

April 8, 1941.

J. D. BENBOW ET AL

2,237,299

HOPPER BOTTOM CAR

Filed Aug. 16, 1937

6 Sheets-Sheet 1

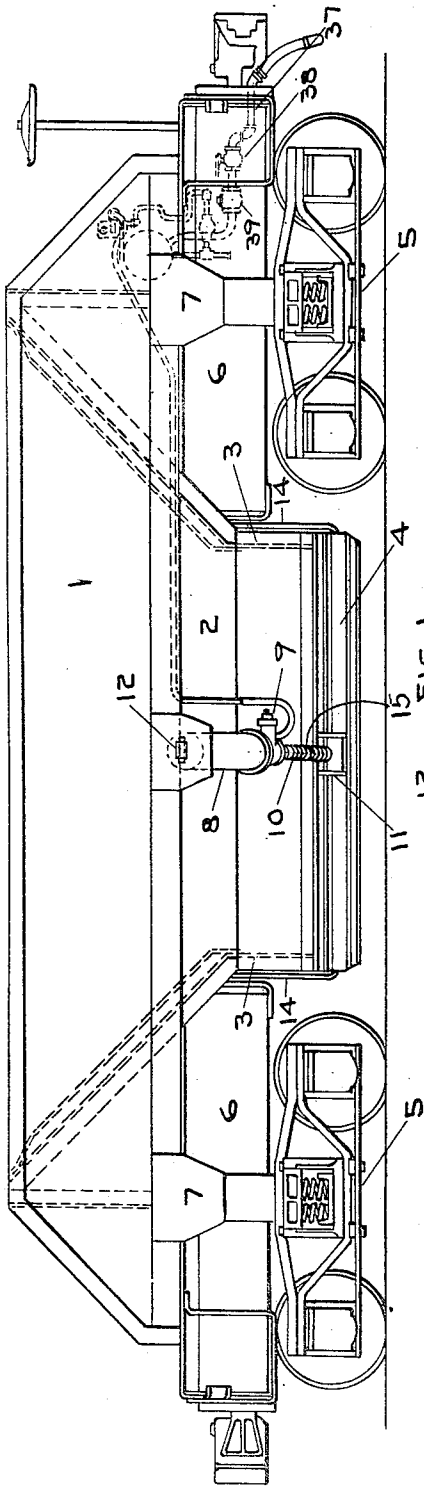


FIG. 1

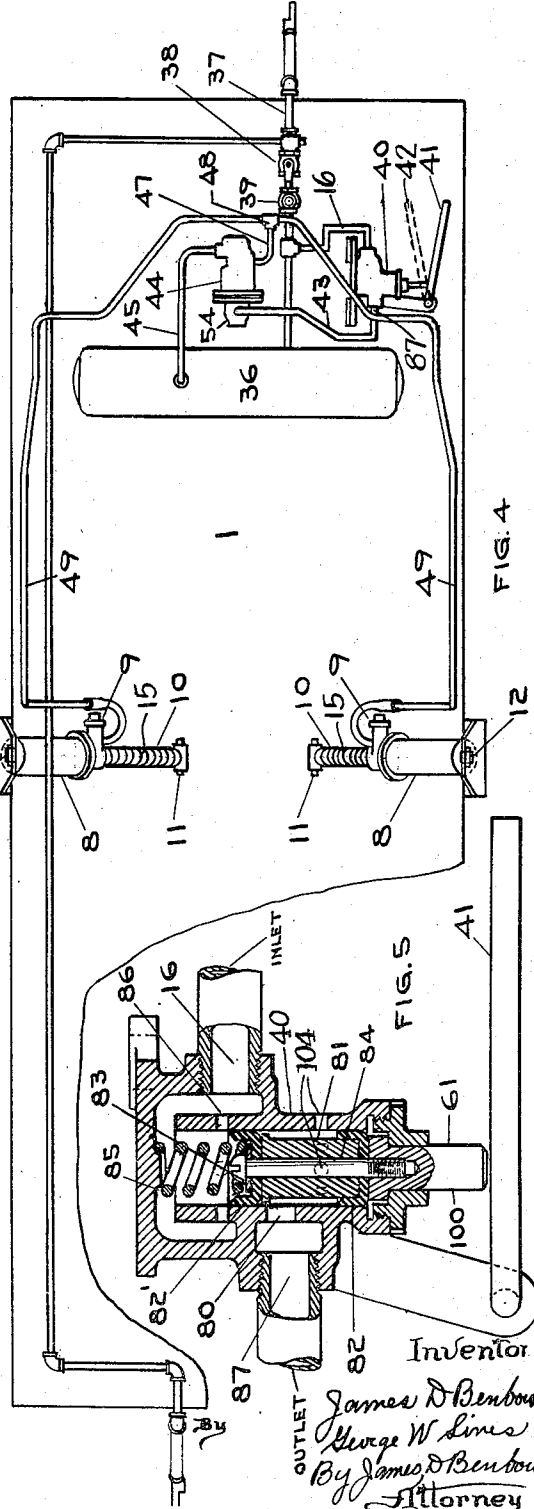


FIG. 4

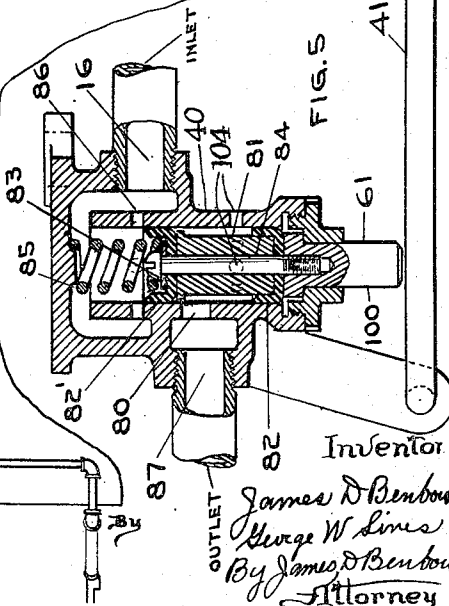


FIG. 5

