

April 22, 1952

J. C. SETTLES ET AL
INBOARD RAILWAY TRUCK

2,594,079

Filed July 15, 1947

9 Sheets-Sheet 1

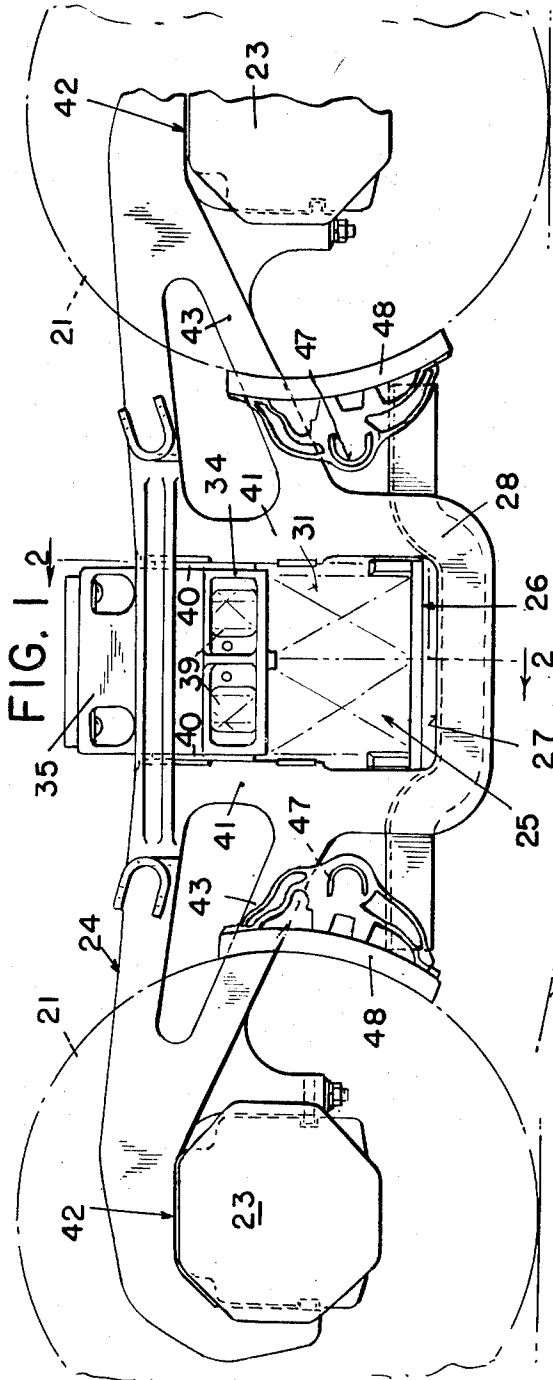


FIG. 4

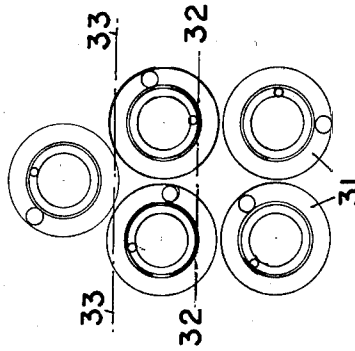
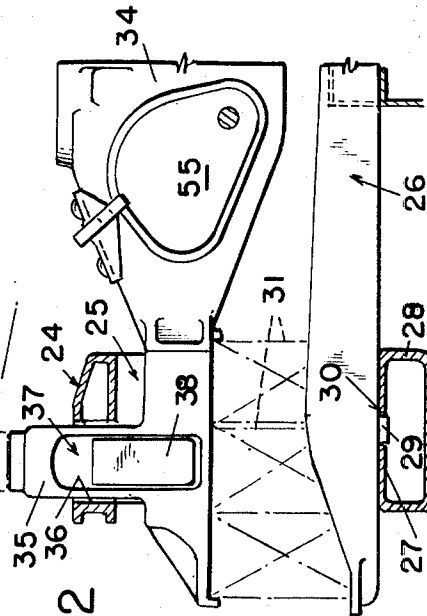


FIG. 2



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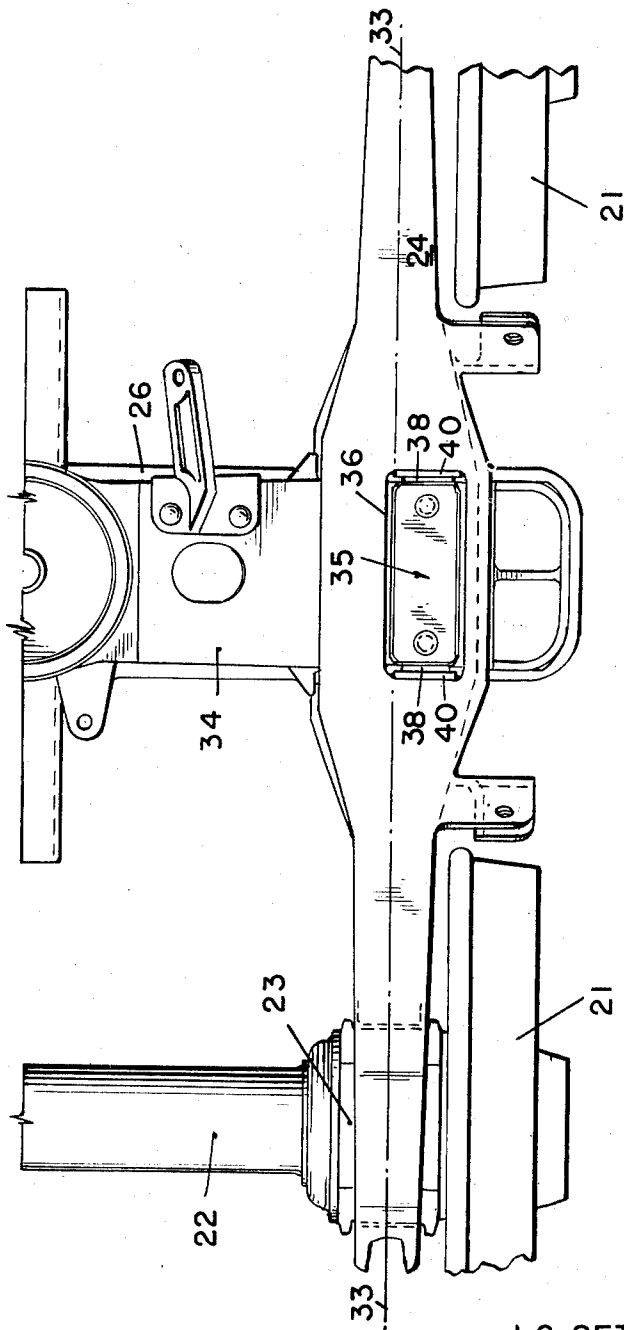
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FIG. 3



