

Sept. 25, 1928.

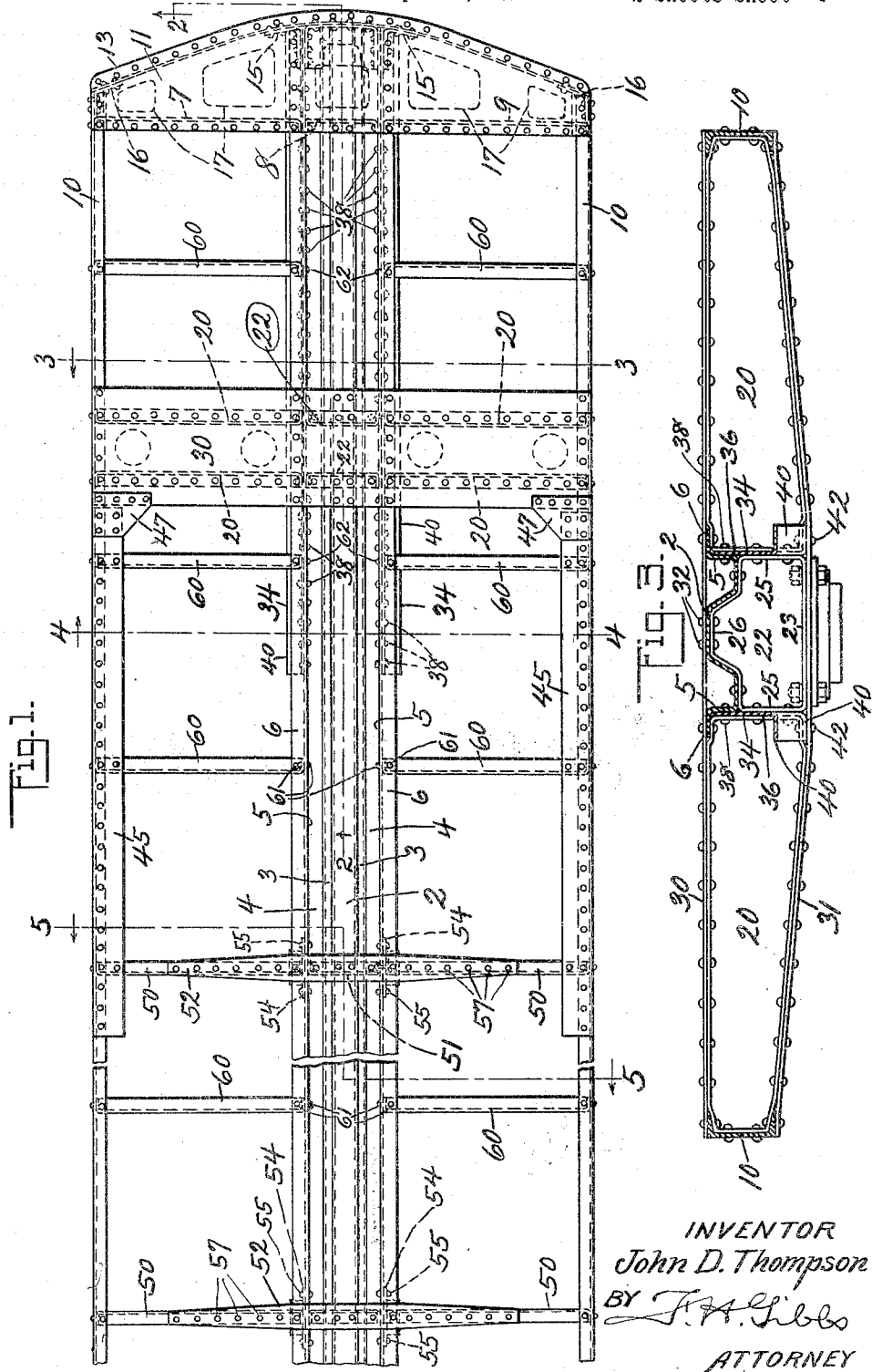
J. D. THOMPSON

1,685,104

CAR UNDERFRAME

Filed April 1, 1927

2 Sheets-Sheet 1



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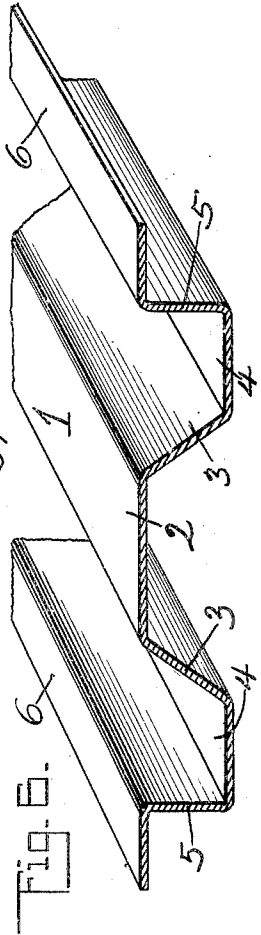
