March 7, 1939. E. W. AUSTIN 2,149,949

WAGON

Filed March 16, 1936 2 Sheets-Sheet 1

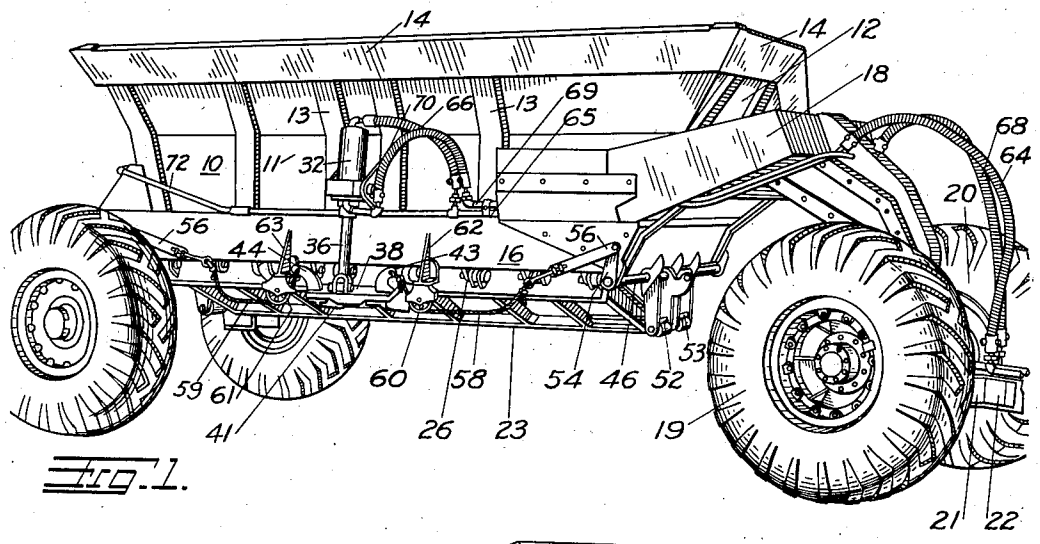


Fig. 1.

