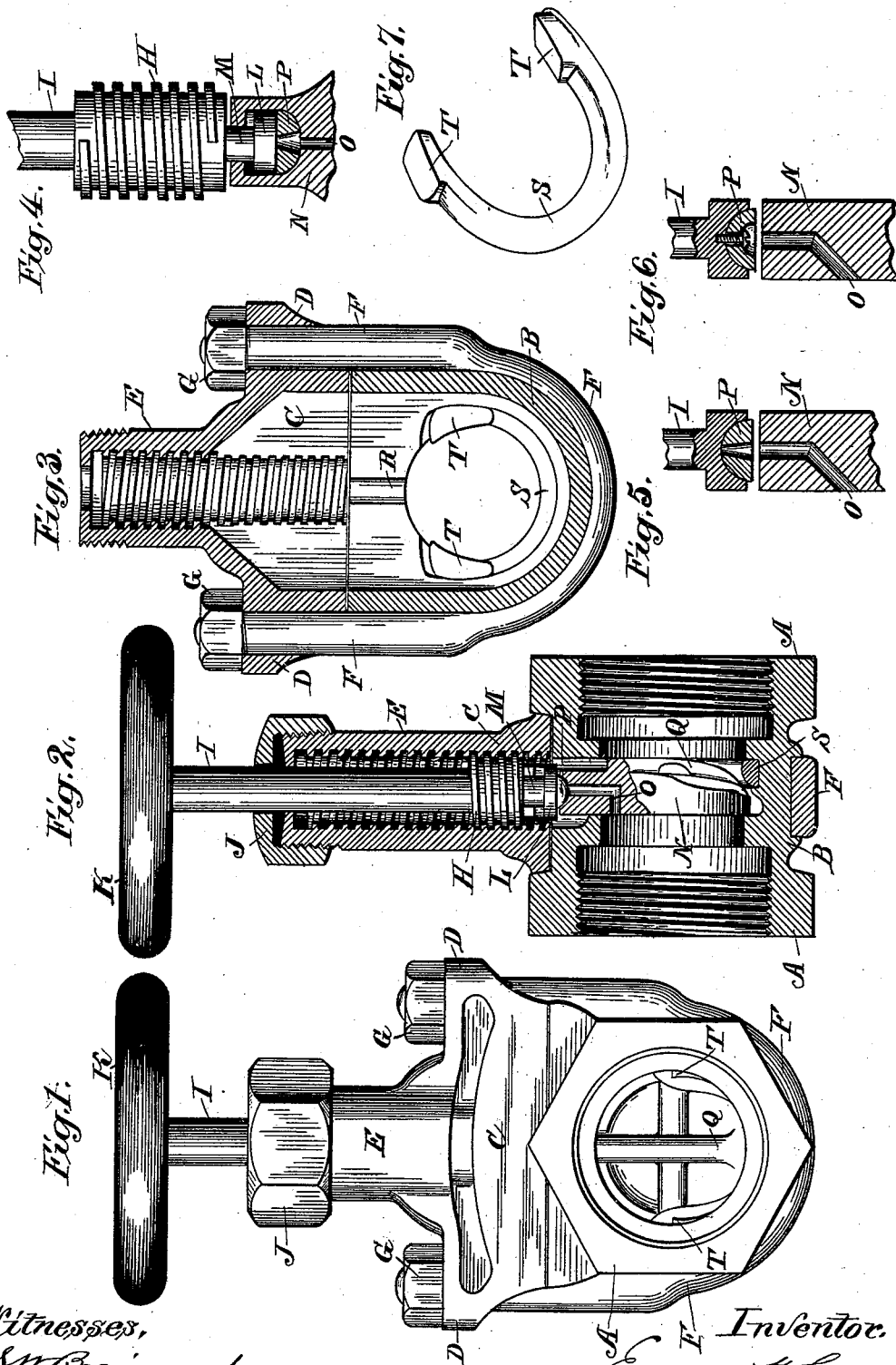


(No Model.)

E. H. LUNKEN.
STRAIGHTWAY VALVE.

No. 523,537.

Patented July 24, 1894.



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UNITED STATES PATENT OFFICE.

EDMUND H. LUNKEN, OF CINCINNATI, OHIO, ASSIGNOR TO THE LUNKEN-HEIMER COMPANY, OF SAME PLACE.

