

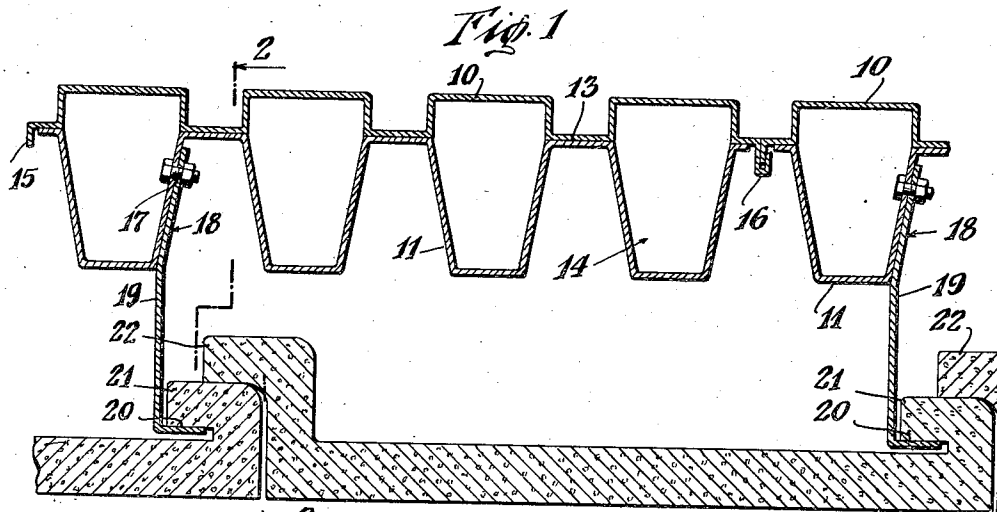
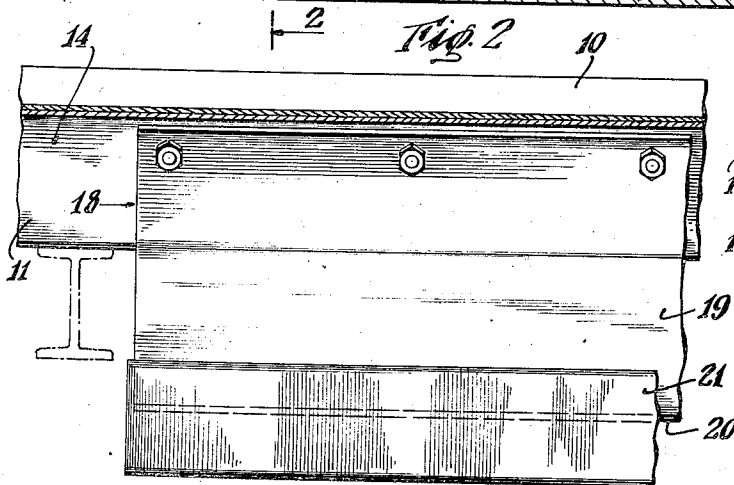
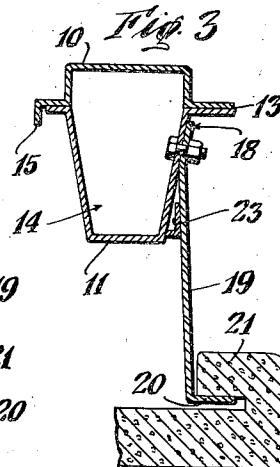
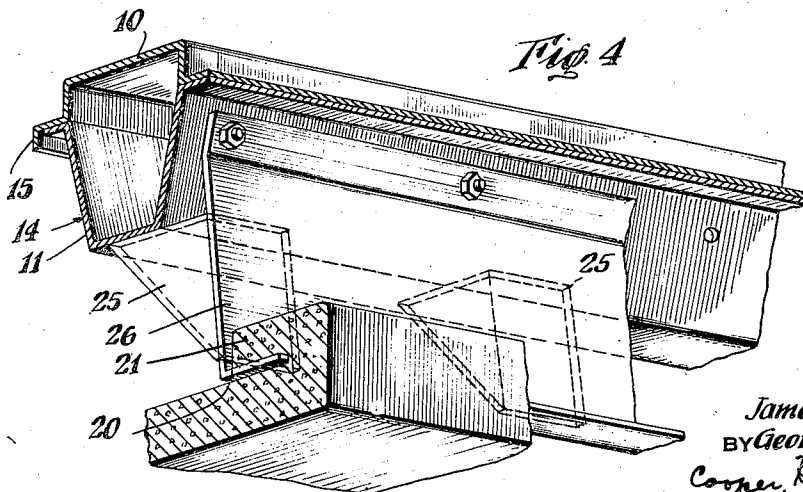
June 8, 1937.

