April 30, 1940. D. M. LIGHT 2,199,360

SPRING PLANKLESS TRUCK

Filed Dec. 6, 1937 3 Sheets-Sheet 1

Fig. 1

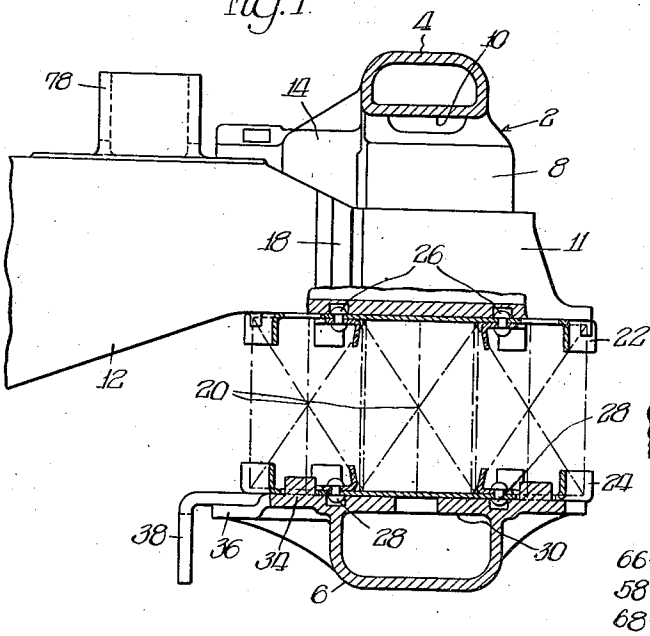


Fig. 6

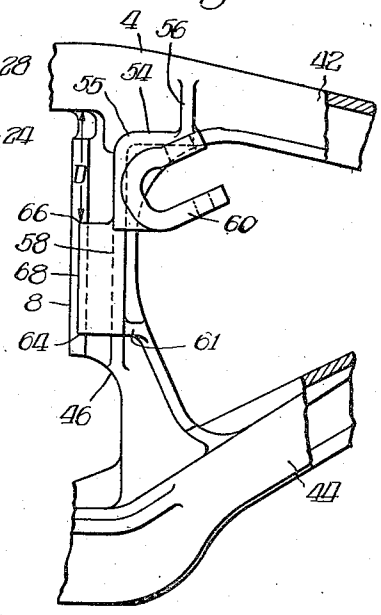
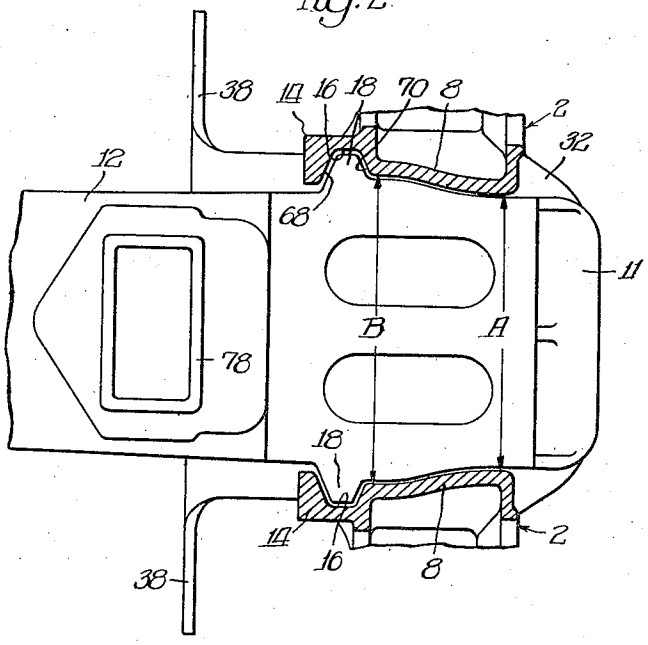


Fig. 2



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SPRING PLANKLESS TRUCK

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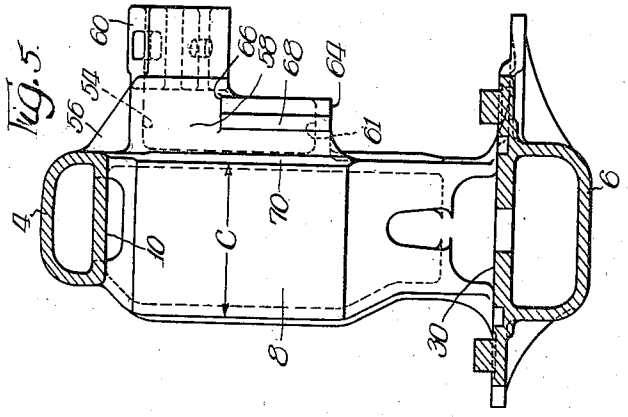

Fig. 5.

