(No Model.) 2 Sheets—Sheet 1.

P. M. BRUNER.

FLOOR CONSTRUCTION.

No. 535,888. Patented Mar. 19, 1895.

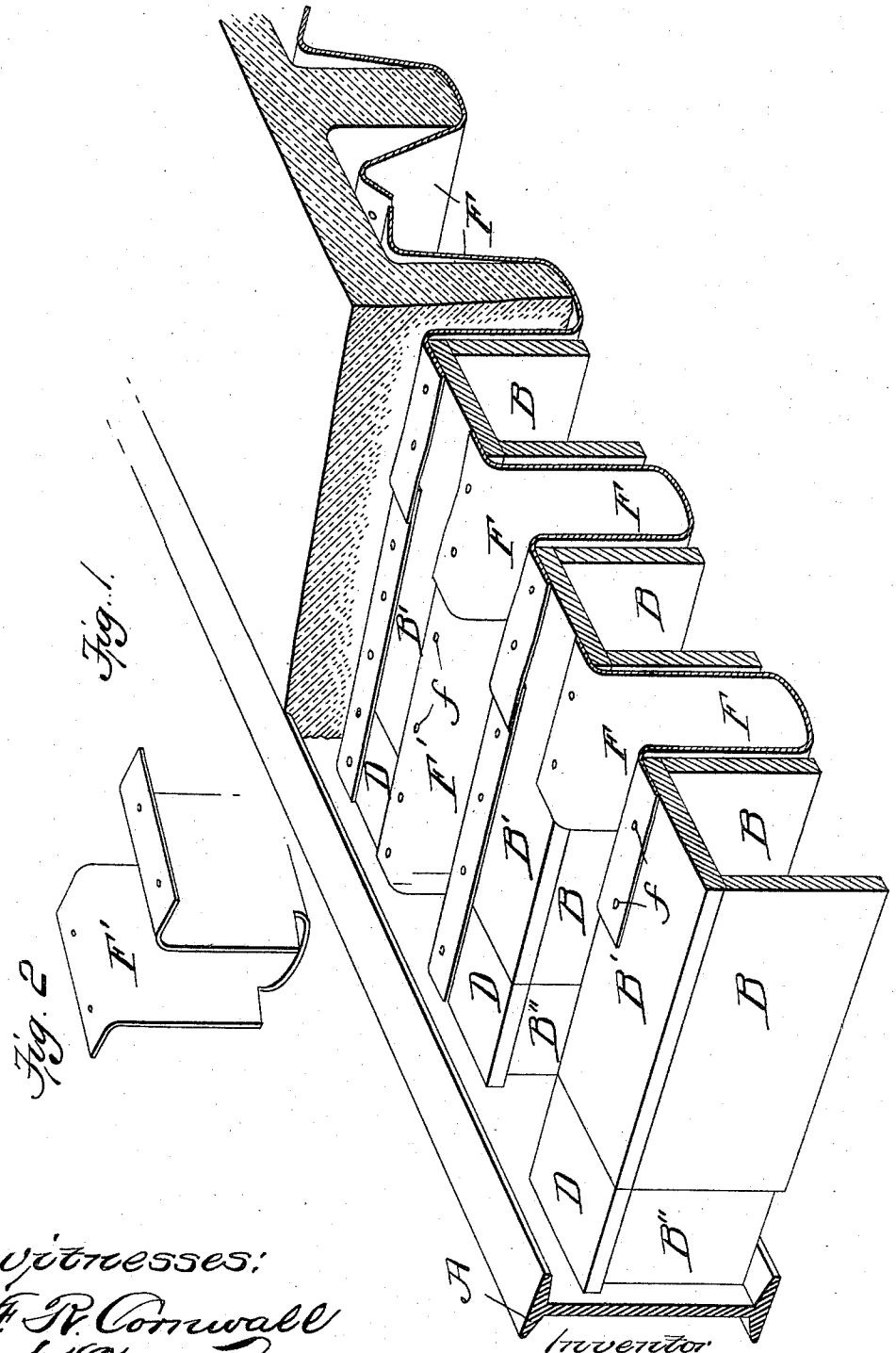

Fig. 1.

Fig. 2.

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(No Model.)

