R. THOMSON.

METAL CONCRETE REINFORCED FLOOR.

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1,065,322. Patented June 17, 1913.

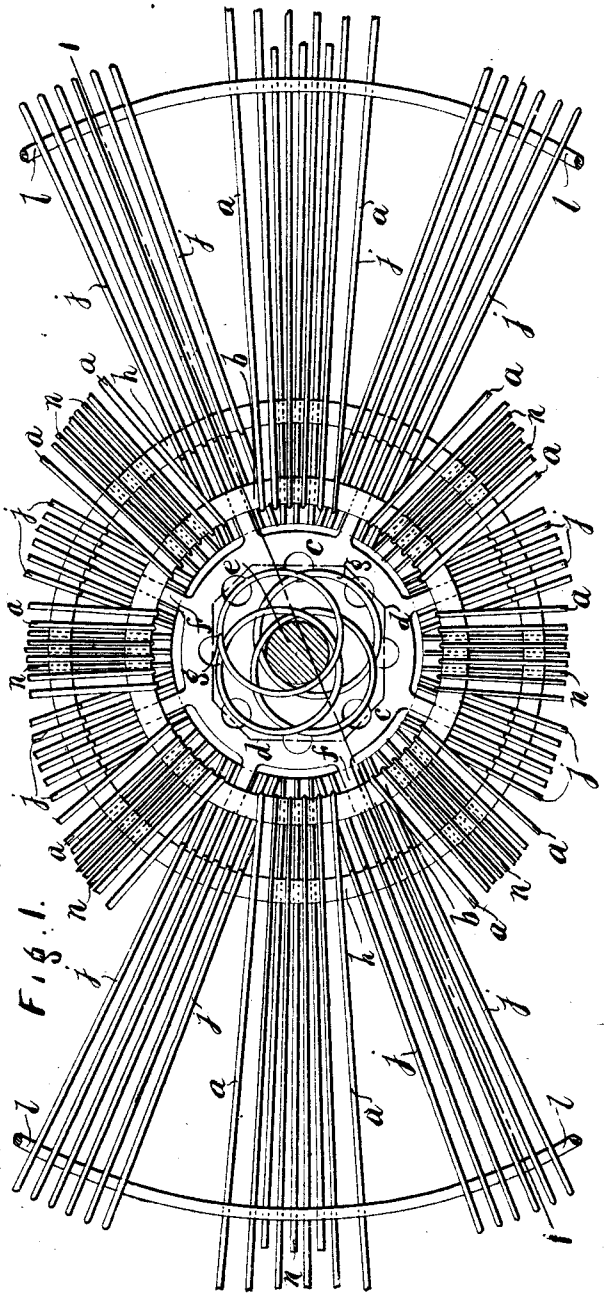

Fig. 1.

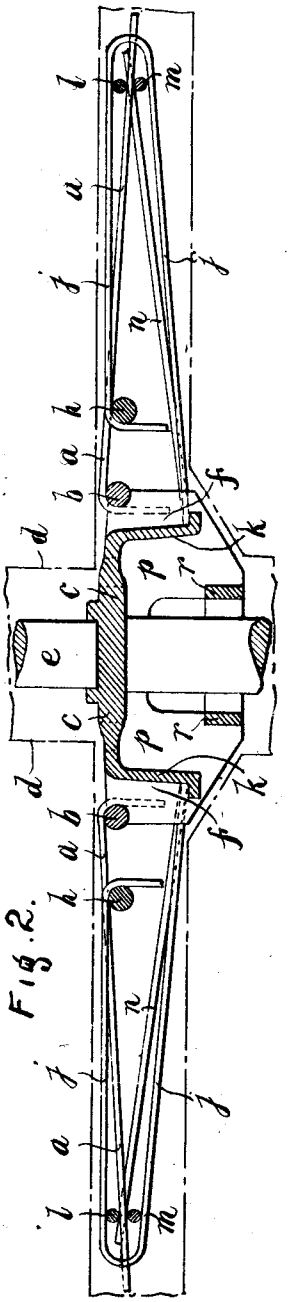

Fig. 2.

WITNESSES

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METAL-CONCRETE REINFORCED FLOOR.

1,065,322. Specification of Letters Patent. Patented June 17, 1913.

Application filed April 5, 1913. Serial No. 759,054.

To all whom it may concern:

Be it known that I, ROBERT THOMSON, a subject of the King of Great Britain and Ireland, and a resident of Pollokshields, Glasgow, Scotland, have invented certain new and useful Improvements in Metal-Concrete Reinforced Floors, and of which the following is the specification.

