P. M. STEWART.

BUILDING CONSTRUCTION.

APPLICATION FILED MAR. 11, 1915.

1,174,452. Patented Mar. 7, 1916.

Fig. 1.

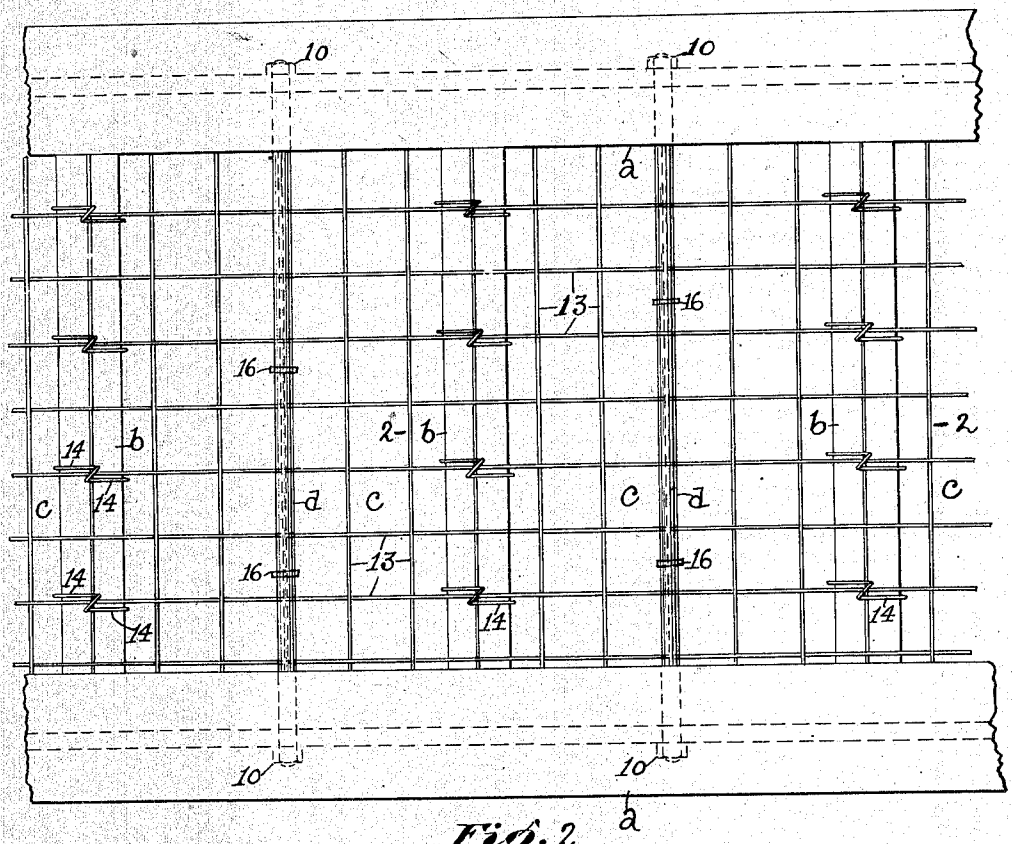
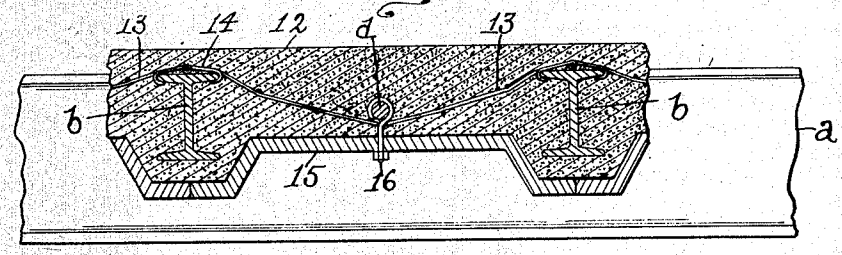


Fig. 2.



Witnesses.

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BUILDING CONSTRUCTION.

1,174,452. Specification of Letters Patent. Patented Mar. 7, 1916.

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To all whom it may concern:

Be it known that I, PEREZ M. STEWART, a citizen of the United States, residing in the borough of Manhattan, in the city, county, and State of New York, have invented an Improvement in Building Constructions, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to a building construction and more particularly to the floor construction of buildings embodying in their structure, cement, concrete, gypsum or similar plastic material.

The invention has for its object to provide a floor construction with which the dead load of the floor slab may be reduced, and the metal frame of the building made lighter with a material saving in the cost of the building without sacrificing the strength of the same.

