of the wall slabs, and these girders have supporting projections 36 which fit into the recesses 16 in the joists or girders, and the projections 17 are supported thereon. The metal edges are also fastened or welded, as at 37, to the wall members. It will be seen that this forms a system of building construction comprising a series of separate precast metal-bound concrete units, which may be erected and then bolted, riveted or welded together to form a completed structure with the same ease as all-steel units.

The construction is intended for dwellings, vehicles and other types of structures. The units are formed as posts, girders, joists, wall sections and floor, roof and ceiling slabs. In a dwelling the posts are first erected on a suitable foundation, then the girders are supported on the posts at their tops, the joists are then supported on the girders and the floor and ceiling slabs secured to the joists and then the wall slabs are set in place. The units are then bolted, riveted or welded together along the meeting metallic faces of the separate units.

The wall units may be placed or formed with an air space between them, and so spaced and dimensioned as to meet the design of the building and provide for window, doors, etc. The metal framework and the wire mesh are prefabricated to proper size and to meet the design of the structure. The T section is preferable for the wall units and girders because of convenience in connecting the wire mesh, while for the posts the L section is the best. The connection is made in all cases through the metal bounding members, either directly or through secondary shelf angles or splice plates. The bounding elements act as reenforcement and as stress carrying elements. The concrete is preferably light-weight, high-strength concrete and the thickness of the wall slabs may vary from 3/8" for light vehicles to 1½" or more for dwellings. The floor and roof slabs are designed to proper thickness for the load carried. The slabs may be precolored or treated for weathering. The various units are connected substantially as a steel frame building is connected, i. e. by riveting, welding or bolting the sections together at the meeting faces of their metallic bounding frames.

The advantages secured by this invention are the elimination of wood, speed of construction, low cost, permanence and adaptability. The various units may be shipped without damage and handled, erected and connected up with the same ease, speed and certainty as a steel frame structure.

It will be noted that there is here a separate skeleton or frame work of the structure composed of posts and longitudinal and transverse girders and these girders and posts are enclosed within the double walls built up of units of composition material which are metal edged, and that the units or sections of the walls are made up of metal edges connected by a metal mesh or webbing which is embedded in the concrete. It will further be seen that the posts have metal edges and cementitious material enclosed within said edges.

I claim:

1. A structure comprising a series of posts, transverse and longitudinal girders connected to said posts on their center line, a series of outer metal edged non-metallic wall sections flush with the outer face of said posts, a series of inner metal edged non-metallic wall sections flush with the inner face of said posts, the girders fitting between said wall sections, and an open space between said wall sections, girders and posts.

2. A structure comprising a skeleton framework comprising posts, transverse and longitudinal girders at the floor levels connected to said posts, a series of wall sections enclosing said girders and said posts, said wall sections having metal edges, metal mesh connecting said edges and cementitious material enclosing said mesh and flush with the metal edges, the posts having metal edges and cementitious material enclosed within said edges, the wall sections supported by and connected to said girders and said posts.

3. A structure comprising a supporting post comprising metal edges, reenforced concrete contained within the limits of said metal edges, internal diaphragms connecting said edges together at intervals, said diaphragms having openings through which the concrete and reenforcement pass, certain of said diaphragms projecting out between the metal edges to form seats for the connecting girders.

4. A structure comprising a supporting post having metal edges, reenforced concrete contained within the limits of said metal edges, internal diaphragms connecting said edges together at intervals, said diaphragms having openings through which the concrete and reenforcement

pass, certain of said diaphragms projecting out between the metal edges, forming seats for connecting girders and vertical plates underneath said projecting diaphragms and on the inside of the metal edges, whereby a double connection is provided for the connecting girders.

5. A structure comprising a building section comprising a unitary flanged metal edge having an inwardly projecting portion near the middle thereof and extending therealong, a unitary metallic mesh connected with said metal edge and substantially parallel therewith, and cementitious material embedding said mesh and limited by and flush with the face of the metal edge the outer face of said flanged metal edge being substantially parallel throughout its entire area with the cementitious material which engages the face of said metal edge.

6. A structure comprising a building section comprising a metal edge with one projecting flange forming a unitary member T-shaped in cross section, a unitary metallic mesh connected with said metal edge near its center and cementitious material embedding said mesh and limited by and flush with the face of the metal edge the outer face of said flanged metal edge being substantially parallel throughout its entire area with the cementitious material which engages the face of said metal edge.

JOSEPH B. STRAUSS.