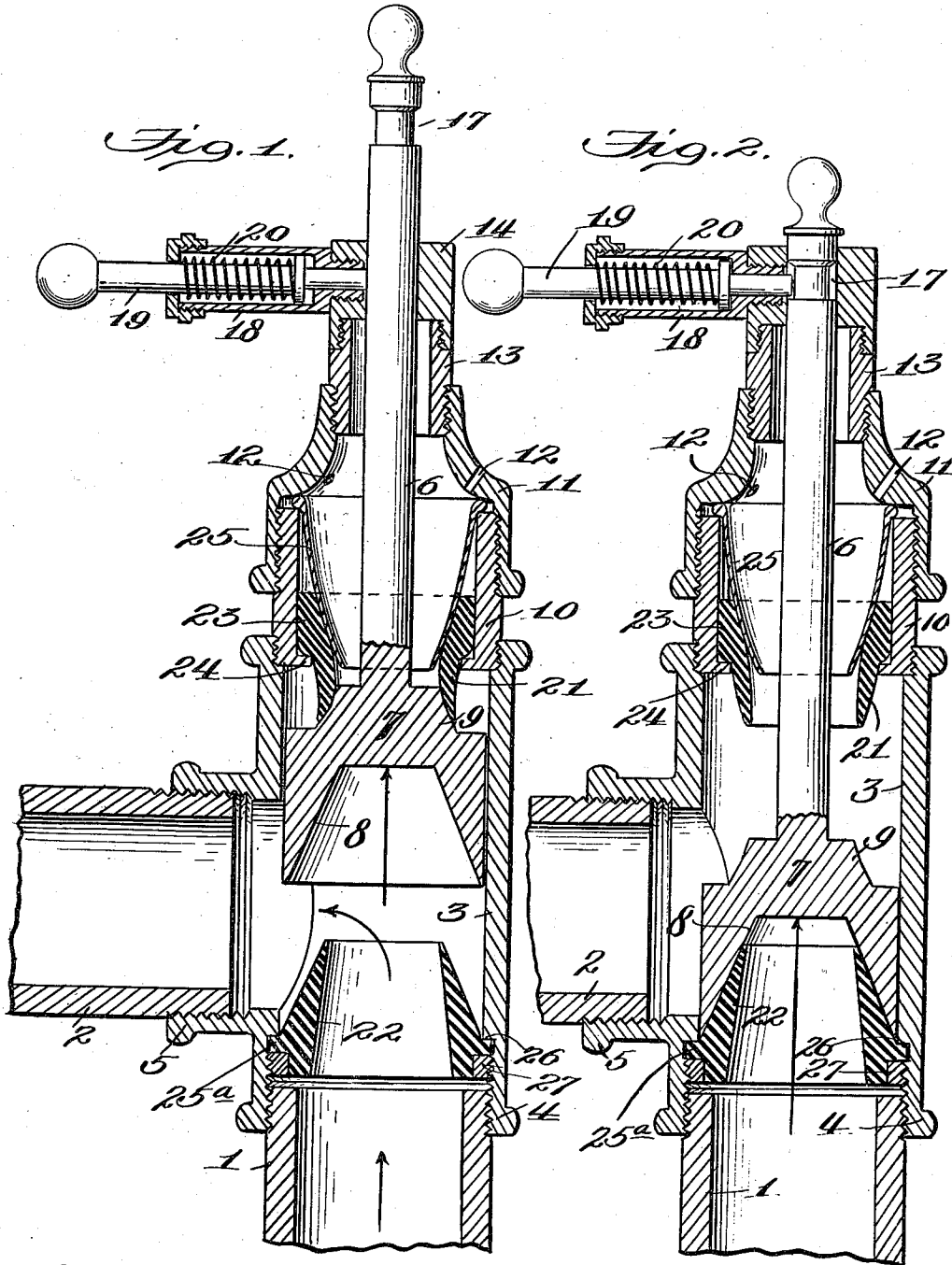


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CUT-OFF FOR GAS LINES.

