

No. 877,014.

PATENTED JAN. 21, 1908.

W. E. SYMONS.
CAST STEEL TRUCK.
APPLICATION FILED SEPT. 20, 1906.

3 SHEETS—SHEET 1.

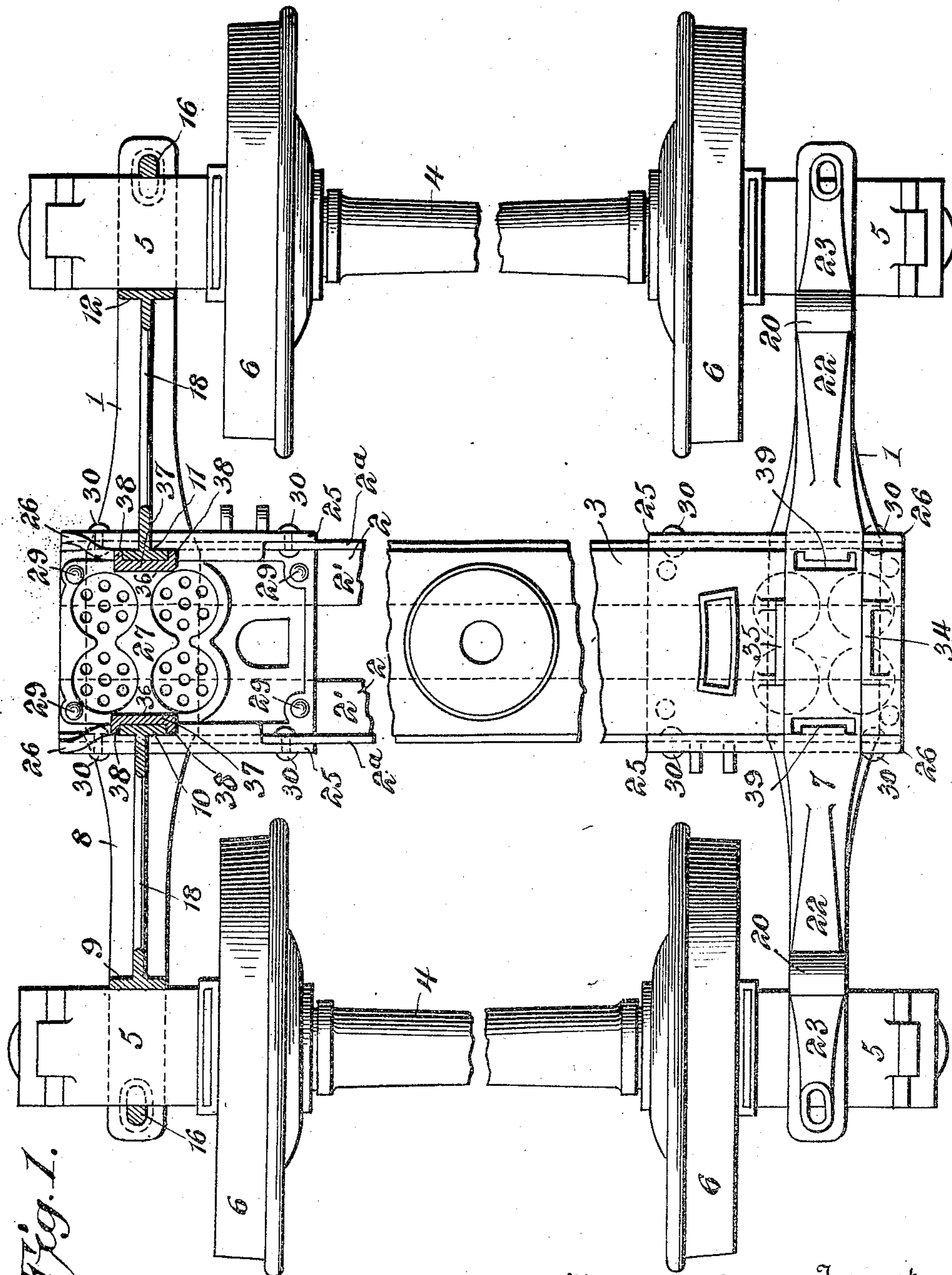


Fig. 1.

