

D. W. MORROW.
REINFORCED CONCRETE CONSTRUCTION.
APPLICATION FILED MAY 18, 1912.

1,064,850.

Patented June 17, 1913.

2 SHEETS—SHEET 1.

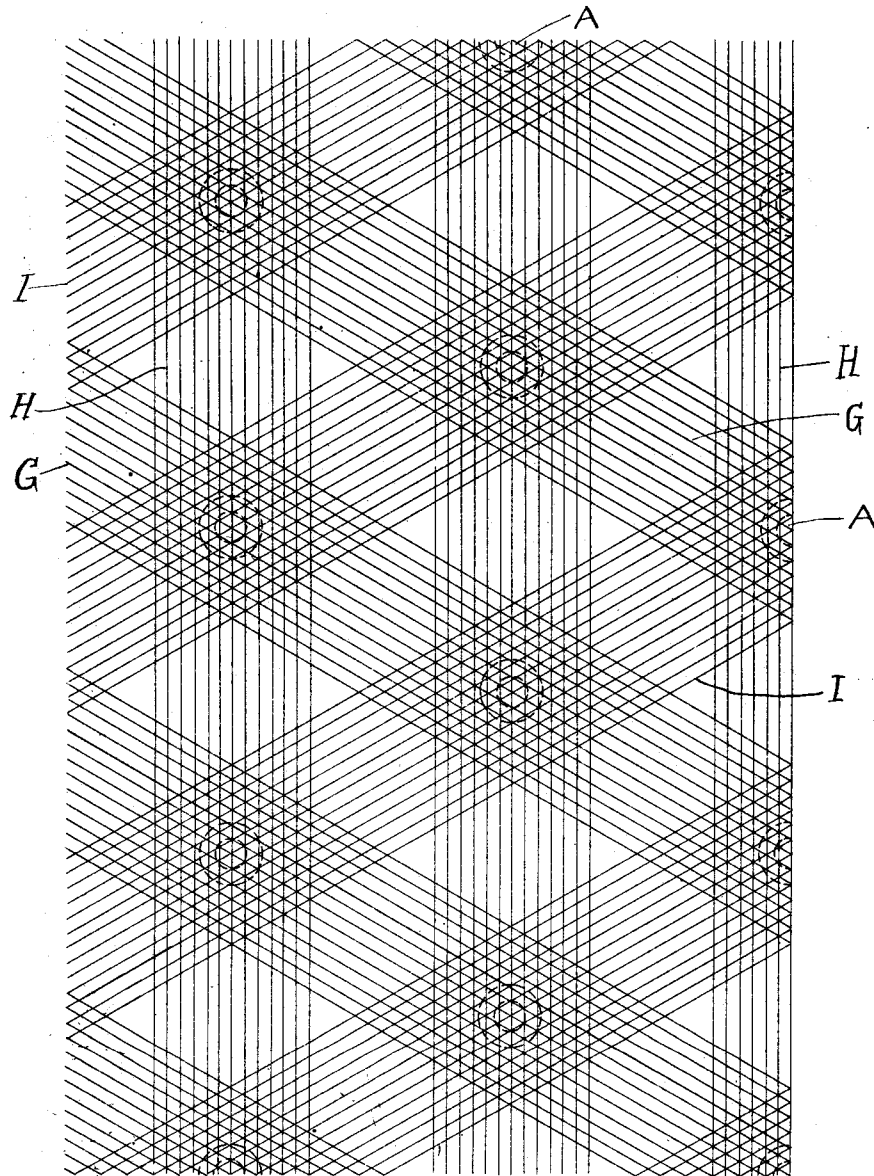


Fig. 1.

WITNESSES:

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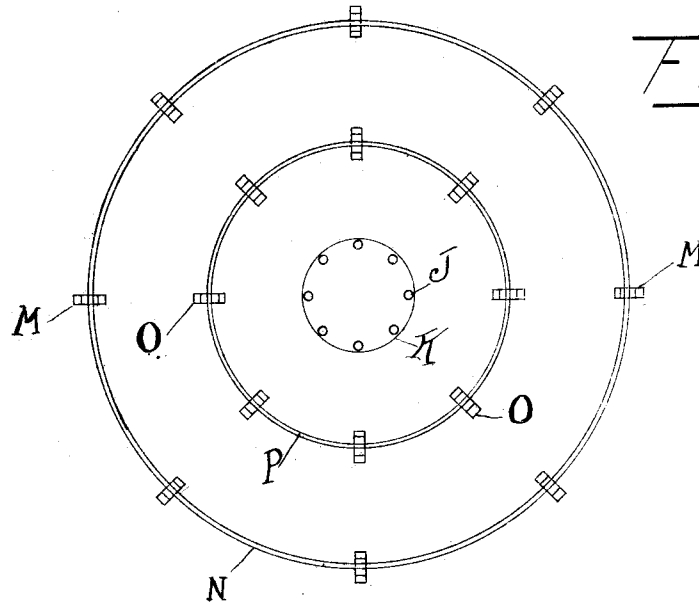


Fig. 2.

