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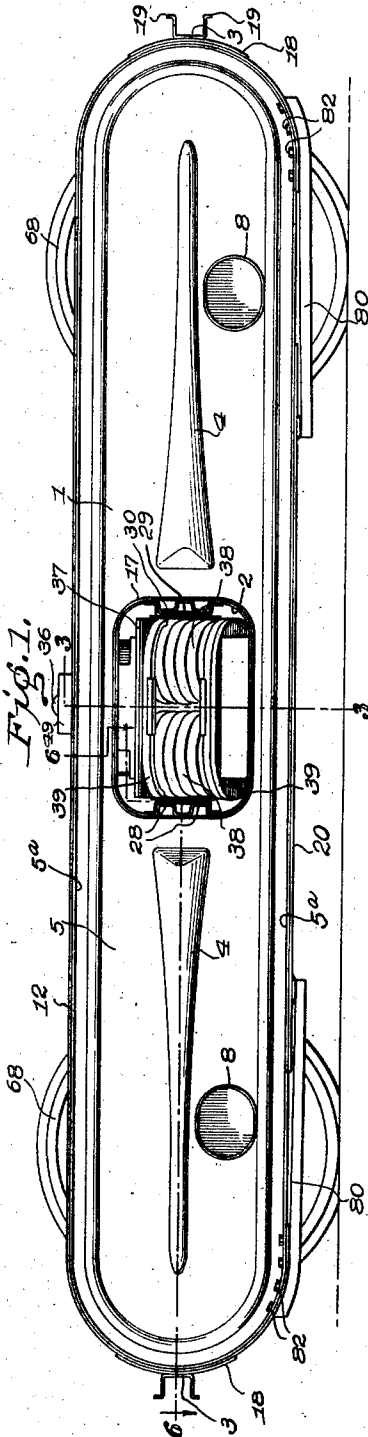
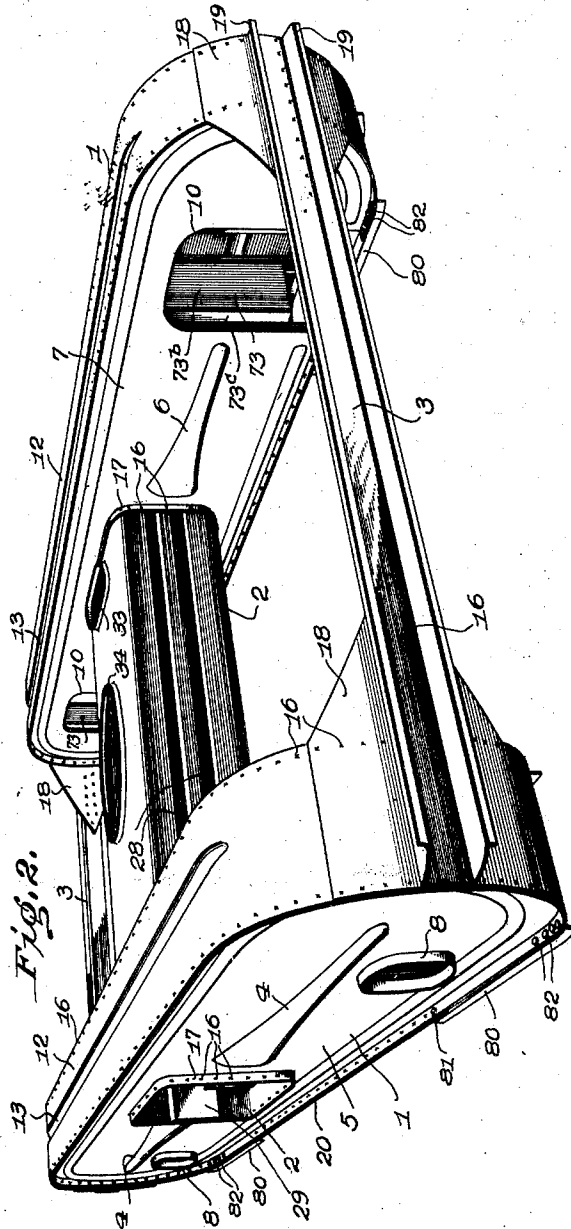
R. EKSERGIAN ET AL.

