April 10, 1951 H. W. SANFORD 2,548,395

WIDE FRAME MINE CAR

Filed May 12, 1947 6 Sheets-Sheet 1

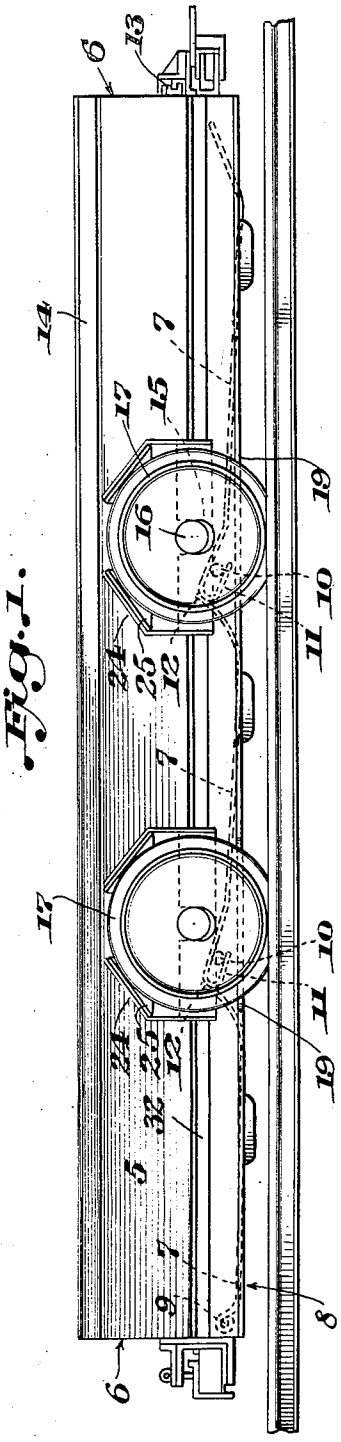

Fig. 1.

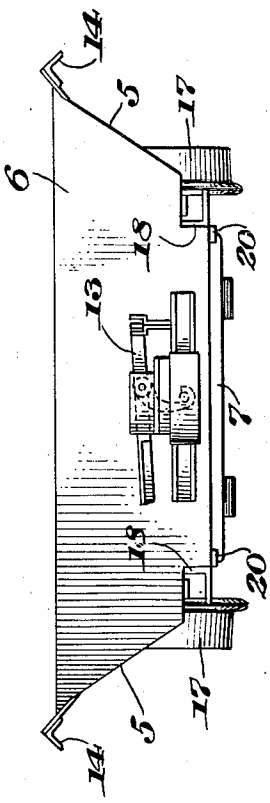

Fig. 2.

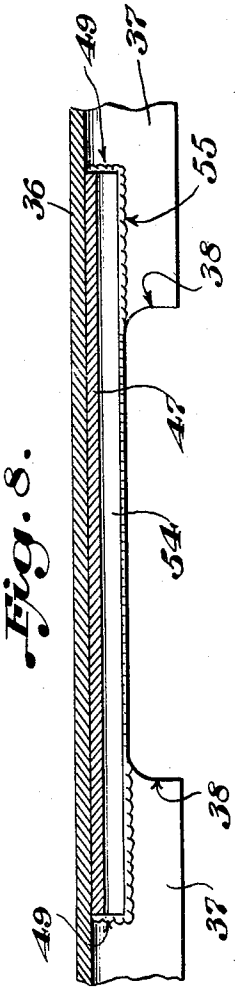

Fig. 8.

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April 10, 1951 H. W. SANFORD 2,548,395

WIDE FRAME MINE CAR

Filed May 12, 1947 6 Sheets-Sheet 2

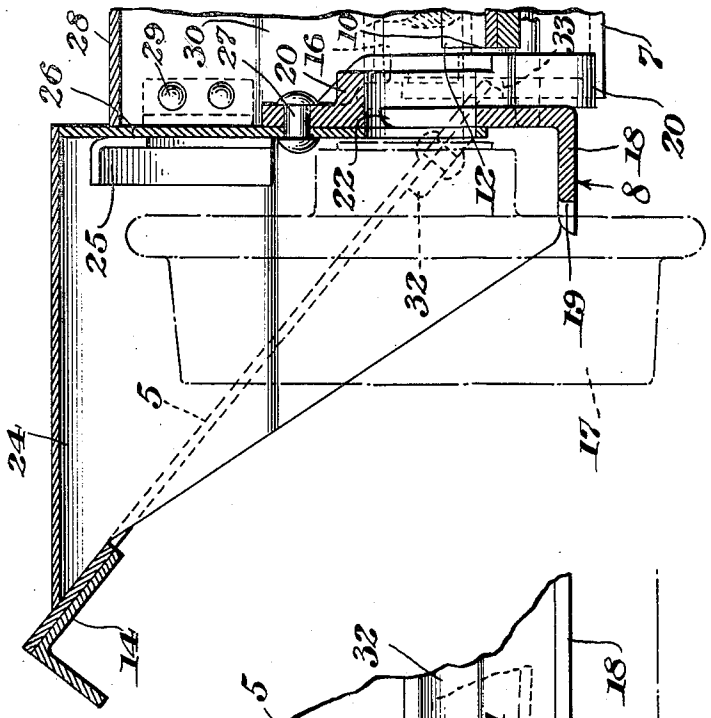

Fig. 4.

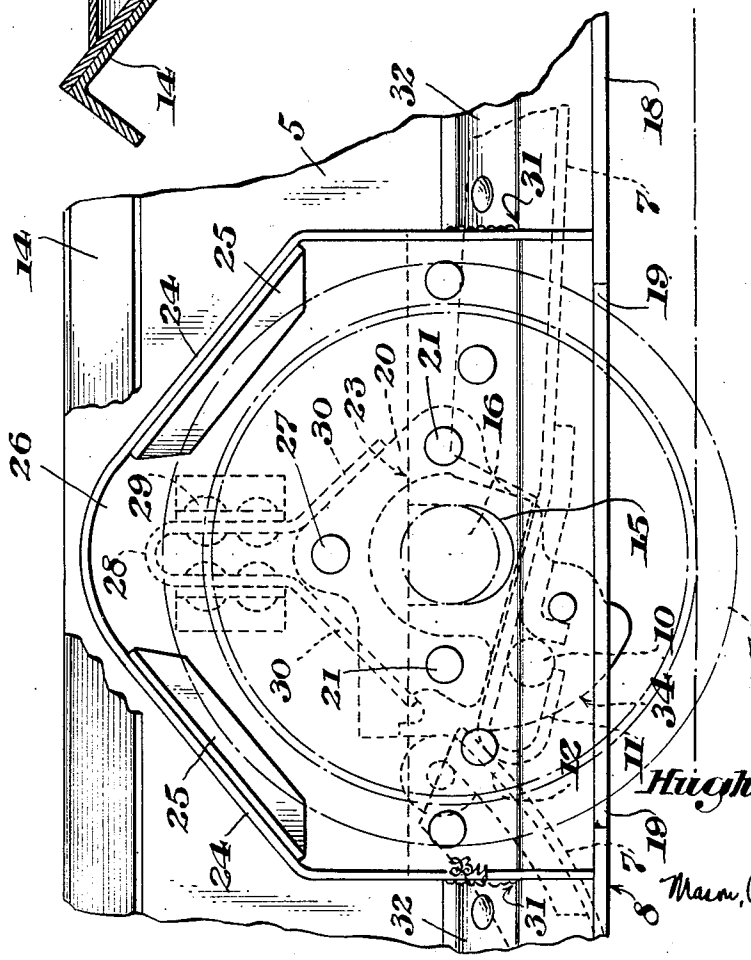

Fig. 3.

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April 10, 1951 H. W. SANFORD 2,548,395

WIDE FRAME MINE CAR

Filed May 12, 1947 6 Sheets-Sheet 3

Fig. 5.