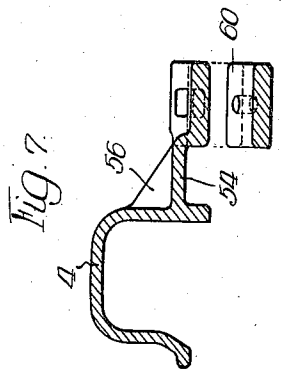

Fig. 7.

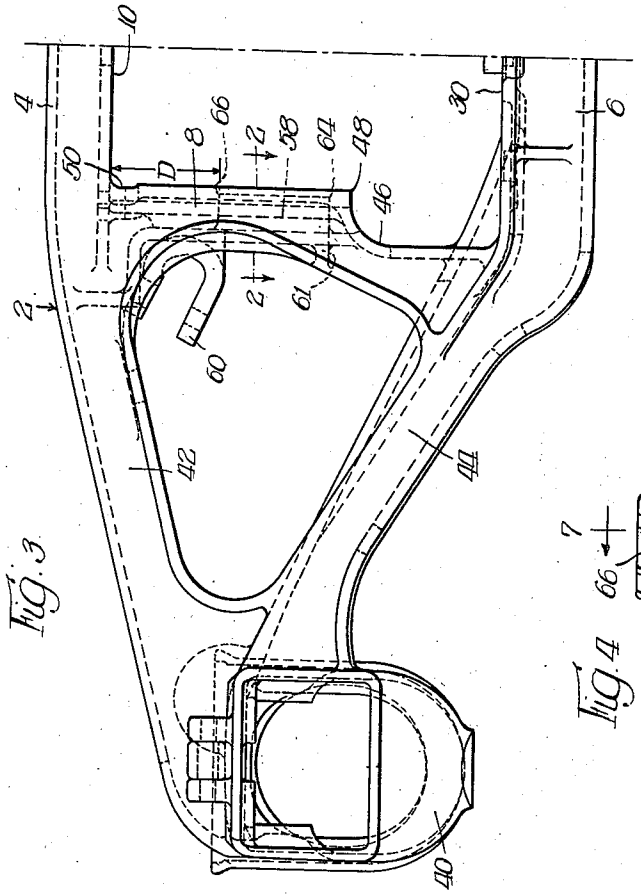

Fig. 3.

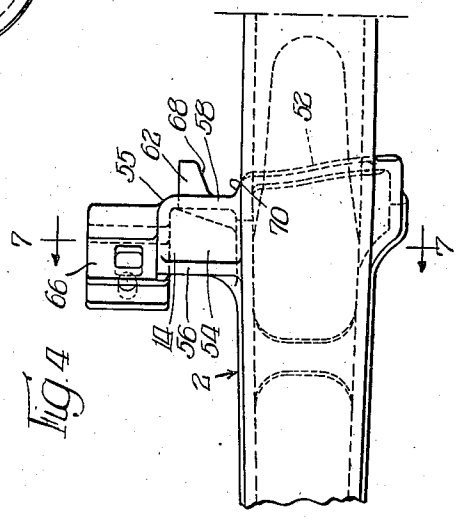

Fig. 4.

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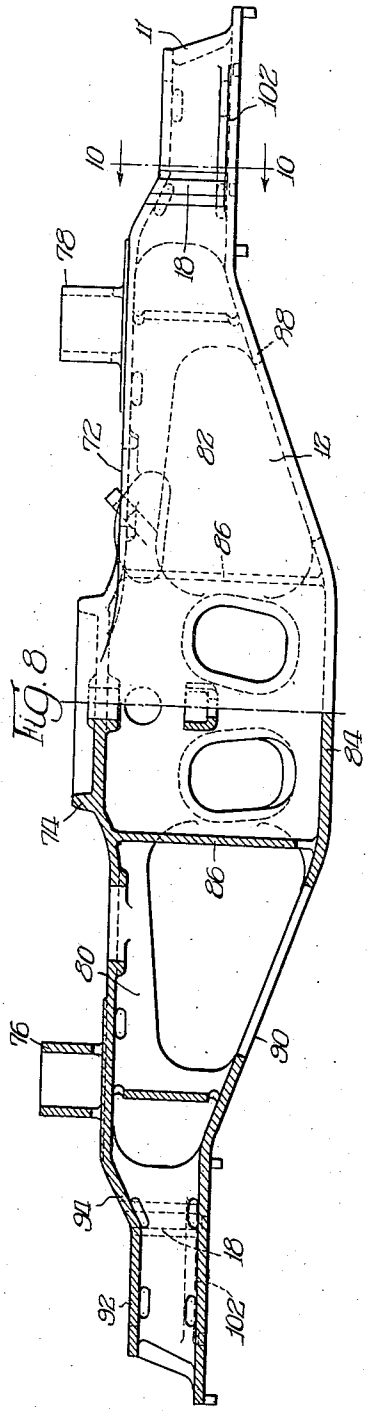

