(No Model.) 3 Sheets—Sheet 1.

# E. MOLLOY.

## FLOOR.

No. 506,521. Patented Oct. 10, 1893.

Fig 2.

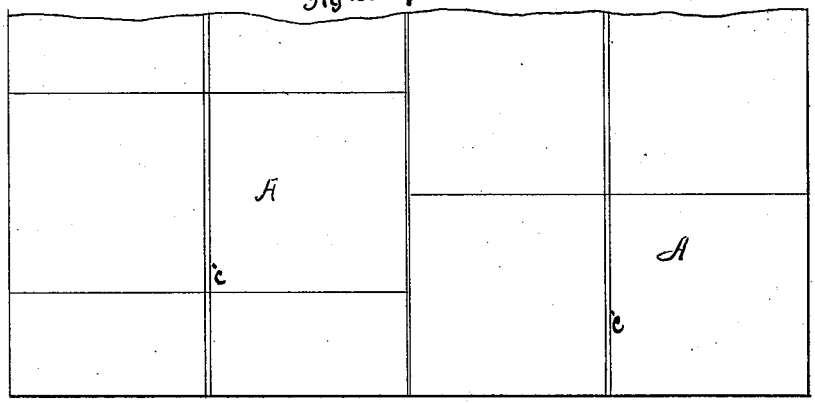



Fig. 1

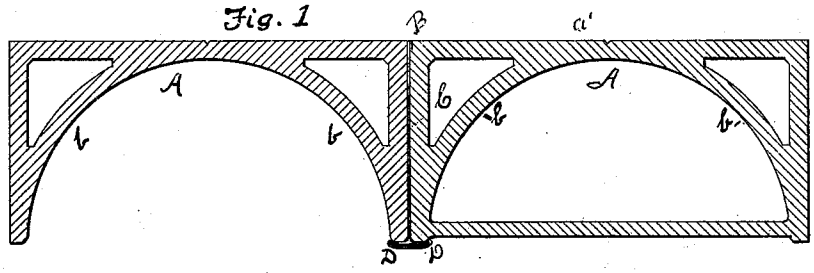
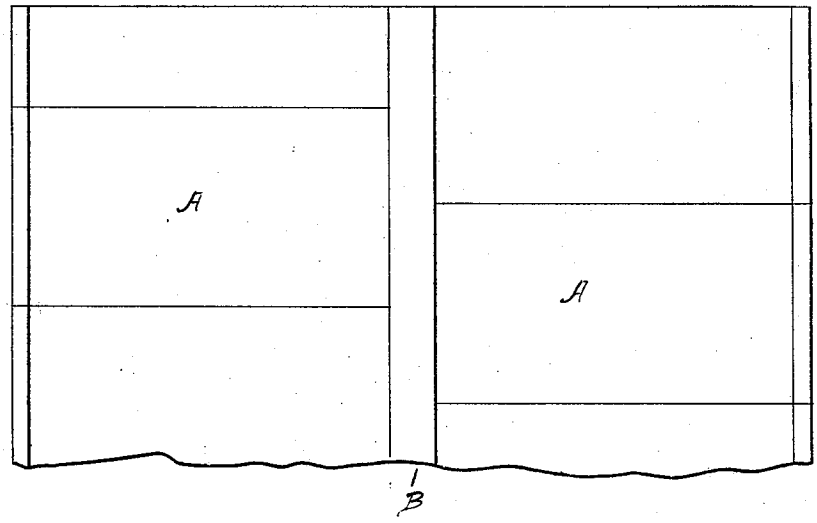



Fig. 3




Witnesses:
Lucien E. Piolet
Geo. W. Reed

Inventor:
Edmond Molloy
per Ryan & Collet
his attorneys

(No Model.) 3 Sheets—Sheet 2.

# E. MOLLOY.

## FLOOR.

No. 506,521. Patented Oct. 10, 1893.

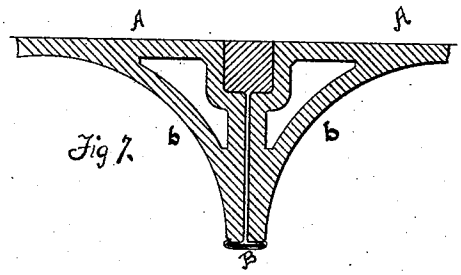



Fig 7.

