

F. L. IRWIN.  
CAR UNDERFRAME CONSTRUCTION.  
APPLICATION FILED FEB. 21, 1908.

900,546.

Patented Oct. 6, 1908.

3 SHEETS—SHEET 1.

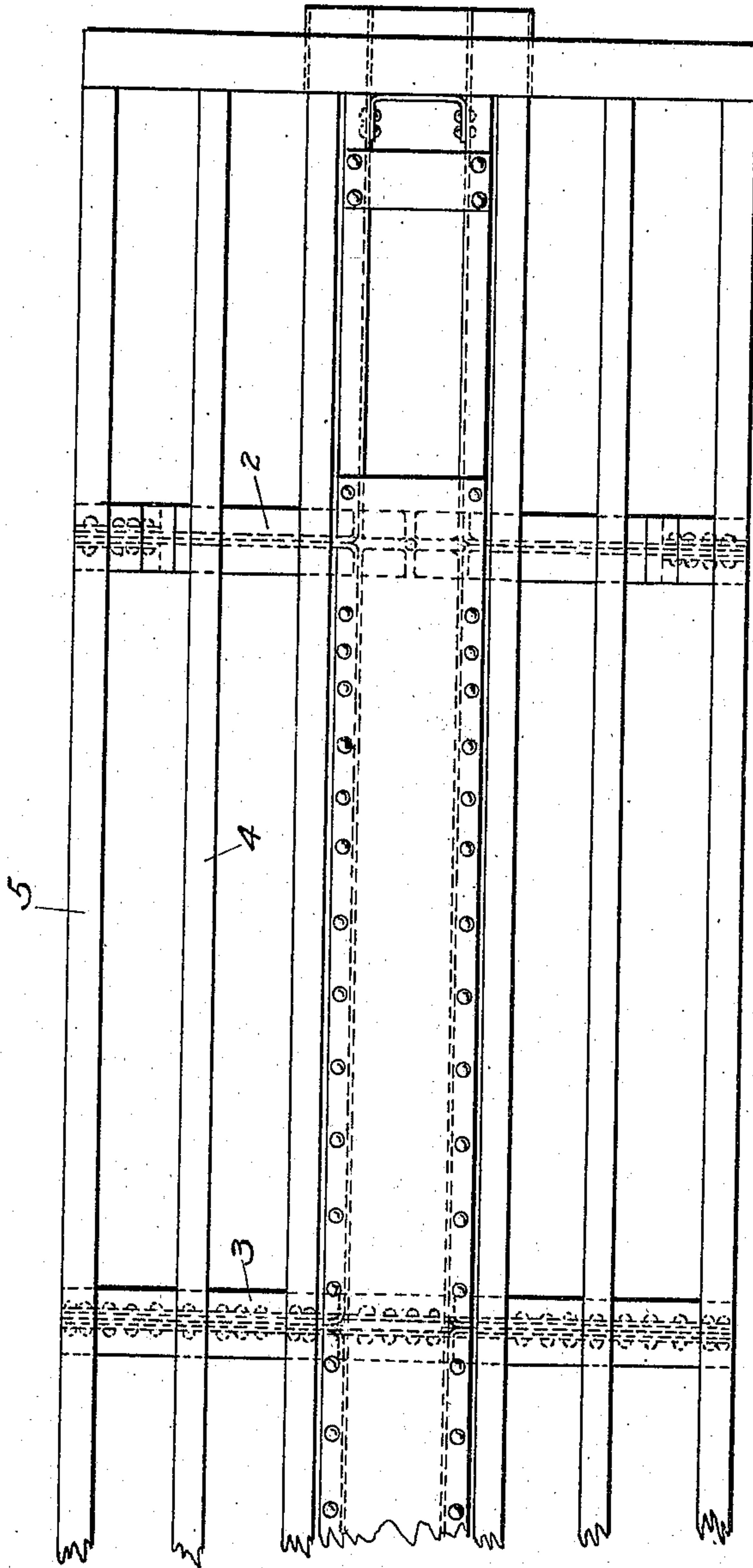


Fig. 1.

