Aug. 13, 1935. J. O. NEIKIRK 2,011,155

CAR CONSTRUCTION

Filed Dec. 11, 1933 5 Sheets-Sheet 1

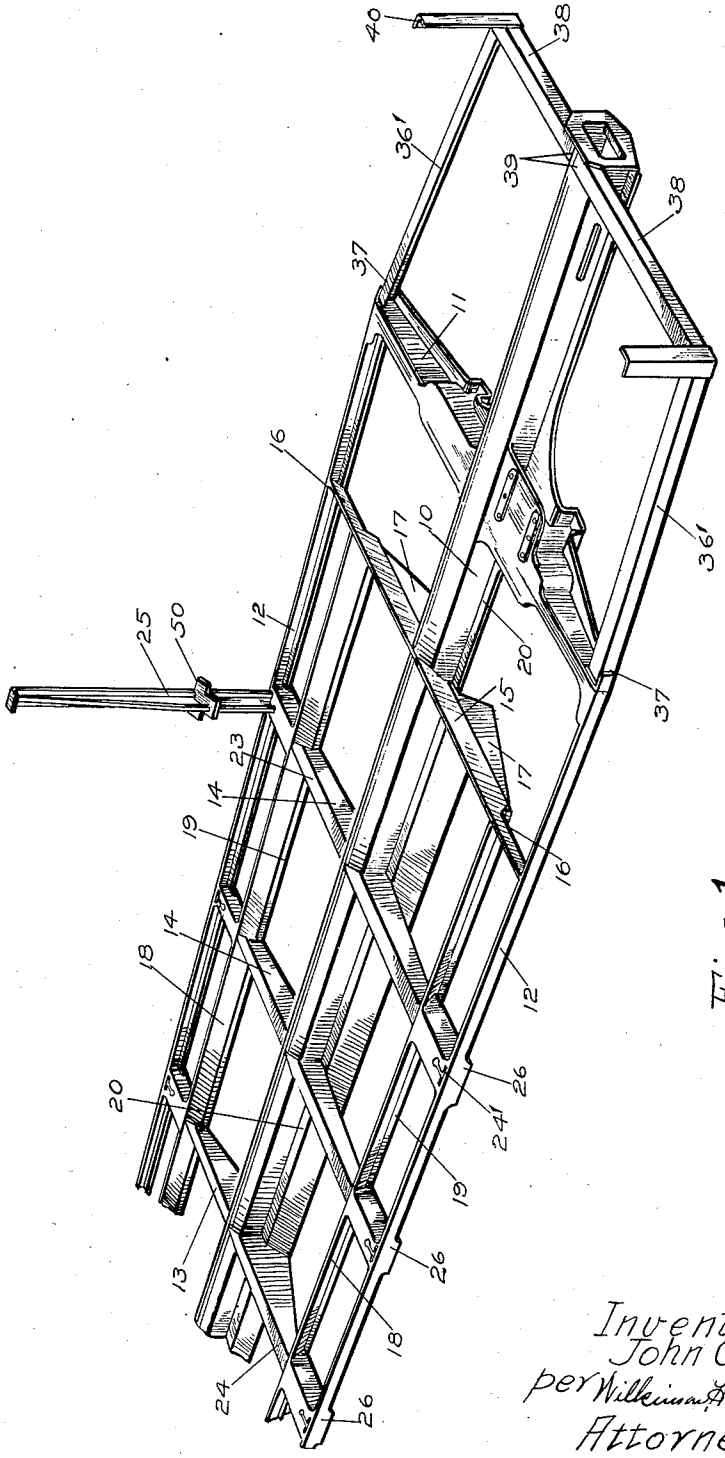


Fig. 1

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Fig. 2

