April 24, 1945. J. LEDWINKA 2,374,218

TRUCK

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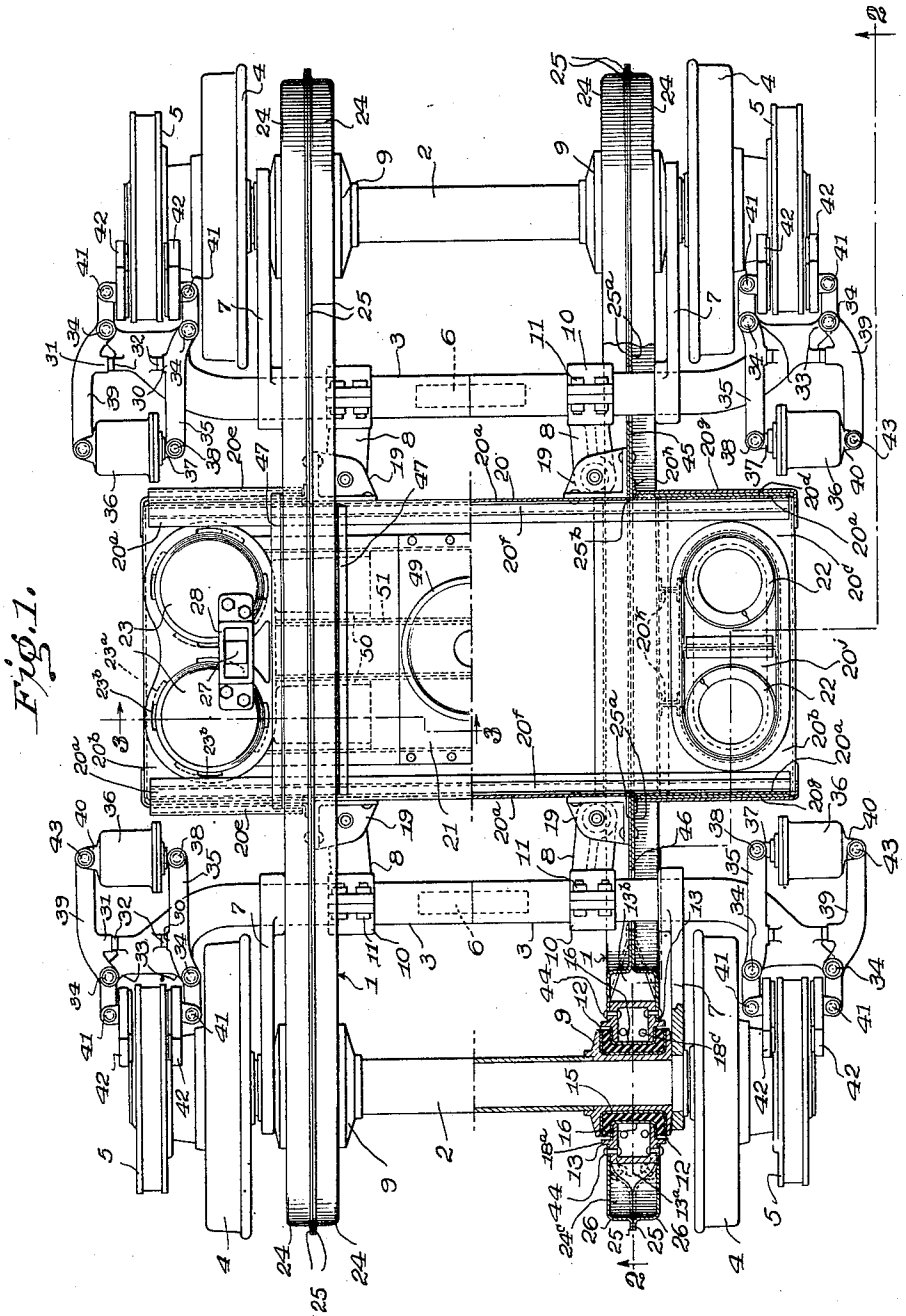


Fig. 1.

