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(54) Remote control of electrical heating appliances.

(57) An electrical heating appliance, e.g. a radiant fire, has manual switches which can be by-passed to allow for remote control. A hand-held controller (27) produces a beam of infra-red energy which impinges on a sensor (26). Control box (24) receives command signals from sensor (26) and carries out an appropriate switching operation. The controller (27) has slider switches (29, 30, 31) for selecting the desired heating appliance mode of operation, but these are ineffective until pressure switch (28) is pressed to produce the beam.

An alternative arrangement has the sensor distant from the heating appliance.

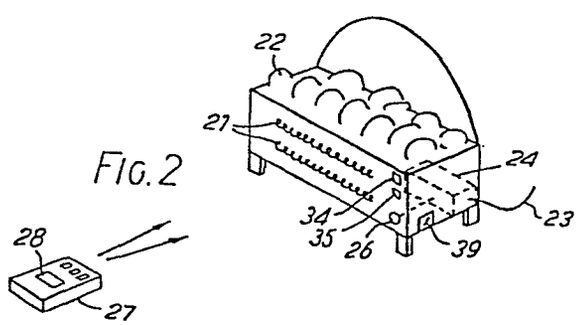


FIG. 2

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REMOTE CONTROL OF ELECTRICAL HEATING APPLIANCES.

This invention relates to the remote control of electrical heating appliances.

It is known for an electrical heating appliance to be operated by manual switches mounted on the appliance itself. Such arrangements suffer the problem that any change in their control has to be effected by someone touching the appliance. This may well be a dangerous proceeding and for disabled people may be impossible.

It is also known to operate television sets by using infra-red beams from hand-held controllers.

This invention is concerned with avoiding the difficulty and possible danger of manual operation of electrical heating appliances, particularly radiant heaters, by providing a remote control.

The invention provides an electrically-powered heating appliance having switching means for selectively operating it located in the appliance characterized by said switching means (18, 24) being adapted to be operated directly or indirectly by an infra-red energy beam from a remote location and by being combined with a normally hand-held remote controller (17, 27) adapted to produce such an energy beam.

There may be infra-red sensing means (26) mounted on a forward facing surface of the appliance and connected to the switching means.

The hand-held controller (17, 18) may be protected against accidental operation.

Two embodiments of the invention are shown in the accompanying drawings, in which:-

Figure 1 is a diagrammatic representation of a first electric fire and control device,

Figure 2 shows another electric fire incorporating a control device,

Figure 3 is a plan view of a hand-held controller, part of the control device of Figure 2,

Figure 4 is a detail of the device of Figure 3, and

Figure 5 is an exploded view of a control box of Figure 2.

Referring first to Figure 1, a radiant-only electric fire (11) has three separately-operable radiant bars (12) and manual switching means (13) for switching on and off and for selecting which of the bars are to be energised. An electrical power supply line (14) to the fire has connected into it a remote signal box (15).

As indicated diagrammmatically in Figure 1, there is a continuous connection for the power line (14) through box (15), so that a power supply is always connected to the fire (11). The signal box operates to superimpose on the waveform of the power supply a signal waveform, e.g. a higher frequency signal, so that the signal is applied to the fire on the same line as the power supply.

A number of different frequency signals can be so produced by the signal box, one signal for each of the possible states of the fire, i.e. OFF, ONE BAR ON, TWO BARS ON, THREE BARS ON.

A control switching unit (18) is built in to the fire and receives the signal on line (14). The unit accordingly operates switch means to bring about that state indicated by the signal. The switch means of the unit is separate from and connected in parallel with the manual switching means (13).

Signal box (15)is triggered to produce a selected one of its signals by an interface unit (16). A battery-operated hand-held remote controller (17) is adapted, when manual control (19) is operated, to produce a narrow beam of infra-red light. The light beam is coded to correspond to a selected one of the possible states of the fire, the manual control (19) providing a different position for each state. The coding may, for instance, comprise distinctive patterns of pulses of infra-red energy. The signal recognition unit is adapted to recognise these patterns.

Line (14) comprises an ordinary electrical power cable, which is flexible and of any selected length, so that the signal box (15) may be mounted in any convenient position. Thus a clear pathway to a desired location for the hand-held controller can be more easily arranged. For instance, signal box (15) can be located high on a wall or ceiling above the area where the path of the infra-red beams is likely to be blocked by objects.

This arrangement is of particular use for invalids or disabled people who are unable to approach the fire to operate it directly. It

will be evident that the signal box (15) can be used to operate different electrical items from the electric fire shown. For instance, for a disabled person there may be arranged a bank of signal boxes, each connected to a different electrical appliance, and operated by pointing a single hand-held controller at the selected box. The cable (14) may be attached to the fire or other electrical appliance by a plug and socket connection so that different appliances may be connected up as required. It will be appreciated that some appliances may require only an 'ON' and an 'OFF' coded signal, while others may require a larger number of coded signals.