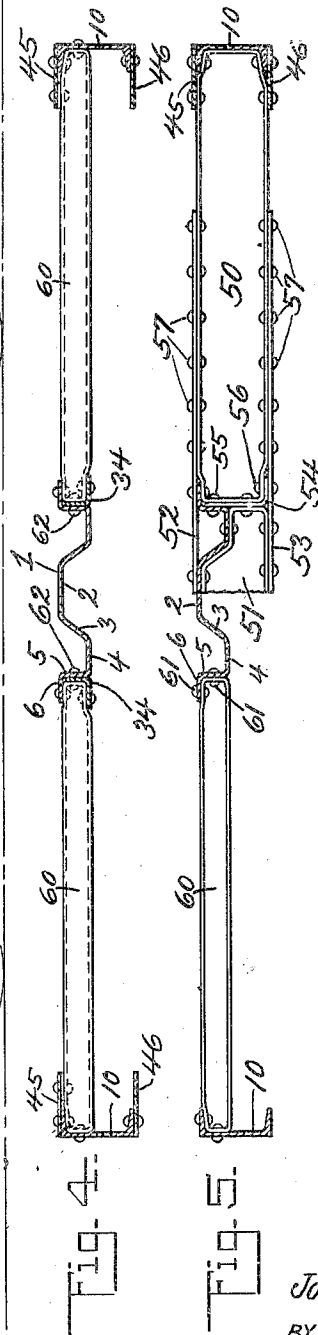
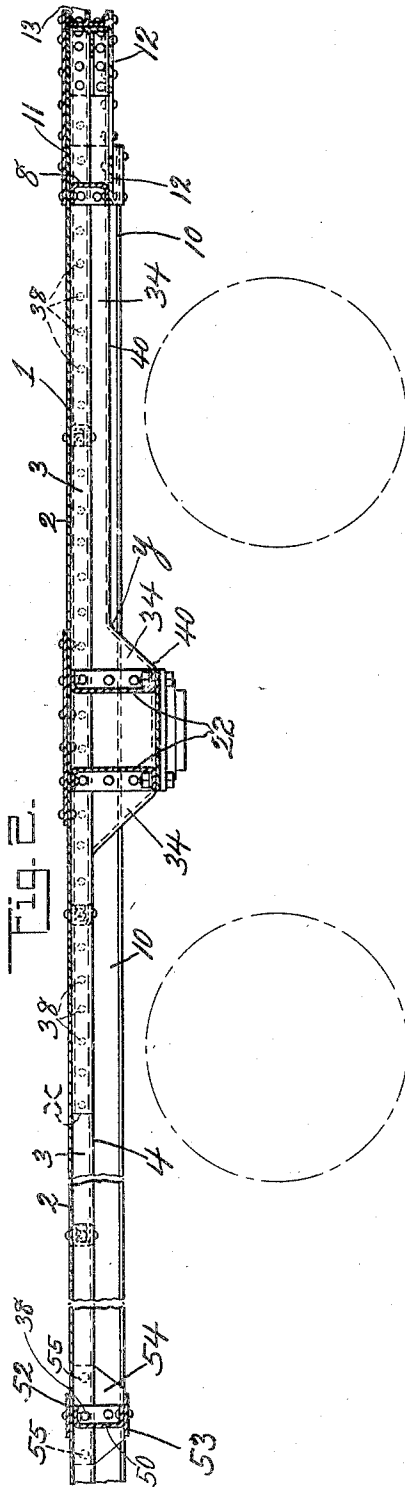
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2 Sheets-Sheet 2



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CAR UNDERFRAME.

