R. H. COWDREY.

SAFETY DEVICE FOR GAS.

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Fig. 1.

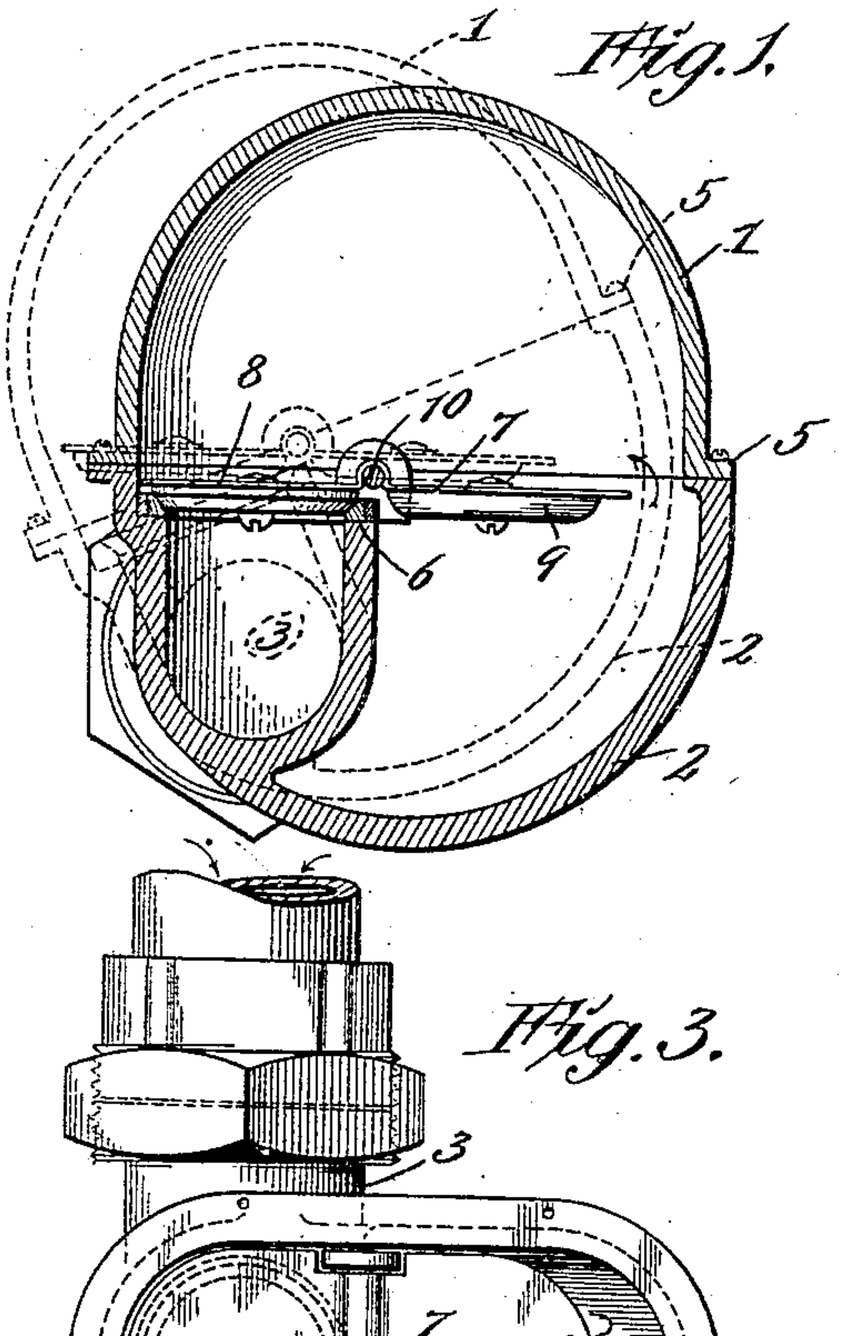


Fig. 2.

