Jan. 26, 1926. 1,571,091

J. LALLY

FIREPROOF BUILDING CONSTRUCTION

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Fig. 1

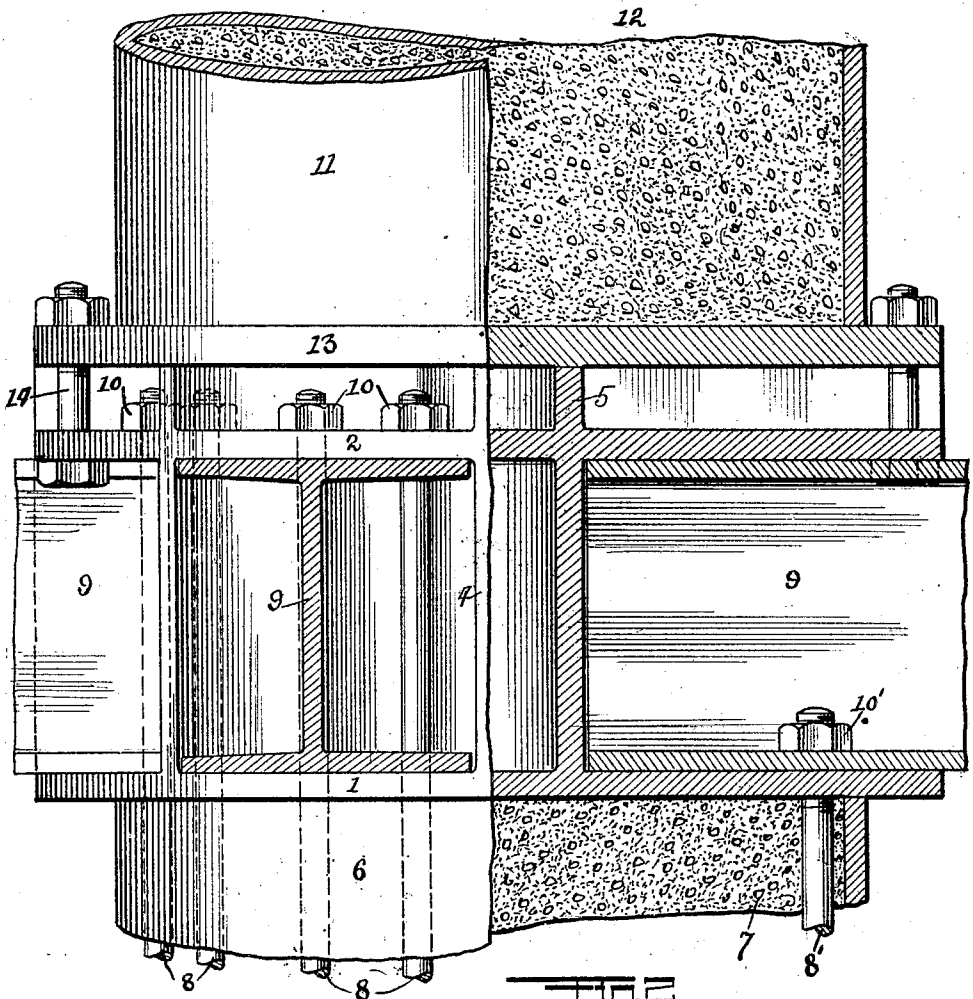
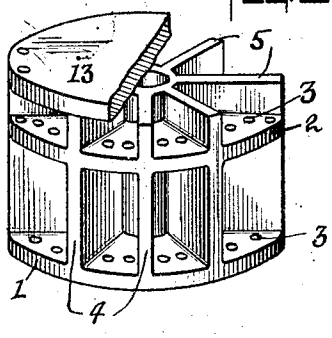


