Nov. 19, 1940. R. B. COTTRELL 2,222,480

CENTER SILL REINFORCEMENT

Filed May 12, 1939 2 Sheets-Sheet 1

Fig. 1.

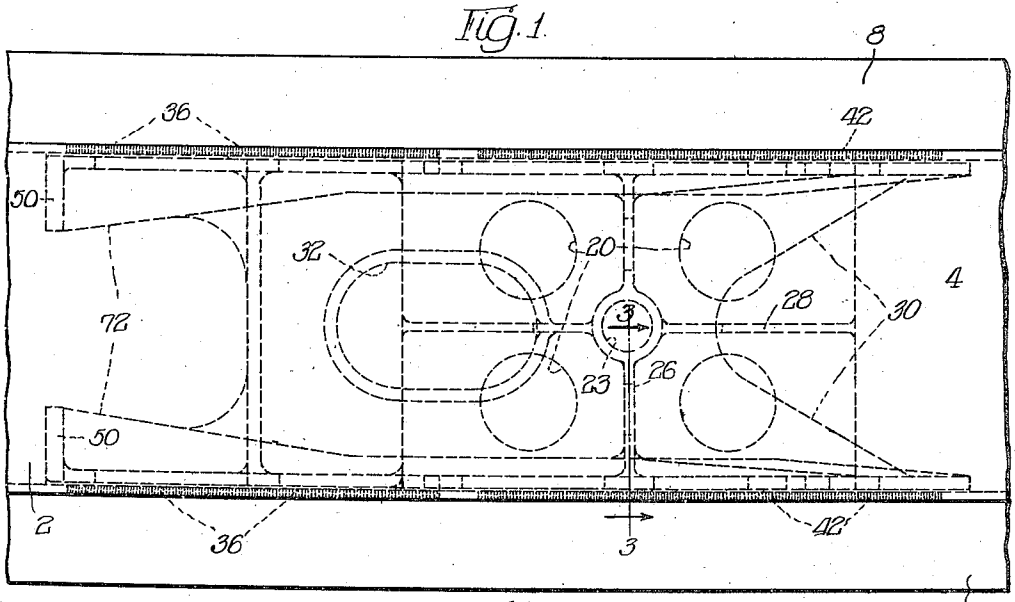


Fig. 2.

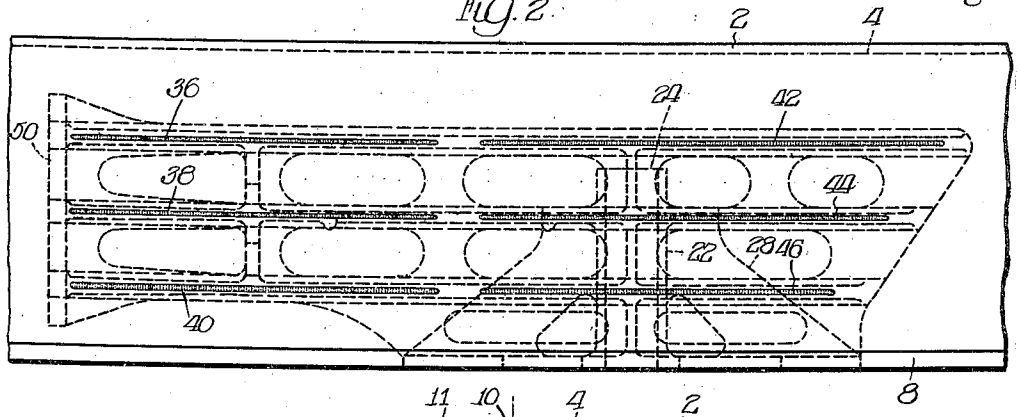
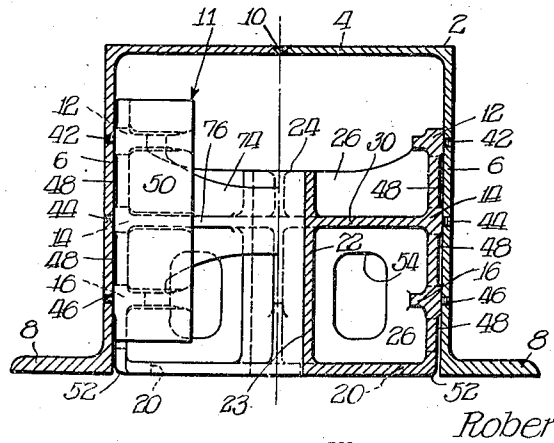


Fig. 3.