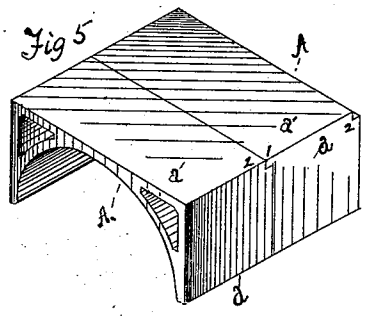



Fig 5

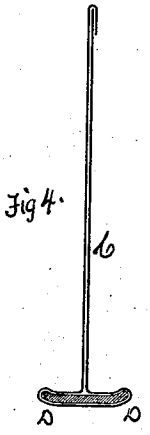



Fig 4.

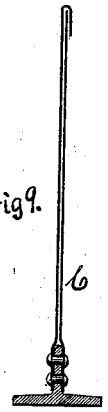



Fig 9.

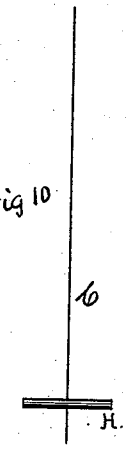



Fig 10

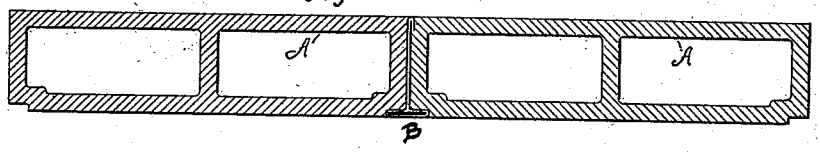



Fig 8

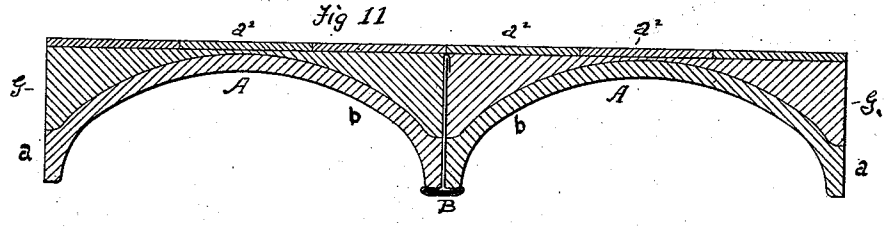



Fig 11

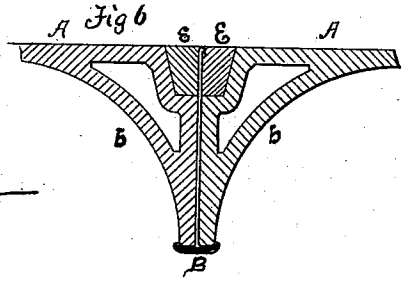



Fig 6

Witnesses:
Lucien E. Pickett
Geo. W. Reed

Inventor:
Edmond Molloy
per Ryan & Goodell
his Attorneys.

(No Model.) 3 Sheets—Sheet 3.

# E. MOLLOY.

## FLOOR.

No. 506,521. Patented Oct. 10, 1893.

