No. 793,281. PATENTED JUNE 27, 1905.

H. J. DAVIS & P. G. AULT.

VALVE.

APPLICATION FILED OCT. 19, 1904.

2 SHEETS—SHEET 1.

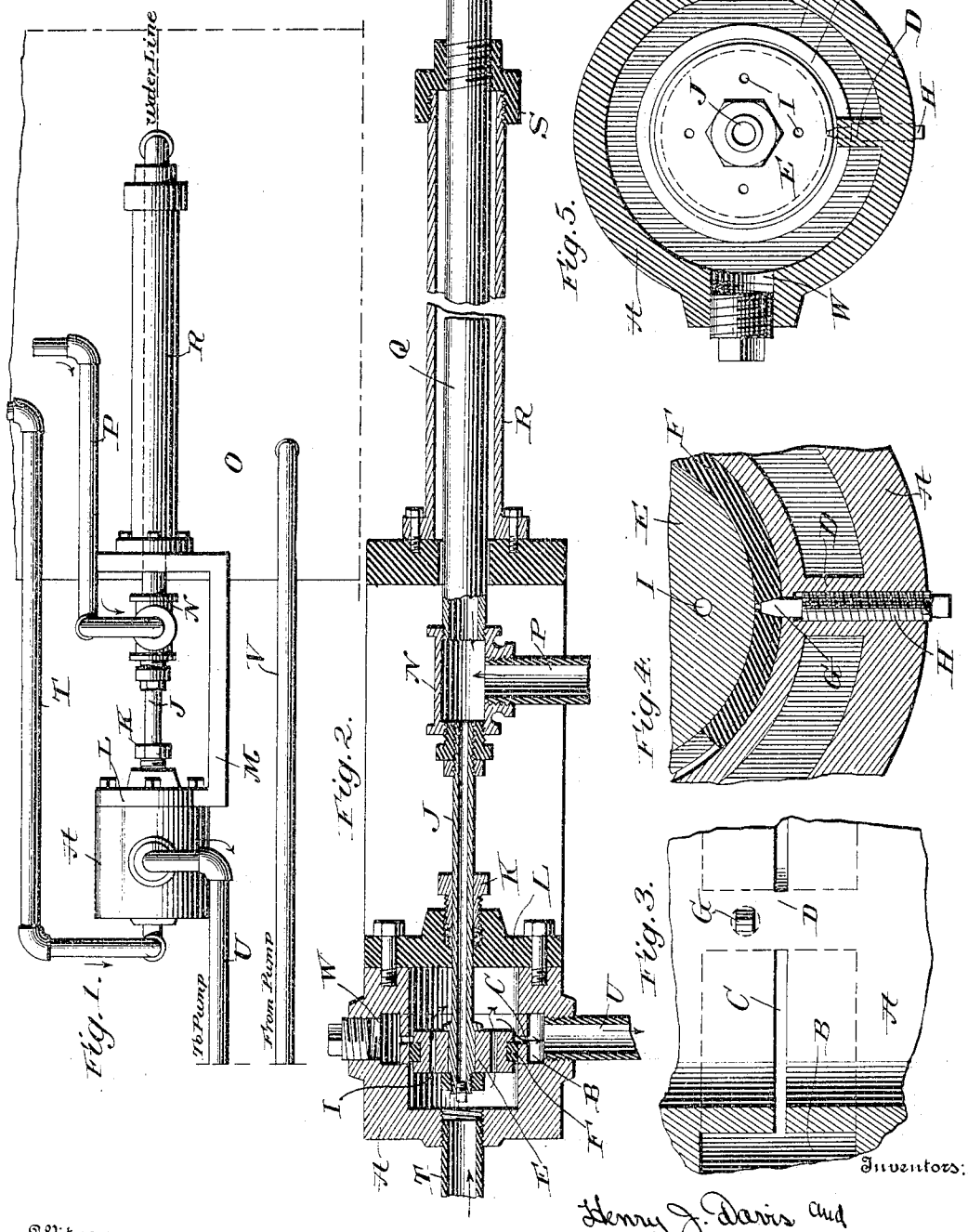


Fig. 1.

Fig. 2.

Fig. 5.

Fig. 4.

Fig. 3.

