A. E. DAVIS.

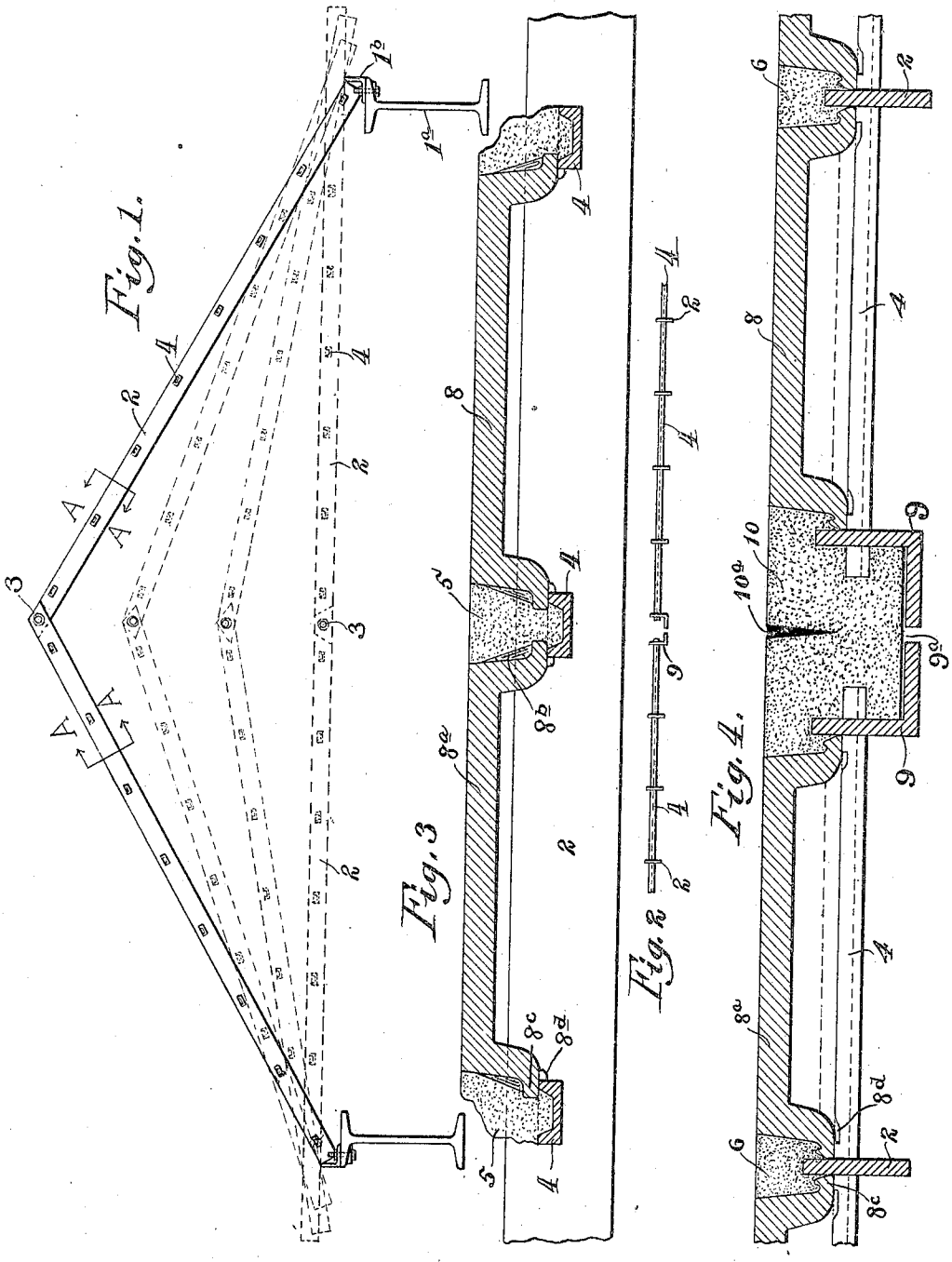
METALLIC FRAME ROOF CONSTRUCTION FOR BUILDINGS.

APPLICATION FILED NOV. 29, 1907.

952,001.

Patented Mar. 15, 1910.

4 SHEETS—SHEET 1.



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4 SHEETS—SHEET 2.

Fig. 5.