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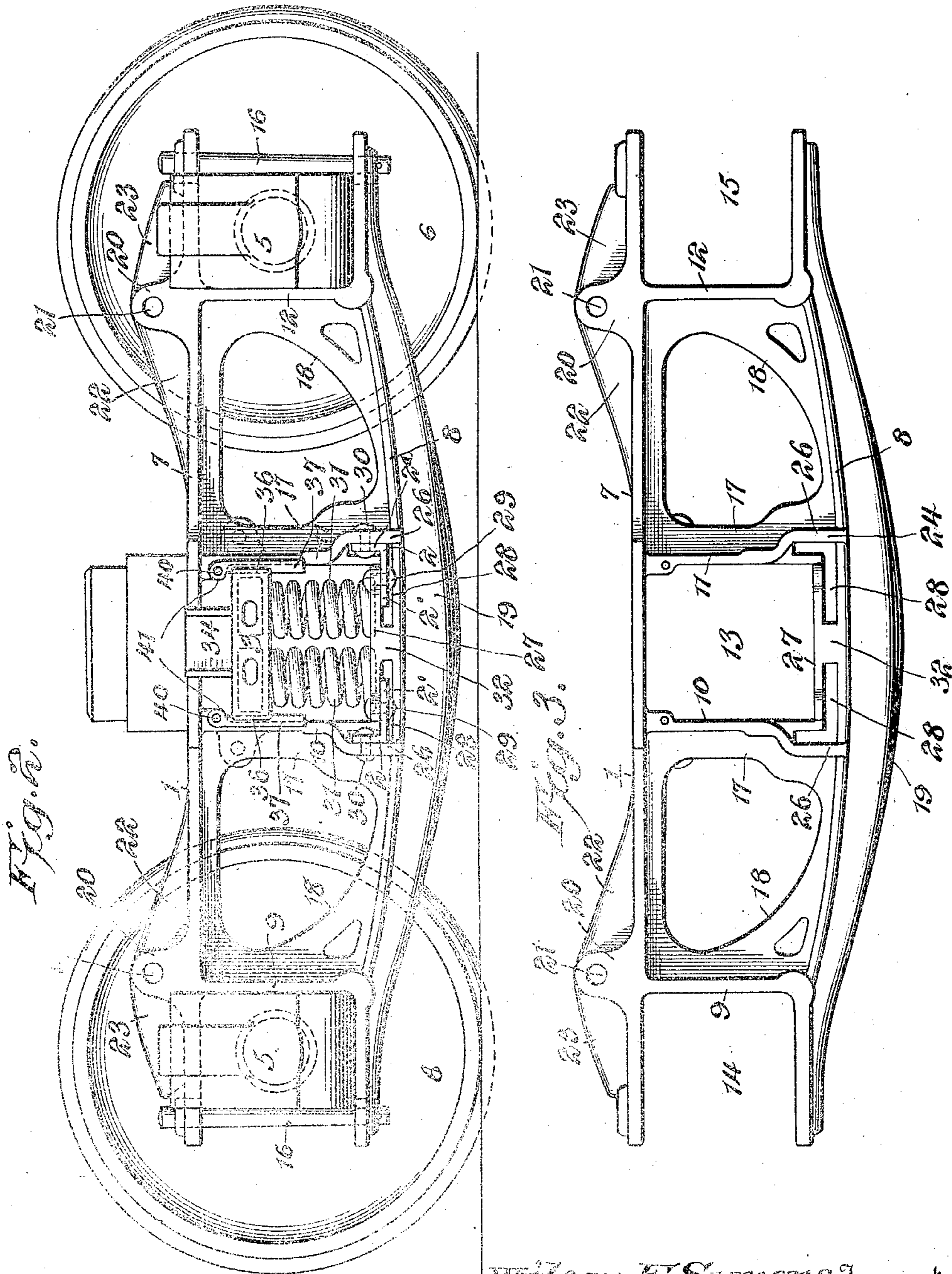
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3 SHEETS—SHEET 3.

