May 4, 1937. R. J. PARSONS 2,079,577

HEATING UNIT CIRCUIT BREAKER

Filed Aug. 21, 1934

Fig. 1.

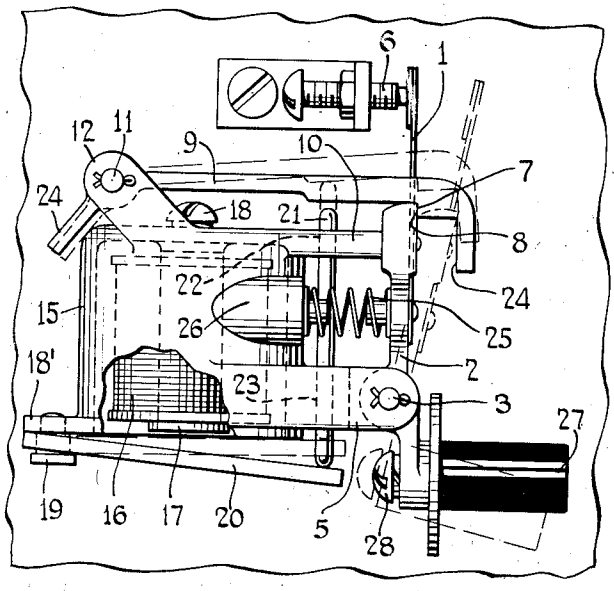


Fig. 2.

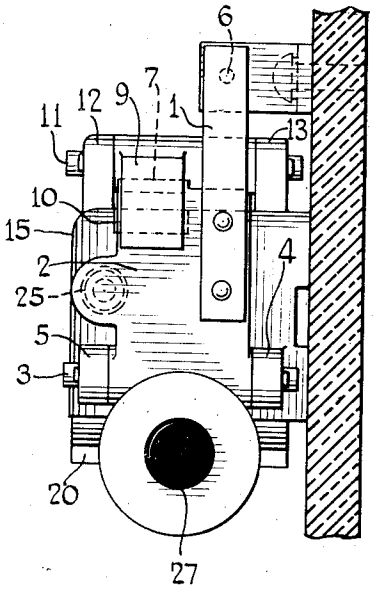


Fig. 3.

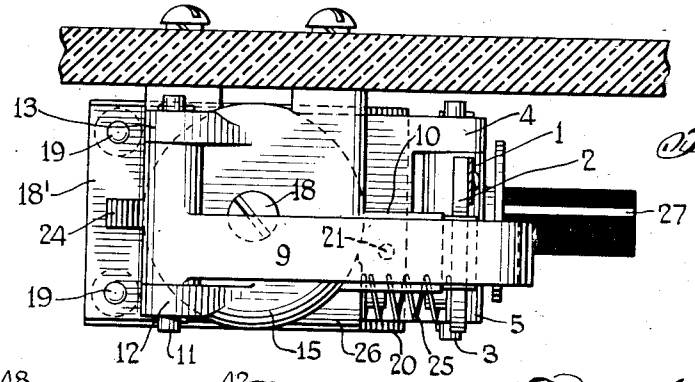
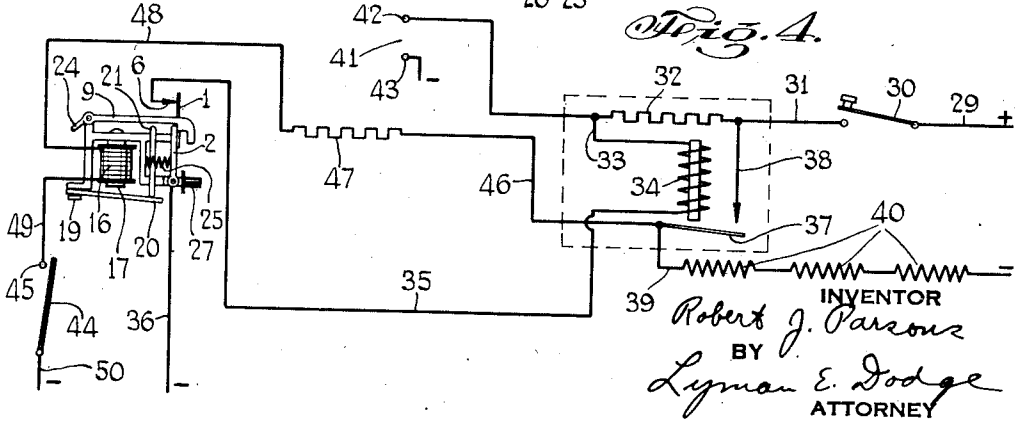


Fig. 4.



INVENTOR

Robert J. Parsons

BY

Lyman E. Dodge

ATTORNEY

Patented May 4, 1937 2,079,577

UNITED STATES PATENT OFFICE

2,079,577

HEATING UNIT CIRCUIT BREAKER

Robert J. Parsons, Schenectady, N. Y., assignor to Consolidated Car-Heating Company, Inc., Albany, N. Y., a corporation of New York

Application August 21, 1934, Serial No. 740,737

1 Claim. (Cl. 200—106)

This invention relates to electricity, particularly to electric heating, and more especially to the circuits and apparatus used therein.

