

May 2, 1939.

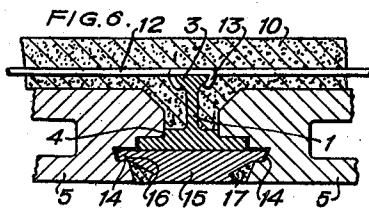
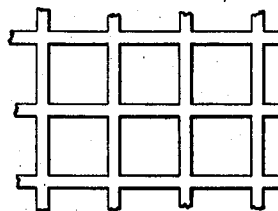
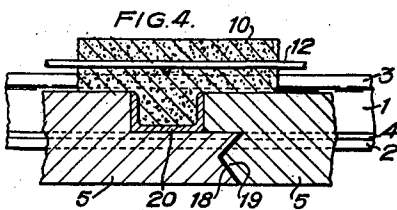
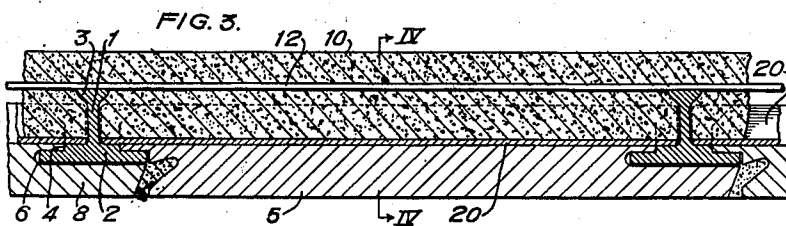
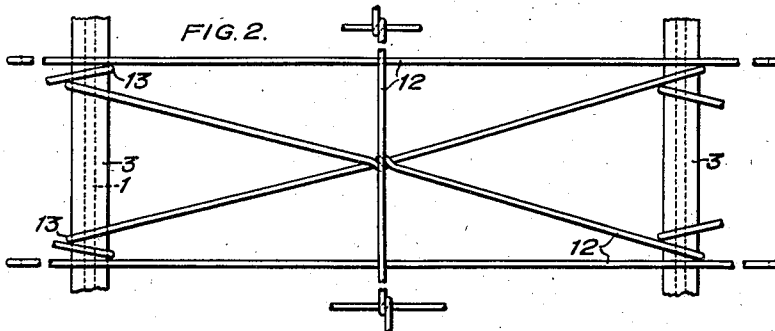
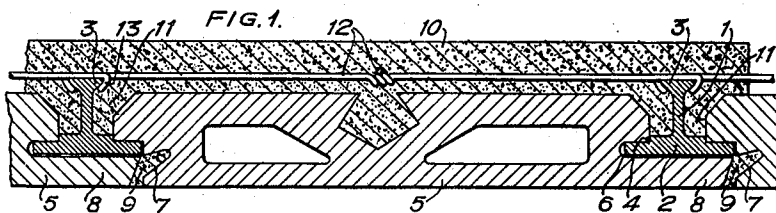
R. HOPEWELL

2,156,588

FLOOR CONSTRUCTION

Filed Oct. 28, 1937

3 Sheets-Sheet 1



INVENTOR
ROBERT HOPEWELL

By *D. P. Willhauser* Atty.

May 2, 1939.