Fig. 8

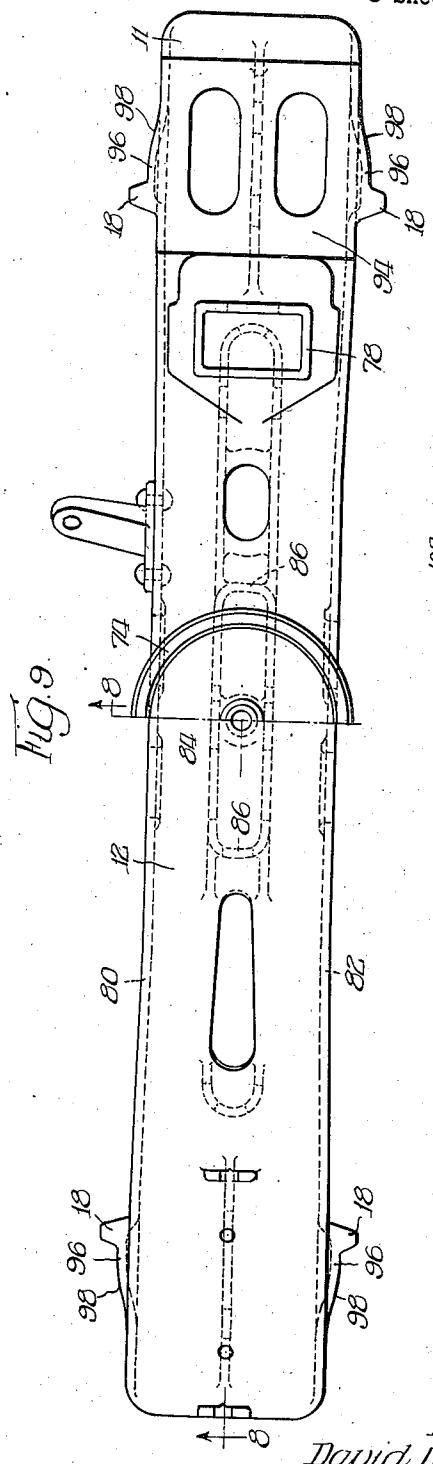

Fig. 9

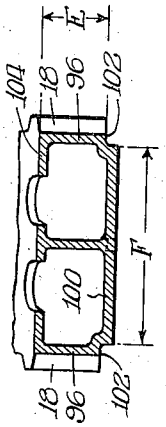

Fig. 10

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UNITED STATES PATENT OFFICE

2,199,360

SPRING PLANKLESS TRUCK

David M. Light, Chicago, Ill., assignor to American Steel Foundries, Chicago, Ill., a corporation of New Jersey

Application December 6, 1937, Serial No. 178,230

21 Claims. (Cl. 105—197.2)

My invention relates to railway trucks of the type generally known as four wheel trucks in which the parts comprise spaced side frames joined by a load carrying member or bolster.

It is an object of my invention to provide such a four wheel railway truck wherein the manner of connecting the side frame and the bolster is so simplified as to expedite wheel changes which are frequently necessary because of wheel wear.

A more specific object of my invention is to provide a novel form of guide means on the side frame columns and on the cooperating bolster ends which will permit the bolster to be quickly dissociated from the side frames without disturbing the spring assembly which is a normal part of such a truck structure.

My invention further contemplates a side frame wherein the brake hanger bracket and the bolster guide means at each side of the bolster opening of said side frame will be incorporated in a single bracket structure of novel form and arrangement.

Other features attained in my novel truck structure will be apparent in the following description and in the appended claims.

