No. 743,511. PATENTED NOV. 10, 1903.

C. E. HUXLEY.

VALVE.

APPLICATION FILED MAY 7, 1902.

NO MODEL.

Fig 1

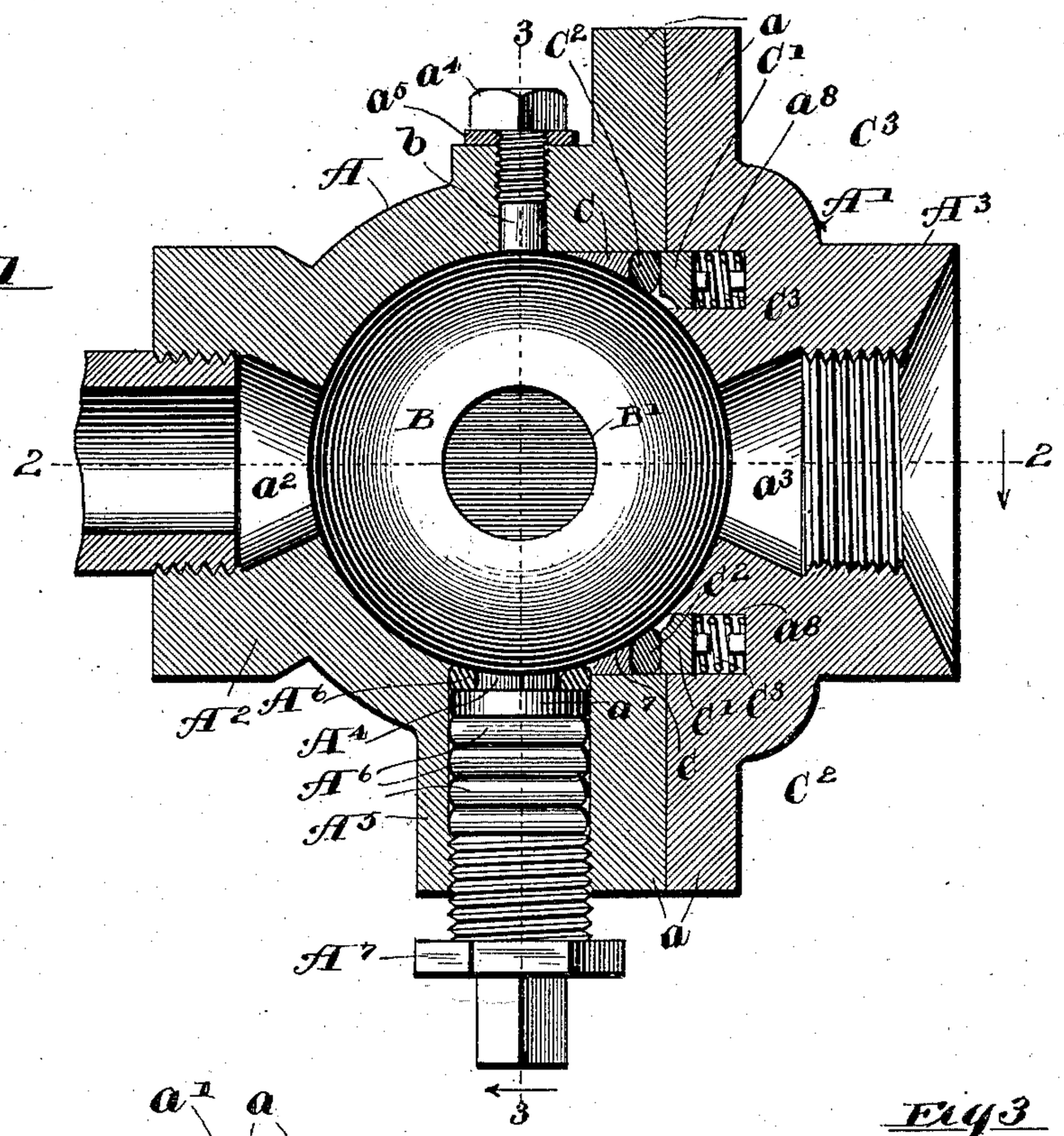


Fig 2

