

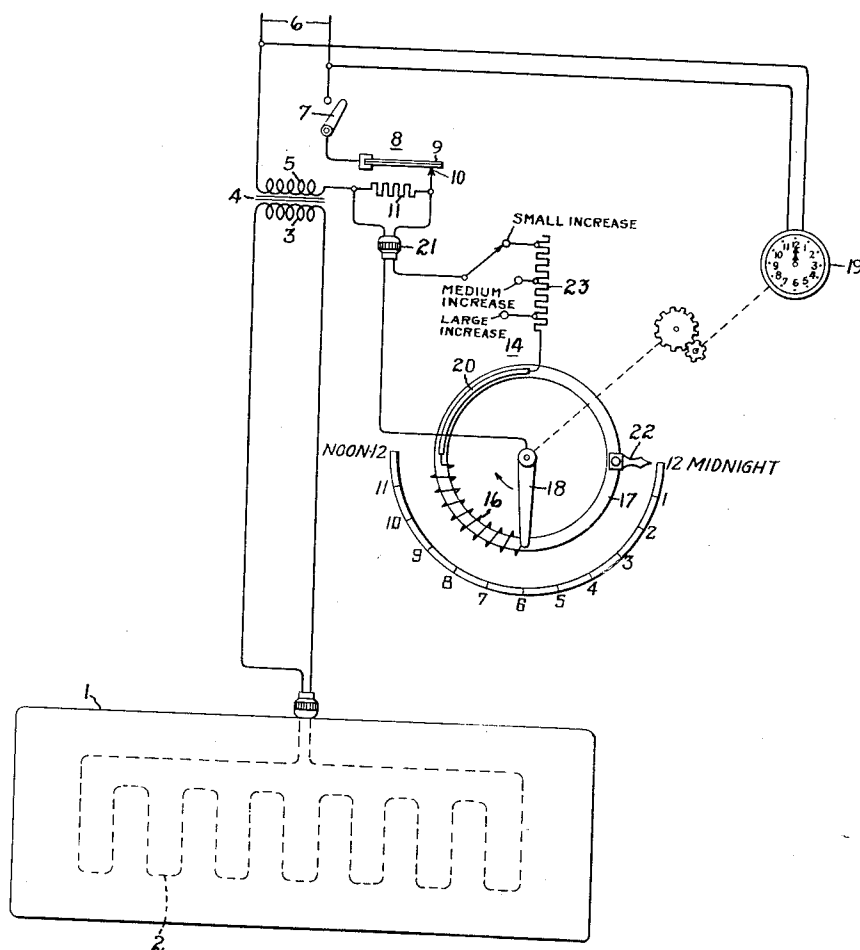
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ELECTRIC BLANKET TEMPERATURE CONTROL APPARATUS

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ELECTRIC BLANKET TEMPERATURE
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My invention relates to electric blanket temperature control apparatus and particularly to a control arrangement which varies the temperature of an electric blanket in accordance with changes in the ambient temperature. In such control arrangements, the amount of electric energy supplied to the blanket varies inversely with the ambient temperature. It is desirable, however, that in some instances the temperature of the blanket also should be slowly increased, independently of the ambient temperature, during the latter part of the sleeping period, usually the early morning hours, when one sleeps less soundly. One object of my present invention is to provide an arrangement for causing the ambient temperature responsive means of the prior control arrangements to increase the electric energy input into the blanket at predetermined times of the day in addition to any change in the energy input that may be effected thereby in response to changes in the ambient temperature.

My invention will be better understood from the following description when taken in connection with the accompanying drawing, the single figure of which diagrammatically illustrates an electric blanket temperature control arrangement embodying my invention, and its scope will be pointed out in the appended claims.

Referring to the drawing, 1 represents an electric blanket having a heating element 2 which is connected to the secondary winding 3 of a transformer 4, the primary winding 5 of which is arranged to be connected to a suitable supply circuit 6 by means of a manually controlled switch 7. The connection between the primary winding 5 of the transformer 4 and the supply circuit 6 is arranged to be opened and closed periodically by means of a thermally operated switch 8 of any suitable type, examples of which are well known in the art. As shown in the drawing, the switch 8 comprises a bimetallic element 9 and a cooperating stationary contact 10 which, when in engagement, are in series with the primary winding 5 of the transformer 4. The switch 8 is also provided with a heating element 11 which is also connected in series with the primary winding 5 of the transformer 4. The thermally operated switch 8, which is so located as not to be materially affected by the temperature of the blanket 1, operates in a manner well known in the art to cause the bimetallic element 9 to move out of and into engagement with the contact 10 peri-

odically at a rate dependent upon the ambient temperature so as to vary the average amount of electric energy supplied to the blanket in accordance with the ambient temperature.