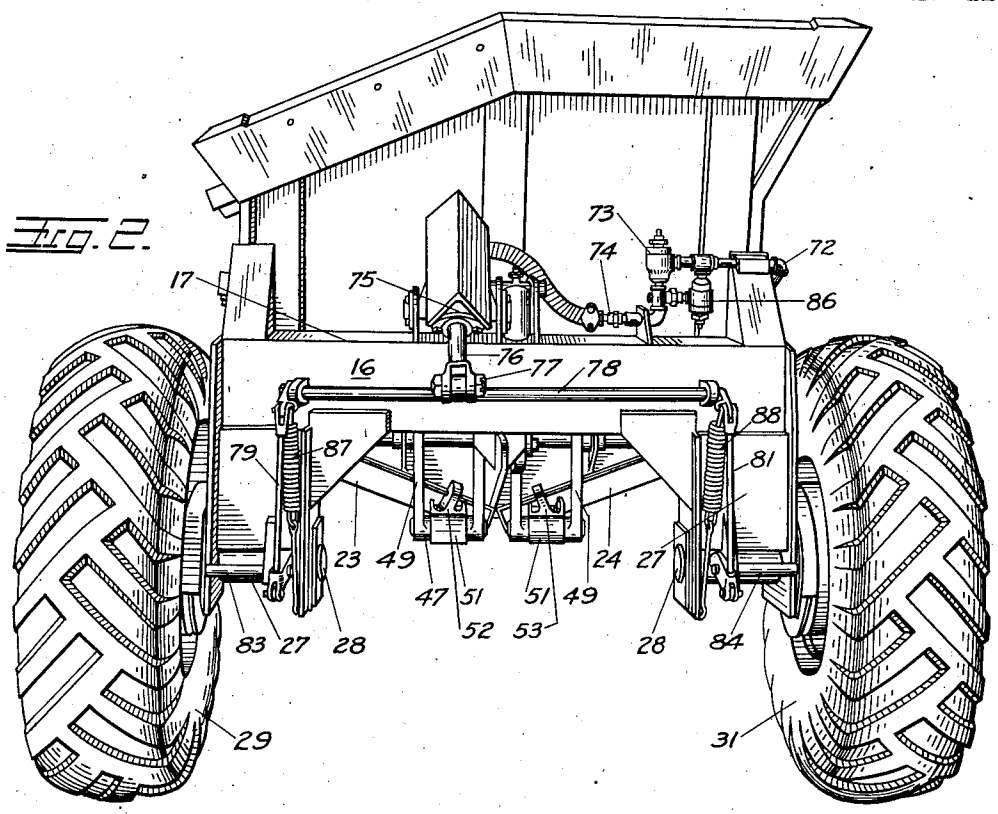


Fig. 2.

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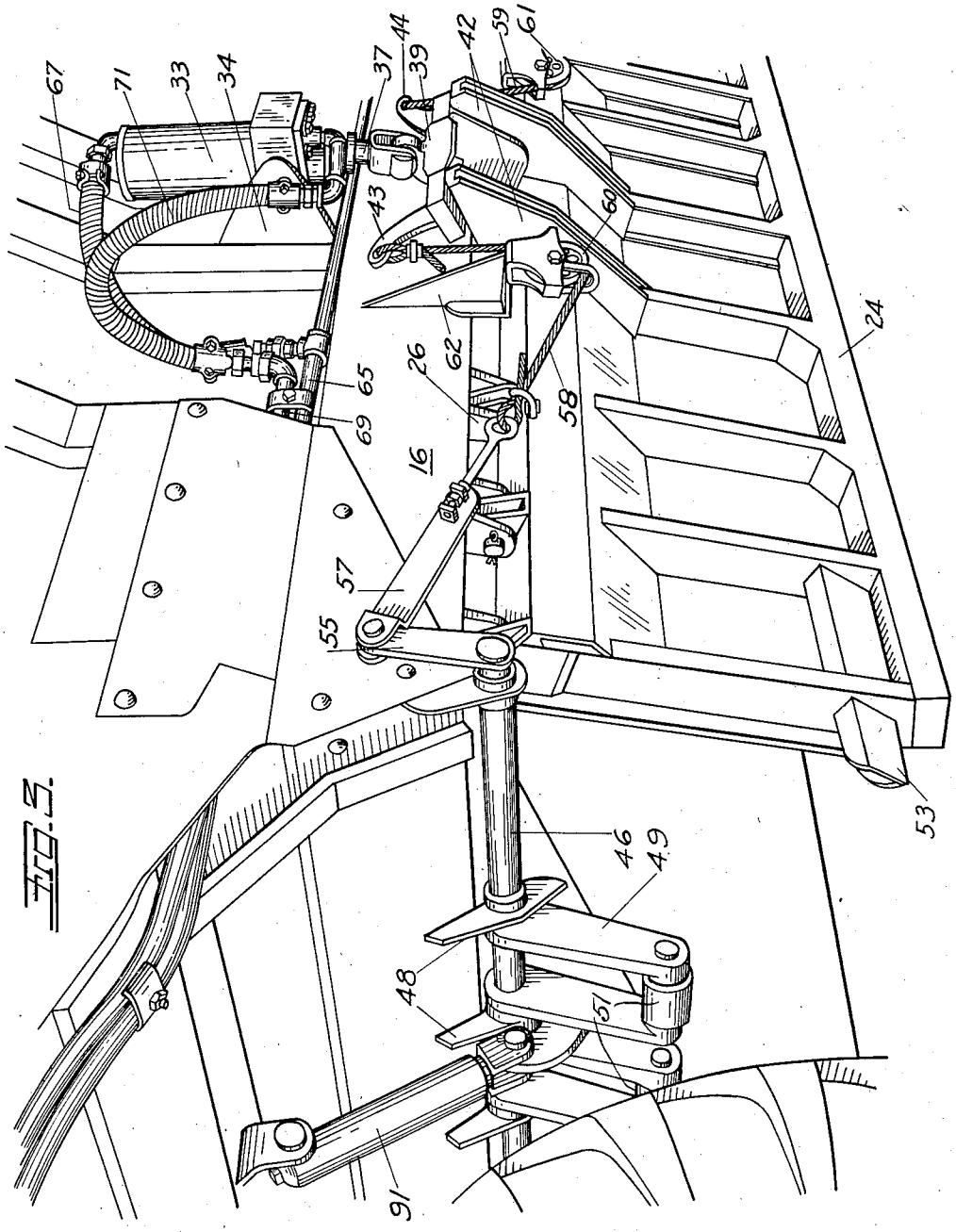


FIG. 5.

