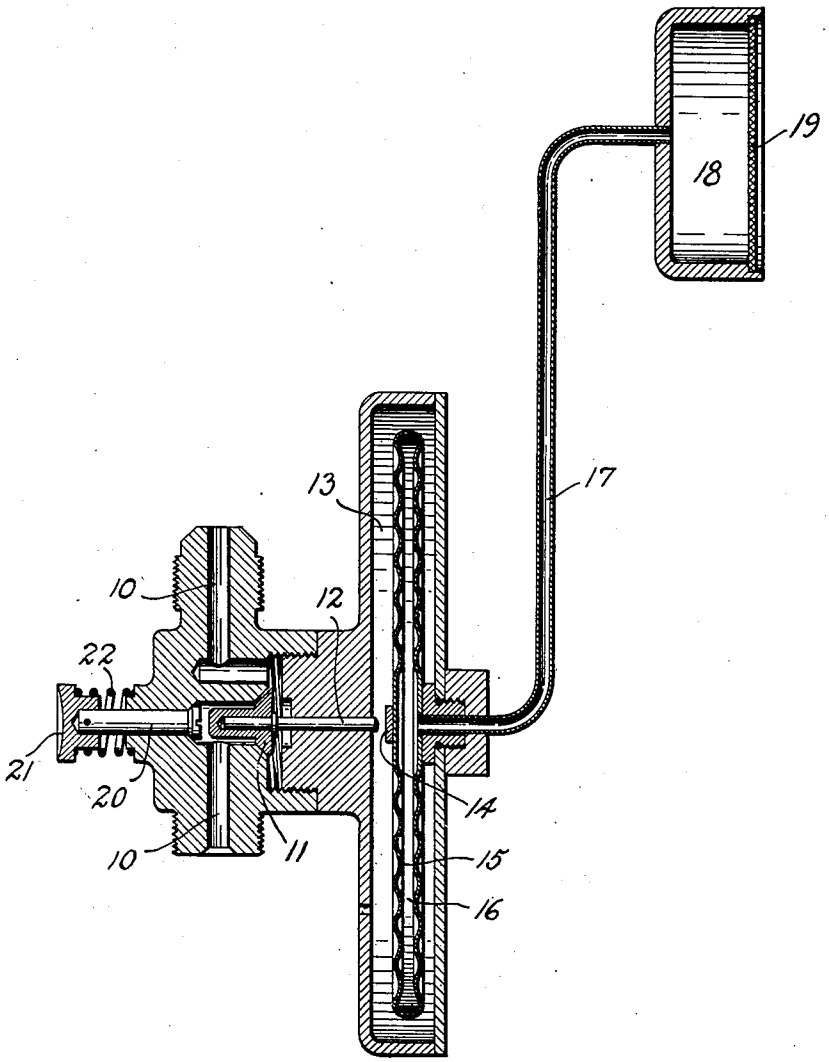
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CONTROL

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CONTROL

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My invention relates to control mechanism. The purpose of my invention is to provide a control mechanism which can serve, amongst other purposes, to cut off flow of a fluid under undesirable abnormal conditions. More particularly, the invention comprises a safety device for cutting off flow of a fluid in case of leakage. For example, the safety device of the invention can be used to cut off flow of gas to a gas burner in case the gas burner should accidentally be blown out or extinguished.

The invention is illustrated by means of the accompanying drawing showing a safety device in accordance with the invention operable to close a valve and cut off flow through a gas line.

On the drawing, reference character 10 designates a gas supply conduit for supplying gas to a gas burner. Flow through conduit 10 can be shut off by valve 11. Valve 11 has a stem 12 which projects into a chamber 13 so that it can be contacted by an abutment 14 attached to the metallic wall 15 of an expansible chamber 16. The wall of the expansible chamber 16 is preferably corrugated and is made of flexible material.

Chamber 16 has communication through conduit 17 with chamber 18. Chamber 18 is closed to the atmosphere except that one side 19 is made of porous material such as earthenware or clay. This chamber normally contains air at atmospheric pressure.

A pin 20 is situated in the valve casing of valve 11 and is adapted to open valve 11 by pressure of the hand on a button 21. A spring 22 normally holds pin 20 away from valve 11.

The operation of the apparatus is as follows:

If gas passing through conduit 10 should escape into the atmosphere surrounding chamber 18, as for instance if a gas burner attached to conduit 10 becomes extinguished, the gas diffuses through the porous material 19. This creates a higher pressure in chamber 18 than in the air surrounding chamber 18. This excess of pressure is transmitted through conduit 17 and to chamber 16, acting on flexible member 15 to expand the same and to move stem 12 so that valve 11 is closed, thereby closing conduit 10. Chamber 13 is at atmospheric pressure, it being the differential of pressure between chambers 16 and 13 which causes the closing action.

When it is desired to have flow through conduit 10, button 21 is pushed inwardly causing pin 20 to move valve 11 off its seat.