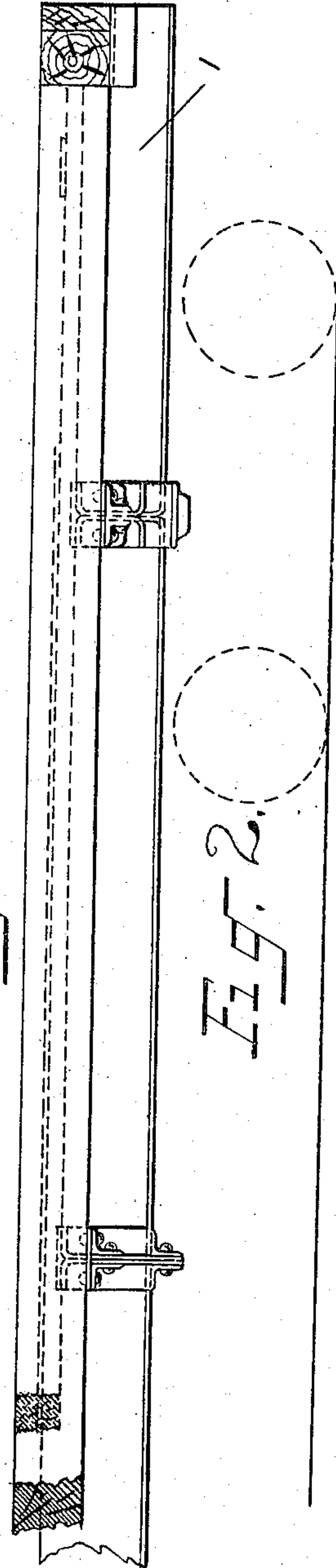


Fig. 2.

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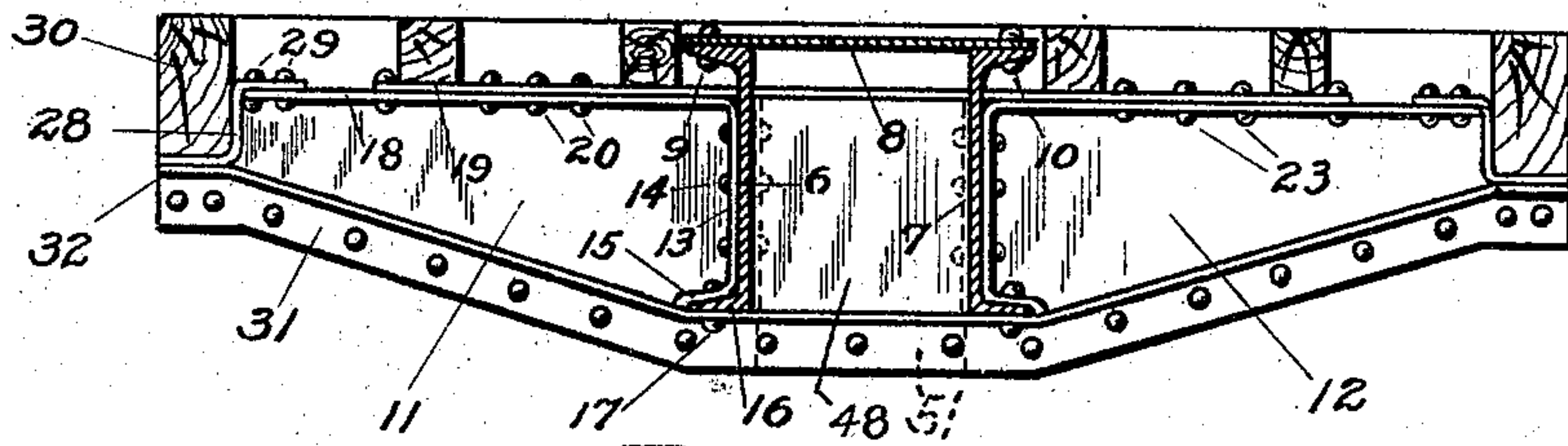


