Aug. 11, 1931. W. H. WILSON 1,818,443

SECTIONAL FIREPROOF CEILING STRUCTURE

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FIG. 1.

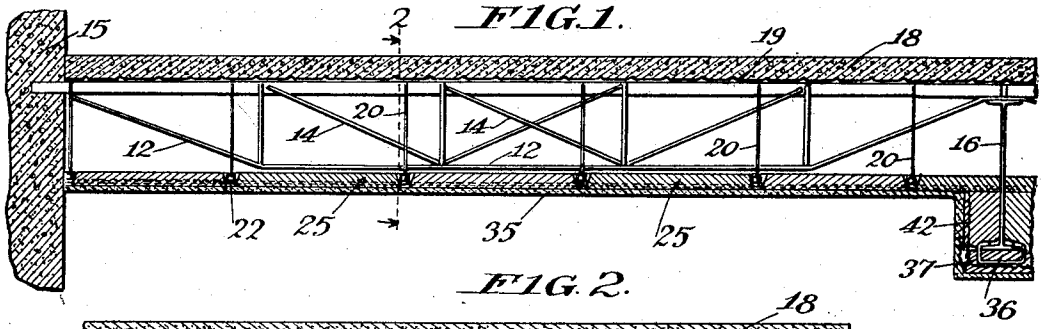


FIG. 2.

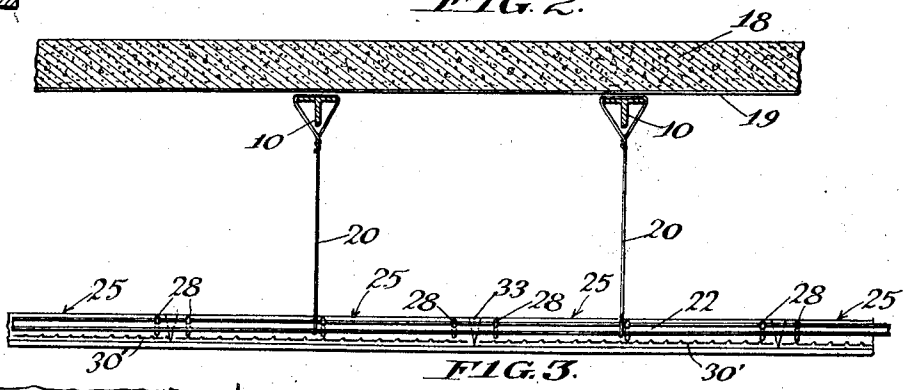


FIG. 3.

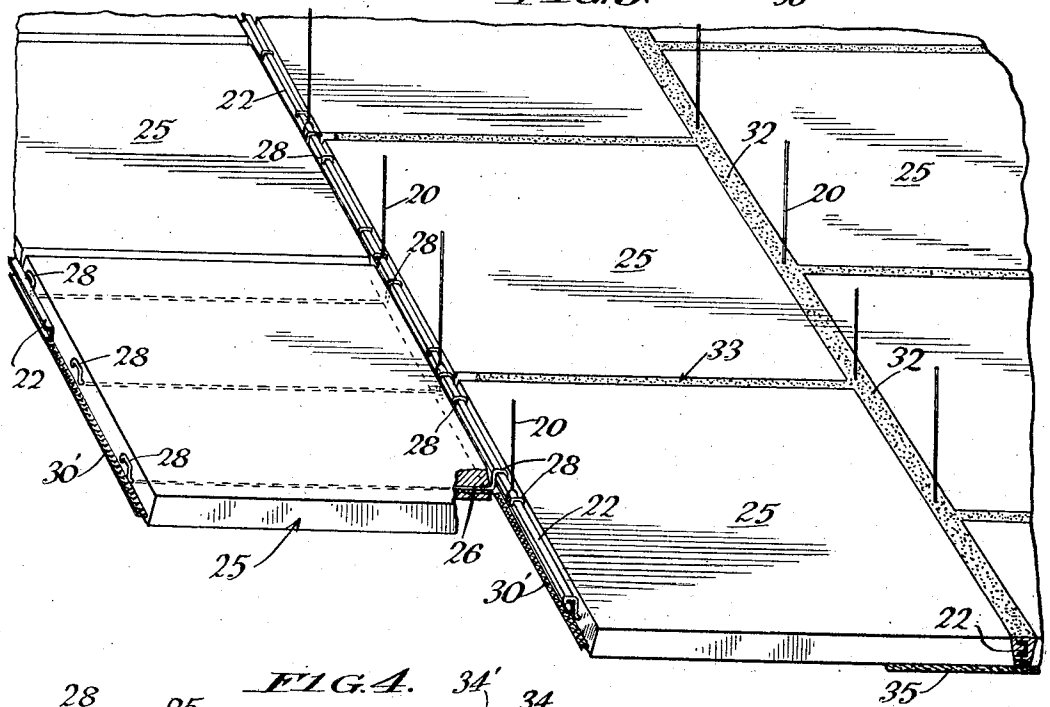
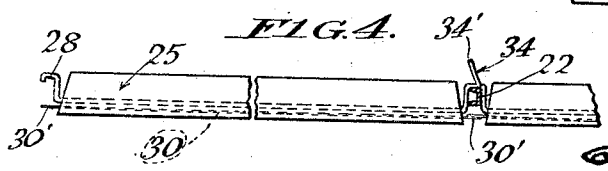