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Fig. 4.

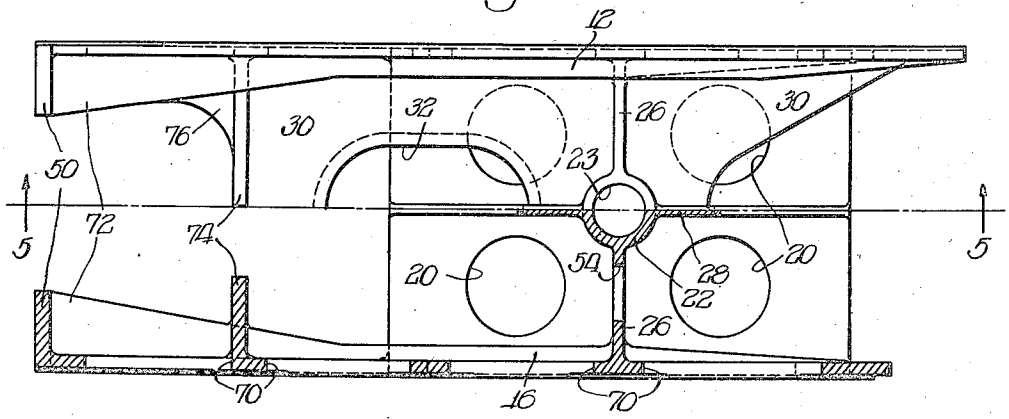


Fig. 5.

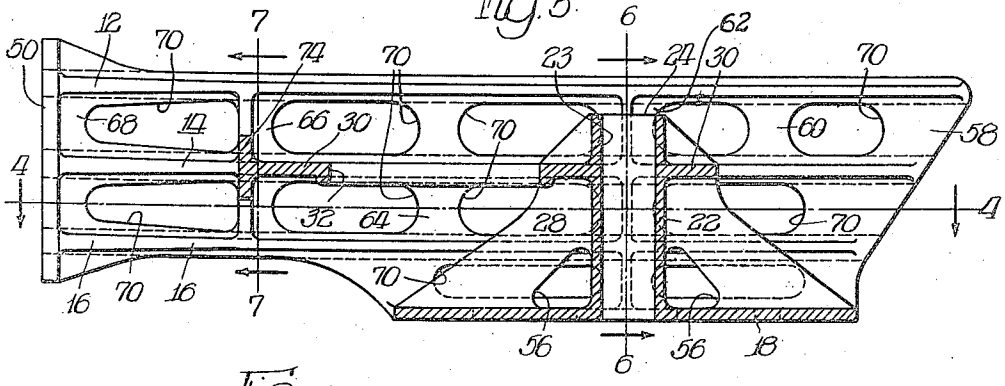


Fig. 6.

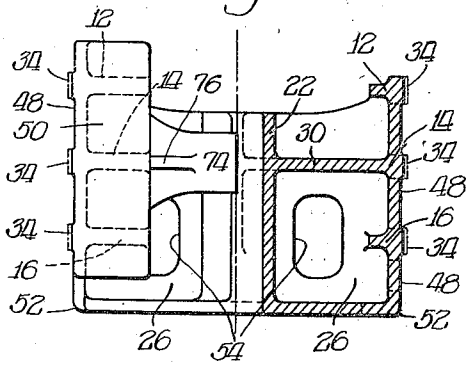
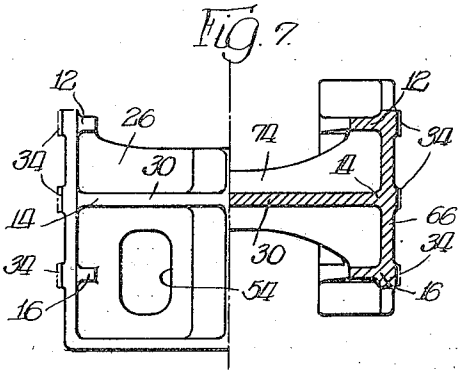


Fig. 7.



