No. 663,275. Patented Dec. 4, 1900.

J. HOPKINSON & J. LOWIS.

VALVE.

(Application filed Aug. 21, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 2

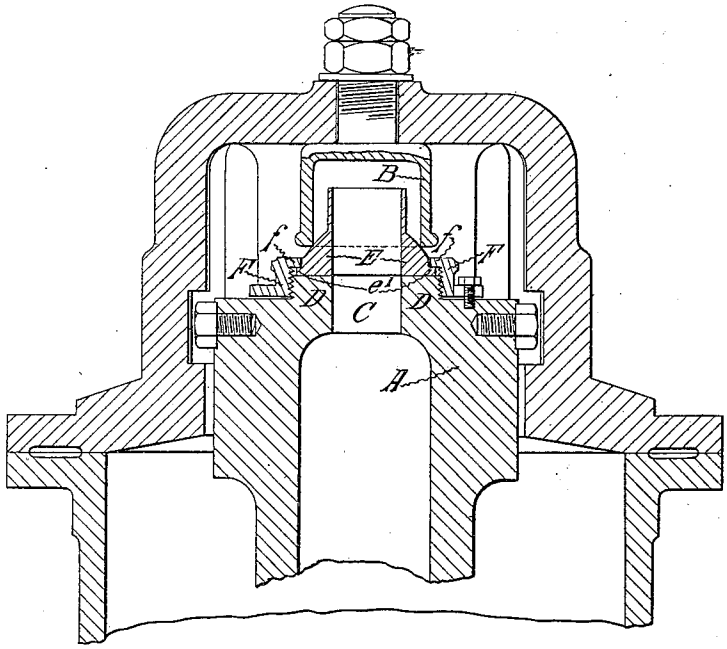
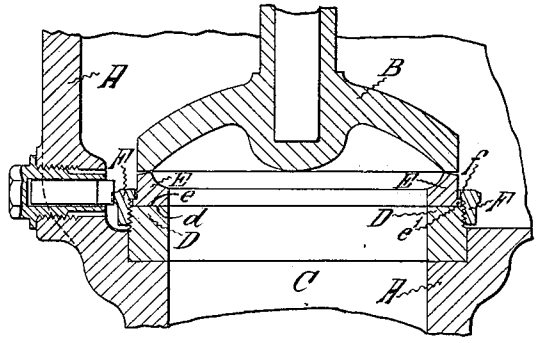


Fig. 1



Witnesses

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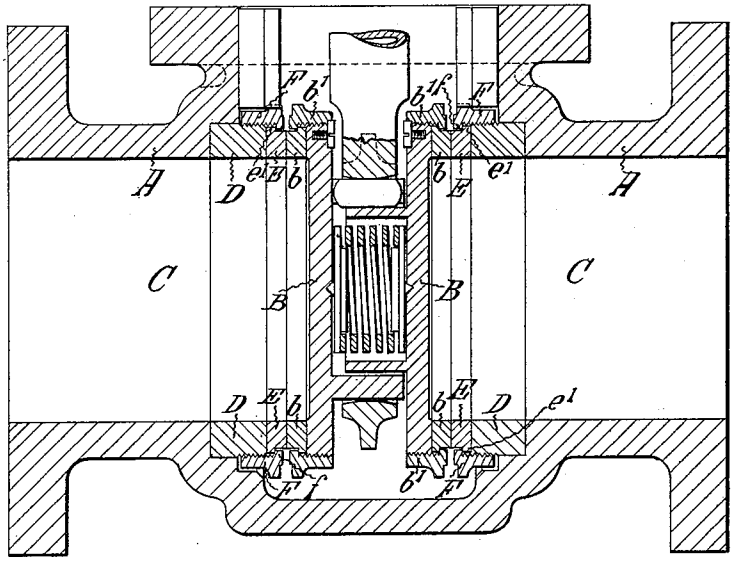
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Fig. 3



Witnesses

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UNITED STATES PATENT OFFICE.

JOSEPH HOPKINSON AND JOHN LOWIS, OF HUDDERSFIELD, ENGLAND, ASSIGNORS TO THE J. HOPKINSON & COMPANY, LIMITED, OF SAME PLACE.

VALVE.

SPECIFICATION forming part of Letters Patent No. 663,275, dated December 4, 1900.

Application filed August 21, 1900. Serial No. 27,571. (No model.)

To all whom it may concern:

Be it known that we, JOSEPH HOPKINSON, engineer, and JOHN LOWIS, works manager, subjects of the Queen of Great Britain, residing at Huddersfield, in the county of York, England, have invented certain new and useful Improvements Relating to Valves, of which the following is a specification.

