

F. S. INGOLDSBY.

CAR.

APPLICATION FILED APR. 9, 1906.

999,791.

Patented Aug. 8, 1911.

4 SHEETS-SHEET 1.

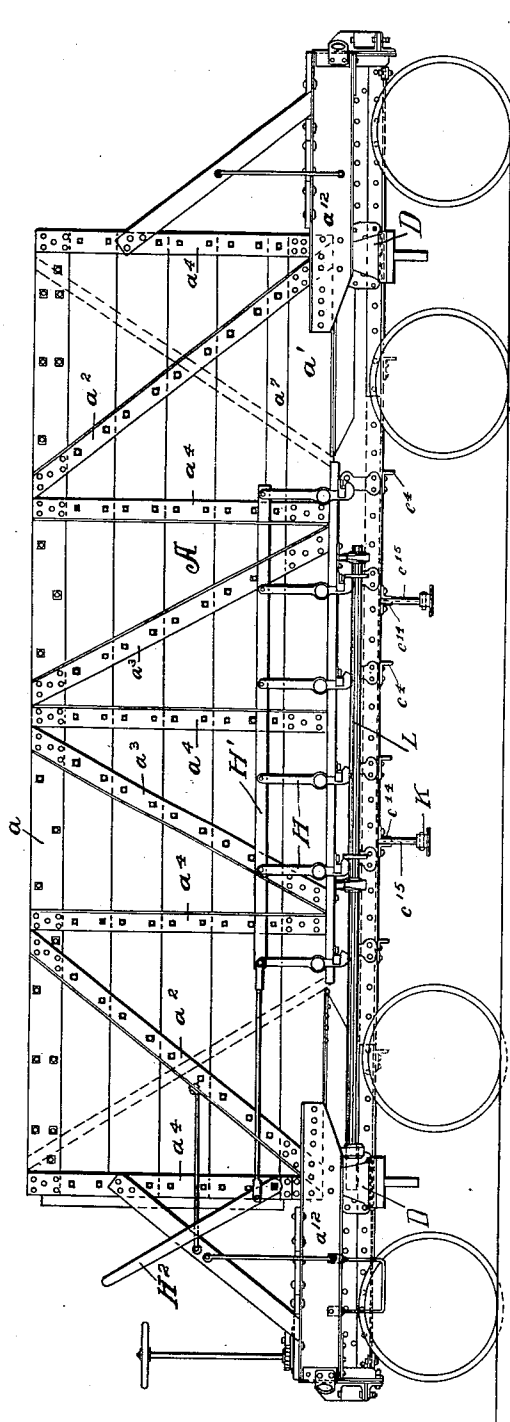


Fig. 1.

