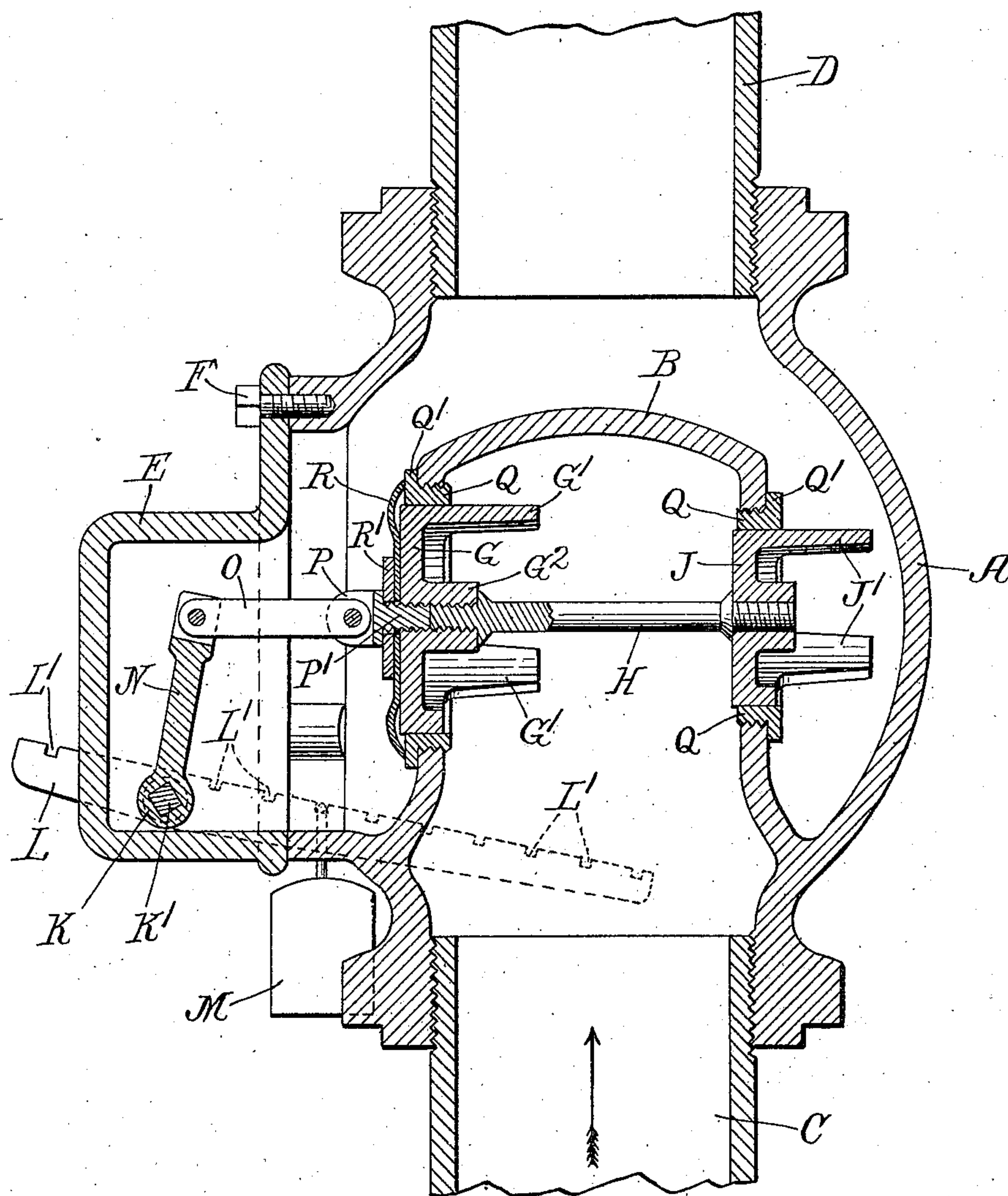


No. 847,401.

PATENTED MAR. 19, 1907.

G. C. DAVIS.  
VALVE.

APPLICATION FILED JULY 2, 1906.



