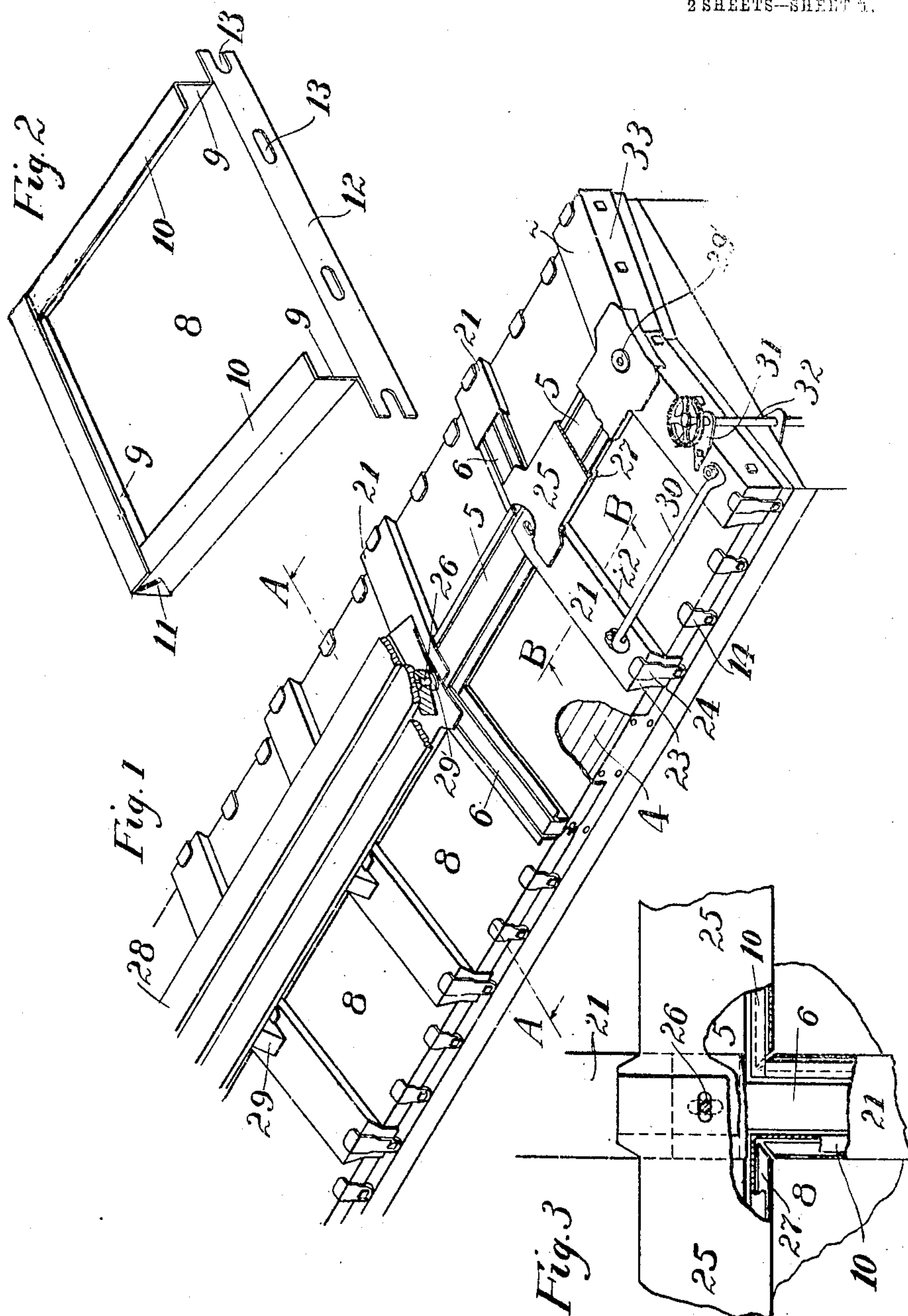


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FREIGHT CAR ROOF CONSTRUCTION.
APPLICATION FILED OCT. 7, 1906.

