May 5, 1925. 1,536,942

A. P. SKAER

COLUMN HEAD FRAME

Filed Oct. 13, 1923

Fig. 1.

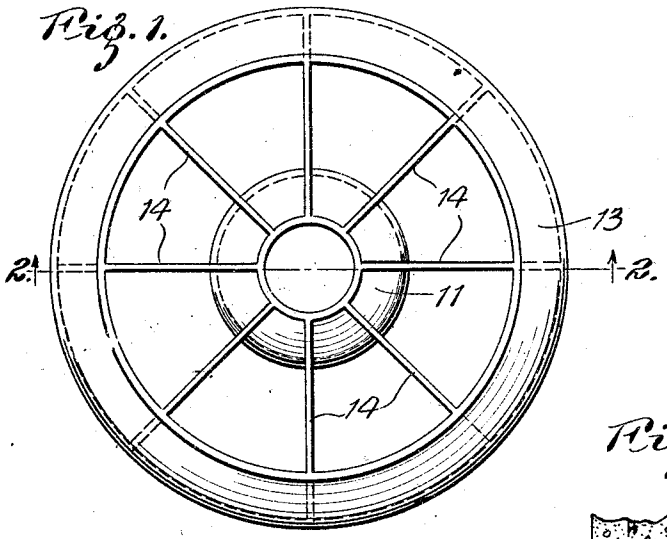


Fig. 2.

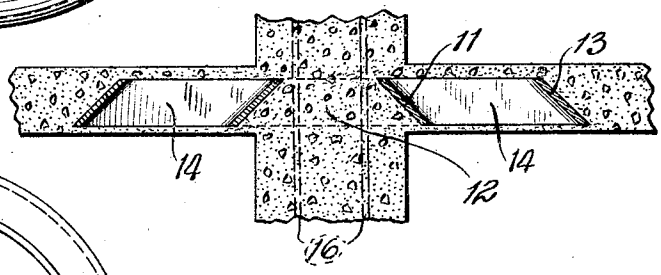


Fig. 3.

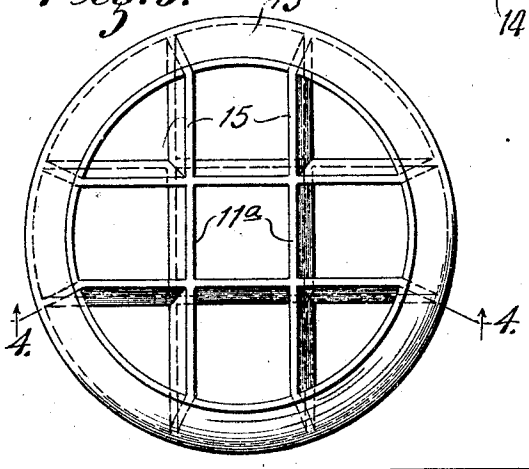


Fig. 4.

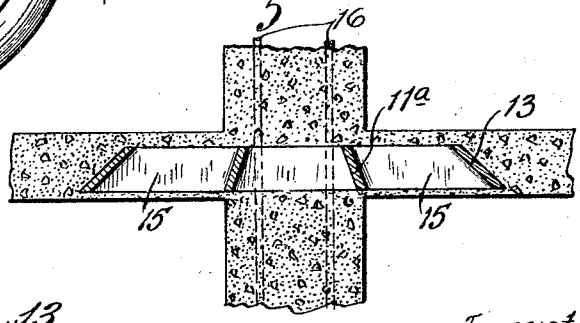


Fig. 5.



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UNITED STATES PATENT OFFICE.

ARTHUR P. SKAER, OF BUFFALO, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO KALMAN STEEL COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE.

COLUMN-HEAD FRAME.

Application filed October 13, 1923. Serial No. 668,276.

To all whom it may concern:

Be it known that I, ARTHUR P. SKAER, a citizen of the United States, and a resident of the city of Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Column-Head Frames, of which the following is a specification.

My invention relates to reinforced concrete constructions and has for its principal object to provide for the transmission of the floor load into the column without enlarging the diameter of the portion of the column exposed to view and without forming brackets thereon.

My invention consists principally in embedding in the concrete concentric with the axis of the column and at the level of the floor slab a hollow conical metal shell preferably with an outer shell concentric therewith and connected therewith. It also consists in the construction and arrangement of parts hereinafter described and claimed.

In the accompanying drawing, wherein like numerals refer to like parts wherever they occur,

Fig. 1 is a plan view of a column head frame embodying my invention;

Fig. 2 is a vertical central section of said frame embedded in the concrete construction;

Fig. 3 is a plan view of a modified form of frame;

Fig. 4 is a vertical central sectional view of said modified form embedded in concrete; and

Fig. 5 shows another modification.