5 In accordance with my invention, I also provide an adjustable rheostat 14 which is arranged to be connected, during a predetermined period of each day, so as to decrease gradually the heating effect of a given blanket current on the bimetallic element 9 in order to make the periods longer during which the switch 8 is closed and thereby increase the average energy input into the blanket. In the particular embodiment of my invention shown in the drawing, the resistor 15 of the rheostat 14 is shown as an uninsulated resistance wire 16 wound around a portion of a rotatably mounted ring shaped member 17 of suitable insulating material. The wire 16 is arranged to be engaged by a movable contact 18 which is continuously moved by a suitable clock 19, such as an electric clock connected to the supply circuit 6, so that the contact 18 makes one revolution every twenty-four hours. The movable contact 18 also is arranged to engage a flat contact member 20 which is also mounted on the rotatable member 17 so that it is continuously engaged by the movable contact 18 for a predetermined time after the contact 18 moves out of engagement with the wound wire 16. The wire 16 and the contact 20 are connected in series and are arranged to be connected by a suitable switch 21 such as a plug and socket so as to complete a shunt circuit around the heating resistor 11 of the thermally operated switch 8. As shown, the wire 16 is wound around approximately a quarter of the ring shaped member 17 and the contact member 20 extends over another quarter of the member 17 so that the movable contact 18 is in engagement with the wire 16 for approximately six hours and is in engagement with the contact 20 for approximately another six hours. Therefore, during the twelve hours while the shunt circuit is completed around the heating element 11, the resistance of the shunt circuit is gradually decreased during the first six hours while the movable contact 18 is engaging the wire 16, and during the last six hours, the resistance of the shunt circuit is maintained at its minimum value while the movable contact 18 is engaging the contact 20. In order that the user may adjust the movable member 17 to vary the time of day when the gradually increasing heat period occurs, the wheel 17 is provided with a projection 22 whereby the wheel 17 may be manually rotated to a

position in which the movable contact 18 moves into engagement with the wire 16, to complete the shunt circuit around the heating element 11, at the desired time of day. As shown in the drawing, the wheel 17 is adjusted so that the gradually increasing heat period starts at 12 o'clock midnight. Also, in order that the user may predetermine whether the additional heat shall be a small, medium or large increase over the normal setting, a manually controlled three-position rheostat 23 is also connected in the shunt circuit around the heating element 11, the rheostat being so connected that when a small increase is desired substantially all of the resistance of the rheostat 23 is in the shunt circuit, when a medium increase is desired a predetermined smaller amount of the resistance of the rheostat 23 is in the shunt circuit and when a large increase is desired only a small portion of the rheostat 23 is in the shunt circuit.

With the arrangement shown in the drawing, it will be evident that the proportion of the total heating current of the blanket 1 that flows through the circuit of the heating element 11 can be gradually decreased to a predetermined value during any desired continuous period of not more than six hours in any given twenty-four hours by adjusting the position of the rotatable member 17 so that the contact 18 moves into engagement with the wire 16 at the beginning of the period during which the setting of the thermal device 8 is to be adjusted and that the amount of increase in the blanket temperature may be regulated by varying the position of the rheostat 23. Also, it will be evident that after the blanket temperature has been increased to the maximum value it will be maintained at that value for six hours. For example, if it is desired to increase the average amount of electric energy supplied to the blanket 1 a small amount during the period from 12 midnight to 6 a. m., the rotatable member 17 is adjusted so that the contact 18 engages the resistor wire 16 at 12 midnight, and the rheostat 23 is adjusted to its "small increase" position. With the member 17 and the rheostat 23 so adjusted, it will be observed that during the period between 12 midnight and 12 noon a shunt circuit is completed around the heating element 11 of the thermal switch 8 by the movable contact 18 engaging the wire 16 and the contact 20 on the member 17. During the period from 12 midnight to 6 a. m., the resistance of the shunt circuit is gradually decreased by the movement of the movable contact 18 over the wire 16 until at 6 a. m. the entire wire 16 has been cut out of the shunt circuit. From 6 a. m. to 12 noon, however, the shunt circuit remains closed without any further change in its resistance since the movable contact 18 remains in engagement with the contact 20. Therefore, since the proportion of the total blanket heating current that flows through heating element 11 varies inversely with the resistance of the shunt circuit, it will be obvious that decreasing the resistance of the shunt circuit causes the bimetallic element 9 to remain in engagement with the contact 10 for a longer time during a given period of time and consequently results in a greater amount of heating current being supplied to the blanket during the same given period of time than if the shunt circuit were not completed around the heating element 11.