919,461

Patented Apr. 27, 1909.
2 SHEETS—SHEET 1.



Witnesses:

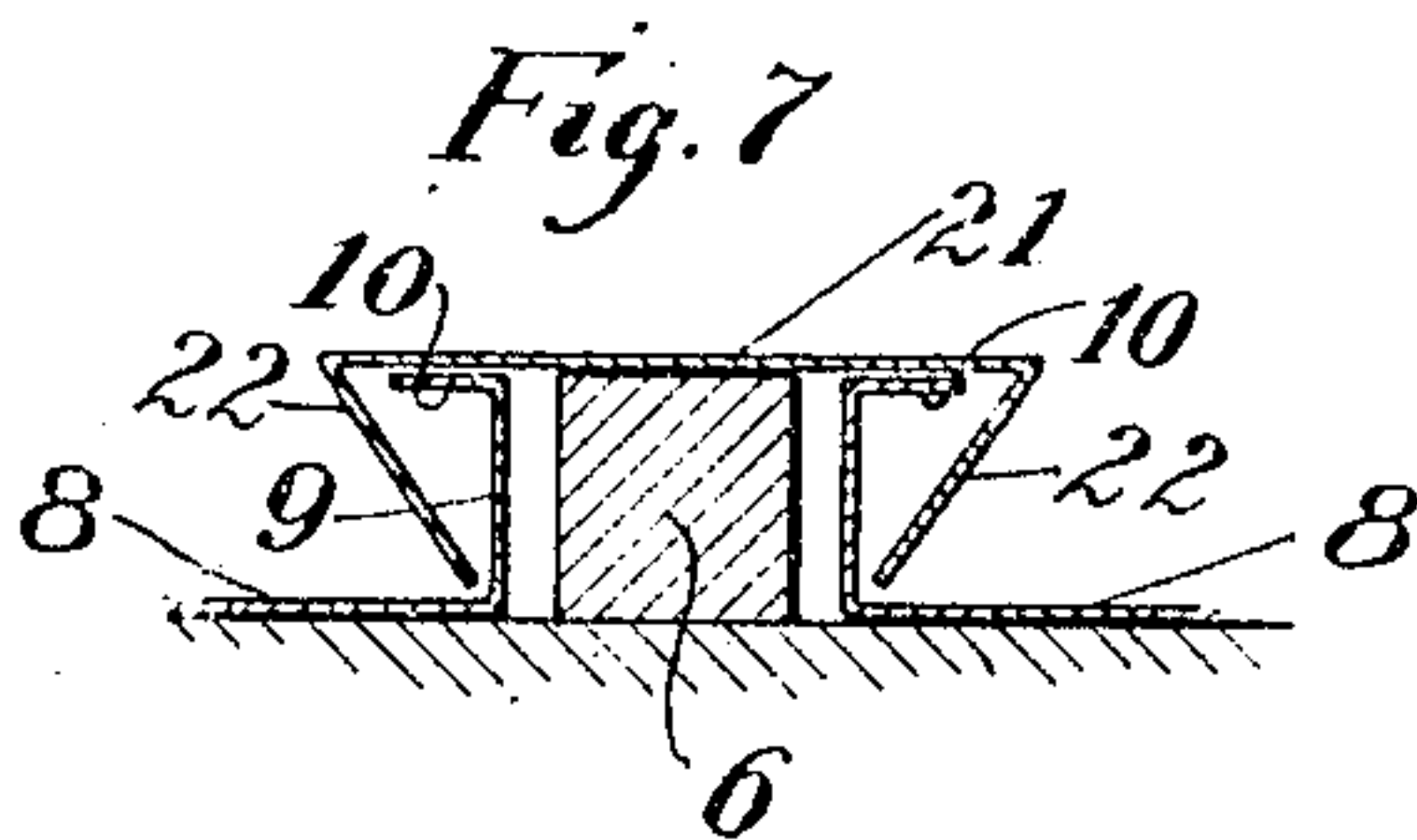
