

Dec. 19, 1933.

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1,940,127

SAFETY DEVICE FOR GAS BURNERS

Filed June 18, 1932

2 Sheets-Sheet 1

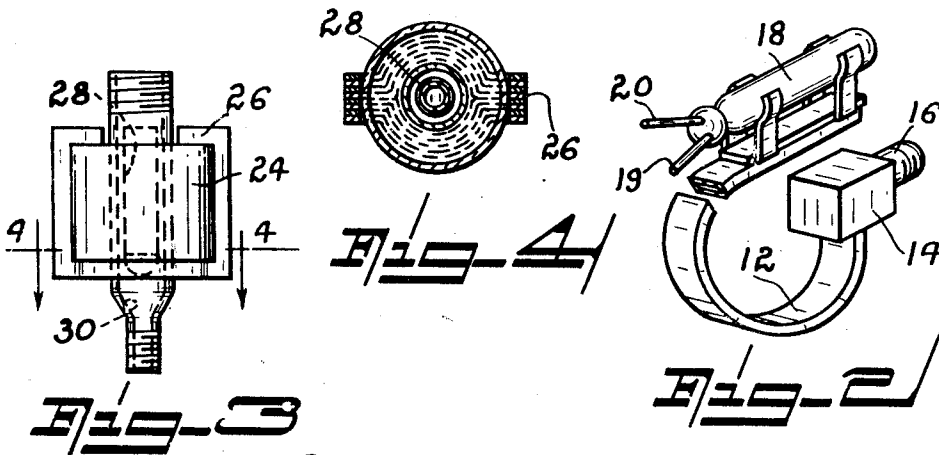
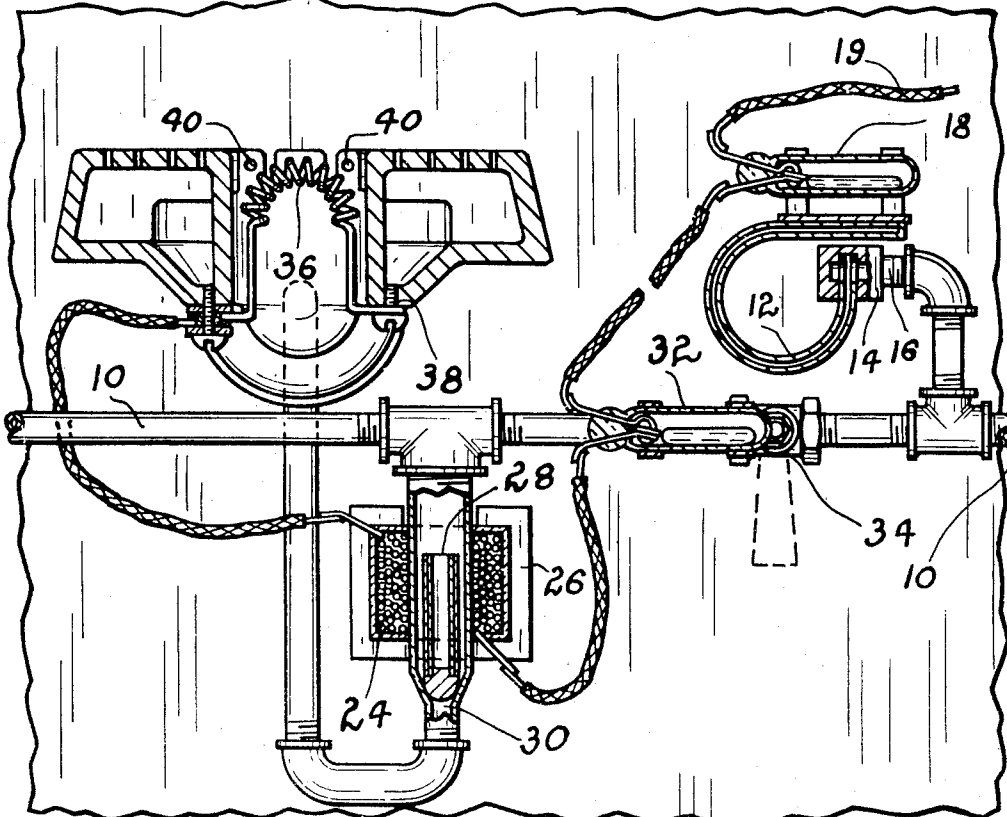


