No. 849,550. PATENTED APR. 9, 1907.

C. G. LUNDHOLM.

AIR BRAKE MECHANISM.

APPLICATION FILED JULY 16, 1906.

Fig. 3.

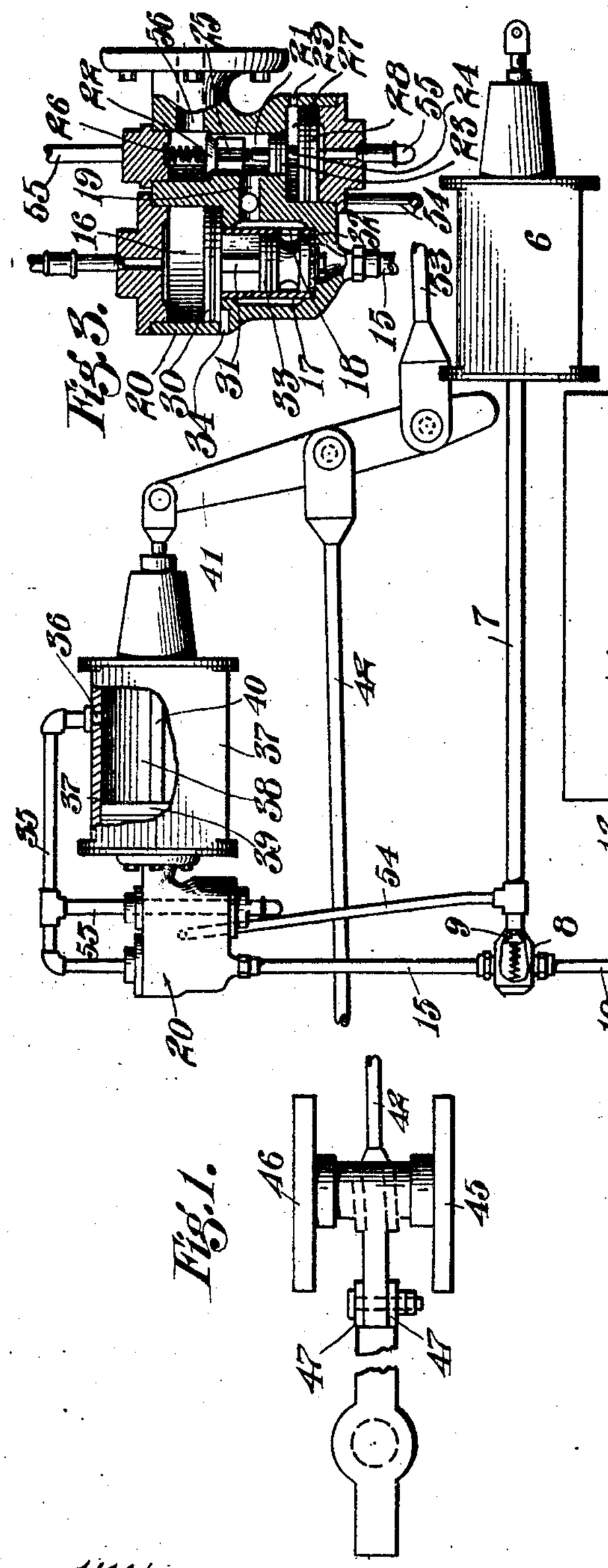
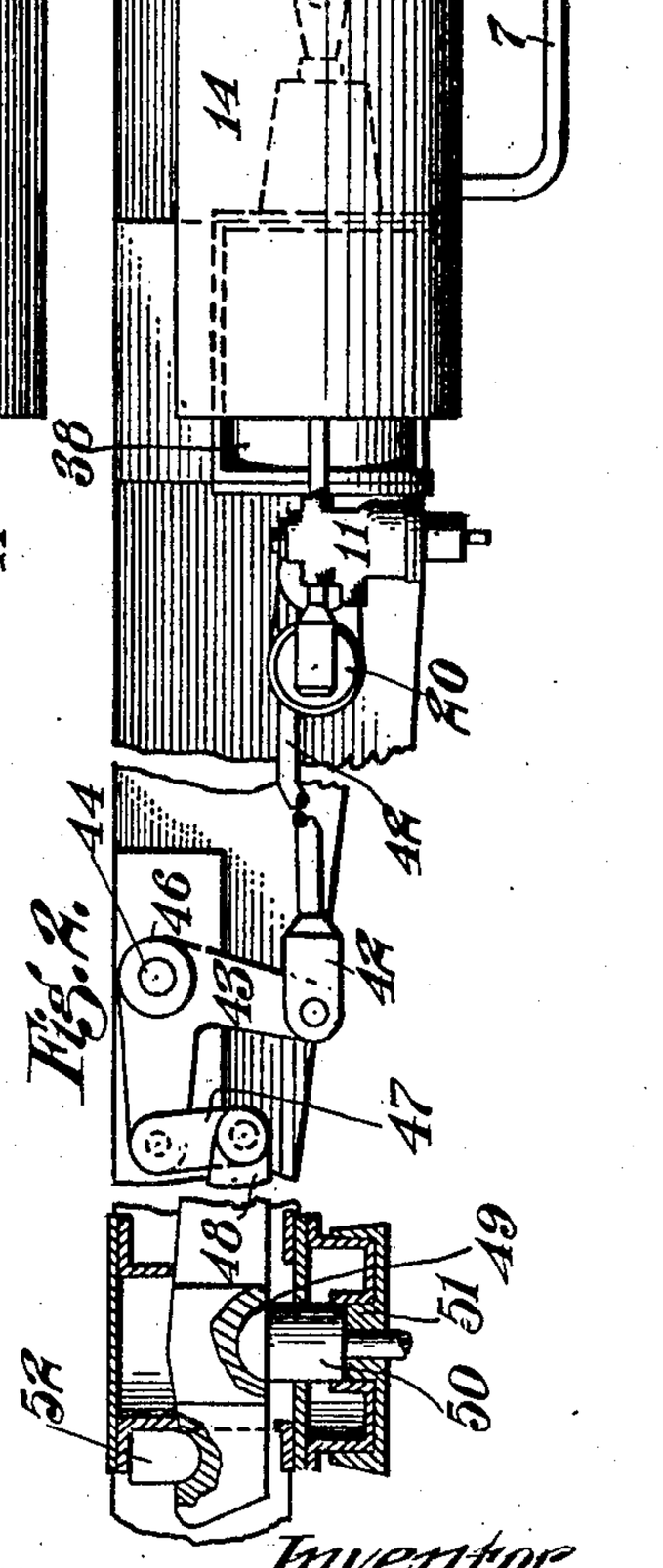


