June 13, 1939. C. W. HOWAT 2,162,307

CAR TRUCK SIDE FRAME

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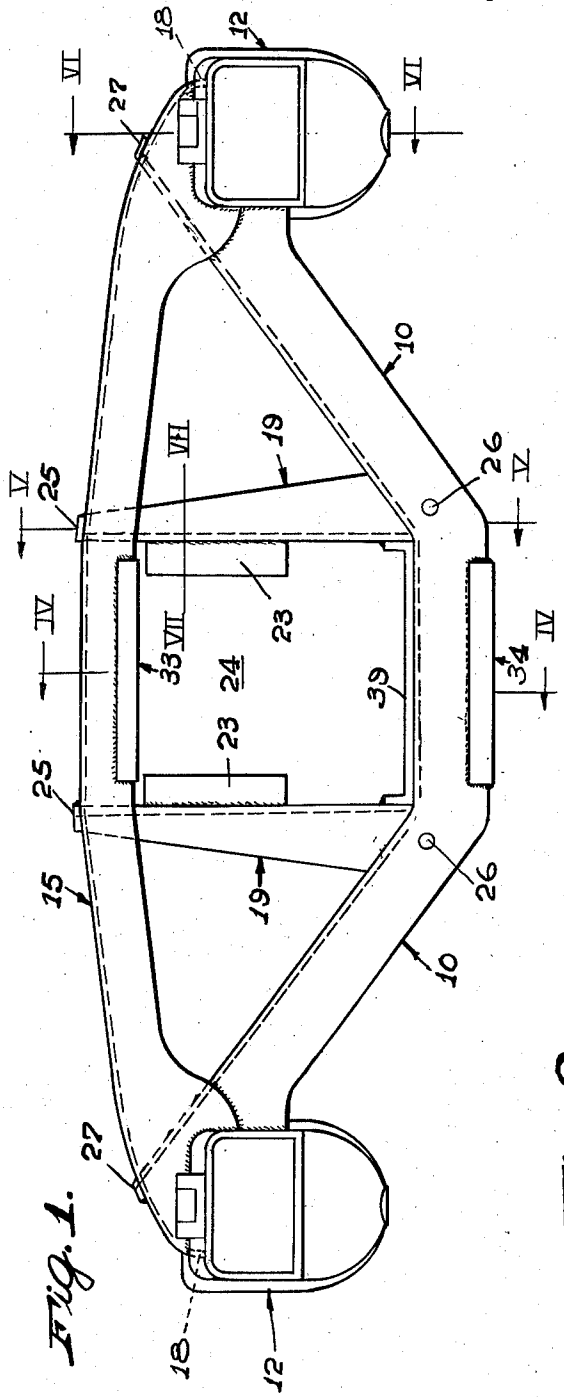


Fig. 1.

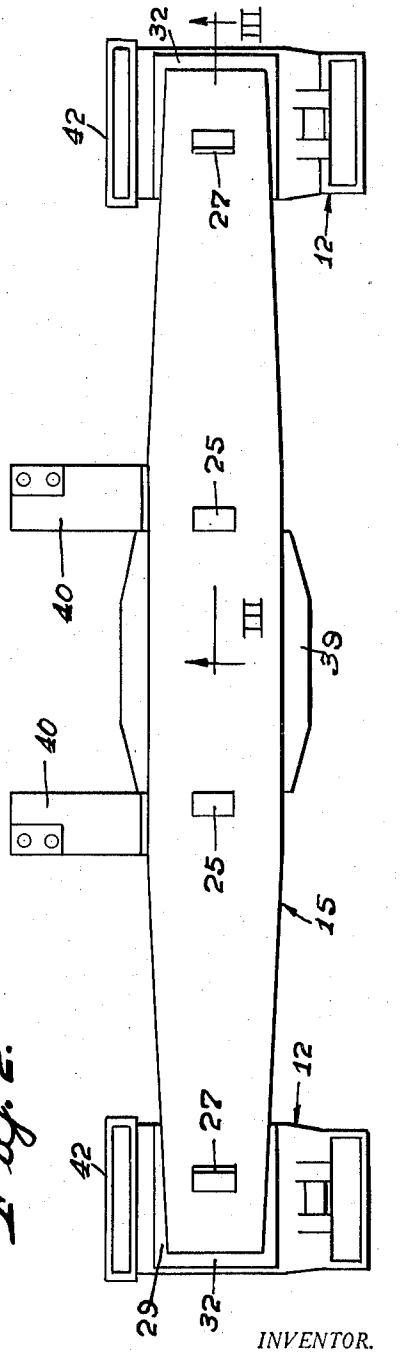


Fig. 2.

