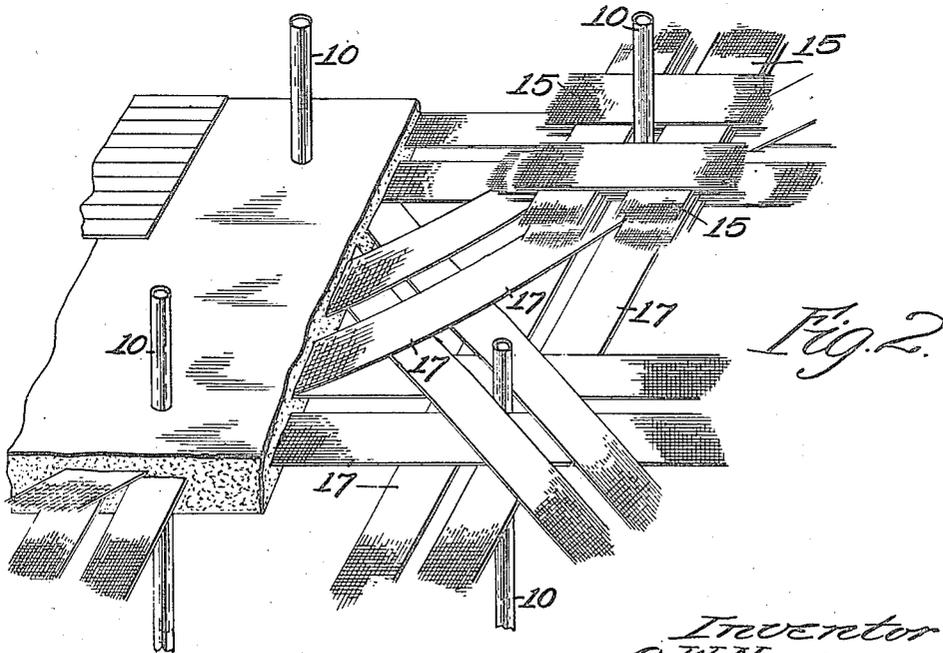
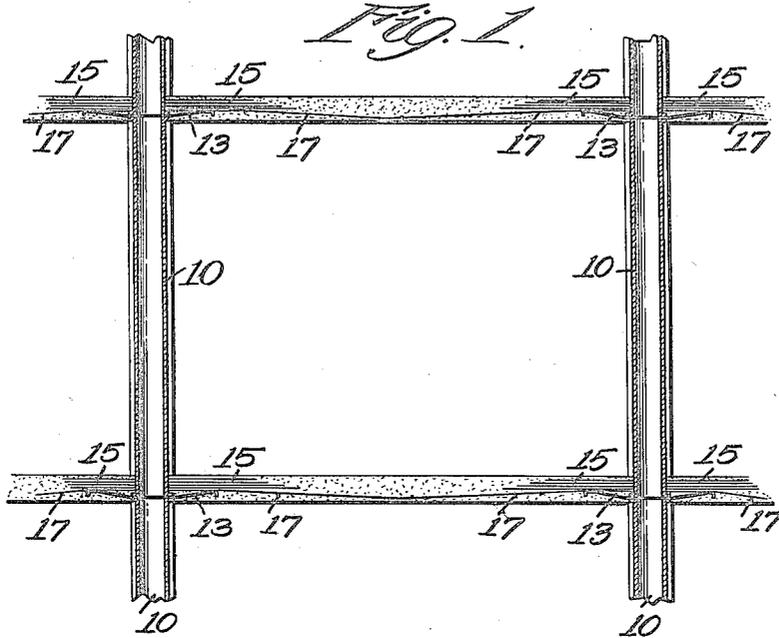


O. W. NORCROSS.
REINFORCED CONCRETE FLOOR CONSTRUCTION.
APPLICATION FILED DEC. 11, 1916.

1,247,865.

Patented Nov. 27, 1917.
3 SHEETS—SHEET 1.