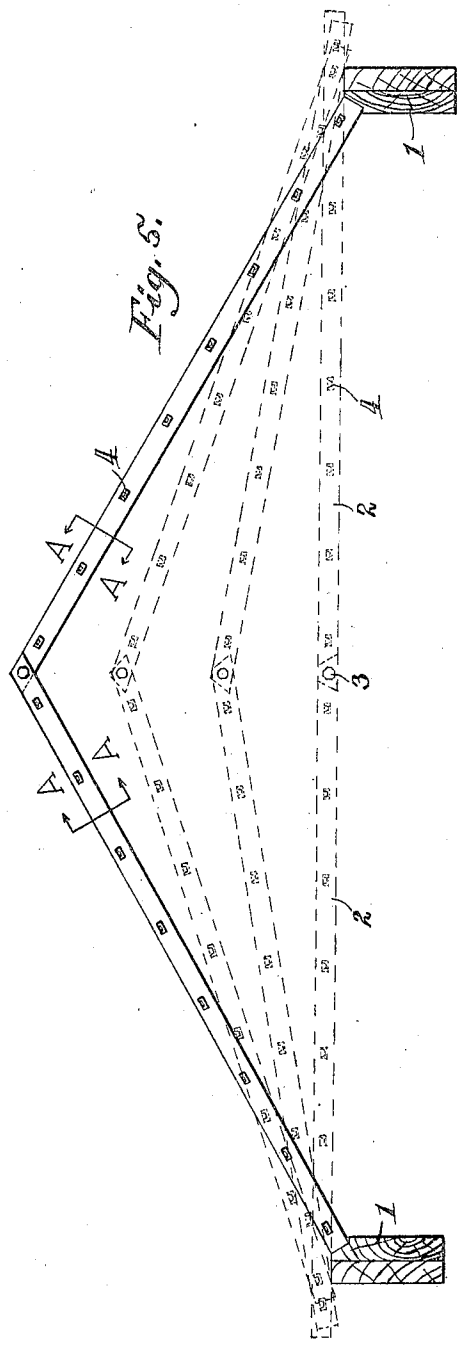


Fig. 6.

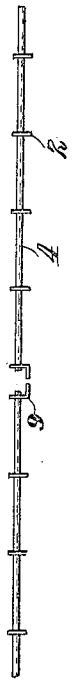
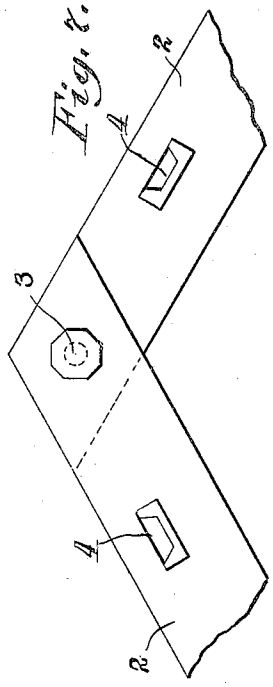


Fig. 7.



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4 SHEETS—SHEET 3.

