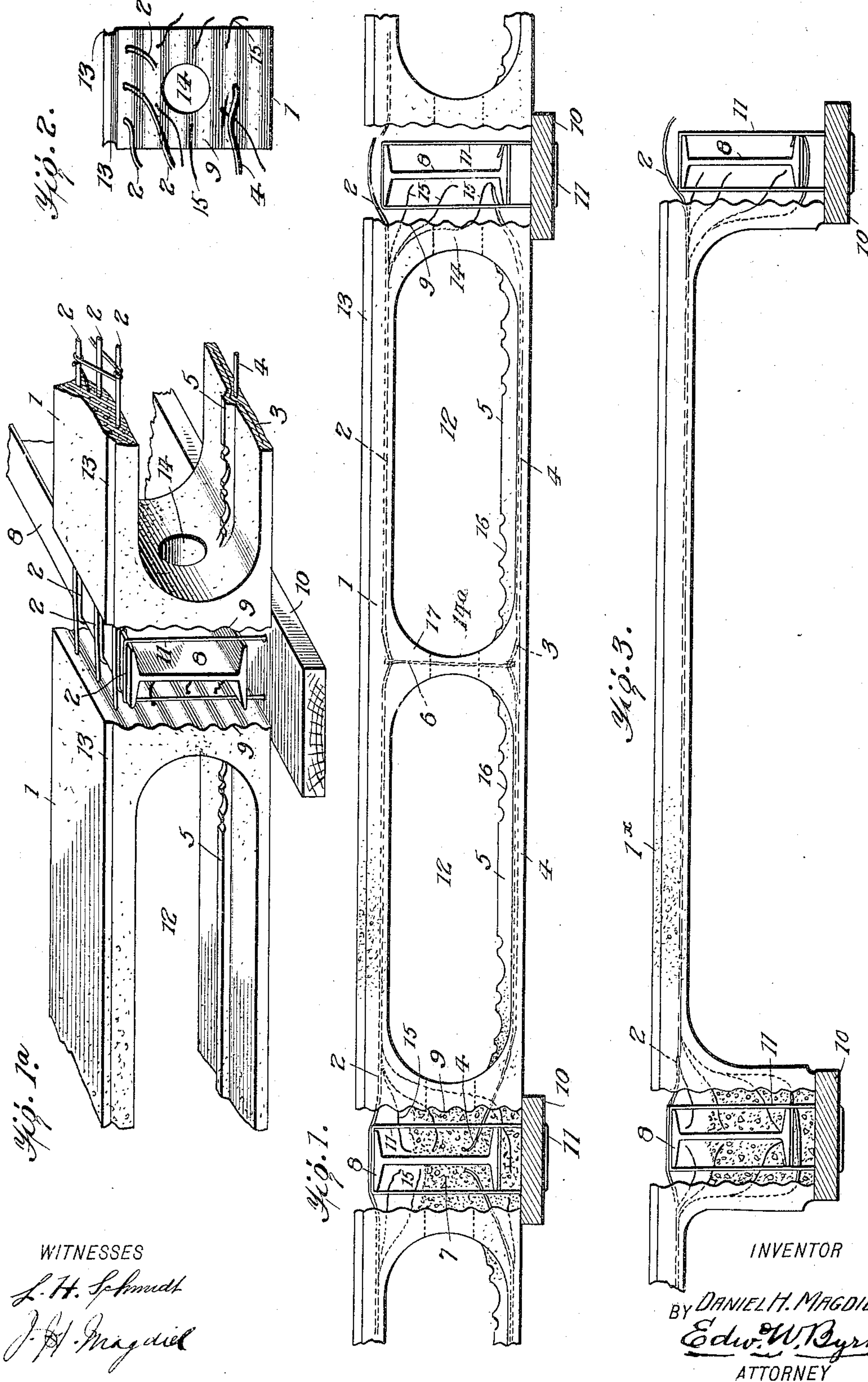


D. H. MAGDIEL.
FIREPROOF FLOOR (I-BEAM CONSTRUCTION).
APPLICATION FILED OCT. 20, 1908.

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WITNESSES
L. H. Schmidt
J. H. Magdiel

INVENTOR
BY *DANIEL H. MAGDIEL,*
Edw. W. Byrn.
ATTORNEY

UNITED STATES PATENT OFFICE.