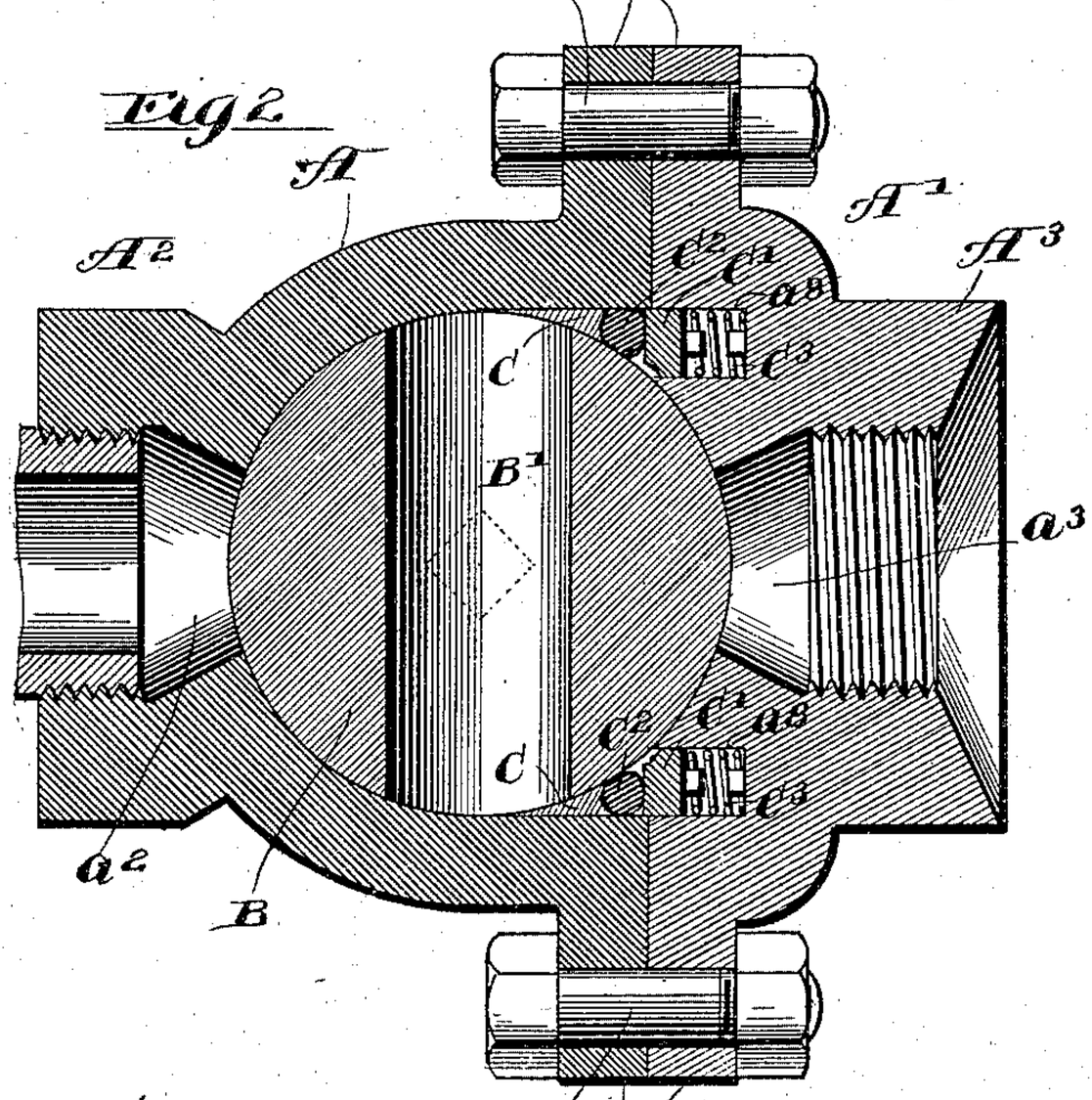
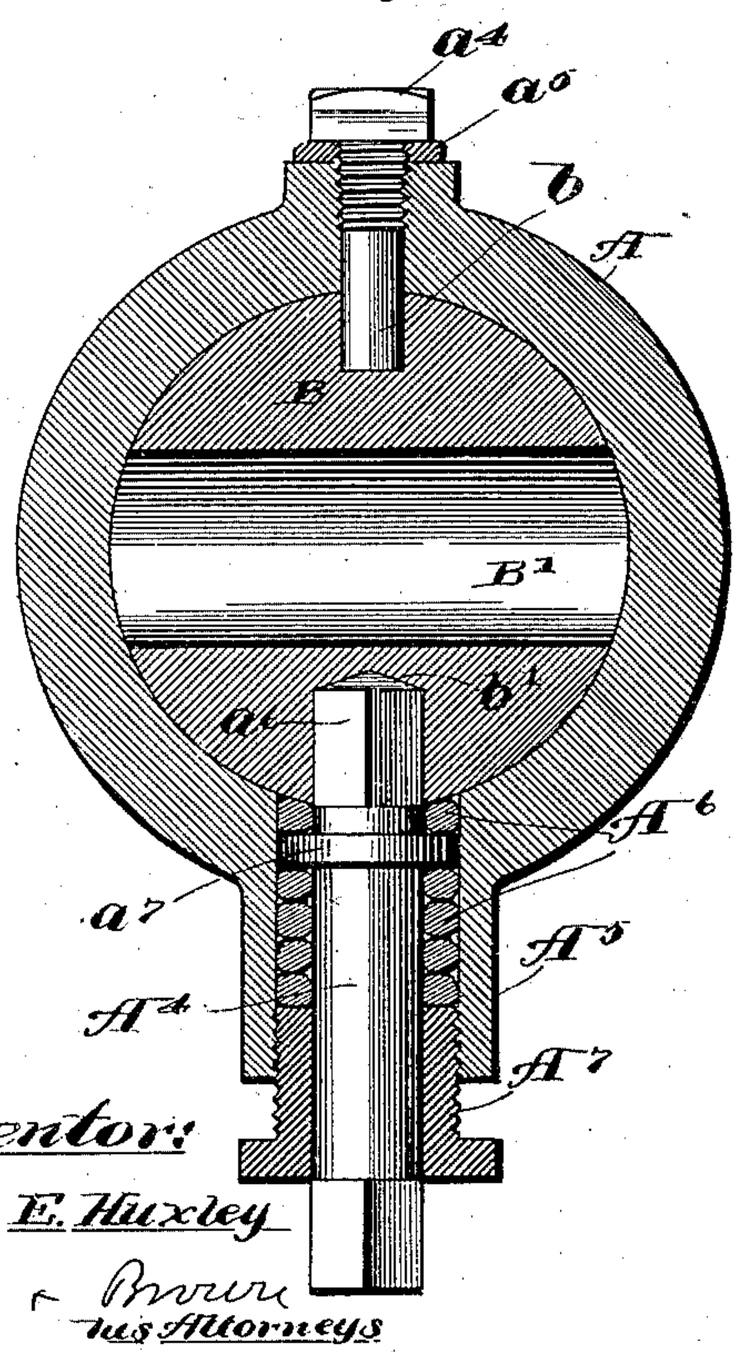