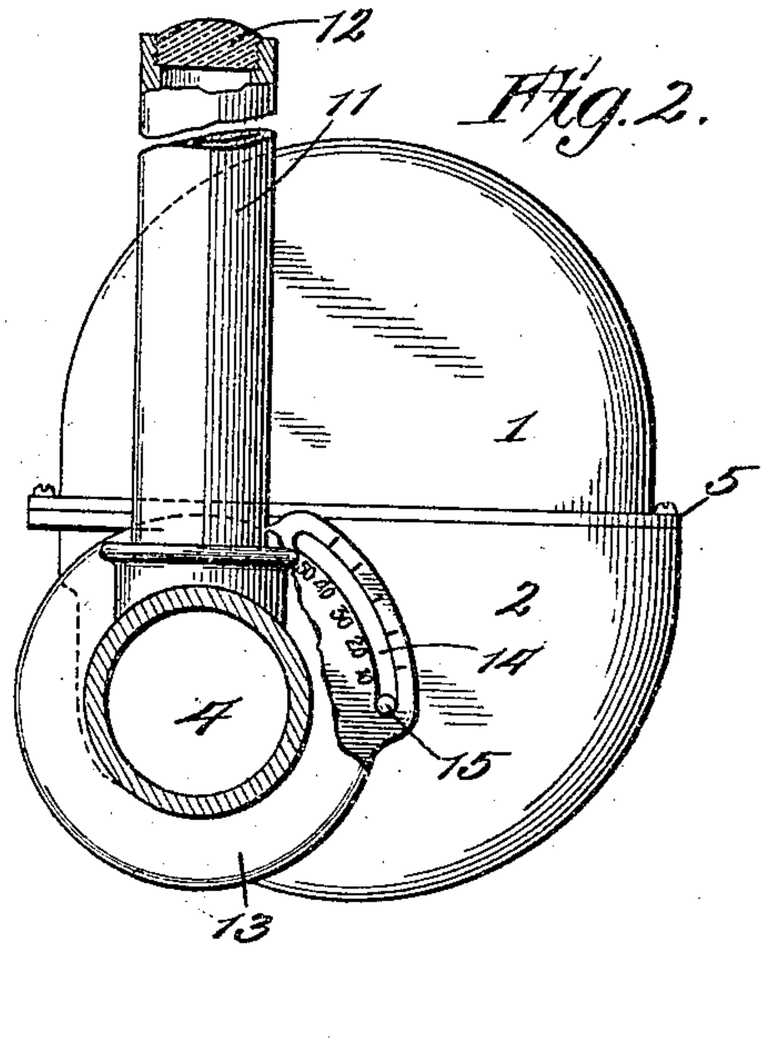


Fig. 3.

