

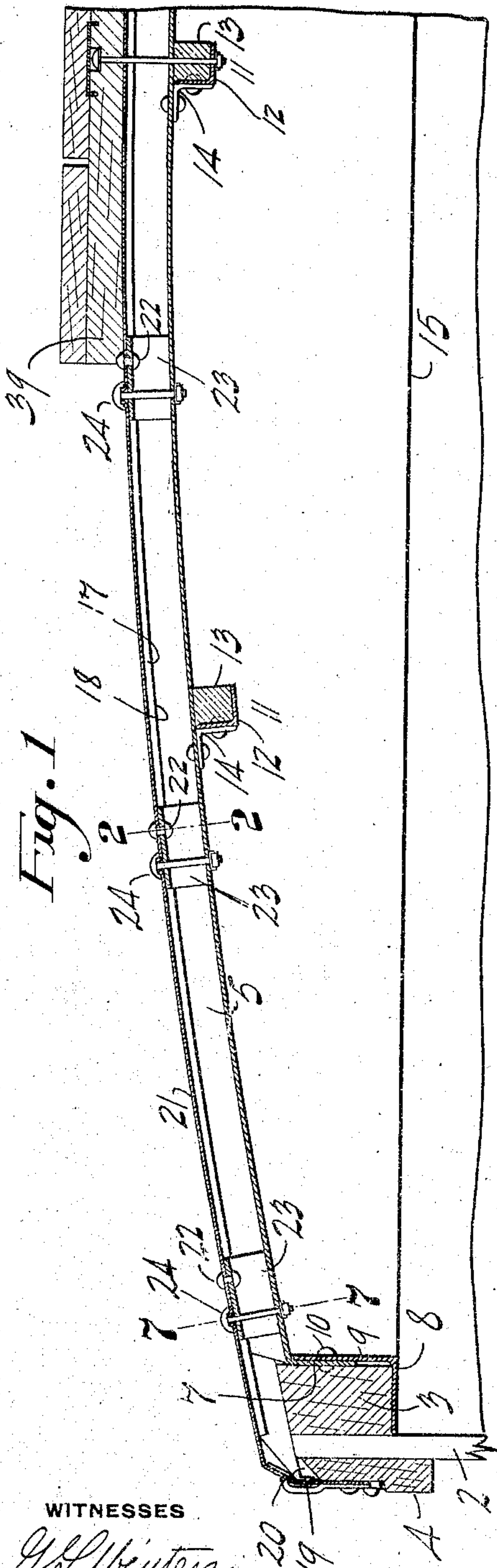
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J. J. HOFFMAN.
METALLIC CAR ROOF CONSTRUCTION.
APPLICATION FILED AUG. 20, 1910.

993,601.

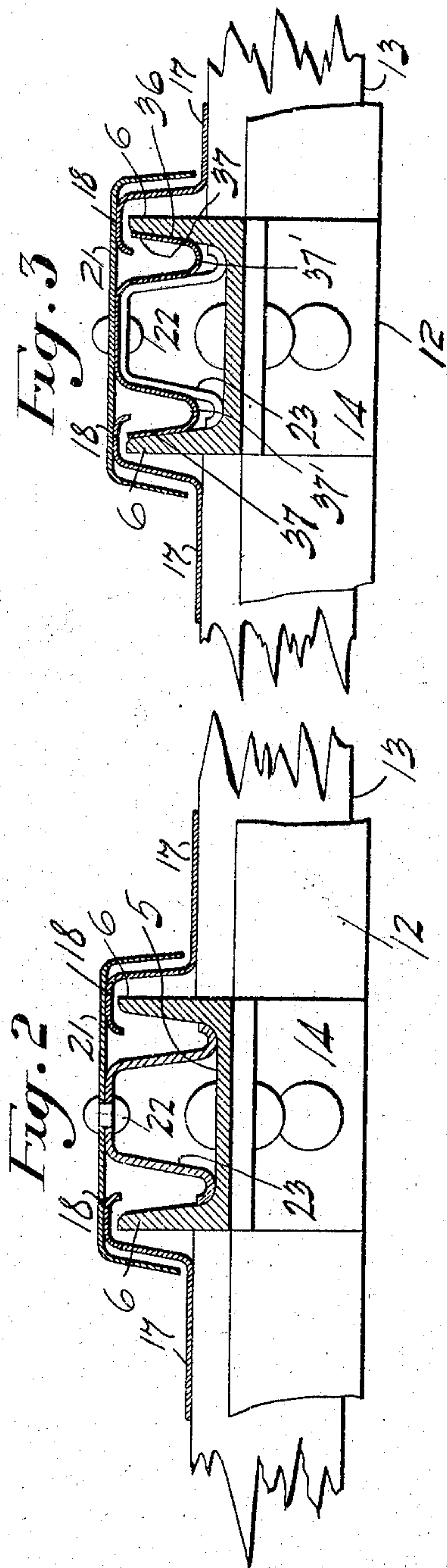
Patented May 30, 1911.

5 SHEETS—SHEET 1.



WITNESSES

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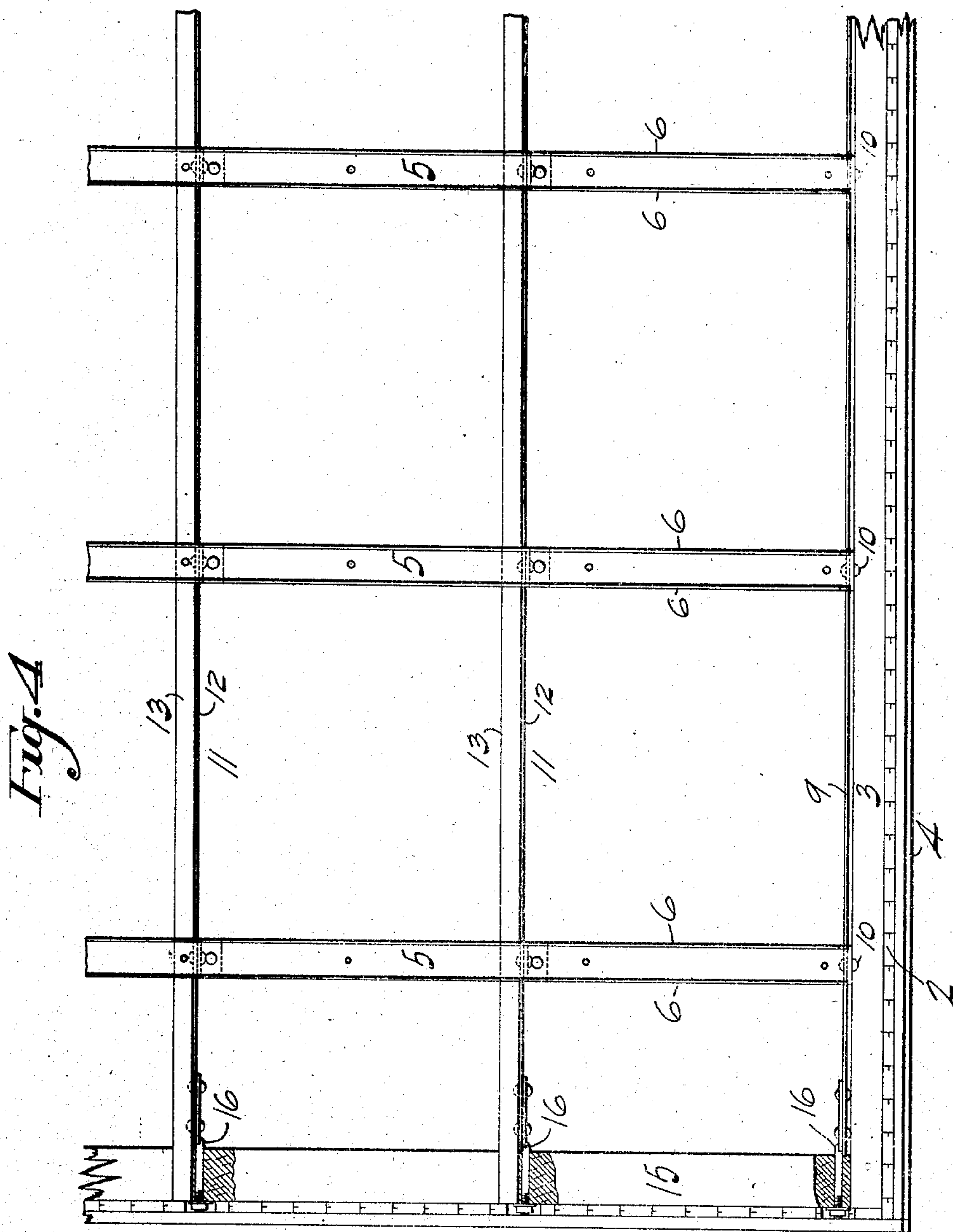