DANIEL H. MAGDIEL, OF SALT LAKE CITY, UTAH, ASSIGNOR OF ONE-THIRD TO JOHN H. MAGDIEL AND ONE-THIRD TO NEPHI L. MORRIS, BOTH OF SALT LAKE CITY, UTAH.

FIREPROOF FLOOR, (I-BEAM CONSTRUCTION.)

No. 914,589.

Specification of Letters Patent.

Patented March 9, 1909.

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To all whom it may concern:

Be it known that I, DANIEL H. MAGDIEL, a subject of the Crown of Great Britain, residing at Salt Lake City, in the county of Salt Lake and State of Utah, have invented certain new and useful Improvements in Fireproof Floors, (I-Beam Construction,) of which the following is a specification.

The invention is in the nature of a new and practical improvement in reinforced fireproof floor and ceiling construction for steel buildings.

The object of the invention is to make a combined fireproof floor and ceiling and to make it as strong and rigid as any other construction known. It is also designed to save time and costly labor.

My invention consists in the novel construction of the floor block and its combination and arrangement in relation to the supporting I-beams and the reinforcing members, whereby the floor may be laid without upright centering supports and whereby a finished floor and a finished ceiling are formed at a greatly reduced cost, as hereafter more fully described with reference to the drawings in which,

Figure 1, is a side view of the floor blocks shown applied between the I-beams on temporary supporting devices, the blocks being of a construction adapted to form a floor on the upper surface and a ceiling on the lower surface, Fig. 1^a is a perspective view of the joint formed by the two blocks at an I-beam, Fig. 2, is an end view of one of the floor blocks and Fig. 3, is a view similar to Fig. 1, but showing a modification of the floor block in which the lower ceiling portion is omitted.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

In the preferred embodiment of the invention the blocks 1 of concrete are made hollow and strongly reinforced throughout. The upper reinforcement 2 is of stout wire embedded in the floor slab and protruding out through the ends of the block and bent over and hooked around the upper flanges of the I-beams or other structural steel, or

support, as seen in Fig. 1^a, thereby making a continuous bond throughout the floor.

The reinforcing in the ceiling part includes wire 3 and rod 4 Fig. 1^a, which rod passes through a rib 5 cast in the middle of the block along the upper edge of the ceiling slab. About the middle of the block the floor and ceiling slabs are integrally formed with a web 17 through which passes a vertical metal reinforcing suspension rod 6 tied to the upper reinforcing 2 and the lower rod 4 so as to make a stiff bend joining the floor and ceiling parts of the block together and causing the ceiling member to be suspended from the upper wires 2, which are anchored to the tops of the I-beams. The reinforcing wires 2, 4 and 15 protrude out through the end of block 1 so that they can be embedded in the concrete grout 7 which is poured between the ends of block 1 and the I-beam 8. The ends of the block are cast with horizontal corrugations 9 to form keys for the grout 7 so that when the latter sets, the block is wholly self-supporting even if there were no reinforcing.

To temporarily support the blocks, planks 10 are held in position beneath the I-beams by hangers 11 and when the grout has set thoroughly the hangers 11 are cut, and the plank 10 is taken down, the ceiling then being level.

In the air spaces 12 of the block there can be concealed wiring, and pipes for plumbing, heating, etc. The upper edge of the rib 5 is formed with seats 16 to receive such pipes. Along the upper edges of the block are formed curved recesses 13 which, with the corresponding recesses of the adjacent blocks, form a trough which is to be filled with grout after all the blocks are laid side by side, to make the floor tight throughout and form a key. The grooves are undercut for this purpose.

The blocks are factory made, or may be made on the job, and can be handled and put in the floor quickly and easily, the floor being ready to walk on as soon as laid. The blocks are, as shown, of a dimension of twelve inches, more or less, in width and seven feet, more or less, in length, are flat on top to form a finished floor, and of a

depth to suit the I-beam, which latter should be of less vertical height than the blocks to allow the upper reinforcing to come straight over the top of the I-beam and be low enough to be fully covered by and embedded in the grout. The floor slabs of the block are preferably about four inches thick, more or less, and the ceiling slabs about one inch, more or less.