Witnesses

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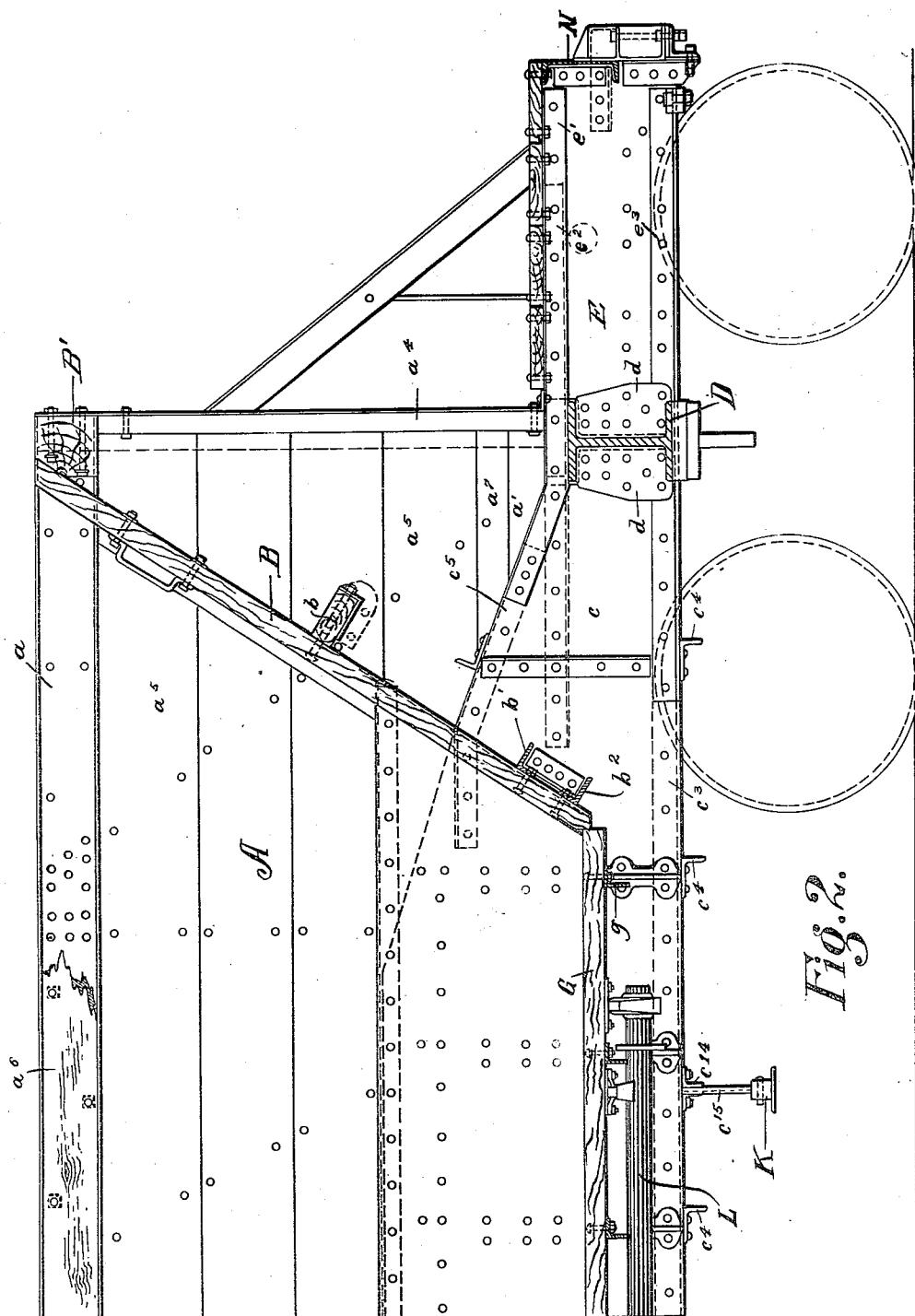
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4 SHEETS—SHEET 2.

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4 SHEETS—SHEET 3.

The diagram illustrates a complex mechanical assembly, possibly a door or window frame, shown in a perspective view. The main body consists of several vertical bars connected by horizontal cross-members. Various parts are labeled with letters and numbers:

- A**: Points to the top and bottom horizontal rails.
- B**: Points to the central vertical section.
- C**, **C'**, **C²**, **C³**, **C⁶**, **C¹²**, **C¹³**, **C¹⁴**, **C¹⁵**: Label various internal structural elements and joints.
- D**, **E**, **F**, **G**, **H**, **I**, **J**, **K**, **L**, **M**, **N**, **O**, **P**, **Q**, **R**, **S**, **T**, **U**, **V**, **W**, **X**, **Y**, **Z**: Label specific components, bolts, and fasteners.
- a**, **a'**, **a²**, **a³**, **a⁴**, **a⁵**, **a⁶**, **a⁷**, **a⁸**, **a⁹**, **a¹⁰**, **a¹¹**, **a¹²**, **a¹³**, **a¹⁴**, **a¹⁵**, **a¹⁶**, **a¹⁷**, **a¹⁸**, **a¹⁹**, **a²⁰**, **a²¹**, **a²²**, **a²³**, **a²⁴**, **a²⁵**, **a²⁶**, **a²⁷**, **a²⁸**, **a²⁹**, **a³⁰**, **a³¹**, **a³²**, **a³³**, **a³⁴**, **a³⁵**, **a³⁶**, **a³⁷**, **a³⁸**, **a³⁹**, **a⁴⁰**, **a⁴¹**, **a⁴²**, **a⁴³**, **a⁴⁴**, **a⁴⁵**, **a⁴⁶**, **a⁴⁷**, **a⁴⁸**, **a⁴⁹**, **a⁵⁰**, **a⁵¹**, **a⁵²**, **a⁵³**, **a⁵⁴**, **a⁵⁵**, **a⁵⁶**, **a⁵⁷**, **a⁵⁸**, **a⁵⁹**, **a⁶⁰**, **a⁶¹**, **a⁶²**, **a⁶³**, **a⁶⁴**, **a⁶⁵**, **a⁶⁶**, **a⁶⁷**, **a⁶⁸**, **a⁶⁹**, **a⁷⁰**, **a⁷¹**, **a⁷²**, **a⁷³**, **a⁷⁴**, **a⁷⁵**, **a⁷⁶**, **a⁷⁷**, **a⁷⁸**, **a⁷⁹**, **a⁸⁰**, **a⁸¹**, **a⁸²**, **a⁸³**, **a⁸⁴**, **a⁸⁵**, **a⁸⁶**, **a⁸⁷**, **a⁸⁸**, **a⁸⁹**, **a⁹⁰**, **a⁹¹**, **a⁹²**, **a⁹³**, **a⁹⁴**, **a⁹⁵**, **a⁹⁶**, **a⁹⁷**, **a⁹⁸**, **a⁹⁹**, **a¹⁰⁰**: Label numerous small details, screws, and bolts throughout the assembly.