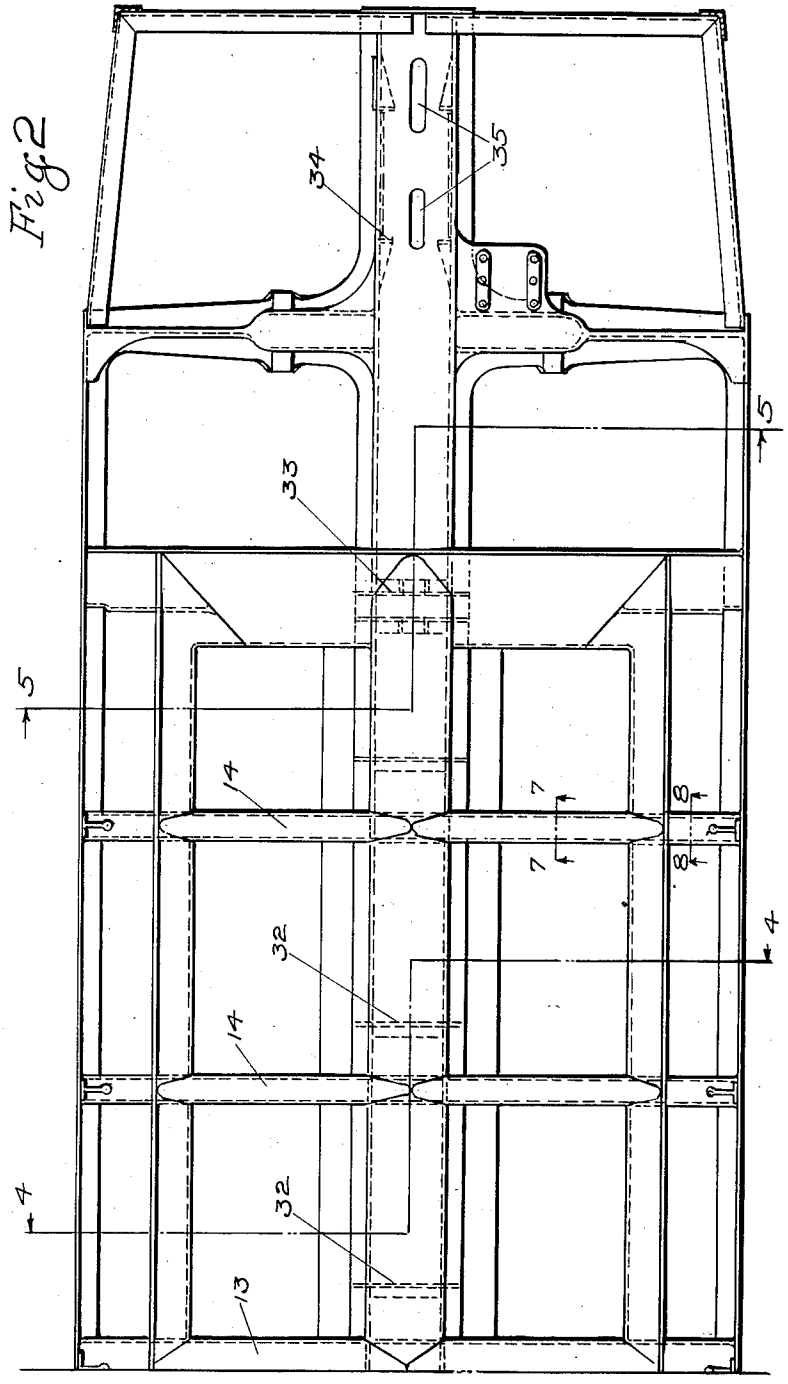


Fig. 8

Fig. 7

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CAR CONSTRUCTION

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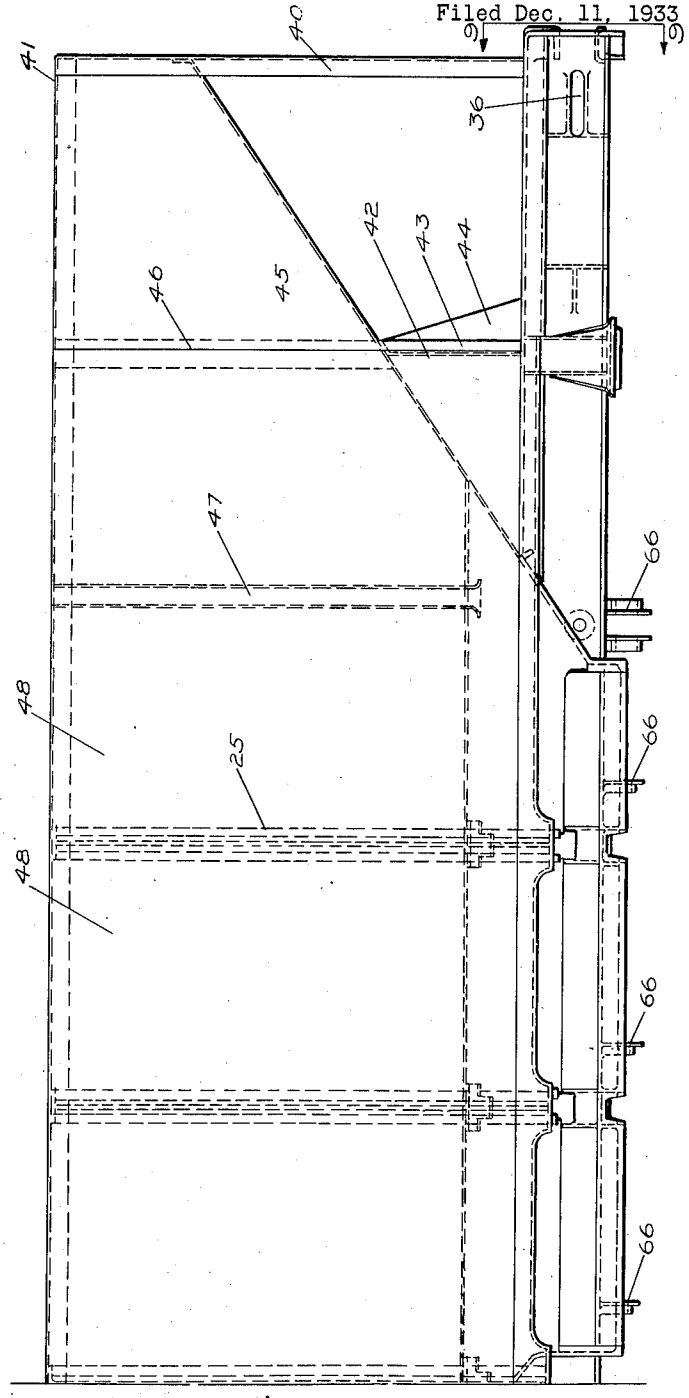


Fig. 3.

