T. H. KANE.

ROOF CONSTRUCTION.

APPLICATION FILED DEC. 30, 1915.

1,260,391.

Patented Mar. 26, 1918.

2 SHEETS—SHEET 1.

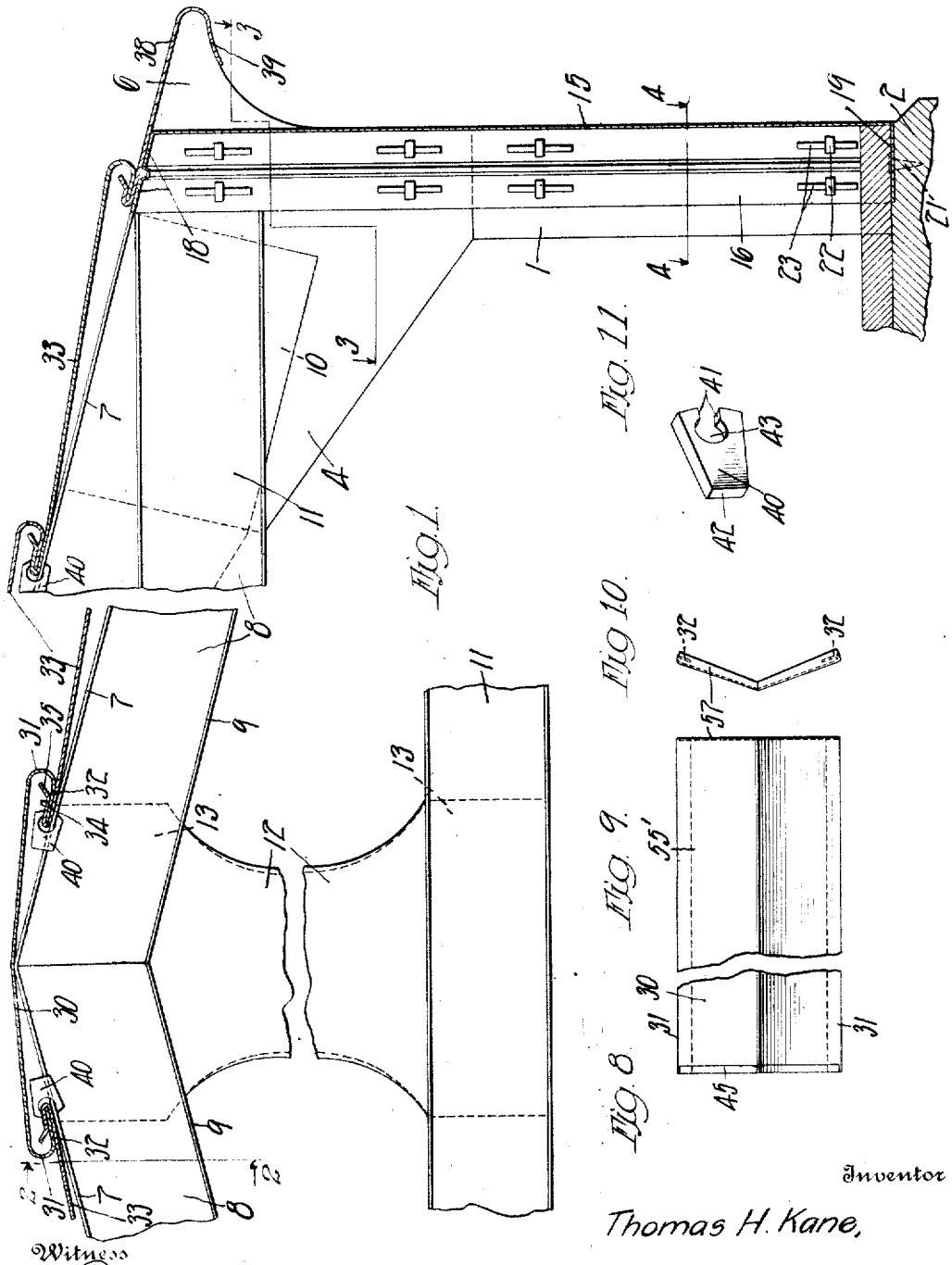


Fig. 1.

Fig. 11.

Fig. 10.

Fig. 9.

Fig. 8.