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WAGON

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19 Claims. (Cl. 298—35)

This invention relates to wagons and has particular relation to operating, control and dumping means for such wagons.

In the transportation of large quantities of materials, it is desirable to employ large steel wagons capable of carrying tremendous loads and such wagons are usually equipped with dump doors of one type or another for discharging the loads to unload the wagon. Wagons of the type here considered may be so large as to weigh empty nine or ten tons and these wagons may be capable of carrying eighteen cubic yards of material weighing as much as twenty-five tons. The operation of the dump doors of such a wagon, for practical considerations, is too difficult for manual operation. Furthermore, with such heavy loads it is difficult for the towing tractor to hold the wagon back on descending a grade. I have therefore devised a simple means employing hydraulic jacks for opening and closing the doors of a dump wagon and for applying brakes for such a wagon. The wagon structure is itself a problem because of the enormous loads involved.

It is a general object of my invention to provide a new and improved wagon structure and it is furthermore another general object of my invention to provide new and improved control and operating means for such a wagon.

Another object of my invention is to provide a mechanism of the above character which may be operated by only two hydraulic jacks and which may be readily controlled by the operator on the tractor.

It is another object of my invention to provide an improved door opening and closing means.

Another object of my invention is to provide means for applying braking effort to such a vehicle by means of the same mechanism which is employed for controlling the dump doors.

It is another object of my invention to provide a new and improved braking means for a wagon.

Another object of my invention is to provide a door opening and closing structure which may be operated by a single jack.

Another object of my invention is to provide door opening and closing means and braking means, all of which may be controlled by a simple movement, forward or back, of a control mechanism.

Another object of my invention is to provide a new and improved wagon structure.

Other and further features and objects of the invention will be more apparent to those skilled in the art upon a consideration of the accompanying drawings and following specifications, wherein is disclosed a single exemplary embodiment of the invention, with the understanding, however, that such changes may be made therein as fall within the scope of the appended claims, without departing from the spirit of the invention.

In said drawings:

Figure 1 is a view in perspective of a wagon constructed according to one embodiment of my invention and showing the dump doors thereof in closed position.

Figure 2 is a rear view in perspective of the device shown in Figure 1 and illustrating the braking mechanism of the device, and

Figure 3 is a fragmentary view in perspective of the other side of the wagon shown in Figure 1 and illustrates the dumping and dumping control mechanisms in greater detail, and shows the dump doors in the open position.

Referring now to the drawings there is shown at 10 generally a wagon box of substantially conventional shape. This wagon box is a built-up structure including side plates 11 and end plates 12 additionally braced by means of gussets 13 and channels 14. The box 10 is supported by means of a built-up rectangular frame 16, the frame being extended at the rear thereof to provide a platform 17 and being also extended at the front to provide a goose-neck tongue 18. The tongue 18 is arched to permit the wheels 19 and 21 to pass below the tongue to permit turning the wagon in a short radius. The wheels 19 and 20 are mounted on an axle structure 21 which is pivotally engaged to the outer lower end of the goose-neck tongue 18. The wagon is adapted to be drawn by means of a tractor (not shown) which is attached to the wagon by means of the drawbar 22.

The bottom of the box or hopper 10 is open and the framework 16 is likewise open in order to permit material to be discharged through the bottom of the wagon, in accordance with the usual practice in wagons of this type. The bottom is adapted to be closed by means of a pair of rectangular doors 23 and 24 which have hinged connection with the side members of the frame 16, as indicated at 26. The doors may be supported in a closed position, such as illustrated in Figures 1 and 2, to support the load of material in the wagon or may be permitted to drop to the open position shown in Figure 3 by means of mechanism hereinafter described, which is more particularly an embodiment of the present invention.

