Aug. 16, 1966 F. C. PULCRANO 3,266,441

RAILWAY CAR UNDERFRAME AND METHOD OF MANUFACTURE

Filed Sept. 21, 1964 3 Sheets-Sheet 1

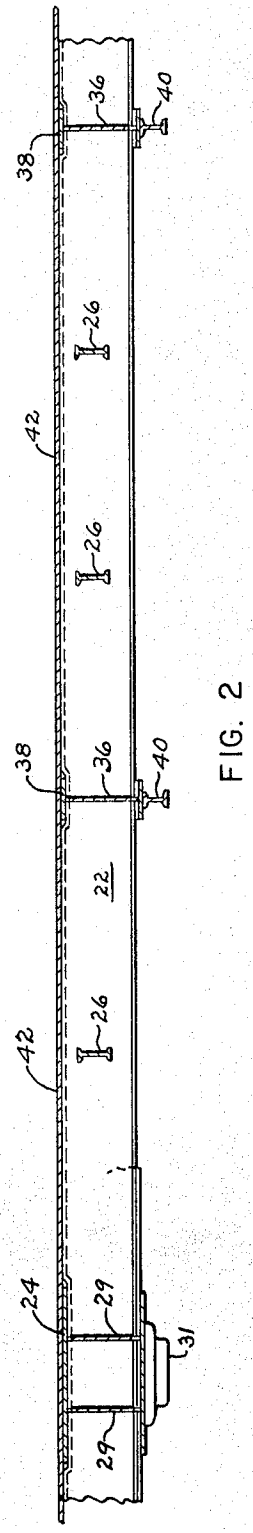


FIG. 2

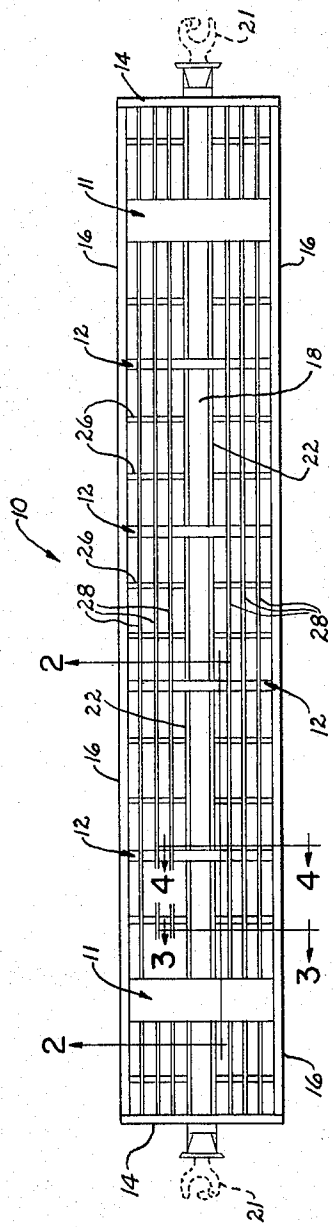


FIG. 1

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RAILWAY CAR UNDERFRAME AND METHOD OF MANUFACTURE

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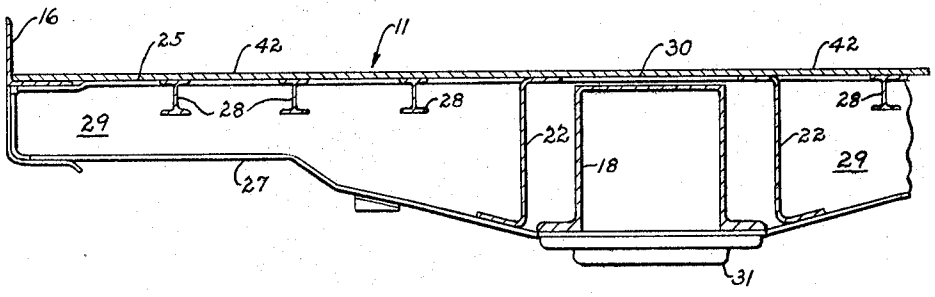


