Oct. 20, 1931. E. G. GOODWIN 1,828,563

CAR CONSTRUCTION

Filed May 1, 1930 2 Sheets-Sheet 1

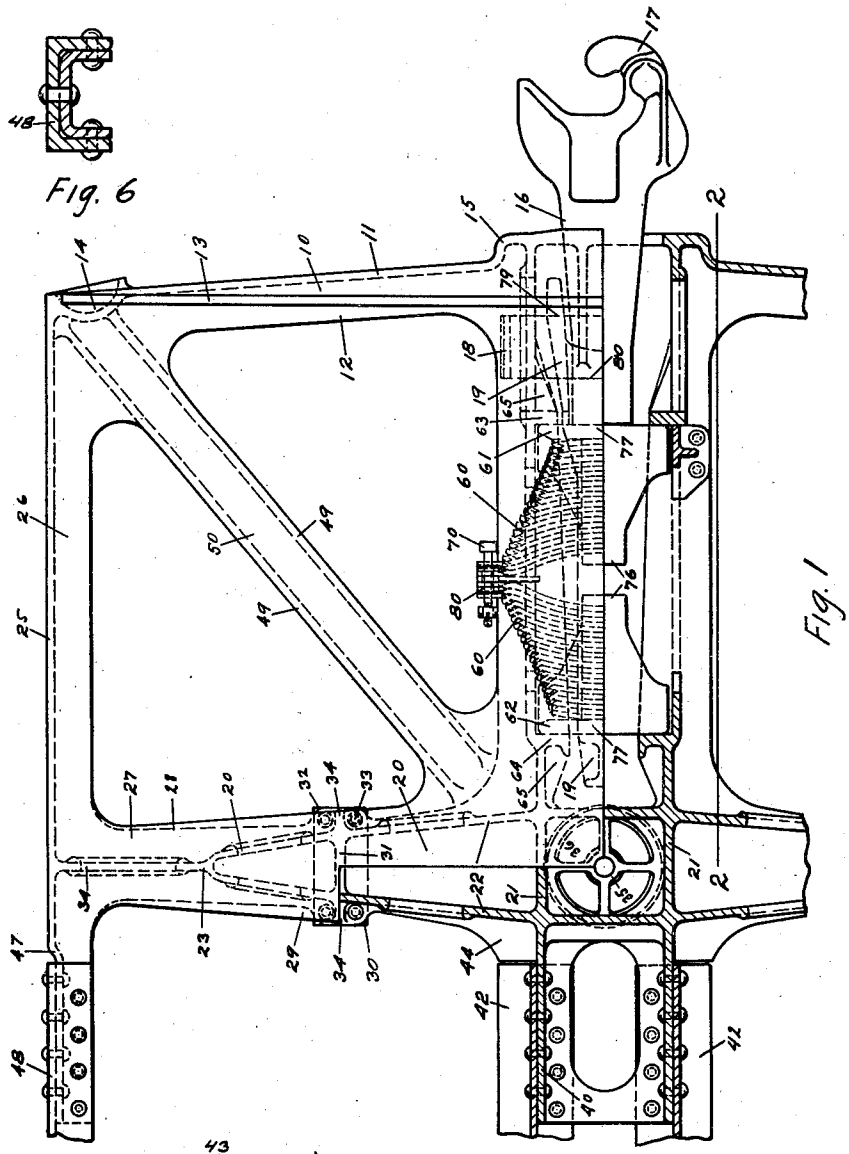


Fig. 1

Fig. 6

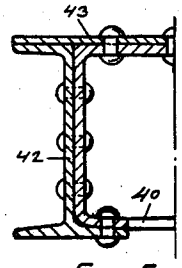


Fig. 5

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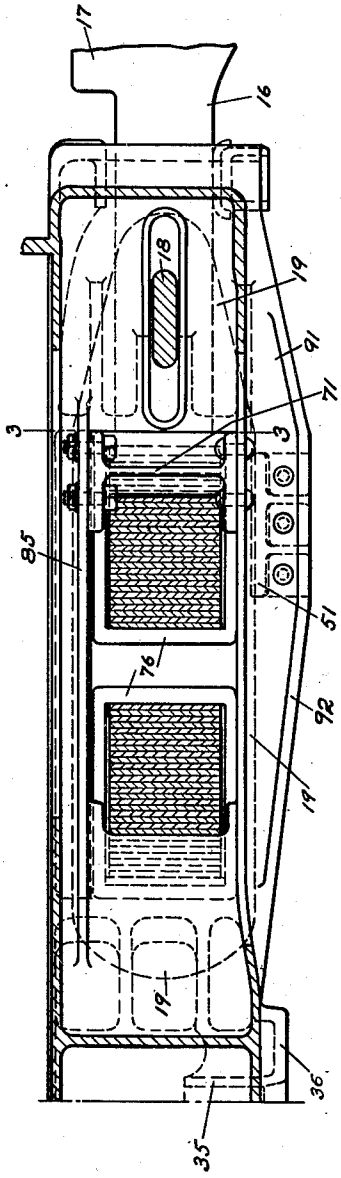


Fig. 2

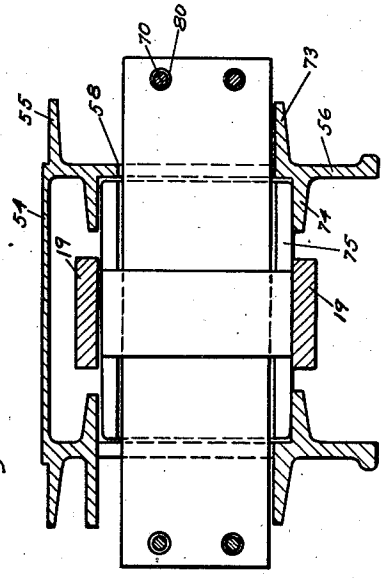


Fig. 4

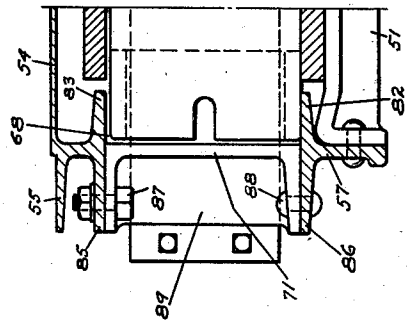


Fig. 3

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Patented Oct. 20, 1931

1,828,563

UNITED STATES PATENT OFFICE

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CAR CONSTRUCTION

Application filed May 1, 1930. Serial No. 449,043.

This invention relates to car construction and has for its principal object the provision of an underframe, especially one adapted to receive a draft gear of somewhat higher capacity than usual. Further objects of the invention are the provision of a cast steel underframe of particularly rigid design, the construction transmitting shocks without injury.

A still further object of the present invention is the provision of a cast steel underframe in which the central sills have been designed so as to permit a draft gear of special dimensions extending laterally thru the integral vertical webs, and for reenforcing these center sill sections in the neighborhood of such openings. With rolled steel sections the top to bottom dimension or depth is quite limited but in the cast steel construction it is possible to give the desired increased depth at mid-points. Other objects of the invention are more particularly brought out in the claims.

In the drawings:

Figure 1 is a top plan view partly in half section illustrating my device.

Figure 2 is a side elevation taken on line 2—2 of Figure 1.

Figure 3 is a section on line 3—3 of Figure 2.

Figure 4 is a section taken centrally thru the spring and showing the center sill in transverse section.

Figure 5 is a vertical section thru the stud center sill where it is riveted to the rolled steel center sill section.

Figure 6 is a vertical section thru the stud side sill where it is riveted to the rolled steel channel which forms the greater portion of the side sill.

The end sill 10 is of channel shape having a vertical web 11 and two side flanges 12, the former being indented at each side to form the push pole pockets 14, while from the top flange rises the integral foundation plate 13 to which the upper structure is secured. At its front the end sill has the usual buffing block 15 thru which is inserted the shank 16 of the draw bar carrying the usual coupler head 17, which bar connects thru the key 18 with the yoke 19.