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Fig. 3.

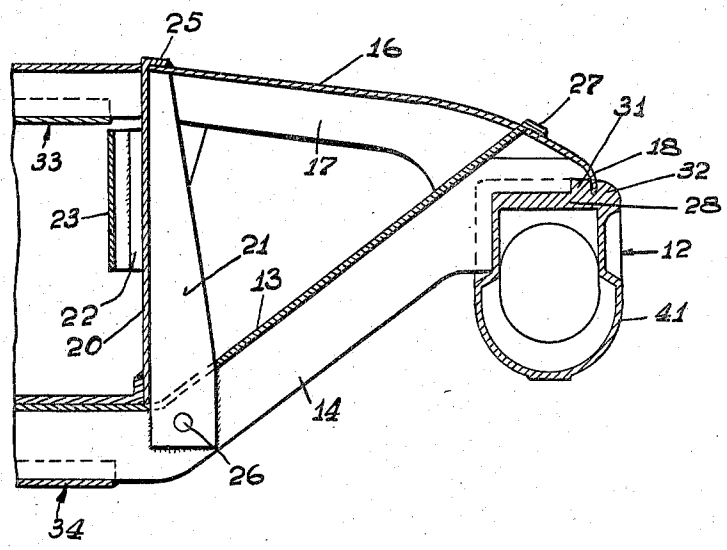


Fig 4.

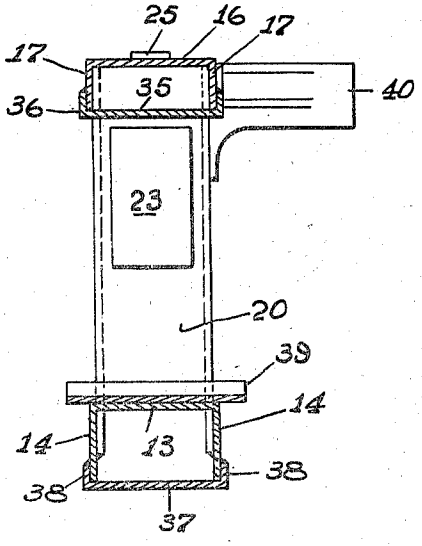
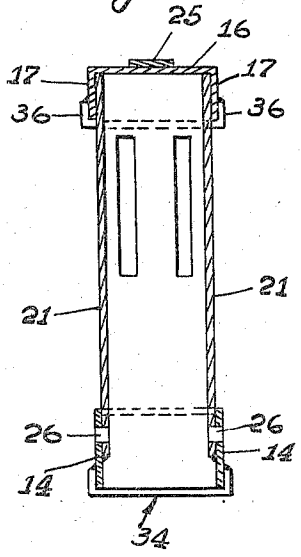


Fig. 5.



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Fig. 8.

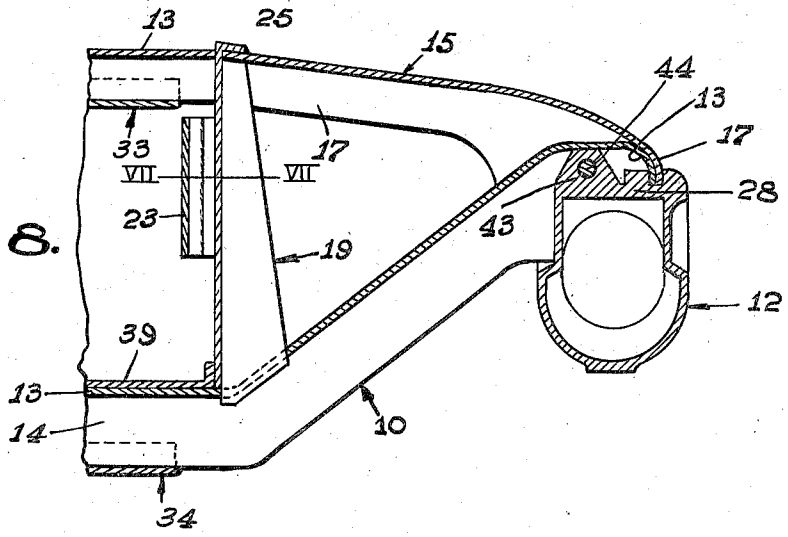


Fig. 6.