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5 SHEETS—SHEET 2.



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5 SHEETS—SHEET 3.

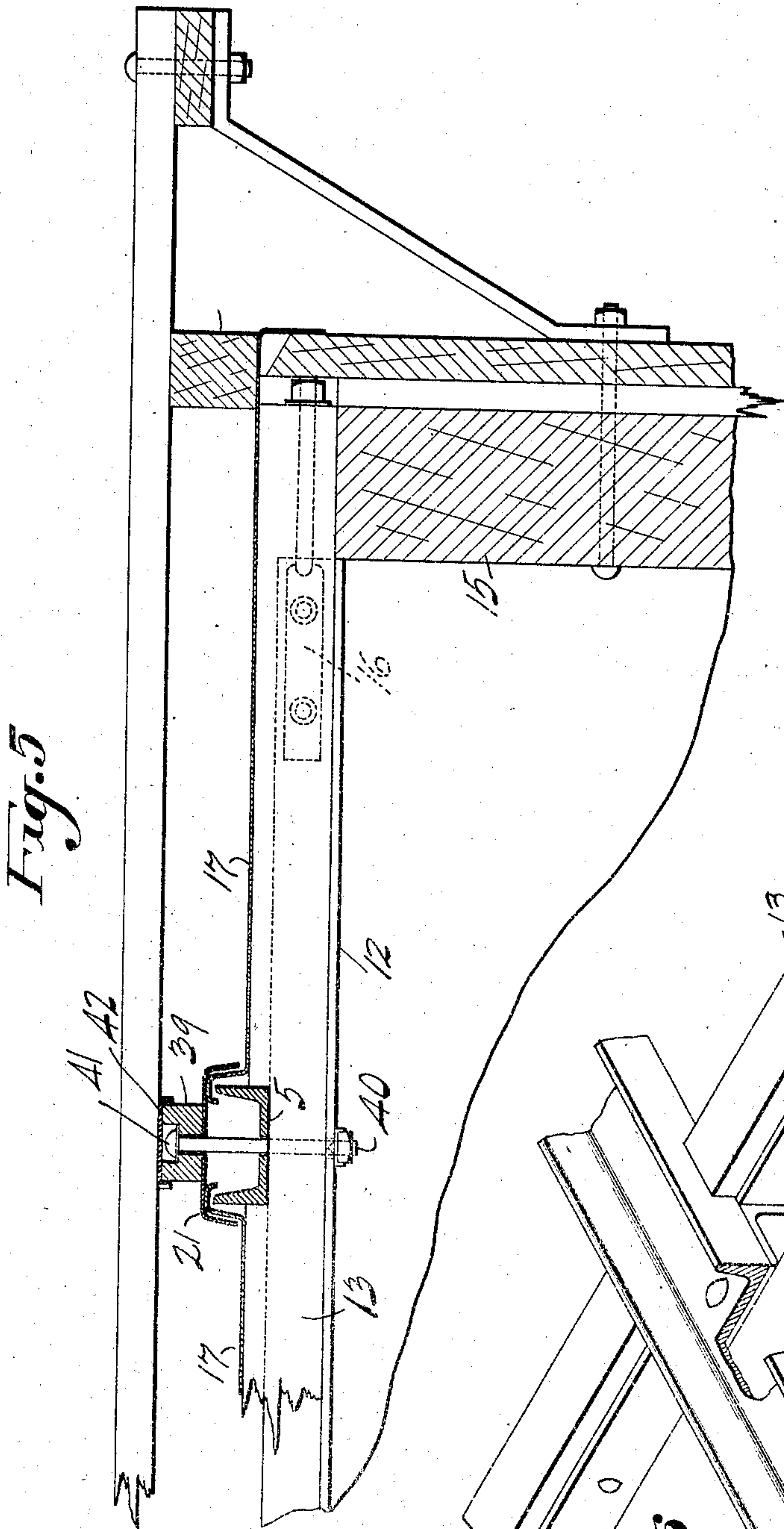


Fig. 5

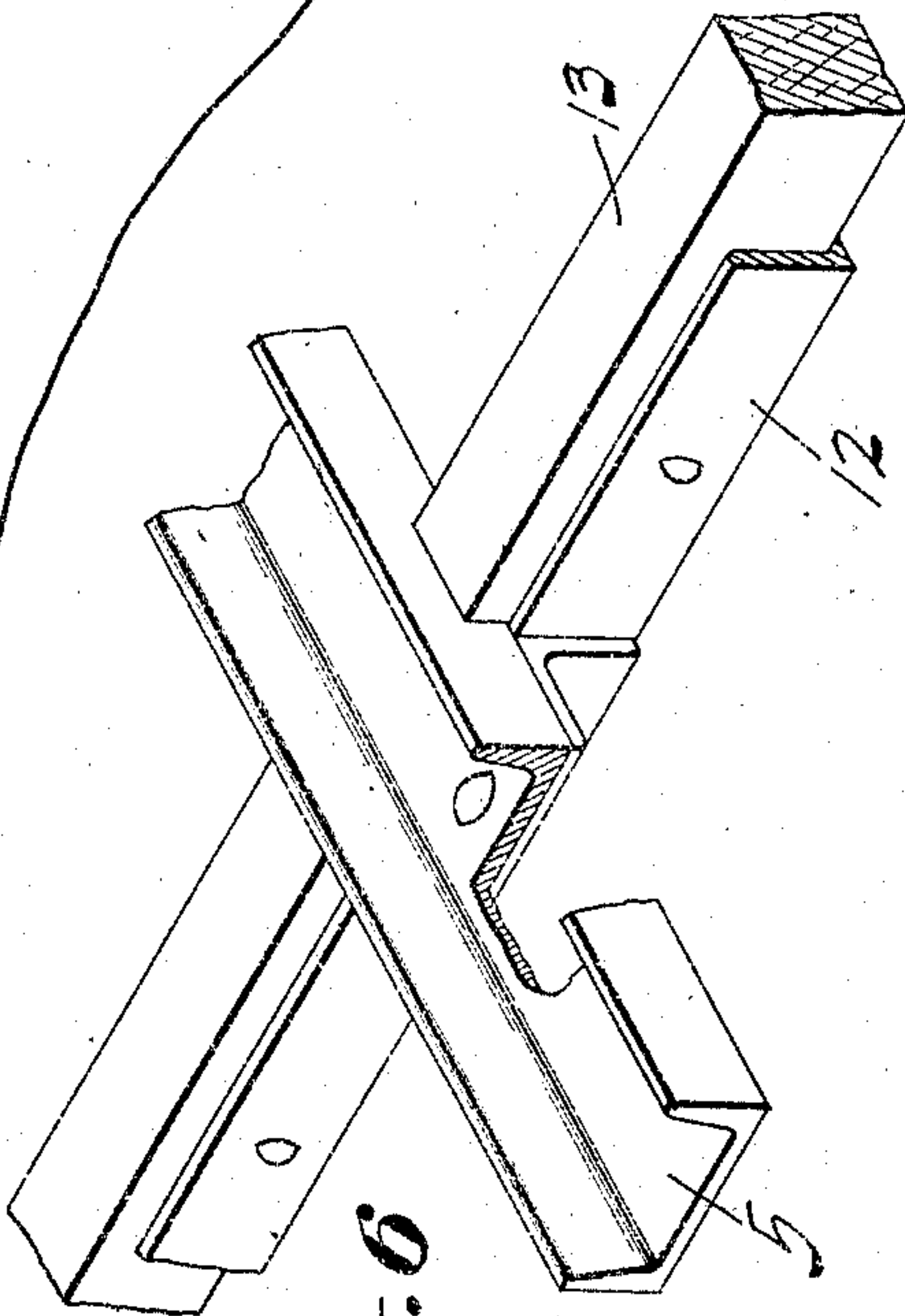


Fig. 6

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5 SHEETS—SHEET 4.

