No. 641,246. Patented Jan. 9, 1900.

R. WEIR.

RAILWAY BRAKE.

(Application filed Aug. 29, 1899.)

(No Model.) 3 Sheets—Sheet 1.

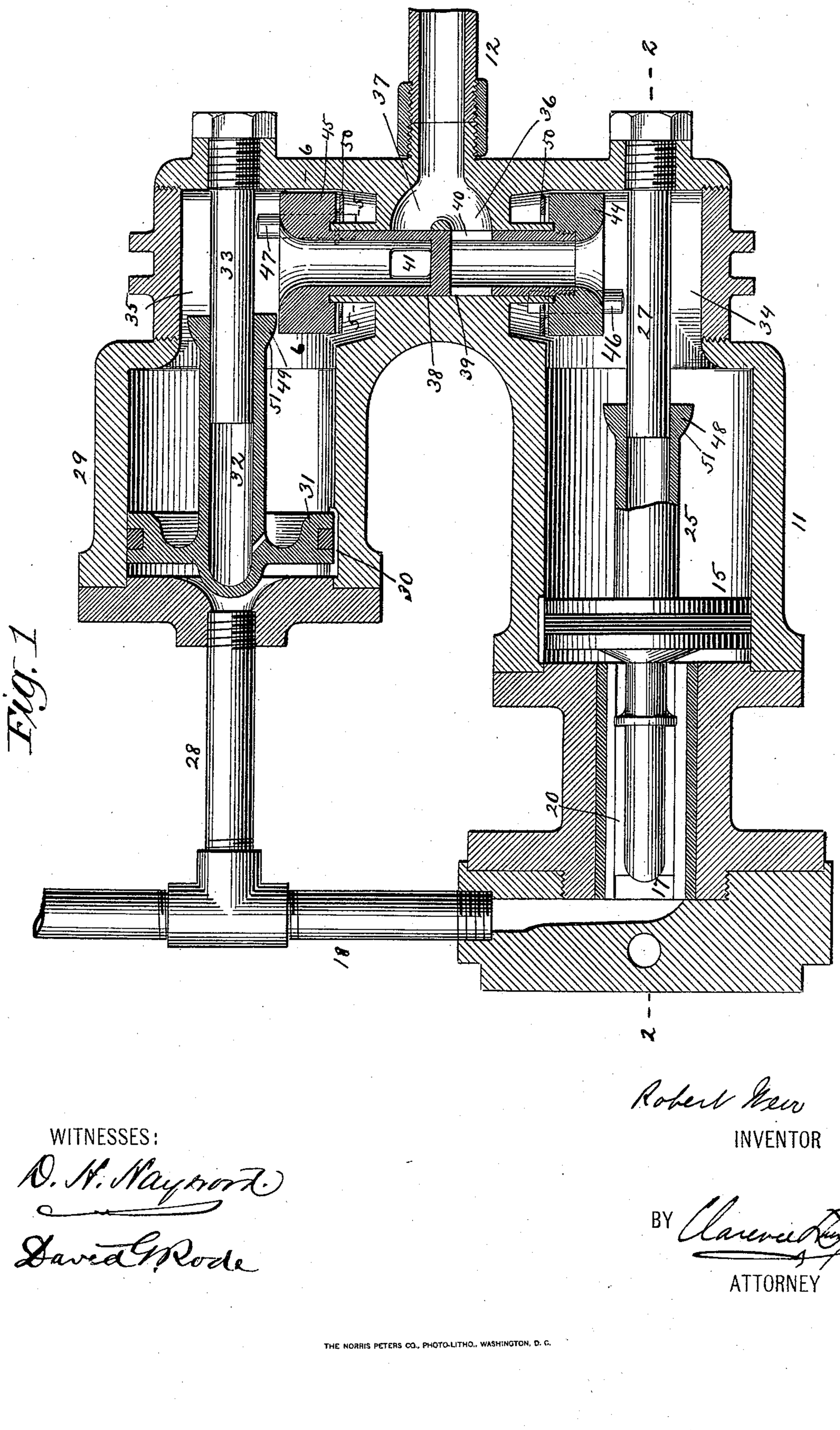

Fig. 1.