Witness

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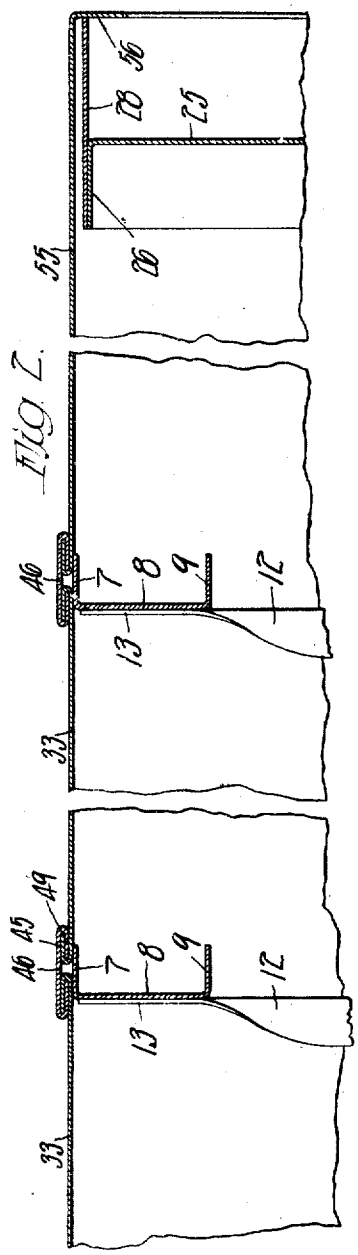


Fig. 2.

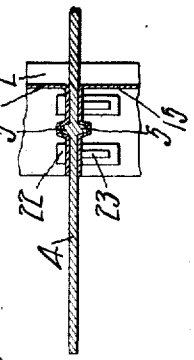


Fig. 3.

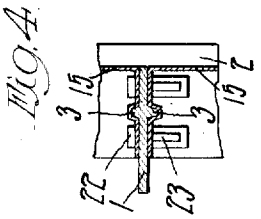


Fig. 4.

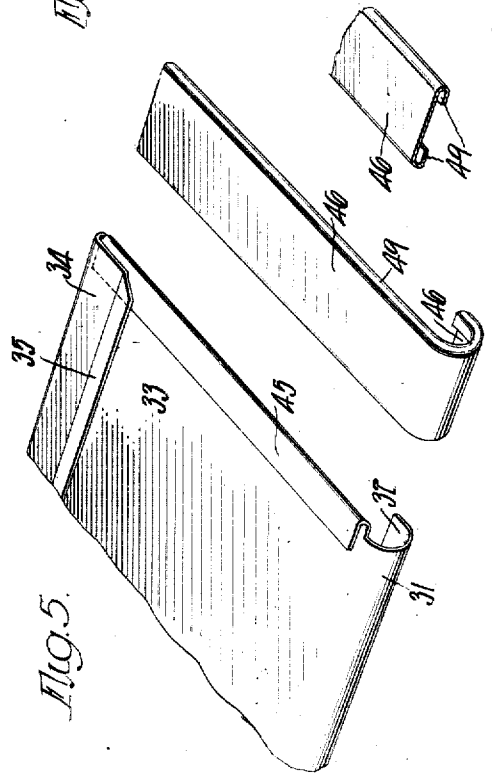


Fig. 5.

Fig. 6.

Fig. 7.

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UNITED STATES PATENT OFFICE.

THOMAS H. KANE, OF YOUNGSTOWN, OHIO, ASSIGNOR TO TRUSSED CONCRETE STEEL COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

ROOF CONSTRUCTION.

1,260,391. Specification of Letters Patent. Patented Mar. 26, 1918.

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To all whom it may concern:

Be it known that I, THOMAS H. KANE, a citizen of the United States, residing at Youngstown, in the county of Mahoning and State of Ohio, have invented a new and useful Roof Construction, of which the following is a specification.

The present invention relates to a roof and its object is to provide very cheaply a construction that can be easily and rapidly assembled, and that effectually excludes light, wind, and moisture. The invention consists in the details of construction shown, described and claimed.

In the drawings, Figure 1 is a fragmentary transverse section through a building showing a preferred embodiment of the invention. Figs. 2, 3 and 4 are sections, respectively, on the lines 2—2, 3—3 and 4—4 of Fig. 1. Fig. 5 is a fragmentary perspective view of one of the roof plates, an edge being broken away. Fig. 6 is a perspective view of a key plate by which the roof plates are joined. Fig. 7 is a similar view, parts being broken away. Fig. 8 is a plan view of an intermediate or joint end of a ridge plate. Fig. 9 is a similar view of the outer end of an end ridge plate. Fig. 10 is an end view corresponding to Fig. 9. Fig. 11 is a perspective view of one of the fasteners.

Similar reference characters refer to like parts throughout the several views.

