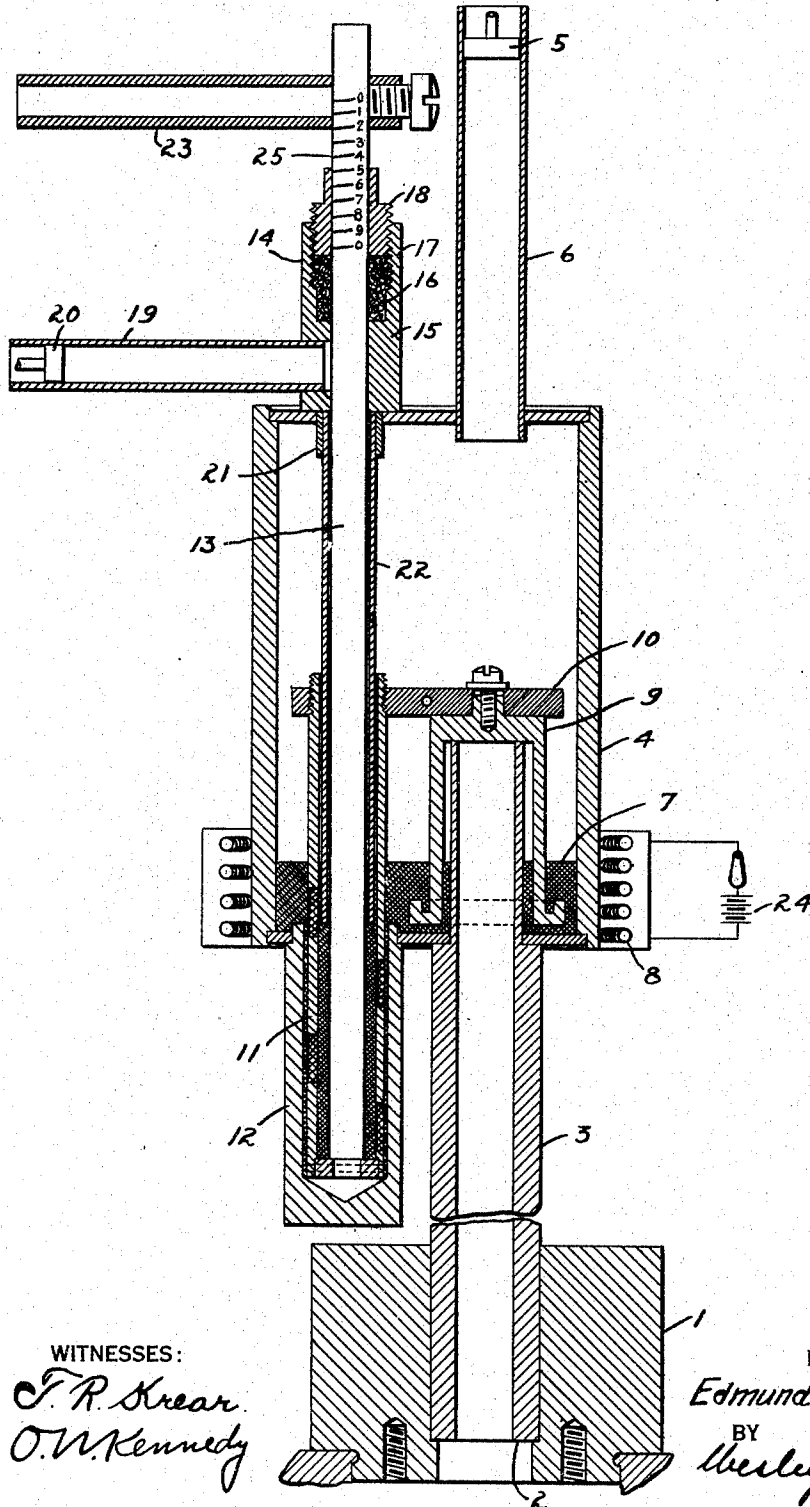


E. F. SIPHER.
OPERATING MECHANISM FOR VALVES.
APPLICATION FILED AUG. 7, 1917.

1,308,262.

Patented July 1, 1919.



WITNESSES:

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OPERATING MECHANISM FOR VALVES.

1,308,262.

Specification of Letters Patent.

Patented July 1, 1919.

Application filed August 7, 1917. Serial No. 184,813.

To all whom it may concern:

Be it known that I, EDMUND F. SIPHER, a citizen of the United States, and a resident of Wilkesburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Operating Mechanism for Valves, of which the following is a specification.