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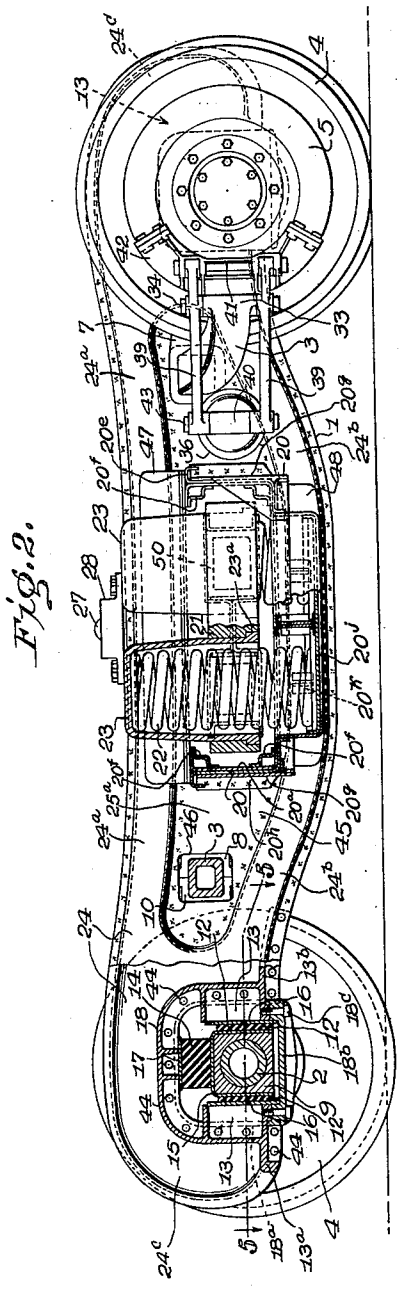


Fig. 2.

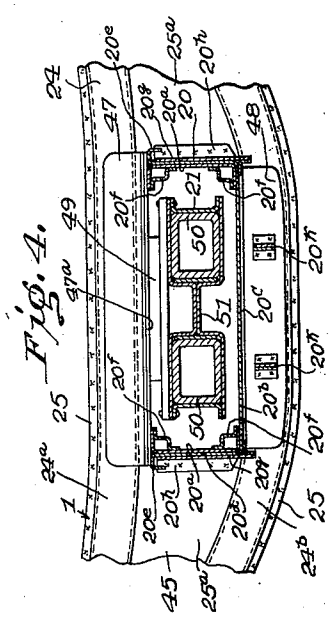


Fig. 4.

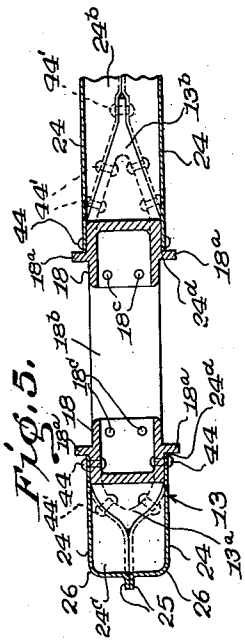


Fig. 5.

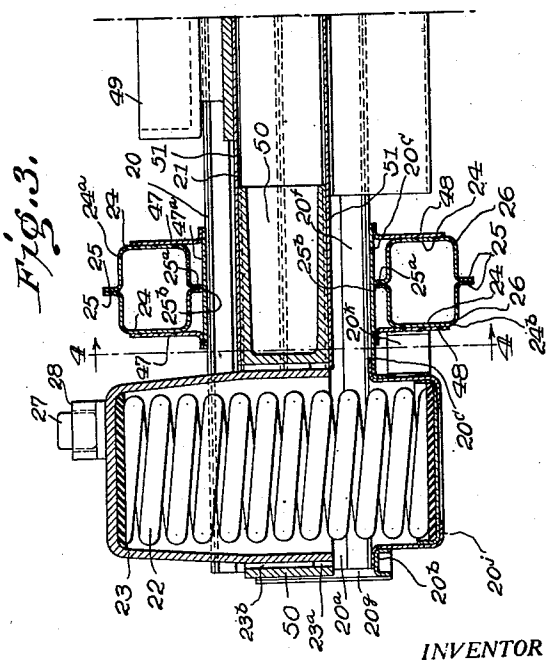


Fig. 3.

