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RAILWAY DRAFT SILL AND BODY BOLSTER STRUCTURE

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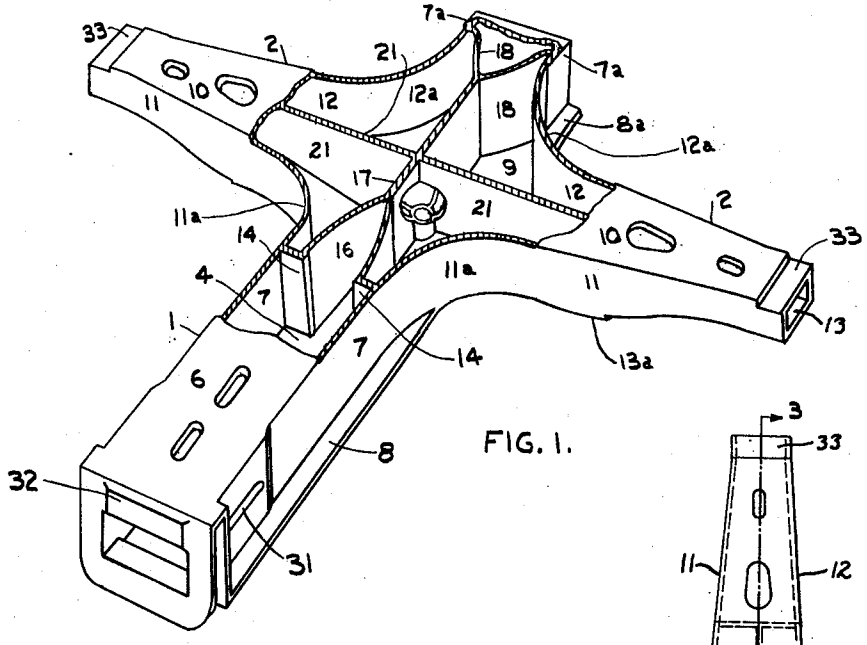


FIG. 1.

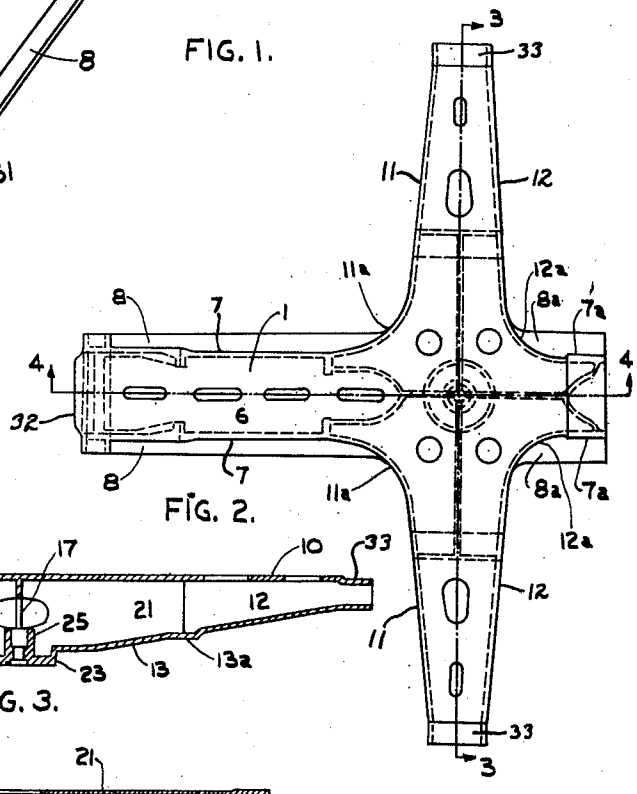


FIG. 2.

FIG. 3.

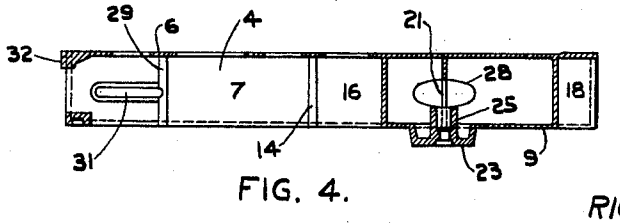


FIG. 4.

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RAILWAY DRAFT SILL AND BODY BOLSTER STRUCTURE

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5 Claims. (Cl. 105—420)

This invention relates to railway rolling stock and consists particularly in a novel integral draft sill and body bolster construction.