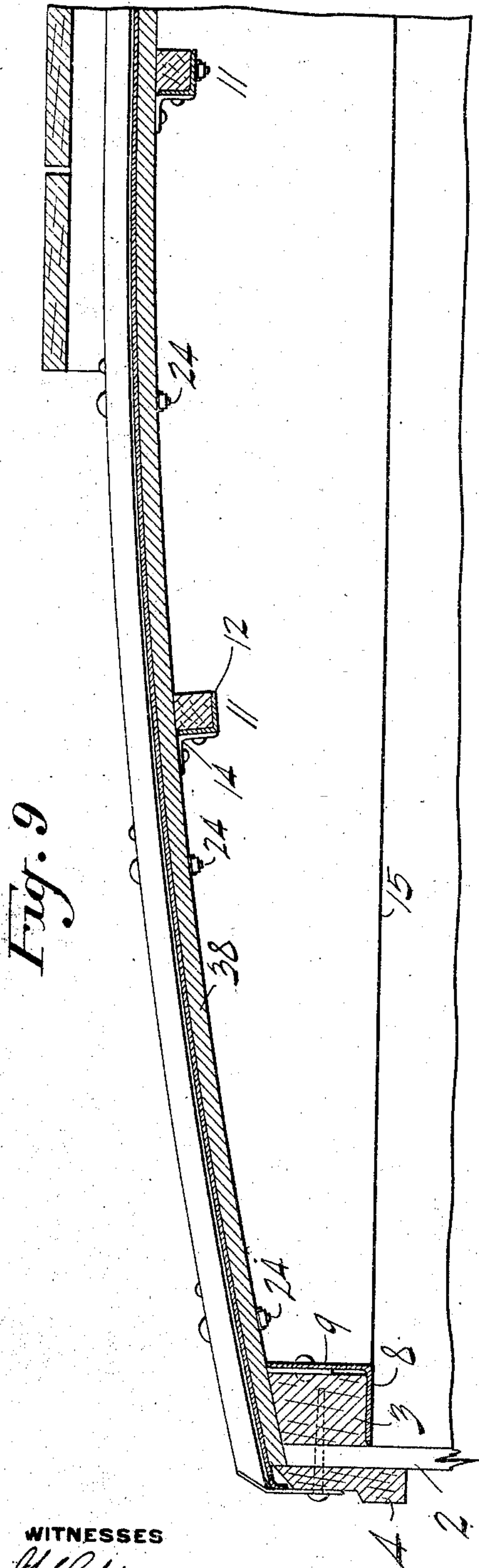


Fig. 9

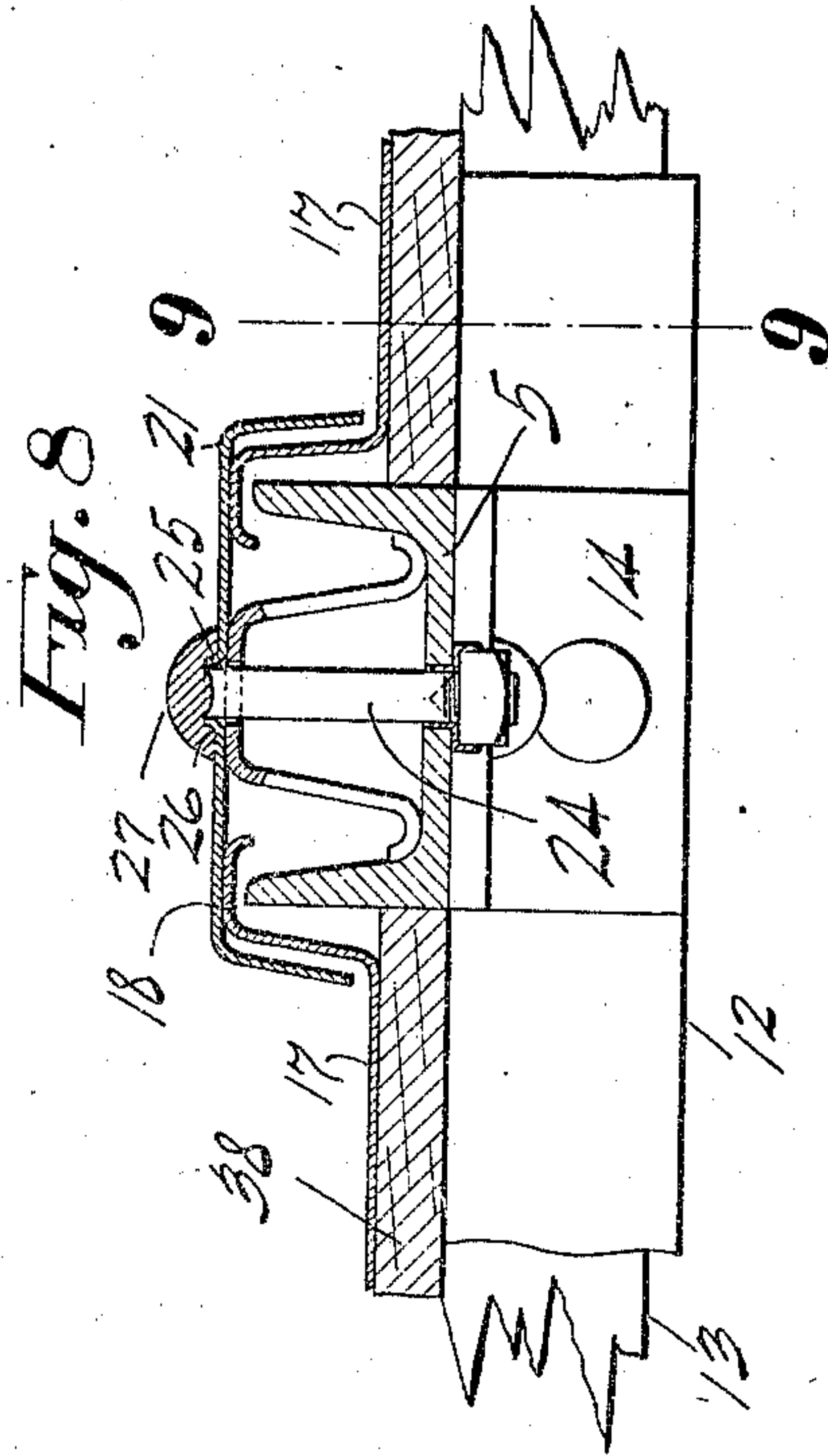


Fig. 8