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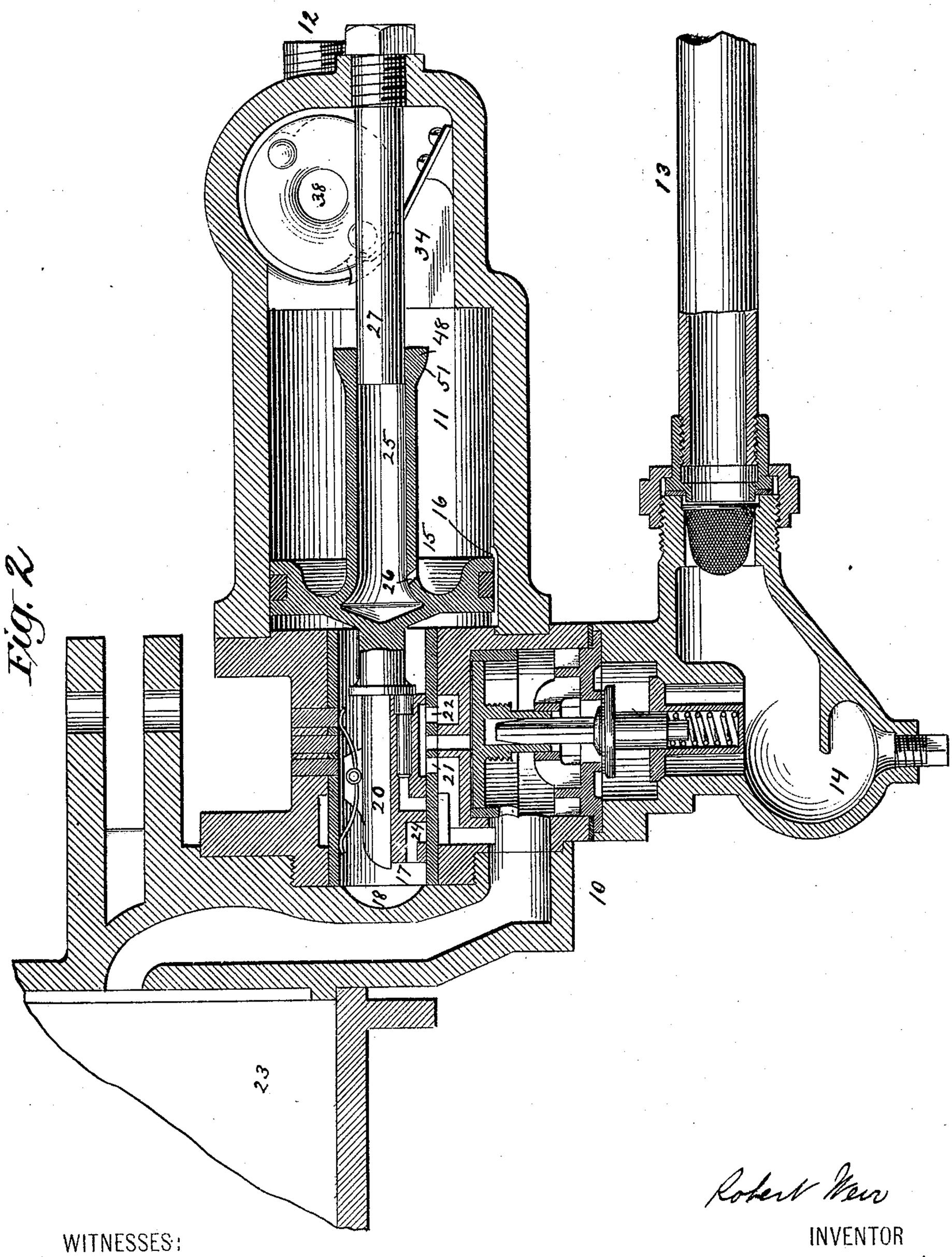

Fig. 2.

