May 22, 1923. 1,455,867

I. S. DOWNING

METAL CAR STRUCTURE

Filed Aug. 7, 1922 2 Sheets-Sheet 1

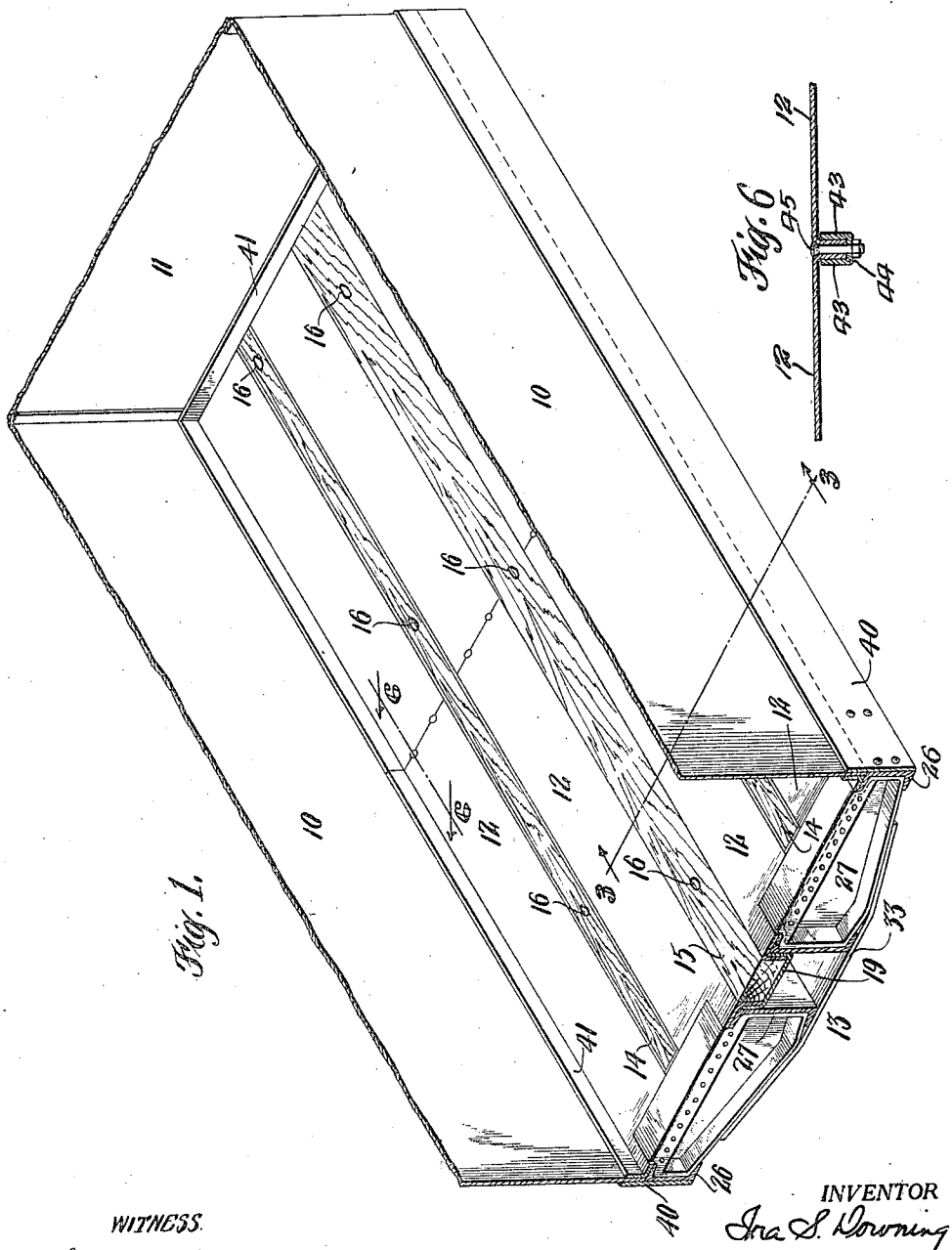

Fig. 1.

