

No. 748,150.

PATENTED DEC. 29, 1903.

C. A. BALPH.
FLOOR CONSTRUCTION.
APPLICATION FILED NOV. 3, 1900.

NO MODEL.

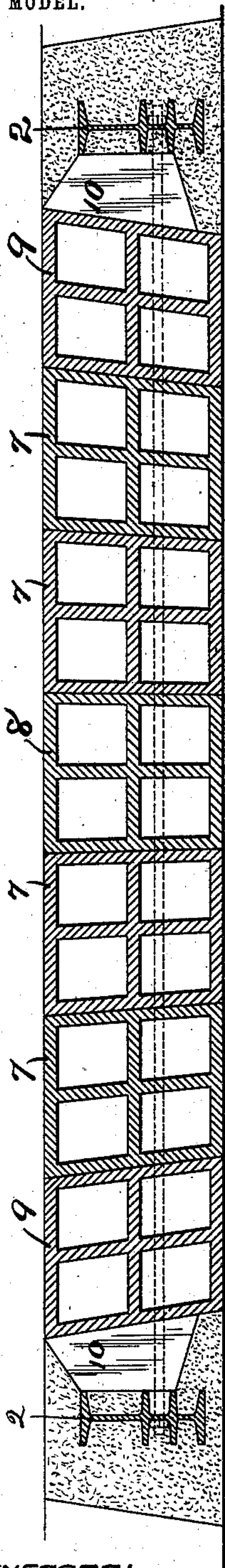


Fig. 1.

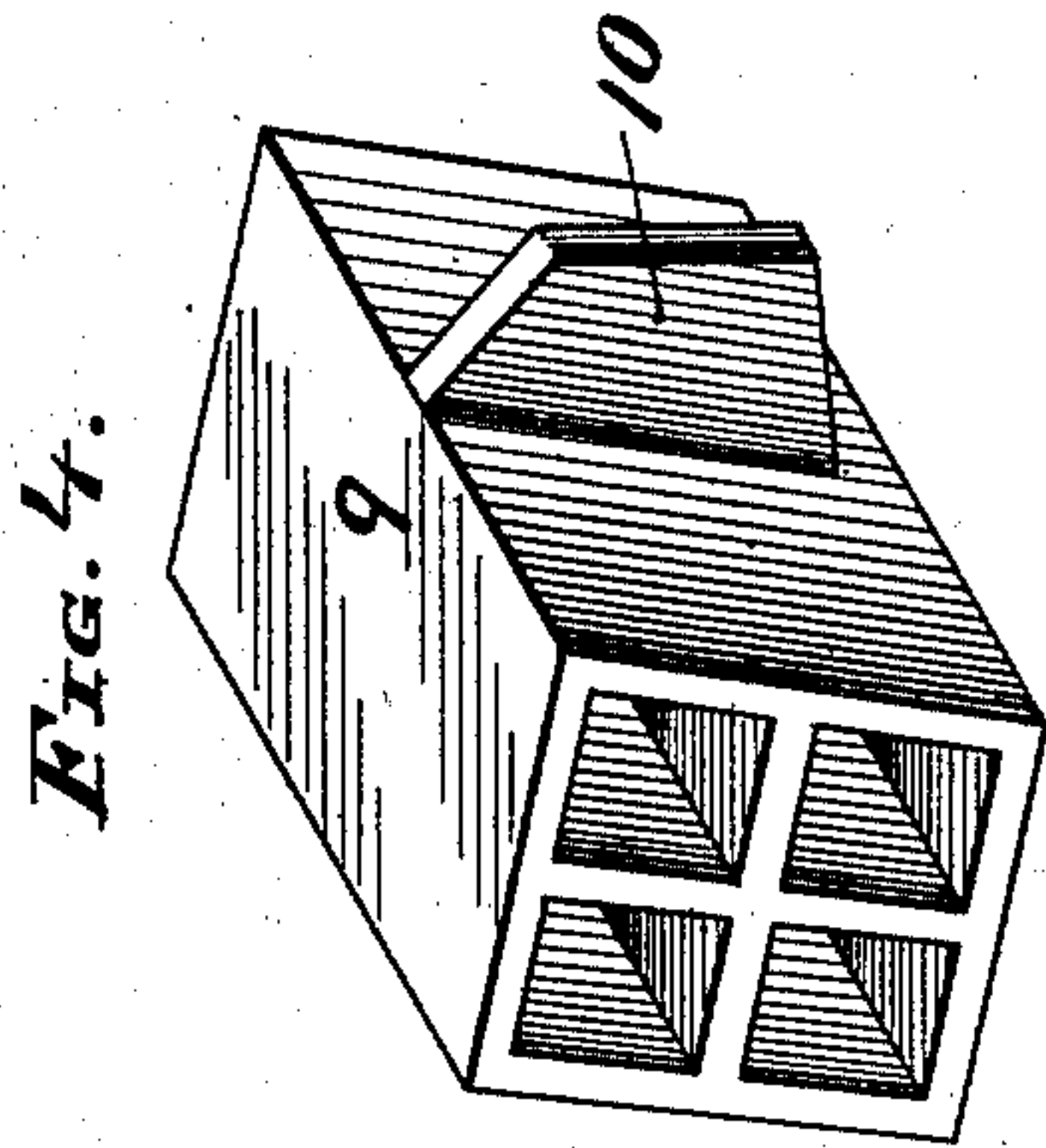


Fig. 4.

