A. J. WISNER.

AIR BRAKE SYSTEM.

APPLICATION FILED AUG. 9, 1907.

955,625.

Patented Apr. 19, 1910.

2 SHEETS—SHEET 1.

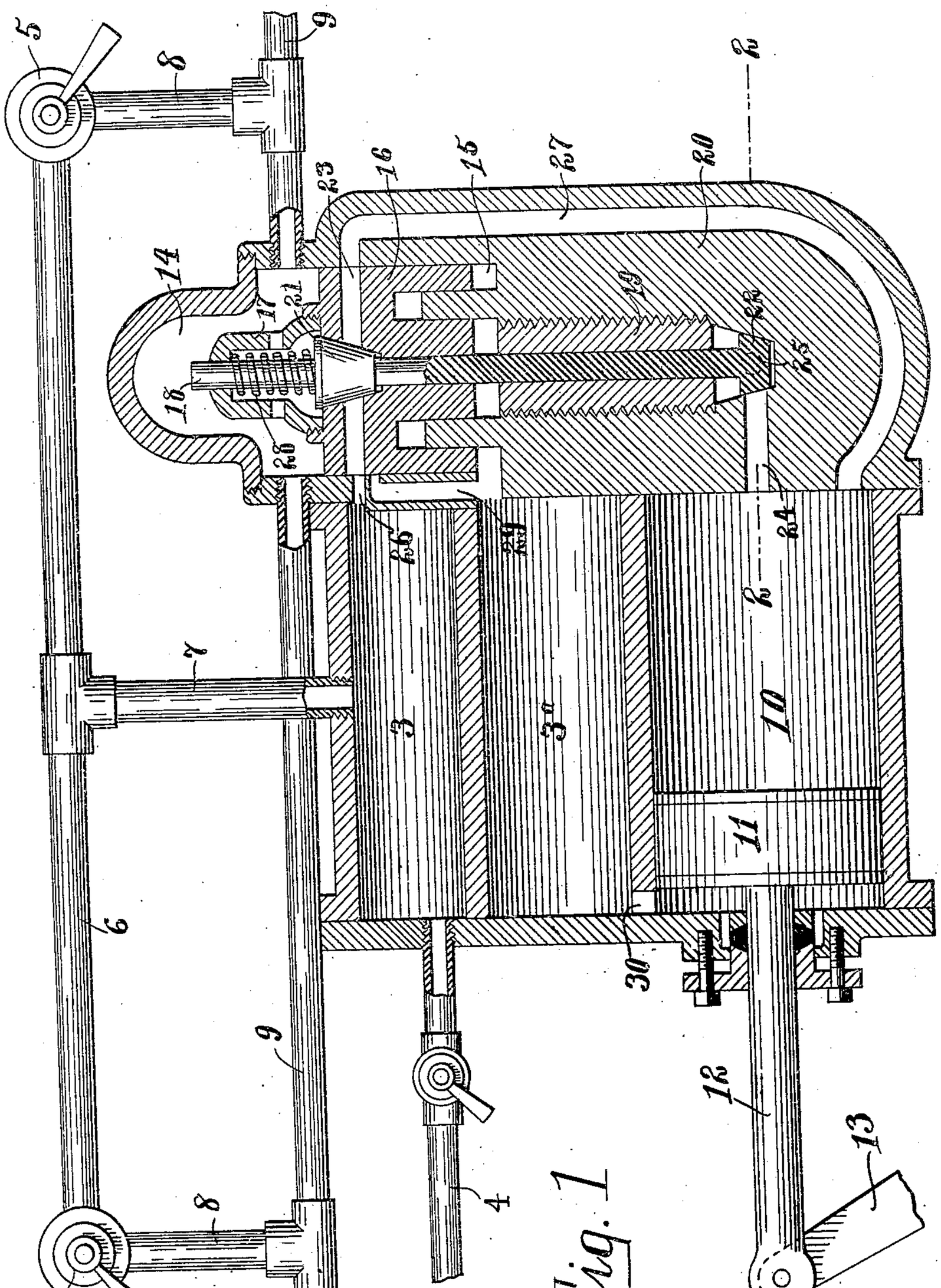

Fig. 1

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2 SHEETS—SHEET 2.