FIG. 4.



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FIG. 5.

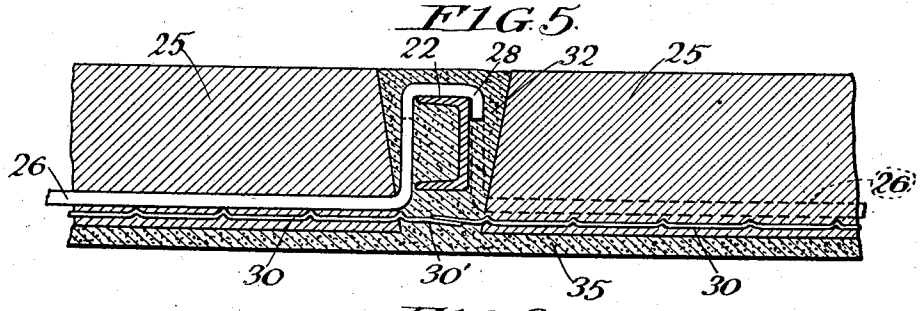


FIG. 6.

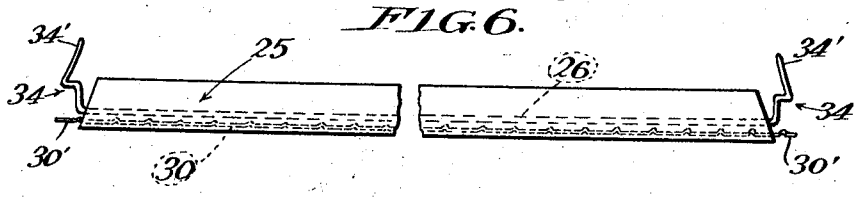
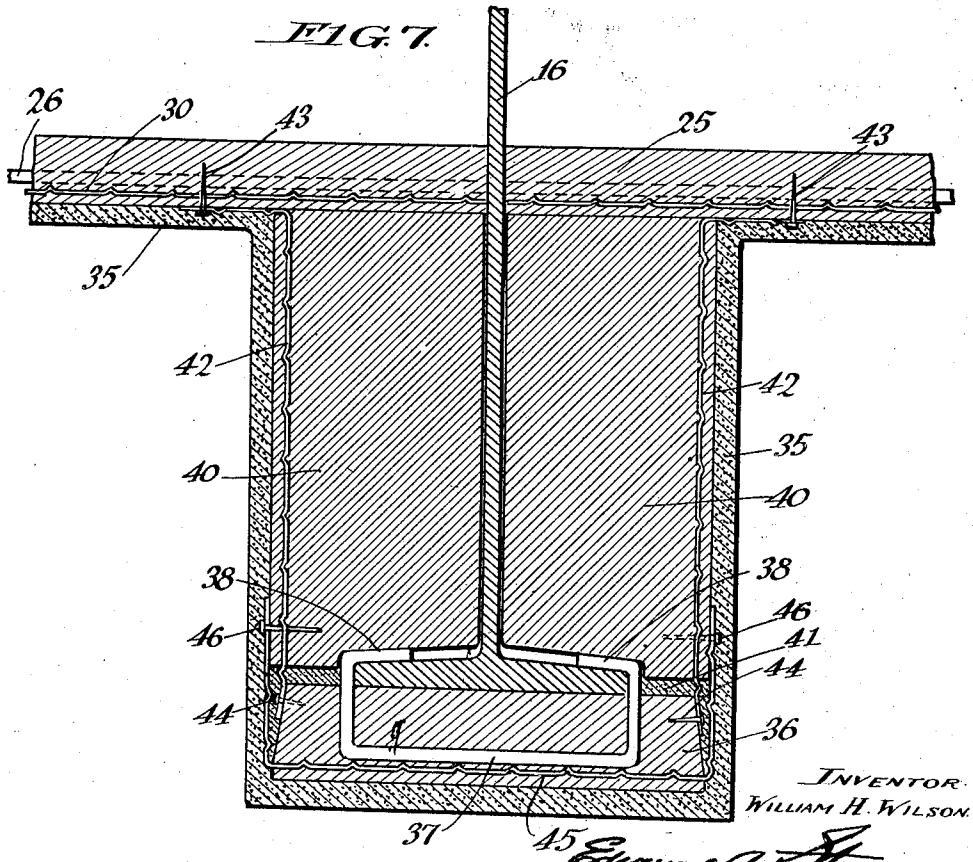


