No. 730,616. PATENTED JUNE 9, 1903.

A. DE MAN.

FLOOR CONSTRUCTION.

APPLICATION FILED JULY 12, 1901.

NO MODEL.

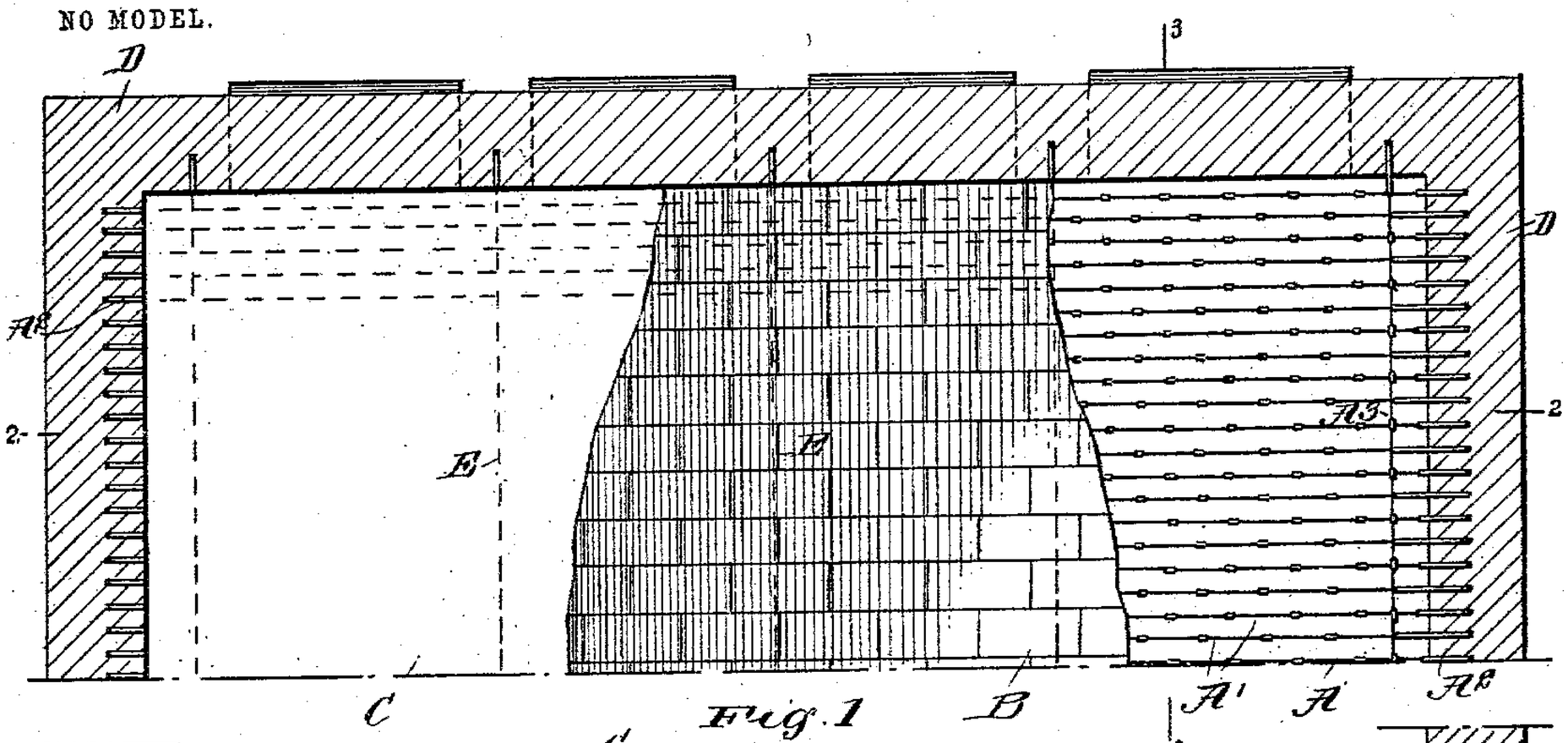

Fig. 1

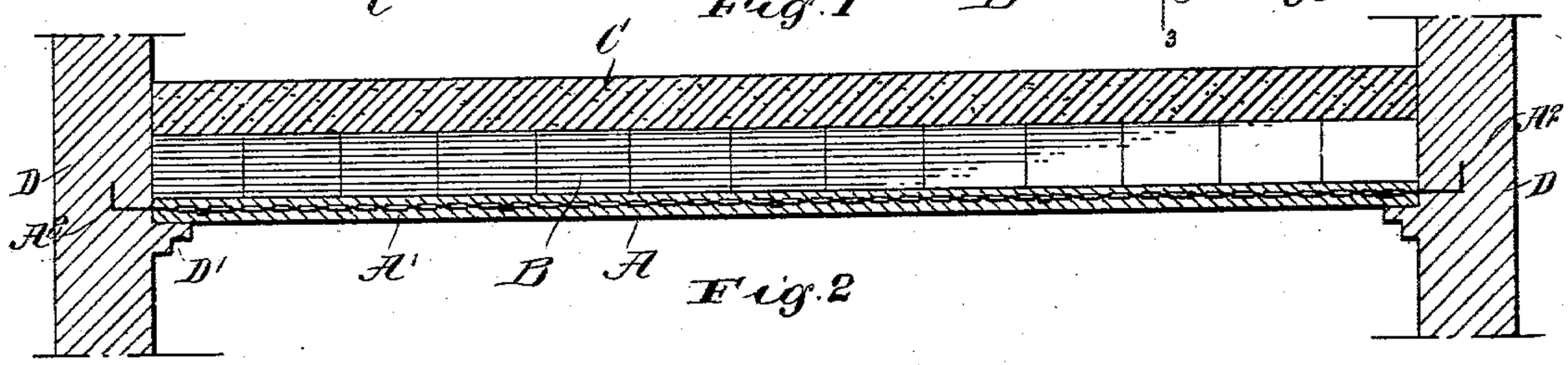

Fig. 2

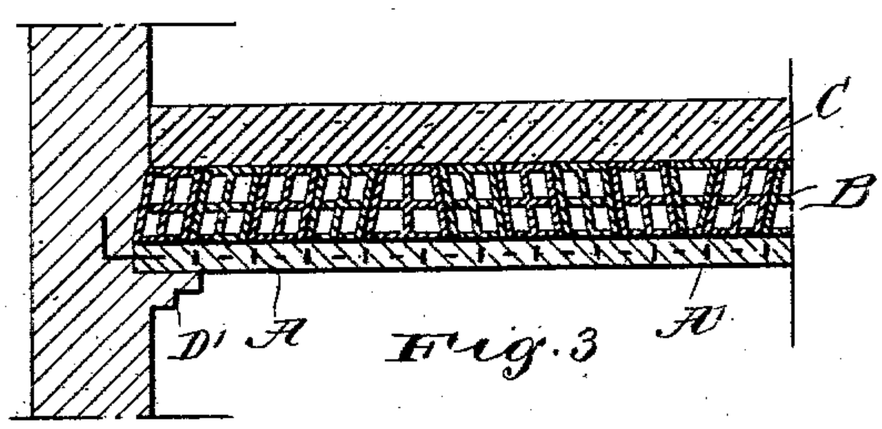

Fig. 3

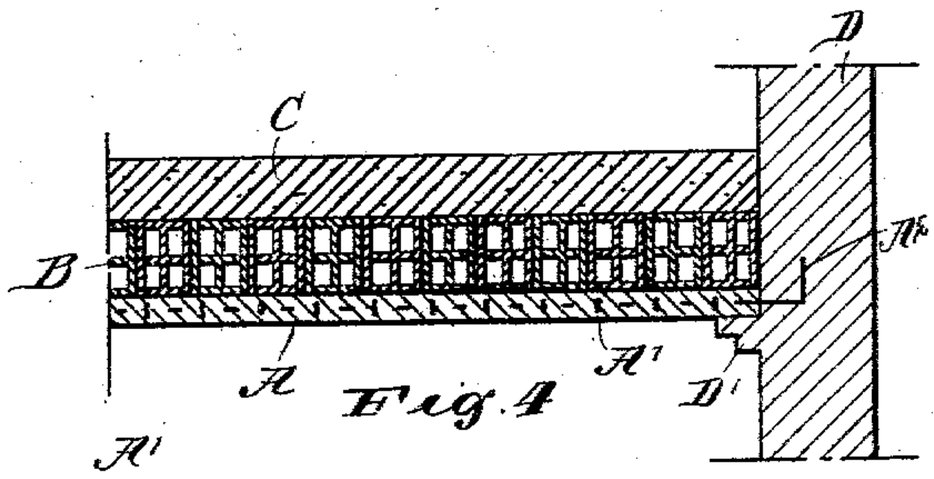

Fig. 4

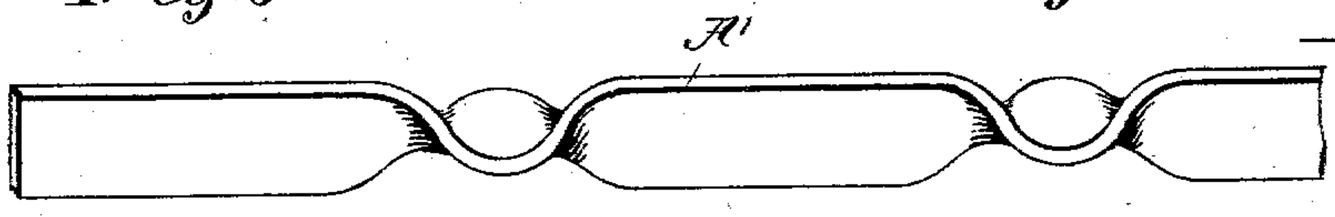

Fig. 5

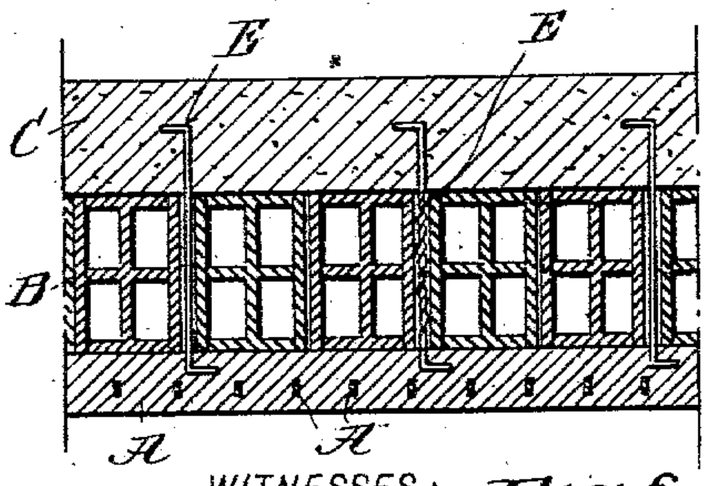

Fig. 6

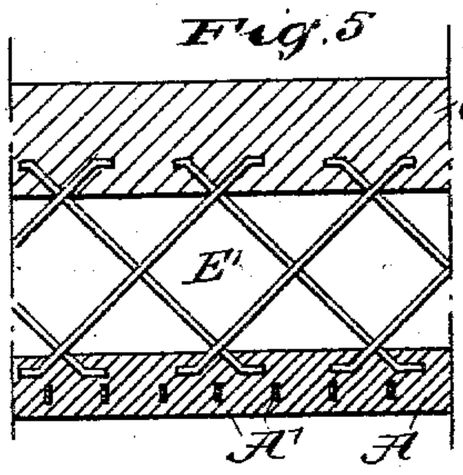

Fig. 7

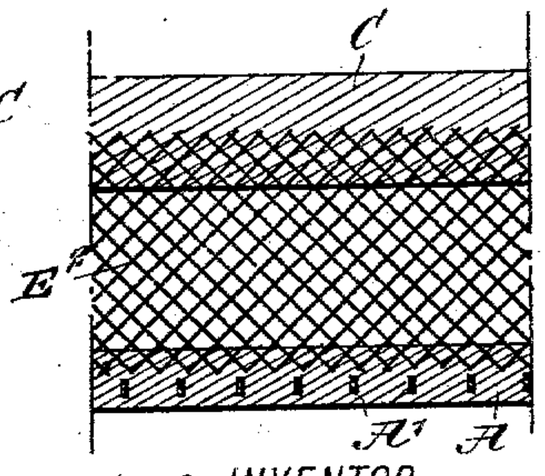

Fig. 8

WITNESSES:

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No. 730,616. Patented June 9, 1903.

UNITED STATES PATENT OFFICE.

ALPHONSE DE MAN, OF NEW YORK, N. Y.

FLOOR CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 730,616, dated June 9, 1903.

Application filed July 12, 1901. Serial No. 67,986. (No model.)

To all whom it may concern:

Be it known that I, ALPHONSE DE MAN, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented new and useful Improvements in Floor Construction, of which the following is a full, clear, and exact description.

The invention relates mainly to floor construction of the fireproof type; and its object is to provide a new and improved floor construction preferably made of fireproof material and arranged to span large bays without the use of floor-beams and at the same time produce a flat ceiling and render the floor sound-proof.