Witnesses
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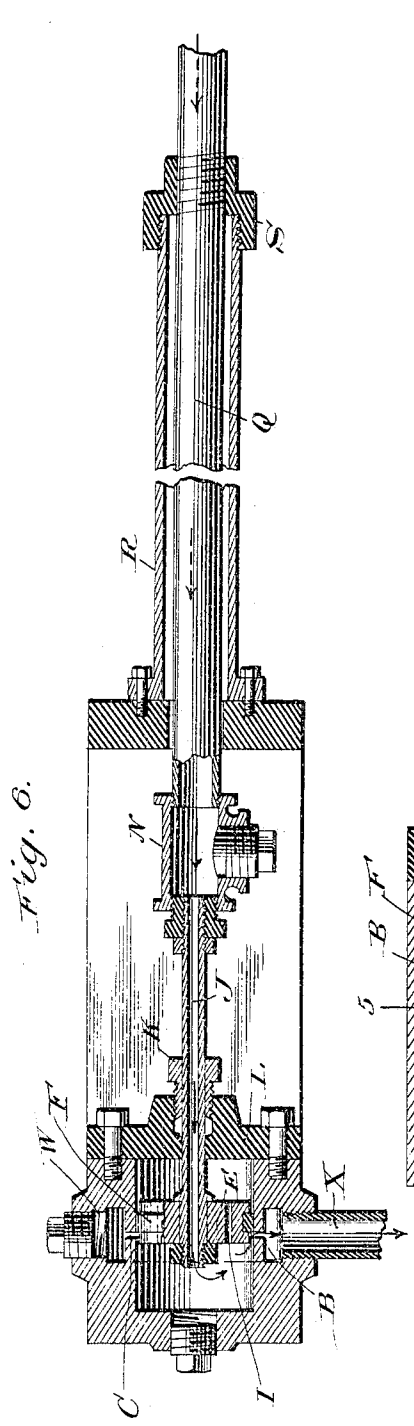


Fig. 6.

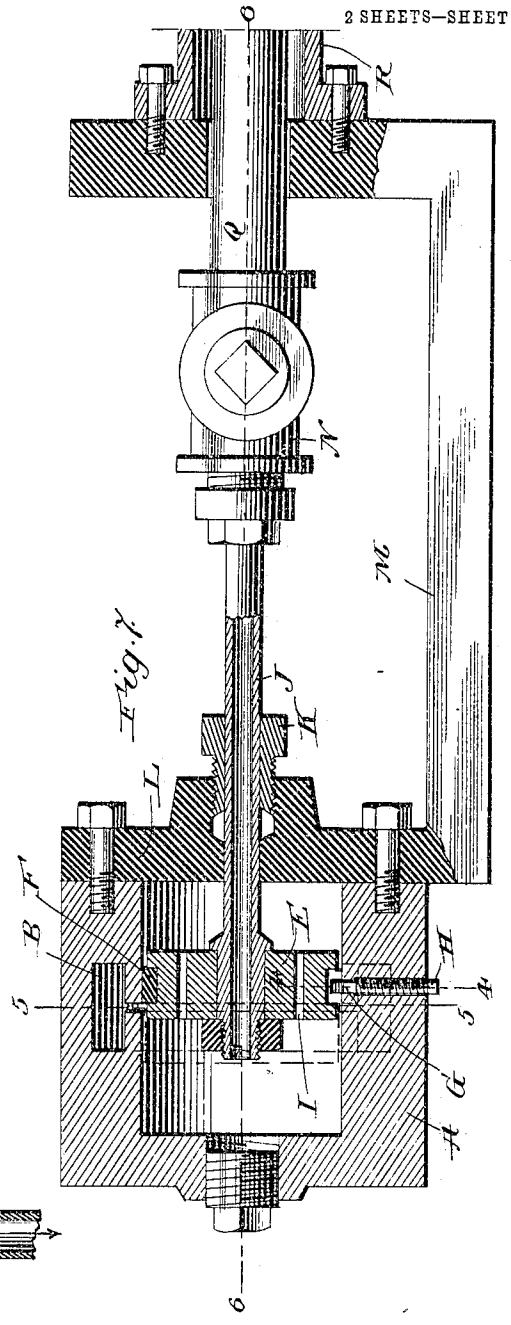


Fig. 7.

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No. 793,281. Patented June 27, 1905.

UNITED STATES PATENT OFFICE.

HENRY J. DAVIS AND PLAYFAIR G. AULT, OF BIRMINGHAM, ALABAMA.

VALVE.

SPECIFICATION forming part of Letters Patent No. 793,281, dated June 27, 1905.

Application filed October 19, 1904. Serial No. 229,147.

To all whom it may concern:

Be it known that we, HENRY J. DAVIS and PLAYFAIR G. AULT, citizens of the United States, residing at Birmingham, in the county of Jefferson and State of Alabama, have invented certain new and useful Improvements in Valves, of which the following is a specification.

