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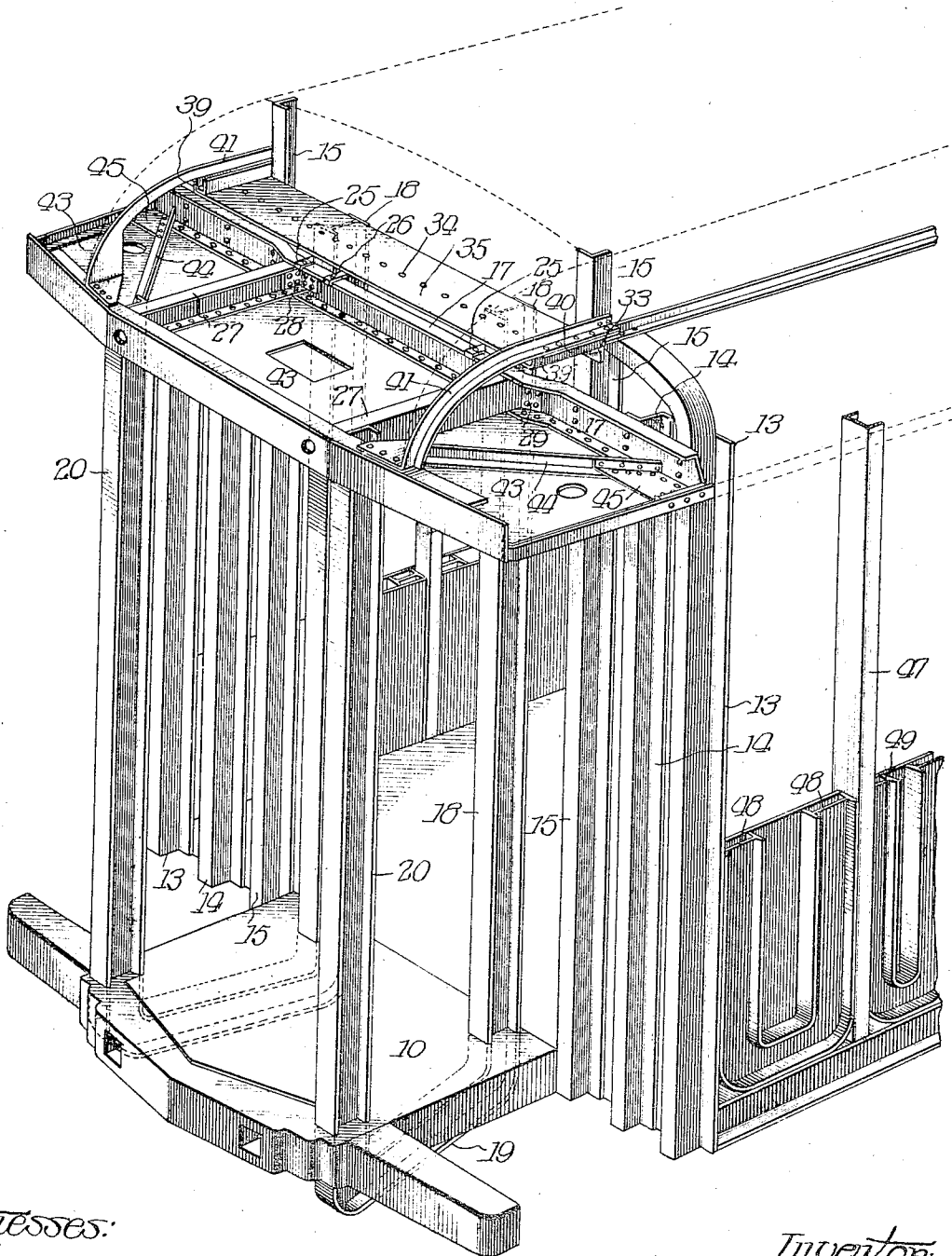
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6 SHEETS—SHEET 1.