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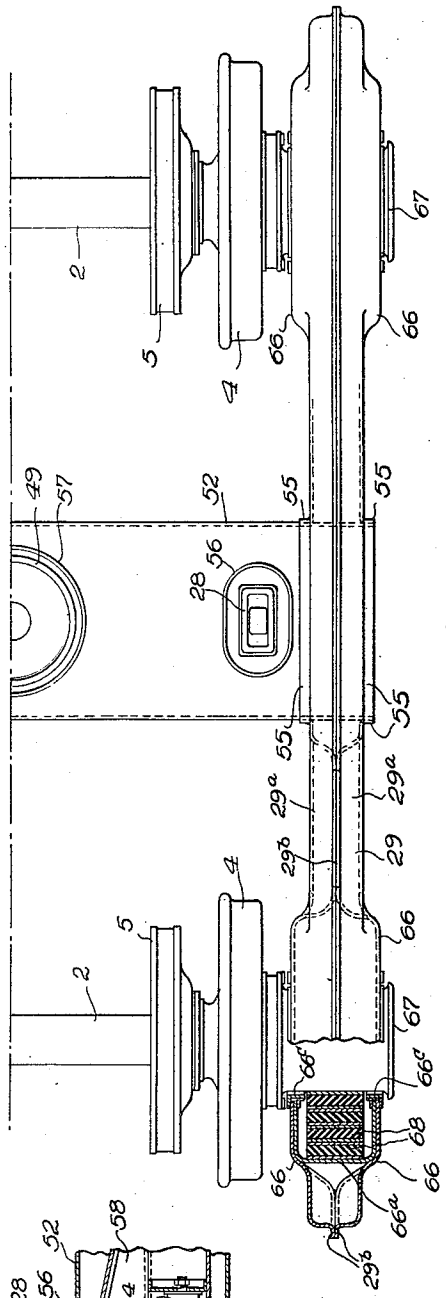


Fig. 6.

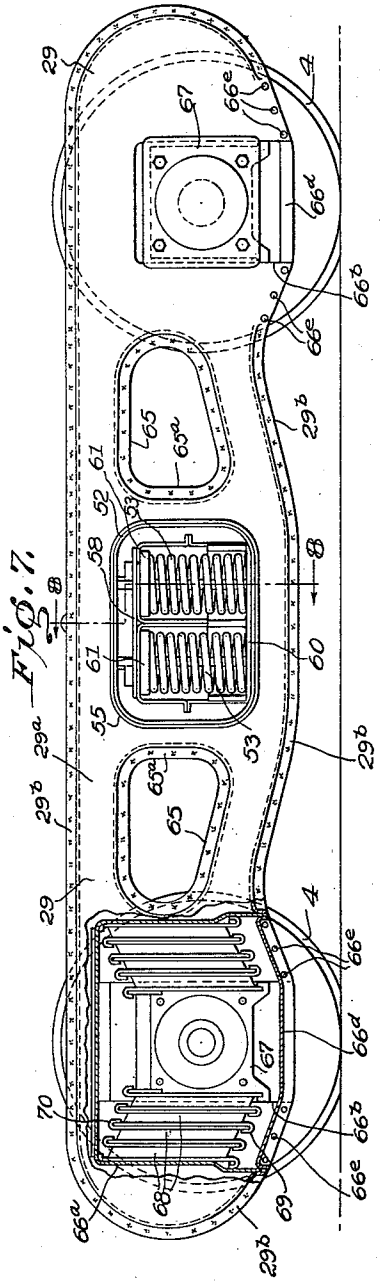


Fig. 7.

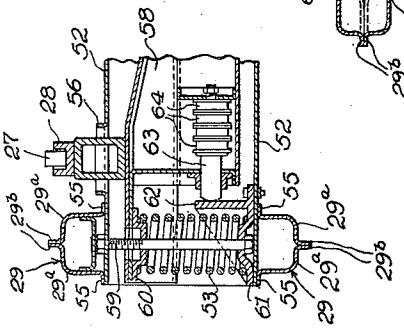


Fig. 8.

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Patented Apr. 24, 1945 2,374,218

UNITED STATES PATENT OFFICE

2,374,218

TRUCK

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Application June 20, 1940, Serial No. 341,457

12 Claims. (Cl. 105—182)

The present invention relates to railway trucks.

More specifically it relates to trucks built up of metal plates which are properly punched and drawn to produce a hollow frame when assembled and secured to one another in pairs, preferably by welding.

