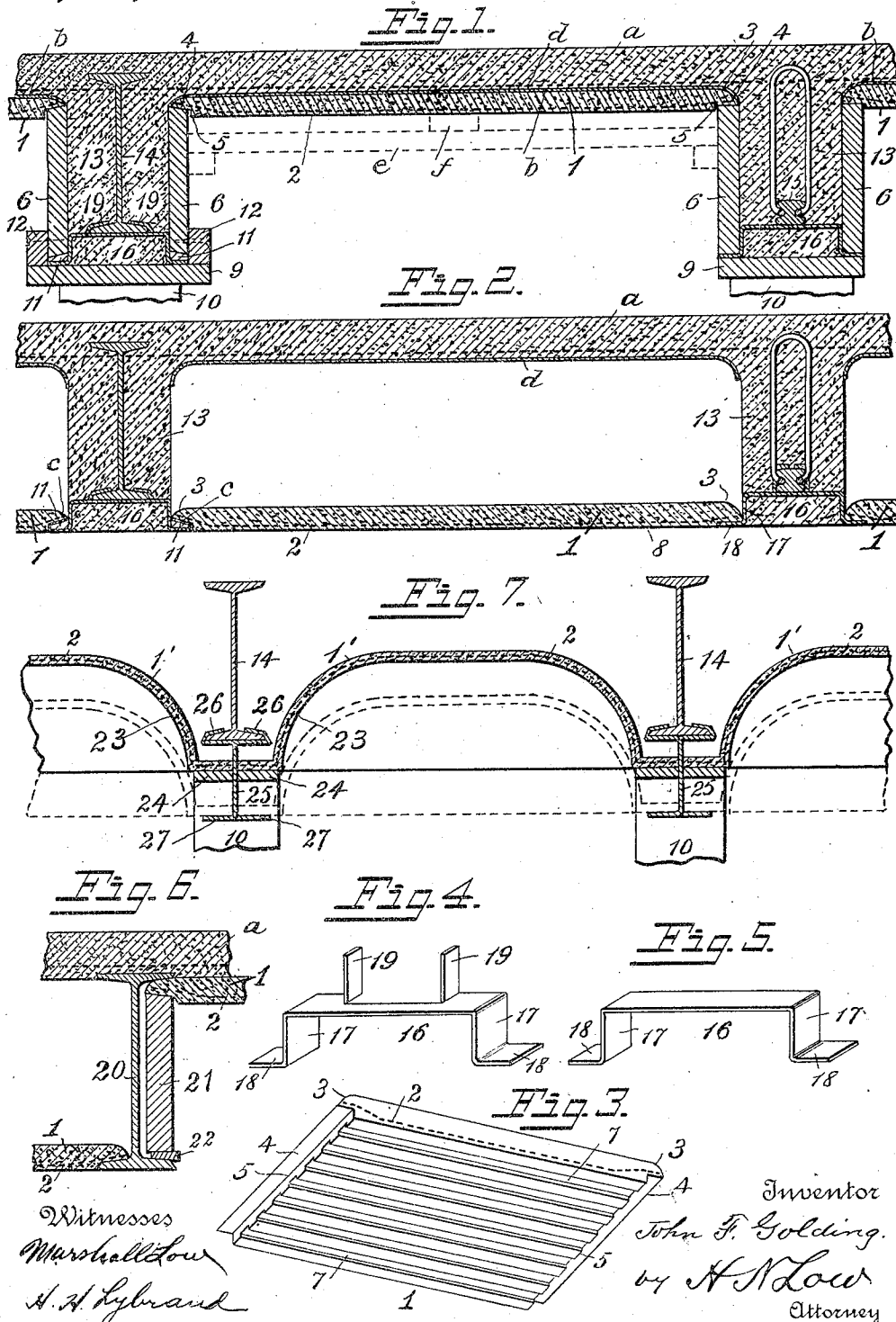


J. F. GOLDING.
 PROCESS OF CONSTRUCTING CONCRETE FLOORS AND CEILINGS.
 APPLICATION FILED SEPT. 11, 1912.

1,053,127.

Patented Feb. 11, 1913.



UNITED STATES PATENT OFFICE.

JOHN F. GOLDING, OF WASHINGTON, DISTRICT OF COLUMBIA.

PROCESS OF CONSTRUCTING CONCRETE FLOORS AND CEILINGS.

1,053,127.

Specification of Letters Patent.

Patented Feb. 11, 1913.

Application filed September 11, 1912. Serial No. 719,855.

To all whom it may concern:

Be it known that I, JOHN F. GOLDING, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Processes of Constructing Concrete Floors and Ceilings, of which the following is a specification.