Fig. 1



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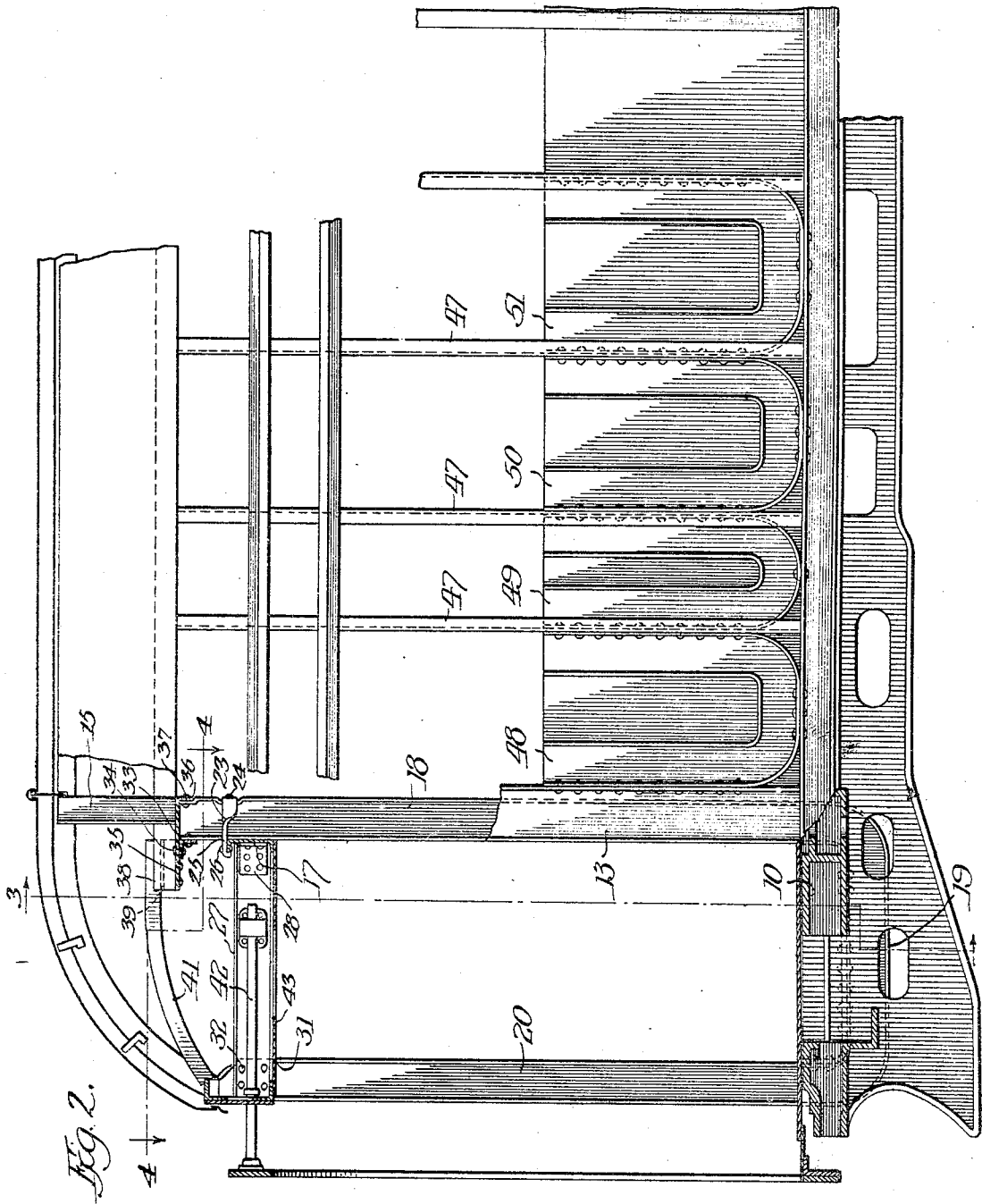
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6 SHEETS—SHEET 2.



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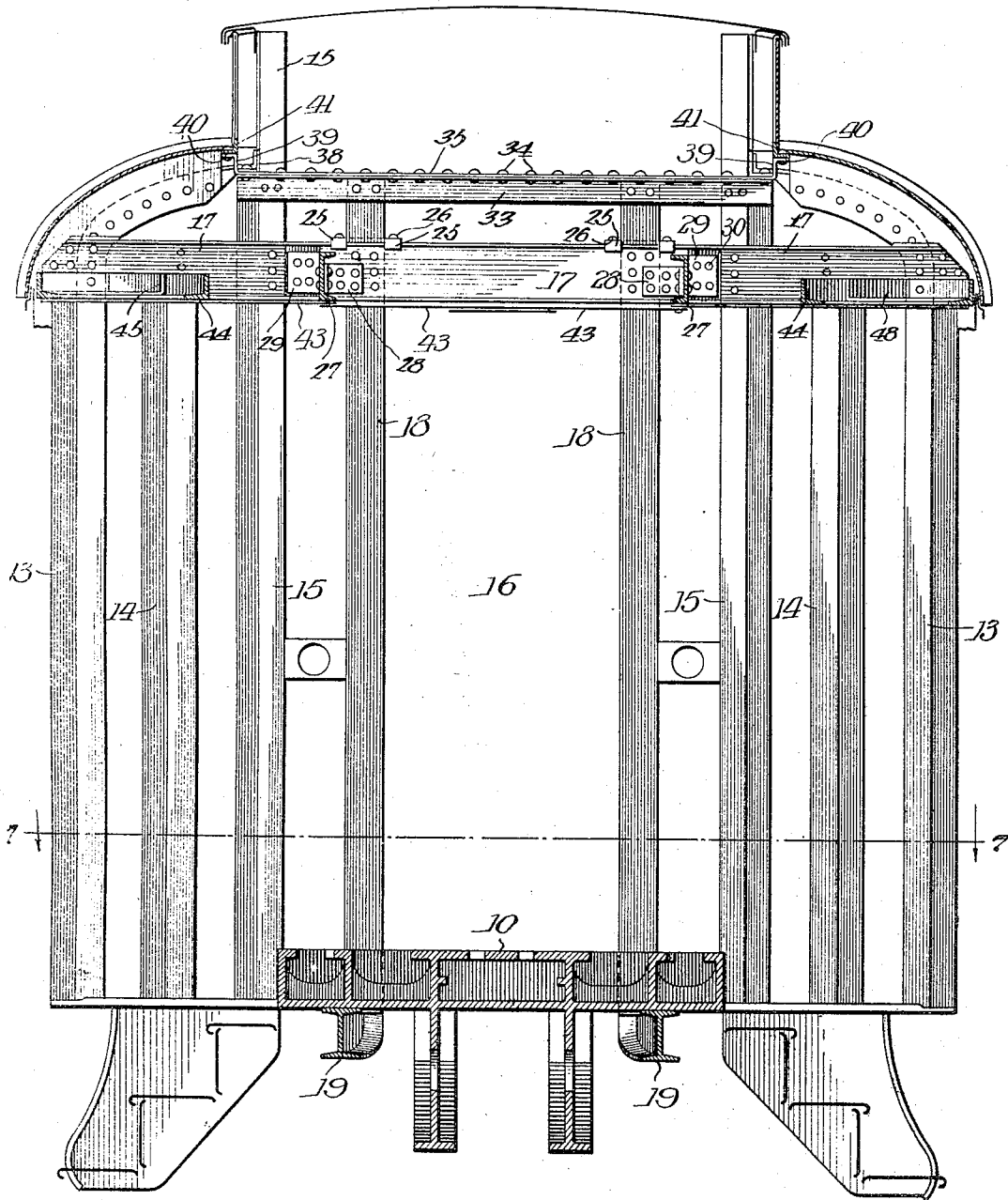
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Fig. 3.



