No. 711,216. Patented Oct. 14, 1902.

H. E. KEYES.

VALVE.

(Application filed June 18, 1902.)

(No Model.)

Fig. 1.

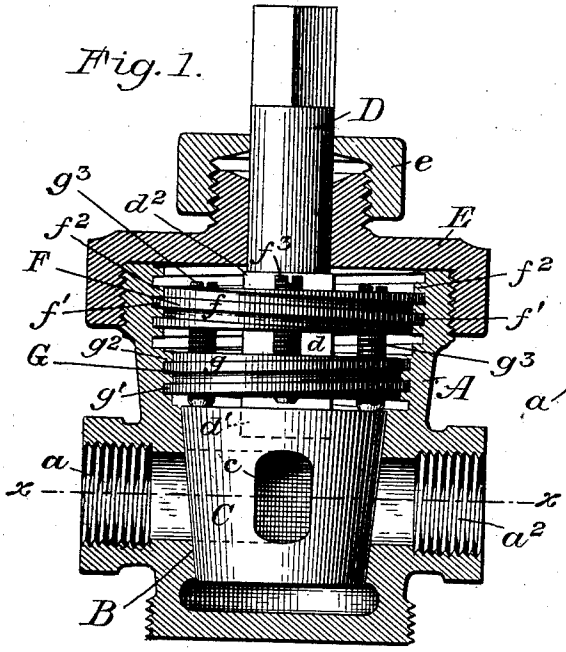


Fig. 2.

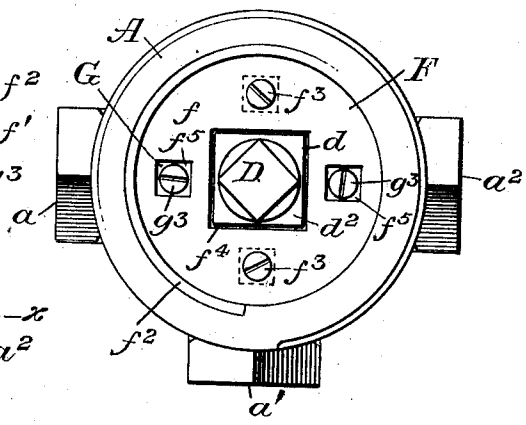
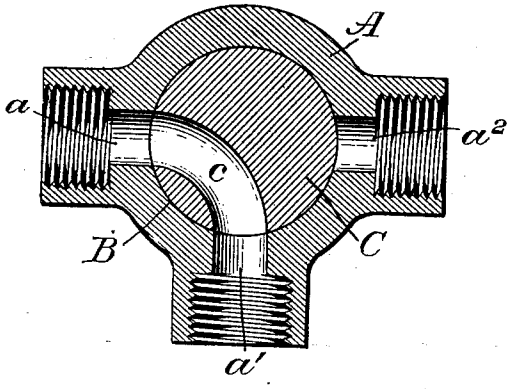


Fig. 3.



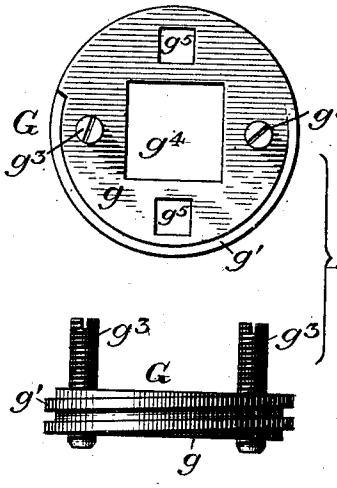


Fig. 4.

Attest:

E. A. Seale

Wm. H. Somerwell.

Inventor:

Harry E. Keyes.

By Howell Battle

Attorney.

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

UNITED STATES PATENT OFFICE.

HARRY E. KEYES, OF HOMESTEAD, PENNSYLVANIA, ASSIGNOR TO KEYSTONE VALVE AND MANUFACTURING COMPANY, OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

VALVE.

SPECIFICATION forming part of Letters Patent No. 711,216, dated October 14, 1902.

Application filed June 18, 1902. Serial No. 112,186. (No model.)

To all whom it may concern:

Be it known that I, HARRY E. KEYES, a citizen of the United States, residing at Homestead, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Valves, of which the following is a specification.