Witness
C. F. Mason

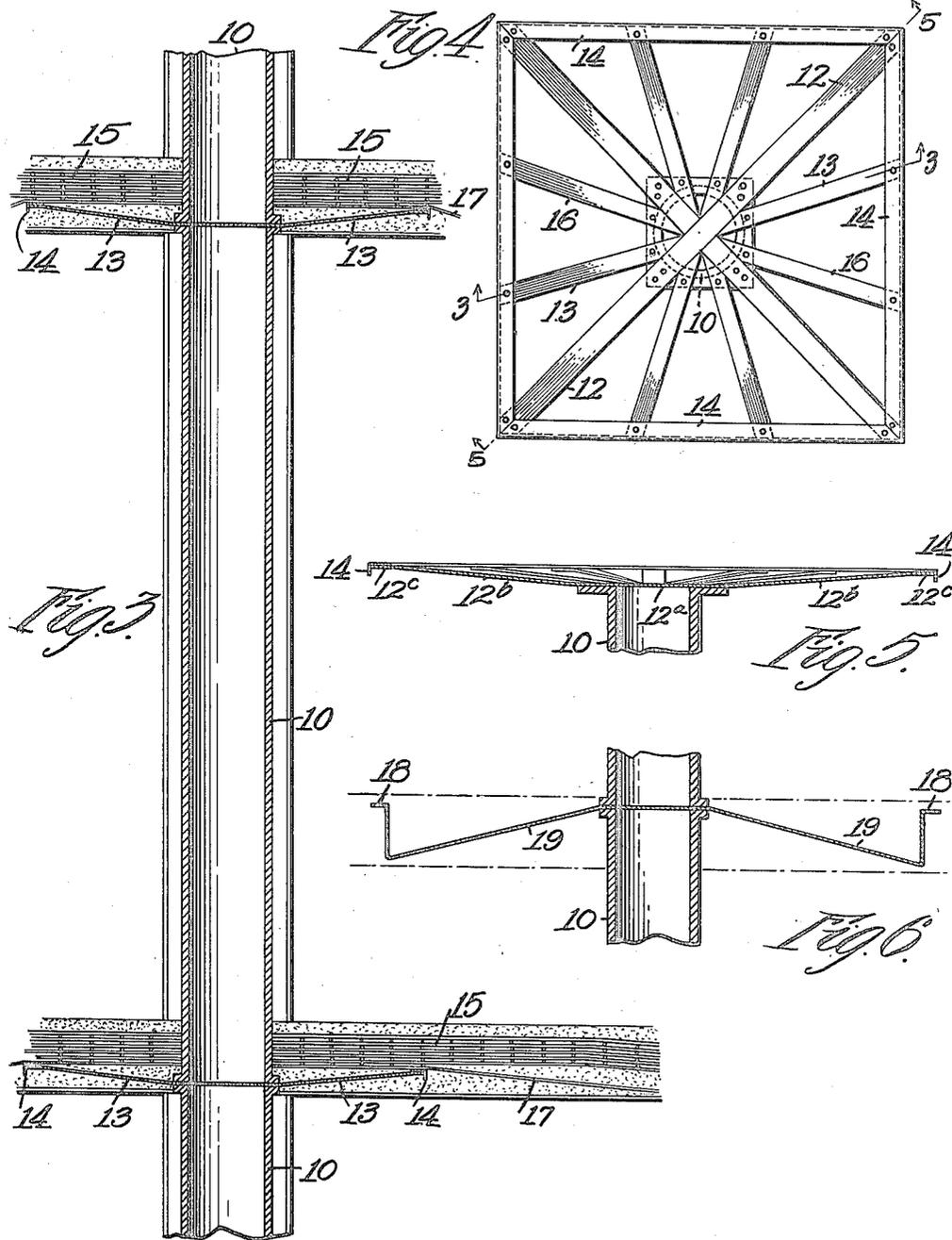
Inventor
O. W. Norcross
by attorneys
S. H. S. S. S. S.

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3 SHEETS—SHEET 3.

