April 26, 1927. 1,625,899

J. LALLY

FIREPROOF BUILDING CONSTRUCTION

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Fig. 1.

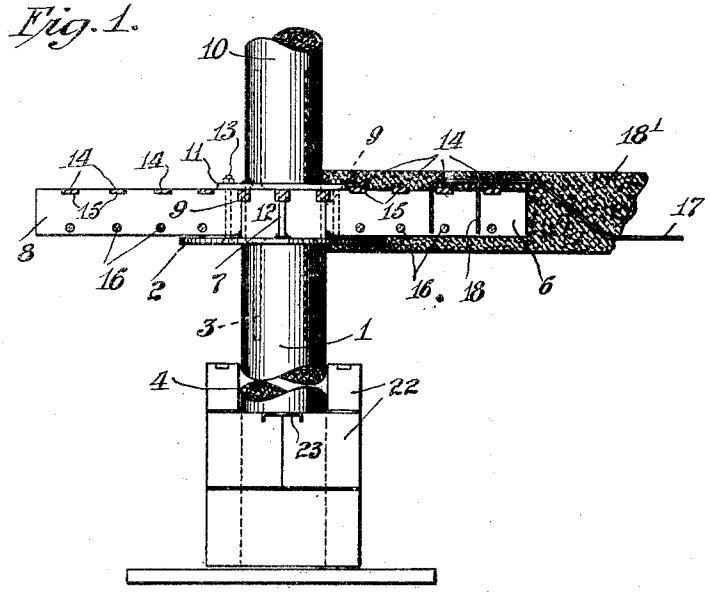


Fig. 8.

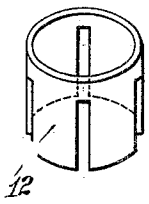
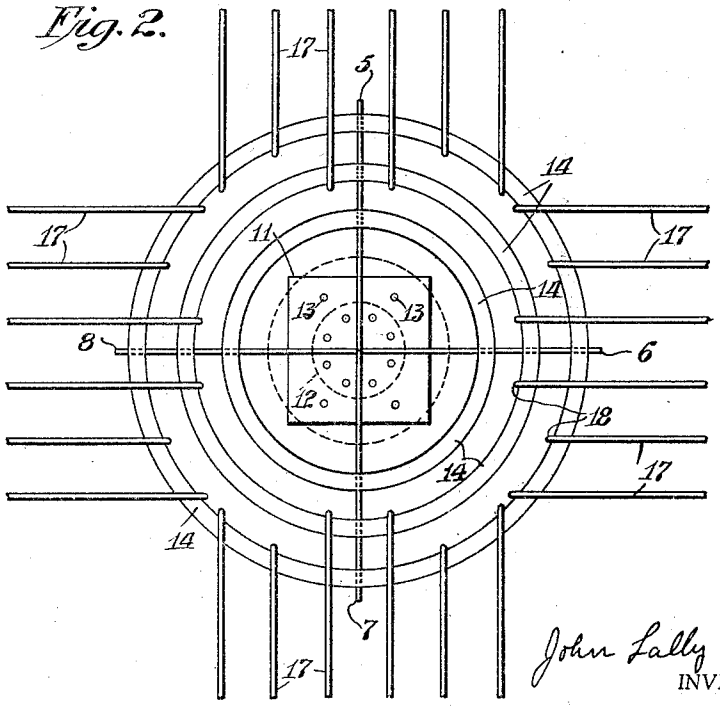


Fig. 2.



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Fig. 3.

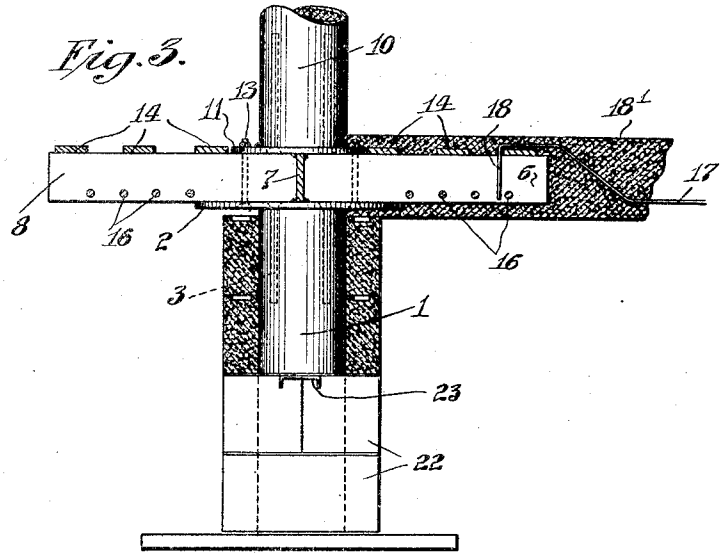


Fig. 4.