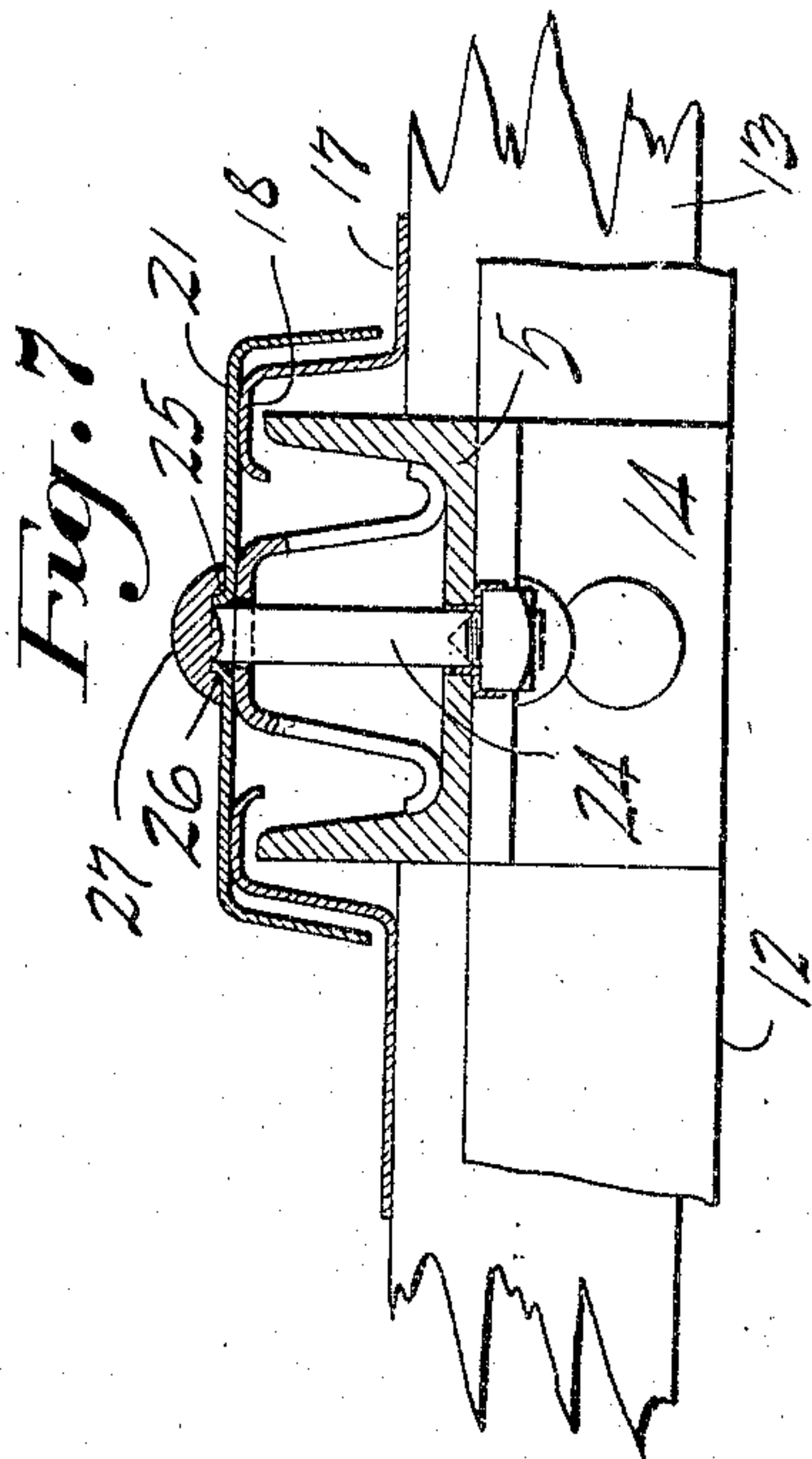


Fig. 7

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5 SHEETS—SHEET 5.

