

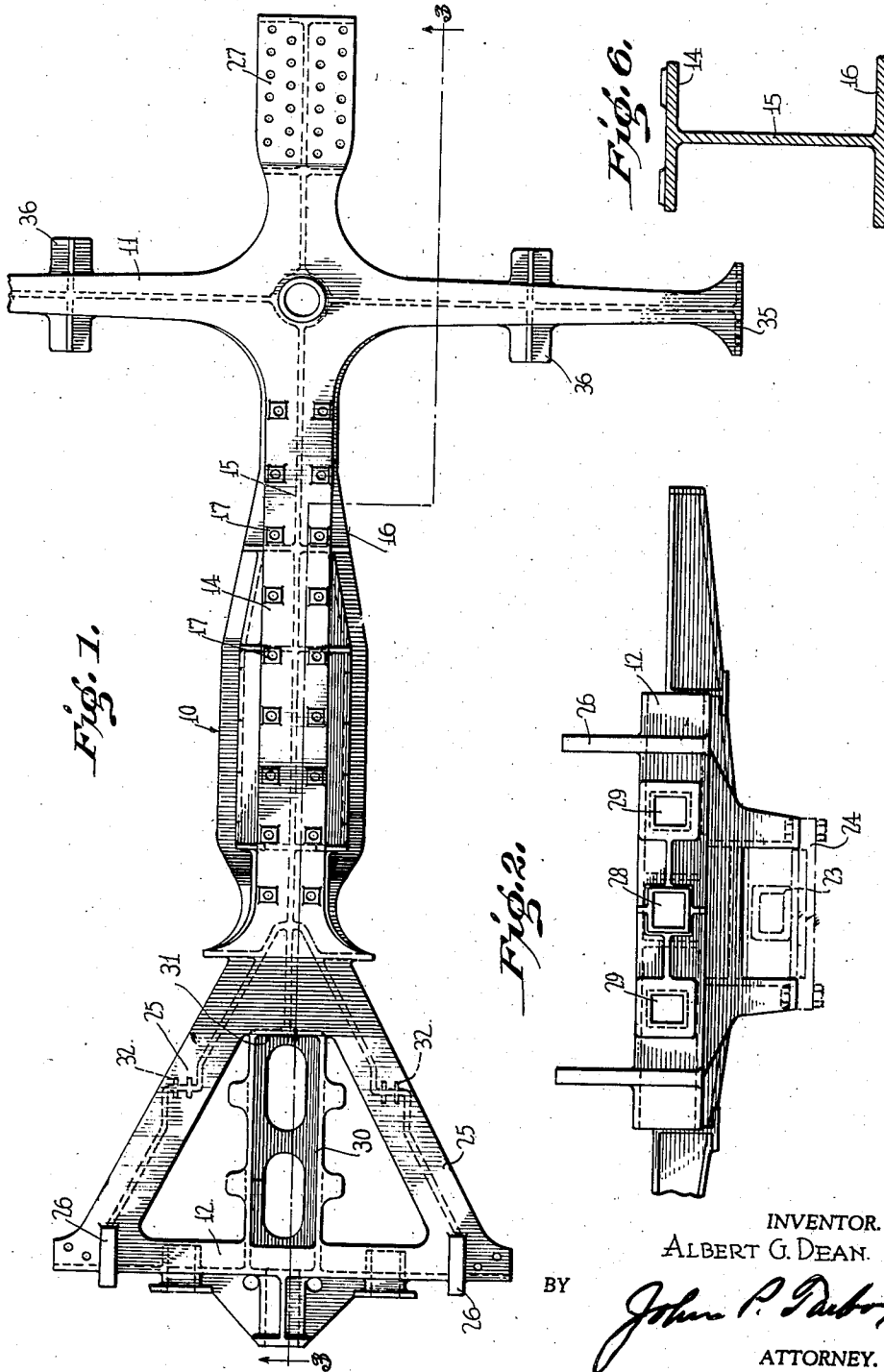
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A. G. DEAN
UNDERFRAME

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Filed May 5, 1937

2 Sheets-Sheet 1



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Jan. 2, 1940.