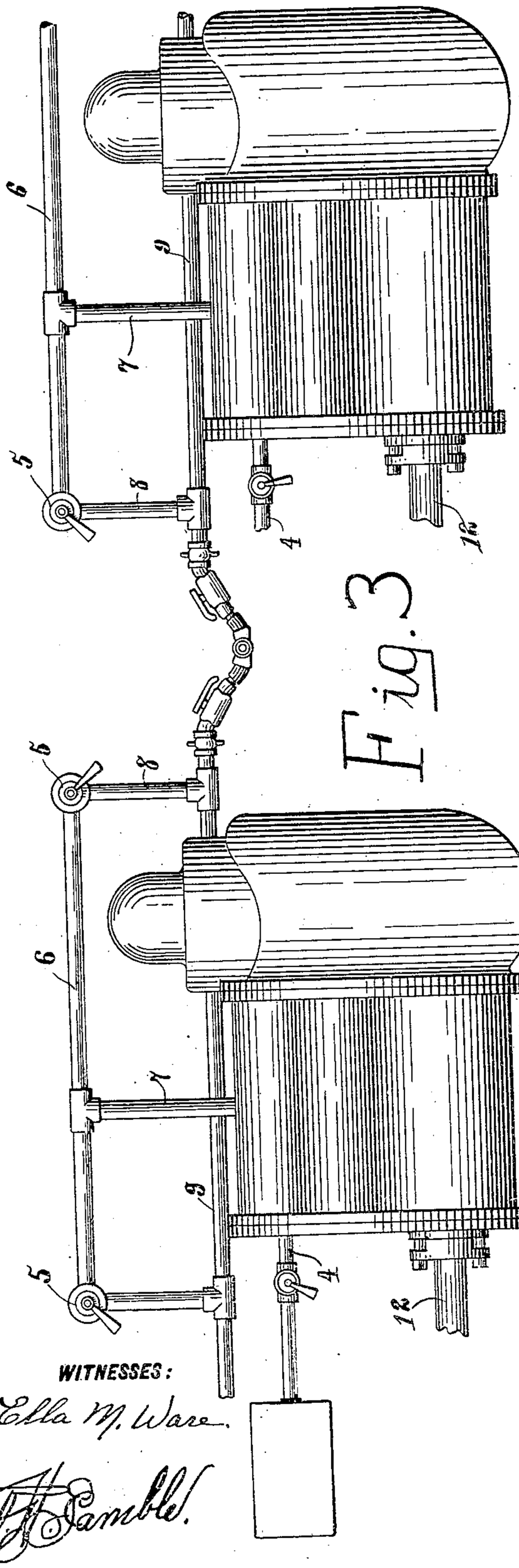

Fig. 3.