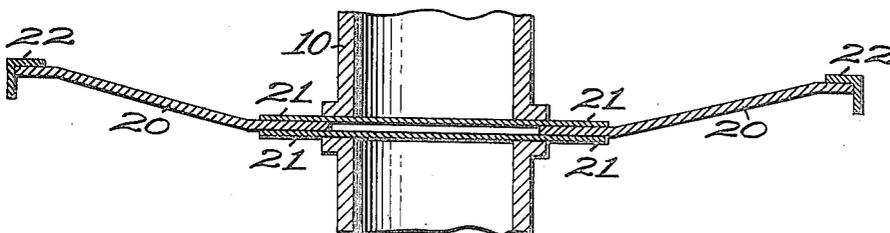
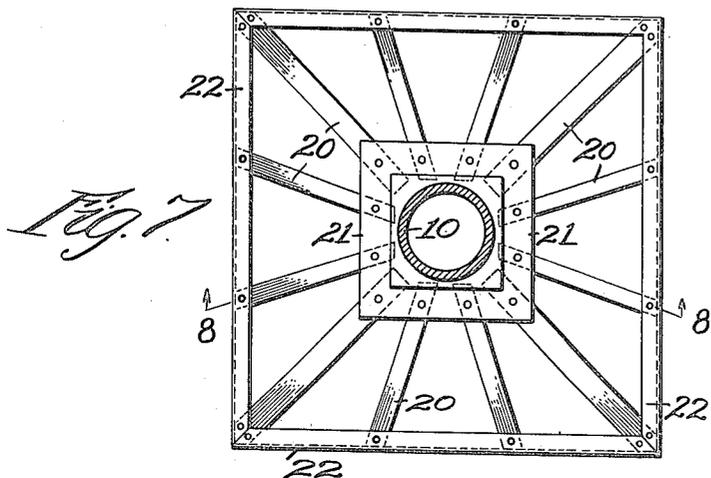


Fig. 8.

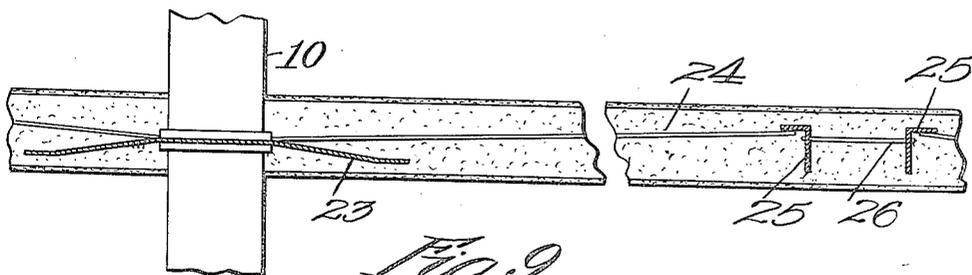


Fig. 9.

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UNITED STATES PATENT OFFICE.

ORLANDO W. NORCROSS, OF WORCESTER, MASSACHUSETTS.

REINFORCED-CONCRETE FLOOR CONSTRUCTION.

1,247,865.

Specification of Letters Patent. Patented Nov. 27, 1917.

Application filed December 11, 1916. Serial No. 136,206.

To all whom it may concern:

Be it known that I, ORLANDO W. NORCROSS, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Reinforced-Concrete Floor Construction, of which the following is a specification.

The object of this invention is to provide a reinforced concrete floor construction and column therefor in which the wire or other reinforcements shall be supported near the top of the floor at the supporting posts or columns, and shall be located near the bottom of the floor at intermediate points, it being understood that these reinforcements are, of course, embedded within the body of the concrete throughout their length. In this way these reinforcements are utilized to the greatest extent possible in supporting the weight of the floor, particularly at points at a distance from the columns. Other objects are to provide an improved means for supporting these reinforcing strips at the columns where they will accomplish the first mentioned object above stated, and at the same time facilitate the erection of the building by furnishing a temporary support for the stagings or anything else that it may be desired to place around the column; to provide an arrangement whereby the floors are attached to the column construction in such a way as to be superior to the steel connections commonly used, and which will be entirely out of sight, so that no unsightly supporting member has to be mounted on the column below the floor, and any kind of capital may be employed for ornamental purposes; to provide a column which shall pass through the floor, so that its two ends may be exactly alike; and to provide an improved cap for the column designed to be embedded in the concrete floor.

