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GAS SAFETY VALVE

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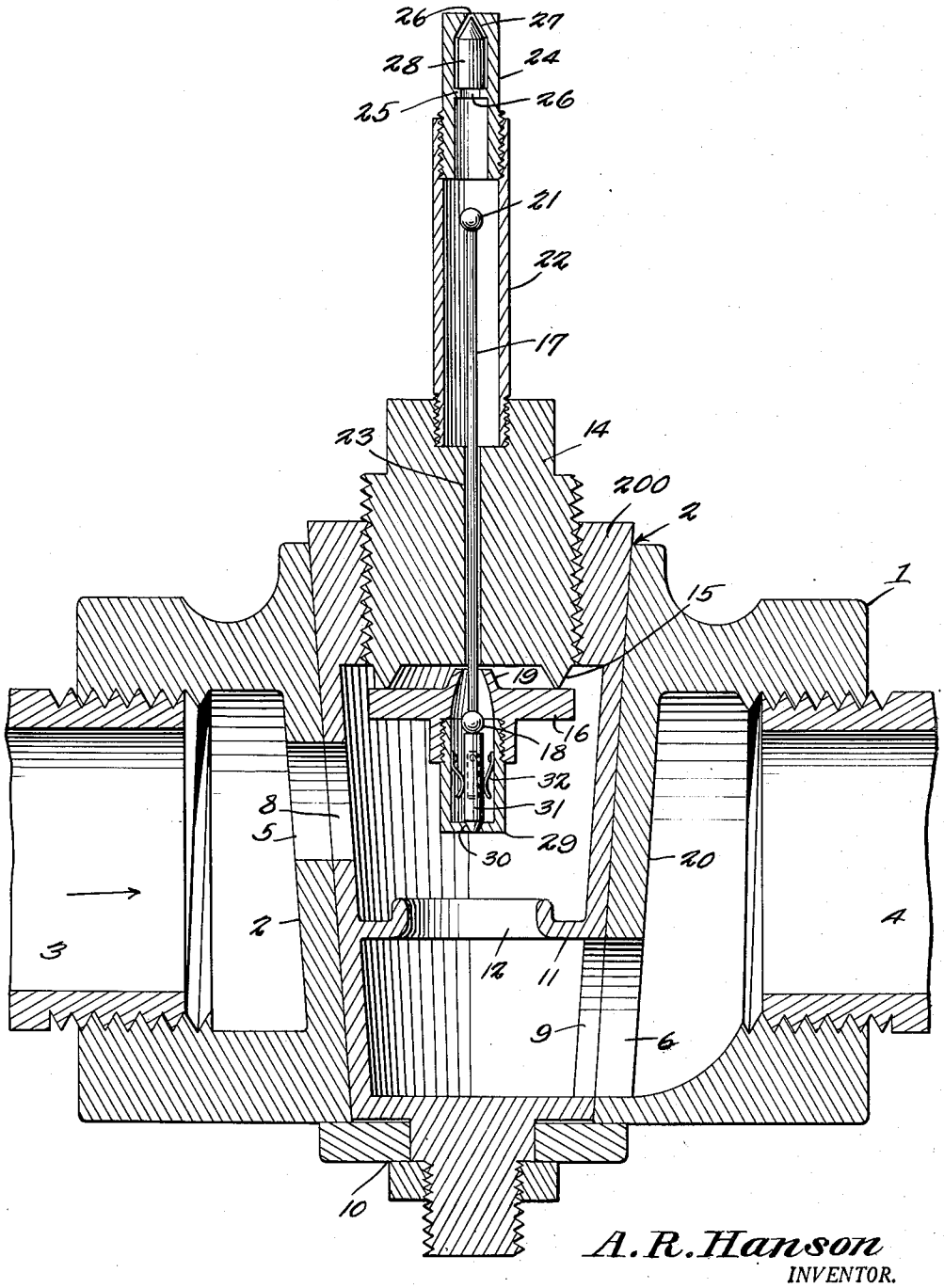

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GAS SAFETY VALVE

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3 Claims. (Cl. 137—153)

This invention aims to provide a novel mechanism for automatically cutting off the flow of gas, when a reduction of pressure, due to a leak in the gas line, occurs.

It is within the province of the disclosure to improve generally and to enhance the utility of devices of that type to which the present invention appertains.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, may be made within the scope of what is claimed, without departing from the spirit of the invention.

In the accompanying drawing, the invention is disclosed in a single figure, which is a vertical section.

In carrying out the invention, there is provided a casing 1, including a cross barrel 2. The cross barrel 2 is a composite structure. It includes a tapered sleeve 20, forming part of the casing 1, and extended across the casing.

An inlet member 3 is mounted in one end of the casing 1. An outlet member 4 is mounted in the opposite end of the casing 1. The sleeve 20 has an upper port 5 communicating with the inlet 3. The sleeve 20 is provided with a lower port 6, communicating with the outlet 4.

A hollow, tapered cut-off valve 200 is mounted to rotate, at the will of an operator, in the sleeve 20. A nut and washer structure 10 on the lower end of the cut-off valve 200 holds it in place in the sleeve 20 for rotation. The valve 200 has a port 8 registering with the inlet port 5, and is provided with an outlet port 9 registering with the outlet port 6. The ports 5—8 are smaller than the ports 6—9.