The bolster 20 is hollow at each side of the square boxing 21 but its two vertical side walls 22 converge toward the point 23 somewhat outward of the side bearing from which point to the edge of the side sill there is but a single vertical web 34 integral with the vertical web 25 of the channel shaped side sill 26, the horizontal flanges of which merge with the top plate 27 and the bottom plate 28 of the bolster. Between the center of the bolster and its ends the lower wall of the bolster is flattened as at 29 and to this portion is riveted the side bearing wear plate 30 above which and within the hollow of the bolster is a vertical reenforcing flange 31 extending from web to web of the bolster. As best seen in Figure 1 the bottom plate of the bolster is extended laterally forming lugs 32 thru which extend the rivets 33 between each pair of which is a tapered reenforcing rib 34 alined with the inner central rib 31. Within the bolster boxing 21 is the usual integral sleeve 35 to receive the king pin and the usual center bearing 36, which is engaged by the truck, forms the bottom of this portion.

To the rear of the center of the bolster is a somewhat reduced hollow square stud section 40 to each side of which is permanently secured a rolled steel center sill 42, and above which is likewise permanently secured a cover plate 43. The integral top plate or flange 44 of the bolster extends rearwardly from the vertical web 22 and stops in close proximity to the forward edge of the center sill rolled section 42. Likewise at the end of each side sill section of the underframe casting the web 25 is indented as at 47 and the rolled steel side sill 48 is riveted or otherwise permanently secured to all three sides of this reduced channel section which is the stud end sill. The two diagonal bracings are each composed of two vertical downwardly extending flanges 49 and a horizontal web 50, the latter merging with the top flanges of the side sill and of the end sill as well as with the top flanges of the bolster and center sill. I prefer that the flanges 49 shall extend respectively to the vertical web 25 of the side sill and to the

vertical web 11 of the end sill, as illustrated merging with the concaved face of the push pole pocket 14.

Between the bolster and the end sill is the center sill casting which is integral with these members, the entire underframe, except for the side bearing wear plate and the carrier iron 51, being in one piece. Having particular reference to Figures 3 and 4 the top plate 54 of the center sills has a slight shoulder at each end beyond which the top plate extends as an outwardly extending flange 55 at each side. For convenience of description the two vertical webs are given separate numbers, 56 denoting the far web as seen in Figure 1 of the drawings, and 57 denoting the near web. An opening 58 is cut thru the far web 56 to accommodate the extending portion of the multi-leaf full elliptic spring 60 which forms the resilient member of the draft gear and its bands 61 and 62 form the followers resting respectively against the front stop lug 63 and the rear stop lug 64, each of these members being integral with the proximate vertical web and being reenforced by triangular stiffening ribs 65 which preferably merge with the vertical wall of the center bearing box 21 in the case of the rear stop lugs.

The opening 68 in the web 57 is of somewhat greater extent than the quite similar opening 58 in the far web 56 since the draft gear spring is inserted from the near side, the usual method of placing the gear in its pocket being to position the rear unit of the spring against the two rear stop lugs 64 and then insert the front unit which can readily be accomplished because of the greater extent of the near opening 68 toward the front of the casting. When the two units are in proper position they are fastened together by the bolts 70 which very loosely fit thru openings 80 in the longer or major leaves of the two semi-elliptic spring units 60 and at this time the near opening 68 is reduced in size to agree with the opening 58, this by means of a plug 71.

Outwardly extending from the far web 56 is a flange 73 which bounds the lower edge of opening 58 and on the opposite side of this web is a similar but inwardly extending flange 74 upon which rests the lower straps 75 of the bands which encircle the two semi-elliptic units of the spring 60. These bands 61 and 62 each have a rather small end plate 76 the two of which are adapted to contact at full load of the spring. The opposite plate 77 of each band is materially thicker thru from front to back and extends from side to side of the pocket having its plane rear face extending snugly against the adjacent stop lug when not loaded.

The operation of the draft gear will be described at this point: Under conditions of pull the rear end of the yoke 19 engages the base plate follower block 77 which is an integral part of the band 62 of the rear spring unit. The other points of engagement are at 79 where the coupler key engages the yoke wings, at 80 where the draw bar 16 of the coupler engages the pin 18 and at 81 where the base plate 77 of the band of the front unit engages the stop lug 63, it being remembered that these two thickened sections of the spring encircling bands 61 and 62 act precisely as followers, eliminating the amount of weight of the usual follower. In the pulling movement the band 62 of the rear unit moves away from the rear stop lugs 64, and the contacting leaves of the two units, these being the longest leaves, roll upon each other, the bolt 70 being sufficiently loose to permit a very considerable separation of the extreme ends of the long or major leaves of the spring, the areas of contact at the two sides constantly approaching the center line of the car as the load is increased. At full load the two smaller end plates 76 of the bands are in contact and any excess load is thereafter transmitted thru the solid metal of the leaves to the widely spaced stop lugs so that there is no possible danger of distorting the spring. There is no possible danger of the spring sticking.

