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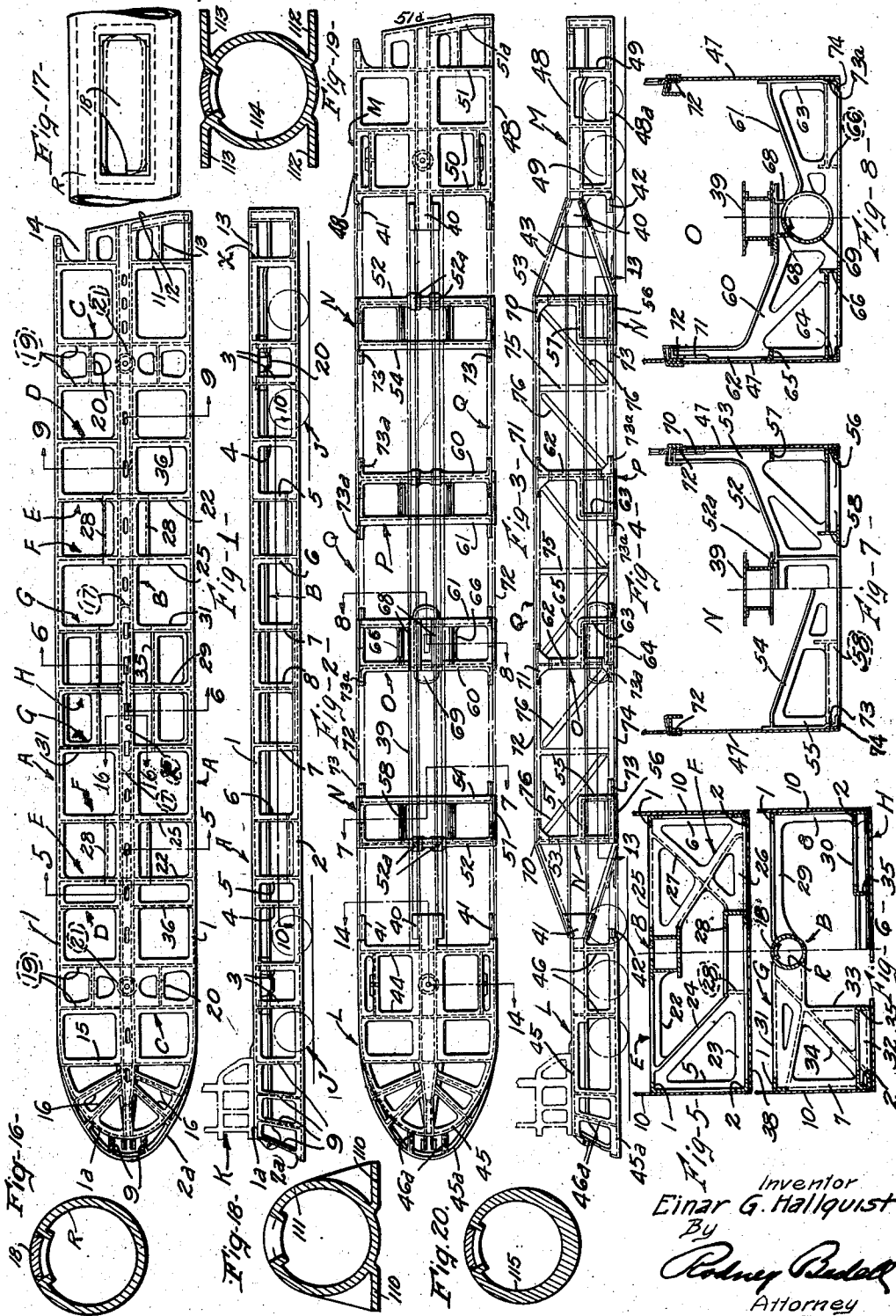
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RAILWAY VEHICLE STRUCTURE

