No. 869,543. PATENTED OCT. 29, 1907.

W. S. BILBREY.

AIR BRAKE.

APPLICATION FILED OCT. 12, 1906.

2 SHEETS—SHEET 1.

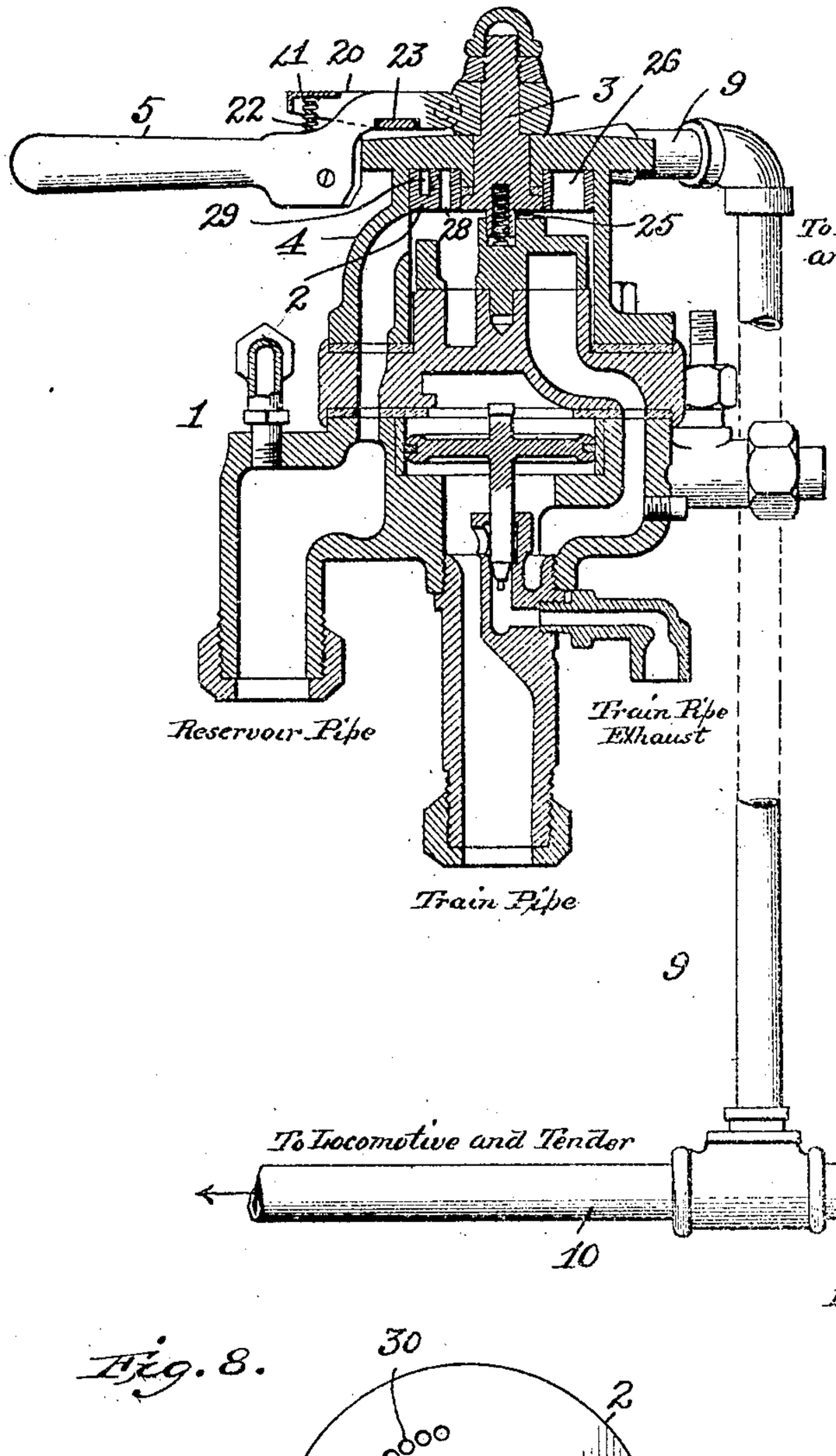

Fig. 1.

Fig. 8.

Witnesses

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2 SHEETS—SHEET 2.

