(No Model.) 2 Sheets—Sheet 1.

E. G. SHORTT.

AIR BRAKE MECHANISM.

No. 538,544. Patented Apr. 30, 1895.

Fig. 1

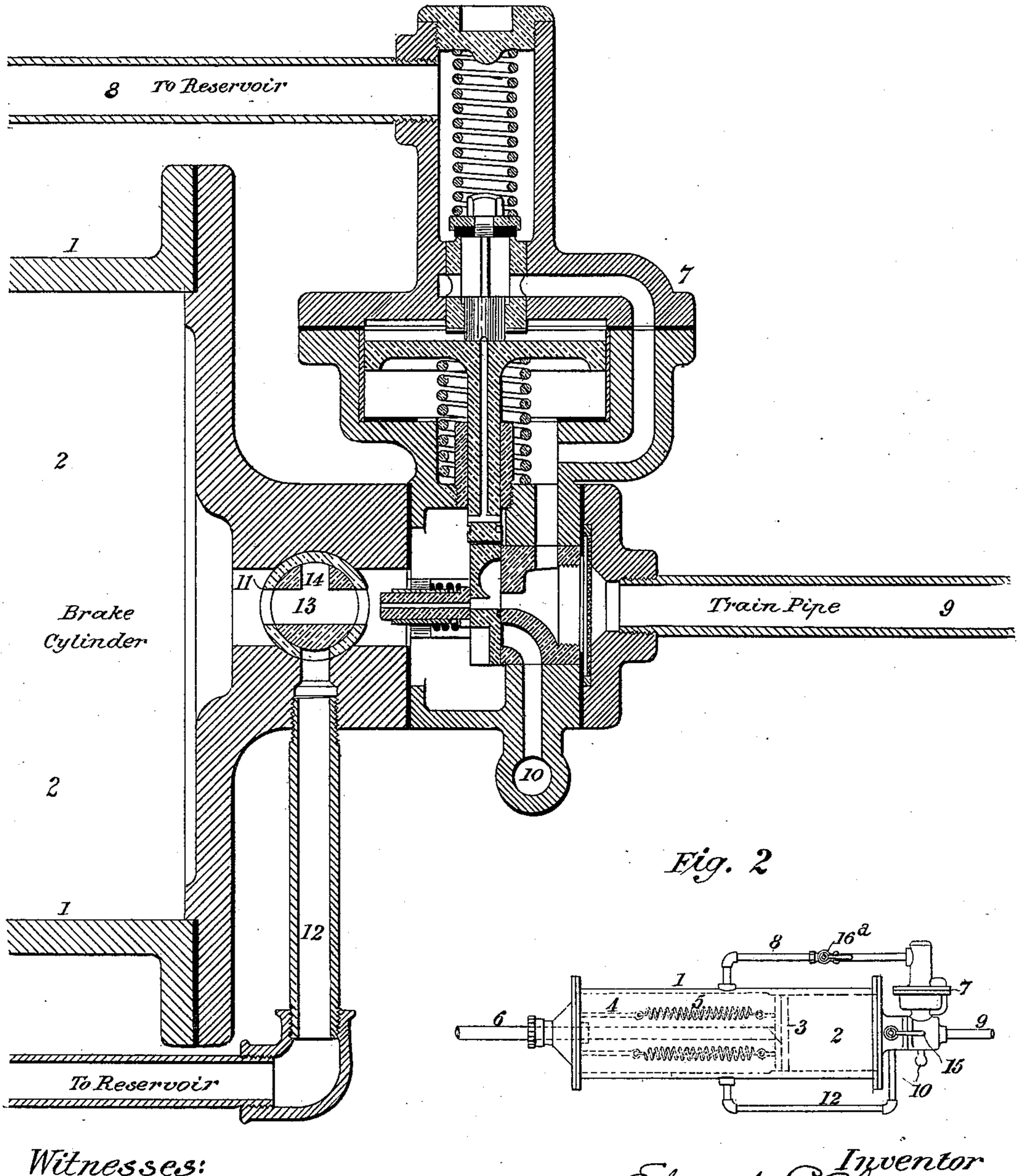

Fig. 2

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(No Model.) 2 Sheets—Sheet 2.