Application filed April 1, 1927. Serial No. 180,185.

Reference is had to the accompanying drawings which illustrate the preferred form of the invention, though it is to be understood that the invention is not limited to the exact details of construction shown and described, as it is obvious that various modifications thereof within the scope of the claims will occur to persons skilled in the art.

In said drawings:

Fig. 1 is a plan view of approximately one half of an underframe forming the subject matter of the present invention;

Fig. 2 is a central longitudinal section, the section being taken on line 2—2 of Fig. 1 looking in the direction indicated by the arrow;

Fig. 3 is a transverse sectional view forwardly of the bolster, the section being taken on line 3—3 of Fig. 1 looking in the direction indicated by the arrow;

Fig. 4 is a transverse sectional view, the section being taken on line 4—4 of Fig. 1;

Fig. 5 is a two-part transverse sectional view, the section being taken on line 5—5 of Fig. 1 looking rearwardly in the direction indicated by the arrow, and

Fig. 6 is a sectional view in the nature of an isometric perspective illustrating the cross sectional contour of the principal member of the center sill hereinafter specifically referred to.

An object of the invention is to provide an underframe construction which will be exceedingly light, strong and adapted for assembly with all parts connected by machine rivets in the shop where fabricated.

Referring to the parts, 1 is the center sill which, as best shown in Fig. 6, comprises a central horizontal portion 2, two obliquely and downwardly extending portions 3, two bottom flange portions 4, two vertical "sill" portions 5 and two top flanges 6, all of said parts 1 to 6, inclusive, being formed from a single sheet of metal pressed to the contour illustrated in the drawings for the purpose of providing an integral center sill construction of sufficient depth to sustain the required load and with transverse connecting portions 2—3 adapted to stiffen the sill construction transversely of the car and more particularly when associated with the cross ties and other associated members hereinafter referred to in detail.

The end sill is a composite structure com-

prising in each end sill three transversely extending channel-shaped diaphragms 7, 8 and 9 which extend the entire distance from the channel-shaped side sills 10 across the underframe. Secured to the top flanges of the diaphragms 7, 8 and 9 at each end of the underframe is a top cover plate 11 and secured to the bottom flanges of the same diaphragms are bottom cover plates 12. Extending the entire distance across the car and serving as a closure between the top and bottom cover plates referred to is a ribbed anti-climber 13 which may be of the type shown in patent to F. Hedley, No. 867,367 of October 1, 1907. It is to be observed that the center sill extends throughout the entire length of the car from the anti-climber at one end to the anti-climber at the other end and is connected by suitable brackets, as 15, thereto, similar angle brackets 16 connecting the channel side sills with the outer ends of said anti-climber. To facilitate driving the connecting rivets the bottom cover plate of the end sill construction is provided with a plurality of openings 17 as illustrated in Fig. 1. The bolster construction, best illustrated in the sectional view, Fig. 3, comprises diaphragms 20 which extend from the channel-shaped side sills 10 inwardly to, and said diaphragms are riveted to, the vertical flanged portions 5 of the center sill, and intermediate the diaphragms 20, underlying the horizontal portions of the center sill and connected thereto by rivets, are pan-shaped bolster center filler members 22 which are provided with horizontal flanges 23 as shown in Fig. 3, and provided with vertical flanges 25 which extend thence vertically upwardly, thence horizontally, thence obliquely upwardly, and merge in a horizontal flanged portion 26. Connecting the side sills and the diaphragms 20 are top and bottom bolster cover plates 30 and 31, to the former of which is connected the portion 2 of the center sill by means of rivets 32. Supplementing the center sill and contributing to the support of the underframe and extending from the end sills to points rearwardly of the bolster at each end, are angular-shaped members 34, which, as shown in plan view, Fig. 1, and in the sectional view, Fig. 3, are provided with vertical web portions 36 connected to the vertical flanges 5 of the center sill by the same rivets 38 which con-

