A. CAMPBELL.

DUMPING CAR.

APPLICATION FILED DEC. 27, 1920.

1,400,867.

Patented Dec. 20, 1921.

3 SHEETS—SHEET 1.

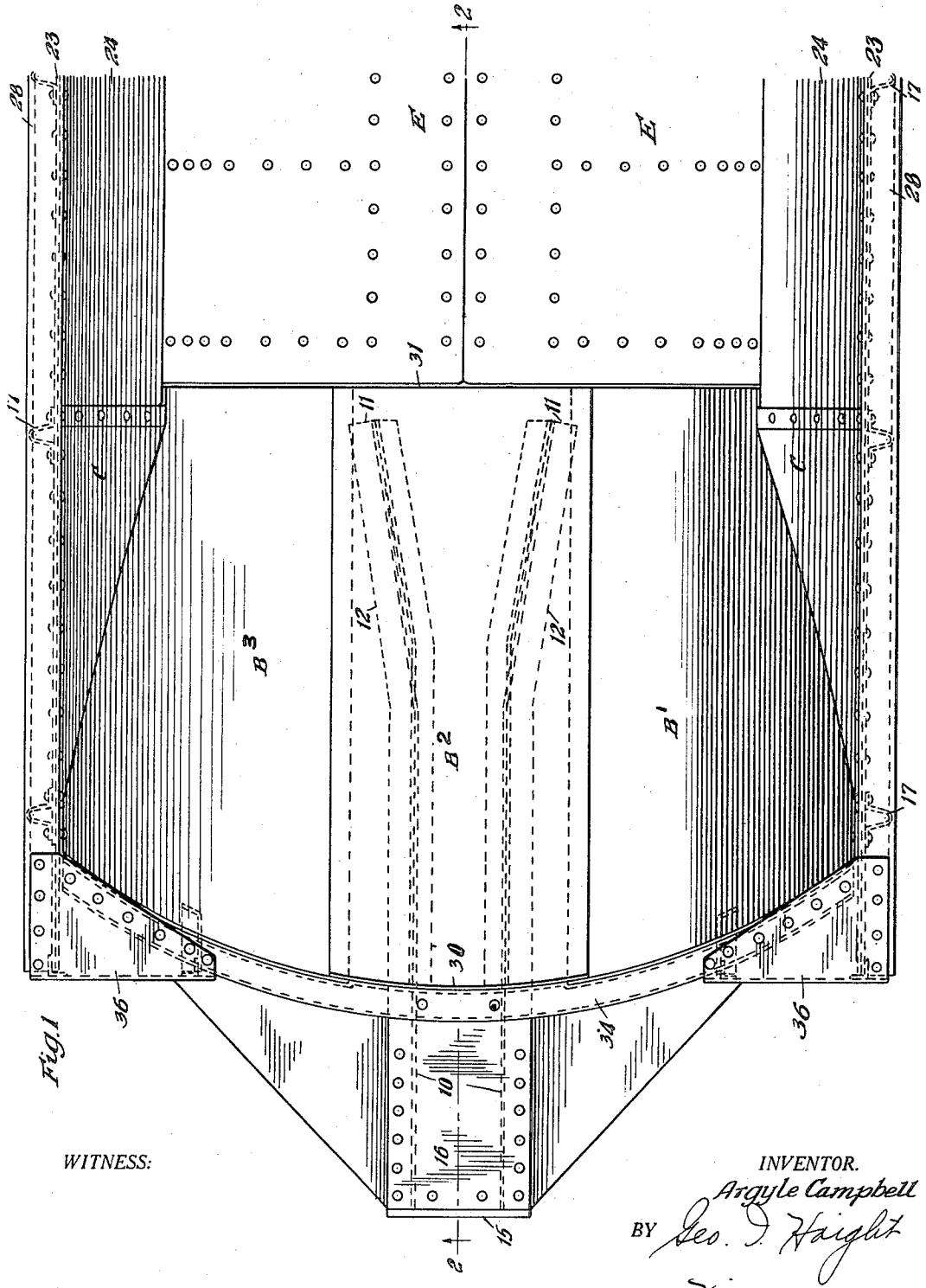


Fig. 1

WITNESS:

INVENTOR.