The framework of the building preferably comprises a series of thin metal columns or key plates 1 resting on sills 2 and provided with longitudinal ribs 3 on opposite sides, together with gusset plates 4 that bear directly on the columns and have ribs 5 in alinement with the ribs 3; the gusset plates also include the eave plate supporting extensions 6 and are joined by sheet metal rafters (preferably of channel cross section, including an upper flange 7, a web 8 and a lower flange 9, the latter of which may be bent into the plane of the web at 10) and sheet metal tie members 11, also preferably of channel cross section. The peaks of the rafters may be joined to each other and to an intermediate portion of the corresponding tie member by a suspender 12 of channel cross section, having its flanges bent out into the plane of the web at the end as indicated at 13. The several joints between the gussets and suspenders, the rafters and the tie members are preferably formed by spot welding in an obvious manner.

The spaces between the adjacent columns and gussets are closed by single sheet metal wall plates 15 that extend from top to bottom, said plates having inturned grooved side flanges 16 that conform closely to the ribbed surfaces of the columns and gussets, and also being provided with the upper inturned flanges 18 located substantially in the plane of the flanges 7 of the rafters. The plates may also have inturned bottom flanges 19 attached to sills 2 by screws 21, and are joined to the frame members by slotted bolts 22 and wedges 23.

The end gables of the building are formed by panels 25 (Fig. 2) having inturned flanges 26 (inclined to correspond to the inclination of the rafters), to which a flat outwardly projecting metal plate 28 is secured, preferably by spot-welding.

The above described elements constitute the frame of the building and may be varied in many respects within wide limits.

Extending longitudinally of the building are ridge plates 30 inclined downwardly each way from the center line and having their edges 31 downturned, spaced appreciably from and bent back (at 32) upon the bodies, whereby hook-like elements are formed. The portions 32 of the ridge plates are received in grooves formed by bending the upper edges of roof plates 33 upwardly and back upon the body thereof at 34; and, for the purpose of more effectually preventing water from being blown upwardly through the seam as well as to allow the sheets to be readily assembled along the edges of the ridge plates, the portions 34 terminate in upwardly inclined margins 35. The same seam is used between overlapping roof plates and between the lowermost roof plates and the eave plates 38 (Fig. 1). It will be noticed that the eave plates have downturned hook-like lower edges 39 that inclose the extensions 6 of the gusset plates and tend to prevent the sheets from being blown from the frame. The various sheets are further retained in position by a series of thin metal fasteners 40 (preferably resilient) that include the spaced contact points 41 and have their opposite ends 42 formed to receive blows from a hammer. The contact surfaces preferably converge inwardly and the material of the fasteners inwardly therefrom

is removed as indicated at 43 to form an opening of greater width than the distance between the contact points. When the sheets are assembled, the fasteners are arranged to inclose the upper flanges of the rafters and the seam 32—33—34 and are driven downwardly at an angle to the rafters, whereby the sheets are rigidly held to the rafters and the several roof sheets are firmly clamped together along the seams. The fasteners 40 are punchings and are, therefore, cheap.

The side edges of the roofing sheets are best shown in Figs. 2 and 5, from which it will be seen that the material is cut away opposite the portions 31—32, 34—35, and that between these points the sheet is bent upwardly about the thickness of the metal and then back upon the body portion at 45. The element 45 is turned over into the position shown before the element 34 is bent down over the body portion. The roofing sheets being assembled, key plates 46 (having downturned lower edges of the same configuration as the edges 31—32 of the roofing plates and having down and inturned marginal flanges 49) are driven upwardly into locking position, as indicated in Fig. 2. The ends of adjacent ridge boards and eave sheets are formed and joined in the same general manner, and the same reference numerals have been applied thereto. The seams are arranged above the rafters throughout.

The end roof sheets 55 (Fig. 2) and the end ridge plates 55′ (Fig. 9) differ from the intermediate plates in that they are provided with downturned marginal flanges 56 and 57 that fit closely to the outer edges of plates 28 of the end gables, whereby light, air and moisture are excluded.

The construction is exceedingly light (for example, in hospitals, twenty feet in width and with the trusses four feet apart, the weight of the trusses need not exceed one hundred pounds) and cheap, may be nested and transported in a relatively small space and may be assembled rapidly and without the use of skilled labor.

While the fasteners have been shown only for attaching roofing plates to rafters, it is clear that they may also be employed to secure overlapping sheet metal plates to studding and other supports for the purpose of forming vertical walls or other structural panels, and for lack of a more generic term "panels" has been employed in some of the claims. It will be observed that the fasteners are located on the side of the sheet metal plates next the supports and are partly pocketed in the space between the overlapping portion of the outer plate and the seam by which upper and lower plates are joined.