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STAINLESS STEEL TRUCK

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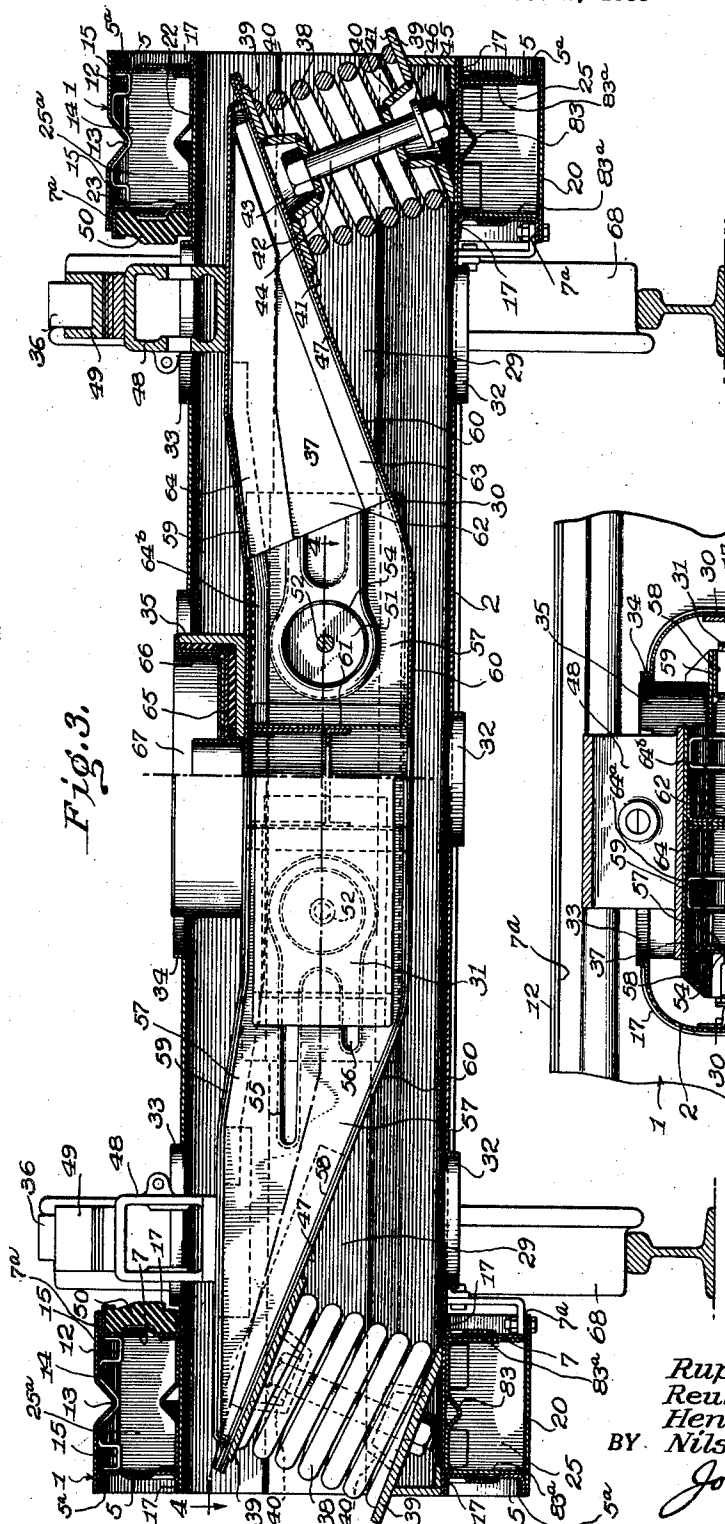


Fig. 3.

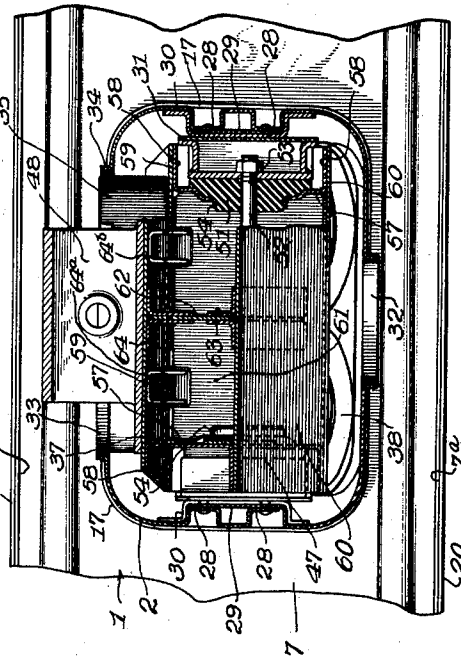


Fig. 5.