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6 Sheets-Sheet 2

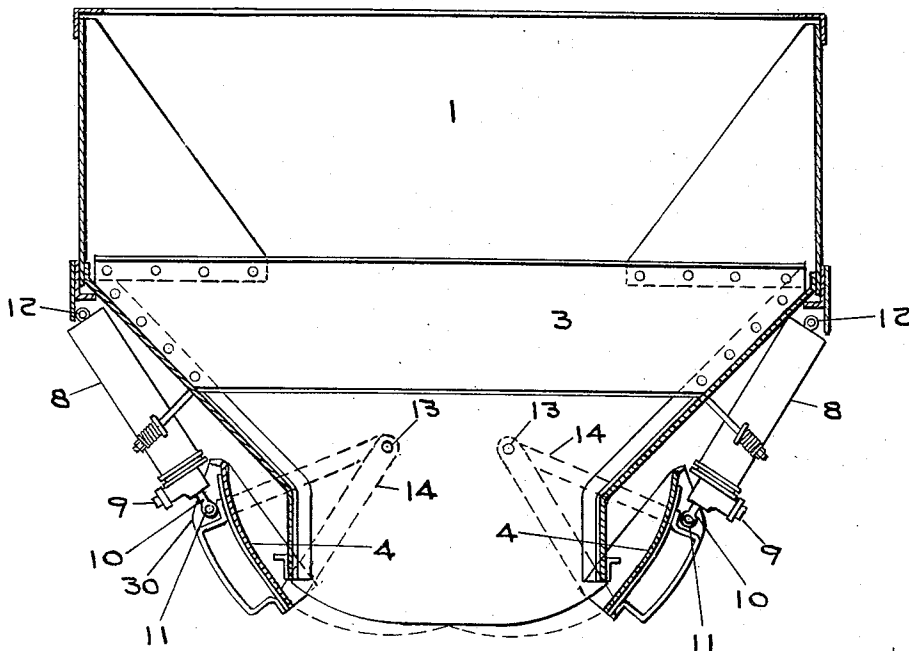
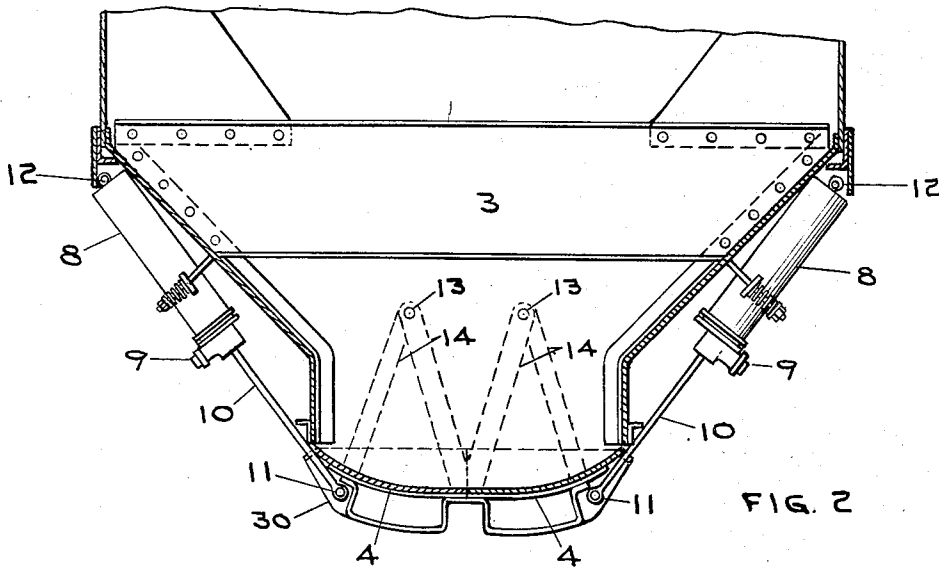


FIG. 3

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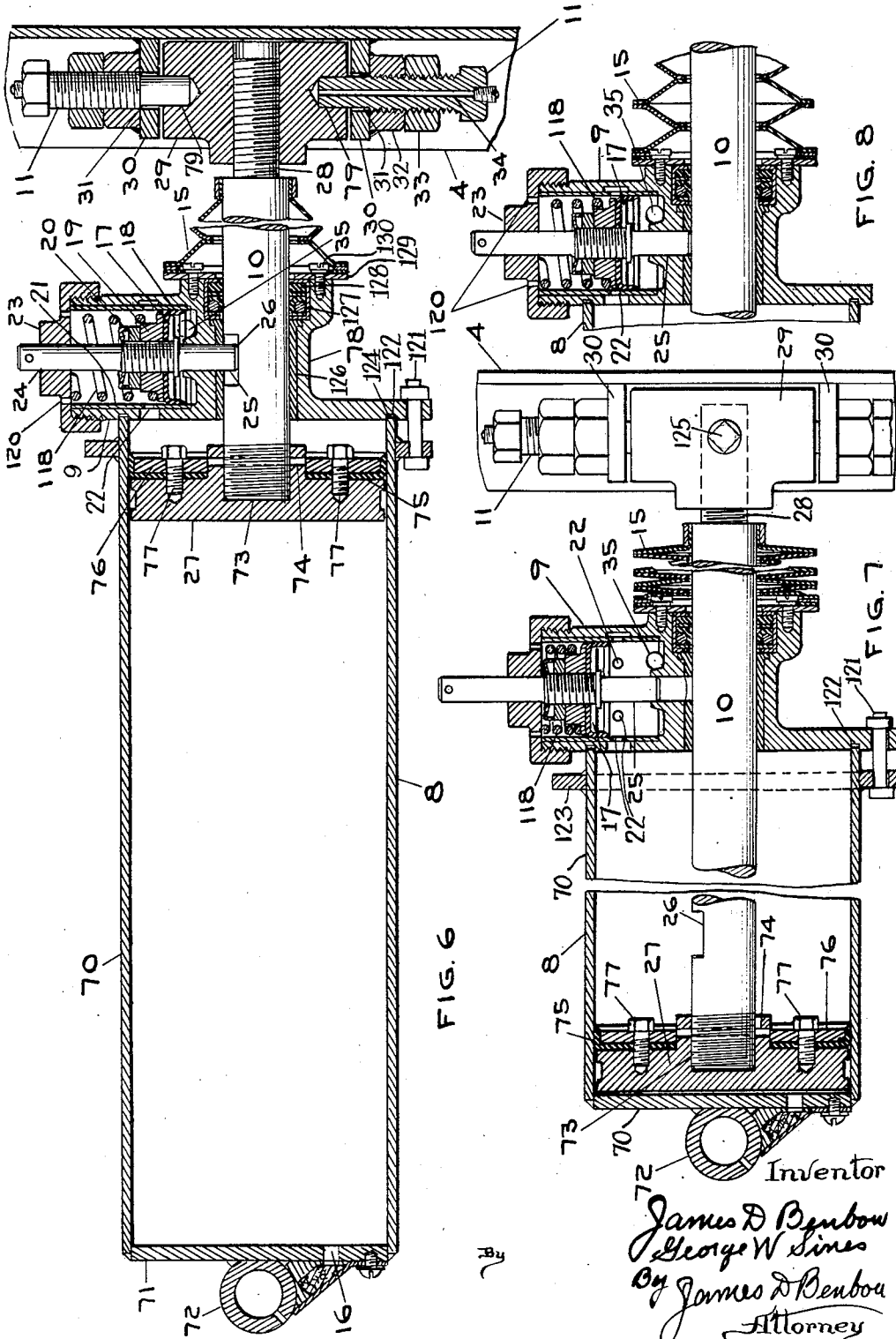
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6 Sheets-Sheet 3