J. A. THOMAS ET AL
FIREPROOFING OF BUILDINGS

2,083,104

Filed June 22, 1936

2 Sheets-Sheet 1



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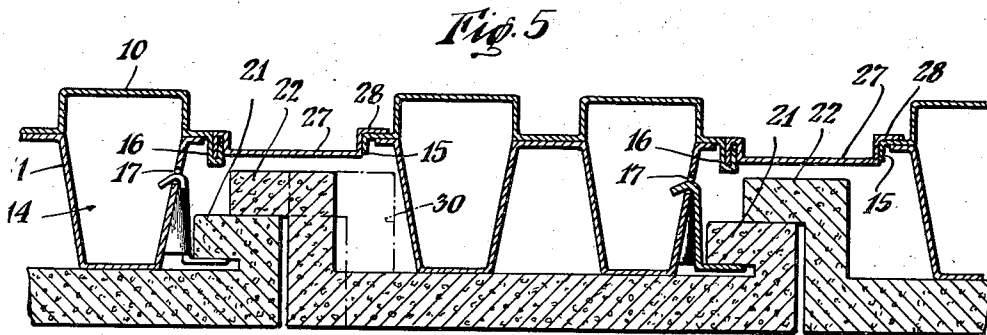
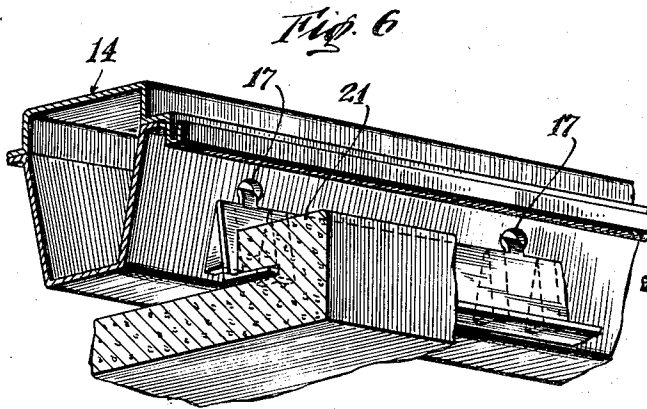
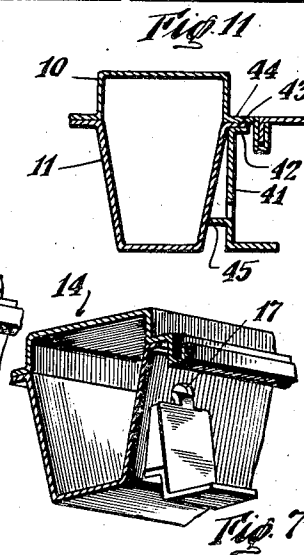
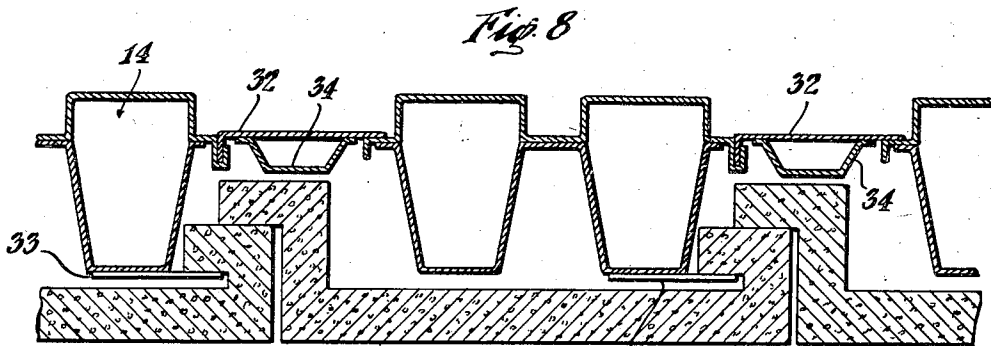
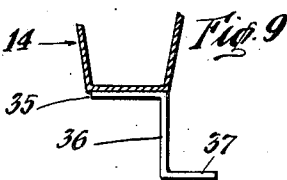
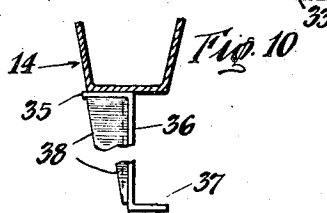
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FIREPROOFING OF BUILDINGS