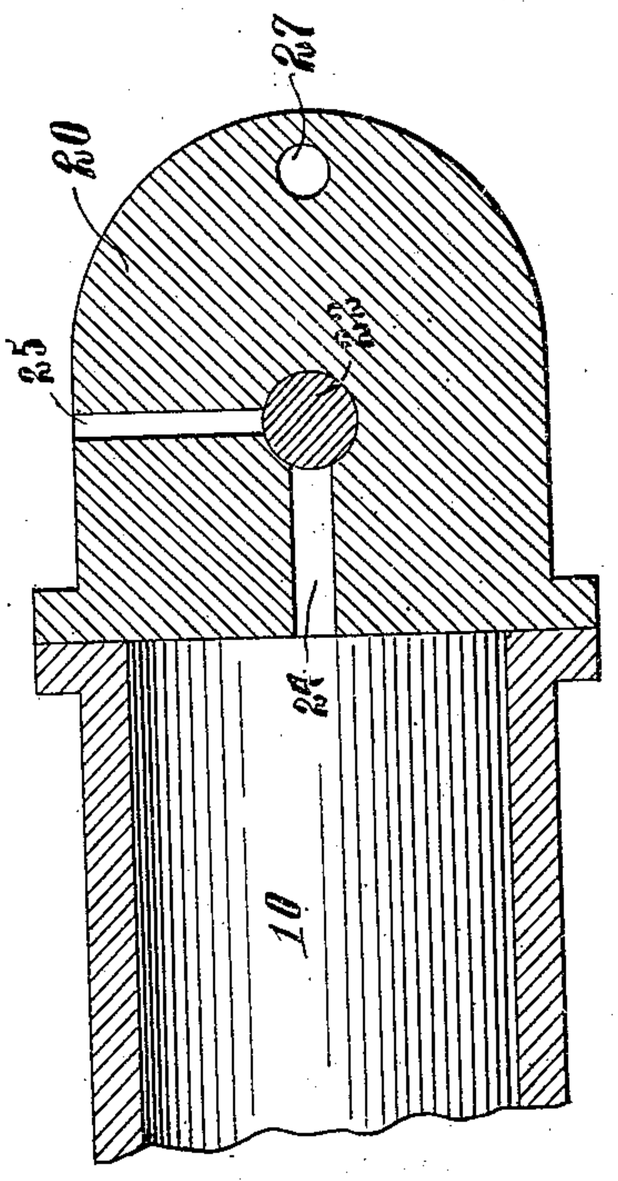

Fig. 2.

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UNITED STATES PATENT OFFICE.

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AIR-BRAKE SYSTEM.

955,625. Specification of Letters Patent. Patented Apr. 19, 1910.

Application filed August 9, 1907. Serial No. 387,761.

To all whom it may concern:

Be it known that I, ANDREW J. WISNER, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Air-Brake Systems, of which the following is a specification.

My invention relates to air-brake systems, and especially to that class wherein each car of a train of cars is supplied with a complete system whereby it may be operated independently of the other cars, the complete system of each car being adapted to be coupled with the systems of a number of cars to work in conjunction therewith, and to be controlled from one point.

Heretofore, in air brake systems of the class to which my invention relates, it has been necessary to provide several different connections between adjacent cars when two or more cars were coupled together, in order that the air-brake system of each car might work in conjunction with the others.

The object of my present invention is to provide a simple and efficient air-brake system of this class, and to dispense with all connections between the cars of a train with the exception of a single air or hose connection between each two adjacent cars.

The invention consists in the novel construction and combination of parts hereinafter fully described and claimed.

Figure 1 is a longitudinal sectional view of an air brake of a single car, embodying my invention. Fig. 2 is a sectional detail thereof as on the line 2—2, of Fig. 1. Fig. 3 is a side elevation of the air brake as coupled together when applied to two adjacent cars.

3 is the main air reservoir, 3^a the auxiliary reservoir, and 4 a pipe leading to the main reservoir 3 from the usual well known pump, (pump not shown in the drawings), by means of which air is automatically supplied to the reservoir 3, as is common and well known.

Located at each end of the car is a controlling valve 5, the valves 5, 5 being connected by a pipe 6 which is in turn connected to the main reservoir 3 by a pipe 7. The valves 5, 5 are also connected by pipes 8, 8, to the main or train pipe 9. The valves 5, 5 are of common and well known construction, whereby communication may be established between the pipe 8 and the open air, or between the pipes 6 and 8 which establishes communication between the main reservoir 3 and the train pipe 9, or the valves 5, 5, may be closed to the open air, the pipe 6, and the pipe 8.

10 designates the brake cylinder, and 11 the piston therein provided with the rod 12 which extends through the rearward head of the cylinder 10 and is connected to the usual brake lever 13. The area of the rearward face of the piston 11 is somewhat less than the forward face thereof, owing to the piston rod 12. Thus it will be seen that if the pressure on both sides of the piston be equal, the excess of force against the forward face of the piston will move the latter to the rearward end of the brake cylinder. After this operation takes place the brakes are released. When, however, the pressure in the forward end of the brake cylinder is reduced below that in the rearward end thereof, greater pressure will drive the piston toward the forward end of the brake cylinder. This latter operation effects the application of the brakes.

