Feb. 6, 1962 G. B. DOREY 3,020,092

PNEUMATIC DISCHARGE HOPPER CAR

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Fig. 1

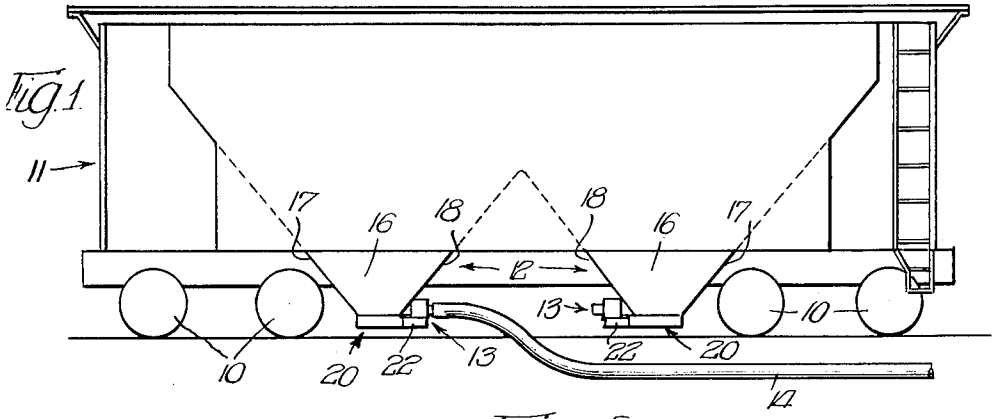


Fig. 4

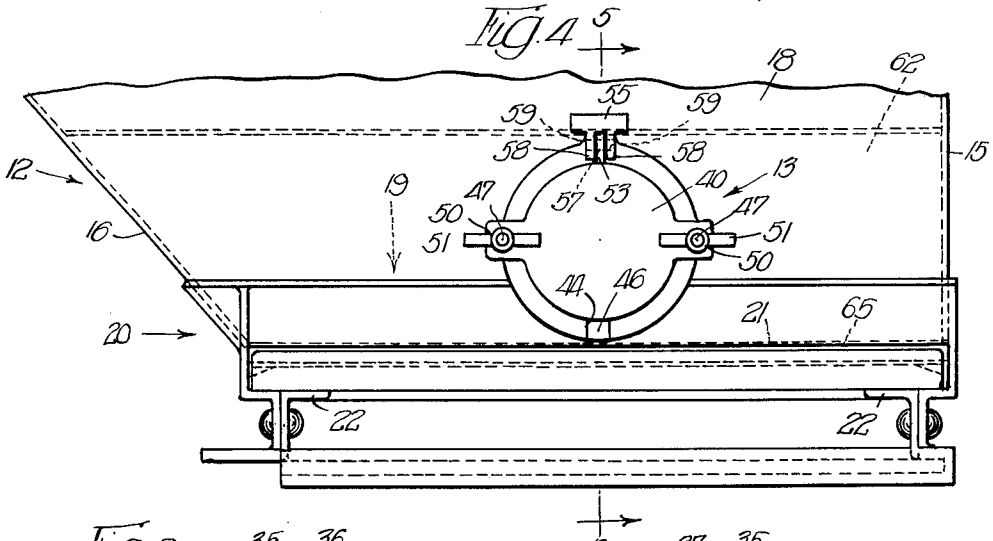


Fig. 6

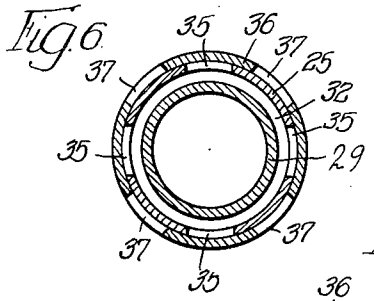


Fig. 7

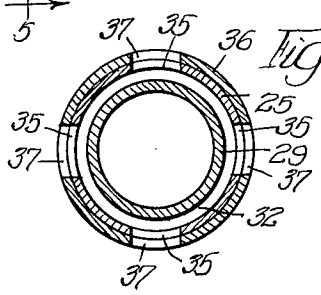
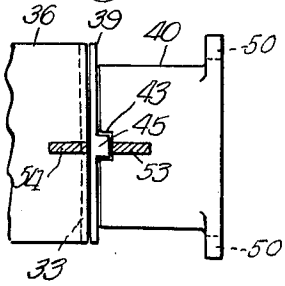