Our present invention pertains to improvements in valves, the construction being particularly applicable for use as a regulating-valve for pumps, steam-traps, and the like.

The invention will be best understood upon reference to the annexed drawings, wherein—

Figure 1 is a side elevation of the valve and attendant parts when it is employed as a controlling-valve for a feed-pump; Fig. 2, a longitudinal sectional view, on an enlarged scale, of the valve and its actuating device; Fig. 3, an enlarged view of a portion of the interior of the valve shell or casing; Fig. 4, a sectional view taken on the line 4 4 of Fig. 7; Fig. 5, a similar view taken on the line 5 5 of Fig. 7; Fig. 6, a horizontal longitudinal sectional view of the valve and attendant parts when the same is employed as a trap, said view being taken on the line 6 6 of Fig. 7; and Fig. 7, a vertical sectional view.

The object of our invention is to produce a valve which may be employed to regulate the passage of steam or water from one source to another and to construct the same so that it operates readily and affords a relatively large port or opening upon a slight movement of the piston. The advantages to be derived from such a construction, together with the details which are present, will be hereinafter fully set forth.

The valve proper is substantially the same in both forms of apparatus shown, the application, however, being slightly modified to suit the varying conditions.

The valve comprises a shell or casing A, having a cylindrical bore, the shell being cored out to form an annular chamber or recess B, which is connected with the interior of the shell by a relatively narrow passage or port C. Chamber or recess B extends entirely around the valve-shell, and the port or opening C is coextensive therewith except for a slight distance where the port is stopped off, forming a bridge D, Figs. 4, 5, and 7. The valve proper comprises a movable piston or carrier E, which part is provided with a circumferential groove, in which is seated a packing-ring F, the ends of the ring abutting against a pin G. Said pin is preferably wedge-shaped at its inner end and is mounted in a recess formed in the bridge D, being held therein by an adjustable follower H, by which it may be projected inwardly between the correspondingly-shaped ends of the ring F. The pin at all times stands between the ends of the ring, the valve movement being so slight in effecting its object—namely, closing and opening port C—that the pin does not pass out of the slot formed by the adjacent ends of the ring. As will be readily appreciated, an inward movement of the wedge-shaped pin will expand the ring F, and consequently cause it to more closely hug the interior face of the shell. The pin also prevents the ring from shifting circumferentially around or about piston or carrier E, so that the space which intervenes between the ends of the ring is at all times in line with the bridge D, thus precluding the passage of steam (or other fluid) through the port C when the valve is moved to such position that the ring overlies said port. In other words, there can be no leakage whatsoever through the port by reason of steam passing through or between the ends of the ring. The piston or carrier is formed or provided with a number of openings or ports I, which extend through from one side to the other. (See Figs. 2 and 7.)

The valve-stem J is preferably made hollow in order that the valve may be adapted to various purposes, as will presently appear, and is rigidly connected to the carrier. Said stem passes through a packing gland or box K, secured in one arm or member L of a casting or bracket M, arm L forming one head of the valve-casing and is rigidly connected to a T or fitting N. Said fitting is connected to the steam-space of the boiler O by a pipe P and also with a pipe Q, which connects with the boiler at a point on the level of the water-

line thereof. Said pipe Q passes freely through the bracket or casting M and is surrounded by a pipe R, one end of which is fixed to casting M, while the outer or opposite end is connected to pipe Q by a reducer or casting S.

A pipe T leads from the steam-space of the boiler or other suitable source to the outer end of the valve shell or casing, while a pipe U, opening into the chamber or recess B, leads to the pump. (Not shown.) A pipe V extends from the pump to the water-space of the boiler. The valve shell or casing is shown as provided with a third outlet W, which in the present instance is shown as plugged up, though it may be connected to a low-water alarm, if so desired.

