This invention relates to an improved construction for railway hopper cars and particularly to means for discharging ballast from cars also equipped with the usual hopper discharge doors.

The usual hopper car designed for the purpose of conveying lading such as coal and the like are provided with transverse hoppers equipped with doors discharging longitudinally of the car directly on top of the car rails, whereas cars constructed for the conveyance and discharge of ballast are usually provided with longitudinally disposed hoppers equipped with discharge means for discharging the ballast in transverse direction between and outside of the car rails.

An object of this invention is to provide a construction for hopper cars having transversely disposed hoppers of the type now employed for hauling coal and the like, having the usual discharge doors for use in discharging the lading longitudinally of the car directly onto the rails and also with discharge means for ballast adapted to discharge ballast in transverse directions between and outside of the car rails.

The ballast discharging means of this invention is of a particular construction whereby the proper ballast discharge is effected from hoppers disposed transversely of the car. It is intended that this invention may be embodied in newly constructed cars whereby the cars possess the joint function of use as either coal hauling or ballast hauling cars and also that the ballast discharge features thereof may be installed as an improved attachment on railroad hopper cars of the coal hauling type already in use whereby such cars may be converted to possess the structural characteristics permitting use for hauling and discharging either coal or ballast.

The characteristic of this invention is that discharge doors, together with ballast deflecting means, are mounted on the outside sloping floor of the transverse hopper whereby the usual coal discharging doors located on the inner sloping walls are also provided of the usual construction, completely intact for normal operation in handling coal or the like.

It is a further object of this invention to provide a novel form of discharge mechanism including doors and control means whereby the desired discharge of ballast may be accomplished in a ready and accurate control over the discharge may be had.

In connection with the last stated object, it is a further object to provide a novel form of door control means, providing great flexibility of control by a simple and cheap mechanism, permitting the operation of the various doors independently or simultaneously as desired.

Various additional objects will readily appear to one skilled in the art as the following description proceeds.

The following description is one preferred form of the invention and is given merely by way of example and is not to be construed as limiting the invention in any respect as the scope of the invention should be determined from the appended claims with an understanding of the present disclosure and an appreciation of the advantages which the invention produces therein.

The following disclosure may be more readily understood by referring to the accompanying drawings, in which—

Figure 1 is a side elevational view in cross section of one-half of a hopper car constructed in accordance with the present invention, and

Figure 2 is a plan view of Figure 1;

Figure 3 is an enlarged elevational view taken on the line 3—3 of Figure 1 and looking in the direction of the arrows;

Figure 4 is a cross sectional view taken on line 4—4 of Figure 3 and looking in the direction of the arrows, and

Figure 5 is an enlarged cross sectional view disclosing the hoppers on both sides of the car in their proper relationship to the car supporting rails.

By referring to the drawings it will be noted that the present invention is disclosed as embodied in a hopper car comprising the usual underframe 10, adapted to be mounted by bolster 11 on track running wheels 12, supported by the usual truck construction,
not shown. The car body 13 of hopper construction is mounted and supported in the usual manner upon the underframe which body comprises side walls 14, end walls 15, a sloping floor 16, terminating at a point below the underframe in the space between the car trucks.

Centrally of the car, the sloping floor or shedding surface 17 is provided having a hinge 18 at the lower edge thereof on which the discharge door 19 is pivotally mounted. The discharge door is of usual arrangement and construction and constitutes the discharge means for the hopper through which coal or similar lading may be discharged in a longitudinal flow on top of the car rails. The means for controlling the movement of door 19 is not disclosed in this specification as it is intended to be of any usual and well known construction.

It is noted that the door 19 is constructed to provide the usual discharge from hoppers disposed transversely of the car, and that the lading passing there through falling from the sloping floor 16 will be traveling in a direction longitudinally of the car and deposited on top of the track rails.

The above description of the disclosed car covers those characteristics which are common in hopper cars of the coal carrying type and do not, except in combination with the ballast discharge means, constitute any part of the present invention.

In combination, however, the present invention permits the maintenance of usual coal type of discharge means of usual form for usual operation, and provides in addition, ballast discharge means effective to discharge ballast in a transverse direction between and outside of the car rails.

As disclosed in the drawings, it will be noted that the discharge means for ballast or the like, which flows from the hopper and is deflected in transverse directions between and on the outside of the car rails, comprises a plurality of openings 20, arranged two on each side of the center of the car in the lower portion of the sloping wall 16. This construction utilizes the opposite sloping surface of the hopper from that constituting the discharge door 19, in the ordinary hopper construction. By locating the ballast discharge doors in this manner, the usual hopper discharge door is not interfered with in any manner.