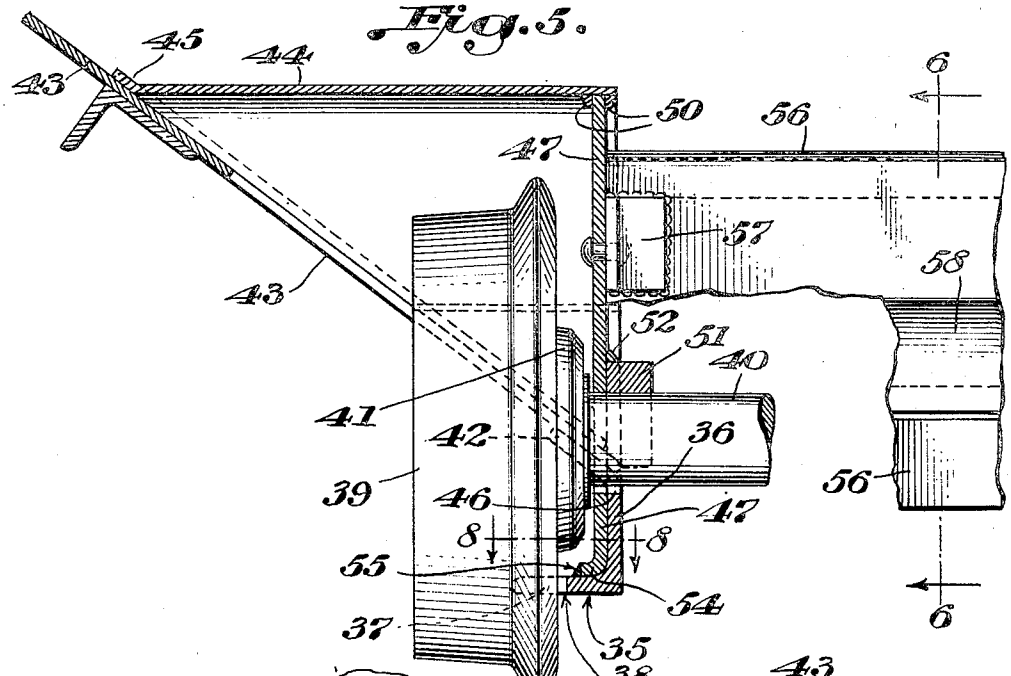
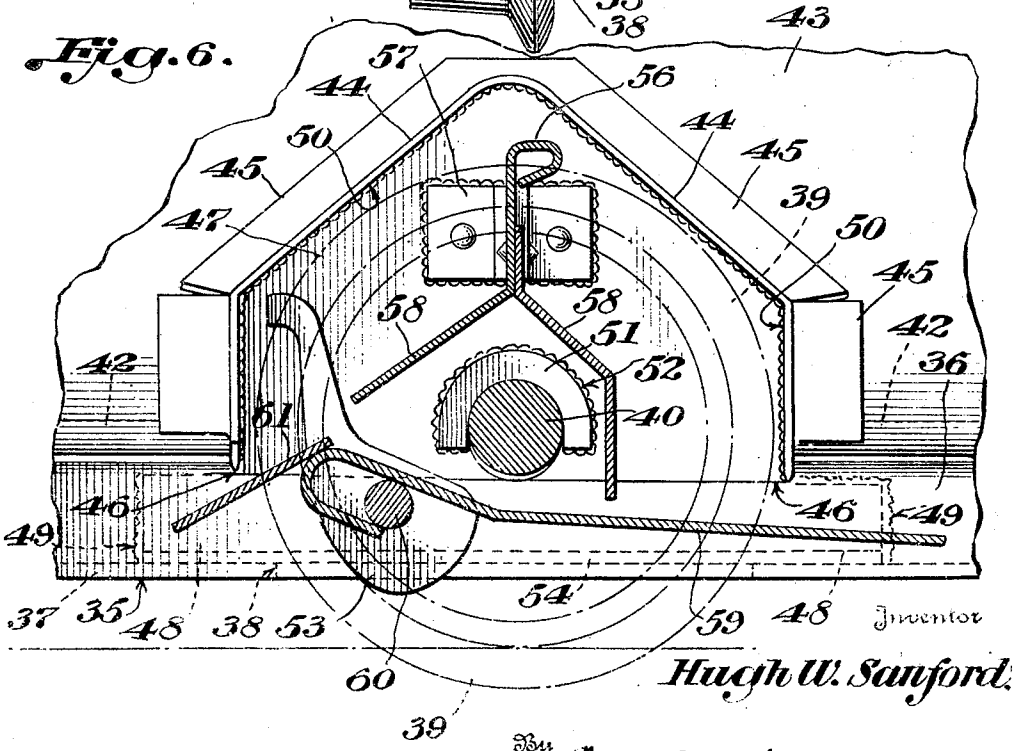


Fig. 6.



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April 10, 1951 H. W. SANFORD 2,548,395

WIDE FRAME MINE CAR

Filed May 12, 1947 6 Sheets-Sheet 4

Fig. 7.

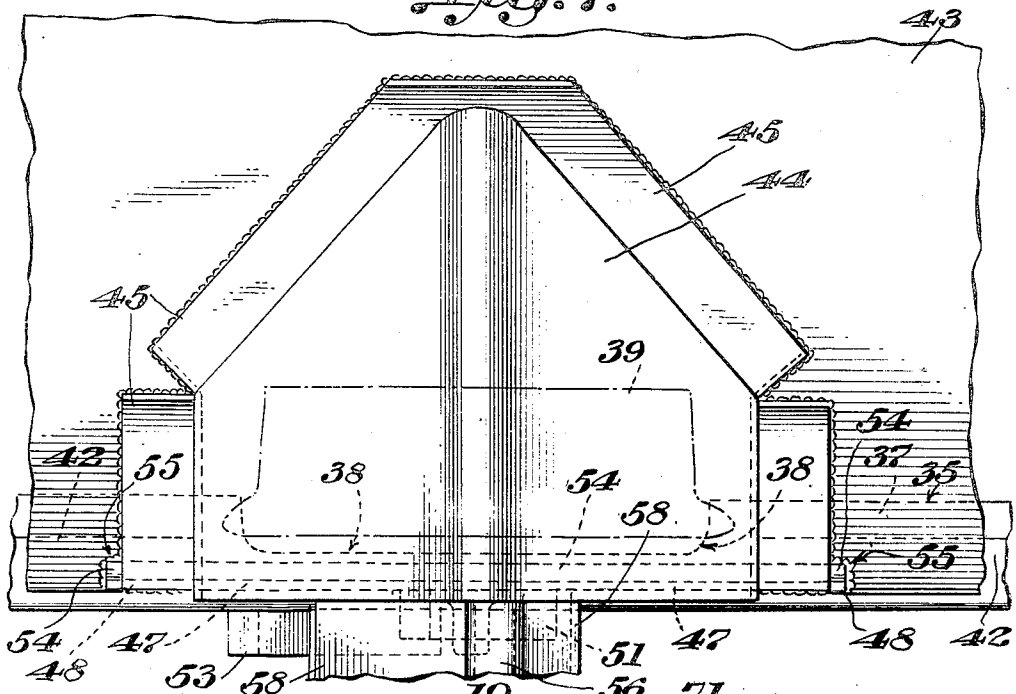

Fig. 9.

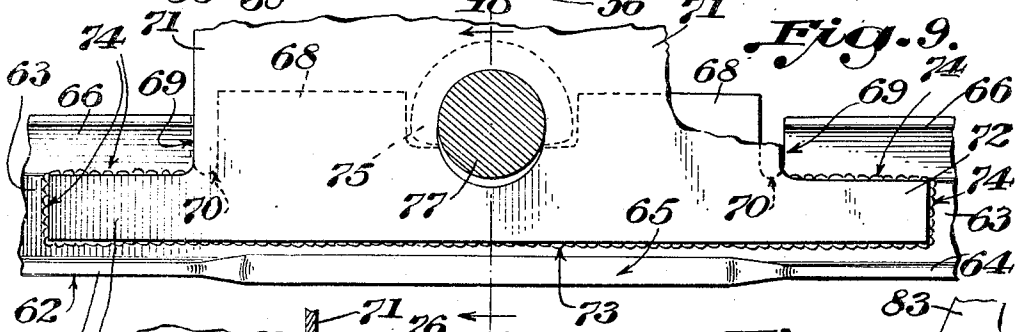

Fig. 12.