Fig. 3

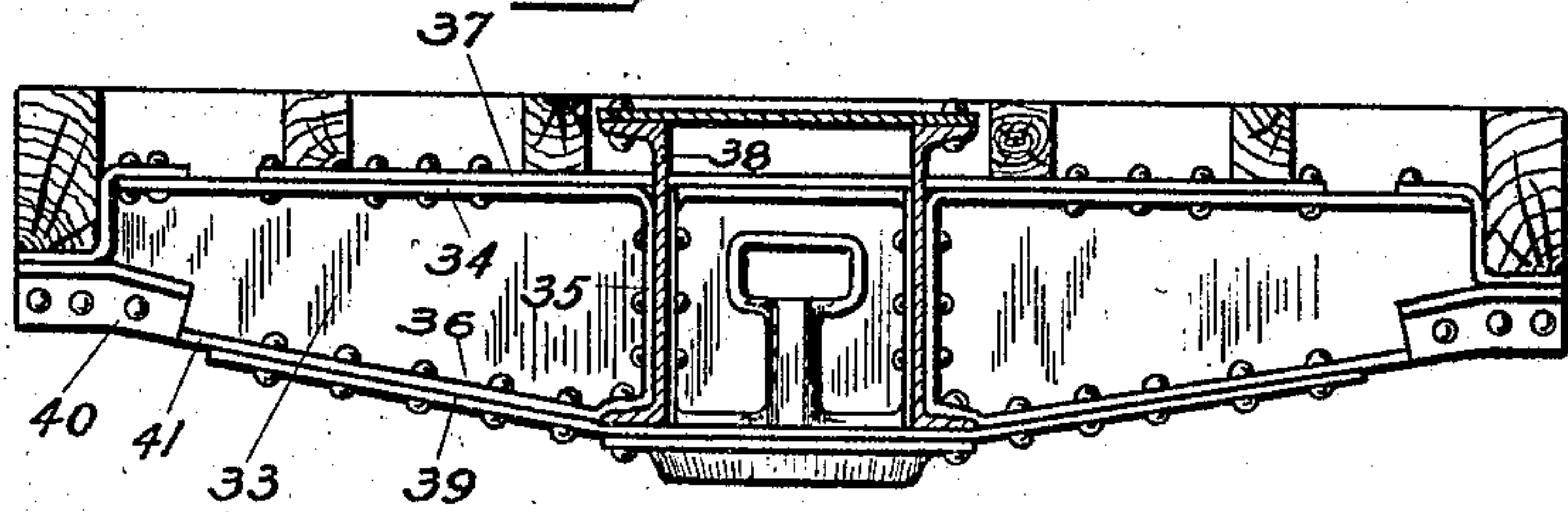


Fig. 4

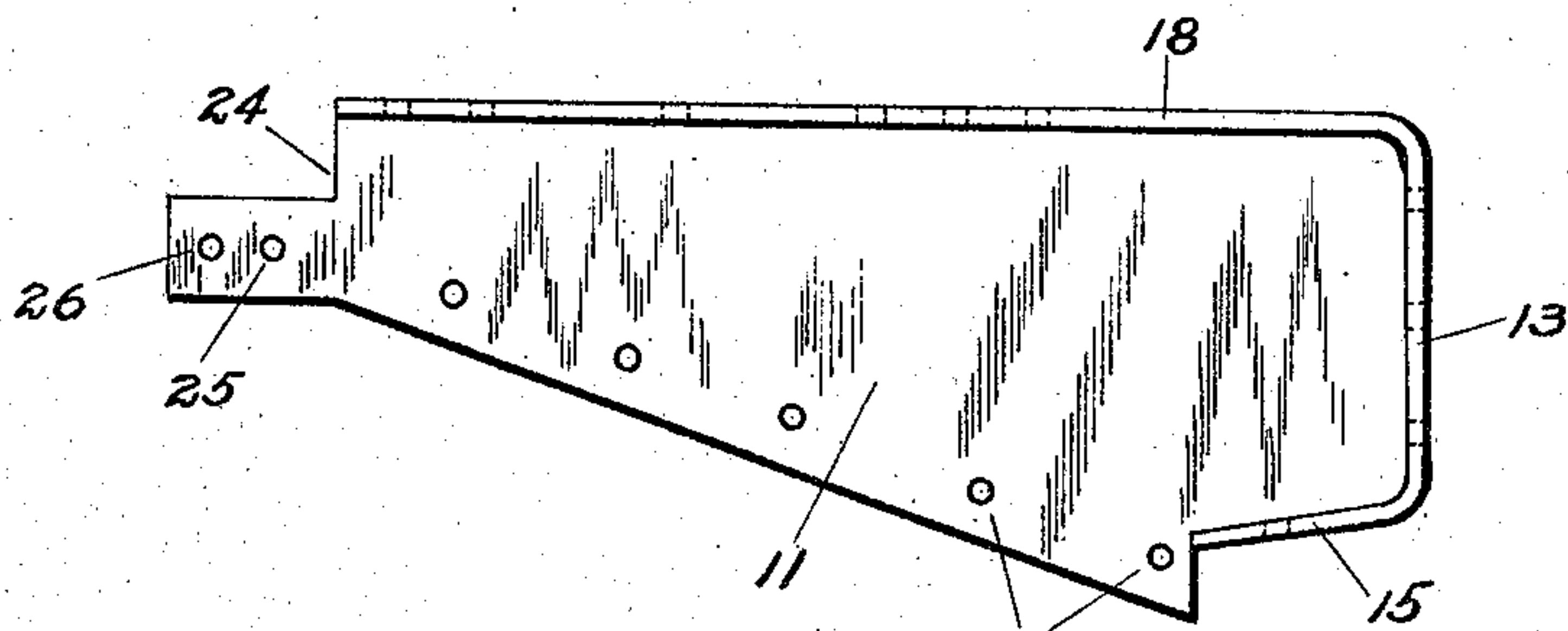


Fig. 5

