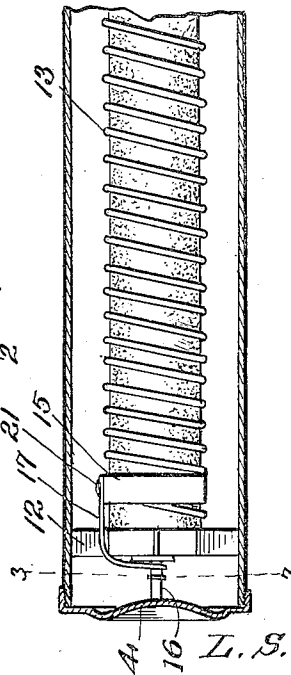
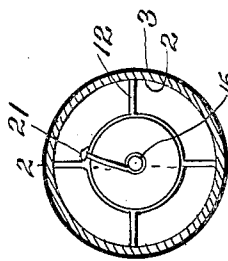
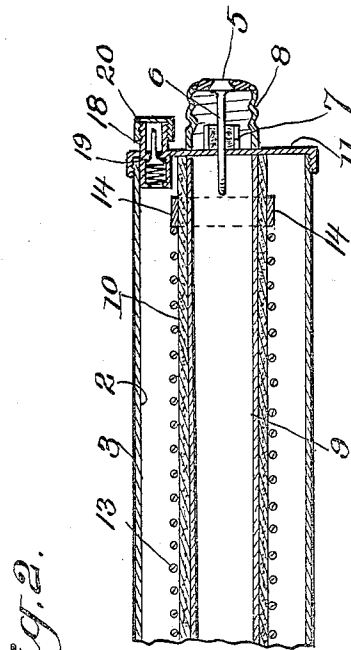
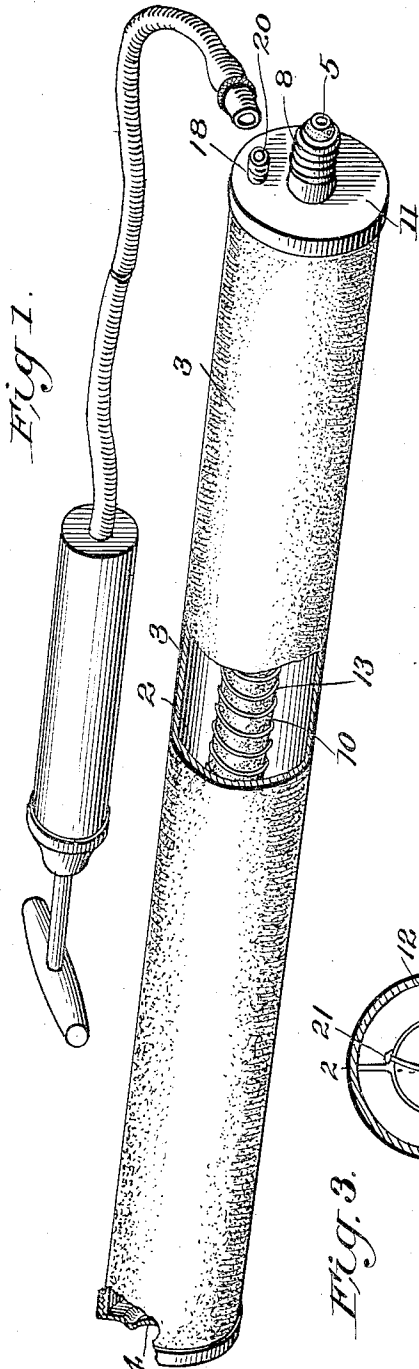


L. S. BESLEY.
 AUTOMATIC ELECTRIC HEATER.
 APPLICATION FILED SEPT. 26, 1911.

1,052,998.

Patented Feb. 11, 1913.



Witnesses
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LEWIS S. BESLEY, OF SALT LAKE CITY, UTAH.

AUTOMATIC ELECTRIC HEATER.

1,052,998.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, LEWIS S. BESLEY, citizen of the United States, residing at Salt Lake City, in the county of Salt Lake and State of Utah, have invented certain new and useful Improvements in Automatic Electric Heaters, of which the following is a specification.

My invention relates to electric heaters, and particularly to a heater adapted to be attached to an ordinary electric light wire and adapted to be used as a bed warmer or as a means of otherwise applying heat locally.

The primary object of my invention is to provide a very convenient, simple and effective heater of this character, readily connected to and disconnected from the ordinary socket of an electric wire, adapted to be readily handled and to be used in situations where ordinary electric heaters would be dangerous.

A further object is to so construct the heater that the circuit through the heating coils shall be automatically broken when a desired temperature is reached, or again established when the temperature of the heater has fallen below the predetermined desired point.

A further object is to provide a heater in which the expansion of compressed air contained within a casing shall act to break the circuit through the heating coils when the temperature of the heater has arrived at any desired point.

A further object is to provide means whereby the air may be compressed to a greater or less degree so as to permit the heater to be raised to various temperatures before the circuit through the heating coils is broken.