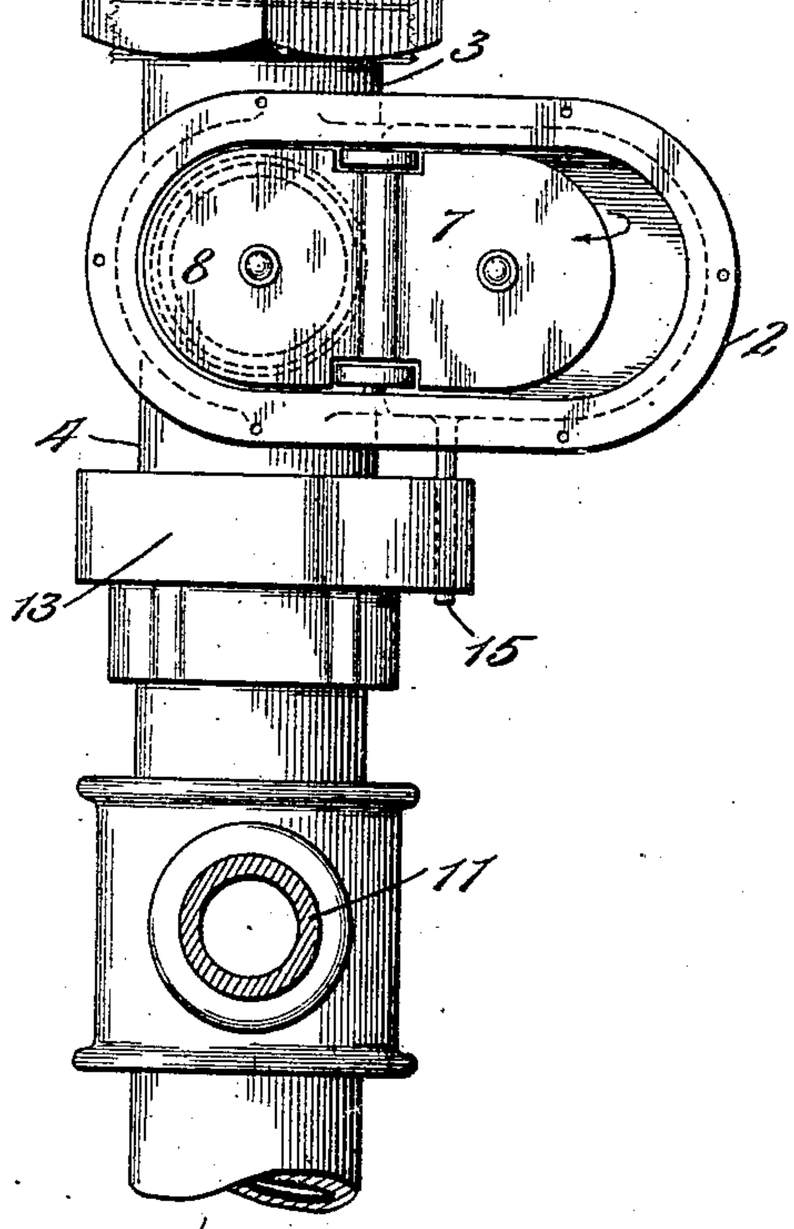


Fig. 4

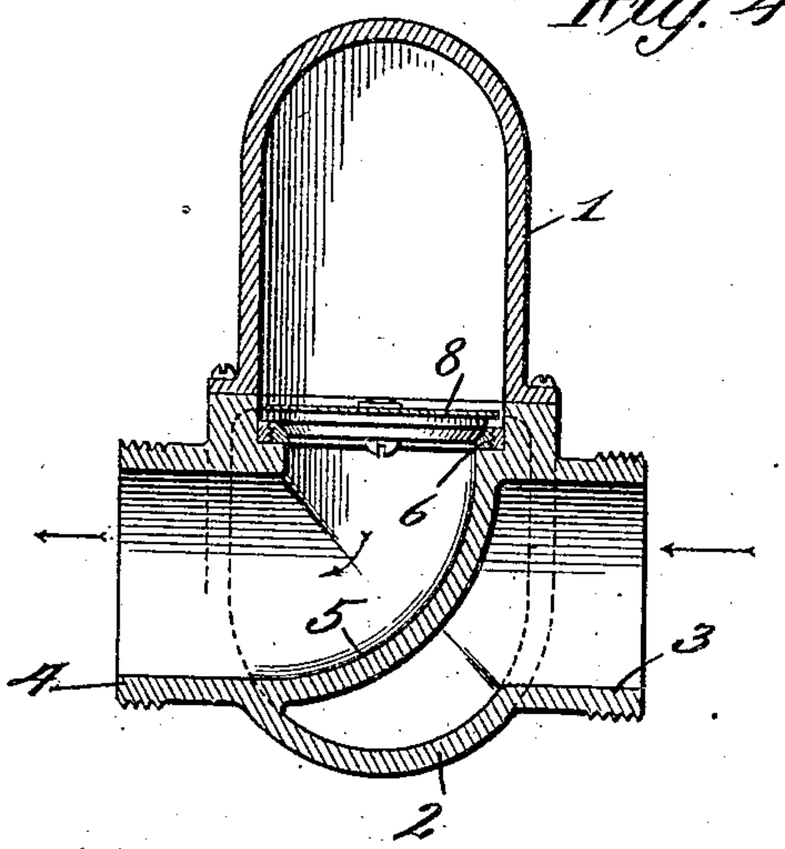
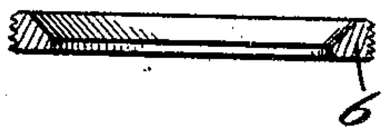


Fig. 5.



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UNITED STATES PATENT OFFICE.

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SAFETY DEVICE FOR GAS.

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To all whom it may concern:

Be it known that I, ROBERT H. COWDREY, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Safety Devices for Gas, of which the following is a full, clear, and exact specification.

My invention relates to safety devices for the control of escaping gas, and its primary object is to provide improved means whereby the volume of flow is made to operate the valve in said device and automatically shut off the gas. Its secondary object is to provide an improved means whereby the gas may be shut off at any time by an operator outside the building. Devices of this character are required to handle the gas supply under conditions of service pressure that range from almost nothing to more than two hundred pounds to the square foot, and as these changes may occur at any moment and without warning, such devices would not be reliable if operative on pressure. To deal successfully with these conditions and secure proper method of operating the valve, it has been necessary to discern and clearly recognize that the movement or flow of gases or fluids produces effects entirely separate from and independent of those produced by pressure. By clearly recognizing the difference in function between flow and pressure, I have been able to construct a device in which the valve is operated and accurately controlled by the rate of flow of gas, and in the practical working of the device I have secured the identical results, from a given rate of flow, under all degrees of service pressure as well as in the total absence of all pressure above atmosphere. As for example, by suction.