Filed July 12, 1934

2 Sheets-Sheet 1



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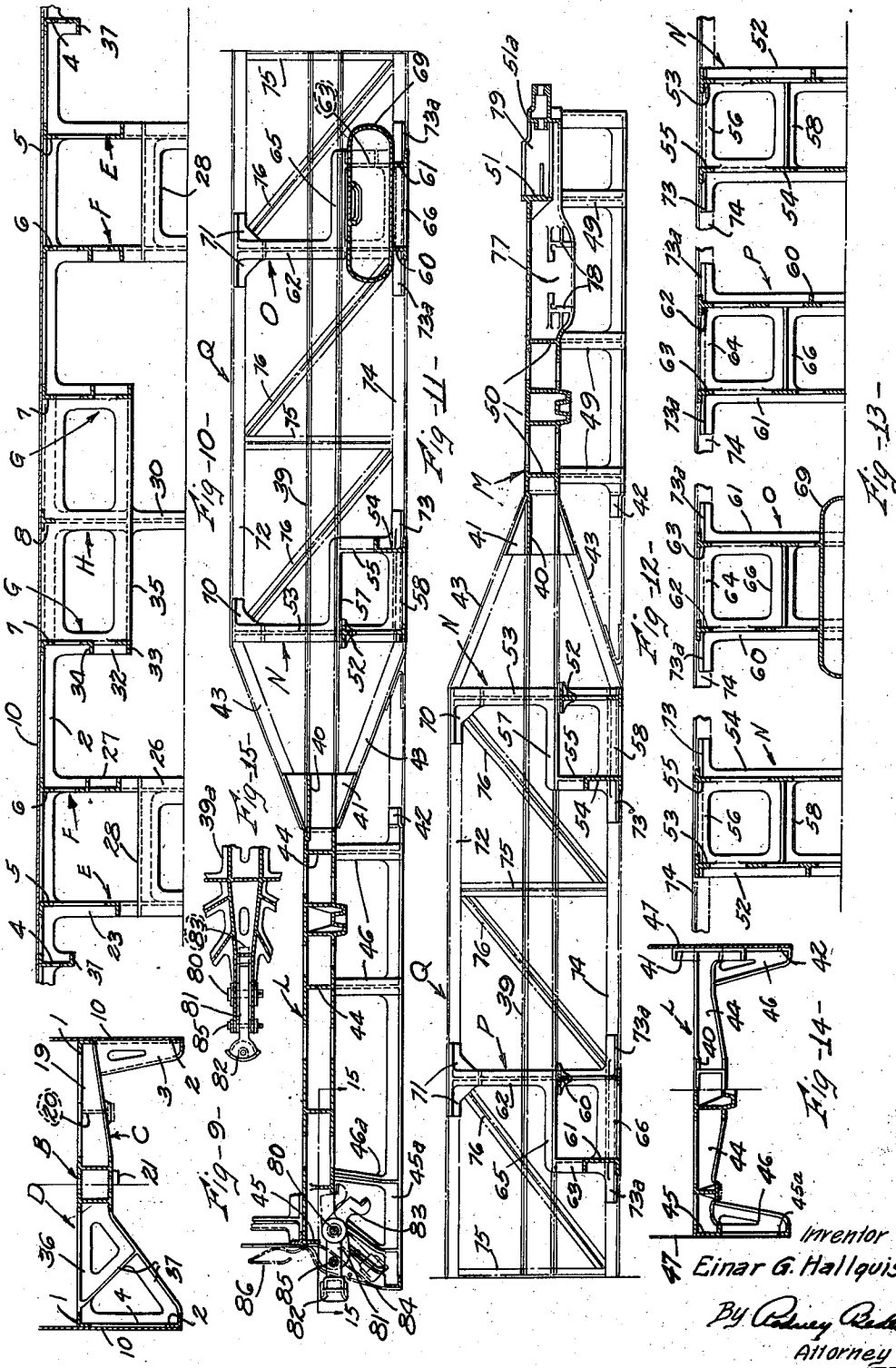
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RAILWAY VEHICLE STRUCTURE

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10 Claims. (Cl. 105-414)

This invention relates to railway rolling stock and consists in novel framing construction for streamlined vehicles and particularly the underportions thereof.

5 The main object of the present invention is to facilitate streamlining the railway vehicles and particularly underportions thereof.

Another object is to provide a closed pocket in the end structure into which a swinging coupler may be moved when inoperative to avoid interfering with the end streamlining.

Another object is to provide adequate supporting framing for the vehicle floor, for oil-electric engine structure, and for the lower portions of the side and end walls which extend to a level in close proximity to the rails for enclosing the vehicle under-equipment, without undue increase in weight of the framing.

Another object is to form a fluid reservoir as an integral part of the center sill structure.

Another object is to combine underframe cross bearer cast units with structural bracing members also forming the center sill and side members of the underframe, the cross bearers being arranged for mounting vehicle under-equipment such as batteries, air conditioning units, etc., and the side members being of trussed construction and together with the cross bearers supporting closure structure for the underportions of the vehicle, which structure extends to a level in close proximity to the rails.

Another object is to form a fluid reservoir as an integral part of a cross bearer unit as described above.