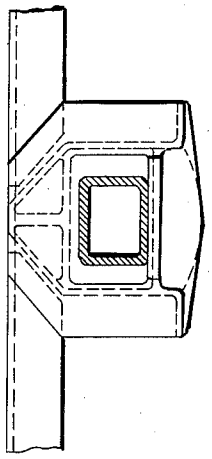


Fig 9

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CAR CONSTRUCTION

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Fig. 5

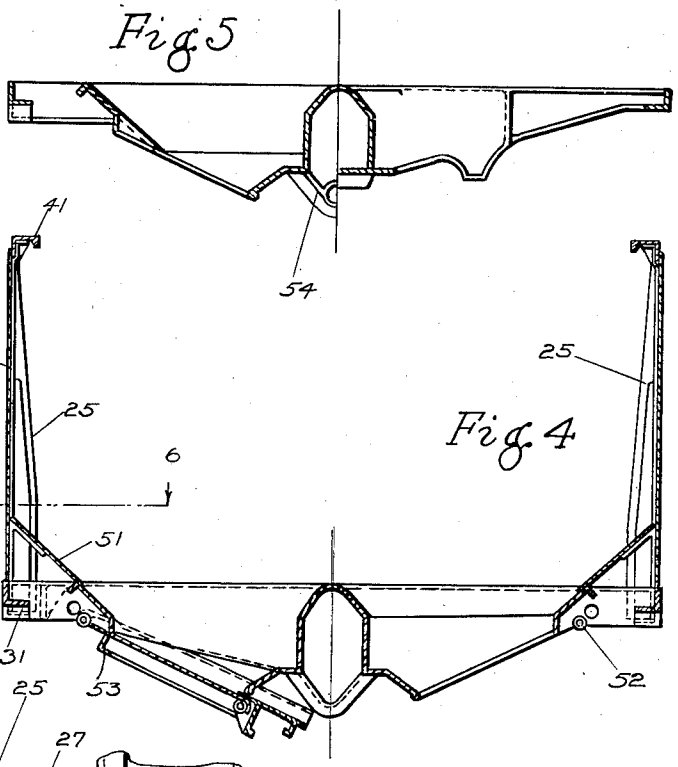


Fig. 4

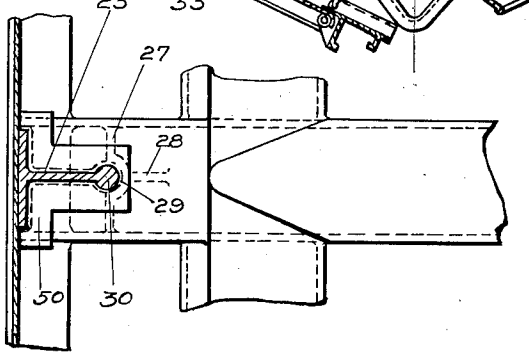


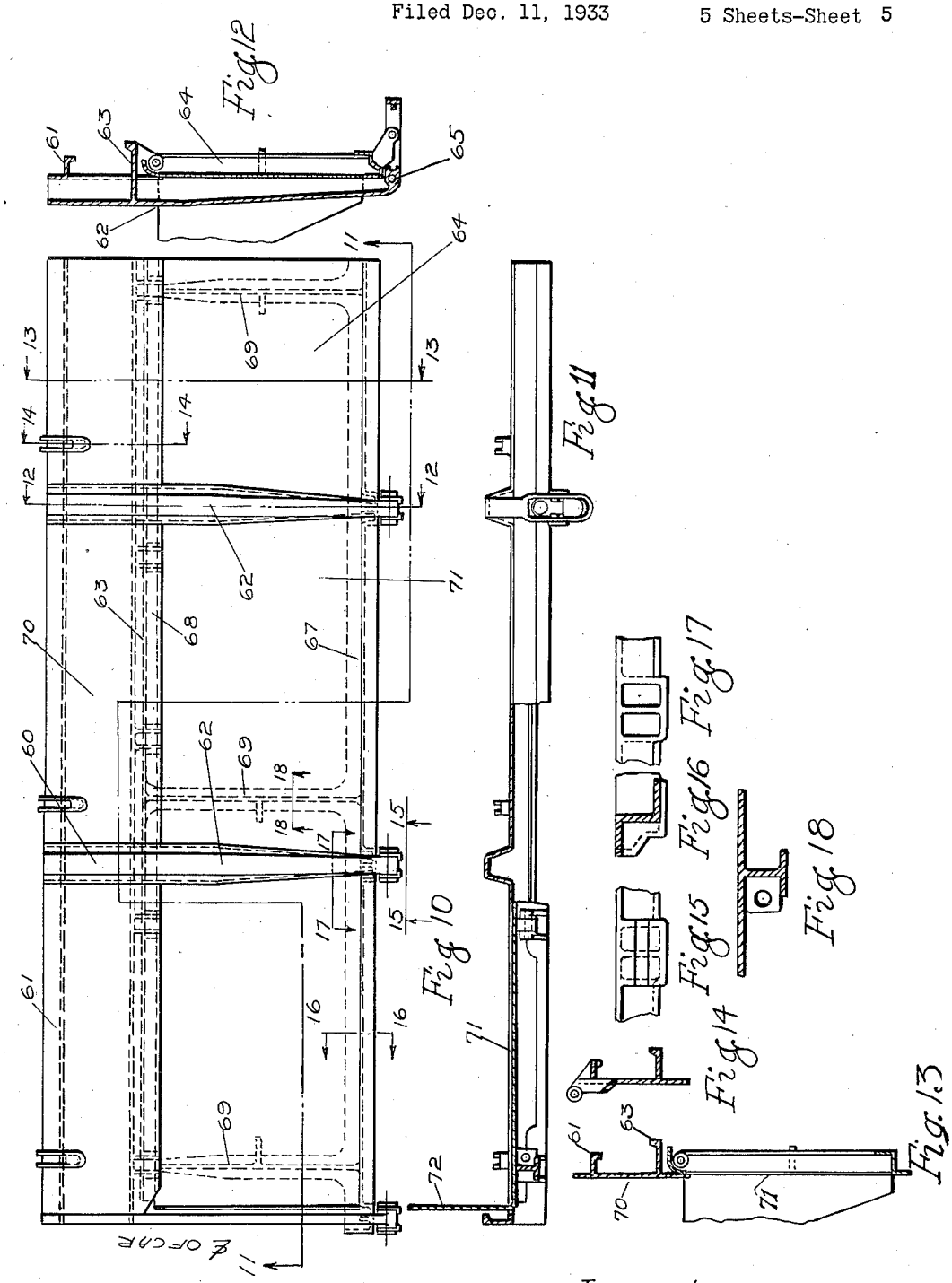
Fig. 6

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CAR CONSTRUCTION

Filed Dec. 11, 1933 5 Sheets-Sheet 5



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Patented Aug. 13, 1935 2,011,155

UNITED STATES PATENT OFFICE

2,011,155

CAR CONSTRUCTION

John O. Neikirk, Chicago, Ill., assignor to Rodger Ballast Car Company, Chicago, Ill., a corporation of Maine

Application December 11, 1933, Serial No. 701,766

6 Claims. (Cl. 105—415)

This invention relates to an improved construction for railway dump cars and is herein illustrated as embodied in a ballast car. The invention relates particularly to the car frame construction characterized in that substantially the entire frame is produced as an integral casting, preferably of steel, including as integral parts thereof, various elements of the frame which heretofore have not been so provided.