Argyle Campbell

BY Geo. D. Haight

His ATTORNEY.

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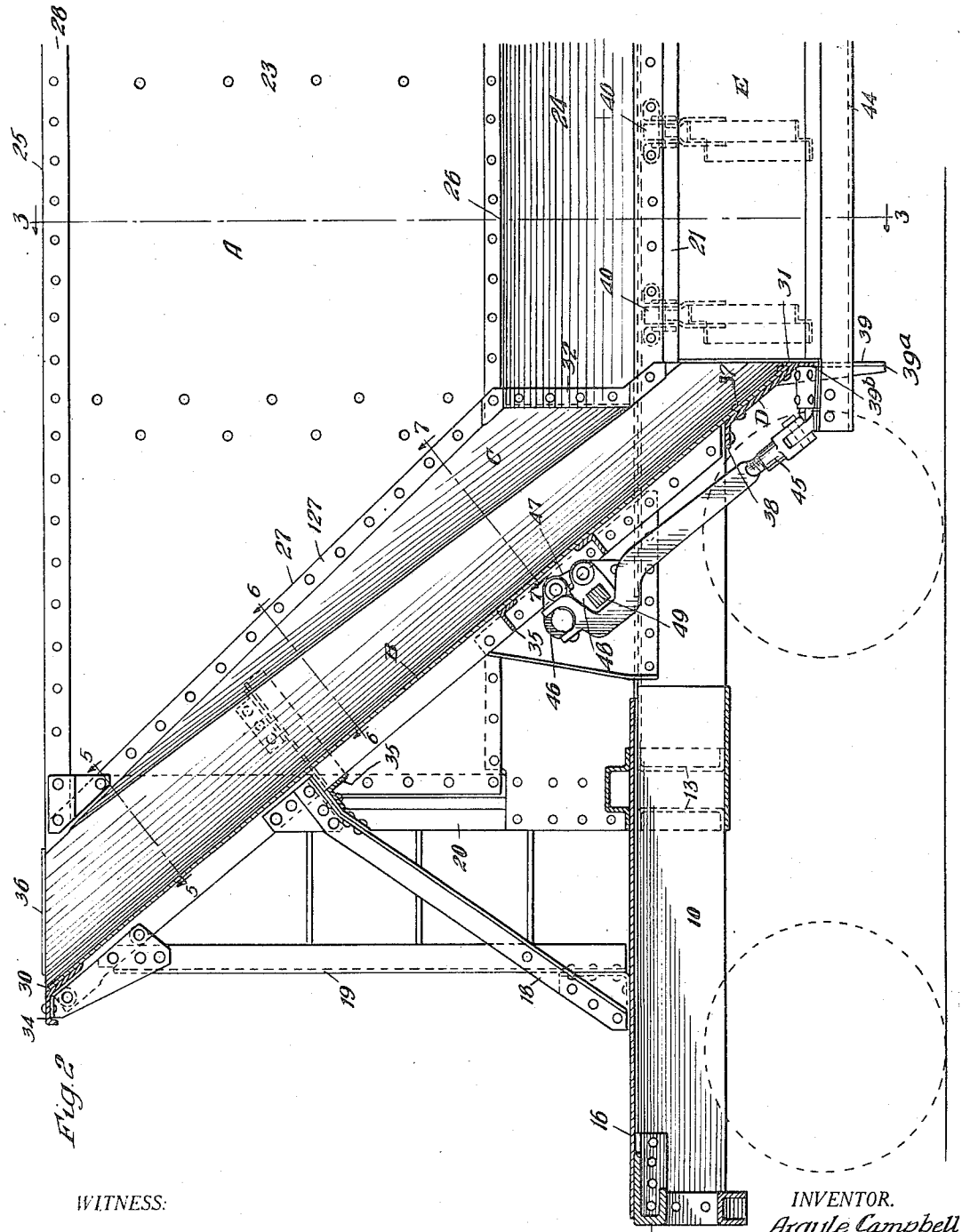


Fig 2

WITNESS:

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3 SHEETS—SHEET 3.