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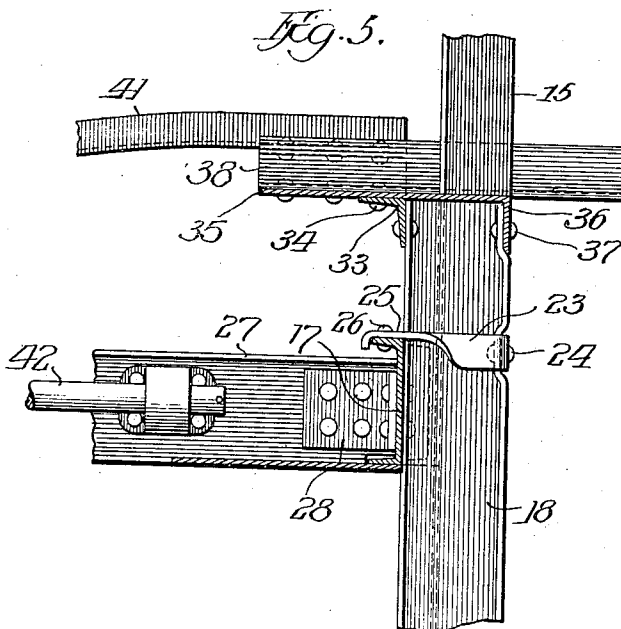
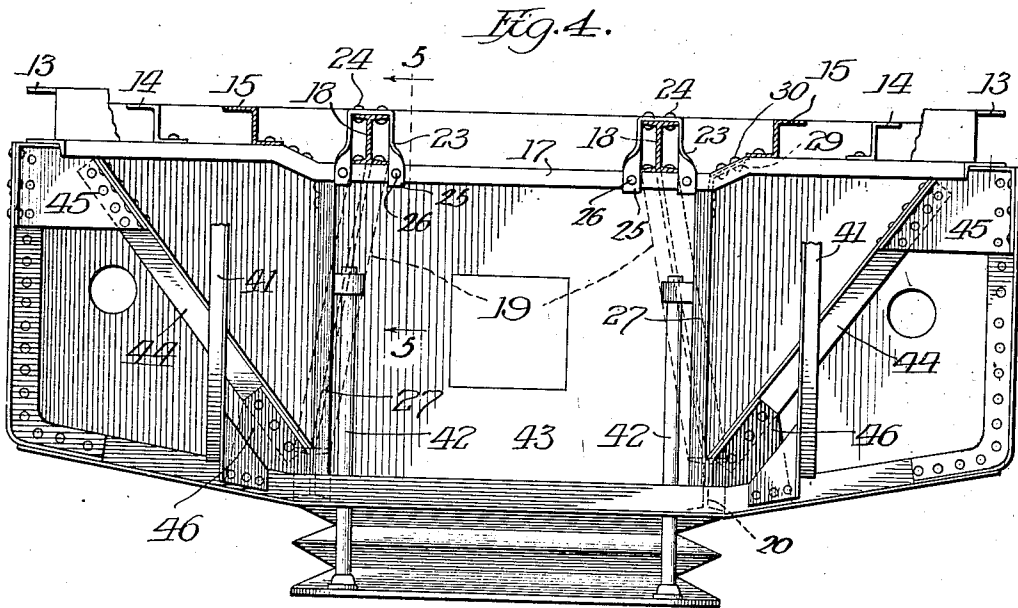
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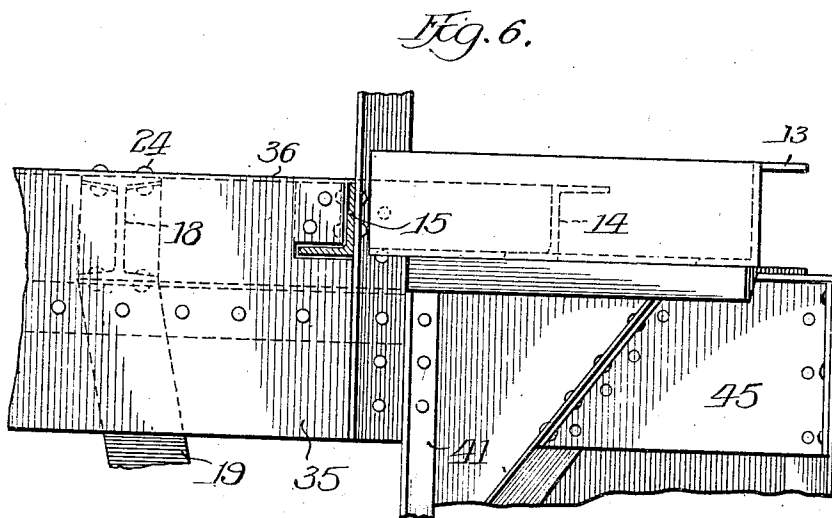
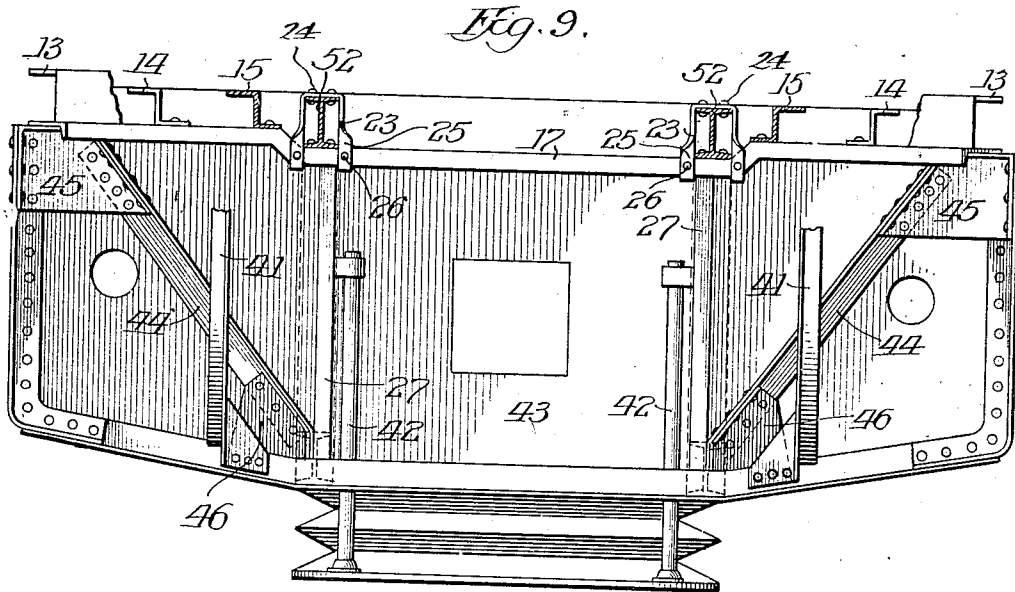
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6 SHEETS-SHEET 5.