Fig 3



Witnesses:—
Carl A Crawford
William H Hall

Inventor:
Charles E. Huxley
by Poole & Brown
his Attorneys

No. 743,511. Patented November 10, 1903.

UNITED STATES PATENT OFFICE.

CHARLES E. HUXLEY, OF QUINCY, ILLINOIS.

VALVE.

SPECIFICATION forming part of Letters Patent No. 743,511, dated November 10, 1903.

Application filed May 7, 1902. Serial No. 106,250. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. HUXLEY, of Quincy, in the county of Adams and State of Illinois, have invented certain new and useful Improvements in Valves; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in rotative valves adapted for use as blow-off valves for steam-boilers and like purposes; and the invention consists in the matters hereinafter set forth, and more particularly pointed out in the appended claims.

A valve embodying my invention embraces, in general terms, a casing having a spherical valve-chamber provided with induction and eduction ports and a spherical rotative valve-closure provided with a through-opening adapted to be brought into register with the ports of the casing and provided with suitable packing devices adapted to prevent leakage between the closure and the casing.

In the drawings, Figure 1 is an axial section of the valve-casing embodying my invention, showing the closure and the actuating-stem therefor in side elevation. Fig. 2 is an axial section of the valve, taken on line 2 2 of Fig. 1. Fig. 3 is a similar section taken on line 3 3 of Fig. 1.

As shown in the drawings, the casing of the valve consists of two metal parts A A′, formed to provide an interior spherical chamber and a spherical valve-closure B, located in said chamber. Said parts A A′ of the valve-casing are provided with overlapping radial flanges a a, through which extend bolts a', by which the parts of the casing are secured together. One part of said valve-casing is provided with an induction-port a^2, formed in the tubular branch or neck A^2 thereon, and the other part of the casing is provided with an eduction-port a^3, formed in a like tubular branch or neck A^3 thereon. Said tubular branches of the casing are interiorly screw-threaded for connection with the induction and eduction pipes. The spherical closure is provided with a through-port B′, which, as herein shown, extends centrally through the closure and is adapted when the closure is turned in one position to register at its opposite ends with the induction and eduction ports, respectively, and when the closure occupies another position to be closed by the spherical imperforate wall of the chamber. Said valve-closure has rotative bearing at one side of the casing on a cylindric stud b, which extends through an opening in the casing and is seated in a bearing-socket in the adjacent part of the closure. The stud is held in its seat by means of a screw-bolt a^4, which has screw-threaded engagement with an apertured enlargement of the casing and bears end to end against the stud b. A gasket a^5 is interposed between the head of said bolt a^4 and the casing around the screw-threaded opening therein to prevent the leakage of steam or other fluid between said screw and casing.

A^4 designates an operating-stem which extends through a tubular neck A^5 of the valve-casing and is seated at its inner end in a socket b' in the spherical valve-closure B, said stem A^4 being located in axial alinement with the stud-bearing b of said closure. Said socket b' and the inner end a^6 of the stem are made flat-sided or angular in cross-section, so that rotative movement of the stem is imparted to the valve-closure. The stem A^4 is surrounded by a packing A^6, which, as herein shown, consists of a fibrous cylindric or rope packing, which fills the space between the stem and the wall of the neck and is held in place by means of a gland A^7, surrounding the stem and having interior screw-threaded engagement with the neck. As herein shown, the stem is provided near its inner end with a radial annular flange a^7, and between said flange and the spherical closure is interposed a packing-ring A^6. Said last-mentioned packing-ring fits closely between the inner end of the neck and the spherical surface of the closure at this point and prevents the escape of steam or other fluid past the same. When the gland A^7 is turned downwardly upon the packing, pressure is exerted on the packing, which acts to force the same tightly against the stem and the inner surface of the neck and acts also against the flange a^7 to force the packing-ring A^6 into the annular space formed between the casing and the spherical closure. A packing is also interposed be-

tween said closure and the casing intermediate the induction and eduction ports of the casing. Said packing embraces a ring C, preferably of metal, which is seated in the part A of the valve-casing near the margin thereof and is provided with a spherical inner surface which coincides with the spherical surface of the parts of the valve-casing and engages the spherical closure. C′ designates a second metal ring, which is seated in an annular groove or recess a^8 in the margin of the part A′ of the casing and surrounds the eduction-port a^3 therein. Interposed between said packing-rings C C′ is a yielding or fibrous gasket C^2, herein shown as made of cylindric form. Said gasket C^2 has four points of bearing—to wit, against the closure and the casing on two opposite sides thereof and against the two metallic rings C C′ on the two remaining sides. The ring C′ is pressed against the gasket C^2 by means of a plurality of spiral springs C^3, interposed between the ring and the bottom of the recess or groove a^8. Said springs when assembled in the device are placed under considerable stress or tension, so as to hold the packing in close contact with the parts surrounding it, notwithstanding wear between the closure, the casing, and the packing-ring C and gasket C^2 during the use of the valve.