STRAIGHTWAY-VALVE.

SPECIFICATION forming part of Letters Patent No. 523,537, dated July 24, 1894.

Application filed January 4, 1894. Serial No. 495,664. (No model.)

To all whom it may concern:

Be it known that I, EDMUND H. LUNKEN, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented a certain new and useful Improvement in Straightway-Valves, of which the following is a description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates more particularly to certain improvements in straightway valves such as that shown in Letters Patent No. 494,582, granted to me on April 4, 1893, but some of its features are applicable to other forms and styles of straightway valves.

In the accompanying drawings Figure 1 represents an end elevation of the valve closed; Fig. 2 a middle vertical section in a plane longitudinally of the passage; Fig. 3 a vertical section in a middle plane transversely through the passage, with the valve-disk and stem and cap-nut removed; Fig. 4 an enlarged detail of the lower end of the valve-stem and upper part of the valve-disk, showing the means for coupling them together and the adjustable seat; Figs. 5 and 6 enlarged details showing modified arrangements of the adjustable seat, and Fig. 7 a perspective view of the wedging piece for forcing the valve-disk against its seat.

The same letters of reference are used to indicate identical parts in all the figures.

As in the patent above referred to, so in the valve illustrated in the drawings, the body of the valve consists of the opposite interiorly threaded pipe-connections A A, and the intermediate integral cylindrical portion B having upon its upper side a flat bearing surface upon which fits and rests the bonnet-portion C of the valve. This bonnet consists of an elongated shell having laterally projecting ears D D and a tubular neck-portion E. The bonnet is clamped to the body of the valve by a U-shaped clip F which fits in a groove in the middle portion B of the valve-body and projects at its upper ends through the ears D D and has the clamping nuts G screwed upon its ends. The tubular neck E, as well as the portion of the bonnet immediately beneath the same, is interiorly threaded to re-

ceive a screw H fast upon or formed integral with the valve-stem I, which latter extends at its upper end through the top of the bonnet and through a cap-nut J screwed upon the upper end of the neck E and has fast upon it a hand-wheel K by which it may be turned. The portion of the valve-stem below the screw H is reduced in diameter and its extreme lower end is provided with a collar L which fits between lugs M upon the upper edge of the valve-disk N, by which the valve-stem is loosely coupled to the disk. The disk is provided with a relief port O arranged to be closed at its upper end by the lower end of the valve-stem when the disk is forced to its seat. The collar L is of such thickness that it has limited play between the upper edge of the valve-disk and the lateral projections of the lugs M, Fig. 4, so that when the valve-stem is turned preparatory to opening the valve the relief-port O will be opened before the stem begins to lift the disk, and thus steam be admitted from the inlet to the outlet side of the valve and the pressure of the steam or liquid holding the disk to its seat be relieved to permit the easy lifting of the disk. This much of the valve is substantially the same as that shown in my patent before mentioned and in another pending application, Serial No. 470,363, filed April 14, 1893.

The first feature of my present invention relates to a self-adjusting seat for the lower end of the valve-stem, by which when the stem is screwed downward and the disk forced to its seat the relief-port O is tightly closed.

In the valve shown and described in the aforesaid pending application the lower end of the valve-stem co-operates directly with a seat upon the upper edge of the disk around the relief-port, but it has been found in some sizes and styles of valves that the disk is not always seated accurately enough to form a tight joint between the stem and its seat upon the disk and securely close the relief-port, so that sometimes the valve will leak through this port. I have overcome this difficulty by providing a self-adjusting member P of hemispherical form, or provided with a suitably rounded under side, which fits loosely but snugly in a suitable recess formed in the up-

per edge of the disk coincident with the relief-port. The flat upper surface of this adjustable member projects slightly above the surface of the valve-disk, so that the bearing of the lower end of the valve-stem is upon it. It is perforated coincidently with the relief-port, so that when the valve-stem is lifted the member is not itself moved, and this perforation is flared outwardly at its lower end so as always to register with the upper end of the relief-port in the different adjusted positions of the member P. The member might be loosely fitted in the lower end of the valve-stem itself, as shown in Fig. 5, or, again, it might be fitted in and carried by the stem, so that it would be lifted with the latter, as shown for instance in Fig. 6. The provision of this self-adjusting member co-operating with the lower end of the valve-stem insures the tight closure of the valve whenever the stem is screwed inward and the disk forced to its seat, and prevents leaking through the relief-port.