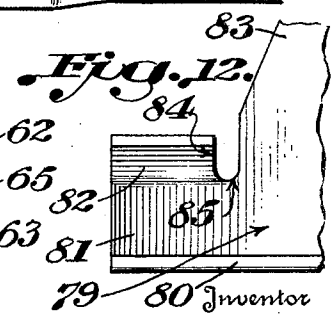

Fig. 11.

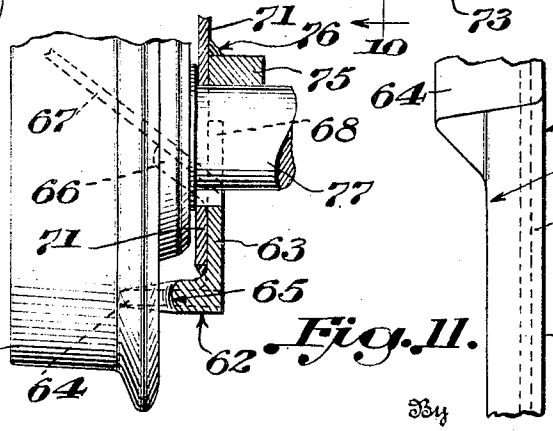

Fig. 10.

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April 10, 1951 H. W. SANFORD 2,548,395

WIDE FRAME MINE CAR

Filed May 12, 1947 6 Sheets-Sheet 5

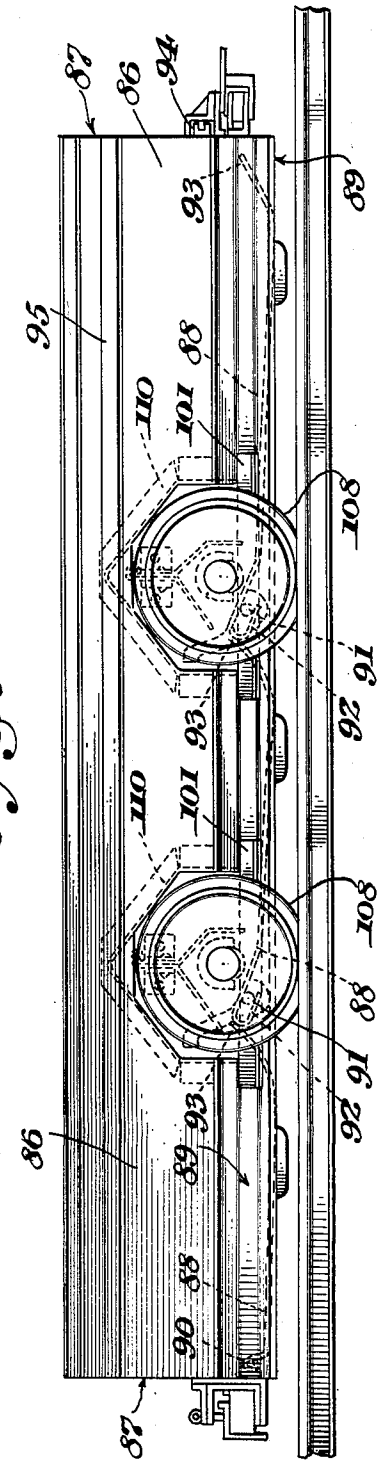

Fig. 13.

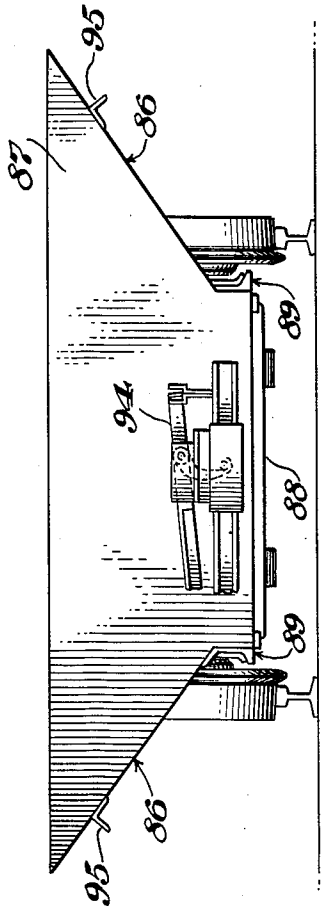

Fig. 14.

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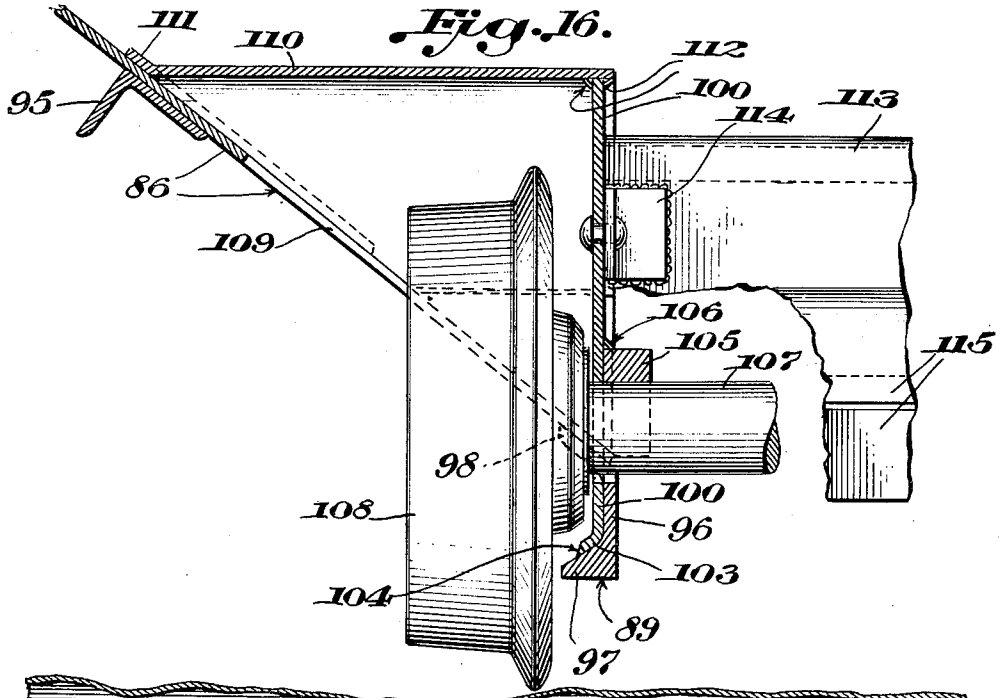
April 10, 1951 H. W. SANFORD 2,548,395

WIDE FRAME MINE CAR

Filed May 12, 1947 6 Sheets-Sheet 6

Fig. 16.