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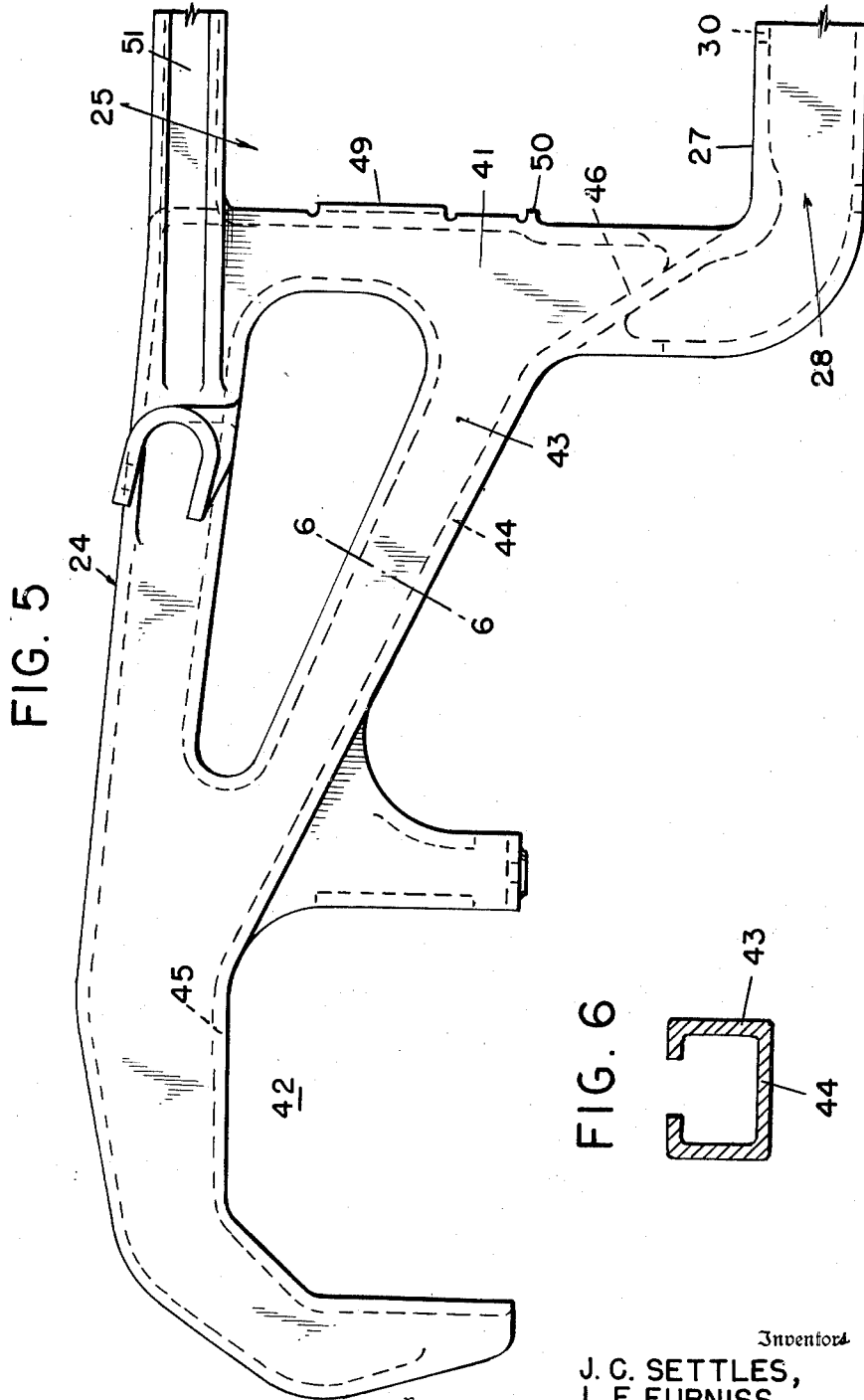
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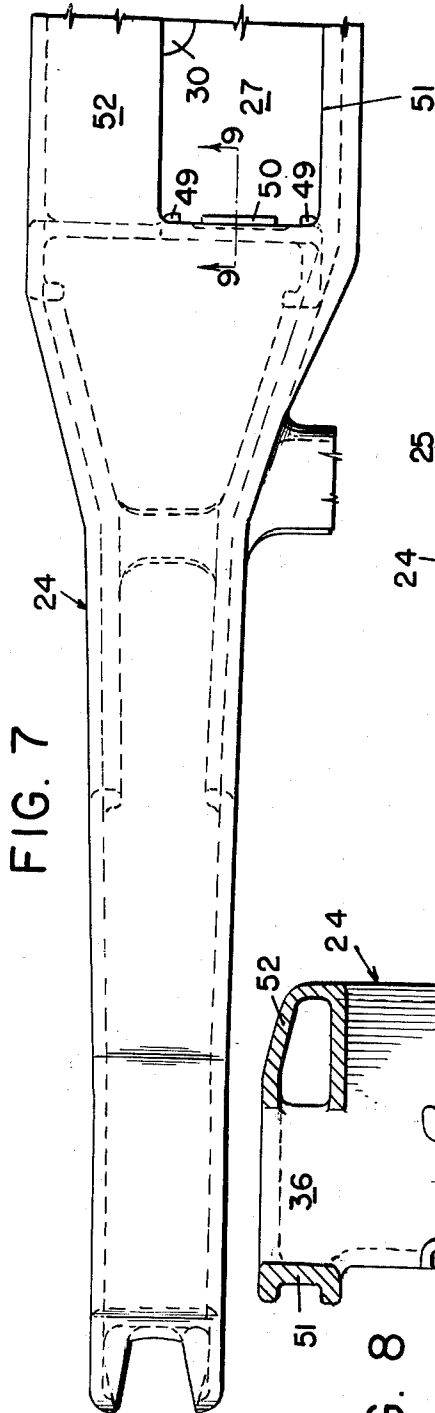
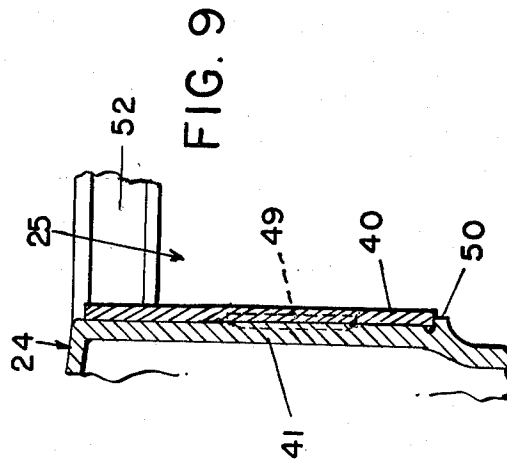