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6 Sheets—Sheet 4

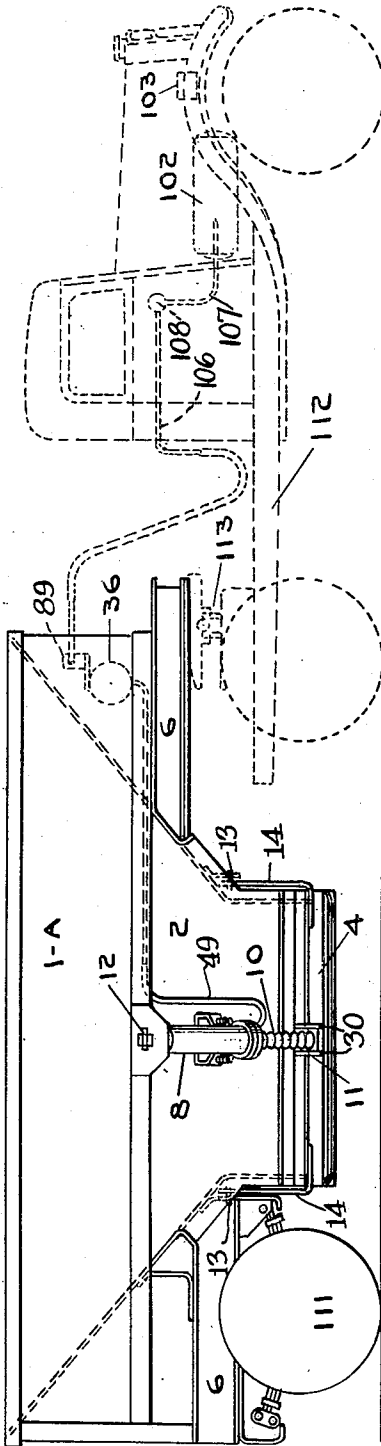


FIG. 9

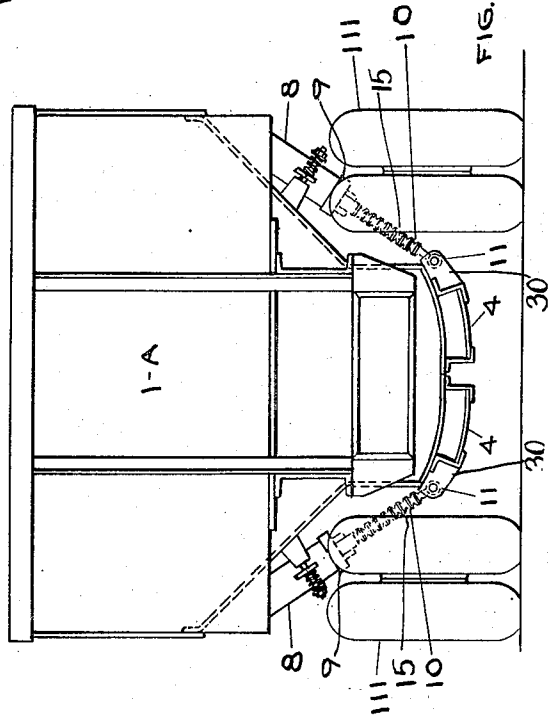


FIG. 10

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6 Sheets-Sheet 5

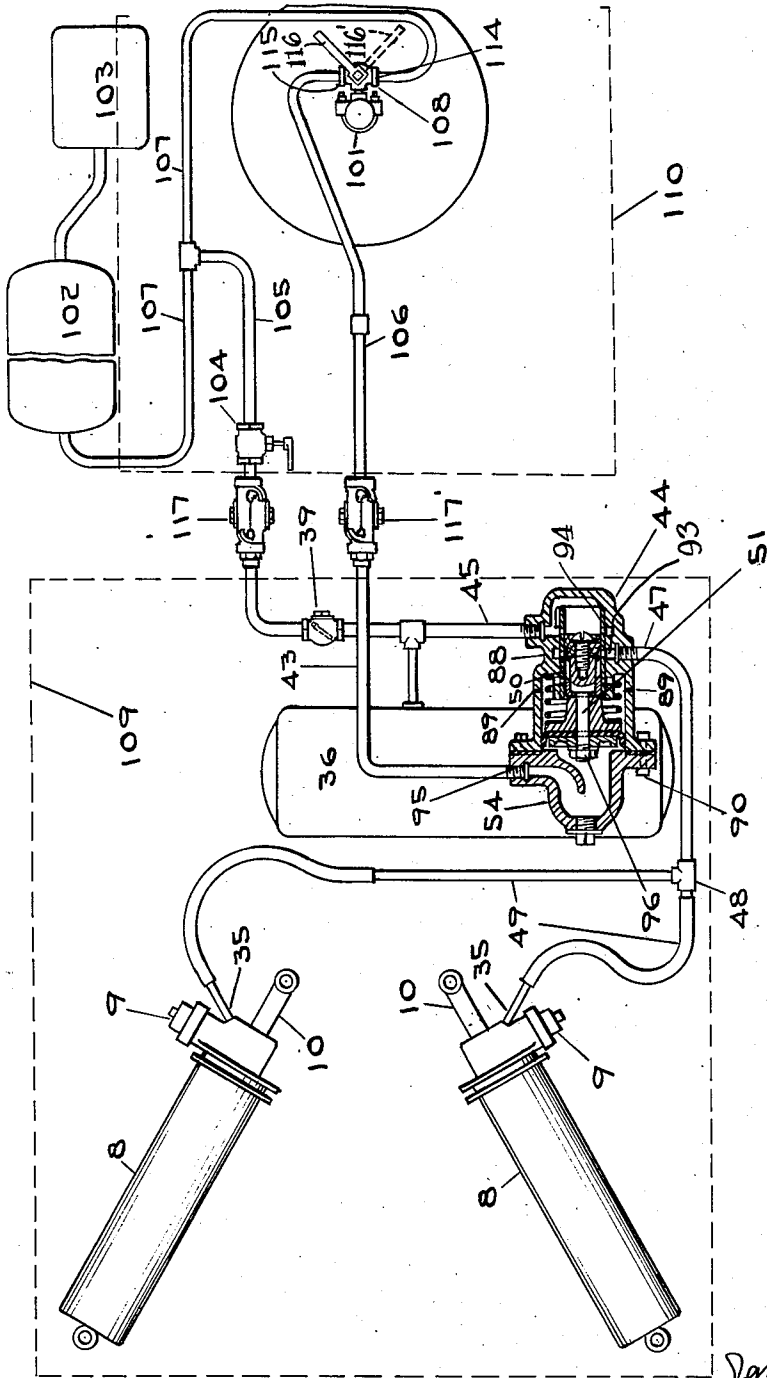


FIG. 11

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6 Sheets-Sheet 6

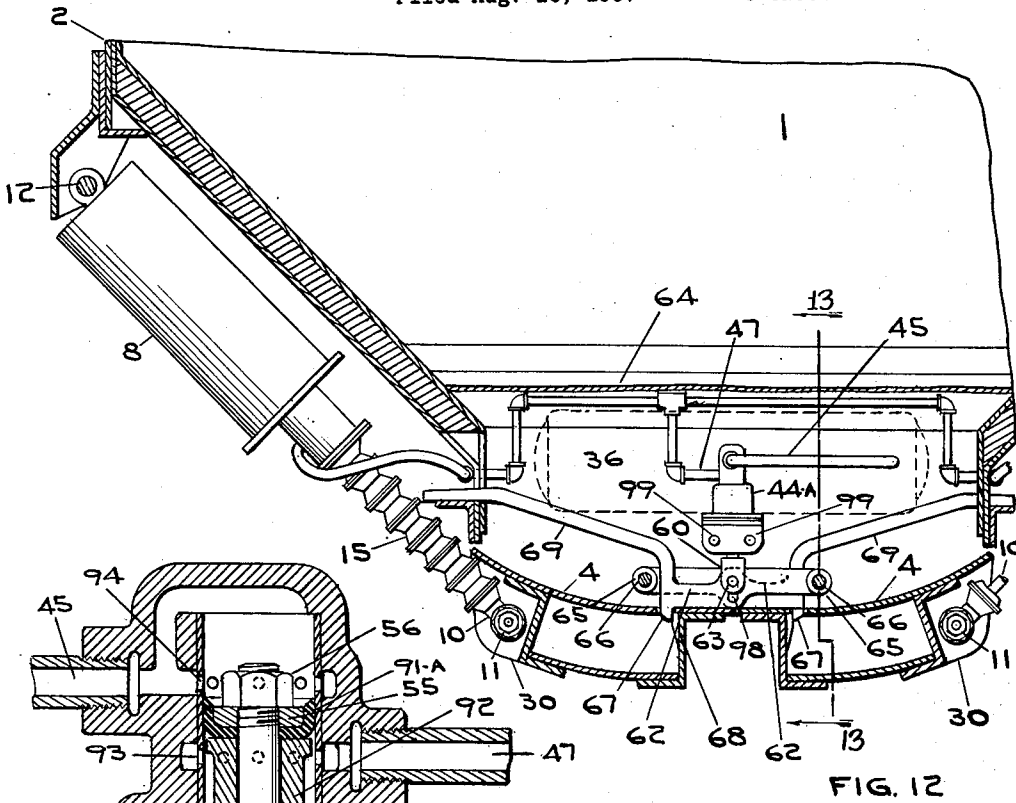


FIG. 12

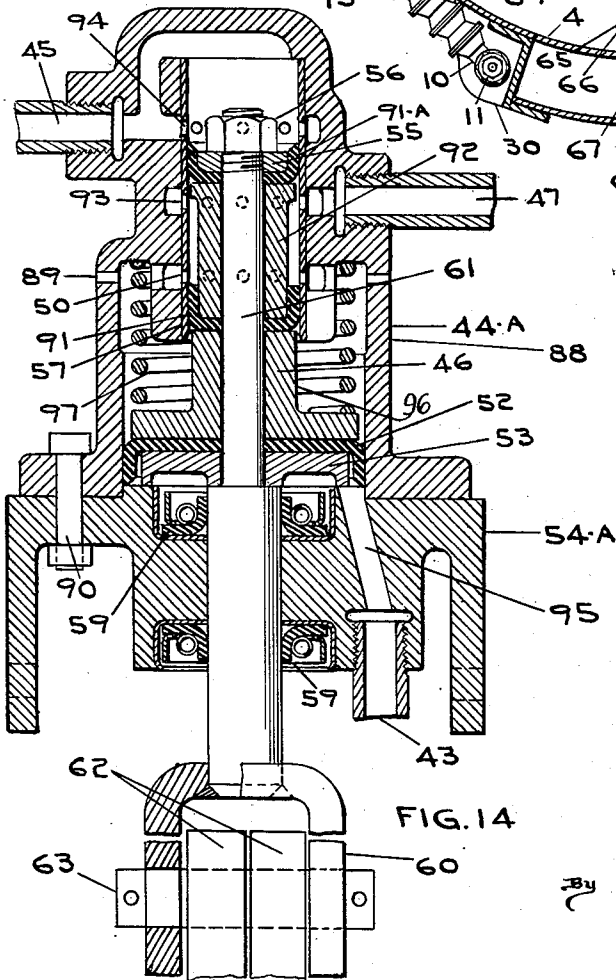


FIG. 14

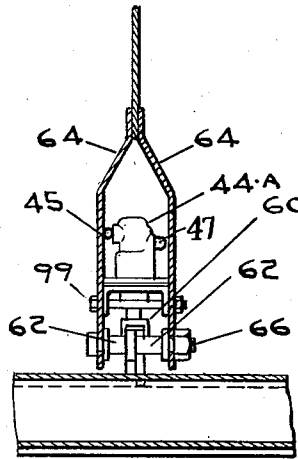


FIG. 13

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2,237,299

HOPPER BOTTOM CAR

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Application August 16, 1937, Serial No. 159,225

23 Claims. (Cl. 105—240)

Our invention relates particularly to hopper type cars with bottom discharge doors mounted on trucks for operation on rails, or hopper containers mounted on wheels with or without rubber tires for operation on roads and pulled by tractor trucks, in which the doors or gates are controlled by air or any other fluid pressure. In the mining industry, coal mining in particular, the opening and closing of the doors or gates, when dumping the load into a hopper or onto a belt conveyor located under the track on which the cars operate, has been accomplished by mechanical means at the discharge point, and the car or the hopper container mounted on rubber tires could not be used to haul refuse or gob on the return trip to the mines and deposit it where the ore or coal had been removed, as it has been necessary to have the mechanical means located at the place of dumping when returning the refuse or gob to the mines, which is impractical because the location of the dump is constantly changing. Our invention permits the opening and closing of the doors or gates at any desired place, thus increasing the usefulness of the hopper car or hopper container mounted on rubber tires. In the drawings only one pair of doors is shown. However, any number of doors can be used and operated as described.

The object of our present invention is to provide improved means for locking the discharge doors or gates in a closed position.

Another object of our invention is to so locate the trunnion or pivot point of the discharge doors or gates that the load in the hopper car or the hopper container will assist in the opening of the doors or gates after the unlocking of the doors or gates has been accomplished.