The drawing includes dashed lines indicating hidden internal features and various views of the components, providing a comprehensive understanding of the device's construction.

Fig. 5.

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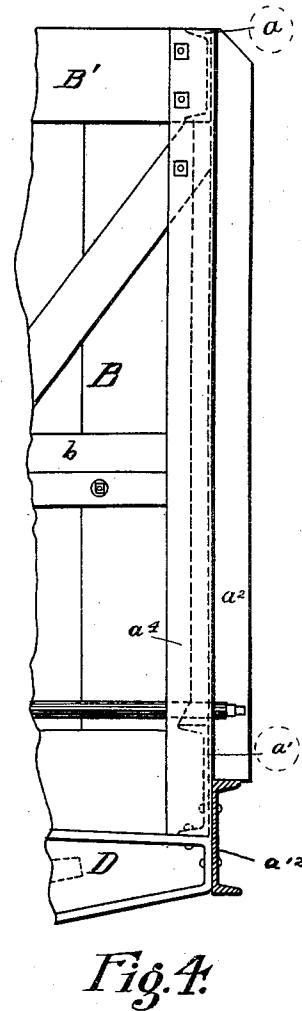
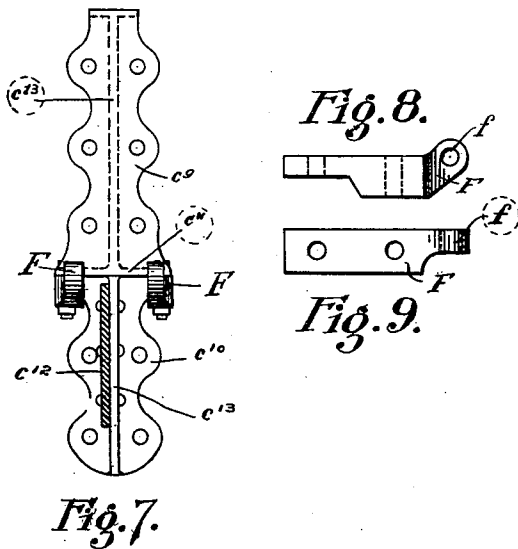
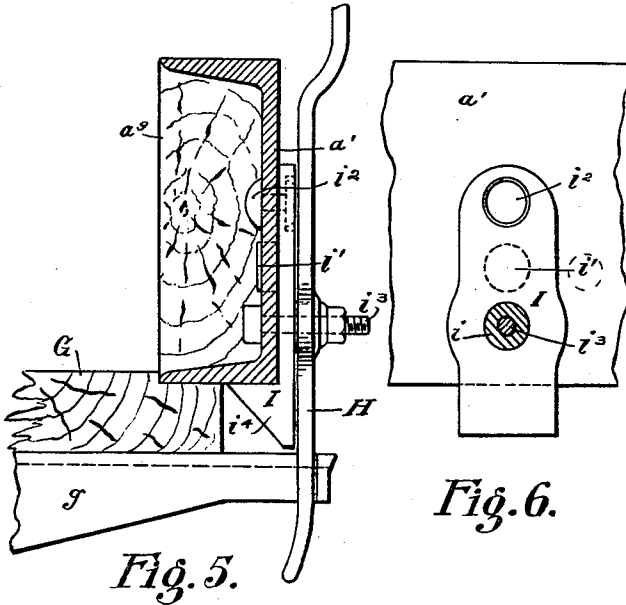
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

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CAR.

999,791.

Specification of Letters Patent.

Patented Aug. 8, 1911.

Application filed April 9, 1906. Serial No. 310,583.

To all whom it may concern:

Be it known that I, FRANK S. INGOLDSBY, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Cars, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to a car of composite construction,—the object being to so employ wood and metal that the advantages of strength, lightness and cheapness will be attained.