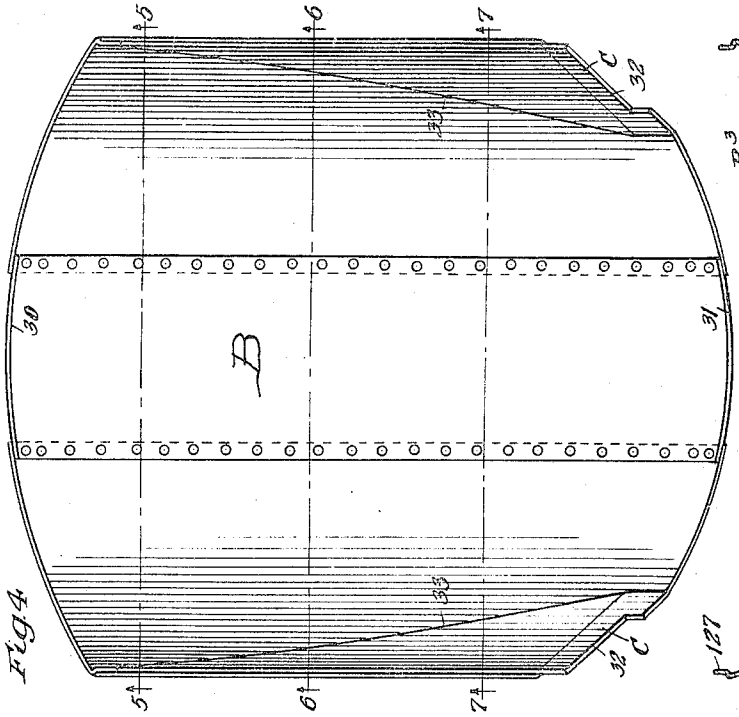


Fig 4

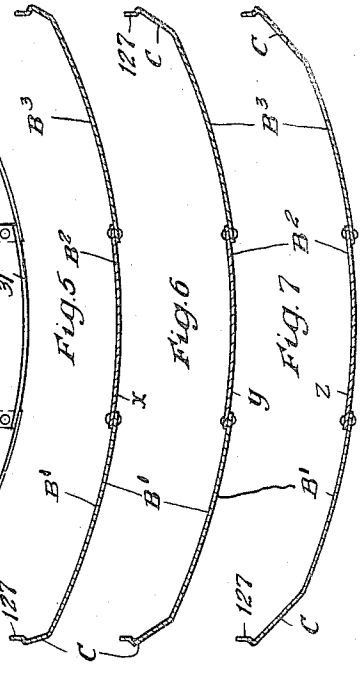


Fig 5 Fig 6 Fig 7

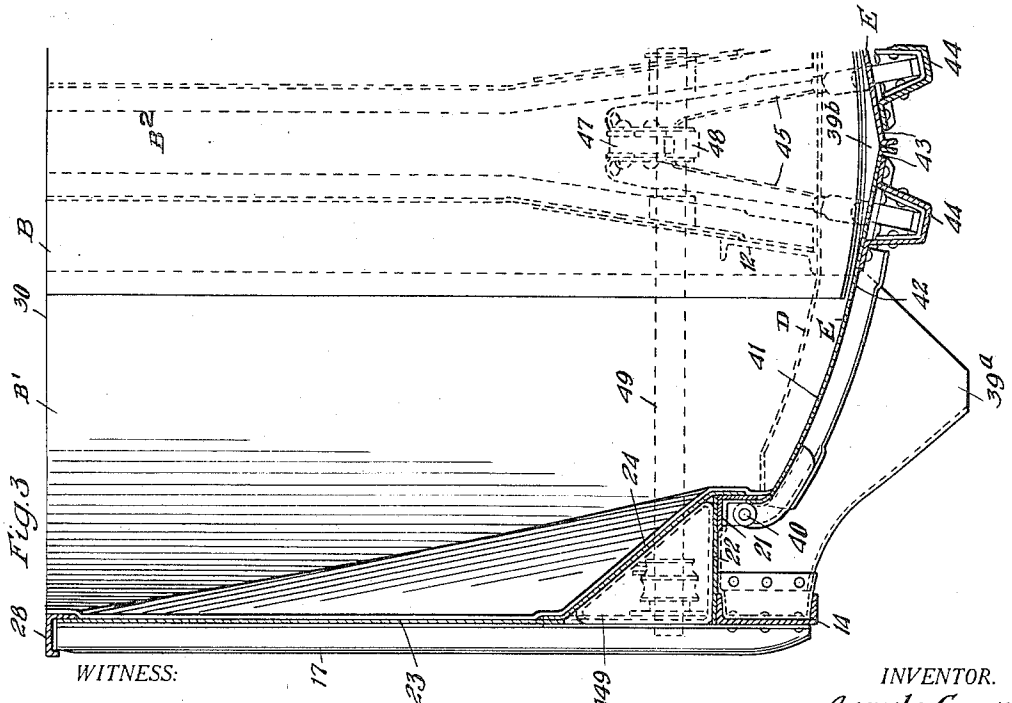


Fig 3

WITNESS:

INVENTOR.

Argyle Campbell

BY Geo. D. Haight

His ATTORNEY.

UNITED STATES PATENT OFFICE.

ARGYLE CAMPBELL, OF CHICAGO, ILLINOIS, ASSIGNOR TO ENTERPRISE RAILWAY EQUIPMENT COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

DUMPING-CAR.

1,400,867. Specification of Letters Patent. Patented Dec. 20, 1921.

Application filed December 27, 1920. Serial No. 433,214.

To all whom it may concern:

Be it known that I, ARGYLE CAMPBELL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Dumping-Cars, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to improvements in dumping cars.

One object of the invention is to provide a car particularly adapted for the carrying of ore, the car being so arranged that it has a single dumping or discharge opening of relatively large area and free from obstruction so as to avoid "bridging" or arching of the load.

Another object of the invention is to provide a hopper arrangement for a dumping car, and more particularly a hopper end wall so designed and related with adjacent walls of the hopper that the load is gradually converged as it passes to the discharge opening and without any abrupt shoulders or restrictions tending to crowd or cram the load as it gravitates to the discharge opening.

One specific object of the invention is to provide a hopper end wall of novel construction free from shoulders or ledges which might otherwise interfere with the easy passage of the load as it gravitates to the bottom of the hopper wall.

Other objects of the invention will more clearly appear from the description hereinafter following.

In the drawings forming a part of this specification, Figure 1 is a top plan view of half of a dumping car of the ore type showing my improvements embodied therein. Fig. 2 is a vertical sectional view taken lengthwise of the car at the center thereof and corresponding substantially to the line 2—2 of Fig. 1. Fig. 3 is a vertical transverse sectional view extending from one side to the center of the car only and corresponding substantially to the line 3—3 of Fig. 2. Fig. 4 is what may be termed an elevational view of my improved hopper end wall. The elevational view of the hopper end wall shown in Fig. 4 is taken from a theoretically infinite distance and looking in a direction perpendicular to the center line of said hopper end wall, that is, perpendicular to the section of said hopper end wall appearing in Fig. 2. And Figs. 5, 6 and 7, are transverse sectional views of the improved hopper end wall taken on lines corresponding to the section lines 5—5, 6—6 and 7—7 respectively of both Figs. 2 and 4.