FIG. 7.



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UNITED STATES PATENT OFFICE

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SECTIONAL FIREPROOF CEILING STRUCTURE

Application filed July 16, 1928. Serial No. 293,066.

This invention relates to building construction, and particularly to the fireproofing of girders, joists and beams in floors and roofs. The specific disclosure hereof indicates the adaptation of the invention to what is commonly called steel-joist floor and roof construction.

Heretofore, difficulty has been experienced in providing at the ceilings of buildings sufficient fireproofing to protect fully the floor girders, beams and joists above, and where such protection has been accomplished the method of procedure has always been awkward, inefficient and frequently unnecessarily hazardous.

One object of the present invention, therefore, is to provide a practical, economical and thoroughly workmanlike construction and method for adequately fireproofing the under sides of steel or wood girders, trusses, beams, or joists in floor and roof constructions. A further object is to provide a method and construction which will make it possible to apply such adequate fireproofing from the under or ceiling side after the floor has been laid.

Another object is to eliminate drying-out periods and the development of rust stains and the like. A still further object is to present a construction whereby a fully seasoned fireproof ceiling may be applied quickly and by unskilled labor, thereby bringing costs down to the lowest possible minimum and at the same time delaying the progress of other work as little as possible.

Briefly stated, the invention in a broad aspect resides in a pre-cast ceiling of any degree of thickness supported from and below the girders, trusses, beams or joists at any desired distance. In practice, this ceiling is sectional and preferably is previously fully seasoned, so that immediately upon installation it is ready to receive the plaster coats. According to one practical construction, the sections are in the form of suitably thick slabs of fireproof materials, these slabs having means for attaching them to transverse members which may be suspended from the girders, joists or beams. The slabs preferably contain metal lath whose edges extend from the edges of the slabs sufficiently to overlap at any joints which are formed so that said joints may be easily sealed by the application of a fireproofing composition. A preferred method for attaching the slabs consists in providing hooks which engage over the transverse members, these hooks conveniently being formed from the projecting ends of reinforcing rods embedded in the slabs. By staggering the slabs, continuous joints are avoided and the development of cracks therealong is minimized.

The invention resides further in such additional features of novelty as may elsewhere herein appear.

In the accompanying drawings wherein one embodiment of the invention is disclosed by way of illustration;

Fig. 1 is a longitudinal section through a floor and ceiling constructed according to the present improvement and showing a trussed steel joist in elevation.

Fig. 2 is a cross section taken on line 2—2 of Fig. 1.

