

UNITED STATES PATENT OFFICE.

EDWARD S. HOUGH, OF SAN FRANCISCO, CALIFORNIA.

FEED-WATER VALVE.

1,101,933.

Specification of Letters Patent.

Patented June 30, 1914.

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To all whom it may concern:

Be it known that I, EDWARD S. HOUGH, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented new and useful Improvements in Feed-Water Valves, of which the following is a specification.

This invention relates to a feed-water valve and particularly pertains to improvements in the valve used in connection with the engine feed-water supply shown in Patent No. 608,679, issued to me August 9, 1898.

It is the object of this invention to provide a self-centering spring-seated valve which is especially designed for use in boiler feed-water supply systems, and which is simple in construction and efficient and reliable in operation.

A further object is to provide a spring-seated valve which is adapted to be adjusted to vary the extent of the opening of the valve, and which is so constructed that the valve will automatically center itself on its seat on the application of back pressure.

Other objects will appear hereinafter.

The invention primarily resides in a disk valve loosely mounted on a seat, adapted to be opened by pressure against the underside of the valve, a follower block having universal connection with the disk valve, a guide in which the follower block is reciprocally mounted, a spring operating on the follower block to normally retain the valve in its seated position, and means for limiting the extent of opening of the disk valve.

The invention further consists of the parts and the construction and combination of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a vertical section of the invention. Fig. 2 is a horizontal section on the line X—X of Fig. 1.

In the drawings A represents a valve casing having an inlet opening 2 and a discharge opening 3; the discharge opening being disposed at right angles to the inlet opening 2. The inlet and discharge openings 2 and 3, respectively, open to a chamber 4 in the valve casing, the upper end of which is opened to admit of the insertion of the valve parts to be hereinafter described, and is closed by means of a cap 5, which is

secured to the valve casing A by means of bolts 6, or in any other suitable manner.

Formed at the intersection of the inlet opening 2 and the chamber 4 is a valve seat 7, on which is mounted a disk valve 8; the disk valve having downwardly extending guide members 9 thereon which extend into the inlet opening 2. Formed on the upper face of the disk valve 8 is a dome-shaped protuberance 10, which extends into a recess 11 formed on the underside of a follower block 12. The follower block 12 is mounted in a cylinder 13 and extends through and is guided in the lower end of the latter; the cylinder 13 being provided with openings 14 to admit of the passage of liquid to and from its interior around the follower block 12. The cylinder 13 is threaded at its upper end, and is screwed into an internally threaded recess on the underside of the cap 5; a shoulder 15 being formed on the cylinder 13 adjacent the threaded end thereof, to form a stop to insure the lower end of the cylinder 13 being positioned a certain distance above the disk valve 8 when the cap 5 is in position on the valve casing. The follower block 12 is formed with an annular shoulder 16 adjacent its upper end, which shoulder surrounds a tubular extension 17 on the upper side of the follower block 12. A helical spring 18 bears between the shoulder 16 on the follower 12 and the underside of the cap 5, and acts to normally retain the follower 12 and the disk valve 18 in their lowermost positions. Extending into the tubular projection 17 on the follower 12 is a stem 19, which passes through a stuffing-box 20, carried on the cap 5, and is provided with a screw-threaded portion 21, which engages with a correspondingly threaded portion of the cap 5. The stem 19 is provided with a hand-wheel 22 on its outer end, by means of which the stem 19 may be rotated and advanced or retracted in relation to the follower 12.

In the application of the invention, the inlet opening 2 of the valve casing A is connected to a supply pipe leading from a suitable pump, not shown; and the discharge opening 3 connects with a supply pipe leading to a boiler, not here shown. The disk valve 8 opens when the pressure on the underside thereof is in excess of the pressure thereabove, so as to allow of the passage of the feed-water into the supply pipe through

the discharge opening 3; the stem 19 being positioned sufficiently far above the follower 12 to permit the disk valve 8 to open. The extent of opening of the disk valve 8 is regulated by adjusting the position of the stem 19 in relation to the follower 12, and where it is desired to retain the disk valve 8 in its closed position, the stem 19 is positioned to bear against the upper face of the follower 12. When fluid pressure above the disk valve 8 is greater than below, the valve 8 is seated by the combined action of the fluid pressure and the spring 18; the spring 18 operating through the follower 12 to move the valve 8 to its seated position.

An important feature of this invention resides in the loose connection between the disk valve 8 and the follower 12, which insures the valve being properly centered on its seat and thus insures an effective closure of the inlet opening 2. A vent passage 23 is formed in the follower 12 and extends from the exterior thereof into the tubular projection 17, to admit of the passage of liquid to and from the interior of the tubular projection 17, when the stem 19 is moved up or down therein; the slidable connection between the stem 19 and the projection 17 cooperating with the lower end of the guide cylinder 13 to maintain the follower 12 in a vertical position. By mounting the follower 12, guide cylinder 13, spring 18, and stem 19 on the cap 5, these parts can be readily removed collectively from the valve casing to give access to the valve, and facilitate assembling the parts. The downwardly extending guide member 9 on the disk valve 8 comprises an annular ring formed with ports immediately below the disk and carried on webs depending from the underside of the disk, the ring being in slidable contact with the circumferential walls of the inlet opening 2 to form a bearing all around its periphery.

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

1. In a valve, a casing having inlet and outlet ports, a disk valve slidable in the inlet port, a dome-shaped projection extend-

ing upwardly from the disk valve, a perforated tubular member secured to the casing in overlying relation to said disk valve, a follower in said tubular member having its lower end projecting down through an opening provided therefor in the bottom of said tubular member and having a depression in its lower face into which said projection of the disk valve extends, the lower end of the tubular member being spaced from the inlet port whereby to allow the disk valve to have free movement in said space, an outwardly extending shoulder on the follower arranged within the tubular member, a tubular extension on the follower, a coil spring surrounding said extension and engaged with the casing and seating on said shoulder, and a one-piece stem threaded into engagement with the casing and having its lower end loosely projected into said tubular extension of the follower to provide a guide for the upper end of the follower and having said lower end for engagement with the upper face of the follower to restrict the upward movement of the follower.

2. In a valve, a casing having inlet and outlet ports, a disk valve for the inlet port slidable in said port, a projection extending upwardly from the disk valve, a guide member secured to the casing and overlying said disk valve, a spring pressed follower in said guide member having a depression in its bottom face which receives said projection, the lower end of the guide member being spaced with relation to the disk valve to allow the latter to have free movement in said space, a tubular extension which projects upwardly from the follower, and a one-piece stem threaded into engagement with the casing and having its lower end loosely arranged in said tubular extension to provide a guide for the upper end of the follower and having said lower end for engagement with the upper face of the follower to restrict upward movement of the follower.

EDWARD S. HOUGH.

Witnesses:

IRVINE SINNETT,
W. W. HEALEY.