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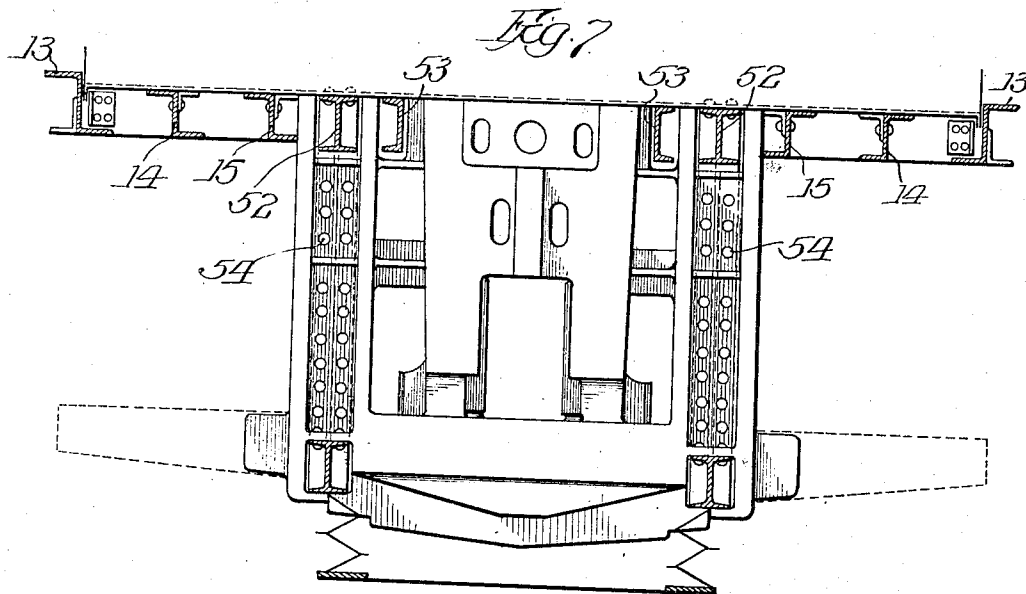
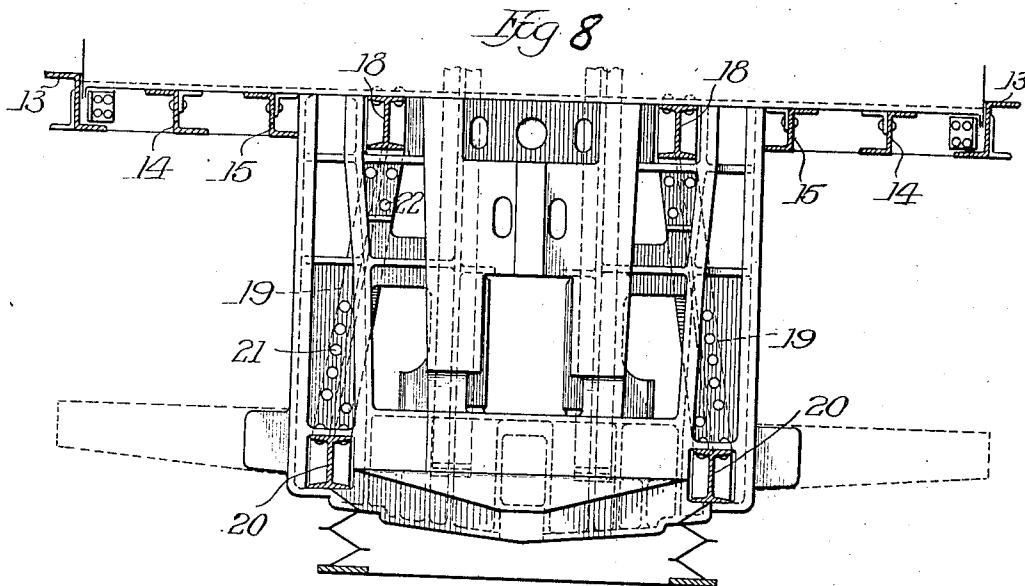
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UNITED STATES PATENT OFFICE.

