



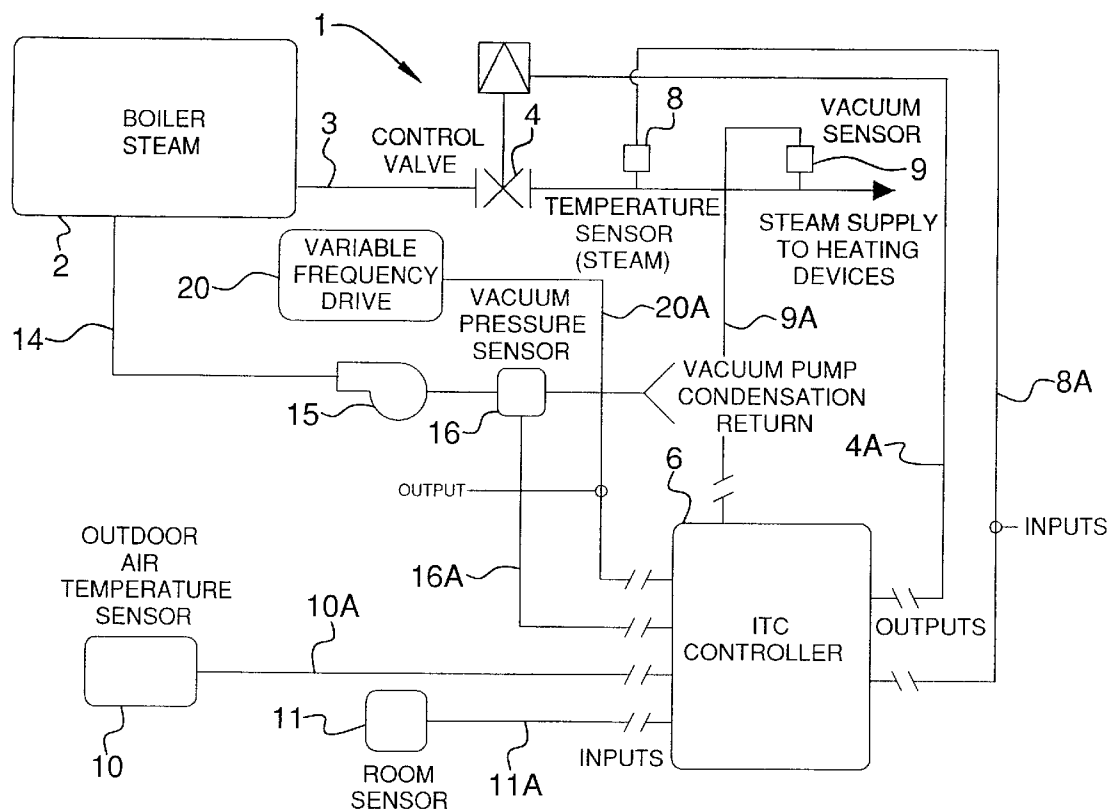
US 20090134233A1

(19) **United States**(12) **Patent Application Publication**
Flynn et al.(10) **Pub. No.: US 2009/0134233 A1**(43) **Pub. Date: May 28, 2009**(54) **STEAM CONTROL SYSTEM****Publication Classification**(76) Inventors: **Bernard Flynn**, College Point, NY (US); **James Flynn**, College Point, NY (US)(51) **Int. Cl.**
F24D 19/10 (2006.01)(52) **U.S. Cl.** **237/9 R**

Correspondence Address:

GLOBAL PATENTS/RANDY W. TUNG, ESQ
838 W. LONG LAKE, SUITE 120
BLOOMFIELD HILLS, MI 48302 (US)(57) **ABSTRACT**

A steam control system. An illustrative embodiment of the steam control system includes a boiler, a steam outlet conduit communicating with the boiler, a steam control valve provided in the steam outlet conduit, a controller connected to the steam control valve and an outdoor temperature sensor connected to the controller.

