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HOPPER DUMP CAR

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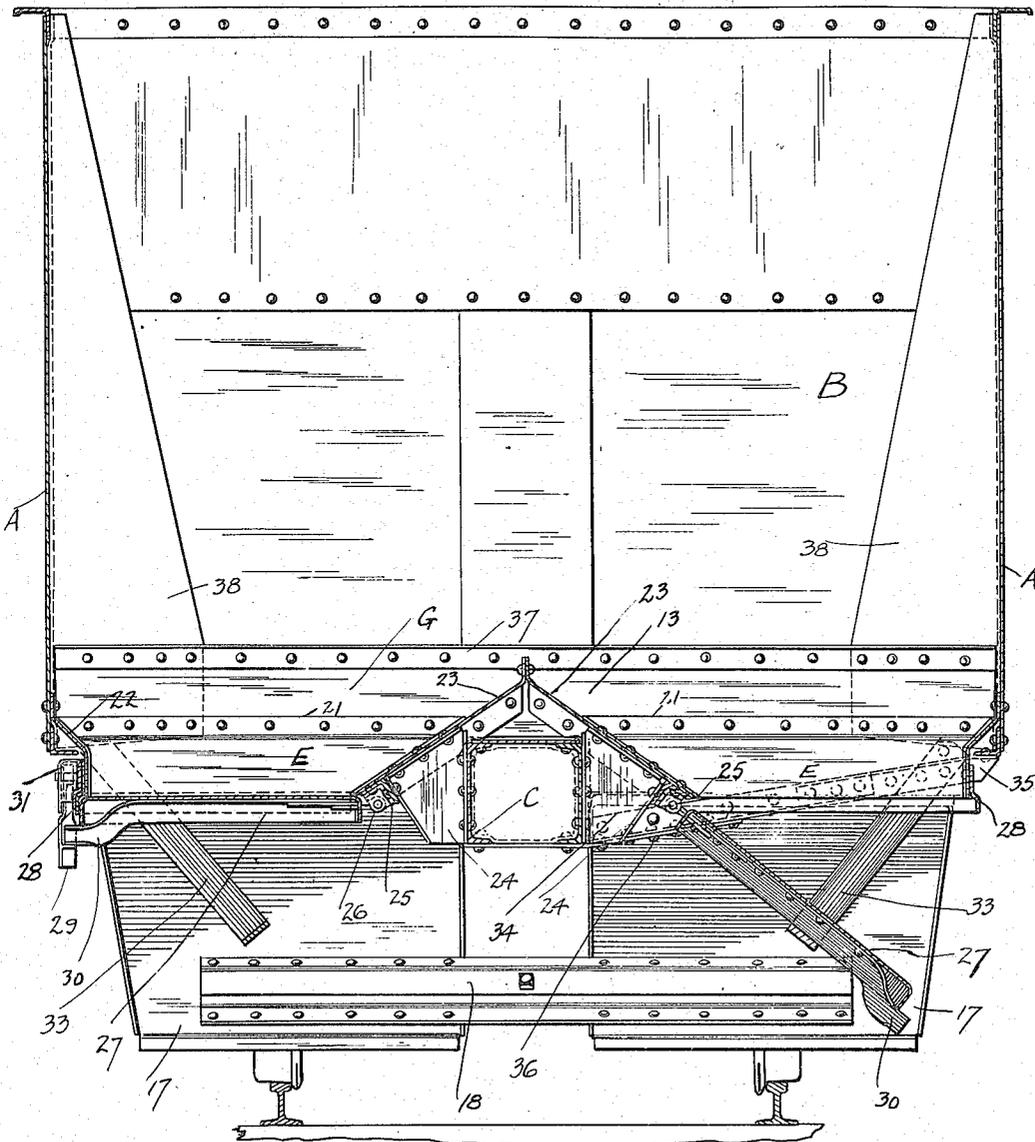


FIG. 3.

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# UNITED STATES PATENT OFFICE.

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## HOPPER DUMP CAR.

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*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 Hopper Dump 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 hopper dump cars.

In the well-known W-type of hopper car, it has been customary heretofore to employ a transversely extending ridge at the center of the car between the sets of hopper doors, said ridge projecting upwardly into the body of the car and thereby reducing the load-carrying capacity of the car. If the angle of said ridge is left comparatively obtuse, for the purpose of minimizing the waste space, then difficulty is encountered in properly discharging the load. On the contrary, if the angle of said ridge is made acute to insure proper discharge of the load, the capacity of the car is reduced and also the center of gravity of the load is made higher.