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CUT-OFF FOR GAS-LINES.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HARRY C. GRIMES, a citizen of the United States, residing at Terra Alta, in the county of Preston and State of West Virginia, have invented new and useful Improvements in Cut-Offs for Gas-Lines, of which the following is a specification.

This invention relates to new and useful improvements in automatic safety cut-offs for gas lines and more particularly to a construction of that type in which a pressure upheld valve is employed to normally maintain the communication of the main and the house service pipe, the valve closing automatically when the pressure falls to a certain degree and remaining in its closed position, either by virtue of some positive means provided for this purpose or by virtue of its relation to the openings in the valve casing.

In so far as the arrangement of parts and modes of operation are concerned, the art of pressure cut-offs has been, in the main, satisfactorily developed and a number of the devices now known to the art are, considered from this standpoint, of efficient nature. In so far as I am aware, however, there is one objection which the prior devices have not solved in a satisfactory and practical manner. This objection resides in the fact that no satisfactory means to seal the joints of the valve and the casing in either of the two positions of the former, has been produced, which may be advantageously or practically used, with devices otherwise practical and efficient. It is desirable that the joints be sealed against leakage for the purposes of safety, more particularly against explosions, and also of economy. It has been proposed to provide ground joints for this purpose. This adds materially to the expense of production and is not over-efficient as a practical proposition. Gaskets of ordinary construction have also been used but in such cases the fact was overlooked, that an elastic and not a non-elastic fluid was to be sealed and while gaskets of ordinary construction may be advantageously employed as the packing of non-elastic fluid valves, they are

not satisfactory when employed as the packing of elastic fluid valves, on account of their liability to wear badly, to warp or to become distorted from other causes. Furthermore, the form of such gaskets does not admit, in all cases, of the necessary and intimate conformable engagement of the interfitting parts whereat the joint occurs.

The present invention resides more particularly in the provision of means of a novel nature for sealing the joints between the valve and the casing in either of the two positions of the former, whereby the results desired are efficiently attained and the disadvantages noted are overcome.

In the accompanying drawings I have illustrated a preferred and advantageous embodiment of the invention.

In the said drawings: Figure 1 is a longitudinal section of a known form of pressure cut-off showing the application of the present improvements thereto, and showing the valve in its open position. Fig. 2 is a similar view showing the valve in its closed position.

Similar characters of reference designate corresponding parts in both views.

The main or supply pipe is indicated by the numeral 1 and the distributing or service pipe by the numeral 2. The valve casing, as 3, forms a connection between these pipes, having an axial threaded continuation 4 to which the pipe 1 is joined and having a lateral threaded continuation 5 to which the pipe 2 is joined. The embodiment of valve casing herein shown is exemplary and not obligatory and other arrangements of the pipes 1 and 2 than that herein shown may be provided for. The valve moves axially of the casing 3 and includes a stem, as 6, and a valve head, as 7, the latter having its under face provided with a conical recess 8 and having its upper face provided with a conical boss, as 9, to which the stem 6 is joined in any suitable manner. The words "upper" and "under" and similar words of location and direction used throughout this specification, are of course employed in a relative and not in an absolute sense.

The upper end portion of the valve casing is for convenience formed of a plurality of sections, one of which, as 10, is threaded into the upper end of the casing 3 and is also connected to a cap section, as 11, having vent openings, as 12. To the section 11, a collar 13 is secured and to the latter a member 14. The member 14 has an opening through which the stem 6 extends. Said stem is formed near its upper end with a groove 17 and the member 14 is provided with a laterally projecting casing 18 in which is mounted a plunger 19 which is forced inwardly by a coil spring 20 and engages in the groove 17 in the lowermost position of the valve.