Fig. 6

WITNESS.

Gustav Genzlinger.

INVENTOR

Ira S. Downing

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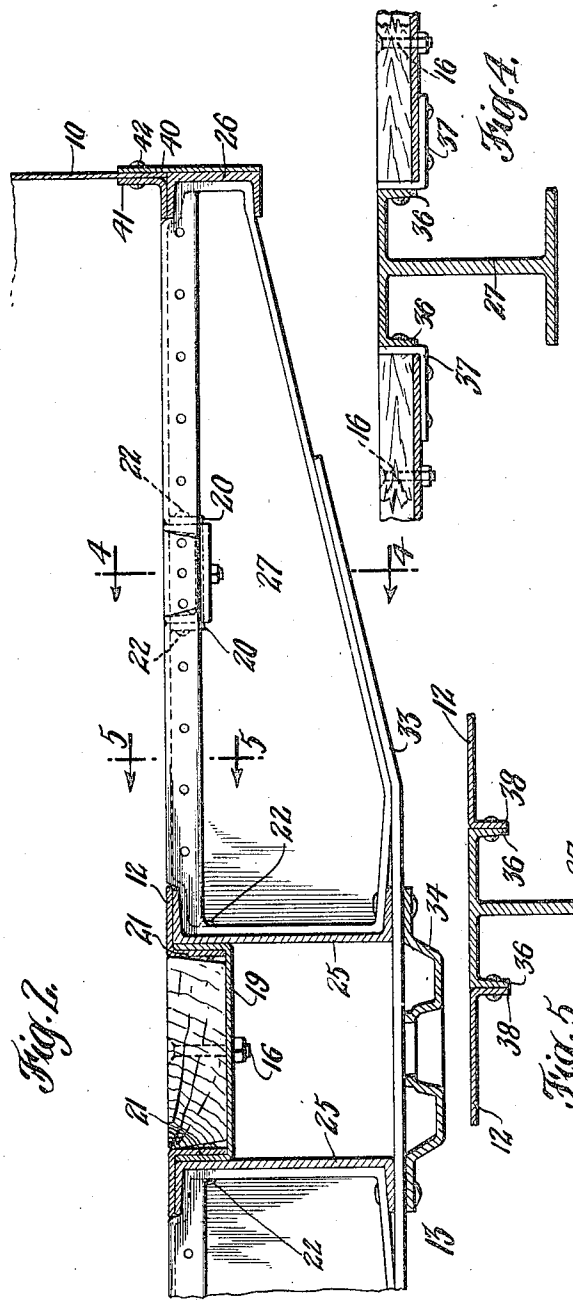

Fig. 2.

Fig. 4.

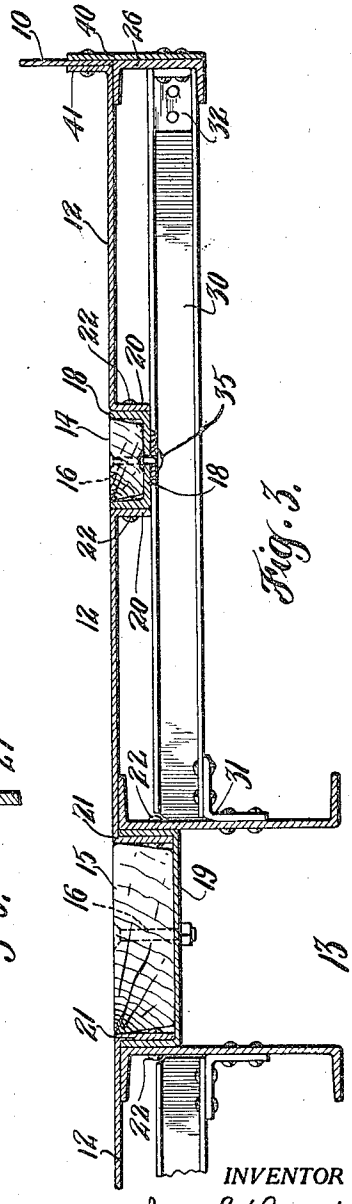

Fig. 3.

