No. 753,999. PATENTED MAR. 8, 1904.

A. H. MOSHER.

CONTROLLING VALVE.

APPLICATION FILED FEB. 25, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig.2

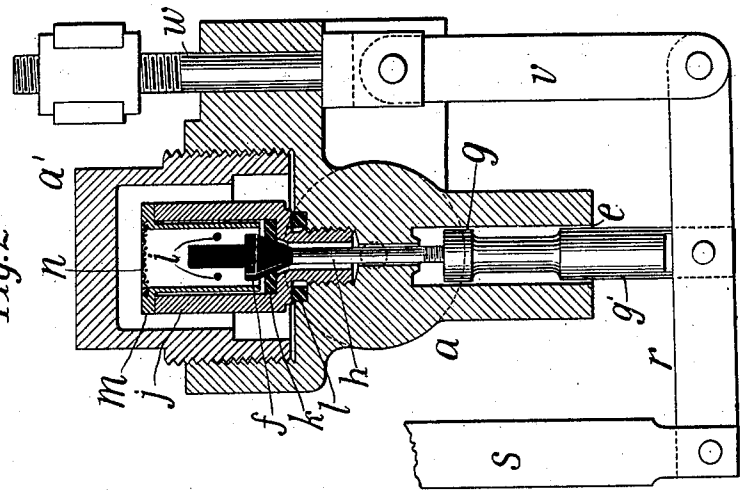
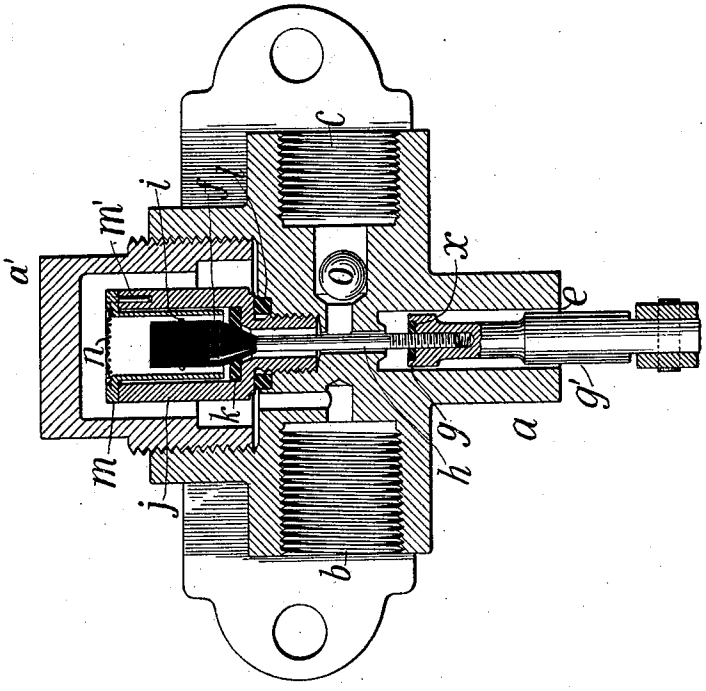


Fig.1



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Inventor
Asa H. Mosher
by Henry D. Williams Att'y

