PATENT SPECIFICATION

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PROVISIONAL SPECIFICATION

Reinforced Concrete Building Constructions

We, JOHN CHARLES SOMERVILLE, a British subject, of 215, Bedford Hill, Streatham, London, S.W.16, and STANLEY JOHNSON, a British subject, of "Alandale", Berry Lane, Chorley Wood, Bucks., do hereby declare the nature of this invention to be as follows:—

This invention relates to floors of buildings; we wish the word "floors" to cover roofs, ceilings and other horizontal, vertical or inclined enclosing surfaces.

The invention is directed towards the provision of improved floors constructed of reinforced concrete and may be regarded as a combination of pre-formed beam units with *in-situ* construction.

In the improved floor of the present invention we employ units consisting of a reinforcing framework, the bottom of which is embedded in concrete, or similar plastic material which hardens on setting, secured to the framework either before delivery to the site or on the site before hoisting into position.

These units are erected in position and *in-situ* concrete is then laid on top of the pre-cast concrete. The units are preferably spaced apart and hollow tiles or like members are arranged to rest on the top of the pre-cast concrete or like material; the *in-situ* concrete will then fill the spaces above the pre-cast concrete and above the tiles or the like thus providing an improved floor of the type commonly referred to as "Tee section".

We will now proceed to describe in some detail one construction of floor embodying the invention.

In this floor the framework is triangular with apex upwards and has two bars at the bottom embedded in pre-cast concrete and one bar at the top with diagonal members, welded to the main members, completing the framework.

In one example the pre-cast concrete is 4in. wide and 1½in. deep; the base of the triangular frame is 3in. wide and the height is 5ins.

These pre-formed units are spaced apart at 18in. centres and hollow tiles 4½in. deep with projecting side lips rest upon the top of the pre-cast concrete of the units and are so shaped that their adjacent edges have an upwardly widening space.

Transverse distribution bars are preferably placed at appropriate intervals below the top members of the triangular main members of the frame. The concrete is then cast between the spaces between the tiles and preferably for a short distance above them.

A finishing surface or screed of fine concrete is preferably laid on the top of the *in-situ* concrete referred to in the above.

The pre-cast members with their top reinforcing bars projecting above them have sufficient bending resistance to enable them safely to resist the weight of the hollow tiles and *in-situ* concrete until the latter has gained its compressive strength on setting.

The reinforcing frames may be pressed from steel sheets or bent up from expanded metal or made from sheet by slitting and expanding.

They may also be made from light rolled structural shapes connected by welding or other means by diagonal members to provide the necessary shear resistance.

The *in-situ* concrete need not be applied wet but can in some circumstances be applied dry in requisite proportions and water added later or coarse aggregate may first be laid in position and cement mortar then poured on top.

It will be understood that the invention is not restricted to the details of the specific embodiment described which may be varied without departing from the broad idea underlying it.

Dated the 9th day of June, 1944.

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COMPLETE SPECIFICATION

Reinforced Concrete Building Constructions

We, JOHN CHARLES SOMERVILLE, a British subject, of 215, Bedford Hill, Streatham, London, S.W.16, and STANLEY JOHNSON, a British subject, of "Alandale", Berry Lane, Chorley Wood, Bucks., do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to floors of buildings; we wish the word "floors" to cover roofs, ceilings and other horizontal, vertical or inclined enclosing surfaces.

The invention is directed towards the provision of improved floors constructed of reinforced concrete which may be regarded as a combination of pre-formed beam units with *in-situ* construction.

It has been proposed to form floors having in parallel spaced relation beam units consisting of bar joists having upper and lower chords connected by oblique bars with cementitious bodies moulded about the lower chords; these bodies form opposed shoulders between which span hollow blocks and concrete is poured above the blocks embedding the bar joists. The present invention may be regarded as providing an improvement in the above kind of construction.

In accordance with the present invention we provide a pre-fabricated reinforced concrete floor beam unit comprising a metal framework having upper and lower main reinforcing metal members connected by diagonal members and having one of the main members encased in a concrete slab and the remainder of the framework projecting exposed beyond the slab, in which the framework is triangular in cross-section and in which the base of the triangle is embedded in the concrete slab.

By concrete we mean any plastic material of a cementitious nature which hardens on setting.

In forming a floor with these units they are preferably spaced apart with slabs lowermost and hollow tiles or like members are arranged to rest on the top of the pre-cast slabs; *in-situ* concrete is then cast to fill the spaces above the pre-cast concrete and the tiles or the like thus providing an improved floor of the type commonly referred to as "Tee section".