Figure 2 also shows a radiant-only electric fire having two separately-operable radiant bars (21) and an illuminated representation of burning fuel (22). Lead (23) supplies mains electricity to a junction box (25) which is mounted in a control box (24) shown in more detail in Figure 5. An infra-red sensor (26) is mounted on a front surface of the fire and is connected by an electrical lead to the control box (24). Hand-held remote controller (27) is adapted when a pressure-sensitive switch area (28) is pressed to produce a beam of infra-red light. The controller is pointed at the fire so that the beam impinges on the sensor (26) which then sends an electronic signal to the control box (24.

The hand-held controller, as shown best in Figure 3, comprises three on/off slider switches (29, 30, 31). Operation of switch (29) selects the illuminated fuel simulation,operation of switch (30) selects one of the radiant bars, while operation of switch (31) selects both radiant bars. The user therefore slides to "on" whichever switches he wishes. No effect, however, is made on the fire until area (28) is pressed. This causes the said beam of infra-red light to be produced, coded accordingly to which of switches (29, 30, 31) is, or are, made. The pressure-sensitive area (28) is protected as shown in Figure 4, which is a section taken on the line A - A of Figure 3. A raised border (33) surrounds the area (28) so that if, for instance, the controller is dropped, it will not be operated. As discussed above, operation of any of switches (29, 30, 31) has no effect without pressure on area (28), so accidental operation of any of them alone will not switch the fire on. Other means for avoiding accidental pressure on area (28) may be

used, e.g. a removable cover and/or deeper depression.

The fire may optionally have indicator lamps (34, 35) which light up to show that one bar or both bars are energized. No such lamp is required for indicating operation of the fuel simulation since this is immediately obvious.

The control box (24) is mounted distanced from the radiants behind and preferably beneath them, so that it is not subjected to excessive temperatures. The control box contains, as well as the junction box (25), a pair of mains voltage relays (not shown), each controlling one of the electric radiant elements(21), a transformer (not shown), and a printed circuit board (36).

The printed circuit board carries a circuit which decodes the signals from the sensor (26) and initiates the appropriate energization. The illuminated fuel simulation is energized directly from the board, since only low power is required. The two radiant elements are energized through the relays.

The sensor (26) is mounted at a short distance from the control box and is connected by a length of electrical cable, for instance 12 cms long. The cable is protected by a sheath (not shown) from mechanical damage and excessive heat. The elements contained in control box (24) are all mounted in a base member (37) and a ventilated cover (38) is then placed over the base member.

The fire also has manual controls (not shown) and a manual/remote switch (39) which operates to by-pass the supply to the control box when manual control is required, so that the control box does not remain energized, or to by-pass the manual switches when remote control is required.

Although the embodiments described above have been describing using a controller producing an infra-red beam, it is within the invention to use other similar devices operating radio or sound beams. The invention may also be applied to the remote control of electric fan heaters and other electrically operated apparatus.

CLAIMS:

1. An electrically-powered heating appliance having switching means for selectively operating it located in the appliance, characterized by said switching means (18, 24) being adapted to be operated directly or indirectly by an infra-red energy beam from a remote location, and by being combined with a normally hand-held remote controller (17, 27) adapted to produce such an energy beam.

2. A heating appliance as claimed in claim 1, further characterized by sensing means (16, 26) for detecting the presence of said energy beam and signalling to the switching means (18, 24), said sensing means (16, 26) being separate from the switching means.

3. A heating appliance as claimed in claim 2, further characterized by said sensing means (16) being contained in a separate signal box (15) connected into an electrical power supply line (14) for the appliance, and operating to superimpose a signal waveform on the power supply to the appliance, the switching means (18) detecting the signal waveform.

4. A heating appliance as claimed in claim 2, further characterized by the sensing means (26) being mounted on a forward facing surface of the appliance and connected to the switching means.

5. A heating appliance as claimed in any of claims 1 to 4, further characterized by the switching means (18, 24) being mounted at a relatively cool location in the appliance and having ventilation openings.

6. A heating appliance as claimed in any of claims 1 to 5, further characterized by said hand-held remote controller (17, 18) being protected against accidental operation by having a raised edge border (33) surrounding manual operating means (19, 28).

7. A heating appliance as claimed in claim 6, further characterized by said hand-held remote controller (27) having mode selection switches (29, 30, 31) for selecting any of a number of modes of operation for the appliance, the operation of any such selection switch being ineffective until the manual operating means (28) is operated to produce an energy beam coded as selected by the mode selection switches.