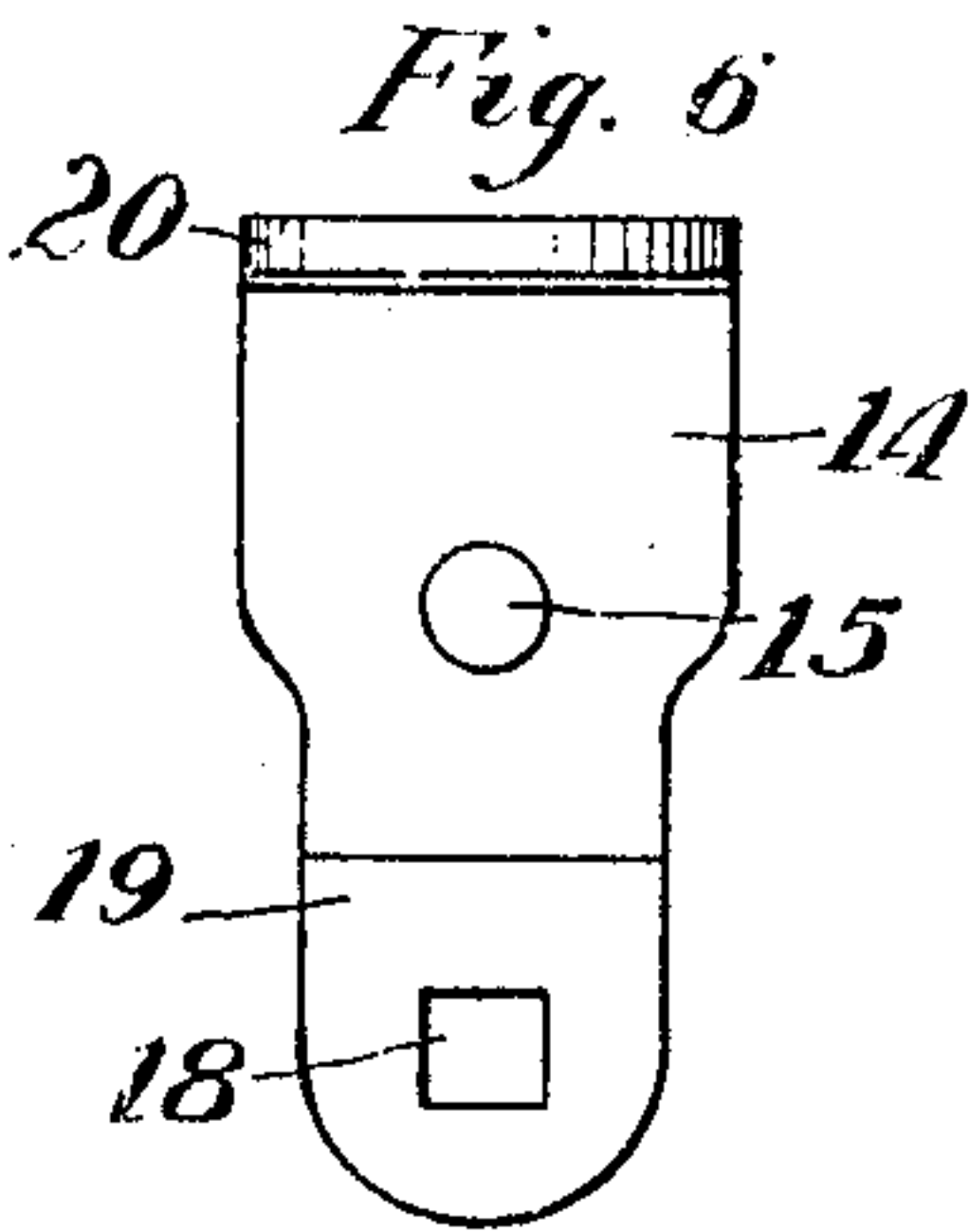
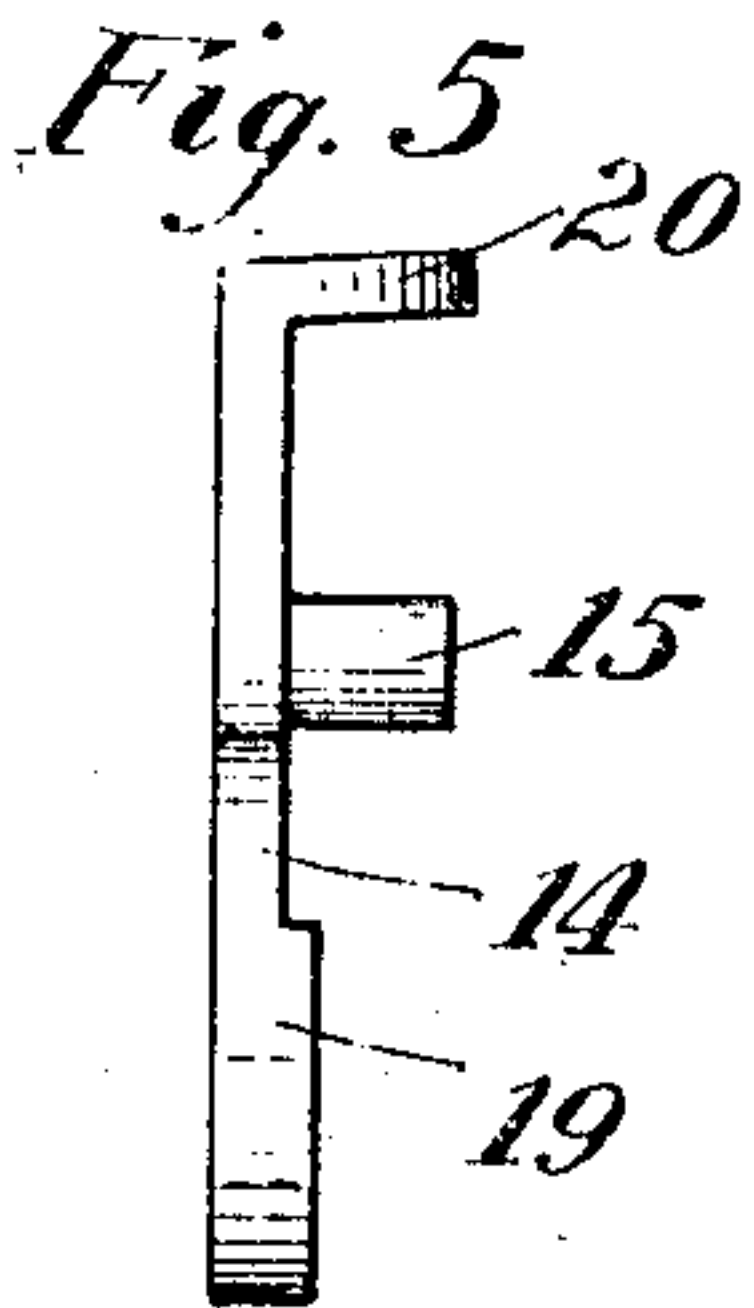
