No. 709,027. Patented Sept. 16, 1902.

H. R. MASON.

ENGINEER'S BRAKE VALVE.

(Application filed Dec. 28, 1901.)

(No Model.)

Fig. 1.

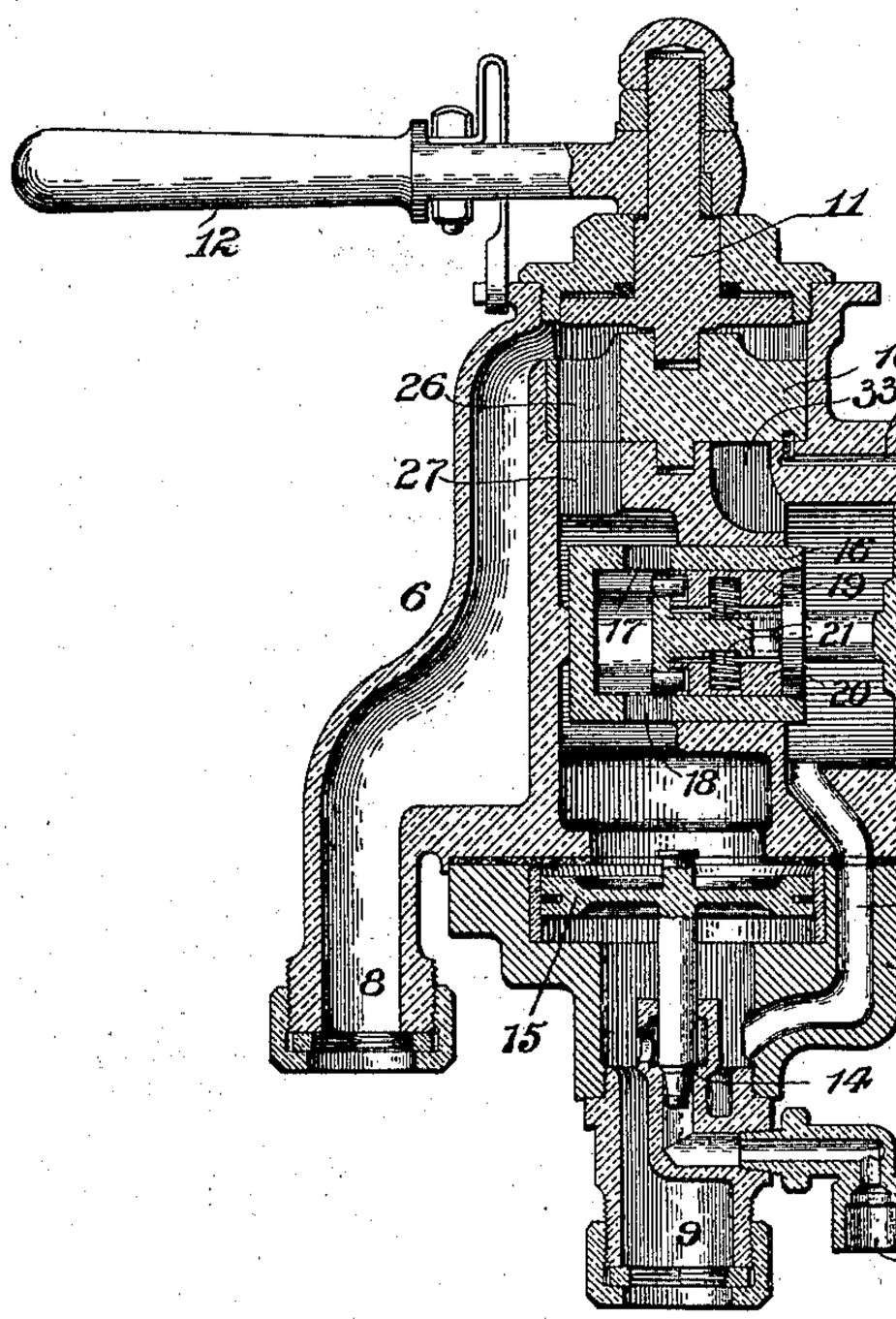


Fig. 4.

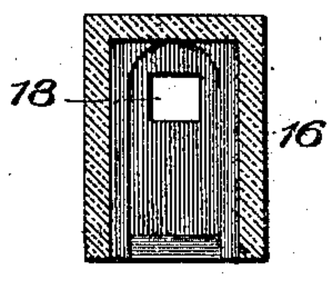


Fig. 5.

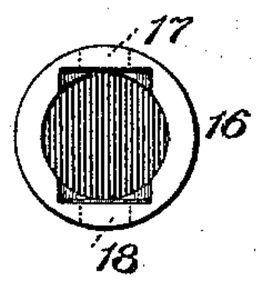


Fig. 3.