An object of my invention is to provide, in a hopper car of the general so-called W-type, increased load-carrying capacity without an increase of the over-all dimensions as compared with the standard W-type hopper proper, or, stated in another manner, obtain the same carrying capacity with lesser over-all dimensions.

Another object of my invention is to provide a car of the type indicated in the preceding paragraph wherein the arrangement for obtaining the increased capacity is utilized without interference in the full opening of the usual end hopper doors; without appreciable additional cost; and with full assurance of discharge of 100% of the load.

My invention further resides in certain other features of novelty and construction such as will more clearly appear from the description and claims following.

In the drawings forming a part of this specification, Figure 1 is a side elevational view of slightly more than one-half of a hopper car embodying my improvements. Figure 2 is a fragmentary, vertical, trans-

verse sectional view taken on a line corresponding substantially to line 2—2 of Figure 1. Figure 3 is a vertical transverse sectional view on the line 3—3 of Figure 1 upon an enlarged scale, the lefthand half side thereof illustrating the corresponding intermediate hopper door in closed position and the righthand half illustrating the righthand intermediate hopper door in open position.

In said drawings, the side walls of the car are indicated by the reference character A; a sloping end floor by the reference character B; and the center sill by the reference character C. As clearly shown in Figure 1, the hopper car is provided with a longitudinal series of three hoppers on each side of the car, the two end hoppers being designated generally by reference characters D—D and the intermediate hopper by the reference character E. In Figure 1 of the drawing, it will be noted that I have indicated in dotted lines the usual arrangement of transverse ridge F employed in the common W-type hopper car. In carrying out my invention, this ridge F is entirely omitted and the two hoppers E employed in lieu thereof with consequent increase in load-carrying capacity, the hoppers E being disposed between the transverse cross members G.

Each of said end hoppers D, on each side of the center sill, is defined by the lower portion of a sloping end floor B; an inner, substantially triangular side hopper sheet 10 secured to the center sill; an outer, inwardly sloping side hopper sheet 11; and a transversely extending ridge sheet 12, the latter being secured along its upper edge to a vertically disposed transverse plate 13 of crossbeam G. Each sloping end floor B is preferably suitably reinforced at its bottom free edge by an angle iron 14 and similarly the bottom edge of each ridge sheet 12 is reinforced by an angle iron 15 secured to the underside thereof and braced to the needle beam 13 by means of braces 16. To each transverse ridge 12 is pivotally attached, along its upper edge, a transversely extending end hopper door 17. Preferably, each pair of transversely aligned end hopper doors 17 is rigidly connected by suitable bracing as indicated at 18 so that the same may be operated simultaneously by means of suitable door operating mecha-

nism actuated from the corresponding adjacent shaft 19. Said operating mechanism preferably consists of an arm 20, rigidly secured to shaft 19, and connected to the door bracing 18 by means of link 20<sup>a</sup> with the parts so associated that the operating mechanism will serve to maintain the doors in open position as indicated in Figure 1.

10 The crossbeams G, which extend transversely of the car from side to side thereof, are suitably spaced from each other as indicated in Fig. 1 for the purpose of accommodating the intermediate hoppers E therebetween, said hoppers E being disposed one on each side of the center sill. Each of said intermediate hoppers E is defined by means of transversely extending ridge plates 21—21 riveted to the corresponding vertically disposed plates 13 of crossbeams G, outer hopper sheets 22, and inner hopper sheet 23, the latter forming a ridge extending longitudinally over the center sill. Intermediate the crossbeams G, the ridge sheets 23 are supported from the center sill by means of brackets 24 and the lower edges of the ridge sheets 23 are reinforced by longitudinally extending angles 25 which are fitted with suitable hinge butts 26. On the hinge butts 26, doors 27 are swingingly mounted and adapted to close with the free edges thereof adjacent the sides of the car. The lower edge of each outer hopper sheet 22 is reinforced by means of a reinforcing strip 28 which insures a tight joint for the door at the free edge thereof. The free edge of each door is supported in closed position by means of door supporting hooks 29 which engage brackets 30 projecting beyond the free edge of the door. Two hooks per door are preferably used and these, for purposes of economy, are preferably mounted on the same bracket 31 which is extended from one to the other and secured to the outer hopper sheet 22. A cam 32 is mounted on the bracket 31 adjacent each hook 29 and is adapted to engage the same to prevent it from moving out of locking engagement with the door.