Fig. 1

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2 Sheets-Sheet 2

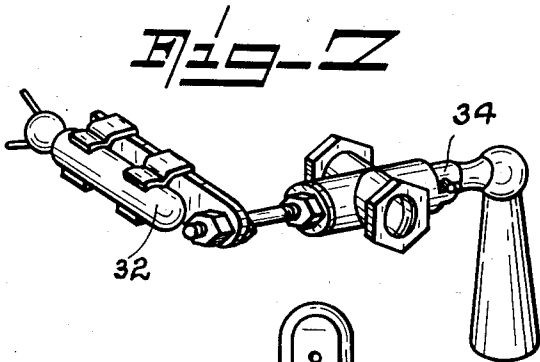
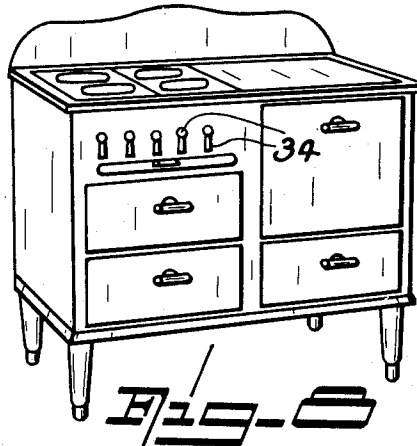
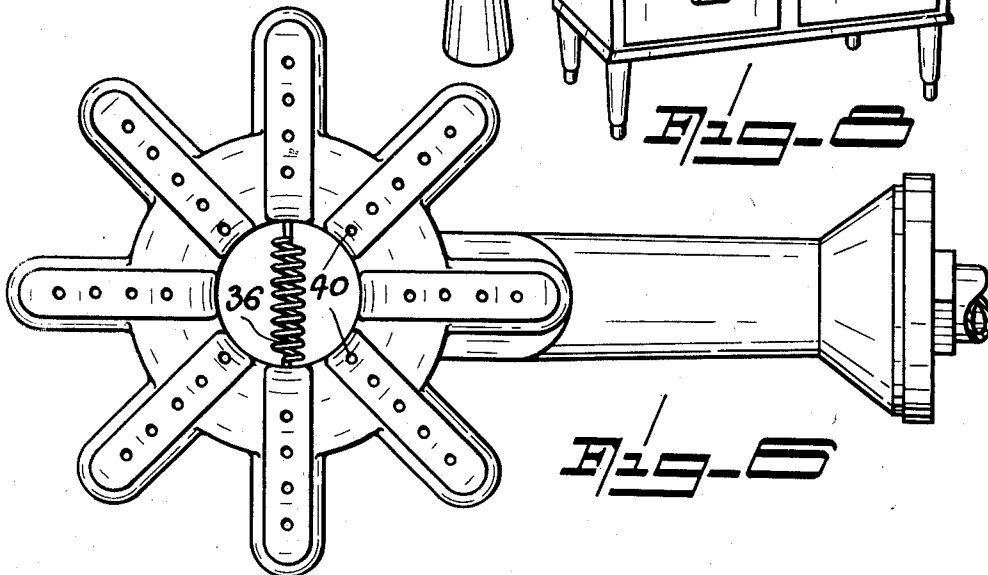
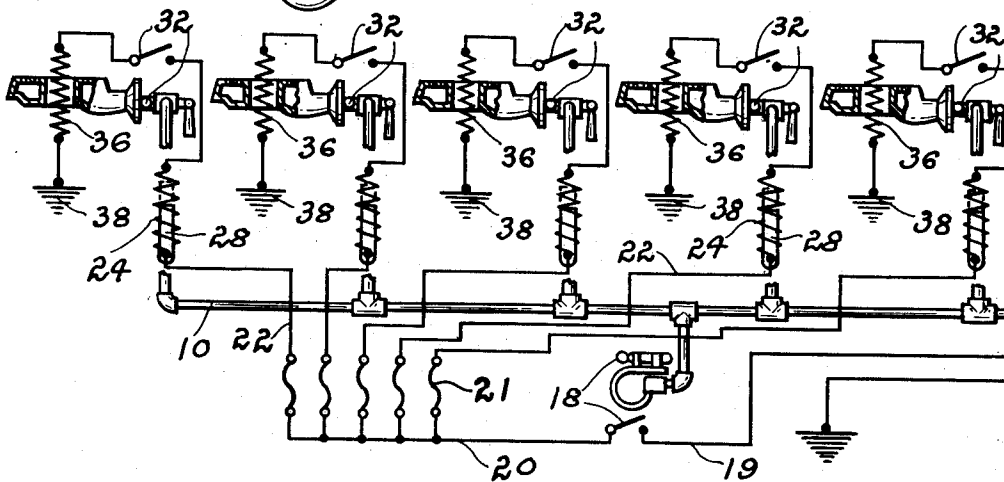


Fig. 5

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1,940,127

SAFETY DEVICE FOR GAS BURNERS

Frederick G. Herthneck, Seattle, Wash.