This invention relates to a concrete floor and ceiling construction for buildings, in which the preformed ceiling slabs are first used as a false work or centering for the construction of the floor, and are then, after the completion of the floor, lowered or shifted to a distance from the floor and supported in proper position to serve as a ceiling, thereby leaving hollow spaces between the beams, girders, floor and ceiling.

The objects of the invention are to attain economy in material and labor and efficiency and lightness of construction.

With such objects in view the invention consists in the method of procedure herein-after set forth and claimed.

In order to make the invention more clearly understood, I have shown in the accompanying drawings means for carrying the invention into practical effect, without limiting my improvements, in their useful applications, to the particular constructions which, for the sake of example, I have illustrated.

In said drawings—Figure 1 is a vertical section of a portion of a floor and ceiling embodying the invention, the ceiling slabs being shown in position to serve as a false work or centering for the construction of the floor. Fig. 2 is a similar view, the slabs having been lowered into position to form a ceiling. Fig. 3 is a perspective view of one of the centering and ceiling slabs, looking at its under side. Figs. 4 and 5 are perspective views of clips which may be combined with the concrete beams to assist in supporting the slabs in their lower position when they serve as a ceiling. Fig. 6 is a sectional view showing the invention as applied to a concrete floor supported by beams not of concrete. Fig. 7 is a sectional view showing ceiling slabs of inverted box form.

Referring to the drawings, 1 indicates the ceiling slabs, preformed preferably of concrete reinforced by expanded metal, wire fabric, or other suitable means, as shown at 2. The slabs may be of various forms and

may be molded with ornamental under faces. As illustrated, they are formed with rounded upper end edges at 3 to facilitate disengagement from the under side of the floor *a*, and with rabbets 4 at their lower end edges to engage with their supporting means, the shoulders 5 of the rabbets serving also to space apart the side centering boards 6 of the beams. The slabs may also be formed on their under sides with grooves 7 to be engaged by the plastering 8. The slabs 1 may be formed of material other than concrete and suitable for ceilings, such as marble, glass or stamped and ornamented sheet metal. The slabs 1 are first arranged as shown in Fig. 1, between the spaces in which the beams are to be formed and across the space between the beams, and are then supported in a suitable manner, preferably on the false work or molds for the beams as indicated. The slabs, laid side by side, extend along the beams so as to form, for the time being, a complete false work for the concrete floor to be laid. In the case of two-way reinforcement where the beams extend cross-wise of each other blocking the floor into squares, the false work or boards 6 will be in box-like form, supporting the slabs, and removable from under the same when the concrete floor has set. It will be understood that any suitable false work or centering for the beams or girders may be employed. In addition to the side boards 6 I have shown bottom boards 9 carried on posts, the latter being indicated at 10. The beam molds may also be supported by or at the walls of the building. Between the lower edges of the boards 6 and the board 9 are left spaces for the formation of lips 11 along the lower edge of the concrete beams. On these lips are carried the ceiling slabs when in their lower position.

12 indicates strips secured by nails or otherwise to the boards 9 to close the outer side of the said spaces for the lips 11.

The beams, shown at 13, may be reinforced in any approved manner. At 14 is shown such a reinforcement consisting of an ordinary I-beam, and at 15 is shown a different kind of reinforcement consisting of what is known in the trade as a monolith bar, comprising a grooved bar and shear members or loops. I prefer to support the beam reinforcements at the required distance above the boards 9, before the con-

crete is filled in, by clips or brackets 16 having legs 17 resting on said boards and outwardly extending feet 18 which may directly support the slabs, as shown at the right of Fig. 2, or may reinforce the lips 11, as shown at the left of Figs. 1 and 2. The clips may have flanges 19 which can be bent down on the reinforcement to properly locate the latter in the beam space and give stability to it during the concrete filling operation. But the supports for the beam reinforcements may be independent of the supports for the slabs, and for both of these purposes any suitable devices may be employed. Also, while I have shown the ceiling slabs as supported flush with the bottoms of the beams to make a flat ceiling, it will be understood that the slabs may be supported at higher points to make a paneled ceiling; or the slabs may be hung at lower points than the bottoms of the beams, which may be desirable under roofs when the beams are inclined and the ceiling is to be horizontal.

My invention is not confined to structures in which the beams are of concrete. In Fig. 6 a structure is indicated in which the beams 20 are of steel. No false work around them is necessary. The slabs are temporarily carried to serve as centering for the floor by boards or blocks 21 located in the recesses of the beams and wedged up by wedges 22 to hold the slabs against the under sides of the top flanges of the beams. After the floor has been laid the wedges 22 are removed, releasing the blocks 21, and the slabs are lowered to rest on the lower flanges of the beams.