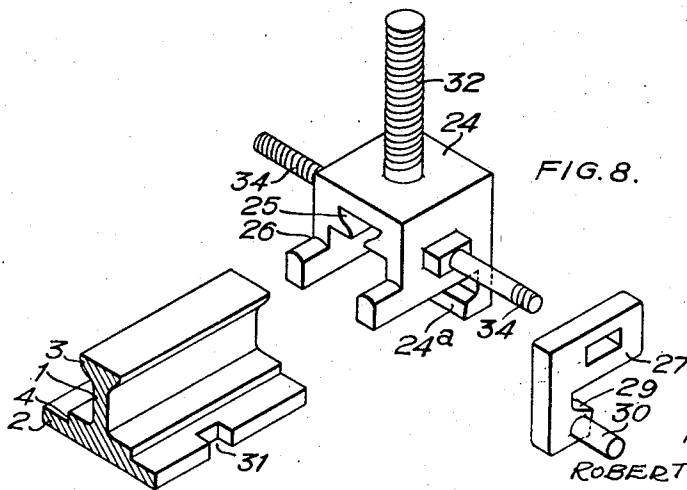
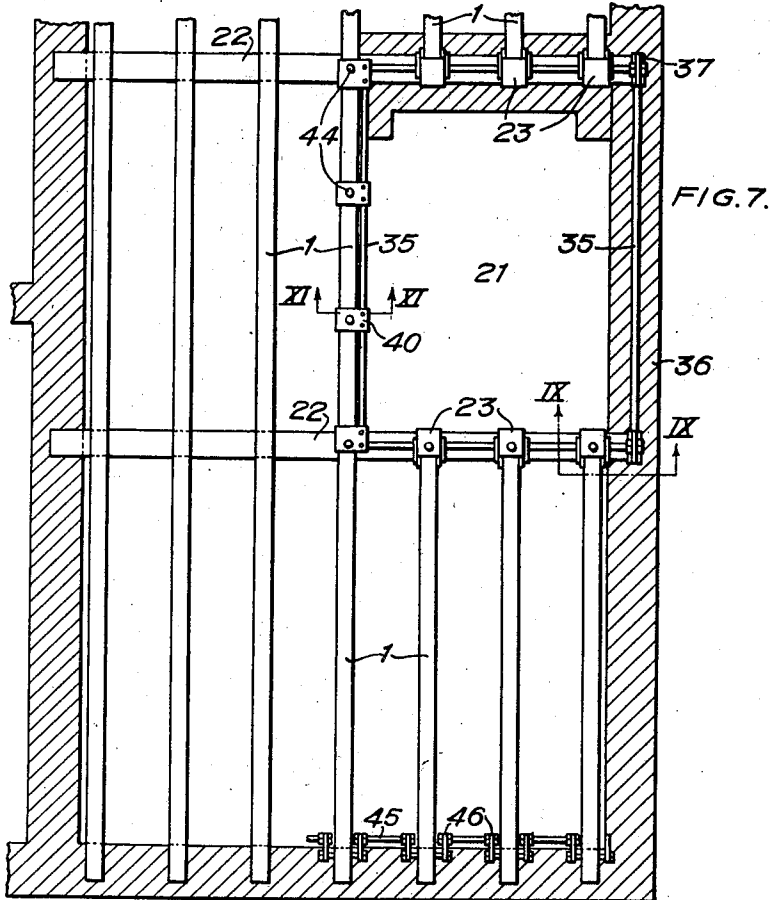
R. HOPEWELL

2,156,588

FLOOR CONSTRUCTION

Filed Oct. 28, 1937

3 Sheets-Sheet 2



INVENTOR
ROBERT HOPEWELL

By *J. P. Wilkerson*
Att'y

May 2, 1939.

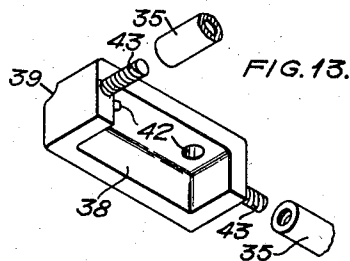
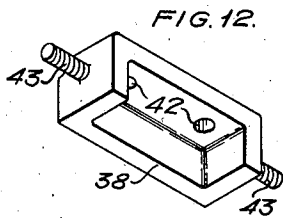
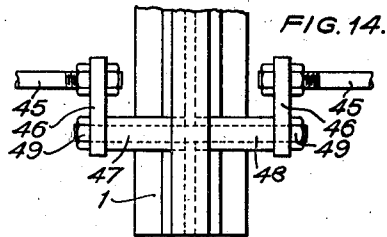
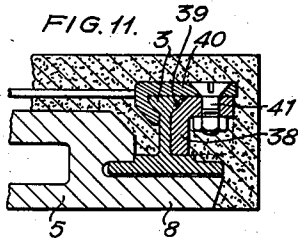
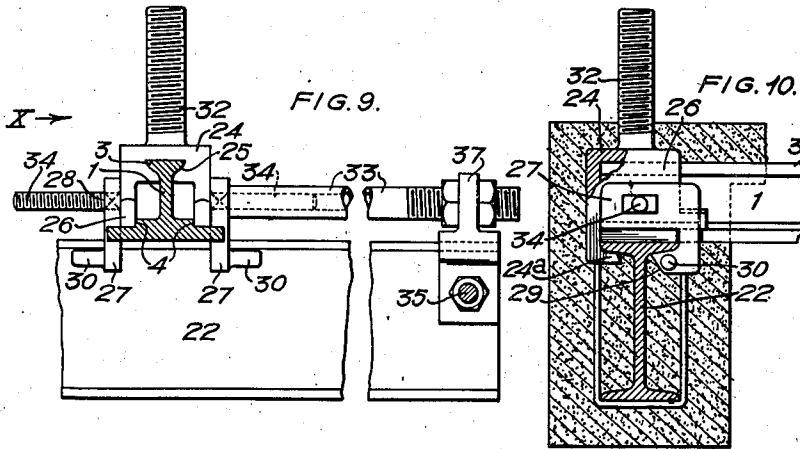
R. HOPEWELL