35 These and other more detailed objects are attained by the structures illustrated in the accompanying drawings in which—

Figure 1 is a top view of a railway vehicle underframe structure illustrating one form of the invention.

Figure 2 is a side view of the same.

Figure 3 is a top view of a railway vehicle underframe structure illustrating another form of the invention, portions being shown in broken lines to clarify the disclosure.

Figure 4 is a side view of the same.

Figures 5, 6, and 9 are vertical transverse sections taken on the corresponding section lines of Figure 1.

Figures 7, 8, and 14 are similar sections taken on corresponding section lines of Figure 3.

Figure 10 is a partial horizontal section through the underframe and taken on the line 10-10 of Figure 2.

Figures 11 and 12 are enlarged vertical longitudinal sections taken on the center line of the structure in Figure 3 and showing the front and rear halves thereof, respectively.

Figure 13 is a partial horizontal section through the underframe and taken on the line 13-13 of Figure 4.

Figure 15 is a similar section taken on the line 15-15 of Figure 11.

Figure 16 is a detail vertical transverse section taken on the line 16-16 of Figure 1.

Figure 17 is a top view of the detail.

Figures 18, 19, and 20 are detail sections corresponding to Figure 16 but showing various modifications thereof.

Figures 1, 2, 5, 6, 9, and 10 illustrate a railway vehicle underframe including side structures A and center sill B extending continuously from end to end of the underframe, bolsters C, and intermediate cross bearers or transoms D, E, F, G and H. The underframe is supported upon trucks indicated at J and is arranged for mounting body superstructure of any desired form, a portion of which is indicated at K in Figure 2.

The side structures A are formed of vertically spaced top and bottom members 1 and 2 connected by vertical posts 3, 4, 5, 6, 7, and 8. The upper side members 1 extend horizontally approximately at the level of the car flooring and may conveniently mount the same. The bottom side members 2 extend at a level in close proximity to the rails and mount the lower edges of the vehicle side walls 10 which depend substantially beneath the level of the floor. The underframe illustrated is intended for the leading car or locomotive of a train and the side members 1 and 2 converge at the front end in smoothly curved streamlined portions 1a and 2a which are connected and braced by the ties 9. Element 1a cooperates with diagonal 16, the adjacent portion of center sill B and an end sill 15 to form a front platform.

At the rear end of the underframe the side structures and the center sill are connected by a platform including the end sill 11 and a buffer beam 12 which extends diagonally of the center sill. One of the underframe top side members 1 is cut away at X to accommodate steps (not shown) which may be conveniently supported upon the underlying portion of the bottom side member 2 and upon the longitudinal tie 13. A pocket 14 opposite the step recess provides for telescopically receiving a movable body end member (not shown), such as is illustrated in co-pend-

ing application Serial No. 703,306, filed December 23, 1933 by Harry M. Pflager.

The center sill B extends from end to end of the car, the upper portion thereof being at the level of the upper side members 1. The center sill is of box-section construction, as shown in Figure 5, except for an intermediate portion R of cylindrical construction with dished end walls 17 which forms a fluid reservoir, the casting openings in this portion being closed by plates 18 welded in place. The cylindrical construction of the reservoir part of the center sill is for the purpose of better resisting internal fluid pressures, while the box-section construction of the remainder thereof facilitates manufacture and is better adapted to withstand the vertical and horizontal loads applied to the center sill. Both sections are adequate to transmit the buffing and draft forces.

Extending between and rigidly bracing the side members and center sill are the bolsters C and the cross bearers D, E, F, G, and H, some of which directly connect and merge with the side members and center sill and others of which connect the lower portions of the side members and extend beneath and clear the center sill. The bolsters include longitudinally spaced vertical webs 19, side bearing ribs 20, and center plates 21.

As shown in Figure 5, the cross bearer E includes side posts 5, a top horizontal bar 22, merging with the upper portion of the center sill and with side members 1, and a bottom bar 23 extending directly between the lower side members 2 and clearing the center sill, bar 23 being braced by diagonals 24.

The cross bearer F includes vertical posts 6, a horizontal top bar 25, connecting the top side members 1 and the center sill, a bottom bar 26, and diagonal braces 27. The bottom bars 23 and 26 are deepened at the center and are connected by longitudinal ties 28 forming therewith a tray for mounting vehicle under-equipment such as batteries, air conditioning units, brake cylinders, etc.

As shown in Figure 6, the cross bearer H includes vertical posts 8, a top bar 29, directly connecting the top side members 1 and the cylindrical portion R of the center sill, and a bottom bar 30, extending directly between the lower side members 2 and clearing the center sill.