The integrally formed car frame of this invention comprises a center sill, lower side chords, body bolsters and cross ties, all of novel and improved construction, cast as an integral unitary frame. In addition, the frame includes portions of slope sheets constituting the bottom portions of the hoppers also cast integrally therewith. The frame structure in its finished form is adapted to receive the hopper doors pivotally mounted at the bottom of the cast portion of the hoppers whereby a very simple, practical and strong construction is provided.

The invention further contemplates the formation of suitable hopper doors composed of integrally cast frame parts of unitary construction, with metallic plates attached thereto in the usual manner.

This invention further involves the use of cast steel side stakes of special construction having a minimum of metal and yet superior strength, together with special receiving sockets in the integrally cast frame whereby the side stakes are adapted to be mounted in the side frame and welded thereto. As an instant of this feature, the car of this invention does not require gusset plates or corresponding supports or braces of any sort whereby the interior of the car is entirely free of such parts and consequently free of the damage to such parts which now frequently occurs during unloading operations by the use of clam shell dippers, buckets and the like. It is obvious that cars employing internal supporting braces, such as gusset plates and the like, which depend upon such parts for their strength, are constantly subjected to the danger of serious damage and impairment of strength by the customary use of clam shell dippers, buckets, and the like.

The car of this invention is further adapted to have the auxiliary parts necessary to complete the frame added thereto by welding whereby to produce a car of superior strength free from bolts or rivets or other structural features of less simplicity or inferior strength.

Although this invention is illustrated as applied to a ballast car, the invention is intended to cover other types of cars, such as other types of dump cars, in which the provisions of this invention are applicable with like advantage.

This invention may be better understood by considering the disclosed embodiment as hereinafter described in connection with the attached drawings.

In the drawings—

Figure 1 represents a perspective view of one-half of the under-frame of a ballast car constructed in accordance with the present invention;

Figure 2 is a plan view of the construction shown in Figure 1, illustrating the parts which are cast as an integral piece;

Figure 3 is a side elevational view of one-half of a completed body of a ballast car constructed in accordance with the present invention;

Figure 4 is a transverse elevational view in cross section taken on the line 4—4 of Figure 2 and looking in the direction of the arrows; (the door on the right hand side being omitted).

Figure 5 is a transverse cross sectional view taken on the line 5—5 of Figure 2, and looking in the direction of the arrows;

Figure 6 is an enlarged plan view, partly in cross section, taken on the line 6—6 of Figure 4, and looking in the direction of the arrows;

Figure 7 is an enlarged cross sectional view taken on the line 7—7 of Figure 2 and looking in the direction of the arrows;

Figure 8 is an enlarged cross sectional view taken on the line 8—8 of Figure 2 and looking in the direction of the arrows; and

Figure 9 is an end elevational view of the center sill as represented by the line 9—9 of Figure 3, and looking in the direction of the arrows;

Figure 10 is a plan view of a door for a ballast car having both portions thereof provided with integrally cast frames;

Figure 11 is a longitudinal elevational view partly in cross section taken on the line 11—11 of Figure 10 and looking in the direction of the arrows;

Figure 12 is a transverse cross sectional view taken on the line 12—12 of Figure 10 and looking in the direction of the arrows;

Figure 13 is a view similar to Figure 12, taken on the line 13—13 of Figure 10 and looking in the direction of the arrows;

Figure 14 is a transverse cross sectional view taken on the line 14—14 of Figure 10 and looking in the direction of the arrows;

Figure 15 shows a fragmentary detailed view of a portion of the inner door as represented by

the line 15—15 of Figure 10 and looking in the direction of the arrows;

Figure 16 is a fragmentary view of the construction of the inner door taken on the line 16—16 of Figure 10 and looking in the direction of the arrows;

Figure 17 is a view of the part shown in Figure 15 from the opposite direction as represented by by the line 17—17 of Figure 10 and looking in the direction of the arrows; and

Figure 18 is a fragmentary cross sectional view of the inner door taken on the line 18—18 of Figure 10 and looking in the direction of the arrows.