Fig. 2.

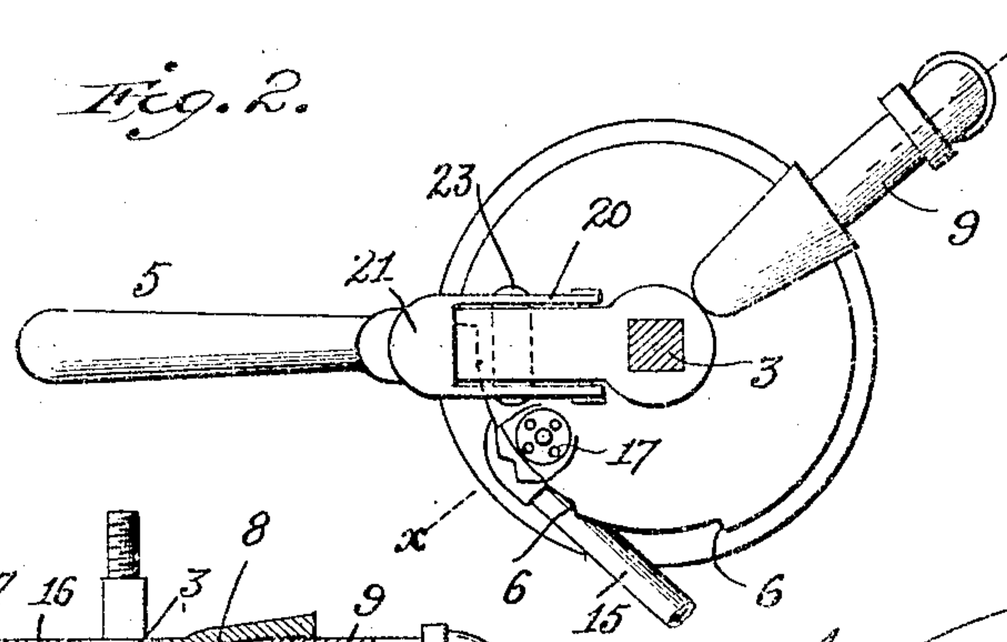


Fig. 3.

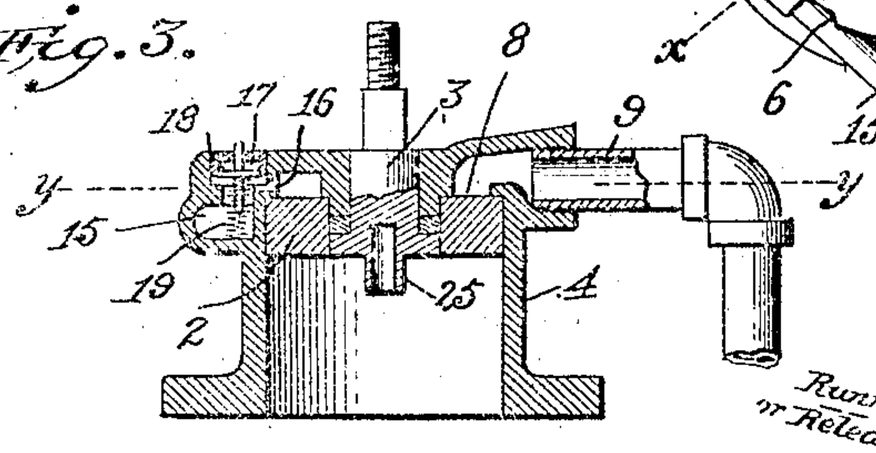


Fig. 4.