It will be observed that the packing devices, consisting of the rings C C′ and the gasket C^2, are located on that side of the center of the spherical closure remote from the induction-port a^2, and this location of the packing devices is of considerable importance, for the reason that the pressure of the steam or other fluid acts against the closure in a manner to press said closure against the packing devices and thereby always maintain a tight joint between the closure and its casing, and thereby prevent the escape of steam or other fluid between said closure and the casing at this point when the valve is closed, or, in other words, when the port B′ of the valve is in the position shown in Figs. 2 and 3.

A general advantage gained by the employment of a valve the casing of which is provided with a spherical valve-chamber and which has a spherical valve-closure fitting closely within or in contact with the walls of the casing is that when the bearing-surfaces of the spherical closure and casing become reduced by wear or if the closure be made somewhat smaller than the casing to admit of expansion of the closure when needed a tight joint will always be maintained between the closure and the side of the casing adjacent to the eduction-port, because said side of the closure adjacent to the eduction-port will be pressed closely into the concave portion of the valve-chamber adjacent to and around the eduction-port by the pressure coming upon the opposite side of the closure. In connection with a valve-closure of spherical form so made as to fit closely within the surrounding valve-casing having a spherical interior surface a special advantage is derived by making the valve-closure without any integral or rigidly-attached valve-stem, it being obvious that when the actuating-stem A^4 projects into a flat-sided socket in the valve-closure a somewhat loose connection between the actuating-stem A^4 and the closure is provided, which permits the closure to be pressed against the side of the casing adjacent to the eduction-port without the bringing of any lateral pressure on the said valve-stem A^4. Similarly an advantage is obtained by the use of a cylindric stud *b* on the casing arranged to extend into a bearing-socket in the adjacent end of the closure, as this construction permits a slight movement of the closure with respect to the casing necessary to enable the closure to come into bearing against the side of the casing adjacent to the eduction-opening.

The valve having a spherical closure and annular packing, as described, has the important advantage that it will remain tight notwithstanding that the closure is fitted so loosely in the casing as to permit expansion or contraction thereof without binding in the casing when heated or cooled by the passage of a hot or cold fluid therethrough—as, for instance, in its use as a blow-off valve. When the valve is opened the closure is liable to become heated while the casing remains much cooler, and by making the closure slightly smaller than the surrounding casing such closure may expand without liability of binding in the casing, while at the same time a perfectly tight joint will be maintained between the casing and closure by the packing arranged as described.

It is obvious that changes may be made in the structural details of the valve herein illustrated without departing from the spirit of my invention, and I do not wish to be limited to such details except as hereinafter made the subject of specific claims.

I claim as my invention—

1. A valve comprising a casing having a spherical valve-chamber and provided with induction and eduction ports, and a rotative spherical valve-closure provided with a through-port, said closure completely filling and fitting closely within the valve-chamber.

2. A valve comprising a valve-casing provided with a spherical valve-chamber and with induction and eduction ports, located at opposite sides of the chamber, a spherical valve-closure in said chamber provided with a through-port, said valve-closure fitting closely within the casing, and an annular packing within the casing located at the side of the same adjacent to the eduction-port, said packing being smaller in diameter than the closure and bearing against the same between said eduction-port and the ends of the through-port of the closure, when the closure is in its closed position.