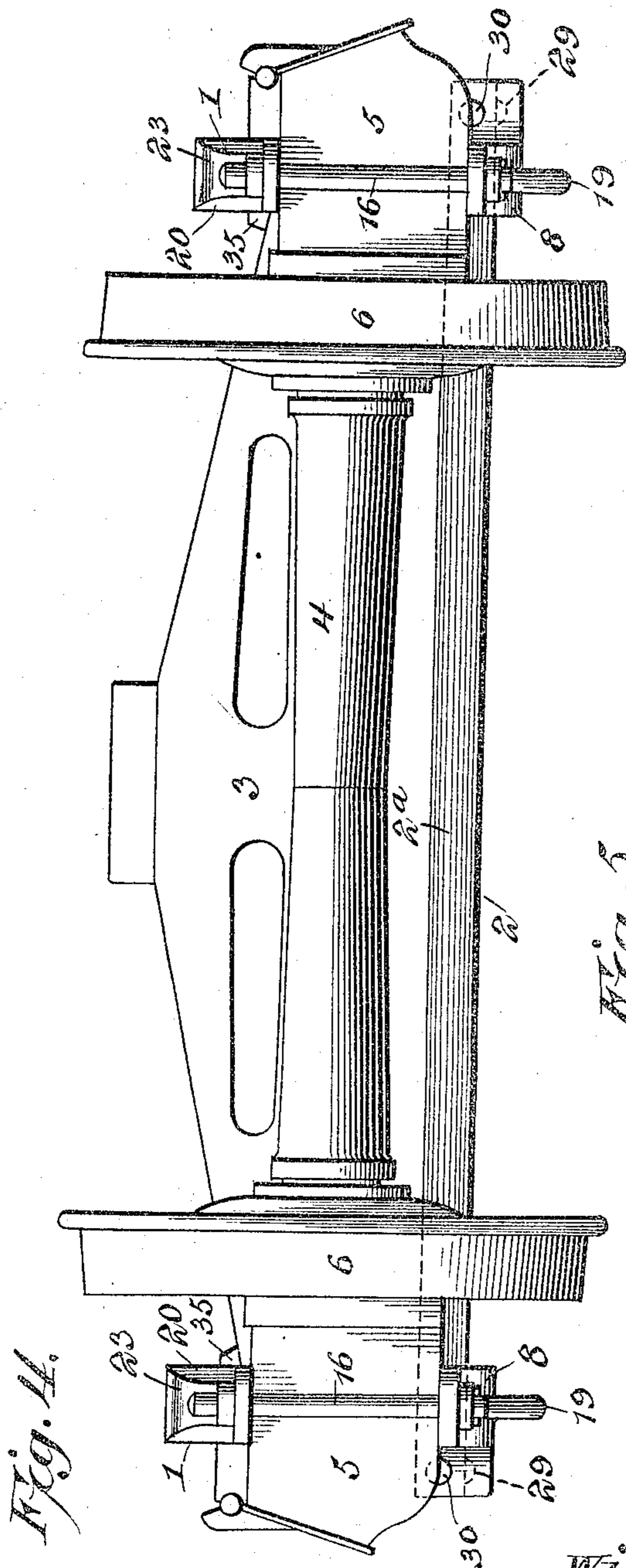


Fig. 4.