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2 Sheets-Sheet 2



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2,083,104

FIREPROOFING OF BUILDINGS

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Application June 22, 1936, Serial No. 86,616

9 Claims. (Cl. 72-68)

This invention relates generally to improvements in the construction of fire-proof buildings and refers particularly to fire-proof ceilings and ways of holding them in place on the under-side of a floor.

One object of the invention is to provide for suspending a fire-proof ceiling from a floor in a way which can be adapted to widely varying requirements such as different thicknesses and weights of floor and ceiling construction, or to suspend the ceiling at different distances from the floor to accommodate conduits and drains or for other purposes.

Another object is to provide a ceiling construction which can be installed economically and at a low labor cost but which will, nevertheless, have a high factor of safety against accidental dislodgment.

Another object is to provide a construction of the kind indicated by which steel members supporting the floor and ceiling may be spaced apart varying distances to facilitate attaching the ceiling, and which will also afford a strong and reliable support for floor material above the supporting members.

With the above and more or less incidental objects in view, the invention consists in a novel construction and relation of parts, the novel features of which are pointed out in appended claims, and certain embodiments of which are hereinafter described with references to the drawings accompanying and forming a part of this specification.

In the drawings:

Fig. 1 shows an embodiment of the invention which is adapted to support the ceiling some distance below the floor support.

Fig. 2 is a view along the line 2-2 of Fig. 1.

Fig. 3 shows the same form of ceiling support as Figs. 1 and 2, but has added thereto a brace or insert for the purposes hereinafter explained.

Fig. 4 shows a construction similar to that of Figs. 1 and 2 with a form of brace different from that in Fig. 3.

Figs. 5, 6, and 7 illustrate forms of ceiling hangers differing from those shown in Figs. 1 to 4; Fig. 5 illustrating particularly one form of spacer or adapter which may be employed when the ceiling members are hung in the illustrated relation to the floor supporting members.

Fig. 8 shows the ceiling supporting members welded or correspondingly attached to the floor supporting units and also shows a reinforced form of spacer or adapter which may be employed

in case the live load to be provided for is great enough to require such reinforcement.

Figs. 9 and 10 show other ways of supporting the ceiling members by members welded to the lower supporting beam.

Fig. 11 shows still another way of securing the ceiling supporting members to the floor supports.

The floor supporting construction shown in the drawings is of a well-known type and consists of a number of parallel cells or hollow beams made by pre-forming an upper half and a lower half from sheets of metal and then welding the two halves together along the lines. This forms a unit which may have any desired number of cells or hollow beams designated generally as. At one side the upper half of each unit is extended and formed downward to provide a flange and at the other side is formed to provide a channel to be engaged by the flange on the next adjacent hollow beam unit.

In the usual construction each beam unit is provided with spaced apart holes, Fig. 6, which have heretofore been used, among other things, for suspending a very complicated system of metal lath or wires to receive and hold the ceiling material. The limitations of this lath or wire construction are obvious, particularly when a ceiling heavy enough to stand a four hour fire test is required.

In the form of the invention shown in Figs. 1 and 2 these holes are utilized for bolting in position plates or strips which may correspond in length to the lengths of the beams. These plates are formed as shown to engage the flat sides of the beams and have an extension terminating in a horizontal flange to support ceiling tiles made of fire-proof material.

The ceiling tiles are formed along one end to provide what may be termed a hook-shaped portion above a slot for engaging the flanges. The other end of each tile is formed as at to engage above the flange engaged portions of tiles in the next adjacent tier. In installing the ceiling the tiles are lifted into a position where, by endwise movement, the flanges may be engaged and the portions of the tiles placed above the portions as shown.