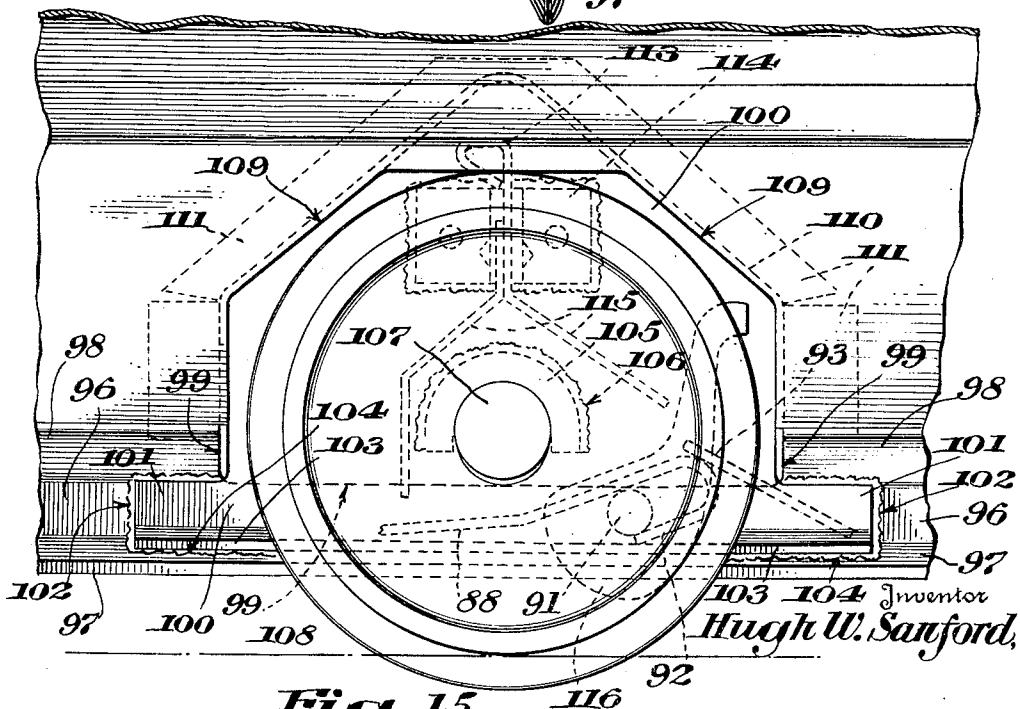


Fig. 15.

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UNITED STATES PATENT OFFICE

2,548,395

WIDE FRAME MINE CAR

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Application May 12, 1947, Serial No. 747,434

19 Claims. (Cl. 105—364)

1

The invention relates generally to mine cars and primarily seeks to provide certain new and useful frame and body structure combinations designed to simplify manufacture of cars of this character and provide a maximum of lading space therein for the same over-all dimensions of cars and in conjunction with cars having limited outside dimensions as well as required practical working clearances above the ground outside the wheels.

This application constitutes a continuation-in-part of the co-pending application for U. S. Letters Patent Serial Number 285,393, filed by me on July 19, 1939, now Patent No. 2,422,136, June 10, 1947.

In the manufacture of mine cars it is, of course, desirable to make the cars as simple and sturdy in construction as is possible, and also to provide the maximum of lading space obtainable therein within the practical limits. One conventional means of providing added lading space is to equip the cars with side wing structures which project laterally beyond the wheels in a plane cutting the wheels. These low side wing extensions necessitate the building of hoods over the wheels and these hood structures sometimes seriously hamper the mounting and removal of wheel structures. It is also customary to provide inwardly and downwardly flared bottom portions in such side wing structures, these slopes downward towards the car sills being necessary in cars of the bottom dumping type to properly shed the lading into the bottom dump opening, and in cars of the rotary or end dumping type, to enable a low positioning of the inner limits of the wing bottoms and the relatively high positioning of the outer limits of said bottoms that they be essential to the provision of necessary roadbed clearances outwardly of the car supporting trackage.

It is well known that mine cars travel over trackage of definite gage. The track gage determines the spacing between the wheel flanges at opposite sides of the car, and this, in turn, provides a definite limitation to the transverse separation of the sill members passing between oppositely disposed wheels. Since the lading capacity provided between the oppositely disposed sills is controlled by the width of the separation of the inside faces of these sills, the capacity of cars having wing bottoms extending outside of the sill members at levels above that of the bottom of the sill is increased by a construction which permits the said sills when located between the wheels to be brought as close to the wheel flanges as possible so as to provide the maximum

2

lading space between the inside walls of the oppositely disposed sills. It matters not how close the outer portions of the sill members or related structures might be placed in relation to the wheel flanges, no advance in the art of obtaining a maximum lading capacity in a mine car of fixed over-all dimensions is made unless the innermost opposed faces or lading space defining walls of said sill members are placed farther apart transversely than the spacing which was conventional prior to the present invention. Therefore, it is an object of the present invention is provide a novel construction and arrangement of sills in which it is possible to place the inner or lading space defining surfaces of the upright wall portions of the sill members farther apart than the conventional spacing of sill members, thereby to provide greater lading capacity in the mine car at the low level of and between the sill members.

An object of the invention is to provide a novel construction and arrangement of sills of the character stated in which the sill members have outwardly directed flanges which are recessed to receive the wheels and permit the placing of the upright wall portions of the sill members closer to the wheel and the spacing of the inner or lading space defining surfaces of said upright wall portions farther apart than the conventional spacing.

Another object of the invention is to provide a novel construction and arrangement of sills of the character stated in which the recesses in the outwardly directed sill flanges are formed by forging or reshaping or deforming rather than by notching, thereby to avoid the cutting away of the metal of the flange and the resulting weakening of the sill structure.

Another object of the invention is to provide a novel construction and arrangement of sills of the character stated in which the sills include outwardly directed top flanges which extend outwardly from the upright wall portions of the sills to provide low level support for the wing bottoms, said flanges being cut away opposite the wheels to facilitate close spacing of said wheels and upright wall portions, and there being included a reinforcing plate welded in a novel manner to the upright wall portion of a sill opposite each wheel and extending upwardly through the particular top flange cut-away and equipped with an axle bearing.

Another object of the invention is to provide a novel construction and arrangement of sills including cut away top flanges and welded reinforcing plates of the character stated in which each sill comprises a rolled structural element

the lower flange of which is so shaped as to provide the desired strength and yet permit the desired close spacing of the sills with relation to the wheels without the necessity of recessing said lower flanges by notching or reshaping.

Another object of the invention is to provide a novel construction and arrangement of sills of the character stated in which each reinforcing plate forms a closure for the inner end of a hood over one of the wheels.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following detailed description, the appended claims, and the several views illustrated in the accompanying drawing.

In the drawings:

Figure 1 is a side elevation of a bottom dumping mine car embodying the invention.

Figure 2 is an end elevation of the car shown in Figure 1.

Figure 3 is an enlarged side elevation of a fragment of the car of Figure 1 at the position of one of the wheel structures, parts being broken away and the wheel and axle being shown in dot and dash line phantom.

Figure 4 is a central vertical cross section of the parts shown in Figure 3.

Figure 5 is a fragmentary vertical cross sectional view similar to Figure 4 illustrating a modified form of the invention wherein the inner end of each hood is closed by a single plate which is welded to and forms a reinforcement of the sill at the position of one of the wheels.

Figure 6 is a vertical cross section taken on the line 6—6 on Figure 5.

Figure 7 is a plan view of the mine car fragment shown in Figures 5 and 6.

Figure 8 is a detail fragmentary horizontal sectional view through the sill structure shown in Figure 5 at the position of one of the wheels, the section being taken on the line 8—8 on Figure 5.

Figure 9 is an enlarged fragmentary side elevation illustrating a modified form of sill structure in which the wheel opposing recess is formed by a forging or re-shaping or deforming of the lower outwardly directed flange.

Figure 10 is a fragmentary vertical cross sectional view illustrating the recessed sill structure of Figure 9, the section being taken on the line 10—10 on Figure 9.

Figure 11 is a fragmentary plan view illustrating the recessed sill structure of Figures 9 and 10.

Figure 12 is a fragmentary face view illustrating a slightly modified form of sill reinforcing, hood closure plate.

Figure 13 is a view similar to Figure 1 showing a modified car structure including rolled structural sill elements, the lower flanges of which are so shaped as to provide the desired strength and yet permit the desired close spacing with respect to the wheels without the necessity of recessing or notching said flanges.

Figure 14 is an end elevation of the car structure shown in Figure 13.

Figure 15 is an enlarged fragmentary side elevation at the position of one of the wheels of the car structure shown in Figure 13.

Figure 16 is a vertical cross section of the structure shown in Figure 15.

In the accompanying drawings there are illustrated several examples of practical embodiment of the invention.

