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Fritzsche

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[54] **FRYER CIRCUIT FOR USE WITH A HOOD CIRCUIT HAVING FIRE PROTECTION APPARATUS**

[75] Inventor: **Donald E. Fritzsche,** Chicago Heights, Ill.

[73] Assignee: **General Electric Co.,** Indianapolis, Ind.

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[52] **U.S. Cl.** ..... **219/490,** 169/2 R, 169/9, 219/494, 219/497, 219/517

[51] **Int. Cl.** **H05b 1/02**

[58] **Field of Search** ..... 169/2 R, 1 R, 9, 169/19, 26, 42; 219/490, 517, 494, 497, 517

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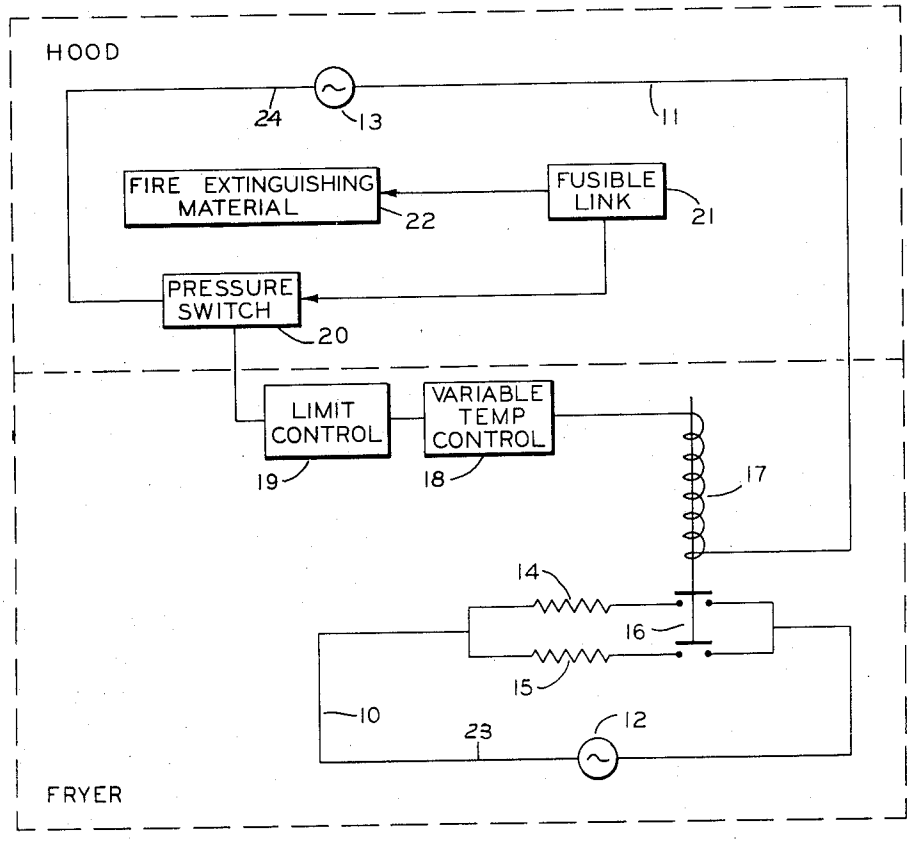
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Primary Examiner—Bernard A. Gilheany
Assistant Examiner—F. E. Bell
Attorney—Radford M. Reams et al.

[57] **ABSTRACT**

A deep fat fryer used under a hood having a fire protection device. Included in the fryer is a heater circuit having heater elements operating at one potential from a first input and a heater control circuit operating at either the same or another potential from a second input. The heaters are controlled by a contactor, the coil of which is in series with the second input, a variable temperature control, a limit control and a switching mechanism, usually a pressure switch located in the hood. The pressure switch is actuated by a fusible link, also located in the hood. The breaking of the fusible link also triggers the release of the fire extinguishing material.