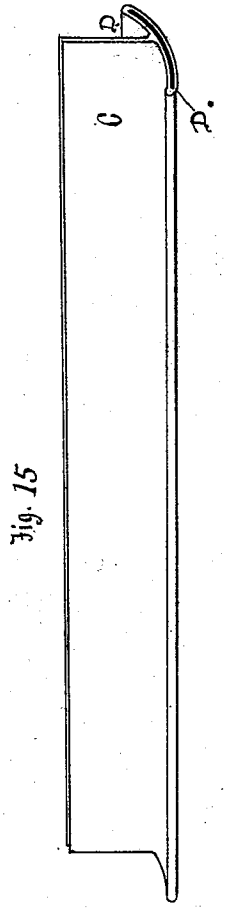



Fig. 15

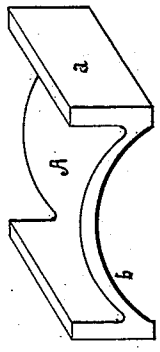



Fig. 13

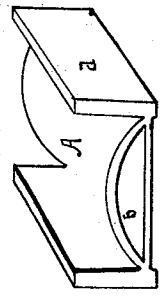



Fig. 14

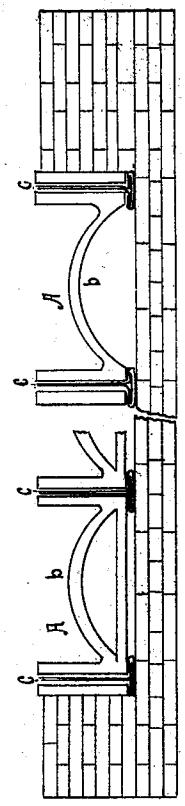



Fig. 12

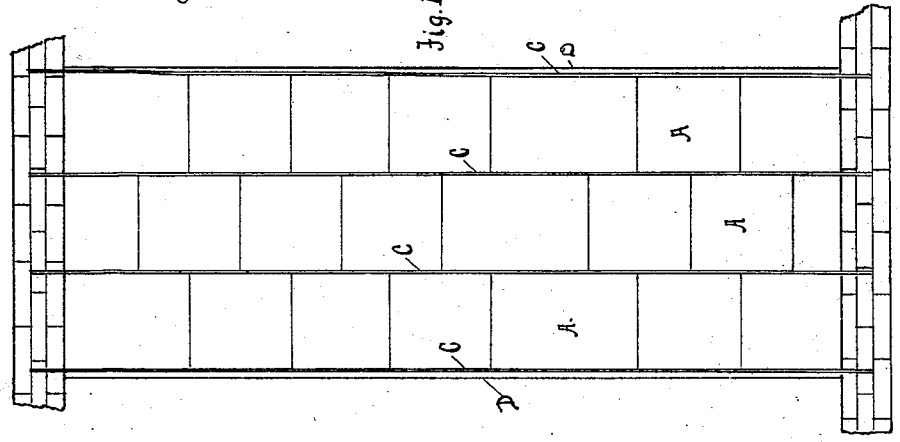



Fig. 11

WITNESSES:

J. J. W. Donath

A. Kershaw.

INVENTOR

Edmond Molloy

BY Ryan & Colleh

ATTORNEYS.

# UNITED STATES PATENT OFFICE.

EDMOND MOLLOY, OF PHILADELPHIA, PENNSYLVANIA.

## FLOOR.

SPECIFICATION forming part of Letters Patent No. 506,521, dated October 10, 1893.

Application filed May 7, 1892. Serial No. 432,115. (No model.)

*To all whom it may concern:*

Be it known that I, EDMOND MOLLOY, a citizen of the United States, and a resident of the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Floors, of which the following is a clear and sufficient specification, reference being had to the drawings annexed.

The main objects of my invention are to construct a fire proof floor structure which will not have the weight of such structures as they have been known prior to my invention, and consequently, will not require the heavy walls and strong supports hitherto used, which can be repaired readily and inexpensively and which will take up less linear space than either the wooden floors or the fire proof floors previously used.

There are other objects of my invention which will be explained in the following portions of my specification or will be apparent to a workman skilled in the art in reading the description.

Prior to my invention fire proof walls were constructed by laying girders from one wall to the other, supporting them where necessary by pillars. From these girders, are built arches of bricks or other material such as cement; the top is then smoothed off and laid with tiles or other suitable materials; or, if a boarded floor is desired, joists are laid, usually in cement, the whole being very weighty and expensive.

My invention and the best means of carrying it out are sufficiently described in the following portions of my specification.

Figure 1, is a sectional view of the type of my invented device. Fig. 2 is a top plan view; and Fig. 3 is a bottom plan view of the same. Fig. 4 is a view of a beam and Fig. 5 is a view of the blocks forming the floor. Figs. 6, 7, 8, 9, 10 and 11 are views of various parts and types of my invention. Fig. 11ª is a plan view of a floor. Fig. 12 is a side elevation, the wall being broken away to show the details of the structure. Figs. 13 and 14 are isoperimetric perspectives of blocks. Fig. 15 is an isometric perspective of a beam..