8. A radiant-only electric fire having an illuminated fuel representation (22) and two or more radiant bars (12, 21) and manual switch means for

selecting operation of the fuel representation and/or any of the radiant bars, characterized by a manual/remote switch (39) which by-passes the manual switch means and energizes a remote switching means (24) located in a relatively cool area of the fire, said remote switching means (24) comprising a transformer, a relay for each radiant bar and a printed circuit providing operating signals to each relay and powering the illuminated fuel representation directly and infra-red sensing means (26) mounted at the front of the fire and connected to feed signals to said remote switching means, and a separate remote controller (18) adapted to produce a coded infra-red beam when operated.

9. A radiant-only electric fire as claimed in claim 8, further characterized by indicator lamps showing which of the radiant bars is being energized.

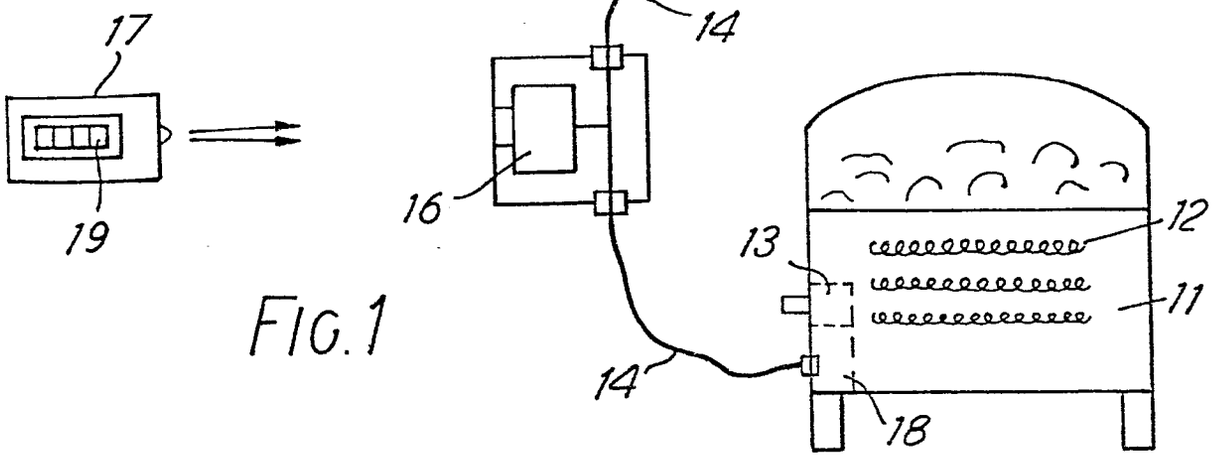


FIG. 1

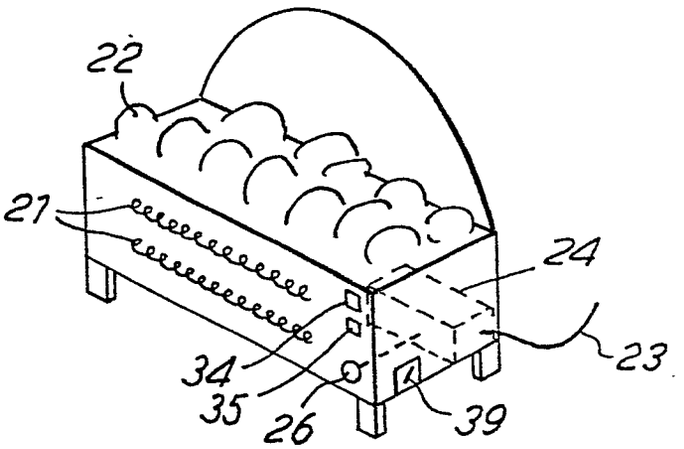
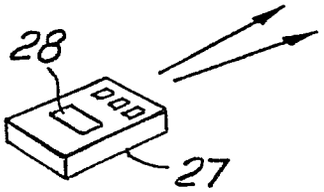