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Fig. 3

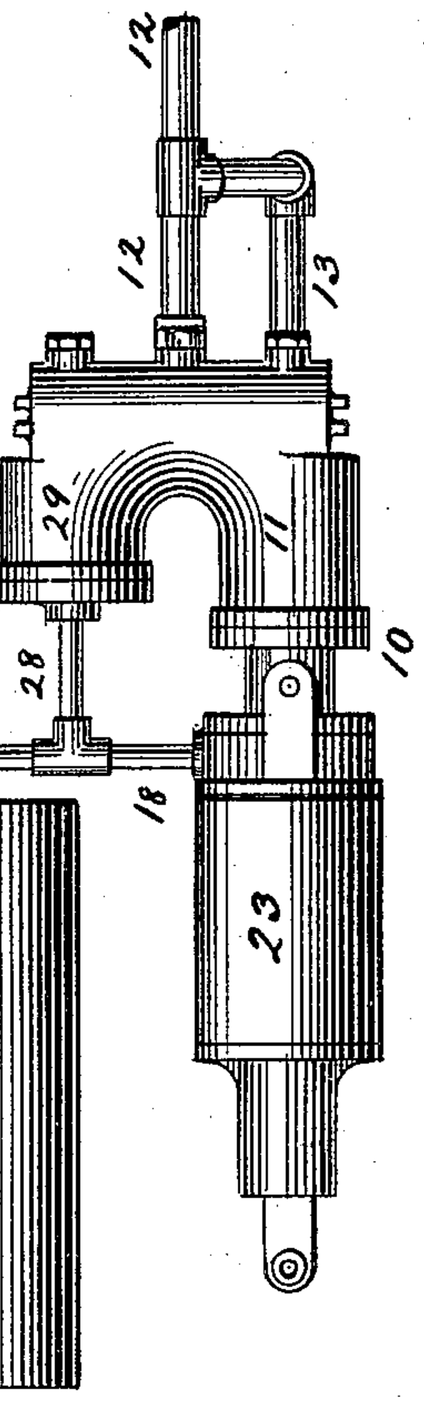


Fig. 5.

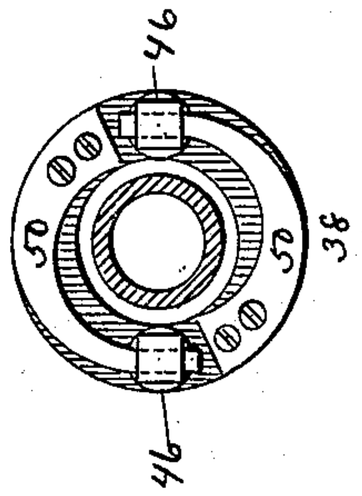


Fig. 6.

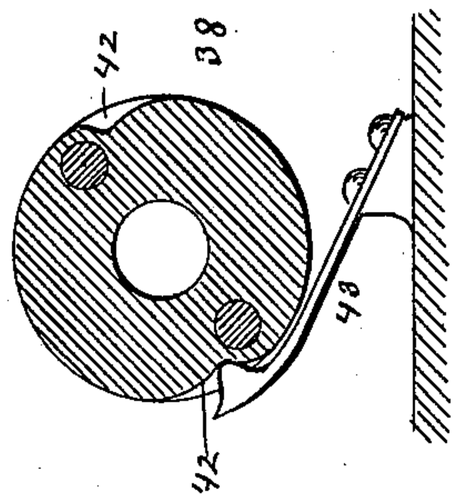
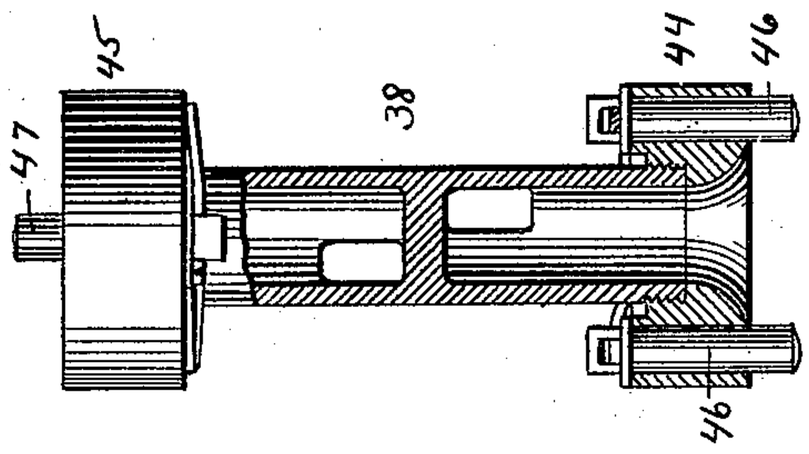