Another object is to construct a hollow side frame from a pair of embossed metal stampings positioned back-to-back and attached together with said embossed portions oppositely disposed with respect to one another for providing longitudinally extending box-shaped cross sections above and below the point of attachment of a transom thereto and to also extend said embossed portions above and beyond the journal box receiving pedestals.

One feature of the invention relates also to a specific arrangement of the brakes, which in one embodiment are located outside the wheels, so as to be readily accessible for inspection, replacement, or repair.

The invention further relates to making such trucks very compact and of relatively light weight, while very rigid and strong, and having a pleasing streamlined appearance.

Other objects and features of the invention will be understood from the following specification, in connection with the drawings which form a part thereof, and which disclose somewhat diagrammatically, two illustrative forms of the invention.

In said drawings:

Fig. 1 is a plan view of the complete truck, one of the side frames and part of the transom and bolster being shown in horizontal section on a plane passing through the axes of the axles;

Fig. 2 is a side elevation thereof, partly broken away and in section on the planes indicated by the broken line 2—2 of Fig. 1;

Fig. 3 is a section on an enlarged scale through one lateral half of the transom, bolster and side frame, on the plane indicated by the line 3—3 of Fig. 1;

Fig. 4 is a fragmentary elevation partly in section through the bolster and transom, on the plane indicated by the line 4—4 of Fig. 3;

Fig. 5 is an enlarged fragmentary sectional view through the pedestal portion of one of the side frames, the section being made on the plane indicated by the line 5—5 of Fig. 2;

Fig. 6 is a plan view, partly in section, of one lateral half of a modified form of wheel truck, wherein the brakes are located inside the wheels;

Fig. 7 is a side elevation, partly broken away adjacent one pedestal, to show the rubber sandwiches supporting the axle of Fig. 6; and

Fig. 8 is a fragmentary longitudinal section made centrally through one end of the bolster and transom of this form of truck, the section being made on the plane indicated by the line 8—8 of Fig. 6.

In all the figures, corresponding elements are indicated by similar reference characters.

Referring first to the embodiment illustrated in Figs. 1 to 5, it will be seen that the truck comprises two side frames, each indicated as a whole by the reference character 1, each side frame being made of two identical half-frames 24, which are stamped or drawn from relatively heavy sheet metal, so that the hollow parts of the resulting frames will be substantially rectangular in cross section providing strong box sections 24a and 24b extending longitudinally of each frame at the upper and lower portions thereof, respectively. At the opposite ends of each frame the upper and lower hollow box sections 24a and 24b communicate with one another and into enlarged hollow pedestal receiving portions 24c. It will be understood that each of the metal plates will actually be somewhat rounded at the bends, for ease of manufacture and increased strength, as well as for improved appearance, this being indicated by the rounded corners shown at 26 in Fig. 1. The extreme edge of each plate is outwardly flanged as shown at 25, in order to afford a readily available abutment of the two halves for welding them together, the ridge formed by these flanges simultaneously acting as a stiffening rib, which further increases the rigidity of the side frame. The portions 25a of said two halves between the hollow portions forming the spaced box sections 24a and 24b and which extend to the hollow end portions 24c also abut one another and are secured together by welds or the like to form a central web 45 of the frame.

At each end of each side frame in the enlarged hollow portion 24c a pedestal 13 is provided, by means of a rigid inverted U-shaped forging or casting, which is suitably secured to both halves of the side frame in any way, as by the bolts or rivets 44. Oppositely directed extensions 13a and 13b are formed on each pedestal casting 18 at the lower end thereof and are positioned between the flanges 25 of the two halves of the frame, said flanges diverging from one another at such point as they extend toward the body of the pedestal casting 18 and engage and conform to the general configuration of the opposite sides of the extensions 13a and 13b. These extensions are also

riveted to the two halves of the frame as shown at 44' in Fig. 5. In this way, these U-shaped pedestal members 18 not only are rigidly held in place, but they furthermore assist in securing the plates 24 rigidly to one another adjacent each pedestal where ample strength is highly desirable.

Outstanding flanges 18a are provided on both sides of each pedestal body 18 and extend through cut-out portions 24b in the two halves of each side frame for reinforcing said pedestals as well as the connection between the pedestals and the frames.