Fig. 3 is a perspective view from the upper side showing a plurality of slabs of ceiling in operative position on transverse supporting rails and also indicating the method of installation.

Fig. 4 is an edge elevation indicating especially a supporting construction which may be used for the final row of slabs to be placed in any ceiling.

Fig. 5 is an enlarged cross sectional detail showing more fully the relation of the parts at a completed joint.

Fig. 6 is an edge elevation showing a slab construction wherein a latch type of hook is provided on both ends.

Fig. 7 is an enlarged detail showing the method of fireproofing a depending beam.

In these drawings the trussed joist is shown as comprising an upper chord 10 of T-iron, a lower chord 12 which may be a flat bar, and suitable truss rods or bars 14, the entire joist being supported at one end, for example, in the wall 15 and at the other end on an I-beam 16. According to this showing the joists support a concrete floor 18 in which is incor-

porated metal lath 19 as is well understood in the art.

The present improvement permits of the pouring and finishing of the floor before work is commenced on the ceiling therebelow. In order to mount the ceiling, a plurality of hangers 20 are suspended from the T-chord 10 and upon the lower ends of these a plurality of channel irons or rails 22 are hung to assume a position spaced slightly below the lower chords 12 and preferably transverse thereof.

The ceiling proper is composed of a plurality of previously formed slabs 25 which preferably have been allowed to season fully after casting, these slabs being composed of any suitable fireproofing material, of which a good example is a mixture of 100 pounds of gypsum and 12 pounds of wood fibre. Each slab contains a plurality of longitudinally extending rods 26 whose ends project from the slab and are formed into hooks 28 adapted to be engaged over the rails 22 to support said slabs from each end.

As the slabs are manufactured, the hooks at one end of each slab are disposed along the slab edge and parallel therewith as best seen at the left of Fig. 3. By this construction the hooks at the other end of the slab can first be engaged over the respective rail 22, and the hooks at the one end then passed up alongside the other rail until they extend above said rail, whereupon the workman uses a pair of pliers or other tool to twist the hooks outward through a ninety degree arc so that they will engage over the respective rail like the other hooks. Also embedded in each slab is a layer of metal lath 30 which lies below the rods 26 and has its edges 30′ extending from the slab edges so as to overlap with the extending edges of adjacent slabs to form lapped joints.

Having placed two or more slabs in position on opposite sides of a rail 22, the joint above the overlapped portions 30′ is then filled with a fireproof cement as at 32 which cement may have the same composition as the slabs themselves or a similar composition. The cement preferably covers and encloses the rails 22 and the various hooks 28. If desired, the joints between contiguous slabs may be coated or filled with a small quantity of the same cement, as indicated at 33, to make a completely sealed joint. This operation is carried along until the last row of slabs is ready to be placed.

For this purpose it is necessary to have a different form of hook on those slab ends which are moved into place last, and this is accomplished by forming each corresponding rod end into a spring hook 34 having a reversely bent extremity 34′ which will guide the hook into position, the hook 34 snapping back into engaging position over the rail 22 when the slab has been pressed into place. It may also be desirable in some instances to use hooks 34 at both ends of the rods 26 and such a construction is shown in Fig. 6. With this form, each slab may be easily pushed into place whereupon the hooks 34 will snap into position over the rails and thereby retain the slab.

The entire ceiling is now ready for plastering and this may be applied in the form of one or more coats 35 which will also be pressed up around the lath overlaps 30′ to completely fill the lower portion of the corresponding joint. Or if desired, this portion of each joint may be filled out with fireproof cement like that used for the upper joint portion 32, the plaster coats being then applied thereover.

In case the ceiling construction presents depending beams as in the case of the I-beam 16 here disclosed, the application of the invention may be extended by constructing and installing special slabs to cover and protect such beams.