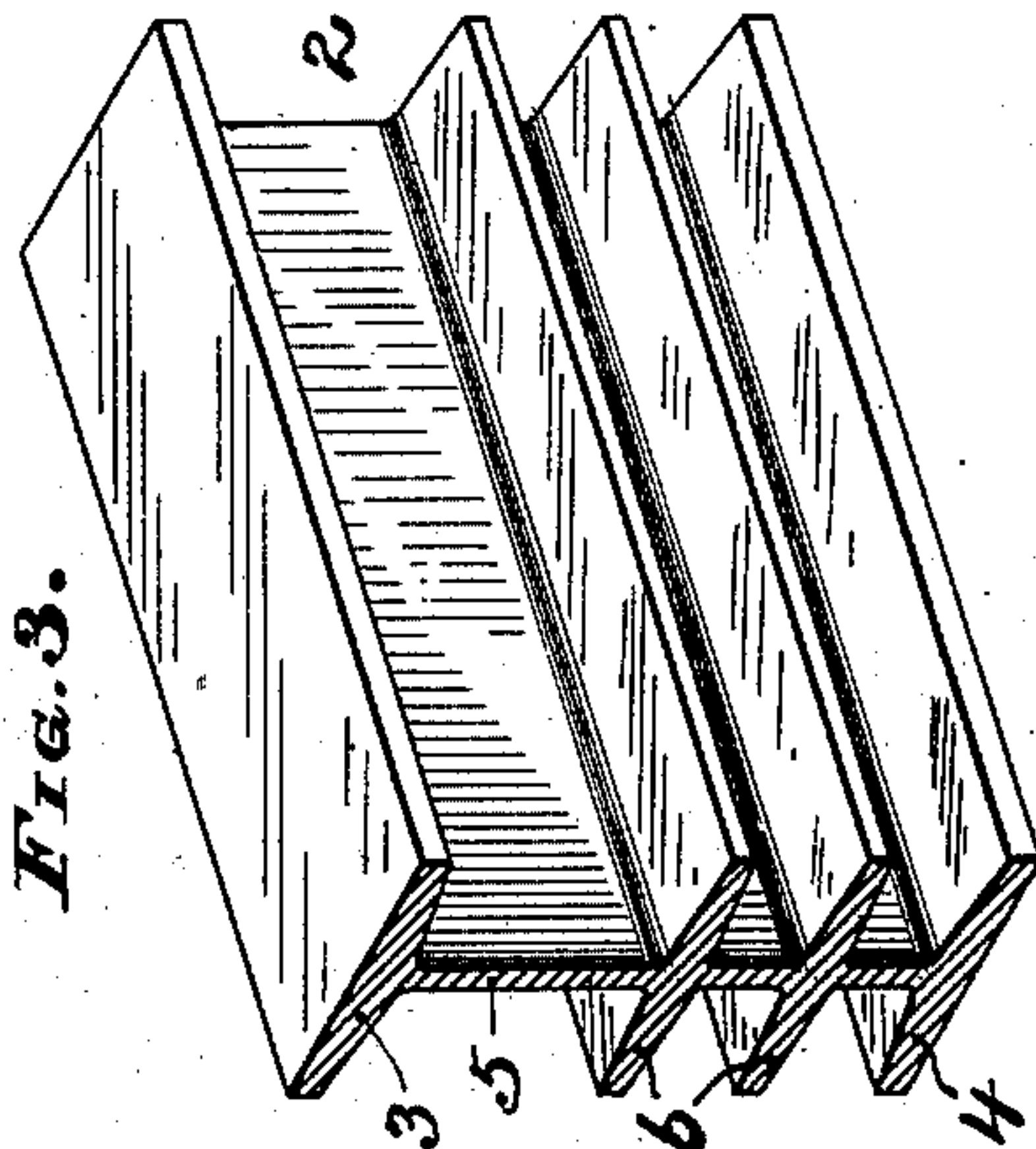


Fig. 3.