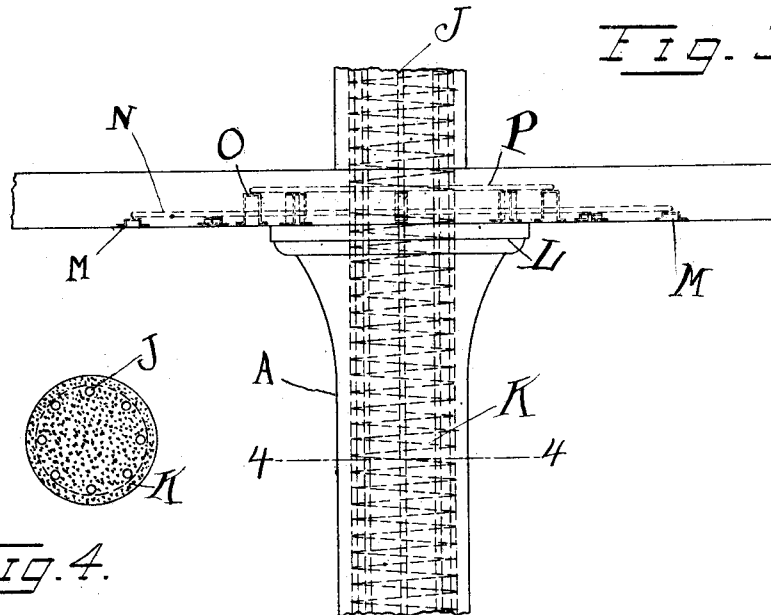


Fig. 3.

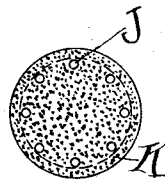


Fig. 4.

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REINFORCED CONCRETE CONSTRUCTION.

1,064,850.

Specification of Letters Patent.

Patented June 17, 1913.

Application filed May 18, 1912. Serial No. 698,096.

To all whom it may concern:

Be it known that I, DAVID W. MORROW, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Reinforced Concrete Construction, of which the following is a full, clear, and exact description.

This invention relates to a reinforced monolithic concrete flat floor slab and column construction of the type wherein slab reinforcing elements extend between adjacent columns and are supported prior to the casting of the floor concrete upon a form or support which is placed above the column and is adapted to be embedded, with the slab reinforcement, in the slab.

One of the objects of the invention is to provide an arrangement of reinforcement for the slab which obtains maximum strength from the reinforced concrete, while effecting an economy of reinforcing material. And further the invention aims to provide a more efficient and effective distribution of the reinforcing material, to the end that the material may be distributed in the slab to give a uniform reinforcement more nearly proportional to the stresses occurring in the slab than is accomplished with constructions at present in use.

A further object is to provide an efficient form of support for the slab reinforcement above the column.

Reference should be had to the accompanying drawings forming a part of this specification, in which—

Figure 1 is a plan view of a slab reinforcement. Fig. 2 is a top plan view showing the support or form for the slab reinforcement above a column; Fig. 3 is an elevation of a portion of a column and slab showing the column reinforcement and the support or form for the slab reinforcement; and Fig. 4 is a section on the line 4—4 of Fig. 3.

Fig. 1 shows a plurality of columns A arranged in rows, and in accordance with my invention the columns in adjacent rows are staggered with respect to each other. These columns are placed so that each column is substantially equidistant from its adjacent columns, and considering a group of any three adjacent columns, they form in effect the corners of an equilateral triangle, or of

a triangle which is substantially equilateral taking into account likely deviation in location of columns from their intended exact locations. However, the columns are placed as near equidistant as is possible in practice. Reinforcing bars arranged in groups indicated at G, H and I, extend between adjacent columns, and the reinforcing bars in each group are arranged so that they lie in the upper portion of the slab at points above the columns, and are adjacent to the lower face of the slab at points midway between the columns.