(21) Appl. No.: **11/945,344**(22) Filed: **Nov. 27, 2007**

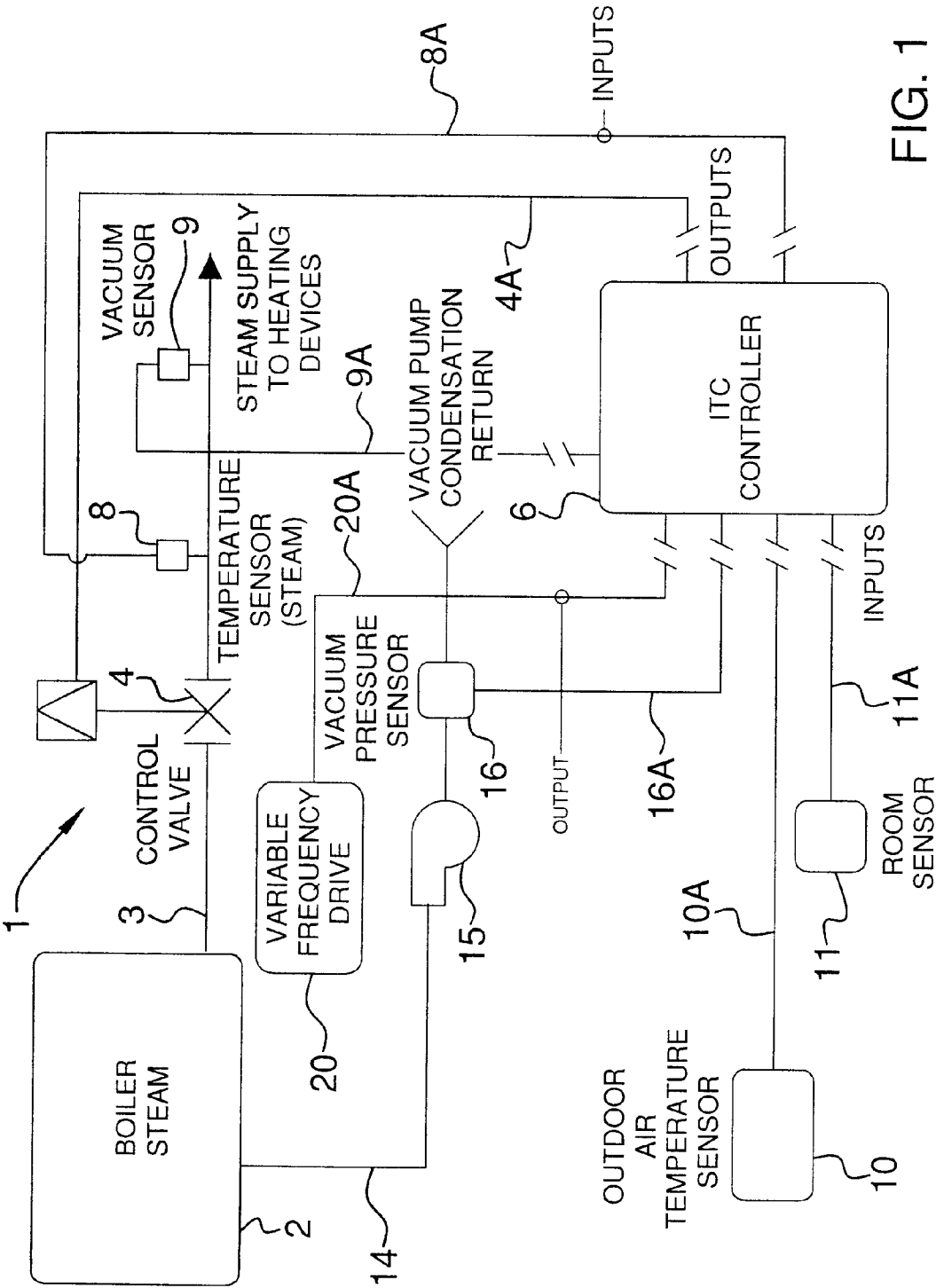


FIG. 1

STEAM CONTROL SYSTEM

FIELD

[0001] The present disclosure generally relates to steam control systems. More particularly, the present disclosure generally relates to a steam control system for steam heating systems and which includes multiple sensor inputs.