In conventional freight car construction, the center sill extends throughout the length of the car, and the bolsters each consist of a pair of box section arms, the side walls of which terminate at opposite sides of the center sill, the top and bottom cover plates passing over and under the center sill to extend the full length of the bolster. The ends of the center sill form a housing for the draft gear and usually include a striking casting, and forward and rear draft lugs for transmitting buffing and draft forces from the draft gear into the center sill. The rear draft lugs are frequently a separate casting or are part of the bolster center filler casting, and are secured by riveting or welding to the inside of the center sill webs; in some cases they are of built-up construction, and consist of a narrow transversely extending vertical plate and a plurality of horizontal rearwardly extending triangular ribs all secured to the interior of the sill side wall by welding. In this type of construction, considerable damage is done to freight cars largely because of the very high velocity impacts incurred during humping operations. Under such high velocity impacts, the draft gears go solid and the buffing shocks are imparted directly to the rear draft lugs frequently causing them to tear away from the sill. When received by the sill, a large percentage of the force is transmitted into the body framing through the bolster on the struck end of the car, with the other bolster and cross members absorbing the remainder. The resultant high horizontal bending moments cause high stress concentrations at connections between the center sill and struck-end bolster, with the result that failures usually occur in the bolster-center sill connections on the tension side of the bolster, that is, on the side of the bolster facing the center of the car. Failure in the bolster-center sill connection is also due in part to the fact that higher velocity impacts cause the springs under the struck-end of the car to go solid. This produces a vertical impact on the center plate with resultant tension in the top cover plate of the bolster.

The principal object of the invention is to provide a draft sill and bolster construction capable of withstanding the high velocity impacts normally occurring in modern railroad operation, particularly during humping operations.

Another object is to reduce stress concentrations in the connections between bolster and center sill.

A further object is to reinforce the rear draft lugs and improve their connection to the draft sill structure sufficiently to prevent their being loosened or torn away as a result of high velocity impacts.

I achieve these and other objects by providing an integral draft sill and bolster construction in which the center sill and bolster side walls are arcuately merged to eliminate the conventional angular bolster-center sill connections and in which conventional horizontal bracing ribs on the rear draft lugs are replaced by a reinforcing

structure comprising a pair of vertical webs connected at their forward ends with the inner edges of the draft lugs and merged at their rear ends in a single longitudinal web which diverges rearwardly of the center plate into a pair of webs which in turn merge with the side walls of the center sill. Additional rigidity is imparted to the bolster by a single transverse central web which intersects the longitudinal center web above the center plate.

The above-mentioned objects and others are attained substantially by the structure illustrated in the accompanying drawings in which—

Figure 1 is a perspective view of an integral draft sill and bolster construction embodying the present invention.

Figure 2 is a top view of the structure shown in Figure 1.

Figure 3 is a transverse section taken along the line 3—3 of Figure 2.

Figure 4 is a longitudinal section taken along the line 4—4 of Figure 2.

The structure illustrated is formed entirely as an integral casting including draft sill 1, and bolster arms 2. The entire structure is of box section, the draft gear receiving portion 4 of the draft sill being open at the bottom. The draft sill has a top wall 6 suitably apertured to lighten the structure and facilitate casting operations, side walls 7 and 7a with outwardly projecting flanges 8 and 8a at their lower edges, and a bottom wall 9.

Bolster arms 2 each have a top wall 10, also suitably apertured to lighten the structure and facilitate casting operations, side walls 11 and 12 and bottom wall 13. Bolster top and bottom walls 10 and 13 merge with draft sill top and bottom walls 6 and 9, respectively, to form a unitary cover plate for the entire structure. Side walls 11 and 12 merge through relatively large radius arcuate wall portions 11a and 12a, respectively, with side walls 7 and 7a of the draft sill so as to eliminate the angular wall intersections in which high stress concentrations occur in conventional structures. Side bearings 13a are formed integral with bolster bottom walls 13. Flanges 8 and 8a merge, respectively, with arcuate wall portions 11a and 12a.

A pair of rear draft lugs 14 extend inwardly from the side walls 7 of the draft sill. Each draft lug 14 is reinforced by a rearwardly extending curved vertical web 16. Webs 16 converge and merge in a single central longitudinal web 17 rearwardly of the draft lugs and forwardly of the transverse center line 3—3. Central web 17 extends rearwardly past the transverse center line and diverges into a pair of webs 18, which in turn merge with the rear side walls 7a of the draft sill. The rear draft lugs and webs 16, 17, and 18 are connected throughout their lengths to the top and bottom walls of the draft sill. Rear draft lugs and webs 16 form the forward boundary of the draft sill bottom wall, the bottom of the draft sill forwardly of these elements being open to receive the draft gear; bottom wall 9 is bounded at its rear end by webs 18. Webs 16, 17 and 18 provide longitudinal web continuity whereby impacts received by the rear draft lugs 14 are transmitted into the center sill rearwardly of the bolster.