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 4

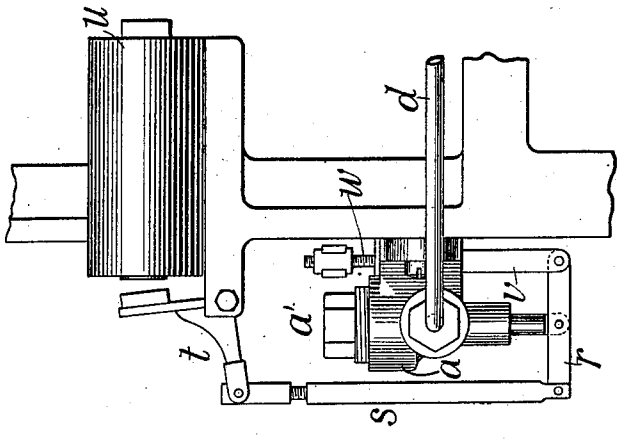
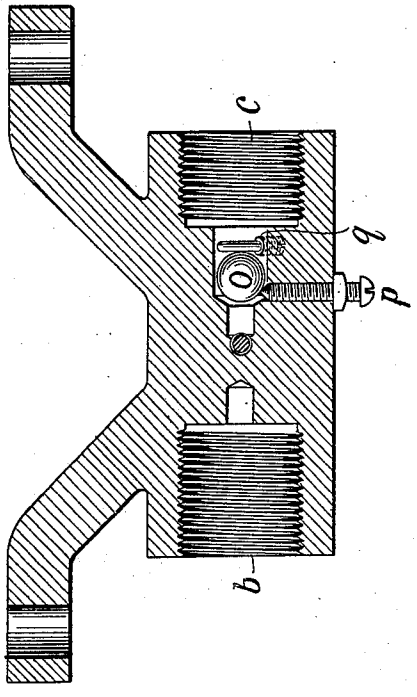


Fig. 3



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No. 753,999. Patented March 8, 1904.

UNITED STATES PATENT OFFICE.

ASA H. MOSHER, OF WESTFIELD, NEW JERSEY, ASSIGNOR TO THE HALL SIGNAL COMPANY, A CORPORATION OF MAINE.

CONTROLLING-VALVE.

SPECIFICATION forming part of Letters Patent No. 753,999, dated March 8, 1904.

Application filed February 25, 1903. Serial No. 144,996. (No model.)

To all whom it may concern:

Be it known that I, ASA H. MOSHER, a citizen of the United States, residing at Westfield, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Controlling-Valves, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to controlling-valves, and the valve embodying my invention is particularly adapted for use as the controlling-valve of an electrically-controlled gas-operated railway-signal.

My invention has for its object the provision of a tight and durable valve capable of satisfactory operation under the conditions present in such mechanism and includes various features of construction and combinations of parts hereinafter fully set forth.

I will now particularly describe the controlling-valve illustrated in the accompanying drawings and embodying my invention and will thereafter point out my invention in claims.

Figure 1 is a central vertical longitudinal section of the valve. Fig. 2 is a central vertical transverse section of the same. Fig. 3 is a central horizontal section of the same. Fig. 4 is an end elevation of the valve and operating parts drawn to a smaller scale.

The valve-casing *a* has a supply-inlet *b*, at which it is suitably connected to a source of motive fluid, as a tank of liquid gas, connected thereto through a reducing-valve, so that the gas is supplied to the valve at a uniform pressure. The casing also has another opening *c*, at which it is connected, as by the pipe *d*, Fig. 4, with a pressure chamber or cylinder in which the gas is utilized to actuate a railway-signal or other device, and this pipe *d* is both a pressure and exhaust connection to such pressure-chamber, the exhaust-outlet *e* being provided in the valve-casing.