INVENTORS

Rupen Eksergian
Reuben H. Horton,
Henry K. Harwich and
Nils K. Shivesen

BY

John P. Paster
ATTORNEY

April 8, 1941.

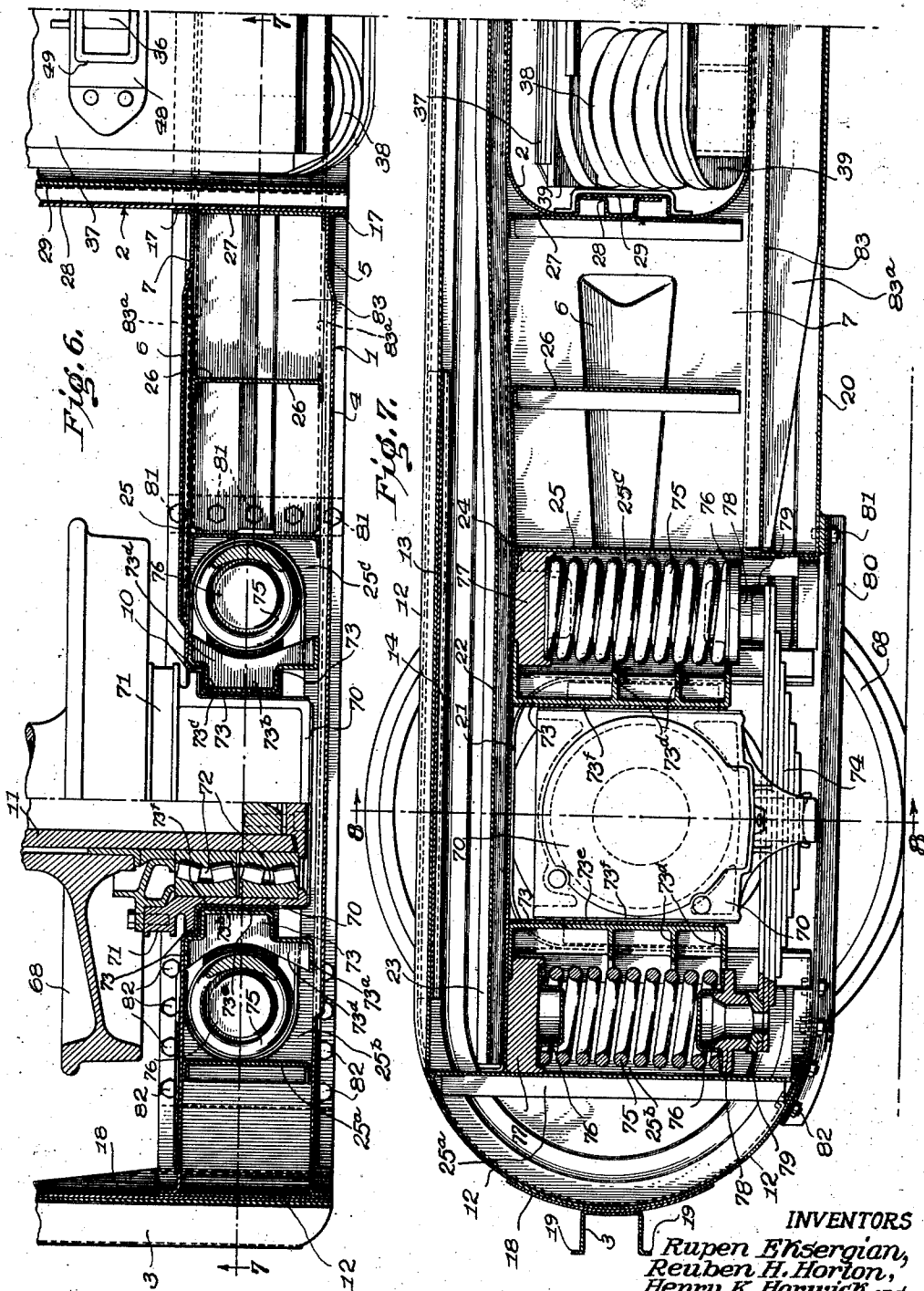
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4 Sheets-Sheet 4



BY

INVENTORS

Rupen Eksergian,
Reuben H. Horton,
Henry K. Harwick and
Nils K. Shivesen

John P. Tinkler
ATTORNEY

UNITED STATES PATENT OFFICE

2,237,757

STAINLESS STEEL TRUCK

Rupen Eksergian, Media, Reuben H. Horton, Philadelphia, Henry K. Harwick, Darby, and Nils K. Skivesen, Philadelphia, Pa., assignors to Edward G. Budd Manufacturing Company, Philadelphia, Pa., a corporation of Pennsylvania

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15 Claims. (Cl. 105—197)

The present invention relates to trucks.