WITNESSES:  
*Horace*  
*Rager*

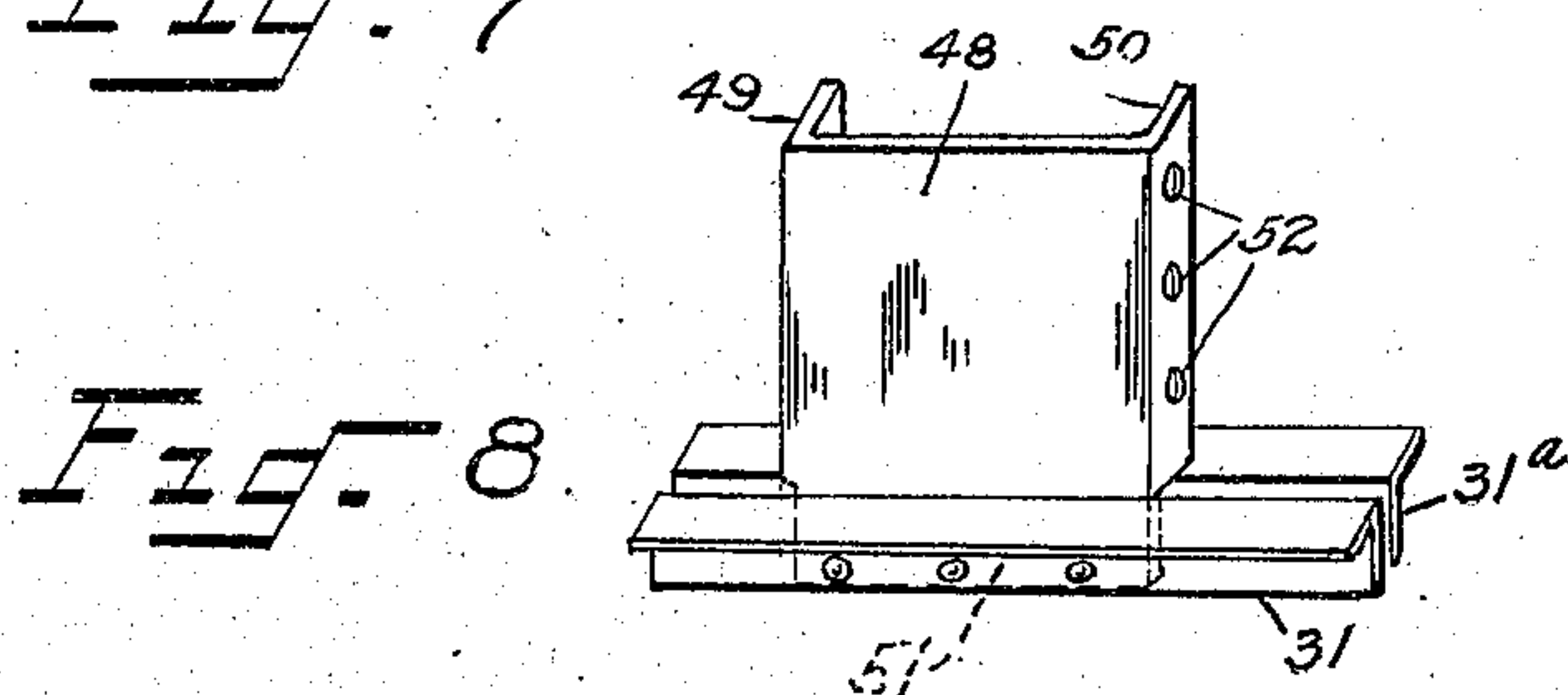
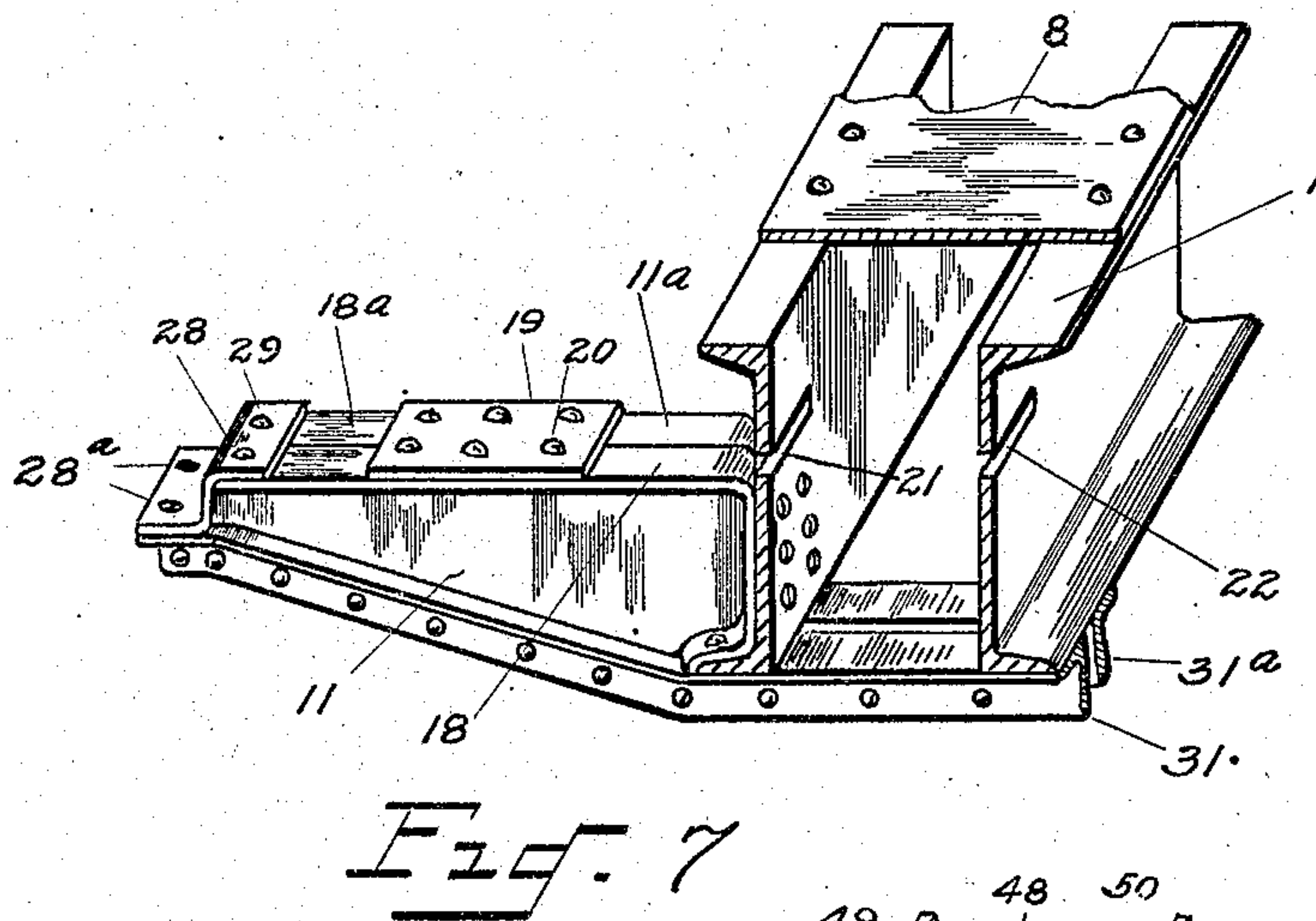