Fig. 1.

Fig. 2.



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CHARLES G. LUNDHOLM, OF OTIS, CALIFORNIA, ASSIGNOR OF ONE-HALF TO FRANK E. DAVISSON, OF LOS ANGELES, CALIFORNIA.

AIR-BRAKE MECHANISM.

No. 849,550. Specification of Letters Patent. Patented April 9, 1907.

Application filed July 16, 1906. Serial No. 326,515.

To all whom it may concern:

Be it known that I, CHARLES G. LUNDHOLM, a citizen of the United States, residing at Otis, in the county of San Bernardino and State of California, have invented new and useful Improvements in Air-Brake Mechanism, of which the following is a specification.

In the application of air-brakes to steam-railway cars it is desirable that the braking power applied to the wheels of each car should be properly proportioned to the weight of the car and its load, so that the maximum efficiency may be obtained without locking the wheels of a car, so that they will slide; and it is the object of my invention to provide means whereby the power applied to the brakes of each car shall be automatically cut off whenever the desired efficiency has been reached whether the car is loaded, partially loaded, or empty. I accomplish this object by the mechanism described herein and illustrated in the accompanying drawings, in which—

Figure 1 is a plan of that portion of the braking mechanism of a car which is my invention, parts being broken away, together with a portion of coöperating parts. Fig. 2 is a side elevation of the parts shown in Fig. 1. Fig. 3 is a central longitudinal section of some of the valves shown in the other figures.

In the drawings, 5 is one of the steel floor-beams of a freight-car, the other parts of which are not shown, as not necessary to the illustration of my invention. To this beam is secured the brake-cylinder 6, by means of which the ordinary car-brakes (not shown) are operated. A pipe 7 leads from this cylinder to a check-valve chamber 8, which has a valve 9 therein which opens outwardly or away from pipe 7. Check-valve chamber 8 is connected by pipe 10 to triple valve 11, of ordinary construction and operation. 12 is the train-line pipe, which is also connected to the triple valve. Pipe 13 connects the triple valve to the auxiliary reservoir 14. The connections of these different pipes are such that the auxiliary reservoir is filled from the train-line through the triple in the usual well-known manner of the Westinghouse air-brake, and pipe 10 can be connected with that port of the triple which leads the air to the brake-cylinder or with exhaust. A pipe 15 leads from the check-valve chamber to the regulating-valve chamber 16. The lower portion of the regulating-valve chamber is smaller than the upper portion and is provided with a bushing 17, which has a port 18 therein, which port is in communication with channel 19 in the side of the casing 20 of the chamber. Channel 19 opens into check-valve chamber 21, in the upper portion of which is an upwardly-opening check-valve 22.

