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SAFETY INDICATOR FOR HEATING SYSTEM

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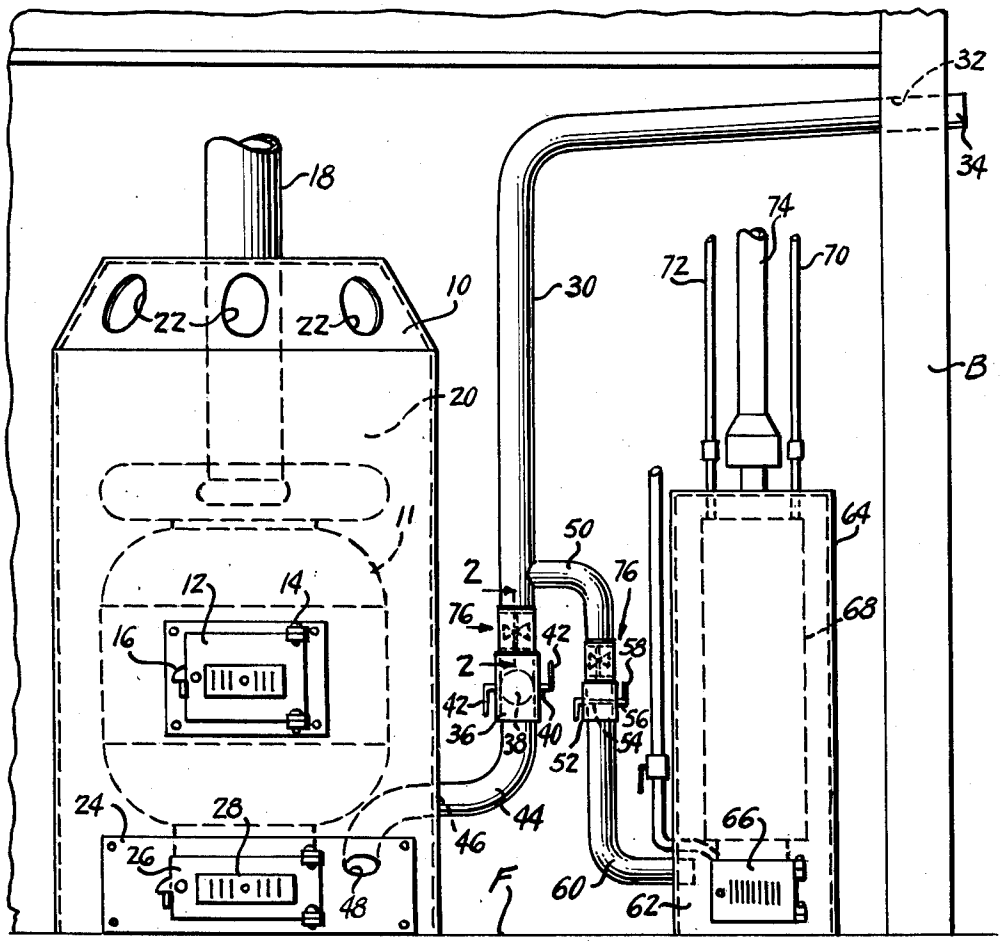


FIG. 1

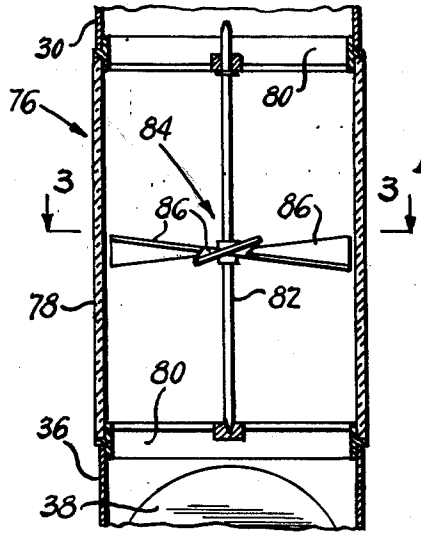


FIG. 2

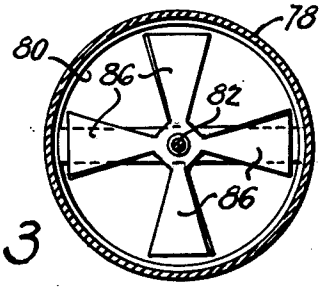


FIG. 3

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SAFETY INDICATOR FOR HEATING SYSTEM

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2 Claims. (Cl. 110—72)

This invention relates to a safety indicator for a heating system and relates more particularly to a device to be used in conjunction with a heating system such as that embodied in my co-pending application, Serial No. 165,114, filed January 9, 1962.