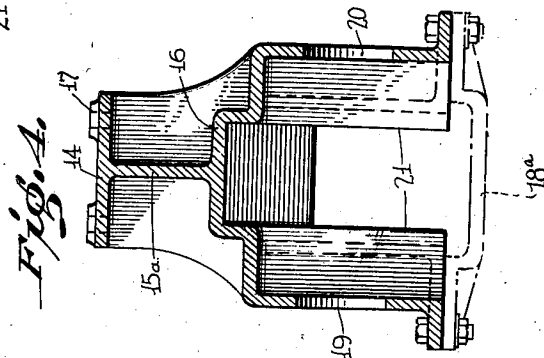
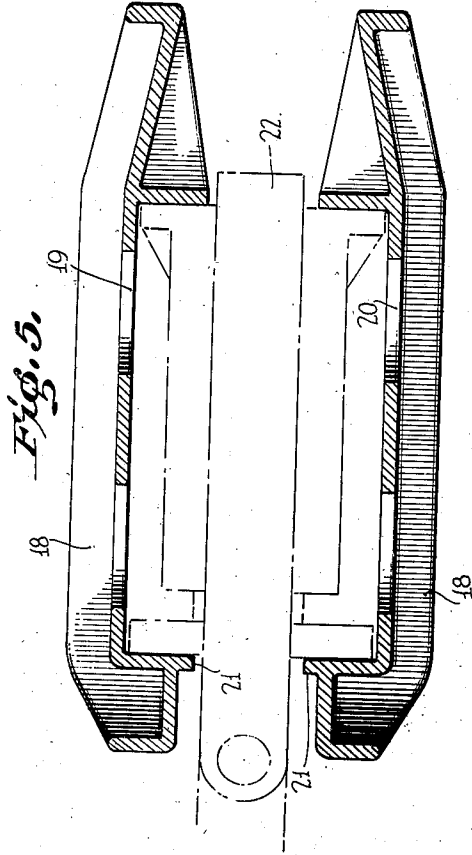
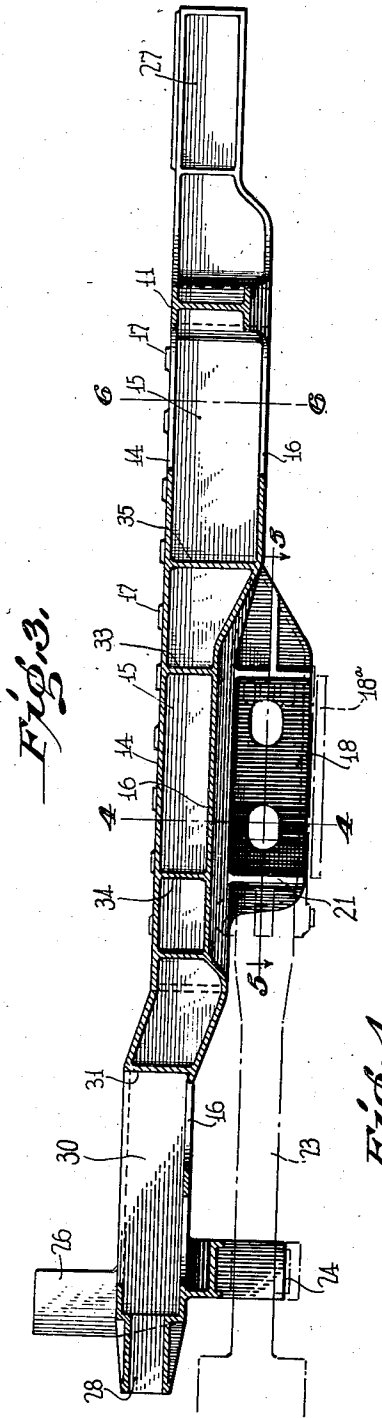
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UNDERFRAME

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2 Sheets-Sheet 2



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UNDERFRAME

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8 Claims. (Cl. 105-414)

This invention relates to improved vehicle body underframes and more particularly to an end underframe structure for a rail car.

The principal object of the invention is to provide an underframe of lighter than usual weight but with high strength, and particularly one which is adapted to be cast or fabricated of suitable flat plates integrally welded together.