The rear portion of the center sill wall structure is thickened and is of the proper cross section to receive the end of a fabricated center sill of conventional construction (not shown) which would preferably be secured by welding. A transverse vertical web 21 is centrally disposed between the bolster side walls and extends from side bearing to side bearing in order to provide additional vertical rigidity transversely of the structure.

At the intersection of the bolster and draft sill center lines the usual body center plate 23 is formed in draft sill bottom wall 9. Center plate 23 is provided with the usual thimble 25, and elliptic openings 27 and 28

are formed adjacent the upper end of the thimble in the intersecting longitudinal and transverse webs **17** and **21**, respectively, to permit application of the center pin.

The center sill is formed with the conventional forward draft lugs **29**, draft key slots **31**, and striking plate **32**. The outer ends of the bolster arms may be recessed as at **33** to receive side sill reinforcement channels (not shown).

It is evident from the foregoing that when the draft gear receives such severe impacts that it goes solid, the shocks imparted to the rear draft lugs will be transmitted into the center sill through the convergent and divergent reinforcing web structure and the rear draft lugs will not be torn off their moorings to the center sill side walls as frequently occurs in conventional constructions. The tendency of the bolster-draft sill connections to fail is greatly reduced by removing the center sill side walls at the bolster intersection and arcuately merging the bolster and draft sill side walls, so as to eliminate the conventional angular connections and the resultant high stress concentrations and by providing additional vertical rigidity transversely of the structure by means of the continuous transverse web. The discontinuity of the draft sill side walls is compensated for by the continuous central web connection between the rear draft lugs and the draft sill side walls rearwardly of the bolster.

Various changes in the details of the structure described may be made without departing from the spirit of the invention, and the exclusive use of such modifications as come within the scope of the appended claims is contemplated.

I claim:

1. A railway combined draft sill and body bolster structure comprising a draft sill having spaced side walls and top and bottom walls, a pair of aligned bolster arms each having spaced side walls extending laterally outwardly from said sill side walls and arcuately merging with adjacent portions thereof, said sill side walls being interrupted between said bolster arm side walls, said bolster arms each having top and bottom walls merging respectively with said sill top and bottom walls, a bearing on said sill bottom wall and disposed longitudinally of said sill, between said bolster arm side walls, draft lugs on the inner surfaces of said sill side walls on one side of the interruptions therein, vertical webs extending toward said bearing from said lugs adjacent the inner margins thereof and converging with each other on the same side of said bearing as said lugs to form a single vertical web extending longitudinally of said sill across said bearing and diverging on the opposite side of said bearing from said lugs to form vertical web structure merging with both said sill side walls on the opposite sides of the interruptions from said lugs, a vertical web extending transversely of said sill intermediate the bolster arm side walls and across said bearing and there intersecting said longitudinally extending web, said transversely extending web terminating laterally outwardly of the arcuate merging portions of said bolster arm side walls, said lugs, vertical webs and web structure merging substantially throughout their upper and lower extremities, respectively, with said top and bottom walls.

2. A railway combined draft sill and body bolster structure according to claim 1 in which said longitudinally- and transversely-extending webs are located respectively on the longitudinal center lines of said sill and said bolster arms, and the center of said bearing is located at the intersection of said center lines.

3. A railway combined draft sill and body bolster structure according to claim 1 in which said bearing is a pivot center plate and in which the bottom walls of said bolster arms are formed intermediate their ends with additional downwardly facing horizontal bearing surfaces, said transversely-extending vertical web terminating above said surfaces.

4. A railway combined draft sill and body bolster structure according to claim 1 in which said bottom walls are substantially continuous throughout the area bounded by said sill and bolster side walls and their arcuate merging portions, said lugs, said converging vertical webs, and said diverging vertical web structure, and said sill bottom wall inwardly of said sill side walls terminates at said lugs and said converging vertical webs and extends laterally outwardly from said sill side walls at both sides of the bolster arms to form horizontal flanges on said sill side walls substantially throughout their lengths.

5. A railway combined draft sill and body bolster structure according to claim 4 in which said sill side walls and top wall extend from said draft lugs away from said bolster arms, there being an upright transverse striking plate merging with the extremities of said extended sill side and top walls, and additional draft lugs formed on the inner surfaces of the extended portions of said sill side walls intermediate said first-named lugs and said striking plate.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 2,902,947 September 8, 1959

Richard L. Lich

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 3, line 42, after the word "disposed" insert a comma.

Signed and sealed this 23rd day of February 1960.

(SEAL)
Attest:

KARL H. AXLINE
Attesting Officer

ROBERT C. WATSON
Commissioner of Patents