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(54) Method and device for increasing draught in a flue.

(57) Draught in a flue (12) leading from a heat source (32) is increased by injecting a flow of gas (22) into the flue in a direction to create suction at the heat source. The flow of gas, generally air, may be generated by blower means such as an electrically powered fan (18) which is located externally of the flue so as not to inhibit cleaning of the flue or obstruct normal gas flow in the flue. Gas is directed from the blower means to the interior of the flue via duct means. In a preferred embodiment for use with existing flues the duct means comprises a probe-like tube (40) adapted to be passed down inside a flue outlet and from which gas is expelled within the flue from an outlet (56) in the tube.

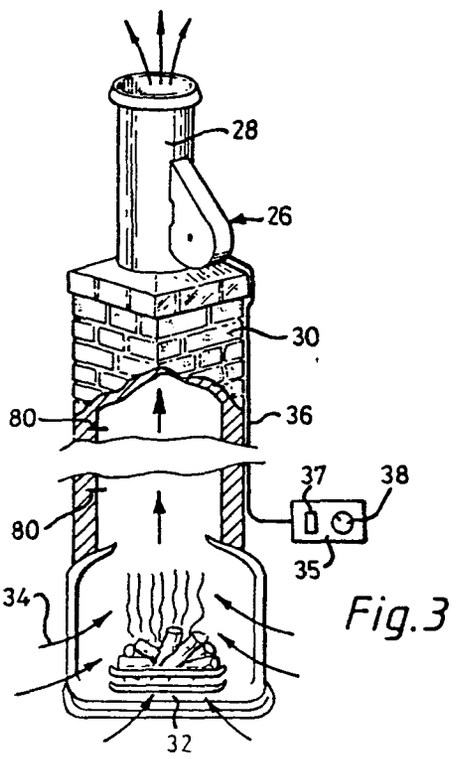

Fig.3

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Improvements in or relating to Chimney Flues

Field of invention.

This invention relates to chimney flues and is concerned particularly with a method and device for increasing draught in a flue.

Background to the invention.

It is well known that low draught or down draught in a chimney flue can cause a heat source such as a solid fuel fire, or oil or gas burner to burn badly or, in extreme cases, to emit smoke or gases into the room etc. where the heat source is located.

Various attempts have been made to improve flue draughts to avoid such effects. For example, it is known to provide chimney cowls, which may be stationary or wind operated, at the flue outlet. It is also known to mount electrically operated fans to the top of a flue outlet for extracting gas from the flue and so promoting flue draught.

Several disadvantages are associated with the known devices. In particular, because of their location at the flue outlet such devices inhibit cleaning of a flue and must generally be removed if a flue is to be satisfactorily cleaned without causing damage to the device. Further, again because of their location, such devices are likely to be damaged or destroyed in the event of a chimney fire. Moreover, in the case of chimney fans, the devices obstruct normal gas flow and must generally be operated continously when the heat source is operative.

The invention.

According to one aspect of the present invention, there is provided a method of creating or increasing draught in a flue leading from a heat source, comprising injecting a flow of gas into the flue in a direction to create suction at the heat source.

By injecting gas, generally air, so as to create suction, the draught in the flue is improved.

To create the desired effect, gas is injected into the flue with a component of motion in a direction away from the heat source with the gas being injected in a direction parallel to or suitably inclined at an angle of up to 90°, e.g. 45°, with respect to the flue axis. The exact angle of injection is not critical to the performance of the invention. In a generally vertical flue, gas is injected with an upwards component of motion, whereas with a flue of horizontal or other orientation, the gas will be injected with a horizontal or other component of motion as appropriate to create the desired suction effect.

In a further aspect the present invention provides a device for creating or increasing draught in a flue leading from the heat source, comprising duct means for injecting a flow of gas into the flue in a direction to create suction at the heat source.

The duct means is conveniently provided with gas, generally air, from blower means adapted to be located externally of the flue, so that use of the device does not lead to the problems noted above associated with known prior art devices. The blower means preferably comprises a fan or compressor, conveniently electrically powered.

In a further aspect, the present invention provides a device for creating or increasing draught in a flue leading from a heat source, comprising duct means for injecting a flow of gas into the flue in a direction to create suction at the heat source, and blower means adapted to be located externally of the flue for supplying gas to the duct means.