In Fig. 7 the ceiling slabs or panels 1' are of inverted box form, their sides 23 serving as false work at the sides of the beams. After the concrete beams and floor have been laid and set the bottom boards 24, 24 are removed and the slabs are lowered to rest on the hangers 25. These hangers pass up through notches in the edge of one of the boards 24 and engage the beam reinforcement by bent-down arms 26. Feet 27 on the lower ends of the hangers carry the ceiling slabs in their lowered position.

In operating my method or process of constructing concrete floors and ceilings, the centerings or false work for the beams, or for the girders and beams, are first erected. I then support the ceiling slabs at the bottom of the space where the concrete floor is to be laid and between the spaces where the concrete beams are to be formed and the beam reinforcements are put in place. When the clips 16 are employed they are located as shown in the drawings. When the beams are of metal (Fig. 6) they are first put in place and the ceiling slabs supported on them as de-

scribed. Sheets *b* of paper or other suitable material are laid on the top of the ceiling slabs to prevent the adhesion of the slabs to the under side of the floor. I then form the concrete floor *a* of a suitable thickness of wet concrete on the sheets *b*. When the beams also are to be of concrete they are formed with the floor in the usual manner. If the lips 11 are to be used to support the ceiling slabs in the finished structure said lips are at the same time formed at the desired places on the sides of the beams. After the concrete has sufficiently set the temporary supports of the ceiling slabs are removed and the slabs are lowered into place on their final supports to form the ceiling as described. I may apply mortar or cement on the top surfaces of such final supports, as indicated at *c*. A suitable metal reinforcement *d*, such as expanded metal, is or may be embedded in the floor when it is laid. I then apply a coat *e* of plaster to the under side of the ceiling. Owing to the evenness of the ceiling and to the fact that there are no openings for the plaster to pass through, a minimum thickness of plaster is sufficient, which results in a material saving in the cost of construction.

When the floor span is considerable, or the ceiling slabs are thin, I may employ additional supports, *e*, *f*, for the ceiling slab while it is carrying the weight of the floor. After the ceiling slabs are in their final position it is only necessary that they be strong enough to carry their own weight.

By the use of a proper false work under the space where the ceiling slabs are first located, they may be molded and preformed of wet concrete or cement *in situ*, instead of being preliminarily cast in molds, and the concrete floor, or concrete floor and beams, may afterward be laid as already described, on such ceiling slabs.

What I claim is:—

1. The process of constructing concrete floors and ceilings, which consists in first supporting preformed ceiling slabs at the bottom of the floor and between the floor beams, then forming concrete beams and a concrete floor between the slabs and on top of the same, then allowing the concrete to set, and then lowering and supporting the said slabs at a distance from the floor to serve as a ceiling and to form hollow spaces beneath the floor.

2. The process of constructing concrete floors and ceilings which consists in first supporting preformed ceiling slabs at the bottom of the floor and between the floor beams, then forming concrete beams and a concrete floor between the slabs and on top of the same, then allowing the concrete to set, then lowering and supporting the said slabs at a distance from the floor to serve

as a ceiling and to form hollow spaces beneath the floor, and then plastering the under side of the ceiling.

3. The process of constructing concrete floors and ceilings which consists in first supporting preformed ceiling slabs at the bottom of the floor and between the floor beams, then forming a concrete floor on top of the same, then allowing the concrete to set, and then lowering and supporting the said slabs at a distance from the floor to serve as a ceiling and to form hollow spaces beneath the floor.

4. The process of constructing concrete floors and ceilings, which consists in first laying and supporting ceiling slabs of wet concrete at the bottom of the space where the concrete floor is to be laid, then allowing the concrete to set more or less, then applying a separating medium such as waterproof paper over the top surface of such ceiling slabs, then laying a floor of wet concrete over such ceiling slabs, then allowing such concrete floor to set, then lowering said ceiling slabs to form hollow spaces beneath the floor and supporting them in place to form a ceiling, and then plastering the under side of the ceiling.

5. The process of constructing concrete floors and ceilings, which consists in first laying and supporting ceiling slabs of wet

concrete at the bottom of the space where the concrete floor is to be laid, then applying a separating medium such as waterproof paper over the top surface of such ceiling slabs, then laying a floor of wet concrete over such ceiling slabs, then allowing such concrete floor and ceiling slabs to set, and then lowering said ceiling slabs to form hollow spaces beneath the floor and supporting them in place to form a ceiling.

6. The process of constructing concrete floors and ceilings, which consists in placing in position side boards at the sides of the hollow space to be formed between the floor and the ceiling and supporting thereon preformed slabs at the bottom of the floor and between the floor beams, then forming concrete beams and a concrete floor between the slabs and on top of the same, then allowing the concrete to set, and then removing the side boards and lowering and supporting the said slabs at a distance from the floor to serve as a ceiling and to form hollow spaces beneath the floor.

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

JOHN F. GOLDING.

Witnesses:

H. N. Low,

N. CURTIS LAMMOND.