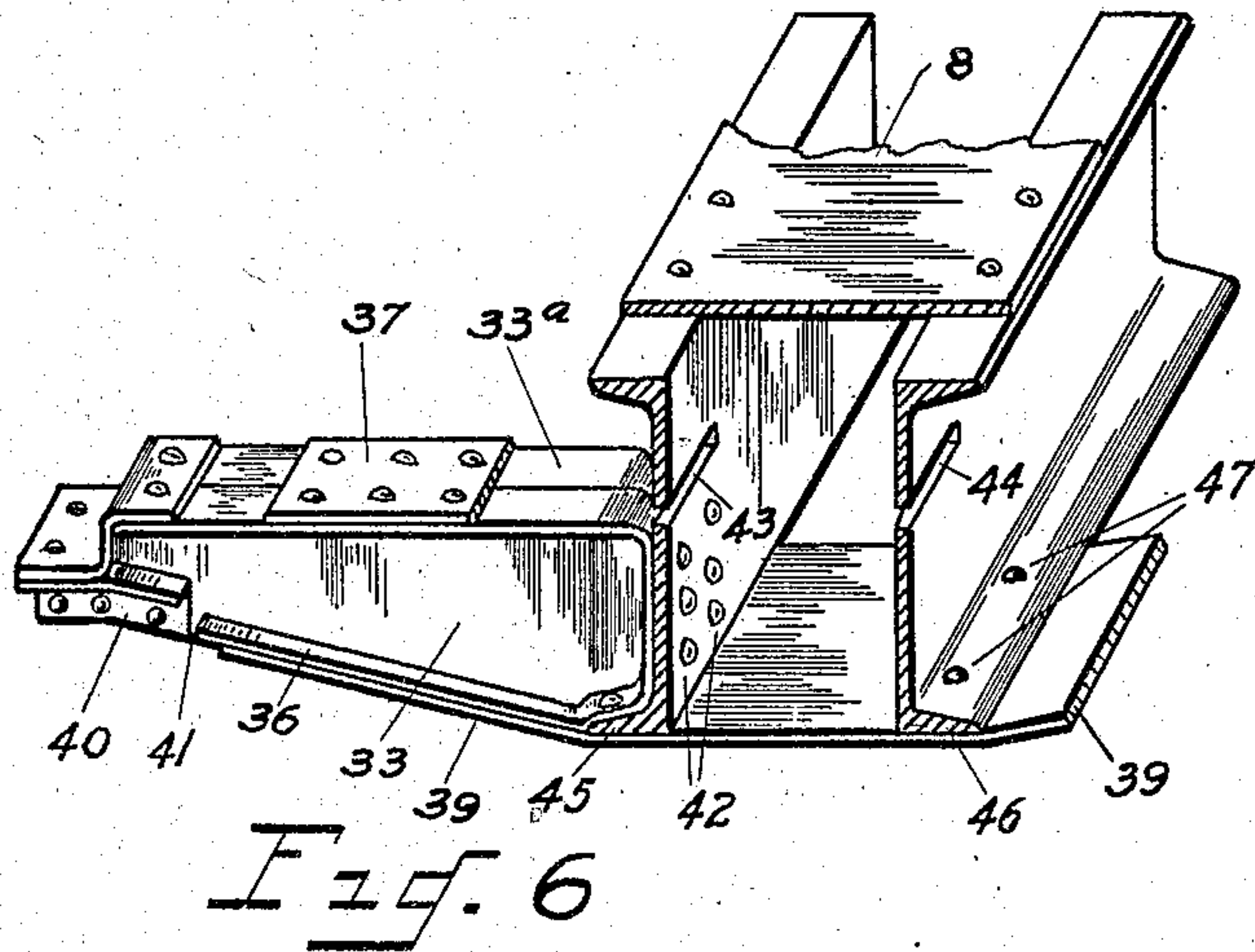
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3 SHEETS—SHEET 3.