The duct means may take a variety of forms and generally comprises one or more tubes or ducts of appropriate configration. For example, one or more tubes may extend from the blower means through a wall defining a flue, e.g. the wall of a chimney for injecting gas into the chimney flue, with the tube or tubes being suitably orientated for causing flow in an appropriate direction. With a vertically extending flue, for example, the tube may be inclined with respect to vertical, e.g. at 45°.

Alternatively, the duct means may comprise a toroidal plenum chamber arrangement, in the form of toroidal tube encircling the flue, to which gas is supplied e.g. via a side tube, the toroidal tube including one or more openings for directing gas therefrom into the flue in an appropriate direction. For example a circular slit may encircle the toroidal tube, for directing a cylindrical curtain of gas into the flue.

As a further possibility, a simple embodiment intended for use with existing flues comprises a probe-like tube adapted to be passed down inside a flue outlet, e.g. by being hooked over the upper edge of a chimney outlet, the tube having an inlet for receiving gas and an outlet from which gas is expelled within the flue in a suitable direction.

Hence, in a preferred aspect the present invention provides a device for creating or increasing draught in a flue leading from a heat source, comprising a tubular member adapted to be passed

down inside a flue outlet, the member having an inlet for receiving a flow of gas and an outlet from which, in use, gas is expelled within the flue in a direction to create suction at the heat source.

The inlet is conveniently in the form of a side tube, located at or adjacent the outer end of the tubular member.

The outlet conveniently comprises one or more holes, preferably located at or near the inner end of the tubular member.

Such a device may, for example, easily be located in position in an existing conventional chimney pot or chimney stack at the top of a generally vertical flue, for discharging gas in an upwards direction within the flue in use.

Control means may be provided for controlling the blower means. In the simplest case, these may comprise a manually operable on/off switch, e.g. for controlling an electric motor powering the blower means. In more complex arrangements, means may be provided for controlling the rate of operation of the blower means and hence the degree of suction created, e.g. by controlling the speed of an electrically operated motor as in a fan. Instead of such control means being manually operable, they may alternatively be automatically controlled in response signals from one or more sensors located in the flue adapted to sense the degree of draught.

One or more devices in accordance with the present invention may be mounted at any desired location on a chimney, for example in the vicinity of the heat source or remote therefrom. It will generally be preferably for the device or devices to be located remote from the heat source, adjacent the outlet of the flue, for example on a chimney pot or stack.

Devices in accordance with the invention may be used with either new or existing flues. Further, the invention finds application in connection with a variety of domestic and commerical heat sources, such as open fires, stoves, oil or gas burners, including wall mounted gas room heaters having a generally horizontally extending flue passing through the wall. The invention may also be used in flues of extractor arrangements, e.g. cooker extractor hoods, with toroidal plenum chamber embodiments as discussed above being particularly suited to this application.

The invention also includes within its scope a flue having one or more devices in accordance with the invention associated therewith, for injecting a flow of gas into the flue in a direction to create suction at a heat source.

The invention will be further described, by way of example, with reference to the accompanying drawings in which:-

Figure 1 is a schematic sectional view illustrating one embodiment of a device in accordance with the invention mounted to a chimney;

Figures 2 is a view similar to Figure 1 illustrating a further embodiment of the invention;

Figure 3 is a schematic part sectional view of a fireplace and chimney provided with a device in accordance with the present invention;

Figure 4 is a front view of a further embodiment of a device in accordance with the invention;

Figure 5 is a part sectional side view of the device of Figure 4; and

Figure 6 is a schematic illustration of the device of Figures 4 and 5 mounted to a chimney.

Detailed description of the drawings.

Figure 1 illustrates a vertically extending chimney 10 defining a flue or flue way 12 leading from a heat source (not shown) such as an open fire to an outlet 14 at the upper end thereof. A device 16 in accordance with the present invention is mounted to the chimney, adjacent to the upper end thereof. Device 16 comprises an electrically operated fan 18 with associated tube or duct 20 for conveying air therefrom. Tube 20 passes through the wall of chimney 10 and opens within flue 12 so that air from fan 18 is injected into flue 12 in a direction determined by the angle of inclination of tube 20 relative to flue 12. In the illustrated embodiment, this angle is about 45°.

In use of the device, when fan 18 is operative this causes air to be expelled from tube 20 and injected into flue 12, as indicated by arrows 22. The relative cross-sectional areas of tube 20 and flue 12 and also the power of fan 18 are such that injection of air in this way causes suction of air in an upwards direction, as represented by arrows 24, resulting in suction at the heat source and so promoting updraught in the flue.