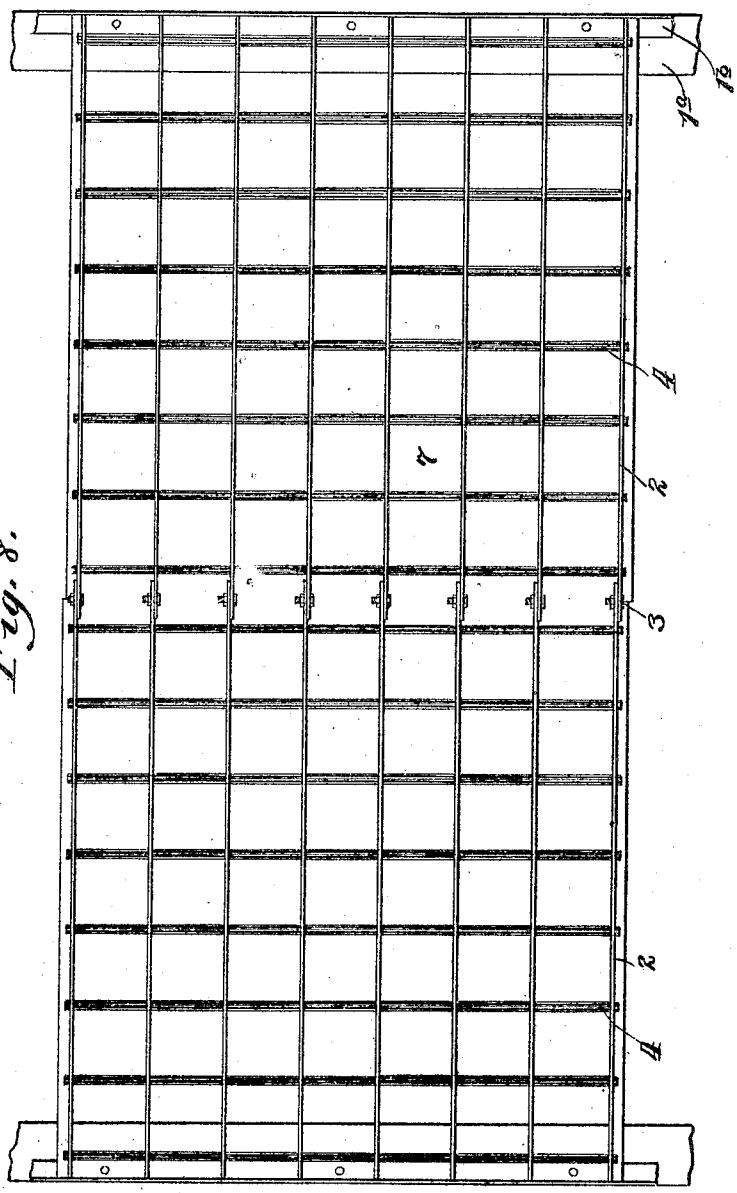

Fig. 8.

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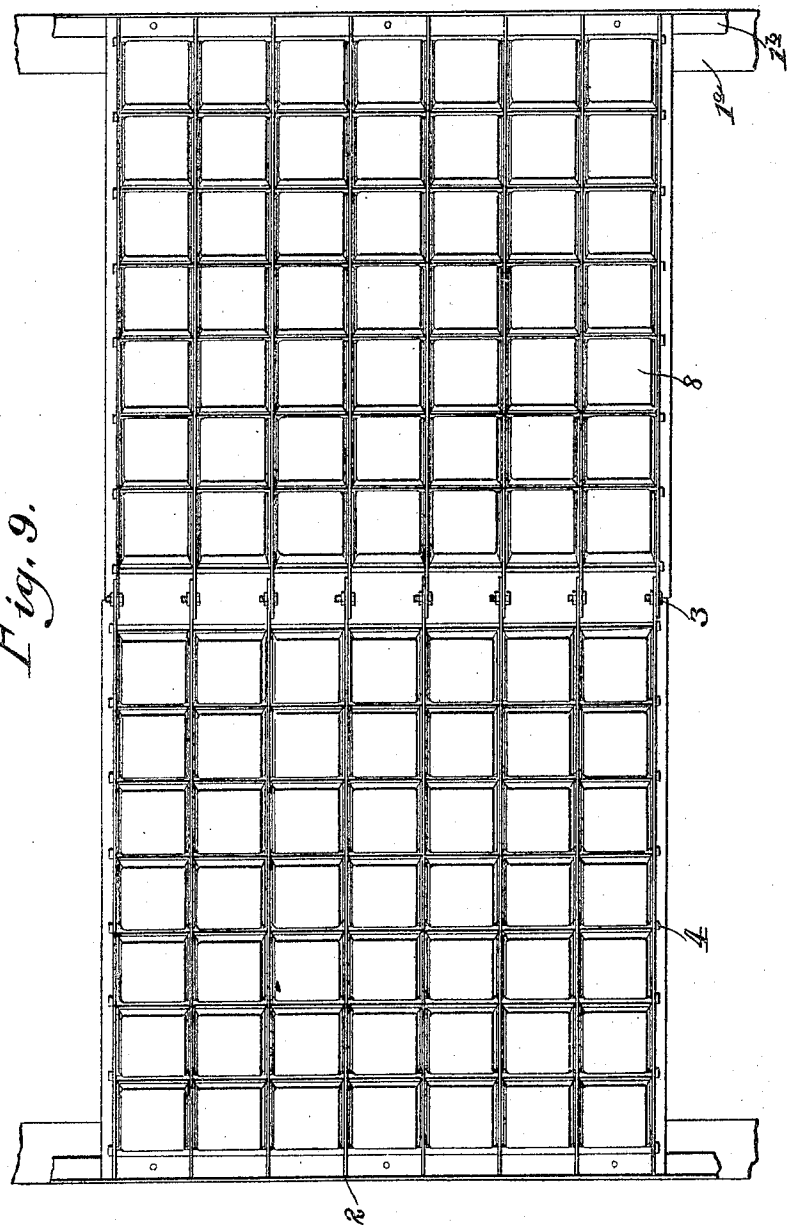
4 SHEETS—SHEET 4.