WITNESSES:  
*Horace R. Rager*

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# UNITED STATES PATENT OFFICE.

FRANK L. IRWIN, OF COLUMBUS, OHIO, ASSIGNOR TO THE RALSTON STEEL CAR COMPANY,  
OF COLUMBUS, OHIO, A CORPORATION OF OHIO.

## CAR-UNDERFRAME CONSTRUCTION.

No. 900,546.

Specification of Letters Patent.

Patented Oct. 6, 1908.

Application filed February 21, 1908. Serial No. 417,193.

*To all whom it may concern:*

Be it known that I, FRANK L. IRWIN, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Car-Underframe Constructions, of which the following is a specification.

My invention relates to improvements in underframe constructions for cars, especially relating to steel or metallic cars, and contemplates improved features at the bolster and at the cross bearer; especially an improved and greatly strengthened construction of the diaphragm plates, the formation of the seat for the side sill thereon, and the construction of the truss extending from the seat upon one side, underneath the center sill to the opposite side.

It further comprises the foregoing features and other features of construction and their combinations hereinafter set forth.

Referring to the drawings which are hereto attached and hereby made a part of this specification, Figure 1 is a plan view of one-half of an underframe construction having my improvements thereon; Fig. 2 is a side view of the underframe construction shown in Fig. 1; Fig. 3 is a transverse section at cross bearer; Fig. 4 is a transverse section at bolster; Fig. 5 shows the development of a diaphragm plate shown in Fig. 3; Fig. 6, is a perspective of a portion of the construction at bolster and Fig. 7 is a portion of the construction at the cross bearer; Fig. 8 is a view of my improved construction of spreader for the center sill at cross bearer.

In the drawings in which the same numeral indicates the same part throughout, 1 is the center sill construction having the bolster 2 thereon and the cross bearer 3, and the stringers 4, and the side sill 5 positioned thereon; the center sill as herein disclosed is formed of channels 6 and 7 having top cover plate 8 secured to the upper flanges of the channels as shown at 9 and 10; at each side of the center sill is a diaphragm plate 11, 12, having a flange portion 13 through which bolts or rivets 14 extend to secure the same to the center sill. The diaphragm plate also has the flange 15 at its lower side conforming to the lower flange 16 on the center sill, through which flanges 15 and 16 is the rivet 17 to secure the said flanges firmly together; on its upper side the diaphragm 11 is also pro-