The auxiliary reservoir, 3^a, and the brake cylinder 10 are each operatively connected to each other and to the train pipe by a series of air passages and valves by means of which the maximum air pressure may be simultaneously introduced to the forward end of the brake cylinder and the auxiliary air reservoir when the air pressure in the train pipe is increased; thereby not only effecting the release of the brakes, but at the same time charging the auxiliary reservoir with the maximum pressure and by means of which the air pressure in the forward end of the brake cylinder may be discharged into the open air when the pressure in the train pipe is decreased, thereby permitting the air in the auxiliary reservoir to enter the rearward end of the brake cylinder and effect the application of the brakes. Thus it will be seen that the brakes may be applied or released by increasing or decreasing the air pressure in the train pipe, as described.

The casting forming the forward head 20 of the main reservoir 3, auxiliary reservoir 3^a, and the brake cylinder 10, is provided with a chamber which is divided into two compartments 14 and 15 by a piston 16. The upper compartment 14 is in communication with the train pipe 9 and the lower

compartment 15 is in communication with the auxiliary reservoir 3a.

The rearward end of the brake cylinder 10 communicates with the auxiliary reservoir 3a by a port 30. Rising from the piston 16 is a laterally perforated sleeve 17, to the upper end of which and the piston is slidingly fitted a vertically movable valve stem 18. This valve stem extends down through a plug 19, screwed into the head 20 and the stem is provided with two valves 21 and 22; one 21 of which is seated in the piston 16 and controls a passageway 23, and the other, 22, of which controls two passageways 24 and 25, leading from the forward end of the brake cylinder 10 to the open air. The passageway 23 is adapted to register with a passageway 26 leading to the main reservoir 3 and also with a passageway 27 leading to the forward end of the brake cylinder, whereby, when the valve 21 is unseated, communication between the main reservoir 3 and the forward end of the brake cylinder 10 is established.

Within the sleeve 17 and encircling the upper portion of the valve stem 18, is a spring 28 which, bearing against the upper portion of the sleeve 17 and the top of the valve 21, supports the piston 16 and seats the valve 21 when the pressure within the compartment 15 is not sufficient to overcome the action of the spring 28 and the pressure against the bottom of the piston. The valve, 22, resting in its seat, supports the stem 18.

Leading from the auxiliary reservoir 3a and the compartment 15 is a passageway 29 which terminates against the face of the piston 16 directly below the passageway 26; whereby, when the piston 16 is depressed against the action of the spring 28, the passageway 23 will be opened by the valve 21 and brought into register with the two passageways 26 and 29, at the same time registering with the passageway 27, thus establishing communication between the main reservoir 3, the auxiliary reservoir 3a, and the forward end of the brake cylinder 10.

Each end of the train pipe 9 is provided with the usual hose coupling and valves whereby the ends of the pipe may be closed when but one car is being used, and whereby either or both ends of the car may be coupled with one or two adjacent cars when the car is used in a train. These hose couplings and valves being common and well known, I have not deemed it necessary to illustrate or describe the same herein.

When the parts occupy the position shown in the drawings, the brakes are released.

Assuming that the ends of the train pipe are closed, the operation is as follows:—One of the valves 5 is adjusted to close communication between the pipes 6 and 8, and the other valve is manipulated to operate the brakes. When it is desired to apply the brakes, the valve 5 is operated to discharge air from the train pipe 9 and thus effect a reduction of pressure in the latter. When the pressure in the train pipe is reduced below that of the auxiliary reservoir 3a, the pressure in the latter will raise the piston 16, and therewith the stem 18, and unseat the valve 22, thereby opening communication between the forward end of the brake cylinder 10 and the open air, through the passageways 24 and 25. The air pressure in the forward end of the brake cylinder being thus permitted to pass to the open air, the pressure in the auxiliary reservoir 3a passes through the port 30 to the rearward end of the brake cylinder 10 and moves the piston 11 forward to effect the application of the brakes. The instant the pressure in the auxiliary reservoir is reduced to train pressure, due to the forward movement of the piston and the escape of air from the forward end of the brake cylinder, the piston 16 and valve 22 drop by gravity, thereby closing the passageways 24 and 25 and preventing the further discharge of air from the forward end of the brake cylinder and consequently the further movement of the piston 11. Thus it will be seen that the greater the reduction of train pipe pressure, the more severe will be the application of the brakes. When it is desired to release the brakes, the valve 5 is manipulated to establish communication between the main reservoir 3, the train pipe 9 and the upper compartment 14. The air pressure entering the upper compartment 14 and being in excess of the pressure in the auxiliary reservoir, acts upon the piston 16 in a manner to depress the same against the action of the spring 28, and thus open the passageway 23 and bring the same into register with the passageways 26, 27 and 29. In this position the piston the main reservoir 3, the auxiliary reservoir 3a, and both ends of the brake cylinder 10 are in communication with each other. The pressure now being the same on both sides of the piston 11, the latter, due to the greater area of its forward face, is moved rearwardly, to release the brakes. When the maximum pressure has passed below the piston 16 the spring 28 raises the latter into engagement with the valve 21, thereby moving the passageway 23 out of register with the passageway 29, and leaving the auxiliary reservoir 3a and brake cylinder 10 charged with the maximum pressure. Thus it will be seen that before the brakes can be released, the auxiliary reservoir will be recharged.