Thus a series of lower slabs 36 are provided to be placed against the lower faces of the I-beam flanges, each of these slabs being provided with rods 37 whose ends project from the upper side of the slab and are bent over said flanges as at 38 to position the slab. Then side slabs 40 are applied against the web of the beam, the upper edges of these slabs engaging the top slabs 25 and the lower edges engaging and retaining the hooks 38, and if desired the joints are filled with composition as at 41. The slabs 40 contain metal lath 42 whose ends project, these being secured to the ceiling slabs 25 as by means of nails 43 and to the bottom slabs 36 as by nails 44. Similarly, the bottom slabs 36 are provided with embedded metal lath 45 whose ends project sufficiently to overlap the side slabs 40 to which they also are nailed at 46. This structure then is ready to receive the plaster coat 35 when the rest of the ceiling is plastered. Thus a completely fireproofed and finished ceiling is produced regardless of the type of construction.

The present invention thus permits of the construction of a fireproof ceiling of any thickness required, the slabs being previously constructed according to specifications. Since complete seasoning may be permitted before installation, the ceiling will be ready for plastering as soon as the slabs have been placed. Similarly since the slabs are thoroughly dry when installed, there will be no dripping or seeping of moisture, nor any rusting, and consequently the plaster coats will never be stained.

The slabs may be easily installed by relatively inexperienced workmen and the labor cost will therefore be reduced to the smallest practical point. Any size or shape, standard or otherwise, may be employed, and depending beams or other parts may be easily cov-

ered and protected merely by manufacturing slabs to meet the individual requirements. Since this type of work is usually done on big jobs only, the extra cost for special shapes is insignificant. Also, since the joints between slabs will be staggered as far as possible the development of continuous cracks will be minimized. Further as the floors and roofs are poured before the ceilings are installed no danger will be experienced from rain and snow storms.

I claim:

1. A ceiling construction comprising a floor construction including a plurality of joists, rails suspended from said joists, and a plurality of pre-cast ceiling sections suspended from said rails, each section containing a plurality of rods whose ends project from the sections and are formed into hooks engaging over said rails for suspending the sections therefrom.

2. A ceiling construction comprising joists, rails suspended from said joists, a plurality of ceiling sections suspended from said rails, each section containing a plurality of rods whose ends project from the sections and are formed into hooks engaging over said rails, and a layer of metal lath embedded in each section certain of whose edges project to overlap projecting edges of adjacent sections.

3. A ceiling construction comprising a floor construction including a plurality of joists, rails suspended from said joists, a plurality of pre-cast ceiling sections suspended from said rails, each section containing a plurality of supporting rods whose ends project from the sections and are formed into hooks engaging over said rails, and a layer of metal lath embedded in each section.

4. A fireproof ceiling construction comprising joists, rails suspended from said joists, a plurality of ceiling sections suspended from said rails, a floor beam for supporting said joists the lower portions of said beam extending below the ceiling sections, fireproof slab members engaging the side walls of said beam, said members each having a layer of metal lath embedded therein adjacent their outer faces, the ends of said lath projecting therefrom, a slab member for the lower end of said beam and means for securing the same thereto, a layer of metal lath embedded therein adjacent the outer face of said member the ends projecting therefrom, the lower ends of the metal lath of the side wall slab members being secured to the side faces of the fireproof slab member that engages the end of the beam, and the ends of the lath of the end slab being secured to the side slab members, whereby to maintain the integrity of the joint between the end and side slab members, the upper ends of the lath of the side slab members being secured to the ceiling sections to protect the joints formed by the side slab members and the ceiling sections.

5. A fireproof ceiling construction, comprising a suspended ceiling construction formed of a plurality of fire-proof slabs, a steel I-beam for supporting a floor structure projecting below the ceiling construction, fireproof slab members for the exposed sides of said beam, each member having a layer of metal lath embedded therein adjacent their outer side faces, the upper and lower ends of said lath projecting therefrom, a fireproof slab member for the lower flange of said beam and means to secure the same thereto, a layer of metal lath embedded therein, the ends of said lath projecting beyond the side faces of said slab member, the upper projecting ends of the metal lath of the side slab members being secured to the ceiling structure to prevent fracture of the joint formed by the slab members and the ceiling structure, the lower projecting edges of the metal lath of the side slab members being secured to the flange slab, and the projecting edges of the lath of the flange slab member being secured to the side slab members, whereby to protect the joint formed between the side slab members and flange slab.

In testimony whereof I affix my signature.

WILLIAM H. WILSON.