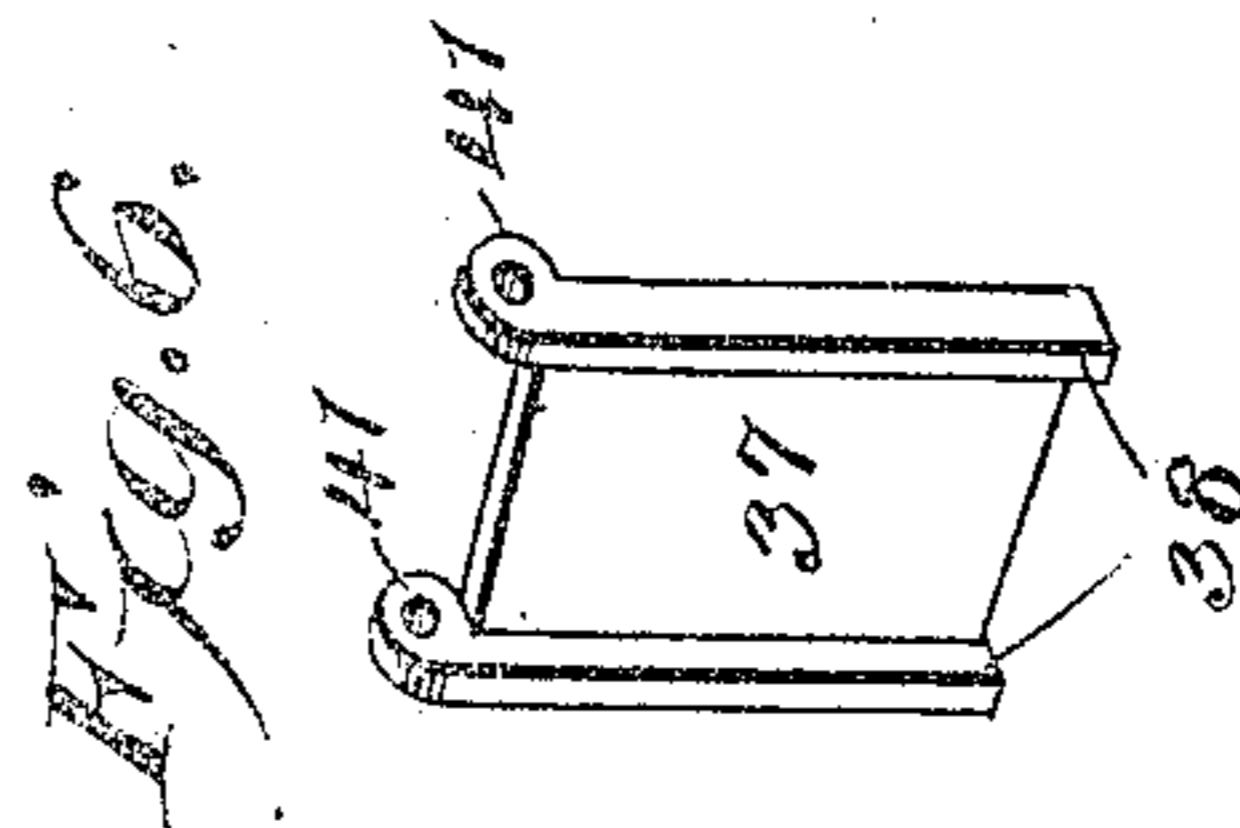


Fig. 6.