50 Referring to Figure 1, it will be noted that the dumping door 27 there shown is so disposed that, if allowed to fall far enough, would strike the doors 17 when the latter are open. In order to limit the downward swing of the door 27 and prevent the same from hitting on the end hopper doors, a stop 33 is provided. Said stop 33 preferably consists of a plate or other structural member bent to a U-shape and secured to the vertical plates 13 of the crossbeam G.

60 Each crossbeam G has the lower part thereof formed of a plurality of sections of angle, secured on opposite sides of the plate 13 and adapted to overlap for a limited distance. Angle 34, forming the inner portion

of the crossbeam bottom member, is so disposed that the horizontal flange of the angle is below the vertical flange thereof whereas the section of angle 35, forming the outer portion of the crossbeam member, is so disposed that the horizontal flange of the angle is above the vertical flange thereof. The usual bottom cover plate 36 extends across the plane of the center sill and on either side thereof and is there secured to the horizontal flanges of the angles 34—34. The upper margin of each vertical plate 13 is stiffened by means of an angle 37 secured thereto and extending transversely through the car. Side stakes 38, each secured to one end of the crossbeam G and side A of the car, prevent outward bulging of the sides.

With my arrangement of two end hoppers and an intermediate dumping space in the manner shown I am enabled to secure greater load carrying capacity than has heretofore been secured with this type of car and this while still permitting the unloading of the car in bins of the same length as heretofore, inasmuch as the dumping of the load is concentrated between the two end hoppers as heretofore. While I have shown and described my improvements in connection with a standard hopper car and the advantages of the same in connection therewith will be readily seen, it will be apparent that in certain circumstances it might be advantageous to lengthen the car and increase the width of the intermediate hopper and dispose a dumping door of greater width or a plurality of doors, operated singly or in unison by means of power mechanism, might be used.

While I have shown and described what I now consider the preferred manner of carrying out my invention, the same is merely illustrative and I contemplate all changes and modifications that come within the scope of the claims appended hereto.

I claim:

1. In a hopper car having four hoppers arranged in pairs transversely of the car and in pairs longitudinally of the car on each side of the center sill and arranged to discharge at the center of the car, each of said hoppers having combined therewith, a transversely disposed hinged door, said doors being adapted for full opening movement, the combination with additional hoppers located intermediate the discharge ends of said first named hoppers, each of said intermediate hoppers including a dump door arranged to swing about an axis extending transverse to the axes of the first mentioned hopper doors; of means for retaining the dump doors of said additional hoppers in closed position.