Another object of the invention is to provide for securing the results secured by the construction shown in my Patent No. 698,542, patented April 29, 1902, but more efficiently.

Reference is to be had to the accompanying drawings, in which—

Figure 1 is a sectional view through two columns showing a reinforced concrete floor supported thereby and illustrating a preferred form of this invention;

Fig. 2 is a perspective view showing the reinforcements with the concrete broken

away partly to show the relation between these parts;

Fig. 3 is a central vertical sectional view of a column on enlarged scale taken on the line 3—3 of

Fig. 4 which is a plan of one of the buckle plates employed in the flooring;

Fig. 5 is a sectional view of the same on the line 5—5 of Fig. 4;

Fig. 6 is a sectional view similar to Fig. 5 showing a modification;

Fig. 7 is a view similar to Fig. 4 of a modification;

Fig. 8 is a sectional view thereof on the line 8—8 of Fig. 7, and

Fig. 9 is a sectional view of another modification.

My above mentioned patent has resulted in the introduction of the flat slab reinforced concrete floor to a very large extent. One of the ways of constructing this floor is to make a very large spread at the capital under the floor. This is a material disadvantage for it obstructs light and heat and takes up room around the upper part of the column and reduces the usefulness of the flat slab construction itself. This invention avoids this difficulty by eliminating the large cap extending down into the room.

In the form of the invention shown in the first five figures, columns 10 are shown which are of ordinary construction, being of hollow metal, except that they are exactly the same at both ends. This in itself is an advantage because in erecting a building it is not necessary to turn the column on its end for it is always right end up. These columns are erected in the usual way, except between each two of them is placed a cap, shown in these figures in the form of a buckle plate. This may consist of a single stamping of metal all in one piece either with or without perforations through it, but in view of the fact that it is usually desired to make these plates rather large as for example, five feet square, or over, I prefer to make them of a plurality of pieces and in the preferred construction shown a buckle plate is illustrated consisting of several elements.

A strip 12 constituting a diagonal of the buckle plate extending from one corner to the other is riveted or bolted to the end of the column at its corners. It has a lower flat bottom portion 12^a in the center and two

slanting portions 12^b beyond this and then two horizontal end portions 12^c. Radiating from this are two members 13. They together are shaped like the member 12 meeting it at its edges and being riveted to the end of the column in the same way. A cross section of these members is shown most clearly in Fig. 3. Additional radial strips 16 of any desired number can be used. At the horizontal outer ends of these members they are connected by four flat edge members 14 riveted to them constituting the edges of the metal structure. It will be seen from this construction that a strong supporting plate is provided having a flat bottom and raised horizontal edges. These edges are connected with the flat bottom by oppositely slanting portions and the horizontal bottom is firmly secured to the top of the column supporting it and also to the bottom of the column above it. Between the members 12, 13 and 16, there are openings entirely through the plate. As will be seen later this plate is embedded in the floor and constitutes part of it, but is entirely invisible. These openings through this support strengthen the plate and afford a means by which the concrete on the two sides is integrally connected so that there is no weak spot in the floor at this point.

It will be observed that the flat bottom of this plate member is supported at a point just above the bottom of the flooring so that the concrete comes both below and above it and mostly above it and that the flat members 14 are supported at a considerable distance above the bottom of the floor. On these members several thicknesses of flat metal reinforcements 15 are located virtually constituting a part of the supports for the floor. These are in the form of rods, or preferably woven wire cloth, as indicated in the drawings. They do not pass directly over the columns as in my above specified patent, but pass them on each side. Additional continuous tie members 17 are shown several radiating from the columns. This gives an opportunity to allow them to hang down between the columns as indicated in Figs. 1 and 2, thus giving a chance to secure a much higher efficiency for them. In this way they exert their strength not exactly in horizontal direction but upwardly, so that the floor is supported at a distance from the columns by slanting reinforcements which exert an upward pull. This is of great importance over constructions in which the pull is nearly or substantially horizontal. The concrete of course entirely surrounds the reinforcements 15 and 17.