BACKGROUND

[0002] Steam heating systems are used in some types of commercial and multi-unit residential structures. A typical steam heating system includes a boiler from which steam is distributed to multiple steam radiators located throughout a building. A temperature control system for the steam heating system may include only one type of sensor input, such as the temperature of the interior of the building.

[0003] A steam control system for a steam heating system is needed which includes multiple sensor inputs to facilitate enhanced temperature control of the steam heating system.

SUMMARY

[0004] The present disclosure is generally directed to a steam control system. An illustrative embodiment of the steam control system includes a boiler, a steam outlet conduit communicating with the boiler, a steam control valve provided in the steam outlet conduit, a controller connected to the steam control valve and an outdoor temperature sensor connected to the controller.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] FIG. 1 is a schematic diagram of an illustrative embodiment of the steam control system.

DETAILED DESCRIPTION

[0006] Referring to FIG. 1 of the drawing, an illustrative embodiment of the steam control system is generally indicated by reference numeral 1. The steam control system 1 includes a boiler 2 which receives a supply of water (not shown) and generates steam (not shown). The boiler 2 may be conventional.

[0007] A steam outlet conduit 3 extends from the boiler 2. A steam control valve 4 is provided in the steam outlet conduit 3 to vary the volume of steam which is distributed from the boiler 2 and through the steam outlet conduit 3, as will be hereinafter described. Heating devices (not shown) such as radiators which can be used to heat rooms in a commercial or multi-unit residential structure, for example, are connected to the steam outlet conduit 3. Other types of devices which utilize steam may be connected to the steam outlet conduit 3, depending on the application.

[0008] A controller 6 is connected to the control valve 4 such as through a valve control line 4a, for example. As will be hereinafter described, the controller 6 is adapted to control opening and closing of the control valve 4 and thus, the volume of steam which is distributed through the steam outlet conduit 3, based on input from multiple input sensors. The input sensors may include, for example, a steam temperature sensor 8 which is adapted to sense the temperature of the steam flowing through the steam outlet conduit 3. The steam temperature sensor 8 may be connected to the controller 6 via a steam temperature sensor line 8a. A vacuum sensor 9 may be provided in the steam outlet conduit 3 and adapted to sense

a vacuum pressure in the steam outlet conduit 3. The vacuum sensor 9 may be connected to the controller 6 via a vacuum sensor line 9a. An outdoor air temperature sensor 10 may be connected to the controller 6 via an outdoor temperature sensor line 10a. The outdoor air temperature sensor 10 is adapted to sense the temperature outside a commercial or residential structure in which the steam control system 1 is installed. At least one room temperature sensor 11 may be connected to the controller 6 via a room temperature sensor line 11a. The at least one room temperature sensor 11 is adapted to sense the temperature of at least one room in the commercial or residential structure in which the steam control system 1 is installed. Multiple temperature sensors 11 may be connected to the controller 6 to sense the temperature of multiple rooms in the commercial or residential structure.

[0009] A condensation return line 14 may connect the vacuum sensor line 9a to the boiler 2. A condensation return vacuum pump 15 may be provided in the condensation return line 14 to pump condensation from the vacuum sensor line 9a, through the condensation return line 14 and to the boiler 2. A vacuum pressure sensor 16 may be provided in the condensation return line 14 between the vacuum sensor line 9a and the condensation return vacuum pump 15. The vacuum pressure sensor 16 may be connected to the controller 6 via a sensor line 16a. Accordingly, responsive to input from the vacuum pressure sensor 16 to the controller 6, the condensation return vacuum pump 15 is operated to maintain vacuum pressure in the condensation return line 14 and ensure the continual removal of condensation from the vacuum sensor line 9a. A variable frequency drive 20 for an AC electric motor (not shown) may be connected to the controller 6 through a drive line 20a.