The metal frame of the building is preferably made of steel as now commonly practised, and the floor frames are composed of girders and beams, with the beams connected to the girders at predetermined points in their lengths according to the span desired or required between the beams. The present invention has for its object to provide a floor construction, in which the carrying capacity of the floor slab may be calculated with accuracy and based on the tensile strength of the steel reinforcement, restrained at predetermined points and brought into absolute deflection, in order that the reinforcement may be strained to its full tensile value, rather than on the compressive value of the plastic material, or by the combination of the strength of the plastic material and the reinforcing steel. A plastic material whose compressive value is low may be used with safety, with a materially lighter steel frame, which reduces materially the cost of the building without reducing its strength or its value, as a fire-resisting structure.

The reinforcing member for the plastic material may be single rods or wires, or as may be preferred, a continuous length of wire mesh may be used, which extends under the deflecting members and over the beams and is secured to the latter by anchoring devices, so as to restrain the continuous wire mesh between its ends and preferably at each beam. The wire mesh, the beams and deflecting members are embedded in the layer of plastic material, which may be concrete, cement, plaster such as now commonly used, but which is preferably gypsum, for a purpose as will be described. The deflecting member being rigidly secured to the girders may be used as a supporting member for the form upon which the plastic material is dumped, when a plate or panel is employed as a permanent or a temporary form. These and other features of this invention will be pointed out in the claims at the end of this specification.

Figure 1 is a plan of a sufficient portion of a floor construction embodying this invention to enable it to be understood, the plastic material being omitted, and Fig. 2, a section on the line 2—2 Fig. 1, showing the plastic material.

Referring to the drawing, *a* represents the girders and *b* the beams of the steel or metal frame of a building such as now commonly constructed, the girders *a* in practice being supported by the foundation walls and columns, not shown, and the beams *b* being secured to adjacent girders by rivets or otherwise, as now practised, to form the spaces or spans *c*. Each span *c* is provided with one or more stationary deflecting members *d*, and in the present instance a single member *d* for each span *c* is shown, which is located substantially central in the span below the level of the heads of the beams *b*, and the member *d* is represented as a rod which is connected to the girders *a*, and in the present instance, the rods *d* have their ends extended through the webs of the girders *a* and rigidly secured thereto by nuts 10.

The rods *d* serve as deflecting members for a reinforcing member or members for a layer 12 of plastic material which may be gypsum, concrete or the like, and said reinforcing member may be single wires or rods or as preferred and herein shown, may be a continuous sheet or layer 13 of wire mesh, which may be made of sufficient length to reach from one side of the building to the other, or which may be made of shorter length and extended across a plurality of successive or adjacent spans *c*.

The continuous layer of wire mesh 13 is passed under the stationary deflecting member *d* in each span and over the beams *b* which form the side walls of the span, and

said wire mesh is capable of being placed under tension until it is brought up into contact with the deflecting member *d*, which being fixed or stationary enables the wire mesh to be placed under a substantial tension without displacement from the position it is desired or required in the layer 12 of plastic material. The continuous wire mesh may also be restrained between its ends and preferably at each beam, by anchoring devices, which are herein shown as wires 14, which are twisted around or otherwise firmly connected with the wire mesh 13 and then secured to the beams, as by bending their free ends under the top flange of the beam so as to engage therewith.

It will thus be seen that the metal reinforcement, especially a continuous sheet or layer of wire mesh, can be placed under considerable tension between the beams, and that this tension can be maintained between spans and localized, as though each span had its own individual tension member which was separate from the tension members of adjacent spans.

The deflecting members *d* may be located in any desired position below the top of the beams *b*, and being rigidly secured to the girders *a* are not capable of being vertically displaced by the upward pressure of the reinforcing member 13 when the latter is placed under tension, consequently the reinforcing member for the plastic material may be made as a continuous wire mesh and placed under tension at its ends without being displaced between its ends from the desired or proper position in the spans. The deflecting member *d* may also be used as a supporting member for the panel plate or form 15 upon which the plastic material is dumped or placed to form the floor slab 12. The panel, plate or form 15 may be suspended from the deflecting member *d* by wires or rods 16, and the plate, panel or form 15 may be arched as herein represented, or it may be flat.