In the drawings, Figure 1 is a transverse sectional view through a truck structure embodying my invention, the section being taken substantially in the transverse center line of the truck and the bolster being shown in elevation;

Figure 2 is a fragmentary top plan view, partly in section, of the truck structure shown in Figure 1, the section being taken substantially in the plane indicated by the line 2—2 of Figure 3;

Figure 3 is a side elevation showing one end of the side frame structure incorporated in my novel truck, it being understood that opposite ends of the structure are similar;

Figure 4 is a fragmentary top plan view of the side frame structure shown in Figure 3;

Figure 5 is a sectional view through the side frame shown in Figures 3 and 4, the section being taken in the vertical plane bisecting the frame transversely;

Figure 6 is a fragmentary elevational view of the inner face of the side frame structure shown in Figures 3 to 5;

Figure 7 is a sectional view taken substantially in the vertical plane indicated by the line 7—7 of Figure 4;

Figure 8 is a view of my novel form of bolster, the right half thereof being in elevation and the left half thereof a section in the vertical plane bisecting the bolster longitudinally and substantially as indicated by the line 8—8 of Figure 9;

Figure 9 is a plan view of the bolster structure shown in Figure 8, the right half thereof showing the top plan and the left half the bottom plan; and

Figure 10 is a sectional view through the end portion of my novel bolster structure, the section being taken substantially in the vertical plane indicated by the line 10—10 of Figure 8.

Describing the features of my invention in more detail and referring particularly for a moment to Figures 1 and 2, my novel truck has the usual spaced side frames 2, 2 having the compression member 4 and the tension member 6, both of box section in the central portion thereof as shown in Figure 1. The novel features of my side frame, to be hereafter described in detail, are directed more particularly to the form of the spaced columns 8, 8 integrally formed with the tension and compression members and defining therewith the window opening 10 within which projects the end 11 of the bolster 12 for cooperation therewith. The side frame has the brake hanger brackets 14, 14 of novel form inwardly projecting therefrom on opposite sides of the bolster and providing support for brake heads and brake shoes designed to have engagement with the wheels (not shown) at opposite ends of the truck. The central portion of the bolster is of box-like structure conforming in general to a well-known design of cast steel bolster for four wheel railway trucks but the bolster end 11 is of novel form and its manner of cooperating with guide means on the side frame is a feature of my invention to be hereafter more particularly described. As shown in Figures 1 and 2 it may be observed that the side frame columns 8, 8 are spaced apart at their outer edges a distance indicated at A and that the faces of said columns diverge in shallow reverse curves to reach a maximum distance apart as indicated at B adjacent the inner edges of the columns and at the junctures of said column with the before-mentioned brackets 14. Each of the brackets 14 is provided with a vertical channel 16 of special form having cooperation with the flange 18 on the adjacent side of the bolster, said flange being complementary in form to said channel as hereafter more particularly described. The bolster end is seated upon the spring group diagrammatically indicated at 20, said springs being retained as a group by the upper and lower spring plates 22 and 24, said upper spring plate cooperating with the bottom wall of the bolster through positioning means indicated at 26 and said bottom spring plate similarly cooperating

by positioning means indicated at 28, 28 with the spring seat portion 30 of the side frame 2. The upper chord of the tension member 6 is widened between the columns 8, 8 outwardly as shown at 32 and inwardly as indicated at 34 to provide the necessary spring seat, and the inner edge of said seat is extended as at 36 to provide support for the brake beam safety bracket 38 which normally underlies the brake beam.

The novel features of my side frame are shown in greater detail in Figures 3 to 7 inclusive wherein it may be observed that the side frame is of the usual truss structure with the compression member 4 and the tension member 6 joined by the integral spaced columns 8, 8 and merging at their ends with the integrally formed journal boxes 40 which provide the usual means of cooperation with wheel and axle assemblies (not shown). The end portion of the compression member between the column 8 and the journal box 40 is generally U-shaped in section as indicated at 42 (Figure 6) and the end portion of the tension member is of a well known form having at 44 (Figure 6) the section indicated. The columns 8, 8 are spaced apart a maximum along their lower portions as indicated at 46 (Figure 3), thus accommodating a spring grouping of maximum size. For the greater portion of their length, however, they have the configuration above mentioned and as best shown in Figures 2 and 4, said configuration extending from an intermediate point of the column as indicated at 48 (Figure 3) to the top thereof except for the slight radius clearance at the upper end as indicated at 50. This portion of the column extending between the points 48 and 50 is widened to the depth indicated at C (Figure 5) to provide a maximum bearing area between the inner face of the column and the side of the associated bolster and as well illustrated in Figure 2. The shallow reverse curve formation of the inner wall of the column 8 as previously described is also shown at 52 in Figure 4.