The embodiment of Figure 2 is generally similar to that of Figure 1, except that tube 20' is somewhat truncated as compared with tube 20 of Figure 1 and terminates flush with the wall of chimney 10. Otherwise, this device is of similar construction to and functions in the same manner as the embodiment of Figure 1.

Figure 3 shows a device 26 (which may be similar to the device of Figure 1 or 2) in accordance with the invention mounted to the exterior of a chimney pot 28 located at the upper end of vertically extending chimney 30 leading away from an open fire 32. This embodiment includes an electric fan and functions in exactly the same manner as described above, promoting updraught as represented at 34.

For all of these embodiments, control means illustrated schematically at 35 are provided for controlling operation of the electric fan, being connected thereto by connector means represented at 36. In the simplest case these control means 35 comprise a manually operable on/off switch 37. In more sophisticated embodiments, a control 38 is provided for regulating the speed of the fan and hence the degree of suction created.

When used with an open fire or the like, as illustrated in Figure 3, if it is observed that the fire is not drawing well or perhaps that smoke is being expelled into the room where the fire is located, then a user may activate the fan to cause suction in the flue, resulting in air being drawn into the fire as indicated by arrows 34 and thus promoting good draught. Once a good draught has been established then the fan may be switched off and natural draught may be sufficient to give satisfactory combustion. With embodiments with fan speed controllers, the fan speed may be varied with time, generally being set at the minimum speed necessary to obtain adequate draught.

Figures 4 and 5 illustrate a probe-like embodiment of device adapted for use with existing flues.

The device 40 comprises a tubular probe portion 42 formed from a generally planar rectangular rear piece 44 and a front piece 46 of generally U-shaped configuration, comprising a front face 48, two side faces 50 and two elongate side flanges 52. The front and rear pieces are secured together to define an elongate opening 54 of generally rectangular cross section with flanges 52 secured to the edges of the rear piece 44.

Two apertures 56 are formed in the front face 48, near the lower end thereof, by inwards punching of portions on the face. A hood 58 is secured to the front face 48 slightly above the apertures, for shielding the apertures to deter ingress of unwanted matter such as rain water.

A circular-section connector tube 60 extends from the rear piece 44, adjacent the upper end thereof, the interiors of the tube and probe portion being in fluid communication with each other.

The illustrated embodiment is made of 316 stainless steel and the probe portion is about 0.45m (18 inches) in length, 25mm (1 inch) wide and 19mm (3/4 inch) deep, being designed for use with a typical domestic chimney having a flue diameter of 0.2m (8 inches).

As illustrated in Figure 6, the device 40 is located in a chimney flue with the probe portion 42 passing down inside chimney pot 62, located adjacent the inside wall thereof, with the connector tube 60 extending outwardly at the top of the chimney pot. The device may be secured in this position, e.g. by drilling four small holes (not shown) through the wall of the chimney pot, two on each side of the probe portion, and passing stainless steel wire through the holes and around the probe portion.

A right angle fitting 64 e.g. a standard plumbing fitting is secured to the free end of connecting tube 60, tube 60 having previously been appropriately shortened by cutting if necessary (as is the case with the Figure 6 arrangement) to suit the dimensions of the chimney pot etc., to which the device is being fitted.

A length of pipe 66 (e.g. copper pipe or plastics pipe such as of PVC or ABS) is connected to fitting 64 and leads to a fan housed in a weatherproof box 68 illustrated secured to chimney stack 70. The fan may alternatively be located elsewhere as convenient, e.g. within a loft or other upper region of the building or on the outside of a lower region of the building. Wires (not shown) lead to control means (not shown) which are conveniently located in the vicinity of the heat source, for controlling operation of the fan. The control means comprise an on/off control and speed control for adjusting the speed of the fan, as described above in connection with Figure 3.

If device 40 is located on a chimney stack, rather than a chimney pot as illustrated, then it will not be necessary to shorten the connector tube 60 to the same extent, and no shortening at all may be required. Further, in this case the device may conveniently be secured in position by U-shaped clamps passing around the connector tube and secured to the top of the stack.

In use, on activation of the fan, a flow of air passes up pipe 66 to the device 40 and is expelled from apertures 56 in probe portion 42 in a generally upwards direction, creating suction in the flue and hence at the heat source. The device is op-

erated by use of the control means as described above,with the fan speed generally being set at the minimum speed necessary to obtain adequate draught.