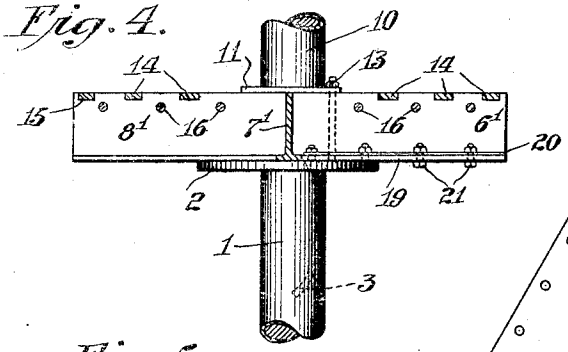


Fig. 9.

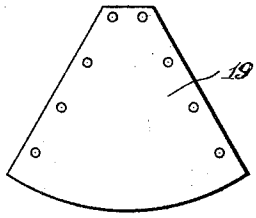
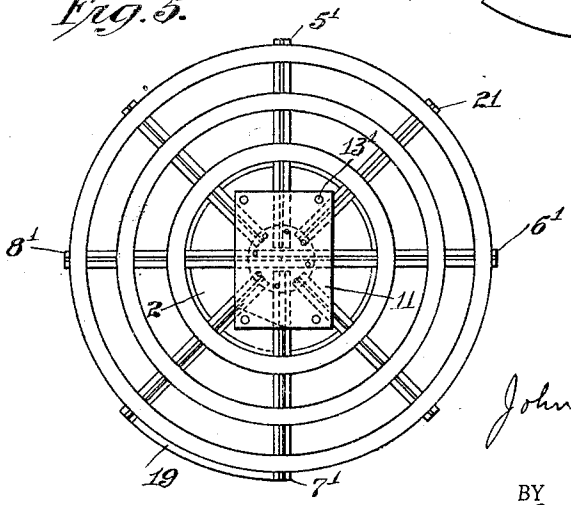


Fig. 5.



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Fig. 6.

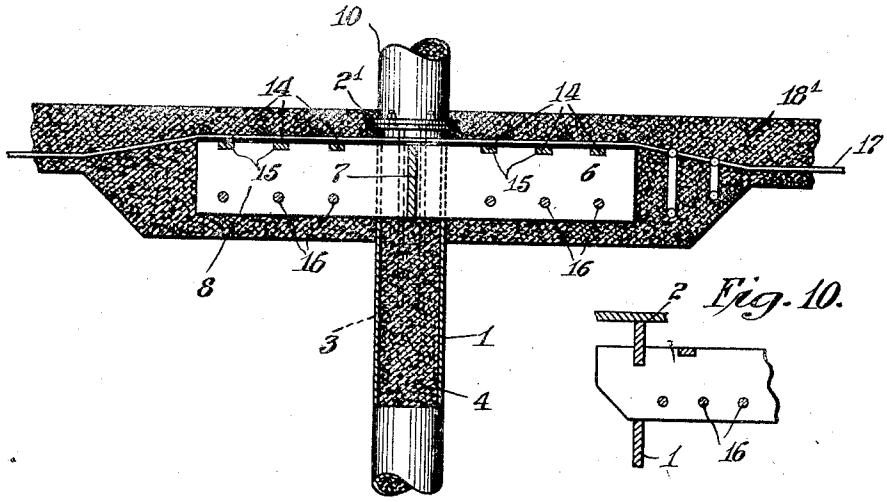
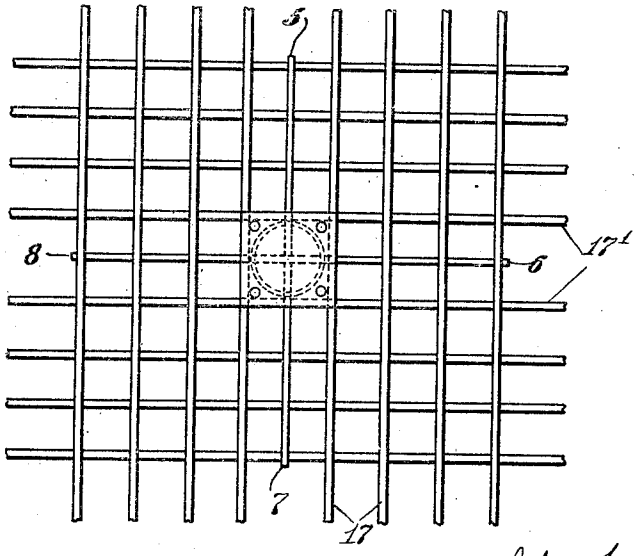