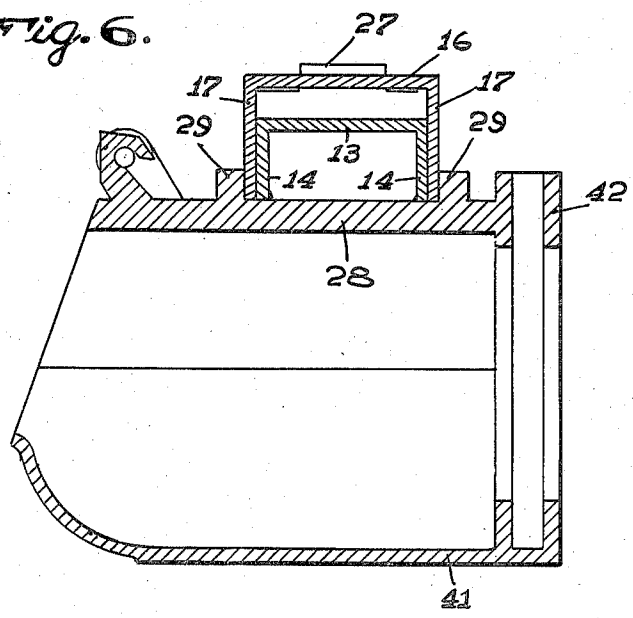


Fig. 7.

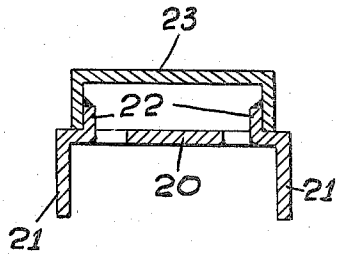
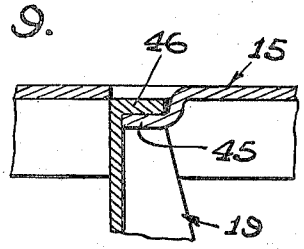


Fig. 9.



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UNITED STATES PATENT OFFICE

2,162,307

CAR TRUCK SIDE FRAME

Clarence W. Howat, Pittsburgh, Pa.

Application April 1, 1937, Serial No. 134,311

10 Claims. (Cl. 105—206)

This invention relates to car trucks and it has particular relation to a side frame for a car truck formed from rolled steel plate material.

One of the objects of the invention is to provide a side frame having a plurality of rolled steel members welded together to form an integral unit.

Another object of the invention is to provide a side frame having a plurality of rolled steel members welded together with the members so formed as to provide stress transfer by direct metal to metal contact so that the load exerted on the frame is carried by the respective members without depending on the welding.

Another object of the invention is to provide a side frame which embodies a simplicity of design together with a ruggedness of construction adapted to meet the operating conditions to which side frames are subjected. Other objects may be inferred from the nature of the invention.

In the construction of a side frame in accordance with my invention, a plurality of members formed from rolled steel plate of substantially uniform thickness are welded together to form an integral unit. This side frame includes a horizontally and diagonally disposed tension member, a compression member, vertical tension members, bolster guides, and journal boxes, these members being arranged in a manner well known to the art. The compression member and the horizontally disposed tension member are substantially channel or U-shaped in cross section. The flanges of these members extend downwardly with the tension member disposed between the flanges of the compression member adjacent the outer ends thereof. Reinforcing elements are provided at vulnerable locations, materially increasing the strength of the side frame. The members of the side frame are assembled with a portion of one member coacting with a portion of another member so as to provide a direct metal to metal contact at the points of stress transfer. All of the members are welded together to form an integral unit. For a better understanding of the invention, reference may be had to the accompanying drawings forming a part of this specification in which:

Fig. 1 is a side elevational view of a side frame constructed in accordance with my invention.

Fig. 2 is a plan view of the side frame as shown in Fig. 1.

Fig. 3 is a horizontal sectional view of the invention taken substantially along line III—III of Fig. 2.

Fig. 4 is a vertical section of the invention taken substantially along line IV—IV of Fig. 1.

Fig. 5 is a vertical section of the invention taken substantially along line V—V of Fig. 1.

Fig. 6 is a sectional view of the invention taken substantially along line VI—VI of Fig. 1.

Fig. 7 is a sectional view of the invention taken substantially along the line VII—VII of Fig. 1.

Fig. 8 is a modification of the invention disclosing different means for securing the members of the frame from that shown in Fig. 3.