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UNITED STATES PATENT OFFICE

2,222,480

CENTER SILL REINFORCEMENT

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Application May 12, 1939, Serial No. 273,163

22 Claims. (Cl. 105—416)

My invention relates to underframe structure for railway cars and more particularly to a form of center sill structure in common use comprising symmetrical rolled members of Z section adapted to be welded along abutting edges to form a substantially integral structure of inverted U section having laterally extending longitudinal flanges along the bottom edges thereof. Such a center sill structure is sometimes referred to as the backbone of the car body and at spaced points longitudinally thereof adjacent each end the structure is commonly reinforced with a center filler casting and adjacent draft lugs, the center filler casting affording a seat and a means of connection to the center bearing of an associated car truck.

In a co-pending application, Serial No. 197,647, filed in the United States Patent Office on March 23, 1938, and issued as Patent No. 2,180,799, Nov. 21, 1939, wherein I am co-inventor, such a center sill is shown as that above described. In the present application I am showing a modified and improved form of center filler and draft lug casting adapted to be associated with a center sill. As welding art has developed it has become practicable to use machine equipment instead of manually operated tools to weld associated structural parts. In designs of center filler and draft lug castings heretofore available, manual welding has been a necessary part of the fabricated plan. In my present application I have designed a novel form of center filler and draft lug casting wherein all of the welding may be done along straight lines after the center filler and draft lug casting has been placed in position between the members of the center sill. It will readily be appreciated that such a structure, if affording the necessary protection to the sills and safely transmitting the heavy thrusts placed upon it, will accomplish a great economy inasmuch as jigs may be arranged to do all of the welding. The structure I have designed is novel in a number of respects and when welded to the sills as provided for gives great strength as well as unusual economy of weight.

An object of my invention is to design a casting of the above described character capable of withstanding the heavy thrust it is normally subjected to in modern railway operation, while at the same time eliminating all manual welding from the fabricating operation.

Another object of my invention is to devise a one-piece center filler casting with rear draft lugs integral therewith, suitable for application to a center sill member by welding, in which the amount of machining required for proper fitting is reduced to a minimum.

Yet another object of my invention is to design a one-piece integral casting comprising a center filler and adjoining draft lugs suitable for fitting between the members of a center sill as above described and adapted to be welded in place solely by machine welding operations.

These and various other objects are accomplished in a manner more clearly set forth in the following description and the appended claims in view of the associated drawings.

Figure 1 is a top plan view of a center sill structure incorporating my invention.

Figure 2 is a side elevation thereof.

Figure 3 is an end view thereof, half in section, the section being taken substantially in the transverse vertical plane indicated by the line 3—3 of Figure 1.

Figure 4 is a top plan view, partly in section, of my novel form of center filler and draft lug casting, the section being taken substantially in the transverse horizontal plane indicated by the line 4—4 of Figure 5.

Figure 5 is a section in the vertical longitudinal plane bisecting the structure shown in Figure 4, the section being taken substantially as indicated by the line 5—5 of Figure 4.

Figure 6 is an end view taken from the left as seen in Figures 4 and 5, partly in section, the section being taken substantially in the transverse vertical plane indicated by the line 6—6 of Figure 5.

Figure 7 is an end view taken from the right as seen in Figures 4 and 5, partly in section, the section being taken substantially in the transverse vertical plane indicated by the line 7—7 of Figure 5.