My invention relates to valves, particularly of the fluid-seal type, and it has for its object to provide a mechanism for readily operating such valves without impairing the effectiveness of the sealing means.

In Patent No. 1,223,736, issued April 24, 1917, is shown and described a valve in which the sealing means consists of a mass of solder or other suitable impervious and readily fusible material. The sealing member of the valve is adapted to be submerged in the sealing material, while in a fused condition, and the material is then permitted to solidify, thus forming an extremely tight closure. The sealing member is adapted to be actuated by a solenoid which withdraws the sealing member from the sealing material when it is desired to open the valve.

The above described arrangement has been found to provide an entirely satisfactory seal for the valve, under ordinary working conditions, but, when the sealing member is operated by the solenoid alone, the exact position thereof with respect to the sealing material is not readily ascertainable from a point outside of the valve. Furthermore, the sealing member is liable to drop suddenly into the sealing material while it is in a fused condition and thus splash the sealing material into the aperture which it is desired to seal.

By my invention, I provide a mechanism for operating the sealing member of a valve of the above-described type in which the position of the sealing member is always definitely known and by means of which it may be lowered into the sealing material without danger of splashing. I further provide means for positively sealing the operating mechanism from the interior of the valve so that a valve embodying my invention may be used in connection with a highly evacuated container without danger of leakage through the moving parts of the operating mechanism.

The single figure of the accompanying drawing is a sectional view of a valve em-

bodiment of a preferred form of my invention, together with associated auxiliary apparatus.

Referring to the drawing for a more detailed understanding of my invention, a portion of the wall 1 of a closed container which it is desired to evacuate, such as the casing of a vapor converter, is provided with an opening 2 within which is welded, or otherwise tightly sealed, a vertically-disposed tube 3. The upper portion of the tube 3 is located within an inclosing casing 4 that is connected to a pump or other evacuating apparatus 5 by a tube 6. A mass of readily fusible and impervious material 7, such, for example, as solder, is located within the casing 4 and partially covers the projecting portion of the tube 3. A suitable heating coil 8 is disposed around the bottom of the casing 4, although it will be understood that any other suitable means may be provided for melting the material 7, such, for example, as a burner located adjacent to the bottom of the casing 4.

A sealing member 9 surrounds the upper portion of the tube 3 and partially extends into the material 7. The member 9 is mounted on an arm 10 that is carried by a hollow plunger 11 which projects below the surface of the sealing material 7 into a downwardly extending cylindrical portion 12 of the casing 4. The plunger 11 is connected to an operating rod 13 that is slidably mounted in a bushing 14 mounted on the top of the casing 4. The bushing 14 comprises a sleeve 15 that is provided with an annular recess 16 surrounding the rod 13 within which is disposed a packing of suitable fibrous material 17 that is held therein by a nut 18. The sleeve 15 is further provided with a lateral opening extending therethrough to the surface of the rod 13 within which is secured a tube 19 that is connected to a pump 20 or other suitable evacuating apparatus. A tubular member 21 extends from the bottom of the sleeve 15 through the top of the casing 4 and is welded or otherwise tightly sealed thereto. A tube 22 of greater inside diameter than the rod 13 is carried by the reduced portion 21 and projects downwardly, within the plunger 11, to a point below the surface of the sealing material 7. The rod 13 projects beyond the end of the bushing 15 and is provided with a handle 23 or other operating means by which a lon-

itudinal movement may be imparted thereto.

Having described the several parts of the valve, the operation thereof is as follows.

5 Assuming the valve to be closed and that it is desired to evacuate the container to which it is connected, the heating coil 8 is energized from a suitable source 24 until the sealing material 7 is fused or liquefied. At the same

10 time, or just prior to the energization of the coil, the space between the rod 13 and the tube 22 is evacuated by the pump 20. After the sealing material is fused, the rod 13 is then drawn upwardly until the lower edge

15 of the sealing member 9 is clear of the surface of the material 7. The position of the member 9, at any time, is readily ascertained by suitable calibrations that are provided on the surface of the rod 13, as indicated at

20 25. The sealing material 7 is then allowed to solidify and the tube 19 may be opened to the atmosphere. The pump 5 is then operated until a suitable degree of vacuum is obtained in the container. When it is de-

25 sired to close the valve, the space between the operating rod 13 and the tube 22 is again evacuated, as previously described, and the heating coil 8 is energized until the material 7 is again liquefied. The rod 13

30 is then moved downwardly until the bottom portion of the sealing member 9 is submerged in the sealing material 7 which is then allowed to solidify and seal the valve. The tube 19 may again be connected to the

35 atmosphere until it is desired to operate the valve.