The supply-valve *f* and the exhaust-valve *g* are oppositely arranged and connected to move together, so that the movement which opens the supply-valve will close the exhaust-valve, and vice versa, and this connection is shown as effected by a common stem *h*, extending down from the supply-valve *f* and through the opening in the seat of such valve and threaded into the exhaust-valve *g*, so that the adjustment of the extent of movement of the valve may be had by manipulation of the lower stem *g'*, extending downwardly from the exhaust-valve *g*, and the supply-valve *f* has a flat portion at its upper part working between guide-pins *i i*, so as to be held from rotation during this adjusting movement. The guide-pins are secured in the cap *m* of the supply-valve guard *j*, this valve-guard having the supply-valve seat *k* located therein. The valve-guard *j* has a stem at its lower part, which is threaded into the casing and is perforated for the free passage of the valve-stem *h*, and the valve-guard is shouldered above the threaded stem, so as to compress a gasket *l* tightly against the casing, and thus to form a readily-separable tight joint therewith. The upper part of the valve-guard is open and carries the cap *m*, above referred to, this cap resting upon the top of the valve-guard and having a tubular apron extending down into the valve-guard and carrying at its upper part a screen *n* to protect the valve and valve-seat from grit or other particles. The cap *m* has a pin *m'*, which enters a perforation in the valve-guard and, as above stated, carries the guide-pins *i i*, which prevent rotation of the supply-valve. The apron of the cap *m* and the pin *m'* are of sufficient length to prevent displacement of parts so long as the cover *a'* of the valve-casing is in place; but when this cover is removed the cap *m* may be lifted and the valve-guard unscrewed and the exhaust-valve *g* unscrewed from the valve-stem *h* and all parts of the valve removed for inspection, cleaning, or repair.

My improved valve has been used for controlling the supply to and exhaust from the pressure-chamber of an electrically-controlled gas-operated railway-signal. In such a structure the moving forces available for controlling the valve are comparatively light, and therefore the valve must remain tight with comparatively light pressure to hold it to its seat and to operate it. The gas employed in such signals, carbon dioxid, has a peculiar

penetrating power, and this has added to the difficulties of the problem. Further, a leaky supply-valve would cause a loss of gas at all times when the supply-valve was closed, and as the supply-valve is open only during the movement of a signal to "clear" and closed at all other times this would mean almost a constant waste of gas. As the gas is stored in reservoirs or containers in liquid form at each signal, such a leaky supply-valve would result in the frequent exhaustion of the containers, involving considerable expense and frequent failures of signals from lack of motive power. The problem of providing a controlling-valve for such mechanism has therefore proved exceedingly difficult of solution. I have found that the employment of a soft-rubber seat *k* for the supply-valve has produced a highly satisfactory, tight, and durable valve. I have also found that the employment of a hard-rubber supply-valve *f* in coöperation with such soft-rubber seat *k* and the provision of conical engaging faces for such valve and seat have given the best results in practice. Further, the detachable supply-valve guard *j*, above described, supplies a satisfactory inclosing device for the soft-rubber seat *k*.

In the manufacture of the valve the soft-rubber valve-seat is first cemented in its proper position in the supply-valve guard *j*, and then its inner working face is burned to conical form by a heated metallic rod corresponding in shape to the hard-rubber supply-valve *f*, and thereby the working face of the soft-rubber valve-seat is shaped to conical form, so as provide a pressure-receiving yielding wall against which the valve will be tightly closed by comparatively light pressure.

The exhaust-valve *g* is of disk form and has an annulus or ring *x*, of soft material, coacting with a projecting annular metallic seat.

It is desirable in such a controlling-valve to nicely adjust the outflow of gas from the pressure-chamber to the exhaust-opening, and to this end a ball check-valve *o* is provided, adjustable by means of a stop-screw *p* as to exhaust-controlling position and restrained by another stop-screw *q* as to open position. This check-valve permits the gas to freely enter the pressure-chamber from the supply-valve, but restrains its escape from the pressure-chamber past the exhaust-valve, so as to restrain the return movement of the signal or other device.

The means shown for actuating the controlling-valve comprise a valve-lever *r*, medially pivoted to the lower end of the valve-stem and pivotally connected at one end to the link *s*, which connects it with the armature-lever *t* of the controlling-electromagnet *u*, and pivotally connected at the other end to the link *v*, which is pivotally connected at its upper end to the pin *w*, the latter being suitably actuated by the signal mechanism. When the electromagnet is energized and its armature attracted, the supply-valve is opened and the exhaust-valve closed. When the signal reaches the safety position, the pin *w* is lowered and closes the supply-valve and opens the exhaust-valve, and when the signal returns to "danger" the deënergization of the electromagnet and consequent retractive movement of the armature-lever and the restoration of the pin *w* to normal position merely cause the valve-lever *r* to rock on the valve-stem as a fulcrum without disturbing the valve. This particular construction of valve-operating mechanism forms no part of my invention.