Fig. 8



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PNEUMATIC DISCHARGE HOPPER CAR

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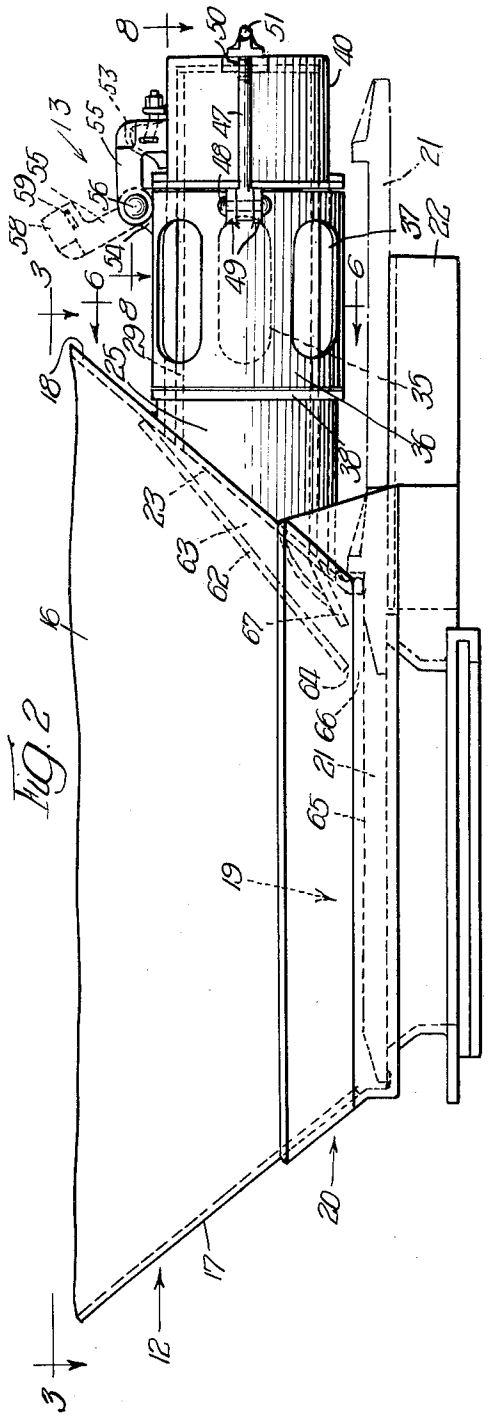