In the form of the invention shown in Figures 1 to 4 of the drawings, the invention is shown as embodied in a mine car of the bottom dumping type including side walls 5 and end walls 6, the side walls being inclined inwardly and downwardly so as to shed the lading through the bottom dump opening controlled by the bottom dump doors 7 which operate between the longitudinally disposed parallel spaced sill members 8 which define the bottom dump opening. The doors may be of any approved construction and the foremost door is pivoted as at 9 in the usual manner. The other doors have their pivot rods 10 disposed in hinge loops 11 formed on the door structures so that as each door is swung upwardly to its bottom closing position, the free edge thereof will suitably engage the adjacent pedestal structures and be moved forwardly so that the hinged edge of the respective door will move beneath and support the overlying free edge 12 of the next foremost door in the manner illustrated in Figures 1 and 3 of the drawings. The free edge of the rearmost door is supported by the usual automatically operable latching equipment generally designated 13. The side walls 5 may be reinforced at their upper edges by longitudinal angle members 14.

The car structure illustrated in Figures 1 to 4 of the drawings is of the 4-wheel, 2-axle type, and the sill members 8 are recessed as at 15 to clear the cross axles 16 on which the wheels 17 are mounted. It will be noted, also, by reference to Figures 1, 3 and 4 of the drawings, that the horizontal flanges 18 of the sill members are recessed as at 19 to straddle the wheel flanges and thus minimize the space intervening the inner faces of the wheels and the outer faces of the sill members vertical flange portions.

A plate or casting 20 is attached to each sill member at the position of each recess 15, and these elements are secured as at 21 to the vertical flange of the sill members. These elements 20 provide wider bearing surfaces for the axles and lugs engaged by transverse brace members to be referred to hereinafter. Each member 20 has an axle bearing aperture 22 therein and an outer face recess 23 for receiving the vertical flange portions lying at each side of the respective sill member recess 15 so as to additionally facilitate close spacing of the wheels and sill members and the provision of a maximum of lading space intervening the inner faces of the sill member vertical flange portions.

The side walls 5 are cut away to accommodate the positioning of hood members 24 which overlie the wheel structures in the well known manner. Each hood structure 24 is welded in position, and secure attachment is facilitated by provision of suitable supporting brackets 25 secured to wall plates 26 which form sill-reinforcing arch means and inner closures for the hoods. These plates are secured as at 27 to the elements 20 and also by the same rivets 21 which secure the vertical flange portions of the sill members and the elements 20 in assembled relation.

Each opposed or cooperating pair of hood and closure plates 26 is joined in rigid assembly by a cross tie member 28 weld-secured to said plates by aid of mounting brackets 29 and comprising a metal plate structure bent into inverted U-form and including downwardly extended lading shedding flange portions 30 which overlie the axle members 16 in the manner best illustrated in Figure 3 of the drawings.

It will be noted by reference to Figures 3 and 4 of the drawings that the vertical flange portions

of the sill members extend full height within each hood structure so as to add this strength to the sill and so as to provide ample surface for the attachment of the elements **26** and **20**. At each side of each hood structure, the sill members are split vertically as at **31** and are bent outwardly-upwardly to form attaching flanges **32** to which the side wall or wing bottom plating **5** is rigidly secured, and to provide a low start for the flare of the wing bottoms and increase the strength of the sill construction. This outwardly bent portion is normally welded to the vertical transverse side walls of the hood structures. It will be observed by reference to Figure 4 of the drawings that the plating **5** is extended inwardly beyond the sill members **8** as at **33** so as to overhang the door edge and shed lading thereover.

It is to be understood, of course, that the invention is not limited to any particular angle of presentation of the split and bent sill portions. The angular relation of the respective wall portions of the sill members depends entirely upon the form of side wing bottom to be used and attached to the split and bent sill portions and said portions may, therefore lie horizontally or at various angles.

It will be observed by reference to Figure 3 of the drawings that each element **20** includes a camming or door wedging surface **34** which is engaged by abutment members secured to the free edge portion of the particular door structure for wedging that door structure forwardly into its door securing position in the manner hereinbefore described.

A modified arrangement of parts somewhat similar to that shown in Figures 1 to 4 is shown in Figures 5 to 8, and in this modified arrangement the continuous length sill members generally designated **35** have relatively shallow upright wall portions **36** extending in parallel spaced relation from end to end of the car, and substantially horizontal, outwardly extending wide bottom flanges **37** which provide stiffness against warping and twisting of the sills. The bottom flanges **37** are cut away or notched as at **38** to provide wheel clearances and permit placement of the upright wall portions **36** of the sills close to the wheels **39** which are mounted on the usual cross axles **40**. The recessing and placement of the sill members as shown in Figure 5 provides a greater than conventional spacing apart of the upright wall portions **36**, and in this manner a greater than conventional lading space is provided between the sills. It will be noted that the wheels include shallow hubs **41**.

The upright wall portions **36** of the sills are relatively shallow and merge into upwardly and outwardly turned flanges which provide low level supports for the wing bottoms **43**. It will be apparent by reference to Figure 5 that the upwardly and outwardly extending wing bottoms intersect the wheels **39** and are cut away or recessed to permit the wheels to project upwardly therethrough in the manner illustrated. Hoods **44** extend over the wheels and are affixed as at **45** to the wing bottoms, as by welding.

The upwardly and outwardly projecting wing bottom supporting flanges **42** are cut away as at **46** where they pass along opposite the wheels **39**, the whole of said flanges being cut away down to the top edge of the upright wall portions **36** in the manner clearly illustrated in Figures 5 and 6. A closure plate **47** having end extensions **48** is welded as at **49** to the outer face of the upright wall portion of the sill at each cut-away in the supporting flange **42**, and each said closure plate extends upwardly into the respective hood and is attached thereto as by welding at **50**. Each hood closure plate has an axle clearance and an axle bearing member **51** welded thereto as at **52** in position for resting upon the respective axle in the manner clearly illustrated in Figures 5 and 6. It will be apparent by reference to Figure 6 that the usual wedge or roller bar hanger **53** is welded to the inner face of each upright sill wall portion opposite each wheel.

The plates **47** serve also as reinforcing means for the sills where they are notched or recessed as at **38**, and it will be apparent by reference to Figures 5 and 6 that the lower edge extremity of each plate is in the form of an angle which seats in the juncture of the upright wall portion **36** of the sill member and the outwardly directed bottom flange **37**, said angle **54** being welded as at **55** to the sill and being extended at each end beyond the terminus of the respective notch or recess **38**.

Each pair of hood end closure plates **47** is joined in rigid assembly by a cross tie assembly **56** which is weld-secured to the plates by aid of brackets **57**, and each said assembly **56** includes downwardly extending lading shedding flange portions **58** disposed over the axles **40** in the manner clearly illustrated in Figure 6.

In the form of the invention illustrated in Figures 5 to 8, as in the previously described form shown in Figures 1 to 4 the invention is shown embodied in a mine car of the bottom dumping type in which the bottom drop opening is normally closed by dump doors **59**, said doors being pivoted as at **60** and having their free ends **61** supported for automatic release in the manner previously described.

In Figures 9 to 11 of the drawings, there is illustrated an arrangement of parts somewhat similar to those previously described, certain modifications in the recessing of the sill members being incorporated therein. In this arrangement, these sill members generally designated **62** are continuous from end to end of the car and include relatively shallow upright wall portions **63** and substantially horizontal, outwardly extending bottom flanges **64**. At the position of each wheel, each bottom flange **64** is recessed as at **65**, but in this instance the recessing is not provided by cutting away of the flange, but rather by forging or re-shaping or mashing back of the flange so as to provide the desired wheel clearing recess. This formation of the recess by reshaping of the flange metal is indicated at **65** and it will be apparent by reference to Figures 9 and 10 that the flange metal is thickened by reason of the formation of the recess, and in this manner the sill structure is not weakened at the positions of the wheel clearing recesses.