In said drawings, the underframe of the car is shown as provided with combined center and draft sills 10—10 which terminate at points indicated at 11—11 in Fig. 1, that is, inside of the usual bolster but just short of the single discharge opening of the hopper. Said sills 10 are made divergent at their inner ends as indicated at 12—12 in Figs. 1 and 3 in order to provide ample clearance for the linkages of the door operating mechanism, hereinafter described which work between said divergent portions of the sills. As will be understood by those skilled in the art, the sill construction 10 illustrated in Fig. 1, is duplicated at each end of the car. In addition to the center draft sills 10, the underframe comprises suitable bolsters as indicated broadly at 13—13 in Fig. 2 and channel side sills 14—14. At each end of the car, a buffer casting 15 may be employed and suitable cover plates 16. The car is formed with side walls, designated generally by the reference character A and more specifically described hereinafter, side stakes 17, sloping end braces 18, ladders 19 disposed at the corners of the car, vertical braces 20, and what may be termed supplemental or auxiliary angle side sills 21 as best shown in Fig. 3. Cover plates 22 extending horizontally are united to each side sill 14 and corresponding parallel auxiliary side sill 21.

Each side wall A of the car comprises an upper vertically extending section 23 and a lower inwardly and downwardly inclined section 24. Each said upper section 23, in outline, has an upper horizontally extending edge 25, a lower horizontally extending edge 26 corresponding substantially to the length of the discharge opening, and inclined end edges 27. Each said lower section 24 is of substantially rectangular outline as best indicated in Fig. 2, the upper edge of each section 24 being riveted to the lower edge 26 of the corresponding upper section and the lower edge of each said section 24 being passed over and secured to the corresponding auxiliary side sill 21, as best shown in Fig. 3.

While the drawings only disclose one hopper end wall, it will be understood that the hopper end walls are duplicated at the two ends of the car and therefore it will only be necessary to describe one of such ends in detail. Each of said hopper end walls, as shown, comprises what may be termed broadly a main section indicated generally by the reference character B and two side sections indicated by the reference characters C—C, the latter being of like construction but oppositely disposed, as will be understood. Each section B corresponds substantially to the surface of a cylinder, that is, any cross section taken transversely of the main portion B in a plane perpendicular to the imaginary cylindrical axis will give a true arc of a circle as indicated at *x—y—z* in Figs. 5, 6 and 7. With this construction, it will be observed that, so far as the main portions B of the end walls are concerned, there is no relative change in depth or contour from top to bottom thereof, thus avoiding crowding or jamming of the load as the latter gravitates down said portions B. Said cylindrical formation of the main portion B of the end wall is carried out to the top edge as indicated at 30 and also to the bottom edge as indicated at 31. As shown in Fig. 4, looking at said end wall in elevation as illustrated in said figure, the top edge will be of curved formation corresponding to the intersection of said main portion B, which is on an incline, by a horizontally extending plane at the top of the car and the lower edge 31 will be curved in accordance with the intersection of said cylindrical surface by a vertical plane. In actual practice, said main portion B of the hopper end wall may be composed of three sheets, B′, B^2 and B^3, suitably riveted together.

Each side portion C of the hopper end wall is of flat, approximately triangular formation which corresponds to a portion of a plane extending at an angle to the side wall of the car and also at an intersecting angle with the imaginary axis of the cylindrical surface above referred to. Each said side portion C has an upper inclined edge 127 overlapping and riveted to the corresponding edge of the side wall A; an inwardly and downwardly inclined narrow bottom edge 32 united to the corresponding adjacent edge of the section 24 of the side wall, and a line or edge 33. Said line or edge 33 corresponds substantially to a portion of an ellipse and is, in effect, determined by the intersection of said plane of the portion C with the cylindrically formed main portion B. In actual practice, each portion C will preferably be formed integrally with the corresponding sheet B′ or B^3.