A more specific object of the invention is to provide a rail car end underframe which is provided with integral pockets for the draft gear and buffer mechanism with the body of the underframe substantially of I-cross section.

Further objects and advantages of the invention will appear from the following disclosure of a preferred form of embodiment of the invention taken in connection with the attached drawings, in which,

Fig. 1 is a top plan view of the end sill member;

Fig. 2 is an end elevation of the end sill member shown in Fig. 1;

Fig. 3 is a vertical longitudinal section taken substantially along the line 3-3 of Fig. 1;

Fig. 4 is a transverse vertical cross section taken substantially along the line 4-4 of Fig. 3;

Fig. 5 is a horizontal section taken substantially along the line 5-5 of Fig. 3; and

Fig. 6 is a typical transverse vertical section as taken through the longitudinal part of the end sill member between the end sill and the needle beams, as, for example, along the line 6-6 of Fig. 3.

In non-articulated cars, it is necessary to provide adequate support for the draft gear and buffing mechanism which is normally carried by the underframe. Frequently, the center sill or underframe members have spaced wall portions between which this draft gear and buffing mechanism operates, but it is found that such structure is exceptionally heavy and costly to make, due to minimum practical thicknesses.

In accordance with one preferred form of embodiment of my invention, I have provided an underframe member generally represented at 10 which is the end underframe and including the bolster 11 and end sill 12, such members being joined and formed into an integral unit by a principal longitudinal I-beam having a top flange 14 having finish pads 17, web 15 and bottom flange 16. As shown in Fig. 6, which is a typical cross section through this member, and as shown in Fig. 4, the web 15 may be of varying size being very deep in that region between the draft gear housing 18 and the transverse bolster

member 11 and being shallow at 15a over the housing 18.

The draft gear housing 18 is located in the intermediate portion of the longitudinal beam and, as shown in Fig. 4, is of substantially inverted U-shape, the bottom of the U being substantially coincident with the bottom flange 16 of the principal longitudinal member. It is bifurcated with the legs 19 and 20 suitably spaced and reinforced by webs 21 which serve as guides for the draft gear, generally shown in dotted lines at 22 in Fig. 5. The draft gear is pivotally connected to the link or coupling member 23, which is carried on guide 24, bolted below the end sill 12, as shown in Fig. 2. A closing plate 18a is detachably carried by draft gear housing 18.

As shown in Fig. 1, the underframe member 10 is preferably provided with outwardly diverging legs 25 which extend to the end sill member 12 substantially adjacent the door end post brackets 26 which are substantial upstanding members, shown in Fig. 3. These brackets provide adequate attachment for the collision or anti-telescoping beams and permit a direct transfer of stress of collision shocks through the legs 25, through the longitudinal beam and thus into the bolster 11, and the center sill which is attached to the longitudinal beam through its inward projection 27.

The end sill 12 is provided with suitable openings 28 and 29 to receive the buffer members (not shown). The buffer housing is indicated at 30 being adapted to receive the center stem (not shown) which bears against the buffer which in turn backs up against web 31. The side stems (not shown) which extend through openings 29, back up against angular projections 32 on the legs 25. The buffer housing is of comparatively light weight merely serving to support the buffer mechanism against vertical displacement.

The bolster 11, is preferably of I-cross section, the outwardly projecting arms having enlarged flanges 35 for attachment to the body of the vehicle. Side bearing pads 36 are provided for contact with side bearings on a supporting truck.

The arrangement of the underframe is such that the buffing mechanism operates substantially on the neutral axis of the entire underframe with collision forces acting through the converging legs into the central I-beam of the principal longitudinal member. This section is general except for the inverted U-section at the draft gear housing and with a substantially coincident web, the stress transfer of the draft gear into the main longitudinal I-beam is very

effective. The entire structure is readily made in one piece and is of especially light weight.

It will be noted that the underframe may thus be considered to consist of a Y-shaped portion, the open ends of the Y being joined by the end sill and preferably directly backing up the collision beams. The stem of the Y extends to the bolster member which is of T-shape with its stem serving as the attachment for the center sill and with the laterally extending branches extending to the side frames. The legs of the Y-shape portion need not be as heavy as the main portion of the underframe for the buffing force acts directly on the crotch of the Y at web 31 and draft loads are placed on the intermediate member along the stem of the Y.