The invention relates to metal-concrete reinforced floors of the known type in which a series of primary reinforcing members are secured to anchor rings carried on supporting devices, which in turn are carried upon the columns supporting the floor. The greatest stress upon the floor is that substantially vertical at and about the point of support—hence, if, with the construction referred to, adequate strength be provided at these points, more strength—more material—than is necessary is provided in the span of the floor where the stresses are not so great.

The invention has for its object to provide additional sources of strength in the neighborhood of the point of support—thus material of only adequate strength as regards the span parts may be used, it being provided with additional strength at the points of support where added strength is required. Therefore there follows a saving in material. Further, as, for a given strength of floor, the number of primary reinforcing rod members may be thus reduced, the diameter of the anchor ring to which they are attached and which is carried on the supporting device, may also be lessened.

According to the invention, there is provided a second or subsidiary anchor ring member of greater diameter than that original anchor-ring member to which the primary tensional members are secured. This second or subsidiary ring member does not rest on the supporting device but lies immediately beneath the primary tensional members, and is supported during construction in any convenient manner. When the floor is completed, the subsidiary ring is adequately supported by the concrete in which it is embedded. To this subsidiary anchor ring are connected—conveniently by hook ends formed on them and engaging the ring—subsidiary tensional reinforcing rod members. These rod members extend outward in a substantially radial direction from the point of support an adequate distance to take their portion of the vertical or substantially vertical load—that is to say, preferably to a distance slightly beyond the point of contraflexure in the floor. They may lie in the same horizontal plane as the primary rod members, or they may extend out substantially parallel with the floor surface beneath which they are embedded. According to one example, they are bent upon themselves and return radially inward and downward to butt against the central anchor ring supporting device engaging the column top. Thus they form cantaliver brackets each with its upper leg in tension and its lower leg in compression.

At or near the point of contraflexure of the floor one or more rings are preferably provided enmeshed within the subsidiary rod members and between them and the primary members. When two rings are used one is placed above and one below the latter. These rings may carry the outer ends of the subsidiary rod members, and they assist to distribute the stresses between the subsidiary and the primary rod members. When these rings are used, the subsidiary rod members, instead of being returned on themselves, may terminate at the outer end of the upper parts in hooks engaging the rings, thus forming the tensional part of the cantaliver bracket—and separate rods in compression butting the anchor support and lying upon the lower of the rings be provided. Alternatively, or in addition, such separate compression rods may be used at intervals around the whole central structure to assist the concrete in resisting compression.

The anchor ring supporting device is strengthened by internal radial ribs, and integral therewith and fitting between these and the column core there may be a ring to prevent flexure of the depending part of the device and so avoid disturbance of the concrete in which it is embedded.

In order that the invention and the manner of performing the same may be properly understood, there is hereunto appended a sheet of explanatory drawings in which—

Figure 1 is a plan and Fig. 2 a section on the line 1 . . . 1 of Fig. 1 of sufficient parts of a floor to show an example of the invention.

As shown in the drawings, there is a series of primary reinforcing rod members *a*, for the span of the floor, the ends of which are hooked over anchor rings *b*, carried on external radial webs *f*, on a hub-like support-

ing device c, which in turn is carried upon a column d, supporting the floor.

The column d is shown as of the known composite type in which there is an axial metallic core e and series of rings g arranged radially and eccentrically about the core, but it is to be understood that other forms of composite column may be used in which there is either a single core or a group of cores.

According to the invention, there is provided a second or subsidiary anchor ring h concentric with but of greater diameter than that original anchor-ring member b to which the primary tensional members a are secured. This subsidiary ring member h is not carried by the supporting device but lies immediately beneath the primary tensional members a, and is supported during construction in any convenient manner. When the floor is completed, the subsidiary ring h is adequately supported by the concrete in which it is embedded. To this subsidiary anchor ring h are connected—conveniently by hook ends formed on them and engaging the ring—subsidiary reinforcing rod members j. These rod members are preferably disposed in groups arranged radially and intermediate between the groups of primary reinforcing rod members a. They extend out substantially radially from the column-support an adequate distance to take their portion of the vertical or substantially vertical load—that is to say, to a point slightly beyond the point of contraflexure of the floor; and they are substantially parallel with the floor surface (Fig. 2) beneath which they are embedded.

The rod members j are bent upon themselves and return radially inward and downward to butt against the cylindrical depending periphery, k, and the webs, f, of the supporting device c engaging the top of the lower column d. Thus the rod members j form cantaliver brackets each with its upper leg (hooked to the ring h) in tension, and its lower leg (butting against the periphery k of the supporting device c) in compression.