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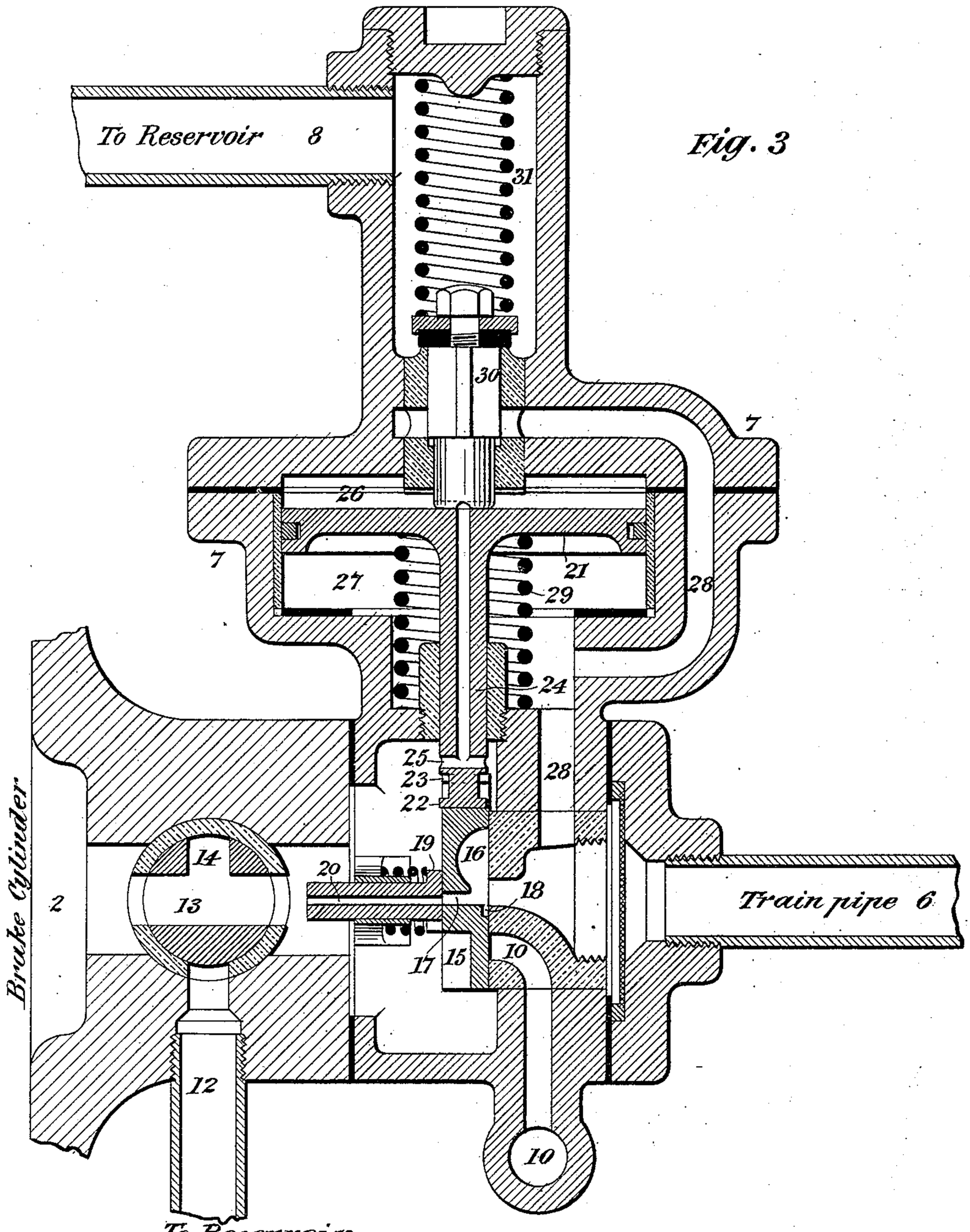

Fig. 3

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UNITED STATES PATENT OFFICE.

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AIR-BRAKE MECHANISM.

SPECIFICATION forming part of Letters Patent No. 538,544, dated April 30, 1895.

Application filed June 17, 1893. Serial No. 478,016. (No model.)

To all whom it may concern:

Be it known that I, EDWARD G. SHORTT, a citizen of the United States, residing at Carthage, county of Jefferson, and State of New York, have invented a certain new and useful Improvement in Air-Brake Mechanism, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

This invention relates to automatic air-brake mechanism by which the brakes are applied by opening the train pipe to local exhaust at points adjacent the brake cylinders.