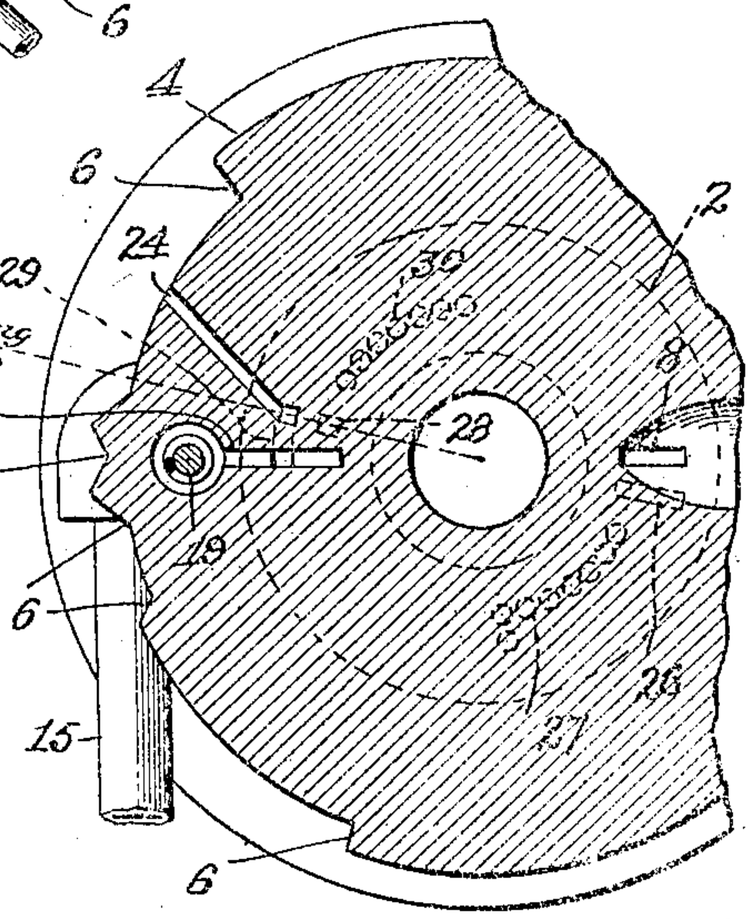


Fig. 5.

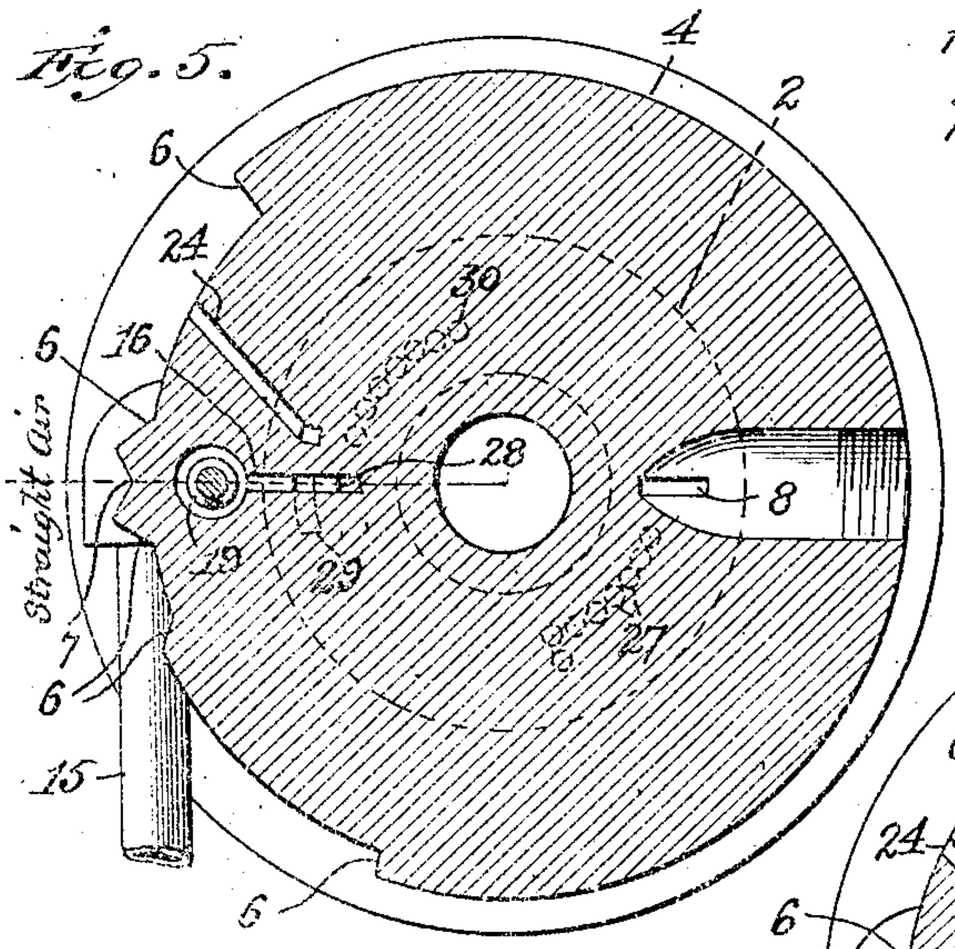


Fig. 6.