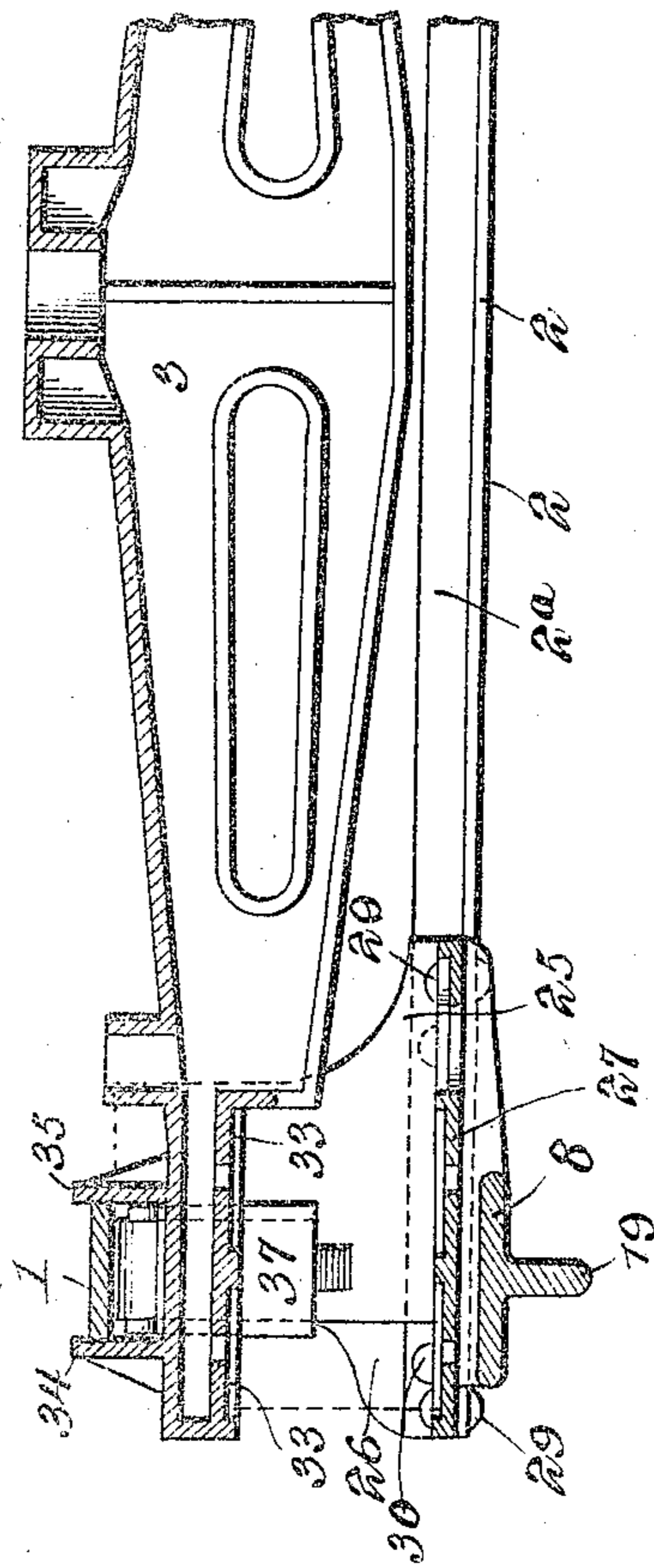


Fig. 5.

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UNITED STATES PATENT OFFICE.

WILSON E. SYMONS, OF CHICAGO, ILLINOIS.

CAST-STEEL TRUCK.

No. 877,014.

Specification of Letters Patent.

Patented Jan. 21, 1908.

Application filed September 20, 1906. Serial No. 335,413.

To all whom it may concern:

Be it known that I, WILSON E. SYMONS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Cast-Steel Truck, of which the following is a specification.

This invention relates to a novel cast steel truck, designed more particularly for use in connection with cars and locomotive tenders. The constant increase in the weight of both tenders and cars of certain types, as for instance furniture, ballast, circus, and other cars, together with the enlarged dimensions thereof, make it desirable to provide trucks therefor which will allow the car bodies to be located very low or near the track. It has therefore been proposed to utilize a low arch-bar type of truck with the straight bar on top, the offset being below the plane in which the upper sides of the oil boxes are located. This arrangement, however, adds materially to the undesirable features of the ordinary arch-bar truck, particularly as to the key bolts, the ends of which are necessarily located so near the rail that interference with switch rails, guard rails, frogs, road crossings, and other parts of the superstructure or permanent way is made possible.

As distinguished from this proposed use of the ordinary arch-bar type of truck, the object of my invention is to produce a cast steel truck in which practically the entire truck structure will be located in a plane below that of the upper sides of the oil boxes, and in which the column bolts, nuts, and other downwardly projecting portions, which might interfere with any portion of the permanent equipment, are eliminated.

Another object is to so construct the cast steel side members of the truck that the former, while being capable of sustaining an enormous weight, will be of extremely light and inexpensive construction.

A further object of the invention is to provide a novel connection between the side members, said connection being sufficiently elastic to absorb the strains imposed upon the truck by irregularities of the road-bed and including angle bars extended into cored out sockets or seats formed in the side members.

Another object of the invention is to insure the retention of the side frames in proper vertical position and the proper relative positions of the side frames and bolster, by pro-

viding the latter, adjacent to each end thereof, with inner and outer guide lugs disposed at opposite sides of the top bar of the side member and with safety guides located at the inner and outer side of each vertical strut of the side member.

Another object of the invention, subordinate to that just stated, is to provide the side member with detachable shoes, which, when in place upon the vertical struts, will cooperate with the safety guides of the bolster and lock the same in the side frames, but which, when removed, will permit the displacement of the bolster to facilitate repairs.

Various other objects, and additional structural characteristics, will hereinafter appear as the description of the illustrated embodiment of the invention is developed.

In the accompanying drawings—Figure 1 is a sectional plan view of my truck complete, one side being shown in plan and the other in section. Fig. 2 is a side elevation of the truck. Fig. 3 is an elevation of one of the side members detached. Fig. 4 is an end view of the truck. Fig. 5 is a vertical section through one of the side frames and the adjacent end of the bolster, and Fig. 6 is a detail view of one of the shoes.