From the foregoing, it is apparent that the sealing member 9 may be operated from a point outside of the casing 4 without

40 danger of leakage around the moving parts of the operating mechanism because the evacuation of the space between the operating rod and the tube 22 before the sealing material is liquefied effectively prevents air

45 at atmospheric pressure from coming up through the sealing material while the sealing member is being raised or lowered. It is obvious, however, that it is necessary to evacuate the space between the rod 13 and

50 the tube 22 only when the sealing material is in a liquid condition because the tube 22 always extends below the surface of the sealing material and, therefore, prevents leakage when the sealing material is in a solid

55 condition.

While I have shown my invention in a simple and preferred form, it will be obvious to those skilled in the art that it is susceptible of various minor changes and modifications within the scope of the appended

60 claims.

I claim as my invention:

1. In a valve, the combination with a casing provided with an aperture, a pool of

65 sealing fluid surrounding said aperture, and

a sealing member adapted to be submerged in said pool, of a slidably mounted operating rod for said sealing member, a portion of which is submerged in said pool, and means for evacuating the medium immediately surrounding said rod above said pool.

2. In a valve, the combination with a casing provided with an aperture, a pool of sealing fluid surrounding said aperture, and a sealing member adapted to be submerged

70 in said pool, of a tube carried by the casing and projecting below the surface of said pool, an operating rod connected to said sealing member and slidably mounted within said tube and means for evacuating the

75 space between said rod and the walls of the tube above the surface of said pool.

3. In a valve, the combination with a casing provided with an aperture, a pool of sealing fluid surrounding said aperture, and a sealing member adapted to be submerged

80 in said pool, and means for evacuating the casing, of a tube carried by the casing and projecting below the surface of said pool, an operating rod slidably mounted on the

85 casing and having an operating portion projecting outside thereof and another portion located within said tube, and means for evacuating the space between said rod and

90 the walls of the tube above the surface of said pool.

4. In a valve, a casing, a fluid port opening therein, a cover member disposed over said port, a pool of sealing medium into which said cover member is adapted to dip

95 for the closure of said port, operating means for said cover member extending to the exterior of said casing, and a liquid seal operative upon a portion of said operating means to prevent leakage through the wall of said

100 casing at the point of entrance of said operating means.

5. In a valve, a casing, a fluid port opening therein, a cover member disposed over said port, a pool of sealing medium into which said cover member is adapted to dip

105 for the closure of said port, operating means for said cover member extending to the exterior of said casing, and a liquid seal operative upon a portion of said operating means to prevent leakage through the wall of said

110 casing at the point of entrance of said operating means, the sealing pool for said cover member being integral with that of said liquid seal.

6. In a valve, a casing, a fluid port opening therein, a cover member disposed over said port, a pool of sealing medium into which said cover member is adapted to dip

115 for the closure of said port, operating means for said cover member extending to the exterior of said casing, a liquid seal operative upon a portion of said operating means to prevent leakage through the wall of said

120 casing at the point of entrance of said oper-

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ating means, and means for substantially equalizing the pressure surrounding said operating means immediately outside said seal with that within said casing, whereby the fluid of said liquid seal is enabled to maintain its position.

7. In a valve, a casing, a fluid port opening thereinto, a cover member disposed over said port, a mass of normally solid but readily fusible sealing material into which said cover member is adapted to dip for the closure of said port, means for, at will, applying heat to said mass for the fusion thereof, operating means for said cover member extending to the exterior of said casing, and a seal of the liquid type operative upon a portion of said operating means to prevent leakage through the wall of said casing at the point of entrance of said operating means, said seal being formed from an integral portion of said fusible mass and said operating means being movable only when said mass is in a state of fusion.

8. In a valve, a casing, a fluid port opening thereinto, a cover member disposed over

said port, a mass of normally solid but readily fusible sealing material into which said cover member is adapted to dip for the closure of said port, means for, at will, applying heat to said mass for the fusion thereof, operating means for said cover member extending to the exterior of said casing, a seal of the liquid type operative upon a portion of said operating means to prevent leakage through the wall of said casing at the point of entrance of said operating means, said seal being formed from an integral portion of said fusible mass and said operating means being movable only when said mass is in a state of fusion, and means for, at will, substantially equalizing the pressure surrounding said operating means immediately outside said seal with that within said casing, whereby the material of said fusible mass is enabled to maintain its position when in a state of fusion.

In testimony whereof, I have hereunto subscribed my name this 19th day of July, 1917.

EDMUND F. SIPHER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."