With the foregoing apparatus, it will be understood that the pressure of the gas flowing through the pipes 1 and 2 is normally sufficient to hold the valve in its uppermost position so that the communication of the pipes 1 and 2 is not interrupted. The valve normally rises and falls in accordance with slight increasing or decreasing variations in the pressure. However, should there be such a material decrease of pressure as would permit the valve to assume its lowermost position, as shown in Fig. 2, the communication of the pipes 1 and 2 will be interrupted and the valve will be held against subsequent upward movement when the pressure again becomes normal, by the plunger 19, the end of which engages in the groove 17 and thereby locks the valve in its lowermost position, in order to prevent the gas from issuing at the open jets in the building. To restore the valve to its normal position, the plunger 19 is retracted and the valve is then lifted, the upper end of the valve stem having a knob which provides a hand grip.

The structure above described, *per se*, does not represent the present invention but simply discloses an embodiment in connection with which the present improvements may be advantageously employed.

The preferred form of means for sealing the valve, such means constituting the essence of the invention, comprises upper and lower sealing devices 21 and 22, in the nature of elastic rubber tubular members, which have what may be termed an unrestricted circumferential sealing engagement with the faces of the boss 9 and recess 8 respectively. The device 21 is preferably of tubular frusto-conical form and at its upper end has an enlarged portion 23 which seats against a flange 24 which projects inwardly at the lower end of the section 10. This seating may be maintained in any suitable manner. As shown in the drawings, a hollow conical member 25 preferably constructed of sheet metal, is employed, which member is

clamped between the section 10 and the cap section 12 and has its lower portion fitted into the conical bore of the tube 21. The smaller end of the latter projects beyond the section 10 and toward the valve head 7. With the valve in its uppermost position, the boss 9 projects into the smaller end of the tube 21, as shown in Fig. 1, producing a wedge-like spreading of the end of the tube which is possible by reason of the flexible nature of the rubber employed. The end of the tube 21 thus yieldably and snugly surrounds the boss 9 and it is for this reason that the engagement of the tube and the boss is termed an unrestricted "circumferential" sealing engagement. This circumferential engagement is effected throughout a certain range of movement of the valve, in which range the boss 9 may assume different positions with relation to the tube 21. The circumferential engagement therefore is not restricted to a single position of the valve but is effective in various positions thereof, this of course being an incident of the flexible, resilient nature of the material composing the device 21. By virtue of the fact that the tube is composed of flexible resilient rubber, a number of advantages are attained. In the first place, being yieldable, it is wear-resisting and is not liable to distortion and in the second place, in connection with the spreading action of the boss 9 and its "circumferential" engagement, it efficiently seals against leakage throughout the normal range of movement of the valve incident to slight pressure variations.

The device 22 is generally similar to the device 21, being composed of flexible rubber and of hollow tubular frusto-conical form. The tube 22 is provided with a circumscribing flange 25^a which is clamped against a shoulder 26 formed in the casing 3 by means of a ring, as 27, which is threaded into the extension 4. The tube 22 has yieldable "circumferential" engagement with the wall of the recess 8, the parts having conformable interfitting relation as is shown in Fig. 2. The tube 22 attains the same advantages as the tube 21 in that it is wear-resisting, not liable to distortion, and has the yieldable unrestricted circumferential engagement described.

While the arrangement shown at the upper end of the valve casing could, if desired, and may under certain circumstances be advantageously adopted, at the lower end of said casing, the arrangement herein shown is preferred with the form of device disclosed, since the recess 8 affords a space in which the gas may accumulate to efficiently "buoy up" the valve.

No specific description of cut-off device herein contained is intended to put a limi-

tation on the application of the invention or on the scope of the following claims.

Having fully described my invention, I claim:

1. In a pressure cut-off for gas lines, the combination with a casing having an inlet and an outlet and a valve in the casing and having two positions, the one establishing communication of the inlet and the outlet through the casing and the other interrupting such communication, of means for sealing the joints between the valve and the casing in either position of the former and comprising tubular elastic rubber members which have unrestricted circumferential sealing engagement with the conformably outlined surfaces of adjacent portions of the valve.