More specifically it relates to trucks having frames built up mainly of relatively thin sheet metal elements and the like, which are connected to one another in any suitable way, as by bolts, rivets, or welding, so as to produce a very rigid structure which is, nevertheless, light in weight.

A further object of the invention is to produce a truck which is quiet in operation and pleasing in appearance, and is particularly advantageous for use in high speed, light weight, railway vehicles.

Briefly described, the truck comprises two hollow side frames connected at their midpoints by a transom which is likewise hollow, said side frames being connected to one another also at their ends by transverse structural elements to space and brace them properly.

An illustrative embodiment of the invention is disclosed in the present specification, and is illustrated in the drawings which accompany the same and form a part thereof.

In said drawings:

Fig. 1 is a diagrammatic side elevation of a truck frame;

Fig. 2 is a view of the truck frame in perspective;

Fig. 3 is a transverse section through the structure shown in Fig. 1, on the plane indicated by the line 3—3, certain portions of the bolster being shown in side elevation;

Fig. 4 is a partly sectional plan view of a portion of the structure shown in Fig. 3, the section being made on the planes indicated by the broken line 4—4;

Fig. 5 is a transverse section through the transom and bolster, the section being made on the planes indicated by the broken line 5—5 of Fig. 4;

Fig. 6 is a plan view, partly in section, of a fragment of the frame, the section being made on the planes indicated by the broken line 6—6 of Fig. 1;

Fig. 7 is a corresponding vertical section through one half of one of the side frames, the section being made on the planes indicated by the broken line 7—7 of Fig. 6; and

Fig. 8 is an elevation, partly in section, through one half of the truck, the axle being partly broken away, and the section being made on the plane indicated by the line 8—8 of Fig. 7.

It will be understood that Figs. 1 and 2 are relatively on a much smaller scale than the remaining figures.

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

The general nature of the truck frame will be best understood by the reference to Fig. 2, wherein are shown the two hollow side frames 1, connected at their midpoints by the substantially square tubular transom 2, and connected at their ends by the channel members 3. For appearance as well as for increasing the strength and stiffness of the side frames, certain portions such as 4 may be embossed or pressed out of the flat sheet 5, forming the outer plate of each side frame 1, as shown in Fig. 1. Similar embossed or pressed portions 6 may be provided in the flat sheet 7, forming the inner plate of each side frame 1.

In the particular form illustrated the side plates 5 and 7 of each frame have the upper and lower longitudinal edges thereof parallel with one another, while their edges at the ends are curved semi-circular. On all of said edges of said plates 5 and 7 outstanding flanges 5^a and 7^a respectively are formed, said flange 5^a being continuous while the flange 7^a has portions cut away near each end thereof.

Flanged apertures 8 are provided in the sheets 5 to provide access to the interior of each side frame, and suitable covers or closures may be provided for said apertures 8, if so desired. Each inner plate 7 has near each end and extending upwardly from the bottom an opening 10, to accommodate the journal box for the axle 11, all of which are arranged as will be understood best from Figs. 6, 7 and 8.

The side plates 5 and 7 of each side frame are connected by a sheet metal top 12, which has a substantially flat central portion and semi-circular ends, conforming in shape with the said side plates 5 and 7. A strengthening groove or corrugation 13 preferably extends the entire length of the flat upper portion of each of the tops 12. In order to additionally strengthen the same, a correspondingly corrugated longitudinal piece of sheet metal 14 (Fig. 8) is located below said top at each end of the flat central portion, said strips 14 having further bends therein, so as to form channels at the longitudinal edges, as shown at 15, thus providing abutments for the side plates 5 and 7.

The entire set of members 12, 14, 5 and 7 may be secured to one another in any desired way, as by bolting, riveting or welding, and adequate overlapping portions are available for this purpose, as shown. While the invention is not restricted to any particular means for securing the sheet metal elements to one another, it is preferred to employ spot welding wherever possible for this purpose, both for strength and economy.