1—1 indicate the side frames, 2—2 the cross members, 3 the bolster, which supports the vehicle body, 4 the axles, 5 the oil boxes, supported by the axles 4 and in turn supporting the side members 1, and 6 the wheels fixed to and rotatably supporting the axles 4. As best shown in Fig. 3, each side member 1 comprises spaced top and bottom bars 7 and 8, intermediate of which are vertical struts 9, 10, 11 and 12. The central struts 10 and 11 define between them a central opening 13 and the end struts 9 and 10 are located a sufficient distance from the outer ends of the upper and lower bars 7 and 8 to define open jaws or oil box receptacles 14 and 15 within which the oil boxes 5 are received and retained by tapered keys 16 located at the outer sides of the boxes and passed through the upper and lower jaws of the receptacles, as shown in Figs. 1 and 2. The spaces between each central strut and the adjacent end strut is occupied by a web 17 designed to lend rigidity to the structure and cut out for the sake of lightness. The cut out portions of the webs 17 are so arranged that curved brace members 18, extending between the upper and lower members, are produced adjacent to the end

struts 12 so as to form a substantial backing for the abutments with which the inner sides of the oil boxes engage. It will be noted also that the lower bar 8 of the side member extends in a graceful downward curve between the inner lower corners of the oil box receptacles and that below the bar is dropped a substantial integral fin or flange 19 which gradually tapers from the middle of the side member to the opposite ends thereof, thus lending great rigidity to that portion of the side frame upon which the weight of the car is imposed.

It is usual in truck constructions, particularly in those designed for the support of locomotive tenders, to attach what are called check or safety chains, which connect the corners of the truck frame with the body of the tender for the purpose of preventing the truck from turning in the event of derailment. In my improved construction, I have made provision for the attachment of these chains and in so doing have provided an excess of metal at those points at which the upper bar of the truck is subjected to the greatest strain, to-wit, at the junctures of the upper bars 7 with the vertical end members 9 and 12. It will be noted, by reference to Figs. 1, 2 and 3 that upwardly extending safety chain lugs 20 are cast integral with the upper bar 7 of each side frame substantially opposite the upper inner corners of the oil box receptacles and preferably extending the full width of the bar 7. The lugs 20 are provided with apertures 21 for the attachment of the safety chains and are braced by webs 22 and 23, downwardly tapering in opposite directions from the lug and serving to further stiffen the side member at those points where the latter sustain the counter-thrusts of the vehicle body and oil boxes. It will be noted, furthermore, that the provision of these webs or flanges 22 and 23 aid materially in giving the side frame of the truck a graceful pleasing contour, since the upper bar, while straight as a matter of fact, is given a general drop-center appearance corresponding approximately to the appearance of the lower bar, so that the side member or frame as a whole appears to have a longitudinal curve giving a graceful downward sweep at the center thereof.

The lower portions of the central struts 10 and 11 are considerably widened, as indicated at 24, and are extended both inwardly and outwardly from the side frame to form inner and outer extensions 25 and 26 thereof. Said extensions also include a transverse member 27, located in a plane above the upper edge of the lower bar 8 and extended between the outer ends of the extensions 25 and 26. The member 27 is integral with the struts 10 and 11, and is spaced from the top of the lower member 8 to define the hori-

zontal portions of angular seats 28 the vertical portions of which are formed in the widened lower ends of the struts, see Fig. 3. These angular seats 28 are designed for the reception of the cross members 2 which are in the form of angle bars having their outer ends extended through the side members and located within the seats 28, it being understood that the angular seats which receive the angle bars extend entirely through the side members and are preferably formed by cores during the casting thereof.

The manner of securing the angle bars in the angular seats or openings of the side members is not material, since keys, rivets, or other suitable securing means may be provided for this purpose. I prefer, however, to rivet the horizontal flanges 2' of the cross members 2 to the inner and outer ends of the transverse member or platform 27, as by rivets 29, and to similarly secure the vertical flanges 2^a of the side members to the extensions 25 and 26 of the struts, as by rivets 30, see Fig. 1. The platform 27 is also designed to serve as a spring seat and for this purpose its upper surface is formed for the reception of the bolster supporting springs 31, portions of the platform being cut out, as shown in Fig. 1, for the sake of lightness. It will also be noted, by reference to Fig. 3, that since the angular seats or openings 28 are spaced apart, the intervening metal constitutes a support 32 for the central portion of that part of the platform 27 which constitutes the seat for the springs, thus lending great rigidity to the structure. It will be seen that this manner of connecting the transverse members of the truck with the side members thereof affords an extended bearing for the former, and while permitting the flexibility of the cross members to absorb all torsional strains which could result in the injury of the truck structure, prevents greater relative movement of the parts than is necessary for the accomplishment of that purpose.