Another object is to provide means whereby the circuit through the heating coils shall be broken when the temperature rises to a dangerous degree.

Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawings wherein:

Figure 1 is a perspective view of my improved heater. Fig. 2 is a longitudinal section of the heater on the line 2—2 of Fig. 3. Fig. 3 is a transverse section of the heater on the line 3—3 of Fig. 2.

Corresponding and like parts are referred to in the following description and indicated

in all the views of the accompanying drawings by the same reference characters.

Referring to these drawings, 2 designates a casing of any desired shape but shown as cylindrical. This casing is preferably made of metal and is covered by any suitable insulation designated 3. I do not wish to limit myself to any particular insulation or any particular means for insulating the casing. I have shown it as covered with a layer of insulating paint or enamel. This casing is closed at one end by means of a plate or end piece having therein a spring section 4 of resilient metal and operating very much after the manner of the bottom of an oil can.

The opposite end of the casing 2 is closed and provided with a plug or base such as used in electric lighting. Preferably the central terminal 5 of this plug or base is electrically connected to a wire 6 which extends from the terminal 5 through suitable insulation 7 to the interior of the casing. The exterior of the plug is of course formed with a screw threaded brass sleeve 8 which is in electrical connection with the metal forming the casing 2.

Supported in any suitable manner within the casing 2 is a mandrel or rod 9 which may be of any suitable material and is preferably, though not necessarily, tubular so as to make it light. This rod 9 may be of insulating material, or it may be of non-insulating material covered with insulation. In the illustration of my invention herewith given, the mandrel 9 is covered with insulating material 10. As illustrated, the mandrel 9 is supported at one end by projecting through the cap 11 which closes one end of the casing 2, and the other end of the mandrel is supported by means of a suitably insulated spider 12.

Wrapped upon the mandrel over the insulation thereof is a wire forming the heating coils 13. This spirally wrapped wire extends from one end of the mandrel to the other, except that a small space is left at each end of the mandrel. The wire forming the coils 13 at one end is connected to a band of copper or like material to which the wire 6 is electrically connected. The other end of the wire forming the heating coils 13 is electrically connected to a band of copper or like material.

Projecting from the end of the mandrel toward the resilient end piece 4 is a contact

pin 16 which is electrically connected by the wire 17 to the copper ring 15. The extremity of this pin 16 is normally in contact with the resilient end piece 4 but the resilient end piece is capable of springing out and away from the end of the pin 16, thus breaking the circuit through the heating coils 13.

So far as described, the operation of my improved heater is as follows: The plug carried upon the end of the casing is connected to an electric light socket (not shown). The current from the wire connected to the socket passes through the terminal 5 along the wire 6 to the band 14; thence through the heating coils 13 to the band 15; thence by means of wire 17 to the pin 16; thence to the resilient end piece 4, and thence returns through the metal of the casing 2 to the terminal sleeve 8 and thence back through the supply wire. The passage of the current through the heating coils 13 will raise the temperature of these coils, and this in turn will raise the temperature of the air contained within the casing 2. The air within the casing expands under the action of the heat, and eventually it will overcome the resilience of the spring end piece 4 and the end piece will spring outward under the pressure of the air, thus breaking the circuit through the heating coils. When the temperature falls to such a degree that the air within the casing 2 contracts beyond a certain point, the resilience of the end piece 4 will cause it to spring inward and into contact with the terminal 16, thus again establishing a circuit through the coils. Thus the action of the device is automatic just so long as it is connected in circuit with the source of supply.

It will be obvious that the temperature required to expand the air contained within the casing 2 so as to actuate the spring end piece 4 will depend upon the original pressure of the air within the casing 2, and for the purpose of varying this pressure and thereby varying the degree of heat to which the coils are raised before the circuit is broken, I provide means whereby the air within the casing 2 may be compressed to any desired degree. For this purpose I have provided an air inlet tube 18 which projects into the casing and preferably is carried upon the end piece 11. This air inlet tube is precisely the same as the air inlet tube ordinarily used on pneumatic tires, though I do not wish to be limited to this precise construction. It is provided with the internal valve 19 which opens upon pressure from the outside and closes upon pressure from the inside of the casing. It is preferably provided with a cap 20 which is removable to permit the air inlet tube to be connected to any suitable air compressing means such as a bicycle pump.

With this construction, the air may be first compressed within the casing 2 to any desired degree and then the current turned on. It will be obvious that a certain degree of pressure of the air has already been secured by means of this compression. Hence a less degree of heat will be required to expand the air sufficiently to spring outward the end piece 4 than if the air were not compressed. Inasmuch as, however, it is difficult to regulate the degree of compression so as to secure a breaking of the circuit through the heating coils when a certain temperature has been attained, I preferably first turn the current through the heating coils until the heater has been raised to the proper temperature. Then air is pumped in until the end piece 4 snaps outward. This compression of the air breaks the circuit through the heating coils at the proper degree of heat, and when the temperature of this compressed air is lowered by the breaking of the circuit, then the spring end 4 will spring inward, again making contact with the pin 16. The temperature will thus be kept automatically at the predetermined degree.