As more clearly shown in Figures 3 and 4, on the under side of the openings 20, on the margins thereof, are plates 21, having edge deflections 22 providing with the edge of the floor openings grooves or slots 23, for receiving opposite edges of the doors 24. The doors are preferably constructed in the form of rectangular plates adapted to slide in a path parallel to the sloping floor 16 and in close contact with the under side thereof.

The lower edge of the door is provided with a lip 25, which is formed by deflecting the body portion of the door upwardly and thence in a parallel direction, whereby the lip will overlie the lower portion 26 of the sloping floor 16. This feature is clearly shown in Figure 4.

It will be understood that the lip 25 is of less width than the main portion of the door whereby it will be free of the groove 23, and project through the door opening in a manner to overlap as described.

The underside of each door is preferably provided with two sets of bearing legs 27, each set having a bearing pin 28, for pivotal connection with the yoke 29, the opposite ends of which are connected to door control mechanism which will now be described.

As the mechanism is the same for each pair of doors on each side of the center of the car, a description of only one pair will be given. The innermost yoke is connected by means of pin 30, to the crank 31, which is keyed to the shaft 32. Shaft 32 may extend entirely across the car from one side to the other whereby rotation of the shaft will serve to actuate both of the inside doors simultaneously or, if for control purposes, it is desired to operate the inside doors independently, two shafts may be employed, disposed end to end to assume the same position as that of the single shaft. In either construction, the inner portion of the shaft is mounted in a bearing 33, whereas the outer end thereof is mounted for pivotal movement within the sleeve 34, which in turn, is mounted for rotation in the bearing 35, carried by the bracket 36, secured to the under side of the hopper.

The sleeve 34 extends inwardly to approximately the mid-point of the outside door and is provided with a crank 37, on the end thereof which is connected to the end of the yoke 29 of the outer door, by means of the bearing pin 38.

It will readily appear that this construction will be effective to control the inside door upon rotation of the shaft and the outside door upon rotation of the sleeve. Obviously, the outside door on the opposite side of the car is controlled by a sleeve on that side, whereas the inside door may be controlled by the rotation of the shaft along with the first inside door or independently thereof by its own shaft if two shafts are provided.

Formed integrally with the sleeve 34, is the cam member 40, and arranged in associated relationship therewith is a second cam member 41, which is fixed to turn with the shaft 32. These members are provided with sockets 42 and 43 respectively, adapted to receive the end of an actuating lever, by which rotation thereof may be effected. It will readily appear that each may be actuated independently of the other.
However, a third socket 44, is provided, made up of complementary depressions in the adjacent faces of the two cams whereby a tool inserted therein, will be effective to rotate both cam simultaneously. By the insertion of an operating lever in the middle socket 44, the shaft and the sleeve are rotated as a unit.

Deflecting or shedding surfaces are also provided located beneath the doors for catching and deflecting the ballast as it flows from the doors and to direct the deposit of the ballast between and on the outside of the rails of the track. This means comprises a bracket 50 which is attached to the under side of the car by means of rivets 51 as shown in Figure 3 and serves as a mounting for the deflecting plate 52, attached thereto by means of rivets 53 at one side and to the under side of the sloping surface by means of rivets 54 and bracket 55 at the other side.

The deflecting plate is provided with an intermediate horizontal portion and downwardly and oppositely inclined portions 56 and 57 respectively, each underlying one of the two doors to deflect the ballast. This plate is provided with side walls 58, whereby the ballast will not spill over the edges under the influence of the longitudinal flow from the hopper doors.

It will thus appear that by proper manipulation of the doors, the ballast will flow through the openings when the doors are open, fall upon the plates and be directed to the side of and between the rails in the desired manner in discharging ballast.

It will also appear that the type of discharge may be selected according to need in use, that is, by operating only the outside door on one or both sides, ballast may be deposited on the side or sides of the track only, or, by operating the inside doors, the ballast may be deposited between the track rails only, whereas, the operation of both doors together will discharge the ballast both between and on the outside of the rails.

Furthermore, the doors on the particular side of the car may be actuated from the control means on the corresponding side, it being understood however, that when the single shaft 32 is employed extending all the way across the car, that the operation from one side of the car only, deposits ballast between the rails from both of the inside doors simultaneously.

By an inspection of Figure 5 of the drawings, it will be noted that the ballast deflecting plates 56, 57 are arranged to deposit the ballast between and on the outside of the car supporting rails. This figure shows the car in its proper relationship to the rails and it is preferable to provide the ends of the deflecting plate 58 so as to lie in an imaginary line which represents the angle of repose of the ballast material when piled to a maximum extent between and outside of the rails without flooding the wheel engaging portions. This imaginary line is represented by the dotted line 101 in Figure 5 and it will be noted that it represents the material piled to a maximum extent without flooding the wheel engaging portions of the rails 100. The angle of repose represented by the line 101 in Figure 5 represents a maximum position, it being understood that the deflecting plates 58 may be longer whereby to prevent the ballast from coming as high up on the rails.