The axles 2 are mounted in these side frames 1, by means of axle mounting boxes 9 positioned in the pedestals 13, said boxes 9 being placed between rubber slabs 12, located in front of and behind them, and moreover have additional rubber blocks 14 above them. The said three rubber elements may form three integral sandwiches by being vulcanized jointly to a single U-shaped sheet metal facing 15 on the one hand, and to three separate facings 16 and 17 on their remaining faces. The slabs 12 will be stressed in shear, while the slab or block 14 will normally be in a state of compression. The lower portions of each inverted U-shaped pedestal body are tied together by a member 18b bolted to the pedestal as at 18c, said member 18b also serving the purpose of holding the box 9 together with the rubber assembly in the pedestal body 18.

The axles 2 herein illustrated are assumed to be dead or stationary axles, and the wheels 4 will be carried at their outer ends, by suitable antifriction bearings, each wheel having a brake disk 5 rigidly secured to its hub, as shown.

These brake disks are thus located outside of the wheels, which makes them readily accessible, and furthermore assists in keeping them cool because they are more freely exposed to the outer air.

A two-piece support 3, generally U-shaped in plan view, is provided to hold the brake shoe-applying means, which consist of a fluid pressure cylinder having the customary piston and levers cooperating therewith, in proper relation to the brake disks, the two halves of this support being secured to one another in any suitable manner, as by the pin 6 shown in dotted lines in Fig. 1. The support 3 is maintained at the proper distance from the axle 2, by means of the arms 7 which are pivotally mounted about the axis of the axle 2 as shown, and whose chief function is merely to maintain the support 3 in the correct position, while allowing it to pivot about said axis. An arm 8, extending away from the axle, may be secured to each half of the support 3 in any suitable way, as by the clamp 10 and bolts 11. Each arm 8 may cooperate with an abutment 19 secured to the side frame and to the transom 20 to limit the extent of pivotal motion of the support 3.

Each brake assembly consists of a brake cylinder 36, having therein a piston attached to a piston rod 37, the cylinder itself having at its other end a perforated lug 40. A bifurcated lever 39 is attached to the lug 40, as by a pin or bolt 43, this lever being pivotally connected to the support 3 by means of a pin or bolt 34 passing through a lug 33 on said support 3, the lever having a short arm on the other side of said pivot 34, which is pivotally connected by a pin or bolt 41 to one of the brake shoes 42.

A companion brake lever 35, also bifurcated, is connected by a pin or bolt 38 to the end of the piston rod 37, each lever 35 also having a pivotal connection, such as a pin or bolt 34 passing through another lug 33 on the support 3, and beyond said pivot being connected by a further pin or bolt 41 to the other brake shoe 42, so that upon supplying a pressure medium to the brake cylinder 36 the two brake shoes 42 will be applied with equal pressures against the opposite side faces of the brake disk 5. These brake cylinders will preferably contain the customary restoring springs, to push the piston back into the cylinder when the pressure is relieved and in this condition, which is illustrated in Fig. 1, it will be noted that a bumper lug 31 on the lever 39 will abut against the corresponding lug 32 on the support 3, while the bumper lug 30 on the lever 35 will likewise abut against a similar lug 32 on said support, so that then both brake shoes 42 will be withdrawn from the brake disk.

The transom 20 which connects the two side frames together at points substantially intermediate the ends thereof consists mainly of two spaced channel members 20a that extend through enlarged openings 25b provided in the abutting portions 25a forming the web 45 of said frames. The ends of the spaced channels 20a outwardly of the side frames are connected together at their lower portions by the members 20b, constructed with a horizontal bottom portion 20c and upwardly extending side portions 20d that engage and are attached to the sides of the channel members 20a. The upper ends of the side portions 20d are bent outwardly and then downwardly as at 20e for reinforcing purposes. Also for reinforcing the transom 20 flanged angled members 20f are welded or otherwise attached to the channels 20a at the corners thereof for providing box sections. These flanged angled members extend the entire length of the channels for the purpose above stated. Side plates 20g are attached to the portions 20d by welds or the like and have the portions 20h thereof bent at right angles and attached to the web portions 45 of the side frames in a similar manner for aiding in forming the connection of the transom to the side frames. The abutments 19 previously referred to are constructed in the form of corner brackets and are riveted to both the channel members 20a of the transom and the abutting portions 25a of the side frames which also form connection and supporting means between the transom and the side frames.