FIG. 7



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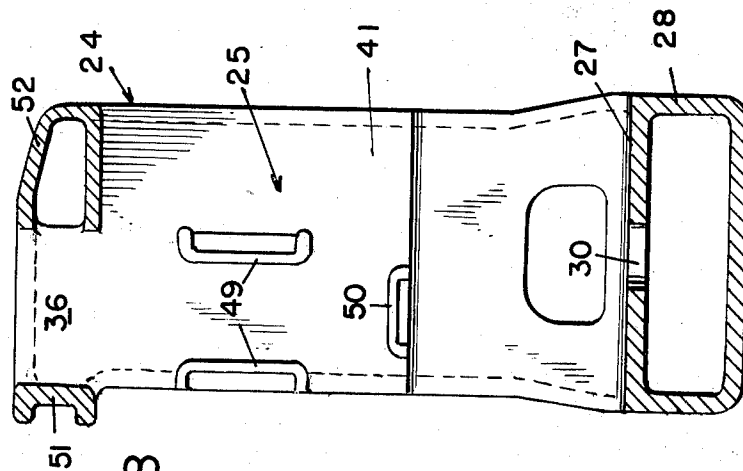


FIG. 8

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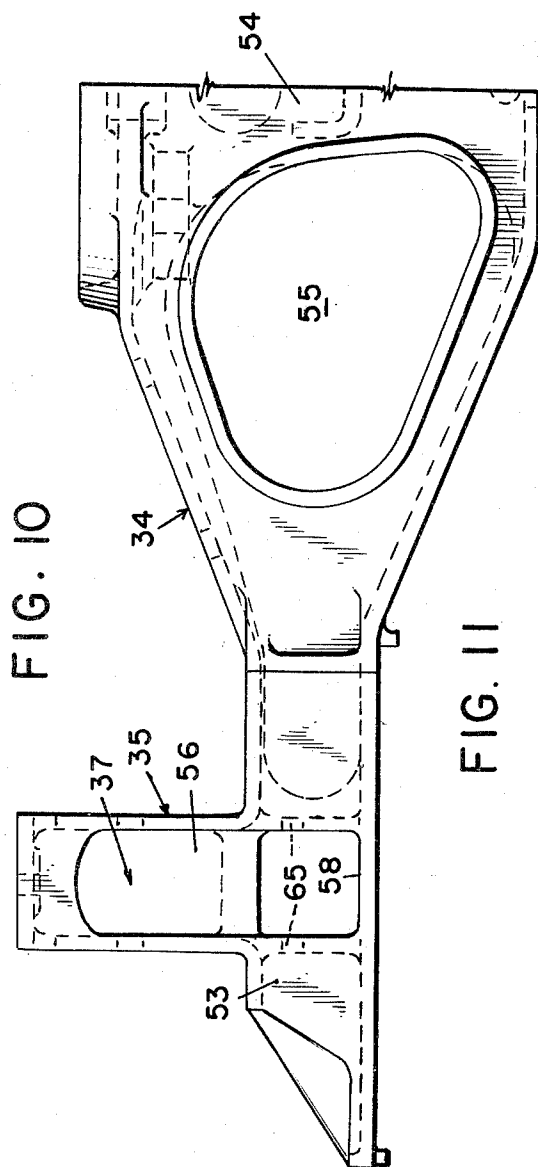
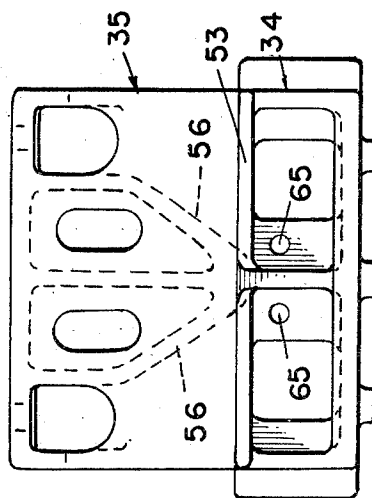