The construction shown in Fig. 3 includes an angle iron welded along the face of the sheet. This will counteract to a certain extent any tendency of the portion to flex under load and the angle iron may be so constructed as to give the portion a preliminary bias against load by holding the portion slightly out of a vertical line (toward the right in Fig. 3). This

biasing against the load can also be used in connection with the other embodiments hereinafter described.

The construction shown in Fig. 4 is similar to that in Fig. 3, but uses a different form of angle iron or brace. Instead of using the long angle iron shown in Fig. 3, the construction shown in Fig. 4 uses short angle irons 25 which may be welded or otherwise attached to the face of the ceiling support or they may be punched from the sheet 26 and formed back in position to engage the lower surface of the beam to which the supporting sheet is attached.

Figs. 5, 6, and 7 show a construction in which a hanger is provided for some or all of the holes 17 (Fig. 6) instead of using the long sheet shown in Figs. 1 to 4 for supporting the ceiling tiles. These individual hangers may be so constructed that, as shown in Fig. 5, the ceiling tiles are in close contact with the under-faces of the floor supporting beams. There is, however, normally not room enough between adjacent beams to receive the portions 21 and 22 of the ceiling tiles. To obviate this difficulty a spacer or adapter 27 is used to separate the beam units far enough to permit installation of the ceiling tiles. This spacer or adapter is a sheet of metal which is preferably as long as the beams to be connected, and is formed at one edge to engage the channel 16 previously referred to and also is formed at its other edge as shown at 28 to engage above the flange or extension 15 of the next adjacent beam unit. The horizontal portion of each spacer or adapter may be corrugated or otherwise formed to give stiffness, but this is not necessary unless the floor is intended to support a very heavy live load.

In installing the tiles in the construction illustrated in Fig. 5 the second tile is lifted into position and as shown by the dotted lines 30, there is sufficient room between the previous tile and the one being installed for the portion 21 of the tile to be raised above the portion 21 of the preceding tile and the second tile is then moved laterally to effect full engagement. The tiles used in this construction may, if desired, have the lower outside corner of the section 22 and the upper outside corner of the section 21 at sharp angles to insure immediate engagement when a start is made towards shifting the tile laterally.

In the construction shown in Fig. 8 the tile supporting flanges extend from plates 33 which are spot welded or otherwise attached to the under-surfaces of the hollow steel floor beams. This construction holds the ceiling tiles quite close to the beams. The spacer or adapter 32 used in this construction and illustrated in Fig. 8 may have welded to its under-side a stiffening member 34 formed like a metal trough and welded at its edges on the under-side of the adapter 32.

In the construction shown in Fig. 9 the flange or strip 35 is welded to the under-side of one of the hollow floor beams and is shaped to give a downward extension 36 terminating in a flange 37 to receive the ceiling tiles. The portion 36 may extend down any desired length depending upon the distance at which it is necessary to hold the ceiling below the floor beams. Where this distance between the ceiling and the floor supporting beams is great enough to make it desirable, braces or stiffening members 38 may be used. It is preferred to make these members as separate angle irons similar to the angle iron 25 shown in Fig. 4 and it is also preferred to so construct the angle irons as to give a slight bias against the load on the flanges. This is, how-

ever, only a desirable thing and not an essential one. Fig. 10 shows a construction similar to that in Fig. 9, but has the extension 36 projecting downward from the center of the beam to which it is attached.

In Fig. 11 there is shown a construction in which the ceiling supporting members may be welded in position as an incident to welding together the upper and lower halves 10 and 11 when constructing the floor supporting units. In this particular arrangement the hanger 41 is formed with a flange or ledge 42 which may be engaged by the electrodes and welded in position at the same time that the portions 43 and 44 are welded together. The portion 41 in this construction is punched or pierced in such a way as to form one or more ears 45 acting to brace the hanger against the side wall of the portion 11 of the floor beam.

From what has been said in describing the construction it is apparent that the ceiling can be quickly installed and that ceiling tiles of any desired size or weight may be employed as the invention provides a wide range of hangers from which the most suitable one may be selected. It is also apparent that the ceiling may fit quite close to the floor beams or it may be suspended at a considerable distance below the floor beams as, for example, when it is desired to provide a conduit or accommodate large size pipes for drains and other purposes.