At or near the point of contraflexure of the floor, rings, l, m, are provided enmeshed within the subsidiary rod members j and between them and the primary members a—one above and one below the latter, these rings being supported in any convenient manner when the parts are being assembled and the concrete applied.

Separate compression rods n butting the periphery k of the anchor support c and lying upon the lower of the rings l, m, extend at intervals around the whole central structure.

The anchor ring-supporting device c, k, is strengthened in known manner by internal radial ribs p, and a ring r is formed in a piece with the lower inner edges of these ribs to strengthen the parts and prevent flexure of the depending part k of the device, and so disturbance of the concrete in which it is embedded, the ring r being of sufficiently greater diameter than the core e of the column d to give room for a substantial layer of concrete between it and the core.

What I claim is:—

1. In a metal-concrete reinforced floor having radially disposed groups of primary reinforcing rod members secured to a primary anchor ring carried on a central supporting device carried in turn on a column; a second and subsidiary anchor ring of greater diameter than the primary anchor ring and disposed beneath the primary rod-members, and subsidiary rod-members arranged in radially disposed groups intermediate between the groups of primary rod-members some extending horizontally and radially outward from the secondary ring to the point of contraflexure of the floor and some extending radially inward and downward from that point to the central supporting device.

2. In a metal-concrete reinforced floor having radially disposed groups of primary reinforcing rod members secured to a primary anchor ring carried on a central supporting device carried in turn on a column; a second and subsidiary anchor ring of greater diameter than the primary anchor ring and disposed beneath the primary rod-members, subsidiary rod-members arranged in radially disposed groups intermediate between the groups of primary rod-members, some extending horizontally and radially outward from the secondary ring to the point of contraflexure of the floor, and some extending radially inward and downward from that point to the central supporting device, and ring supporting means enmeshed between the primary rod-members and the outer ends of the subsidiary rod-members.

3. In a metal-concrete reinforced floor having radially disposed groups of primary reinforcing rod members secured to a primary anchor ring carried on a central supporting device carried in turn on a column; a second and subsidiary anchor ring of greater diameter than the primary anchor ring and disposed beneath the primary rod-members, and subsidiary rod-members arranged in radially disposed groups intermediate between the groups of primary rod-members, some extending horizontally and radially outward from the secondary ring to the point of contraflexure of the floor, and some extending radially inward and downward from that point to the central supporting device, the pairs of outwardly and inwardly extending subsidiary rod members being joined at their outer ends.

4. In a metal-concrete reinforced floor

having radially disposed groups of primary reinforcing rod members secured to a primary anchor ring carried on a central supporting device carried in turn on a column; a second and subsidiary anchor ring of greater diameter than the primary anchor ring and disposed beneath the primary rod-members, subsidiary rod-members arranged in radially disposed groups intermediate between the groups of primary rod-members, some extending horizontally and radially outward from the secondary ring to the point of contraflexure of the floor, and some extending radially inward and downward from that point to the central supporting device, the pairs of outwardly and inwardly extending subsidiary rod members being joined at their outer ends, and ring supporting means enmeshed between the primary rod-members and the outer ends of the subsidiary rod-members.

5. In a metal-concrete reinforced floor having radially disposed groups of primary reinforcing rod members secured to a primary anchor ring carried on a central supporting device carried in turn on a column; a second and subsidiary anchor ring of greater diameter than the primary anchor ring and disposed beneath the primary rod-members, subsidiary rod-members arranged in radially disposed groups intermediate between the groups of primary rod-members, some extending horizontally and radially outward from the secondary ring to the point of contraflexure of the floor, and some extending radially inward and downward from that point to the central supporting device, ring supporting means enmeshed between the primary rod-members and the outer ends of the subsidiary rod-members, and additional compressional rod members in groups and extending radially inward and downward from the ring supporting means to abut against the central supporting device.

6. In a metal-concrete reinforced floor having radially disposed groups of primary reinforcing rod members secured to a primary anchor ring carried on a central supporting device carried in turn on a column; a second and subsidiary anchor ring of greater diameter than the primary anchor ring and disposed beneath the primary rod-members, subsidiary rod-members arranged in radially disposed groups intermediate between the groups of primary rod-members, some extending horizontally and radially outward from the secondary ring to the point of contraflexure of the floor, and some extending radially inward and downward from that point to the central supporting device, the pairs of outwardly and inwardly extending subsidiary rod members being joined at their outer ends, and ring supporting means enmeshed between the primary rod-members and the outer ends of the subsidiary rod-members, and additional compressional rod members in groups and extending radially inward and downward from the ring supporting means to abut against the central supporting device.

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

ROBERT THOMSON.

Witnesses:

DAVID FERGUSON,

WILFRED HUNT.