FIG. 11



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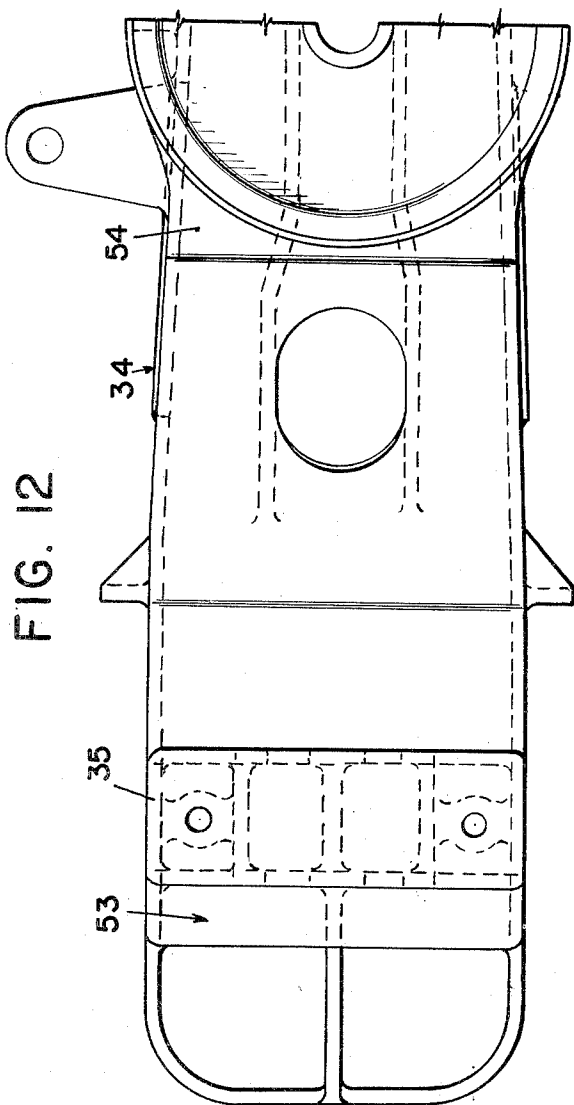
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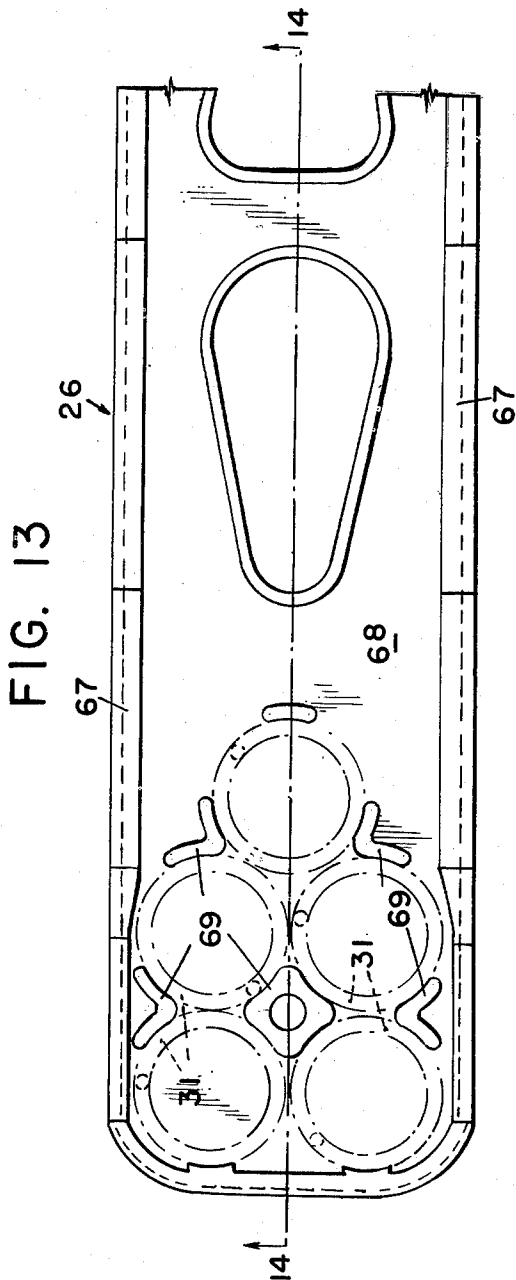
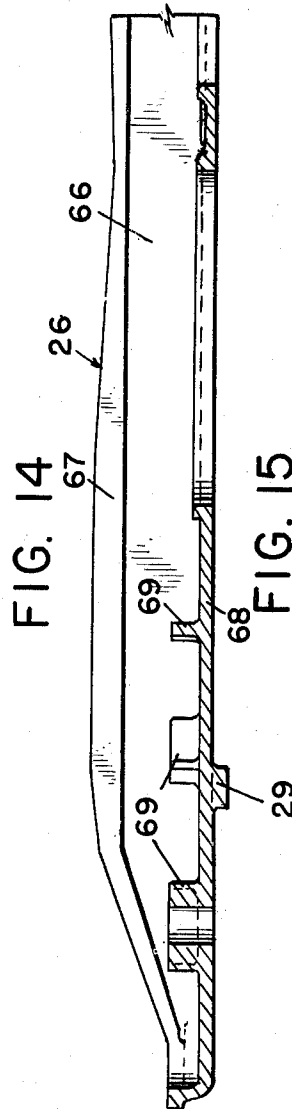
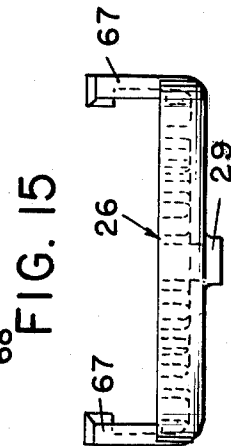
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FIG. 17

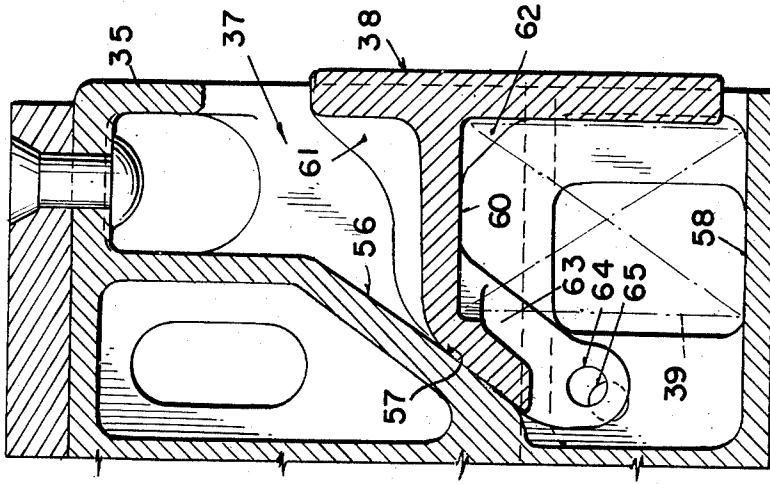
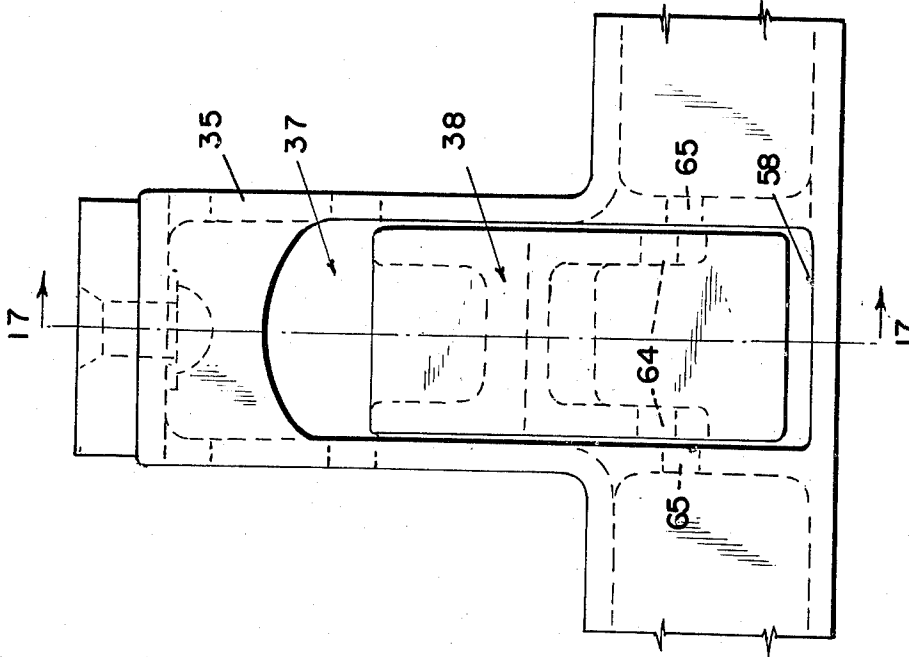