2 Sheets—Sheet 2.

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Fig. 3

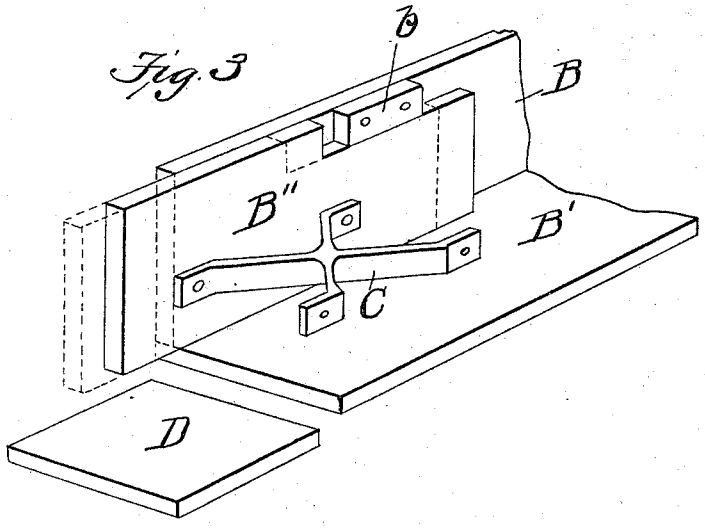


Fig. 4

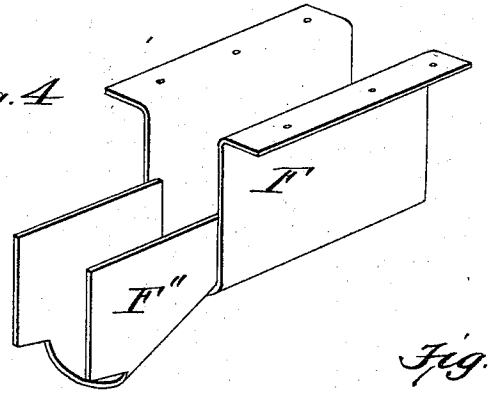
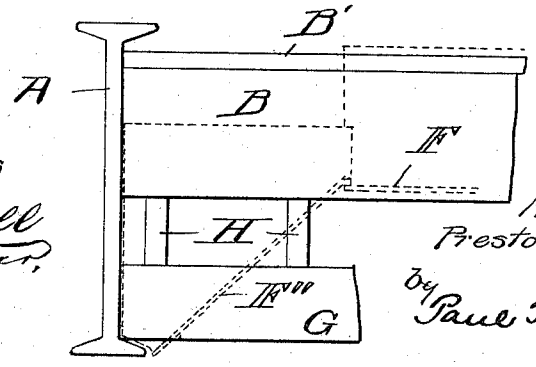


Fig. 5.



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UNITED STATES PATENT OFFICE.

PRESTON M. BRUNER, OF ST. LOUIS, MISSOURI.

FLOOR CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 535,888, dated March 19, 1895.

Application filed December 10, 1894. Serial No. 531,336. (No model.)

To all whom it may concern:

Be it known that I, PRESTON M. BRUNER, a citizen of the United States, residing at the city of St. Louis, State of Missouri, have invented a certain new and useful Improvement in Floor Construction, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, wherein—

Figure 1 is a perspective view illustrating the manner of using my invention. Fig. 2 is a detail view of one of the end sections of the sectional molds. Fig. 3 is a view illustrating the extension on one of the forms, inverted Fig. 4 is a view illustrating the manner of making the floor rib reach the lower flange of the supporting beam, when the central part of said rib is on a higher plane than the flange; and Fig. 5 is a view illustrating the manner of using my invention when the channel of the supporting beam is wider than the combined depth of the floor and supporting rib.

This invention relates to a new and useful improvement in the constructions of floors composed of composition concrete material, and consists, generally stated in the peculiar construction and arrangement of a removable sub-structure, which is held in position while the composition, composing the floor and its strengthening ribs, is "setting."

Concrete floors provided with strengthening ribs at their bottom, for spanning areas, are rapidly coming into general use, chiefly because constructional devices have been designed to enable this work to be done safely and cheaply. In order to cast or form the floor with ribs, it is necessary to build "forms" of wood, metal, &c., which provide grooves and depressions corresponding with the projections in the concrete. These are in many cases readily constructed, but the difficulty rests in withdrawing this sub-structure, without injury to the green concrete. Furthermore, by these old methods, it was impossible to use the forms repeatedly without expensive changes. In an application for United States Letters-Patent filed by me November 14, 1894, (serially numbered 528,824,) is shown a construction which is eminently suited for this class of work, and which is a solution of the problem in the construction of small spans. This present invention is designed more particularly, though not exclusively, for use in floor construction involving long spans.

In the accompanying drawings:—A indicates a permanent support for the finished floor, in the form of an I-beam. In practice, the sub-structure is generally attached to these beams or equivalent supports, until the concrete becomes hard, or crystallizes, when the sub-structure is removed.