4 Claims, 1 Drawing Figure



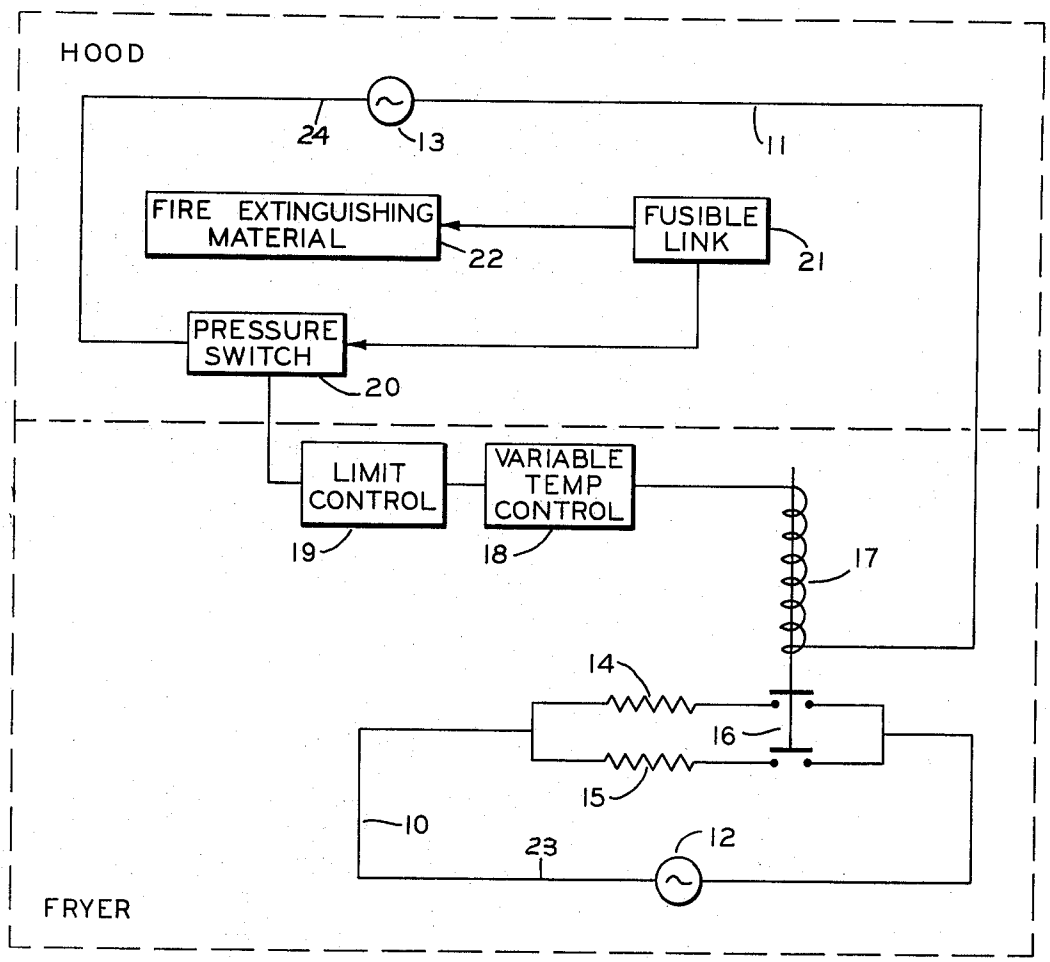

HOOD
24
13
11
FIRE EXTINGUISHING MATERIAL
22
FUSIBLE LINK
21
PRESSURE SWITCH
20
LIMIT CONTROL
19
VARIABLE TEMP CONTROL
18
17
14
16
15
10
23
12
FRYER

FIG. 1

FRYER CIRCUIT FOR USE WITH A HOOD CIRCUIT HAVING FIRE PROTECTION APPARATUS

BACKGROUND OF THE INVENTION

This invention relates to a cooking device utilizing a heating circuit and a hood circuit which controls a fire extinguishing system. More particularly it relates to an improved means of turning off the cooking device when the temperature exceeds a certain level wherein the hood circuit and heating circuit are interconnected. Cooking devices, in particularly deep fat fryers which are used in restaurants and cafeterias, are usually operated under an overhead hood. This hood is used for exhausting gases out of the room and furthermore provides a location for fire extinguishing apparatus to be used in case of a fryer fire. The hood also contains a device which controls the emmission of fire extinguishing material. If and when a fire occurs in the deep fat fryer or in the hood, it is desirable not only to emit fire extinguishing material onto the fire but also to terminate the flow of energy, such as electric current in a case of electric heaters, to the fire. It is therefore desirable, where fire extinguishing systems are provided, that the operation of an extinguishing system should automatically shut off all sources of fuel and heat to all equipment protected by the extinguishing system or located under the hood protected by an extinguishing system. This means that the extinguishing system should be capable of shutting off the heat supply to the cooking equipment while simultaneously spraying extinguishing material onto the fire. It should be apparent that it is much easier to extinguish a fire if the fuel source is removed. Furthermore, by shutting off the fuel source, the possibility of re-ignition of the fire is greatly reduced. Limit thermostats such as a resettable fuse were provided in series with the heating circuit to cut the fuel off during a fire. This method was undesirable because the high operating currents and transients, associated with the cooking circuit, made it necessary to use high current thermostats. Another means of opening the heating or fryer circuit was to place a contactor in series with the electric heaters in the fryer circuit. The movement of the contactor was controlled by a relay coil. The relay coil was also in a circuit relationship with the voltage source used in the circuit. The relay coil was further coupled to a fuse or limit thermostat which opens the circuit and thus opens the contactors during over-heating or during a fire. The heating or fryer circuit was thus independent of the hood circuit which controlled the fire extinguishing material. The fire extinguishing material might be initiated in the hood at a certain predetermined temperature and the fryer circuit might open at another predetermined temperature since they were independent. However, in order to guard against possible re-ignition and to provide a reliable means of extinguishing a fryer fire, the extinguishing system should shut off sources of fuel, that is, the electric current to the heaters and fryer circuit. Therefore, a novel and efficient means to interrelate the hood circuit and fryer circuit has been found.