By referring to the drawings, it will be noted that the frame of this invention is provided as an integral unit such as may be produced by casting steel, it being understood, however, that the same may be provided of iron or any suitable iron or steel alloy. The frame comprises a center sill 10, which extends the entire length of the car and having formed therewith at the proper locations adjacent its ends body bolsters 11.

Formed integrally with the ends of the body bolsters are side sills or bottom chords 12, which extend throughout the distance between the body bolsters. At the central location of the car, a cross tie 13 is provided, which connects the center sill and the side sills or bottom chords and between the central cross tie and the body bolster are a plurality (in this instance two on each side), of similar cross ties 14, but which are preferably of less size and strength than the central cross tie. In practice, it is found that cross ties of the size and strength of the center cross tie are not needed throughout the intermediate locations. In addition to the frame parts above enumerated, a slope sheet 15 is provided at each end cast integrally with the center sill and integrally attached by means of webs 16 to the side sills. These slope sheets are inclined throughout the major portion of their length and terminate at their bottom edge in a vertical flange 17, as clearly shown in Figures 1, 2 and 3. Extending longitudinally of the car between the center sill and the side sills are additional slope sheets 18, which are integrally formed with the end slope sheets 15 and with the cross ties 13 and 14. These slope sheets also terminate in a vertical depending flange 19 at their bottom edges.

As will be noted from Figure 1, the center sill is provided with a horizontally extending flange 20, at its bottom edge, which throughout the region of the slope sheets 18, is provided with a downwardly extending shedding surface 21, arranged in opposed relationship to the slope sheets 18. The center sill is provided with topped inclined surfaces 22, whereby to shed the lading carried in the car and eliminate the liability of portions of the lading becoming lodged thereon in interference with unloading operations.

Similarly, the cross ties 13 and 14 are provided with top shedding surfaces 23 and 24, respectively. Instead of inclined top surfaces, the cross ties may have rounded tops as shown in Figure 7.

The cross ties are preferably formed at their ends with flat top surfaces, as shown in Figure 8, throughout that portion which lies exteriorly of the shedding surfaces 18. This provides an enlarged construction of additional strength in which openings or sockets 24' are provided for receiving and holding side stakes 25. This structural characteristic is more clearly illustrated in Figures 4, 5, and 6.

It will be noted that the side sills or lower chords 12 are of increased depth, as shown at 26, at the locations where they join with the cross ties 13 and 14. As shown in Figure 6, the ends of the cross ties may be provided with internal webs 27 and 28 which are formed with a semi-cylindrical socket 29 for receiving the end of the rounded reinforcement 30, of the side stakes 25. The portion of the bottom edge of the side stakes rests, as at 31, on an underlying flange which is provided as an integral part of the side sills. In constructing the car, the side stakes are inserted in their respective openings and are welded in position whereby they form in effect, an integral part of the cast frame.

One feature of this invention resides in the novel construction and mounting for the side stakes wherein special strength is obtained, enabling the elimination of gusset plates and other internal braces. The stakes here shown, when made of cast steel, and mounted by welding in the manner described, provide an extremely strong construction affording sufficient strength to withstand the outward pressure of the lading carried in this type of car. This makes for a great advantage in that the elimination of gussets, braces and the like, in the interior of the car, avoids damage and weakening of the car such as is frequently caused by grab shell buckets, dippers, and the like, which on some occasions, unavoidably block against and do damage to these parts.

The exact formation of the various parts of the frame may be selected according to need but in Figure 1, is clearly shown one preferred form of parts, such as for instance, the body bolsters and the like. It is of course, contemplated that necessary internal strengthening of the center sill is provided as a part of the casting such as is represented at 32 and 33 in Figure 2. Similarly, the usual structural features such as the lugs 34, openings 35 and 36 are provided for mounting the draft gear. Likewise, any other special features of construction now employed in the standard types of cars can be provided as a part of the integral casting. Mounting lugs, brackets and the like, for back rigging and other necessary parts of the car are specifically referred to.

At the ends of the car, side sill elements 36' are preferably provided as separate pieces which are welded as at 37, to the body bolster. Likewise, end sills 38 are provided welded to the ends of the side sills 36 with their inner ends welded as at 39 to the center sill. The corner stakes 40 may be provided as separate parts which are welded at their lower ends at the juncture of the sills 36 and 38 and extend upwardly for engagement with the top chord 41 as shown in Figure 3.