The cross bearers G include vertical posts 7, the heavy top bar 31, a bottom bar 32, extending only partially across the underframe from each bottom side member 2, and braces 33 and 34.

Longitudinal ties 35 connecting the adjacent bottom bars 30 and 32 of cross bearers H and G on one side of the center sill cooperate with portions of bottom side members 2 to form supports for under-equipment.

Each of the cross bearers D, Figure 9, includes vertical posts 4, a top bar 36, extending between the top side members 1, and the center sill braces 37.

The right hand portion of Figure 9 shows half of one of the bolster vertical webs 19 aligned with one of the vertical ties 3 which support the portion of the side wall 10 extending beneath the level of the center sill. Each of the cross bearer vertical posts 4, 5, 6, 7, and 8 similarly supports the depending portion of the side wall. The cross bearer bottom bars 23, 26, 30 and 32 support bottom closure sheeting 38. The cross bearer top bars 22, 25, 29, 31 and 36 and the tops of bolsters 19 are all flush with the top of the center sill and the top side members 1 for supporting the ve-

hicle flooring (not shown). Sufficient space is provided between the flooring and the bottom closure sheeting 38 for accommodating all vehicle under-equipment. Perforations are provided in the bottom sheeting for the truck wheels.

The underframing is arranged for mounting engine and generator units or other propelling mechanism and these may be carried on top of the under frame or supported beneath the level of the center sill.

Figures 3, 4, 7, 8 and 11 to 14 illustrate a modified form of underframe construction including front and rear platform castings L and M and cross bearer castings N, O, and P tied together by structural members forming the built up center sill 39 and trussed side members generally indicated at Q. The front and rear platforms are similar to those previously described except that these parts are separate units and have pads 40, 41 and 42 for attachment to the center sill 39 and the converging diagonals 43 at the ends of the trussed side members.

The front platform unit L includes bolster structure 44 and forwardly converging side members 45 and 45a connected by posts 46 and 46a. Member 45a extends at a level in close proximity to the rails for bracing the lower portions of the depending side and end walls 47 and 48.

The rear platform unit includes vertically spaced horizontal side members 48 and 48a, connected by vertical posts 49, the bolster structure 50, end sill 51, and diagonal buffer beam 51a.

Each unit N includes a deep transverse member 52, a shallow transverse part 54, and vertical posts 53. Members 52 have pads 52a for rigid attachment to the under surface of the center sill 39. Transverse member 54 is spaced longitudinally from member 52 and extends beneath and clears the center sill and has short vertical posts 55 at the ends. Posts 53 and 55 are connected by ties 56 and 57. Intermediate ties 58 connect the lower portions of members 52 and 54 and form therewith trays for supporting vehicle under-equipment (Figures 7 and 13). The units N at each end of the truss are identical but are in reversed positions.

The unit O (Figure 8) includes transverse members 60 and 61 and vertical posts 62 and 63 connected by horizontal ties 64 and 65. Member 60 is directly tied to the under surface of the center sill. Members 60 and 61 are also connected at the bottom by intermediate ties 66 for supporting vehicle under-equipment. Formed integral with unit O and extending through members 60 and 61 immediately beneath the center sill and tied thereto by the longitudinal rib 68 is a hollow cylinder 69 which serves as a fluid reservoir.

Unit P is similar to unit O but is in the reverse position and the integral fluid reservoir is omitted.

The longer posts 53 and 62 at the ends of the cross bearer units are provided at their tops with gussets 70 and 71 for attachment to the structural angle top cord members 72 of the side trusses, the horizontal flanges of these members resting on top of the posts. At the lower ends of posts 55, 53, 62 and 63 are the projections 73 and 73a for attachment to the truss bottom cords 74. The top and bottom cords on each side are further connected by structural vertical and diagonal members 75 and 76 to complete the trusses. The gussets 70 and 71 and projections 73 and 73a are slightly offset inwardly whereby the outer surfaces of cast end members 45, 45a, 48 and 48a,

the outer faces of the end members of intermediate cross bearer units, and the outer faces of the structural truss members are in flush relation for mounting the car side walls 47.

5 Each end of the center sill is provided with means for coupling to an adjacent vehicle in a train. At the rear end of the sill (Figure 12) is a buffer pocket 79 and draft pocket 77 with the usual draft lugs 78.