nect the diaphragms 20 thereto. Within the zone of the bolster, as best shown in Fig. 2, the vertical web portion of the member 34 is of increased depth and extends downwardly for the full depth of the bolster so that the bottom flange 40 of the member 34 will rest upon the bottom cover plate 31 of the bolster and the rivets 42 which connect the diaphragms 20 to the bottom cover plate 31 will also connect said bottom flange 40 between the diaphragms and the said bottom bolster cover plate. Referring to Fig. 2 it will be observed that the angular member 34 is relatively shallow from its rear end at *x* to the point where it increases in depth at the bolster, and of a considerably increased depth from the point *y* forwardly to the anti-climber before referred to.

The side sills 10 are as shallow as is consistent with the strength required throughout the major portion of the length of the underframe, but near the door openings, and spanning such door openings, the side sills are reinforced by the addition of top and bottom plates 45 and 46 which, as shown in Fig. 1, extend from the bolster rearwardly a sufficient distance to span a door opening provided in the superstructure or car body to be carried upon the underframe illustrated. These reinforcing plates 45 and 46 are connected by gusset plates 47 with the top cover plate of the bolster before referred to and are riveted to the top and bottom flanges of the channel side sills as illustrated in Figs. 1, 4 and 5.

At convenient intervals throughout the length of the car, cross bearers are provided which are formed, as best shown in Fig. 5, with diaphragms 50 extending from the side sills to the center sill and with pan-shaped pressed filler members 51 interposed between such diaphragms and between the top and bottom cover plates 52 and 53, respectively, of such cross bearers. Supplementing the details of the cross bearers referred to are pressed struts 54 which are connected at their upper portion by means of the rivets 55 with the longitudinally extending flanges of the cross bearer diaphragms 50 and are connected by means of the rivets 56 with the horizontal flanges of said diaphragms 50 and with the bottom cover plates 53 of the cross bearers, and it will be observed that the struts 54 are angle-shaped in cross section, that is, there is a vertical web and a horizontal flange, as best shown in Fig. 5.

The cover plates 52 and 53 of the cross bearers are connected by rivets 57 to the top and bottom flanges of the cross bearer diaphragms, as best shown in Figs. 1 and 5, and said cover plates extend less than the entire length of said diaphragms towards the side sills. Intermediate the cross bearers referred to are floor supports 60 at conven-

ient intervals, said floor supports being connected to the vertical and horizontal portions 5 and 6 of the center sill by rivets 61, as shown at the left of Fig. 5. Where the floor supports 60 are connected with the center sill within the zone of the members 34, as shown at Fig. 4, the rivets 62 pass through the vertical flanges of the floor supports 60 and through the vertical portion 5 of the center sill.

It is to be understood that while only one end portion of an underframe is shown in Figs. 1 and 2, such parts are duplicated at the opposite end of the underframe, and as many cross bearers and floor supports are supplied as may be required throughout the length of the underframe.

What is claimed is:

1. In an underframe, a center sill formed of a single piece of material and having a plurality of top and bottom flanges, vertical webs and an arch-shaped intermediate portion in combination with angle-shaped reinforcing members paralleling and being connected directly to said vertical webs.

2. In an underframe, a single center sill having a plurality of top and bottom flanges, vertical webs and an intermediate web portion connecting said bottom flanges, in combination with bolster diaphragms connected with said vertical webs and a top bolster cover plate connected with the top flanges of the sill and with said intermediate web portion.

3. In an underframe, a single center sill comprising a plurality of vertical web portions, a plurality of top and bottom flanges and an intermediate web portion connecting the bottom flanges and extending to the plane of the top flanges.

4. In an underframe, a single center sill comprising a plurality of vertical web portions with horizontal top flanges and a horizontal portion spaced from the flanges and arranged in the plane of the latter.