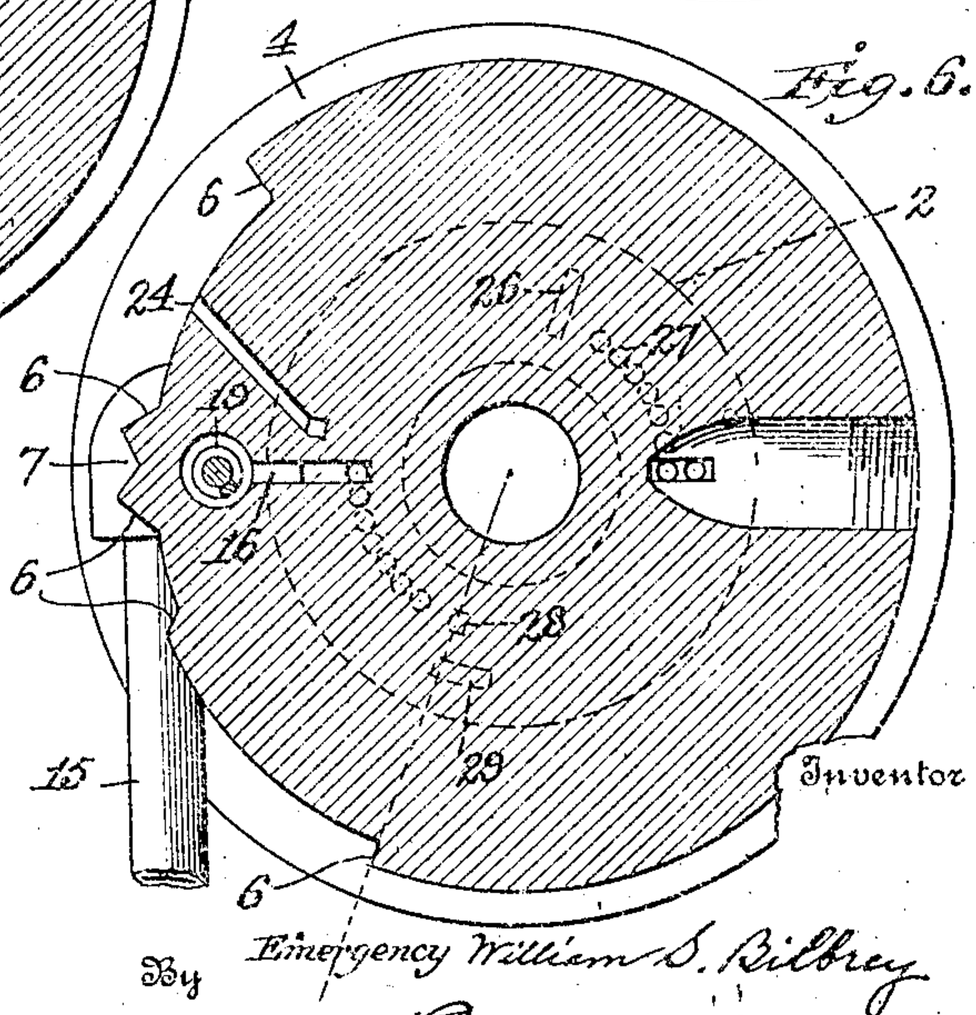
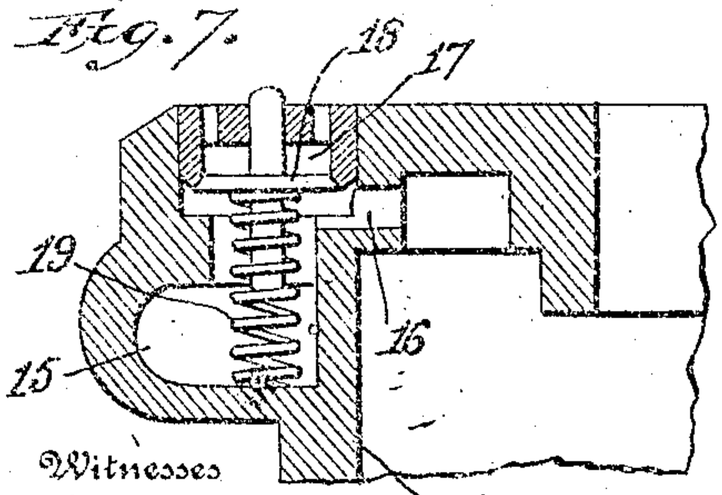


Fig. 7.



