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L. HERMANN.

FLOOR AND CEILING CONSTRUCTION FOR FIREPROOF BUILDINGS.

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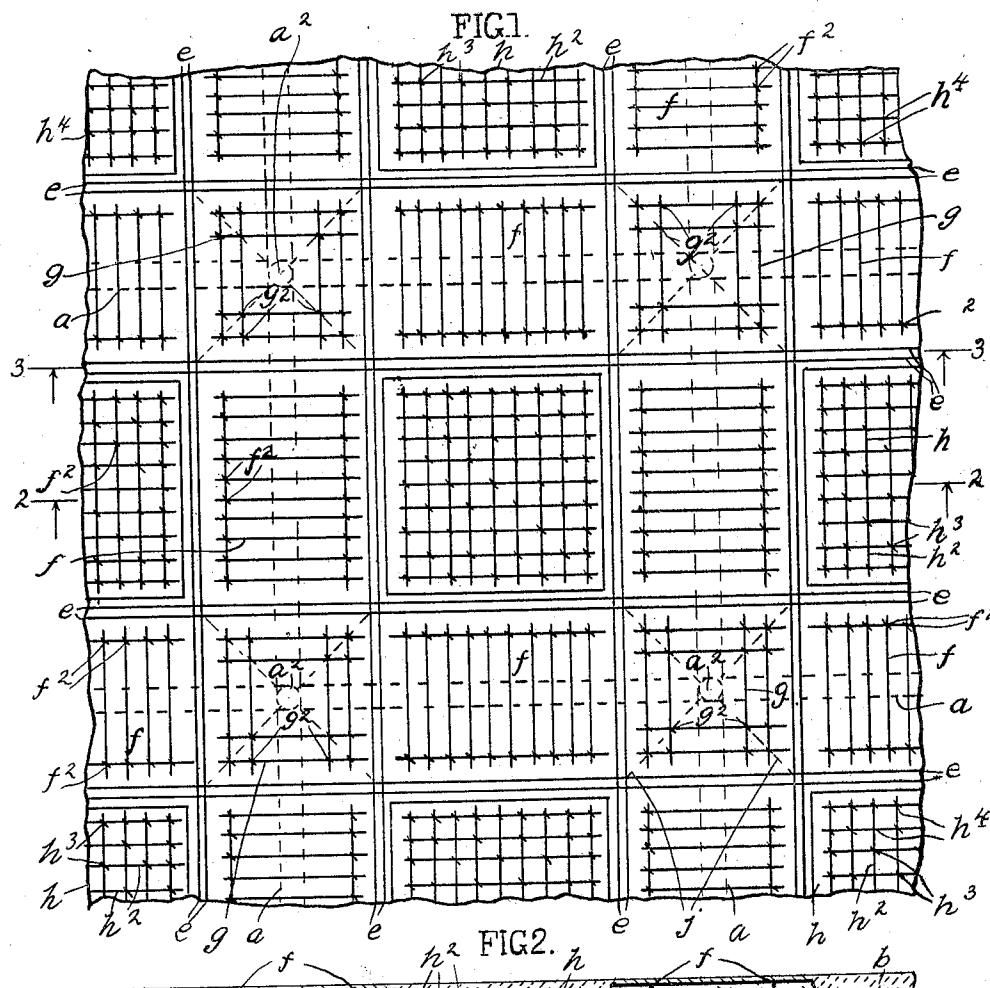


FIG. 3.

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FLOOR AND CEILING CONSTRUCTION FOR FIREPROOF BUILDINGS.

No. 897,253.

Specification of Letters Patent.

Patented Aug. 25, 1908.

Original application filed February 4, 1907, Serial No. 355,530. Divided and this application filed June 5, 1907.
Serial No. 377,289.

To all whom it may concern:

Be it known that I, LEIBU HERMANN, a subject of the King of Roumania, and residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Floor and Ceiling Construction for Fireproof Buildings, of which the following is a specification, such as will enable those skilled in the art to 13 which it appertains to make and use the same.

This invention relates to fireproof buildings which involve the use of reinforced concrete and particularly to the floor and ceiling construction of buildings of this class, and 15 the object thereof is to provide a floor and ceiling construction for buildings of this class which possesses the greatest possible amount of strength in proportion to the amount of material employed, and in which the floor and ceiling construction or the reinforced concrete thereof is arranged in panels formed by I-beams which cross each other at right angles and which are supported by columns or posts placed beneath the crossings of the 25 I-beams.

This application is a division of application No. 355,530 filed Feb. 4, 1907, and the invention which forms the subject matter of this application is fully described and claimed 30 in the following specification of which the accompanying drawing forms a part, in which the separate parts of my improvement are designated by suitable reference characters in each of the views, and in which

35 Figure 1 is a plan view of a section of floor and ceiling construction involving my improvement; Fig. 2 a section on the line 2—2 of Fig. 1, and Fig. 3 a section on the line 3—3 of Fig. 1.

40 The improvement which forms the basis of this application involves in its simplest form a single layer of reinforcing material placed in the concrete of the floor and ceiling construction, and comprising rods or bars arranged in parallelograms over the columns which support the floor and ceiling construction, and between said columns and in the 45 panels formed by the I-beams and columns or posts. The parallelograms of reinforcing material over the columns and between the columns being in the top portion of the concrete while the parallelograms of reinforcing material in the middle of the panels being in the bottom portion of the concrete, and in 50 this form of construction, I also employ con-

tinuous rods or bars which cross each other in opposite directions and which are arranged in the bottom portion of the concrete at the opposite sides of the columns and beams and corresponding floor and ceiling material and 60 which divide the floor and ceiling construction into parallelograms in which the reinforcing material is placed; and in this form of construction the central portion of the panels are also preferably formed separately 65 and reinforced separately.