Fig. 13

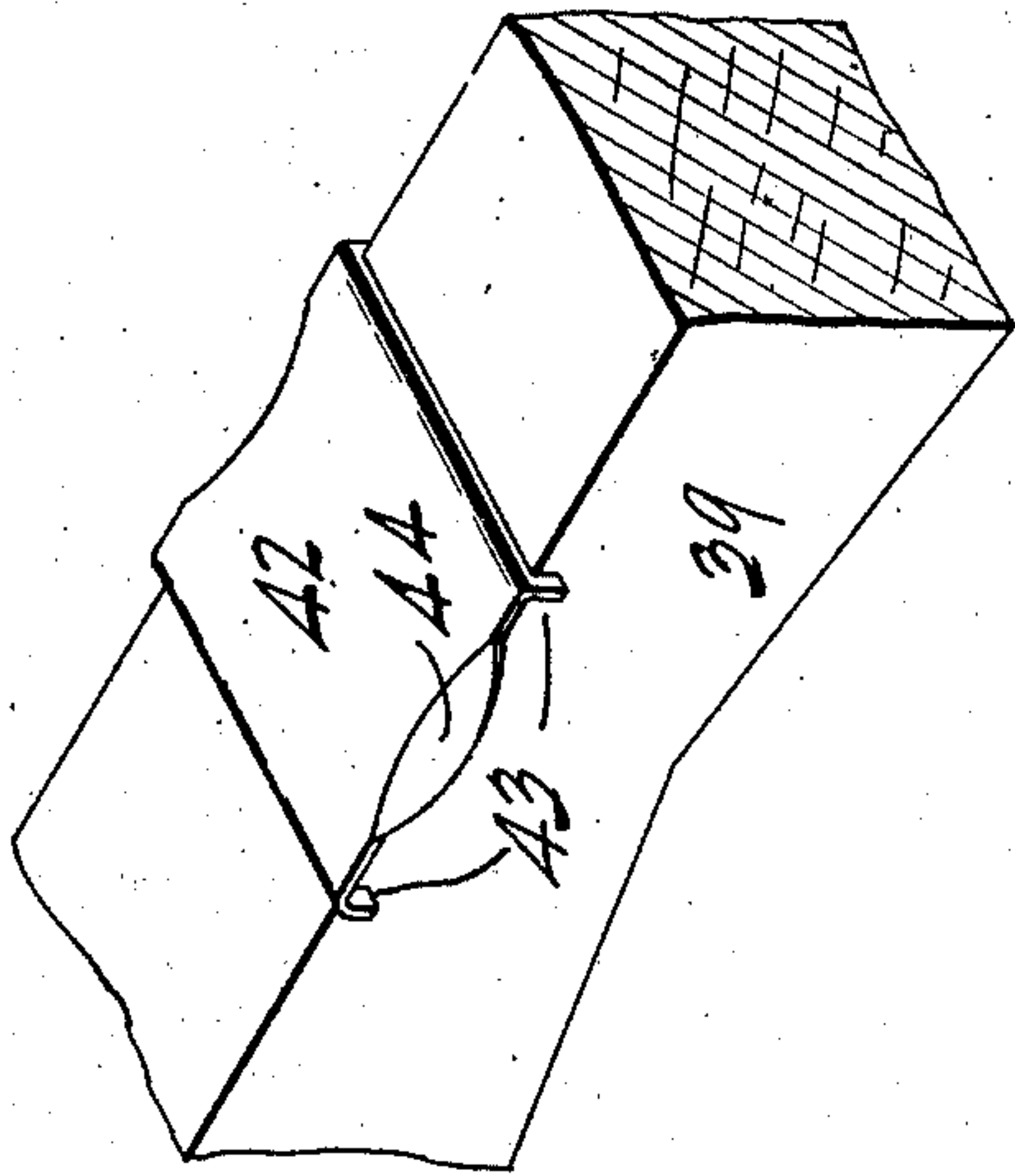


Fig. 11

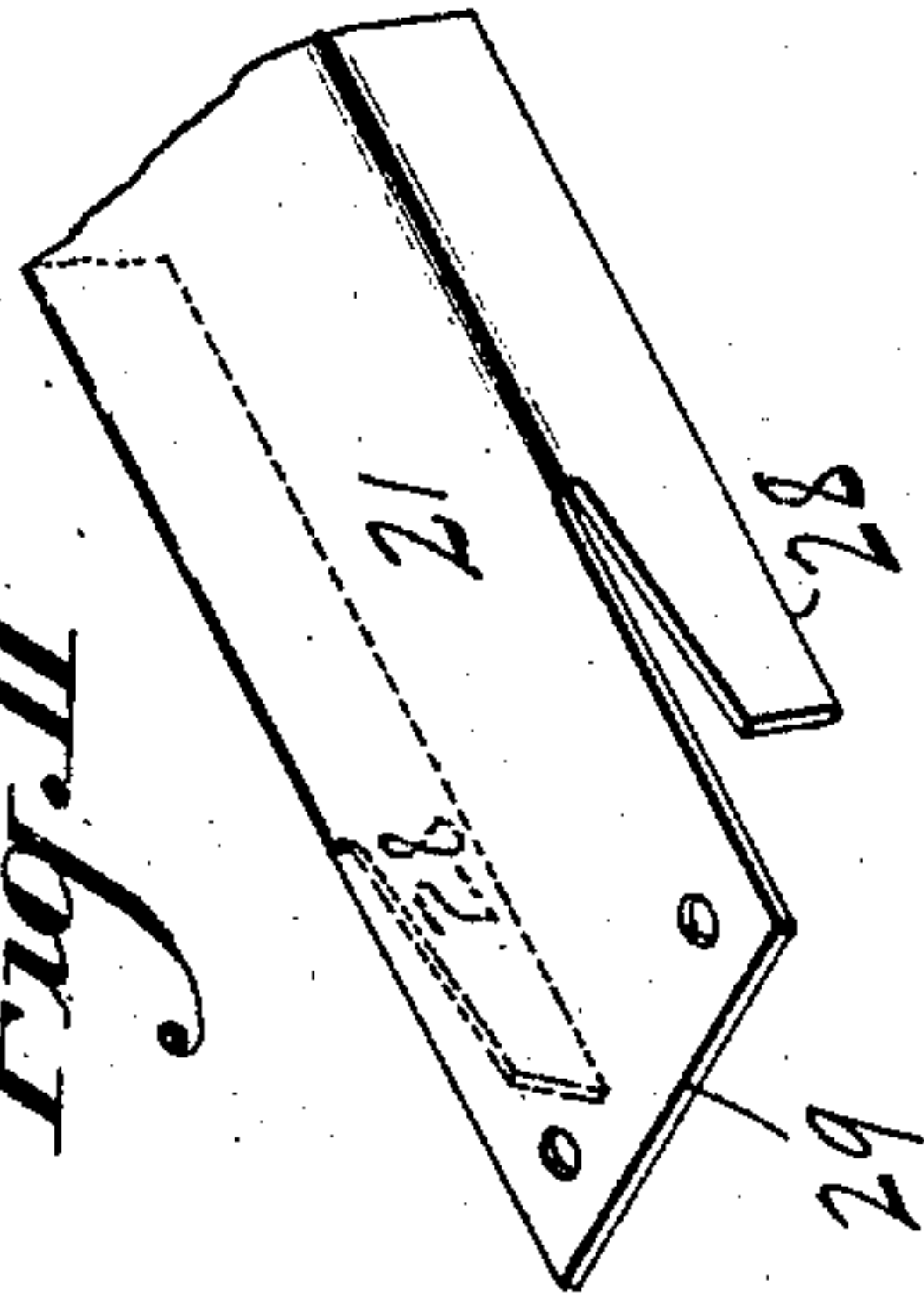


Fig. 12

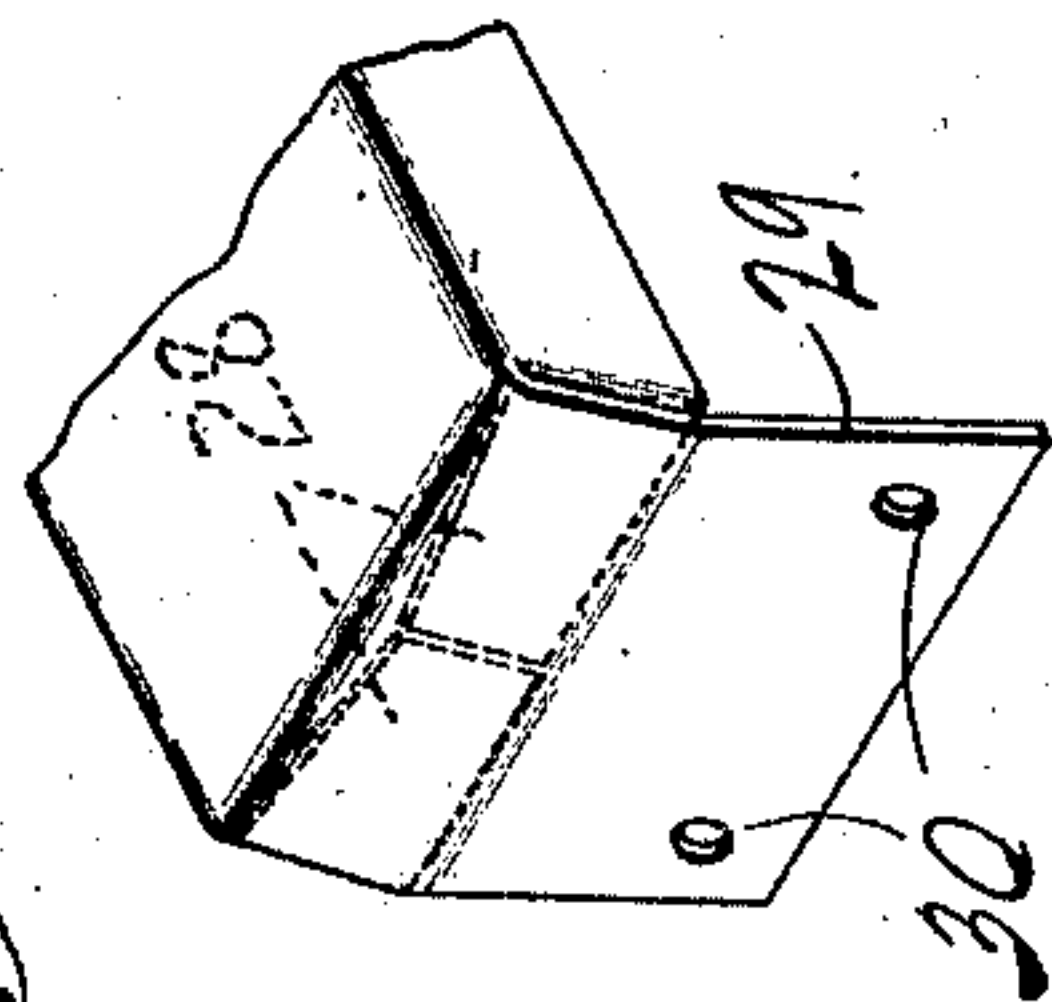
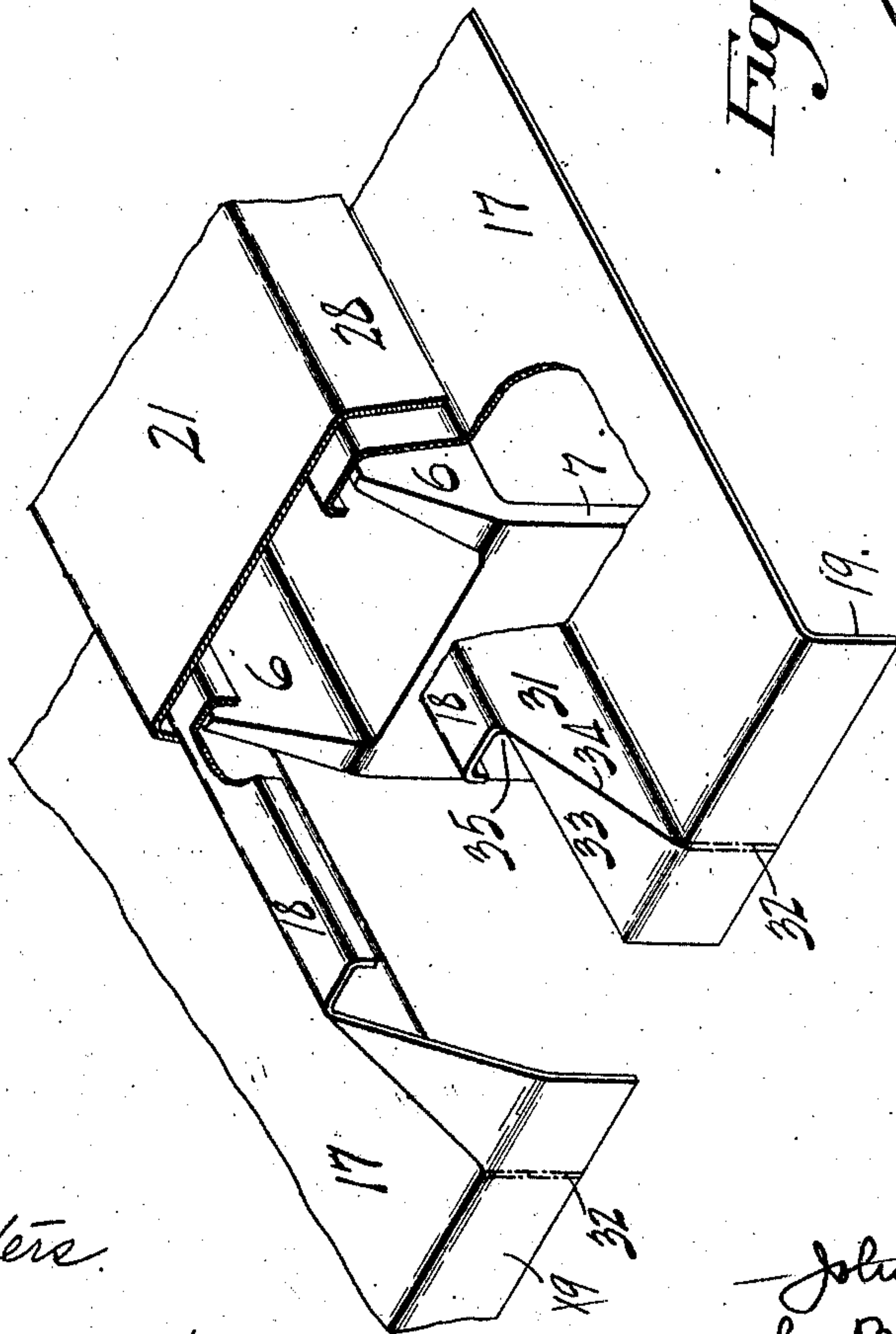


Fig. 10



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UNITED STATES PATENT OFFICE.

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METALLIC CAR-ROOF CONSTRUCTION.

993,601.

Specification of Letters Patent.

Patented May 30, 1911.

Application filed August 20, 1910. Serial No. 578,207.

To all whom it may concern:

Be it known that I, JOHN J. HOFFMAN, of New Kensington, county of Westmoreland, and State of Pennsylvania, have invented a new and useful Improvement in Metallic Car-Roof Construction, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form part of this specification.

This invention relates to car roof construction, more particularly to that type commonly employing supports having in cross section vertical and horizontal web portions, in combination with a series of metallic roof sheets having edge flanges which coöperatively associate with the support and a finishing strip or cap for the formation of a connective seam between the several sections of the roof.

The primary object of my invention is to provide a roof construction of the general character indicated, which shall be extremely light and durable, which is easy to assemble and which shall be absolutely water-proof.

With the above object in view, I also aim to provide a roof construction in which the seam formation may be perfectly maintained under weaving of the roof and contraction and expansion of the sheets, as will be hereinafter more fully set forth.