Fig. 4.



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UNITED STATES PATENT OFFICE.

ROBERT WEIR, OF MONTCLAIR, NEW JERSEY.

RAILWAY-BRAKE.

SPECIFICATION forming part of Letters Patent No. 641,246, dated January 9, 1900.

Application filed August 29, 1899. Serial No. 728,853. (No model.)

To all whom it may concern:

Be it known that I, ROBERT WEIR, a citizen of the United States, residing at Montclair, Essex county, New Jersey, have invented a new and useful Improvement in Railway-Brakes; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention relates to automatic railway-brakes of the class to which the Westinghouse air-brake belongs, and as carried into practice by me is particularly designed for application to the form of Westinghouse brake in general use.

The primary object of my invention is to provide simple and efficient means for recharging the auxiliary reservoir from the air-pump on the locomotive while the brakes are set by the air-pressure from the auxiliary reservoir.

My invention consists, generally speaking, in combining with the air-supply pipe, triple valve, brake-cylinder, and auxiliary reservoir, and other essential parts of an automatic air-brake, such as the Westinghouse, an additional airway from the air-supply pipe to the auxiliary reservoir, an auxiliary piston and double air-valve therein for cutting off the air-supply alternately from the auxiliary reservoir and from the triple valve, and means for operating said double valve by the action of the triple valve and the auxiliary piston, so that, while normally the air-supply is led into the triple valve as usual, when the air-pressure is suitably reduced in the train-pipe to set the brakes by the action of the auxiliary air-supply thereon the consequent retraction of the piston of the triple valve operates the double valve so as to cut off the train-pipe from the triple valve and connect the train-pipe directly with the auxiliary reservoir, and on then restoring the pressure in the train-pipe the auxiliary reservoir is replenished, while at the same time setting the brakes. On then reducing the pressure in the train-pipe the auxiliary piston, by its retraction, operates the double valve so as to cut off the train-pipe from the auxiliary reservoir and connect it with the triple valve, and on then restoring the pressure in the train-pipe the triple valve causes the brakes to be released, as usual.

In order that my invention may be clearly understood, I shall first describe in detail the mode in which I carry the same into practice and then point out its various features in the claims.

Reference is to be had to the accompanying drawings, forming part of this specification, in which the same parts are designated by like numbers in all the figures.

Figure 1 is a sectional plan view of the triple valve and connections of an ordinary Westinghouse air-brake to which my improvement is applied. Fig. 2 is a sectional elevation of the same on the line 2 2, Fig. 1. Fig. 3 is a reduced plan view of the same. Fig. 4 is a plan view, partly in section, of the double valve employed in said application of my improvement. Figs. 5 and 6 are cross-sectional views of the said double valve on the lines 5 5 and 6 6, respectively, in Fig. 1.