Figures 4 to 7 inclusive show most clearly the form of my novel combination brake hanger and guide bracket 14. The said bracket 14 is integrally formed on the inner face of the column 8 and has the upper horizontal wall 54 (Figure 7) reinforced by the vertical rib 56, said horizontal wall 54 merging at 55 with the vertical wall 58 as well as with the brake hanger bracket 60 and the rib 61 at its lower end, all of said structure being integrally cast with the side frame proper. On the lower portion of the vertical wall 58 and along the outer edge thereof is formed the vertical flange 62 (Figure 4), the lower extremity of said flange being indicated at 64 and the upper extremity thereof at 66 (Figures 5 and 6), said flange having the diagonally arranged inner face 68 of the form most clearly apparent in the sectional view of Figure 2 or in the top plan view of Figure 4. The inner wall of the side frame column opposite the face 68 is also diagonally arranged as indicated at 70, said diagonally arranged faces 68 and 70 forming with the wall 58 a channel in a form complementary to the vertical guide lug 18 on the side of the bolster as most clearly seen in Figure 2. Thus the flange 62 is centrally located vertically of the side frame column and along the inner edge of the lower half of the bracket 14, the upper end of said flange 62 being spaced below the bottom wall of the compression member 4 a distance D (Figures 3 and 6), thus providing sufficient clearance between the flanges 62 and the compression member 4 to permit the insertion or removal of the bolster end 11 without disturbing the spring assembly upon which the bolster end may be seated.

Referring more particularly to Figures 8 to 10, it will be observed that my novel bolster has a central structure of usual box-like formation having the generally horizontal top wall 72 with the usual center bearing 74 and side bearings 76 and 78, the side walls 80 and 82 and the bottom wall 84 horizontal under the center post 86 and extending diagonally upward on either side of the central portion 84 as at 88 and 90 to merge with the novel end structure. The end portions of my novel bolster are also box-like but relatively shallow as may be seen in the sectional view of Figure 8. The top wall 72 of the main body of the bolster merges with the end top wall 92 in a sloping portion indicated at 94, the outer edge of said sloping portion 94 merging with the horizontal top wall 92 of the bolster in the vicinity of the guide flanges 18, 18. Outwardly of the guide lugs 18 the side walls of the bolster are bulged laterally of said bolster as indicated at 96, 96 and from the said points 96, 96 the side walls narrow gradually in reverse curves as indicated at 98, 98 toward the end of the bolster. The faces of these side walls at the ends of the bolster are complementary in form to the inner faces of the widened portions of the columns 8 of the side frames as indicated at "C" in Figure 5. From a consideration of Figure 10 it may be observed that the bulged or widened portion of the bolster end shown at 96 does not extend through the bottom wall 100 thereof, the horizontal lower edge of said widened portion being indicated at 102, most clearly seen at the right of Figure 8, or in the offset, indicated at 102 in Figure 10. The depth of the side walls at the bulged portions 96, 96 is relatively shallow as indicated at E (Figure 10), said dimension E being less than the dimension D heretofore referred to (Figure 6) in order to permit assembly or dismantling of the bolster end between the side frame columns without disturbing the spring assembly. It may also be observed that the vertical guide flanges 18 on the sides of the bolster ends extend downwardly only to the depth of said widened portion of the bolster and as most clearly seen at 102 (Figure 10). The bottom wall 100 of the bolster end therefore is somewhat narrower than the top wall 104 as shown in Figure 10, the width of said bottom wall as indicated at F being confined to a dimension somewhat less than the distance between the flanges 62, 62 on the spaced columns 8, 8 of the side frame.

It will be apparent therefore that I have provided a novel bolster end structure and a new manner of connecting the bolster ends to the spaced side frames. By a consideration of the before-mentioned description it will be apparent to those skilled in the art that the curved and tapering side faces on the ends of the bolster will provide a maximum bearing against the complementary guide columns of the side frame. Furthermore, that my novel method of interconnecting the bolster ends with the side frame permits said parts to be assembled or dismantled without disturbing the position of the spring group which is seated as usual upon the tension member of the side frame between the columns.

It is to be understood that I do not wish to be limited by the exact embodiment of the device shown, which is merely by way of illustration and not limitation, as various and other forms of the device will of course be apparent to those

skilled in the art without departing from the spirit of the invention or the scope of the claims.