To attain these ends and to accomplish other new and useful results, as will appear, my invention consists in the combination and arrangement of the various mechanical parts in such manner as to apply and make use of certain elements and principles hitherto not recognized or indifferently considered, as hereinafter more fully described and claimed, and shown in the accompanying drawings, in which—

Figure 1 is a sectional view of my improved device in a medial plane transverse to the direction of flow of the gas; Fig. 2 is a side elevation of the device shown in Fig. 1. Fig. 3 is a top plan view of the device with the upper portion of the casing removed. Fig. 4 is a section on the vertical longitudinal plane through the inlet and outlet pipes, and Fig. 5 is a vertical section of the valve seat arranged above the mouth of the outlet pipe.

Referring more particularly to the drawings, the casing is composed of two approximately semi-circular sections, 1 and 2, of elongated elliptical cross-section. The upper of said sections is entirely hollow while the lower of said sections is provided with an inlet port 3 and an outlet port 4. Arranged adjacent to the outlet port 4 is a ninety-degree elbow partition 5 opening upwardly into the upper section of the casing. Said partition 5 is provided at its upper end with a valve-seat 6 to be hereinafter referred to.

To unite the sections of the casing together, said sections are provided with peripheral flanges adapted to fit together and be held by suitable fastening means. The casing when assembled has formed therein a circular passage with a single convolution connecting the inlet passage 3 with the outlet passage 4. Rigid with the side walls of the casing is a stationary pivot 10 out of center with said casing. Swingingly mounted upon the pivot 10 is a valve member comprising a valve 8 and a counter-weight 9, said valve and counterweight being of equal weight and mounted on opposite sides of pivot 10 and below the horizontal plane through the axis of said pivot in such manner as to counterbalance.

By reference to Fig. 1, it will be apparent that the center of gravity of the valve member comprising the counterbalance valve 8 and counterweight 9, is immediately under the axis of the pin 10. It will thus be evident that whenever the valve member is moved out of the horizontal, the center of gravity thereof will be raised out of its lowermost position to a degree corresponding with the force displacing it from its horizontal balanced position. It will furthermore be evident that as soon as the force ceases to act, said valve member is caused to return to horizontal position by reason of its center of gravity being returned to its lowermost position of stable equilibrium. In operation the casing is mounted to swing eccentrically about the inlet and outlet pipes as a center. Rigid with the outlet pipe 4 is a circular enlargement 13

provided with an arcuate slot 14, within which a pin 15 carried by the lower member 2 of the casing moves. A graduated scale along the edge of the said arcuate slot enables the casing to be set at the desired angular position. Upon the outer end of the outlet pipe 4 is mounted an emergency outlet stand pipe 11, closed at the top by a glass plug 12. In the case of fire or other emergency in which the flow of gas must be stopped, the fireman or other operator by the use of a sledge or other heavy article may smash the glass 12, thereby permitting an increased flow of the gas which causes the valve to close in the manner to be hereinafter referred to.

When in use the casing is set at some such angle of position as indicated by dotted lines in Fig. 1, which position corresponds to the quantity of gas it is desired to have available for use. The valve member being counterbalanced in the manner already pointed out, will assume the horizontal position indicated by dotted lines in Fig. 1.

In operation the gas enters the lower section 2 of the casing through the inlet port 3, flows around the counterweight 9 of the valve, upwardly through the hood 2 of the casing and down past the valve 8 through the outlet passage 4. The casing having been set at such angular position as will allow a certain volume of gas to pass the valve 8 in a certain time without causing the valve to close, the valve will be displaced angularly from its seat to such an extent that the distance through which it would be necessary to raise the center of gravity of the entire valve member would be such as would prevent the valve being forced closed by that set volume, even should such volume be passing through the valve at that moment. This volume is termed the normal volume or normal flow for each position of the casing. The device as thus far described is intended to act automatically, but should it be desired to have the device operated from without the building at the will of an authorized person, means can readily be provided without the building whereby the required flow to operate the valve may be caused at will, such as by smashing the glass 12 in the stand-pipe 11. By means of a few trials the required position of the casing can be ascertained to give the desired flow.

The advantages resulting from this construction and arrangement of the parts is a great saving in the cost of manufacture, an especial feature being that the valve member is swung from the side walls of the casing, thereby enabling the setting of the casing to be instantly and accurately determined.

Having thus described my invention, what I claim is:—

1. In a safety device for fluids, in combination a casing, a movable balanced valve inclosed therein and supported on the walls thereof, an adjustable valve seat, an emergency outlet pipe whereby an abnormal flow of fluid may be caused to operate said valve or grate, means for adjusting the valve to various degrees of opening, and means for indicating the degree of valve opening.