In the construction of screw-down valves of the mushroom type, parallel slide and other stop-valves, safety-valves, and the like with seat-rings made of a metal which is different from and has a greater coefficient of expansion than that of which the valve casing or body is made difficulties arise owing to the differences of expansion and contraction between the valve-body and the seat-ring when they are subjected to great variations of temperature, as is the case when the same are used in connection with high-pressure steam plants. A common method of constructing such valves is to force the seat-ring into a recess provided for it in the valve body or casing; but it is obvious that such method does not provide for allowing the ring to expand when subjected to high temperature, and therefore many difficulties and troubles well known to engineers arise. We have heretofore employed a method of constructing compound valve-seats having for its object the avoidance of the difficulties and troubles above referred to, the seat-ring being free to expand and contract in accordance with the variations of temperature to which the valve is subjected when at work. The preferred mode of constructing the seats according to this method is as follows—that is to say, a projection is formed around the orifice or passage through the casing or valve-body, such projection being either an integral part of the casing itself or formed on a separate ring driven into a recess provided for it in the casing, such ring being intended to remain permanently in the said recess and being formed of a metal the same as that of the valve body or casing, or of a metal having substantially the same coefficient of expansion as the metal of the casing. The top or face of this projection is suitably faced and ground after the ring is fixed in the valve-body, and the outer circumference of the projection is screw-threaded or otherwise so constructed that a seat-ring proper can be screwed or attached thereto, the said seat-ring having an internal flange which is faced on its lower side to fit closely upon the aforesaid faced surface of the fixed ring or projection, so that when the seat-ring is screwed home upon the fixed ring the two faces thereof come together and form a fluid-tight metal-to-metal joint. The upper face of the seat-ring is prepared in a suitable manner to form the valve-seat proper. In this method of construction the fixed ring and the seat-ring are liable to be distorted in the process of manufacture and in the operation of fitting them in the valve-body, so that when the seat-ring is screwed down a perfect metal-to-metal fluid-tight joint between the two planes of the seat-ring and fixed ring is not insured. Our present invention, while obviating the defects above referred to, accomplishes all the objects of said method and also embodies other advantageous features whereby compound valve-seats are made more efficient, less liable to strains and stresses, easier and more certain of manufacture, and at the same time the seats are easier to remove, renew, and replace without requiring the valve-body to be dismounted.

In the accompanying drawings, which illustrate our present invention, Figure 1 is a central section of a portion of a mushroom-type screw-down stop-valve fitted with our improved valve-seat. Fig. 2 is a similar view of a dead-weight safety-valve, and Fig. 3 is a central section of a parallel-slide stop-valve.

Like letters of reference denote corresponding parts in the several figures.

A is the valve body or casing. B is the valve proper.

For the purposes of our invention we provide around the orifice or passage C of the valve-casing which is to receive the seat, as in the method above referred to, an annular projection D, formed integrally with the casing A, as shown in Fig. 2, or formed by a ring which is forced into a recess provided to receive it in the said casing, as shown in Figs.

1 and 3, said ring being made of the same metal as the casing or of a metal having substantially the same coefficient of expansion as the metal of the casing. The outer circumference of the projection D is screw-threaded, as shown, or it may be provided with interrupted screw-threads or with ears or projections equivalent to screw-threads, and the upper face or end *d* of the ring or projection is suitably ground and faced, so as to be capable of making a fluid-tight joint. Upon the end of the said projection we apply the seat-ring proper, E, which may be of brass, for example, having a substantially uniform section and the lower face *e* of which is ground and faced to make a fluid-tight joint with the face *d* of the aforesaid projection D. The said ring E has formed on it an external flange *e'*, and the same is secured upon the projection D by means of an external ring F, which passes over the seat-ring E and screws upon the outer circumference of the said projection D. The retaining-ring F has formed on it an internal flange *f*, which when the said ring is screwed upon the projection D bears upon the external flange *e'* of the seat-ring, thereby holding the seat-ring in place. By this method of construction the seat-ring E cannot be distorted, and therefore the upper face of said ring, which is suitably ground and faced to form the valve-seat proper, remains perfectly true when fixed in position, while at the same time the seat-ring, as well as the retaining-ring F, is free to expand and contract as may be required by the variations of temperature to which the valve is subjected. The retaining-ring is entirely external to the seat-ring and is not in any way restrained circumferentially. When the valve-body and the projection D are constructed of iron or steel, for example, and the seat-ring E is made of gun-metal or the like having a greater coefficient of expansion than the projection D, we make the retaining-ring of a metal also having a greater coefficient of expansion than the projection D and preferably the same as the ring E.

Our invention is specially intended for valves in which the seat-ring is made of metal different from that of the valve body or casing.

Where necessary or desirable, the retaining-ring is furnished with guide-bars for guiding the valve.

In Fig. 3 we have shown the slide-valve B furnished with detachable rings *b* on its faces, similar to the seat-rings E and secured to the valve by retaining-rings *b'*, similar to the retaining-rings F. This construction is specially applicable to large valves when it is not desired to make the whole of the valve of gun-metal.

What we claim is—

1. In a valve, the combination, with the valve-body, of an annular projection formed around the orifice or passage through the body, a seat-ring resting on the outer face of said projection, and a retaining-ring surrounding said seat-ring and having a connection with said projection, substantially as described.

2. In a valve, the combination, with the valve-body, of a ring secured in a recess around the orifice or passage through the body, an annular projection on said ring, a seat-ring resting on said projection, and a retaining-ring surrounding and partially overhanging said seat-ring and secured on the outside of the said projection, substantially as described.

3. In a valve, the combination, with the valve body or casing, of an annular projection formed around the orifice or passage through the body, a seat-ring resting on said projection, an external flange on said seat-ring, a retaining-ring surrounding said seat-ring and having an internal flange resting on the external flange of the seat-ring, and screw-threads on the outside of the annular projection engaging internal screw-threads in the retaining-ring, substantially as described.

4. In a valve, the combination, with the valve proper, of a detachable face having an external flange, a retaining-ring surrounding the detachable face and having an internal flange resting on the external flange of the detachable face, said retaining-ring being secured to the valve by screwing, substantially as described.

5. In a valve, the combination with the valve-casing having an annular projection formed around the passage through said casing, of a detachable seat-ring resting on said projection, an annular flange on said seat-ring, and a flanged retaining-ring having a connection with the flange on the seat-ring and with the said annular projection, substantially as described.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

JOSEPH HOPKINSON.
JOHN LOWIS.

Witnesses:
GEORGE HELM,
C. E. HOBSON.