Fig. 10.

Fig. 7.



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Patented Apr. 26, 1927. 1,625,899

UNITED STATES PATENT OFFICE.

JOHN LALLY, OF BOSTON, MASSACHUSETTS.

FIREPROOF BUILDING CONSTRUCTION.

Application filed May 17, 1923. Serial No. 639,592.

My invention relates to improvements in fire-proof building construction and in particular to heads for columns to be used in reinforced concrete construction and it is my object to produce a column head which can be assembled either on the job or in the shop, in which columns may be superimposed with the head entirely embedded in the floor, saving valuable space, and in which shearing strains will be more highly resisted than in the present construction thereby affording greater strength with lightness and a minimum of metal.

In the drawing Fig. 1 is a view, partly in section, of a steel tube, concrete filled column provided with one form of my new head, in combination with a concrete floor slab; Fig. 2 is a top plan view of a head embodying my invention; Fig. 3 shows a modification of the head of Fig. 1; Fig. 4 shows a further modification of the head of Fig. 1; Fig. 5 shows a plan view of a further modification of the metal parts of the head of Fig. 1; Fig. 6 shows a view, partly in section, of a further modification of the head of Fig. 1; Fig. 7ª top view of the metallic elements of the structure of Fig. 6; Fig. 8 is a detail view of the slotted sleeve used in the head of Figs. 1 and 2; Fig. 9 is a detail view of the floor plate used in the head of Fig. 4; and Fig. 10 is a detail view of a notched radial arm.

The present invention consists briefly in making a head of radially extending structural steel, either in plate or T-beam form, and in arranging the floor reinforcing bars in such a way that they are tied into the head in such a way that shearing strains are reduced to a minimum.

In Fig. 1 the lower column 1 is of the "Lally" type composed of an outer metal shell and a concrete filling, and supports a crown plate 2, which is tied in place by anchor bolts 3 extending through the plate and into the concrete filling 4.

Radial arms 5, 6, 7 and 8 are provided with notches 9 in their upper edges in line with the base of the upper column 10 which is provided with a base plate 11. A slotted pipe 12 slips down over the notches filling the space between the arms 5, 6, 7 and 8 and rests on the crown plate 2. When the head is assembled on top of the crown plate and the upper column is set in place bolts 13 pass through the plates 2 and 11 between the arms and lock the head solidly in place between the column ends. If desired the edges of the arms 5, 6, 7, and 8 may be welded to the crown plate and the faces of the arms to the pipe slots, and the bottom plate 11 of the upper column 10 may be welded together.

Rectangular bars 14 are bent into circles, or other suitable form, and are laid on top of the radial arms, notches 15 for their reception being preferably formed in the upper edges of the arms. These bars 14 are intended to resist shearing strains on the surrounding floor and to prevent cracking of the concrete at this point, which is generally the part that has the greatest stress on it.

Round bars 16 may also be run through the radial arms at their lower parts to act as webs to hold the floor together making the entire head strong with little expense owing to the small amount of steel required by this method of construction.

The main floor carrying bars or reinforcements 17 extend from one column head to another with hook ends 18 passing over the bars 14 and are embedded in the concrete 18′ forming the floor, the bars 14 resisting the shearing strains and as they are in turn carried by the radial arms 5, 6, 7 and 8 the construction results in greater strength than the ordinary methods of concrete reinforcing.

In the structure of Fig. 3 the slotted piece of pipe shown in Fig. 8 extending between the crown plate 2 and the base plate 11 has been omitted and the arms 5, 6, 7 and 8 are welded together at their junction. This welding together of the brackets together with the bolting of the crown plate 2 to the base 11 holds the head solidly in position on the end of the column.