I will now describe my invention so that others skilled in the art to which it appertains may understand and construct the same, referring to the accompanying drawings in which I have shown one embodiment of my invention. It will be apparent, however, that I do not limit myself in this respect, as many changes may be made in the construction shown without departing from my invention.

Figure 1 is a vertical section through a portion of car roof embodying my invention; the section being taken approximately along the seam of the conjoined flanges of the roof sheets; Fig. 2 is a section on the line 2—2 of Fig. 1; Fig. 3 is a section corresponding to Fig. 2 and showing a modification to be hereinafter more fully referred to; Fig. 4 is a top plan view of the supporting frame work; the end-plate of the car being partly broken away; Fig. 5 is a longitudinal vertical section of the roof, being taken substantially at the ridge purlin; Fig. 6 is a perspective view partly broken away, showing the man-

ner of securing the frame members or supports at points of intersection; Fig. 7 is a section taken on the line 7—7 of Fig. 1; Fig. 8 is a similar view showing my invention as adapted to the employment of an under-roof or sub-sheathing construction; Fig. 9 is a section taken transversely of the roof on a line 9—9 of Fig. 8; Fig. 10 is a fragmentary perspective showing the end formation of the roof sheets; Fig. 11 is a similar view showing an end of the U-shaped finishing cap or strip before being bent to closed position; Fig. 12 is a similar view showing the end of the U-shaped cap as being closed; and Fig. 13 is a perspective view of the cap piece for protecting the fastening bolt of the running-board saddle.

In describing my invention, the reference numeral 2 represents the siding, 3 the side plates, and 4 the crown mold or fascia of a car of ordinary construction.

Arched to take the shape of the roof are the carlines 5, which are adapted to be disposed in the usual manner at intervals along the car siding. Each carline is in the form of a commercial rolled channel section, arranged with its flanges 6 projecting upwardly and is provided with the depending end flange 7 by means of which it is secured to the respective side plate 3 of the car. This flange 7 is preferably formed by shearing away the flanges 6 and bending downwardly the remaining terminal portion of the web of the channel, in the manner shown. If desired, the side plate may be provided with the angle piece 8, longitudinally disposed thereon, and between the upwardly projecting flange 9 of which and the inner face of the side plate 3 may lie the flange 7 of the carline. This angle arrangement serves to strengthen the side plate and obviates the necessity of bolting each carline directly through the side plate and car siding, as the carlines may be secured to the angle, as by rivets 10, and the angle piece 8 rigidly secured to the side plate at a less number of points than the number of carlines.

Completing the supporting frame-work are the longitudinal members 11 which extend beneath and are spaced at intervals along the carlines 5, as shown in Figs. 1 and 4. These members comprise the angle sections 12 and wooden beam or stringers 13; the latter resting upon a substantially hori-

zontally disposed leg of the section 12 which is preferably riveted to the under side of the carline 5 through the medium of the angle-brackets or clips 14, and is tied to the end plate 15 of the car preferably by means of suitable bolts 16 terminally carried by the said angle section. However it will be apparent that other means may be employed to tie the angle section 12 to the end plate.

10 The numerals 17 indicate the roof sheets or plates which are preferably of single units, extending transversely of the car and between the carlines 5 and resting upon the members 11. However, if desired, they may
15 be of sectional or built-up construction. These plates are shaped to conform to the roof contour of the carlines and have the upwardly standing double turned or re-bent edge flanges 18 which overhang the flanges 6 of the carline, and the depending end flanges 19 which lie in the recess 20 of the fascia 4. The height of the flange 18 of the sheet is preferably greater than the distance between the upper face of the supporting member 11
25 and the upper edge of the carline flange 6 so that the said flange will not bind against the carline. Surmounting and partially embracing the carline 5 and its associated flanges 18 of the roof sheets is the inverted U-shaped finishing cap or strip 21 which serves to seal the joint between the opposing sheet sections. Preferably carried by the strip 21, by means of rivets 22, and seated within the channel like face of the carline, preferably at intervals therealong, are the U-shaped supports 23 which serve to space the U-shaped finishing strip from the flanges of the roof sheets. This spacing of the cap or strip renders the sheets or plates of the roof free to move under expansion and contraction and the weaving of the roof incident to operative stresses. The strip 21 is rigidly secured against deflection or rising, preferably by means of suitable fastening bolts 24 which pass through the strip preferably at points associated with the supporting members 23, to the web of the channel carline, as is clearly shown in Figs. 1 and 7. By passing the bolt through the finishing strip at this point, the strip may, by reason of the supporting members, be rigidly clamped in position without injuriously bending or crushing the upper face of the strip. And at this point where the bolt passes through the finishing strip or cap, to prevent the entrance of moisture, I form on the upper face of the strip the outwardly projecting annular flange or boss 25 coöperatively associated with which is the recess 26 of the head 27 of the fastening bolt 24.

As shown in Fig. 11, the cap or strip 21 has the terminal flanges 28 and 29, the former flanges 28 of which are adapted to be 35 first folded inwardly and the other top

flange 29 then folded downwardly, as shown in Fig. 12, to effect sealing closure of the end of the cap or strip. The flange 29 in closed position is secured to the fascia 4 of the car as shown, by the suitable fastening means 30, and this fastening of the flange is preferably at a point below the flanges 19 of the roof sheets, which underlie the said flange 29. By this arrangement the depending flange 19 (the office of which, as is well understood in the art, is to seal the roof at the edge or along the car siding against the entrance of moisture and cinders) is rendered free to move within the fascia recess 20, both transversely and lengthwise of the roof, under movement of the sheet, incident to expansion and contraction and to weaving due to operative stresses.

Referring to Fig. 10, it will be seen that the lower or depending end flange 19 of the roof sheet does not terminate substantially on a line with the inner wall 31 of the up-standing, double-turned side flange 18, as indicated by the broken line 32 and as is the customary practice in car roof construction, but that the said flange 19 is carried out, or rather extended, practically flush with the outer edge of the flange 18 and is provided at this point with the upwardly sloping wall or flange portion 33, which is preferably formed by angularly folding at 34 the upright wall 31 of the flange 18 as the end of the sheet is folded downwardly to form the depending flange 19. To permit of the flange wall 31 being readily folded along the line 34 in the manner just described, I notch the upright edge flange as at 35, obviating thereby the necessity of contracting or folding the metal at this point when the flange is folded.

The above mentioned corner construction of the sheet greatly stiffens and reinforces the sheet at this point where the tendency is, and which is a very frequent occurrence, to cause the sheet to break and tear as the sheet resisted through its edge flange by the embracing U-shaped finishing cap or strip, or other fastening means, moves along the roof and over the ribbed under severe operative pressure and contraction and expansion. This motion, by stopping the depending flange to short of the upturned flange, as is the usual practice and as described above, of allowing along the edge of the sheet, actually passes against the end of the strip, turning the flange and finds access to the inside of the roof. It will be apparent that this cannot take place with the corner construction of the sheet in my improved roof, as water flowing along the edge flange will be excluded by the upwardly sloping flange 33 and directed by the end of the flange 19, outside of the car. As above described, the end of the U-shaped finishing cap or strip overlies the opposing corners of the sheets

with their depending flanges 19 so as to effectually exclude moisture and cinders from the edge of the sheet at this point where the sheet passes over the edge of the car.