Such fastenings are indicated at 16, which reference character merely represents diagrammatically any selected type of such securing means.

Each side plate 5 and 7 has, at its midpoint, a flanged opening 17 to receive the tubular transom 2. The flange is formed from the substance of the side plate itself, and the transom 2 is secured to the side plates by the fastenings 16, as shown best in Fig. 2. It will be understood that the flanges formed on the various parts and around the openings therein, aside from providing very satisfactory means for securing parts, also materially stiffen the said parts, and thus contribute to provide a very rigid structure.

In order to provide an adequate support for the channel members 3, additional plates 18 may be interposed between the semi-circular ends of the plates 12 and the said channel members 3, said plates 18 being curved to conform to the plates 12 and also being long enough to provide additional overlap on the cross members 3, the said plates 18 being connected to both by the securing means 16. The transverse members 3, which are substantially channel bars, may be further stiffened and strengthened by bending out their edges, as shown at 19, thus providing very rigid cross members with relatively light weight material. At the bottom, the plates 5 and 7 are held together in spaced relation by flat metal plates 20, as shown in Figs. 1 and 3. These plates 20 however are relatively short, and leave open spaces for the pedestals and springs, as will be understood from Fig. 7.

Further stiffness is imparted to the top portion of each side frame at each end by a substantially flat piece of metal 21, (Fig. 8), having a corrugated piece 22 lying thereon, and secured thereto, as shown. The member 22 may have its longitudinal edges flanged, as shown at 23, and secured to the side plates 5 and 7. The members 21 which have been described as substantially flat, are bent slightly upwardly, beginning at the point designated by 24, in Fig. 7, in order that the plate 22 which lies above them may pass over the transom 2, and be secured thereto to aid in rigidly connecting the side frame to the transom as best shown in said figure. The side frames may be further braced by means of longitudinally extending corrugated elements 25, positioned in the lower portions of the frames between the plates 5 and 7 and beneath the transom 2, which is also attached thereto by welds or the like. Deep depending flanges 26 are formed at the opposite sides of said member 25 and are attached to said plates 5 and 7 by welds or the like. The members 22 and 25 extending, in the case of member 22, from end to end of the side frame, and in the case of member 25, from pedestal to pedestal, thus form with the sides and top and bottom members of the frame, box section top and bottom chords which greatly stiffen the structure. Vertical members, such as 25, 26 and 27 are also placed between the plates 5 and 7, said vertical members being substantially flat in their central parts, with flanges at their edges, said flanges being secured to the respective plates to brace and stiffen them. The vertical members 25, 26 and 27 are also flanged at their upper ends for attachment to either the member 21 or 22 while the lower ends of the members 26 and 27 terminate slightly short of the member 23. The lower end of the vertical member 25 extends further down than the members 26 and 27 and is attached to a flange on the ends of the bottom

plate 20 and to flanges on the end of the member 23 abutting the side thereof.

It will be seen that the transom 2 is formed with corrugations running along its front and rear. These corrugations are provided by making the tubular transom of two correspondingly formed pieces of sheet metal, each having corrugations 28 at one side edge and a flat depressed portion 29 at the other side edge. Then upon interfitting the two halves of the tube, as indicated in Fig. 5, the flat portion along one edge of each piece will become located beneath the corrugation on the opposite edge of the other piece, whereupon they may be secured to one another, preferably by welding or the like, to form a substantially square tube, with strengthening corrugations along two opposite faces. The vertical members 27 in the side frames are secured to the sides of the transom 2 to further strengthen the connection of the transom to the side frames.

This corrugated portion, which extends inward on the front and rear faces of the transom, serves also to support the pads or wear plates 30, which are welded to the transom, and upon which slide the cooperating pads 31 which are carried by the bolster, so as to guide the same within the transom and allow adequate relative vertical movement. The transom may have flanged openings 32 at its bottom to give access to adjacent parts of the bolster, and corresponding flanged openings 33 at its top. There is also a larger flanged opening 34 in the top of the transom through which projects the center plate 35 of the bolster, which, in cooperation with the side bearing rollers 36, also mounted on the bolster, carries the weight of the vehicle.

Referring now to Fig. 3, the general structure of the bolster 37 is here illustrated. It comprises a substantially horizontal central portion with triangular or wedge shaped ends, said ends being supported by the springs 38.