As will be understood from the preceding description, considered in connection with the drawings, the sides of the hopper end walls are made to gradually conform to the vertical and sloping portions of the side walls of the car, without, however, introducing any sharp angles or shoulders or suddenly restricted transverse dimension so that the load, in gravitating to the discharge opening of the car, is permitted an easy and smooth movement so as to avoid choking or bridging of the load, which has been a difficulty heretofore in cars of this general type. Each hopper end wall B is suitably strengthened at the top by a flanged element 34 and at points intermediate the top and bottom by arcuate angle iron braces 35—35. At the corners of the car, as shown in Fig. 1, suitable gusset plates 36 may be employed. At the bottom of each hopper end wall, I preferably employ a special brace member designated generally by the reference character D. Said member D extends from one side sill 14 to the other side sill 14 and, between the auxiliary side sills 21, is curved to conform to the under side of the cylindrical hopper end wall and is riveted or otherwise securely united thereto as indicated at 37 in Fig. 2. The member D along its top edge is provided with a suitable strengthening flange 38 disposed under the hopper end wall and, in line with the transverse vertical plane defining the lower edge of the hopper end wall, said member D is formed with a depending flange 39 which, on opposite sides of the center of the car is extended downwardly somewhat in the form of a triangle as indicated at 39^a in Fig. 3 so as to provide baffle plates to prevent the load discharging against the wheels when the doors are open. At the center of the car, the flange 39 is extended as indicated at 39^b in Figs. 2 and 3, so as to prevent any of the load being lost from the ends of the doors which are of special construction, as hereinafter described.

The doors for closing the single opening of the car are two in number and of like construction, the same being designated each by the reference character E. Each of said doors E is hinged along its upper longitudinally extending edge by a series of hinges indicated at 40—40 in Figs. 2 and 3, the hinges being secured to the auxiliary angle iron side sills 21. Each of said doors E, from a point adjacent its hinges, is of arcuate form as indicated at 41 corresponding to the curvature presented by the lower edge of the hopper end wall looking at the latter endwise of the car. Said curved portion 41 of each door E extends to a point as indicated approximately at 42 in Fig. 3. From the point 42 to the free edge of the door, the latter is flat as indicated at 43 and tangent to the curved portion 41. The object of this formation of the door is to facilitate the complete and quick discharge of the load as the doors swing to their fully open position. Were the door curved throughout, the lower

edges thereof, when the doors are in opened position, would form a somewhat upwardly curved scoop-like arrangement which would interfere with the free passage of the load over the edges of the doors. With my construction, I avoid this difficulty.

The lower edges of the doors E are suitably braced by longitudinally extending members 44 of substantially trough shape, as best shown in section in Fig. 3, the ends of said members 44 being projected beyond the ends of the doors so as to provide for attachment of the duplicated links 45 which are extended upwardly and connected by a series of other shorter links 46 and 47 to a common drum 48 carried by a transversely extending shaft 49. As will be understood by those skilled in the art, a corresponding shaft will be provided at the opposite end of the car and similar linkages for the other ends of the doors, the two shafts being operated simultaneously by any suitable mechanism, as for instance, sheave wheels and chains extending longitudinally of the car within the triangular spaces formed therein, one of which is indicated at 149 in Fig. 3. One form of suitable operating mechanism is disclosed in my co-pending application Serial No. 395,507 filed July 12, 1920.

I have herein shown and described what I now consider the preferred manner of carrying out the invention but I am aware that changes and modifications may be made without departing from the spirit of the invention and all such changes and modifications are contemplated that come within the scope of the claims appended hereto.

I claim:

1. An inclined hopper end wall for a dumping car, said wall comprising a main portion corresponding substantially to a portion of a cylindrical surface, and two plane side portions of generally triangular form intersecting said central portion, the upper edge of said wall corresponding substantially to a line produced by intersecting said cylindrical surface by a horizontal plane at the top of the car hopper and the lower edge of said main portion of the wall corresponding substantially to a line produced by the intersection of said cylindrical surface by a vertical plane.