I have illustrated the invention as embodied in an equilibrio brake mechanism, but it is to be understood that the same is applicable to any brake mechanism in which the train pipe is locally exhausted.

It has been found that, in a brake system, wherein local exhausts from the train pipe to the atmosphere take place to effect an application of the brakes, if a brake cylinder and the valve mechanism which locally exhausts the train pipe be cut from the train pipe, and such local exhaust be sealed by such disconnection, then the flow of the air from the train pipe for effecting the operation of the other, and particularly of the following brake cylinder valves, will be slightly retarded. In other words, to get the most rapid and efficient application action of the brake cylinder valves, it is desirable that the train-pipe be fully open to the atmosphere and that there be as little travel of air throughout the same as possible. Obviously then, if a long section of train pipe be closed as to local exhaust (even by cutting out one brake cylinder) and the air or air wave has to travel throughout the same, then the time of such travel will be slower than if there were a local exhaust or exhausts along such section. I design, therefore, to so disconnect a brake cylinder when desirable or necessary, that its valve mechanism or the valve mechanism operating the train pipe local exhaust shall be left operative and capable of acting to open and close such exhaust as though the brake piston were to be worked; also, I design to make such disconnection by means and in manner permitting the utilization of the local reservoir to assist in recharging the train pipe.

In the drawings, Figure 1 is an enlarged sectional view of one end of a brake-cylinder and the valve mechanism for operating the same. Fig. 2 is an elevational view of the same. Fig. 3 is an enlarged sectional view of the said valve mechanism.

The brake cylinder piston or movable partition and the connections attaching it to the brake mechanism are in general construction substantially the same as those described in my United States Patent No. 473,789—that is to say, the brake piston is one operating on the equilibrio principle, one end of the cylinder serving as a reservoir containing compressed air, which operates to move the piston so as to apply the brakes upon the withdrawal from the other end of the cylinder of the air contained therein and normally balancing the reservoir pressure.

Referring to the views of drawings in detail, 1 represents the brake cylinder, 2 being the working end thereof, or the end in which the brake piston 3 plays back and forth, and 4 is the reservoir end of the cylinder. For the purposes of this invention, the reservoir end of the cylinder may be considered as though separate from the working end of the cylinder.

5 represents springs tending to hold the brake piston in normal position, or with brakes off, as shown in Fig. 2.

6 is the piston rod, which is to be properly connected to the brake shoe mechanism.

7 is the valve mechanism controlling the admission of air to and from the working end of the cylinder and to and from, through pipe 8, the reservoir or reservoir end of the cylinder.

9 is the train pipe and 10 is the local exhaust port through which air is exhausted from both the brake cylinder and train pipe to effect the application of brakes.

11 is a valve or stop cock located between the brake cylinder and the valve mechanism 7, and 12 is a pipe extending from said valve or cock to the reservoir or reservoir end of the brake cylinder. This valve or stop cock is provided with the diametrical passage 13 and the lateral passage 14, so arranged that

when the handle 15, of the valve or cock is turned as shown in Fig. 2, the pipe 12 is cut off and the passage between the brake cylinder and the valve mechanism 7 is open; and when the handle be turned to right-angles from its present position the valve or cock will close the passage from the brake cylinder to the valve mechanism and open the brake cylinder to the reservoir.

Referring especially to Fig. 3, 15 is the exhaust valve which controls the local exhaust port 10, which valve is provided with the large train pipe exhaust passage 16, the smaller cylinder exhaust passage 17, and the graduation exhaust passage 18. 19 is a centrally perforated feed valve, which is spring-seated against the exhaust valve and is held against movement therewith, its central passage 20 coinciding with the cylinder passage 17 for the purposes of feeding to and recharging the cylinder when the parts are in the running position illustrated. 21 is the exhaust valve actuating piston, being attached thereto through the medium of its piston rod head 22 and the clamp 23 on the valve. This rod, 24, is centrally perforated by passage 25 which is in open communication with the brake cylinder space and the upper part 26 of the valve piston chamber, the lower part 27 of which chamber is in similar communication through passage 28 with the train pipe. Spring 29 serves to normally hold the piston and valve in the closed or running position shown, or against the stem of the storage or reservoir valve 30, which valve is normally held seated by a spring 31 and serves to control the reservoir passage 9 and its communication with the train pipe through passage 28.