2,156,588

FLOOR CONSTRUCTION

Filed Oct. 28, 1937

3 Sheets-Sheet 3



INVENTOR
ROBERT HOPEWELL

By *J.P. Wellhauser*
Atty.

UNITED STATES PATENT OFFICE

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FLOOR CONSTRUCTION

Robert Hopewell, London, England

Application October 28, 1937, Serial No. 171,577
In Great Britain November 2, 1936

5 Claims. (Cl. 72-66)

This invention relates to improvements in floors and provides an improved construction of flooring which obviates the need for shuttering or form-work during the construction of the floor, which is preferably composed throughout of fireproof materials.

The improved floor according to the invention may be briefly stated to comprise parallelly disposed I joists whereof the lower flange of each joist is formed with a ridge or the like on each side of the web, and precast filler blocks which span the distance between the ridges of adjacent parallel joists and which are formed with stepped-back ends that lie adjacent the extremities of the joist flanges, one or each stepped back portion having a recess to enable the block to be tilted for positioning it between the ridges.

In order that the invention may be readily understood and carried into effect, reference will now be made to the accompanying drawings, wherein:

Figure 1 shows a part of an improved floor according to the invention, in cross section, and embodying one form of filler block,

Figure 2 illustrates the metal reinforcing network incorporated in the floor of Figure 1,

Figure 3 is a similar cross section to Figure 1, but shows the inclusion of a metal channel running between the longitudinal sides of the filler blocks laid side by side.

Figure 4 is a transverse section on the line IV-IV of Figure 3 to show the method of interlocking adjacent side by side filler blocks,

Figure 5 shows an alternative arrangement of the reinforcing network,

Figure 6 shows a modified form of filler block with an interconnecting fillet between longitudinally aligned blocks,

Figure 7 is a layout of a floor according to the invention incorporating a stairwell,

Figure 8 is a perspective exploded view of the securing block which secures crossing joists together at the stairwell,

Figure 9 is a cross section on the line IX-IX of Figure 7, and shows the securing block in position,

Figure 10 is a view looking in the direction of the arrow X in Figure 9,

Figure 11 is a section on the line XI-XI of Figure 7 and shows the manner in which the joist mounting blocks at the stairwell opening are secured to the top flange of the I joist extending along one side of the opening,

Figure 12 is a detail perspective view of the intermediate joist mounting block, and Figure 13

is a similar view of the corner post mounting block,

Figure 14 is a detail of the means employed for securing the rod which holds the longitudinal joists of the floor spaced apart in parallel relation at the ends.

The improved floor comprises parallelly arranged I joists 1, the lower flange 2 of each of which projects beyond the upper flange 3, and is provided with two ridges 4 symmetrically disposed one on each side of the web of the joist. Pairs of the joists 1 support between them filler blocks 5 (which may be hollow as shown). The blocks 5 are of a length less than the distance between the webs of the I joists but greater than the distance between the lower flanges 3 thereof so that they span the distance between the ridges 4 as shown, the ridges, when the blocks are in position, engaging the ends of the blocks to prevent endwise movement thereof. The blocks have their ends stepped back as at 6 so that the inner wall of the stepped back portion lies adjacent the extremities (and may engage them) of the lower flanges 2 of the joists. At one end the stepped back portion is provided with a recess 7, whilst the other end has a lower part 8 which extends under the lower flange of the adjacent joist to a point beyond the vertical centre of the joist web.