Application June 18, 1932. Serial No. 618,051

3 Claims. (Cl. 175-115)

My present invention relates to the art of gas burners and more particularly to a safety device for gas burners.

One of the greatest objections to the use of gas for cooking and heating in the home is the great attendant danger from asphyxiation. Many devices have been created for the purpose of providing safety means. Unfortunately, however, most of these devices rely on the manual operation of certain parts of the unit. In my present device I provide means which automatically make it impossible for the escape of gas.

I accomplish this general result by so arranging my electrical equipment that in case of a failure of any single element the whole burner is put out of commission.

The principal object of my invention is to provide a full automatic safety means for gas burners.

A further purpose of my invention is to provide means which will ignite gas if the pressure should again build up after once falling off.

A further purpose is to provide a solenoid valve which does not have gas pressure to overcome when opening.

Other and more specific objects will be apparent from the following description taken in connection with the accompanying drawings, wherein

Figure 1 is an elevation showing my device as installed, certain parts of which are shown in section to better illustrate the construction.

Figure 2 is a perspective view of the pressure controlled electric switch.

Figure 3 is a face view in elevation of my solenoid unit.

Figure 4 is a cross sectional view on the line 4-4 of Figure 3.

Figure 5 is a diagrammatic view showing the various electrical connections I employ within my safety means.

Figure 6 shows the top plan view of a typical gas burner employing one of my ignition coils.

Figure 7 shows the usual gas shut off and regulating valve which has applied to it a mercury bead switching arrangement.

Figure 8 is a perspective view showing a general plan of a range upon which my device can most easily be installed.

Referring to the drawings, throughout which like reference characters indicate like parts, 10 designates the gas service line. This I provide with a suitable pipe connection so as to apply the gas pressure to the curved flat tube 12. This as a matter of convenience I have arranged by anchoring it into base member 14, having the

pipe thread connection 16 so that it may be easily installed. Secured to this flat tube is the usual type of mercury bead switch 18 which is adapted to form electric contact between the two electric wires 19 and 20. This serves to interrupt the electric service line, it being understood that contact is maintained at this point during the time that gas pressure is up to normal and when it drops below normal the current is broken at this point. It then follows that when the gas pressure is again built up to normal or at a predetermined point which may be considerably below normal so as to take care of any flow of gas, that might be present, the electric circuit is formed so that ignition of the escaping gas may be accomplished.

I then lead the electric current from feed wire 20 thru suitable fuses 21, then as by wires 22 to the manual switch 32. In this instance I have shown a mercury bead switch. However, in place of this most any type of switching arrangement of sufficient capacity would suffice. This has been shown in Figure 7 as connected directly to the gas shut off valve 34. This is a most desirable arrangement, as by so connecting any movement of the gas shut off to open the gas flow, automatically tips the switching means 32 and contact is made providing the igniting current and the solenoid current.

The current then passes on to the solenoid coils 24. These solenoids are arranged with suitable core material as 26 so as to act as an electro magnet. The purpose of this magnet is to raise upwardly as shown in Figure 1 the magnetic valve 28 so that it will be raised from its seat 30 and allow the gas to flow. It will be apparent, it is believed, that if the current is broken the valve will drop of its own weight being independent of any spring action. In this arrangement it is very desirable to have the gas cock 34 so constructed that a reasonable movement of the handle will be necessary before the gas flow starts. This assures that the electric circuit will be completed at switch 32 sufficiently ahead of the start of the gas flow, to give the igniting element 36 sufficient time to heat to the proper temperature to ignite the gas when it is discharged from the burner. A most important feature of this relative timing of the electric switch and the gas shutoff is that in shutting off the gas cock the gas is shut off before the electric current, consequently all the gas is expelled, in the line from the burner back to the solenoid valve 28 before the electric element 36 can cool off and further the gas pressure is dissipated between the gas cock and the solenoid valve before the latter

closes. This greatly reduces the lifting load on the solenoid and it may therefore be made small, and inexpensive.

The opening of valve 28 is then accomplished in proper sequence. The electric current after passing thru solenoid 24 goes to one end of the ignition coil 36 which is grounded to the burner proper at 38. As the other side of the feed line is also grounded to the burner frame the circuit is thus complete. This grounded system I have found to be the most satisfactory but I would not care to have my present application limited to this specific construction as it could clearly be a two wire circuit.

I provide the heating element 36 as a low current consuming element which glows much after the fashion of the ordinary electric range element but being quite small the current consumed is negligible yet it is unfailing in its ability to ignite gas. To this end I have provided definitely that gas will be discharged directly on to this burner by small jet, of which there should be a plurality, such as are shown at 40.