I claim:

1. In a four wheel railway truck, a truss type side frame having a compression member, a tension member, and integral columns forming therewith a bolster opening, a spring group seated on said tension member in said opening, said columns having guide faces relatively close together at their outer edges and flaring therefrom to a maximum distance apart at their inner edges, brackets on the inner edges of said columns, said brackets having a vertical height substantially equal to the vertical height of said faces, vertical flanges formed on said brackets and extending upwardly from their lower edges, said flanges defining with the edges of the adjacent columns vertical guide channels, a bolster end extending into said opening and seated on said spring group, said bolster end being relatively shallow and having lateral guide faces complementary in form to the before-mentioned faces and cooperating therewith, vertical flanges on the side walls of said bolster cooperating with said vertical channels, said parts being so constructed and arranged as to permit said bolster end to be elevated above the flanges on said brackets and disengaged from said side frame.

2. In a four wheel railway truck, a truss type side frame having a compression member, a tension member, and integral columns forming a bolster opening, said columns having opposed faces forming bolster guiding surfaces, the outer edges of said faces being spaced apart a minimum distance and flaring inwardly therefrom along reverse curves to a maximum distance apart at their inner edges, each of said columns having an inwardly directed bracket with brake hanger means adjacent its upper end and a guide flange adjacent its lower end, the top of said flange having substantial vertical clearance from the lowermost portion of said compression member, each of said guide flanges forming with the adjacent column a substantially V-shaped channel, a bolster having an end projecting into said opening, said bolster end having column guide faces complementary in form to the faces of said columns and guide flanges formed on said bolster inwardly of said faces, said last-mentioned flanges having cooperation with said before-mentioned channels and being releasable from said co-operation by vertical movement whereby said bolster may be removed from said opening through said clearance.

3. A truss type side frame having a compression member, a tension member, and integral columns defining therewith a bolster opening, said columns having opposed guide faces spaced apart a minimum distance at their outer edges and tapering therefrom to a maximum distance at their inner edges, inwardly directed brackets formed on said columns, each of said brackets having along the lower portion thereof a vertical flange spaced from said compression member to form vertical clearance therewith and defining with the inner edge of the adjacent column a substantially V-shaped vertical channel, a bolster having an end projecting into said opening, said bolster having on opposite sides thereof guide faces complementary in form to the guide faces on said columns, and vertical guide lugs on said bolster inwardly of said faces having cooperation respectively with said channels and being releasable from said cooperation by vertical movement whereby said bolster may be removed from said opening through said clearance, said guide faces of said columns and on said bolster end having a reverse curve formation between their inner and outer edges.

4. In a four wheel railway truck, a truss type side frame having a compression member, a tension member, and integral columns forming therewith a bolster opening, said columns having guide faces spaced apart a minimum distance at their outer edges and flaring therefrom to a maximum distance apart at their inner edges, brackets extending along the inner edges of each of said columns for the length of said faces, vertical flanges on said brackets extending from their lower edges for substantially half their height, a bolster of general box structure having a relatively shallow end portion projecting into said opening, said end portion having lateral walls complementary in form to and cooperating with said faces, and vertical flanges cooperating with said first-mentioned flanges, said parts being so constructed as to permit the elevation of said bolster to disengage said flanges and remove said bolster end from said opening.

5. In a four wheel car truck, spaced truss type side frames, a bolster with guide means connecting said frames, each of said frames comprising a compression member, a tension member, and integral columns forming therewith a bolster opening, said columns having their opposed faces spaced apart a minimum distance at the outer edges of said faces and tapering therefrom in reverse curves to a maximum distance apart at their inner edges, brackets projecting inwardly from each of said columns, each of said brackets comprising an outwardly directed brake hanger jaw on the upper portion thereof and an inwardly directed vertical flange on the lower portion thereof, said flange having wide vertical clearance from said compression member and forming with the adjacent wall of the column a substantially V-shaped vertical channel for the reception of said guide means, said bolster being removable from said opening through said clearance by vertical movement thereof to disengage said guide means from said channel.

6. A truss type side frame having a compression member, a tension member, and integral columns defining therewith a bolster opening, said columns having opposed guide faces spaced apart a minimum distance at their outer edges and tapering therefrom to a maximum distance at their inner edges, inwardly directed brackets formed on said columns, each of said brackets having along the lower portion thereof a vertical flange spaced from said compression member to form vertical clearance therewith and defining with the inner edge of the adjacent column a substantially V-shaped vertical channel, a bolster having an end projecting into said opening, said bolster having on opposite sides thereof guide faces complementary in form to the guide faces on said columns, and vertical guide lugs on said bolster inwardly of said faces having cooperation respectively with said channels, said bolster being vertically movable to release the engagement between said guide lugs and said channels and remove said bolster end from said opening through said clearance.