The rear end of the wagon is supported by means of an arched axle structure which is of

built-up construction employing plate members welded or otherwise secured together to form suitable box sections. The axle is really nothing more than a pair of legs 27 secured to the underside of the platform 17 and having stub axles 28 therein on which the wheels 29 and 31 are rotatably mounted. The wheels 19 and 20, 29 and 31, are preferably provided with the extremely large pneumatic tires here shown in order not only to furnish broad rolling surfaces for the wagon but also to furnish resilient means for absorbing the shocks resulting from inequalities of the ground over which the wagon is drawn.

A pair of hydraulic jacks 32 and 33 are mounted one on each side of the wagon by means of brackets 34 in which the jacks are pivotally mounted and in such position that the rams 36 and 37 project downwardly. The lower ends of the rams 36 and 37 are provided with cross-bars or yokes 38 and 39 which are pivotally engaged to the rams for motion about axes which are transverse to the rams and parallel to the longitudinal axis of the wagon.

A pair of brackets 41 and 42 are secured to each of the doors 23 and 24 and when the doors are in an open position these brackets project outwardly and upwardly to a position beside the side frame members 16 and below the yokes 38 and 39, in such position that when the rams are forced downwardly, the yokes 38 and 39 bear against the brackets 41 and 42 to push them downwardly and rotate the doors about the hinges 26 until they are in the closed position.

Each of the yokes 38 and 39 is provided with a pair of upstanding ears 43 and 44. A pair of cross shafts 46 and 47 are provided at the front and rear of the wagon respectively and these cross shafts are pivotally engaged within suitable bracket members 48 which in turn are engaged to the frame members 16. The cross shafts are each provided with link or latch members 49 and these latch members have rollers 51 adapted to engage suitable channel-like ears 52 and 53 on each of the inner corners of the respective doors 23 and 24.

Each of the cross shafts 46 and 47 is provided with levers 54 and 55 on the ends of the shafts projecting beyond the side members of the frame 16 and links 56 and 57 are pivotally engaged to the free ends of these levers. Cables 58 and 59 are secured to these links and are trained over respective pulleys 60 and 61 located on suitable brackets 62 and 63 which in turn are secured to the side members of the frame 16. The free ends of the cables 58 and 59 are engaged to the respective ears 43 and 44.

It is now apparent that when the rams 36 and 37 are drawn upwardly to their extreme upper position, the ears 43 and 44 on the yokes 38 and 39 will pull the cables 58 and 59 to rotate the shafts 46 and 47 to withdraw the latches 49 from their engagement with the ears 52 and 53, thereby releasing the doors to permit discharge of the load from the wagon. The members 91 are merely spring members adapted to normally close the latches 49.

The jacks 32 and 33 are of course double-ended and fluid for operating them is introduced into the upper end by means of conduits 64, 65, 66 and 67, fluid under pressure being supplied by means of a hydraulic pump (not shown) on the tractor and controlled by means of a suitable valve mechanism (not shown) located in a position near the operator of the tractor. Fluid for driving the rams upwardly is furnished from the pump on the tractor by means of conduits 68, 69, 70 and 71.

It is apparent therefore that the operator on the tractor may at will introduce fluid under pressure into the upper ends of the cylinders 32 and 33 to close the doors or into the lower ends of the cylinders to withdraw the latches 49 to permit the doors to open and thus discharge the load.

It is also very desirable, by reason of the extreme weight of the wagon and load, that some means be provided to furnish a braking effect to prevent the wagon from overrunning the tractor when descending a grade and this result is secured by means of the mechanism I am about to describe. The pressure within the cylinders necessary for closing the doors is only on the order of 200 pounds per square inch. The pump utilized for operating the door closing and tripping mechanism is capable of pressures of 500 to 700 pounds per square inch. In order to operate a braking mechanism hereinafter described, I provide a continuation of the conduits 65, as indicated at 72, leading to a pressure valve 73 located at the rear of the platform above the platform 17. This pressure valve requires pressures in the neighborhood of 500 pounds per square inch in order to open the valve, but when the valve is opened the fluid under high pressure is admitted to a conduit 74 which leads to the lower end of a hydraulic jack 75 pivotally mounted upon the platform 17. The fluid under high pressure within the jack 75 drives the ram 76 upwardly and inwardly and this ram is pivotally engaged to lever arms 77 on a rotatably mounted cross-shaft 78. The consequent rotation of the shaft 78 pulls upwardly on the pull rods 79 and 81 which in turn rotate brake shafts 83 and 84 to operate brake mechanisms (not shown) within the wheels 29 and 31 to retard the wagon. When the pressure within the conduit 72 is reduced to a pressure substantially below 500 pounds, the valve within the housing 73 closes and the fluid within the jack 75 and conduit 74 passes through a low pressure relief valve 86 and is returned into and through the line 72 to the pump. The springs 87 and 88 are so secured to the members 27 and levers on the ends of the cross-shafts 78 as to pull the pull rods 79 and 81 downwardly to assist to release the brakes.