Another object of our invention is to provide means for controlling the unlocking or opening of the doors or gates from a remote point on the car.

Another object of our invention is to provide means for controlling the unlocking, or the opening and closing of the doors or gates from a tractor truck or locomotive by the tractor operator or the locomotive engineer.

Another object of our invention is to provide means whereby the air or fluid pressure means must first unlock the doors or gates before the air or fluid pressure is applied to the door opening means.

Another object of our invention is to provide means whereby the piston rod can be adjusted as to length to provide for wear, or variations in shop practices.

Another object of this invention is to provide discharge door locking means which is a part of the pressure cylinder, and the locking means must be unlocked before fluid pressure can be admitted to the cylinder.

Another object of this invention is to so locate the pivot points of the discharge doors or gates that they will be self-closing.

Another object of our invention is to provide a fluid pressure cylinder having the locking and unlocking means made an integral part of the fluid pressure cylinder, whereby the locking and unlocking of the doors are controlled by admitting or releasing the air or fluid pressure means into or out of the locking and unlocking means in the cylinder. Fluid pressure means must first be applied to the locking means in the cylinder to unlock the doors before it can be applied to the cylinder. By exhausting the fluid pressure, the locking means will engage the piston rod of the cylinder when the piston rod of the cylinder is in an extended position.

Another object of our invention is to provide a fluid pressure cylinder having a piston and piston rod mounted therein and a valve located in the lower cylinder head with a spring actuated locking means and fluid pressure unlocking means, which engages the piston rods to hold the doors closed when the piston rod is in an extended position. The locking device is so designed that air or any fluid pressure cannot be admitted to the fluid pressure cylinder until the locking means has been disengaged from the piston rod, thus permitting the fluid pressure means to flow to the cylinders and open the doors.

Another object of our invention is to provide mechanical locking means to lock the doors in a closed position and fluid pressure means to unlock and open the doors, and a method of mounting the doors on the container so as to make them self-closing.