10 At the forward end of the center sill (Figures 11 and 15) a pin 80 is seated in suitable bearings in the converging side walls of the sill and mounts a swinging coupler device including shank 81, coupler head 82, and a counterbalance 83 rigid
15 with the shank. In the position illustrated in solid lines in Figure 11, the coupler extends through an opening in the lower portion of the front streamlined sheeting 84 and is secured in said position by a pin 85 detachably seated in the
20 center sill side walls forwardly of the pin 80. Removal of the pin 85 will permit the coupler shank and head to swing downwardly to the broken line position shown in Figure 11 inside the front sheet 84, counterbalance 83 engaging
25 the undersurface of the center sill in this position to limit the downward swinging of the coupler shank and head. When the coupler is in the lowered or inoperative position, the door 86 may be lowered over the coupler opening in the
30 front sheet 84 to complete the streamlined surface thereof. Counterbalance 83 facilitates raising the coupler shank and head from the inoperative to the operative position as well as limiting the downward swinging of the coupler.

35 In Figures 18, 19, and 20 are shown various means for reinforcing the hollow cylindrical fluid reservoir, formed as an integral portion of the center sill illustrated in Figures 1 and 6, to better adapt this portion to withstand the longitudinal
40 and vertical forces applied to the center sill. In Figure 18 the flanges 110 project laterally from the lower portion of the cylinder 111 to resist tensional forces applied to the cylinder. In Figure 19, ribs 112 and 113 project laterally from
45 the upper and lower portions of the cylinder 114 to resist both tensional and compressional forces applied to the cylinder. In Figure 20, the metal of the cylinder 115 is gradually thickened in section towards the bottom thereof.

50 In each of the forms described, the underframe structure is adapted to be conveniently and economically formed either by casting as an integral structure or by casting portions thereof which are assembled with structural shapes. The structures
55 are adapted to adequately support streamlined sheeting enclosing the lower portions of the vehicle and means is provided for stably mounting the usual vehicle under-equipment in connection with the rigid cast portions of the structures. Obviously the invention is not limited to the details described and illustrated but may be modified in various respects as will occur to those skilled in the art to which the invention pertains and the exclusive use of all such modifications
60 which come within the scope of the appended claims is contemplated.

I claim:

70 1. A railway vehicle underframe including a center sill, side parts, and cross tie units bracing said parts and with elements for attachment to

said center sill, said side parts and cross tie units depending substantially beneath the level of said sill for mounting closure structure for the vehicle under-equipment and the depending
5 portion of one of said cross tie units being located at one end of the underframe and being of streamlined contour for mounting end closure structure for the vehicle under-equipment.

2. A railway vehicle framing integral cast unit including a bolster member, end structure
10 extending to a level in close proximity to the rails for supporting streamlined closure structure for vehicle under-equipment, and elements for attaching the unit to adjacent underframe members.

3. Framing as specified in claim 2 in which said end structure includes members spaced apart vertically and each extending around the end of the unit, there being tie members connecting and
15 bracing said members.

4. Framing as specified in claim 2 including platform members between said bolster and said end structure.

5. A railway vehicle framing integral cast cross tie unit including parts for attachment to vehicle side and center members, structure extending substantially beneath the level of said center member attaching part for supporting closure structure for vehicle under-equipment, and a fluid reservoir formed rigid with the lower part
25 of said unit and spaced from said attaching part.

6. A railway vehicle framing integral cast cross tie unit including parts for attachment to vehicle side and center members, web structure extending substantially beneath the level of said center member attaching part for supporting closure structure for vehicle under-equipment, and a fluid reservoir intersecting said structure and tied thereby to said center sill attaching parts.

7. In a streamlined railway vehicle, a center
40 sill, a plurality of cross tie units each secured to said sill, side structures each including structural members connecting said cross tie units and forming trusses therewith extending to a level in close proximity to the rails, side walls carried
45 by said trusses, and a bottom plate carried by said cross tie units, said walls and said plate forming streamlined closure structure for the vehicle under-equipment.

8. Structure as specified in claim 7 in which
50 all of said cross tie units include parts extending substantially below the level of said center sill and supporting said bottom plate.

9. In a railway vehicle underframe, cross ties having posts at their ends extending vertically
55 substantially beyond the vehicle floor level, and members connecting said posts on each side to form therewith trusses for supporting the vehicle walls.

10. A railway vehicle underframe cross tie unit
60 comprising a part for supporting flooring, there being horizontally spaced portions beneath said part forming a tray for supporting vehicle operating equipment, both of said spaced portions being arranged at their ends for attachment to vehicle side members and one of said portions being
65 arranged for attachment to the vehicle center sill.

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