Fig. 2



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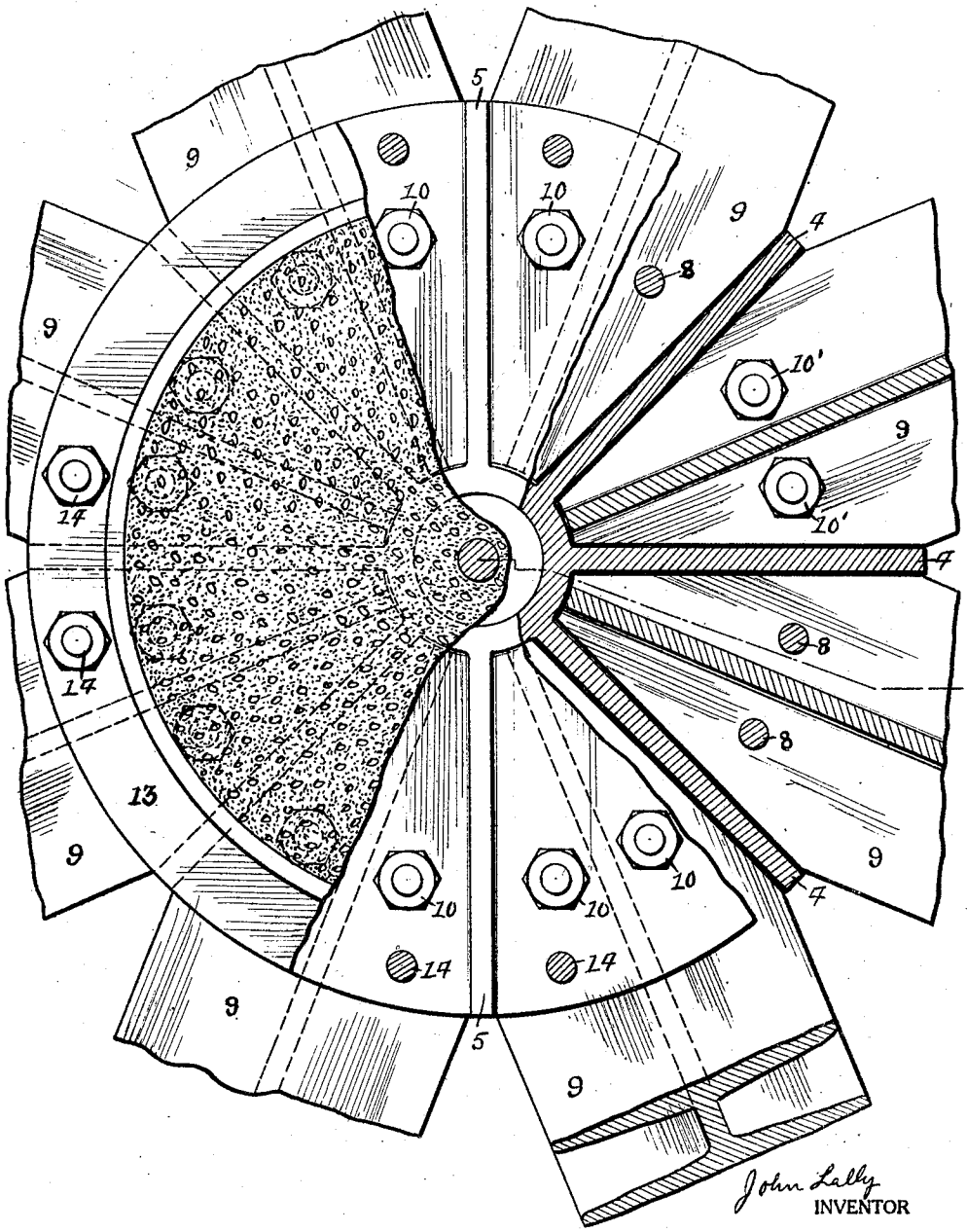
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FIREPROOF BUILDING CONSTRUCTION