FIG. 16



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FIG. 18

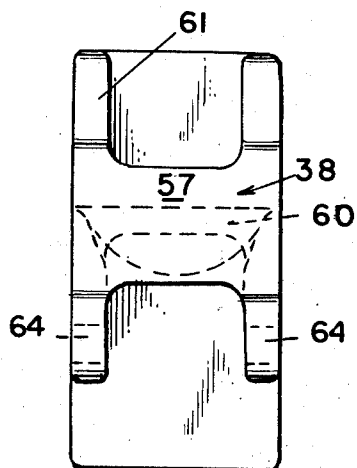


FIG. 19

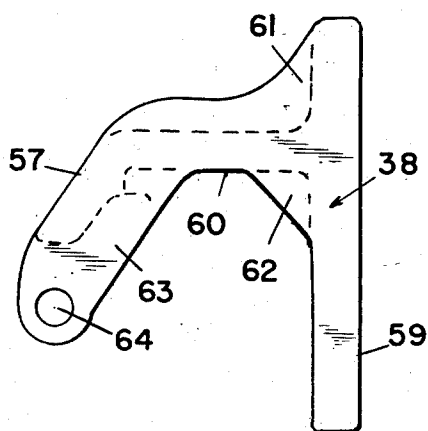
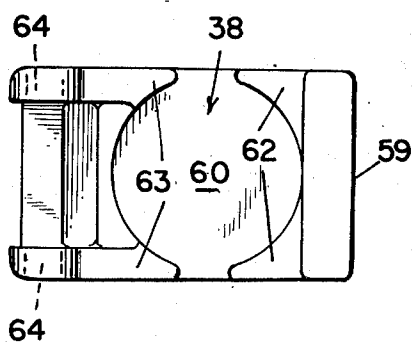


FIG. 20



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2,594,079

INBOARD RAILWAY TRUCK

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Application July 15, 1947, Serial No. 761,038

23 Claims. (Cl. 105-197)

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This invention relates to railway trucks and more particularly to inboard railway car trucks.

One of the objects of the invention is to provide a truck of this type in which the side frames are arranged for standard type brakes with the brake beams passing under inclined tension members of the frames.

Another object is to supply a truck of this character in which each side frame has a guide opening in the top thereof to accommodate an upwardly projecting side bearing table of the bolster.

A still further object is to furnish in such a truck, a bolster having at each end portion thereof, an upwardly projecting side bearing table which extends through and is guided by the side frame top member, and is provided with oppositely disposed spring pressed friction wedges designed to engage the bolster guide columns of the side frame, for damping movement of the bolster.

Another object is to provide a truck of this type in which the center of gravity of the bolster supporting spring group at each side of the truck is off-set outwardly from the longitudinal center line of the side frames and journals at that side of the truck, the spring groups being supported by a spring plank which connects the opposed side frames and extends outwardly beyond such frames to act as a beam.

With these objects in view, one specific embodiment of the invention will be described for the purpose of making the invention clear and for illustrating and defining the manner in which the invention may be carried out. The invention generally will be defined in the claims from which other objects of the invention may be ascertained.

Reference is had to the accompanying drawings, in which:

Fig. 1 is a fragmentary side elevational view of our improved truck with certain parts omitted to facilitate illustration.

Fig. 2 is a transverse vertical sectional view taken on the line 2-2 of Fig. 1 and illustrating half of the truck, with parts omitted to facilitate illustration.

Fig. 3 is a half fragmentary top plan view of the truck with certain parts omitted.

Fig. 4 is a diagrammatic top plan view of one of the bolster supporting spring groups.

Fig. 5 is an enlarged side elevation of a half of one of the side frames.

Fig. 6 is a transverse sectional view of a detail of the same taken on the line 6-6 of Fig. 5.

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Fig. 7 is a top plan view of the structure shown in Fig. 5.

Fig. 8 is a transverse vertical sectional view taken through the medial portion of the side frame.

Fig. 9 is a sectional view of a detail taken on the line 9-9 of Fig. 7.

Fig. 10 is a side elevation of one-half of the bolster.

Fig. 11 is an end view of the bolster.

Fig. 12 is a top plan view of the structure illustrated in Fig. 10.

Fig. 13 is a top plan view of one-half of the spring plank.

Fig. 14 is a vertical sectional view of the same taken on the line 14-14 of Fig. 13.

Fig. 15 is an end view of the spring plank.

Fig. 16 is a side elevation of a portion of the bolster and showing one of the friction wedges positioned in a pocket thereof.

Fig. 17 is a vertical sectional view taken on the line 17-17 of Fig. 16, but illustrating only one-half of the bolster and one of the friction wedges, and the pocket which receives the same.

Fig. 18 is a rear elevation of one of the friction wedges.

Fig. 19 is a side elevation of one of such wedges.

Fig. 20 is a bottom plan view of the wedge.

Referring to Figs. 1 to 4, inclusive, 21 designates wheels, the wheel supporting axles 22 being journaled in anti-friction bearings 23. The bearings support side frames 24 arranged inwardly of the wheels, and each side frame has a bolster opening 25 for the reception of a spring plank 26, the end portions of which rest on the top 27 of the spring seats 28 of the side frames and are interlocked therewith by any suitable means such as lugs 29 projecting downwardly from the spring plank into openings 30 in the tops of the spring seats.

Each end portion of the spring plank supports a group of springs 31 (preferably of the long travel type), arranged as illustrated in Fig. 4, so that the center of pressure 32 of each spring group is positioned outwardly of the longitudinal center line 33 of the side frame at that side of the truck in order to increase the lateral stability of the truck.