In the structure of Fig. 4 the arms 5′, 6′, 7′ and 8′ are formed of inverted T-beams which enables the floor plate 19 (shown in Fig. 9) to rest on the flanges 20 and be bolted thereto at 21. These floor plates extend from flange to flange of the radial arms thus making the head solid to receive the floor slabs. The rectangular section bars 14 and the round bars 16 take care of shearing strains as in the structure of Fig. 1. Floor carrying bars 17 are used as in the structure of Fig. 1 and the bolts 13 passing through the plates 2 and 11 hold the head solidly in place.

In the structure of Fig. 5 the anchor bolts 13′ in the columns extend from the

concrete filling beyond the end of the column and are threaded at their exposed ends. Holes are made in the flanges of the radial arms through which the anchor bolts pass so that by running home the nuts on the threaded ends of the anchor bolts the radial arms and floor plates are solidly locked to the top of the column. This construction also employs the rectangular-section bars 17, floor plates 19 and reinforcements 14 used in the structure of Fig. 4.

In the construction shown in Figs. 6 and 7 the arms 5, 6, 7 and 8 pass through slots in the column wall below its top end and the crown plate 2′ is anchored into the concrete filling by the tie bolts. This gives additional strength to the head as the arms 5, 6, 7 and 8 are held rigidly in case of eccentric loads on the floor. The arms 5, 6, 7 and 8 are welded together at their junction after they have been inserted in the slots and before the concrete filling has been poured. These arms may have notches in their upper edges as shown in Fig. 10 so that the crown plate 2 will rest solidly on the top edges of the radial arms. This type of head can be advantageously used in semi-slab construction but is deeper at the head than the rest of the floor giving additional strength in case of shearing loads at this point. Strength to almost any desired degree can be obtained by widening and lengthening the radial arms.

Fig. 7 shows the construction of Fig. 6 with the reinforcing bars 17′ laid thereunder.

As shown in Figs. 1 and 3 the column proper may be surrounded by fire resisting blocks provided with tongues and grooves in the upper and lower edges and clamped together at their vertical edges by clamps 23 which lie inside the horizontal joints.

I claim:—

1. Fireproof building construction comprising a column, a crown plate secured to one end thereof, a plurality of radially extending arms on said crown plate, a plurality of reinforcing rings on said arms, a second plate on top of the arms and means for tying the plates and arms together, the arms, rings and plates being adapted to be embedded in concrete.

2. Fireproof building construction comprising a column, a crown plate secured to one end thereof, a plurality of notched, radially extending arms on said crown plate, a plurality of reinforcing rings in the notches on said arms, a second plate on top of the arms and means for tying the plates and arms together, the arms, rings and plates being adapted to be embedded in concrete.

3. Fireproof building construction comprising a column, a crown plate secured to one end thereof, a plurality of notched, radially extending arms on said crown plate, a notched pipe engaging the arms with the notches interlocking, a second plate on top of the arms and pipe and means for tying the arms, plates and pipe together, the whole being adapted to be embedded in concrete.

4. Fireproof building construction comprising a column, a crown plate secured to one end thereof, a plurality of notched, radially extending arms on said crown plate, a notched pipe engaging the arms with the notches interlocking, a second plate on top of the arms and pipe, the arms, pipe and plates being welded together.

5. Fireproof building construction comprising a column, a crown plate secured to one end thereof, radially extending T-beam arms on said plate secured together and to the crown plate, floor plates filling the spaces between the arms and secured to the T-beam flanges, the whole being adapted to be embedded in concrete.

6. Fireproof building construction comprising a column, a crown plate secured to one end thereof, a plurality of radially extending T-beam arms on said plate secured together and to the crown plate, floor plates filling the spaces between the arms and secured to the T-beam flanges and a plurality of reinforcing rings on the arms, the whole being adapted to be embedded in concrete.

7. Fireproof building construction comprising a column, a crown plate on one end thereof, a plurality of radially extending arms secured to said crown plate, a plurality of reinforcing rings on said arms and a plurality of floor rod reinforcements each with a turned-down hook-like end passing between the reinforcing rings and concrete embedding the column end, plate, rings, arms and rods.

In testimony whereof I have affixed my signature.

JOHN LALLY.