In the ends of the floor blocks are preferably formed holes 14 and the webs 17 have also holes 14^a; these allow for the passage of pipes and wiring when it is desired to carry them lengthwise the blocks and when not so required the inner ends of the holes 14 may be closed and the matrix of grout will then enter in the form of tenons into the outer ends of holes 14 to make a more substantial bond between the blocks and the said matrix of grout about the I-beam.

From the foregoing description it will be seen that the floor and ceiling block forms a complete floor and ceiling and without other accessories and is a cheap, practical and strong construction in which the blocks may be made in advance in the shop and be quickly applied in the building. It will be seen, also, that no expensive upright centering timbers are required, since the I-beams carry the weight of the floor as the blocks are laid, and yet these I-beams are completely embedded in a matrix of grout which not only fills in the spaces between the ends of the blocks and the I-beams, but also extends over the tops of the I-beams, covering, holding, and hiding the anchorage ends of the reinforcing wires or rods where they are hooked around the top of the I-beam, and filling this space flush with the tops of the blocks, so that it forms a perfect floor on which the floor covering may be laid, said grout also flowing under the I-beam and filling the space below it flush with the bottom of the block, so as to hide the I-beam and make a finished ceiling below. An important feature in securing this result is to be found in making the floor blocks of greater vertical depth than the I-beams, so that the upper surface of the block extends above the I-beam far enough to allow the grout to cover the hooked-over ends of the wires and hide the same, thus making a floor surface flush with the tops of the blocks, and also allowing the grout to flow under the I-beam to embed and hide it and make a finished ceiling surface flush with the lower surface of the block. While these great economic advantages are secured, the anchorage of the reinforcing wires or rods to the I-beam and the terminal wires extending at different levels from the corrugated ends of the block into the grout make a thoroughly strong and substantial construction, when the matrix of grout has set, forming a sim-

ple, practical, and strong floor, that can be laid quickly, at a very little expense and may be used at once for any light traffic, since any one floor block is sustained at both ends from the I-beam by the planks, stirrups and anchorage rods 2, and at both sides by the adjacent blocks through the interlock of the cement keys in the undercut grooves 13. It will also be seen, that the upper rods 2 being anchored to the I-beams and the suspension member 6 being anchored to both the upper rods 2 and the lower rods 4, the weight of the lower or ceiling slab, in the middle, is transferred by suspension to and carried by the I-beams through the rods 2. The separate wire ends which protrude through the ends of the blocks as free ends also permit very solid packing of the cement, as the upper wires are bent laterally out of the way, while the wires of the lower level are being embedded and rammed.

I claim:

1. A floor construction, comprising floor blocks having flat upper surfaces, and I-beams, the floor blocks having longitudinal reinforcing members embedded in the same and extending through and beyond the ends of the blocks to be embedded in a matrix of grout, and anchored to the I-beams, and the blocks being made at the ends of greater vertical depth than the height of the I-beams, the upper part of the blocks extending above the tops of the I-beams and the lower part of the end wall of the blocks extending below the bottom of the I-beams and a matrix of grout extending over the top, down the sides and under the bottom of the I-beams flush with the upper and lower ends of the blocks, and embedding the projecting reinforcements of the blocks to make a finished floor above, and a finished ceiling below.

2. A floor construction, comprising floor blocks having flat upper surfaces, and I-beams, the floor blocks having longitudinal reinforcing members embedded in the same and extending through and beyond the ends of the blocks to be embedded in a matrix of grout and anchored to the I-beams, and the blocks being made at the ends of greater vertical depth than the height of the I-beams, the upper part of the blocks extending above the tops of the I-beams and the lower part of the end walls of the blocks extending below the bottom of the I-beams and a matrix of grout extending over the top, down the sides and under the bottom of the I-beams flush with the upper and lower ends of the blocks and embedding the projecting reinforcements of the blocks to make a finished floor above and a finished ceiling below, the blocks being made hollow and having an upper floor slab and a lower ceiling slab with a longitudinal rib on the

upper and inner surface of the ceiling slab provided with indented seats for pipes &c., and a reinforcing rod extending through the vertical plane of the rib and having its ends
5 extended beyond the ends of the blocks and embedded in the matrix of grout around the I-beams.