When the valve is employed in the manner illustrated in Figs. 1 and 2, the other end of the hollow stem is closed, as shown in Fig. 2, so that the steam or water, as the case may be, passing into pipes P and Q and stem J, will be confined therein or at least cannot pass out into the valve-shell. In practice pipe Q will drain toward the boiler, so that the water may pass therefrom and from stem J when the water in the boiler falls below the established water-line, thereby permitting steam to directly enter the pipe and also to pass into said pipe and the hollow valve-stem through pipe P. From this it will be seen that pipe Q is filled with water so long as the water-level remains at the proper point. Under these conditions the stem and pipe Q are contracted, and by reason of such contraction the valve will be drawn to the right and caused to cover port C, thereby cutting off the passage of steam from pipe T through ports or openings I, port C to pipe U to the pump, whereupon the pump will come to rest. When the water in the boiler falls below the predetermined level, steam enters pipe Q and stem J, thereby causing the same to expand and elongate, the fitting S becoming a fixed abutment or point from which the pipe moves. This elongation causes the valve to move to the left or into that position shown in Fig. 2, thereby opening port C and permitting steam to pass to the pump. With the construction set forth a relatively small movement of the valve is all that is necessary to effect the proper operation of the parts. By having the port C extend around substantially the entire circumference of the valve a large port is afforded upon a relatively small movement of the valve. The steam within the shell serves to hold the ring closely to the wall of the shell, thereby insuring a close fit of the ring over the port C when the ring overlies the same.

In Figs. 6 and 7 the valve is shown employed as a trap. The general construction is the same, the arrangement being different in the following particulars: The valve is arranged to the right of port C, and the outer end of the valve-stem is left open, being in direct communication with the interior of the valve-shell. The lateral opening in fitting N is plugged, and pipe Q is connected with the exhaust of a radiator or the like. All the openings in the valve-shell are likewise closed, excepting one in communication with chamber B, from which extends a pipe X. The operation of the valve when thus arranged will be clearly understood. When steam is first turned into the radiator, it will naturally condense to a greater or less extent, and the water of condensation will pass into pipe Q and the valve-stem, thence from the valve-stem into the valve-shell, through port C into chamber B, and finally into pipe X. The parts will thus remain until all water of condensation is drained off and steam strikes pipe Q. When this occurs, said pipe and the valve-stem will elongate, thereby shifting the valve to the left and shutting off the further passage of steam from the radiator or heater. When the water of condensation again collects in the valve, the valve-stem, and the pipe, the parts become cool, and consequently contract, whereupon the valve again opens to discharge the accumulated water.

As will be seen, the valve is automatic in its operations and that a slight movement thereof is necessary to effect its objects and functions. A slight movement of the valve presents a maximum port.

It is conceivable, of course, that the valve may be employed with apparatus of a form other than those described, and we do not desire to limit ourselves to those herein specifically referred to.

Having thus described our invention, what we claim is—

1. In combination with a valve shell or casing having a chamber extending around the same, said chamber being in communication with the interior of the shell by a port extending around the shell; a bridge across the port; a valve mounted in the shell, comprising a carrier and a split ring mounted thereon; and a pin extending inwardly from the bridge between the ends of the ring.

2. In combination with a valve shell or casing having a port opening laterally into the same; a bridge extending across the port; a valve movable over the port, the ends of valve being separated; and a pin extending inwardly from the bridge between the ends of the valve.

3. In combination with a valve shell or casing having a port opening laterally into the same; a bridge extending across the port; a valve movable over the port; said valve comprising a carrier, and a split ring carried thereby; and a wedge-shaped pin extending inwardly between the ends of the ring.

4. In combination with a valve shell or casing having a port opening laterally into the same; a bridge extending across the port; a valve movable over the port, said valve comprising a carrier, and split ring mounted

thereon; a wedge-shaped pin extending inwardly between the ends of the ring; and means for adjusting said pin.

5. In combination with a valve shell or casing having a port opening laterally into the same; a valve mounted in said shell, the valve comprising a perforate carrier, and a ring carried thereby adapted to close the port; and means for moving the valve.

6. In combination with a valve shell or casing having a port opening laterally into the same; a perforated carrier mounted in the shell; a ring mounted on the carrier, said ring being of a width greater than that of the port; and a hollow stem connected to the carrier.

7. In combination with a valve shell or casing having a port opening laterally into the same; a perforated carrier mounted in the shell; a split ring mounted on the carrier; a pin extending from the shell between the ends of the ring; and a hollow stem extending through the carrier and opening into the shell.

8. In combination with a valve shell or casing having a port opening laterally into the same; a bridge extending across the port; a perforate carrier mounted in the shell; a split ring mounted on the carrier; a wedge-shaped member extending inwardly from the bridge between the ends of the ring; and means for adjusting said member,

9. In combination with a valve shell or casing having a port opening laterally into the same; a bridge extending across said port; a perforate carrier mounted in the shell; a hollow stem connected to said carrier and opening into the shell; a split ring mounted upon the carrier; a wedge-shaped pin extending inwardly from the bridge between the ends of the ring; and means for moving said pin inwardly.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

HENRY J. DAVIS.
PLAYFAIR G. AULT.

Witnesses:
GEO. H. BUNCH,
L. C. CLEARY.