Further objects of this invention are to provide a construction of maximum simplicity, efficiency, economy and ease of assembly and operation, and such further objects, advantages and capabilities as will later more fully appear and are inherently possessed thereby.

The invention further resides in the combination, construction and arrangement of parts illustrated in the accompanying drawings and, while we have shown therein a preferred embodiment, it is to be understood that the same is susceptible of modification and change without departing from the spirit of our invention.

In the drawings:

Figure 1 is a side elevation of a hopper car mounted on standard railroad trucks.

Figure 2 is a cross section of the car, or container, with the doors in a closed position.

Figure 3 is a cross section of the car, or container, with the doors in an open position.

Figure 4 is a diagrammatic drawing showing the piping of the control means for unlocking, opening and closing the doors.

Figure 5 is a cross section of the operating or control valve.

Figure 6 is a cross section of the cylinders when the doors are in locked position.

Figure 7 is a cross section of the cylinders when the doors are in open position.

Figure 8 is a cross section of the door locking valve when the air, or fluid pressure, is being exhausted.

Figure 9 is a side elevation of the hopper, or container mounted on wheels or rubber tires and tractor truck for operation on roads.

Figure 10 is a rear view of the hopper, or container mounted on rubber tires, showing the doors in a closed position.

Figure 11 is a diagrammatic view of the means for controlling the unlocking, opening and closing of the discharge doors.

Figure 12 illustrates another means of locking the doors in a closed position.

Figure 13 is a partial cross section at 12-13.

Figure 14 is a cross section of the door locking and unlocking valve shown in Figure 12.

Referring to the drawings, the car hopper and underframe 1, having sides 2, ends 3 and doors 4, are supported on the draftbeams 6 and bolsters 7 by trucks 5, which may be of any suitable design for operation on rails of any desirable track gauge.

Doors 4 are supported and carried by arms 14 which are attached to each end of doors 4 and are hung from the ends 3 by pins 13, which permits the oscillation of doors 4 for the opening and closing of the bottom of the hopper 1. The opening and closing of doors 4 is accomplished by cylinders 8 which are attached to the sides 2 by pins 12. Piston rods 10 of cylinder 8 are attached to the doors 4 by pins 11.

By referring to Figures 2 and 3, you will note that the doors 4 are so hung or supported on the ends 3 of the hopper 1 as to be self-closing. Also, the weight of the material inside of the hopper 1, which rests on the doors 4, assists the cylinders 8 in the opening of the doors 4. Referring to Figure 3, the dotted line indicates the travel of the lower edge of the doors 4 and it can be readily seen that, inasmuch as the pressure is downward and the pins 13 to which the arms 14 are attached to the ends 3 are towards the outside of the center line of the ends 3, the cylinders 8 are assisted in the opening of the doors 4, by weight on doors 4.

Referring to Figures 6, 7 and 8, which are cross sections of the cylinder 8 and its component parts, the piston rod 10 of cylinder 8 is covered by an accordion type boot 15 which prevents dirt or other foreign matter from accumulating on piston rod 10. Cylinder 8 has a body 70 to which is welded the upper head 71 and pin bearing 72 thru which pins 12 attach the cylinder 8 to the body or sides 2. Piston rod 10 is attached to piston 27 by the threaded portion 73 of the piston rod 10 and is prevented from turning, after being screwed in place in piston 27, by pin 74. Packing cup 75 is applied to piston 27 and held in place by piston follower 76 and cap screws 77. The

piston rod 10 has groove 26 which is engaged by lock pin or piston rod 25 of valve 9 to hold the doors 4 in a closed or locked position. The lower portion or cylinder head 78 has a groove 122 to receive gasket 124 and body 70 of cylinder 8 and is bolted by bolts 121 to flange 123 of cylinder 8. Cylinder head 78 contains the valve 9 and also has brass bushing 126 and leather air or oil seal 127 and dirt seal 128, which are held in place by plate 129 with tap screws 130, and is used as a guide for the piston rod 10. The lower portion 28 of piston rod 10 is threaded to receive a T-shaped tapped nut 29 having holes 79 to receive pins 11, the T-shaped nut 29 being tapped to receive the lower threaded portion 28 of piston rod 10, which provides adjustment for wear as well as adjustment for the length of the stroke of piston rod 10. Set screw 125 is provided to prevent the turning of T-shaped nut 29 on the lower threaded portion 28 of piston rod 10.

The valve 9 in the lower portion of cylinder head 78 consists of a lock pin or piston rod 25 which is upset and threaded to receive washer 17 and packing cup 18 which are held together by nut 19 and lock nut 20. Tube 21 is pressed in the body of valve 9 and has a series of holes 22 in the periphery of the tube to permit air to flow from the inlet 35 thru the series of holes 22 into cylinder 8. When air or other fluid pressure means is admitted to the cylinder 8 through valve 9 at the inlet 35, it moves the lock pin or piston rod 25 of valve 9 outward in guide nut 23 thru hole 24, compressing spring 118 and unlocking the piston rod 10 of cylinder 8 as shown in Figure 7. The air or other fluid pressure means is then free to flow thru the holes 22 into the body of the cylinder 8 and will cause the piston 27 and piston rod 10 to move upward to the position shown in Figure 7. When air pressure is released from the inlet 35 of the valve 9, lock pin or piston rod 25 and spring 118 of the valve 9 return to the position shown in Figure 8 and the air from the cylinder 8 is released thru the holes 22 and into the atmosphere thru the holes 120 of the nut 23 instead of returning thru inlet 35. The piston 27 and piston rod 10 are thus permitted to return the doors 4 to the normal position very quickly and the spring 118 moves lock pin or piston rod 25 to engage the piston rod 10 as shown in Figure 6, which is the locked or closed position of the doors 4.

The doors 4 have projections 30 with a threaded portion 32 to receive the threaded pin 11 with adjusting nut 33, which prevents the rotation of pin 11 but allows the T-shaped nut 29 to oscillate on each of the pins 11. Pins 11 are provided with an Alemite fitting and a hole 34 full length thereof to oil or grease the end of pins 11 which engage the T-shaped nut 29 in the recessed hole 79. Other methods of adjusting the length of the piston rod 10 can be used and come within the scope of our claims.

The control or 3-way valve 40, a cross section of which is shown in Figure 5, is similar to the control valve shown and more fully described in Letters Patent No. 1,395,469 issued to J. D. Benbow November 1, 1921, and Letters Patent No. 1,456,049 issued to J. D. Benbow May 22, 1923. It is believed to be unnecessary, therefore, to describe this valve in detail in this application.

Attached to the body of control or 3-way valve 40 is lever 41 for movement as indicated by the dotted position 42 in Figure 4. The piston 100 consists of piston rod 61, packing cup 82, spacer

81, packing cup 82' and retaining washer 83, all held together by bolt 84 which is screwed into a threaded portion of piston rod 61 as shown in Figure 5. The spring 85 holds the piston 100 in the safety position shown in Figure 5 until the pressure applied to lever 41 moves the piston 100 upward and packing cup 82 covers exhaust ports 104, compressing spring 85 to permit air to flow thru the inlet 16 and holes 86 into the body of the control or 3-way valve 40 and thru hole 80 to outlet 87.