2. In a pressure cut-off for gas lines, the combination with a casing having an inlet and an outlet and a valve to control the communication of the inlet and the outlet, the valve being axially movable in the casing to a position at either end thereof, of means for sealing the joints between the valve and the casing in either position of the former and comprising axially disposed tubular elastic rubber members which have unrestricted circumferential sealing engagement with the adjacent conformably outlined faces at the ends of the valve.

3. In a pressure cut-off for gas lines, the combination with a casing having an inlet and an outlet and a valve to control the communication of the inlet and the outlet, the valve being axially movable in the casing to a position at either end thereof, of means for sealing the joints between the valve and the casing in either position of the former and comprising axially disposed tubular elastic rubber frusto-cone-shaped members which have unrestricted circumferential sealing engagement with frusto-conical faces provided therefor at the adjacent ends of the valve.

4. In a gas pressure cut-off, the combination with a valve and its casing, of means to seal the joint between the valve and the casing in one position of the former and comprising an elastic rubber tubular member which has unrestricted circumferential yielding engagement with the adjacent conformably outlined surface of the valve.

5. In a gas pressure cut-off, the combination with a valve and its casing, of means to seal the joint between the valve and the casing in one position of the former and comprising an elastic rubber tubular frusto-cone-shaped member which has unrestricted circumferential yielding engagement with a frusto-conical face provided therefor at the adjacent end of the valve.

6. In a gas pressure cut-off, the combination with a valve and its casing constitut-

ing companion parts, of means for sealing the joint between the same and comprising an elastic rubber tubular member carried by one of the parts and having unrestricted circumferential yielding engagement with the conformably outlined face of the companion part.

7. In a gas pressure cut-off, the combination with a valve and its casing, constituting companion parts, of means to seal the joint between the same in one position of the former and comprising an elastic rubber tubular frusto-cone-shaped member carried by one of the parts and having unrestricted circumferential yielding engagement with a frusto-conical face provided therefor on the companion part.

8. In a gas pressure cut-off, the combination with a valve and its casing, constituting companion parts, of means to seal the joint between the same in one position of the former and comprising an elastic rubber frusto-cone-shaped member carried by one of the parts and having unrestricted circumferential yielding engagement with a frusto-conical face provided therefor on the companion part.

9. In a pressure cut-off for gas lines, the combination with a casing having an inlet and an outlet and a valve axially movable in the casing, the valve having a frusto-conical boss on its upper face and a frusto-conical recess in its underface, of means for sealing the joints between the casing and the respective faces of the valve in the various positions thereof, comprising tubular elastic rubber members which are secured in the valve casing, one of which has unrestricted circumferential sealing engagement with the surface of the aforesaid boss and the other of which has unrestricted circumferential sealing engagement with the surface of the aforesaid recess.

10. In a pressure cut-off for gas lines, the combination with a casing having an inlet and an outlet, of a valve movable axially of the casing and having frusto-conical upper and under faces, elastic rubber tubular frusto-conical members separably arranged at the ends of the casing for unrestricted circumferential sealing engagement with the said faces and means for securing the members in position.

11. In a pressure cut-off for gas lines, the combination with a casing having an inlet and an outlet and a valve in the casing having a frusto-conical boss, of an elastic rubber tubular frusto-conical member arranged for unrestricted circumferential yielding engagement with the surface of the boss, the latter in such engagement projecting into the smaller end of the member and spreading the same.

12. In a pressure cut-off for gas lines,
the combination with a casing having an in-
let and an outlet, of a valve movable axi-
ally of the casing and normally upheld by
5 pressure in the position to open the inlet,
the valve having a frusto-conical upper
face, an unrestricted elastic rubber tubular
frusto-conical member for circumferential
sealing engagement with said face, and
10 means for engagement with the lower un-

derface of the valve to seal the same, when
the valve falls to its lowermost position.

In testimony whereof I have hereunto set
my hand in presence of two subscribing wit-
nesses.

HARRY C. GRIMES.

Witnesses:

ROY SEE,

BLAIN W. TAYLOR.