The invention is well adapted for dump cars of the Ingoldsby type, wherein there is a central longitudinal beam to which are hinged dumping doors which form a portion of the floor of the car and drop downward at their outer edges to discharge the load. When the present invention is embodied in such dump car, the central longitudinal beam is a steel structure, preferably of the box girder type, while the sides and inclined ends of the car are made of planking with suitable metal trussing and bracing.

Other features of invention increasing the efficiency of the car, will appear from the following description, wherein the embodiment of the invention shown by the drawings is fully explained.

In the drawings, Figure 1 is a side elevation of my car. Fig. 2 is a vertical section of half of the car shown in Fig. 1. Fig. 3 is a cross section of the car. Fig. 4 is a portion of an end view, being sectioned through the side sill beyond the bolster. Fig. 5 is an enlarged view of the locking lever and its support. Fig. 6 is a face view of the lever-support, being sectioned through the journal boss. Fig. 7 is an edge view of the filler casting which supports the door hinge and the raising shaft. Fig. 8 is a side elevation and Fig. 9 a plan of the hinge-eye carried by the filler casting.

The side of the car, indicated by A, is a Howe truss composed of the upper chord a , and the lower chord a' , which are channel beams, the main struts a^2 and additional inclined struts, as a^3 , and the vertical ties a^4 . The struts and ties are riveted at their lower ends directly to the lower chord a' and at their upper ends directly to the upper chord a . These struts and ties are preferably angle members, as shown. Secured to the

struts and ties by bolts is the planking a^5 of the car sides which preferably may be made of ordinary ship-lap.

Within the channel a and bolted to it, and thus constituting a portion of the upper chord is the wooden filler beam a^6 . This beam extends from one end of the car to the other. A stiff compression chord is thus provided, resisting not only the downward strains on the car, but the outward strains. By making the car side in the form of a Howe truss, the effective length of the upper chord is reduced to the distance between the upper end of the two diagonal main struts a^2 , whereby the strains are much better resisted.

To keep a tight joint between the lower channel beam a' , and the planking of the side in case the planking shrinks, I provide a comparatively narrow strip a^7 of seasoned wood immediately adjacent to the channel. The strip being well seasoned and small has comparatively no shrinkage. The strut ties hold it in engagement with the channel beam a' and the shrinkage of the rest of the planks between themselves or from the strip a^7 does no harm by reason of the lap on the planks. The inner face of the strip a^7 is beveled to the edge of the channel beam and this channel beam is filled with a wooden strip a^8 , extending between the end floors of the car to prevent any ledges on which the material might lodge.

When the invention is embodied in a dump car, as shown, there are inclined end floors B, composed of ship-lap, or tongue and groove boards, and a central longitudinal steel ridge beam C extending from end floor to end floor and having some of its members passing through the end floors to the bolsters. As shown, the inclined end floor is secured at its upper end to an upper cross beam B' of the car and is braced immediately by a cross beam b which may be of wood, and by the cross beam angle irons b^1 and b^2 .

The central beam may be of the box girder type, composed of a pair of vertical plates c which extend in parallelism from the bolster D at one end of the car to the bolster at the other. The upper edges of these plates are cut off diagonally as they approach the bolster, as shown in Fig. 2. The central beam has cover plates c' c' extending from end floor to end floor and riveted to the upper

bent portion of the box girder plates, and this construction is joined together and reinforced by an angle beam c^2 . These plates are flanged on the under side of the end floors and thus form connections and supports for the latter, which are secured to them by bolts. Intermediate of the end floors, the upper edges of the plates c are bent toward the apex of the ridge and lie along such ridge, being riveted to it and reinforcing it as shown. The plates c carry along their lower edges angles c^3 . Secured to these angles are cross braces c^4 . Stiffener plates c^5 are located at intervals in the upper portion of the box girder and have flanges bearing against the plates c , and rivets pass through these flanges, whereby the stiffener is held in place.

The arrangement of the center sills, draft sills and bolster is covered in my application No. 312,535, filed Apr. 19, 1906. Briefly it comprises a through bolster D having cross webs d to which the ends of the plates c and the draft plates E are riveted. Along the upper edges of the draft plates, are riveted angle members e^1 and e^2 , with their flanges facing in opposite directions. These members extend across the top of the bolster and are riveted to opposite sides of the center sill plates c . A third angle member e^3 is provided on the opposite side of the plate c , from the angle member e^1 . The angles c^3 at the lower edge of the center sill plates extend to the bolster, and additional angles e^3 are secured to the draft plates and cross through the bolster and are secured to the lower ends of the center sill plates on the opposite side from the angles c^3 . This makes a very stiff and strong construction, and one which, in the event of damage to the end of the car, is easily and economically removed and replaced without disturbing the balance of the car.