Fig. 2

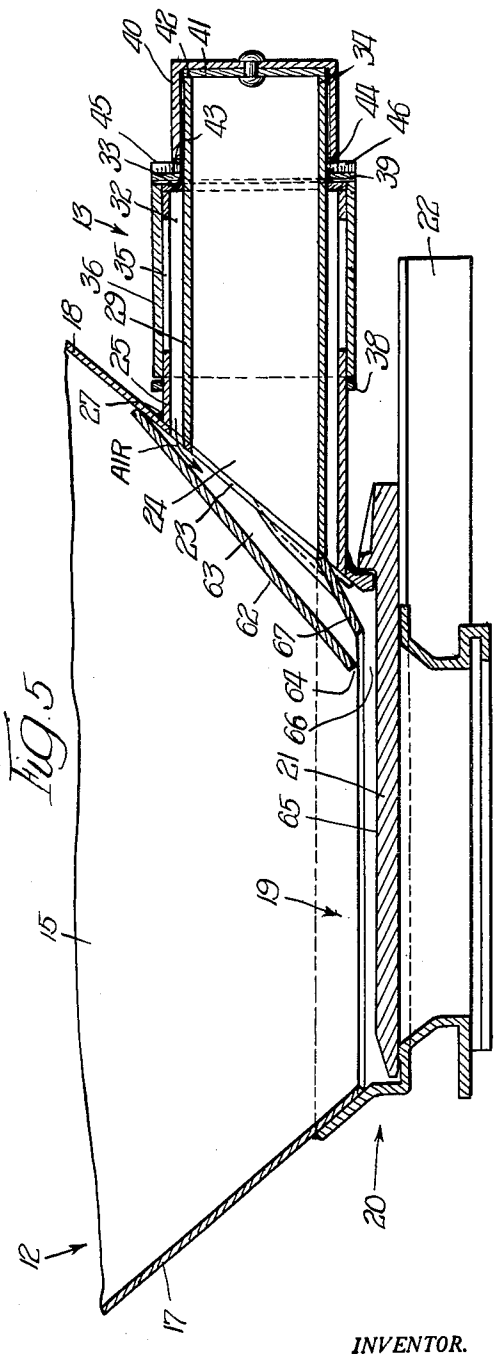


Fig. 5

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PNEUMATIC DISCHARGE HOPPER CAR

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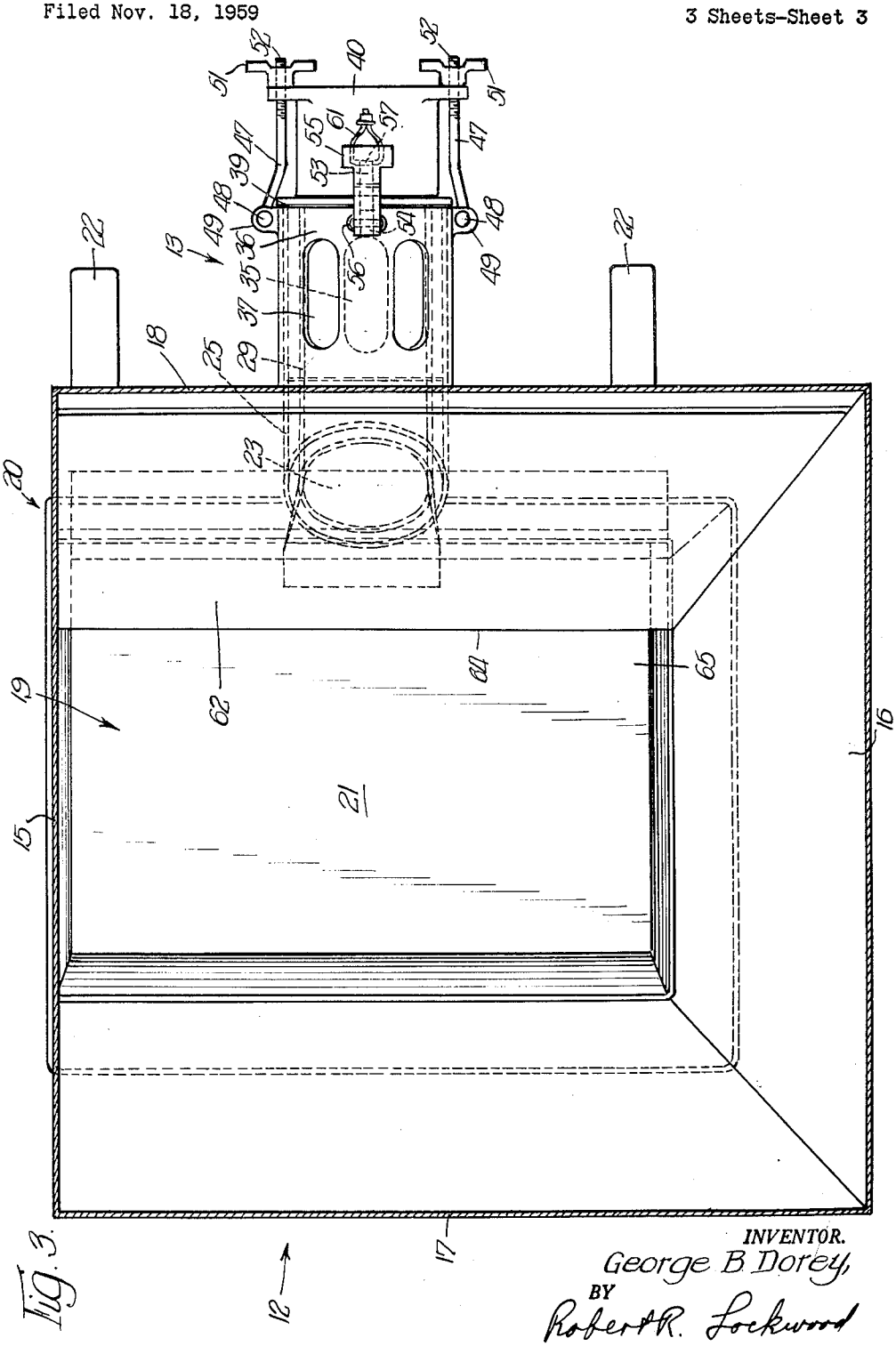


Fig. 3.