The upright wall portions **63** of the sill members merge into upwardly and outwardly extending flanges **66** which serve the previously described function of supporting the inner edges of the wing bottoms **67** in the manner illustrated in Figure 10. It will be noted by reference to Figures 9 and 10 that the upright wall portions **63** of the sill members extend full height as at **68** opposite the wheels, and these full height portions may be formed by edge notching continuously rolled flanges **66** as at **69**, and then bending the portions intended to lie opposite wheels uprightly into the position illustrated in Figures 9 and 10. It is preferred that the notches **69** be well rounded at the bottom as at

70, thereby to minimize any tendency on the part of the sill structure to tear at the position of the notches as an incident to the stresses and strains imparted to the sill structures during the travel of the cars over trackage.

A hood closure plate 71 is mounted in each recess in the sill flange 66 opposite a car wheel, and each plate 71 is provided with end extensions 72 which extend endwise of the recess in the manner clearly illustrated in Figure 7 The lower edge of each hood closure plate 71 is welded as at 73 to the upright wall portion 63 of the respective sill member, and the plate end extensions 72 are welded as at 74 to said upright wall portions. Each plate 71 is provided with an axle bearing member 75, the latter being welded thereon as at 76 and being positioned for resting upon the respective axle 77 in the manner clearly illustrated in Figures 9 and 10. Each axle 77 carries the usual complement of wheels 78.

In Figure 12 of the drawings, there is illustrated another slight modification of sill reinforcing plate, the same being generally designated 79. This form of plate is angle bent at its lower edge as at 80 when it is to be weld-secured as a reinforcing means in the angle juncture of the upright wall portion and the outwardly directed bottom flange of a sill, and the plate is provided with end extensions 81 and upper flange opposing angle-bent portions 82 which extend beyond the wheel opposing recess in which the particular plate is mounted. The extensions 81 and 82 may be welded to the upright wall portions and top flange portions of the sill members opposed thereby. It will be observed by reference to Figure 12 that each angle-bent extension 82 is separated from the main upwardly extended body 83 of the plate by an edge notch 84 having a well rounded, tear preventing bottom 85. The upwardly extending plate body portion 83 may act as a full closure for a hood, or it may be terminated short of the top of the hood and serve as a mere anchoring point to which a downwardly extended portion of the hood may be secured, as by welding. It is to be noted that the recesses 38 and 65 formed in the sill structures of Figures 5 and 10 respectively are deeper than the recesses 19 formed in the sill structure of Figure 4. It is to be understood, however, that even slight notching of the horizontal flanges of the sills is very beneficial. For example, to increase the lateral spacing between the upright wall portions of the sills, a total of two inches, by moving each sill laterally outwardly one inch is very beneficial because it not only increases the central lading bottom width and capacity and the size of the door opening for dropping coal but it also allows the wing bottoms to start from a point spaced a greater distance from the longitudinal center of the car and rise toward the lateral extremities of the car. It will thus be apparent that even a slight increase in the spacing of part of the sill members as in Figure 4 will add several cubic feet to the capacity of a car, that is, let's say twelve feet long, and obviously much greater increase in lading capacity will be provided in cars having the relatively deep flange recesses such as are illustrated in Figures 5 and 10.

In Figures 13 to 16 of the drawings, there is shown another modification of the invention in which the sill members are in the form of rolled structural shapes which provide the necessary strength and yet are so formed as to dispense with the necessity of recessing the bottom flanges of the sill members as in the previously described forms.

In the disclosure in Figures 13 to 16 the invention is shown as embodied in a mine car of the bottom dumping type including side walls 86 and end walls 87, the side walls being inclined inwardly and downwardly so as to shed the lading through the bottom dump opening controlled by the bottom dump doors 88 which operate between the longitudinally disposed parallel spaced sill members generally designated 89 and which define the bottom dump opening. The doors are of the usual form and the foremost door is pivoted as at 90 in the usual manner. The other doors have their pivot rods 91 disposed in hinge loops 92 formed on the door structures so that as each door is swung upwardly to its bottom closing position, the free edges thereof will suitably engage the adjacent wedge or roller bar hangers and be moved forwardly so that the hinge edge of the respective door will move beneath and support the overlying free edge 93 of the next foremost door in the manner illustrated in Figures 13 and 15. The free edge of the rearmost door is supported by the usual automatically operable latching equipment generally designated 94. The side walls 86 may be reinforced at their upper edges by longitudinal angle members 95.

The sill members include shallow upright wall portions 96 which extend in parallel spaced relation from end to end of the car, and each sill member terminates at its lower end in an enlargement 97 which extends outwardly so as to avoid obstruction of the inner, lading space defining face of the sill and provide the necessary rigidity against twisting and drooping, but not far enough to interfere with close spacing of the wheels and require notching or recessing of the type previously described.

It will be apparent by reference to Figures 14 and 16 of the drawings that the rolled structural shapes 96 can be placed close enough to the wheels to provide greater than conventional lading space between the inner faces of said sill members.

The sill members are so rolled as to provide upwardly and outwardly extended top flanges 98, and in the rolling of the sills a heavy fillet is provided at the juncture between the upright wall portions 96 and the top flanges 98 into which they merge, thereby to provide great strength with a minimum of bulk and weight. Each top flange 98 is cut away opposite each wheel as at 99 down to the upper extremity of the respective upper wall portion 96, and a hood closure plate 100 having end extensions 101 is mounted within each top flange recess in the manner clearly illustrated in Figures 15 and 16. The end extensions of each plate are welded as at 102 to the respective sill, and the lower edge extremity of each plate 100 is angle-bent as at 103 and welded as at 104 in the angle juncture of the upright wall portion and the bottom flange or enlargement 97. Each plate also is provided with an axle clearance and a bearing member 105 welded thereto as at 106 in position for bearing upon the cross axle 107 upon which the usual complement of wheels 108 is mounted.

The wing bottoms or side walls 86 are cut away as at 109 at the position of each wheel, and a hood 110 extends over a wheel and is attached as at 111 to the wing bottom, as by welding. Each closure plate 100 is welded as at 112 to the respective hood 110 so as to form a closure for the

inner end thereof in the manner clearly illustrated in Figures 15 and 16.

Each pair of hood end closure plates 100 is joined in rigid assembly by a cross tie assembly 113 which is weld-secured to the closure plates by aid of brackets 114, and each assembly 113 includes downwardly extending lading shedding flange portions 115 which extend over the axle 107 in the manner clearly illustrated in Figure 15. As in the previously described form, the usual wedge or roller bar hanger 116 is welded to the inner face of each sill upright wall portion 96 opposite each wheel.

The special form of rolled sill structure shown in Figures 13 to 16 provides the necessary strength for the sill element, and by virtue of the particular design the sill will withstand the vertical and transverse stresses to which it will be subjected in use. By having this special structural shape rolled and including the heavy horizontal flange at the bottom, it is possible to eliminate all notching and weakening of the bottom flange, and also to save much shop work and cost. The outwardly directed enlargement or flange 97 projects a minimum distance and permits close placement of the sill structures with respect to the wheels. This permits the provision of a very wide central lading bottom for the track gage used without notching the bottom flange in the manner previously described. This form of sill structure also provides a very strong construction supporting the wing bottoms because of the thicker web at the point where the top flange starts out from the upright wall portion. It is to be noted that the particular form of sill structures shown in Figures 13 to 16 provides all the desired strength with about thirty percent reduction in weight.

While specific forms of the invention have been shown for purposes of illustration, it is to be clearly understood that various changes in the details of construction and arrangement of parts may be made without departing from the spirit and scope of the invention as defined in the appended claims.

I claim:

1. In a large capacity drop-bottom rail car, a lading body including two wing bottoms, two oppositely disposed side sills angle shaped and extending longitudinally substantially from end to end of the lading body of the car and having substantially upright portions arranged in parallel laterally spaced relation throughout their length from end to end of the lading body and defining between them the central drop-bottom opening of the car, said wing bottoms extending laterally outwardly from said upright sill portions, said angle shaped sills also having wide stiffening flanges extending substantially horizontally and outwardly from the bottom of the said upright portions and the said substantially upright portions between oppositely disposed car wheels passing the adjacent car wheels closely whereby to provide a larger than conventional central lading body capacity and also whereby to provide a larger than conventional lading capacity between said wing bottoms, and the said substantially horizontally and outwardly extending flanges extending farther from the longitudinal center line of the lading body than the transverse distance from this line to the innermost portion of the flange of an adjacent car wheel and being recessed sufficiently to provide a working clearance between the flanges of adjacent car wheels and the said adjacent horizontal flanges where the said sills pass alongside of the said flanges.

