(No Model.)

J. A. STARRETT & E. F. WELSH.

VALVE.

No. 576,909. Patented Feb. 9, 1897.

Fig. 1.

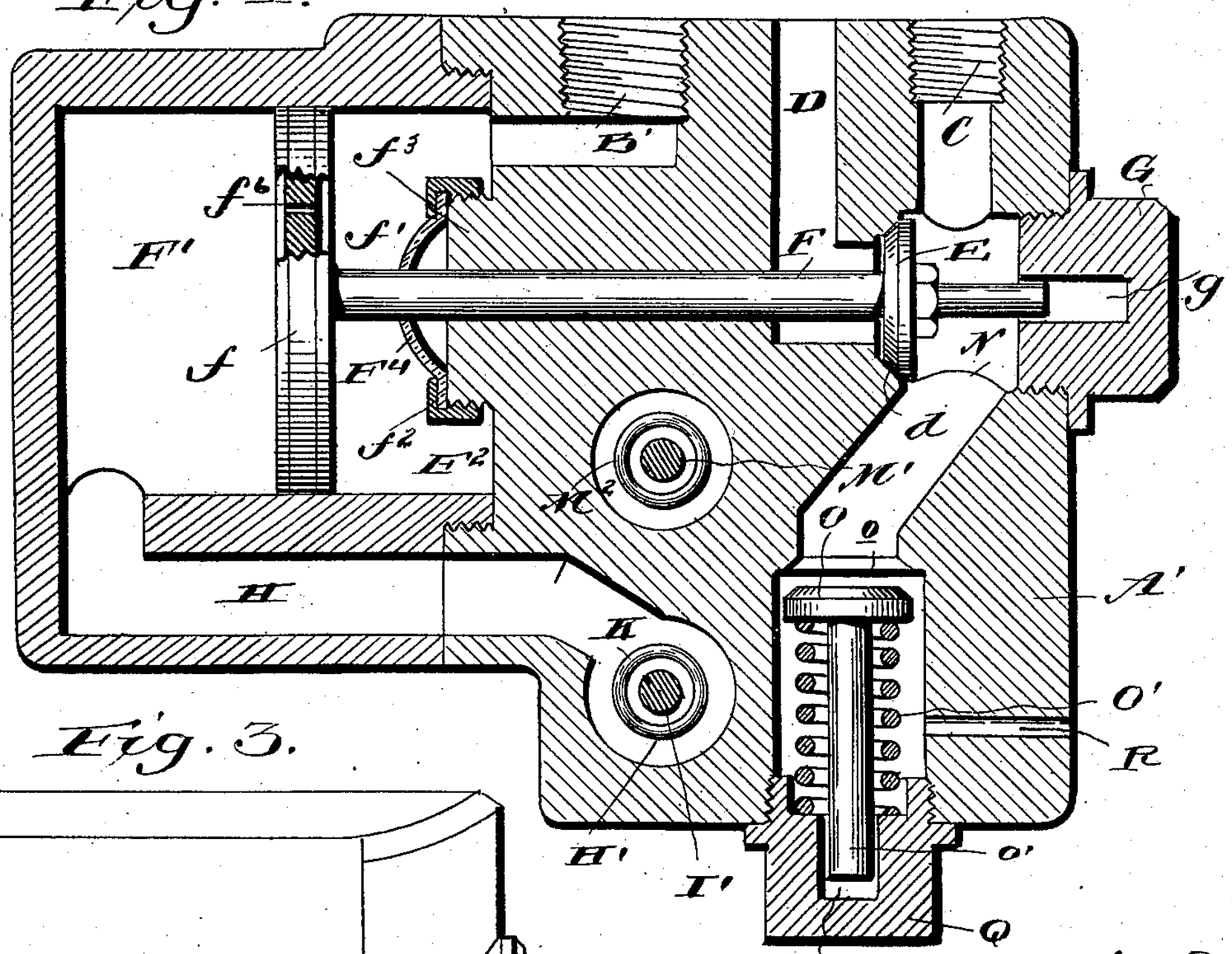


Fig. 3.