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Fig. 3



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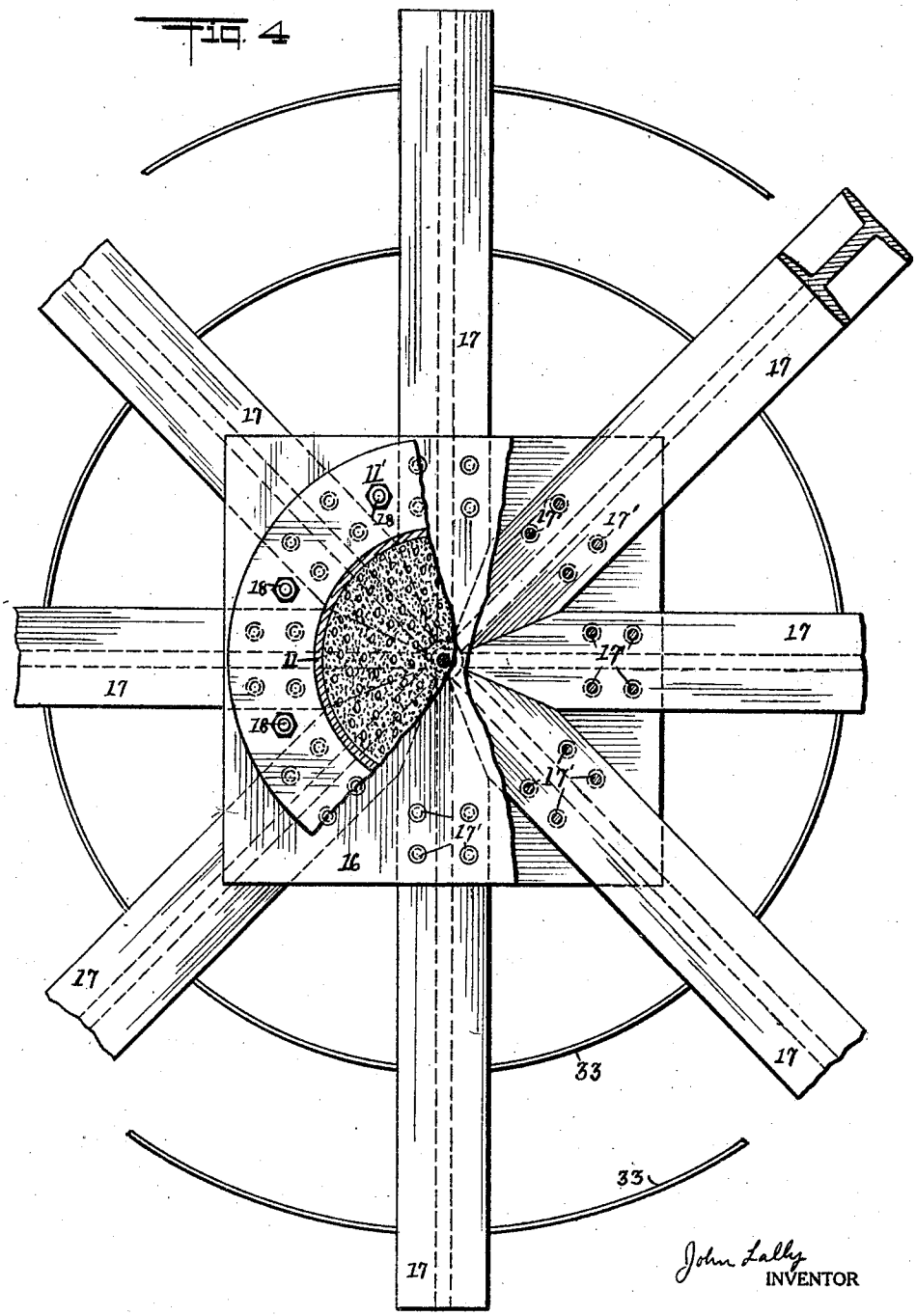
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FIREPROOF BUILDING CONSTRUCTION

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Fig. 4



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FIREPROOF BUILDING CONSTRUCTION

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Fig. 6

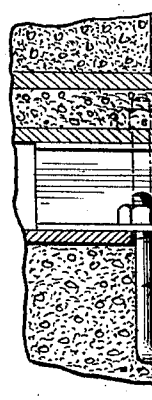


Fig. 5

Fig. 7

Fig. 8

Fig. 9

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Patented Jan. 26, 1926. 1,571,091

UNITED STATES PATENT OFFICE.