2. A large capacity mine car having two oppositely disposed side sills and supporting axles and wheels, said sills extending longitudinally substantially from end to end of the lading body of the car and having substantially upright portions disposed in parallel laterally spaced relation throughout their length and wide flanges extending substantially horizontally and outwardly from the bottom of said upright portions to provide stiffness against warping and twisting of the sills, said flanges being recessed at the portions thereof passing said wheels so as to extend laterally outwardly beyond the innermost limits of the wheels and provide working clearances for the wheels and place the upright portions of the sills closer to the wheels than would be possible were said recessing not provided, whereby to space said upright sill portions a greater than conventional distance apart and provide a greater than conventional lading space therebetween, and means closing said lading space against the falling of lading therethrough.

3. A large capacity mine car having two oppositely disposed side sills and supporting axles and wheels, said sills extending longitudinally substantially from end to end of the lading body of the car and having substantially upright portions disposed in parallel laterally spaced relation throughout their length and wide flanges extending substantially horizontally and outwardly from the bottom of said upright portions to provide stiffness against warping and twisting of the sills, said flanges being recessed at the portions thereof passing said wheels so as to extend laterally outwardly beyond the innermost limits of the wheels and provide working clearances for the wheels and place the upright portions of the sills closer to the wheels than would be possible were said recessing not provided, whereby to space said upright sill portions a greater than conventional distance apart and provide a greater than conventional lading space therebetween, and means closing said lading space against the falling of lading therethrough, said wheel clearing recesses being provided by notching out of the outwardly extending sill flanges at portions opposite said wheels.

4. A large capacity mine car having two oppositely disposed side sills and supporting axles and wheels, said sills extending longitudinally substantially from end to end of the lading body of the car and having substantially upright portions disposed in parallel laterally spaced relation throughout their length and wide flanges extending substantially horizontally and outwardly from the bottom of said upright portions to provide stiffness against warping and twisting of the sills, said flanges being recessed at the portions thereof passing said wheels so as to extend laterally outwardly beyond the innermost limits of the wheels and provide working clearances for the wheels and place the upright portions of the sills closer to the wheels than would be possible were said recessing not provided, whereby to space said upright sill portions a greater than conventional distance apart and provide a greater than conventional lading space therebetween, and means closing said lading space against the falling of lading therethrough, said wheel clearing recesses being formed by reshaping the outwardly extending sill flanges at por-

tions opposite said wheels by thickening the same so as to provide the desired recesses without reducing the strength of the sills.

5. A large capacity mine car having two oppositely disposed side sills and supporting axles and wheels, said sills extending longitudinally substantially from end to end of the lading body of the car and having substantially upright portions disposed in parallel laterally spaced relation throughout their length and wide flanges extending substantially horizontally and outwardly from the bottom of said upright portions to provide stiffness against warping and twisting of the sills, said flanges being recessed at the portions thereof passing said wheels so as to extend laterally outwardly beyond the innermost limits of the wheels and provide working clearances for the wheels and place the upright portions of the sills closer to the wheels than would be possible were said recessing not provided, whereby to space said upright sill portions a greater than conventional distance apart and provide a greater than conventional lading space therebetween, and means closing said lading space against the falling of lading therethrough, and a reinforcing plate welded into the angle formed by each sill upright portion and the substantially horizontal flange opposite each recess for reinforcing the sills at the positions of said recesses.

6. A large capacity mine car having two oppositely disposed side sills and supporting axles and wheels, said sills extending longitudinally substantially from end to end of the lading body of the car and having substantially upright portions disposed in parallel laterally spaced relation throughout their length and wide flanges extending substantially horizontally and outwardly from the bottom of said upright portions to provide stiffness against warping and twisting of the sills, said flanges being recessed at the portions thereof passing said wheels so as to extend laterally outwardly beyond the innermost limits of the wheels and provide working clearances for the wheels and place the upright portions of the sills closer to the wheels than would be possible were said recessing not provided, whereby to space said upright sill portions a greater than conventional distance apart and provide a greater than conventional lading space therebetween, and means closing said lading space against the falling of lading therethrough, and a reinforcing plate welded into the angle formed by each sill upright portion and the substantially horizontal flange opposite each recess for reinforcing the sills at the positions of said recesses, each said plate extending above the respective upright sill portion and having an axle clearance therein and an axle bearing secured thereto in position for resting upon the respective axle.

7. In a mine car, a sill member extending longitudinally of the car from end to end thereof along each side, supporting wheels and axles, a central lading bottom closing the space between the sill members and cooperating with the sill members in forming a center bottom lading space extending at least in part below the plane in which the wheel axes are located, a side wing bottom extending laterally-outwardly from each sill member at a level higher than that of the center bottom and having openings therethrough through which said wheels extend upwardly, a hood attached to a wing bottom and extending over each wheel, said sills having shallow upright wall portions disposed in parallel spaced relation throughout the length of the car and wide flanges extending substantially horizontally and outwardly from the bottoms of said upright portions to provide stiffness against warping and twisting of the sills, said flanges being recessed at the portions thereof passing said wheels so as to extend laterally outwardly beyond the innermost limits of the wheels and provide working clearances for the wheels and place the upright portions of the sills closer to the wheels than would be possible were said recessing not provided, whereby to space said upright sill portions a greater than conventional distance apart and provide a greater than conventional lading space therebetween, and said sills also having outwardly extending flanges forming supports for the wing bottoms, said last named flanges being cut away opposite the wheels to form clearances, and plates attached to the sills in the last mentioned clearances and projecting upwardly from the sills to form closures for the hoods, said plates having axle clearances therein and axle bearings secured thereto in position for resting upon the respective axles.

8. Mine car structure as defined in claim 7 in which each plate includes longitudinal extensions extending longitudinally along the upright portion of the respective sill member beyond the recess within which the plate is mounted and being welded to said upright portion.

9. Mine car structure as defined in claim 7 in which each plate includes longitudinal extensions extending longitudinally along the upright portion of the respective sill member beyond the recess within which the plate is mounted and an angled lower edge portion engaging in the juncture of the upright portion and the bottom flange of the particular sill member, said extensions and angled lower edge portion of each said plate being secured by welding to the sill member engaged thereby.

10. In a mine car, a sill member extending longitudinally of the car from end to end thereof along each side, supporting wheels and axles, a central lading bottom closing the space between the sill members and cooperating with the sill members in forming a center bottom lading space extending at least in part below the plane in which the wheel axes are located, a side wing bottom extending laterally-outwardly from each sill member at a level higher than that of the center bottom and having openings therethrough through which said wheels extend upwardly, a hood attached to a wing bottom and extending over each wheel, said sills having shallow upright wall portions disposed in parallel spaced relation throughout the length of the car and wide flanges extending substantially horizontally and outwardly from the bottoms of said upright portions to provide stiffness against warping and twisting of the sills, said flanges being recessed at the portions thereof passing said wheels so as to extend laterally outwardly beyond the innermost limits of the wheels and provide working clearances for the wheels and place the upright portions of the sills closer to the wheels than would be possible were said recessing not provided, whereby to space said upright sill portions a greater than conventional distance apart and provide a greater than conventional lading space therebetween, and said sills also having outwardly extending flanges forming supports for the wing bottoms extending only along those portions of each sill member disposed between wheels and endwise of the wheels at the respective side, and plates attached to the sills opposite the wheels and projecting upwardly from the sills to

form closures for the hoods, said plates having axle clearances therein and axle bearings secured thereto in position for resting upon the respective axles.