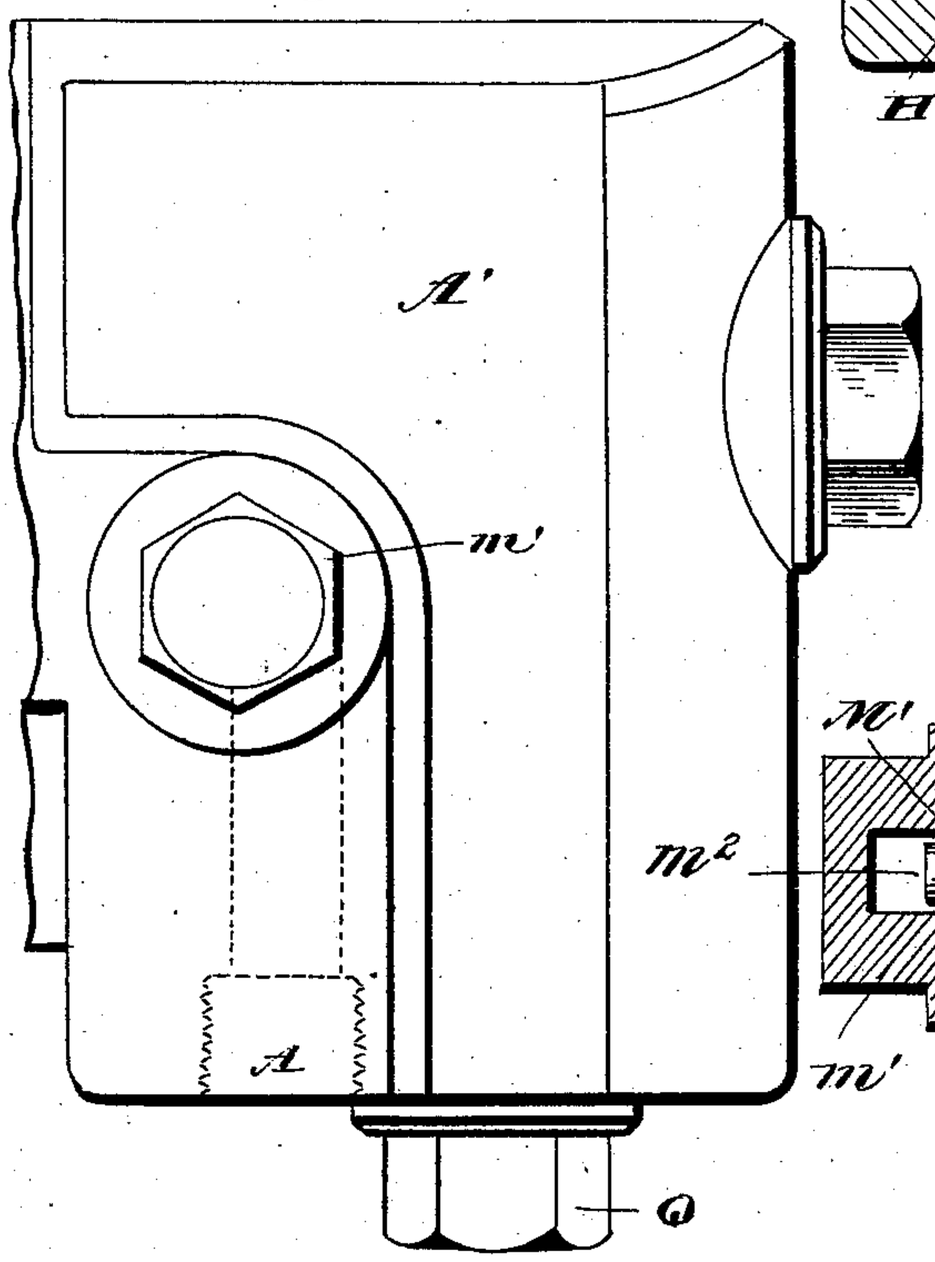