Automatic valve 44 is shown in cross section in Figure 11 and a similar automatic valve 44—A is shown in Figure 14. A more complete description is given in Letters Patent No. 1,481,787 issued to J. D. Benbow January 29, 1924, and it is therefore believed unnecessary to describe this valve in more detail in this application. The difference between the two valves is in the design of the bolt 51. Automatic valve 44—A has an extension to bolt 51 projecting thru the bottom head 54—A with a jaw 60.

Referring to Figure 11, the automatic valve 44 consists of a body 88 and bottom head 54 having inlet 45 and outlet 47 and exhaust ports or holes 89. The bottom head 54 is attached to the valve body 88 by bolts 90. The complete piston 96 consists of packing follower 53, packing cup 52 and spacer 46, packing cup 91 and spacer 92, packing cup 91—A and washer 55, which are connected by bolt 51 and nut 56, forming one unit (piston 96) for movement in the valve body 88. Valve body 88 has brass tube 57 pressed therein and has three series of holes 50, 93 and 94 located in the periphery thereof. The inlet 45 is connected to the auxiliary air reservoir 36, thereby maintaining constant air pressure above the packing 91—A.

By the operation of control or 3-way valve 40 (see Fig. 4), moving handle 41 to the dotted position 42, air from reservoir 36 will flow through control or 3-way valve 40 to the lower portion 54 of automatic valve 44 (see Figs. 11 and 14) thru inlet 95, which forces the piston 96 upward and permits air from reservoir 36 to flow in thru the holes 94 and out through the holes 93 to outlet 47. Returning the valve handle 41 of the control or 3-way valve 40 to its normal position releases the pressure in the lower portion 54 of the automatic valve 44 and the spring 97, combined with the air pressure above the packing 91—A, forces the piston 96 downward to the position shown in Figure 11 and the air will be exhausted from the outlet 47 back thru the holes 93 and outwardly to the atmosphere thru the holes 50 and 89.

Referring to Figures 12, 13 and 14, which illustrate another method of locking and unlocking the doors 4, automatic valve 44—A, a cross section of which is shown in Figure 14, is similarly constructed to automatic valve 44 shown in Figure 11, except that the bottom head 54 is changed as shown by 54—A of Figure 14. The bolt 61 of the automatic valve 44—A is similar to bolt 51 of automatic valve 44 except that it is made longer and extends thru leather, oil or air seals 59 in the lower head 54—A and has the jaw 60 attached for operating a door locking and unlocking mechanism as shown in Figures 12, 13 and 14. Automatic valve 44—A is located between the two partition plates 64 (see Figs. 12 and 13) and fastened thereto by bolts 99 which pass thru the lower portion 54—A of automatic valve 44—A. The door locking arms 62 are attached to the partition plates 64 at ends

65 by pins 66, which permits the oscillation of the door locking arms 62 for locking and unlocking doors 4. Door locking arms 62 have vertical slotted holes 98 and they are attached to bolt 61 at jaws 60 by pins 63. The door locking arms 62 have projections 67 which engage the doors 4 at the lugs 68 which are provided for adjustment of wear. Door locking arms 62 are provided with extensions 69 which project thru the sides 2 to permit manual unlocking of the doors 4 should some part of the automatic valve 44—A fail to operate.

Referring to Figures 1, 4 and 5 and also to Figure 11 for cross section of automatic valve 44, mounted on the car underframe 1 is auxiliary air reservoir 36 which is charged thru some outside source, such as a locomotive having an air pump, thru the pipe line 37, which has valve 38 for cutting off the air supply when the car is to be disconnected, and check valve 39 which prevents air from returning from auxiliary air reservoir 36. Control or 3-way valve 40 is mounted at some convenient place on either side of the car underframe 1 having valve handle 41, which, when depressed to the dotted lines 42, allows the air to flow from auxiliary air reservoir 36 thru pipe line 37 through inlet 16 to the control or 3-way valve 40 and pipe line 43 to the lower end 54 of the automatic valve 44. Pipe line 45 is connected to the upper part of automatic valve 44 and to auxiliary air reservoir 36, thereby keeping a constant pressure of air on the upper end of the automatic valve 44. When air is applied by the movement of valve handle 41 to the position 42, it forces the piston 96 in automatic valve 44 upward and permits the air to flow from the auxiliary air reservoir 36 thru automatic valve 44 to pipe 47, thru T 48 and thru pipe lines 49 to the valve 9 of the cylinders 8 on either side of the car body, unlocking piston rod 10 and causing piston 27 and piston rod 10 to open doors 4. When the valve handle 41 is returned from position 42 to the full line position of valve handle 41, the air is exhausted from the lower portion of automatic valve 44, which allows the return of piston 96 to its normal position and the air in pipe lines 49 is exhausted from valve 9 thru the pipe line 49 and 47 to automatic valve 44 and thru the holes 50 and 89, which are a series of holes in the periphery of tube 57 and body 88 of automatic valve 44, to the atmosphere, permitting the lock pin or piston rod 25 to return to the position shown in Figure 8. Packing cup 18 uncovers holes 22 and allows the air in cylinder 8 to flow to the atmosphere thru exhaust holes 120, and piston 27, piston rod 10 and lock pin or piston rod 25 return to the normal position shown in Figure 6 and the doors 4 return to a closed locked position.

Referring to Figures 9, 10 and 11, Figures 9 and 10 show the hopper container 1—A mounted on rubber tires 111 and supported by truck 112 at the oscillating fifth wheel 113. Figure 10 is a rear view of Figure 9 and shows the location of the doors 4 and the door mechanism in reference to the hopper container 1—A and the tires 111. The parts which are similar to the hopper car 1 shown in Figure 1 are given the same reference numbers and the opening and closing of the doors 4 is accomplished by the cylinders 8 in a similar manner to the opening and closing of the doors 4 in the hopper car 1 mounted on railroad trucks 5.

Referring to Figure 11, the dotted lines 110

represent the truck 112 in Figure 9 and dotted lines 109 represent the hopper container 1—A in Figure 11. To better understand Figure 11 we will describe the method of opening and closing the doors 4 when using a truck 112 for the motive power in pulling the hopper container 1—A on the highways. The valve 108 can be control valve 40 or an ordinary 3-way valve having inlet 114, outlet 115, exhaust 101 and valve handle 116, and is mounted in the cab of the truck 112 as shown in Figure 9. 103 represents air pump located on the truck 112, which is power driven and is usually connected to the engine of the truck 112 by a flexible belt. The air pump 103 charges the air reservoir 102 from which the air pressure is drawn to charge the auxiliary air reservoir 36 located in the front end of the hopper container 1—A thru pipe 107, 105 and check valve 39. The air pressure in the auxiliary air reservoir 36 is prevented from returning to the atmosphere by check valve 39, in the event the automatic hose connector 117 is disconnected.

By moving the valve handle 116 of the 3-way valve 108 to the dotted position 116', air will flow from the air reservoir 102 thru pipe 107, into the inlet 114 and the outlet 115 of the valve 108, thru pipe 106, thru the automatic connector 117, thru pipe 43 into inlet 95 to the lower portion 54 of automatic valve 44. The air pressure will force the piston 96 upward, permitting the air to flow from the auxiliary air reservoir 36 thru pipe 45 to the upper part of the automatic valve 44 thru the series of holes 94 and 93, thru outlet 47, thru pipe 49 to the valves 9 of the cylinders 8 at inlets 35, moving the lock pin or piston rod 25 outward, unlocking piston rod 19 of cylinder 8 and permitting the air to flow thru the holes 22 into the body of the cylinder 8 and force the piston 27 and piston rod 19 upward to the position shown in Figure 7, thus opening the doors 4.