FIG. 3

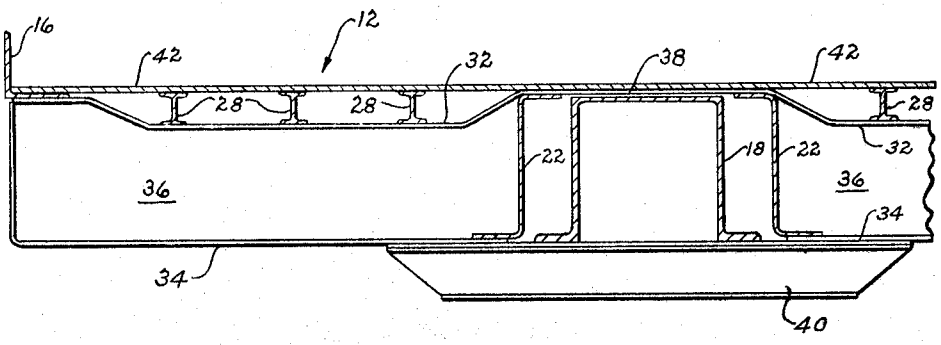


FIG. 4

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RAILWAY CAR UNDERFRAME AND METHOD OF MANUFACTURE

Filed Sept. 21 1964 3 Sheets-Sheet 3

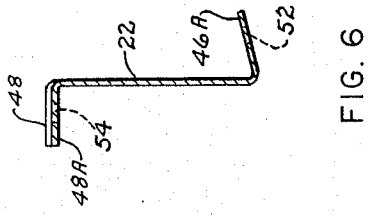


FIG. 6

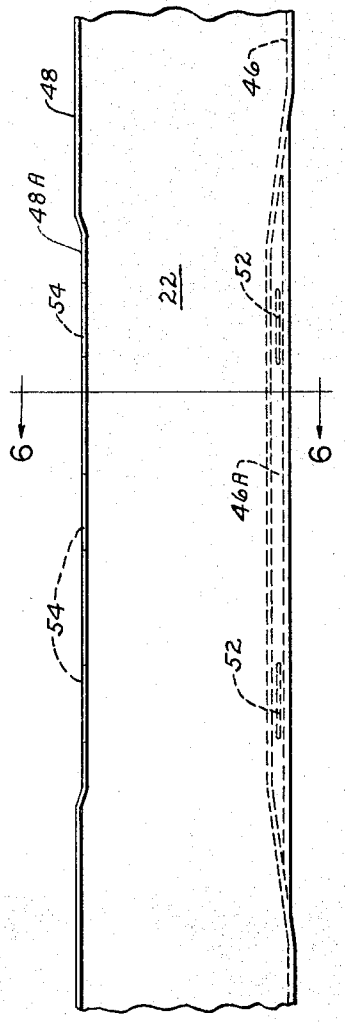


FIG. 5

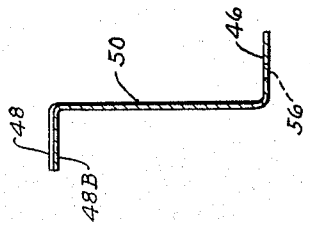


FIG. 8

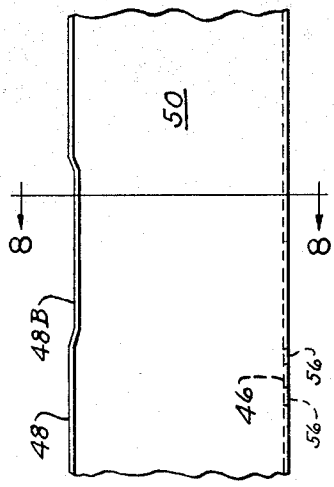


FIG. 7

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United States Patent Office 3,266,441 Patented August 16, 1966

3,266,441

RAILWAY CAR UNDERFRAME AND METHOD OF MANUFACTURE

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Filed Sept. 21, 1964, Ser. No. 397,730
1 Claim. (Cl. 105—416)

This invention relates to a railway car underframe and its method of manufacture. More particularly, this invention relates to a cushioned underframe of the type in which a rigid draft and buff column extends generally the length of the car and is movable relative to the car body and bolster assemblies.

Underframes of the general type characterized above are well known and comprise a fixed center sill structure in which a movable center sill structure is mounted for sliding movement relative to the fixed center sill structure and the remainder of the underframe. As the sliding center sill structure receives and dissipates a substantial portion of the draft and buff forces, the fixed center sill structure may be of relatively small dimensions, such as, for example, of a thickness of around 5/16 inch.

Heretofore, in cushioned underframe railway cars, the top cover plate of each bolster structure has extended over the upper surface of the fixed sill structure. When the floor is positioned on the underframe over the top cover plates of the bolster structures, the upper surface of the fixed sill structure is spaced from the lower surface of the floor an amount equal to the thickness of the bolster top cover plate. Thus, filler bars or plates between the floor and the fixed sill structure have been required to be placed at intervals along the length of the fixed sill structure. The mounting of such filler bars is time consuming as well as costly.

The present invention provides an underframe and method of manufacture in which the upper surfaces of the cross bearer members, the upper surface of the fixed sill structure, and the upper surfaces of the top cover plates of the bolster structures are substantially flush so that a floor or the like may be positioned in contact with these surfaces without the use of any filler bars or plates between the floor and the fixed center sill structure.

It is an object of this invention to provide a cushioned underframe having a fixed center sill structure in which filler bars or plates are eliminated between the fixed center sill structure and a floor structure positioned over the center sill structure.