Each spring 38 has a retainer 39 at each end thereof, each such retainer having an outer flange with a central depression 40. While these retainers may be made in any preferred way, those here shown are built up by welding together a flat outer flange portion 41, a frusto-conical portion 42, and a flat perforated inner portion 43. The bolt 44 is accommodated through the apertured portions 43, as shown, its head being located in one of the end cavities, while the nut and washer 45 and 46 will enter the other cavity when the spring 38 expands. These bolts, in combination with the retainers 39, thus serve to maintain the springs in proper position to bear against the inclined lower surface 47 of the bolster on the one hand, and against the transom on the other hand, said retainers 39 being secured to said inclined under-surface 47 of the bolster and to the transom where the same is connected to the side frame.

Box-like castings or forgings 48 are mounted on the upper side of the bolster near its ends and project through the flanged openings 33 to support the guides 49 for the rollers 36 already mentioned, which, in cooperation with the center plate 35, support the vehicle on the bolster.

Rubber buffers 50 are mounted on the plates 7 of the side frames adjacent the box-like elements 48 to limit and cushion any undue transverse movement of the bolster.

In order to provide a resilient mounting of the wear plates 31, which are carried by the bolster, rubber cushions 51 may be provided, as shown

In Figs. 4 and 5. In the embodiment illustrated, four such cushions are utilized, one pair on each side of the center of the bolster, each pair supporting a wear plate 31, and opposite cushions of each pair are held together by means of a bolt 52, having a lock nut 53 thereon, whereby the bolt thus holds the wear plates 31 and the rubber cushions 51 in proper positions with the rubber seated in the openings 54, formed in opposite sides of the bolster. In order to strengthen the side plates of the bolster adjacent said apertures 54, portions thereof may be embossed inwardly, as at 55 and 56, thus materially stiffening said side plates.

These side plates, which are indicated at 57, are substantially rectangular in their central portions, with triangular ends, flanges 58 being bent outwardly therefrom to provide adequate overlap on the top plate 59 and bottom plate 60 of said bolster for welding or otherwise securing the component parts of the bolster together. Additional partitions or strengthening spacers, such as 61, may further be provided, as shown, as well as central longitudinal webs 62 and cooperating angular shapes 63 and 64, to provide a central stiffening element at the ends of the bolster.

To further stiffen the bolster a pair of spaced longitudinally extending channel members 64^a and 64^b are attached by welds to the under-surface of the top plate 59 with their outer ends protruding beyond the inner ends of the central longitudinal webs 62, the partitions 61 being notched to permit said channels to extend therethrough and aid in supporting the weight applied on the center plate 35.

Rubber pads such as the flat ring 65 and the cylindrical ring 66 may be interposed between the center plate 35 and the pan 67 mounted therein, so as to provide a resilient mounting for the vehicle at this point. The said pan 67 may likewise be built up of a number of sheets of metal, that is, it may be laminated as shown in Fig. 3.

Referring now to Figs. 6, 7, and 8, the wheel structure and pedestal are disclosed in detail. The axle 11 carries the wheel 88, which has the brake disk 89 attached thereto. The journal box 70 has formed thereon a cylindrical grooved portion 71 which pivotally carries the arm of the brake mechanism, which may be of the type disclosed in co-pending application Serial No. 27,750, filed April 29, 1939. Suitable roller bearings 72 are preferably provided in the journal box 70 to support the axles, and the journal boxes themselves may slide vertically between the cast metal guides 73, located on opposite sides thereof.

The cast metal guides are provided at the opposite side edges of the opening 10 in the inner side plate 7 between said side plate 7 and the side plate 5 and have the opposite side walls 73^a thereof rigidly secured to said plates in any desired manner. Offset vertical guide walls 73^b for supporting the journal box 70 during the vertical movement thereof are formed on the cast metal guides 73, while vertical guide shoulders 73^c are formed at right angles to said walls 73^b for supporting the axle and journal box against transverse movement with respect to the truck frame. Between the various walls of said cast metal guides a series of lateral webs 73^d are provided for strengthening the castings. Angled wear strips 73^e are secured to the guide walls 73^b and guide shoulders 73^c for engaging similar wear strips 73^f carried by the journal box 70.