The closing of the doors is accomplished by returning the valve handle 116 from the dotted position 116' to the full line position shown in Figure 11, thus exhausting the air from the pipe lines 106 and 43 and from the lower portion 54 of the automatic valve 44, which permits the piston 96 to return to the original position as shown in Figure 11. Thereby, the air is allowed to flow thru the pipe lines 49 and 47 into the atmosphere thru the exhaust holes 89 of the automatic valve 44, thus permitting the lock pin or piston rod 25 of the valve 9 to return to the position shown in Figure 8 and releasing the air from the cylinder 8 thru the holes 22 into the atmosphere thru the holes 120 of the nut 23. The piston 27 and piston rod 19 are thus permitted to return the doors 4 to the normal position and the spring lift causes lock pin or piston rod 25 to engage the groove 26 of the piston rod 19 as shown in Figure 5, which is the locked or closed position of the doors 4.

Other methods may be used to open and close the doors 4, such as oil pressure using a 4-way valve instead of the 3-way or control valves 108 and 40 and an hydraulic pump with power means connected to the traction engine for operating the pump. Piston 27 of cylinder 8 can be supplied with an additional packing cup in the reverse of the position of packing cup 75, having two pipe lines leading from the control valve 40 or 108 and connecting the upper and lower ends of cylinder 8. Admitting oil under pressure to the upper end of piston 27 of cylinder 8, will close

the doors 4 and hold the same in locked position. Releasing the oil pressure from the upper end of piston 27 of cylinder 8 and admitting oil pressure to the under side of piston 27 of cylinder 8, will open the doors 4. Air or other fluid pressure could be substituted for oil pressure.

From the description it can readily be seen that it is impossible to admit air or other fluid pressure to the cylinders until the door locking mechanism has unlocked the doors. Also, this mechanism can be separate from the cylinders or can be embodied in the cylinders. When the door locking mechanism is a part of the cylinders, each door can be locked and unlocked independently of the other, thus permitting one door to open and the other to remain closed, or both to open at one time.

We claim:

1. In a railway hopper bottom dump car, a plurality of discharge doors, fluid pressure cylinders with pistons, piston rods and piston rod locking and unlocking means mounted in the said fluid pressure cylinders mounted on the sides of said hopper bottom dump car, said piston rods connected to said discharge doors, control means mounted on said hopper bottom dump car to control the admission of fluid pressure to unlock and open said discharge doors and to allow said doors to close and lock.

2. In a hopper bottom dump car, a pair of self-closing discharge doors mounted on said hopper bottom dump car, fluid pressure cylinders with pistons, piston rods, automatic door locking means and fluid pressure unlocking means mounted in said cylinders pivotally mounted on the sides of said hopper bottom dump car, said piston rods connected to said discharge doors, control means on said hopper bottom dump car to control the admission of fluid pressure to the said fluid pressure cylinders and said fluid pressure door unlocking means to unlock said automatic door locking means which contacts the said piston rods and open the said doors and to control the release of fluid pressure in said cylinders and said door unlocking means to allow said doors to close, and the said automatic door locking means to engage the said piston rods and lock the said doors in a closed position.

3. In a hopper bottom dump car, in combination, discharge doors mounted on said hopper bottom dump car, fluid pressure cylinders with pistons and piston rods mounted therein mounted on said hopper bottom dump car, said piston rods connected to said discharge doors, means mounted in said pressure cylinders to engage and lock said piston rods when said piston rods are in an extended position to hold said doors in a closed position.

4. In a hopper bottom dump car having self-closing sidewise swinging doors pivotally mounted on the ends of said hopper bottom dump car to close the hopper opening, fluid pressure cylinders with pistons, piston rods, automatic piston rod locking means and fluid pressure unlocking means mounted in said fluid pressure cylinders mounted on the sides of said hopper bottom dump car, said piston rods connected to said doors, control means on said hopper bottom dump car to control the admission of fluid pressure to said fluid pressure unlocking means and cylinders to unlock and open the said doors and to release fluid pressure in said cylinders and said fluid pressure unlocking means and allow the force of gravity to close said doors and the said automatic lock-

ing means to operate and lock said doors in the closed position.

5. In a hopper bottom dump car, in combination, having bottom doors supported at opposite ends of said hopper bottom dump car for side-wise swinging movement, fluid pressure cylinders with pistons, piston rods and spring actuated piston rod locking means mounted in said fluid pressure cylinders mounted on the hopper sides of said hopper bottom dump car, said piston rods connected to said doors, means mounted on said hopper bottom dump car to control the admission and release of fluid pressure which actuates the pistons and spring actuated piston rod locking means and said fluid pressure cylinders to unlock, open, close and lock the said doors.

6. In a railway dump car or container, having discharge doors, fluid pressure cylinders with pistons and piston rods mounted therein mounted on said car or container, said piston rods connected to said doors, spring actuated door locking means engaging said piston rods to hold said doors closed, fluid pressure unlocking means mounted in the cylinder head of the said fluid pressure cylinders, control means on said dump car or container to control the admission of fluid pressure to said fluid pressure unlocking means and said cylinders to unlock and open the said doors and to release the fluid pressure in the said fluid pressure cylinders and the said fluid pressure unlocking means to allow said doors to close and the said spring actuated door locking means to lock said doors in a closed position.

7. In a hopper bottom dump car, having self-closing sidewise swinging doors pivotally mounted on the hopper ends of said hopper bottom dump car, fluid pressure cylinders with pistons and piston rods mounted therein mounted on said hopper bottom dump car, said piston rods connected to said doors, spring actuated door locking means engaging said piston rods and fluid pressure unlocking means mounted in the cylinder heads of the said fluid pressure cylinders, control means on the said hopper bottom dump car to control the admission of fluid pressure to said fluid pressure in locking means and said fluid pressure cylinders to unlock and open the said doors and to control the release of the fluid pressure in the said fluid pressure cylinders and the said unlocking means and allow the said doors to close and the said spring actuated door locking means to engage the extended said piston rod and lock the said doors in a closed position.

8. In a hopper container, in combination, supporting means for said hopper container for movement over the road, tractor truck connected to said hopper container supporting means, said hopper container having bottom discharge doors, fluid pressure cylinders with pistons, piston rods and piston rod locking means mounted thereon mounted on said hopper container, said piston rods connected to said doors, fluid pressure control means mounted on said tractor truck having fluid connection means to said hopper container door locking means and said cylinders to control the unlocking and opening of the said doors and release the fluid pressure to allow said doors to close and lock.

9. A hopper container with means to support and move said hopper container over the ground, in combination, multiple doors at the bottom of said container, power opening and closing means attached to said hopper container and to said doors, power locking means attached to said power opening and closing means to hold said doors

closed, remote control means to control the unlocking of said power locking means and said power opening means to open said doors.