At the location of the body bolster a transverse brace may be provided for supporting the sloping floor of the car which may be of any suitable construction but as here illustrated, comprises a sheet metal web 42 which extends throughout the width of the car, braced by means of angles 43 and gussets 44. The gussets 44 may be located at the central region and extend downwardly for welding to the top or side of the center sill. Plate 42 may have its end built over as at 45 for engaging the top surfaces of the braces 43 and 44, respectively, and thereby provide an inclined supporting pedestal for the under-surface of the car floor. Internal wall braces 46 and 47, as shown in Figure 3, may be provided against the inner

surface of the wall plates to add strength and rigidity. The exterior wall of the car is completed by means of the usual top chord 41 which is secured along the tops of the side stakes 25 and to which may be attached on the exterior edge thereof, sheet metal wall plates 48 as shown in Figure 3.

Each side stake 25 is equipped with an inclined flange 50, clearly shown in Figures 1, 4 and 6, providing a support for sheet metal slope sheets 51. The flanges 50 are of sufficient width to provide a generous ledge for the slope sheets to rest upon whereby it will be unnecessary for the slope sheets to be provided with accurately cut openings to fit around the side stakes. As shown in Figure 6, the lower end of the slope sheets extend to the upper edge of the cast portion of the slope sheet 18, whereby the edges may be secured thereto by welding, or other suitable securing means.

An important structural change over the usual type of dump car is embodied in the present invention making it possible to eliminate the usual internal gusset plates or other diagonal ties or braces now employed as necessary means for sustaining the side stakes against the outward pressure of the load. To understand this improvement, attention is directed to the fact that the connection of the bottom end of the side stake with the side sill serves primarily to sustain the side stake in the vertical direction whereas the outward thrusts are resisted by the sustaining gussets or other diagonal ties or braces.

Gussets and the like, have been necessary in the past, because they are attached to and support the side stake from a point sufficiently high on the stake to provide an adequate holding force through an increased leverage or mechanical advantage. In other words, it may be regarded that the connection at the bottom of the side stake with the center sill supports, in the vertical direction, the side stake, and also establishes the fulcrum point in connection with which a gusset or diagonal brace is employed, attached to the side stake, at a point sufficiently above the fulcrum point to provide, through leverage, the necessary strength.

The present invention involves the principle of utilizing the side sill for its vertical support in the usual way and providing a bottom support or fulcrum point for the lower end of the side stake lower than has been utilized heretofore, whereby the leverage or mechanical advantage necessary for sustaining the side stake against lateral movement is accomplished through means located lower than has heretofore been possible, and whereby it is possible to eliminate undesirable means, such as gussets, angle braces and the like, which extend a substantial distance into the body of the car.

This invention embodies the above mentioned principle of structure through the fact that the side sills 12 provide bottom supports for the side stakes at a point sufficiently below the inclined flanges 50, to provide through slope sheets 51 adequate bracing strength for the side stakes. It will be noted that the side sills are deflected downwardly as at 26, and form lower points of support. Other structural forms may be utilized for practicing this feature of the invention, such as for instance, extending the ends of the side stakes downwardly below the side sills and anchoring the depending ends to suitable supports under the car. The ends could be anchored by transverse braces extending upwardly for attachment to the cross ties or to any other part of the frame or in certain types of cars, the ends could be anchored by means of cross tie rods underneath the car and connected between the stakes on opposite sides of the car.

It is obvious that the sustaining strength of the side stake is realized through the use of means connected in a way to provide the necessary leverage, and therefore, if the leverage is provided through a construction located in a lower position, then the upper bracing means can be correspondingly lowered, such as will enable the use of means which could not be heretofore used. In the present illustration, the slope sheet 51 provides the sustaining support and enables the elimination of the usual gusset plates, angle braces or the like.

From the above description, it will be noted that a new and improved type of car is provided having as one of its structural advantages, integrally cast slope sheets constituting the lower portion of the hoppers and that the lower portion of the hoppers, are equipped with doors mounted directly thereon in operative relationship to the discharge openings. Accordingly, hinge means 52 may be provided as shown in Figure 4 for mounting the doors 53. The doors are disposed in the usual manner with their lower ends adapted for closing engagement with the lower edge of the downwardly extending flange 21, carried by the center sill.