The primary object of this invention is the provision of a safety indicator which may be used in a conduit for a heating system wherein a current of air is to flow when the system is in operation.

Another object of this invention is to provide a device of the character described having visual means to indicate the flow of air through the conduit.

A further object of the instant invention is the provision of a safety indicator having a transparent casing enclosing a propeller bladed fan which is adapted to turn slowly when a current of air passes thereover.

A still further object of this invention is to provide such a device mounted directly adjacent a butterfly valve in such a manner that the operating elements of the valve can be visually inspected to determine if they are in an opened or closed position.

Another object of this invention is to provide a safety indicator for a heating system which is inexpensive to manufacture and simple and dependable in operation.

Other and further objects reside in the combination of elements, arrangements of parts, and features of construction.

Still other objects will in part be obvious and in part be pointed out as the description of the invention proceeds and as shown in the accompanying drawing wherein:

FIGURE 1 is a schematic view of one form of a heating system incorporating the safety device of the instant invention;

FIGURE 2 is a fragmentary longitudinal cross-sectional view to an enlarged scale, taken on line 2—2 of FIGURE 1; and

FIGURE 3 is a transverse cross-sectional view taken on line 3—3 of FIGURE 2.

Similar reference characters refer to similar parts throughout the several views of the drawing.

Referring now to the drawing in deatil, and more particularly to FIGURE 1, there is generally indicated at B a fragment of a wall of the building or other enclosure to be heated. A substantially horizontal floor F which may be in the basement, or any other desired locality, has mounted thereon a furnace **10** which, illustratively, is of the coal type. The furnace **10** includes a combustion chamber **11**, provided with a fuel feeding door **12**, hinged at **14** and having a readily releasable latch means **16** which may, if desired, comprise a light spring so that in the event of a minor flare or explosion interiorly of the combustion chamber **11**, the door **12** would be blown open without any damage to the additional components.

A flue **18** extends upwardly from the combustion chamber **11** and is surrounded by an air space **20** as is the chamber itself, in which air is circulated to be conveyed to suitable outlets through vents **22** in the usual manner.

An ash pit or base **24** is provided with an ash door **26** of conventional construction, but which is normally sealed to prevent any ingress of air. The usual slidable draft **28** is also provided, but is permanently closed so that no surrounding air from the basement or from the interior of the building may be drawn into the air space to be heated.

A combustion air inlet pipe **30** extends outwardly through an opening **32** in the wall B of the building and has a fresh air inlet **34** from the outside air. If desired, a suitable screen or filter (not shown) may be provided in the opening to prevent the introduction of foreign matter into the pipe **30**.

A section of the pipe **30** is comprised of a vertical sleeve **36** in which is mounted a closure plate **38** of a butterfly valve. The closure plate **38** is pivotally mounted on a rod **40** which is provided with oppositely disposed operating handles **42** so that the same may be tilted from the open or vertical position shown in dashed lines in FIGURE 1 to the closed or horizontal position or any intermediate position.

Construction of this device may be in accordance with the teachings of my aforementioned co-pending patent application, Serial No. 165,114, and the disclosure thereof is incorporated herein by reference.

From the lower side of the sleeve **36**, a pipe **44** extends through a suitable opening **46** in the side wall of the furnace **10** and opens as at **48** into the ash pit **24** so that when the closure plate **38** is opened, cold, fresh air is drawn from the inlet **34** exterior of the building, directly into the base of the furnace to provide air for combustion in the chamber **11**.

In the embodiment shown in FIGURE 1, a branch pipe **50** extends downwardly from the single inlet pipe **30** to a vertical sleeve **52** provided with a closure plate **54** of a butterfly valve indicated as horizontal or in closed position in FIGURE 1 and mounted on a rod **56** having oppositely disposed handles **58** similar to the valve in the sleeve **36**. Sleeves **36** and **52** are close to each other both horizontally and vertically. A pipe **60** extends from the sleeve **52** to the base **62** of a conventional hot water heater **64** which has a gas combustion unit with a normally sealed access door **66**. Water contained in a tank **68** interiorly of the heater **64** is heated and conveyed to a supply pipe **70** to the desired plumbing fixtures and recirculated through a return pipe **72**. The usual flue **74** permits the escape of gases from the combustion in the heater **64**.

The safety indicator of the instant invention is shown generally at **76** in FIGURE 1 as interposed in the inlet pipe **30** and the branch pipe **50** immediately before the sleeves **36** and **52**, respectively containing the aforementioned butterfly valves.