B indicates a "form" or temporary bridging which is supported by the lower flange of the beam, said "form" being of an inverted U-shape, the legs, being vertically disposed, readily sustaining the great weight of the superimposed composition material. The top-piece B′ connects the legs, spacing them properly, and if desired, braces may be used in the interior of the form to space the lower edge of the legs. These forms are preferably made extensible for the purpose of enabling their insertion and removal from the channels of the beams. To accomplish this, I have shown an arrangement in Fig. 3, in which B″ are sliding extensions of the vertical legs B, said extensions being recessed at their lower inner edges to receive a block *b* which is secured to the lower edge of the legs B. To maintain parity between these extensions, I arrange between them a bracket or brace C, by which these extensions may also be operated from below in the case of their withdrawal for the purpose of removal of the form. When the form is in position, and the extensions are resting upon the lower flange of the supporting beam, I arrange thereon a short board or block D, which forms substantially a continuation of the top cross-piece B′. After the forms have been arranged in position and properly spaced, I temporarily suspend therebetween a sectional mold comprising the parts F, F, &c., and F′, which are, preferably, of U-shape, the edges thereof resting on, and being supported by the forms. To insure retention of the proper position of these molds, I attach them to the forms in some suitable manner, along their edges, as by nails or tacks *f*.

The mold section F′ is preferably cut away at its lower edge, as shown in Fig. 2, so that it will snugly fit the lower flange of the supporting beam to retain the material in position while it is setting.

The sub-structure placed in position as above described, the sections F overlapping each other, slightly, to make a close joint, if necessary, the material is then laid, and allowed to set. When set, to remove the substructure, it is first necessary to retract the extensions B″, which can easily be done by a lever, as no part of these extensions are attached permanently to anything, nor do they contact with the material. When the extensions are housed, the next step is to detach that part of the top-piece B′ which is exposed to the material between the edges of the molds. There being comparatively a small surface so exposed, little resistance is offered by the adhering concrete, and a slight leverage will do the work, employing, if desired, the bracket C; beam A acting as a fulcrum. When the form is loosened it is removed, likewise the short section of board D. The molds F, by reason of their great surface exposed to the concrete, adhere thereto with considerable tenacity, which leaves them embracing the floor ribs after the forms have been removed. The slight connection between the forms and edges of the molds, is broken, upon the removal of the former, and the nails or tacks are left in the edges of the molds. A trowel blade or other instrument is now introduced between the edges of the molds and the floor, and the sheet material composing the molds is slightly loosened, after which, it may be peeled off readily, as shown to the right, Fig. 1.

It very often occurs in the practical laying of floors of this description, that the combined depth of the ribs and floor does not equal the depth of the channel in the supporting beam. To meet this contingency, I have devised the scheme illustrated in Figs. 4 and 5, in which, G indicates beams or joists which bridge the bay, said joists supporting blocks H, which in turn support the forms. The forms are arranged in the usual manner. To deepen the rib near the supporting beam so that it will rest upon the lower flange of said beam, I dispense with the section F′ and in its place arrange a section F″ which is formed with an inclined bottom running from the required depth of the rib, to the lower flange of the supporting beam. Sub-structures built up and supported in this manner, and the molds formed with the sections F″ as above described, are operated in substantially the same way as that ascribed to the construction illustrated in Figs. 1, 2, and 3.

I am aware that many minor changes in the construction, arrangement, and combination of the several parts of my device, can be made and substituted for those herein shown and described without in the least departing from the nature and principle of my invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination with supporting beams, of a substructure which is built therebetween, comprising extensible forms and sectional molds, substantially as described.

2. The combination with supporting beams, of forms which are removably mounted thereon and molds which are supported from the tops of the forms, said molds being suspended therebetween, substantially as described.

3. The combination with supporting beams, of extensible forms which are supported therebetween, a block D which forms a continuation of the form, and molds which are arranged between the forms, substantially as described.

4. The herein-described form for floor construction, comprising an inverted U-shaped body portion, and an end portion which is susceptible of extension and retraction, substantially as described.

5. The combination with supporting beams, of forms which are supported therebetween, and sectional molds which are arranged between the forms, comprising the sections F, and F′, substantially as described.

6. The combination with supporting beams, of forms which are supported therebetween, and sectional molds which are arranged between the forms, the end sections of which are so formed as to permit the material forming the floor ribs, to rest directly upon the lower flanges of the supporting beams, substantially as described.

7. The combination with the supporting beams, of forms which are supported therebetween and sectional molds which are arranged between the forms, the end sections of which are formed with inclined bottoms, substantially as described.

8. The combination with the supporting beams, of forms which are temporarily supported therebetween, and flexible molds which are arranged between the forms, substantially as described.

9. The combination with the supporting beams, of forms which are temporarily supported therebetween, and molds which are supported between the forms, said molds forming the supporting ribs of the floor, and made of flexible material, so that when the forms are removed the molds may be peeled from the ribs, substantially as described.

In testimony whereof I hereunto affix my signature, in presence of two witnesses, this 4th day of December, 1894.

PRESTON M. BRUNER.

Witnesses:
F. R. CORNWALL,
HUGH K. WAGNER.