Fig. 9 discloses another form for securing the members together in a metal to metal contact.

In practicing my invention, a horizontally and vertically disposed tension member 10, having outwardly extending portions terminating in relatively horizontal portion, resting upon journal boxes 12 is provided. The tension member is formed from rolled steel plates of substantially uniform thickness and comprises a web portion 13 and depending flanges 14. A compression member 15 formed from rolled steel plate having a central web 16 and depending flanges 17, similar to those of the tension member, is provided with the tension member 10 resting between the flanges 17 of the compression member adjacent the outer ends thereof, as best shown in Fig. 6.

As best shown in Fig. 3, the compression member is provided with depending tab portions 18 formed by removing portions of the flanges 17. The tab 18 engages the edge surface of the flanges 14, terminating at the bottom of the flanges adjacent the top of the journal boxes as hereafter described.

Vertical tension members 19 are formed from rolled steel plate of uniform thickness of U-shape section, having a web 20 and flanges 21, each of the vertical tension members being provided with lugs 22 punched from the web with the lugs so formed as to engage a bolster guide 23, for transferring transverse stress between the bolster guide and vertical tension member. The bolster guides are of U-shape in section, being formed with a web and flanges and are welded in position as best shown in Fig. 7. The guides are of less width than the vertical tension members 19 thus providing a stronger frame yet meeting the requirements as set by the industry. The vertical tension members are positioned in spaced relation forming an opening 24, having a bolster (not shown). Each of the members 19 is provided with a tab 25 formed from the web 20 and extends through the web 16 of the compression member, being shaped to engage the outer sur-

face of the web in a metal to metal contact as shown in Fig. 3. The flanges 21 of the vertical tension member extend through the web 13 of the horizontally disposed tension member 10 as shown in Fig. 5 and they are secured in a metal to metal contact with the flanges of the tension member by pins 26 welded in position. While I have disclosed different means for providing a metal to metal contact at the points of stress transfer in the construction as shown, it is obvious that either form may be employed to the exclusion of the other form and that other forms for providing this means are possible.

A flange 27 formed by a continuation of the web 13 of the horizontally disposed member 10 extending through the web 16 of the compression member adjacent the outer ends thereof is also formed to provide a transfer of stress, the tension member to the compression member, without depending upon the weld.

In addition to the above means for reinforcing the frame at the points of stress transfer, by providing direct metal to metal contact, the journal boxes 12 are provided with flat roofs 28 having upstanding shoulders 29 integral therewith, the shoulders being positioned parallel with the downwardly extending flange portions 17 of the compression member. Upstanding lugs or flanges 31 and 32 formed integral with roof of the journal boxes and at right angles to the shoulders 29, are provided as shear lugs for preventing any horizontal movement of the compression and tension members respectively. In practice, the shoulders 29 and the lugs 31 and 32 form a flange of substantially U-shape thus providing contact surfaces for the flanges 16 and tab 18 thereby preventing not only horizontal movement of the compression and tension members, but also lateral movement of these members. This is accomplished in conjunction with the tab portion 18 extending downwardly, flush with the bottom of the flanges 17 and engaging both the lugs 31 and 32 together with the top of the roof 29. It will be noted from the construction as shown in Fig. 3 that a relatively simple design is provided in which any breakdown of the members adjacent the journal boxes has been eliminated.

In operation, the load exerted on the side frames of the construction heretofore employed causes the flanges of the compression and the horizontally disposed tension members to spread or flare outwardly permitting the central portions of the respective members to sag. To eliminate this defect, reinforcing members 33 and 34 of U-shape in section are provided. The member 33 is provided with a web 35 and upstanding flanges 36 positioned with the web contacting the bottom of the flanges 17 of the compression member and the flanges 36 extending upwardly and engaging the outer surfaces of the flanges 17. The flanges 14 of the tension member 10 are likewise reinforced to prevent outward movement thereof, with a web 37 of the reinforcing member 34 contacting the bottom of the flanges 14 and flanges 38 extending upwardly and engaging the outer surfaces of the flanges 14.

A spring plate 39 is positioned on the web 13 of the tension member 10. Brake hanger brackets 40 are welded to depending flanges of the vertical tension member. It is to be understood that these brackets are of conventional design and shape. While I have described the upper portion of the journal box 12 in detail, it is to be understood that the lower portion may be formed in the usual conventional manner, with the bottom 41 and dust guards 42, integral with the upper portion of the journal boxes.