Figures 1 to 3 show the parts in assembled relationship. It may be noted that the car center sill 2 is of inverted U section having the top web 4, the side webs 6, 6, and the relatively thick base flanges 8, 8. While such a member may be rolled as a single piece, a common method of forming it is by uniting by welding as at 10 two Z-shaped members along their abutting top edges. Within the said sill is fitted my novel form of skeletal center filler and draft lug casting 11, said casting being bisymmetrical in form, having along each side a plurality of substantially parallel longitudinal ribs designated 12, 14 and 16 from top to bottom, each of said ribs extending in a straight line from one end of the casting to the other thereof. In conjunction with the intervening webs the said ribs form

substantially a wall structure at either side of the casting 11. Joining said walls and spaced from the lowermost of said longitudinal ribs 16, 16 is the bottom wall 18 having therein a plurality of lightening openings 20, 20, said bottom wall extending along one end of the casting to form a substantial means of cooperation with the center plate of an associated truck bolster. Extending upwardly from the bottom wall 18 and centrally thereof is the center post 22 with the central opening 23, the top of said post terminating as at 24 short of the top of said casting as best seen in Figures 3 and 5. Extending between the lateral walls of the casting and integrally formed therewith and with the base 18 is a single vertical transverse wall 26 interrupted centrally thereof by the before-mentioned center post 22 and substantially at right angles to the transverse wall 16 is formed the longitudinal wall 28 of generally triangular form having the elongated base reaching from end to end of the bottom wall 18 and tapering therefrom at either end to extend through the horizontal wall 30 and merge with the center post 22 adjacent the top thereof as best seen in the sectional view of Figure 5. The horizontal wall 30 extends between the longitudinal ribs 14, 14 at either side of the structure intermediate the top and bottom thereof and at one side of the center post 22 said intermediate wall 30 is cored out to form the large lightening opening 32. Each of the longitudinal ribs 12, 14 and 16 has formed therealong a raised machinable pad 34, said pad after machining being normally positioned in alignment with a plurality of longitudinal slots cut in the side webs 6, 6 of the sill member 2 as indicated at 36, 38, 40, 42, 44 and 46 (Figure 2). The longitudinal slots 36, 38, 40, 42, 44 and 46 afford openings into which welding material may be applied, thus securing the longitudinal ribs of the casting to the webs 6, 6 of the center sill in such manner that all of said welds are placed in shear with respect to the two members secured together. Moreover, the entire length of each weld is along a straight longitudinal line in a position to afford maximum resistance to the longitudinal thrusts normally received by the ends of the castings which form draft lugs or stops as at 50, 50 (Figure 1). The web portions of the lateral walls extending between the longitudinal ribs thereof are substantially relieved with respect to said pads and are thus spaced from the webs 6, 6 of the sill when placed in position, said spacing being best seen at 48, 48 in Figure 3. The bottom longitudinal edges of the casting 12 are formed with radii as best seen at 52, 52 (Figure 3), thus affording additional welding area along straight longitudinal lines if desired.

It may be noted that the draft stops at the left of the casting as viewed in Figures 1 and 2 are so positioned as to be centrally located along the web 6, 6 at either side of the center sill and are spaced from the top and bottom of the sill. The base wall of the casting 18 extends along only that portion thereof which forms an abutment for the body center bearing or center plate.

The detail of the center filler and draft lug casting is shown in Figures 4, 5, 6 and 7. Portions thereof have already been referred to and particularly the bottom wall 18, the center post 22, the transverse vertical wall 26, the central longitudinal rib or wall 28, the intermediate horizontal wall 30, the longitudinal ribs 12, 14 and 16 at each side thereof, the openings 20, 20 cored out of the bottom wall 18, and the large opening 32 cored out of the intermediate wall 30. The transverse wall 26 has openings 54 cored therein between the bottom wall 18 and intermediate wall 30, and the longitudinal rib or wall 28 has openings 56 cored therein adjacent the bottom of the center post 22. Spaced webs at the ends of the casting and at intermediate points join the spaced longitudinal ribs 12, 14 and 16 and the base of the casting as indicated at 58, 60, 62, 64, 66 and 68 with relatively large elongated openings cored therein as indicated at 70, 70 (Figure 5). The manner in which the webs between the longitudinal ribs are relieved with respect to the ribs is well seen at 48, 48 in the end view of Figure 6. By this arrangement I have made it possible for one machining operation to trim off the pads at each side of the casting with a minimum of work to fit said casting between the webs 6, 6 of the center sill for the welding operation.