vided with a flange 18 and positioned upon the upper face of the diaphragm plate is a cross cover plate 19, said cover plate being secured to the flange portion 18 by means of the rivets shown at 20. The center sill members are pierced as appears distinctly in Fig. 7 at 21 and 22, to permit the insertion there-through of the cover plate 19, which cover plate at its opposite end is secured to the upper flange on the diaphragm 12 by the rivets 23. Adjacent its outer end diaphragm 11 is cut away as appears at 24, leaving an unflanged end 25 provided with rivet holes 26; and it is further noted that the lower side of the diaphragm plate 11 is unflanged, but is provided with rivet holes 27. Diaphragm plate 11<sup>a</sup> similar to 11 is placed against diaphragm plate 11 and their upper flanges 18 and 18<sup>a</sup> form the surface upon which cover plate 19 is positioned; in other words the diaphragm plates are provided in pairs placed back to back, as will more clearly appear in Fig. 7.

In the recess 24 of the diaphragm plates there is positioned a Z-plate 28 firmly riveted at 29 to the flange portion 18 of the diaphragm plate 11, and a seat is thus formed for the side sill 30. To strengthen this seat and also to strengthen the general construction of the cross bearer, the bent angle 31 is provided, firmly riveted to the diaphragm plate through openings 26 and 27; a similar angle 31<sup>a</sup> is provided and placed side by side with 31, and between these two angles are inclosed the unflanged portions of the plates 11 and 11<sup>a</sup>, the rivets inserted through the holes 26 and 27 passing also through both diaphragm plates 11 and 11<sup>a</sup> and through both angles 31 and 31<sup>a</sup>, thereby providing the construction which is of four thicknesses and securely riveted. This construction is also of four thicknesses adjacent the seat for the side sill, and furthermore the seat is of a double thickness composed of the Z-plate 28 and the flange 32 on the angle 31. Holes 28<sup>a</sup> formed through the Z-plate are adapted to receive bolts inserted through a side sill, to secure said sill firmly to said seat. The construction on the opposite side of the center sill is identical with that just described for diaphragm plate 11.

At the bolster shown in Fig. 4, the diaphragm plate 33 is formed with flanges on three edges shown at 34, 35 and 36, the flange 34 being secured to the cover plate



37, the flange 35 being secured through the center sill channel 38 and the flange 36 having secured thereto the truss plate 39 extending beneath the center sill and to quite a distance on either side thereof upwardly along the diaphragm plates. At the bolster it is not practicable to provide the angle shown at 31 from the side sill at one end to the side sill at the other end, and therefore to strengthen the seat for the side sill, the short portion 40 of an angle is secured by rivets through the diaphragm plates beneath the Z-plate seat for the side sill, the inner end 41 of the angle 40 abutting against the outer end of the flange 36, thereby forming a bracing construction for the support of the seat for the side sill.

Referring to Fig. 6, it will be seen that at the bolster, two diaphragm plates 33 and 33<sup>a</sup> are provided, placed back to back and similarly secured to the channel of the center sill by the rivets shown at 42; the cover plate 37 placed thereon is secured to the flanges of both of said diaphragm plates and is inserted through the slits 43 and 44 formed in channels of the center sill; the bottom truss plate 39 is firmly secured to the lower flanges 45 and 46 of the center sill channels by means of rivets shown at 47.

I also provide at the cross bearer an improved construction of spreader member 48 having the flanges 49 and 50 thereon and the extension 51 which is received between the angles or members 31 and 31<sup>a</sup>; the flange portions are provided with bolt or rivet holes 52 therethrough and the rivets which secure the diaphragm plates noted above to the outer faces of the center sill also secure the spreader member to the inner faces of the center sill; the depending portion 51 of the spreader member is positioned between the angle members 31 and 31<sup>a</sup> and is securely fastened between said angle members by the bolts or rivets shown. In this manner I greatly strengthen the construction of the center sill and provide a strong bracing construction at the cross bearer. In this manner, at the bolster, I also provide a double diaphragm at each side of the center sill, rivet the same to the center sill, pass a top cover plate through the center sill channels and secure the same to the diaphragm upon the opposite sides of the center sill and secure said diaphragms on their lower edges to a bottom truss plate extending from adjacent the outer end of the diaphragm plates on one side of the center sill to a point adjacent the outer ends of the diaphragm plates on the opposite side of the center sill, thereby binding the diaphragm plates on the opposite sides of the center sill both above and below, as well as securing the same firmly through the center sill; the seat formed at the outer end of the diaphragm plates for the side sill is also of very strong

construction; the seat for the side sill is generally made weak, but the construction herein shown provides a broad, firm seat for the sill, provides means for securing the sill to its seat, and provides means for reinforcing the seat.

