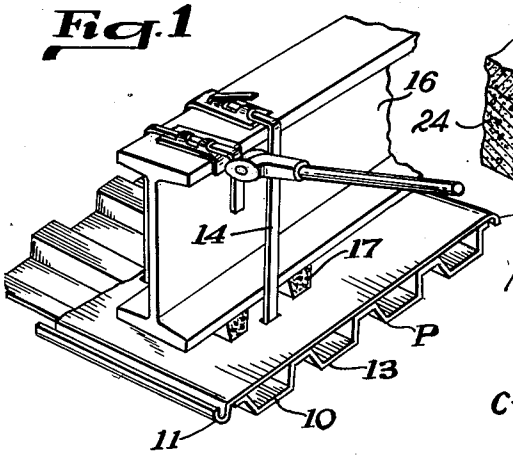
Sept. 30, 1952 A. W. BAILEY 2,611,944

METHOD OF FORMING FLOOR AND CEILING STRUCTURES

Filed April 29, 1949

Fig. 1



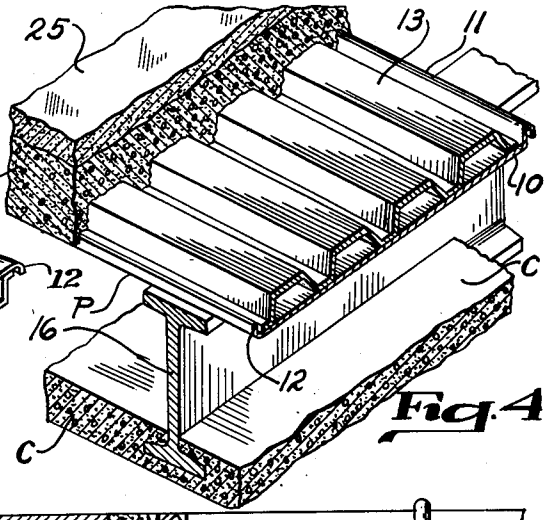


Fig. 4

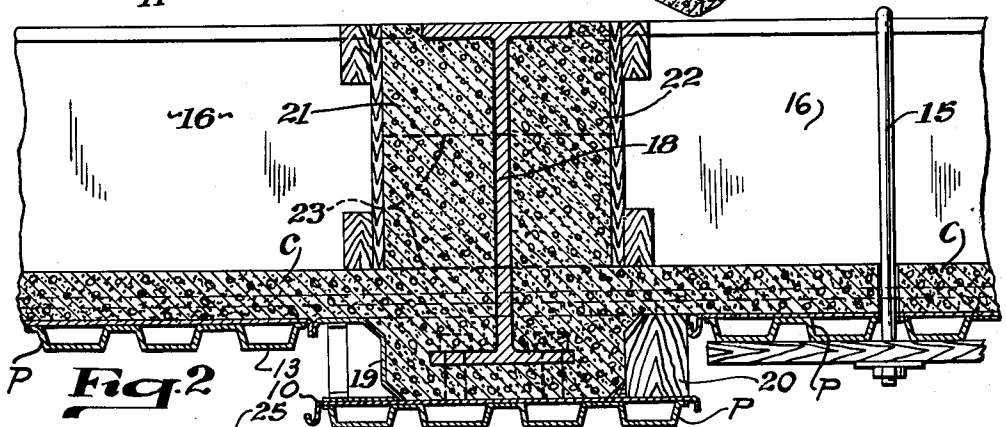


Fig. 2

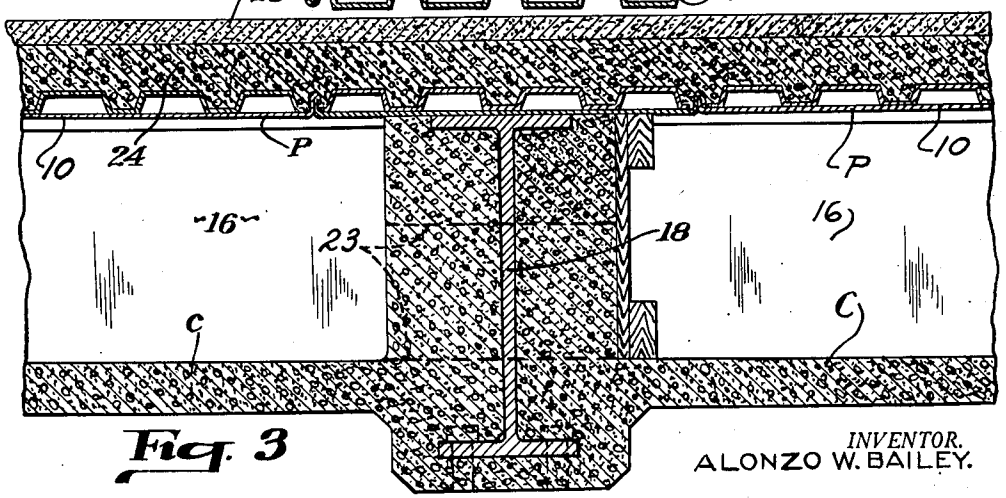


Fig. 3

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METHOD OF FORMING FLOOR AND CEILING STRUCTURES

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5 Claims. (Cl. 25—154)