2. An inclined hopper end wall for a dumping car, said wall comprising: a main portion concave on its upper side and of the same curvature from its top to bottom edge, and two flat side portions merging with said main portion, each of said side portions being additionally inclined with respect to said main portion.

3. An inclined hopper end wall for a dumping car, said wall comprising a main centrally disposed portion sloping with respect to the vertical and of similar curvature in transverse section from top to bottom, the lengths of said arcuate sections gradually decreasing from the top to the bottom of said main portion, and oppositely disposed side portions each of which is additionally inclined with respect to said main centrally disposed portion, each said side portion being flat and merging in the main portion with a curved line corresponding to the intersection of a plane with the curved main portion.

4. In a dumping car, the combination with a hopper having side walls and sloping end walls, the bottom edges of said end walls being curved transversely of the car; of a pair of doors adapted to close the bottom of said hopper, said doors being hinged along their upper edges, each door being curved substantially in the arc of a circle from its hinged edge for a part of the distance appreciably less than the entire distance toward its free edge to substantially correspond with said curved lower edge of the hopper end walls and from said point to its free edge being flat and substantially tangential to the curved portion thereof, the free edges of said doors meeting in a line below the curved bottom edges of the end walls.

5. In a dumping car, the combination with a hopper having side walls and sloping end walls, the bottom edges of said end walls which define the hopper discharge opening being lower at their central portions than at the ends merging with the side walls of the hopper; of a pair of doors adapted to close the discharge opening of said hopper, said doors being hinged along their outer edges, each of said doors being curved substantially in the arc of a circle from its hinged edge for a part of the distance appreciably less than the entire distance toward its free edge and thence flat and substantially tangential to the curved portion thereof, the free edges of said door meeting in a line below the lowermost points in the bottom edges of said end walls.

6. In a dumping car, the combination with an underframe including relatively short center sills at each end of the car, said center sills being laterally diverged at their inner ends inside of the bolster; of a single hopper having an unobstructed opening, said hopper having side walls and sloping end walls, the latter being disposed over said diverged ends of the center sills; doors adapted to close said opening; and mechanism for operating said doors, said mechanism including a transversely extending shaft disposed beneath a hopper end wall and above said center sills, and duplicated linkages from said shaft to the doors, said linkages passing between said divergent portions of the corresponding adjacent center sills.

7. An ore car having a single un-

obstructed discharge opening, said ore car having a hopper defined by two side walls and two end walls, each side wall having an upper vertically extending portion and a lower inwardly inclined portion, each end wall having a substantially cylindrical main portion and two side generally triangularly shaped flat portions merging with said cylindrical portion and the side walls of the car, a top plan of said hopper presenting parallel side edges and oppositely outwardly curved ends, a top plan of the discharge opening presenting a substantially rectangular orifice; of doors arranged to close said opening; and mechanism for operating said doors.

8. An ore car having a single unobstructed discharge opening, said ore car having a hopper defined by two side walls and two end walls, each side wall having an upper vertically extending portion and a lower inwardly inclined portion, each end wall having a substantially cylindrical main portion and two side generally triangularly shaped portions merging with said cylindrical portion and the side walls of the car, a top plan of said hopper presenting parallel side edges and oppositely outwardly curved ends, a top plan of the discharge opening presenting a substantially rectangular orifice; of doors arranged to close said opening; mechanism for operating said doors; and a combined baffle plate and truss member at each end of the hopper opening and extending from side to side of the car, said member being conformed to the curvature of and secured to its corresponding hopper end wall.

In witness that I claim the foregoing, I have hereunto subscribed my name this 16th day of December, 1920.

ARGYLE CAMPBELL.

Witnesses:
CARRIE GAILING,
UNA C. PERIN.