In the drawings, 10 designates the triple valve of an ordinary form of Westinghouse air-brake, the essential parts of which, so far as my improvement is concerned, are the pressure-cylinder 11, into which the air-supply is led in my improvement from the train-pipe connection 12, but in the ordinary form directly from a train-pipe connection 13, which in this case leads into the ordinary drip-chamber 14, the piston 15, which moves in the cylinder 11 over and away from the air-port 16 therein, and when the pressure is maintained in the train-pipe is forced forward thereby and permits the air-supply to pass through the port 16 and the valve-chamber 17 into the pipe 18, leading into the auxiliary reservoir 19, and the slide-valve 20, connected to the piston 15, which slide-valve when the piston 15 is advanced, as described, closes the ports 21 and 22, leading from the valve-chamber 17 to the brake-cylinder 23 and to the atmosphere, respectively, and thus prevents the setting of the brakes, and, when the piston 15 is retracted by the reduction of pressure in the train-pipe, so as to cut off the air-supply through the port 16, connects by the ports 24 and 21 the auxiliary reservoir 19 with the brake-cylinder 23, so as to cause the brakes to be applied.

The piston 15 is fixed on a sleeve 25, having a vent 26 and working on a fixed plunger 27 to guide and check its motion in either direction.

To provide for replenishing the auxiliary

reservoir independently of the triple valve in accordance with the purpose of my invention, I, by means of suitable castings, which in the embodiment of my invention shown are specially adapted and applied to the ordinary triple valve 10, provide an extra way 28 from the train-pipe 12 outside the triple valve to the auxiliary reservoir 19 and interpose in said way a pressure-cylinder 29, having an air-port 30 and a pressure-piston 31, having a vented sleeve 32 working on a fixed plunger 33 to check its motion similar to the pressure-cylinder 11 and piston 15 of the triple valve 10.

Back of and opening into the cylinders 11 and 29, respectively, are air-chambers 34 and 35, into which the air from the train-pipe is adapted to be led through ports 36 and 37, respectively. The air-ports 36 and 37 are alternately connected with and cut off from the respective air-chambers 34 and 35 by a rotatable hollow cylindrical two-way or double valve 38, which fits and turns in a cylindrical valve-seat 39 and has a transverse port 40 to open and cut off communication between the air-port 36 and through its bore and the air-chamber 34 the triple-valve cylinder 11, and another transverse port 41 at a right angle to and separate from the port 40 to cut off and open communication between the port 37 and through its bore and the air-chamber 35 the auxiliary cylinder 29.

The rotatable double valve 38 has notches 42 to be alternately engaged by a spring-dog 43, so as to press and hold the valve when operated, as hereinafter described, firmly in position with either its port 40 or 41 in registry (through the port 36 or 37) with the train-pipe 12.

On the ends of the double valve 38 are heads 44 and 45, respectively, from which project crank-pins (serving as shoulders) 46 and 47, respectively, in the path of heads 48 and 49 in the ends of the piston-sleeves 25 and 32, respectively, so that when the piston 15 is retracted its sleeve-head 48 will strike a crank-pin 46 and turn the valve 38 to the position in which the train-pipe 12 is cut off from the triple valve and connected with the auxiliary cylinder 29, and when the piston 31 is retracted its sleeve-head 49 will strike an opposite crank-pin 47 and turn the double valve to the position shown in Fig. 1, in which the train-pipe 12 is connected with the triple valve and cut off from the auxiliary cylinder 29.

The crank-pins 46 and 47 are mounted to slide axially on the sleeve-heads 48 and 49 and are held yieldingly in projecting position by springs 50, the sleeve-heads 48 and 49 having also beveled sides 51, so that when the pistons are retracted the bevels 51 will press inward and pass by the crank-pins 46 and 47.

In the use of my invention thus illustrated, to keep the brakes free the air-pressure is maintained, as usual, in the train-pipe 12, and hence the valve 38 being in the position shown in Fig. 1 in the triple-valve cylinder 11, thereby advancing the piston 15, feeding the air through the port 16 and pipe 18 into the auxiliary reservoir 19, and by means of the slide-valve 20 cutting off the auxiliary reservoir 19 from the brake-cylinder 23, as usual.