For a typical 0.2m (8 inch) diameter flue, a device 40 of the configuration and dimensions specified above in conjunction with a 240v single phase 750W fan is found to give good results. Further, such a device in a 0.2m (8 inch) diameter flue occupies only 2.5% of the flue area, providing little obstruction to normal chimney clearance etc. The size and configuration of the device may, of course, be varied to suit other applications.

With all the above embodiments, instead of providing for manual operation, automatic control means may be provided. In this case one or more sensors shown schematically at 80 in Figure 3 responsive to the degree of draught in the flue may be provided in the flue. Signals from the sensor or sensors are sent to appropriate control means arranged to cause activation of the fan when the sensed draught falls to a predetermined lower value. The control means may further be arranged to cause ceasing of the fan when the sensed draught reaches a predetermined upper level. As a further refinement, the control means may be arranged to vary the speed of operation of the fan to maintain the sensed draught at or within a predetermined level or range.

Automatic operation in this way will generally be required with closed devices such as oil or gas burners, where operating conditions are not readily observable visually and manual operation is not practicable.

Because the injector means is located externally of the flue, use of the device needs cause little or no obstruction of the flue and so does not result in the problems noted above with the prior art devices. In particular, fitting of a device in accordance with the invention will not interfere with good flue cleaning practices. Such devices will furthermore not be susceptible to damage in the event of a chimney fire. Further, such devices need not significantly obstruct normal draught in the flue, so that continuous operation is not required, as is the case with conventional chimney fans.

Claims

1. A device for creating or increasing draught in a flue leading from a heat source, comprising duct means for injecting a flow of gas into the flue in a direction to create suction at the heat source.

2. A device for creating or increasing draught in a flue leading from a heat source, comprising duct means for injecting a flow of gas into the flue in a direction to create suction at the heat source, and blower means adapted to be located externally of the flue for supplying gas to the duct means.

3. A device according to claim 2, further comprising control means for controlling the blower means.

4. A device according to claim 3, wherein the control means comprise means for controlling the rate of operation of the blower means.

5. A device according to claim 3 or 4, wherein the control means are adapted to be automatically controlled in response to signals from one or more sensors located in the flue adapted to sense the degree of draught.

6. A device according to any one of claims 1 to 5, wherein the duct means comprises a probe-like tube adapted to be passed down inside a flue outlet.

7. A device for creating or increasing draught in a flue leading from a heat source, comprising a tubular member adapted to be passed down inside a flue outlet, the member having an inlet for receiving a flow of gas and an outlet from which, in use, gas is expelled within the flue in a direction to create suction at the heat source.

8. A device according to claim 7 , wherein the inlet comprises a side tube located at or adjacent the outer end of the tubular member.

9. A device according to claim 7 or 8 , wherein the outlet comprises one or more holes located at or near the inner end of the tubular member.

10. A method of creating or increasing draught in a flue leading from a heat source, comprising injecting a flow of gas into the flue in a direction to create suction at the heat source.

