My invention relates to an improvement in a discharge outlet for railway cars and the like. My invention is more especially related to that type of outlet having a sliding gate for controlling the discharge of lading and having a fixed chute below the gate with provision for receiving and supporting a removable extension chute. My invention is by way of an improvement on a construction which is now in extensive use and which includes an integrally formed outlet member combining the attaching walls of the frame, supporting and guiding grooves for the gate and a fixed chute below the gate, said chute having laterally extending projections for supporting the removable chute. Such an integral construction has proved highly satisfactory in service but has been found costly to manufacture due in part to the large and cumbersome cores which must necessarily be employed.

A particular feature of my invention resides in the relation between the fixed hopper chute and the means provided for retaining the removable chute in position whereby I am enabled to obtain a simple and strong construction and dispense with a number of complex cores. My improved construction contemplates an outlet structure having a large rigid frame member and a number of independently formed parts all assembled into a unitary structure as will hereinafter be fully described. In carrying out my invention I retain the principle of forming in one piece the main part of the outlet thus combining strength and rigidity with lightness and simplicity, but form the chute supporting means of separate members thus eliminating cores and permitting the outlet frame to be either drop forged or made from a flat plate and pressed to shape and still be interchangeable with a cast member.

My invention further resides in certain other features of construction and detail of parts such as will hereinafter be more fully described and claimed.

For further comprehension of my invention, reference may be had to the accompanying drawings wherein: Fig. 1 is an elevational side view of part of a hopper car showing my improved construction applied thereto. Fig. 2 is a vertical transverse sectional view through the structure illustrated in Fig. 1 and taken on a line 2—2 of said Fig. 1. Fig. 3 is a vertical elevational view of the outlet frame as illustrated in Fig. 1. Fig. 4 is a plan view of the frame shown in Fig. 3 and as viewed from the top. Fig. 5 is an end view of the frame shown in Fig. 4 and as viewed on a line 5—5 of said figure. Fig. 6 is a view showing on an enlarged scale a side elevational view of the outlet assembly shown in Fig. 1. Fig. 7 is a top plan view of the assembly shown in Fig. 6. Fig. 8 is an end elevational view of the assembly and is shown as viewing Fig. 7 from right to left. Fig. 9 is a vertical elevational view through the structure shown in Fig. 8 and is taken on a line corresponding substantially to a line 9—9 of Fig. 6. Fig. 10 is a fractional elevational sectional view taken through a line 10—10 of Fig. 7. Fig. 11 is a fractional elevational sectional view taken through a line 11—11 of Fig. 7. Fig. 12 is a fractional elevational sectional view taken through a line 12—12 of Fig. 7. Fig. 13 is a fractional elevational sectional view taken on a line 13—13 of Fig. 7.

In said drawings, my improved construction is shown as applied to a railway hopper car and is illustrated in relation to one of rails A on which the car rests and one of the truck wheels is indicated at B. The car body hopper, which is shown at C, is located at one of the sides of the longitudinally extending center sill D. The outlet assembly proper is indicated at E and supplementary supporting and guiding means for the sliding gate is shown at F, said guiding means being for the purpose of supporting the gate when in open position.

The car body hopper C includes inner wall 10, outer wall 11 and sloping transverse walls 12 and 13, said respective walls 10, 11, 12 and 13 meeting together and leading downwardly to a rectangular shaped discharge opening. The inner wall 10 is preferably substantially vertically disposed and leads downwardly from the lower margin of the center sill D and is preferably welded thereto as at 14, the other walls of the hopper shown at 11, 12 and 13 preferably slope downwardly at a sufficient slope to direct lading towards the discharge opening. Surrounding the lower margin of the hopper is the outlet frame 15 of the assembly E and said frame is fitted with a sliding gate 16 whereby the discharge of the lading from the hopper is controlled. Operation of the gate is effected by an operating shaft 17 having geared pinions 18 non-rotatably associated therewith, said pinions meshing with rack teeth 19 formed integrally with the underside of the gate. The shaft 17 is preferably of non-circular section and non-rotatably mounted on the shaft are shaft bushings 20, the latter being formed with circular outer surfaces 21 whereby the shaft is mounted in bearings 22, said bearings being formed in side rail members 23. The side rail members are secured on the respective sides of the frame and
project beyond the frame to present extensions lying at each side of the gate.