From the above description it will readily appear that a car is provided by this invention which is capable of use for coal or the like, or ballast, in which all of the structural features necessary and desirable for hopper cars of the coal hauling type are maintained both in structure and function as they now exist in cars solely for this purpose, and in addition, ballast discharge means is also provided which is operable to discharge ballast between and on the outside of the rails in lateral directions.

It will also appear that the ballast discharge means is capable of being added to ordinary hopper cars of the coal hauling type without material or substantial alteration and without interfering with the coal discharge mechanism already provided for in their construction.

I claim:

1. A car of the character described comprising in combination a transverse hopper having downwardly converging floors, a portion of one of said floors constituting a hinged door for providing discharge of lading on to the track rails, and discharge means in the opposite floor, said discharge means having deflecting surfaces for depositing lading discharged therethrough on the side of and between the track rails.

2. A hopper car of the character described comprising in combination a hopper having converging sloping floor surfaces, one having a portion constituting a discharge door for depositing lading longitudinally of the car on to the track rails and the other being provided with discharge means for depositing lading entirely independently of said discharge door, said discharge means having deflecting surfaces for directing the discharge for deposit on the sides of and between the track rails.

3. A hopper car of the character described comprising in combination a hopper having converging sloping floor surfaces, one having a portion constituting a discharge door for depositing lading longitudinally of the car on to the track rails and the other being provided with discharge means for depositing lading entirely independently of said discharge door, said discharge means having deflecting surfaces for depositing the lading by flow in lateral directions.
4. A hopper car of the character described comprising in combination a hopper having converging sloping floor surfaces, one having a portion constituting a discharge door for depositing lading longitudinally of the car on to the track rails and the other being provided with discharge means for depositing lading entirely independently of said discharge door, said discharge means having deflecting surfaces for selectively depositing lading to either or both sides of, or between said track rails or any combination thereof.

5. A hopper car of the character described comprising in combination a hopper having converging floor surfaces and a transverse vortex, discharge openings in one hopper floor surface on one side of said vortex, and doors therefor mounted for sliding opening and closing movement in a path parallel to said hopper floor surface, and means therefor beneath for deflecting ballast transversely, between and to the sides of the track rails.

6. A hopper car of the character described comprising a sloping floor surface having portions extending below the center sill on opposite sides of said center sill each provided with a pair of discharge openings, and means beneath the inside openings for directing ballast therefrom between the track rails and means beneath the outside openings for directing ballast therefrom outside of the track rails.

7. A hopper car of the character described comprising a sloping floor surface having portions extending below the center sill on opposite sides of said center sill each provided with a pair of discharge openings, and means beneath the inside openings for directing ballast therefrom between the track rails and means beneath the outside openings for directing ballast therefrom outside of the track rails, said control means comprising a single device for operating said inside doors and separate devices for operating said outside doors.

8. A hopper car of the character described comprising a sloping floor surface having portions extending below the center sill on opposite sides of said center sill each provided with a pair of discharge openings, and means beneath the inside openings for directing ballast therefrom between the track rails and means beneath the outside openings for directing ballast therefrom outside of the track rails, said control means comprising a single device for operating said inside doors and separate devices for operating said outside doors, all constructed for operating said inside doors simultaneously with either outside door by a single operating movement.

9. A construction of the character described comprising in combination a pair of discharge openings and doors for each of said openings, and a shaft connected for operating one of said doors and a sleeve concentric with said shaft connected for operating the other of said doors, independent means fixed to said shaft and sleeve respectively for receiving an operating tool and cooperating complementary parts on said means for receiving a tool whereby said means may be operated as a unit.

10. A construction of the character described comprising in combination a pair of discharge openings and doors for each of said openings, and a shaft connected for operating one of said doors and a sleeve concentric with said shaft connected for operating the other of said doors, independent means on said shaft and sleeve respectively, each having a tool receiving socket therein, and complementary depressions jointly constituting a tool receiving socket.

11. A car construction of the character described comprising a sloping floor having a discharge opening therethrough, a slide track adjacent the edges of said opening and a door slideable to open and shut positions with respect to said opening, mounted in said slide track, and means for operating said door, said door having its lower end extended through said opening and in overlapping relation with the lower edge of said opening when in closed position.

Signed at Chicago, Illinois, this 24th day of July, 1930.

WILLIAM J. HOSCEIT.