Fig. 5.

WITNESS

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BY

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UNITED STATES PATENT OFFICE.

IRA S. DOWNING, OF INDIANAPOLIS, INDIANA.

METAL CAR STRUCTURE.

Application filed August 7, 1922. Serial No. 580,000.

To all whom it may concern:

Be it known that I, IRA S. DOWNING, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Metal Car Structures, of which the following is a specification.

My invention relates to metal car structures, and especially to the construction of car floors of metal. Various forms and features of the preferred construction that I have devised for the purposes of my invention are applicable with special advantage to railroad box cars and the like; accordingly, I have hereinafter explained my invention, and described the best embodiment known to me, with particular reference to this application.

At the present time, steel box cars are being built with wood floors, mainly for the simple reason that when package freight is transported in such a car, the packages must often be secured in place by cleats nailed to the floor,—which would be impossible if the floor were of steel. Also, steel floors as ordinarily constructed for freight cars of other types would be objectionable on account of the projection above the floor surface of the heads of rivets securing the floor plating to the subjacent steel supporting frame.

Wood floors for box cars are objectionable, however, for the reason that such floors soon come to have holes or cracks in them through which grain or other bulk freight of similar nature leaks out and is lost. Also, wood floors readily become foul and unfit for carriage of grain or flour (even in sacks), as a result of getting smeared and impregnated with filth,—such as grease from green hides, oils, tar, etc., leaking out of barrels transported in the cars. When once thus fouled, wood floors cannot be effectually cleaned so as to be fit for general use; whereas metal floors would not be permanently affected by filth of any sort, but could always be easily and completely cleansed.

Through my invention, the limitations of steel floors as regards the securing of packing freight and projecting rivets can be overcome, and the drawbacks incident to the present use of wooden floors consequently done away with. Also, my invention affords other advantages over the construction heretofore used,—quite aside from package freight or projecting rivet heads.

How such advantages as here referred to can be realized through my invention in a novel and convenient manner will appear from my description hereinafter of the best construction for the purposes of the invention at present known to me.

In the drawings, Fig. 1 is a fragmentary perspective view of a car conveniently embodying my invention, various parts being broken away or in section.

Fig. 2 is a fragmentary view illustrating the construction at a body bolster, on a larger scale than Fig. 1, partly in section.

Fig. 3 is a fragmentary view showing a transverse section through the car floor, taken about as indicated by the line 3—3 in Fig. 1.

Figs. 4 and 5 show transverse sections through the bolster, taken (as indicated by the lines 4—4 and 5—5 in Fig. 2) at vertical planes extending lengthwise of the car.

Fig. 6 shows a cross section of a transverse joint connecting plates in a longitudinal strake of floor plating, taken at a vertical plane extending lengthwise of the car, as indicated by the line 6—6 in Fig. 1.

The car fragmentarily illustrated in Fig. 1 has upright metal sides 10 and ends 11, rising from a floor structure that comprises sheet metal flooring 12 on a subjacent horizontal supporting frame 13. As a means for securing package freight, nailing blocks or timbers are exposed through openings or gaps in the flooring 12, in the form of suitably stout strips of wooden planking 14, 15 set in the floor substantially flush with its surface. For this purpose, the metal floor 12 may be longitudinally channeled, and the nailing timbers 14, 15 housed and seated in the channels, and removably secured in place by means of bolts 16 extending through the channel bottoms and having their flat topped conical heads countersunk in the wood at least flush.