On the outer sides of the plates c and beneath the ridge plates are filler castings c^8 secured to both the plates c and the cover plates and serving to brace the beam. These castings are of the form shown in side view in Fig. 3 and edge view in Fig. 7. They have webs c^{13} and flanges c^9 by which they are riveted to the cover plates, and flanges c^{10} riveted to the plates c . The filler castings also have cross flanges c^{11} . To the under side of these cross flanges are bolted the hinge straps F. These straps are provided with eyes f to receive the hinge pintles.

The dumping doors are indicated by G. They comprise suitable planking and floor beams g ,—the floor beams terminating at their inner ends in eyes which are hinged to the straps F. When the doors are closed, the outermost plank G thereon abuts against the lower face of the channel beam a' . The doors are adapted to be held in this position

by locking levers H pivoted to the channel beam and having hooked lower ends adapted to extend beneath the projecting floor beams g , which preferably have hooks on their outer ends. The upper ends of the levers H may be connected by a link H' and operated by a lever H². The lever H is journaled on a boss i formed on the outer side of a block I which is secured to the channel a' . A boss i' formed on the inner side of the block seats in a hole in the channel and a rivet i^2 seated in the recess in the block holds the same against the channel. A bolt i^3 and nut hold the lever in place on its boss. This construction carries the strain from the lever directly to the channel beam itself.

It will be seen that there is some distance between the lower edge of the chord a' and the floor beams g , and the tendency of the car side to bend outwardly might thus give a severe bending strain to the locking levers which engage the hooked ends of the floor beams. To prevent this, I extend the plate I downward below the channel beam and extend it inward beneath such beam, as shown at i^4 ,—Fig. 5. This puts the locking levers in shear and enables them to hold the car side against outward bulging.

When the levers release the doors, they drop by gravity. I provide suitable bumpers K to receive the impact of the dropping doors,—these bumpers being adapted to engage springs g^2 carried on the under side of the doors. The bumpers may be carried on plates c^{15} secured (preferably by bolting) to the angles c^3 on the under side of the box girder, said plates having proper angles c^{14} riveted to their upper edges for this purpose. The bumpers, as shown, are pivoted to such plate and may be turned down to hold the door in position to shed outside the rail, or may be turned up, as shown in dotted lines in the left hand portion of Fig. 3, to allow the doors to drop vertical. Pivoted bumpers are shown and claimed in a co-pending application of mine.

To raise the doors after they have dropped, I provide a pair of rock shafts L on which are mounted arms l adapted to engage beneath the doors. These rock shafts are journaled in plates c^{12} , riveted to the web c^{13} of the filler castings c^8 . Suitable means, not shown, are provided for rocking the shafts L to cause the arms l to raise the doors.

The channel beam a' which constitutes the main portion of the lower chord, extends from out to out of the bolsters and rests on the upper face of the bolsters to which it is secured. The channel beams a^{12} extending beyond the bolsters and terminating at the end of the car are secured to the channels a' and to the ends of the bolster. The end sills N are secured to these extension channels a^{12} . The projecting flanges

of the main struts a^2 and the end ties a^4 are removed where the channel a^{12} crosses them and filling plates are provided between these channels and the car sides, so that the channels may be conveniently secured in place outside of the struts and ties. These extensions of the side are placed as described so that in case of any damage to the end of the car, the extension channel may be easily and economically removed and replaced without disturbing any of the balance of the car.

Having thus described my invention, I claim:—

1. In a car side, the combination of an upper chord in the form of a channel beam, a lower chord in the form of a channel beam, strut ties connecting said beams, a wooden filling beam for the upper chord, wooden planking between the chords and secured to the strut ties, inclined end floors for the car, a metal ridge extending from end floor to end floor, and a wooden filling beam for the lower chord extending between the end floors.

2. In a car, the combination of bolsters, side sills extending from bolster to bolster and resting on the bolsters near their ends, extension channels with their flanges outward on the outer side of the car extending across the end of the bolster and secured to the bolster and to the side sill.

3. The combination with a side sill in the form of a metal channel of a bolster to which it is secured, an extension member on the outer side of the car extending across the bolster and secured to the end of the bolster and to the side sill, a long wooden reinforcing beam occupying such channel.