Referring to the accompanying drawings which illustrate one embodiment of the invention,

Fig. 1 shows a cross-section through one form of floor unit according to the invention,

Fig. 2 shows an elevation of part of the unit,

Fig. 3 shows a cross-section through one form of finished floor using the units,

Fig. 4 is a corresponding sectional elevation of the floor of Fig. 3.

In this unit the framework is triangular in section with apex upwards and has two bars 1, 2 at the bottom embedded in pre-cast concrete slab 3 and one bar 4 at the top. Diagonal members 5, 6, lying in two planes, each forming one side of the triangular section of the beams and welded to the main members, complete the framework.

In one example the pre-cast concrete slab 3 is 4 in. wide and 1½ in. deep; the base of the triangular frame is 3 in. wide and the height is 5 ins.

These pre-formed units when used in the floor illustrated are spaced apart at 18 in. centres and hollow tiles 7 4½ in. deep with projecting side lips 8 rest upon the top of the pre-cast concrete of the units and are so shaped that their adjacent edges leave an upwardly widening space 10.

Transverse distribution bars 9 are preferably placed at appropriate intervals above the tiles. Concrete 11 is then cast between the spaces between the tiles and preferably for a short distance above them.

A finished surface or screed 12 of fine concrete is preferably laid on the top of the *in-situ* concrete referred to in the above.

In Fig. 4 the unit is shown on the left-hand side as resting in a recess 16 of a brick wall 13 and on the right-hand side in the casing 15 of a stell I beam 14.

In-situ concrete is filled into the recess 16 and forms the casting 16 at the same time as the other *in-situ* concrete is placed in position.

The pre-cast members with their top reinforcing bars projecting above them have sufficient bending resistance to enable them safely to resist the weight of the hollow tiles and *in-situ* concrete until the latter has gained its compressive strength on setting.

The reinforcing frames may be pressed from steel sheets or bent up from expanded metal or made from sheets by slitting and expanding.

The *in-situ* concrete need not be applied wet but can in some circumstances be applied dry in requisite proportions and

water added later or coarse aggregate may first be laid in position and cement mortar then poured on top.

The construction of the present invention is particularly suitable for use with framed buildings; in such buildings the outer walls do not have to resist vertical forces but act as vertical slabs resisting horizontal wind forces. In using the construction of the present invention for such walls the construction in principle is the same as that described in detail for horizontal floors; the difference is that the beam units are laid vertically with the slabs on the inside of the building and the exposed framework is on the outside of the building.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A pre-fabricated reinforced concrete floor beam unit comprising a metal framework having upper and lower main reinforcing metal members connected by diagonal members and having one of the main members encased in a concrete slab and the remainder of the framework projecting exposed beyond the slab in which the said framework is triangular in cross-section and in which the base of the triangle is embedded in the concrete slab substantially as described.

2. A concrete floor beam unit as in claim 1 in which the diagonal members are in two planes each forming one side of the triangular section of the beam substantially as described.

3. A concrete floor beam unit as in claim 1 in which a longitudinal metal rod is placed at each angle of the triangle.

4. A reinforced floor having in combination a number of units as in claim 1 in parallel spaced relation with the slabs lowermost, hollow pre-formed tiles or like members resting on the tops of the slabs and *in-situ* concrete embedding the projecting frames and filling the spaces between the tiles or like members and the slabs substantially as described.

5. A reinforced concrete floor as in claim 4 in which the *in-situ* concrete extends above the tops of the tiles and transverse reinforcements are embedded in the portion of the said *in-situ* concrete above the tiles, substantially as described.

6. A reinforced concrete floor substantially as described with reference to the accompanying drawings.

Dated the 8th day of June, 1945.

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2. A concrete floor beam unit as in claim 1 in which the diagonal members are in two planes each forming one side of the triangular section of the beam substantially as described.

3. A concrete floor beam unit as in claim 1 in which a longitudinal metal rod is placed at each angle of the triangle.

4. A reinforced floor having in combination a number of units as in claim 1 in parallel spaced relation with the slabs lowermost, hollow pre-formed tiles or like members resting on the tops of the slabs and *in-situ* concrete embedding the projecting frames and filling the spaces between the tiles or like members and the slabs substantially as described.

5. A reinforced concrete floor as in claim 4 in which the *in-situ* concrete extends above the tops of the tiles and transverse reinforcements are embedded in the portion of the said *in-situ* concrete above the tiles, substantially as described.

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