Due to the fact that the columns about any one column are arranged equidistant therefrom, the stresses in the slab about a column head are uniform in all directions from the axis of the column. Such being the case there is much less likelihood of cracking and failure of slabs than would be the case if the stresses were unequal.

The arrangement of reinforcing elements shown in this figure of the drawing and just described, produces a slab having the required strength and at the same time requires considerably less reinforcing material than is at present required by other forms of slab reinforcement now in use.

In the event that the columns being arranged as shown in Fig. 1 are placed a considerable distance apart, it may be necessary to use some additional reinforcing material at points between the columns. But even under such conditions the amount of reinforcing material thus used will be relatively less than in those systems at present used, wherein the columns about any one column are unequally spaced therefrom.

The form of reinforcement for the column may be varied. I have shown a group of vertical rods J which are bound together by a spiral reinforcement K. The column reinforcing element may be extended past the slab, that is to say, they may be extended from the top to the bottom of the building, but the portion between adjacent slabs or floors when concreted are formed with a flaring head which becomes integral with the slab.

In order that the reinforcing members for the slab may be supported and correctly positioned in the slab and more particularly those portions thereof above the column, I have arranged a support or form to be used

for the purpose of supporting and securing the correct positioning of the bars before they are embedded in the concrete.

As is well known, it is customary to use decking to support the concrete before it sets. Upon the decking thus used I place a plurality of brackets or standards M which rest on the decking and may be secured to the decking if such be desired. These brackets are arranged around the reinforcements for the column and upon these brackets M there is supported a circular or other shaped bar N which is arranged symmetrically with respect to the column.

A second group of brackets O are arranged around the column, these latter brackets being higher than the brackets M, and they are also arranged nearer to the column. A circular or other shaped bar P is supported by these brackets. It will be clear that other bars, in addition to those shown, may be used, where such is desired, or necessary.

The object sought by the support or supports, as the case may be, is merely to support and correctly position the slab reinforcing bars, so that they may occupy the correct position in the slab when it is cast. The brackets M and O may be cast or may be stamping material, and when these are employed to support the bars N and P the positioning of the slab reinforcement may be very correctly made, much more so than if the bars are bent by the workmen in the laying of the same.

When the slab reinforcing elements have been made the slab is then poured which embeds the reinforcing elements and support for the same above the column.

Having thus described my invention, I claim:—

1. In a monolithic concrete construction, the combination with a reinforced flat slab and a plurality of reinforced columns, the said columns being arranged in rows and the columns of adjacent rows being staggered with respect to each other, any group of three adjacent columns in two adjacent rows forming the apices of a substantially equilateral triangle, said slab having groups of reinforcing rods passing over the columns in the directions of the three sides of the triangle.

2. In a monolithic concrete construction, a floor slab, a plurality of reinforced columns arranged in rows, the columns in adjacent rows being staggered with respect to each other, any four adjacent columns which

form the apices of a parallelogram being substantially equidistant apart in the directions of the four sides and short diagonal of the parallelogram, and groups of reinforcing rods extending over the columns in the directions of the four sides and of the short diagonal.

3. In a monolithic concrete construction, a floor slab, a plurality of reinforced columns arranged in rows, the columns in adjacent rows being staggered with respect to each other, any four adjacent columns which form the apices of a parallelogram being substantially equidistant apart in the directions of the four sides and short diagonal of the parallelogram, and groups of reinforcing rods extending over the columns in the directions of the four sides and of the short diagonal, the said rods being near the lower face of the slab midway between the columns, and near the upper face of the slab over the columns.

4. In a monolithic concrete construction, a floor slab, a plurality of reinforced columns arranged in rows, the columns in adjacent rows being staggered with respect to each other and any four adjacent columns which form the apices of a parallelogram being substantially equidistant apart in the directions of the four sides and short diagonal of the parallelogram, and groups of reinforcing rods extending over the columns in the direction of the four sides and short diagonal, the said reinforcing rods substantially covering the area between said columns.

5. In a monolithic concrete construction, a floor slab, a plurality of reinforced columns arranged in rows, the columns in adjacent rows being staggered with respect to each other and any four adjacent columns which form the apices of a parallelogram being substantially equidistant apart in the directions of the four sides and short diagonal of the parallelogram, and belts of reinforcing rods extending over the columns in the directions of the four sides and short diagonal, the said belts being of but one thickness of reinforcement midway between the columns and three thicknesses of reinforcement over the columns.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

DAVID W. MORROW.

Witnesses:

A. F. Kwis,
A. J. HUDSON.