Nov. 28, 1933. E. E. HALL 1,936,666

FORM FOR CONCRETE COLUMNS

Filed May 9, 1930 2 Sheets-Sheet 1

Fig. 1

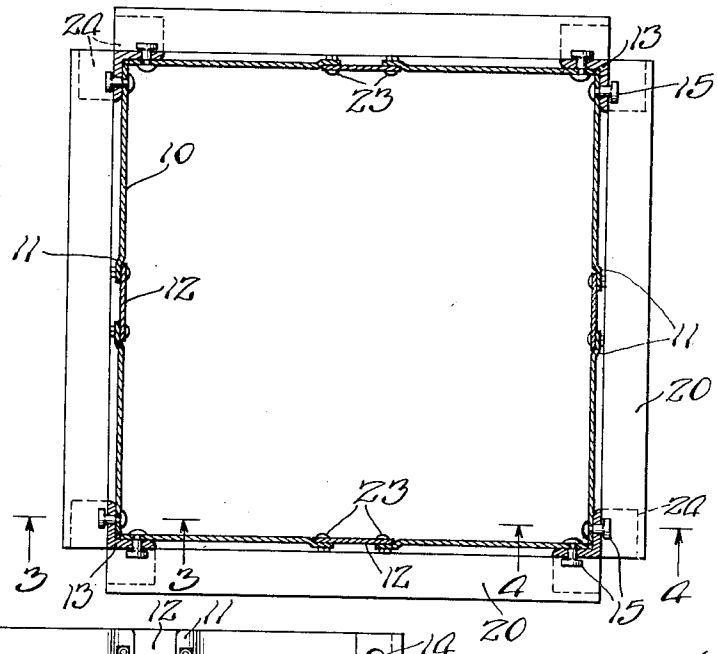


Fig. 2

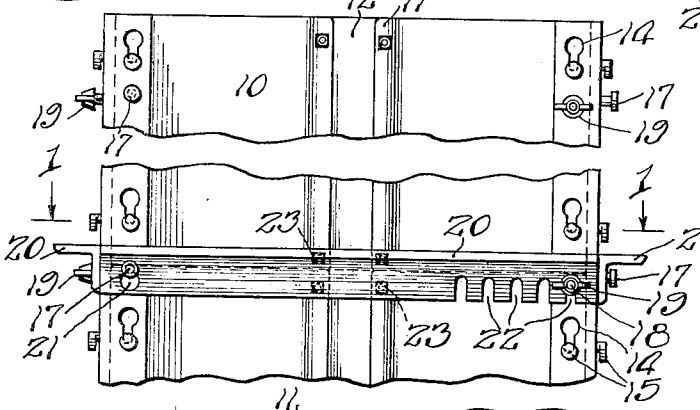
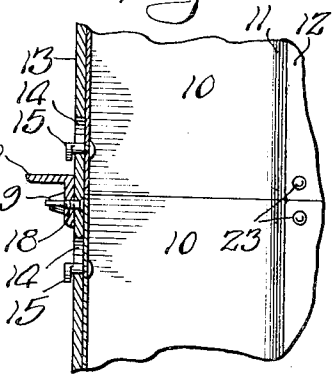