SUMMARY OF THE INVENTION

Accordingly, it is one object of this invention to provide a cooking device for use in conjunction with a fire extinguishing device wherein all the heating energy to the cooking device is terminated upon the fire extinguishing operation.

It is another object of the invention to provide a cooking device wherein the cooking circuit is opened upon the expulsion of fire extinguishing material on a fire.

It is a further object of the invention to provide a heating circuit operating from a voltage source and a hood circuit including control and limit thermostats for the heating circuit operating from a second independent voltage source wherein the two circuits are connected by coil and contactor.

In accordance with one form of the present invention there is provided a circuit for operating an electric cooking device in conjunction with a hood circuit and a fusible link which controls a fire extinguishing device. The overall circuit includes a first branch circuit having an electric heating device and first input means for connecting the first branch to a first voltage source. A power contactor switch is interposed between the heating device and the first input means. The circuit further includes a second branch circuit having second input means for connecting the second branch to a second independent voltage source. While the two voltage sources operate independently they are ultimately connected to a common power source. The second branch circuit includes a temperature control and a limit control which open and close the circuit at pre-determined temperatures. The second branch circuit also includes a means for connecting the second branch circuit to a fire extinguishing system and a means for connecting the second branch circuit to a fusible link which controls the application of fire extinguishing material. The second branch circuit further includes means for connecting this branch to a control switch for opening the second branch circuit in response to the opening of the fusible link. The opening of the control switch further causes the contactor power switch to open. Electric energy is thus cut off from the heating device at least while the fire extinguishing material is applied to the fire.

BRIEF DESCRIPTION OF THE DRAWINGS

The subject matter which is regarded as the invention is set forth in the appended claims. The invention itself, however, together with further objects and advantages thereof may be better understood by reference to the following description taken in conjunction with the accompanying drawing in which:

FIG. 1 is a schematic circuit diagram of one embodiment of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now more particularly to FIG. 1, there is provided a circuit for operating and controlling a cooking device, and an apparatus for applying fire extinguishing material during a cooking fire. The circuit includes a first branch circuit **10** which operates the heaters **14** and **15** for the cooking device from a first voltage source **12**, and a second branch circuit **11** which controls the cooking device. The discharge of the fire