The horizontal bottom portion 20c of the member 20b besides extending between the two channel members 20a also extends inwardly and has attached thereto flanges of members 48 which are in turn connected to the opposite sides of the frame. The upper portions of said channel members adjacent each end are tied together by a plate 47a which has connected thereto by welds or the like the flanges of members 47 welded or otherwise attached to the sides of a frame. Thus the members 47 form an attachment of the upper portions of the frames to the transom while the members 48 form an attachment or connection of the lower portions of the frames to the transom.

Constructed on the horizontal bottom portion 20c of the members 20b are depressed pockets 20j which receive and support the lower ends of the coil springs 22. Spacer members 20k are attached to the sides of the depressed pockets 20j and to the members 48 for aiding in rigidly supporting the outer ends of the transom.

The bolster 21, like the transom 20, is built up largely of sheet metal. Fig. 4 shows how the

ends of the plates 51 have castings or forgings 50 therein to hold the inverted cups 23, housing springs 22 which bear on the one hand against the bottoms of the cups and on the other hand against the bottom of the depressed pockets 20[1] of the transom, to carry the bolster and its load. The inverted cups 23 have lugs 23[a] thereon that are received in bayonet slots 23[b] provided in the castings or forgings 50. With this arrangement the bolster 21 may be assembled endwise in the transom 20 prior to placing the springs 22 and inverted cups 23 in position for yieldably supporting the bolster. At each end the bolster on the inverted cups 23 may have a guide 28 secured thereto, each of these guides having a roller such as 27 therein for supporting the vehicle, in cooperation with the center plate 49 mounted at the mid-point of the bolster.

While the web portions 45 of the side frames are shown with small openings 46 therein to allow the supports 3 for the brake assemblies to pass through, it is to be understood that relatively large openings may be made for permitting free circulation of air therethrough as well as permitting access to the space within the truck frame. However, since the brake mechanism is placed outside the wheels in this form, it is not highly important to have access to the space within the truck frame, and it is for this reason that the webs 25[a] are allowed to remain in this embodiment. In the other embodiment which will now be described, the brake mechanism is inside the wheels and therefore this web is absent, that is, large holes are available to give access to the interior of the truck frame.

Referring now to the modified form illustrated in Figs. 6, 7, and 8, it will be seen that the side frame 29 replacing side frame 1 of the other form is built up of the same general shape and manner as the side frame 1, which consists mainly of two halves 29[a] placed back to back and attached together by welds. The two halves are heavily embossed throughout the major portions thereof for producing spaced side walls of the side frames, while the marginal edges thereof are flanged as at 29[b] for abutment and attachment to one another.

The side frames 29 may be connected by a transom 52 of tubular form, which as shown is of rectangular cross section with the corners rounded. The transom may be secured to the side frames 29 by forming flanges 55 at embossed portions on both halves 29[a] on said side frames, these flanges being formed from the sheet metal itself and of proper size and shape to fit around the ends of the transom as shown, whereupon the transom may be secured thereto in any suitable way, preferably by spot welding.

The transom has suitable apertures 56 in its upper surface to allow the guides 28 for the rollers 27 to pass therethrough, and also has an opening at the center of its top surface as shown at 57, to accommodate the center plate 49. The bolster 58 within the transom is supported by springs 53, as shown in Figs. 7 and 8. Bolts 59 pass through the transom and in connection with the centering flanges 60 and 61 hold the springs in proper position.

An abutment plate 62 may be provided in connection with the flange 61 to restrain endwise motion of the bolster, as shown in Fig. 8, the plunger 63 bearing against said abutment plate 62, and being carried by the bolster 58 with yieldable means, such as the rubber sandwiches 64, cooperating therewith to resiliently resist such sidewise motion of the bolster.

Adjacent each axle, the embossed portions of the side frames are enlarged as at 66 of increased width and have fixed therein at said enlargements the housings 66[a] to accommodate the rubber sandwiches which support the side frames from journal boxes 67. The enlarged portions 66 of the side frames as well as the housings 66[a] have vertical slots 66[b] extending upwardly therein through which the journal boxes 67 extend. Wear strips 66[c] are located on the opposite side edges of the slots 66[b] for slidably supporting the journal boxes in their vertical movement with respect to the side frames. Tie members 66[d] are attached by bolts, rivets or the like 66[e] to the lower portions of said side frames at the slots 66[b] for reinforcing the material weakened by the slots.