5. In combination, side sills, a center sill, an end sill construction enclosing an end portion thereof, said end sill comprising a plurality of diaphragms lapping the side sills and said center sill, top and bottom cover plates, and a ribbed end member to which the cover plates are secured.

6. In combination, flanged side sills, bolsters, horizontal reinforcing plates of less length than said sills secured upon the flanges of said sills intermediate the bolster, a center sill intersecting said bolster, a bolster cover plate connected directly to said center sill and to said side sills and tie plates connecting the reinforcing plates to the bolster cover plate.

7. In an underframe, a bolster intersected by a single center sill having a plurality of top and bottom flanges, vertical webs and an arch-shaped intermediate portion in com-

bination with angle-shaped reinforcing members paralleling and being connected directly to said vertical webs and bolster top and bottom cover plates connected to said sill and to a flange of said angle-shaped member.

8. In combination, side sills, a center sill formed from a single plate and comprising spaced vertical portions, with top and bottom flanges and a web connecting the bottom flanges, a sill construction enclosing an end portion of said center sill and comprising a plurality of diaphragms lapping the side sills and said center sill, a ribbed end member and a top cover plate.

9. In an underframe, a center sill having a plurality of top and bottom flanges, vertical webs connecting the top and bottom flanges, and an arch-shaped portion connected to the bottom flanges and arranged intermediate the vertical webs.

10. In an underframe, a center sill comprising a single unit having a plurality of top and bottom flanges, vertical webs connecting the top and bottom flanges, and an arch-shaped portion connected to the bottom flanges.

11. In an underframe, a center sill formed of a single piece of material and having a plurality of top and bottom flanges, vertical webs connecting the top and bottom flanges, and an arch-shaped portion connecting the bottom flanges and provided with a horizontal portion arranged in substantially the same horizontal plane as the top flanges and spaced from the latter.

12. In an underframe, a center sill comprising a unit formed of a single piece of material having a plurality of top and bottom flanges, vertical webs connecting said flanges, and an arch-shaped portion intermediate the bottom flanges and of a height substantially equal to the distance between the top and bottom flanges.

13. In combination, a center sill having vertical portions and a web portion connected to said vertical portions and spaced therefrom, a bolster comprising diaphragms connected to said vertical portions, a bolster cover plate connected to said web portion, cross bearers, and side sills connecting said cross bearers and bolster.

14. In combination, flanged side sills, bolsters, horizontal reinforcing plates secured to the flanges of the said side sills with one

end arranged adjacent one bolster and the other end terminating short of the other bolster, a center sill, bolster cover plates, and tie plates extending across the meeting edges of the bolster and reinforcing plates and secured thereto.

15. In combination, flanged side sills, bolsters, relatively short horizontal reinforcing plates secured to the flanges of said side sills adjacent one bolster, a center sill, a bolster cover plate for each bolster, and tie plates connecting the reinforcing plates and the adjacent bolster.

16. In combination, flanged side sills, a bolster, relatively short reinforcing members secured to the side sills adjacent to bolster, an end sill, a center sill, tie plates connecting the reinforcing members and the bolster, and flanged members of gradually increasing height secured to the center sill and extending from the rear of the bolster to the end sill.

17. In a car underframe, a center sill formed of a single piece of material and comprising a plurality of top and bottom flanges, vertical webs and an arch-shaped portion intermediate the bottom flanges, and means for reinforcing the end portion of the sill comprising opposed members secured to each vertical web and extending to a point adjacent the end of the sill.

18. In a car underframe, a center sill formed of a single piece of material and comprising a plurality of top and bottom flanges, vertical webs and an arch-shaped portion intermediate the vertical webs, and means for strengthening the end portion of the sill comprising opposed members of gradually increasing height secured to each vertical web at the end portions thereof.

19. In a car underframe, a center sill formed of a single piece of material and comprising a plurality of top and bottom flanges, vertical webs and an arch-shaped portion intermediate the vertical webs, a bolster, and means for reinforcing the end portion of the sill comprising opposed members of gradually increasing height secured to the vertical webs and extending from a point in the rear of the bolster to a point adjacent the ends of the webs.

In witness whereof I have hereunto set my hand.

JOHN D. THOMPSON.