The beams, B, B, which may be set in the wall in any convenient manner, but which I prefer should be so placed that they will be supported beneath one of the blocks A, A, as in Fig. 1, I construct out of sheets of metal or other tenaceous material. Galvanized or other sheet iron may very conveniently be used. The portion of the beam mainly giving the strength to the beam is the web C, which has its height in the direction of the strain and is prevented from "crumpling" or buckling by the portions of the block fitting against it as will be described. This web I construct in the form of my device shown in Fig. 4 of two parallel sheets of metal, one of them folded over the other at the top. To support the individual blocks, I place at the bottom of this web a pair of horizontally extending flanges D, D. These flanges are formed, in the type of my invented beam illustrated in Fig. 4, by wrapping the sheet metal around a piece of stiffer material, such as a piece of hoop iron. The requisite of these flanges, is only that the flanges be stiff enough to support the individual blocks and such weight as may be placed thereon without injurious sagging. I do not therefore limit myself to this form of supporting flange since many other forms of supporting flange may be contrived one of which is illustrated and will be described in the subsequent portion of my specification. While ordinarily, there will be sufficient friction between the pieces of metal to prevent them from sliding on each other the two sheets forming the web may be secured together by rivets or other means familiar to the ordinary skilled mechanic, which rivets may be used to set in the blocks and support them. Between these beams, which are placed at a distance from each other corresponding to their strength and the weight intended to be supported by them, I place the blocks A, A, A, A. These blocks have perpendicular plane faces *a*, *a*, resting against the sides of the metal forming the web of the beam and are so placed as to hold this web clamped firmly between these plane faces, and to prevent it from bending. By the web of the beam being thus prevented from bending, the thin material, which otherwise would crumple or buckle at its upper edge and lose all supporting power gives, through the height of the web portion, which varies according to the weight to be supported, by each beam, a sufficient strength to sustain a very great weight, since the size of the section in the direction of

the pressure is that which gives almost entirely the supporting strength. I preferably construct these blocks entirely in a manner which will prevent them from turning, the plane faces resting against the web piece in any manner and bending it. In the form illustrated in Figs. 1, 2 and 3, I construct these blocks each with a flat portion forming the upper surface *a'* serving for a floor or as a foundation therefor in case a board floor or a cement laid floor is to be used, and provided with the supporting arms *b b* where necessary. These arms *b b* can also form the ceiling of the room beneath. I place these blocks resting on the flange D, D, of the beam B and extending from one beam to the next, and place next to it another block placed and extending in the same manner, which by resting close up against it keeps it solidly in place.

To keep light from penetrating from one side of the floor to the other the blocks may be provided with a projection 1 fitting into an inset 2 in the next block. These blocks are preferably arranged to break joints on opposite sides of the beam B.

In the Figs. 1 and 2, a cut is shown at *c* as made on the top surface of the block A, to make it simulate a tiled floor.

I consider that the floor is more secure where the beam supported by the wall is securely clamped on the web portion in the wall or other supports on which it rests in such a manner as will secure it from being "crumpled" or buckled or being bent out of perpendicular. A very convenient manner of so doing, is to set the beam on a projection on which the end of the block nearest the wall also rests.

Where it is desired to have a flat ceiling, the tile or block may be constructed with a flat slab at the bottom, as shown in the right hand block of Fig. 1.

I do not desire to limit myself to this form of block, as many other forms of blocks may be made, the requisites being only that they be provided with faces adapted to clamp all or a portion of the web as described, means for holding them in position, and means giving support to the floor surface substantially. Blocks containing these requisites may be constructed of many materials and forms and in one or several pieces.

I consider that the use of any block that clamps the web of a beam having such web of sheet metal, in conjunction with such a beam and clamping the sheet metal web thereof is an invasion of my invention.

In Fig. 6 I have illustrated a form of my invented floor in which provision is made for a board floor, in which the blocks are cut away at the top and wooden beams E, E, inserted on either side of the web of the beam B. On the top of these wooden beams E, E, the flooring boards are laid in any ordinary manner. Another form of floor suitable for a board floor is shown in Fig. 7 in which the sheets forming the beam are carried around the inset joists.