The invention consists of novel features and parts and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional plan view of the improvement as applied and with parts broken out. Fig. 2 is a sectional side elevation of the same on the line 2 2 of Fig. 1. Fig. 3 is a transverse section of the same. Fig. 4 is a similar view of a modified form of the improvement. Fig. 5 is an enlarged perspective view of part of one of the tension members. Fig. 6 is an enlarged transverse section of the improvement, showing the use of reinforce members. Fig. 7 is a similar view of the same, showing a modified form of the reinforce members; and Fig. 8 is a like view of the same, showing still another form of reinforce members.

In fireproof and other buildings as heretofore constructed it was necessary to use iron or wooden floor-supporting beams to divide up the bays; but such supporting-beams, besides rendering the floor construction expensive, keep the floor moving, owing to the expansion and contraction of the metal employed. Brick arches in floor construction can be used for only comparatively small spans, and when employing the more modern flat floor-slab of reinforced concrete it is necessary to increase the thickness of the floor proportionately to the span; but after certain dimensions are reached it becomes necessary to employ either concrete ribs or supporting-beams.

In my improvement, presently to be described in detail, the supporting-beams are entirely dispensed with in buildings of ordinary dimensions, and for very large spans the number of floor-beams needed is reduced to a minimum.

The improvement consists, essentially, of a lower section A, a central or middle section B, and an upper section C, all combined to form a triplex floor construction extending to the walls D of the building and without the use of floor-beams. The lower section A consists of a layer of fireproof cementitious substance (such as cinder concrete) reinforced by tension members A′, formed into anchors A^2 at their ends, to be anchored in the walls D, some tension members A^3 being also employed transversely to the tension members A′, to be anchored in the end walls between doors and windows, as is plainly indicated in Fig. 1. The tension members A′ and A^3 are preferably of the construction shown and described in the Letters Patent of the United States No. 606,988, granted to me on July 5, 1898, for a fireproof construction, so that a further detailed description of these tension members is not deemed necessary.

The ends of the lower section A preferably rest on supports D′, projecting from and forming parts of the walls, as is plainly indicated in Figs. 2, 3, and 4. The lower section is made of sufficient strength to resist the tension strain which the floor and its load will develop. The middle or center section B is composed of a light fireproof material, such as hollow tile, having sufficient strength in the upwright webs to transmit all the reactions between the upper and lower sections, the connection between the tiles and the lower and upper sections being had by means of cement mortar, so as to form with them a monolithic mass, in which the three sections will act in unison when under a load. The thickness of the middle section is regulated to make up, with the bottom and top sections, the full depth of the floor, it being understood that the hollow material of the middle section, in addition to giving lightness and strength,

renders the floor sound-proof. The upper section is composed of a layer of fireproof cementitious substance, as a cinder concrete, of sufficient thickness to resist all the compression strains which the floor and its load develop.