11. In a mine car, a sill member extending longitudinally of the car from end to end thereof along each side, supporting wheels and axles, a central lading bottom closing the space between the sill members and cooperating with the sill members in forming a center bottom lading space extending at least in part below the plane in which the wheel axes are located, a side wing bottom extending laterally-outwardly from each sill member at a level higher than that of the center bottom and having openings therethrough through which said wheels extend upwardly, a hood attached to a wing bottom and extending over each wheel, said sills having shallow upright wall portions disposed in parallel spaced relation throughout the length of the car and wide flanges extending substantially horizontally and outwardly from the bottoms of said upright portions to provide stiffness against warping and twisting of the sills, said flanges being recessed at the portions thereof passing said wheels so as to extend laterally outwardly beyond the innermost limits of the wheels and provide working clearances for the wheels and place the upright portions of the sills closer to the wheels than would be possible were said recessing not provided, whereby to space said upright sill portions a greater than conventional distance apart and provide a greater than conventional lading space therebetween, and said sills also having outwardly extending flanges forming supports for the wing bottoms extending only along those portions of each sill member disposed between wheels and endwise of the wheels at the respective side, and plates attached to the sills opposite the wheels and projecting upwardly from the sills and being attached to the hoods, said plates having axle clearances therein and axle bearings secured thereto in position for resting upon the respective axles.

12. Mine car structure as defined in claim 7 in which each plate includes longitudinal extensions extending longitudinally along the upright portion of the respective sill member beyond the recess within which the plate is mounted and an angled lower edge portion engaging in the juncture of the upright portion and the bottom flange of the particular sill member, said extensions and angled lower edge portion of each said plate being secured by welding to the sill member engaged thereby, and each said plate end extension having an outwardly extending flange portion welded to the adjacent upper sill flange extending endwise from the position of the particular plate.

13. In a sill member, an upright wall portion of major height, an upright wall portion of minor height, and a flange extending outwardly from said wall portion of minor height and separated from the wall portion of major height by a wide notch terminating downwardly in a well rounded bottom effective to minimize tearing tendencies incidental to the imposition of stresses and strains upon the sill member.

14. A sill reinforcing plate having an upright wall portion of major height having end extensions of minor height, a flange extending outwardly from the top of each end extension and separated from the wall portion of major height by a wide notch terminating downwardly in a well rounded bottom effective to minimize tearing tendencies incidental to the imposition of stresses and strains upon said plate, and a flange extending from the bottom of said plate throughout the length thereof.

15. In a mine car, a sill member extending longitudinally of the car from end to end thereof along each side, supporting wheels and axles, a central lading bottom closing the space between the sill members and cooperating with the sill members in forming a center bottom lading space extending at least in part below the plane in which the wheel axes are located, a side wing bottom extending laterally-outwardly from each sill member at a level higher than that of the center bottom and having openings therethrough through which said wheels extend upwardly, a hood attached to a wing bottom and extending over each wheel, said sills having shallow upright wall portions disposed in parallel spaced relation throughout the length of the car and lower edge enlargements extending substantially the full length of the sill members to provide stiffness against warping and twisting of the sills and so placed as to permit placement of the sill member upright portions so close to the wheels as to provide greater than conventional spacing of the sill members, and said sills also having outwardly extending flanges forming supports for the wing bottoms, said last named flanges being cut away opposite the wheels to form clearances, and plates attached to the sills in the last mentioned clearances and projecting upwardly from the sills to form closures for the hoods, said plates having axle clearances therein and axle bearings secured thereto in position for resting upon the respective axles.

16. In a mine car, a sill member extending longitudinally of the car from end to end thereof along each side, supporting wheels and axles, a central lading bottom closing the space between the sill members and cooperating with the sill members in forming a center bottom lading space extending at least in part below the plane in which the wheel axes are located, a side wing bottom extending laterally-outwardly from each sill member at a level higher than that of the center bottom and having openings therethrough through which said wheels extend upwardly, a hood atached to a wing bottom and extending over each wheel, said sills having shallow upright wall portions disposed in parallel spaced relation throughout the length of the car and lower edge enlargements extending substantially the full length of the sill members to provide stiffness against warping and twisting of the sills and so placed as to permit placement of the sill member upright portions so close to the wheels as to provide greater than conventional spacing of the sill members, and said sills also having outwardly extending flanges forming supports for the wing bottoms, said last named flanges being cut away opposite the wheels to form clearances, and plates attached to the sills in the last mentioned clearances and projecting upwardly from the sills to form closures for the hoods, said plates having axle clearances therein and axle bearings secured thereto in position for resting upon the respective axles, each said plate including longitudinal extensions extending longitudinally along the upright portion of the respective sill member beyond the recess within which the plate is mounted and being welded to said upright portion.

17. In a mine car, a sill member extending longitudinally of the car from end to end thereof along each side, supporting wheels and axles, a central lading bottom closing the space between

the sill members and cooperating with the sill members in forming a center bottom lading space extending at least in part below the plane in which the wheel axes are located, a side wing bottom extending laterally-outwardly from each sill member at a level higher than that of the center bottom and having openings therethrough through which said wheels extend upwardly, a hood attached to a wing bottom and extending over each wheel, said sills having shallow upright wall portions disposed in parallel spaced relation throughout the length of the car and lower edge enlargements extending substantially the full length of the sill members to provide stiffness against warping and twisting of the sills and so placed as to permit placement of the sill member upright portions so close to the wheels as to provide greater than conventional spacing of the sill members, and said sills also having outwardly extending flanges forming supports for the wing bottoms, said last named flanges being cut away opposite the wheels to form clearances, and plates attached to the sills in the last mentioned clearances and projecting upwardly from the sills and being attached to the hoods, said plates having axle clearances therein and axle bearings secured thereto in position for resting upon the respective axles, each said plate including longitudinal extensions extending longitudinally along the upright portion of the respective sill member beyond the recess within which the plate is mounted and being welded to said upright portion.

18. In a mine car, a sill member extending longitudinally of the car from end to end thereof along each side, supporting wheels and axles, a central lading bottom closing the space between the sill members and cooperating with the sill members in forming a center bottom lading space extending at least in part below the plane in which the wheel axes are located, a side wing bottom extending laterally-outwardly from each sill member at a level higher than that of the center bottom and having openings therethrough through which said wheels extend upwardly, a hood attached to a wing bottom and extending over each wheel, said sills having shallow upright wall portions disposed in parallel spaced relation throughout the length of the car and lower edge enlargements extending substantially the full length of the sill members to provide stiffness against warping and twisting of the sills and so placed as to permit placement of the sill member upright portions so close to the wheels as to provide greater than conventional spacing of the sill members, and said sills also having outwardly extending flanges forming supports for the wing bottoms, said last named flanges being cut away opposite the wheels to form clearances, and plates attached to the sills in the last mentioned clearances and projecting upwardly from the sills to form closures for the hoods, said plates having axle clearances therein and axle bearings secured thereto in position for resting upon the respective axles, each said plate including longitudinal extensions extending longitudinally along the upright portion of the respective sill member beyond the recess within which the plate is mounted and being welded to said upright portion, and each said plate end extension having an outwardly extending flange portion welded to the adjacent upper sill flange extending endwise from the position of the particular plate.

19. A large capacity drop-bottom rail car including drop bottom doors and having two oppositely disposed side sills extending longitudinally substantially from end to end of the lading body of the car and having substantially upright portions disposed in parallel laterally spaced relation throughout their length and defining between them the drop bottom doors and having wide stiffening flanges extending substantially horizontally and outwardly from the bottom of the said upright portions the said substantially horizontally and outwardly extending flanges extending farther from the longitudinal center line of the lading body than the transverse distance from this line to the innermost portion of the flange of an adjacent car wheel and being recessed sufficiently to provide a working clearance between the flanges of adjacent car wheels and the said adjacent horizontal flanges where the said sills pass alongside of the said flanges and place the said substantially upright portions between and passing oppositely disposed car wheels a greater than conventional distance apart, thereby to provide a larger than conventional central lading body capacity.

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