As is customary, the springs support a bolster 34, and it will be noted from Fig. 2, that the bolster and spring plank at each side of the truck projects outwardly beyond the side frame at that side of the truck. In accordance with the present invention, each end portion of the bolster is provided with a side bearing table 35 that pro-

jects upwardly through a guide opening 36, offset outwardly in the top of the side frame at that side of the truck. Each side bearing table is provided at opposite sides thereof with pockets or cavities 37 for the reception of friction wedges or shoes 38 resting on springs 39 (Fig. 17), within the pockets and urged by the springs toward wear plates 40 secured to the bolster guide columns 41 which confront the wedges.

Referring now to the details of construction, it will be noted that each side frame (Figs. 5-9) consists of a one-piece casting, symmetrical about the transverse center line of the truck, and each end of the frame is provided with a pedestal opening 42 for the reception of the anti-friction bearing or roller bearing journal box 23, shown in Fig. 1. The inclined tension members 43 of the side frame are each preferably U-shaped in cross-section, having a bottom web 44 which extends from the top 45 of the pedestal opening to the medial portion of the adjacent bolster guide columns 41. From the point where the web joins such column, it extends diagonally downward across the lower portion of the column, as indicated at 46 (Fig. 5), and merges with the top 27 of the spring seat member, which is preferably box-shaped in cross-section (Fig. 8).

As the inner end of each inclined tension member 43 is raised above its usual position to approximately midway the height of the column 41, it will permit a standard brake beam 47 (only partially shown in Fig. 1) to pass under each side frame for applying brake shoes 48 to the wheels. The remainder of the brake mechanism may also consist of the usual standard arrangement of levers, rods, and associated parts.

Each bolster guide column 41 is preferably provided with a pair of spaced side lugs 49 and a bottom lug 50 for positioning one of the vertical wear plates 40, against which one of the friction wedges 38 bears. Each wear plate may be secured to a column by welding or any other suitable means.

Over the bolster opening, the top member of the side frame (Fig. 8) consists of an outer portion 51 and an inner portion 52 which portions form the outer and inner walls, respectively, defining the opening 36 for accommodation of the side bearing table 35 at the side of the truck. The outer portion 51 is formed as a relatively shallow recumbent channel, and the inner portion 52 is formed as a relatively deep recumbent channel. The top member of the side frame is the only portion of the frame proper which is not symmetrical about the center line of the journals.

With reference to the specific construction of the bolster, it will be noted from Figs. 10 to 12, that the bolster proper is also a one-piece casting, symmetrical about both its transverse and longitudinal center lines. Due to the inboard design of the truck, the bolster is much shorter in span than the usual bolsters of outboard trucks. As seen in elevation (Fig. 10), the bolster has a relatively shallow end portion 53 positioned about midway the height thereof and this enables the bolster to be employed with the long travel springs 31 which support the bolster on the spring plank. The bolster also has a relatively deep medially portion 54 to accommodate a large opening 55 through the bolster, to permit the use of the usual "rods through" type of standard brakes. These proportions are dictated by general truck conditions which are also found in outboard trucks and it is believed that they are novel in combination with the upstanding side

bearing tables 35 which extend through the tops of the side frames.

As best shown in Figs. 16 and 17, each upstanding side bearing table has in each pocket thereof, an inclined surface 56, these surfaces in the two pockets of each side bearing table (Fig. 11) converging downwardly relatively to the bolster. Each inclined surface cooperates with a complementary inclined surface 57, of one of the friction wedges, and the bolster has a spring seat 58 at the bottom of each pocket for supporting the wedge spring 39. Each friction wedge 38, as best illustrated in Figs. 18 to 20, has a vertical friction surface 59 which bears against the wear plate on the side frame column 41, a slightly crowned inclined surface 57, mentioned above, and a horizontal spring seat surface 60 which rests upon the top of the spring 39. These elements of the wedge are integrally formed and are reinforced by a novel arrangement of ribs 61, 62 and 63, which adequately strengthen the friction wedge and also allow sufficient space for friction spring 39. Holes 64 are provided in the lower ends of the tails of the wedges and are arranged to align with holes 65 (Fig. 17) in the bolster, for the reception of a retaining pin (not shown), used in holding the wedge spring 39 under compression when it is desired to connect or disconnect the bolster from a side frame. It will be understood that the friction damping devices thus provided function to damp movements of the bolster relatively to the side frames.

The spring plank is also believed to be of novel construction, and as shown in Figs. 13 to 15, it is symmetrical about its center line. Due to the fact that the center of spring pressure 32 (Fig. 4), lies outwardly of the truck, beyond the center line 33 of the supporting side frame, this spring plank is subjected to greater bending action than is usual in a spring plank for an outboard truck in which the center of pressure of the bolster supporting spring group coincides with the center line of the supporting side frame. For this reason, it is more economical to form the spring plank as a casting in which the strength at the various sections along its length can be varied to correspond with the bending action rather than to use the usual uniform section rolled steel channel. As illustrated, the plank has an upstanding marginal flange 66 of varying height, topped by a bead 67 also of varying height and thickness. The bottom plate 68 of the plank is provided with integral upstanding spring positioning lugs 69 and serves as a seat for the bolster supporting coils 31.

From the foregoing, it is believed the construction, operation and advantages of the improved truck may be readily understood, and we are aware that changes may be made in the details disclosed without departing from the spirit of the invention, as expressed in the following claims.

What we claim and desire to secure by Letters Patent is:

1. A railway truck comprising opposed, wheel-supported side frames, each side frame having a bolster opening and a second opening in its top above the bolster opening, a bolster supported by the side frames and having its ends extending into the bolster openings, upstanding side bearing tables arranged on the bolster and extending through said second openings, and damping means mounted in the bolster at the places where the side bearing tables are located and cooperat-

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ing with the side frames to damp relative movement between the bolster and side frames.

2. A railway truck comprising opposed, wheel-supported side frames, each side frame having a bolster opening and a second opening in its top above the bolster opening, a bolster supported by the side frames and having its ends extending into the bolster opening, upstanding side bearing tables arranged on the bolster and extending through said second openings, and damping means mounted in the bolster at the places where the side bearing tables are located and cooperating with the side frames to damp relative movement between the bolster and side frames, said damping means including inclined surfaces within each side bearing table, wedge shoes having inclined surfaces movably engaging the first-mentioned inclined surfaces, and springs carried by the bolster and engaging the wedge shoes.