In order to position the block, it is tilted from below so that the recess 7 in one end engages over the reduced portion of the lower flange 2 of the left hand I joist 1, and the block is then moved endwise to cause the opposite end to slide over the reduced portion of the lower flange of the right hand I joist, whereby the opposite end faces of the block are located between and engage the ridges 4 of the two joists. Plastic filling material 9 is inserted in the spaces between longitudinally aligned blocks, the recesses 7 forming keys.

The blocks are covered by an upper layer 10 of plastic filling material, such as concrete, this material entering into the spaces 11 between the ends of the filler block and the webs of the joists.

Embodied in the upper layer 10 is a metal reinforcing network 12 which may have any suitable form, such as that shown in Figure 2, or that in Figure 5, and this network has portions 13 which engage, preferably clip round as shown in Figures 1 and 2, the upper flanges 3 of the I joists to constitute a bracing arrangement to the whole floor.

As an additional means of locating the blocks,

metal spacing members may be included as described in the aforesaid application, these members being formed by down-turned limbs of the reinforcing network which are substantially vertically disposed to abut the end faces of the blocks and which have the spacing bridge pieces resting on the top of the ridge 4.

In Figure 6 there are shown filler blocks which instead of having the lower projecting tongue 8 at one end, are formed with recesses 14 similar to 7, and between longitudinally aligned blocks a terracotta or other fillet 15, with ends 16 shaped substantially as shown to engage the recess 14, is slid transversely, thereby to interlock the blocks, a plastic filler 17 being introduced between the fillet and the ends of the blocks.

To facilitate positioning of the blocks, and also provide a better key for the plastic filler, the blocks with the tongues 8 may have these tongues chamfered at the ends as shown in Figure 3. The reduced portions of the joist flanges may also be chamfered to simplify the block positioning, and for the same purpose chamfering of the ends of the block in Figure 6 is provided.

In Figure 4 a method of interlocking blocks laid side by side is shown, wherein the longitudinal sides of the blocks are provided with complementary interlocking portions 18 and 19. In this figure and in Figure 3, these sides of the blocks are also shaped to form longitudinal recesses in which are housed metal channels 20 providing greater strength in the finished floor.

The ridges 4 of the I joists also serve to locate a device employed for securing two crossing joists together, such as occurs where a series of longitudinal joists terminate at a stairwell opening and require to be secured to a transverse post or girder which forms a boundary for said opening. Figure 7 shows a floor layout according to the invention with a stairwell opening 21 formed by ridged longitudinal joists and bounded by transverse girders 22, which are secured to the longitudinal joists by devices generally designated 23 in Figure 7 and shown in detail in Figures 8, 9 and 10. Each device 23 consists of a U-shaped block 24 interiorly formed as at 25 to slide over the end of a longitudinal joist and fit the top flange 3 thereof. The side wings or legs 26 of the block rest against the ridges 4 as shown in Figure 9, and on them are mounted clip plates 27 located on side studs 28 of the wings. The hooks 29 of the clip plates 27 engage under the top flange of a transverse girder 22 and have laterally projecting pins 30 which also come under this top flange as will be seen in Figure 10. The stems of the hooks engage in recesses 31 in the reduced portions of the bottom flange of the longitudinal joist to locate the clip plates in position.

At one end of the block 24 there is formed another hook 24a which clips under the top flange of the transverse joist but on the opposite side to the clip plates as will be clearly seen in Figure 10. Thus, the block is securely held in position.

These securing blocks serve also for mounting hand rail or newel posts, being provided where necessary with upstanding screwed studs 32 on to which the posts are screwed.

To hold the longitudinal joists transversely spaced, there are provided rods 33 which screw on to lateral screw studs 34 on the securing blocks 24.

Along the sides of the stairwell opening 21 are rods 35 which serve inter alia to space the transverse joists 22 and give increased rigidity

to the floor structure. In the arrangement shown in Figure 7, the right hand rod 35 is embedded in a side wall 36, being secured at the ends by suitable brackets 37. The opposite rod 35 is in several parts which serve to hold in spaced relation blocks 38 for mounting hand rail or like parts along the side of the opening 21.