Fig. 3



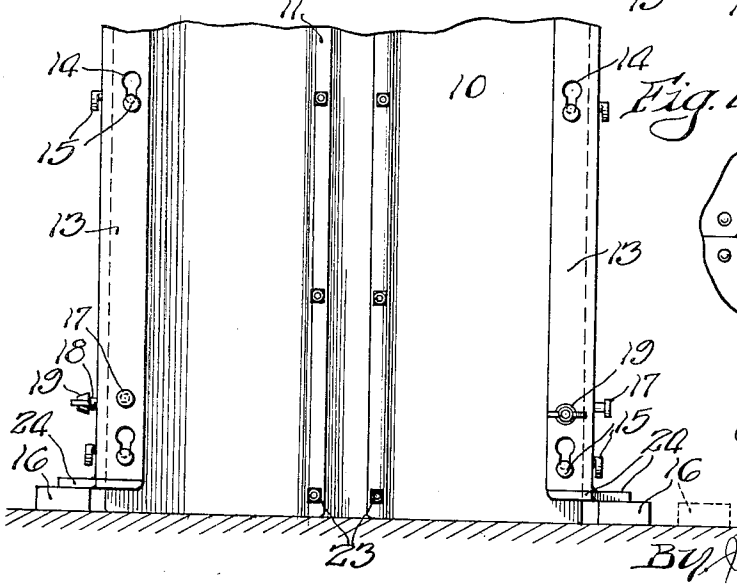
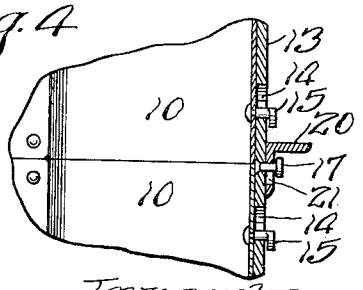


Fig. 4



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FORM FOR CONCRETE COLUMNS

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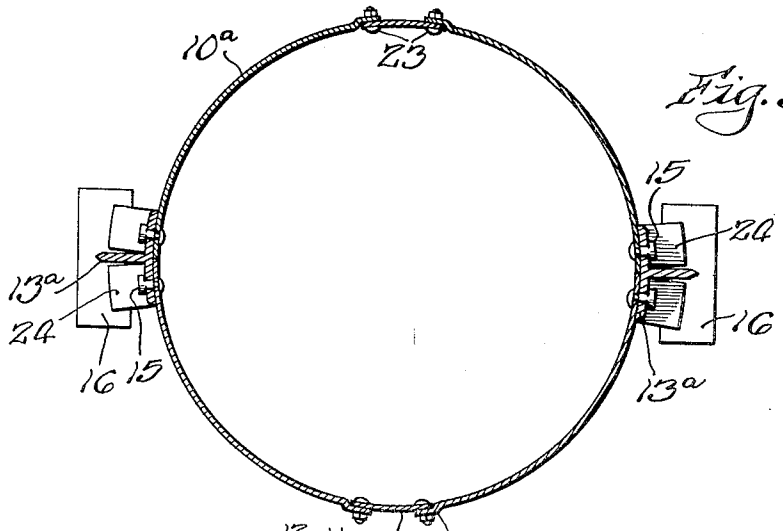