An additional object of this invention is to provide a method of manufacture for a cushioned railway car underframe to form the underframe in a minimum of time with the upper surfaces of the bolster cover plates and the upper surfaces of the fixed sill structure being substantially flush for supporting a floor or the like thereon.

Briefly, my improved underframe structure and method of manufacture comprises the forming of depressions in the upper flanges of a pair of Z-shaped fixed sill members when the Z-shaped members are being formed from flat steel plates. The depressions which are formed to receive the bolster cover plates and the cross bearer cover plates are easily cold pressed simultaneously with the pressing of the Z-shaped members from flat metal plates. As the Z-shaped members are only around 5/16 inch in thickness, the cold pressing operation is easily accomplished with the depressions being of a depth generally corresponding to the thickness of the bolster top cover plates and the cross bearer cover plates which are subsequently received within the depressions. Slots are formed in the upper flange of the Z-shaped members at the depressions so that the cover plates may be easily welded thereto with the upper surfaces of the Z-shaped

members adjacent the depressions being substantially flush with the cover plates. Other objects of this invention may be in part apparent and in part pointed out hereinafter.

The invention accordingly comprises the constructions hereinafter described, the scope of the invention being indicated in the following claims.

In the accompanying drawings, in which one of several possible embodiments of the invention is illustrated:

FIGURE 1 is a top plan of a railway car underframe construction in accordance with the present invention;

FIGURE 2 is a section taken generally along line **2—2** of FIGURE 1;

FIGURE 3 is a section taken generally along line **3—3** of FIGURE 1 and showing the arrangement of the fixed sill structure adjacent the bolster structure;

FIGURE 4 is a section taken generally along line **4—4** of FIGURE 1 and showing the arrangement of the fixed sill structure adjacent the cross bearer members;

FIGURE 5 is an enlarged fragmentary view of a Z-shaped sill member which forms a portion of the center sill structure adjacent the bolster structure;

FIGURE 6 is a section taken generally along line **6—6** of FIGURE 5 and showing the Z-shaped member of the center sill structure adjacent the bolster structure;

FIGURE 7 is an enlarged fragmentary view of the Z-shaped member of FIGURE 5 showing the portion thereof adjacent a cross bearer member; and

FIGURE 8 is a section taken generally along line **8—8** of FIGURE 7.

Corresponding reference characters indicate corresponding parts throughout the several views of the drawings.

Referring to the drawings for a better understanding of my invention, a railway car underframe generally designated **10** is illustrated such as is commonly employed on box cars and flat cars. Underframe **10** includes bolster structures generally designated **11**, cross bearer structures generally designated **12**, end sills **14**, and side sills **16**. Underframe **10** is a cushioned underframe of the type in which a rigid draft and buff column forming a sliding sill generally designated **18** is provided. Sliding sill **18** is generally hat-shaped and has a suitable cushioning unit to absorb impact and draft force exerted through a coupler structure **21** carried at each end of sliding sill **18**. An example of such a cushioned underframe is exemplified in various patents such as U.S. Patent No. 1,693,194 issued Nov. 27, 1928 to Otho C. Duryea.

Forming a rigid part of underframe **10** is a fixed center sill structure comprising a pair of Z-shaped sill members **22** in which sliding sill **18** is mounted for relative sliding movement. Cross bearer structures **12** are spaced at intervals along the length of sill members **22**. Extending from sill members **22** are crossties **26**. Stringers **28** extend longitudinally the length of the car supported on cross bearer members **12**, end sills **14**, crossties **26**, and bolster assemblies **11**.

Referring to FIGURE 3, bolster structure **11** comprises a bolster upper cover plate **25**, a bolster lower cover plate **27**, and vertical webs **29** secured between cover plates **25** and **27**. A connecting cover plate **30** of cover plate **25** extends between and connects Z-shaped sill members **22**. A center plate structure is indicated at **31**. Stringers **28** are formed with depressed upper surfaces adjacent webs **29** to extend beneath bolster cover plates **25** and to be welded to adjacent webs **29**.

Referring to FIGURE 4, each cross bearer structure or member **12** has an upper plate **32**, a lower plate **34**, with a vertical web **36** therebetween. Upper plate **32** and web **36** are formed to receive stringers **28** thereon so that the upper surfaces of the stringers are positioned at the same level as the upper surfaces of Z members **22**. A

connecting cross bearer plate **38** is secured, such as by welding, across Z-shaped members **22** at the cross bearer structure **12**. Secured between lower cross bearer plates **34** beneath Z-shaped sill members **22** is a suitable I beam **40**.