The above mentioned sandwiches, designated by reference character 68, consist of rubber slabs vulcanized between metal plates, said plates having hooks alternately on the bottom and top as indicated at 69 and 70, so that they may be hooked together thereby, the outermost sandwich being connected to the side frame, and the innermost to the journal box. It will be noted that two sets of such sandwiches are provided for each journal box, and located on the opposite sides thereof.

Between the enlargements 66 and the transom connections of each frame are enlarged openings 65 to allow access to the mechanism between said side frames, as shown in Figure 7, and such openings will also assist in keeping the brakes cool by facilitating the flow of air when the vehicle is in motion. Around the openings 65 the metal of the two halves 29[a] is flanged as at 65[a] to provide abutting and attaching portions.

In the other form of truck previously referred to the wheels 4 and brake discs 5 were outside the side frames while in this embodiment the axles 2 carry the brake discs 5 and wheels 4 inside the side frame. The brake mechanism cooperating with the discs 5 is not shown, as it forms no part of the present invention. It will be understood, however, that it may be of the same general nature as that indicated in Figure 1 by way of example.

Having described the structure of two forms of the wheel trucks, which embody the invention, it is believed that the operation will be self-evident. It may be well to summarize it briefly as follows.

In the wheel truck disclosed in Figs. 1 to 5, the weight of the vehicle is transmitted to the bolster through the center plate 49 and the cooperating rollers 27, which are carried by the ends of the bolster. The stress then passes to the transom through the helical springs 22 and from the transom it passes to the axles 2 through the pedestal member 18 and the rubber slabs 12 and 14. In this way a sufficiently yieldable and resilient support for the vehicle is provided, to absorb shocks and deaden noises.

The brakes are actuated by supplying air pressure or the like to the cylinders 36 in the customary way, so as to bring the brake shoes 42 into contact with the side faces of the brake disks 5. These brake disks and their cooperating mechanism are readily accessible at all times, for inspection, replacement, or repair, and are in a relatively open position where the air currents produced by the motion of the vehicle will assist in cooling them.

The operation of the other embodiment of the invention, illustrated in Figs. 6, 7, and 8, briefly consists in supporting the vehicle by means of the center plate 49 and the rollers 27, all of which are carried by the bolster 58, which then transmits the stress to the transom through the helical springs 53. The transom passes the stress to the side frames, which at their pedestals in turn transfer it to the rubber sandwiches 68 which will be stressed in shear, and pass their load to the journal boxes 67. Thus a quiet, resilient, and yieldable mounting for the vehicle is provided. Any excessive side sway will be snubbed by the rubber sandwiches 68, which become stressed when the bolster moves in the direction of its own length.

Any suitable means for forcing the brake shoes against the brake disks 5 may be provided to cooperate with this type of truck frame.

While the present invention has been described herein in connection with two detailed embodiments thereof, it is obvious that these embodiments are not the only forms in which the invention may be constructed but that they are merely illustrative of certain forms of structure which at present seem to be preferred embodiments.

Inasmuch as many changes, additions, and omissions may be made with respect to the structure disclosed herein, attention is specifically directed to the fact that the invention is not to be considered as limited to the precise structures herein disclosed, but is defined solely by the following claims.

I claim:

1. A truck comprising side frames, a transom secured to the said frames and maintaining them properly spaced apart, a pedestal at each end of each frame, an axle mounted in each opposite pair of pedestals, the said axle extending outward beyond each side frame, a wheel mounted on each end of the axle, a brake means including a brake disc and brake shoes for cooperation therewith located beyond the outer side of each wheel, and a generally U-shaped support for said brake shoes carried by the truck frame and axle and extending from side to side of the truck and beyond the side frames, the brake shoes being supported by lateral extensions of the U-shaped support.

2. A truck comprising side frames, a transom secured to the said frames and maintaining them properly spaced apart, each frame having a pedestal adjacent each end, an axle mounted in opposite pedestals and carrying a wheel at each end, cooperating rotatable and non-rotatable brake means at each end of the axle, located outside the frame, and a generally U-shaped support for said non-rotatable brake means carried by the truck frame and axle and extending from side to side of the truck and beyond the side frames, the non-rotatable brake means being carried by lateral extensions of the U.