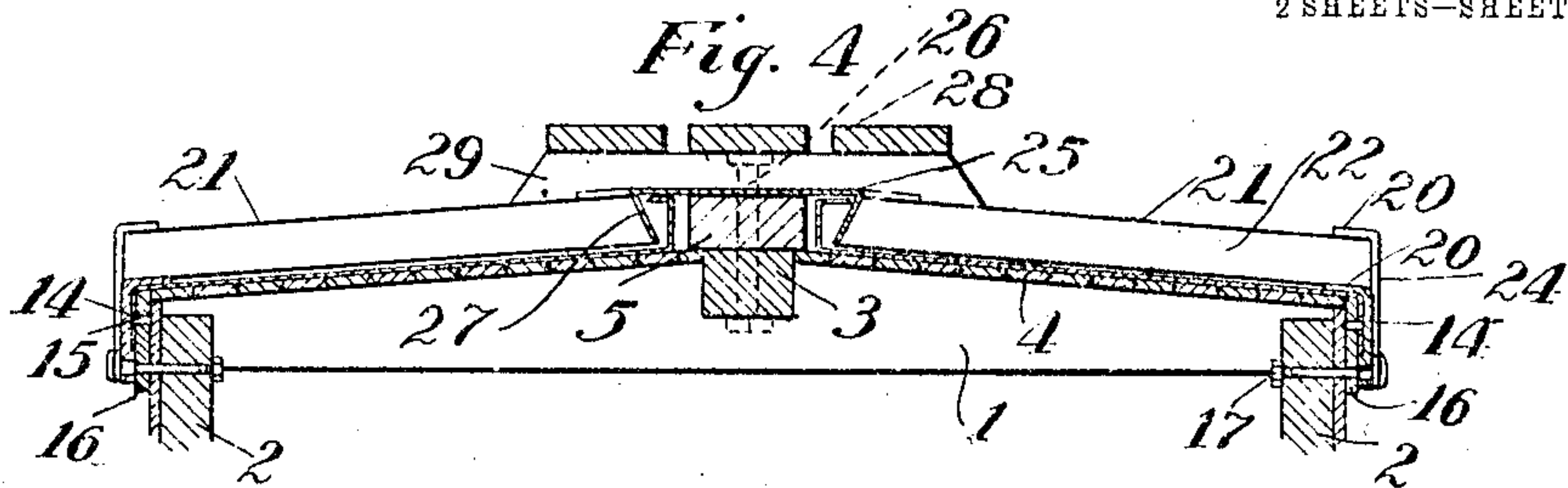
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UNITED STATES PATENT OFFICE.