It is apparent, therefore, that the operator can not only close the doors and release them for dumping the load but that he may also, by applying excess pressure when the doors are in closed position, apply braking effect to the wheels.

Although a preferred embodiment of my invention has been here shown, it is apparent that other modifications may be made by those skilled in the art. Such modifications may be made without departing from the spirit and scope of my invention as set forth in the appended claims.

I claim as my invention:

1. In a wagon having doors adapted for opening and closing and latch means for holding the doors in closed position, a pair of jacks and means operatively connecting the rams of the jacks to the doors to permit them to be closed by the jacks and other means actuated by the same jacks for unlatching the doors, a third jack connected to the first named jacks, a braking mechanism operated by the last named jack, and control means whereby fluid from the line supplying the first named jacks may be employed to apply the brakes on the wagon.

2. In a wagon, doors pivotally engaged to the

wagon box for opening and closing movement, latches for holding the doors in closed position, a braking mechanism for the wheels of the wagon, jacks for closing the doors and operating the latching mechanism and for operating the braking mechanism, one supply line operatively connected to all of the jacks for operating the doors and the brakes, and another supply line connected to some of the jacks for unlatching the doors.

3. In a wagon, hydraulic door operating jacks for closing the doors and latching them in closed position, another hydraulic brake jack for applying brakes to the vehicle, and means connecting the door actuating jacks with the brake jack whereby when fluid at pressures in excess of that required to operate the door jacks is introduced into the door jacks, the braking jack will also be operated.

4. In a wagon having doors adapted for opening and closing, latches for holding the doors in the closed position, a braking mechanism for the wheels of the wagon, hydraulic jacks for closing the doors and operating the braking mechanism, one supply line for feeding fluid to the jacks to close the doors and to actuate the brakes, and another supply line for feeding fluid to the jacks to disengage the latches and open the doors.

5. In a wagon having doors adapted for opening and closing movement, latching means for securing and holding the doors in the closed position, a braking mechanism for the wheels of the wagon, a hydraulic jack system for operating the door and latching means and the brake systems comprising hydraulic jacks and fluid supply lines for feeding fluid to the jacks, the hydraulic system being designed to utilize the fluid at one pressure range for operating the door and latch mechanisms and at another pressure range for actuating the braking mechanism.

6. In a wagon, doors pivotally engaged to the wagon box for swinging movement therewith, latches for holding the doors in closed position, a braking system for the wheels of the wagon, hydraulic jacks mounted on either side of the wagon for actuating the doors and latches, a third jack mounted on the rear of the wagon for actuating the braking mechanism, a supply line for supplying fluid to all three jacks for closing the doors and actuating the brakes and another supply line for supplying fluid to the jacks on either side of the wagon to actuate the latches.

7. In a wagon having doors adapted for opening and closing and latches for holding the doors in the closed position, a braking mechanism for the wheels of the wagon, a hydraulic system for opening and closing the doors, and for operating the latches and brake mechanism, said system being adapted to use fluid in a single supply line under comparatively low pressure for closing the doors and under higher pressure for operating the braking mechanism.

8. In a dump wagon, a door pivotally connected to the wagon to dump the load, the door having extensions thereof, a jack engaged on the side of the wagon, means on the ram of the jack for engaging the extensions of the door, a latching means for holding the door in closed position, and means operatively connecting the latching means and the ram of the jack for unlatching the door.