Door operating mechanism of the usual construction may be provided such as by means of a shaft carried in the shaft hanger 54, integrally formed on the under side of the center sill as shown in Figure 5. The doors are more clearly illustrated in Figures 10 to 18, inclusive, from which it will be noted that the general characteristics are quite similar to the doors now employed for ballast cars. However, it will be noted that the door comprises a main frame 60, having an edge brace 61, transverse braces 62, and an inner longitudinal brace 63 which serves as a mounting for the hinges of the inner door 64. The door is provided as at 65 with hinges for mounting the door on the lower end of the hoppers by means of hinge brackets 66, shown in Figure 3. The inner door likewise comprises an integrally cast frame consisting of longitudinal braces 67 and 68 respectively, and transverse braces 69. That portion of the main door frame which is not occupied by the inner door is covered by metallic plates 70, whereas the inner door is covered with a metallic plate or plates 71. Preferably the plate or plates 71 for the inner door are provided with their ends bent upwardly as at 72, for closing end openings when the door is opened. It is understood that the cross sectional shapes of the various parts of the car and door frame may vary according to need but a preferred construction therefore is illustrated in the drawings.

From the above description it will readily appear that this invention relates to a new and improved construction for railway cars of the dump car type which is complete in all particulars, and is one which makes for superior strength and greater simplicity of construction.

It is to be understood that the invention is not to be restricted by the disclosure herein given as it is merely illustrative and one preferred embodiment of the invention. Although the illustrated embodiment relates to a ballast car, it is obvious that the invention is likewise applicable to ordinary hopper and other types of dump cars, and when so applied that the integrally cast slope

sheets and other structural parts could be modified to the extent necessary to conform to the required construction of the car to which the invention is applied.

I claim:

1. A car frame of the character described, comprising integrally cast center sill, cross ties, side sills, and slope sheet carried by said cross ties, said cross ties having shedding surfaces throughout their portions located inside of said slope sheet and flat top surfaces throughout their portions located exteriorly of said slope sheet and constructed to form with said side sills, enlarged joints, provided with a socket for receiving the end of a side stake.

2. A car frame of the character described, comprising a center sill having inclined top surfaces adapted to shed lading therefrom, integrally formed cross ties having inclined top surfaces adapted to shed lading therefrom, and integrally formed inclined walls projecting downwardly and away from said center sills on each side thereof throughout the extent of said center sill which is coextensive with the space between said cross ties, said inclined walls providing slope sheets as portions of hoppers on each side of said inner sill and also providing integral strengthening members for said center sill.

3. A car frame of the character described comprising a center sill having inclined top surfaces adapted to shed lading therefrom, integrally formed cross ties having inclined top surfaces adapted to shed lading therefrom, and, integrally formed inclined walls projecting downwardly and away from said center sills on each side thereof throughout the extent of said center sill which is coextensive with the space between said cross ties, said inclined walls providing slope sheets as portions of hoppers on each side of said center sill and also providing integral strengthening members for said center sill, and integrally formed wall members carried between said cross ties and spaced outwardly from said center sill and providing hopper walls extending downwardly and toward said inclined walls of said center sill.

4. An integrally formed car frame of the character described, comprising a longitudinally disposed center sill, a pair of side sills spaced from and disposed parallel to said center sill and integrally connected thereto by cross ties, and integrally formed wall members carried by said cross ties disposed in the space between, and extending parallel to said center sill and said side sills, said last named members being inclined inwardly and downwardly and serving as slope sheets for hoppers on each side of said center sill.

5. An integrally formed car frame of the character described, comprising a longitudinally disposed center sill, a pair of side sills spaced from and disposed parallel to said center sill and integrally connected thereto by cross ties, and integrally formed members carried by said cross ties disposed in the space between, and extending parallel to said center sill and said side sills, said last members being inclined inwardly and downwardly and serving as slope sheets for hoppers on each side of said center sill, and inclined wall portions integral with said center sill and projecting downwardly and toward said inclined wall members providing inner slope sheets for said hoppers and strengthening members for said center sill.

6. An integrally formed car frame of the character described, comprising a longitudinally disposed center sill, a pair of side sills spaced from and disposed parallel to said center sill and integrally connected thereto by cross ties, and integrally formed wall members carried by said cross ties disposed in the space between, and extending parallel to said center sill and said side sills, said last members being inclined inwardly and downwardly and serving as slope sheets for hoppers on each side of said center sill, and inclined wall portions integral with said center sill and projecting downwardly and toward said inclined wall members providing inner slope sheets for said hoppers and strengthening members for said center sill, said center sill and cross ties having upper inclined surfaces for shedding lading therefrom.

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