Fig. 5

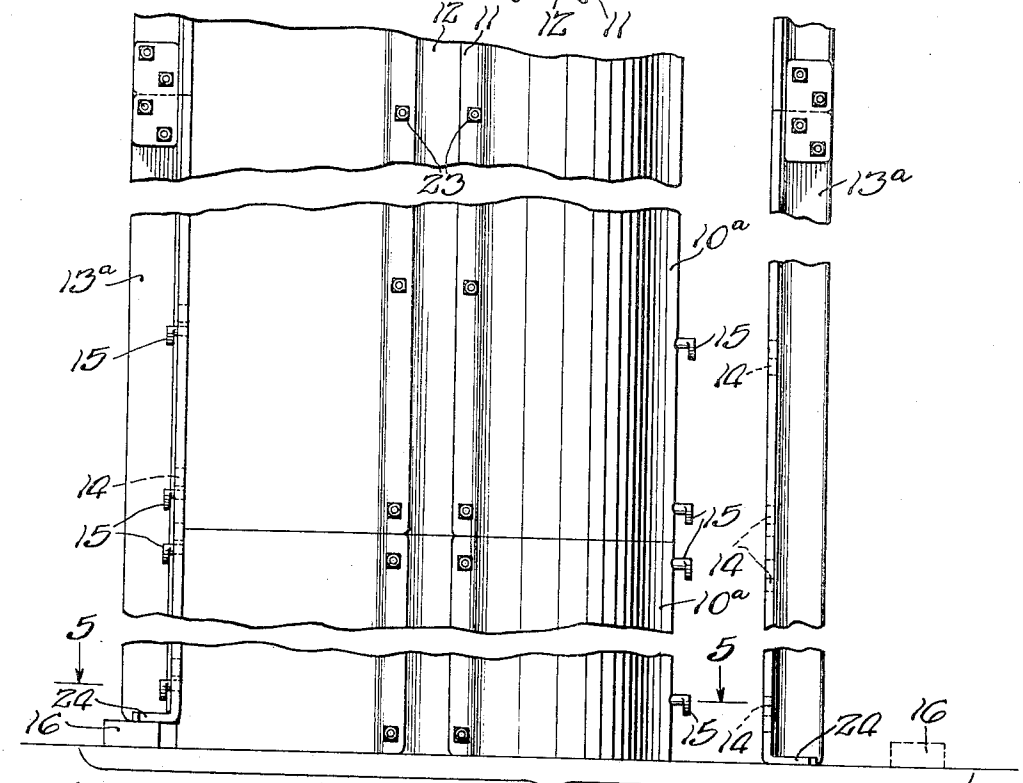


Fig. 6

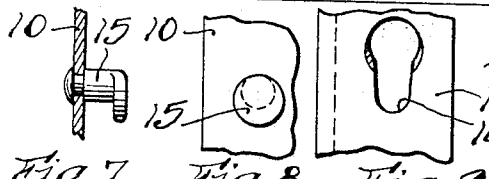


Fig. 7 Fig. 8 Fig. 9

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Patented Nov. 28, 1933 1,936,666

UNITED STATES PATENT OFFICE

1,936,666

FORM FOR CONCRETE COLUMNS

Eric E. Hall, Chicago, Ill.

Application May 9, 1930. Serial No. 450,965

10 Claims. (Cl. 25—131)

My invention is concerned with forms for concrete columns, concrete walls, etc. and a novel method of erecting and removing the same and is designed to produce such a form that can be easily assembled on a bench, i. e., in a horizontal position, and then placed for use in a vertical position, and so that when the concrete is poured and set, the form can be removed with a minimum of effort ready for re-use, thus enabling me to construct such columns at a cost substantially less than has been possible heretofore.

It is also concerned with such a column form that can be adjusted to make columns of different sizes, such as are used on different floors in tall buildings, the size of the columns being diminished as the higher floors of the structure are reached.

To these ends it consists of the novel combination of elements hereinafter generally described, and particularly defined by the claims.

To illustrate my invention, I annex hereto two sheets of drawings in which the same reference characters are used to designate identical parts and all the figures, of which—

Fig. 1 is a horizontal section of the form in place, as seen on the line 1—1 of Fig. 2;

Fig. 2 is a side elevation of the form in place, with portions thereof broken out;

Figs. 3 and 4 are details in section on the lines 3—3 and 4—4 of Fig. 1;

Fig. 5 is a view similar to Fig. 1 but showing a round instead of a square column and in section on the line 5—5 of Fig. 6; and

Fig. 6 is a side elevation of the form for the round column with one of the connecting bars removed as it would be in the process of dismantling the form after the column is set.

Referring first to Figs. 1 to 4, where a form for a column square in cross section is shown, the form is made up of the four side members 10 which are made of sheet metal, and where the columns are small each side piece will be made up of a single piece of sheet metal. Where the columns are large, and especially where the form is to be adjustable for columns of different size, each side member is made up of the two outer sections having their inner ends offset, as seen at 11, and connected by an intermediate strip 12 bolted thereto, the intermediate strips 12 of course being of different widths for different sized columns. The outer portions and the intermediate strip 12 are connected by short bolts and nuts in a manner which will be readily understood. If the column is of a considerable height, the side members may be made in sections, the sections of course being symmetrical and of exactly the same size so that they will be secured firmly together to form a continuous column without any crevices through which leakage of the concrete could occur when the side members are assembled and secured to the connecting bars.