Fig. 8 is a modification for obviating horizontal movement of the tension and compression members and also providing a point of stress transfer in which the roof 28 of the journal box 12 is provided with an upstanding flange 43 having an opening for a pin 44. The pin extends through the opening of the flange and also through the flanges 14 and 17 of the members 10 and 15 respectively. In this construction the webs 13 and 17 of the members 10 and 15 extend downwardly into an engagement with the top of the roof 28 and they are both positioned between the lugs 31 and 32 of the journal boxes.

Fig. 9 discloses another means for providing metal to metal contact for stress transfer in which tabs 45 are formed in the web portion of the member, such as the compression member 15, by any well known method such as punching, with the tab 45 carrying a flange 46 formed from a coacting member such as the vertical tension member 19.

From the foregoing description it is apparent that I have provided a side frame made of rolled steel plate or plate section that is of integral character throughout due to its welded construction. While the position of the various welds are illustrated by the drawings, the various means and manner in which the welding may be accomplished have not been described for the reason that it is obvious that all adjacent surfaces and edges should be united. Moreover it is apparent that with the construction of a side frame as disclosed by my invention, I have provided a frame in which the stress of the load exerted on the frame is substantially removed from the welded surfaces providing metal to metal contact between the members at points of stress. Obviously a frame constructed in accordance with my invention provides a ruggedness of construction not apparent in frames heretofore employed.

It is to be understood that the forms of the invention herewith shown and described is merely illustrative of preferred embodiments and that such changes as fall within the purview of one skilled in the art may be made without departing from the spirit of the invention and the scope of the appended claims.

I claim:

1. A side frame formed from a plurality of members welded together to form an integral unit comprising a compression member of rolled steel plate formed into channel section having depending flanges, a horizontally disposed tension member of rolled steel formed into channel section having depending flanges, vertical tension members positioned in spaced relation between the compression and horizontally disposed tension members adjacent the center of said members, a reinforcing member of U-shape having flanges extending upwardly about the outer surfaces of the flanges of the compression member, a second reinforcing member of U-shape having flanges extending upwardly about the outer surfaces of the flanges of the horizontally disposed tension member, journal boxes having flat roofs, each roof having an upstanding flange of U-shape engaging the end of the compression member and means positioned at points of stress transfer for providing stress transfer by direct metal to metal contact, whereby the load exerted on the frame is carried by the respective mem-

bers, thereby relieving the weld of a considerable portion of the shear.

2. A side frame comprising a plurality of members formed from rolled steel of uniform thickness including a compression member having depending flanges, a reinforcing member of U-shape having upstanding flanges, the flanges of the reinforcing member engaging the outer surfaces of the flanges of the compression member, a tension member having depending flanges and a second reinforcing member of U-shape having upstanding flanges engaging the outer surfaces of the flanges of the tension member and vertical tension columns positioned between the compression member and the tension member adjacent the center of said members, all the members being welded together to form an integral unit.

3. A side frame comprising a compression member formed from rolled steel into channel section having a web and depending flanges, tabs formed by the web extending downwardly from the flanges adjacent the outer ends thereof, a horizontally and diagonally disposed tension member formed from rolled steel into channel section having a web and depending flanges, each end of the tension member engaging a tab of the compression member, with the tension member resting between the flanges of the compression member, vertical tension members positioned in spaced relation between the compression member and the horizontally disposed tension member adjacent the center of said members, a reinforcing member of channel shape positioned between the vertical tension members and engaging the flanges of the compression member, a second reinforcing member of U-shape positioned between the vertical tension members and engaging the outer surfaces of the flanges of the horizontally disposed tension member and journal boxes having flat roofs with an upstanding flange of U-shape, the flange engaging the compression and horizontally disposed tension member, thereby preventing relative horizontal movement of the compression and horizontally disposed tension member, all the members being welded together to form an integral unit.

4. A side frame formed from a plurality of members welded together to form an integral unit comprising a compression member of rolled steel formed into channel section having depending flanges, a horizontally and diagonally disposed tension member of rolled steel formed into channel section having a web and depending flanges, vertical tension members positioned in spaced relation between the compression and the horizontally disposed tension member, means formed on the vertical tension members adjacent the ends thereof, the means engaging the compression and the horizontally disposed tension members at the points of stress transfer whereby the load exerted on the frame is substantially carried by the respective members, thereby relieving the weld of a considerable portion of the shear, journal boxes with flat roofs having a pair of upstanding flanges thereon the flanges engaging a surface of the web of the compression and tension member respectively for preventing relative horizontal movement of the compression and horizontally disposed tension member.