[0010] In typical operation of the steam control system 1, steam (not shown) is generated in the boiler 2. Responsive to input from the steam temperature sensor 8, the vacuum sensor 9, the outdoor air temperature sensor 10 and the room temperature sensor 11, the controller 6 adjusts the steam control valve 4 to facilitate flow of a controlled volume of steam from the boiler 2, through the steam outlet conduit 3 and to the heating devices (not shown) and/or other types of devices (not shown) which utilize steam. The controlled volume of steam which flows through the steam outlet conduit 3 depends on the temperature of the steam (as determined by the steam temperature sensor 8); the vacuum pressure in the steam outlet conduit 3 (as determined by the vacuum sensor 9); the outdoor temperature (as determined by the outdoor temperature sensor 10); and the room temperature (as determined by the at least one room temperature sensor 11). Generally, the controller 3 opens steam control valve 4 to a relatively wider configuration to facilitate flow of a relatively large volume of steam through the steam outlet conduit 3 when the temperature of the steam, the vacuum pressure in the steam outlet conduit 3, the outdoor temperature and/or the room temperature is low. Conversely, controller 3 partially closes the steam control valve 4 to facilitate flow of a relatively smaller volume of steam through the steam outlet conduit 3 when the temperature of the steam, the vacuum pressure in the steam outlet conduit 3, the outdoor temperature and/or the room temperature is high. In the foregoing manner, the controller 3 facilitates enhanced interior temperature control of the commercial or residential establishment. Condensation may be removed from the vacuum sensor line 9a and returned to the boiler 2 by operation of the condensation return vacuum pump 15, as was heretofore described.

[0011] Although this disclosure has been described with respect to certain exemplary embodiments, it is to be understood that the specific embodiments are for purposes of illustration and not limitation, as other variations will occur to those of ordinary skill in the art.

What is claimed is:

1. A steam control system, comprising:
a boiler;
a steam outlet conduit communicating with said boiler;
a steam control valve provided in said steam outlet conduit;
a controller connected to said steam control valve; and
an outdoor temperature sensor connected to said controller.
2. The steam control system of claim 1 further comprising at least one room temperature sensor connected to said controller.
3. The steam control system of claim 1 further comprising a steam temperature sensor communicating with said steam outlet conduit and connected to said controller.
4. The steam control system of claim 1 further comprising a vacuum sensor communicating with said steam outlet conduit and connected to said controller.
5. The steam control system of claim 4 further comprising a vacuum sensor line connecting said vacuum sensor to said controller and a condensation return line connecting said vacuum sensor line to said boiler.
6. The steam control system of claim 5 further comprising a condensation return vacuum pump provided in said condensation return line and a vacuum pressure sensor provided in said condensation return line between said vacuum sensor line and said condensation return vacuum pump and connected to said controller.

7. The steam control system of claim 1 further comprising a variable frequency drive connected to said controller.

8. A steam control system, comprising:
a boiler;
a steam outlet conduit communicating with said boiler;
a steam control valve provided in said steam outlet conduit;
a controller connected to said steam control valve;
an outdoor temperature sensor connected to said controller;
at least one room temperature sensor connected to said controller;
a steam temperature sensor communicating with said steam outlet conduit and connected to said controller; and
a vacuum sensor communicating with said steam outlet conduit and connected to said controller.

9. The steam control system of claim 8 further comprising a vacuum sensor line connecting said vacuum sensor to said controller and a condensation return line connecting said vacuum sensor line to said boiler.

10. The steam control system of claim 9 further comprising a condensation return vacuum pump provided in said condensation return line and a vacuum pressure sensor provided in said condensation return line between said vacuum sensor line and said condensation return vacuum pump and connected to said controller.

11. The steam control system of claim 8 further comprising a variable frequency drive connected to said controller.

* * * * *