10. A hopper container with supporting means for movement over the ground, in combination, a pair of gravity closing doors swingably supported at the ends of said hopper container, fluid pressure cylinders with pistons, piston rods and piston rod locking mechanism mounted in said cylinders mounted on said hopper container, said piston rods connected to said doors, control means to control the movement of fluid pressure to the said piston rod locking mechanism and fluid pressure cylinders and control the movements of the said pistons and locking mechanisms when opening and closing said doors.

11. In a container having sloping sides and ends with openings at the bottom thereof, in combination, supporting means for said container for movement over the road, doors pivotally mounted at the ends of the said container to close said openings, fluid pressure cylinders having pistons, piston rods and locking means for said piston rods mounted in said cylinders mounted on the sides of said container, said piston rods connected to said doors, and said piston rod locking means engages and locks the said piston rods in the extended position to hold the doors closed.

12. In a railway hopper bottom dump car, a plurality of discharge doors, fluid pressure cylinders with pistons, piston rods and door locking means mounted therein pivotally mounted on said hopper bottom dump car, said piston rods are adjustably and pivotally connected to said discharge doors, control means mounted on said hopper bottom dump car to control the admission of fluid pressure to said door locking means and said cylinders to unlock the door locking means and open said doors.

13. In a hopper bottom container with bottom openings, supporting means for said container for movement over the road, self-closing doors to close said bottom opening swingably mounted on the ends of said container, fluid pressure cylinders with pistons and piston rods mounted therein swingably mounted on the sides of said container, one end of said piston rods pivotally connected to said doors, fluid pressure door unlocking means and automatic door locking means mounted on said container, said automatic door locking means locks said doors when said doors are in a closed position, control means on said hopper bottom container supporting means to control the admission of fluid pressure from the fluid pressure reservoir mounted on said supporting means, to the said door unlocking means to unlock said doors and to said cylinders to open said doors and to control the release of said fluid pressure to allow said doors to close and automatically lock.

14. A hopper container with bottom openings, in combination, supporting means for movement of said hopper container over the ground, gravity closing bottom doors to close said bottom openings swingably mounted on said container, fluid pressure cylinders with pistons and adjustable piston rods mounted therein swingably mounted on said container, said piston rods pivotally connected to said doors, fluid pressure unlocking and locking means mounted in the heads of said cylinders with means to engage said piston rods when in an extended position to hold said doors in a closed position, control means mounted on said container supporting means to control the admission of fluid pressure to said unlocking means

and said cylinders to unlock and open the said doors and allow the said doors to close and lock.

15. A hopper container with bottom openings, in combination, supporting means for movement of said container, gravity closing doors mounted on the ends of said container to close said bottom openings, fluid pressure cylinders with pistons and piston rods mounted therein swingably mounted on said container, said piston rods pivotally connected to said doors, spring locking and fluid pressure unlocking means mounted in said cylinders with means to engage said piston rods to hold said doors in a closed position, remote fluid pressure control means having fluid pressure connection to said locking and unlocking means and said cylinders to control the unlocking and opening of said doors and to release the fluid pressure and allow the doors to close and lock.

16. A hopper container having bottom discharge doors mounted on the ends thereof with supporting means for movement of said container over the road, in combination, a self-propelling power unit attached to said container, fluid pressure cylinders with pistons, piston rods and door locking and unlocking means mounted therein swingably mounted on the sides of said container, said piston rods pivotally connected to said doors, control means mounted on said propelling unit having fluid pressure connection to said door locking and unlocking means and to said cylinders to control the unlocking and opening of said doors and allow said doors to close and lock.

17. A hopper container having self-closing bottom discharge doors with supporting means for movement of said container over the road, in combination, fluid pressure unlocking and automatic locking means mounted at the bottom of said hopper container above said doors and said locking means contacting said doors, fluid pressure cylinders with pistons and piston rods mounted therein swingably mounted on the sides of said hopper container, one end of said piston rods pivotally connected to said doors, fluid pressure control means mounted on said hopper container supporting means having fluid pressure connection to said unlocking means and to said cylinders to control the unlocking and opening of the said doors and to release said fluid pressure to automatically close and lock said doors.

18. A hopper container having swinging doors mounted at the bottom thereof, in combination, rolling supporting means for movement of said hopper container, a self-propelled traction unit having an operator's station mounted thereon attached to said supporting means, fluid pressure cylinders with pistons, piston rods, spring locking means and fluid pressure unlocking means mounted therein swingably mounted on the sides of said container, said piston rods pivotally connected to said doors, said spring locking means engaging said piston rods when doors are closed, automatic valves to admit fluid pressure to the unlocking means and cylinders mounted on said container supporting means, fluid pressure control valves mounted at said operator's station of said traction unit having fluid pressure connecting means to said automatic valves, unlocking means and cylinders to control the unlocking, opening, closing and locking of the said doors.

19. A hopper bottom container with swingable bottom discharge doors mounted for movement on rail or road as described, fluid pressure cyl-

inders with pistons and piston rods pivotally mounted on the sides of said hopper bottom container, door locking and unlocking means mounted in the cylinder heads of said fluid pressure cylinders, said piston rods pivotally connected to said bottom discharge doors, remote means to control the unlocking and the admission of fluid pressure to the said fluid pressure cylinders to open said doors, and to control the releasing of fluid pressure in said fluid pressure cylinders to allow said doors to close and be locked.

20. A hopper bottom container with bottom openings and means to support and move said hopper bottom container, in combination, discharge doors mounted on said hopper bottom container to close said bottom openings, fluid pressure cylinders with pistons and piston rods mounted therein mounted on said hopper bottom container, said piston rods connected to said discharge doors, means mounted in said pressure cylinders to engage and lock said piston rods when said piston rods are in an extended position to hold said doors in a closed position.

21. A hopper bottom container with bottom openings and means to support and move said hopper bottom container, in combination, discharge doors mounted on said hopper bottom container to close said bottom openings, fluid pressure cylinders with pistons and piston rods mounted therein mounted on said hopper bottom container, said piston rods connected to said discharge doors, means mounted in said pressure cylinders to engage and lock said piston rods when said piston rods are in an extended position to hold said doors in a closed position, remote control means to control the unlocking of said door locking means and permit fluid pressure to enter the said fluid pressure cylinders and open said doors, and to control the release of fluid pressure from said fluid pressure cylinders and permit the doors to close and be locked.

22. In a hopper bottom container with swingable doors to close the bottom of said hopper bottom container, in combination, means to support and move said hopper bottom container, fluid pressure cylinders having pistons, piston rods, locking and unlocking means mounted in said cylinders mounted on the said hopper bottom container, said piston rods connected to said doors, means to control the unlocking and admit fluid pressure to said cylinders to open said doors, and to control the releasing of the fluid pressure from said cylinders to allow the doors to close and be locked.

23. In a hopper bottom container with swingable doors to close the bottom of said hopper bottom container, in combination, means to support and move said hopper bottom container, fluid pressure cylinders having pistons, piston rods, spring locking and fluid pressure unlocking means mounted in said cylinders mounted on said hopper bottom container, said piston rods connected to said doors, means to control the admission of fluid pressure to the said unlocking means and said cylinders to open said doors and to control the release of said fluid pressure in said cylinders and unlocking means to allow the doors to close and the said spring locking means to lock said door in a closed position.

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