In the lower portion of the check-valve chamber is a piston 23, which carries a stem 24, which projects from both sides thereof. When the piston is moved upwardly, the upper portion of the stem engages stem 25 of the check-valve and lifts the valve off its seat against the power of spring 26. The lower portion of the check-valve chamber opens into the check-valve-controlling chamber 27, in which piston 28 works. Piston 28 is mounted on stem 24.

In the upper portion of chamber 27 is a port 29, that opens to the atmosphere, so that the air between pistons 23 and 28 is always at atmospheric pressure. Passage 19 is connected by pipe 54 with pipe 7. The upper portion of the regulating-valve chamber 16 is larger than the lower portion, and a piston 30 has a working fit therein. A stem 31 is secured to said piston and extends to the lower end of the bushing in the lower part of the regulating-valve chamber. On the lower end of this stem is a piston 32, and intermediate pistons 30 and 32 is another piston 33, which provides additional packing to prevent the air passing up into the upper part of the chamber when in use, as explained hereinafter.

In the lower portion of the upper part of the regulating-valve chamber is a port 34, which opens to the air, so that the portion of the regulating-valve chamber between the pistons 30 and 33 shall always be in free communication with the external air. Pipe 35 connects the upper portion of the regulating-valve chamber with a port 36 in the casing 37 of the supplemental piston-chamber 38. Pipe 35 is also connected to chamber 27 below piston 28 by pipe 55. The upper portion of the check-valve chamber is connected by passage 56 with chamber 38. Piston 39 in the supplemental piston-chamber is provided with a stem 40, which is pivotally connected to a floating lever 41 at one end thereof. A rod 42 is connected to lever 41, and the other end thereof is connected to

one arm of bell-crank lever 43, which is mounted on pin 44, secured in bearings 45 and 46, which bearings are secured to the floor-beams of the car. The other arm of bell-crank lever 43 is connected by links 47 to the end of lever 48. Near the other end of lever 48 is a recess 49, into which is received center pin 50, which is connected to and supported by the truck center plate 51, which is connected to and supported by the car-truck. (Not shown.) A bearing-pin 52 is connected to the body of the car and rests upon the outer end of lever 48, and as the outer end of said lever moves up or down the body of the car is raised or lowered. A rod 53 is connected to a bell-crank lever at the other end of the car, similar to bell-crank lever 43. This lever is connected by links to a lever like lever 48. This last lever is similar in its construction and mounting and bearing to said lever 48 and raises and lowers that end of the car in like manner to lever 48.

The operation of my device is as follows: When it is desired to apply the brakes to the car-wheels, air is admitted to pipe 10 from the auxiliary reservoir through the triple valve in the usual well-known manner of admitting air to the brake-cylinder. The air passes upwardly to the regulating-valve chamber and raises the piston therein until port 18 is uncovered, when the air passes through passages 19 and pipes 54 and 7 into the brake-cylinder. It will also be observed that the air-pressure is communicated, through the check-valve chamber and passage 56, to the supplemental piston-chamber 38, and as soon as the pressure rises high enough to move the piston therein to uncover port 36 the air will pass through pipe 35 into the regulating-valve chamber above piston 30, when by reason of the fact that the portion of the chamber between pistons 30 and 33 is connected to open air the pressure of the air upon piston 30 will move piston 32 to cut off the admission of air to port 18 and no more air can reach the brake-cylinder. The time at which port 36 will be uncovered will depend upon the amount of the resistance piston 39 has to overcome, and this resistance is determined by the weight of the car-body and its contents, if any. It will be observed that stem 40 of piston 39 is connected to the floating lever 41, which lever is connected to rods 42 and 53, which extend toward the opposite ends of the car. The movement of the piston in the supplemental piston-chamber away from the regulating-valve chamber causes rods 42 and 53 to pull upon their respective bell-crank levers, and the movement of said bell-crank levers operates to raise the body of the car, and whenever the body of the car is raised high enough to permit the travel of piston 39 past port 36 the admission of air to the brake-cylinder is cut off, as before explained. When it is desired to release the brakes, pipe 10 is connected by the triple to exhaust, when the air will escape from the brake-cylinder in the usual well-known manner, valve 9 opening for that purpose. It will be observed that piston 28 is subjected to air-pressure as soon as the air enters through pipe 55, and it moves upwardly and holds the check-valve from seating until piston 39 travels back beyond port 36, which it will not do until the brakes are released. As soon as piston 39 has traveled back beyond port 36 pipe 35 is thrown to exhaust, when spring 26 will close check-valve 25 and the remaining air in chamber 38 will be trapped and retained for future use. It will be understood that the backward travel of piston 39 is sufficient to relieve the strain on the connected parts.

