

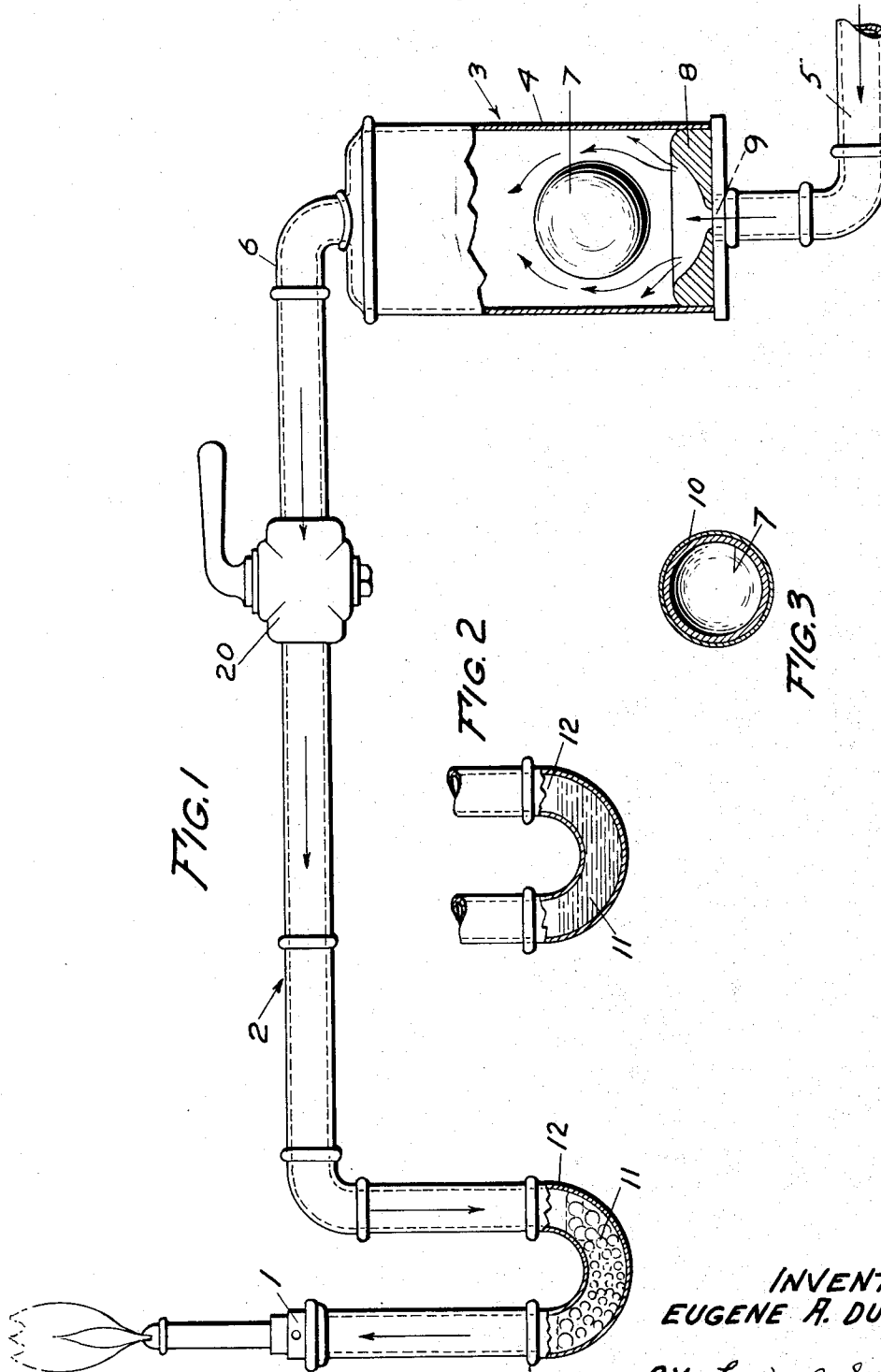
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E. A. DUPIN

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AUTOMATIC SAFETY CUT-OFF DEVICE FOR GAS APPLIANCES

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INVENTOR
EUGENE A. DUPIN
BY Louis C. Smith
ATTORNEY

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AUTOMATIC SAFETY CUT-OFF DEVICE FOR GAS APPLIANCES

Eugene A. Dupin, New York, N. Y.