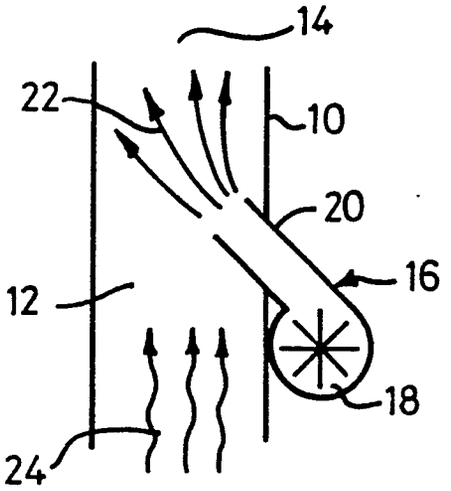

Fig.1

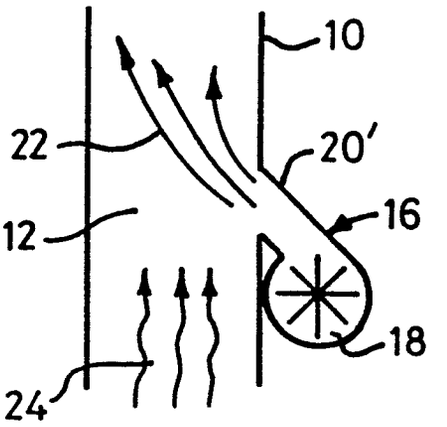

Fig.2

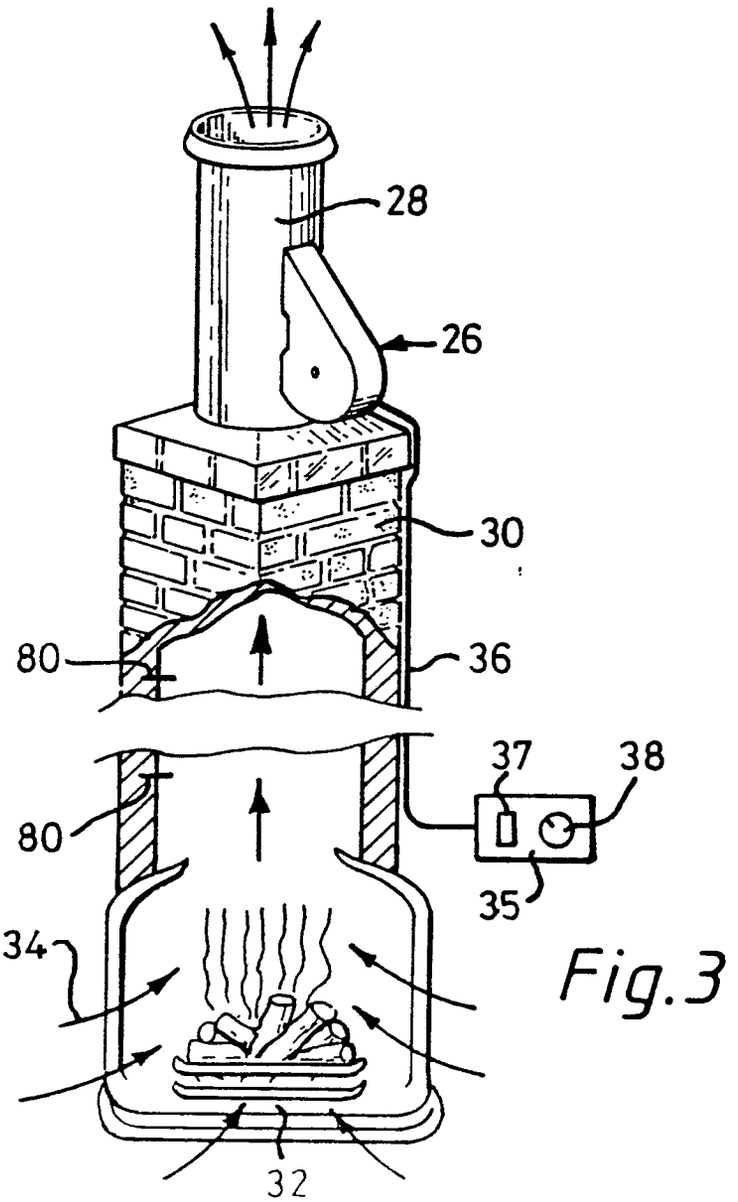

Fig.3