3. A truck comprising side frames and a transom secured to the said frames and maintaining them properly spaced apart, a pedestal at each end of each frame, an axle mounted in each opposite pair of pedestals, the said axle extending outward beyond each side frame, a wheel mounted on each end of the axle, a brake ring located beyond the outer side of each wheel and secured to the said wheel, a generally U-shaped support extending from side to side transversely of the truck and beyond the side frames and removably secured to the truck frame and axle, a brake shoe carried by the support and cooperating with the said brake ring, and means also carried by the said support for actuating the said brake shoe.

4. A truck comprising side frames connected by a transom, an axle extending outward beyond each side frame, a wheel mounted on an end of the axle, a brake ring located beyond the outer side of the wheel and secured to the said wheel, a support extending transversely of the truck between and beyond the side frames and removably secured to the truck, brake shoes carried by the support and cooperating with the opposite faces of the said brake ring, and means also carried by the said support for forcing the said brake shoes against the faces of the ring, said means comprising a brake cylinder and its piston, and levers connecting them to the respective shoes.

5. A truck side frame provided with pedestal openings near its ends, said frame comprising as main structural elements two stampings, said stampings being symmetrically shaped and having their main bodies arranged generally parallel to and spaced from each other, connecting means between the outer margins of said plates and the margins of said pedestal openings, further connecting means between said plates provided along upper and lower longitudinally extending lines vertically spaced from the outer margins of the plates and also from each other in the region between the two pedestal openings and along longitudinally spaced lines arranged between said pedestal openings and the transverse center line of the frame and interconnecting said longitudinally extending lines, said connecting means comprising flanges bent off from the said plates along their outer margins and along said lines, the flanges being directed toward each other and connected along their meeting edges, said plates and said connecting means resulting together in a system of intercommunicating box section girders which are closed substantially throughout their length and possess, therefore, great strength and rigidity against the torsional forces.

6. In a hollow frame structure, two plates spaced from each other, flanges along a marginal portion of said plates, said flanges of different plates being directed toward and connected with each other over part of their length but spaced from each other for another part of their length, the spaced flange portions merging gradually in the adjoining connected flanges, a member being inserted in the space between said flanges, said member being provided with a portion of gradually diminishing width so as to fill the space of diminishing width between said flanges.

7. A truck frame comprising two plates having their main bodies spaced from each other and being provided with a pedestal opening, the outer margins of said plates near to said opening being flanged toward each other and connected with each other along the edges of said flanges, the connection between said flanges ending a short distance from said opening and the flanges being gradually spaced from each other adjacent the opening, a pedestal bracket being inserted between the margins of said pedestal opening and being provided with extensions which fit into and are connected to the spaced portions of said flanges, said flanges and said brackets together with their extensions resulting in a completely closed box sectional frame structure.

8. In a truck side frame, two plates arranged longitudinally and vertically of the truck, said

plates being spaced from each other, connecting means between the outer margins of said plates, extended central portions of said plates being offset toward the other plate, said offset portions being connected with each other so that their marginal portions and said connecting means constitute together with the adjoining portions of the main bodies of said plates closed box sectional sill structures.

9. In a truck frame according to claim 8 having pedestal openings near its ends and having also a central opening, means for the attachment of a transom or bolster, said offset portions of said plates extending between said pedestal openings and said central opening being provided within the area of said offset portions.

10. In a truck, a side frame in the form of a box-section beam arranged on edge, inboard of the wheel location, a hollow section transom with a bottom wall and side walls having its one end extended through registering openings in the vertical walls of said side frame and projecting a considerable distance beyond said frame, means for connecting both vertical walls of the side frame to the walls of the said transom, the outwardly projecting portion of the bottom wall of the transom constituting supporting means for a bolster.

11. In a truck according to claim 10, said transom having its walls reinforced by means extending between and in both directions beyond the attachment to the vertical walls of the side frame.

12. In a truck, a box-sectional side frame arranged on edge, a hollow section transom having its one end extended through registering openings in the vertical walls of said side frame, the vertical walls of said side frame being inwardly flanged around the opening through which the transom extends and being connected with each other by the flanges, angle-section braces being attached to the outside of the vertical walls of the side frames by one of their arms and having their other arms attached to the outside of said transom.

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