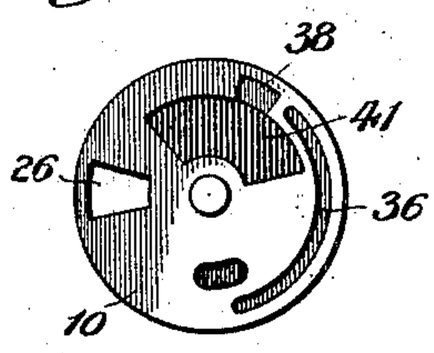
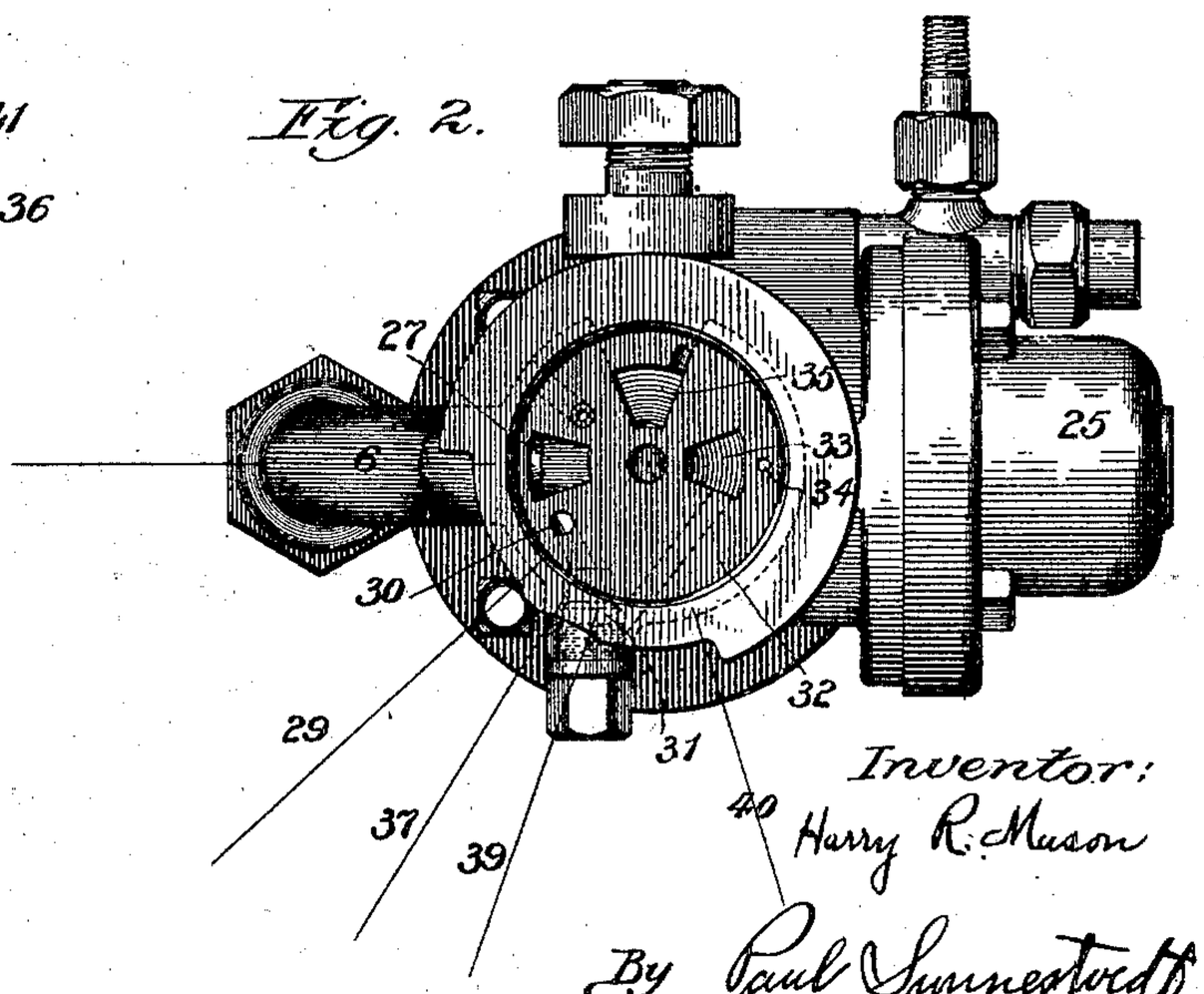


Fig. 2.



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UNITED STATES PATENT OFFICE.

HARRY R. MASON, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE WESTINGHOUSE AIR BRAKE COMPANY, OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

ENGINEER'S BRAKE-VALVE.

SPECIFICATION forming part of Letters Patent No. 709,027, dated September 16, 1902.