As will be seen from the above description, the operation of the apparatus depends on the increase of pressure in the space behind porous material 19. The difference of pressure in such space results from difference of molecular weights of the gases on each side of the porous wall due to diffusion of gas through the porous wall. The greater the difference in molecular weights of the gases separated by the porous wall, the quicker and the greater will be the alteration of pressure in the space behind the porous wall.

Assume, first, that the gas behind the porous wall, that is, in conduit 17 and chamber 16, is air having a molecular weight of 28.8 and that the gas on the outside of the wall is pure nitrogen N_2 having a molecular weight of 28.0. With these gases, the difference of molecular weights will cause a sufficient pressure differential to operate the device if the sensitivity of the flexible member 15 is very high. It would not be practical, however, under all circumstances to give flexible member 15 so high a sensitivity. It should be constructed to have a sensitivity which has a given relation to the particular purposes for which the device is used. In practice, in the use of the valve to cut off flow of gas, it is not necessary to shut off the valve for every slight difference of pressure between the two sides of the porous wall 19. It is only when there is such leakage of gas that a dangerous condition has arisen that it is necessary to shut off valve 11. Consequently, flexible member 15 should be so designed and constructed as not to react to minute changes of pressure but to react to those changes of pressure which represent dangerous or undesired conditions.

Assume that the apparatus is used in a kitchen for closing the gas supply pipe when a burner is accidentally extinguished or in case there is a leak in the gas pipe. The flexi-

ble member 15 should be such as to close the gas pipe in event of admission of gas to the room. For such reasons, it should not, however, be so sensitive as to close due to the presence of water vapor in the kitchen developed by boiling water.

It is, however, not necessary to determine the sensitivity of the apparatus merely by the design and construction of flexible member 15. A filter, of known kind, may be arranged between porous wall 19 and the surrounding atmosphere to filter out gases which should not affect the apparatus. This produces the same effect without losing any sensitivity for actuation of the valve due to leakage of the dangerous gas.

While I have described one form of apparatus for carrying out the invention, it will be understood that other forms are possible within the spirit and scope thereof.

Having thus described my invention, what I claim is:

1. A safety device for a gas conduit comprising a valve adapted to cut off flow through said conduit, a chamber having a flexible wall, a chamber having a porous wall for diffusion of escaped gas, means of communication between said chambers, said flexible wall being arranged to close said valve upon diffusion of escaped gas through said porous wall.

2. Apparatus according to claim 1 including a pin adapted to be pushed by hand to open the valve.

3. A safety device for a gas conduit comprising a housing, a passage through said housing, a valve arranged to close said passage, a chamber in said housing having a flexible wall, means whereby excess pressure in said chamber moves said flexible wall to close said valve but whereby said valve remains closed on release of the excess pressure, a chamber having a porous wall for diffusion of escaped gas and means of communication between said chambers, said valve being arranged to be moved in direct relation to the force exerted thereon by said flexible wall.

4. A safety device for a gas conduit comprising a housing, a passage through said housing, a valve arranged to close said passage, a chamber in said housing having a flexible wall, means whereby excess pressure in said chamber moves said flexible wall to close said valve but whereby said valve remains closed on release of the excess pressure, a chamber having a porous wall for diffusion of escaped gas, means of communication between said chambers and manual means for opening said valve, said valve being arranged to be moved in direct relation to the force exerted thereon by said flexible wall.

5. A safety device for a gas conduit comprising a housing, a passage through said housing, a valve arranged to close said passage, a chamber in said housing having a flexible wall, means whereby excess pressure in said chamber moves said flexible wall to close said valve but whereby said valve remains closed on release of the excess pressure, a chamber having a porous wall for diffusion of escaped gas, means of communication between said chambers and spring retained manual means for opening said valve, said valve being arranged to be moved in direct relation to the force exerted thereon by said flexible wall.

6. A safety device for a gas conduit comprising a housing, a passage through said housing, a valve arranged to close said passage, an expansible chamber in said housing made of corrugated metal, means whereby excess pressure in said expansible chamber moves the chamber wall to close said valve but whereby said valve remains closed on release of the excess pressure comprising said valve and guide means therefor, said valve and guide means being arranged unconstrainedly in said housing, a chamber having a porous wall for diffusion of escaped gas and means of communication between said chambers.

7. A safety device for a gas conduit comprising a housing, a passage through said housing, a valve arranged to close said passage, an expansible chamber in said housing made of corrugated metal, means whereby excess pressure in said expansible chamber moves the chamber wall to close said valve but whereby said valve remains closed on release of the excess pressure comprising said valve and guide means therefor, said valve and guide means being arranged unconstrainedly in said housing, a chamber having a porous wall for diffusion of escaped gas, means of communication between said chambers and manual means for opening said valve.

In testimony whereof I hereunto affix my signature.

JOHN GUDBRAND TANDBERG.