7. In a four wheel truck, a truss side frame with integral columns defining the sides of a bolster opening, said columns being spaced apart a maximum distance along their lower portions and having along their upper portions guide faces flaring inwardly of said truck, brackets on said

columns, vertical flanges on said brackets defining with the edges of adjacent columns vertical channels, a bolster end extending into said opening and having guide faces of complementary form cooperating with said first-mentioned faces, and means on opposite sides thereof cooperating with said channels to retain said parts in assembled relationship, the vertical distance between the tops of said flanges and the compression member of said frame being greater than the depth of the bolster end.

8. In a four wheel railway truck, a truss side frame having integral columns defining the opposite sides of a bolster opening, said columns having bolster guide faces with their outer edges spaced apart a minimum distance and flaring therefrom in shallow reverse curves to a maximum distance apart at their inner edges, brackets integral with said columns, said brackets having vertical flanges along their lower portions with substantial vertical clearance from said compression member and forming with the adjacent edges of said columns substantially V-shaped channels, a bolster end projecting into said opening and having guide faces complementary in form and cooperating with the before-mentioned guide faces, and vertical flanges on the sides of said bolster cooperating with said channels, said bolster being vertically movable to release engagement between said flanges and said channels and permit the removal of said bolster end from said opening through said clearance.

9. In a truss side frame, a compression member, a tension member, and spaced integral columns forming therewith a bolster opening, each of said columns having a guide face whose outer edge is spaced a minimum distance from the plane bisecting said side frame transversely, said face flaring therefrom to a maximum distance from said plane at its inner edge, an integral bracket on the inner edge of said column along the upper portion thereof, said bracket having a brake hanger jaw at the upper end thereof and a vertical flange extending from its lower edge for approximately half the height of said bracket whereby clearance is provided between the top of said flange and the bottom of said compression member to permit the assembling or dismantling of an associated bolster end, said flange forming with the edge of the adjacent column a vertical and substantially V-shaped channel for cooperation with guide means on an associated bolster.

10. In a four wheel railway truck, a truss type side frame having a compression member, a tension member, and integral columns forming therewith a bolster opening, said columns having integral inwardly directed brackets with brake hanger jaws adjacent their upper ends and vertical flanges along the lower portions thereof but spaced from said compression member to have vertical clearance therewith and defining with the opposed walls of said columns vertical V-shaped channels, a bolster having an end projecting into said opening between said columns and having vertical flanges of a form complementary to said channels and cooperating therewith to retain said bolster and said side frame in operative relationship, said bolster being vertically movable to release said flanges from said channels and permit disengagement of said bolster from said side frame and removal from said opening through said clearance.

11. In a four wheel truck, spaced side frames, each of said side frames having a compression member, a tension member, and spaced integral columns forming therewith a bolster opening, guide faces on said columns, said guide faces having their outer edges spaced apart a minimum distance and flaring therefrom to a maximum distance apart at their inner edges, brackets on said columns, vertical flanges on said brackets so spaced from said compression member as to form vertical clearance therewith, and a bolster extending between said side frames and having its ends in said openings respectively, each of said bolster ends having side walls complementary in form to said faces, and vertical guide flanges cooperating with said before-mentioned flanges to retain said parts in cooperative relationship, said bolster being vertically movable to release the engagement between said bracket flanges and said guide flanges and permit removal of said bolster from said opening through said clearance.

12. In a four wheel railway truck, a truss type side frame having a compression member, a tension member, and integral columns forming a bolster opening, said columns having opposed faces forming bolster guiding surfaces, the outer edge of said faces being spaced apart a minimum distance and flaring inwardly therefrom along reverse curves to a maximum distance apart at their inner edges, each of said columns having an inwardly directed bracket with brake hanger means adjacent its upper end and a guide flange adjacent its lower end, each of said guide flanges being located a vertical distance below said compression member substantially equal to the flange length and forming with the adjacent column a substantially V-shaped channel for cooperation with guide means on an associated bolster.

13. A truss type side frame having a compression member, a tension member, and integral columns defining therewith a bolster opening, said columns having opposed guide faces spaced apart a minimum distance at their outer edges and tapering therefrom to a maximum distance at their inner edges, inwardly directed brackets formed on said columns, each of said brackets having along the lower portion thereof a vertical flange defining with the inner edge of the adjacent column a substantially V-shaped vertical channel for cooperation with guide means on an associated bolster, each of said flanges being spaced below said compression member a distance substantially equal to the flange length.