Fig. 9.



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UNITED STATES PATENT OFFICE.

ANTHONY ELTON DAVIS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO AMERICAN BAR LOCK COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

METALLIC-FRAME ROOF CONSTRUCTION FOR BUILDINGS.

952,001. Specification of Letters Patent. Patented Mar. 15, 1910.

Application filed November 29, 1907. Serial No. 404,330.

To all whom it may concern:

Be it known that I, ANTHONY ELTON DAVIS, a citizen of the United States, residing in the city of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Metallic-Frame Roof Construction for Buildings, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to roof construction for buildings and has for its objects, first to provide a steel or other metallic open support or frame, on which, as a supporting means, small metallic or other plates, or molded tiles of glass, clay or other materials may be laid in spaced relation and then cemented together and to the frame, to constitute not only a concrete tight roof, but, if desired, one which will operate in whole or in part as a skylight; and second to so construct and combine said elements, as to constitute and produce a steel-frame hipped roof of unusual strength and durability.

To these ends my invention consists of the elements, some of which are new, constructed and arranged in novel coöperative combination as hereinafter described to produce the results stated, the distinguishing features of which will be pointed out in the appended claims.

In the accompanying drawings illustrating my invention: Figure 1 is an end elevation, partly in dotted lines, of a steel-frame hipped roof, embodying my invention, and Fig. 2 is a section thereof on the line A—A of Fig. 1. Fig. 3 is an enlarged view, partly in elevation and partly in section, of a portion of the same detached; illustrating the connecting channel bars and the tiles supported thereon. Fig. 4 is a like view, in a transverse direction, illustrating the metallic and cement connection between the frame bars and between the tiles supported thereon. Fig. 5 is a like view of a modification of the frame shown in Fig. 1, wooden supports being substituted for I-bar metallic supports for the ends of the frame, and Fig. 6 is a section thereof on line A—A of Fig. 5. Fig. 7 is a side elevation of a detached portion of the frame bars of Figs. 1 and 5, where their meeting ends abut at the apex of the hipped roof construction. Fig. 8 is a plan view of the frame, and its metallic supports shown in Fig. 1, and Fig. 9 is a like view of the same with the tiles in place in the frame and ready to be cemented therein.

Referring now to said drawings: the numeral 1 in Fig. 5 indicates a suitable wooden support, and the numeral 1^a in Fig. 1, a metallic support, at each of two opposite sides of the roof construction to support the metallic frame.

The wooden support 1 of Fig. 5 is shown as a pair of wooden joists placed edgewise, the innermost being suitably shaped or chamfered at its upper edge to receive the ends of the metallic frame; while the metallic support shown at 1^a in Fig. 1 is shown as an I-bar to which is bolted an angle iron 1^b.

The metallic frame is composed of two sections each consisting of a plurality of flat iron bars 2, arranged edgewise in parallel series; the ends of each two longitudinally-opposite bars in the two sections being brought into overlapping coincidence, and secured together by a bolt 3 as shown in Figs. 1, 5 and 7. Each bar in the series of bars 2 in each section, is slotted to receive a series of transversely-disposed connecting bars 4, 4, 4, (see Fig. 3) which also serve to support the small rectangular metallic plates or glass tiles, and these are preferably formed as U-shaped or channel bars, as shown in Figs. 3 and 4, for the purpose of better enabling the filling-in cement between the plates or tiles to obtain a more secure locking hold between them and the frame bars 2 and 4, as shown at 5 in Fig. 3 and at 6 in Fig. 4.

In assembling and uniting the two sections of bars 2 and transverse connecting channel bars 4, the sections are first laid flat on the end supporting bars as shown in the lowest series of dotted lines in Figs. 1 and 5, the bolt 3 being in place but sufficiently loose to allow of movement between the coinciding overlapping ends of the bars 2. The frame

sections, thus connected, are gradually raised at the temporary pivotal connection between them, as indicated in the second and third of the dotted lines in said Figs. 1 and 5 until, as shown in the heavy lines in said figures, a proper relative inclination of the sections is obtained to form an angle in which the ends of one section will bear against and be supported by the ends of the other, through the medium of the connecting bolt 3 which is then drawn up tight, the resultant frame forming a hipped roof frame, and which, in plan view, will present the appearance shown in Fig. 8 wherein the spaces between the edgewise flat bars 2 and the transverse channel bars 4 will be rectangular spaces, indicated at 7 in Fig. 8; and if channel bars 4 instead of flat bars are employed as the transverse connecting bars, the width of the spaces 7 should be slightly greater between each pair of bars 4 than between each pair of bars 2 for the purpose of leaving a narrow space between the adjacent edges of the square plates or tiles 8 supported thereon, in order that cement may pass into such space and into the subjacent channel or U-shape of the bar 4 beneath such space, as indicated at 5 in Fig. 3.