Those acquainted with the art of electric heating, especially the heating of electrically propelled vehicles, are aware that the management is often in unskilled hands, and consequently the circuits and apparatus connected therewith must be such that they are easily manipulated, rugged in construction, easily maintained, and so designed that positive assurance is secured that the electric current will not be allowed to flow through the heating units after the space in which they are placed reaches a certain temperature.

A principal object of the present invention is to provide a system of circuits for heating installations, and the necessary automatic circuit breakers in connection therewith such that safety in use, easy manipulation, and the greatest degree of freedom from maintenance troubles will be secured.

Other objects and advantages will appear as the description of the particular physical embodiment selected to illustrate the invention progresses and the novel features will be particularly pointed out in the appended claim.

In describing the invention in detail and the particular physical embodiment selected to illustrate the invention reference is had to the accompanying drawing wherein like characters of reference designate like parts throughout the several views, and in which:

Figure 1 is a front elevational view of a circuit breaker embodying my invention; Fig. 2 is a side elevational view of the device as shown by Fig. 1; Fig. 3 is a top plan view of the device as shown by Fig. 1; Fig. 4 is a schematic view illustrating the connections and arrangement of the device, as shown by Figs. 1 to 3 inclusive, in connection with a heating device.

The circuit breaker as shown by Figs. 1 to 3 inclusive, comprises essentially a pivoted electrical conducting arm controllable both manually and electro-magnetically.

In Fig. 1 the electric conducting arm is designated 1. It is attached in any suitable or appropriate manner, as by riveting, to the two arm lever 2. The two arm lever 2 is pivoted in any suitable or appropriate manner, as by pivot pin 3, supported by the extended arms 4 and 5. The pivot pin 3 is so placed that the conducting arm 1 cooperates with a stationary contact 6 when in one position, but is separated therefrom when in another of its positions, as shown by dash lines in Fig. 1.

The two arm lever 2 is provided with a latch engaging shoulder 7 and is adapted to cooperate with the shoulder 8 of a latch 9. When the shoulder 7 of the two arm lever 2 cooperates, as shown in Fig. 1, with the shoulder 8 of the latch 9, the conducting arm 1 is in cooperative relation with the conducting contact 6. The two arm lever 2 also cooperates with a stop 10 which limits its movement in one direction.

The latch 9 is pivoted in any suitable or appropriate manner, as by the pivot pin 11 supported by the outstanding bearings 12 and 13, so that it is free to oscillate. The latch 9 also carries a limiting shoulder 14 which is positioned and adapted to limit the movement of the two arm lever 2 in a direction away from the stop 10 so that when the limiting shoulder 14 cooperates with the two arm lever 2 the conducting arm 1 is in the dash line position as shown in Fig. 1.

The stop 10, the extended arms 4 and 5 and the extended arms 12 and 13 are attached to a coil housing 15, preferably integral. This coil housing 15 is made of metal, preferably a magnetic metal, which not only protects and encloses a wire coil 16, but is also attached to one end of a magnetic core 17, as by screw 18, thus forming part of the magnetic circuit of the electromagnet having the coil 16.

A flange 18' extends from the lower end of the housing 15 and supports headed pins 19. These pins 19 in turn support the armature 20.

The energization of the coil 16 by electric current causes the armature 20 to rise, as viewed in Fig. 1, and in so doing to lift the latch rod 21. This latch rod 21 is guided in bores 22 and 23 in the arms 5 and 10, and so positioned that when it rises it contacts with the latch 9 and raises the latch. When the latch 9 is raised the shoulder 8 is removed from cooperative relation with the shoulder 7 of the two arm lever 2, so that the two arm lever 2 is free to be moved outwardly to the dash line position as shown in Fig. 1, catching on the limiting shoulder of the latch 9 and thereby breaking contact between the conducting arm 1 and the conducting contact 6. To insure the arm 2 catching on the limiting shoulder 14 the latch 9 is provided with a limiting tail piece 24 which contacts with the coil protector 15 to prevent the right hand end of the latch 9, as viewed in Fig. 1, from rising to such a height that the two arm lever 2 may pass beyond the limiting shoulder 14 of the latch 9.

In order to insure the movement of two arm lever 2 from the full line position to the dash line position as shown in Fig. 1, applicant preferably provides a bias. This bias, in the preferred form, is an expansible member or compression spring 25, only one of which appears in the drawing, positioned between lever 2 and spring abutments as 26, preferably formed integral with the protecting casing 15.

After lever 2 has moved into the dash line position, as shown in Fig. 1, it is returned to normal position in contact with contact member 6 by a

manual movement. In order to facilitate this movement applicant prefers to provide a manipulating button 27. This manipulating button is preferably made of insulating material and is attached to one arm of the two arm lever 2 in any suitable or appropriate manner as by screw 28. The button is adapted to be moved upwardly from the dash-line position to re-set the parts in their full-line position.