14. In a truss side frame having a compression member, integral columns defining the sides of a bolster opening, guide faces along the upper portions of said columns and spaced apart a minimum distance at their outer edges, said faces flaring in shallow reverse curves from their outer edges to a maximum distance apart at their inner edges, brackets integrally formed on the inner edges of said columns along the upper portions thereof, each of said brackets having a vertical flange extending upwardly from its lower edge and defining with the opposed edge of the adjacent column a substantially V-shaped vertical channel, the tops of said flanges terminating a distance below said compression member substantially equal to the length of said flanges.

15. In a truss side frame having a compression member, integral columns defining the sides of a bolster opening, guide faces along the upper portions of said columns and spaced apart a minimum distance at their outer edges, said faces flaring from said outer edges to a maximum distance apart at their inner edges, brackets integrally formed on the inner edges of said columns

along the upper portions thereof, each of said brackets having a vertical flange extending upwardly from its lower edge and defining with the opposed edge of the adjacent column a substantially V-shaped vertical channel, said vertical flange extending over approximately half the height of said bracket, and having vertical clearance from said compression member substantially equal to the length of said flange..

16. A truss type side frame having a compression member, a bolster opening defined by integral columns at opposite sides thereof, said columns having opposed guide faces spaced apart a minimum distance at their outer edges and flaring therefrom in reverse curves to a maximum distance apart at their inner edges, inwardly directed brackets on said columns, said brackets having along their edges remote from said columns vertical flanges forming substantially V-shaped channels with the opposed edges of said columns, the tops of said flanges being spaced from said compression member a distance equal to their length.

17. In a four wheel railway truck, a truss type side frame having a compression member, a tension member and spaced integral columns forming therewith a bolster opening, guide faces on the upper portions of said columns, said faces being spaced apart a minimum distance at their outer edges and flaring therefrom in shallow reverse curves to a maximum distance apart at their inner edges, and inwardly directed brackets on said columns supporting vertical flanges parallel with said edges, the tops of said flanges being spaced from said compression member a vertical distance substantially equal to their length.

18. In a four wheel railway truck, a truss side frame having a compression member, a tension member, and spaced columns forming a bolster opening, said columns having angularly disposed faces forming bolster guide surfaces, inwardly directed brackets on said columns supporting vertical flanges having their tops spaced from said compression member to form vertical clearance therewith, a bolster end extending into said opening and having vertical guide lugs cooperating with said flanges to retain said parts in assembly, said bolster end having at opposite sides thereof diagonally arranged guide faces cooperating with said before-mentioned surfaces, said lugs being formed on said bolster end inboard of said surfaces, said bolster end being vertically movable in said opening to disengage said lugs from said flanges and remove said bolster end from said engagement through said clearance.

19. In a four wheel railway truck, a truss side frame having a compression member, a tension member, and spaced columns forming a bolster opening, said columns having angularly disposed faces forming bolster guide surfaces, brackets along the inner edges of said columns, vertical flanges on the lower portions of said brackets having vertical clearance from said compression member, and a bolster extending through said opening and having lugs engaging said flanges to retain said parts in assembled relationship, said bolster having at opposite sides thereof diagonally arranged guide faces cooperating with said before-mentioned surfaces, said lugs being formed on said bolster inboard of said surfaces, said bolster being vertically movable in said opening to disengage said lugs from said flanges and remove said bolster from said opening through said clearance.

20. In a four wheel railway truck, a truss side frame having a compression member, a tension member, and spaced columns forming a bolster opening, said columns having angularly disposed faces forming bolster guide surfaces, brackets on the inner edges of said columns with guide flanges along the lower portions thereof spaced from said compression member to form vertical clearance therewith, and a bolster extending into said opening with guide lugs engaging said flanges, said bolster having on opposite sides thereof guide surfaces engaging said before-mentioned surfaces, said guide surfaces on said bolster being formed entirely outboard of said guide lugs, said bolster being vertically movable to disengage said lugs and permit the withdrawal of said bolster from said opening through said clearance.

21. In a four wheel truck, a truss side frame with integral columns, said columns being spaced apart a maximum distance along their lower portions and having along their upper portions diagonally arranged guide faces, brackets on said columns, vertical flanges on said brackets defining with the edges of adjacent columns vertical channels, a bolster end extending into said opening and having guide faces in abutment with said first-mentioned faces, and means on opposite sides of said bolster end cooperating with said channel to retain said parts in assembled relationship, the vertical distance between the tops of said flanges and the compression member of said frame being greater than the depth of said bolster end.

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