4. A car side having a metal truss and wooden planking, the truss including a channel shaped lower chord extending from bolster to bolster and constituting the side sill of the car, a supplemental sill in the form of a channel member on the outside of the car extending from the end of the car across the bolster, said supplemental sill being riveted to the bolster and to the side sill.

5. A composite dump car having sides composed of wooden planking and metal trusses, a central longitudinal ridge beam composed wholly of metal having members extending from bolster to bolster, and dumping doors carried by the ridge beam.

6. A dumping car having sides composed of wooden planking and metal trusses, inclined ends composed of wooden planking, a central longitudinal beam having a metal ridge with metal under-bracing and having members passing through the end floors and secured to the bolsters, and doors hinged to the central beam.

7. A composite dump car having sides

composed of metal Howe trusses and wooden planking, wooden inclined end floors, a metal central longitudinal ridge, and dumping doors hinged to the central beam.

8. The combination, in a dump car, of inclined wooden end floors, bolsters beyond the end floors, a box girder central beam including a pair of vertical plates extending from bolster to bolster, and a metal ridge mounted on the box girder and extending from end floor to end floor.

9. The combination, in a dump car, of a central box-girder beam, including a pair of vertical plates and a surmounting ridge, and castings between the vertical plate and ridge and riveted to each of them.

10. The combination, in a dump car, of a central box-girder beam including a pair of vertical plates and a surmounting ridge, filling members between the vertical plates and ridge and riveted to each of them, hinge eyes carried by said filling members, and dumping doors pivoted to said hinge eyes.

11. The combination, in a dump car, of a central box girder beam including a pair of vertical plates and a surmounting ridge, and castings between the vertical plate and ridge and riveted to each of them, pivoted dumping doors, and raising mechanism for the doors carried by said castings.

12. The combination, in a dump car, of a central box girder beam including a pair of vertical plates and a surmounting ridge, and castings between the vertical plate and ridge and riveted to each of them, dumping doors pivotally carried by said castings, journal plates carried by said castings, a rock shaft mounted in said plates, and a rock arm mounted on said shaft adapted to engage the door.

13. In a dump car, the combination with a dumping door and a hooked locking lever therefor, of a block on which said lever is pivoted, said block extending beyond the support thereof toward the hook on the lever to prevent bending of the lever.

14. The combination of a car side, a locking lever carried thereby, a pivoted door having a floor beam with which said lever may engage, and means for reducing the bending strain which outward bulging of the car side tends to give the lever.

15. The combination of a car side, a locking lever carried thereby, a pivoted door adapted to abut said side and having a floor beam with which said lever may engage, said lever being mounted on a block carried by the car side and which extends below said side.

16. A car having a beam, a lever, a block having a boss extending into said beam and having a boss on which the lever is mounted, said block extending beyond the beam

to form a brace for the lever, there being a hook formed on the lever, combined with a member with which said hook coöperates.

17. The combination of a car side having
5 a side sill, a dumping door adapted to close against the same, a block secured to the side sill and having a boss seating in the side sill and having a boss on its outer side, a locking lever journaled on said last men-
10 tioned boss and adapted to engage a floor beam of the dumping door, said block being extended downward beneath the side sill and between the lever and the door to brace the lever.

18. A composite dump car having sides
15 composed of wooden planking and metal trusses, the upper chords of which are channel beams, said channel beams being reinforced by wooden beams occupying the recesses in the said channels and extending
20 from end to end of the beams, wooden inclined end floors, a central longitudinal member comprising a box girder, having vertical and metal side plates reaching
25 from bolster to bolster of the car, a metal ridge surmounting said girder, and dumping doors hinged to said metal ridge.

19. In a dump car, the combination of a
30 side composed of planking and angle irons secured to the outer side thereof, a dumping

door and supporting mechanism therefor including a longitudinal bar passing loosely through openings in the outstanding webs of such angle irons.

20. In a dump car, the combination of the
35 composite sides, the metal central member, the wooden doors carried by the central member and coöperating with the sides and the bumpers for the doors carried by the
40 central member.

21. In a dump car, the combination of a
45 dumping door, means carried by the side of the car and extending below it for supporting said door, and means for preventing inward bending of said supporting means.

22. In a dump car, the combination with
50 a bolster, of reinforcing channels at the upper and lower chord, angle irons forming struts and ties riveted to the said channels, and extension members riveted to the channels forming the lower chords, and extending from the bolster to the end sill of the car.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

FRANK S. INGOLDSBY.

Witnesses:

MARY D. WHITCOMB,
THELMA KNUDSON.