While I have, in accordance with the patent statutes, shown and described my invention as applied to a particular system and as embodying

various devices diagrammatically indicated, changes and modifications will be obvious to those skilled in the art, and I therefore aim in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In combination, an electric blanket, a heating circuit for said blanket, ambient temperature responsive means for periodically opening and closing said circuit, and timing means for progressively varying the setting of said ambient temperature responsive means during a predetermined period of the day.

2. In combination, an electric blanket, a heating circuit for said blanket, ambient temperature responsive means for periodically opening and closing said circuit, and clock operated means for gradually varying the setting of said ambient temperature responsive means during a predetermined period of the day.

3. In combination, an electric blanket, a heating circuit for said blanket, a thermally operated switch for periodically opening and closing said circuit in response to the ambient temperature including a heating element and a source of current connected thereto, and means for progressively varying the current supplied to said heating element from said source during a predetermined period of the day.

4. In combination, an electric blanket, a heating circuit for said blanket, a thermally operated switch for periodically opening and closing said circuit in response to the ambient temperature including a heating element and a source of current connected thereto, and clock operated means for gradually decreasing the current supplied to said heating element from said source during a predetermined period of the day.

5. In combination, a source of current, an electric blanket connected to said source, a bimetallic element heated by the current supplied to said blanket, means controlled by said element for opening the circuit between said source and blanket when the temperature of said element exceeds a predetermined value, a heating element for said bimetallic element energized from said source, and means for gradually varying the current supplied to said heating element during a predetermined period of the day.

6. In combination, a source of current, an electric blanket connected to said source, a bimetallic element heated by the current supplied to said blanket, means controlled by said element for opening the circuit between said source and blanket when the temperature of said element exceeds a predetermined value, a heating element for said bimetallic element energized from said source, and clock operated means for gradually decreasing the current supplied to said heating element from said source during a predetermined period of the day.

7. In combination, a source of current, an electric blanket connected to said source, a bimetallic element having a heating element connected in series relation with said source and blanket, means controlled by said bimetallic element for opening the circuit between said source and blanket when the temperature of said bimetallic element exceeds a predetermined value, means for completing a shunt circuit around said heating element, and means for varying the resistance of said shunt circuit.

8. In combination, a source of current, an elec-

tric blanket connected to said source, a bimetallic element having a heating element connected in series relation with said source and blanket, means controlled by said bimetallic element for opening the circuit between said source and blanket when the temperature of said bimetallic element exceeds a predetermined value, means for completing a shunt circuit around said heating element during a predetermined period of the day, and means for varying the resistance of said shunt circuit during said predetermined period of the day.

9. In combination, a source of current, an electric blanket connected to said source, a bimetallic element having a heating element connected in series relation with said source and blanket, means controlled by said bimetallic element for opening the circuit between said source and blanket when the temperature of said bimetallic element exceeds a predetermined value, means 20

for completing a shunt circuit around said heating element, and clock operated means for decreasing the resistance of said shunt circuit.

10. In combination, a source of current, an electric blanket connected to said source, a bimetallic element having a heating element connected in series relation with said source and blanket, means controlled by said bimetallic element for opening the circuit between said source and blanket when the temperature of said bimetallic element exceeds a predetermined value, a manually controlled rheostat, a variable resistor, means for automatically connecting around said heating element during a predetermined time of the day a shunt circuit including said rheostat and resistor in series, and means for gradually decreasing the effective amount of said resistor in said shunt circuit while it is completed.

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