The indicator **76** located in the vertical portion of the inlet pipe **30** is substantially the same as the indicator in the vertical portion of the branch pipe **50** and only one will be described in detail. The indicator **76** is comprised of a tall transparent cylindrical casing member **78** formed of any conventional material such as methylmethacrylate or glass and having substantially the same interior diameter as the inlet pipe **30** and the sleeve **36** and being of any desired length. A preferred vertical length of **78**, as shown in FIGURE 2, is twice its diameter. Two transversely extending carrying bars **80** are secured in any conventional manner between the juncture of the cylindrical member **78** and the inlet pipe **30** and the juncture between the cylindrical member **78** and the sleeve **36**, respectively. Rotatably supported between these carrying bars **80** is a spindle **82** having secured thereto approximately midway between the carrying bars **80**, a fan means **84** with a plurality of outwardly extending propellers or blades **86**, four being shown for illustrative convenience.

The use and operation of the safety indicator of the instant invention will now be apparent. When air is being drawn through the inlet pipe **30** and the butterfly valve within the sleeve **36**, it will cause the fan means **84** to rotate slowly about its mounting on the carrying

bars 80 to indicate visually to an operator that exterior air is being supplied to the heating system. By mounting the indicator 76 directly above the sleeve, either 36 leading to the furnace 10, or 52 leading to the water heater 64, it is also possible for an operator to look downwardly through the tall cylindrical member 78 and see the position of the closure plate 38 or 54 of the butterfly valves to thereby determine whether the same is opened or closed. As installed, the operating handles 42 and 58 are each coplanar with its closure plate. However due to the small diameter of rod 40 compared to the much larger diameter of plate 38, in use this coplanar relationship is not always retained. Thus although the handles 42 or 58 are intended to provide some indication to the operator of the position of the closure plate 38 or 54, the device of the instant invention insures him that the valve is in the position that he desires. If the valve is seen to be in an open position and yet the safety device 76 of the instant invention indicates no flow of air, it will be clear that the inlet pipe 30 is clogged somewhere along its length requiring cleaning of the same.

While there is herein shown a multiple unit coal furnace and a gas-fired hot water heater, it will be readily understood that the invention has equal application to multiple unit oil burning or gas burning furnaces or any other such multiple unit heating systems.

It can now be seen that there is herein provided a device which accomplishes all of the objects of the instant invention and others, including many advantages of great practical utility and commercial importance.

Since many embodiments may be made of this inventive concept and since many modifications may be made in the embodiments hereinbefore shown and described, it is to be understood that all matter herein is to be interpreted as merely illustrative, and not in a limiting sense.

I claim:

1. In a heating system having a furnace, a combustion air conduit passing vertically from an inlet above said furnace to an outlet in the base of said furnace,

(1) said furnace including a combustion chamber above and communicating with said base,

(2) a safety indicator device interposed in a vertical portion of said conduit,

(3) a pivoted-plate-containing air regulating valve also interposed in said vertical portion of said conduit, immediately adjacent and below said indicator device and in open communication with said indicator device,

(4) the said safety indicator device including a transparent cylindrical casing of a height approximately twice its diameter,

(5) a rotatable vertical axis spindle mounted in the casing extending the full height of said casing,

(6) a plural bladed fan secured at the midheight of said rotatable spindle,

(7) whereby an observer looking downwardly from outside the casing and above the fan,

(8) may clearly simultaneously see both the degree of rotation of the fan and the position of the pivoted plate of the valve, and by considering these simultaneous conditions, determine whether or not the conduit is open or whether it may be unsafely clogged somewhere along its length.

2. In a multiple unit heating system having a furnace and an adjacent fluid heater, both mounted on the same horizontal floor,

(1) a combustion air conduit formed as a single conduit at an inlet end above said furnace and above said fluid heater, and extending downwardly to a branch structure to form therebelow two close vertical conduits, one vertical conduit communicating with the base of said furnace, the other vertical conduit communicating with the base of said fluid heater,

(2) combustion chambers in said furnace and in said fluid heater above and communicating individually with said bases,

(3) a pivoted-plate-containing air regulating valve including a sleeve interposed in each vertical conduit at approximately the same distance from the floor,

(4) each sleeve being open at each end,

(5) an indicator device also interposed in each vertical conduit immediately adjacent and above each air regulating valve,

(6) the indicator device including a tall transparent cylinder casing open at each end, a vertical axis rotatable spindle mounted within the cylinder and extending the full height of said casing, and a plural bladed fan secured to the midheight portion of said rotatable spindle,

(7) whereby the setting of each regulating valve and the resulting rate of flow of combustion air in each conduit may be observed by looking downwardly from outside the casing and above the fan.

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