Witnesses
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AIR-BRAKE.

No. 869,543. Specification of Letters Patent. Patented Oct. 29, 1907.

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To all whom it may concern:

Be it known that I, WILLIAM S. BILBREY, a citizen of the United States of America, residing at West Point, in the county of Troup and State of Georgia, have invented certain new and useful Improvements in Air-Brakes, of which the following is such a full, clear, and exact description as will enable others skilled in the art to which it appertains to make and use the same.

The object of this invention is to provide simple and efficient mechanism whereby the locomotive and tender brakes may be operated independently of the car brakes and simultaneously therewith or without operating the car brakes.

The invention consists in certain novel features which are illustrated in the accompanying drawings and will be hereinafter first fully described and then particularly pointed out in the claims.

In the drawings, Figure 1 is a vertical section taken through the ordinary Westinghouse engineer's valve and showing the same fitted with my improvements; Fig. 2 is a plan view of the same partly broken away; Fig. 3 is a vertical section taken on the line *x*—*x* of Fig. 2; Fig. 4 is a horizontal section through a portion of the cap taken on the line *y*—*y* of Fig. 3 and showing the parts in the running position; Fig. 5 is a view similar to Fig. 4 showing the parts in the straight-air position; Fig. 6 is a similar view showing the parts in the emergency position; Fig. 7 is an enlarged view of the valve shown in Fig. 3, and Fig. 8 is a detail plan view of the rotary valve.

The engineer's valve, 1, is of the usual construction but is coupled to the train-pipe only, the usual connections between said valve and the locomotive brakes and the coupling between the train-pipe and the brakes on the tender being omitted when my invention is applied.

In carrying out my invention, I employ a rotary valve, 2, which is mounted on the usual stem or key, 3, and fits in the cap or upper end of the valve casing or body, 4, above the usual rotary of the engineer's valve. The operating handle, 5, is secured on the stem in the usual manner and the body is formed with the usual shoulders or stops, 6, to mark the different positions of the handle. I also provide an additional stop, 7, between the running and lap positions which I call the "straight-air" position. Directly opposite this stop or notch 7, the cap or body is provided with a port, 8, leading into a pipe, 9, which extends down to a pipe, 10, running to the brake cylinders on the locomotive and on the tender. This pipe 10 has one end in communication with an equalizing cylinder, 11, in which is mounted a piston, 12, carrying a valve, 13, which normally closes the port, 14, in said cylinder leading to the atmosphere. From the upper end of the equalizing cylinder, a pipe, 15, extends up to the cap at a point diametrically opposite the end of the pipe 9 where it communicates with the interior of the cap above the valve 2 through a port, 16, shown most clearly in Fig. 7. A direct communication with the atmosphere from the pipe 15 is provided through the top of the cap, as shown at 17, said communication being controlled by a valve, 18, which is normally pressed against its seat to close the passage 17 by a spring, 19, and has its stem projecting slightly above the top of the cap in position to be actuated by a lever or presser plate, 20, which is pivotally mounted on the handle. This lever is a branched or U-shaped arm fitting over the handle and having a thumb-plate, 21, at its outer end which is normally held raised by a spring, 22, seated between the same and the upper side of the handle. The lower edges of the arm 20 are connected by a pressure plate, 23, which is adapted to depress the valve 18 in the operation of my invention and also serves to prevent the spring 22 throwing the arm or lever too high for successful use. An additional port, 24, is provided in the cap near the port 16 and leads directly through the side of the same to the atmosphere.