Application filed December 28, 1901. Serial No. 87,589. (No model.)

To all whom it may concern:

Be it known that I, HARRY R. MASON, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Engineers' Brake-Valves, of which the following, taken in connection with the accompanying drawings, is a specification.

This invention has reference, primarily, to improvements in engineers' brake-valves designed for use in conjunction with long trains to avoid the disadvantages incident to surge of pressure in the forward end of a long train-pipe which, as is known in the art, tends to produce a release of the brakes on the forward cars on sudden closure of the discharge-opening.

The first of the objects of my present invention is the provision of an improved form of mechanism for accomplishing the results referred to in a reliable and simple manner and for utilizing in the accomplishment of such objects an arrangement of power mechanism or piston device which will automatically coöperate with the movements of the main controlling-valve of the brake-valve in governing the opening and closing of certain ports which have a part in the operation of the apparatus.

A further object of my invention is the provision of an engineer's brake-valve having connection from a main reservoir and to a train-pipe, a train-pipe-service discharge-port, a valve constructed to control such train-pipe service discharge-port, and a piston arranged to produce gradual closure of said valve in service applications of the brakes, the said several parts being combined with a passage in the brake-valve for establishing communication between the fluid-pressures on opposite sides of the said piston, a valvular device for controlling such passage, and power mechanism, preferably in the shape of a movable abutment or piston, for actuating the said valvular device. The above, as well as such other objects as may hereinafter appear, I attain by means of a construction which I have illustrated in preferred form in the accompanying drawings, in which—

Figure 1 is a transverse vertical section of a valve embodying my improvements. Fig. 2 is a plan view thereof with the main controlling-valve and top cap removed to show the ports in the valve-seat. Fig. 3 is an inverted view of the main controlling-valve. Fig. 4 is a sectional view showing in detail a portion of the valve mechanism, and Fig. 5 is an inverted plan view of said detail shown in Fig. 4.

Referring now more particularly to Fig. 1, it will be seen that in carrying out my invention I provide first a valve body or casing consisting principally of an upper part 6 and a lower part 7, the upper part being provided with an inlet-opening 8 from the main reservoir and the lower part with an opening 9, adapted for connection with a train-pipe. In the upper portion of the upper part of the case I provide a main controlling-valve, preferably of rotary type, (marked 10,) said valve being arranged to be actuated by the rotatable shaft 11 through movement of the lever 12, which constitutes the handle whereby the engineer manipulates the device.

In the lower part of the casing 7 I provide a train-pipe-service discharge-port 13, subject to the control of a valve 14, preferably of puppet type, which is movable by means of a piston 15 in the operation of the device.

Preferably in a location between the parts last described and the main controlling-valve 10 I insert mechanism comprising, primarily, a bushing 16, provided with ports 17 and 18, controlled, respectively, by the slide-valves 19 and 20, having the springs 21 for holding them to their seats in addition to the air-pressure and adapted to be moved by means of the piston 22 and spring 23, which latter rests at one end upon the piston and at the other upon the plug 24, which is screwed into the cap 25.

In the position shown in Fig. 1, which is what is known as the "release" position of the valve, a large port 26 in the valve 10 is in register with a port 27 in the seat of said valve, (see also Figs. 2 and 3,) whereby main-reservoir air is permitted in large volume to flow downward through the openings 17 and 18 to supply pressure on the upper side of the piston 15 and past the slide-valves 19 and

20, at the sides thereof, to supply pressure to move the piston 22 to the position shown against the strength of the spring 23 and also pressure through the passage 28 to the train-pipe connected at 9 and the under side of the piston 15, creating a balance of pressures on opposite sides of the piston in this position. Thus in this position, which, as stated, is known as the "release" position, air in large volume is free to flow from the main reservoir to the train-pipe and also to both sides of the piston 15, which, because of the equilibrium of pressures thus established, will remain in its lowermost position—that is, with the valve 14 closed—cutting off the escape of pressure through the train-pipe-service discharge-port 13, because of the relatively larger area for the pressure to act upon above the piston over that under the piston 15. Moving the handle of the brake-valve around to what is known as "running" position, which I have marked in Fig. 2 with the number 29, brings the port 26 in register with the port 30, whence air passes in the usual way past the excess-pressure valve 31 and through the dotted passage 32 to the opening 33, which communicates with the train-pipe by a passage 28, and also permits the air to act upon the piston 22 to hold it over against the spring 23 in the position shown in Fig. 1, thus in this position, which, as stated, is the running position, also holding the ports 17 and 18 open and establishing a balance of pressures on opposite sides of the piston 15.