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1,055,615.

Specification of Letters Patent.

Patented Mar. 11, 1913.

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To all whom it may concern:

Be it known that I, RICHMOND DEAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Cars, of which the following is a specification.

After a careful study of the effects of accidents and collisions on railway passenger cars, I have discovered that the constructions of framing of the cars may be modified so as to afford greater safety to the passengers and to reduce to a minimum the damage done to the cars. It has heretofore been supposed that to enable the cars, more particularly those of the modern steel or partial steel construction, to best withstand the shocks of collisions, the car underframes should be made of comparatively great strength and rigidity so that the buffs and blows of the collisions would be transmitted through the longitudinal beams or members of the underframe, and in this way, prevent damage to the body of the car. This style of construction, however, may be improved because of the fact that when the impact occurs the underframe of one car has a tendency to mount and override that of the next car, shearing off or otherwise seriously injuring the super-structure or car-body. In other words, I have discovered that unduly strong underframes, instead of affording the presumed advantage of safety to the passengers and of preserving the cars from injury, may, at least in some instances, contribute to the damage of the latter. If the force of the collision is sufficient to cause such overriding underframe to break down the end-wall of the car against which it is thrust, then the further travel of the frame is not materially opposed, due to the fact that the car-body side-walls will spread outwardly and admit the advancing car between them.

It is the object of this invention to overcome these and other difficulties. In substance my invention involves the plan of preventing the collapsing or battering down of the car-body end-wall, because, as has been explained, if this occurs the resistance to the advance of the crushing car is materially decreased. My plan is to remove the surplus strength from the underframe and so construct and strengthen the vestibule, that the latter will act as a cushion to absorb and dissipate the force of impact.

A further object is to so reinforce the end-wall that it will also act as a buffing cushion and prevent the on-coming car from entering the main body against which it is thrust. It is not my present intention to increase the weight of the car as a whole, but rather to re-distribute the weight of the various elements in the car construction and thereby more nearly equalize the strengths of the various parts. It will be apparent that I weaken the overriding or overlapping underframe and increase the resistance offered against its advance. Of course, in all vestibule cars the vestibules act somewhat as telescopic shields or cushions for the car-body proper, but I find that when these are crushed the riveted joints of the framings give way so that the major portion of the cushioning effect in the ordinary constructions resides in the joints.

In accordance with my invention, I provide cushion members or bent beams, preferably without joints, in the vestibule structure, whereby, to collapse or crush the vestibule, it is necessary to bend such relatively strong beams, such bending absorbing wholly or in part the blow imposed and deflecting the shock and the colliding car. In a structure of this character the breaking of riveted joints is not depended upon, but rather the bending of heavy beams, (desirably rolled or other fabricated beams), is used for a cushioning effect or concussion dissipation. In a somewhat similar manner I strengthen and brace the car-body end-wall by similar shock-absorbing and deflecting cushions.

In order that those skilled in this art may have a full and complete understanding of this invention, I have illustrated preferred and desirable embodiments of the same in the accompanying drawings, which form a part of this specification and to which reference should be made in connection with the following detailed description.

In these drawings: Figure 1 is a fragmentary perspective view of a car-framing embodying my invention. Fig. 2 is a fragmentary side elevation of the end-portion of a vestibule passenger car, part of the members being broken away and others shown in section to more clearly illustrate the construction; Fig. 3 is a vertical cross-section through the vestibule framing on line 3—3 of Fig. 2; Fig. 4 is a horizontal section of the vestibule construction on line 4—4 of

Fig. 2; Fig. 5 is a vertical cross-section on an enlarged scale on line 5—5 of Fig. 4; Fig. 6 is an enlarged fragmentary plan view of a corner portion of the structure; Fig. 7 is a horizontal section on line 7—7 of Fig. 3, the parts being viewed in the direction indicated by the arrows; Fig. 8 is a view similar to Fig. 7, illustrating a modified construction, and Fig. 9 is a view similar to Fig. 4 showing the same modified construction.