The longitudinal ribs are widened laterally of the casting adjacent the draft stop as best seen at 72, 72 (Figure 4) and a reinforcing vertical rib 74 extends between the opposite draft stop portions at the adjacent end of the intermediate wall 30, said rib 74 being widened vertically at its ends to merge with each of the longitudinal ribs and narrowed intermediate its ends to lighten the casting. The rib 74 is spaced somewhat from the stops 50 at the end of the casting and its juncture with the intermediate rib 14 is reinforced by the horizontal gusset 76. 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 railway car, a center sill of inverted U section and a reinforcing center filler and draft lug casting therein comprising a plurality of spaced longitudinal ribs spaced from the bottom wall thereof and aligned with longitudinal openings in the vertical webs of said sill, whereby said ribs may be welded to said sills in parallel longitudinal lines, said casting comprising a center filler portion and a draft stop portion, said center filler portion including a transverse vertical wall and a longitudinal vertical wall substantially at right angles to each other and interrupted intermediate their ends by a center post, and an intermediate horizontal wall extending between parallel ribs at opposite sides of said casting intermediate the ends of said center post, said intermediate wall extending through said center filler portion and into said draft lug portion, and a transverse vertical web at the end of said intermediate wall joining opposite sides of said draft lug portion.

2. In a railway car, a center sill of inverted U section and a reinforcing center filler and draft lug casting therein comprising a plurality of spaced longitudinal ribs spaced from the bottom wall thereof and aligned with longitudinal openings in the vertical webs of said sill, whereby said ribs may be welded to said sills in parallel longitudinal lines, said casting comprising a center filler portion and a draft stop portion, said center filler portion including a transverse vertical wall and a longitudinal vertical wall substantially at right angles to each other and interrupted intermediate their ends by a center post, and an intermediate horizontal wall extending between

parallel ribs at opposite sides of said casting intermediate the ends of said center post.

3. In a railway car underframe, a center sill of inverted U section having a plurality of spaced parallel longitudinal openings in the lateral webs thereof and reinforcing means therein in the form of an integral skeletal casting having at each side thereof a plurality of spaced parallel ribs each in alignment with a plurality of said openings and weldable therethrough along parallel longitudinal straight lines, said casting also comprising spaced parallel horizontal walls, one of which is at the bottom of said casting, and a plurality of vertical walls arranged at right angles to each other and interrupted at their intersection by a center post, one of said vertical walls tapering from the ends of one of said horizontal walls through the other thereof to the top of said center post.

4. In a railway car underframe, a center sill of inverted U section having a plurality of spaced parallel longitudinal openings in the lateral webs thereof and reinforcing means therein in the form of an integral skeletal casting having at each side thereof a plurality of spaced parallel ribs each in alignment with a plurality of said openings and weldable therethrough along parallel longitudinal straight lines, said casting comprising a center filler portion and a draft lug portion, said draft lug portion being arranged along the vertical webs of said sill and spaced from the top and bottom thereof, and said center sill portion comprising a bottom wall aligned with the bottom edges of said sill and a center post centrally arranged with respect to said bottom wall.

5. In a railway car, a center sill of inverted U section and a reinforcing center filler and draft lug casting therein comprising a plurality of spaced longitudinal ribs spaced from the bottom wall thereof and aligned with longitudinal openings in the vertical webs of said sill, whereby said ribs may be welded to said sills in parallel longitudinal lines, said casting comprising a bottom wall, a center post, a transverse wall extending between certain of said ribs and interrupted by said center post, and a central longitudinal wall tapering from adjacent the ends of said base to the top of said center post and spaced from the top of said casting.

6. In a railway car, a center sill of inverted U section and a reinforcing center filler and draft lug casting therein comprising lateral walls, each having a plurality of spaced longitudinal ribs spaced from the bottom wall thereof and aligned with longitudinal openings in the vertical webs of said sill, whereby said ribs may be welded to said sills in parallel longitudinal lines, said casting comprising vertical transverse and longitudinal walls arranged substantially at right angles to each other and interrupted centrally of said casting by a center post, said longitudinal wall tapering from adjacent said base to the top of said center post and terminating short of the top of said casting, said lateral walls being normally spaced from the walls of said sill, whereby said ribs may be machined to afford a close fit with the walls of said sill for welding thereto through said openings.