As here shown (see Figs. 1, 2 and 3), the flooring 12 is divided into longitudinal strakes, which are separated to afford the gaps for the timbers 14, 15. The longitudinal channels 18, 19 that accommodate and carry these timbers 14, 15 are separate upward-open, hollow members extending along

in and beneath the gaps between the horizontal portions of the plates 12. They are secured to the edges of the plates 12, so as to connect them beneath the timbers 14, 15. As shown, the plate edges are turned or flanged downward at 20, 21, and are united to the abutting flanges of the channels 18, 19 by rivets 22. Thus these joints and the heads of the rivets 22 are out of the way below the floor surface. The plate flanges 20 lie outside the flanges of the relatively narrow channels 18, while the plate flanges 21 lie or "hook" inside of the flanges of the much wider channel 19.

In this construction, it will be seen, each channel 18, 19 in itself serves as a longitudinal strength member for reinforcing and stiffening the nailing timber 14, 15 associated with it, as well as for supporting and stiffening the floor 12, both vertically and horizontally. With reference to each adjacent plating strake, the horizontal web or bottom of each channel member 18, 19 is in effect a downset shelf extending along its edge below the floor surface, to support the timber 14 or 15 extending alongside such strake. And regardless of the channel bottom, on the other hand, the channel flanges serve as stiffening reinforcements for the plate flanges 20, 21,—both in their capacity of preventing lateral displacement of the timbers 14, 15 in the plane of the floor, and in that of stiffening the floor itself vertically.

Still referring to Figs. 1, 2 and 3, it will be seen that the horizontal supporting frame 13 of the car includes a pair of longitudinal center sill members 25 in the form of outward-facing channels extending below the car floor, and also a pair of longitudinal side sills 26 in the form of narrower inward-facing channels similarly located. In addition, there are deep-webbed, double-flanged transverse body bolsters 27 extending between adjacent sill members 25 and 26 and riveted to the latter at their ends; and also cross beams 30 (of channel or I-beam cross section) similarly arranged. These cross beams 30 are connected to the sill webs by angle brackets 31, 32, and thus supported by the sill members 25, 26. As shown, the adjacent inner ends of the body bolsters 27 are connected and spaced apart by stout plates 33 extending and riveted along the lower bolster flanges, and the truck pivot saddles or chairs 34 are riveted to the lower center sill flanges through these plates. The smaller lateral longitudinal channels 18 extend along over the cross beams 30 about midway between the center and side sills, with their webs resting on the beams and secured to them by rivets 35, so as virtually to form part of the supporting framing 13. As shown (see Figs. 1, 2 and 4), the channels 18 are interrupted at the bolsters 27, and the channel ends are secured to the downturned or flanged edges 36 of the top bolster flanges by means of angle brackets 37 riveted to both parts. The larger central longitudinal channel 19, on the other hand, extends along uninterrupted between the center sill members 25, with its flanges abutting and secured to the sill webs by the same rivets 22 that secure the channel flanges to the floor plate flanges 21. Thus this channel member 19 serves to stiffen and reinforce the center sill of the car in the plane of the floor,—and, indeed, virtually forms part of it.

In the present instance, the strakes of floor plating 12 are interrupted at the bolsters 27 (see Figs. 1 and 5), and their ends are turned or flanged downward at 38, and riveted to the downturned edges 36 of the top bolster flanges. Preferably, the top surface of these bolster flanges, the upper sides of the plates 12 and of the timbers 14 and 15, and the upper edges of the channels 18 all lie flush with one another, as shown. As shown, also, the lower edges of the car sides 10 are supplemented and attached to the side sills 26 by vertical plating strips 40 that overlap the sill webs and are riveted to them. The outer edges of the floor plates 12 are turned or flanged upward at 41, and secured to the sides 10 above the floor surface by the rivets 42 that secure together the car sides 10 and the plates 40. Thus these joints and the heads of the rivets 42 are out of the plane of floor surface, and much less in the way than if the rivets projected upward from the floor.