In this way it will be seen that these plates not only serve on account of their great strength to assist in supporting parts of the floor at a material distance from the columns, but they raise the reinforcements

to a high point at the columns and thus add greatly in two ways to the strength of the structure. Furthermore, the ends of the columns are themselves embedded in the floor and the plate located between them serves as an anchoring element to hold the columns and floor in proper relative position.

As has been stated, this plate facilitates the erection of the building as it furnishes a support for the stagings, piping, and other things used in the erection of a building. It makes it much easier to provide sections for the flat slab construction; provides for attaching the floors to the column construction in such a manner as to be superior to the steel constructions ordinarily used, and shortens the span between the supports to the extent of the relation between the dimensions of the buckle plate and the width of the span. It is provided at an expense considerably less than that needed for spreading the column below because more steel is used, and it is put in the place where it will do the most good. Less concrete is required, each of the columns being reduced by a weight of nearly one and one-half tons.

In the form shown in Fig. 6, a different arrangement is illustrated, in which the buckle plate 19 is turned down instead of up from the center. In this case the wire reinforcements are supported on the elevated outer edge 18. Some of them are supported substantially at the top of the flooring and others pass over them and then downwardly half-way between the columns as in the other case, but in both cases this supporting plate is embedded in the floor and thus the disadvantages of the cap below the floor are entirely eliminated while the strength of the floor is increased. As illustrated here this plate is shown in one piece but it can be made up of a plurality of strips for large sizes.

In the form shown in Figs. 7 and 8 the buckle plate is of skeleton form having radiating metal strips 20, the inner ends of which are held between two flat plates 21 to which they are riveted. Outside connecting strips 22 are shown for the same purpose as in Fig. 4.

In the form shown in Fig. 9 a central plate 23 is shown having radiating arms or strips 24 provided with a pair of angle bars 25 forming a square frame as in the other cases. These angle bars are shown as connected by rods 26 and are designed to support the reinforcements at a comparatively great distance from the column.

Although I have illustrated and described only a few forms of the invention, I am aware of the fact that modifications can be made therein by any person skilled in the art without departing from the scope of the invention as expressed in the claims. Therefore I do not wish to be limited to all the

details of construction herein shown and described, but what I do claim is:—

1. A building structure comprising a metal column having identical flanges at both ends, a concrete floor supported thereby and surrounding the top of the column so as to embed said flanges within the concrete, a metal buckle plate having a flat base resting on top of the column above the bottom of the flooring, secured to said flanges, and provided with upwardly slanting parts beyond the base, and a surrounding rim in a horizontal plane at a point materially above the bottom of the flooring but all embedded therein, a second column like the first named one located with its bottom flange resting on and secured to the bottom of said plate within the concrete floor, and separate reinforcing members supported by the raised rim of said metal structure, but passing by the sides of the upper column and extending downwardly therefrom within the body of the concrete flooring.

2. A cup-shaped sheet metal buckle plate

for supporting a flooring from a column comprising a flat base resting on top of a column having an end flange and secured to the end flange thereof, and provided with upwardly slanting rigid parts beyond the base, and a surrounding rim in a horizontal plane at a point materially above the bottom of the flooring constituting the sole means for holding the ends of said slanting parts together, whereby said buckle plate is held together without strengthening members between it and the column.

3. A buckle plate for supporting a flooring from a column comprising a flat base made up of two plates resting on the top of the column, a series of flat strips radiating from the center of said base and secured between said plates, and a surrounding rim formed of flat connecting strips secured to the ends of said radiating strips and located in a horizontal plane.

In testimony whereof I have hereunto affixed my signature.

ORLANDO W. NORCROSS.