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This invention relates to the method of forming concrete floors and ceilings and further pertains to the structure and use of the molding forms employed in the exercise of the improved method.

One of the objects of the invention resides in the use of fabricated steel panels as a ceiling molding form in a building structure and the further use of the same panel as a permanent reinforcing element in a floor section.

The deleterious effect of cement on lumber and steel molding forms is too well-known in the building art to merit more than a general resume of the difficulties presented when planking or metal forms are used a second time. Lumber is subject to warpage, is absorbent and difficult to clean without mutilating; hence the forms made therefrom must be completely rebuilt after limited use. The framing of wooden molds is often difficult and costly, even when new lumber is used, and the removal of such forms is expensive when an effort is made to salvage the planking. Steel molds are expensive of fabrication, are susceptible of rapid deterioration in the presence of moisture and cement, are invariably mutilated when they are pounded during the casting and cleaning operation and are heavy and difficult to handle during the installation and removal of the mold.

The present invention contemplates a composite sheet metal panel which is designed primarily as a load-carrying member or reinforcing element in a concrete floor and further designed to accommodate the use thereof as a ceiling and floor mold. In the practice of the present invention the panel is first used as a form for molding a section of a ceiling, wall or other structural element of a building. The panel is then transferred to another environment where it is installed as a permanent element of the building structure. Coincident this operation the panel may be altered by cutting hand holes or other openings therein or by changing the contour thereof to meet the architectural specifications or design. In the latter installation the panel is inverted and the face thereof, opposite that formerly used to support the ceiling, is then employed as the mold for the floor. After the initial use of the panel it is unnecessary to remove the incrustations of cement accumulated thereon, since the condition of the surface of the panel is immaterial in the subsequent use thereof.

In addition to the foregoing objects and advantages the invention also comprehends a method which will accommodate the ready installation of conduits, cables, and other equipment in the area

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above the ceiling, prior to the construction of the floor, and, if desired, the full or partial use of the void between the floor and the ceiling as a passageway for pre-conditioned air currents or as a ventilating duct.

Other objects and utilities of the method and structure and the manner in which all of the various objects are realized, will appear in the following description, which, considered in connection with the accompanying drawings, sets forth the preferred embodiment of the invention.

Referring to the drawings:

Fig. 1 is a view in perspective of a fragmentary portion of a beam illustrating the manner in which the panel is suspended when used in the initial molding operation;

Fig. 2 is a vertical sectional view through a fragmentary portion of a building illustrating several panel sections in place after the ceiling has been poured;

Fig. 3 is a similar section illustrating the use and position of the panels upon completion of a floor section; and

Fig. 4 is a view in perspective of a fragmentary portion of a building illustrating the assembled relation of the panel with a floor beam or girder and the structural proportions of the floor and ceiling relative thereto.

Referring first to Figs. 1 and 2, the panels P comprise a sheet metal plate 10 formed with a channel 11 in one of the marginal edges thereof and a flange 12 in the opposed edge for interlocked engagement with the channel in the contiguous panel assembly. The plate 10 has a corrugated sheet metal reinforcing strip 13 welded to one of the faces thereof constituting a load-carrying element. The gauge of the metal employed in both the plate 10 and the reinforcing member 13 depend upon the size of the bays or center-to-center distance between the floor beams. The width of the panels is preferably about one-third the length thereof; for example, in a 20-foot square bay, three panels substantially 6 feet 8 inches wide and 20 feet long would be employed. The panels are pierced at spaced intervals for the reception of hangers such as the steel straps 14 or U-bolts 15 which are employed to facilitate the suspension of the panels when used as a mold in forming a ceiling. As illustrated in Fig. 1, the panel is secured in position with the plate 10 disposed upwardly and in spaced relation with the lower face of the floor beam 16 of the building structure, wood or cement blocks 17 of a requisite thickness being interposed between the plate 10 and the lower flange of the I-beam 16 to regulate