While the embodiments shown and described are well adapted for the purposes stated, it is apparent that the invention can be employed in other ways, and it is, therefore, not the desire to be limited except as such limitations appear in the claims which follow.

What is claimed is:

1. A fire-proof floor and ceiling construction comprising a plurality of spaced apart floor supporting members, devices supported from non-adjacent floor supporting members and each provided with a horizontal flange and ceiling members provided with slots at one side to engage the aforesaid flanges and constructed at their opposite ends to provide ledges for overlapping engagement with the flange engaged ends of the next adjacent ceiling members whereby to support adjoining ends of the members from the same flange.

2. A fire-proof floor and ceiling construction comprising a plurality of spaced apart floor supporting members, devices supported from said floor members and each provided with a horizontal flange, bracing members between the floor supporting members and the sides of said devices, and ceiling members constructed at one end to provide a slot to engage the aforesaid flange and at the opposite end to provide a means for engaging said opposite end over the flange engaged end of the next adjacent ceiling member.

3. A fire-proof floor and ceiling construction comprising a plurality of floor supporting members each composed of a plurality of parallel hollow beams connected together to form a unit, devices supported by non-adjacent hollow beams and each provided with a horizontal flange, ceiling members provided with slots at one end to engage the aforesaid flanges and constructed at their opposite ends to provide one or more portions to engage above the flange engaged ends of the next adjacent ceiling members, and adapters between the aforesaid units to support floor material when said units are spaced apart to ac-

commodate the engaged ends of the ceiling members.

4. A fire-proof floor and ceiling construction comprising a plurality of floor supporting members each composed of a plurality of parallel hollow beams connected together to form a unit, devices attached to non-adjacent hollow beams and each provided with a horizontal flange, ceiling members constructed at one end to hook over the aforesaid flanges and constructed at their opposite ends to portions to be hooked above the flange engaged ends of the next adjacent ceiling members, and a reinforced adapter to support flooring material between floor supporting units.

5. A fire-proof floor and ceiling construction comprising a plurality of floor supporting units each comprising a plurality of hollow beams, ceiling supporting devices welded to the under-sides of non-adjacent beams and each constructed to provide a horizontal flange, and ceiling members provided with slots at one end to engage the aforesaid flanges and constructed at their opposite ends to provide ledges for engagement with the flange engaged ends of the next adjacent ceiling members.

6. A fire-proof floor and ceiling construction comprising a plurality of floor supporting units each comprising a plurality of parallel hollow beams, ceiling supporting devices welded to the under-sides of certain of said beams and each constructed to provide a horizontal flange, ceiling members provided with slots at one end to engage the aforesaid flanges and constructed at their opposite ends to provide ledges constructed to engage over the flange engaged ends of the next adjacent ceiling members, and adapters between the floor units to support floor material when said units are spaced apart to accommodate the engaged ends of the ceiling members.

7. A fire-proof floor and ceiling construction comprising a plurality of spaced apart floor supporting members, devices supported from said floor supporting members and each provided with a horizontal flange, bracing members between the floor supporting members and the sides of said devices constructed to give to said devices a bias against the load on the flanges, and ceiling members constructed at one end to provide a slot to engage the aforesaid flange and also constructed at the opposite end to provide a ledge to engage with the flange engaged ends of ceiling members in the next adjacent tier.

8. A fire-proof floor and ceiling construction comprising a plurality of parallel floor supporting members, devices secured to certain ones of said members and each provided with a horizontal flange, and fire-proof ceiling members constructed to provide at one end of each ceiling member a hook-shaped portion to engage said flange and at the other end to engage above the hook-shaped portion for the next adjacent ceiling member, whereby to support the adjoining ends of two members from the same flange.

9. A fire-proof floor and ceiling construction comprising a plurality of spaced apart floor supporting members, devices supported from desired ones of said floor supporting members and each provided with a horizontal flange, fire-proof ceiling members constructed to provide hook-shaped portions at one end engaging with said flange and constructed at the other end providing portions hooked over the hook-shaped portions of the next adjacent ceiling members whereby to support adjoining ends of two members from the same flange and with said adjoining ends in close abutment.

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