To all whom it may concern:

Be it known that I, GEORGE E. DALE, a citizen of the United States, and a resident of Trenton, Mercer county, New Jersey, have invented Improved Forms for Reinforced-Concrete Wall and Column Construction, of which the following is a specification.

My invention relates to forms, molds or centering for concrete construction; and the object of my invention is to provide an improved form supporting means for wall and column construction.

My invention consists in the use of metal members of flat, angle and channel form suitably braced and supported, and adjustable for the purposes described.

My invention is fully shown in the accompanying drawings, in which:

Figure 1, is a plan view of a wall support or centering means embodying my invention; Fig. 2, is a perspective view of the same; Fig. 3, is a plan view of a column centering form embodying my invention; Fig. 4, is a perspective view of the upper portion of a column centering form embodying an important modification of my invention; Fig. 5, is a perspective view of the upper portion of a column centering form embodying an important modification of my invention; Fig. 6, is a plan view of the same, and Fig. 7, is a sectional elevation thereof.

In a companion Patent, No. 1,131,479, dated March 9, 1915, I have described the use of metal members or sections as centering for floors, beams or girders and lintels. My present invention relates to forms or centering for walls and columns, and for such purpose I employ metal channels and angles in combination with flat metal plates, with means for holding the same in proper position when assembled for the purpose desired.

Wall forms or centering embodying my invention are shown in Figs. 1 and 2, and they may comprise channel sections 1, which alternate with plates 2, the latter lapping or overlapping the channels as indicated. At the corners of the wall form, angles 3 may be employed. The members forming such wall form will be spaced the proper distance apart and may be held in proper relationship with each other by means of wire ties 4, as clearly shown in Figs. 1 and 2. The channel sections 1 are preferably disposed with their flanges 5 projecting outwardly as indicated, and to stiffen such wall forms and at the same time maintain a substantially unbroken surface, I provide flat bars 6 which lie against the flats webs of the channels and pass through slots 7 cut in the flanges of said channels. In order that the bars may lie close to the webs of the channel, the slots may extend part way into such webs. To maintain the bars against said webs, I may employ wedges 8, which may be driven into the slots of the channel flanges directly against the bars 6, as shown. The slots in the flanges of the channel sections will be preferably disposed in proper relative position in order that the bars from adjacent walls may be carried across each other and be secured by suitable means; for instance, by pins 9 as shown, such pins entering registering apertures 10, of which each bar has a series. The wire ties 4 will be left embedded in the concrete and they may be cut away 75 from the metal forms when it is desired to remove the latter. The form for the inner corner of the wall may have angle sections 11, secured thereto as indicated, in order that it may be brought into proper relation with respect to the next channel sections to be braced by the bars 6.

The column form shown in Figs. 3 and 4, is preferably made of a series of metal angle members 12, substantially W shape in cross section, which members are placed together in position to form a hollow space to be subsequently filled with concrete to form a column. The metal angle members may be relatively small, and may serve primarily for the support of flat metal plates 13, which provide the actual sides or walls of the column form; and these plates may be secured to the angle sections 12 in any approved manner. By preference, the outwardly extending flanges 14 of said angle members are slotted at 15 in the same manner as the flanges 5 of the channel sections of the wall forms, and bars 6 are provided to pass through said slots and lie against the webs 10.
of the angle members. To hold the bars against said angle members, I may provide the wedges 8, and the bars will be held in place with respect to each other by means of pins 9, entering registering apertures 10, of which each bar has a series.

In the use of the metal wall and column forms, the bracing bars will be used at frequent intervals. The wall forms will be of standard length, and of such a weight of metal as to be capable of overlapping without affecting unduly the normally flat surface of the wall to be formed. The column forms will also be of standard length, and I prefer to provide adjustable and removable extension means for the same when a column of greater height than that provided by the standard length forms is to be constructed, since it is much easier to add to the height than to reduce it. The extension means may be of wood, and the metal forms will preferably be provided with means for properly supporting such extension means and maintaining it in proper relation to the metal portions of the column form.

Since in the construction of concrete columns it is more or less difficult to produce good corners for the same and a much more satisfactory result can be attained by chamfering such corners. In Figs. 5, 6 and 7, I show an arrangement of column forms comprising plates 15 having portions 16 bent at an angle thereto and arranged so as to lie against the flat surface of another plate 15 disposed at right angles to the first. This arrangement is carried out with respect to all the plates comprising the sides of the form. In addition each plate is provided with an angle piece 12 riveted or otherwise secured to said plate and adjacent to bent portions 16, and having outwardly extending flanges 14. This form of structure will be held together by the bars 6 and pins 9 in the same manner as that illustrated in Figs. 3 and 4.

The column forms will be of standard length which may be in some instances too short for the height of the column desired. In such case it is necessary to provide extension means for the upper end of said column form. For this purpose I prefer sections of wood, which may be of various heights to properly complete the desired dimensions of the column. To support the wooden sections, which are shown at 20, the members composing the side walls of the form shown in Figs. 5, 6 and 7 are provided with brackets 21, which may be secured thereto in any suitable manner, by riveting, as indicated at 22, for instance, or by other suitable means, and such brackets should be of such shape and dimensions as to properly support the wooden extensions with their inner faces flush with the inner faces of the metal portions of the forms.

The extensions will also be constructed to provide the desired chamfered edges for the column. Should the walls or column forms require lateral support they may be braced from the floor by suitable means. In the case of the wall forms, the braces may engage the flat bars used for stiffening purposes. In other instances it may be desirable to secure brackets to the metal members which will serve as means for the application or attachment of suitable shoring. The metal wall forms shown in Figs. 3 and 4 may be provided with the same kind of brackets illustrated in Figs. 5 and 7, in order to increase the height of the same without the use of full-sized sections.

The metal members of the wall and column forms may be of such weight of metal as to overlap readily without making bulky joints or may be butt or mitered and joints or, I may arrange to butt the succeeding sections and provide vertically disposed stays or stiffening members to maintain the several sections in proper position and place. In some cases it may be desirable to provide the column forms in a plurality of vertical sections, although I prefer a single standard section which may or may not have the extension means.

It will be understood that the concrete to be poured into the several forms will be reinforced by metal rods or bars. Such reinforcing members will be spaced and stayed by suitable means which may or may not engage the walls of the forms. The column forms, as well as the wall forms will be of a character that may be readily fitted into place in combination with the floor and girdler or beam centering forms of any companion application filed of even date herewith.

I claim:

1. In forms for wall and column construction, the combination of a plurality of flat metallic members some of which are flanged and all of which are adjustably mounted with respect to each other, certain of said metallic members covering the joints between other of the metallic members and the flanges of certain of said members being slotted, bracing bars passing through the slots of said flanged portions, means for securing the bracing bars together, and wedges for holding said bracing bars in contact with the flat portions of one set of the members.

2. In forms for wall and column construction, the combination of a plurality of metallic members some of which have a plurality of flanges and all of which are adjustably mounted with respect to each other, parts of said members being in the form of plates covering the joints between other metallic members, and connecting means for the several metallic members, said means being.
ing adjustable to permit variations in the size of a wall or column, certain of said flanges being disposed diagonally with respect to the members carrying the same to provide vertical chamfered corner edges for the finished wall or column.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

G.E.O. E. DALE.

Witnesses:

MURRAY C. BOYER,

JOS. H. KLEIN.