These connecting bars 13, where square columns are to be formed, are made of angle irons, and have apertures 14 formed therein to register with the outwardly directed headed projections 15 which are secured to the edges of the side members 10 in the necessary locations to register with the apertures 14 when the forms are assembled. As will be apparent, the apertures 14 have their upper ends large enough to receive the heads of the projections 15, and their lower ends are reduced so as to accommodate only the necks of the projections, so that when the connecting bars are put in place, they are first located in a position where their ends register with the ends of the side members, as is necessary for the heads to enter the enlarged portions of the apertures, and then the connecting bars are slid upwardly, so to speak, on the side members and the parts are connected as shown in Fig. 2. This assembly can be made with the parts in a horizontal position with much less trouble than if the assembly had to be made with the entire column in a vertical position. When the parts are thus assembled, they are taken to the location, and placed over the reinforcing rods, assuming such are used, and the connecting bars are held in their then raised position by the blocks or wedges 16 which constitute an essential part of the combination during the use of the forms. It will be obvious that when the concrete has been poured in the column, and has finally set, the removal of the form will be a very simple matter, as all that is necessary is to knock out the blocks or wedges 16, after which the connecting bars 13 can be easily forced down, if they do not drop down, and with the heads 15 registering with the large portions of the apertures 14, they can be pulled off and the side members removed.

Where columns of a considerable height are to be formed, it is necessary to brace the side members 10 to prevent their bulging out under the hydrostatic pressure of the concrete, which is substantially liquid when it is poured. For this purpose, at suitable points on the connecting bars, I place on one flange thereof the headed projections 17, and on the other flange the threaded studs 18 adapted to have the wing nuts 19 screwed thereon, and I provide the brace bars

20 which will be of a length equal to the greatest possible width of the columns for which the form is adapted, and which will have at one end the apertures 21 similar to the apertures 14, but reversed, and with the large portion adapted to receive the heads 17 at the lower side. At the other end I provide a series of spaced open recesses 22, one of which will fit over the stud 18, depending upon the size of the column, and will then be secured in place by the wing nut 19. These brace bars 20 will preferably be located at junctions of the sections of the side members, and the short bolts and nuts 23, where the intermediate pieces 12 are used will be of the proper length so that the vertical flange of the angle irons 20 will be engaged thereby.

Where the columns to be constructed are round, as shown in Figs. 5 and 6, the side members will be of the same construction, but curved of course on the arc of a circle, and the side members 10^a and the connecting bars 13^a will be preferably constructed of T-bars, which will be curved to correspond to the curvature of the side members. In both cases, the lower ends of the connecting bars 13 and 13^a will have their flanges bent horizontally to form the projections 24 adapted to rest on the blocks 16.

While I have specifically illustrated my invention as applied to the making of concrete columns, it will be understood that the fundamental structure and method might be applied to the construction of concrete walls, which may be considered as columns very much elongated horizontally.

While I have shown and described my invention as employed in the form which at present I consider best adapted to carry out its purposes, it will be understood that it is capable of modifications, and that I do not desire to be limited in the interpretation of the following claims except as may be necessitated by the state of the prior art.

What I claim as new and desire to secure by United States Letters Patent is:—

1. In a device of the class described, the combination with a plurality of side members adapted when assembled to form a complete enclosure for the projected concrete column and provided along their adjacent edges with headed outwardly directed projections secured thereto, of a corresponding plurality of connecting bars provided with vertically elongated slots therein large enough at their upper ends to receive the heads of the projections and at their lower ends to receive only the necks thereof, and removable supports for the lower ends of the bars, all combined and cooperating for the purpose described.

2. In a device of the class described, the combination with a plurality of side members adapted when assembled to form a complete enclosure for the projected concrete column and provided along their adjacent edges with headed outwardly directed projections, of a corresponding plurality of connecting bars provided with vertically elongated slots therein large enough at their upper ends to receive the heads of the projections and at their lower ends to receive only the necks thereof, and removable supports for the lower ends of the bars, said side members being provided with detachable central sections which can be removed and replaced with others of different widths to vary the size of the columns, all combined and cooperating for the purpose described.

3. In a device of the class described, the combination with a plurality of side members adapted when assembled to form a complete enclosure for the projected concrete column and provided along their adjacent edges with headed outwardly directed projections secured thereto, of a corresponding plurality of connecting bars provided with vertically elongated slots therein large enough at their upper ends to receive the heads of the projections and at their lower ends to receive only the necks thereof, removable supports for the lower ends of the bars, a corresponding plurality of horizontal brace bars, and means for detachably securing said brace bars to the vertical connecting bars to prevent the side members from yielding outwardly under the pressure of the concrete.