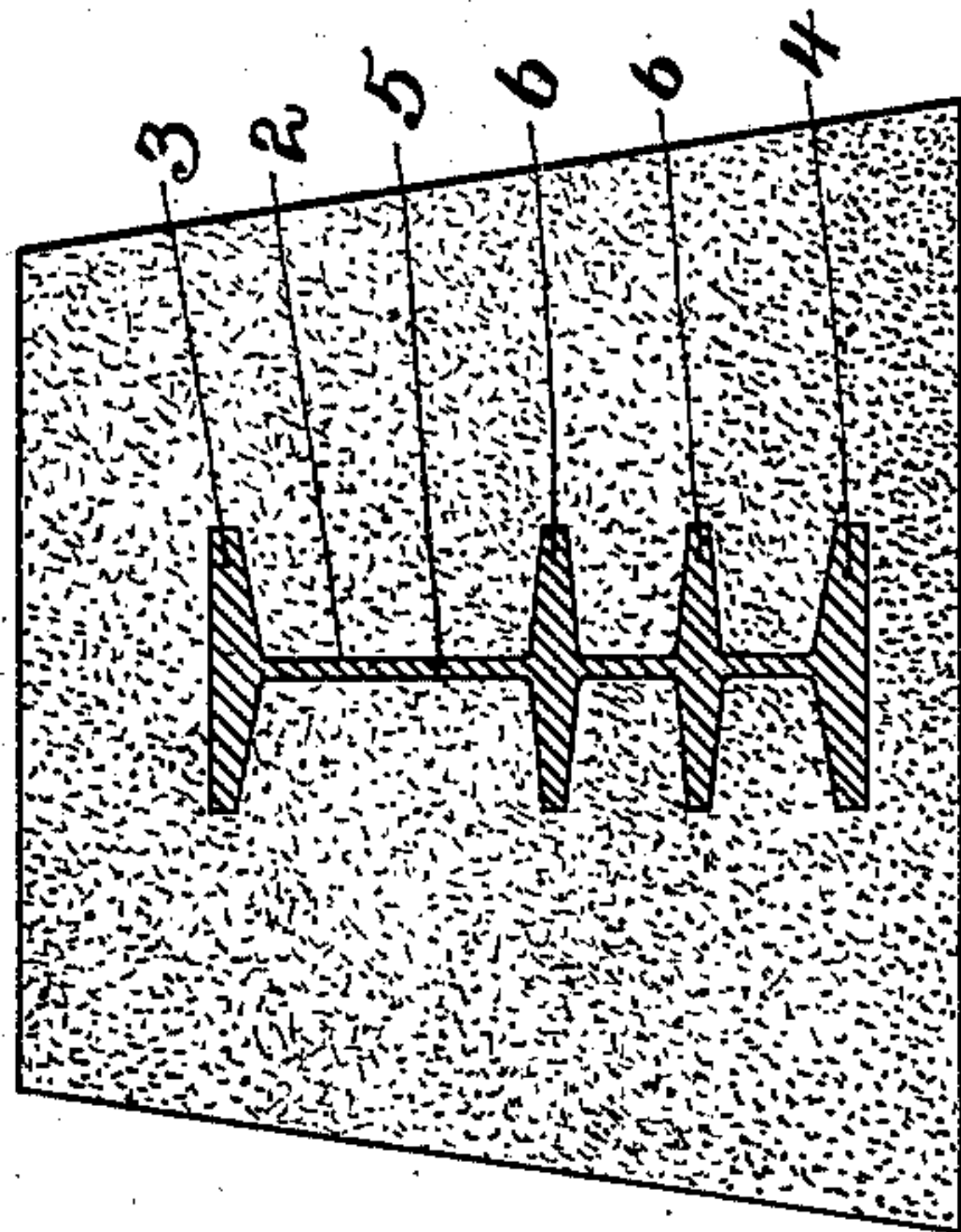


Fig. 2.

WITNESSES:

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UNITED STATES PATENT OFFICE.

CHARLES A. BALPH, OF PITTSBURG, PENNSYLVANIA.

FLOOR CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 748,150, dated December 29, 1903.

Application filed November 3, 1900. Serial No. 35,352. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. BALPH, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Floor Construction; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to floor construction in which steel beams or girders are employed to support the floor. Heretofore in such floor construction it has been customary to employ ordinary I-beams of the requisite dimensions to sustain the load they may be called upon to carry, and in some cases as a protection against fire the beams have been embedded in concrete or other incombustible plastic material. In the latter case the concrete is filled in the space between the upper and lower flanges of the beam on both sides of the web, as well as under the lower flange. The addition of the concrete, as stated, protected the beams against fire, but in no way increased the strength or rigidity of the beam.