Having described my invention, what I claim is—

1. The combination with a car and brake-cylinder for controlling the brake-levers, of a lifting mechanism independent of and disconnected from the brake mechanism, and valve mechanism for controlling said lifting mechanism.

2. The combination with a brake-cylinder, auxiliary reservoir and supplemental piston-chamber, of a regulating-valve chamber and check-valve chamber in communication with each other and the latter in communication with the supplemental piston-chamber, and a valve for automatically regulating the communication between said chambers.

3. The combination with a brake-cylinder, auxiliary reservoir and supplemental piston-chamber, of a regulating-valve chamber and check-valve chamber in communication with each other and the latter in communication with the supplemental piston-chamber, a valve for automatically regulating the communication between said chambers, a pipe extending from the air-passage between the regulating-valve chamber and check-valve chamber to the brake-cylinder, a triple valve and pipes leading from the auxiliary reservoir to the triple valve and from the latter to the regulating-valve chamber.

4. The combination with a brake-cylinder, auxiliary reservoir and supplemental piston-chamber, of a regulating-valve chamber and check-valve chamber in communication with each other and the latter in communication with the supplemental piston-chamber, a valve for automatically regulating the communication between said chambers, a pipe extending from the air-passage between the regulating-valve chamber and check-valve chamber to the brake-cylinder, a triple valve, pipes leading from the auxiliary reservoir to the triple valve and from the latter to the regulating-valve chamber, a check-valve chamber in the pipe leading to the brake-cylinder and a check-valve in said chamber.

5. The combination of a fluid-pressure brake apparatus of an independent valve-casing on the communication between the auxiliary reservoir and brake-cylinder, said casing being smaller at the bottom than at the top, two pistons in said casing connected by a stem, said casing having an exhaust-port at the lower portion of the enlarged upper part thereof, and a connection intermediate said pistons to an auxiliary piston-chamber and to the brake-cylinder.

6. In a fluid-pressure brake apparatus, an independent valve device for controlling the flow of fluid to the brake-cylinder; a pressure-operated lifting mechanism for controlling the position of said independent valve; a check-valve on the passage leading to said pressure-operated lifting mechanism; and mechanism for holding said check-valve open until the pressure-operated lifting mechanism is released.

7. The combination with an auxiliary reservoir and brake-cylinder adapted to operate brake mechanism, of lifting-levers, a floating lever, means connecting the latter with the lifting-levers, of a supplemental piston-chamber, a piston therein which guides the floating lever, a regulating-valve chamber, a check-valve chamber in communication with the supplemental piston-chamber, a passage between the regulating-valve chamber and the check-valve chamber, valves in said chambers, and a pipe leading from the passage between the chambers to the brake-cylinder.

8. The combination with an auxiliary reservoir and brake-cylinder adapted to operate brake mechanism, of lifting-levers, a floating lever, means connecting the latter with the lifting-levers, of a supplemental piston-chamber, a piston therein which guides the floating lever, a regulating-valve chamber, a check-valve chamber in communication with the supplemental piston-chamber, a passage between the regulating-valve chamber, and the check-valve chamber, valves in said chambers, a pipe leading from the passage between the chambers to the brake-cylinder, a pipe leading from the auxiliary reservoir to the regulating-valve chamber and a pipe leading from the supplemental piston-chamber to the regulating-valve chamber and the check-valve chamber.

9. The combination with an auxiliary reservoir, a brake-cylinder and a triple valve, a pipe leading from the reservoir to the triple valve and a train-line pipe leading to the triple valve, of a supplemental piston-chamber and piston therein, a lifting mechanism operated by the piston-valve mechanism, a pipe leading from the triple valve to said mechanism, a valve leading from the valve mechanism to the brake-cylinder and a pipe leading from the supplemental piston-chamber to the valve mechanism whereby power applied to the brakes of each car is automatically cut off, whenever the desired efficiency has been reached, whether the car be loaded, partially loaded, or empty, without locking the wheels of the car.

10. The combination with a brake-cylinder, an auxiliary reservoir, a supplemental piston-chamber, a piston therein, and lifting mechanism operated and controlled by said piston, of valve-chambers in connection with the brake-cylinder, reservoir and supplemental piston chamber, and valves therein which are automatically cut off whenever the desired or maximum efficiency has been reached, so that the brake-power applied to the wheels of the car shall be perfectly proportioned to the weight of the car and its load.

In witness that I claim the foregoing I have hereunto subscribed my name this 7th day of July, 1906.

CHARLES G. LUNDHOLM.

Witnesses:
G. E. HARPHAM,
EDMUND A. STRAUSE.