The valve 2 is fitted on the stem or rotary key above the ordinary rotary, as before stated, and is secured thereto so as to rotate therewith by the upper portion of the usual wings, 25, thereon, the valve being provided with a transverse groove in its lower face to engage said wings, as will be readily understood. The valve is constructed with a port, 26, which is arranged to establish communication between the reservoir pressure in the engineer's valve body and the pipe 9 leading to the brake cylinders on the locomotive and tender, and adjacent to said port and extending around the valve a distance equal to the distance between the straight-air and emergency positions of the same are a line of smaller ports, 27, which also maintain the same communication between the brake cylinders and the reservoir pressure. It will be noted that I have shown a series of small ports instead of one continuous port but the one continuous port may be employed if preferred. At the end of this series of small ports, I provide an additional port or the end port may be made in the form of a radial slot, the same as the port 26, in order that in the emergency position a full pressure may be admitted to the port 8 and the pipe 9. Diametrically opposite the port 26, the valve is provided with a port, 28, which serves to establish communication between the reservoir pressure and the port 16 while in its upper side radially beyond but adjacent to the said port 28, the valve is provided with a recess or blind port, 29, which serves to establish communication between the port 16 and

the port 24, the ports 26, 28 and 29 all being on the same radial line with the operating handle 5. The valve is also provided with a series of small ports or a continuous port, 30, which extend partly around the same from near the port 28 so as to preserve the communication between the reservoir pressure and the port 16 and thereby maintain the pressure on the upper side of the equalizing piston 12.

The preferred construction and arrangement of the parts being thus made known, the operation and advantages of the same will be readily understood. Assuming that all brakes are applied, when the handle 5 is moved back to the release position the automatic valve operates to release the train brakes, after which the handle is moved forward to the running position thus releasing the straight-air or engine and tender brakes. All brakes will then be off and the train will be ready for running. When the handle is thrown around to the service position to apply the brakes, the air is permitted to pass through the ports 27 and the port 8 to the pipe 9 and also through the ports 30 and the port 16 to the pipe 15. The piston 12 is free to seat the valve 13 and thus close the discharge port 14 so that the air in the pipe 9 is forced to pass through the pipe 10 and apply the brakes. The handle is then moved back to the lap position, as usual, in which position the solid portion of the valve between the port 26 and the end of the slot or small ports 27 and between the port 28 and the end of the ports 30 will be brought over the ports 8 and 16 respectively so as to cut off the flow into the pipes 9 and 15, these solid portions of the valve being just large enough to provide for the lap position. Should the handle be moved to any point beyond the service position, the circulation of air just described will occur and in the emergency position the larger capacity at the end of the ports 27 will permit a full flow of air through the pipes 9 and 10 to quickly apply the brakes. When the handle is brought into the running position, the flow of air to the pipes 9 and 15 is cut off but the blind port will connect the ports 16 and 24 and thereby permit the air in the pipe 15 to escape to the atmosphere. The pressure above the equalizing piston 12 being thus reduced, the pressure of the air in the pipe 10 will raise the said piston so as to unseat the valve 13 and consequently permit the air to escape through the discharge port 14 to the atmosphere and release the brakes on the locomotive and tender.

The brakes on the cars will be released through the engineer's valve which works in the usual manner during all the operations herein described. Should the locomotive slide, the engineer after returning the handle to the lap position depresses the arm 20 so as to strike the stem of and unseat the valve 18 when the air in the pipe 15 will escape through the passage 17, releasing the locomotive and tender brakes through the action of the piston 12 as before described but leaving the car brakes applied. Should it be desired, for any reason, to release the brakes on the cars without releasing the tender and engine brakes, the handle is moved quickly to the full release position when the car brakes will be released through the usual action of the rotary but the ports 28 and 29 will be carried backward so quickly that no appreciable amount of air will escape from the pipe 15, and, therefore, the locomotive and tender brakes will remain applied, it being understood that the blind port 29 is so positioned and of such extent as to establish the communication between the ports 16 and 24 only when the handle is in the running position. If the handle be then moved from the release position to the running position, the locomotive and tender brakes will be released by the escape of the pressure through the ports 16 and 24, as above described.