In addition to the vertical brace members 25, 26 and 27, another vertical brace member 25^a

attached between the side plates 5 and 7 of the side frame and located between the outermost cast metal guide 73 and the end of the frame is provided. This vertical brace member is also flanged at its sides for attachment by means of welds to the side plates 5 and 7, at its top for attachment to the top plate 12 and at its bottom for attachment to the extreme end of the semi-circular end portion of the plate 12. Also attached to this vertical brace member 25^a are flanges formed on the end of the longitudinal member 22 which abut the side thereof.

In the space between the vertical brace 25^a and the outermost cast metal guide a spring housing 25^b is provided, while a similar spring housing 25^c is had in the space between the innermost cast metal guide and the vertical brace 25.

Helical springs 75 are arranged in the spring housings 25^b and 25^c and have suitable cupped retainers 76 inserted in their ends. The upper cupped retainers bear against the blocks 77 resting on the under-surface of the bracing members 21 and 22, while lower retainers receive bearing members 78 having convex lower ends resting in concave castings or cups 79 mounted on the opposite ends of a leaf spring 74. The leaf spring 74 is mounted underneath the journal box 70 and supported thereby, as shown. Thus the weight of the truck and car body thereon is resiliently transmitted to the axles through the combined leaf and helical springs.

In order to strengthen the side frame at its ends, the gap beneath the spring and pedestal structures is bridged by suitable structural members, such as combined plates 80, one of which is of channel formation in cross section, and both of which are secured to the side frames in any suitable manner, as by bolts 81 and 82, as shown in Figure 7. Said combined plates 80 have a relatively large elongated opening 80^a therein for permitting free movement of the spring elements as well as permitting inspection and access to said spring elements and their associated parts.

The operation of the invention will be self-evident from the structure of the device. Briefly summarized, the weight of the vehicle usually will be carried by two trucks, one at each end, and will rest mainly upon the center plate 35 of each. The rollers 36 will take the residual or unbalanced loads, and such loads as exist from time to time when the vehicle is going around a curve, or swaying for any reason.

The loads will be carried by the bolster 37, which in turn transmits them to the side frames 1, through the springs 38. The rubber pads 65 and 66 will cushion shocks and deaden noises, while the rubber buffers 50 will limit transverse motion of the vehicle.

The side frames 1 in turn transmit the load to the axles 11 through the helical springs 75 and the composite flat springs 74, which are "in series" with one another, and thus have increased shock-absorbing and resilient action.

Due to the proper use and placement of relatively light metal elements in fabricating these truck frames, a very rigid and relatively light truck is attained, which is particularly suitable for use in high-speed light-weight railway vehicles and is relatively much safer than a truck built largely of cast metal, because of the homogeneous character of the sheet metal from which it is constructed. Even the innermost structural members of the present truck can be readily examined for any defects during construc-

tion, and in sheet metal there are no blow holes or other hidden defects, such as sometimes appear in castings even when most carefully made.

Although the herein-described truck frame is a preferred embodiment of the invention, and has a pleasing appearance, in addition to its excellent mechanical properties, it should be understood that the same is merely illustrative of the inventive features, and is not the sole form in which they may be embodied. For a definition of the scope of the invention, attention is therefore directed solely to the following claims.

What we claim is:

1. A truck frame consisting of side frames and a transom, each side frame comprising spaced side plates of sheet material having outwardly flanged openings at their midpoints through which the transom extends, said transom being in facial engagement with said flanges and attached thereto, and spacing members between said side plates and attached thereto, said spacing members being arranged in facial engagement with said transom and attached thereto.

2. A truck frame consisting of side frames and a transom all built up of sheet metal, each side frame comprising spaced side plates having continuously flanged openings at their midpoints, said transom being of tubular formation and extending through said openings in facial engagement with said flanges and attached thereto, and members positioned between said side plates and attached thereto for engagement with and attachment to said transom, said members being arranged above, below and at opposite sides of said tubular transom.

3. A hollow side frame for a truck, comprising elongated inner and outer side plates with curved ends, said side plates being of a sheet metal and each having an outwardly directed flange at its marginal edges, said flange on said outer plate being continuous while the flange on the inner plate is interrupted by pedestal openings one at each end of said plate, other plates attached to said flanges of both plates providing top, bottom and curved end walls, and structural frame supporting members attached to said inner side plate at opposite sides of said pedestal openings.

4. A hollow side frame for a truck comprising elongated inner and outer side plates with curved ends, each of said side plates having an outwardly directed flange at its marginal edges, said flange on said outer plate being continuous while the flange on the inner plate is interrupted by pedestal openings one at each end of said plate, other plates attached to said flanges providing top, bottom and curved walls, and structural frame supporting members located beneath said frame at the pedestal openings and attached to the flanges of both inner and outer plates.