Ordinarily, the cut-off valve 200 remains stationary, in the position shown in the drawing. Since the valve 200 is rotated to bring the ports 5—8 and 6—9 out of registration, only when it is desired to cut off the flow of gas from the inlet 3 to the outlet 4 completely, the valve 200 may be considered as a part of the so called "cross barrel" 2, hereinbefore alluded to.

The hollow valve 200 has a transverse partition 11, located between the ports 5—8 on the one hand, and the ports 6—9 on the other, the partition being supplied with an upwardly extended lower valve seat 12.

A plug 14 is threaded to a fixed position in the upper part of the valve 200, and may be considered as a part of that valve. The plug 14 is provided with a depending annular upper seat 15.

The numeral 16 marks a disk-like control valve, adapted to engage the upper seat 15. A lifter 17, in the form of a rod, is mounted to slide vertically in the plug 14. At its lower end, the lifter 17 is provided with a ball 18 adapted to be received in a tapered upstanding neck 19 on the valve 15. A swivel connection thus is afforded, and the valve 16 will engage properly with the seat 15 when the lifter 17 is pulled upwardly by hand. The lifter 17 is supplied at its upper end with an enlarged head or ball 21.

A tube 22 is threaded at its lower end into the plug 14, and communicates with a bore 23 in the plug, wherein the lifter 17 slides. The lifter 17 does not fill the bore 23 completely.

A nipple 24 is threaded into the upper end of the tube 22. Intermediate its ends, the nipple 24 is supplied with a transverse partition 25, having an opening 26. At its upper end, the nipple 24 is equipped with an outlet 26, and below the outlet 26, the nipple 24 has a tapered seat 27. An upwardly closing check valve 28 is supported on the partition 25, the tapered upper end of the valve 28 being adapted to engage the seat 27 and close the outlet 26.

A cup-shaped nipple 29 is threaded into the valve 16 and communicates with the neck 19. The nipple 29 is provided in its bottom with an opening 30, controlled by a gravity valve 31 within the nipple. The nipple 29 is supplied with a plurality of spring tongues 32, which press inwardly against the valve 31.

Having taken off the nipple 24, the operator raises the valve 16 by means of the lifter 17 until the valve is engaged with the upper seat 15, and the nipple 24 is replaced. The valve 16 stays in the position specified, because its upper surface is subjected to atmospheric pressure only, whereas its lower surface is subjected to pressure in the gas line 3—4.

If there is a leak in the outlet line 4, causing reduction of pressure to a point where the weight of the valve 16 and associated parts makes itself felt, the valve 16 moves downwardly until it engages the seat 12, and the flow of gas from the inlet 3 to the outlet 4 is cut off.

A shock of considerable magnitude will cause the valve 16 to vibrate, thereby letting gas into the bore 23, the tube 22 and the nipple 24, and the check valve 28 closes. Thus, pressure on both the upper and lower surfaces of the valve 16 will be equalized, and the valve 16 will drop

by gravity until it engages the seat 12, the flow of gas thus being cut off from the inlet 3 to the outlet 4.

A dangerously high pressure may be as objectionable as a low pressure caused by a gas leak. In the event of an objectionably high pressure, the valve 16 will drop downwardly, engage the seat 12 and cut off the flow of gas. The springs 33 can be designed to hold the valve 31 in closed position with respect to the opening 30 in the nipple 29 until a predetermined high pressure has been attained. When that pressure is reached, the valve 31 is moved upwardly, to open the aperture 30. The gas flows upwardly through the bore 23, and the tube 22 into the nipple 24, the valve 28 closing the opening 26. When the pressure both above and below the valve 16 is equalized, and the valve will drop down on the seat 12, cutting off the flow of gas from the inlet 3 to the outlet 4.

When it is desired to stop the flow of gas from the inlet 3 to the outlet 4 in the ordinary way, the valve 200 is turned by hand until the ports 5—8 and 6—9 are out of registration. The device, therefore, combines the advantages of an automatic cut-off and a hand cut-off.

Having thus described the invention, what is claimed is:

1. In a device of the class described, a body having a gas conduit and provided with upper and lower seats, the lower seat being interposed in the conduit, the body being provided with an outlet member communicating with the atmosphere, an outwardly closing check valve in the outlet member, a lifter under the control of an operator and slidable in the body, a control valve on the lower portion of the lifter and movable between the seats, the outlet member opening on top of the control valve when the control valve is engaged with the upper seat, the control valve having a passage communicating with the conduit, and communicating with the outlet member when the control valve is engaged with the upper seat, and a downwardly closing check valve carried by the control valve and constituting means for opening and closing the passage.

2. A device of the class described, constructed as set forth in claim 1, in combination with means for retarding the opening movement of the last specified check valve, to make it responsive to a predetermined maximum pressure in the conduit.

3. In a device of the class described, a body having a gas conduit, a valve carried by the body and under the control of an operator to open and close the conduit, and automatically acting means carried by the valve for closing the conduit responsive to abnormally high and abnormally low gas pressures therein.

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