The metallic frame thus constructed and arranged is adapted to support, in the rectangular space between each pair of frame bars 2 and transverse connecting bars 4, a square filling-in plate 8, as shown in Fig. 9, and which, if a skylight or vault-light is desired, in whole or in part, these filling-in plates 8 may be constructed in the form of glass tiles of known construction, preferably formed with a tread-portion 8^a, slightly inclined vertical walls 8^b, horizontal flanges 8^c and bottom spacing lugs 8^d (see Fig. 3). So placed in position on the metallic frame described, the spaces between those adjacent edges of the filling-in plates or tiles 8, over the transverse channel bars 4 (see Fig. 3) are filled in with cement 5; while those adjacent edges of the plates or tiles 8 over and on either side of the edgewise frame bars 2 (see Fig. 4) are filled in with cement 6; in both cases the cement extending to and being flush with the tread surface of the plates or tiles and forming a solid flat surface throughout.

Where the roof is required to be wide, transversely to the hip or inclination thereof, it is desirable, for facility of assembling and providing for contraction and expansion, to construct the frame series of edgewise flat bars 2 in sections of not more than 4 or 5 bars, these sections being then united as shown in Fig. 4, namely, the adjacent ends of the transverse channel bars 4 in each of such sections do not coincide or abut against each other, but are assembled in spaced relation and are slotted to permit the insertion and mounting in such slots, of a pair of angle irons 9, the horizontal legs of which should not abut but leave a small space between them (see Fig. 4), and these legs support a flat metallic plate 9^a on which, and in the space thus provided between the ends of the pair of adjacent channel bars and between the tiles supported thereon, a body of cement indicated at 10, is filled in, preferably with a central opening 10^a to compensate for expansion.

The resultant steel or metallic frame roof is, I believe, wholly new, in building construction; is well adapted to permit a portion of the roof to operate as a skylight, is exceedingly strong, and unusually durable as compared with ordinary roof construction.

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

1. A metallic hipped roof comprising in combination a pair of parallel end-supporting I-beams 1^a, angle irons 1^b bolted thereon to form an abutment for frame bars, two series of parallel flat bars arranged edgewise, slotted at intervals, the ends of each two longitudinally opposite bars in the two series being in overlapping coincidence and pivotally connected, a series of parallel channel bars arranged transversely to said flat bars and fixedly supported in the slots thereof, a series of filling-in plates in the square spaces formed between the frame bars, and a cement binder between the adjacent edges of said plates and the frame bars.

2. A metallic frame for a hipped skylight roof for buildings comprising a pair of parallel end-supports and a hipped metallic frame supported thereon and composed of two series of parallel flat bars slotted at intervals in their length and arranged edgewise, the ends of each two longitudinally opposite bars in the two series being in overlapping coincidence and pivotally united at the apex of their inclination, transverse plate-supporting channel bars between said edgewise frame bars adapted to hold both sets of bars rigidly and in spaced relation, forming a rectangularly-spaced plate-supporting frame, a series of rectangular glass tiles supported in said spaces; and a cement filling between the adjacent edges of said tiles operating to bind the same together and to the respective frame bars.

3. A metallic roof frame for buildings comprising a pair of opposite end-supports and a metallic frame supported thereon and formed in sections, each section consisting of a series of flat bars slotted at intervals in their length and arranged edgewise and in parallelism, transversely-disposed channel bars between the flat bars in the section adapted to connect and maintain said bars

rigidly and in spaced relation, the adjacent ends of each two transverse channel bars between the coinciding sections being slotted and provided with angle irons, plates supported thereon and cement filling resting on said plates and between the frame sections.

In testimony whereof, I have hereunto affixed my signature this 25th day of November A. D. 1907.

ANTHONY ELTON DAVIS.

Witnesses:

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