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PNEUMATIC DISCHARGE HOPPER CAR

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1 Claim. (Cl. 302—52)

This invention relates to a pneumatic discharge hopper car and more particularly it relates to that type of car having provision for selectively discharging the lading either by gravity or pneumatically by connection with a source of reduced pressure.

The objects of the invention, among others, are: To provide a car of the identified type wherein the mouth of the pneumatic outlet conduit is protected against flooding; to provide an improved type of vacuum chamber for receiving lading in a controlled flow; to provide a simple type of baffle plate for cooperation with slope sheets of the hopper and with a movable floor to form a vacuum chamber for admission of lading prior to its entrainment in the outlet conduit system; to provide improved air inlet and outlet conduit means; and to provide improved means for simultaneously retaining and sealing closures for the openings of the air inlet and air and lading outlet conduits.

The invention further resides in certain details of construction and refinement of parts such as will be pointed out hereinafter.

For further comprehension of the invention reference may be had to the accompanying drawings wherein the improvement is shown as applied to a so-called covered hopper car.

In said drawings:

FIG. 1 is a side elevational view of a covered hopper car with a conveying pipe connected to one of the hoppers of the car.

FIG. 2 is a side elevational view, on an enlarged scale, of one of the hoppers embodying the improved structure.

FIG. 3 is a top plan view of the structure shown in FIG. 2.

FIG. 4 is an end elevational view of the structure shown in FIG. 2 as viewed from right to left.

FIG. 5 is a longitudinal vertical sectional view as taken on line corresponding to a line 5—5 of FIG. 4.

FIG. 6 is a vertical sectional view taken through the conduit assembly as taken on a line 6—6 of FIG. 2.

FIG. 7 is a sectional view similar to FIG. 6 except that the closing sleeve for the air inlet is shown as positioned in closed relation with respect to the air inlet ports.

FIG. 8 is a sectional plan view taken on a line 8—8 of FIG. 2 to specifically illustrate the anti-rotation interlocking action between the exit conduit nozzle and its associated sleeve.

In said drawings referring more particularly to FIG. 1, the hopper car, which is indicated by the trucks 10 and the body structure showing a portion of the length of the car shown at 11, includes load containing hoppers one of which is indicated at 12. Each hopper 12 has an outlet conduit assembly 13, one of which is connected with a flexible conveying hose 14 leading to a source (not shown) of reduced pressure.

The main load containing hopper 12 as best seen by reference to FIGS. 2 to 5, inclusive, includes side walls 15 and 16 which meet with sloping walls 17 and 18 to form a four-sided hopper leading to a rectangular shaped discharge opening 19. The opening 19 is surrounded by a frame 20 which forms a support for a sliding gate 21 whereby discharge of lading may be effected by gravity upon movement of it to the open position.

Extension rails 22—22 are provided for supporting the overhanging portion of the gate 21 in opened position.

The mechanism for moving the gate 21 does not form any part of the present invention and is therefore not shown or described herein.

The sloping end wall 18 is provided with an opening 23 which constitutes a mouth 24 of an outer shell 25 of the conduit assembly 13, previously mentioned. The shell 25 is welded at 27 to the end wall 18. The conduit assembly 13 also includes an inner tube 29 having its surface spaced from the inner surface of the outer shell 25 to provide an annular chamber 32 therebetween for the passage of air. The inner tube 29 is extended beyond an annular end wall 33 of the chamber 32 to provide a projecting nozzle section 34 for receiving the flexible suction hose 14, as seen in FIG. 1.