WILLIAM QUEENAN AND CHARLES MURPHY, OF AURORA, ILLINOIS.

FREIGHT-CAR-ROOF CONSTRUCTION.

No. 919,461.

Specification of Letters Patent.

Patented April 27, 1909.

Application filed October 7, 1908. Serial No. 456,542.

To all whom it may concern:

Be it known that we, WILLIAM QUEENAN and CHARLES MURPHY, citizens of the United States of America, and residents of Aurora, county of Kane, State of Illinois, have invented certain new and useful Improvements in Freight-Car-Roof Constructions, of which the following is a specification.

The main objects of this invention are to provide an improved form of metal sheathing for freight-car roofs which is suitable for either "inside" or "outside" constructions and which is water-tight and proof against being broken, distorted or rendered leaky by any of the many forms of stretching, compressing and torsional strains to which such structures are subjected under the conditions of ordinary service; to provide an improved form of joint between the adjacent plates of metal roof sheathing whereby the plates may be secured in such manner as to be proof against becoming loosened by wind storms, but are at the same time free to have considerable movement along the plane of the roof so as to avoid distortion of the plates or breaking of the joints between them through the movements of the roof under strains; to provide a joint of this type which shall be tight against leakage of water even during violent storms when the rain is driven almost horizontally by a strong wind; and to provide an improved form of clip for securing the edges of roof sheets. These objects are accomplished by the device shown in the accompanying drawings, in which:

Figure 1 is an isometric view of a freight-car roof constructed according to this invention, some of the parts being broken away, and the vertical dimensions being exaggerated for the sake of clearness. Fig. 2 is an isometric view of one of the main sheets of the roof. Fig. 3 is a detail in plan of one of the joints between the metal plates at the ridge of the roof. Fig. 4 is a transverse section of the roof on the line A--A of Fig. 1, the vertical dimensions being exaggerated with respect to the horizontal dimensions. Figs. 5 and 6 are details of the fastening clips by means of which the plates are secured at the edges of the roof. Fig. 7 is a detail of the joint between adjacent plates, being a section on the line B--B of Fig. 1.

In the drawings, the invention is illustrated as applied to what is commonly called

an "outside" roof,—that is, one in which the metal sheathing is uppermost. In the "inside" construction the metal work is substantially the same, but it is covered over by a sheathing of wood.