It will be noted that especially in the region of the draft gear housing 18, as well as in other places where there is a change of section of material, that webs are provided. In this particular construction webs 33 and 34, as shown in Fig. 3 as well as web 35, serve as web stiffeners to reduce secondary stress concentrations due to the bending tendencies of the longitudinal I-beam under draft loads. Such webs are readily formed at the desired locations and greatly strengthen the underframe member.

While I have shown a preferred form of embodiment of my invention, I am aware that other modifications may be made thereto and I, therefore, desire a broad interpretation of my invention within the scope and spirit of the disclosure herein and of the claims appended hereinafter.

What I claim is:

1. An underframe member of the class described having a bolster, an end sill and a longitudinally extending member joining them, said longitudinally extending member being of I-cross section throughout its major portion, the I-cross section being modified in the region between its ends by a vertical web of decreased height and a downward extension of the bottom flanges of the I to form a draft gear housing, and reinforcing webs between the top and bottom flanges and the web of the I in the said region.

2. An underframe member of the class described having a bolster, an end sill and spaced vertical extensions for securement thereto of vertical collision posts and a longitudinally extending member joining said bolster and end sill, said longitudinally extending member being of I-cross section throughout its major portion, said longitudinally extending member having diverging outwardly extending legs connected with said end sill adjacent said spaced vertical extension and having a U-shape buffer housing fixed intermediate said diverging legs with its inner end located in the crotch thereof.

3. An underframe member of the class described having a bolster of substantially I-cross section, a longitudinally extending substantially I-cross section beam, said beam having diverging legs also of substantial I-section and an integral end sill secured to the ends of said diverging legs, said underframe having a buffer housing intermediate said diverging legs and said end sill and having a draft gear housing depend-

ing from said longitudinal beam and integral therewith.

4. A one piece underframe of the class described of substantially Y-shape in plan having a T-shape bolster integrally superimposed thereon extending from side to side of a car, the open portions of said Y-shape being joined by an integral end sill member of substantially less length than the bolster, the stem of said Y-shape member extending to the central portion of said T-shape bolster, the stem of said bolster being adapted to be secured to a center sill.

5. A one piece underframe of the class described of substantially Y-shape in plan having a T-shape bolster integrally superimposed thereon extending from side to side of the car, the open portions of said Y-shape being joined by an integral end sill member of substantially less length than the width of the car, the stem of said Y-shape member extending to the central portion of said T-shape bolster, the stem of said bolster being adapted to be secured to a center sill, said underframe being substantially entirely of I-cross section.

6. A one piece underframe of the class described of substantially Y-shape in plan having a T-shape bolster integrally superimposed thereon, the open portions of said Y-shape member being integrally joined by an end sill and its stem extending to the central portion of said T-shape bolster, the stem of said bolster being adapted to be secured to a center sill, said underframe being substantially entirely of I-cross section and having an inverted U-shape integral draft gear housing depending therefrom.

7. A one-piece underframe subassembly unit of the class described having a bolster, an end sill having spaced vertical extensions for securement thereto of vertical collision posts, and a longitudinally extending member having an I-cross-section throughout its major portion, said member having outwardly diverging legs in its portion adjacent the end sill connected with said end sill adjacent said spaced vertical extensions thereof, the I-cross-section of said member being deepest in the portion adjacent the bolster and extending some distance forwardly thereof and the shallower I-cross-section between this deepest portion and the outwardly diverging legs being reinforced by lateral downward extensions forming a draft gear pocket therewith.

8. A one-piece underframe subassembly unit of the class described having a bolster of substantially I-cross-section and a longitudinally extending substantially I-cross-section beam, said beam having diverging legs also of substantially I-cross-section and an integral end sill having spaced vertical extensions for the securement of collision posts and secured to the ends of the diverging legs adjacent said extensions, the portion of the longitudinally extending beam adjacent the bolster being of a depth of I-cross-section substantially greater than the intermediate portion of said beam, said intermediate portion being reinforced by lateral downward extensions forming a channel section including the bottom of the I.

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