My invention relates to means for limiting the movements and assuring a proper seating of a rotary valve-plug of a three or four way valve; and, broadly stated, said invention consists in providing such a valve with a pair of valve-seating devices which are moved in opposite directions by the rotation of the valve-plug for alternately bearing upon the same and forcing it to its seat, according to the direction in which said plug is rotated.

In United States Letters Patent issued to myself and W. Gluck November 16, 1897, No. 593,587, a two-way valve is shown and described which is provided with a single valve-seating device movable toward and from the valve-plug by the rotation of the valve-stem to force the valve-plug to its seat when the valve-ports are closed and to remove the pressure thereon when said plug is rotated for opening said ports. My present invention involves the use of a pair of such devices organized to be moved in opposite directions by the rotation of the valve or valve-stem, so that said valve will be first released from pressure and then forced to its seat regardless of the direction in which it may be rotated.

To more particularly describe my invention, I will refer to the accompanying drawings, in which—

Figure 1 is a central vertical section through the casing of a three-way valve embodying my invention. Fig. 2 is a top view of the same with the cap or cover removed. Fig. 3 is a sectional view thereof, taken on line x x of Fig. 1; and Fig. 4 illustrates one of the valve-seating devices in top and edge views.

The valve-casing A may be of any design suitable for a three or four way valve, my invention being equally applicable to both types of rotary plug-valves. The casing illustrated is designed for a three-way valve and is therefore provided with three ports a, a', and a^2, which communicate with a tapered valve-seat B. Within said seat is a tapered valve-plug C, ported, as at c, so that ports a and a' or a' and a^2 may be placed in communication by the rotation of the plug, as will be readily understood. If the valve is to be a four-way valve, the casing A must be provided with an additional port and the plug C correspondingly ported, as will be understood. The valve-plug is rotated by means of a stem D, which projects through a cap or cover E, screwed upon or otherwise secured to the casing A, said cover being provided with a neck surrounding the stem D, and said neck is supplied with a gland e, which is packed in the usual manner for assuring a tight joint around the valve-stem. The valve-stem may be formed integral with the valve-plug, or it may be detachable therefrom, so that it may be readily replaced in case of breakage without the necessity of also removing and replacing the valve-plug. As shown in Fig. 1, that portion of the valve-stem d which is within the casing is square in cross-section, and the lower end thereof rests in a square hole d' in the valve-plug, (indicated in dotted lines in Fig. 1,) the valve-stem acting as a "key-wrench" in rotating the valve-plug, as will be readily understood. The stem is prevented from being withdrawn from the casing and from its seat in the valve-plug by a shoulder d^2 at the junction of the square and round portions of the stem, which prevents the latter from being drawn up through the cap or cover E.

In the space between the upper surface of the valve-plug and the under surface of the cap or cover E are located two valve-seating devices F and G, which in combination with the valve-plug embody my invention. So far as the main feature of my invention is concerned it is immaterial how these devices may be constructed, so long as they are movable in opposite directions by the rotation of the valve or valve-stem for alternately forcing the valve-plug to its seat, according to the direction in which said plug is rotated. As illustrated in the drawings, the devices F and G consist of circular blocks or disks, which are screw-threaded on their peripheral sur-

faces to engage threaded portions of the valve-casing, and each block is provided with screws, the ends of which afford adjustable bearing-surfaces for contact with the upper surface of the valve-plug. The block or disk f of the device F is provided in its peripheral edge with a left-hand screw-thread f', which engages a similar thread f^2 around the inner surface of the casing A. Tapped into said block are two screws f^3 f^3, which when the block is rotated in the direction which will force it toward the valve-plug will bear down upon the upper surface of the plug and force it to its seat. Through the center of the block is a square opening f^4 for the square portion of the valve-stem, said stem acting to rotate said block while permitting it to be moved by its screw-thread toward or from the valve-plug, according to the direction of rotation.