JOHN LALLY, OF BOSTON, MASSACHUSETTS.

FIREPROOF BUILDING CONSTRUCTION.

Application filed October 30, 1923. Serial No. 671,732.

To all whom it may concern:

Be it known that I, JOHN LALLY, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Fireproof Building Construction, of which the following is a specification.

My invention relates to fireproof building construction in which concrete filled steel columns are tied to heads carrying the floor loads and it is my object to produce a structure in which the superimposed columns will be solidly united, in which the heads will be solidly united to the columns which heads will have a maximum load carrying capacity with a minimum of material and occupy the space between the floor and ceiling so that the floor and ceiling will be flat and clear right up to the column casing.

In the drawing Fig. 1 is a view, partly in section, of one form of my invention showing an upper and a lower column and a head; Fig. 2 is a perspective view, partly in section, of the steel casting forming part of the head of the structure of Fig. 1 with the bottom plate of the upper column laid thereon; Fig. 3 a plan view, partly in section, of the structure of Fig. 1; Fig. 4 a plan view, partly in section, of my invention when built up of structural steel elements; Fig. 5 a side view, partly in section, of the structure of Fig. 4; Fig. 6 a sectional view showing a form of tie rod used in securing a metal to metal tie; Fig. 7 a like view of another form of tie rod, Fig. 8 a like view of still another form of tie rod; and Fig. 9 a sectional view showing how the tie rod of Fig. 8 is secured to the outside of the column casing.

In the embodiment of the invention shown in Figs. 1 and 3 the steel casting shown in Fig. 2 is employed. This has a lower plate 1 and an upper plate 2 each having holes 3 drilled therein near the edges. The plates are united by vertical webs 4 and like webs 5 extend above the top plate 2.

The lower column is formed of a steel casing 6 filled with concrete 7 and a plurality of tie rods 8 are embedded therein in position to enter the holes 3 in the plates 1 and 2. These rods extend above the end of the column and are threaded at their upper ends to receive nuts. I-beams 9, about four and a half feet long in practice, are coped or bevelled at their inner ends to fit the segmental pockets formed by the top and bottom plates 1 and 2 and the webs 4 and are provided with holes in their flanges alining with the holes 3 in the top and bottom plates and with the tie rods. These I-beams are set into the pockets and the casting and I-beams are set down onto the upper column with the tie rods 8 extending through the holes in the casting and I-beam flanges after which nuts 10 are turned home thereby tying the casting and I-beams solidly to the lower column. At the right of Fig. 1 I have shown how the tie rods 8^a can be passed through the bottom plate and the bottom flange only of the I-beams and held by a nut 10^a.

The upper column is also composed of a casing 11 and a concrete filling 12 and is generally provided with a base plate 13 which sits on the upper edges of the webs or flanges 5 of the casting, which webs form pockets for the ends of the tie rods and their nuts. The base plate may be tied to the casting by bolts 14 passing through the plates 13 and 2.

The I-beams and the casting form a head for the reinforced concrete building construction and are completely embedded therein when the concrete is poured.

In Figs. 4 and 5 I have shown how the invention may be constructed of structural steel elements instead of using a casting. Two steel plates 15 and 16 are formed with rivet holes and the I-beam headers 17 with coped ends are set up with the plates 15 and 16 on either side, the plates being riveted at 17′ to the flanges of the I-beams. The tie rods 18 in the lower column pass through the plates and I-beam flanges just as is the case when the casting is used to tie the parts together.

A ring 34 as shown in Figs. 6 and 7 may be used as the equivalent of the webs 5 on the casting to provide space for the nuts and the ends of the tie rods and this ring may be filled with concrete.