It is to be observed that in both the release and running positions of the valve the chamber at the right of the piston 22 is in communication with the external atmosphere through a passage 34, which has communication with the atmospheric discharge-port 35 in said positions by means of the recess 36 on the under face of the main controlling-valve. If now the valve be moved to the lap position, which is that marked 37, the port 30 will be cut off, stopping further feed of air to the train, and the passage 34 will be cut off from communication with the atmosphere and by means of the recess 38 (see Fig. 3) will be put in communication with the train-pipe through the opening in the valve-seat marked 33, establishing an equilibrium of pressures on opposite sides of the piston 22 and permitting the spring 23 to act to push the slide-valves 19 and 20 to the left until the ports 17 and 18 are closed.

The action last above described cuts off all communication between the pressures on the upper and lower sides of the piston 15, so that when the handle is moved around to the service position (marked 39) and a reduction thereby made in the pressure on the upper side of the piston 15, in a manner known in the art, the pressure on the under side of the piston 15 will raise the valve 14 and discharge train-pipe air to the atmosphere until such time as the discharge has reduced the pressure below the piston 15 to a point at which that above the piston will gradually and slowly close the valve 14 through the reëstablishment of the equilibrium of pressures on opposite sides of the piston 15, thus effectually preventing the surge of pressure in the forward end of the train-pipe and the consequent release of the forward brakes of a long train which would be produced by a sudden closure of the discharge-valve. The valves 19 and 20 therefore constitute in effect a valvular device which exercises control over the passage which establishes communication between the fluid-pressures on opposite sides of the piston 15, and the piston 22 is, in fact, a movable abutment or power mechanism whereby such valvular device is actuated in the closure of the communication in making service applications of the brakes. By this means, it is to be observed, the control of the communication between the opposite sides of the piston is taken out of the direct action of the main controlling-valve and made to be dependent upon the automatically-actuated power mechanism or movable abutment 22.

In emergency operation of the brake the handle is moved around to the position marked 40, in which, as is usual in valves of this class, the cavity 41 establishes communication between the train-pipe port 33 and the large atmospheric discharge-opening 35, so as to make a sudden and rapid reduction in train-pipe pressure.

From the above description it will be obvious that I have by my present invention provided a valve device of the character specified in which the passage which establishes communication between the pressures on the opposite sides of the piston which controls the action of the train-pipe-service discharge-valve will maintain in release and running position a perfect equilibrium of pressures on opposite sides of such piston and yet not be subject to the control of the main controlling-valve directly in the making of service applications, but will be closed or cut off automatically to imprison the air on the upper side of the said piston, and such automatic closure will be effected by means not liable to derangement from the action of dirt or other foreign matter which may lodge in or around the parts because of the employment of the power mechanism or movable abutment and what is known as a "sliding valve" as contradistinguished from a puppet-valve.

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

1. An engineer's brake-valve having connection from a main reservoir and to a train-pipe, a main controlling-valve, a train-pipe-service discharge-port, a valve controlling said port, a piston arranged to produce gradual closure of said valve in service applications of the brakes, a passage for establishing communication between the fluid-pressures on opposite sides of said piston, a valvular device for controlling said passage, and power

mechanism for actuating said valvular device, substantially as described.

2. An engineer's brake-valve having connection from a main reservoir and to a train-pipe, a main controlling-valve, a train-pipe-service discharge-port, a valve controlling said port, a piston arranged to produce gradual closure of said valve in service applications of the brakes, a passage for establishing communication between the fluid-pressures on opposite sides of said piston, a valvular device for controlling said passage and a movable abutment for actuating said valvular device, substantially as described.

3. An engineer's brake-valve having connection from a main reservoir and to a train-pipe, a main controlling-valve, a train-pipe-service discharge-port, a valve controlling said port, a piston arranged to produce gradual closure of said valve in service applications of the brakes, a passage for establishing communication between the fluid-pressures on opposite sides of said piston, a valvular device for controlling said passage, and a piston for actuating said valvular device; substantially as described.

4. An engineer's brake-valve having connection from a main reservoir and to a train-pipe, a main controlling-valve, a train-pipe-service discharge-port, a valve controlling said port, a piston arranged to produce gradual closure of said valve in service applications of the brakes, a passage for establishing communication between the fluid-pressures on opposite sides of said piston, a valvular device for controlling said passage, a piston for actuating said valvular device, and means for establishing or destroying equilibrium of air-pressures on opposite sides of said piston, substantially as described.

5. An engineer's brake-valve having connection from a main reservoir and to a train-pipe, a main controlling-valve, a train-pipe-service discharge-port, a valve controlling said port, a piston arranged to produce gradual closure of said valve in service applications of the brakes, a passage for establishing communication between the fluid-pressures on opposite sides of said piston, a valvular device for controlling said passage, a piston for actuating said valvular device, means for establishing or destroying equilibrium of air-pressures on opposite sides of said piston, and a spring coöperating in the movement of said last-named piston, substantially as described.

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