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2 Claims. (Cl. 158—132)

This invention relates to automatic safety cut-off device for gas appliances.

Gas appliances usually include a gas burner and a supply pipe for supplying gas under pressure to the burner, and also a shut-off valve in the supply pipe by which the flow of gas to the burner can be cut off when the appliance is not being used.

It sometimes happens that when a gas appliance is in use a failure of gas pressure may occur from one cause or another in which case the burner flame is extinguished. Or the gas pressure may be reduced to such an extent that the flame will go out. When the gas pressure is restored, the gas will escape through the unlighted burner, unless someone has noticed the fact that the burner has been extinguished and has closed the shut-off valve. If the shut-off valve remains open the escaping of gas through the gas burner produces a hazardous condition which is liable to result in fatalities.

It is one of the objects of the present invention to provide novel means for automatically shutting off the flow of gas to the burner of the gas appliance whenever the gas pressure in the supply pipe fails or is reduced to a predetermined subnormal pressure.

A further object of the invention is to provide a cut-off device for gas appliances which includes a valve in addition to the shut-off valve that is held open by the normal gas pressure in the supply pipe and which is provided with magnetic means that assists in closing the valve whenever the gas pressure fails or falls to a predetermined subnormal point, and which also maintains the valve closed until the failure or normal gas pressure is restored.

Another object of the invention is to provide a device of this type which includes sealing material in the supply pipe which, when the burner is lighted, is maintained in a liquid condition by the heat of the burner flame, so that the gas can freely bubble through the liquid material in its passage to the burner, which sealing material is of such a nature that it solidifies and thus seals the supply pipe whenever the flame is extinguished, thereby making it impossible for gas to escape from the unlighted burner.

In the drawings where I have illustrated a selected embodiment of the invention:

Fig. 1 is a somewhat diagrammatic view illustrating the invention, parts being shown in section.

Fig. 2 is a fragmentary sectional view illustrating the sealing material in its solid condition.

Fig. 3 is a section through the ball valve.

In the drawings, 1 indicates diagrammatically the burner of any usual gas appliance and 2 indicates the supply pipe by which the gas under pressure is supplied to the burner, said supply pipe being shown as having a shut-off valve 20 therein.

Situated in the supply pipe is an auxiliary valve device illustrated generally at 3, and which comprises a cylindrical casing 4 which communicates at its lower end with the supply pipe in section 5, and at its upper end

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with the supply pipe section 6, so that the gas which is delivered to the burner 1 flows through said casing 4.

Situated within the casing is a light weight ball valve 7, and in the bottom of the casing 4 is a valve seat 8 on which the ball 7 may rest to close the port 9 which provides a communication between the supply pipe section 5, and the casing 4.

The ball 7 is preferably a hollow ball, and its weight is such that the pressure of the gas flowing through the casing 4 will normally hold the ball removed from the valve seat 8, as shown in Fig. 1.

The ball is provided with a thin metallic coating 10, and the valve seat 8 is in the form of a magnet so that normally the metal coated ball 7 will be attracted toward the valve seat 8. However, as stated above, the construction is such that the normal pressure of the gas entering the casing 4 will hold the ball valve 7 suspended and separated from the valve seat 8.

If the gas pressure fails for any reason, the valve 7 will normally gravitate toward the valve seat and its closing movement will be assisted by the magnetic attraction between the ball 7 and the valve seat. Said magnetic attraction serves not only to assist the closing of the valve 7 onto its valve seat, but it also maintains the ball seated.

Furthermore, the construction is such that if the gas pressure is reduced to a predetermined low point, the ball valve 7 will be drawn to its seat and held thereon, thereby closing the inlet pipe, by the magnetic attraction between the valve 7 and the valve seat.

The invention also includes a quantity of sealing compound 11 which is permanently located within the supply pipe 2 at a point closely adjacent the burner 1, and which is solid at room temperatures within the temperature range resulting from normal fluctuations of the outside temperature but which has a melting point slightly above such temperature range.