Should the engine be running alone, the brakes are applied by moving the handle to the "straight-air" position thus bringing the port 26 into registry with the port 8 and the port 28 into registry with the port 16 and establishing the flow through the pipes 9 and 15 to apply the brakes as before described. Should it be desired to slightly bunch the cars before braking them, the handle is moved slowly past the straight-air position, thus causing an application of the engine and tender brakes without affecting the car brakes so that when the service position is reached the cars will be bunched just enough to compensate for the usual slack and attain a simultaneous and uniform braking of all the cars.

It will be understood, of course, that when the engine brakes are set by placing the handle in the straight-air position the car-brakes are unapplied because the feed-valve remains partly open and admits air to the train-pipe until the handle reaches the service position. It will likewise be understood that to apply the engine and car brakes simultaneously, the handle is carried quickly past the straight-air position to the service position so that the straight-air ports will not be given time to affect the engine brakes through their greater capacity.

My device is very simple in its construction and efficient in its operation. It does not interfere with the usual operation of the regular engineer's valve nor necessitate any change in the construction or arrangement of the parts of the same. By its use loss of air is avoided as there are no auxiliary reservoirs or triple valves on the locomotive or tender to be exhausted or operated. The piping on the locomotive is reduced and the triple valves and auxiliary reservoirs thereon are dispensed with so that the cost of equipment of the engine is minimized. The brakes on the engine and tender are more quickly applied and released than with the apparatus now employed.

From the foregoing description it will be seen that my invention enables the engineer, through the manipulation of a single handle or lever, to apply all brakes simultaneously; to set the engine brakes separately, leaving the train brakes unapplied; to release the engine, leaving the train brakes applied; and to release the train brakes, leaving the engine brakes applied.

Having thus described my invention, what I claim and desire to secure by Letters-Patent is:—

1. In an air brake, the combination with the engineer's valve, of an independent valve mounted on the key thereof and controlling the engine and tender brakes.

2. The combination of the engineer's valve, an independent valve mounted above the same and operable therewith, a pipe leading from one side of the valve casing to the engine brakes, an equalizing cylinder in communication with said pipe, and a pipe leading from the opposite side of the valve casing to said cylinder, the flow through said pipes being controlled by said independent valve.

3. The combination of an engineer's valve, pipes leading from the opposide sides of the body of the same to

control the engine brakes, and an independent valve mounted in the body and arranged to establish direct communication with said pipes and the reservoir pressure.

4. The combination with the body having diametrically opposite applying and releasing ports, of a rotary valve mounted therein and having diametrically opposite ports arranged to establish communication between the reservoir pressure and the said applying and releasing ports in one position of the valve and provided with continuous series of ports extending partly around the valve in opposite directions to maintain such communication during movement of the valve.

5. The combination of the valve body having a release port and a discharge port leading to the atmosphere, a rotary valve mounted therein having a series of ports adapted to register with the release port and a blind port adapted to form a communication between the said release and discharge ports.

6. The combination of the valve body having a release port and a discharge port leading to the atmosphere, a valve mounted therein having a series of ports adapted to register with the release port and a blind port adapted to form a communication between the said release and discharge ports.

7. The combination of the valve body having a release port, a valve mounted in said release port, a rotary handle mounted above the body, and a presser plate carried by the handle and adapted to actuate said valve to open the port.

8. The combination of the valve body having a release port and a discharge port, a valve mounted in the body and arranged to close and open the release port and establish communication between the release and discharge ports, the release port having a branch passage leading to the atmosphere, a valve in said branch passage normally closing the same, an operating handle for manipulating the first-mentioned valve, and a presser plate carried by said handle and adapted to operate the valve in the branch passage to open the same.

9. In an air brake, the combination of the body having diametrically opposite applying and releasing ports, and a valve mounted therein and provided with diametrically opposite ports adapted to register with said ports in the body when at a point between the running and lap positions, said valve being further provided with solid portions to block said ports when in the lap position and with further ports adapted to open the said applying and releasing ports at points beyond the lap position.

10. In an air brake, the combination with the engineer's valve, of an independent valve mounted to operate with the engineer's valve and adapted to establish direct communication between the reservoir pressure and the engine brakes.

11. In an air brake, the combination with the engineer's valve, of an independent valve mounted to operate with the engineer's valve and controlling the engine brakes.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

WILLIAM S. BILBREY.

Witneses:

R. W. BISHOP,

CHARLES LOWELL HOWARD.