In buff, under which conditions the stresses are considerably greater, the follower 77 of the rear spring unit engages the two rear stop lugs 64 and the draw bar engages the plane face of the follower 77 of the forward spring section. Here again the entire stress is carried to the widely separated stop lugs and all excess loads are transmitted thru absolutely solid metal, the shortest leaf of each spring unit being in full contact with the curved face of its follower at the moment the smaller end plates 76 are in contact, the shape of the curve of the follower being designed so that the last or shortest leaf shall give its extreme strength at full contact, that is, the shape of the curve of the follower is designed to agree with that of the last or shortest leaf when the latter is fully deflected and faces 76 are in contact with each other.

The near vertical rib 57 of the center sill section of the casting is provided with outwardly and inwardly extending flanges bounding the spring receiving opening 68 but extending beyond the margins thereof. These flanges are numbered: 82, extending inwardly in line with flange 74; 83, extending inwardly above the top margin of the spring and in alinement with a similar inwardly extending flange on the far web 56; 85, the upper outwardly extending flange and 86, the lower outwardly extending flange; the latter two flanges receiving respectively the bolts 87 and the rivets 88 which pass thru the top and bottom horizontal flanges of the plug 71, the latter having a central vertical outwardly extending stiffening rib 89 to reenforce the

channel shaped section of this plug which holds the spring 60 against removal.

The transverse carrier iron 51 follows usual practice and supports the yoke 19 preventing undue friction between the bands 61 and 62 and the flanges 74 and 82. In addition to its function as a support for the yoke the carrier iron has the important function of reenforcing the bottom of the center sill section of the casting and to this end the carrier iron is provided with a plurality of strengthening ribs. It will be noted that the flange 85 extends beyond the forward margins of the spring receiving opening 68 and also extends well to the rear of the line of the back stop lugs 64. The lower margin 91 of each vertical web of the center sill section extends downwardly toward its center and for the most part is strengthened by a somewhat slight thickened lip 92.

What I claim is:

1. In an underframe, a one-piece casting including a channel-shaped end sill, a pair of channel-shaped side sills, a bolster, and diagonal channel-shaped braces extending from the bolster center to the junction of each side sill with the end sill, said diagonal braces having their webs continuous with the upper flange of each channel member and having their two vertical flanges extending to the web of the side sill and end sill.

2. In a car underframe, a one-piece casting including an end sill, two side sills and a bolster, said bolster being extended laterally on its lower face to provide attaching lugs to receive a side bearing wear plate and having transversely of the bolster above the wear plate an upwardly directed reinforcing flange integral with both sides of the bolster.

3. A pair of center sills including two vertical webs each having a central opening therethru to receive a draft gear device, one of said vertical webs having a plurality of outwardly extending flanges adjacent one side of said openings and a plug or closure member adapted to be secured to said flanges to secure the draft gear device in place.

4. The device of claim 3 in which the opening closed by the plug is materially larger than the opening in the opposite web.

5. A center sill construction for a cast steel underframe including two spaced vertical webs, a plurality of horizontal outwardly directed flanges on one side of said webs, an outwardly directed flange on the other web, each of said webs having a gear receiving opening therein, the opening in the first mentioned web being defined in part by the horizontal flanges and the opening in the opposite web being defined in part by the outwardly extending flange of that web.

6. In a cast steel underframe, a draft gear center sill structure including two vertical webs each having a gear receiving opening therein, integral stop lugs extending from each web inwardly near the margins of said openings, each of said webs having a downwardly directed triangular flange adapted to receive a yoke carrying iron, said webs being closed above by an integral plate extending from the top of one web to the top of the other.

In testimony whereof I affix my signature.

ERNEST G. GOODWIN.