The bolster 3 is located above the horizontal flanges 2' of the cross members and extends through the central openings in the side members, as shown in Fig. 5, being provided with integral spring seats 33 which rest upon the upper ends of the springs 31 in a manner well understood in the art. At each end of the bolster and projecting upwardly therefrom are a pair of thrust flanges 34 and 35 located respectively at the outer and inner sides of the adjacent side member and arranged to cooperate with the opposite sides of the upper bar 7 thereof, see Fig. 5. These thrust flanges serve to prevent the approach or recession of the upper edges of the side members and guide the bolster in its vertical movement. In addition to the thrust flanges, however, I prefer to employ what may be termed safety guides whereby

the bolster will still be properly guided in its movement and the relation of the bolster and side frames retained, in the event of breaking of one or more of the thrust flanges.

5 At the opposite sides of each end of the bolster are formed vertically-disposed safety guides 36 which may be produced by forming vertical recesses or vertical flanges in or upon the sides of the bolster when the latter is cast. These guides receive and slide
10 vertically upon a pair of shoes 37 imposed against the inner faces of the struts 10 and 11 and provided with side flanges 38 which bear against the opposite edges of the struts
15 and serve to prevent the displacement of the shoes in a lateral direction.

In assembling the parts, the bolster is first extended into the side frame and the shoes are then passed down through openings 39
20 in the upper bar 7 of the side frame and into the guides of the bolster, in which position the shoes are retained by pins 40 passed through the upper ends of the struts 10 and 11 and through apertured ears 41 at the up-
25 per end of each shoe, see Figs. 1, 2, 5 and 6. Obviously, these shoes 37 not only serve to guide the bolster, but constitute keys which interlock the bolster with the side frames and thus prevent dislocation of the side members
30 even in the event of the breaking of the thrust flanges.

It is thought that from the foregoing the novel construction of my truck and the many advantages accruing from the use there-
35 of will be clearly comprehended. However, I do not wish to be understood as limiting myself to the structural details defined, as on the contrary, I reserve the right to effect such changes, modifications, and variations of the
40 illustrated structure as may come fairly within the scope of the protection prayed.

What I claim is:—

1. A cast steel truck, including a side member comprising longitudinal upper and lower
45 bars and intermediate vertical struts, arranged to produce substantially longitudinal open jaws at the ends of the side member, and reinforcements extending above the upper side of the upper bar and located at the
50 upper rear corners of the upper jaws.

2. A cast steel truck, including a side member having open jaws at its opposite ends, and safety chain attaching lugs located over the upper inner corners of the jaws and ex-
55 tending above the upper edge of the side member to serve the dual function of chain attaching means and reinforcements.

3. A cast steel truck, including a side member having open jaws at its opposite ends for the reception of the oil boxes and having reinforcing flanges or projections extending above the upper side of the upper bar of the member and extending longitudinally thereof over the upper inner corners of the jaws.
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4. A cast steel side member for trucks, in-

cluding upper and lower bars and vertical struts, said bars and struts being arranged to produce substantially longitudinal open jaws at the opposite ends of the member for the reception of the oil boxes, safety chain
70 attaching lugs formed integral with the upper bar of the side member and extended above the upper face thereof at points opposite the upper inner corners of the jaws, and integral
75 ribs or flanges extending in opposite directions from the lugs and diminishing in height as they recede therefrom.

5. A cast steel side member for trucks, including a straight upper bar, a drop-center lower bar, intermediate vertical struts, and
80 reinforcements located on the end portions of the upper bar above certain of the struts and projecting above the upper side of said upper bar.

6. A cast steel side member for trucks 85 comprising a straight upper bar, a drop-center lower bar, intermediate and end struts extending between the bars, and integral webs reinforcing the bars and struts and located intermediate thereof, said webs being
90 cut out and forming braces that are associated with and diagonally disposed to certain of the struts.