In order to reinforce the floor, reinforce members E in the shape of flat or twisted bars are employed, extending between adjacent tiles and anchored at their upper and lower ends in the material forming the upper and lower sections C and A of the floor. The reinforce members may also be formed by rods E', crossing each other between adjacent tiles and anchored in the material of the upper and lower sections, as is plainly indicated in Fig. 5, and if desired the said reinforce members may be made of a network E^2, as indicated in Fig. 8. Now by the arrangement described it is evident that the superimposed sections form a monolithic mass capable of resisting all the strains developed in the floor and its load, it being especially understood that the lower section resists the tension strains, while the upper section resists all the compression strains, and the middle or central section transmits all the reactions or web strains between the lower tension-section and the upper compression-section.

It is understood that theoretically the strains and reactions referred to are similar to those developed in a beam or lattice-girder, the lower, middle, and upper sections of the floor corresponding to the lower chord, the lattice-web and the upper chord, respectively, the floor on the whole being considered an aggregate of girders built side by side.

In forming the floor it is necessary to first erect false work, on which is placed the cinder concrete for the lower section, and in the cinder concrete the tension members are embedded and anchored in the walls. The tiles for the middle or central section are then set on the lower section in cement mortar and abutted end to end with the joints breaking in adjacent rows, as is plainly indicated in Fig. 1, it being understood that tiles may be used with either inclined sides, and key-tiles, as shown in Fig. 3, or straight rectangular tiles, as indicated in Fig. 4. When tiles with inclined sides are used, the keys are alternately reversed, as indicated in Fig. 3. The third or upper section C is then placed on the tiles to the desired depth. When the floor has set, the false work is removed, thus leaving the triplex floor in position, extending from one wall to another without the use of floor-beams.

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

1. A floor construction, comprising superimposed lower, middle and upper sections, of which the lower section consists of a cementitious substance and tension members embedded therein, the said lower section resisting tension strains, the upper section consisting of a cementitious substance of sufficient thickness to resist compression strains, and the middle section consisting of a light fireproof material, and transmitting the reaction strains developed in the upper and lower sections, and reinforce members connecting the upper and lower sections, as set forth.

2. A floor construction comprising a lower section composed of cinder concrete and tension members embedded in the concrete, an upper section composed of cinder concrete, and a middle section consisting of light fireproof material, such as hollow tiles, and reinforce members extending through the middle section and connecting the upper and lower sections, as set forth.

3. A floor construction comprising superimposed lower, middle and upper sections and reinforce members extending vertically through the middle section and connecting the upper and lower sections, as set forth.

4. In a structure, the walls and a fireproof floor sustained by the walls and comprising a lower section of concrete and tension members embedded in the concrete and anchored in the walls to resist all tension strains developing in the floor, an upper section of concrete for resisting the compression strains developing in the floor, and a middle section of hollow tiles laid with cement mortar to make a strong connection with the lower and upper sections, the whole forming a monolithic structure, and reinforce members connecting the upper and lower sections, as set forth.

5. In a structure, the walls and a fireproof floor sustained by the walls and comprising a lower section of concrete and tension members embedded in the concrete and anchored in the walls to resist all tension strains developing in the floor, an upper section of concrete for resisting the compression strains developing in the floor, a middle section of hollow tiles laid with cement mortar to make a strong connection with the lower and upper sections, the whole forming a monolithic structure, and reinforce members extending between sundry of the hollow tiles and anchored in the upper and lower sections, as set forth.

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

ALPHONSE DE MAN.

Witnesses:
THEO. G. HOSTER,
EVERARD B. MARSHALL.