To set the brakes, the pressure is reduced, as usual, in the train-pipe 12. The greater pressure from the auxiliary reservoir then forces back the piston 15 and slide-valve 20, cutting off the supply of air through the port 16 to the auxiliary reservoir and connecting the ports 24 and 21, so that the air from the auxiliary reservoir enters the brake-cylinder 23 and applies the brakes. At the time the piston 15 is thus retracted, however, its sleeve-head 48 strikes the crank-pin 46 and turns the double valve 38 through an arc of ninety degrees, thereby cutting off the air in the train-pipe entirely from the triple-valve cylinder 11 and opening communication from the train-pipe into the auxiliary cylinder 29. The air-pressure is then restored in the train-pipe, and while it is shut off from the triple valve and the brakes are thus still set it enters the auxiliary cylinder 29, forces forward the piston 31, and passes through the port 30 and pipe 28 into the auxiliary reservoir, (and as well the brake-cylinder,) thus replenishing the auxiliary reservoir as much as desired while the air therefrom is setting the brakes.

To release the brakes, the pressure is again reduced in the train-pipe, which is now in connection with the auxiliary cylinder only, thus causing the auxiliary piston 31 to be retracted, the port 30 to be closed, and the air-supply cut off from the auxiliary reservoir. At the same time the sleeve-head 49 of the retracted auxiliary piston 31 strikes the crank-pin 47 and turns the double valve forward another ninety degrees to its original position shown in Fig. 1, cutting off the auxiliary cylinder 29 from the train-pipe and opening communication between the train-pipe and the triple valve. The pressure is then immediately again restored in the train-pipe 12, acting on the triple valve to release the brakes and charge the auxiliary reservoir in the usual manner.

The importance of the object accomplished by this improvement is too well understood to require amplification. The simplicity and efficiency of the general means by which I attain this object are shown by this description and drawings. It must be understood, however, that I do not limit my invention to the particular application, construction, or arrangement herein shown and described, as the same may be considerably modified in detail without departing from the boundaries of my invention. The form which my improvement will take in practice will naturally vary largely with the style of air-brake to which it is applied.

It is evident that by thus providing for sup-

plying the auxiliary reservoir and the brake-cylinders while the brakes are set it becomes possible to reduce the size of the auxiliary reservoir very materially. In fact, it may be merely an air-chamber, as the necessity for the storage of a large supply of air for use when the brakes are set for a long time is obviated.

Having thus set forth the nature of my invention and the mode in which I carry the same into practice, I claim as my invention—

1. The combination with an air-brake of the general character described, of a way from the supply-pipe to the auxiliary reservoir independent of the triple valve, an auxiliary pressure-cylinder and piston in said way, an auxiliary valve to cut off the train-pipe alternately from the triple valve and from the auxiliary cylinder, and means whereby the motion of the triple-valve piston and the auxiliary piston operates the auxiliary valve substantially as described.

2. The combination with an air-brake of the general character described, of a way from the supply-pipe to the auxiliary reservoir independent of the triple valve, an auxiliary pressure-cylinder and piston in said way, a rotary valve to cut off the train-pipe alternately from the triple valve and from the auxiliary cylinder, and crank-pins or projections on said rotary valve in the path of parts moved by the triple-valve piston and the auxiliary piston respectively.

3. The combination with an air-brake of the character described, of an auxiliary way from the supply-pipe to the auxiliary reservoir, a pressure-cylinder in said way, a piston in said cylinder having a check-sleeve and plunger, an auxiliary rotary valve to cut off the supply-pipe alternately from the auxiliary reservoir and from the triple valve and crank-pins or projections on the rotary auxiliary valve in the paths of the auxiliary-piston sleeve and of the triple-valve-piston sleeve respectively.

In testimony whereof I have hereunto set my hand this 19th day of August, 1899.

ROBERT WEIR.

In presence of—
DAVID G. RODE,
CLARENCE L. BURGER.