In the construction illustrated in Fig. 1, the frame comprises a central portion 11 in the form of a hollow truncated cone, whose top opening is smaller than the bottom opening so that the concrete 12 which is within said cone is confined and thereby made capable of transmitting the floor load more uniformly into the column. Concentric with the central cone 11 is a second truncated cone 13 of larger diameter but preferably of the same depth as the inner cone 11. These two cones may be integrally connected by a multiplicity of radial arms 14. The top opening of the outer cone is smaller than the bottom opening thereof, thereby forming an outer inclined surface which constitutes a support for the floor slab without reducing the effectiveness of the said slab to take vertical shear.

The outer periphery of the frame corresponds with the outer margin of the exposed and enlarged heads of present day practice.

In the modification illustrated in Figs. 3 and 4 the frame comprises an outer hollow truncated cone 13 and a central portion in the form of a hollow truncated pyramid 11^a formed by intersecting chord members 15 of the outer hollow truncated cone, thus confining the concrete inside said pyramid as is done by the central hollow conical portion 11 in Figs. 1 and 2. The outer conical portion 13 in Figs. 3 and 4 is the same as shown in Figs. 1 and 2, but the connecting members 15 between the central portion and outer portion are chordal instead of radial.

In practice, the column head frame is centered on the axis of the column and at the level of the floor slab, the top opening of the central cone being smaller than the cross section of the column so that the confined concrete inside of this said cone will lie wholly within the horizontal section of the column, and said frame is thin enough from top to bottom to permit the proper placing of the slab reinforcement above or below said frame. Preferably the top opening of this central cone is less than the cross section of the concrete which it is designed to be used, and the bottom opening is greater than the cross section of such concrete column, and the slope or taper of the cone is preferably in the neighborhood of forty-five degrees. Concentric with the central cone 11 is a second truncated cone 13 of larger diameter but preferably of the same depth as the inner cone 11. These two cones are integrally connected by a multiplicity of radial arms 14. For instance, the outer cone may be dispensed with in which case the inner cone may be used either with or without the radial arms.

The principal advantages of my invention are the following: It concentrates the metal in a manner which will most efficiently take care of the stresses heretofore provided for by the enlargement of the column below the slab; and, in thus concentrating the metal, it provides for open-

ings of such extent as to insure the proper placing of column reinforcement 16, conduits and the flow of concrete in and around the metal head, thereby eliminating voids in the concrete. While the load of the floor slab acts vertically, it is supported by the conical outer surface of the frame whose reaction is perpendicular to such conical surface, and by the horizontal force which said slab exerts against said conical surface. By confining the concrete over the column, by means of a hollow conical member or a hollow truncated pyramid, the load of the slab is distributed over a greater area of the column, thus avoiding large concentrations of stress directly under the metal where it bears on the column.

Another great advantage is that the device is well adapted for manufacture out of cast metal, which, in turn, is well adapted to take care of the stresses to which it will be subjected in practice. As an incident to the manufacturing process, the designer has full control over the proportionate distribution of the metal in the different parts of the device.

Obviously the designs of column head frames hereinbefore illustrated are typical and admit of great variation in detail; and I do not wish to be restricted to the details of such designs. For instance, instead of making the two concentric shells integral with each other, it may be preferable to make them separate, as illustrated in Fig. 5. In such case, it is preferable that the top opening of the outer shell be smaller than the bottom opening of the inner shell.

What I claim is:

1. In concrete construction, the combination with a concrete column and a concrete slab supported thereby of a metal frame embedded in the concrete concentric with the column and at the level of the slab, said frame comprising a truncated shell which has a taper in the neighborhood of forty-five degrees and whose top opening is less than the cross section of the column.

2. In concrete construction, the combination with a concrete column and a concrete slab supported thereby of a metal frame embedded in the concrete concentric with the column and at the level of the slab, said frame comprising a truncated shell whose opening is least at its top and is there less than the cross section of the column and whose opening at the bottom is greater than the cross section of the column.

3. In concrete construction, the combination with a column and a concrete slab supported thereby of a metal frame embedded in the concrete concentric with the column and at the level of the slab, said frame comprising a conical shell whose top opening is less than the cross section of the column and whose bottom opening is greater than the cross section of the column.

4. In concrete construction, the combination with a column and a concrete slab supported thereby of a metal frame embedded in the concrete concentric with the column and at the level of the slab, said frame comprising concentric truncated shells of less opening at the top than at the bottom, and arms connecting said shells.

5. In concrete construction, the combination with a column and a concrete slab supported thereby of a metal frame embedded in the concrete concentric with the column and at the level of the slab, said frame comprising concentric truncated conical shells and radial arms connecting the same and integral therewith.

6. In concrete construction, the combination with a column and a concrete slab supported thereby of a metal frame embedded in the concrete concentric with the column and at the level of the slab, said frame comprising rigidly connected concentric truncated shells of less opening at the top than at the bottom, the top of the inner shell being inside the extended outer surface of said column.

7. A frame for a concrete column head comprising an inner hollow shell that tapers upwardly and an outer hollow shell that tapers upwardly, said shells being rigidly connected by spaced arms.

8. A frame for a column head comprising inner and outer truncated conical shells connected together by radial arms integral therewith.

Signed at Buffalo, New York, this 8th day of October, 1923.

ARTHUR P. SKAER.