As is usual the car-frame is equipped at each end with a cast steel combined platform and double body-bolster casting 10. The car-body end-wall fastened to this casting, in the present instance, is composed of the two corner Z bars or posts 13, 13, and the intermediate Z bars or posts 14, 14, and 15, 15, the latter extending upwardly to the top of the roof, as is shown in Figs. 1, 2 and 3, these upright beams or posts being secured to the other parts of the car framing in the usual or any desired manner. To the outer faces of these various posts 13, 14, and 15, above the doorway 16 is riveted a bent channel deck end-sill 17. As is well shown in Fig. 4, such sill 17 is outwardly bowed at its central portion for the accommodation behind it of the rear upright legs 18, 18, of a pair of relatively heavy U-shaped beams 19, 19, the other, or front legs 20, 20, of which form the passageway or end-posts of the vestibule. As is indicated in Figs. 2 and 7 the platform casting 10 is apertured for these upstanding legs 18 and 20, the connecting-portion of the U-shaped beams being disposed beneath the casting 10 and riveted at 21 and 22 to suitable webs or fins provided on such casting for this as well as strengthening purposes. These U-shaped beams 19 are the ones referred to above whose resistance to bending or distortion constitutes the safety cushion and upwardly deflecting means for preventing injury to the car-body proper.

In order to attach the inner upright portions or legs 18 of these bent rolled I-beams 19 to the channel deck end-sill 17, I employ bent straps or saddles 23, one of which is associated with each of the posts 18, each of such fastening straps extending around the rear face of the part 18, being riveted at 24 to the flanges of the I-beam, each strap having horizontal forwardly-projecting hook-ends 25 above and riveted at 26 to the top flange of the channel 17. In order to hold separated the upper ends of the legs of the heavy U-shaped beams 19, I employ in connection with each, a horizontal channel strut 27 fastened at its inner end by means of an angle plate 28 riveted to its web to the channel-sill 17, and to one of the front flanges of the leg 18. Also at its inner end, each of these struts 27 has its top and bottom flanges removed, the remaining web 29

being bent outwardly at an angle so as to lie against the correspondingly-disposed portion of the web of the channel 17 to which it is riveted. At its top end each of the legs 20 of the bent I-beams has one of its inner flanges cut away at 31 to permit the web of the channel strut 27 to lie against the web of the leg 20 to which it is riveted at 32, the ends of the top and bottom flanges of the strut 27 preferably bearing against the outer flange of the leg 20.

Each of the legs 18 extends upwardly beyond the deck end-sill 17, and connecting these legs together on their front face is a transverse angle-bar 33 to the top of which is riveted at 34 the strengthening horizontal transverse-plate 35, the inner edge of which is bent down to provide a flange 36 riveted at 37 to the inner flanges of the two legs 18. To such plate 35 are also riveted the projecting ends of the angle deck-sills 38. The ends of plate 35, as is shown in Fig. 3 are bent upwardly at 39 and then outwardly to form the pair of flanges 40, 40, to the tops of which are riveted the inner ends of curved angle deck-sill extensions 41. In this way an effective and efficient connection is secured for the various parts, the plate 35 affording the required additional strength and rigidity. The customary vestibule diaphragm face-plate rods 42 are slidingly and suitably mounted on the struts 27, as is illustrated. Beneath these members 27 the ordinary sheet-metal ceiling-plates 43 acting as gussets or stiffeners are employed, suitable diagonal angle stiffeners and braces 44 being used in the relation indicated and fastened at their opposite ends to suitable gusset-plates 45 and 46. It will be observed that with this arrangement of elements the upper portions of the bent I-beams forming the vestibule passageway-posts are braced in position by direct connection with the corner-posts 13, whereby the latter and the side-walls of the car assist in maintaining the bent-beams in position in their proper planes for withstanding the shocks to which they may be subjected. The remainder of the vestibule structure, for example, the roof-structure and other parts, may be constructed in any approved and satisfactory manner, the main feature of the framing described being the U-shaped I-beams 19, the legs of which form door and vestibule passageway posts, such beams projecting through suitable apertures in the double bolster casting, as has been explained.

While I have herein referred to the beams 19 as rolled I-beams, it is to be understood that their particular shape of cross-section is not essential and their manner of production, whether rolled, forged, pressed or the like, is not material so long as their mode of fabrication gives them adequate capability for distortion and bending without break-

ing, whereby to permit them to bend under shock and in so bending to act as a cushion and deflecting means.

The side-frame of the car, as illustrated in Figs. 1 and 2, may be of the usual and ordinary construction, but extending rearwardly from each corner post 13, between the various posts 47, 47, of the side-frame, I interpose and fasten in place, any desired number of U-shaped cushion-members or beams 48, 49, 50 and 51, which may be all of the same height as illustrated, or may be of decreasing height if preferred. In the present case these beams have been merely extended up to the window line, but to those skilled in this art, it will be obvious that their size and shape may be chosen to conform to the service which they are intended to render, and harmonize with the remainder of the structure of the car. In this instance, these various bent cushions have been shown as I-beams, but of course, their cross-section may be anything desirable. If an on-coming car, during a collision, attempts to break down the end-wall of such a car-body, these various bent beams will act as cushion supports or braces for such wall, it being necessary to bend or distort one or more of them if the end-wall is to yield. In other words, the resistance which these inserted U-shaped beams offer to bending, acts to assist in properly supporting the end-wall and constitutes a cushion for absorbing and dissipating any blows or impacts imposed upon the car-body end-wall.