9. In a dump wagon, a jack, means connecting the jack and door for closing the door, a hydraulic braking system including a second jack, and means for hydraulically connecting the first and second jacks whereby when the first named jack is in an extreme position excess hydraulic pressure will actuate the hydraulic braking system, the first named jack being adapted to operate in one range of pressure and the second named jack being adapted to operate only at a higher range of pressure.

10. In a dump wagon including a dump door, a hydraulic jack for closing the dump door, a latching means for holding the door in closed position, means operatively connecting the jack with the latching means whereby the jack may be employed for unlatching the door, and a hydraulicly operated braking mechanism including a hydraulic jack, the jack having means for preventing the entrance of fluid thereto except at pressures higher than those used for closing the door, whereby the hydraulic braking mechanism is actuated only at higher pressures than the pressures used for closing the doors.

11. In a dump wagon, a hydraulic jack for actuating the door of the dump wagon, a second single acting jack having parallel hydraulic connection with one end of the first named jack, means for permitting the entrance of fluid into the second named jack at pressures materially higher than those used for operating the first named jack, and means for permitting escape of fluid from the second named jack at lower pressures.

12. In combination with a tractor, a dump wagon adapted to be towed by the tractor, hydraulic means for actuating the door of the dump wagon, a hydraulic connection from the towing vehicle to the door actuating means, and a hydraulic braking mechanism for the dump wagon having hydraulic connection with the door actuating means whereby fluid supplied from the towing vehicle may be used successively for operating the doors and applying the brakes.

13. In a wagon having a door adapted for opening and closing, a latch means for holding the door in closed position, a hydraulic jack, an arm on the ram of the jack, an extension arm on the door located in the path of the arm on the ram whereby the movement of the ram causes the arm of the ram to strike the arm on the door and close the door, and a pull system operatively engaged to the arm on the jack and to the latch whereby movement of the jack in the opposite direction from the direction of the movement used in closing the door will actuate the pull system and withdraw the latch.

14. In a wagon, a dump door at the bottom of the wagon and hinged to the side thereof, a hydraulic jack on the side of the wagon, an extension arm on the door, an arm on the ram of the jack, the arm on the door being located in the path of the movement of the arm on the jack, latch means for holding the door in closed position, and an operative connection between the latch means and the ram, whereby movement of the ram in one direction closes the door, and movement of the ram in the other direction withdraws the latch means.

15. In a dump wagon, a door at the bottom of the wagon, hingedly connected to the side thereof, a pair of arms secured to the door and extending beneath and beyond the side of the wagon, a hydraulic jack mounted on the side of the wagon, a yoke member mounted on the ram of the jack, the jack, yoke and arms on the door being so arranged that downward movement of the ram closes the door, a cross shaft at the end of the wagon, latch means on the cross shaft, means on the door whereby the latch

may hold the door in closed position, and a pull rope extending from the yoke to the cross shaft for rotating the cross shaft on upward movement of the ram of the jack to withdraw the latch member.

16. In a dump wagon having a door for supporting and dumping the load, a hydraulic jack, means on the door in the path of movement of the jack in one direction for closing the door, latch means for holding the door in closed position, and other means connecting the jack and the latch for dropping the door to dump the load on movement of the jack in the opposite direction.

17. In a wagon having a door swung for opening and closing, a ram, a lever secured to the door and projecting into the path of the ram whereby motion of the ram in one direction will force the door closed, a latch for holding the door in closed position, and a lost motion linkage connecting the latch and the ram whereby extreme movement of the ram in a direction opposite to the door closing movement withdraws the latch to dump the load.

18. In a wagon having a door swung for opening and closing, a power means, a lever secured to the door and projecting into the path of movement of the power means whereby motion of the power means in one direction will close the door, a latch for holding the door in closed position, and means projecting into the path of movement of the power means when moving in the direction opposite to that used in closing the door, the last named means being operatively engaged to the latch, so that when the power means is moved in the opposite direction it will strike the last named means and release the latch to permit the door to open.

19. In a wagon having a door swung for opening and closing, a hydraulic ram for closing the door, brakes for the wagon, a hydraulic ram for actuating the brakes, the ram for closing the door and the ram for operating the brakes being connected to the same pressure supply means but with the brake operating ram arranged to require higher operating pressures than the door closing ram whereby the brakes will be actuated only when the door closing ram has reached the end of its stroke.

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