In the construction shown the portion of the supply pipe adjacent the burner is provided with a U-bend 12, and the sealing material 11 is permanently located in the bight of said bend, as shown in Figs. 1 and 2, and the quantity of sealing material is such as to fill said bight. While any suitable material which will be solid at room temperatures within the range resulting from the usual fluctuations of the outside temperature but will become liquid at a temperature 10 or 15° above such temperature range may be employed, yet I will preferably use some suitable metal such as that known as "mallet" metal which has a property of fusing or liquifying at a temperature of 10 or 15° above the before mentioned temperature range.

The construction is such that the bight of the U-bend in the pipe is close enough to the burner 1 so that when the latter is lighted the heat from the burner will be sufficient to maintain the sealing material 11 in its liquid condition. When the sealing material is in liquid form it has a specific gravity such that the gas at normal pressure will bubble freely through the amount of sealing material necessary to fill the U-bend, as clearly seen in Fig. 1, and hence so long as the sealing material is in liquid form and the gas maintains its normal pressure said gas will be freely delivered to the burner.

If at any time while the burner is in operation the gas pressure fails and the burner flame is extinguished so that the sealing material is not subjected to the heat from burner, said material will rapidly solidify, thereby permanently closing the U-bend of the supply pipe and preventing any gas from passing therethrough to the burner.

The lining in Fig. 2 is designed to indicate the sealing material in its solid form.

With the device as above described it will be observed

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that so long as the gas pressure is normal and the burner 1 is in operation, the valve 7 will be held open by the gas pressure and the sealing material 11 will be maintained in a liquid condition so that the gas is free to flow to the burner to maintain the burner flame.

If for any reason the gas pressure fails or is reduced below a predetermined point, the ball valve 7 will be seated and held to its seat by the magnetic attraction between it and the seat, and the burner flame will be extinguished. As soon as the burner flame is extinguished the sealing material 11 will begin to solidify, and in a very short time will become solid, thereby permanently closing the supply pipe.

If, thereafter the gas pressure is restored and the ball valve 7 is lifted from its seat by the gas pressure, the supply pipe will still be closed by the solid sealing material, as shown in Fig. 2, so that no gas will be permitted to flow to the unlighted burner, and the creation of a hazardous condition will thus be entirely eliminated.

In order to start the burner in operation again it will be necessary to heat the solidified material 11 sufficiently to render it fluid, and this can be easily done by simply applying a lighted match to the bight of the U-bend, since the sealing material is of such a nature that it will melt at a low temperature of only a few degrees above temperature range above referred to.

My device, therefore, will prevent escape of gas through an unlighted burner whenever the burner flame becomes accidentally extinguished because of failure of gas pressure or other means.

I claim:

1. In a safety device for gas appliances which include a burner, the combination with said burner, of a supply pipe leading to the burner and having a U-bend located closely adjacent thereto, sealing material filling the bight of the U-bend and permanently retained therein, which sealing material is normally in a solid state in the absence of heat generated by the burner but has a sufficiently low melting point so that it is maintained in a liquid state by the heat generated by the lighted burner, the amount of sealing material in said bight and its specific gravity being such that the gas flowing through the supply pipe

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under normal pressure may bubble freely therethrough at the U-bend and thus may provide a continuing supply of gas to the burner, whereby so long as the burner is lighted the gas will be supplied thereto through the liquid sealing material occupying the U-bend, but if the burner becomes extinguished, thereby eliminating the source of the heat by which the sealing material was maintained in its liquid state, said sealing material will rapidly solidify, thus effectively closing the supply pipe at the U-bend.

2. An automatic safety cut-off for gas appliances comprising a burner, a supply pipe leading to the burner, an automatically closing valve device in the supply pipe which is held open by the gas therein when it is under normal pressure, but which closes automatically when the gas in the supply pipe has a subnormal pressure, said supply pipe having a U-bend closely adjacent the burner and sealing material filling the bight of the U-bend, said sealing material being in solid form at room temperatures within the temperature range resulting from the usual fluctuations of the outside temperature, but having a melting point slightly above such temperature range, said U-bend being so located relative to the burner that the heat given off by the lighted burner will maintain the sealing material in liquid form, the amount of liquid sealing material in the bight and the specific gravity thereof being such that the gas in the supply pipe under normal pressure may bubble freely therethrough in its passage to the burner, whereby when the gas pressure falls the valve device will automatically close thus extinguishing the burner, and the sealing material will solidify because of the absence of heat from the burner, and thereby effectually seal the U-bend of the pipe.

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