Fig. 8 is a view of a form of floor where the weight to be sustained is comparatively small or the number of beams large, and has the advantage of taking up very little space between the stories of the building. In this form, the blocks have the shape of a parallelogram—as indeed they may have in any form of my invented device but not so conveniently as others as in this. The flange of the beam may be inset into the blocks and a flat surface secured for plastering or other purposes. As an illustration, the entire lineal space occupied by the plastering and the floor need not be over four inches in very large rooms where the beams are placed at quite a distance apart.

Fig. 10 illustrates a form of beam, in which the web is composed of a single sheet of metal and a pin H passing through it projects into dowel holes cut in the blocks.

Another form of beam is illustrated in Fig. 9 in which the flange portions are composed of a piece of "T" iron; of course the piece of "T" iron may be used with the single sheet of metal and vice versa. I consider it advantageous in making the flanges D, D, that they should be bent upward at the parts away from the web.

Fig. 11. shows a form of my invented device in which the blocks form only the arch part and a portion of the faces clamping the web of the beam, the other parts being formed of cement in which are laid the tiles $a^2, a^2, a^2$, the cement being denoted by the letter G.

While I have described several forms of my invented floor, I do not limit myself thereto as many changes may be made in such constructions without departing from my invention, and as moreover, I consider myself the pioneer in making floors in which the supporting beams are constructed with vertical webs of sheet metal and in which such webs are kept from bending and in condition to support the floor by the perpendicular plane faces, of the material supported, clamping them between them; but I do not claim as within my invention, any floor constructed with beams having webs which are composed of plate as distinguished from sheet material and in which the said webs are not kept from buckling or crumpling by the clamping action of the adjacent floor portion.

I would say that I consider the word "floor" to mean any flat supporting surface and that my invention may be applied to tables, roofs and such like structures.

What I do claim, and desire to secure by Letters Patent, is—

1. The combination of a beam having a vertical web constructed of sheet material and blocks having vertical plane faces fitting against the web and clamping it between such faces substantially as described.

2. The combination of beams having vertical web portions constructed of sheet mate-

rial, and provided with flanges at the bottom and blocks provided with perpendicular faces fitting against this web and clamping it between them said blocks resting on the flanges at the bottom of the web substantially as described.

3. The combination of beams having a vertical web portion composed of sheet metal and a flange portion on which the blocks forming the floor can rest, and blocks provided with vertical faces parallel with said web and floor surfaces connected with said vertical faces and extending from one beam to the next substantially as described.

4. In a floor, beams composed of a vertical web of sheet metal and substantially horizontal flanges reinforced by a stiffer strengthening material substantially as described.

5. The combination of beams having the strength giving portion formed of a vertical web of sheet material, supports for said beams, supports for the individual portions of said floor attached to said beams, and a flooring material provided with clamping faces fitting close against said vertical web substantially as described.

6. In a floor supported by girders having vertical webs of sheet material and supports for the flooring portions secured to said webs, blocks extending between said girders said blocks having a flooring surface $a'$ and a surface $a$ lying close up against the web of the beam substantially as described.

7. A floor supported by girders having as their strength giving portions vertical webs clamped between the portions of the floor lying adjacent thereto, and supports for the extremities of said girders having provisions for clamping the web of said girders and keeping the same from buckling substantially as described.

8. A floor provided with supporting beams composed of sheet material, and having the strength-giving portions of said beam formed of a vertical web of said material and having flanges at the bottom of said beams formed by wrapping the sheet material around a piece of stiffer material substantially as described.

9. The combination in a floor, of girders provided with vertical webs, and blocks extending between the girders, and having a plane surface $a$ lying close up to the web of the girder and supports $b$ reinforcing said surfaces substantially as described.

10. In a floor formed with beams which are provided with flanges, and blocks extending between said beams and resting on said flanges, flanges having the parts away from the points of junction with the web turned up toward the upper floor surface substantially as described.

11. The combination with beams having vertical webs of sheet material, and blocks having vertical plane faces fitting against said web and clamping them between such faces, said blocks being arranged to break joints substantially as described.

12. A floor provided with a beam having a vertical web portion formed of plural sheets of sheet material and a flooring portion having vertical faces clamping said sheets of material substantially as described.

In testimony whereof I have hereunto set my hand this 26th day of April, 1892.

EDMOND MOLLOY.

Witnesses:

MARK WILKS COLLET,

GEO. W. REED.