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# UNITED STATES PATENT OFFICE.

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## VALVE.

No. 847,401.

Specification of Letters Patent.

Patented March 19, 1907.

Application filed July 2, 1906. Serial No. 324,617.

*To all whom it may concern:*

Be it known that I, GEORGE COIT DAVIS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Valves, of which the following is a specification.

The invention relates to valves, and particularly to the type of valves in which the movable element is reciprocated in an orifice in the casing, and has for its object to provide a construction by which a perfect fit will be maintained between the movable element and the casing throughout changes of temperature.

The invention is illustrated in the accompanying drawing, in which is shown a vertical section through one form of valve constructed according to my invention, certain parts being shown in elevation.

The valve shown is a back-pressure valve of the double-piston type suitable for use in connection with non-condensing engines or steam-heating systems.

A represents the outer valve-casing, B the inner casing, which is preferably formed integral therewith. This structure is ordinarily made of iron. The steam enters the casing at the bottom through the pipe C. A pipe D leads from the top of the outer casing. The casing A is closed at one side by the removable cap E, secured by a screw-bolt F. This particular valve is taken simply for purposes of illustration. Obviously the arrangement of parts will be subject to very considerable variation in accordance with the conditions under which the particular valve is designed to be used. The inner casing B is provided with two oppositely-placed ports of unequal area. The larger of these ports is controlled by the disk G, having wings G' and the central inward projection G<sup>2</sup>, into which screws the spindle H, the other end of which is screwed into a similar disk J, controlling the other port. This disk has the wings J'. A short shaft K, journaled in the cap-piece E, carries the lever L, provided with notches L' for the weight M. On a squared portion K' of the shaft K is a rock-arm N, forked at its upper end to receive the pivoted end of a link O, which at the other end is pivoted to the fork P of a screw P', which takes into the disk G. In valves of this character the casing is ordinarily made

of iron, and in order that there should be a close fit between the valve-disks and the casing the former have been made of brass or some like relatively soft metal. The difference in the coefficients of expansion of these different metals has given rise to some trouble in the operation of the valve.

The present invention has for its object to do away with this difficulty. I now make my valve-disks of metal having substantially the same coefficient of expansion as the casing, in practice ordinarily making the casing and the disks of iron, and in order to get the snug fit afforded by the soft metal I insert in the orifices in the iron casing soft metal bushings Q, which are made of brass, bronze, or the like. The bushings are preferably screw-threaded, so as to be removable from the casing, and have the flanges Q'. Their inner faces are flat, and may of course be ground down, so as to give the proper fit. These bushings are relatively thin, so that their change in volume, due to temperature changes, is inconsiderable. Moreover, the coefficients of expansion of the metals of which they are composed being greater than that of iron if they are fitted into the orifices in the casing when the metals are cold, expansion due to rise in temperature, is effectively prevented. In order to make the valve very noiseless, I also preferably associate with one of the disks a spring R, clamped between the plate R' and the disk. This spring is curved at its outer part and put under tension when the valve is closed.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to any person skilled in the art.

The use and operation of my invention are as follows: The steam enters the inner casing through the pipe C, exerting a pressure against both disks G and J. This pressure is greatest, of course, against the disk G on account of its greater area. When the pressure on G has become sufficient to overbalance that on the smaller disk and the pressure exerted by the counterweight M, the disks will be moved from their seats to allow the escape of steam into the outer casing and through the exhaust-pipe B. By making the valve-casing and the disks of metals having the same coefficients of expansion,

the sticking or leaking of the valve, due to changes in temperature, is effectively prevented. The soft metal bushings interposed between the casings and the disks insures  
5 the proper fit of the valve in its bearings.

I claim—

10 In a valve device the combination of a valve-casing having two orifices in line with each other with two valves arranged on one stem and adapted to simultaneously slide back and forth in and through such orifices, the diameter of the valves being smaller than

the diameters of their respective orifices, said valve and casing composed of hard metals having the same coefficients of expansion, 15 and soft metal bushings or linings for the orifices of said casing of such thickness as to leave the orifices of substantially the same diameters as their respective valves.

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