5. A side frame formed from a plurality of members welded together to form an integral unit comprising a compression member of rolled steel formed into channel section having depending flanges, a horizontally and diagonally disposed tension member of rolled steel formed into channel section having a web and depending flanges, vertical tension columns positioned in spaced relation between the compression and the horizontally disposed tension members, adjacent the center of said members, bolster guides formed of rolled steel into channel section, the flanges of the bolster guides engaging the web of the vertical tension columns, means formed on the vertical columns adjacent the ends thereof for engaging the compression and tension members at the points of stress transfer whereby a considerable portion of the load exerted upon the frame is carried by the respective members, thereby relieving the weld of a considerable portion of the shear, journal boxes with flat roofs having a pair of upstanding flanges thereon, the flanges engaging a surface of the compression and tension members, a flange formed on the roof of each journal box at right angles to the first mentioned flanges and means coacting with the last mentioned flange for engaging the flanges of both the compression and tension members.

6. A side frame formed from a plurality of members welded together to form an integral unit comprising a compression member formed of rolled steel, of uniform thickness, into channel section having depending flanges, a horizontally disposed tension member formed of rolled steel of uniform thickness having depending flanges, the tension member resting between the flanges of the compression member adjacent the outer ends thereof, vertical tension members of rolled steel having a web and flanges, the vertical tension members being positioned in spaced relation between the compression member and the horizontally disposed tension member, adjacent the center of said members, bolster guides of channel section, the flanges of the bolster guides engaging the web of the vertical tension members, a reinforcing member of channel section positioned between the vertical tension members, the flanges thereof engaging the outer surface of the flanges of the compression member, a second reinforcing member of channel section positioned at the bottom of the horizontally disposed tension member with the flanges of the reinforcing member engaging the outer surfaces of the flanges of the tension member, journal boxes with flat roofs having upstanding flanges thereon for engaging the compression and horizontally disposed tension members and means positioned at points of stress transfer, whereby the load exerted on the frame is carried by the respective members thereby relieving the weld of a considerable portion of the shear.

7. A side frame formed from a plurality of members welded together to form an integral unit comprising a compression member formed of rolled steel into channel section with depending flanges, a horizontally and diagonally disposed tension member of rolled steel formed into channel section having depending flanges, vertical tension members positioned in spaced relation between the compression and horizontally disposed tension members adjacent the center of said members, a reinforcing member of U-shape having flanges extending upwardly about the outer surfaces of the flanges of the compression member, a second reinforcing member of U-shape having flanges extending upwardly about the outer surfaces of the flanges of the hori-

zontally and diagonally disposed tension member and journal boxes having flat roofs, each of the roofs having an upstanding flange of U-shape for engaging the flanges of the compression member.

8. A side frame comprising a compression member having a web and depending flanges, a tab at each end of the compression member formed by the web extending downwardly beyond the bottom of the flanges adjacent the outer ends thereof, a horizontally and diagonally disposed tension member having a web and depending flanges, an end of the tension member engaging a tab of the compression member, and journal boxes having flat roofs, each roof having upstanding flanges thereon, a tab of the compression member positioned between the flanges provided on the roof of each journal box, all of the members being welded together to form an integral unit.

9. A side frame formed from a plurality of members welded together to form an integral unit comprising a compression member of channel section having depending flanges, a horizontally and diagonally disposed tension member of channel section having depending flanges, the flanges of the tension member resting between the flanges of the compression member adjacent the outer ends of said members, vertical tension members positioned in spaced relation adjacent the center of the compression member and the horizontally disposed tension member, journal boxes, having flat roofs provided with an upstanding flange, the flange being positioned between the flanges of the compression and horizontally disposed tension members and shear means extending through the aforementioned flanges, thereby relieving the weld of a considerable portion of the shear.

10. A side frame formed from a plurality of members welded together to form an integral unit comprising a compression member of channel section having depending flanges, a tab at each end of the compression member formed by a portion of the member extending downwardly beyond the flanges of said member, a horizontally and diagonally disposed tension member of channel section, having a tab at each end thereof, the tab extending downwardly with the outer surface thereof engaging a tab of the compression member, and journal boxes having flat roofs, each roof being provided with a pair of upstanding lugs with the tabs at each end of the compression and tension members resting between the aforementioned lugs.

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