From the above description and the accompanying illustrations, it should be apparent that when another car attempts to damage or injure the car described in detail herein, it is necessary for the second car to first impose its blow or force against the outer legs 20 of the large rolled or otherwise fabricated U-shaped I-beams 19, and before such blow can be effectively imposed upon the car-body end-wall, the legs 20 will of necessity have become considerably bent, such bending absorbing wholly, or in part, the force of the blow imposed, and deflecting the shock or concussion upwardly. Owing to the location of a portion of the platform casting between the base portions of the posts or legs of the U-beams, the bending occurs above the platform, which assists in the deflection of the on-coming car, as will be readily understood. If, however, a material crushing force should reach the end-wall of the car-body, the latter in turn, offers an increased resistance to being battered or broken down by the reinforcing and bracing action of the several bent beam cushions 48, 49, and 50, so that if such wall is broken down or distorted or bent, the blow imposed upon the same is absorbed and discharged in the necessary bending of the beam cushions 48, 49, etc. Clearly then, the beams 19

and 48, 49, 50 and 51, cooperate and co-act to save the body of the car from damage and injury, and in each instance it is the bending of an integral fabricated beam which is used as a shield or absorber of the force of impact.

It has doubtless been noticed that in the embodiment of this invention described above, the heavy cushioning U-shaped I-beams 19 are distorted slightly out of their true planes longitudinally of the car-body so that the upright legs might form the posts of the car-body doorway and of the vestibule passageway. In some cases it might be desirable to have the planes of such beams disposed exactly longitudinally of the car so as to secure the maximum cushioning or shielding effect, which the resistance of such members to bending affords. In Figs. 8 and 9 such a modification has been illustrated, but the only substantial difference between this structure and that described above is that both legs of the heavy U-shaped beams 52 are in the same plane, suitable additional door-posts 53 of any desired cross-section being provided. Of course, in this form of construction the double-body-bolster and platform casting has to be modified somewhat to accommodate the style of U-beam used, and in the present instance the middle or leg connecting portion of these heavy U-beams is riveted at 54 to suitable webs of the casting.

It will be appreciated by those skilled in this art, that in each of these embodiments or styles of construction the car-body end-wall is reinforced by the bent beam cushions or shields in the side-walls, and that the end-wall in turn is effectively connected to the heavy U-beams of the vestibule so that all of these various cushions and shields cooperate to afford a maximum of safety to the passengers and to the car itself.

Although I have herein shown and described two particular styles and forms of construction, it is to be understood that my invention is in no way limited to the precise and exact mechanical features illustrated and described, because these may be varied within comparatively wide limits without departure from the substance of my invention, and without the sacrifice of any of its material benefits and advantages.

What I claim is:

1. In a railway car, the combination of a car-body, and a vestibule frame containing one or more bent beams opposed to collapsing or crushing of the vestibule, the bend in such beam being substantially on a level with the car-body under-frame, substantially as described.

2. In a railway car, the combination of a car-body, and a vestibule frame containing one or more substantially vertically-arranged bent beams opposed to collapsing or crush-

ing of the vestibule, the bend in such beam being substantially on a level with the car-body under-frame, substantially as described.

3. In a railway car, the combination of a car-body, and a vestibule-frame containing a substantially vertically arranged bent beam forming one of the posts of the vestibule passageway and opposed to the collapsing or crushing of the vestibule, substantially as described.

4. In a railway car, the combination of a car-body and a vestibule frame containing a substantially vertically arranged bent beam forming one of the posts of the vestibule passageway and opposed to the collapsing or crushing of the vestibule, the bend in such beam being substantially on a level with the car-body under-frame, substantially as described.

5. In a railway car, the combination of a vestibuled car-body, and a bent beam forming a post of the car-body end-wall and a post of the vestibule end-wall, substantially as described.

6. In a railway car, the combination of a vestibuled car-body, and a bent rolled beam forming a post of the car-body end-wall and a post of the vestibule end-wall, substantially as described.

7. In a railway car, the combination of a vestibuled car-body, an integral beam forming a post of the car-body end-wall and a post of the vestibule end-wall, substantially as described.

8. In a railway car, the combination of a vestibuled car-body, and an integral beam forming a door-post of the car-body end-wall and a post of the vestibule passageway, substantially as described.

9. In a railway car, the combination of a vestibuled car-body, and a bent rolled beam forming a door-post of the car-body end-wall and a post of the vestibule passageway, substantially as described.

10. In a railway car, the combination of a car-body, and an integral bent beam forming a door-post of the car-body end-wall and a passageway post of the vestibule end-wall, substantially as described.

11. In a railway car, the combination of a car-body, and a substantially U-shaped integral beam, the legs of which form a post of the car-body end-wall and a post of the vestibule end-wall, substantially as described.

12. In a railway car, the combination of a car-body, a U-shaped integral beam, one leg of which forms a door-post of the car-body end-wall, the other leg of which forms a post of the passageway of the vestibule end-wall, and a strut between such posts, substantially as described.

13. In a railway car, the combination of a car-body, an apertured platform casting, and a U-shaped integral bent beam, the legs

of which are extended upwardly through the apertures of said casting and form respectively a post of the car-body end-wall and a post of the vestibule end-wall, substantially as described.