3. A railway truck comprising opposed, wheel-supported side frames, each side frame having a bolster opening and a second opening in its top above the bolster opening, a bolster supported by the side frames and having its ends extending into the bolster openings, upstanding side bearing tables arranged on the bolster and extending through said second openings, and damping means mounted in the bolster at the places where the side bearing tables are located and cooperating with the side frames to damp relative movement between the bolster and side frames, said damping means including pockets arranged in the bolster and side bearing tables, inclined surfaces within the pockets, wedge shoes having inclined surfaces slidably engaging the first-mentioned inclined surfaces, and springs supported by the bolster for urging the wedge shoes into engagement with the side frames.

4. A railway truck comprising opposed, wheel-supported side frames, the side frames being arranged at the inboard sides of the wheels and each side frame having a bolster opening and a second opening in its top above the bolster opening, a bolster supported by the side frames and having its ends extending into the bolster openings, upstanding side bearing tables arranged on the bolster, guided by the side frames and extending through said second openings, and damping means mounted in the bolster at the places where the side bearing tables are located and cooperating with the side frames to damp relative movement between the bolster and side frames.

5. A railway truck comprising opposed, wheel-supported side frames, the side frames being arranged at the inboard sides of the wheels and each side frame having oppositely disposed bolster guide columns arranged at opposite sides of a bolster opening, each side frame having a second opening in its top positioned between the columns, a bolster supported by the side frames and having its ends extending into the bolster openings, upstanding side bearing tables arranged on the bolster and extending through said second openings, and damping means mounted in the bolster at the places where the side bearing tables are located and cooperating with said guide columns to damp relative movement between the bolster and side frames.

6. A railway truck comprising opposed, wheel-supported side frames, the side frames being arranged at the inboard sides of the wheels and each side frame having oppositely disposed bolster guide columns arranged at opposite sides of a bolster opening, each side frame having a

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second opening in its top positioned between the columns, a bolster supported by the side frames and having its ends extending into the bolster openings, upstanding side bearing tables arranged on the bolster and extending through said second openings, and damping means mounted in the bolster at the places where the side bearing tables are located and cooperating with said guide columns to damp relative movement between the bolster and side frames, said damping means comprising converging inclined surfaces arranged in one of the side bearing tables, wedge shoes having inclined surfaces slidably engaging the first-mentioned inclined surfaces, and springs carried by the bolster for urging said shoes into engagement with the columns of one of said side frames.

7. A railway truck comprising opposed, wheel-supported side frames, each side frame having a bolster opening and a second opening in its top above the bolster opening, a bolster supported by the side frames and having its ends extending into the bolster openings, upstanding side bearing tables arranged on the bolster and extending through said second openings, damping means mounted in the bolster at the places where the side bearing tables are located and cooperating with the side frames to damp relative movement between the bolster and side frames, said damping means comprising converging inclined surfaces arranged in one of the side bearing tables, wedge shoes having inclined surfaces slidably engaging the first-mentioned inclined surfaces, and springs supported by the bolster and bearing against the wedge shoes for moving them into engagement with the inclined surfaces of the side bearing table.

8. A railway truck comprising opposed, wheel-supported side frames, each side frame having a bolster opening and a second opening in its top above the bolster opening, a bolster supported by the side frames and having its ends extending into the bolster openings, upstanding side bearing tables arranged on the bolster and extending through said second openings, damping means mounted in the bolster at the places where the side bearing tables are located and cooperating with the side frames to damp relative movement between the bolster and side frames, said damping means including pockets arranged in opposite sides of the bolster and in one of said side bearing tables, converging inclined surfaces arranged in the pockets, wedge shoes having inclined faces slidably engaging the first-mentioned inclined surfaces, and springs supported by the bolster and cooperating with the wedge shoes to move them against said inclined surfaces and in opposite directions outwardly from said pockets.

9. A railway truck comprising wheel-supported axles, side frames mounted on the axles at the inboard sides of the wheels, each side frame having a bolster opening and a second opening at its top above the bolster opening, a bolster supported by the side frames and having its ends extending into the bolster openings, said bolster having upstanding side bearing tables extending through the second openings and guided by the side frames, each bearing table having pockets at opposite sides thereof, converging inclined surfaces arranged in the pockets of each bearing table, opposed friction wedges arranged in the pockets of each bearing table and having inclined surfaces slidably engaging the inclined surfaces in the pockets of that bearing table, and springs

supported by the bolster and engaging the wedges for urging them into engagement with said side frames.

10. A railway truck comprising opposed wheel-supported side frames, the side frames being arranged at the inboard sides of the wheels and each side frame having a bolster opening, a compression member on each side frame, a spring plank having end portions extending through the bolster openings and connecting the side frames, a group of springs arranged at each of the end portions of the plank and supported thereby, a bolster supported by the springs and having its ends extending through the bolster openings, the center of pressure of each spring group being positioned outwardly of the longitudinal center line of the side frame at that side of the truck to provide increased lateral stability of the bolster on said springs each side frame having an opening in its compression member located entirely within the lateral dimensions of the compression member, and an upstanding side bearing table carried by each end portion of the bolster extending upwardly through the openings in the compression members of the side frames.

11. A railway truck side frame comprising a top member, spaced bolster guide columns depending from the top member, a spring seat joining the lower ends of the columns, said top member between the columns consisting of a pair of spaced recumbent channels, one of said channels being relatively shallow and the other relatively deep to provide therebetween an opening positioned above the spring seat and off-set toward one side of the side frame, and tension members converging from the end portions of the side frame toward the columns and merging therewith.

12. In a structure of the character described, a bolster having near one end thereof an upstanding side bearing table, the bolster and side bearing table having oppositely disposed pockets positioned in opposite sides of the bolster and side bearing table, converging inclined surfaces arranged in the pockets, friction wedges extending into the pockets and having inclined surfaces slidably engaging said converging surfaces, and springs arranged in the pockets and bearing respectively at one end against the bolster and at the opposite end against one of the friction wedges.

13. A side frame for a railway car truck comprising, a compression member, spaced guide columns depending substantially vertically from the compression member, a spring seat including a top web arranged in one generally horizontal plane joining the lower ends of the guide columns, tension members inclined downwardly from the compression member in proceeding from opposite end portions of the side frame, said tension members joining the guide columns about mid-way the height of said columns to provide vertical portions of the guide columns between the lowermost portions of the tension members and the plane of the top web of the spring seat.

