

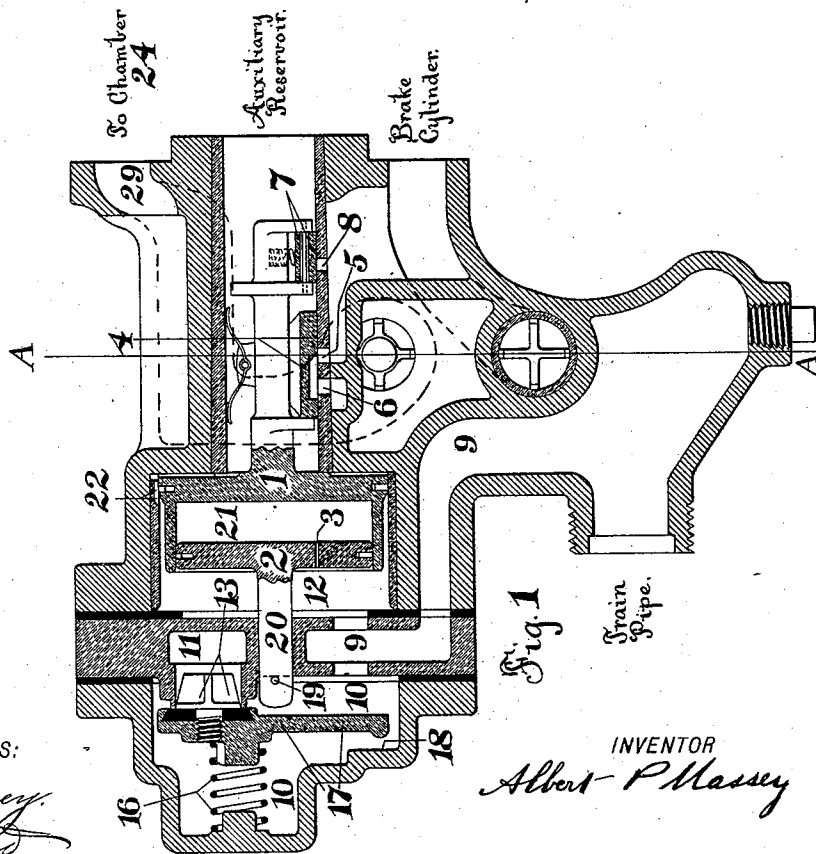
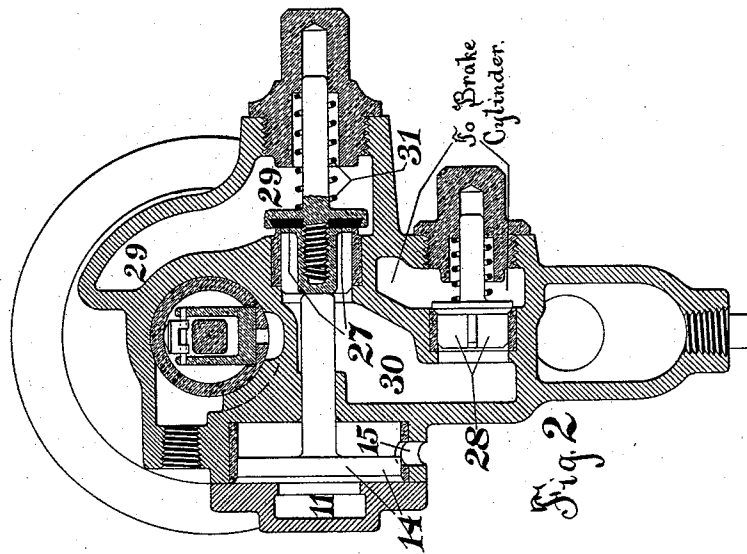
(No Model.)

2 Sheets—Sheet 1.

A. P. MASSEY.  
AIR BRAKE.

No. 537,057.

Patented Apr. 9, 1895.