14. In a railway car, the combination of a car-body, an apertured platform casting, a U-shaped integral beam having its legs extended upwardly through the apertures of said casting, said legs forming respectively a door-post of the car-body end-wall and a passageway post of the vestibule end-wall, and a strut between the upper ends of said posts, substantially as described.

15. A car-body having an end-wall and side-walls, said side walls having posts and bent beams between such posts acting as bracing cushions for the end-wall, substantially as described.

16. A car-body having an end-wall and side-walls, said side walls having posts and integral bent beams between such posts acting as bracing cushions for the end-wall, substantially as described.

17. A car-body having an end-wall and side-walls, with upright posts, each of said side-walls having a series of integral bent beams between and engaging its upright posts, such beams acting as bracing cushions for the end-wall, substantially as described.

18. In a railway car, the combination of a car-body having an end-wall and side-walls, integral bent beams in said side-walls acting as bracing cushions for the end-wall, and an integral bent beam forming a post of the car-body end-wall and a post of the vestibule end-wall, substantially as described.

19. In a railway car, the combination of a car-body having an end-wall and side-walls, bent beams in said side-walls acting as bracing cushions for the end-wall, an apertured platform casting, and bent beams having portions forming respectively posts of the car-body end-wall and posts of the vestibule end-wall extending through the aperture of said platform casting, substantially as described.

20. In a railway car, the combination of a car-body having an end-wall and side-walls, integral bent beams in said side-walls acting as bracing cushions for the end-wall, an apertured platform casting, one or more U-shaped integral beams having their legs projecting upwardly through the apertures of said casting and forming respectively a post of the car-body end-wall and a post of the vestibule end-wall, and a strut between the upper ends of said posts, substantially as described.

21. A railway car having a vestibuled car-body with one or more bent beams opposed to the collapsing or crushing of the vestibule, one member of said bent beam being at the front of the vestibule and another mem-

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ber of the bent beam being at the back of the vestibule, substantially as described.

22. A railway car having a vestibuled car-body with one or more bent beams opposed to the collapsing or crushing of the vestibule, one member of said beam being at the front of the vestibule, another member of the beam being at the back of the vestibule and the bend in the beam being substantially at the level of the car-body under-frame, substantially as described.

23. A vestibuled railway car body having a platform frame, a vestibule end wall post extended through said frame, a car-body end wall post also extended through said frame, and means connecting said posts together beneath said frame, substantially as described.

24. A vestibuled railway car body having a platform frame, a vestibule end wall post extended through said frame, a car-body end wall post also extended through said frame, means connecting said posts together beneath said frame, and means fastening said connecting means to said platform frame, substantially as described.

25. A vestibuled railway car body having a platform frame, an integral beam having a portion forming a post of the vestibule end wall, another portion forming a post of the car body end wall, and an intermediate portion below and fastened to said platform frame, substantially as described.

26. A vestibule for railway cars, including a platform frame, and a substantially U-shaped metal beam having its leg members extending through the platform, an intermediate part of the beam which connects the legs lying below the platform, one leg being at the front of the platform and the other leg being at the back of the platform, substantially as described.

27. A vestibule for railway cars having means to prevent telescoping thereof, said means including front and rear upright posts of rolled metal connected at their lower ends by an integral bend, substantially as described.

28. A vestibule for railway cars having means to prevent telescoping thereof, said means including front and rear upright posts of rolled metal connected at their lower ends by an integral bend located below the platform of the vestibule, substantially as described.

29. A vestibule for railway cars having means to prevent telescoping thereof, said means including a substantially U-shaped rolled metal beam, the part of the beam

which connects the legs thereof being at the bottom of the beam, and the legs of the beam defining the transverse entrance to the vestibule, substantially as described.

30. A car body having an under-frame and side posts, and substantially U-shaped bent rolled metal beams interposed between successive posts at each end of the car body, the legs of each beam lying against adjacent posts, and an intermediate part of the beam which connects the legs being at the bottom of the beam and adjacent the under-frame of the car-body, substantially as described.

31. In a railway car, the combination with a car-body having corner-posts, of a vestibule frame composed of beams bent into U-shape, the part of each beam which connects the legs thereof being arranged substantially horizontal and parallel to the platform of the vestibule frame, the legs of the beams affording door-posts in the car-body end-wall and posts for the vestibule passageway, bracing means between the upper ends of the legs of the respective beams, and bracing means between the upper ends of the vestibule post members and the corner-posts of the car-body, substantially as described.

32. In a railway car, the combination of a car-body and an apertured vestibule platform-casting, a pair of U-shaped fabricated beams having their legs projecting upwardly through the apertures of said casting, struts between the legs of the respective beams tending to hold said legs properly spaced apart, and bracing means at the upper portion of one of the legs of each beam assisting in maintaining it in position to oppose shocks tending to crush the vestibule, substantially as described.

33. In a railway car, the combination of a car-body and an apertured vestibule platform-casting, a pair of U-shaped fabricated beams having their legs projecting upwardly through the apertures of said casting, one of the legs of each beam constituting a vestibule passageway-post, struts between the legs of the respective beams tending to hold said legs properly spaced apart, and bracing means at the upper portions of the vestibule passageway-post members assisting in maintaining them in position to oppose shocks tending to crush the vestibule, substantially as described.

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