2. A hopper car having sides, ends and sloping end floors defining a plurality of

- separate discharge openings, doors hinged on transversely extending axes for closing said discharge openings and adapted to swing towards each other into opened position, and  
 5 dumping doors having their axes arranged longitudinally of the car disposed intermediate of the aforesaid transversely extending doors and adapted to close other and independent discharge openings of the car.
- 10 3. A hopper car having sloping end floors terminating in hoppers on each side of the center sill, transversely extending dump doors adapted to close the aforesaid hopper openings, the said dump doors being spaced  
 15 from each other an appreciable distance longitudinally of the car to provide dumping openings intermediate thereof, and doors, swinging on axes extending longitudinally of the car, adapted to close the latter open-  
 20 ings.
4. A hopper car having dumping doors with their axes arranged longitudinally of the car, and transversely disposed doors adapted to swing towards each other into  
 25 opened position and longitudinally in line with said longitudinally hinged doors when opened.
5. A hopper car having dumping doors with their axes arranged longitudinally of the car, transversely disposed doors adapted to swing towards each other into opened po-  
 30 sition longitudinally in line with said longitudinally hinged doors when opened, and stops for limiting the downward swing of the first named doors.
- 35 6. A hopper car having sloping end floors and six discharge hoppers arranged in two longitudinal series of three each on each side of the center sill, each of said series includ-  
 40 ing two end hoppers and an intermediate hopper, each of said end hoppers being defined by side hopper sheets, a sloping end floor, a transverse ridge sheet, and a dump door hinged to said transverse ridge sheet;  
 45 each of said intermediate hoppers being defined by two oppositely extending transverse ridge sheets, outer side hopper sheet, inner hopper sheet sloping from the center sill, and a dump door hinged to said hopper  
 50 sheet sloping from the center sill.
7. A hopper car having sloping end floors and a plurality of discharge openings arranged in two longitudinal series on each  
 55 side of the center sill, each of said series including two end hoppers and an intermediate hopper, the end hoppers being adapted to be closed by transversely extending doors and the intermediate hopper by a door mov-  
 60 able substantially at right angles to the aforesaid transversely disposed doors.
8. A hopper car having ends, sloping end floors and a plurality of discharge openings arranged in two longitudinal series on each  
 65 side of the center sill; each of said series including two end hoppers and an inter-  
 mediate hopper, each of said end hoppers being defined by side hopper sheets, a sloping end floor, a transverse ridge sheet and a dump door hinged to said transverse ridge  
 70 sheet and having the free edge thereof adapted to engage the sloping end floor; each intermediate hopper being defined by two oppositely extending transverse ridge  
 75 sheets, outer side hopper sheet, inner hopper sheet sloping from the center sill and a dump door hinged to said inner hopper sheet and having the free end thereof supported by mechanism carried by the outer  
 hopper sheet.
9. A hopper car having sides, sloping end  
 80 floors and a plurality of discharge openings arranged in two longitudinal series on each side of the center sill, each of said series including two end hoppers and an inter-  
 85 mediate hopper, the end hoppers having transversely extending dump doors and the intermediate hoppers having doors hinged adjacent the center sill and swinging in a plane substantially at right angles to that  
 90 of the aforesaid transversely disposed doors, and means disposed adjacent the sides of the car for supporting the free ends of said intermediate doors.
10. A hopper car having sides, sloping  
 95 end floors and a plurality of discharge openings arranged in two longitudinal series on each side of the center sill, each of said series including two end hoppers and an inter-  
 100 mediate hopper; said intermediate hoppers being separated from the end hoppers by means of transversely extending crossbeams each including, a vertical plate extending across the car and in-  
 105 clined shedding plates riveted to the sides thereof; a transversely extending hopper door hinged to the lower edge of each of said transverse ridge sheets located nearest said sloping end floor, and a longitudinally extending ridge sheet over the center sill be-  
 110 tween the crossbeams, and doors hinged to the lower edges of said longitudinally extending ridge sheet for closing said intermediate discharge openings.
11. A hopper car having sides, sloping  
 115 end floors and a plurality of discharge openings arranged in two longitudinal series on each side of the center sill, each of said series including two end hoppers and an inter-  
 120 mediate hopper, said intermediate hoppers being separated from the end hoppers by means of transversely extending crossbeams, transversely extending doors co-operating with the sloping end floors to close said end  
 125 hopper openings and doors disposed at right angles to the aforesaid transversely extending doors for closing the intermediate hopper and stops carried by the crossbeams for the purpose of limiting the downward  
 swing of said intermediate doors.
12. In a hopper car having four hoppers

arranged in pairs transversely of the car and in pairs longitudinally of the car on each side of the center sill and arranged to discharge at the center of the car, each of  
5 said hoppers having combined therewith, a transversely disposed hinged door, said doors being adapted for full opening movement, the combination with additional hoppers located intermediate the discharge ends  
10 of said first named hoppers, each of said intermediate hoppers including a dump door arranged to swing about an axis extending transverse to the axes of the first mentioned hopper doors; of means for retaining the dump doors of said additional  
15 hoppers in closed position.

18. In a hopper car having four hoppers arranged in pairs transversely of the car and in pairs longitudinally of the car on  
20 each side of the center sill and arranged to discharge at the center of the car, each of

said hoppers having combined therewith, a transversely disposed hinged door, said doors being adapted for full opening movement; the combination with additional hoppers located intermediate the discharge ends  
25 of said first named hoppers, each of said intermediate hoppers including a dump door arranged to swing about an axis extending transverse to the axes of the first mentioned hopper doors; of means for retaining the dump doors of said additional hoppers in closed position; and operating mechanisms for all of the first named hopper doors.  
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In witness that I claim the foregoing I have hereunto subscribed my name this 21st day of May, 1923.

ARGYLE CAMPBELL.

Witnesses:

FRANCES SAVAGE,  
HARRIETTE M. DEAMER.