It will be obvious that the resilient end piece 4 constitutes a resilient diaphragm which is forced in one direction by the compression of air within the casing and is returned to its original position upon a decrease in this pressure within the casing by the resiliency of the diaphragm. While I have illustrated this diaphragm as forming the end of the casing, it is to be understood that the diaphragm might be located intermediate of the ends of the casing and still perform its function in practically the same manner as described.

In order to prevent a too high amount of current from passing into the heater, I preferably provide a fuse 21. This fuse is secured by making the connection 17 of resilient wire which tends to spring outward and away from the copper band 15. This wire 17 is held in contact with the band 15 by easily fusible solder. When the temperature is raised too high, this solder will fuse and the wire 17 will spring outward, thus entirely breaking the circuit. It will be understood that fused plugs or like devices might be used for breaking this circuit upon the burning out of the fuse.

While I have illustrated what I believe to be the best and most effective arrangement of my invention, I do not wish to be limited to the details of the arrangement or the details of the construction as it is obvious that the device might be modified in many ways without departing from the spirit of the invention. My invention is simple, can be cheaply made and is thoroughly effective in use.

While I have described this device as be-

ing used with air alone as a filling for the casing, it is to be understood that I may also use oil or like liquid within the casing together with air, the air being used to secure the elasticity necessary to operate the spring end.

The snapping of the spring is a very vital and important part of my invention as without it the contacts would spark and would soon burn out.

It will be obvious that the principle of my device may be applied to a large number of other devices than mere electric heaters and that it may be used wherever it is desired to cause a circuit to break when a certain temperature has been reached.

What I claim is:

1. An electric heater including in its organization an outer casing containing a fluid expansible under heat, a diaphragm movable in one direction by the expansion of said fluid, an electrical heating element disposed within the casing, a fixed contact point opposed to the inner face of the diaphragm and normally in contact therewith, said heating element, contact point and diaphragm being connected in circuit with a source of energy, and means whereby the initial pressure of the fluid within the casing may be increased or decreased.

2. An electrical heater including in its organization an outer casing, an end plate closing one end of the casing and a resiliently deformable diaphragm closing the other end of the casing, a mandrel supported within the casing and extending the whole length thereof, an electrical heating coil mounted upon said mandrel and insulated therefrom, a plug passing through the end of the casing opposite the diaphragm, said plug including a central contact and an exterior contact sleeve, a connection between the heating coil and the central contact of the plug, a rigid contact pin carried by the mandrel opposed to said diaphragm and normally in contact therewith, and means whereby fluid expansible under heat may be initially compressed within the casing.

3. An electric heater including in its organization an outer casing, electric heating coils inclosed within the casing and connected in circuit with a source of energy, thermostatic means for breaking the circuit when the temperature within the casing has risen above a predetermined point and for making said circuit when the temperature therein has lowered below a predetermined point, said means including a member movable in one direction by an increase of pressure of the fluid contained within the casing and movable in an opposite direction by the decrease of pressure in said fluid, and a fluid pump connected to said casing for the pur-

pose of adjustably varying the fluid pressure within the casing.

4. An electric heater including in its organization an outer casing having an inlet opening, electric heating coils inclosed within the casing and connected in circuit with a source of energy, and thermostatic means for breaking the circuit through said coils when the temperature within the casing has risen above a predetermined point and for making said circuit when the temperature therein has lowered below a predetermined point, said means including a member movable in one direction by an increase of pressure within the casing consequent upon a rise in temperature above a predetermined point and movable in the other direction by a decrease of pressure within the casing consequent upon a decrease of temperature, and a pump detachably engaging the inlet opening of the casing.

5. An electric heater, including in its organization an outer casing having an inlet opening, an inwardly opening valve disposed in said opening, said opening being provided with a screw-threaded nipple whereby it may be connected to fluid compressing devices, electric heating coils inclosed within the casing and connected in circuit with a source of energy, thermostatic means for breaking the circuit through said coils when the temperature within the casing has risen above a predetermined point, and for making the said circuit when the temperature therein has lowered below a predetermined point, said means including a member movable in one direction by an increase of pressure within the casing consequent upon a rise in temperature, and movable in the other direction by a decrease of pressure in the casing consequent upon a decrease of temperature.

6. An electric heater, including in its organization an outer conductive casing, electric heating coils inclosed within the casing, a plug for wiring connections attached to one end of said casing, said plug including electric terminals, one connected to the casing and the other electrically connected to the coil, and a diaphragm operatively mounted upon said casing and forming part thereof, said diaphragm being movable into and out of electrical engagement with one terminal of said coil to make or break the circuit therethrough and through the casing, said diaphragm being actuated in one or the other direction by increase or decrease of pressure within the casing.

In testimony whereof I affix my signature in presence of two witnesses.

LEWIS S. BESLEY. [L. s.]

Witnesses:

SNUEOEN,

S. ANDREW JACKSON.