The device G is the same in structure as the device F, except that its block or disk g is provided with a right-hand screw-thread g' instead of a left-hand screw-thread and is made slightly smaller in diameter to facilitate the cutting of its coöperating thread g^2 on the inner surface of the valve-casing. Said block is similarly provided with a central square opening g^4 for the square portion of the valve-stem and with two screws g^3 g^3, which afford adjustable contacts for forcing the valve-plug to its seat. The block g of the device G is provided with two holes g^5 g^5 for the passage of the screws f^3 f^3 of the device F toward and from the valve-plug, and block f is similarly provided with holes f^5 f^5 for the passage of screws g^3 g^3 and for affording access thereto for purposes of adjustment.

It will now be understood that if the valve-stem be rotated to the left for placing ports a' and a^2 in communication by way of port c through the valve-plug the devices F and G will be rotated together by the valve-stem. Device G will, however, be moved by its right-hand screw-thread away from contact with the valve-plug for removing the pressure thereon, and device F will be moved by its left-hand screw-thread into contact with the plug for forcing it to its seat, and that by a reverse movement of the stem a reverse action will take place—*i. e.*, the device F will first release its pressure on the valve, which will again be forced to its seat by the device G. The screws f^3 f^3 and g^3 g^3, which afford the adjustable contacts for the two devices, are initially adjusted, so that sufficient pressure will be applied to the plug at the proper movement to prevent its being rotated beyond the point at which its ports are properly registered with the ports in the valve-casing. Any wear between the valve and its seat may be readily taken up by readjusting said screws, as will be readily understood.

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

1. The combination substantially as hereinbefore described, of a valve-casing having a tapered valve-seat and three or more ports communicating therewith, a rotary valve-plug seated therein and ported to register with the ports in said casing, and a pair of valve-seating devices which are moved in opposite directions by the rotation of said plug for alternately bearing upon the same according to the direction of rotation thereof.

2. The combination substantially as hereinbefore described, of a valve-casing having a tapered valve-seat and three or more ports communicating therewith, a rotary valve-plug seated therein and ported to register with the ports in said casing, a valve-stem for rotating said plug, and a pair of valve-seating devices which are moved in opposite directions toward and from said plug by the rotation of said stem and adapted to alternately bear upon said plug for forcing it to its seat according to the direction of rotation of said stem.

3. The combination substantially as hereinbefore described, of a valve-casing having a tapered valve-seat and three or more ports communicating therewith, a rotary valve-plug seated therein and ported to register with the ports in said casing, a pair of valve-seating devices consisting of a pair of oppositely-screw-threaded blocks or disks provided with contacts for forcing said plug to its seat, coöperating screw-threads on the inner surface of the valve-casing and means for causing said blocks to be rotated with said plug.

4. The combination substantially as hereinbefore described, of a valve-casing having a tapered valve-seat and three or more ports communicating therewith, a rotary valve-plug seated therein and ported to register with the ports in said casing, a pair of valve-seating devices consisting of a pair of oppositely-screw-threaded blocks or disks provided with adjustable contacts for forcing said plug to its seat, coöperating screw-threads on the inner surface of the valve-casing, and means for causing said blocks to be rotated with said plug.

5. The combination substantially as hereinbefore described, of a valve-casing having a tapered valve-seat and three or more ports communicating therewith, a rotary valve-plug seated therein and ported to register with the ports in said casing, a valve-stem for rotating said plug, a pair of oppositely-threaded blocks or disks arranged one above the other above said plug, coöperating screw-threads on the inner surface of said casing, contacts carried by the upper block adapted to bear upon the valve-plug through openings in the lower block, similar contacts on the lower block, and means for causing said blocks to be rotated together by the rotation of said valve-stem.

6. The combination substantially as hereinbefore described, of a valve-casing having a tapered valve-seat and three or more ports communicating therewith, a rotary valve-

plug seated therein and ported to register with the ports in said casing, a valve-stem for rotating said plug, a pair of oppositely-threaded blocks or disks arranged one above the other above said plug, coöperating screw-threads on the inner surface of said casing, adjustable contacts carried by the upper block adapted to bear upon the valve-plug through openings in the lower block, similar adjustable contacts carried by the lower block, openings through the upper block in line with said last-mentioned contacts, and means for causing said blocks to be rotated together by the rotation of said valve-stem.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

HARRY E. KEYES.

Witnesses:
AMELIA SUTTER,
JOHN SANKEY.