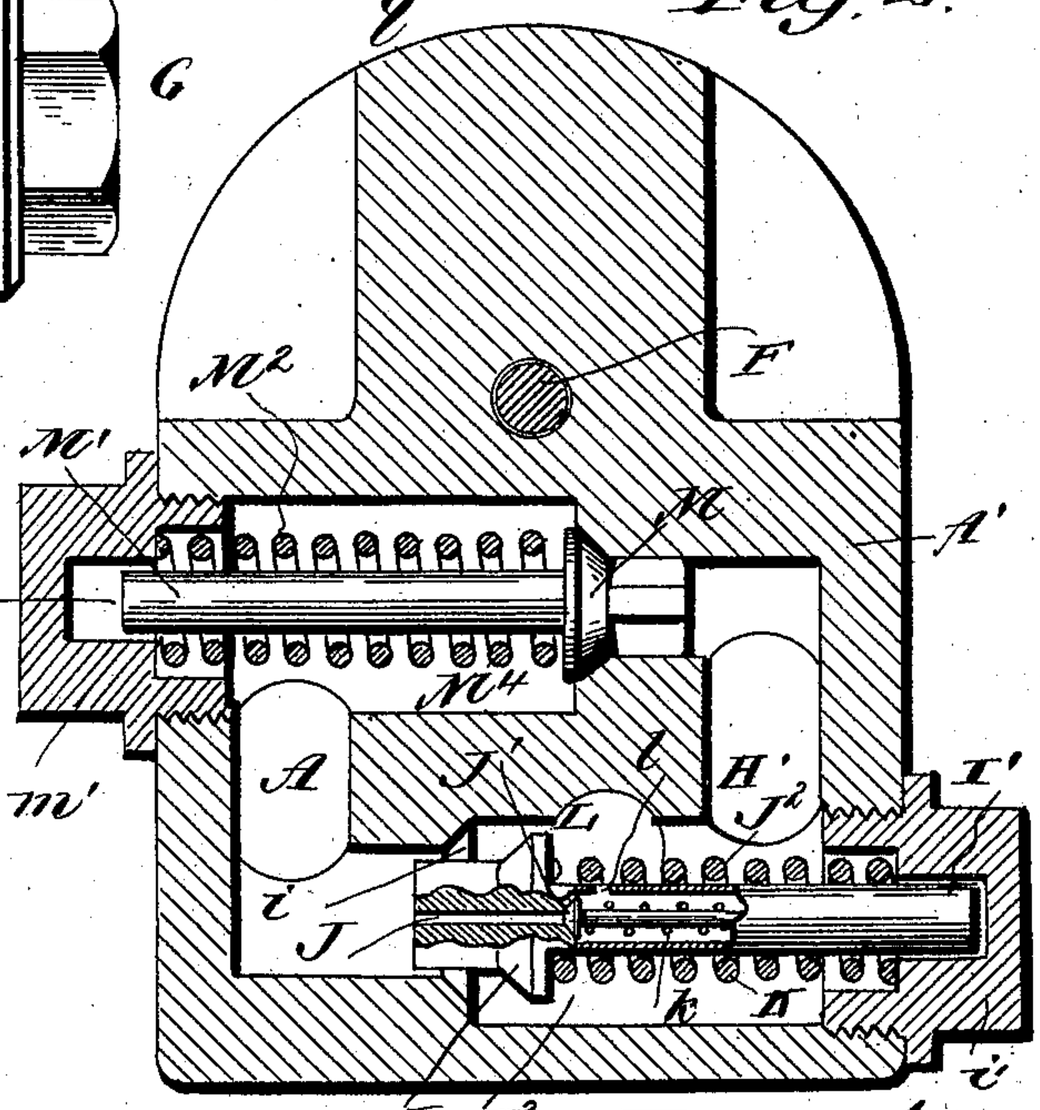