It will be observed that the metal parts of the structure are tied or fastened together so as to form a unitary metal structure, the strength of which can be figured readily, and consequently a plastic material of small compressive value such as gypsum may be used, which being light and inexpensive enables the cost of the metal structure and the foundations therefor to be materially reduced in weight without detriment to the building. If desired the reinforcing member may be tied or otherwise secured in fixed relation to the stationary deflecting members. If desired additional reinforcing rods may be used with the wire mesh or either alone may be used. Even if I do not fasten the reinforcing member to the beams, by extending the reinforcing member under the deflecting member, the reinforcing member is brought into permanent deflection, thus insuring a more effective and positive depth for the reinforcing member than is now possible. There is no chance for this effectiveness being reduced, as is possible in present practice. The resisting moment of the slab is increased, thus insuring a greater bending moment and a stronger slab.

I do not limit myself to the deflecting member going on top of the reinforcing mesh—it can go under the mesh and be tied to it, and thus work in conjunction with the reinforcing member brought into absolute deflection, and as a result a very heavy load can be carried by a light construction at a minimum cost, and the spans can be made longer, because when the load is applied, it is taken up by the tension of the mesh and also by the deflecting member, which distributes a portion of the load to the girders to which it is secured in fixed relation.

I claim—

1. In a building structure of the character described, in combination, a metal frame comprising girders and beams secured together to form spans, deflecting members located in said spans below the upper surface of said frame and secured to said frame in fixed relation thereto, a continuous wire mesh extended under the deflecting members of a plurality of said spans to be restrained from upward displacement and over a plurality of said beams, means for anchoring said wire mesh between its ends to a plurality of said beams, and a layer of plastic material enveloping said deflecting member and the wire mesh between said beams.

2. In a building structure of the character described, in combination, a metal frame comprising girders and beams secured together to form spans, deflecting members located in said spans below the upper surface of said frame and secured to said frame in fixed relation thereto, a continuous wire mesh extended under the deflecting members of a plurality of said spans to be restrained from upward displacement and over a plurality of said beams, means for anchoring said wire mesh between its ends to a plurality of said beams, a form to support plastic material between said beams, means for suspending said form from said stationary deflecting member, and a layer of plastic material supported by said form and enveloping said deflecting member and wire mesh.

3. In a building structure of the character described, in combination, a metal frame comprising girders and beams secured together to form spans below the upper surface of said frame, deflecting members located in said spans and secured to said frame in fixed relation thereto, and a metal

reinforcing member extended under the deflecting member to be restrained from upward displacement and anchored to said beams.

4. In a building structure of the character described, in combination, a metal frame comprising girders and beams secured together to form spans below the upper surface of said frame, deflecting members located in said spans and secured to said frame in fixed relation thereto, and a metal reinforcing member to be restrained against upward displacement extended under a deflecting member.

5. In a building structure of the character described, in combination, a metal frame comprising girders and beams secured together to form spans below the upper surface of said frame, deflecting members located in said spans and secured to said frame in fixed relation thereto, a form to support plastic material between said beams, means for suspending said form from said stationary deflecting member, and a layer of plastic material supported by said form and enveloping the deflecting member from which said form is suspended.

6. In a building of the character described, in combination, a metal frame comprising girders and beams secured together to form spans, a continuous layer of wire mesh extended into the spans and over said beams, means engaging the wire mesh with the top flanges of the beams for anchoring said continuous layer at a plurality of points between its ends to said beams, and deflecting members for said wire mesh secured in fixed relation to said frame and located in said spans below the upper surface of said frame and coöperating with said wire mesh to deflect the same.

7. In a building structure of the character described, in combination, a metal frame comprising girders and beams secured together to form spans, a deflecting member located in said span below the upper surface of said frame and secured therein in fixed relation to said frame, and a metal reinforcing member coöperating with said deflecting member to be restrained thereby against upward displacement and to be brought into permanent deflection thereby.

8. In a building structure of the character described, in combination, a metal frame comprising girders and beams secured together to form spans, a deflecting member extended across the span and through opposing walls of the said frame below the upper surface of said frame and secured in fixed relation thereto, and a reinforcing member coöperating with said deflecting member to be restrained thereby against upward displacement.

9. In a building structure of the character described, in combination, substantially parallel members separated to form opposing walls of a span, a deflecting member extended across the span below the upper surface of said parallel walls and secured in fixed relation to the said walls below the upper surface thereof, and a reinforcing member coöperating with said deflecting member to be restrained thereby against upward displacement.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

PEREZ M. STEWART.

Witnesses:
DOUGLAS B. STEWART,
FRANCIS C. LOWTHORP.