The details of construction may be varied considerably in other particulars; and I do not, therefore, wish to be limited otherwise than as indicated by the subjoined claims.

I claim:

1. A roof comprising a plurality of columns and a plurality of roof trusses corresponding to the columns, each of the roof trusses having a thin metal extension projecting beyond the columns to form an eave plate support and retainer, roof plates and eave plates resting on the trusses, said roof plates overlapping the eave plates and being interlocked therewith, said eave plates extending out over the extensions and having their edges turned downwardly and inwardly beneath the extensions, whereby the eave plates and roof plates are retained in position on the trusses.

2. Means for forming structural panels comprising supporting means and upper and lower rows of sheet metal plates secured thereto, each of the plates including a lower edge turned back upon and spaced from the body thereof on the side next the supporting means and an upper edge turned back upon and spaced from the body thereof on the side opposite the support to form a groove in which the lower edge of the sheet next above is received, each of said plates also including side edges turned back upon the body and spaced therefrom on the side opposite the supports, said turned back side edges terminating at substantially the beginning of the turned back lower edge of the corresponding plate, and sheet metal key plates for connecting the adjacent plates of each row, each of said key plates having their lower edges bent back upon themselves and spaced from the bodies thereof on the side next the supporting means to correspond to the lower edges of the sheet metal plates of the corresponding row, and their side edges turned back upon and spaced from the bodies thereof on the side next the supporting means to form grooves in which the edges of the first mentioned plates are received when the key plates are forced upwardly on the other plates.

3. Means for forming structural panels comprising supporting means and upper and lower rows of sheet metal plates secured thereto, each of the plates including a lower edge turned back upon the body thereof on the side next the supporting means, each of said plates also including side edges turned back upon the body and spaced therefrom on the side opposite the supports, said turned back side edges terminating at substantially the beginning of the turned back lower edge of the corresponding plate, and sheet metal key plates having their lower edge bent back upon themselves and spaced from the bodies thereof on the side next the supporting means to correspond to the lower edges of the first mentioned sheet metal

plates, and their side edges turned back upon and spaced from the bodies thereof on the side next the supporting means to form grooves in which the edges of the first mentioned plates are received when the key plates are forced upwardly on the other plates of the corresponding row.

4. A roof construction comprising a sheet metal gable end having a flange in the plane of the roof, a roof truss, a light sealing plate secured to the flange of the gable end and projecting therefrom on the side opposite the roof truss, and sheet metal roof plates being spaced farther vertically from the flange of the gable end at some points along the latter than at others, said roof plates including downturned end flanges that extend over the outer edge of the light sealing plate in close relation thereto.

5. A roof structure comprising a pair of metal columns and a metal roof truss extending across between the columns and resting thereon, said roof truss having at one end a thin metal extension projecting beyond the corresponding column to form a support and retainer for a plate whereby a part of the roof structure is formed, and a roofing plate extending out over the extension and having its outer edge interengaged with the extension whereby the plate is prevented from being blown up off from the roof.

6. A roof-construction comprising a sheet metal gable end having a flange inclined to conform to the opposite sides of the roof, a roof truss, a light sealing plate secured to the flange of the gable end and projecting therefrom on the side opposite the roof truss, and a sheet metal ridge board having inclined sides corresponding to the sides of the roof, said ridge board being spaced farther vertically from the flange of the gable end at some points along the latter than at others and having downwardly turned end flanges that extend over the outer edge of the light sealing plate.

7. A panel plate formed of a single sheet of metal and comprising a body portion and side edges turned upwardly and inwardly from the body portion and spaced therefrom, said sheet also comprising an upper edge portion turned down along the body portion and overlapping the upper portion of the side edges, said turned down upper edge portion being spaced from the side edges.

8. A roof comprising rafters and a roof structure, the latter including a plurality of upper and lower rows of sheet metal plates the side edges and the upper edge of each of which is turned back upon the body of the corresponding plate and spaced therefrom on the side opposite the rafters, the bodies of the plates extending across between the rafters corresponding thereto and resting directly on said rafters, the lower edges of each of said plates being turned back upon the body of the corresponding plate on the side next the rafters and being received beneath the upper edges of the plates of the row next above, and a series of narrow key plates having side edges inturned thereon on the side next the rafters and embracing the side edges of the adjacent plates, the lower ends of said key plates conforming to the downturned lower edges of the corresponding plates which they connect.

In testimony whereof I sign this specification.

THOMAS H. KANE.