In the construction shown, the roof comprises the usual transverse carlines 1 supported from the side walls 2 of the car and a ridge rafter 3 mounted on the carlines 1. Above the carlines are the matched boards 4 which extend lengthwise of the car, and these are covered by a sheathing of sheet metal, the construction of which will be hereinafter described. The upper surface of the roof is subdivided into a plurality of rectangular spaces by means of strips of wood, one strip 5 extending along the middle line of the roof above the ridge rafter 3, and the others extending transversely on each side of the ridge strip 5 between it and the edge of the roof. Each of the rectangular spaces bounded by the strips 5 and 6 is covered by a single sheet or plate 8 of metal, preferably in the form shown in Fig. 2. The edges of the sheet 8 which are adjacent to the strips 5 and 6 are flanged upward and then inward so as to provide a vertical part 9 with an inwardly extending horizontal flange 10 at its upper edge. The corners are preferably formed by folding the metal upon itself, as illustrated at 11 in Fig. 2, so as to form a tight joint between the upstanding parts 9 at that point. The edge of the sheet which is adjacent to the edge of the roof is bent downward to form the depending flange 12 which is provided with a series of horizontally elongated apertures 13. The sheets 8 are so proportioned that there will be considerable clearance,—say, for example, one-half of an inch between the flanges of the sheet and the adjacent strips 5 and 6. The sheets 8 are free from the roof except at the flange 12, and said flange is secured by means of fastening clips 14 which allow a certain limited range of movement to the plates 8, but prevent them from being accidentally torn loose from the roof. The construction of these clips is illustrated in Figs. 5 and 6, each clip being provided with a stud 15 which extends through the respective aperture 13 in the flange 12, and into the covering board 16 on the side of the car, as illustrated in Fig. 4. The clip 14 is fastened to the side of the car by means of a carriage bolt 17 having the squared part on its shank fitting a square aperture 18 in the clip 14.

The clip 14 has a boss 19 which causes the part of the clip which is adjacent to the flange 12 to stand away from said flange so as to loosely confine it. It is also preferred to provide a flange 20 at the upper end of each clip 14, which extends over the top of the sheet 8 and, while loosely confining the sheet at that point, prevents any possibility of a strain upon the sheet causing the apertures 13 to be enlarged or the edges of the sheet to be torn so that it becomes detached.

Each of the strips 6 is covered by a sheet metal cap 21 which extends across the flanges 10 of the adjacent sheets 8 and has depending flanges 22 which extend at an angle inwardly and downwardly under the flanges 10. The adjacent parts of the cap 21 and sheets 8 are clear of each other so as to allow the desired freedom of movement of said plates. The caps 21 are flanged downward at their outer ends, the end flanges 23 being so shaped as to cover and close the ends of the spaces between the flanges 22, 9, and the strips 6 so as to prevent the entrance of rain at that point. The inner ends of the caps 21 extend across the strips 5 so as to overlap the caps 21 on the opposite side of the car. The caps 21 are fastened only at their ends, the inner end being fastened by a single bolt extending through the strip 5 and ridge rafter of the car, and the outer end being fastened by a clip 24 shaped somewhat like the clips 14, but having the flange 20 spaced at a greater distance above the stud 15 so as to allow the flange to overlap the top of the cap 21. The apertures at the inner ends of the caps 21 are elongated in a direction transverse to the middle line of the car, so as to allow for spreading of the roof under strains, but the apertures in the flanges 23 at the outer ends of the caps 21 are circular and fit the studs 15 of the clips 24. This arrangement tends to keep the caps 21 in central alignment with the strips 6, but allows of such movement as may be necessary to allow the caps to accommodate themselves to distortion of the roof when under strain.