Referring to Fig. 3, I show the seam of the roof sheets as being provided with the inverted channel like strip 36 which is interposed between the members 23 and the horizontal wall of the cap 21 and which is provided with the upturned flange portions 37 which snugly fit against the inner faces of the flanges 6 of the carline, terminate substantially flush with the top edges thereof, and form at each side of the supports 23 the drain flutes 37', the purpose of which is to prevent seepage through the perforated carline of water which readily condenses from moisturous and foggy atmosphere passing beneath the flanges of the U-shaped cap 2, as in the case of the foggy atmosphere incident to seaboard railway lines. This drain strip 36 being arched, is preferably so disposed to convey the water resulting from such condensation, along the flutes 37' to the sides of the car at points outside of the zone of the carlines and side plates.

In Fig. 8 I show my improved roof-construction as employed in connection with a sub-roof or undersheathing 38, which may be of any suitable construction and which is adapted to be interposed between the members 11 and the roof sheets or plates. This sub-roof may be in the form of water-proof paper sheathing or the like, as in the case where it is desired to obviate "sweating" incident to moisturous condensation on the under face of the metallic roof sheets, as when the car is of the construction adapted for refrigeration service.

In Figs. 1, 5 and 13, the running board saddle 39 is shown as mounted upon the U-shaped finishing cap or strip 21 and, in Figs. 1 and 5, as being secured thereto by means of the bolt 40 which passes down through the cap 21, carline 5 and under-purlin or longitudinal member 11. The head of this bolt lies in the counter-sunk recess 41 in the saddle, and over this counter-sunk bolt head I place the cap piece 42, which has the depending end flanges 43 which fit in suitable recesses transversely of the upper face of the saddle, and the side ears 44 which are adapted to coöperatively resiliently hug the sides of the saddle. This cap piece arrangement serves to prevent moisture from entering the roof through the saddle bolt hole, should the superposed plank of the running board become loosened or split.

In assembling the roof sections, the sheets are preferably first placed on the supports 11, between the upwardly projecting flanges of the carline and the U-shaped finishing strip carrying the supporting members 23, and in certain cases the drain strip 36, then inserted interlockingly with the edge flanges

18, at the edge of the roof and slidingly longitudinally shifted into position, after which the side flanges 28 of the end of the finishing strip are folded inwardly and the end flange 29 folded downwardly and secured to the car facia in the manner above described to effect sealing closure of the end of the strip and to prevent, by the flange 29, deflection thereof from the roof sheets.

It will be apparent that the construction shown is capable of great modification without departure from the spirit of my invention, and I do not therefore desire to limit myself thereto.

The advantages of my improved roof will be appreciated by those skilled in the art.

Having thus described my invention, what I claim and desire to secure by Letters Patent, is,—

1. In a car roof, the combination with the car siding, of carlines carried thereby, angle sections spaced at intervals along the carlines and extending longitudinally of the roof, and so arranged as to have legs substantially horizontally disposed, non-metallic strips resting upon the horizontal legs of the angle sections and extending between the carlines, and roofing resting upon the non-metallic strips between the carlines.

2. In a car roof, the combination with the car siding, of carlines carried thereby, angle sections spaced at intervals along the carline and extending longitudinally of the roof and so arranged as to have legs substantially horizontally disposed, non-metallic strips resting upon the horizontal legs of the angle sections and extending between the carlines, sub-sheathing resting upon the strips, and roofing resting upon the sheathing.

3. In a car roof, the combination with the car siding, of carlines carried thereby, angle sections spaced at intervals along and extending beneath the carlines and so arranged as to have legs substantially horizontally disposed a distance from the under faces of the carlines, non-metallic strips resting upon the horizontal legs of the angle sections and extending between the carlines, and roofing resting upon non-metallic strips.

4. In a car roof, the combination with the car siding, of carlines carried thereby, angle sections spaced at intervals along and extending beneath the carlines and so arranged as to have legs substantially horizontally disposed a distance from the under faces of the carlines, non-metallic strips resting upon the horizontal legs of the angle sections and extending between the carlines, sub-sheathing resting upon the strips, and roofing resting upon the sub-sheathing.

5. In a car roof, the combination with the car siding, of carlines carried thereby, angle sections spaced at intervals along and extending beneath and secured to the carlines and tied to the end plates of the car and so

arranged as to have legs substantially horizontally disposed a distance from the under faces of the carlines, non-metallic strips resting upon the horizontal legs of the angle sections and extending between the carlines, and roof sheets resting upon the non-metallic strips and having edge flanges associated with the carlines.

6. In a car roof, the combination with the car siding, of carlines carried thereby, angle sections spaced at intervals along and extending beneath and secured to the carlines, and tied to the end plates of the car and so arranged as to have legs substantially horizontally disposed a distance from the under faces of the carlines, non-metallic strips resting upon the horizontal legs of the angle sections and extending between the carlines, a sub-sheathing resting upon the non-metallic strips, and roof sheets resting upon the sheathing and having edge flanges associated with the carlines.

7. In a car roof, the combination of a support having in cross section horizontal web and vertical flange portions, roof sheets having edge flanges associated with the supports, a cover strip embracing the edge flanges of the sheets and a drain strip interposed between the cover strip and the support.

8. In a car roof, the combination of a support having in cross section horizontal web and vertical flange portions, roof sheets having edge flanges rebent to overlie the vertical flanges of the support, a cover strip adapted to embrace the edge flanges, and a drain strip adapted to interlockingly associate with the sheet flanges and carried by the cover strip; the cover strip and the drain strip being adapted to be slidably shifted into engagement with the edge flanges of the sheets.

9. In a car roof, the combination of a support having in cross section horizontal web and vertical flange portions, roof sheets having edge flanges associated with the vertical flanges of the support, a cover strip adapted to embrace the edge flanges and adapted to

be slidably shifted into position, means for spacing the strip from the support, and a drain strip carried by the cover strip and adapted to lie between the vertical flanges of the support and be shifted with the cover strip into interlocking association with the flanges of the roof sheets.

10. In a car roof, the combination with the car siding, of a support carried thereby and having in cross section horizontal web and vertical flange portions, roof sheets having upturned edge flanges associated with the support and downturned end flanges overlying the car siding, the side flange having an angularly turned terminal flange portion sloping downwardly toward the depending end flange of the sheet, and a cover strip embracing the edge flanges.

11. In a car roof, the combination with the car siding, of a support carried thereby and having in cross section horizontal web and vertical flange portions, roof sheets having upturned edge flanges associated with the support and downturned end flanges overlying the car siding, the side flange having an angularly turned terminal flange portion sloping downwardly and depending extensively with the depending end flange of the sheet, and a cover strip embracing the edge flanges.

12. In a car roof, the combination with the car siding, of a support carried thereby and having in cross section horizontal web and vertical flange portions, roof sheets having upturned edge flanges rebent to overlie the vertical flanges of the support and downturned end flanges overlying the car siding, the side flange having an angularly turned terminal flange portion sloping downwardly toward the depending end flange of the sheet, and a cover strip embracing the edge flanges.

In testimony whereof, I have hereunto set my hand.

JOHN J. HOFFMAN.

Witnesses:

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M. A. KELLER.