5. A hollow truck side frame fabricated of side plates flanged outwardly in their outer margins, the plate outwardly of the truck extending substantially unbrokenly from end to end of the frame except for a central opening to receive a transom and the inward plate also having a corresponding central opening but alone being provided with vertical pedestal openings arranged adjacent the ends of the frame, closing plates overlapping and secured to the flanged outer margins of the side plates, extending around the top, ends and bottom of the frame and broken only by said pedestal openings.

6. A hollow truck side frame according to claim 5 in which an inner generally channel section stiffening plate runs from end to end of the frame across the top margins of said openings in the side plates, the side walls of said channel overlapping and being secured to the side plates.

7. A hollow truck side frame according to claim 5 in which a pair of generally channel section stiffening plates bridge the space between the side plates with the side walls thereof overlapping and secured to said side plates, one of said stiffening plates extending from end to end of the frame and flanking the top margins of the openings in the side plates and the other flanking the bottom margin of the central openings and extending between the vertical pedestal openings of the inward side plate.

8. A hollow truck side frame according to claim 5 in which generally channel-section stiffening plates bridge the space between the lateral plates with their channel side walls overlapping and secured to said side plates, a pair of said stiffening plates extending longitudinally, one above and one below the central transom receiving opening and the other of said stiffening plates extending vertically and flanking the sides of said opening.

9. A hollow truck side frame according to claim 5 in which spaced vertically extending members are arranged on each of the opposite sides of the pedestal openings, said members bridging the space between and secured to the side plates and to a horizontal bridging member extending between and connecting the side plates at the top margins of said openings, said horizontal and vertical members forming spring pockets with said side plates.

10. A hollow truck side frame built up mainly of sheet metal parts, comprising elongated inner and outer side plates of substantially uniform width throughout their length and each having a flanged opening at its central portion to receive and secure a transom, and flanged outer margins, the marginal flange of the outer plate being continuous while the marginal flange of the inner plate is interrupted by pedestal openings one at each end of the plate, spaced plates extending from end to end of the side frame at the top of the frame, one overlapping and secured to the marginal flanges of the side plates and the other flanged in its margins and having said flanges overlap and secured to the side plates, similar spaced plates but extending only from pedestal opening to pedestal opening and similarly secured to the side plates at the bottom of the frame, and vertical stiffening plates extending between and connected to the side plates at spaced points in their length.

11. A truck frame comprising side frames and a transom built mainly of sheet metal, each side frame comprising spaced side plates having continuously flanged openings, said transom being of tubular formation and of a size to house a sprung bolster, and extending through said openings in overlapping engagement with said flanges and secured thereto.

12. A truck frame comprising side frames and a transom built mainly of sheet metal, each side frame comprising spaced side plates having continuously flanged openings at their central portions, said transom being of tubular formation and extending through said openings in overlapping engagement with said flanges and secured thereto, said transom having substan-

tially vertical side walls stiffened by a box section formation.

13. A truck frame comprising side frames and a transom built mainly of sheet metal, each side frame comprising spaced side plates having continuously flanged openings at their central portions, said transom being of tubular formation and extending through said openings in overlapping engagement with said flanges and secured thereto, and generally channel section stiffening members extending between the side plates in the margins of the flanged openings and secured thereto through their channel side walls.

14. A truck frame including side frames and a central transom built up mainly of sheet metal, said side frames comprising elongated spaced side plates having rounded ends, said side plates each having an outwardly directed flange at its marginal edges, said flange on the outer plate being continuous while the flange on the inner plate is interrupted by pedestal openings, one

adjacent each end of said plate, other plates overlapping and secured to the flanges of both side plates providing top, bottom and curved end walls, each side plate having a continuous flanged opening at its central portion, said transom being of tubular formation and extending through said openings in overlapping engagement with said flanges and secured thereto.

15. A truck frame according to claim 14 in which each of the adjacent rounded ends of the side frames are interconnected by an angular section member of sheet metal, the ends of said member each being widened by a plate having a wide overlap with the rounded ends of the adjacent side frame and secured thereto through the outwardly directed flanges of the side plates and the overlapping other plate.

RUPEN EKSERGIAN.
REUBEN H. HORTON.
NILS K. SKIVESEN.
HENRY K. HARWICK.