7. A cast steel side member for trucks, including a straight upper member, a drop-
95 center lower bar, a pair of intermediate struts, a pair of end struts, and inclined braces extending diagonally from the lower bar to the end struts.

8. A cast steel side member for trucks, in-
100 cluding a straight upper bar, a drop-center lower bar, a pair of intermediate struts, a pair of end struts, the end struts being spaced from the ends of the upper and lower bars to form open jaws, and safety chain at-
105 taching lugs formed integral with and extending above the upper bar opposite the points of junctures between said bar and the end struts.

9. A cast steel side member for trucks, 110 comprising a straight upper bar, a drop-center lower bar, a pair of intermediate struts, a pair of end struts, reinforcement integral with the upper bar and disposed above the same opposite the junctures between said
115 bar and the end struts, and intermediate braces each located between an end strut and an intermediate strut and extending in an inclined direction from the lower bar to the end strut.
120

10. A cast steel side member having an opening at its center for the reception of the bolster, an integral spring seat for the bolster supporting springs, and an opening below said spring seat for the reception of a cross
125 member.

11. A cast steel side member for trucks having an opening at its center to receive the bolster, an integral spring seat for the bolster supporting springs, and an angular
130

opening for the reception of an angular cross member.

12. A truck, including cast steel side members having central openings for the reception of the bolster ends, and also having openings separate from the central openings for the reception of the ends of a cross member extending between the side members.

13. A truck, including cast steel side members each having an opening for the reception of the bolster, an integral platform constituting a spring seat, and a pair of cross members extended between the side members and having their ends passed through said side members below the integral platform.

14. A truck, including cast steel side members, a bolster, and a pair of angle bars constituting cross members, each side member having an opening that receives the bolster and a pair of angular openings separate from the bolster-receiving opening that receives the angle bars.

15. A truck, including cast steel side members each having a central opening for the reception of the bolster, and an integral platform located at the bottom of the opening to form a spring seat and extended beyond the inner and outer sides of the side member, and cross members secured to the inward extensions of the platform.

16. A truck, including cast steel side members, and a pair of angle bars constituting cross members, said side members having angular openings for the reception of the ends of the angle bars and also having inward extensions to which the angle bars are secured.

17. A truck, including cast steel side members and angle bars constituting cross members, said side members having openings for the reception of the angle bars and also having both horizontal and vertical extensions to which horizontal and vertical flanges of the angle bars are secured.

18. A truck including cast steel side members and a pair of angle bars constituting cross members, each side member comprising upper and lower bars, vertically disposed intermediate and end struts, and an integral spring seat spaced above the lower member and extending between the intermediate struts, the angle bars being extended under the spring seat and through the intermediate struts.

19. A truck, including cast steel side members each including upper and lower bars, vertically disposed intermediate and end

struts, an integral spring seat spaced above the lower bar between the intermediate struts and extended inwardly from the side member, and vertically disposed flanges extended inwardly from the intermediate struts, and angle bars extending between and through the side members and secured to the extensions of the spring seat and intermediate struts, respectively.

20. A side member having an opening for the reception of the bolster, a guide shoe located against one of the walls of the opening and having ears, and a pin passing through the ears and side member to hold the shoe in place.

21. A side member having an opening for the reception of a bolster, a guide shoe having spaced side flanges in its outer face that embrace the side member, and means extending transversely through the shoe and side member for detachably securing the shoe against movement to the side member.

22. A cast steel truck, including a side member comprising longitudinal upper and lower bars forming upper and lower longitudinally disposed jaws at their ends, openings formed through the outer ends of the jaws for the reception of oil box-retaining means, and reinforcing lugs projecting above the upper sides of the upper bar at the inner ends of the jaws formed thereby, said lugs terminating at the said openings.

23. A truck including cast steel side members having central openings and also having openings separate from the central openings and disposed below the same, a bolster having its ends engaged in the central openings, and cross members extending between the side members and having their ends secured in said other openings.

24. A side member having an opening for the reception of a bolster, guide shoes located against the opposite walls of the opening and having outstanding flanges that embrace the side member, said shoes also having ears at their upper ends, pins passing through the ears and side member, and a bolster engaged in the opening between the shoes and slidably interlocked with said shoes.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

WILSON E. SYMONS.

Witnesses:

H. A. JOHNSON,
E. W. HAYES.