In the practice of my invention as shown in the drawing I provide a floor and ceiling construction for fireproof buildings which comprises I-beams *a* supported by columns *a*² and by means of which the said floor and ceiling construction is divided into panels. The floor and ceiling construction or the reinforcing material thereof is divided in parallelograms formed by continuous rods or bars *e*, two or more of which are employed and which cross each other at right angles and which are arranged on the opposite sides of and over said beams *a*. The continuous rods or bars *e* are placed in the bottom portion of 80 the floor and ceiling construction, and over the beams and between the columns *a*², and in the top portion of the concrete forming the floor and ceiling construction, and over the beams and between the columns are placed 85 parallelograms *f* of reinforcing material composed of rods or bars which may cross each other and which are preferably tied together as shown at *f*², and over the columns *a*², are placed other parallelograms *g* of reinforcing 90 material which preferably consist of parallel rods or bars which cross each other and may be tied together as shown at *g*², if desired.

In each of the panels or spaces formed by the beams *a* is a central block *h* which is rectangular in form and which is preferably formed separately and separately reinforced by reinforcing material *h*² placed in the bottom portion thereof and composed of rods or bars which cross each other at right angles 100 and which are preferably tied together as shown at *h*². In this form of construction, the concrete floor and ceiling construction directly over the columns *a*² and beams *a* is thicker than elsewhere, and this thickness 105 gradually tapers or grows less as indicated by the lines *i* in Figs. 2 and 3 toward the four sides of the panels formed by the rods or bars *e* and this forms four radial corners of the ceiling construction around the tops of the 110

columns a^2 which are indicated by the dotted lines j in Fig. 1.

From the foregoing description it will be seen that this construction involves the central blocks or parallelograms h centrally of the panels or spaces formed by the beams a in which the reinforcing material is placed in the bottom of the floor and ceiling construction, and that the reinforcing material in the other portion of the floor and ceiling construction is placed in the top portion thereof except in the case of the rods or bars e which cross each other at right angles between the beams a and at a predetermined distance therefrom and dividing the whole floor and ceiling construction into separate blocks or panels said rods or bars e being in the bottom portion of the floor and ceiling construction.

Although I have described the arrangement of reinforcing material as composed of separate parallelograms or subdivisions of rods or bars arranged over the columns and beams and some of which may consist of rods or bars arranged parallel only and others of rods or bars which cross each other in opposite directions, it will be apparent that these separate parallelograms or sub-divisions of reinforcing material may be composed of wire netting, expanded metal or other equivalent forms of construction, and while I have used the word parallelograms as describing the arrangement of the separate sub-divisions of reinforcing material, the said separate sub-divisions are not necessarily parallelograms as will be understood, and the plan thereof may be of any desired shape or form.

The idea of making the central portions of panels separate is to obtain a certain location of the point of inflection in the panels, and in this form of my improvement the point of inflection is at the joint. I understand by point of inflection the point where the tensile stress passes from the bottom to the top of the panel. This tensile stress is taken up by the metal reinforcement. The location of the point of inflection being given, the figuring of the floor and ceiling is simple and certain, and I am able to use the least amount of material for the required strength.

A floor and ceiling construction made in this manner may be made of any desired strength, the strength and resisting quality depending entirely on the amount of material employed and the proximity of the members which make up the separate subdivisions of the reinforcement or reinforcing material which is placed in the concrete.

Although, I have described I-beams as placed in the floor and ceiling construction for dividing the same into panels, it will be apparent that any desired form of beams may be employed and these beams may be composed of reinforced concrete, if desired,

and although, I have described the columns or posts as placed under the crossings of the I-beams, it is not absolutely necessary that such columns or posts be placed under all of said crossings of the I-beams. It is also not necessary that the central block h be rectangular in form as the same may be circular, or of any other desired shape.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. A floor and ceiling construction composed of reinforced concrete supported by columns and beams or similar supports which divide the floor and ceiling construction into panels, the central portion of each panel being composed of a block of reinforced concrete, said block having no connection with the concrete of the floor panel, but being supported therein by the form of the face walls of the block and of the corresponding face walls of the opening in the concrete of the floor panel, in which the block is placed, the reinforcing material in the main part of the floor and ceiling construction outside of the central block consisting of rods or bars arranged in top and bottom layers, the top layer of rods or bars being placed over the columns and over the beams, the bottom layer of rods or bars being placed around the central block between and over the beams; the reinforcing material in the central block consisting of rods or bars placed in the bottom portion thereof.

2. A floor and ceiling construction composed of reinforced concrete supported by columns and beams or similar supports which divide the floor and ceiling construction into panels, the central portion of each panel being composed of a block of reinforced concrete, said block having no connection with the concrete of the panel or reinforcing material thereof, but being supported therein by the form of its face walls and of the corresponding face walls of the opening in the panel in which it is placed, the reinforcing material in the main part of the panel around said opening being arranged in top and bottom layers, the top layer being placed over the columns and over the beams, and the bottom layer being placed around the central block between and over the beams, and the reinforcing material in the block being placed in the bottom portion thereof.

In testimony that I claim the foregoing as my invention I have signed my name in presence of the subscribing witnesses this 3rd day of May 1907.

LEIBU HERMANN.

Witnesses:

C. E. MULREANY,
A. WORDEN GIBBS.