The ridge strip 5 is capped by means of a series of plates 25 which meet and overlap each other at points adjacent to the caps 21. At this point the caps 25 are provided with apertures elongated in the direction of the middle line of the roof and located so as to engage the same bolt 26 which fastens the overlapped ends of the caps 21. This allows the caps 25 to move longitudinally with respect to each other to accommodate themselves to lengthening and shortening of the roof under strain. The caps 25 are provided with depending flanges 27 which have the same relation to the adjacent edges of the sheet 8 as do the flanges 22. The meeting ends of the flanges 27 and 22 are cut at a miter so as to fit each other, as shown in Fig. 3.

The running boards 28 are mounted upon saddles 29 which fit over the tops of the caps 25 and 21. Said saddles 29 are fastened by the same bolts 26 which fasten the caps 21 and 25. One bolt is sufficient for securing each saddle, as the saddles are prevented from turning out of position by means of the nails or screws which fasten the running boards to them. The saddles of the running boards are supported by the caps 21 and the transverse strips 6 below said caps, and they do not in any way interfere with the free movement of the main plates 8. While the saddles may be drawn into tight engagement with the caps 21 by the bolts 26, they do not prevent the relative movement of the caps 21 to opposite sides of the roof, since the flanges 22 on said caps 21 stiffen them sufficiently to prevent them from buckling under longitudinal strains and thereby cause them to slip under the running board saddles when there are movements in the roof construction which require such slipping. In order to prevent leakage, washers 29' of packing material may be interposed between the saddles and the caps below them at each of the bolts 26.

The hand grips 30 and the brackets 31 in which the brake masts 32 are mounted are attached to the strips 6 through the caps 21, and therefore leave the plates 8 perfectly free to move as hereinbefore described. The caps 21 which are at the two ends of the car are modified by having their outer flanges 33 bolted against the end of the car, but are in other respects similar to the other caps 21.

It will be seen that in the construction shown the plates 8 are secured only along the flanges 12, and that even at this point they are free to shift longitudinally of the roof. The joints between the plates and the caps 21 and 25 are such that there is ample room to allow for any lateral longitudinal or twisting movements of the plates which would occur under various strains to which the roof structure might be subjected during ordinary usage of the car, without said plates and caps interfering with each other at their joints and thereby permanently distorting the joints or tearing the plates. In all prior constructions of which we are aware, the various plates which comprise the roof structure are to some extent interdependent and interlock at their joints in such manner that the plates are not left free to shift independently, and the joints are also such that even a slight twisting movement of the plates in their planes would distort the joints or break the plates and render them leaky.

We claim:

1. A freight-car roof, comprising a plurality of sheets of metal, each having one edge flanged downwardly over the edge of the roof and having its other edges flanged upwardly, caps mounted on the roof sepa-

rate from said plates and extending along the joints between adjacent plates, depending flanges on said caps embracing the upwardly extending flanges on said plates, the depending flanges of said plates having therein apertures elongated in a longitudinal direction with respect to the edge of the roof, a plurality of fastening devices rigidly secured to the sides of the car below the depending flanges of said plates and extending upwardly adjacent to said flanges, and studs on said fastening devices extending through said apertures and adapted to movably secure said plates.

2. A freight-car roof, comprising a plurality of sheets of metal, each having one edge flanged downwardly over the edge of the roof and having its other edges flanged upwardly, caps mounted on the roof separate from said plates and extending along the joints between adjacent plates, depending flanges on said caps embracing the upwardly extending flanges on said plates, the depending flanges of said plates having therein apertures elongated in a longitudinal direction with respect to the edge of the roof, a plurality of fastening devices rigidly secured to the side of the car below the depending flanges of said plates and extending upwardly adjacent to said flanges, and studs on said fastening devices extending through said apertures and adapted to movably secure said plates, each of said fastening devices having thereon a part extending upwardly and inwardly over the edge of the roof to provide additional security against upward movement of the outer edges of said plates.