Possibly the showing in this application would lead one to believe that this is a large clumsy arrangement. This is not true. For purpose of illustration, so that it may be clear, the various parts are shown in exaggerated detail. However, the entire arrangement is normally disposed underneath the burner top surface so as to be out of sight. This is particularly true in the newer style of range installation, such as shown in Figure 8 where everything is enclosed. However, I have used these units on one and two plate burners as it is not necessary to make the component parts of this assembly large and they can thus be well masked from view.

Method of operation

In operating my device let it be assumed that normal gas pressure is present in the feed line 10. This acting upon the flattened tube 12 has already closed the electric contact at 18, thus making current available at switch 32. However, assuming that the gas has not yet been manually turned on, there is no current flowing in the switches, and no gas pressure around the solenoid valve, consequently solenoid 24 is not energized and valve 28 is firmly seated by gravity on seat 30, thus preventing the flow of gas. As soon as the gas cock 34 is turned on the first operation is to trip the electric switch 32 thus causing a flow of current thru the circuit, thru the solenoid 24 and thru the heating coil 36. This gives heating coil 36 a moment's time to heat because it is necessary for valve 28 to be raised by the solenoid 24 before any gas can flow. This momentary delay works to insure having coils 36 at the proper temperature before the gas actually reaches that point. As soon as the gas strikes the incandescent coil 36 ignition takes place and the burner is in operation.

Now suppose that for some unforeseen reason the gas supply is shut off, the electric element 36 will remain incandescent as long as current is applied and the current will be applied until the pressure in feed line 10 drops below the set value for switch 18, at which time the electric circuit will be broken and solenoid 24 will have no further lifting power on valve 28. This will then close, positively shutting off any leakage of gas which might be occasioned by a very low pressure in the main.

It may then be assumed that pressure is built up again in main 10. The first action will then

be to expand tube 12 thereby closing switch 18. This as before, assuming of course that no change has been made in the valve cock 34, energizes solenoid 24, heats the incandescent filament 36 and raises valve 28 off its seat thus permitting the flow of gas again which when it comes in contact with element 36 will be ignited and the flame burn as before.

It will be apparent it is believed that if any of the ordinary causes of putting out a flame should occur, such as smothering or by the spilling of liquids and the like, the element 36 will not be affected and will immediately ignite any gas present. Further, it will be understood it is believed, that the functioning of the entire system is dependent upon the manual operation of the valve 34. If this is not operated the current cannot flow and the gas will not flow. This safety device is not dependent upon temperature, consequently it permits the full range of temperature regulation. It is not affected by the retained heat of smooth top gas plates and the like and its action is based upon the plan that all its essential elements are connected in series so that if any one of them fail the entire system is dead. This in itself is believed to be a very valuable feature of my device.

The foregoing description and the accompanying drawings are believed to clearly disclose a preferred embodiment of my invention but it will be understood that this disclosure is merely illustrative and that such changes in the invention as may be made are fairly within the scope and spirit of the following claims.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. The combination of a gas burner, a feed pipe, a pressure actuated device connected with the feed pipe, a branch pipe connecting the burner and the feed pipe, and a manually controlled valve for the branch pipe, an electric igniter and ignition circuit for the burner, a gravity closed valve in the branch pipe to prevent flow of gas to the burner if the igniter is burned out, an electro-magnet for holding open the latter valve, a control switch operated by the manually operated valve, and a circuit breaker controlled by the pressure actuated device, all of the elements of the electric circuit being in series, whereby the electric circuit is opened, the valve in the branch pipe is closed by gravity, and the igniter de-energized if there is a failure of gas.

2. The combination with a gas burner, a feed pipe, a branch connecting the burner and feed pipe, a gravity closed valve in said pipe to prevent flow of gas to the burner if the igniter is burned out, and a manually controlled valve for the branch pipe, of an electric igniter and ignition circuit for the gas burner, an electro-magnet for holding open the gravity closed valve, a control switch operated by the manually controlled valve, and a circuit breaker operative in the absence of pressure in said pipe, all of the elements in the electric circuit being in series, whereby the electric circuit is opened, the valve in the branch pipe is closed by gravity, and the igniter is de-energized if there is a failure of gas.

3. The combination with a gas burner, a feed pipe, a pressure operated, expansible tube connected with said pipe, a branch pipe connecting the burner and the feed pipe, and a manually operated control valve in the branch pipe, of an electric igniter and ignition circuit for the burner,

a gravity closed valve to prevent flow of gas through the branch pipe if the igniter is burned out, a solenoid for holding said gravity valve open, a control switch operated by the manually operated valve, and a circuit breaker operated by the expansible tube as the latter contracts in the absence of gas pressure therein, all of the elements of the electric circuit being in series, whereby the electric circuit is opened, the valve in the branch pipe is closed by gravity, and the igniter de-energized if there is a failure of gas.

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