Fig. 2.



Witnesses:
L. C. Hills.
E. H. Bond

Inventors
J. A. Starrett, and
Edwin F. Welsh,
by E. B. Stocking Atty

UNITED STATES PATENT OFFICE.

JACOB ALBERT STARRETT AND EDWIN F. WELSH, OF WILMERDING, PENNSYLVANIA, ASSIGNORS OF ONE-EIGHTH TO WILLIAM F. KIMMICK, OF SAME PLACE.

VALVE.

SPECIFICATION forming part of Letters Patent No. 576,909, dated February 9, 1897.

Application filed August 8, 1896. Serial No. 602,193. (No model.)

To all whom it may concern:

Be it known that we, JACOB ALBERT STARRETT and EDWIN F. WELSH, citizens of the United States, residing at Wilmerding, in the county of Allegheny, State of Pennsylvania, have invented certain new and useful Improvements in Valves, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in automatic pressure-valves for air-brakes; and it has for its object, among others, to retain a certain pressure in the brake-cylinder or release it automatically by the application and reduction of air in the train-pipe.

It has for its objects, further, to provide for the operation of this valve with a single line of pipe, known as the "train-pipe," and also to provide for the operation of this valve with ports or openings in any engineer's brake valve or cock to control the release of valve without interfering in any way with the brake apparatus now in use.

Our improvement is simple in its nature, composed of few parts, those readily assembled, and the invention as a whole easily applied, not liable to get out of order, and most efficient for the purpose for which it is intended.

Other objects and advantages of the invention will hereinafter appear, and the novel features thereof will be particularly pointed out in the appended claims.

The invention is clearly illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this specification, and in which—

Figure 1 is a substantially central section through our improvement with portions in elevation. Fig. 2 is a section at right angles to Fig. 1 with parts in elevation and a portion broken away, and Fig. 3 is a detail in elevation.

Like letters of reference indicate like parts throughout the several views.

Referring now to the details of the drawings by letter, A designates a port which is adapted to be connected with the train-pipe of the air-brake system of any of the well-known forms.

B is the port designed for connection with the reservoir.

C is the port designed for connection with the triple-valve exhaust.

D is the exhaust to the atmosphere.

d is a valve-seat formed in the wall between the ports D and C, and against which is designed to be seated a valve E, carried by the stem F, to the other end of which is the piston-valve *f*, working in the cylinder F′, as shown, the said stem working through the stuffing box or cup *f*′, which is flanged, as shown at f^2, and held in place by the flange-nut F^2, which is engaged on the screw-threaded boss f^3, as shown clearly in Fig. 1. This valve-stem is limited in its outward movement by the stop G, which comprises the flanged plug screwed into an opening in the flanged case A′ and having an opening *g*, into which the end of the flange-stem works. This piston *f* is provided with the equalizing-port f^6, as seen in Fig. 1, and which port provides for the equalization of pressure upon opposite sides of the piston in a manner which will be readily understood.

H is a port leading from the cylinder F′ upon one side of the piston *f* and communicating with the port H′, which communicates with the chamber H^2, as seen in Fig. 2, and through this valve is the feed or equalizing port J, which is opened and closed by the valve J′, carried by the stem J^2, working within the hollow stem I′ of the valve I, as seen in Fig. 2, and limited in its movement in its outward direction by engagement with the stop *i*′, which is flanged, as shown, and threaded into an opening in the casing A′, and having an opening in which the end of the flanged stem works. K is a spring around this valve-stem and serving to normally keep the valve I to its seat. The feed or equalizing valve J connects with the port L by the passage *l* in the wall of the hollow stem of the valve I, as clearly shown in Fig. 2.

k is a spring around the valve-stem J^2, as seen in Fig. 2.

M is a valve fitted to a seat *m* and controlling communication between the ports A and H′, as shown, the stem M′ being surrounded by a spring M^2, which serves to normally hold the valve to its seat, and being limited

in its outward movement by the stop m', which is flanged and screw-threaded into an opening in the casing A', as shown, and having an opening M^2, into which the end of the valve-stem works.

O is a flange fitted to a seat o at the end of the inclined passage N and normally held to its seat by a spring O', surrounding the stem o' of said valve, which is limited in its outward movement by the stop-cap Q, which is flanged and threaded into the opening, as shown, and having an opening q, in which the end of the valve-stem works. From this valve-chamber extends the exhaust R, as shown.