When the car is used in conjunction with others in a train, the train pipes in each car are in communication with each other, as previously explained, and the valves 5 of each car are closed with the exception of one valve for one car which valve controls the brakes for the entire train. When a

train is being controlled by this single valve, the valve may be manipulated to establish communication between the entire train pipe and the open air, in which case the air will be discharged from the upper compartment 14 of each car to effect the application of the brakes; and this valve may also be manipulated to establish communication between the main reservoir of its car and the train pipe, to effect a depression of the piston 16 of each car and the consequent release of the brakes of the entire train, and a recharging of the auxiliary reservoir of each car by its own main reservoir, and the air pump acting in conjunction therewith.

I claim—

1. In an air brake system, the combination of the brake cylinder, its piston, and auxiliary air reservoir having communication with one end of said cylinder, a main air reservoir, means for discharging air from the reverse end of the brake cylinder to effect the application of the brakes, and means for simultaneously establishing communication between the main air reservoir, the auxiliary air reservoir and said reverse end of the brake cylinder to effect the release of the brakes.

2. In an air brake system, the combination of the brake cylinder, its piston, and auxiliary air reservoir having communication with one end of said cylinder, a main air reservoir, means for discharging air from the reverse end of the brake cylinder to effect the application of the brakes, a passageway leading from the main air reservoir, a passageway leading from the auxiliary air reservoir, a passageway leading from said reverse end of the brake cylinder, a valve piston having an opening therein to register with said passageways, and means for moving said valve piston to bring its opening into and out of register with said passageways.

3. In an air brake system, the combination of the brake cylinder, its piston, and auxiliary air reservoir having communication with one end of said cylinder, a main air reservoir, means for discharging air from the reverse end of the brake cylinder to effect the application of the brakes, a passageway leading from the main air reservoir, a passageway leading from the auxiliary air reservoir, a passageway leading from the reverse end of the brake cylinder, a valve piston having an opening therein to register with said passageways, means for introducing air pressure from the auxiliary reservoir against one end of the valve piston to move its opening out of register with said passageways, and means for introducing air pressure from the main reservoir against the other end of said valve piston to move its opening into register with said passageways.

4. In an air brake system, the combination of the brake cylinder, its piston, and auxiliary air reservoir having communication with one end of said cylinder, a main air reservoir, a train pipe, a passageway leading from the main air reservoir, a passageway leading from the auxiliary air reservoir, a passageway leading from the reverse end of the brake cylinder, a valve piston having an opening therein to register with said passageways, one end of said valve piston receiving pressure from the auxiliary reservoir, and the other end of said piston receiving pressure from the train pipe, a valve to establish communication between the reverse end of the brake cylinder and the open air, said valve being operatively connected to the valve piston, means for discharging air from the train pipe to permit the pressure of the auxiliary reservoir to raise the valve piston and open said valve, and means for introducing air pressure from the main reservoir to the train pipe to depress the valve piston to close said valve and bring the opening in the valve piston into register with said passageways.

In testimony whereof I affix my signature in presence of two witnesses.

ANDREW J. WISNER.

Witnesses:
A. V. GROUPE,
RALPH H. GAMBLE.