Upon a proper reduction of train pipe pressure, the cylinder pressure will depress the valve piston so that the graduation passage in the exhaust valve will open to the exhaust port, whereupon the cylinder air and the train pipe air will escape and effect a graduation application of the brakes, and upon the cylinder pressure being lowered to a point below that of the train pipe pressure and that of the spring of the piston, the valve will be returned to close the exhaust port. A greater train pipe reduction of pressure will cause the valve piston to descend to the bottom of its chamber, and the exhaust valve to move to position where the train pipe will be opened to the exhaust port through the larger exhaust passage in the valve, and thereby a full or emergency exhaust of the train pipe and cylinder will be effected and a corresponding application of the brakes. Upon restoring train pipe pressure, the valve piston will be moved to open the reservoir valve, thereby causing the reservoir air to flow into the train pipe and cylinder spaces to assist in producing a release action of the brakes.

A valve or stop cock 16^a in pipe 8 serves to disconnect, when desirable, the reservoir from the valve mechanism.

The operation of the parts composing the invention will now be apparent. Assuming that the brake mechanism has been disabled or for some other reason it is desired that the brake piston be not operated with the other pistons of the system, then by turning the cock 11 the brake cylinder will be cut from the valve mechanism and train pipe and thereby the pressure in the reservoir and working end of the brake cylinder will be equalized and remain so whatever variation there may be produced on either side of the piston. This disconnection has not affected the relation of the valve mechanism to the train pipe or to the reservoir end of the cylinder. In fact, the working end of the cylinder has now been made a part of the reservoir, whether these two be in one cylinder as shown, or in separate cylinders. Upon effecting a variation in the train pipe pressure the valve mechanism will operate as before to open the train pipe through the exhaust port to the external atmosphere, and also to open the reservoir to the train pipe to recharge the same. If desired the cock 16^a may be turned so as to disconnect the reservoir from the valve mechanism. In this case the valve mechanism would still continue to act upon suitable reduction to put the train pipe to local exhaust, as before; but in this case the train pipe would not be recharged from the local reservoir, but it would, and what is most important, be put to local exhaust in conjunction with the like action of the other local exhaust valves. It will thus be seen that the brake cylinder may be disconnected without affecting the action of the train pipe exhaust valves succeeding the cylinder cut from the train pipe. The efficiency of the system, therefore, for quick application and quick release, is not affected by such cut-out, for the valve mechanism of the cylinder cut out would continue to act to effect the quick transmission of a reduction in pressure in the train pipe to the other brake cylinders.

It is to be understood that the valve mechanism herein shown stands only for a type. Any valve mechanism capable of putting the train pipe to exhaust at or adjacent to the brake cylinders upon a reduction of pressure in the train pipe would, so far as concerns this improvement, serve equally well. The essential feature is, that when the air brake cylinder is cut from the train pipe, there be left a valve mechanism operating to locally exhaust the train pipe, as well if its reservoir be not cut out, to assist in the recharging or release action.

I claim—

1. In combination in an air-brake system, a brake cylinder, a train pipe communicating therewith, a valve mechanism arranged between the brake cylinder and the train pipe and operating to control the brake cylinder and to put the train pipe to local exhaust, and a cock or valve arranged between the brake cylinder and the said valve mechanism

whereby the brake cylinder may be disconnected from the train pipe without affecting the normal operation of the said valve mechanism, for the purposes set forth.

2. In combination in an air-brake system or mechanism, a brake cylinder and piston, a local air reservoir and connections from the same to the train pipe, a valve mechanism operating upon reduction of pressure in the train pipe to locally exhaust the same, a valved pipe or passage connecting the reservoir to the brake cylinder and the said valve mechanism for the purposes set forth.

3. In combination in an air-brake mechanism, a brake cylinder and piston, a local reservoir and train pipe, a valve mechanism controlling a connection between the brake cylinder, train pipe and reservoir and operating to locally exhaust the train pipe, and a valved pipe or passage from said reservoir connecting said reservoir to the brake cylinder between the brake cylinder and the said valve mechanism, for the purposes set forth.

4. In combination with an equilibrio air brake piston and cylinder, a train pipe connected to the working end of the cylinder and a valved pipe or passage connecting the reservoir end of the cylinder with the working end of the same, and a valve or cock for disconnecting the train pipe from the cylinder, for the purposes set forth.

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Witnesses:
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