WITNESSES:

*A. P. Massey*  
*W. H. Ford*

INVENTOR

*Albert P. Massey*

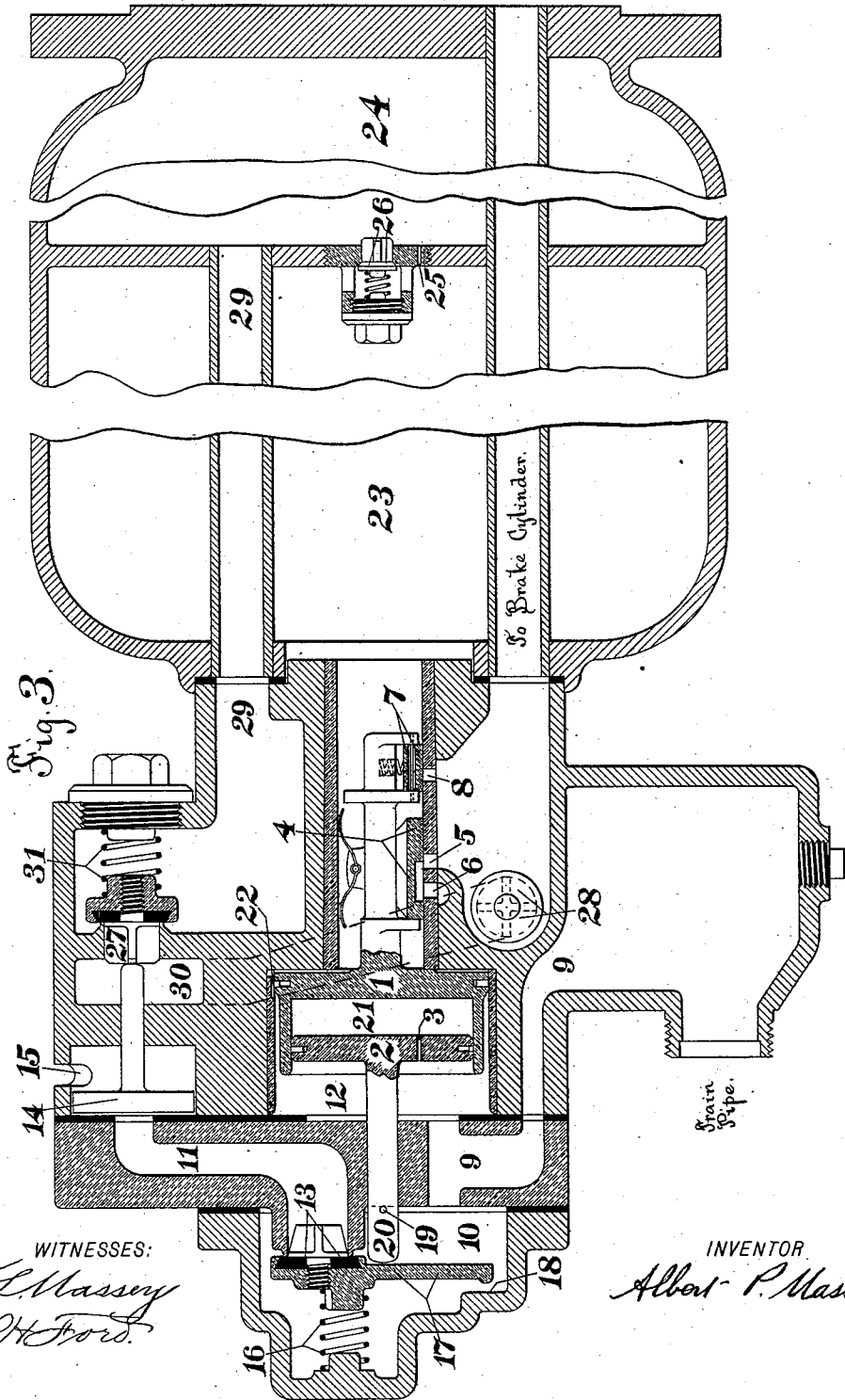
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WITNESSES:  
*H. L. Massey*  
*W. H. Ford.*

INVENTOR:  
*Albert P. Massey*

# UNITED STATES PATENT OFFICE.

ALBERT P. MASSEY, OF WATERTOWN, NEW YORK.

## AIR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 537,057, dated April 9, 1895.

Application filed February 15, 1895. Serial No. 533,529. (No model.)