14. A side frame for a railway car truck comprising, a compression member, spaced guide columns depending substantially vertically from the compression member, a spring seat including a top web arranged in one generally horizontal plane joining the lower ends of the guide columns, tension members inclined downwardly from the compression member in proceeding from opposite end portions of the side frame, a web forming the bottom of each tension member, said tension

members joining the guide columns at approximately the mid-portion of said columns to provide vertical guide column portions between the bottom web of each tension member and the plane of the top web of the spring seat, and the bottom web of each tension member extending through the associated guide column at an angle differing from the slope of its tension member and merging with the top web of the spring seat.

15. A side frame for a railway car truck comprising, a compression member, spaced guide columns depending substantially vertically from the compression member, a spring seat including a top web arranged in one generally horizontal plane joining the lower ends of the guide columns, tension members inclined downwardly from the compression member in proceeding from opposite end portions of the side frames, a substantially straight web forming the bottom of each tension member, said tension members joining the guide columns at approximately the mid-portion of the height of said columns to provide vertical guide column portions between the bottom web of each tension member and the plane of the top web of the spring seat, the bottom web of each tension member extending through the associated guide column joining an end of the top web of the spring seat, and said bottom webs within the guide columns each being arranged at a greater angle with respect to the compression member than portions of the bottom webs outwardly of the guide columns.

16. A side frame for a railway car truck comprising, a compression member, spaced guide columns depending substantially vertically from the compression member, a box section spring seat including a lower web and a top web arranged in one generally horizontal plane joining the lower ends of the guide columns, tension members U-shaped in section inclined downwardly from the compression member in proceeding from opposite end portions of the side frames, each tension member having a substantially straight bottom web, said tension members joining the guide columns at the mid-portion of said columns to provide vertical guide column portions between the bottom web of each tension member and the plane of the top web of the spring seat, the bottom web of each tension member extending through the associated guide column at an angle differing from the slope of its tension member and merging with the top web of the spring seat, and lower web of the spring seat extending upwardly at its ends to provide vertical portions joining the bottom webs of the tension members above the plane of the top web of the spring seat.

17. A bolster for a railway car truck comprising, a medial portion having a relatively large depth measured vertically through the medial portion, a center plate carried by the top of the medial portion, an end portion relatively shallow in depth measured vertically of the bolster joining the medial portion about mid-way the height of the medial portion, an integral side bearing table projecting upwardly from the shallow end portion about mid-way the length of the shallow end portion, said side bearing tables extending upwardly and terminating above the plane of the center plate, and each side bearing table having two pockets therein one open at one side of the bolster and the other open at the other side of the bolster.

18. A side frame load bearing assembly for a railway car truck comprising, a spring plank including a bottom web and a marginal flange ex-

tending along and upwardly from each edge of the bottom web, bolster supporting springs resting on the bottom web of the spring plank, a side frame spring seat supporting said spring plank inwardly of the center of pressure of said springs, an intumed bead integral with the top of each flange, and said beads increasing in height and thickness in proceeding outwardly from a central portion of the spring plank.

19. A side frame load bearing assembly for a railway car truck comprising, a spring plank including a bottom web and a marginal flange extending along and upwardly from each edge of the bottom web, bolster supporting springs resting on the bottom web of the spring plank, a side frame spring seat supporting said spring plank inwardly of the center of pressure of said springs, and an intumed bead integral with the top of each flange with each bead increasing in thickness and in height in proceeding outwardly from the center of the spring plank and attaining a maximum height and thickness where the spring plank rests on the spring seat.

20. A railway truck comprising, opposed wheel-supported side frames, said side frames being arranged at inboard sides of the wheels, each side frame having a bolster opening, a spring plank having end portions extending through said bolster openings and connecting the side frames, a group of springs supported on each end portion of said plank, a bolster supported by said spring groups and having its ends extending through the bolster openings, the center of pressure of each spring group being positioned outwardly of the longitudinal center of the associated side frame to provide lateral stability of the bolster on said spring groups, each side frame having an opening in the top thereof, an upstanding side bearing table carried by each end of the bolster extending upwardly through the associated opening in the top of each side frame, and damping means mounted in said side bearing tables cooperating with the side frames to snub relative movement between the bolster and the side frames.

21. In a railway car truck, a compression member, spaced guide columns depending substantially vertically from said compression member, a spring seat including a top web arranged in a substantially horizontal plane joining lower ends of the guide columns, tension members connected to and inclined downwardly from the compression member in proceeding from opposite end portions of the truck, said tension members joining the guide columns at approximately the mid-portion of the height of said columns to provide unobstructed areas under the tension members adjacent vertical portions of the guide columns, and said compression member having an opening therein over said spring seat.

22. In a railway car truck, a compression member, spaced guide columns depending substantially vertically from said compression member, a spring seat including a top web arranged in a

substantially horizontal plane joining lower ends of the guide columns, tension members connected to opposite end portions of the compression member, said tension members sloping downwardly from the compression member in proceeding from opposite end portions thereof, a substantially straight web forming the bottom of each tension member, said tension members joining the guide columns at approximately mid-portion of the height of said columns to provide vertical guide column portions between the bottom web of each tension member and the horizontal plane of the top web of the spring seat, the bottom web of each tension member extending through the associated guide column joining an end of the top web of the spring seat, said webs within the guide columns each being arranged at a greater angle with respect to the compression member than portions of the bottom webs outwardly of the guide columns, and said compression member having an opening in the mid-portion thereof over said spring seat.

23. In a bolster and friction shoe unit, a bolster, a medial portion on the bolster having a relatively large depth measured vertically through the medial portion, a center plate carried by the top of the medial portion, an end portion on the bolster of relatively shallow depth measured vertically of the bolster joining the medial portion about mid-way the height of the medial portion, an integral side bearing table projecting upwardly from the end portion about mid-way the length of the shallow end portion, said side bearing table extending upwardly and terminating above the plane of the center plate, said side bearing table having two pockets therein one open at one side of the bolster and the other open at the other side of the bolster, inclined surfaces carried by the bolster within said pockets, a friction shoe in each pocket having a sloping surface for engaging the inclined surfaces in the associated pocket, and springs engaging the bolster at one end and the respective friction shoes at the other end urging the shoes into engagement with said inclined surfaces.

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