The outlet frame 15 is rectangular in shape to conform to the shape of the hopper proper and the sides of the frame are of generally 2 shape section with the web 24 horizontally disposed and the flanges 25 and 26 leading from the opposite sides of the web portion 24 upwardly and downwardly respectively. The web 24 constitutes a runway on which the gate 16 is supported and the four downwardly extending walls 28 which lead from the inner end of the web define a rectangular chute of appreciable depth. The upwardly extending walls 25 which lead from the outer end of the web 24 extend substantially vertically for a limited distance on three sides of the frame and thereafter extend at an angle to conform to the slope of the hopper as indicated at 27 or continue vertically as indicated at 28. On the fourth side of the frame, the gate projects through the frame wall and an opening 29 is provided and above said opening, the frame is provided with a sloping wall 30 underlying the sloping wall 13 of the hopper. The wall 30 is reinforced at its upper margin by a flange 31 and at its lower margin the wall 30 is provided with a bulb like portion 32, said wall members 30, 31 and 32 are integrally united at each end by vertically extending walls 33. The walls 30, 31 and 32 in combination with walls 33 constitute overlapping means which partially enclose the outer end of the sliding gate 16 and guard against the lodgement of snow and ice on the outer end of the gate and otherwise assists in keeping moisture from contacting the lading in the car.

Outstanding from the lower margin of walls 26 are members 34, 35, 36 and 37, said members being for the purpose of supporting a removable extension chute. All of said members 34 to 37 inclusive are provided with vertical webs 38 which overlie and are secured to the walls 26 of the frame chute. The outstanding portions of members 34 and 35 are in the form of channel grooves 39 whereas the outstanding portions of members 36 and 37 are preferably in the form of flat outstanding horizontal ledges having bracket portions 40 for retention of the removable chute.

The side rail members 23—23 overlie the members 34 and 36 respectively and fit in the channel shaped recesses defined by the under side of wall 24 and the outstanding marginal portions of members 34 and 36. Said rails are preferably secured in position by rivets 51 and adjacent the end of the frame are deflected outwardly as at 42 and thereafter upwardly to present upwardly extending portions 43 at each side of the gate.

Pivotedly associated with the upwardly portions 43 is a locking cam 44 which has a body portion 45 movable to a position in the path of movement of the gate and operates to latch the latter in closed position. Said cam 44 is formed with end portions 46 lying outwardly of the rail portions 43 and through which the cam supporting pivots 47 extend. The axial center of pivots 47 lies in the same horizontal plane as the gate and this location of the pivotal axis combined with an arcuate shaped face 48 on the cam operates to provide a powerful wedging action between the gate and locking cam.

On each end wall 49 of the latching member there is a laterally projecting lug 50 whereby a purchase may be had for moving said latching member either to operative latching position or to an overbalanced position out of the path of movement of the gate.

The supplementary guiding and supporting means preferably consist of angle shaped members 55 riveted or otherwise secured to the rail 23 as at 51. The outer ends of members 55 are supported from the car structure in any suitable manner, preferably by angles and gussets as shown at 52, 53 and 54 respectively. Movement of the gate 16 in an opening direction is limited by the stop angle 55.

The gate 16 is of the usual construction and is caused to move through the medium of the shaft 47 by reason of the interengagement of the pinion and rack teeth as will be understood. Rotation of the shaft is effected by any suitable means for obtaining a leverage effect on the shaft and preferably consists of a socket 56 fixedly mounted on the outer end of the shaft 47 and having a plurality of openings 57 for the reception of an operating bar.

A major advantage of my improved construction, as will be noted by reference to Figs. 3 to 5 inclusive, resides in the fact that the integral frame member may be positioned in a forming die after casting and coined to the required shape thereby obtaining a perfectly flat surface 24 for the gate and this without the necessity of machining. The absence of laterally projecting parts at the lower margin of the frame in addition to eliminating cores enables the manufacture either in drop forging or pressing to shape from a flat metal plate.

What I claim is:

1. In a load discharging hopper having an outlet frame at the lower portion thereof, said frame including a sliding gate to control the discharge of the lading and means for restraining the gate against opening movement when in closed position; said frame including a flat ledge portion for supporting the gate and a four sided depending chute below the gate; rails disposed on the outer side of the chute, said rails leading from two parallel sides of the four sided chute and extended beyond the frame and there formed with upwardly extending portions, said means for restraining the gate against movement including a latching element pivotally mounted on said upward extensions, said latching elements including walls pivotally associated with the said upwardly extending portions and lying on the outer side thereof and a body portion extending between and integrally uniting the said wall portions, said body portion being of arcuate form and movable to a position in the path of movement of the gate to latch the latter in operative closed position.

GEORGE B. DOREY.