It is obvious that modifications may be made in the construction shown and above particularly described within the spirit and scope of my invention.

What I claim, and desire to secure by Letters Patent, is—

1. A controlling-valve comprising a casing having a supply-inlet, a combined pressure and exhaust opening and an exhaust-outlet, a supply-valve and an exhaust-valve connected to move together by a stem extending through the supply-valve opening from the supply-valve to the exhaust-valve, the supply-valve having a conical working face and a soft-rubber seat for the supply-valve also having a conical working face.

2. A controlling-valve comprising a casing having a supply-inlet, a combined pressure and exhaust opening and an exhaust-outlet, a supply-valve and an exhaust-valve connected to move together by a stem extending through the supply-valve opening from the supply-valve to the exhaust-valve, the supply-valve being of hard rubber, and a soft-rubber seat for the supply-valve, the valve and seat having counterpart working faces.

3. A controlling-valve comprising a casing having a supply-inlet, a combined pressure and exhaust opening and an exhaust-outlet, a supply-valve and an exhaust-valve connected to move together by a stem extending through the supply-valve opening from the supply-valve to the exhaust-valve, a soft-rubber seat for the supply-valve, the valve and seat having counterpart working faces, and a supply-valve guard detachably connected to the casing and having the soft-rubber valve-seat therein, substantially as set forth.

4. In a controlling-valve, in combination, the casing *a* having the cover *a'* and having a supply-inlet *b*, a combined pressure and exhaust opening *c* and an exhaust-outlet *e*, a supply-valve *f* of hard rubber, an exhaust-valve *g* connected to the supply-valve by a stem *h* extending through the supply-valve opening, a soft-rubber seat *k* for the supply-valve, the supply-valve and seat having conical engaging faces, and a supply-valve guard *j* detachably connected to the casing and having the soft-rubber supply-valve seat therein, substantially as set forth.

5. The combination, with electromagnetic valve-controlling means, of a casing having a supply-inlet, a combined pressure and exhaust opening and an exhaust-outlet, a supply-valve and an exhaust-valve connected to move together by a stem extending through the supply-valve opening from the supply to the exhaust valve, the supply-valve having a conical working face, and a soft-rubber seat for the supply-valve also having a conical working face.

6. The combination, with electromagnetic valve-controlling means, of a casing having a supply-inlet, a combined pressure and exhaust opening and an exhaust-outlet, a supply-valve and an exhaust-valve connected to move together by a stem extending through the supply-valve opening from the supply-valve to the exhaust-valve, the supply-valve being of hard rubber, and a soft-rubber seat for the supply-valve.

7. The combination, with electromagnetic valve-controlling means, of a casing having a supply-inlet, a combined pressure and exhaust opening and an exhaust-outlet, a supply-valve and an exhaust-valve connected to move together by a stem extending through the supply-valve opening from the supply-valve to the exhaust-valve, a soft-rubber seat for the supply-valve, and a supply-valve guard detachably connected to the casing and having the soft-rubber valve-seat therein, substantially as set forth.

8. The combination, with electromagnetic valve-controlling means, of a casing *a* having the cover *a'* and having a supply-inlet *b*, a combined pressure and exhaust opening *c* and an exhaust-outlet *e*, a supply-valve *f* of hard rubber, an exhaust-valve *g* connected to the supply-valve by a stem *h* extending through the supply-valve opening, a soft-rubber seat *k* for the supply-valve, the supply-valve and seat having conical engaging faces, and a supply-valve guard *j* detachably connected to the casing and having the soft-rubber supply-valve seat therein, substantially as set forth.

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

ASA H. MOSHER.

Witnesses:

HENRY D. WILLIAMS,

HERBERT H. GIBBS.