The concrete floor and ceiling 19 is shown in Fig. 5 and entirely encloses the plates, headers, I-beams and column ends so that the floor and ceiling are flat right up to the column casings. When the load comes on the floor the I-beams are solidly held between the plates and cannot deflect under rated loads as the lower plate resists at its outer portion and the upper plate at its inner portion. The load stresses are there-

by distributed over a larger area of metal and less metal is required to carry a given load. Reinforcing rods 33 may be built into the I-beam webs to further increase the distribution of the load.

By the use of my invention the casting may be drilled in the shop together with the I-beams and the columns shop made so that in erection the I-beams can be slipped into the pockets and the I-beams and casting set over the tie rods on the lower column and bolted home. Or, in the use of the structural steel form the entire head can be shop made and set in place on the building.

In some cases it may be desirable to use a metal to metal connection between the head and columns instead of embedding the tie rods in concrete filling. In Fig. 6 the tie rod 20 is bent at its lower end and is hooked into a hole 21 in the column casing 22, passing upward on the inside of the casing and terminating either at the lower flange of the I-beam or the top plate of the head. Where it is desired to get a metal to metal tie from the lower column to the bottom plate of the upper column the tie rod of Fig. 7 may be used which passes through two holes 23 and 24 in the casing 25 with the bent end 26 in the lower hole and the angular upper part passing out through the upper hole and thence upwards through the plates and I-beam flanges whence it may be continued upwards to engage the base plate of the upper column as indicated in dotted lines.

In the forms shown in Figs. 6 and 7 sufficient of the tie rods are embedded in the concrete filling to hold them in place.

If desired the tie rods may be on the outside of the casing as shown in Figs. 8 and 9 with the bent end 29 in a hole 30 in the casing 31 and extending upwards at 32 to engage the plates and I-beam flanges and the base plate of the upper column, the portion of the tie rod in contact with the casing being welded thereto as indicated.

I claim:—

1. Fireproof building construction comprising upper and lower plates, radially extending I-beams secured between said plates, a column, tie rods on said column and extending beyond the end thereof, said tie rods passing through the plates and beam flanges for tying the parts together.

2. Fireproof building construction comprising upper and lower plates, radially extending I-beams secured between said plates, a column, tie rods on said column extending beyond the ends thereof, said tie rods passing through the plates and beam flanges for tying the parts together and an upward extension on the upper plate to receive an upper column and form a pocket to enclose the upper ends of the tie rods.

3. Fireproof building construction comprising a casting having upper and lower plates and radial webs between the two forming pockets, coped-end I-beams entering the thus formed pockets, a column, tie rods on said column extending beyond the end thereof and passing through the lower plate and bottom flanges of the I-beams for tying the parts together.

4. Fireproof building construction comprising a casting having upper and lower plates and radial webs between the two forming pockets, coped-end I-beams entering the thus formed pockets, a column, tie rods on said column extending beyond the ends thereof and passing through the plates and beam flanges for tying the parts together.

5. Fireproof building construction comprising a casting having upper and lower plates and radial webs between the two forming pockets, webs extending above the upper plate and adapted to carry an upper column, coped-end I-beams entering the pockets, a column and tie rods on said column extending beyond the end thereof and passing through the plates and beam flanges into the space between the webs on the upper plate for tying the parts together.

6. Fireproof building construction comprising upper and lower plates, radially extending beams secured between them, a lower column, tie rods on said lower column extending beyond the end thereof and passing through the plates and beams, an upper column, a base thereon and tie bolts securing the base to the upper plate.

7. Fireproof building construction comprising an apertured column, a head thereon composed of upper and lower plates, beams secured between them, tie rods having bent ends entering the column apertures and passing through a plate and beams for securing the parts together.

8. Fireproof building construction comprising an apertured column, the apertures being in vertical pairs, a head thereon composed of a pair of plates, beams secured between them, tie rods with bent ends entering the lower column apertures, and passing outward through the upper apertures and through a plate and the beams for securing the parts together.

9. Fireproof building construction comprising an apertured column, a head thereon composed of upper and lower plates, beams secured between them, tie rods having bent ends entering the column apertures and welded to the outside of the column and passing through a plate and beams for securing the parts together.

In testimony whereof I have affixed my signature.

JOHN LALLY.