With the parts constructed and arranged substantially as hereinbefore set forth the operation is as follows: After the train is coupled the engineer opens his brake-valve to feed position, which fills the train-line and the auxiliary reservoirs and thus equalizes the pressure on each side of the piston-valve f, the reservoir-pressure coming in at the port B into the chamber F^4 and the train-line pressure coming in through the port A into the feed-port J, and thence into the port L and through passage-way II to the chamber F' and through the equalizing-port f^6 of the piston, which equalizes the pressure on both sides of the piston. If a reduction is made in the train-pipe at the port A, it causes the air in the chamber F^4 to force the piston outward, and when the pressure in the chamber F' has been reduced through the opening of the check-valve M by reason of such lowering of the train-pipe pressure, the pressure in the chamber F^4 overcoming that in the chamber F', the piston is moved against the pressure in the chamber F' and the air in the ports H and H^2 finds its way through the ports M^4 and A to the train-pipe. Thus the air in the chamber F^4 forces outward the piston upon which is the valve E until the latter is seated upon its seat d. This cuts off the port C from the exhaust-port D and throws the cylinder-pressure into the inclined passage N, in which is seated the valve O, and this valve cuts off communication between port N and the exhaust R, the spring O' of this valve retaining the desired amount of air in the cylinder. To release the valve, air is let into the train-pipe, which, entering at the port A, overcomes the tension of the spring acting on the valve I, and the air passes through the ports H' and L into the chamber F', overcoming the pressure in the chamber F'. The piston is moved inward and the valve E is moved from its seat and forced outward until it is stopped by the stop G. This opens communication between the port C and exhaust-port D and allows all the air in the cylinder to pass out at the exhaust-port D to the atmosphere.

Modifications in detail may be resorted to without departing from the spirit of the invention or sacrificing any of its advantages.

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

1. The combination with the casing and the chamber with the piston therein, of a valve carried by the piston-stem, ports opening upon opposite sides of said valve, and a passage leading from one of the ports and connected with the reservoir, and a spring-actuated valve located in the passage communicating with one of said ports; substantially as described.

2. The combination with the casing and the port connected with the train-pipe, of the piston, its stem and valve, and the oppositely-movable valves upon opposite sides of the port connected with the train-pipe; substantially as described.

3. The combination with the casing and the port connected with the train-pipe, of the piston, its stem and valve, and the oppositely-movable valves upon opposite sides of the port connected with the train-pipe, one of said valves having a regulating-passage; substantially as described.

4. The combination with the casing and the port connected with the train-pipe, of the piston, its stem and valve, and the oppositely-movable valves upon opposite sides of the port connected with the train-pipe, one of said valves having a regulating-passage and a hollow stem; substantially as described.

5. The combination with the casing and the port connected with the train-pipe, of the piston, its stem and valve, and the oppositely-movable valves upon opposite sides of the port connected with the train-pipe, one of said valves having a regulating-passage and a hollow stem, and a spring around the said stem; substantially as described.

6. The combination with the casing and the port connected with the train-pipe, of the piston, its stem and valve, the oppositely-movable valves upon opposite sides of the port connected with the train-pipe, one of said valves having a regulating-passage and a hollow stem, and a spring around the said stem, and a valve closing said regulating-passage; substantially as described.

7. The combination with the casing, of the chamber, the piston therein, the valve-stem, the valve thereon fitted to a seat between connection of the triple valve and the exhaust-ports to the atmosphere, and valves controlling ports to the train-pipe side of the piston; substantially as described.

8. The combination with the casing, of the chamber, the piston therein, the valve-stem, the valve thereon fitted to a seat between connection of the triple valve and the exhaust-ports to the atmosphere, valves controlling ports to the train-pipe side of the piston, one of said valves having a regulating-passage, and a spring-actuated valve controlling the same; substantially as described.

9. The combination with the casing and its

ports, of an automatic retaining pressure-valve and connections from the reservoir and train-pipe and subsidiary valves, one of which has a regulating-passage and a spring-actuated valve controlling the same all arranged, combined and operating by reservoir-pressure and through the train-pipe; substantially as herein shown and described.

In testimony whereof we affix our signatures in presence of two witnesses.

JACOB ALBERT STARRETT.
EDWIN F. WELSH.

Witnesses:
C. POWER,
CYRUS P. M. TINSTMAN.