4. In a device of the class described, the combination with a plurality of side members adapted when assembled to form a complete enclosure for the projected concrete column and provided along their adjacent edges with headed outwardly directed projections secured thereto, of a corresponding plurality of connecting bars provided with vertically elongated slots therein large enough at their upper ends to receive the heads of the projections and at their lower ends to receive only the necks thereof, removable supports for the lower ends of the bars, a corresponding plurality of horizontal brace bars, means for detachably securing said brace bars to the vertical connecting bars to prevent the side members from yielding outwardly under the pressure of the concrete, said means consisting of a headed projection on a vertical bar for each brace bar cooperating with a bayonet slot in one end of the brace bar and a threaded projection and cooperating wing nut on the connected vertical bar adapted to cooperate with a plurality of spaced recesses in the other end of the brace bar.

5. In a device of the class described, the combination with a plurality of side members adapted when assembled to form a complete enclosure for the projected concrete column, of a corresponding plurality of connecting bars, and removable supports for the lower ends of the bars, said side members and connecting bars being provided with interlocking mechanism which holds them securely together when the lower ends of the connecting bars are raised above the side members and rest on the supports, and which releases them when the supports are removed and the connecting bars are allowed to drop.

6. The novel method of erecting and removing forms for concrete structural elements which consists in (1) connecting while in a horizontal position the side pieces having headed projections along their edges by connecting bars co-operating with said edges and having slots therein with enlargements at their upper ends co-operating with the projections; (2) raising the assembled forms to vertical position with supports underneath the bottom of the connecting bars to retain the necks of the projections in the narrow portions of the slots; (3) removing the supports so that the connecting bars can drop to bring the enlargements of the slots into register with the heads of the projections; and (4) first removing the connecting bars and then the side pieces by horizontal movements thereof.

7. The novel method of erecting and removing forms for concrete structural elements which consists in (1) connecting while in a horizontal position the side pieces having headed projections along their edges by connecting bars co-operating with said edges and having slots there-

in with enlargements at their upper ends co-operating with the projections; (2) securing horizontal brace bars around the assembled parts intermediate their ends; (3) raising the assembled forms to vertical position with supports underneath the bottom of the connecting bars to retain the necks of the projections in the narrow portions of the slots; (4) removing the horizontal brace bars; (5) removing the supports so that the connecting bars can drop to bring the enlargements of the slots into register with the heads of the projections; and (6) first removing the connecting bars and then the side pieces by horizontal movements thereof.

8. In a device of the class described, the combination with a plurality of side members adapted when assembled to form an enclosure for the projected concrete structural element and provided along their adjacent edges with headed outwardly-directed projections secured thereto, of a corresponding plurality of connecting bars provided with vertically elongated slots therein large enough at their upper ends to receive the heads of the projections and at their lower ends to receive only the necks thereof, and removable supports for the lower ends of the bars, all combined and co-operating in the manner and for the purpose described.

9. In a device of the class described, the combination with a plurality of side members adapted when assembled to form an enclosure for the projected concrete structural element, of a corresponding plurality of connecting bars, and removable supports for the lower ends of the bars, said side members and connecting bars being provided with interlocking mechanism which holds them securely together when the lower ends of the connecting bars are raised above the side members and rest on the supports, and which releases them when the supports are removed and the connecting bars are allowed to drop.

10. In a form for concrete construction, mold-sections arranged angularly with respect to each other and with their edges in abutment, rigid headed pins on the outer faces of said mold-sections adjacent the adjoining edges thereof, and a joining strip comprising flanges arranged at an angle with respect to each other corresponding to the angle between said mold sections, each flange having slots therein and each of said slots being enlarged at one end for the reception of one of said pins and restricted at the other end whereby the pins may be firmly engaged within said slots by sliding the strip upon the mold sections.

ERIC E. HALL.