7. In a railway car, a center sill of inverted U section, a reinforcing center filler and draft lug casting therein in the form of a skeletal casting having along each side a plurality of spaced parallel pads each aligned with a plurality of openings in said sill, whereby said casting may be welded to said sill through said openings, said casting comprising an intermediate horizontal wall and an intermediate vertical wall arranged substantially at right angles to each other and interrupted centrally of said casting by a center post, said vertical wall tapering downwardly from the top of said center post to spaced points on opposite sides thereof adjacent the base of said casting, each side of said casting being afforded a tapering end portion adapted to accommodate successive termination of said pads and so afford a gradually diminishing section-modulus when welded to said sill.

8. In a railway car, a center sill of inverted U section, a reinforcing center filler and draft lug casting therein in the form of a skeletal casting having along each side a plurality of spaced parallel pads each aligned with a plurality of openings in said sill whereby said casting may be welded to said sill through said openings, said casting comprising an intermediate horizontal wall and an intermediate vertical wall arranged substantially at right angles to each other and interrupted centrally of said casting by a center post, said horizontal wall lying in the same plane as certain of said pads at opposite sides of said casting, each side of said casting being afforded a tapering end portion adapted to accommodate successive termination of said pads and so afford a gradually diminishing section-modulus when welded to said sill.

9. In a railway car, a center sill of inverted U section and a reinforcing center filler and draft lug casting therein comprising a plurality of spaced longitudinal ribs spaced from the bottom wall thereof and aligned with longitudinal openings in the vertical webs of said sill, whereby said ribs may be welded to said sills in parallel longitudinal lines, said casting comprising vertical transverse and longitudinal walls interrupted by a center post, said longitudinal wall tapering from adjacent the ends of the base of the casting to the top of said center post, each side of said casting being afforded a tapering end portion adapted to accommodate successive termination of said ribs and so afford a gradually diminishing section-modulus when welded to said sill.

10. In a railway car, a center sill of inverted U section, a reinforcing center filler and draft lug casting therein in the form of a skeletal casting having along each side a plurality of spaced parallel pads each aligned with a plurality of openings in said sill, whereby said casting may be welded to said sill through said openings, said casting comprising an intermediate horizontal wall and an intermediate vertical wall arranged substantially at right angles to each other and interrupted centrally of said casting by a center post, each side of said casting being afforded a tapering end portion adapted to accommodate successive termination of said pads and so afford a gradually diminishing section-modulus when welded to said sill.

11. In a car underframe, a center sill of inverted U section having spaced parallel slots, reinforcing means in said sill in the form of an integral skeletal casting comprising spaced parallel ribs at opposite sides thereof in alignment with said slots and weldable therethrough, said casting also comprising a bottom wall spaced from said ribs and a vertical longitudinal intermediate wall interrupted centrally thereof by a center post, said intermediate wall tapering from the ends of the base of said casting to the top of said center post, each side of said casting

being afforded a tapering end portion adapted to accommodate successive termination of said ribs and so afford a gradually diminishing section-modulus when welded to said sill.

12. In a car underframe, a center sill of inverted U section having spaced parallel slots, reinforcing means in said sill in the form of an integral skeletal casting comprising spaced parallel ribs at opposite sides thereof in alignment with said slots and weldable therethrough, said casting also comprising spaced horizontal walls and a vertical longitudinal wall intermediate the sides thereof, said vertical wall tapering from adjacent the ends of one of said horizontal walls through the other of said horizontal walls to adjacent the top of said casting, one of said horizontal walls extending between corresponding intermediate ribs at opposite sides of said casting.

13. In a railway car, a center sill of inverted U section and a reinforcing center filler and draft lug casting therein comprising a plurality of spaced longitudinal ribs spaced from the bottom wall thereof and aligned with longitudinal openings in the vertical webs of said sill, whereby said ribs may be welded to said sills in parallel longitudinal lines, said casting comprising a bottom wall, a center post, a transverse wall extending between certain of said ribs and interrupted by said center post, and a central longitudinal wall tapering from adjacent the ends of said base to the top of said center post, each of said ribs extending substantially from end to end of said casting for welding through said openings.