2. In a safety cut-off for fluids, the combination with inlet and outlet pipes, of a casing connected therewith, a balanced valve movable from its position of equilibrium by a current of fluid through the casing and a valve seat communicating with the outlet within said casing and movable toward and from said valve.

3. In a safety cut-off for fluids, the combination with inlet and outlet pipes, of a casing connected therewith, a balanced valve movable from its position of equilibrium by the flow of fluid through the casing, and a valve seat within said casing and through which gas flows to said outlet pipe, said valve seat being adapted to swing toward and from said valve.

4. In a safety cut-off for gas pipes, the combination of a casing with inlet and outlet ports, a balanced valve mounted therein and a valve seat between said ports and movable angularly toward and from said valve.

5. In a safety cut-off for gas pipes, the combination with the inlet and outlet pipes, of a casing, a swinging valve provided with means restraining itself against angular movement during a normal flow of gas, and a valve seat movable angularly toward and from said valve, said valve and valve-seat being arranged and adapted to control the flow of gas through said casing.

6. In a safety cut-off for fluids, the combination with inlet and outlet pipes, of a casing, a valve-seat connected with said casing and movable relatively to said inlet and outlet pipes, and a balanced valve coöperating with said valve-seat, said valve being movable from its position of equilibrium by the flow of fluid through the casing and said valve-seat and valve being adapted to control the flow of gas through said casing.

7. In a safety cut-off for fluids, the combination with inlet and outlet pipes, of a casing, a valve-seat within said casing and connected with said outlet pipe, and a valve, said valve and valve-seat being movable about the same center and relatively to each other.

8. In a safety cut-off for fluids, the combination with inlet and outlet pipes, of a casing pivoted on said pipes and provided with a passage connecting said pipes, a valve seat arranged in said passage, and a counterbalanced valve for said valve-seat, said valve being movable in said passage to the valve seat by an abnormal flow of fluid and adapted by its counterbalance to be returned to

its position of equilibrium upon cessation of the fluid flow.

9. In a safety cut-off for gas pipes, the combination with inlet and outlet pipes, of a casing pivoted thereon and provided with means for indicating its angular setting, a valve-seat through which gas flows from the inlet to the outlet pipe, and a balanced valve pivotally mounted in the casing and adapted to be forced to said valve seat only by an abnormal flow of gas.

10. In a safety cut-off for gas pipes, the combination with inlet and outlet pipes, of a casing pivoted thereon and provided with a passage connecting said pipes, a valve seat in said passage, and a valve pivoted in a plane through its center of gravity and co-operating with said valve-seat.

11. In a safety cut-off for gas pipes, the combination with inlet and outlet ports, of a pivotally mounted casing, a pivotally mounted valve normally horizontal and controlling the flow of gas through the casing, and means for indicating the angular position of said casing whereby the angular opening of the valve is determined.

12. In a safety device for gas, the combination with a casing provided with inlet and outlet openings, of a valve and valve seat relatively movable within the casing for controlling the flow of gas therethrough, said casing being provided with curved walls arranged to diverge from said valve in the direction of its opening movement, and means operatively related to said valve and valve seat whereby the flow is limited to a certain normal flow, said means being adapted to permit the closure of the valve when the flow exceeds the normal.

13. In a safety device for gas, the combination with a casing, of a valve in said casing adapted to be closed by an abnormal flow of gas, said valve and casing being capable of relative adjustment to adapt said valve to close under different abnormal flows, and a vent pipe whereby an abnormal flow of gas may be produced in an emergency to close the pipe.

14. In a safety device for gas installed within a building, the combination with a casing, of a valve in said casing adapted to be closed by an abnormal flow of gas, said valve and casing being capable of relative adjustment to adapt said valve to close under different abnormal flows, and a vent pipe extending from said casing to a point without the building whereby an abnormal flow of gas may be produced to close the valve.

15. In a safety device for gas, the combination with a casing adapted to be closed by an abnormal flow of gas, said valve and casing being capable of relative adjustment to adapt said valve to close under different abnormal flows, and a vent pipe leading from said casing, said vent pipe being closed by a glass plug adapted to be smashed by a blow to permit an abnormal flow of gas to close the valve.

16. In a safety device for gas, the combination with a casing, of a valve in said casing adapted to be closed by an abnormal flow of gas, said valve and casing being capable of relative adjustment to adapt said valve to close under different abnormal flows.

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