The blocks 38 are of the form shown in Figures 12 and 13 for insertion under the top flange 3 of the longitudinal joist running along the side of the opening 21. At the corner 39 they are recessed to fit the under face of the top flange, and they are secured in position by a hooked plate 40 the hook of which clips under the opposite side of the top flange as will be seen in Figure 11, the plate being fixed to the block by nuts and bolts 41, of which the bolts pass through holes 42 in the top plate of the block 38. Projecting from the sides of the blocks 38 are screwed studs 43 for receiving the ends of the parts of the left hand rod 35. In Figure 12 these screwed studs 43 project from opposite ends, the block there shown being an intermediate one, whilst in Figure 13 one of the studs projects from the longitudinal side of the block for receiving the end of the transverse spacing rods 35; this block is therefore designated a corner block.

The hand rail posts are fixed into the hooked plates 40 as at 44, Figure 7.

Finally, there may be incorporated in the improved floor, spacing rods 45 at the ends of the longitudinal joists. As will be seen more clearly in Figure 14, these rods are secured to the joists by means of plates 46 which are held spaced from the joists by tubes 47 projecting from each side of the joist web and mounted on a through transverse pin 48. The plates 46 are clamped by nuts 49 screwed on to the ends of the pin 48.

The components incorporated in the floor according to the invention are designed on economical manufacturing lines and with a view to easy assembly into a rigid structure.

I claim:

1. In a floor, a pair of spaced parallel I-joists each including a web and a bottom flange, and a pre-cast filler block supported at its ends upon and spanning the space between said joists, said filler block having end portions resting upon the bottom flanges of the joists and a bottom portion extending below said joist flanges, end shoulders on said bottom portion substantially abutting the free edges of the joist bottom flanges, said filler block further having at least at one end thereof a recess opening through the related shoulder at a point below the portion of the shoulder which substantially abuts the free edge of the joist bottom flange, said recess being of a size to accommodate the related joist bottom flange during mounting of the filler block between the joists thus to facilitate such mounting.

2. In a floor, a pair of spaced I-joists each including a web and a bottom flange, and a pre-cast filler block supported at its ends upon and spanning the space between said joists, the upper portions of the bottom flanges of said joists being stepped to provide marginal portions of reduced thickness and shoulders at the inner ends of said reduced thickness marginal portions, said filler block having end portions resting upon the reduced thickness marginal portions of said joists, the end faces of said end portions substantially abutting said shoulders, said filler block having end shoulders below its said end portions substantially abutting the free edges of the reduced thickness marginal portions of the

joist bottom flanges, at least one of the end shoulders of said block extending below the related joist bottom flange, said block having a recess opening through its said last mentioned end shoulder at a point below the portion of said shoulder which substantially abuts the free edge of the reduced thickness marginal portion of the joist bottom flange, said recess being of a size to accommodate the reduced thickness marginal portion of the related joist bottom flange during mounting of the filler block between the joists to facilitate such mounting.

3. In a floor, spaced parallel I-joists each including a web and a bottom flange, and a pre-cast filler block supported at its ends upon and spanning the space between said joists, said filler block having end portions resting upon the bottom flanges of said joists, end shoulders on said block substantially abutting the free edges of the flanges of said joists, a lip at one end of said block underlying the bottom flange of the related joist, the shoulder at the other end of the block extending below the bottom flange of the re-

lated joist, said block having a recess opening through the shoulder at the last mentioned end thereof at a point below the portion of said shoulder which substantially abuts the free edge of the bottom flange of the related joist, said recess being of a size to accommodate the related joist bottom flange during mounting of the block between the joists thus to facilitate such mounting.

4. In a floor as set forth in claim 1, a top recess in the block extending from end to end thereof, and a metal channel element disposed in said recess and seated at its ends on the bottom flanges of the I-joists.

5. In a floor as set forth in claim 1, a top recess in the block extending from end to end thereof and opening through one side edge of the block, an adjacent block having a top lip extending into said recess, and a metal channel element disposed in said recess and seated at its ends on the bottom flanges of the I-joists.

ROBERT HOPEWELL.