the thickness of the cast concrete slab C below the face of the beam. The hanger straps 14 or bolts 15 are adjusted to draw the plate into intimate engagement with the spacers 17 and maintain a flat even surface relative to each adjacent plate within the bay. After the panels are thus positioned the concrete is poured thereover and to a height substantially double the thickness of the spacer 17. After the concrete has set the straps 14 or U-bolts 15 are released to facilitate the removal of the panels. In forming the ceiling section beneath a girder 18 or other structural steel member the panel may be positioned in a similar manner but with secondary forms such as the fabricated steel plate 19 or wooden form 20 mounted in spaced relation with the marginal edges of the building frame structure. A concrete curb 21 may be formed around the sides of the portion of the girder that is disposed above the ceiling by placing forms 22 in spaced relation therewith, then pouring concrete between such forms at the same time the ceiling is cast. If desired, openings 23 may be provided in the curb and central web of the girder to form passageways for the circulation of air between adjacent bays and accommodate the installation of pipes and conduits. If desired, additional forms may be placed upon the upper surface of the panels 10 on the ceiling prior to the molding operation to provide openings in the concrete for the reception of ventilation ducts, junction boxes, or hangers.

After the ceiling is cast and while the structure is in the condition illustrated in Fig. 2, the electrical conduits, ventilator frames, plumbing, and other fixtures may be installed. Thereafter, the panels formerly used as the ceiling molds are inverted and secured in fixed relation to the beam 16 and/or girders 18 as structural steel load-carrying members. The grouting 24 for the floor is then poured thereover and the facing 25 is finish-trowelled in the usual manner.

It will be recognized that the improved method of construction will assure the production of a clean smooth surface in the ceiling of the building since the panels employed in the molding operation are always new, straight, and clean, and that the cement remaining thereon will in no wise impair the subsequent use thereof as a structural steel reinforcing member and molding form for the floor. It will also be recognized that the method of construction will accommodate the ready installation of the pipes and conduits between the floors at a time in which such installations may be made with the greatest facility, that openings may be cut in the floor and molds mounted thereover to produce hand holes, floor ducts, or similar openings, and that the voids between the ceiling and floor and the openings 23 between the bays may be organized for use as heating or ventilating passageways.

Although the foregoing description is necessarily of a detailed character, in order that the invention may be completely set forth, it is to be understood that the specific terminology is not intended to be restrictive or confining, and that various rearrangements of parts and modifications of detail may be resorted to without departing from the scope or spirit of the invention as herein claimed.

I claim:

1. The method of forming a concrete floor and ceiling in a steel frame building structure comprising suspending a steel load-carrying floor member from the steel framework of the building in spaced relation with the lower face thereof, pouring concrete thereover to form a celing, removing the member from beneath the ceiling and securing it to the upper face of the steel framework of the building, and pouring concrete thereover to form a composite floor structure.

2. The method of forming horizontal partitions for steel framework buildings comprising the steps of detachably supporting a sheet metal form having a reinforced generally flat plate between spaced building framework members with the flat plate uppermost to form with the framework a trough, pouring a layer of cementitious material into the trough to partially fill it, removing the plate after setting of the cementitious material, placing the plate that has been employed to form the bottom of a trough across framework members that have been spanned by a hardened aggregate of cementitious material with the flat portion of the plate lowermost, and pouring a layer of cementitious material over the plate to form a reinforced horizontal wall.

3. The method of forming a concrete floor and ceiling in a steel frame building structure comprising suspending a reinforced steel, load-carrying floor member from the steel framework of the building, pouring concrete thereover to form a celing, removing the member after said ceiling concrete has hardened, securing said member to the upper face of the framework, and pouring concrete on said member whereby said concrete and the member cooperate to form a load-carrying floor.

4. A method of forming a concrete floor and ceiling for a steel frame building structure comprising the forming of a reinforced load-supporting floor member, supporting said member from the steel framework of the building, pouring concrete thereover to form a ceiling, removing the member after said ceiling concrete has hardened, placing said member above said ceiling on said frame, and pouring concrete on the member whereby said concrete and the member cooperate to form a load-carrying floor.

5. A method of forming a concrete floor and ceiling for a steel frame building structure comprising the forming of a reinforced load-supporting floor member by joining reinforcing material to a flat panel, supporting said member from the steel framework of the building with the flat panel uppermost, pouring concrete thereover to form a ceiling, removing the member after said ceiling concrete has hardened, placing said member above said ceiling on said frame with the reinforcing material uppermost, and pouring concrete on the member whereby said concrete and the reinforced member cooperate to form a load-carrying floor.

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