The object of my invention is to provide a floor construction in which the beam or girder is so constructed that when embedded in concrete or other suitable plastic material its strength and rigidity are greatly increased.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a sectional view of a floor construction embodying my invention. Fig. 2 is an enlarged view showing the beam or girder embedded in the concrete. Fig. 3 is a perspective view of the beam or girder. Fig. 4 is a perspective view of one of the floor-tiles used next to the beam.

Like figures indicate like parts in each.

I have illustrated my invention in connection with a fireproof floor construction, in which incombustible floor-tiles are used between the beams or girders; but it is apparent that it may be used in connection with other fireproof constructions or even ordinary wooden floor construction, if desired.

In the drawings, 2 represents a steel beam or girder rolled to the required length and having the upper and lower flanges 3 4, re-

spectively, similar to those of the ordinary I beam or girder.

On the web 5 of the beam 2 and extending longitudinally thereof are formed by rolling or otherwise secured the flanges or projections 6, said flanges extending out from both sides of the web 5. These flanges 6 are formed on the web 5 at points below the mid-point or neutral axis of the beam, so as to be on the lower half of said beam, for the purpose more fully hereinafter set forth.

The beams 2, constructed as described, are arranged at the proper distance apart and supported in the ordinary manner. The space between adjoining beams may be filled in with tiles 7 or any other suitable material, according as the structure is to be fireproof or otherwise. Where tiles 7 are employed, said tiles are laid from each beam outward until the middle of the space is reached, when the central tile 8 or keystone is inserted to complete the space, as clearly shown in Fig. 1.

The tiles 9 adjoining the beams are formed with the wings or projections 10, and when placed in position the wings 10 rest in contact with the flanges of the beam, so that where a floor construction formed of tiles is employed in connection with my invention the body portion of tiles 9 adjoining the beams are at sufficient distance from said beams to permit of the concrete being filled in and around said beams in the manner illustrated. After the tiles have been set in the manner described the beams are surrounded or embedded in concrete or other plastic material having the same properties. To accomplish this, a suitable platform may be erected beneath the beams, and the concrete, of proper consistency, is packed down and around the beams so as to surround and embed the same, the platform acting to support the concrete during this operation and until it has set or hardened. In this manner the concrete is closely packed between the flanges of the beam and around the same to form one solid homogeneous mass. The adhesion of the concrete to the flanges 6 and to the angles and corners of the same stiffens the beam and increases its power to resist deflection. This is due to the fact that concrete is strong in compressive and adhesive strength. When-

ever a beam or girder becomes deflected or bent under its load, the metal in the lower half of said beam or girder stretches or becomes elongated, and any power or agent 5 which will resist this elongation or stretching of the metal in the lower half of the girder will necessarily greatly increase its rigidity and strength. When embedded in concrete, this stretching or elongating of the metal in 10 the lower half of the girder or beam cannot take place without some slipping of the metal in the concrete, and inasmuch as concrete has a strong adhesive and compressive power it follows that if a sufficient surface is pro- 15 vided on the lower half of the girder or beam to give the concrete a strong adhesion or grasp thereupon then the adhesive strength of such concrete will greatly resist the tendency of the beam slipping therethrough and 20 the compressive strength of the concrete will be brought into play, whereby deflection of the beam is prevented and its strength greatly increased. This large surface for the adhesion of the concrete is secured in my beam 25 by means of the flanges or projections 6, and it follows that the larger the number of such flanges or projections the stronger will be the beam. It will also be obvious that if the surfaces of said flanges or projections are rough- 30 ened a still greater adhesion of the concrete thereto will be secured, with a corresponding increase in the stiffness and strength of the beam. Furthermore, when the beam deflects there is a tendency to crush the concrete between the flanges 6 or between the flanges 6 35 and the lower flange of the beam, so that the

compressive strength of the concrete in this space is also utilized to strengthen the beam. The upper half of the beam and that portion of the concrete surrounding it are always 40 under compression, so that the compressive strength of the concrete is added to that of the beam, and with the concrete under compression between the flanges 6 on the lower half of the beam and the adhesion of the concrete to the flanges and projections the carrying capacity of the said beam is greatly in- 45 creased, and in consequence of this a lighter beam may be employed to do the work required, and the cost of floor construction is greatly reduced. The concrete so applied 50 therefore not only stiffens and strengthens the beam, but at the same time protects it against fire. The union of the concrete with such special shapes of beams will also greatly 55 reduce the vibration consequent to the use of ordinary beams.

What I claim as my invention, and desire to secure by Letters Patent, is—

A floor construction comprising beams or 60 girders, tiles between said beams or girders, the tiles adjoining said beams or girders having projections adapted to engage said beams or girders, and concrete embedding said beams or girders and said projections on said 65 tiles.

In testimony whereof I, the said CHARLES A. BALPH, have hereunto set my hand.

CHARLES A. BALPH.

Witnesses:

G. C. RAYMOND,
ROBERT C. TOTTEN.