As shown in Fig. 6, the adjacent ends of adjacent plates 12 in the longitudinal or fore and aft plating strakes are bent or flanged downward at 43 so as to lie in contact with one another. In the present instance, however, these ends 43, 43 are not simply riveted together in the same way as the flanges 36, 38, but are united by the different type of joint shown in Fig. 6. That is to say, a deep channel or U-bar 44 is fitted over the downturned plate flanges 43, and plow bolts 45 in holes formed half and half in the abutting faces of the two flanges extend down through the bottom of the splice bar 44 to hold it in place. The conical heads of these bolts are countersunk in the plates 12 at their bends, so that the heads do not really project above the floor surface.

From the foregoing description, it will be seen that the floor plating 12 is in effect divided into longitudinal sections (each one strake wide) united by the nailing-timber carrying members 18, 19. Also, the floor structure as a whole is practically divided into two longitudinal sections (each including one of the center sills 25 and the corresponding plating 12, bolsters 27, cross beams 30, member 18 and side sill 26). The sills

25 and their respective floor sections are in effect structurally independent cantilevers connected and united together, below the timber 15 extending and exposed between them, by the member 19 and the bolster strap plates 33.

The functions of the mailing timber or strip members 14, 18 and 15, 19 in stiffening and reinforcing the floor have already been explained.

The nailing timbers 14, 15 can be made of much better stuff than would ordinarily be used in an all wood floor, so as to stand up under the relatively intensive nailing to which they are subjected in service. They can be removed when hides, oil or other freight likely to contaminate them is carried; or they may be removed or replaced with clean ones whenever grain or flour is carried. Even without such precautions, moreover, they can do less damage to susceptible loads than could an entire wood floor when grease-soaked. Likewise, the floor 12 as a whole can be much more easily and completely cleansed than could an all wooden one.

What I claim is:

1. A car floor comprising metal floor plating with a gap therein, and nailing timber exposed through said gap.

2. A car floor comprising sections of metal floor plating with a gap therebetween, and nailing timber exposed through said gap.

3. A car floor comprising metal floor plates separated lengthwise of the car, and nailing timber extending along and exposed through the gap between said plates.

4. A metal car floor with a separate channel member secured therein, for housing nailing timber.

5. A car floor comprising a strake of metal floor plating with a downset shelf along the edge thereof, and nailing timber extending along said shelf.

6. A car floor comprising metal floor plating with a gap therein, nailing timber exposed through said gap, and means interconnecting the plating at opposite sides of said gap and supporting said nailing timber.

7. A car floor structure comprising metal floor plating with a gap therein, supporting framing associated therewith, and nailing timber secured to said framing and exposed through said gap.

8. A car floor comprising metal floor plating with gaps therein, and cross beams beneath said plating adapted to support nailing timber members exposed through said gaps.

9. A car floor comprising metal floor plating, and a metal strength member extending along at one edge of said plating below the floor surface for supporting nailing timber exposed alongside said plating.

10. A car floor comprising metal floor plating with a gap therein, and a metal strength member beneath said gap for supporting nailing timber exposed therethrough.

11. A car floor comprising metal floor plating, a metal strength member extending along at one edge of said plating below the floor surface, and nailing timber extending alongside said plating carried by and secured to said strength member.

12. A car floor comprising a metal member, a strake of metal floor plating with downturned edge extending along and secured to said member below the floor surface, and nailing timber on said member alongside said plating.

13. A car floor comprising an upward open metal channel, metal floor plating with downturned edge secured to the channel flange below the floor surface, and nailing timber in said channel.

14. A car floor comprising metal floor plating, a longitudinal metal sill extending below the floor, and nailing timber accomodated in said sill and exposed through a gap in the floor plating.

15. A car floor comprising metal floor plating with a gap therein, a metal member extending along beneath said gap and interconnecting the plating at opposite sides thereof, and nailing timber on said member exposed through said gap.