3. A valve comprising a valve-casing, provided with a spherical valve-chamber and with induction and eduction ports, a spher-

ical valve-closure provided with a through-port and which fits closely within said chamber and an annular packing interposed between said casing and closure at the side of the center of the closure adjacent to the eduction-port, said packing embracing two rigid packing-rings and a yielding gasket interposed between said rings and bearing on the closure.

4. A valve comprising a casing provided with a spherical valve-chamber and with induction and eduction ports, a spherical closure provided with a through-port and which fits closely within said chamber and a packing device of annular form, interposed between the casing and closure at the side of the center of the closure adjacent to the eduction-port, said packing device embracing a yielding gasket and springs applied to thrust the same against the surface of the closure.

5. A valve comprising a casing provided with a spherical chamber and with induction and eduction ports, a spherical closure provided with a through-port and which fits closely within said chamber and an annular packing device interposed between said casing and closure at the side of the center of the closure adjacent to the eduction-port, said packing device embracing two rigid packing-rings, a yielding gasket interposed between said rings and a spring or springs applied to press one of said rings against the said gasket.

6. A valve comprising a casing consisting of two parts provided with a spherical valve-chamber, one of said parts being provided with an induction-port and the other with an eduction-port, a spherical valve-closure in said chamber provided with a through-port and an annular packing device interposed between the said closure and the casing at the side of the center of the closure adjacent to the eduction-port, said packing device comprising a rigid ring fitted to slide in one of the parts of the casing, a rigid ring in the other part of the casing and a yielding gasket interposed between said rings and bearing on the closure.

7. A valve comprising a valve-casing provided with a spherical valve-chamber, with induction and eduction ports and an annular groove opening into said chamber, a spherical valve-closure in said chamber, an annular gasket of yielding material located in said annular groove, a packing-ring in said groove and springs located behind the said ring and acting to press the same against the said gasket and to hold the latter in contact with the closure.

8. A valve comprising a valve-casing provided with a spherical valve-chamber, with an annular groove opening into said chamber, and with induction and eduction ports, a spherical valve in said chamber provided with a through-port, and packing devices interposed between said casing and closure embracing two rings, one of which is located in said groove, a yielding gasket interposed between said rings and bearing against the closure, and springs in said groove pressing the packing-rings therein against the said yielding gasket.

9. A valve comprising a casing provided with a spherical chamber, with induction and eduction ports, and with an annular groove located at the side of the casing adjacent to the eduction-port and opening into said chamber, a spherical valve in said chamber provided with a through-port, packing devices interposed between said closure and chamber comprising two packing-rings, one of which is located in said groove, a yielding gasket interposed between said rings and springs located in said groove and pressing the packing-ring therein against said gasket.

10. A valve comprising a valve-casing provided with a spherical valve-chamber and with induction and eduction ports, a spherical valve-closure in said chamber provided with a through-port, an annular packing device bearing against said closure between said eduction-port and the ends of the through-port when the closure is in its closed position, and means for pressing said packing against said closure.

11. A valve comprising a valve-casing provided with a spherical valve-chamber and with induction and eduction ports, a spherical closure in said chamber provided with a through-port, an annular packing in the casing bearing against the closure between the said eduction-port and the ends of the through-port when the closure is in its closed position, a bearing-stud affixed to the wall of the chamber and entering a socket at one side of the closure, and an actuating-stem extending through the casing in line with the bearing-stud and engaging at its inner end a socket in the closure.

12. A valve comprising a valve-casing provided with a spherical valve-chamber and with induction and eduction ports, a spherical closure in said chamber provided with a through-port, an annular packing in the casing bearing against the closure between the said eduction-port and the ends of the through-port when the closure is in its closed position, a bearing-stud affixed to the wall of the chamber and entering a socket at one side of the closure, an actuating-stem extending through the casing in line with the bearing-stud and engaging at its inner end a socket in the closure, a packing surrounding said stem and a gland surrounding the stem outside of said packing and having screw-threaded engagement with the casing.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 2d day of May, A. D. 1902.

CHARLES E. HUXLEY.

Witnesses:
HOMER D. DINES,
CHARLES B. MCCRORY.