14. In a car underframe, a center sill of inverted U section having spaced parallel slots, reinforcing means in said sill in the form of an integral skeletal casting comprising spaced parallel ribs at opposite sides thereof in alignment with said slots and weldable therethrough, said casting also comprising bottom and intermediate horizontal walls, transverse and longitudinal vertical walls, and a center post interrupting all of said walls centrally of said casting, said intermediate horizontal wall extending directly between corresponding intermediate ribs at opposite sides of said casting.

15. In a car underframe, a center sill of inverted U section having spaced parallel slots, reinforcing means in said sill in the form of an integral skeletal casting comprising spaced parallel ribs at opposite sides thereof in alignment with said slots and weldable therethrough, said casting also comprising bottom and intermediate horizontal walls, transverse and longitudinal vertical walls, and a center post interrupting all of said walls centrally of said casting, said longitudinal vertical wall tapering from the ends of said bottom wall to the top of said center post, each of said ribs extending substantially from end to end of said casting for straight line welding through said slots.

16. In a railway car underframe, a center sill of inverted U section having a plurality of spaced parallel longitudinal openings in the lateral webs thereof and reinforcing means therein in the form of an integral skeletal casting having at each side thereof a plurality of spaced parallel ribs in alignment with said openings and weldable therethrough, whereby said casting may be welded in said sill along parallel straight lines, each of said ribs extending substantially from end to end of said casting, and an intermediate horizontal wall extending transversely with said casting and directly between corresponding ribs at opposite sides thereof.

17. In a railway car underframe, a center sill of inverted U section having a plurality of spaced parallel longitudinal openings in the lateral webs thereof and reinforcing means therein in the form of an integral skeletal casting having at each side thereof a plurality of spaced parallel ribs each in alignment with certain of said openings and weldable therethrough, the lateral walls of said casting being normally spaced from the walls of said sill, whereby said welded ribs may afford the sole means of connecting said casting to said sill.

18. In a car underframe, a center sill of inverted U section having spaced parallel slots, reinforcing means in said sill in the form of an integral skeletal casting comprising spaced parallel ribs at opposite sides thereof in alignment with said slots and weldable therethrough, said casting also comprising a bottom wall and a transverse wall, said transverse wall extending through said casting directly between intermediate ribs at opposite sides thereof, the side walls of said casting being spaced from the webs of said sill, and said welded ribs affording the sole means of connection between said casting and said sill.

19. In a railway car, a center sill of inverted U section and a reinforcing center filler and draft lug casting therein comprising a plurality of spaced longitudinal ribs spaced from the bottom wall thereof and aligned with longitudinal openings in the vertical webs of said sill, whereby said ribs may be welded to said sills in parallel longitudinal lines, the lateral walls of said casting being normally spaced from the walls of said sill, whereby said welded ribs may afford the sole means of connecting said casting to said sill.

20. In a railway car underframe, a center sill of inverted U section and reinforcing means therein in the form of an integral skeletal casting comprising a center post, spaced longitudinal ribs at opposite sides thereof in alignment with openings in said sills and weldable therethrough, and a transverse wall extending between certain of said ribs, the side walls of said casting being spaced from the webs of said sill, whereby said welded ribs form the sole means of connection between said sill and said casting.

21. In an underframe, a center sill having spaced side webs with parallel longitudinal slots, and an integral draft lug and center filler casting secured therebetween, said casting having side walls spaced from said webs and parallel longitudinal ribs therealong in alignment with said slots for welding therethrough, said welding along parallel longitudinal lines affording the sole means of connection between said sill and said casting.

22. In an underframe, a sill having spaced side webs with longitudinal slots, and a reinforcing integral skeletal casting therebetween, said casting having side walls spaced from said webs, and parallel longitudinal raised ribs along said side walls in alignment with said slots for welding therethrough, said casting having a tapering end portion adapted to accommodate successive termination of said ribs and affording a gradually diminishing section-modulus as welded to said sill.

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