*To all whom it may concern:*

Be it known that I, ALBERT P. MASSEY, a citizen of the United States, and a resident of Watertown, Jefferson county, State of New York, have invented a new and useful Improvement in Air-Brakes, of which the following is a specification.

The object of my invention is to provide a quick action automatic brake apparatus in which the quick braking power is obtained from the compressed air stored in the auxiliary reservoir.

It consists of the ordinary automatic air brake composed of a train pipe, an auxiliary reservoir, a brake cylinder and a triple valve controlling a passage from the train pipe to the auxiliary reservoir, a passage from the auxiliary reservoir to the brake cylinder and a passage from the brake cylinder to the atmosphere, combined with local vents from the train pipe similar to those described in patent to Ford, Westinghouse and Welsh, No. 162,465, and suitable means for quickly opening a second passage from the auxiliary reservoir, or one chamber thereof, to the brake cylinder.

Figure 1 is a longitudinal section of the apparatus as constructed. Fig. 2 is a cross section of the same on line A A. Fig. 3 is a modification of the structure in order to show all the moving parts in one plane. It has the same moving parts, acting on each other in the same way as the structure of Figs. 1 and 2. It differs only in the form of the passages between the valves.

The various parts are numbered the same on all drawings, but the description may be followed more easily by reference to Fig. 3.

In the drawings 1 is the ordinary triple valve piston one side of which has a cylindrical recess in which piston 2 is fitted. 3 is a small opening through piston 2 through which air may pass to equalize the pressure upon its opposite sides. 4 is an exhaust valve controlling connection between port 5, which is open to the brake cylinder, and port 6 which is open to the atmosphere. 7 is an application valve controlling the port 8 between the auxiliary reservoir and the brake cylinder. These valves are operated by the piston 1 in the usual way; that is, when piston 1 is as shown, the brake cylinder is open to the at-

mosphere through valve 4 and its ports while valve 7 is closed. When piston 1 is at the other end of its stroke, valve 7 does not cover port 8 and the auxiliary reservoir is open to the brake cylinder, while valve 4 has closed port 5 and cut off the opening from the brake cylinder to the atmosphere.

9 is a large passage connecting the train pipe with chambers 10 and 12.

The valve 13 controls a vent 11 which leads to the open air when piston 14 has been moved to uncover passage 15. A spring 16 tends to hold valve 13 upon its seat.

17 is an arm of valve 13 which fulcrums upon the shoulder 18 when valve 13 is partly open.

19 is a pin passing through stem 20 of piston 2, which limits the motion of piston 2 in a right hand direction to the position shown in the drawings.

21 is the space between the two pistons.

22 is a charging groove. The auxiliary reservoir is divided into two chambers 23 and 24, between which are an always open passage 25 and a check valve 26 which will permit air to flow freely from chamber 24 to chamber 23.

Valve 27 and check valve 28 are located in a passage 29—30 joining chamber 24 and the brake cylinder. Check valve 28 permits air to flow from 30 to the brake cylinder, but prevents flow in the opposite direction.

31 is a spring that tends to keep valve 27 on its seat. Valve 27 is opened by the stem of piston 14.

When in service compressed air from the train pipe passes through passage 9, chamber 10, chamber 12, and charging groove 22 into the auxiliary reservoir, also from chamber 12 through passage 3 to 21, the space between the two pistons, and the pressure in all the above mentioned chambers and the auxiliary reservoir becomes equal.

The passage 3 is made of such a size that when the piston 1 is moved slowly to the left, the air in space 21 will be pressed through passage 3 without making sufficient pressure on piston 2 to overcome the resistance of the spring 16 and the air pressure tending to keep valve 13 on its seat. Therefore the piston 1 may move its whole stroke to the left slowly without opening the vent covered by valve 13. When piston 1 is moved quickly to the

left, the air confined in space 21 cannot flow through passage 3 fast enough, and it therefore forces piston 2 to the left with sufficient force to push valve 13 from its seat and vent the train pipe to the passage 11. As the passage 3 is always open the confined air in 21 will gradually pass through the passage from the pressure of the spring 16 on valve 13 and stem 20 until piston 2 has entered its cylinder far enough to allow valve 13 to close the vent. On the return of piston 1 to the position shown in the drawings, the pin 19 prevents the piston 2 from returning farther than the position shown, and air passes through passage 3 to fill space 21 to the same pressure as in chamber 12.