My invention consists in forming the fixed sill structure with depressions in order to receive connecting cover plates **38** of cross bearer structures **12** and bolster connecting cover plates **30**. By forming depressions in Z-shaped sill members **22**, the upper surfaces of Z-shaped member **22**, stringers **28**, and plates **25**, **38** are arranged at substantially the same horizontal level so that a floor **42** may be supported by Z-shaped members **22** for the length of the car without the necessity of any spacer or filler bars between the Z-shaped center sill members **22** and the lower surface of floor **42**. Since a portion of the load is carried by sliding sill **18** the fixed sill structure comprising Z-shaped members **22** may be of a relatively small thickness, such as 5/16 inch. With a thickness of around 5/16 inch Z-shaped members **22** may be easily pressed in a cold forming operation simultaneously with the forming of the Z-shaped member from a flat metal sheet or plate.

Referring to FIGURES 5 and 6 in which a depressed area in Z-shaped member **22** adjacent a bolster structure **11** is illustrated, Z-shaped member **22** includes a lower flange **46**, an upper flange **48** and a vertical web **50** integral with flanges **46** and **48**. Lower flange **46** is bent upwardly at **46A** at an angle of around fifteen (15) degrees with respect to the horizontal and is formed with a pair of slots **52** to permit welding. Lower bolster cover plate **27** is welded to bent flange **46A** through slots **52**. Upper flange **48** is pressed downwardly at **48A** and formed with welding slots **54**. Bolster connecting cover plate **30** (see FIGURE 3) is welded across depressed flanges **48A** on sill members **22** through slots **54**.

The fixed center sill structure is of a uniform cross-sectional thickness and would probably be of a maximum not over around 3/8 of an inch in thickness as larger thicknesses are difficult to press. The minimum thickness would probably be around 1/4 inch as buckling occurs if thicknesses below 1/4 inch are employed.

Referring to FIGURES 7 and 8 a portion of a Z-shaped member **22** adjacent each cross bearer structure **12** is illustrated. The lower flange of Z-shaped member **22** is not bent as at bolster structure **11**. Upper flange **48** is pressed downwardly at **48B** to a depth substantially the same as the thickness of the connecting cross bearer cover plate **38**. No slots are provided in flange **48B** for welding purposes as connecting plate **38** is welded along its outer edges to adjacent flanges **48B**. However, slots **56** are provided in lower flange **46** for welding I beam **40** between adjacent lower flanges **46**.

In the assembly of underframe **10**, Z-shaped members **22** are first cold pressed from flat metal sheets to form flanges **46**, **48**, and depressed portions **48A**, **48B** of flange **48**. The bolster connecting cover plates **30** are then welded to flanges **48A** through holes **54** which have been cut in flanges **48A**. The draft and buff column **18** is then positioned within or between the Z-shaped members **22** forming the fixed sill structure. Next, crossties **26** and cross bearer structures **12**, except for connecting plates **30**, are secured to the vertical webs **50** of Z-shaped members **22**.

The remainder of bolster structures **11** are then secured along with end sills **14** and side sills **16** to underframe **10**. Next, connecting plates **38** of cross bearer structures **12** are welded along their outer edges to flanges

48B to connect Z-shaped members **22** together. Stringers **28** are then welded to the crossties, cross bearer structures **12**, and bolster structures **11**. The floor **42** may then be secured to the upper surfaces of Z-shaped sill members **22** and be supported along the entire length of sill members **22** as well as the upper surfaces of stringers **28** and bolster top cover plates **25**.

As the depressions in flanges **48** are formed simultaneously with the forming of Z-shaped members **22**, no additional handling of the fixed sill members **22** is required which eliminates any costly procedure for forming the depressions. Additional contact area for the undersurface of floor **42** is provided when the floor rests against the upper surfaces of Z-shaped sill members **22** for the entire length of underframe **10**.

While sill members **22** have been illustrated as Z-shaped, it is to be understood the sill members may be formed of a channel shape if desired.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results obtained.

As various changes could be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

A method of making a railway car structure comprising cold pressing a pair of Z-shaped sill members from a pair of flat metal plates having a thickness between 1/4 inch and 3/8 inch, simultaneously cold pressing a plurality of depressions in one of the flanges of each sill member, the depressions being spaced along the length of the Z-shaped sill members and being transversely aligned, securing a bolster structure to the sill members adjacent each end of the sill members in alignment with a pair of adjacent transversely aligned depressions, welding a top cover plate to each bolster structure and to the adjacent sill members in the transversely aligned depressions thereof with the exposed upper surfaces of the sill members and the cover plates being substantially flush, securing a plurality of transverse members to the sill members, securing a plurality of stringer members to the transverse members and the bolster structures in a direction generally parallel to the longitudinal axis of the sill members with the upper surfaces of the stringers being substantially flush with the adjacent surfaces of the Z-shaped sill members to form an underframe in which the upper exposed surfaces of the sill members and the upper surfaces of both the bolster top cover plates and the stringers are in generally the same plane, and securing a floor to the upper surfaces of the sill members and the bolster top cover plates.

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