The outer shell 25 is provided with a series of radially spaced apertures 35 for admittance of air in the chamber 32. For controlling the volume of entering air, a sleeve 36, having a series of apertures 37, is rotatably mounted on the outer shell 25. The said apertures 37 are disposed in axial alignment with the apertures 35 and radially spaced to correspond therewith. The spacing of the respective apertures 35 and 37, thus corresponding axially and radially, allows for full opening movement upon rotation of the sleeve to bring the openings 35 and 37 in regulating alignment as seen in FIG. 7. Graduation of the air openings is effected by partial rotation of the sleeve 36 toward fully closed position shown in FIG. 6 and holding it positioned to the required extent between its open and closed position.

The sleeve 36 is maintained against axial movement by flanges 38 and 39 and is adapted to be held in closed position against rotation by interlocking with a nozzle cap 40 as will be described.

The cap 40 is of cup shape with a resilient gasket 41 on its inner end which is arranged to impinge on the end face 42 of the nozzle section 34. The cap 40 is notched at its upper and lower opposite sides as seen at 43 and 44 and said notches engage with lugs 45 and 46 which in turn are fixedly associated with the flange 39. The cap 40 is retained in tight sealing engagement with the end 42 of the nozzle 34 by means of swinging bolts 47 which are pivotally connected at 48 on lugs 49 which in turn are mounted on the sleeve 36. The cap 40 is provided with laterally extending open sided notches 50 in which the swinging bolts 47 are received and held by screw threaded wing nuts 51 which engage with complementary screw threaded end portions 52 of the swinging bolts 47.

The cap 40 and sleeve 36 are provided with aligned lugs 53 and 54 which are straddled by a catch 55, the said catch 55 being pivoted on lug 54 at 56. The lug 53 is apertured at 57 and spaced side walls 58—58 on the cap 40 are likewise apertured at 59 with the said apertures 57 and 59 so located as to be in registering alignment to receive a sealing ribbon 61 when the cap 40 is in its finally closed and latched position.

The catch 55, when in overturned released position as indicated by conventional dot and dash lines in FIG. 2, forms a convenient handle for rotating the sleeve 36.

The load containing hopper 12 adjacent the mouth 24 of the conduit assembly 13 is provided with a secondary floor 62 which overlies the mouth 24 of the conduit assembly 13 and in cooperation with the main wall 18 and the sliding gate 21 forms a vacuum chamber 63. The lower marginal edge 64 of the floor 62 is spaced a limited distance from the upper surface 65 of the gate 21 to provide an opening 66 for the entrainment of lading into the vacuum chamber 63 and thence into the inner tube 29 of the exit conduit 13.

With the arrangement of a secondary floor **62** thus disposed above the mouth **24** of the exit conduit **13** to form the vacuum chamber **63**, it will be seen that clogging of the conduit system by a glut of lading is effectively guarded against. A scoop like extension **67** is provided adjacent the mouth **29** of the outer shell **25** for the purpose of easing the flow of lading into the inner tube **29**.

The operation and advantages of the improvement will be best understood by reference to the procedure involved in an unloading operation. Assuming the parts positioned as in FIGS. 2–6, inclusive, the cap **40** is first removed and connection effected by means of a flexible hose **14** with a source (not shown) of reduced pressure. The ports **37** are then uncovered by partial rotation of the sleeve **36** and air is admitted in the system to flow through the annular chamber **32**, and thence into the chamber **63** and there creating a partial vacuum. The reduced pressure thus created has the effect of drawing lading from the main hopper **12** through the narrow opening **66** and along the scoop like extension **67** into the inner tube **29** of the outlet conduit assembly **13**.

What is claimed as new is:

In combination, a multi-sided load containing hopper having a discharge opening and a sliding gate for controlling discharge of lading by gravity from the opening and additional means for withdrawal of lading pneumatically including air inlet and air and lading exit conduits connecting with one side of the hopper, a secondary floor spaced from the hopper side having the exit conduit to form in combination with said hopper wall and with the floor of the sliding gate a vacuum chamber, said secondary floor being spaced from the floor of the gate to provide an entrance opening for the lading, and a deflector extending downwardly from the mouth of the exit conduit towards the entrance opening to direct the flow of lading into the exit conduit.

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