16. A car floor comprising metal floor plating with a gap therein, a metal strength member extending along beneath said gap, and nailing timber on said member exposed through said gap.

17. A car floor comprising metal floor plates separated lengthwise of the car, a longitudinal metal strength member beneath the gap between said plates, and nailing timber in said gap supported by said member.

18. A car floor comprising metal floor plates separated lengthwise of the car, a longitudinal metal member at the gap between said plates interconnecting the latter, and nailing timber in said gap supported by said longitudinal member.

19. A car floor comprising separated metal floor plates, a metal channel at the gap between said plates interconnecting the latter, and nailing timber housed in said channel.

20. A car floor comprising separated metal floor plates, a hollow metal strength member at the gap between said plates interconnecting the latter, and nailing timber in said gap accommodated in said member.

21. A metal car floor divided into structurally separate sections, nailing timber extending and exposed between said sections, and means of interconnection between said sections.

22. A metal car floor divided longitudinally into structurally separate sections with separate longitudinal sill members, longitudinal nailing timber extending between

said sill members and exposed between said floor sections, and means interconnecting said sill members beneath said nailing timber.

23. A metal car floor divided into structurally separate sections, an upward open metal channel connecting said sections along their adjacent edges, and nailing timber in said channel exposed between said floor sections.

24. A car floor structure comprising metal floor plating with transversely separated longitudinal metal sills, cross beams beneath said plating supported by said sills, and a longitudinal nailing timber member supported on said beams between said sills and exposed through a gap in said plating.

25. A car floor structure comprising transversely separated longitudinal metal sills; cross beams connecting said sills; longitudinal strakes of metal floor plating over said cross beams, with remote edges supported by said sills, and with downturned flanges at their adjacent edges; and a longitudinal nailing timber member between said strakes supported by said cross beams.

26. A car floor structure comprising transversely separated longitudinal metal sills; cross beams connecting said sills; longitudinal strakes of metal floor plating over said cross beams, with remote edges supported by said sills, and with adjacent edges separated; and a longitudinal nailing timber member supported by said cross beams extending between said strakes and affording support for their adjacent edges.

27. A car structure comprising pairs of longitudinal center and side sill members, body bolsters extending and connected between adjacent center and side sill members, cross beams supported by said sill members, and upward open longitudinal metal channels supported by said cross beams; an upward open longitudinal metal channel between the center sill members, with its flanges secured to them; longitudinal strakes of metal floor plating connected to said bolsters and said channel members below the floor surface, and also connected to the car sides outside the plane of the floor surface; and longitudinal nailing timber in said channel members.

28. A car structure comprising pairs of longitudinal center and side sill members, body bolsters extending and connected between adjacent center and side sill members, cross beams supported by said sill members, and longitudinal metal strength members supported on said beams between said center and side sills; a longitudinal metal channel between the center sill members, with its flanges secured to them; and metal floor plating connected to said bolsters, strength members, and channels below the floor surface.

29. A car floor structure comprising longitudinal center and side sills; cross beams supported by said sills; and floor plating connected to the center sill below the floor surface, with intermediate longitudinal reinforcement connected to said floor plating below the floor surface and supported by said cross beams.

30. A car floor structure comprising longitudinal center and side sills; cross beams connecting said sills; and floor plating over said cross beams connected to the center sill below the floor surface, and having upturned flanges connected to the car sides above the floor surface.

31. A car structure comprising a horizontal metal supporting frame, metal sides connected to said frame, and metal floor plating over said frame secured thereto below the floor surface, and having upturned flanges secured to the sides above such surface.

32. A car structure comprising a horizontal metal supporting frame, metal sides connected to said frame, and metal floor plating over said frame with downturned flanges secured thereto, and upturned flanges secured to the car sides.

In testimony whereof, I have hereunto signed my name.

IRA S. DOWNING.