3. In a car-roof, the combination of a ridge strip and a plurality of transverse strips extending from said ridge strip toward each side of the roof, individual plates covering the surface of the roof between successive transverse strips, the edges of said plates which are adjacent to said strips being flanged upwardly and spaced away from said strips, and the edges of said plates which are adjacent to the edges of the roof being flanged down and secured to the edge of the roof, caps extending along said strips and having depending flanges embracing and loosely overhanging the adjacent flanges on said sheets, there being a plurality of caps on the ridge strip each extending between two successive transverse strips and having their ends overlapping each other and overlapping the ends of the caps on said transverse strips, and fastening means extending through the overlapped parts of said caps, said caps having apertures therein for said fastening means arranged to permit said ridge caps to yield along the direction of the ridge and to permit said transverse caps to yield transversely to the ridge while preventing other movements thereof.

4. In a roof construction, the combination of plates having one edge flanged down over the edge of the roof, a plurality of fastening clips secured below the depending flanges and extending upward and over the edge of the roof for loosely confining said flanges, said flanges having apertures therein elongated in a horizontal direction, and means on said clips extending through said apertures and thereby limiting the horizontal movement of said plates.

5. In a car-roof construction, the combination of a strip extending along and projecting upward from the roof, and a metal sheathing covering said roof and comprising a sheet slidably mounted at one side of said strip and having a flange turned upward and then backward adjacent to said strip, and a second sheet extending over said strip and across the flange of said first sheet and having a depending flange extending under the flange of said first sheet, said flanges being spaced apart to permit relative movement transverse to each other, a depending flange on said first sheet extending over the edge of the roof, and means for movably securing said last named flange.

6. A freight-car roof, comprising a ridge strip, a plurality of strips extending transversely from said ridge strip toward each side of the car and subdividing the roof into a plurality of spaces, sheets of metal covering each of said spaces and each having its edges which are adjacent to said strips flanged upwardly and being of such size as to permit said sheets to have a considerable range of movement without interference with said strips, metal caps extending along said strips and over said upwardly flanged edges of said sheets, and running board saddles mounted above said strips and arranged to secure the running boards without interfering with the free movement of said sheets.

7. In a car-roof, the combination of a ridge strip and a plurality of transverse strips extending from said ridge strip toward each side of the roof, individual plates covering the surface of the roof between successive transverse strips, the edges of said plates which are adjacent to said strips being flanged upwardly and spaced away from said strips, and the edges of said plates which are adjacent to the edges of the roof being flanged down and secured to the edge of the roof, caps extending along said strips and having depending flanges embracing and loosely overhanging the adjacent flanges on said sheets, there being a plurality of caps on the ridge strip each extending between two successive transverse strips and having their ends overlapping each other and overlapping the ends of the caps on said transverse strips, fastening means extending through the overlapped parts of said caps, said caps having apertures therein for said

fastening means arranged to permit said ridge caps to yield along the direction of the ridge and to permit said transverse caps to yield transversely to the ridge while preventing other movements thereof, and running board saddles mounted at the junction of said ridge and transverse strips and supported clear of said sheets.

8. In a car-roof, the combination of a ridge strip and a plurality of transverse strips extending from said ridge strip toward each side of the roof, individual plates covering the surface of the roof between successive transverse strips, the edges of said plates which are adjacent to said strips being flanged upwardly and spaced away from said strips, and the edges of plates which are adjacent to the edges of the roof being flanged down and secured to the edge of the roof, caps extending along said strips and having depending flanges embracing and loosely overhanging the adjacent flanges on said sheets, there being a plurality of caps on

the ridge strip each extending between two successive transverse strips and having their ends overlapping each other and overlapping the ends of the caps on said transverse strips, fastening means extending through the overlapped parts of said caps, said caps having apertures therein for said fastening means arranged to permit said ridge caps to yield along the direction of the ridge and to permit said transverse caps to yield transversely to the ridge while preventing other movements thereof, and running board saddles mounted at the junction of said ridge and transverse strips and supported clear of said sheets, said running board saddles being secured by said fastening means.

Signed at Chicago this 5th day of October, 1908.

WILLIAM QUEENAN.
CHARLES MURPHY.

Witnesses:

EUGENE A. RUMMLER,
MARY M. DILLMAN.