What I claim is:

1. In a metallic underframe construction for cars, a center sill formed of channels, a diaphragm plate positioned on each side of said center sill, a flange provided on the inner edge of said diaphragm plate through which the same is secured to a center sill channel, a flange provided on the upper edge of said diaphragm, a cover plate secured to said flange and adapted to be inserted through slits in said center sill, a flange formed on the lower edge of said diaphragm plate, a truss member positioned beneath said diaphragm plate and secured thereto through said last mentioned flange, said diaphragm plate having a recess formed therein adjacent its outer end, and a Z-plate positioned in said recess and secured to the upper flange of said diaphragm plate to form a seat for the side sill, said truss member being also intended to form a reinforcement for said side sill seat.

2. In a metallic underframe for cars a center sill, a pair of diaphragm plates located on each side of said center sill and flanged at their inner edges and secured to said center sill through said flanges, lateral flanges formed on the upper edges of said diaphragm plates, a cover plate mounted upon said diaphragm plates and secured thereto and passing through said center sill and being secured to the oppositely disposed pair of diaphragm plates, a plurality of angle truss members embracing the lower edges of the diaphragm plates on one side of the center sill, and being secured thereto, and extending beneath said center sill, and embracing the lower edges of the diaphragm plates on the opposite side of said center sill and being secured thereto, whereby said oppositely disposed pairs of diaphragm plates are firmly bound together in operative position both on their upper faces and on their lower faces.

3. In a metallic underframe for cars a center sill, a pair of diaphragm plates located on each side of said center sill and flanged at their inner edges and secured to said center sill through said flanges, lateral flanges formed on the upper edges of said diaphragm plates, a cover plate mounted upon said diaphragm plates and secured thereto and passing through said center sill and being secured to the oppositely disposed pair of diaphragm plates, a plurality of angle truss members embracing the lower edges of the diaphragm plates on one side of the center sill, and being secured thereto, and extending beneath said center sill, and embracing the lower edges of the diaphragm plates on the oppo-



site side of said center sill and being secured thereto, whereby said oppositely disposed pairs of diaphragm plates are firmly bound together both on their upper faces and on 5 their lower faces, said diaphragm plates at their outer ends having a recess formed therein, a plate to conform to said recess being secured to the upper flanges of said diaphragm plates and forming a seat for a side 10 sill, said seat being reinforced by said angle truss members.

4. In a car bolster, a diaphragm plate having an inner flange, whereby said plate is secured to the center sill, a flange on the lower 15 edge of said plate terminated near the outer end thereof, said plate having a recess formed in its upper edge at its outer end, an angle member secured to said plate to form a continuation of said lower flange and to 20 abut against the same at its inner end and having its upper face adapted to supplement the edge of said plate in said recess to form a seat for a side sill.

5. In a car bolster, a diaphragm plate recessed at its outer end, a seat member formed to fit the walls of said recess and overlapping 25 the top of said plate, means to secure said overlapping part to said plate, a flange on the lower edge of said plate cut away near its 30 outer end, an angle abutting against the outer end of said flange secured to said plate and adapted to form a support for said seat member.

6. In a car bolster or cross bearer, a diaphragm plate having its outer end recessed, 35 a seat member formed to fit the walls of said recess and to overlap the upper face of said diaphragm, means for securing said overlapping part to said diaphragm, and an angle 40 positioned beneath said seat member, and secured to said diaphragm plate.

7. In a metallic car underframe construction, a center sill formed of spaced apart

members, a spreader member positioned between said center sill members and secured 45 thereto, and a cross bearer mounted on said center sill, a truss member extending from one end of said cross bearer to the other beneath the said center sill, said spreader member having a depending portion adapted to 50 be secured to said truss member.

8. In a metallic car underframe construction, a center sill formed of spaced apart 55 members, a spreader member positioned between said center sill members and secured thereto, a cross bearer mounted on said center sill, a plurality of truss members spaced apart and extending from one end of said cross bearer beneath said center sill to the 60 other end of said cross bearer, said spreader member having a depending portion positioned between said truss members and means for securing said truss members and said depending portion firmly together.

9. In a metallic car underframe construction a center sill formed of spaced apart 65 members, oppositely disposed diaphragm plates mounted upon said center sill members, a spreader member interposed between said center sill members, and means inserted 70 through said center sill members for securing said spreader member and diaphragm plates thereto, truss members positioned against the under face of said center sill and engaging said diaphragm plates at their outer 75 ends, and an extended portion on said spreader member adapted to be positioned between said truss members and securely united thereto.

In testimony whereof I affix my signature 80 in the presence of two witnesses.

FRANK L. IRWIN.

Witnesses:

HORACE S. KERR,  
A. RAGER.