3. A floor construction, comprising floor blocks, having flat upper surfaces and I-beams, the floor blocks having longitudinal reinforcing members embedded in the same and extending through and beyond the ends of the blocks to be embedded in a matrix of grout, and the blocks being made at the ends of
10 greater vertical depth than the height of the I-beams, the upper part of the blocks extending above the tops of the I-beams and having reinforcing rods hooked over the tops of the I-beams and the lower part of
20 the end walls of the blocks extending below the bottom of the I-beams and a matrix of grout extending over the top, down the sides and under the bottom of the I-beams flush with the upper and lower ends of the blocks
25 and embedding the projecting reinforcements of the blocks to make a finished floor above and a finished ceiling below, the blocks being made hollow and having an upper reinforced floor slab and a lower reinforced
30 ceiling slab, both made integral with a connecting web, and a vertical reinforcing member extending through said web and connecting the upper and lower horizontal reinforcing members.

4. A floor construction, comprising floor blocks, having flat upper surfaces and I-beams, the floor blocks having longitudinal reinforcing members embedded in the same and extending through and beyond the ends
40 of the blocks to be embedded in a matrix of grout, a portion of said reinforcements being hooked over the tops of the I-beams, and the blocks being made at the ends of greater vertical depth than the height of the I-beams, the upper part of the blocks extending
45 above the tops of the I-beams and the lower part of the end walls of the blocks extending below the bottom of the I-beams and a matrix of grout extending over the top, down the sides and under the bottom of the I-beams flush with the upper and lower ends
50 of the blocks, and embedding the projecting reinforcements of the blocks to make a finished floor above and a finished ceiling below.

5. A floor construction, comprising floor blocks, having flat upper surfaces, and I-beams, the floor blocks having longitudinal reinforcing members embedded in the same and
60 extending through and beyond the ends of the blocks and anchored to the I-beams, and the blocks being made at the ends of greater vertical depth than the height of the I-beams, the upper part of the blocks extending above

the tops of the I-beams and the lower part
65 of the ends of the blocks extending below the bottom of the I-beams and a matrix of grout extending over the top, down the sides and under the bottom of the I-beams and embedding the projecting reinforcements of
70 the blocks to make a finished floor above and a finished ceiling below, the ends of the blocks having longitudinally opening holes to receive bonding tenons of cement from the matrix of grout.

6. A floor construction, comprising floor blocks having flat upper surfaces, and I-beams, the floor blocks having longitudinal reinforcing members embedded in the same a part of which are anchored to the I-
80 beams and all of which extend through and beyond the ends of the blocks in the form of free ends to be embedded in a matrix of grout, and the blocks being made at the ends of greater vertical depth than the
85 height of the I-beams, the upper part of the blocks extending above the tops of the I-beams, and the lower part of the end walls of the blocks extending below the bottom of the I-beams and a matrix of grout extending
90 over the top, down the sides and under the bottom of the I-beams and embedding the projecting reinforcements of the blocks to make a finished floor above and a finished ceiling below, the blocks having their upper
95 corner edges replaced by grooves to match and form troughs between the sides of the blocks, and a filling of cement for said grooves extending into the enveloping matrix of the I-beams.

7. A floor block having embedded in the same a plurality of longitudinally arranged reinforcing wires extending beyond the
ends of the blocks at different levels, said
105 blocks having vertical end walls with horizontal corrugations through which the wires protrude.

8. A floor block made hollow with parallel upper and lower slabs, reinforcing members extending longitudinally through both
110 upper and lower slabs and projecting through and beyond the ends of the blocks at different levels in the form of free ends.

9. A floor block made hollow with parallel upper and lower slabs, reinforcing members extending longitudinally through both
115 upper and lower slabs and projecting through and beyond the ends of the block at different levels in the form of free ends, said upper and lower slabs being cast with
120 an integral web connecting them and a vertical reinforcing suspension member embedded in said web and connecting the upper and lower reinforcing members.

10. A floor construction, comprising I-
125 beams, a hollow floor block having an integral web connecting the upper and lower parts, reinforcing wires extending longi-

tudinally through both the upper and lower parts and extending at the ends beyond the blocks, the upper ones being anchored to the upper parts of the I-beams and an upright
5 suspension member connecting the upper and lower reinforcement and extending through and embedded in the middle web.

In testimony whereof I affix my signature in presence of two witnesses.

DANIEL H. MAGDIEL.

Witnesses:

LOUIS R. WELLS,
JOHN R. WINDER.