FIG. 2



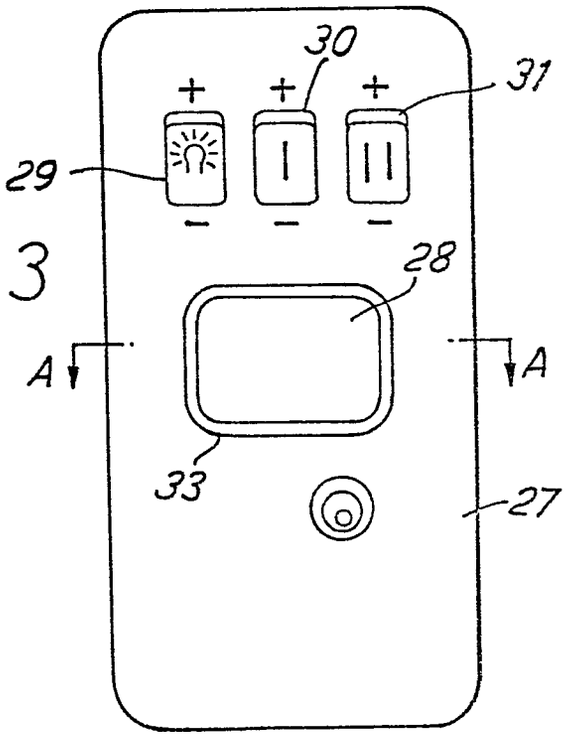


FIG. 3

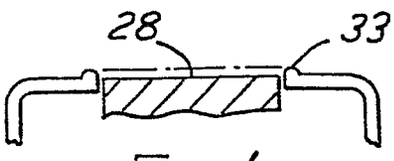


FIG. 4

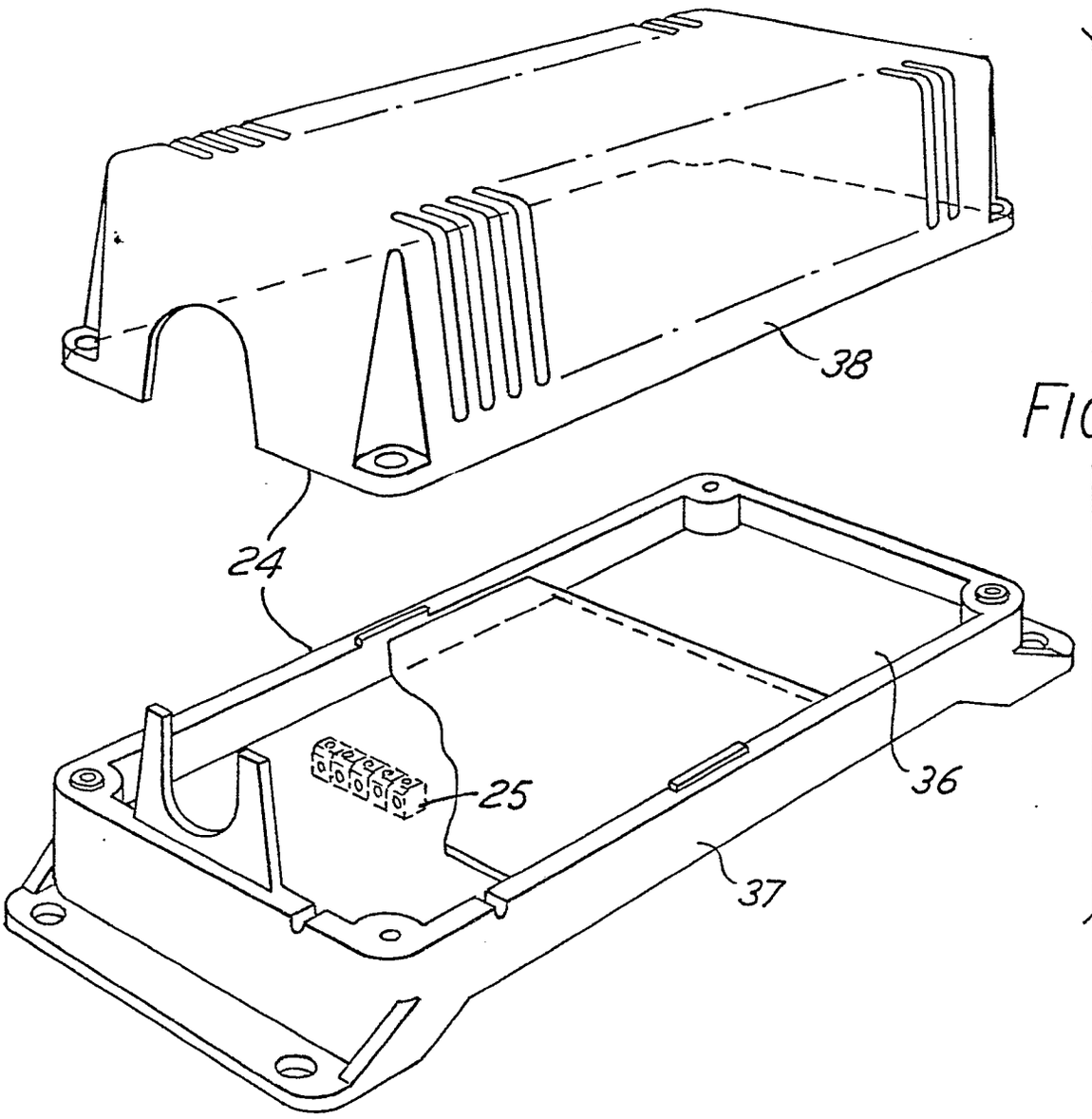


FIG. 5