In the process of applying brakes in the ordinary automatic brake systems, the operator reduces the pressure in the train pipe slowly if he wishes a moderate application, and very quickly if he wishes a quick application. When in the normal condition the pressure in the auxiliary reservoir and in chamber 12 is the same as in the train pipe, to which chamber 12 is open, and consequently the pressure on both sides of piston 1 is equal. Upon a reduction of pressure in the train pipe the preponderance of pressure on the reservoir side of piston 1 moves it to the left. In the traverse of piston 1 it first closes charging groove 22; second, closes exhaust valve 4, and, third, opens port 8 between the auxiliary reservoir and the brake cylinder. If the reduction in the train pipe is slow, the air confined in space 21 will have time to flow through passage 3 and there will be no motion to piston 2. The action above described is called a service stop and occasions a moderate application of the brakes. If the pressure in the train pipe is quickly reduced, the preponderance of pressure on the reservoir side of piston 1 moves it quickly to the left carrying with it piston 2 (because the confined air in space 21 cannot flow through passage 3 fast enough) which opens valve 13 and vents the train pipe into passage 11. The fluid pressure in passage 11 moves piston 14 to the right and allows the vented air from the train pipe to pass to the atmosphere through valve 15. The movement of piston 14 to the right opens valve 27 and allows air to pass from chamber 24 of the auxiliary reservoir through passage 29—30 and check valve 28 to the brake cylinder. At the same time port 8 will be open and air will flow from chamber 23 of the auxiliary reservoir to the brake cylinder. As the passage 29—30 is many times larger than the passage 8 the pressure in chamber 24 of the auxiliary reservoir will equalize with that in the brake cylinder before much air has passed from chamber 23 through passage 8. Under normal conditions this equalization would be forty-five to fifty pounds pressure in the brake cylinder. The air flowing from chamber 23 through port 8 would gradually increase this pressure about ten pounds more. The check

valve 28 prevents this additional pressure from reaching chamber 24 through passage 29—30. As passage 25 is always open there will be a gradual reduction of pressure in the brake cylinder by this passage until the pressures in chambers 23—24 and the brake cylinder are equal. This is a desirable feature in a brake as it is important to get a high braking pressure instantly when the speed is great and to reduce that pressure as the speed slackens in order to prevent skidding the wheels. An increase of pressure in the train pipe forces piston 1 to the right, thus closing port 8 and opening the brake cylinder to the atmosphere through ports 5 and 6 and in valve 4.

It is obvious that this device would operate in the same manner if attached to an ordinary auxiliary reservoir without any division. In this case when by a quick reduction of train pipe pressure vent valve 13 was opened, the escaping air would move piston 14 to the right and open valve 27, thus opening a large passage from the auxiliary reservoir to the brake cylinder in addition to the small passage 8. The pressure in the brake cylinder would be raised to the full point of equalization almost instantaneously. The apparatus can therefore be attached to the auxiliary reservoirs now in service, although the extreme pressure obtained with a divided reservoir would not be reached.

The peculiar arrangement of pistons 1 and 2 and the inclosed chamber 21 I have already claimed in my application filed January 10, 1895, Serial No. 534,419.

What I claim as new, and desire to secure by Letters Patent, is—

1. In an automatic brake system normally operated by a triple valve, the combination with a vent valve between the train pipe and the atmosphere, of a piston located in the line of flow from the vent valve to the atmosphere, so as to be actuated by a quick discharge of fluid from the vent valve to cause opening movement to a valve controlling a passage from the auxiliary reservoir, or a portion thereof, to the brake cylinder, substantially as set forth.

2. In an automatic brake system normally operated by a triple valve, which controls a passage from the auxiliary reservoir to the brake cylinder, an auxiliary reservoir divided into two parts with an always open passage between them and a check valve opening in one direction combined with a valve controlling a separate passage from one portion of the auxiliary reservoir to the brake cylinder, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 12th day of February, 1895.

ALBERT P. MASSEY.

Witnesses:

M. J. MORKIN,  
R. C. AUGUR.