extinguishing material from container **22** is controlled by mechanical fusible link **21** in the exemplification embodiment. The second branch circuit is operated from a second independent voltage source. Referring now to the first branch circuit **10,** in the exemplification embodiment a pair of heaters **14** and **15** are connected in parallel and to a first source **12** which is connected to the circuit by a first input **23.** The first source of voltage may be rated at, for example, 208, 230 or 460 volts. Contactor **16** controls the current through both heaters **14** and **15** and is connected between the voltage source **12** and the heaters. When the contactor is closed current flows through the heaters and heat is supplied to the cooking device. When the contactor is open the current path is broken and no energy is supplied to heat the cooking device. Contactor **16** is controlled by coil **17** which is in the second branch circuit **11.** The second branch circuit is operated by a second voltage source **13** and is connected to this branch by second input **24** and may be, for example, 120 volts. Coil **17** is further connected to the series circuit comprising temperature control **18,** limit control **19** and pressure switch **20** which are in turn connected to voltage source **13.** Temperature control **18,** while shown to be variable, may be made fixed if desired. These devices are rated to be operated on the voltage of voltage source **13** which is, for example, 120 volts. The temperature control includes a variable thermostat which is set at a desired cooking temperature. When that temperature is reached the thermostat opens, the second branch circuit opens deenergizing coil **17** and opening contactor **16.** The limit control **19** includes a fixed temperature thermostat which opens the circuit if the temperature of the cooking device exceeds a certain limit. This temperature limit is usually somewhat above the maximum setting of the variable thermostat. In the preferred embodiment the temperature set is 470°F for deep fat fryer applications. Fire extinguishing block **22** includes a cylinder containing the material under pressure. Fusible link **21** is, in this embodiment, mechanically connected to the fire extinguishing material cylinder. When the temperature at the fusible link reaches a predetermined point, for example 360°F in the preferred embodiment, the link is broken and the fire extinguishing material is allowed to pour out upon the fire. Furthermore the fusible link is mechanically connected to the pressure switch **20** and the breakage of the fusible link causes pressure switch **20** to open. The opening of pressure switch **20** opens the second branch circuit **11.** When the second branch circuit is opened, current no longer flows through coil **17** and thus contactor **16** opens. When contactor **16** is open, current no longer flows through the first branch circuit **10** and heaters **14** and **15** are no longer energized. The cooking device no longer receives energy. In this embodiment the pressure switch **20** will stay open even after all of the fire extinguishing material **22** is used in order to prevent re-ignition of the fire. Thus, the first branch circuit and the second branch circuit operate simultaneously to extinguish a fire which exists in the cooking device by applying fire extinguishing material to the fire and by cutting off power to the heaters.

The fire extinguishing material **22,** the fusible link **21,** and the pressure switch **20** are generally located under a hood as indicated. The limit control **19,** the variable temperature control **18,** the coil and contactor **16** and **17,** and the heaters **14** and **15** are generally located in the fryer or cooking apparatus.

During normal operation while the temperature is at the proper cooking level contactor **16** is closed and current flows through heaters **14** and **15** from the first voltage source **12.** As the fryer heats up to a temperature above the setting on variable temperature control **18** the contactor **16** is open because of the lack of current through coil **17.** As the fryer cools down, the variable temperature control thermostat **18** closes and current again flows through coil **17.** Contactor **16** is again closed. If the temperature in the cooking device exceeds a certain limit, limit control **19** opens the second branch circuit and thus current no longer flows through coil **17** and contactor **16** is open. If a fire occurs in the cooking device fusible link **21** is opened causing fire extinguishing material from cylinder **22** to spray down on to the cooking device and in the hood where a fire may also occur. At the same time pressure switch **20** is opened by the breakage of the fusible link, again opening the second branch circuit. Current from the second voltage source **13** no longer flows through heaters **14** and **15** and heat is no longer added to the cooking device. Thus fire extinguishing material is applied to the cooking device simultaneously as heating current is taken away from the cooking device.

From the foregoing description of one embodiment of the invention it will be apparent that many modifications may be made therein. It will be understood, however, that this embodiment of the invention is intended as an exemplification of the invention only and that the invention is not limited thereto. For example, other types of switches beside a coil and contactor may be used in place of coil **17** and contactor **16.** It is to be understood, therefore, that it is intended in the appended claims to cover all modifications as fall within the true spirit and scope of the invention.

I claim:

1. A circuit for operating an electric cooking device from a first voltage source, and controlling the electric cooking device from a second independent voltage source; for use in conjunction with a fire extinguishing system which utilizes a container of fire extinguishing material, a control switch for opening and closing the circuit, and a fusible link for controlling the expulsion of fire extinguishing material and for controlling the control switch comprising:

a first branch circuit including, an electric heating device, a power switch connected to said electric heating device for controlling the current through said electric heating device, input means for connecting said first branch current to the first voltage source;

a second branch circuit including, control means for controlling the opening and closing of said power switch, a temperature control connected to said control means for opening and closing said second branch circuit at pre-determined temperatures, means for connecting said second branch circuit to a second independent voltage source, means for connecting said second branch circuit to the control switch, whereby said control switch and said power switch are opened upon the expulsion of the fire extinguishing material.

2. The circuit as set forth in claim **1** wherein said power switch is a mechanical contactor and said control means is a relay coil.

3. The circuit is set forth in claim **1** wherein said temperature control means is a variable thermostat.

4. The circuit as set forth in claim **3** further including a limit control connected to said variable thermostat for opening said second branch circuit at a predetermined temperature.

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