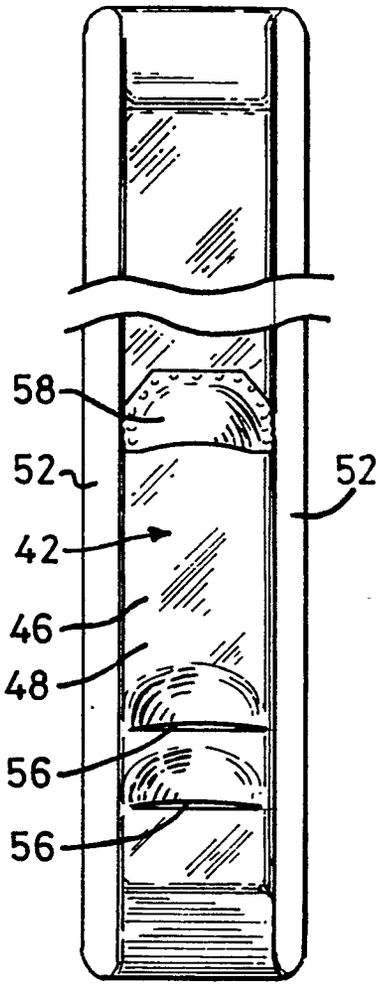

Fig.4

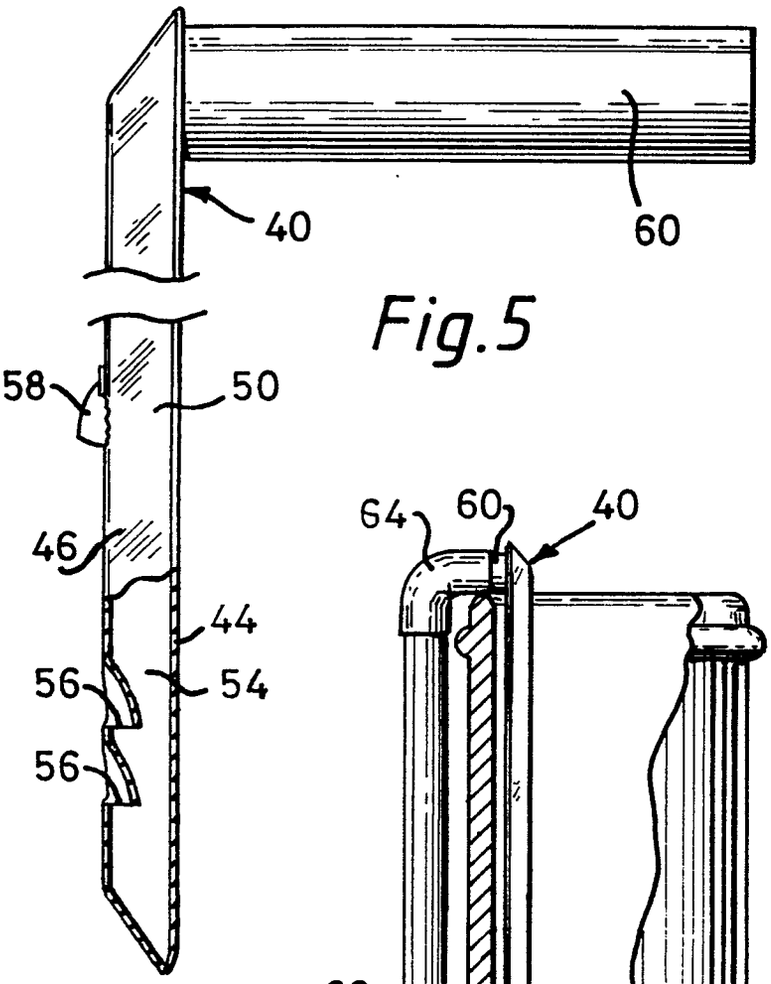

Fig.5

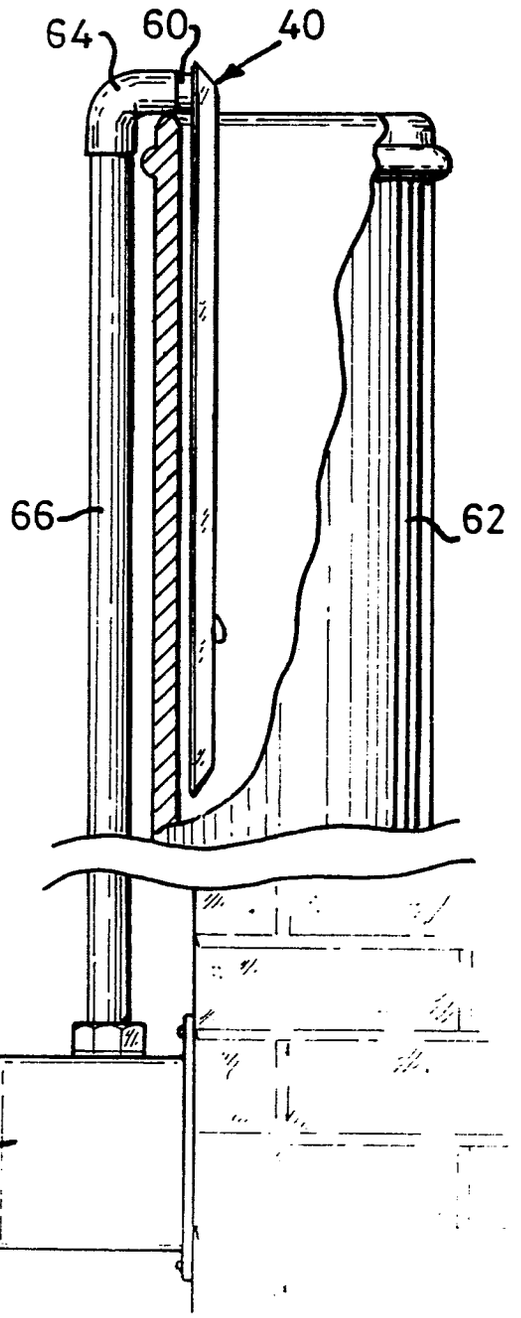

Fig.6