The device hereinbefore described furnishes a rugged, substantial, easily manipulated and easily maintained circuit controller especially suitable for use in connection with heating circuits which are manipulated by comparatively unskilled persons.

In Figure 4 applicant has schematically shown a preferred arrangement of circuits and apparatus for energizing and controlling a heating unit.

In Fig. 4 a source of operating and heating current is connected with the wire 29 in which is interposed the manually operable switch 30 of any desired form. When the switch 30 is closed, that is, makes contact with the wire 31, current may flow to and through the non-inductive resistance 32, to the wire 33, relay coil 34, and wire 35 to the conducting arm 1 and from conducting arm 1 through the two arm lever 2 and wire 36 to the other side of the source of potential.

Current flowing in the above traced path energizes the relay coil 34 and so causes the armature 37 to be raised so as to make contact with wire 38. As soon as this contact is made between 37 and 38, current then flows from the positive terminal of the source through wire 29, switch 30, wires 31 and 38, armature 37 and wire 39 to the several heating coils 40 and then to the negative terminal of the source.

Thermostat 41 is positioned so as to be influenced by the heat generated by the heating coils 40. When the temperature has arrived at a certain high value, the thermostat 41 will close its contacts 42 and 43 so that a shunt path is provided from the junction of resistance 32 and wire 33 to the negative terminal of the source which so decreases the coil flow in current 34 that the armature 37 is released, or drops to its lower position, as shown in Fig. 4, so cutting off the supply of electrical energy to the heating coils 40. When these coils and the space heated thereby are sufficiently cool, the thermostat again closes its contacts 42 and 43, and, if switch 30 is closed, the coils are again supplied with energy.

It might very well be that thermostat 41 would fail to act properly so that a continuous supply of energy would be fed to the heating coils 40; or a short circuit of some one of the coils 40 might occur sending a greater amount of current through the other coils; or the vent for the space being heated by the coils 40 might be accidentally closed; or a blower motor blowing air over the coils 40 might become defective and stopped. This would either finally burn up the coils or cause a dangerous rise of temperature in the space within which the coils are situated. In order to provide for this, applicant provides a thermostat 44 which is illustrated as being of the ordinary bi-metallic rod type which bends in one direction by decrease of temperature and in the other by the increase of temperature. In Fig. 4 the thermostat 44 is shown in the open position. If the temperature caused by the coils 40 rises too high, that is, higher than would be necessary to cause thermostat 41 to close its contacts, and thermostat 41 fails to close its contacts, then thermostat 44 makes contact at its upper end, as shown in Fig. 4, with post 45. The current could then flow from armature 37 through wire 46, non-inductive resistance 47, wire 48, coil 16, wire 49, post 45, thermostat 44, and wire 50 to the negative terminal of the source. Current flowing in the above traced path would energize coil 16 and cause armature 20 to be raised thereby raising latch rod 21 and lifting latch 9 so that lever 2, by reason of springs, as 25, moves into a position corresponding with the dash line position of Fig. 1, that is, so that conducting arm 1 breaks contact with contact point 6. As soon as 1 and 6 separate, relay coil 34 becomes de-energized and armature 37 drops and cuts off the supply of energy to the heating coils 40, thereby insuring that they will not become unduly heated or burn out.

Even if the temperature falls to a proper value after thermostat 44 has broken the circuit at armature 37, the circuit will not be re-established at armature 37 until the button 27 has been manually manipulated to restore the conducting arm 1 to its cooperative connection with contact 6, so that if the circuit breaker is open due to a defect, it would not, of itself, again close the circuit so that current may be supplied to the heating coils.

Applicant's arrangement of heating and controlling circuits is simple, easy to maintain, and susceptible of use by one not highly skilled, furthermore, is particularly safe in that the controlling and governing devices are simple and rugged and once automatically operated must be returned to normal condition by a manual operation.

Although I have particularly described one particular physical embodiment of my invention and explained the principle and operation thereof, nevertheless, I desire to have it understood that the form selected is merely illustrative but does not exhaust the possible physical embodiments of the idea of means underlying the invention.

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

In an electromagnetic circuit controller, in combination: a magnetic core; an energizing coil surrounding said core; a coil housing formed of magnetic material around said coil and magnetically attached to said core at one end and terminating adjacent the other end of said core; an armature oscillatably attached at one end to said housing; a latch rod adapted and positioned to be moved longitudinally by said armature whereby when said armature is attracted to said pole the latch rod will be moved longitudinally; a latch pivotally mounted and lying within the path of said latch rod whereby when the latch rod is moved longitudinally in one direction the latch is tripped; a biased pivoted lever cooperating with said latch and latched in position thereby against its bias whereby when the latch is tripped the lever tends to assume its biased position; a limiting shoulder on said latch for cooperating with said lever to prevent it from moving unduly in response to its bias; a conducting contact; a conducting arm attached to said lever and positioned when the lever is in latched position to cooperate with said contact to form part of a circuit; means to prevent undue movement of the latch; and means for manually returning the lever to latching position.

ROBERT J. PARSONS.