The next feature of my invention relates to means for guiding the valve-disk in its movements to and from its seat and insuring its accurate seating at each closing of the valve. To this end the disk is provided upon its side facing the inlet of the valve with a rib Q extending across the face of the disk parallel with the line of the valve-stem and movement of the disk, and fitting in a guideway R formed in the inner face of the body portion B of the valve and also in the guideway formed by the inner threaded surface of the bonnet C. In the opening and closing movements of the valve the rib Q is confined in and travels through this guideway and the disk is thereby maintained in proper position. The rib Q also serves to strengthen the disk and brace it against the strain to which the pressure in the valve subjects it, thereby permitting the disk to be made thinner than could otherwise be done and consequently contributing to the compactness of the valve. The rib not only extends across the circular portion of the disk, but along the shank by which the disk is coupled to the valve-stem, to the upper end thereof, so that at the last closing movement of the valve the lower edge of the disk is held from tilting over the lower edge of the valve-seat and cutting away of the seat by the disk thereby prevented.

The prior valve above referred to was provided with a half-ring wedging piece S which co-operated with the valve-disk to force it tightly against its seat when the valve-stem was screwed inward. This wedging piece is employed in the present valve, and is shown fitted in a suitable groove in the bottom of the body, Figs. 2 and 3. In the prior valve the wedging surfaces of this ring were simply beveled toward the valve-seat, so that when the valve was closed the only action

of the wedging surfaces was to force the disk toward its seat. In the present valve the wedging surfaces T of this half-ring are not only inclined toward the valve-seat but also toward the center of the passage through the valve, as seen in Fig. 5, so that when the disk is forced downward by screwing in the valve-stem it is not only guided and centered by its rib and the guide-way above described, but the inwardly beveled wedges force it toward the center of the valve and insure its accurate seating and the tight closure of the valve.

The thread upon the screw H of the valve-stem, instead of tapering at its ends to a point, as in the prior valve, terminates abruptly, forming shoulders at each end of the thread, Fig. 4, by which the threads upon the inner surface of the bonnet are cleared of any obstructions as the valve-stem is turned in one direction or another, and thereby any wedging of the valve-stem in the threads of the bonnet by accumulation of dirt or foreign material in the threads thereof prevented.

Having thus fully described my invention, I claim—

1. In a straightway valve, the combination, with the valve-stem I and the disk N loosely coupled thereto and provided with the relief-port O, of the self-adjusting member P interposed between the disk and stem at the upper end of the relief-port and co-operating with the under surface of the lower end of the stem, substantially as and for the purpose described.

2. In a straightway-valve, the combination, with the valve-stem I and the disk N loosely coupled thereto and provided with the relief-port O, of the self-adjusting member P interposed between the disk and stem at the upper end of the relief-port and provided with the perforations co-operating with the relief-port, substantially as and for the purpose described.

3. In a straightway valve, the combination, with the valve-stem I and the disk N loosely coupled thereto and provided with the relief-port O, of the self-adjusting member P provided with the flaring perforation and interposed between the disk and stem at the upper end of the relief-port, said perforation co-operating with the relief-port, substantially as and for the purpose described.

4. In a straightway valve, the combination, with the valve-stem I and the disk N provided with the relief-port O, of the perforated self-adjusting member P fitted in a recess in the upper edge of the valve-disk and co-operating with the lower end of the valve-stem, substantially as and for the purpose described.

5. In a straightway valve, the combination, with the valve-stem I and the disk N provided with the relief-port O, of the self-adjusting member P provided with the flaring perforation and fitted in a recess in the up-

per edge of the valve-disk and co-operating with the lower end of the valve-stem, substantially as and for the purpose described.

6. In a straightway valve, the combination
5 of the casing provided with the guide-way R, the reciprocating disk N provided with the rib Q co-operating with the guide-way, and the fixed wedging surfaces T T inclined both

toward the vertical plane of the disk and toward its center and over which the disk rides 10 as it is forced to its seat, substantially as and for the purpose described.

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Witnesses:

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