

C. A. SHALER.
ELECTRICAL HEATING UNIT.
APPLICATION FILED FEB. 28, 1910.

1,044,269.

Patented Nov. 12, 1912.

Fig. 1.

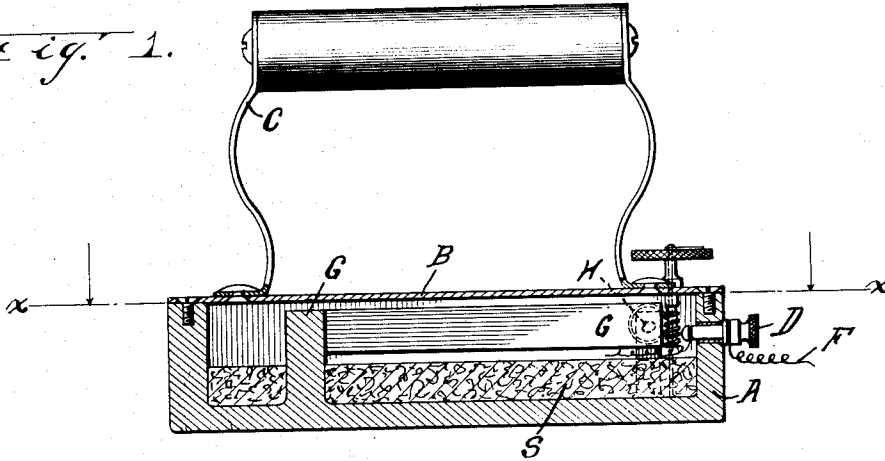


Fig. 2.

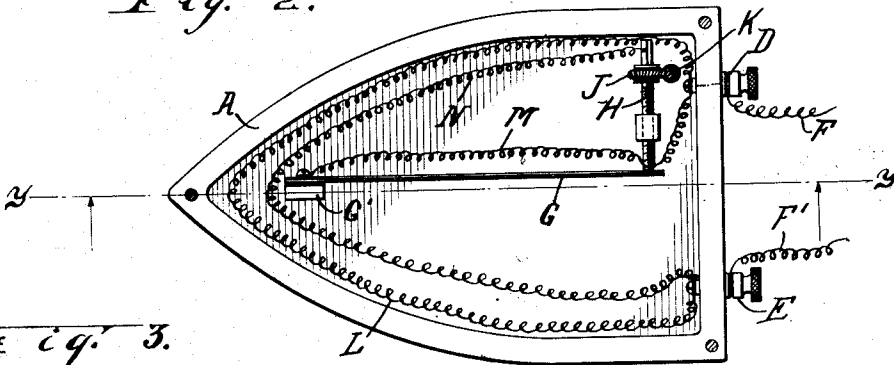


Fig. 3.

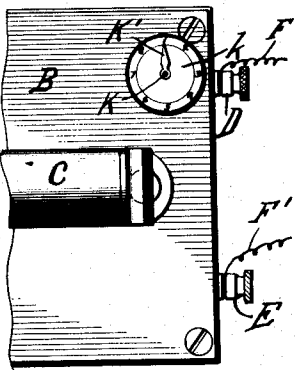
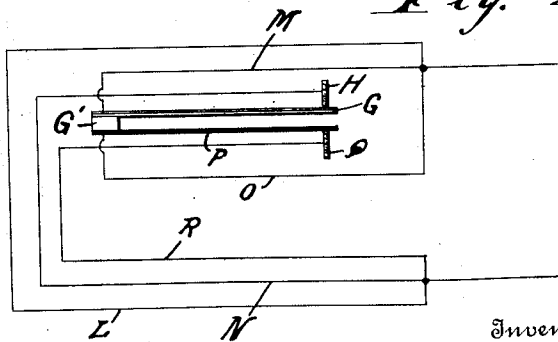


Fig. 4.



Witnesses.

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CLARENCE A. SHALER, OF WAUPUN, WISCONSIN.

ELECTRICAL HEATING UNIT.

1,044,269.

Specification of Letters Patent.

Patented Nov. 12, 1912.

Application filed February 28, 1910. Serial No. 546,484.

To all whom it may concern:

Be it known that I, CLARENCE A. SHALER, a citizen of the United States, residing at Waupun, county of Fond du Lac, and State of Wisconsin, have invented new and useful Improvements in Electrical Heating Units, of which the following is a specification.

My invention relates to improvements in electrical heating units.

In a former Patent Number 955479, dated April 19th, 1910, for improvements in vulcanizers, I have shown and described means whereby heating coils arranged in series, may be employed to supply heat to the vulcanizing surfaces and the heat controlled by a thermostatic switch, which operates, without breaking the circuit, to either direct the current through an entire coil or set of coils in series, or through only a portion thereof in accordance with the heat requirements.

The invention herein described, however, relates to the provision of a heating unit adapted for wide application in a great variety of devices and utensils, such as compartment heaters, sad irons, etc., this invention being in part shown and described, but not claimed in said other application.

The object of this invention is to provide an electrical heating unit, in which the flow of current will be continuous but automatically varied in volume or potential, step by step, each variation being too slight to cause destructive arcing, and wide or rapid temperature changes.

In the following description, reference is had to the accompanying drawings, in which—

Figure 1 is a vertical sectional view of a sad iron embodying my invention. Fig. 2 is a plan view of the same with the cap and handle removed, the electrical coils being illustrated diagrammatically. Fig. 3 is a plan view of the rear portion of the sad iron with the cap in place, showing means for regulating the operation of the thermostat. Fig. 4 is a diagrammatic view, illustrating a modified arrangement of the coils, in which a plurality of thermostats are employed.

Like parts are identified by the same reference characters throughout the several views.

The body A of the sad iron, together with the cap B and handle C may be of any ordinary construction, adapted for electrical heating. The body is provided with binding

posts D and E, to which the main conducting wires F and F' are connected. Within the body, a thermostatic bar G is mounted upon an insulated support G' in a position to contact with a screw H. The contact screw H is preferably provided with a worm wheel J, which is actuated from the outer surface of the sad iron cap by means of a vertically disposed worm shaft K extending through the cap and provided with a pointer K', (see Fig. 3), which is adapted to swing over the surface of a dial L. The worm wheel J may be insulated from the contact screw H.

A primary heating coil L extends from the inner end of the binding post D throughout the body of the sad iron, preferably in such a manner as to substantially reach all portions thereof, the other end of this coil being connected to the binding post E, whereby a complete circuit is established through the coil L independently of the thermostat. A conducting wire M extends from the inner end of the binding post D to the thermostatic bar G, to which it is secured, preferably at the point of connection between said bar and its support G'. This wire M may either consist in a coil or in a straight length of conducting wire. Another coil N extends from the contact screw H throughout the body of the sad iron and is connected with the inner end of the binding post E. A secondary circuit will thus be established from the binding post D through the coil or conducting wire M, the thermostatic bar G, screw H and coil N. The thermostatic bar G is so arranged that as the heat increases beyond the desired limit, the bar G will swing away from the screw H, thus breaking the circuit through the coil N, while leaving it established continuously in the coil L. By this means, arcing will be prevented, since the variation in the current will be comparatively slight, the heat of the sad iron being principally supplied by the coil L, the auxiliary coil N being merely used as a heat regulating coil of sufficient capacity to carry the heat of the sad iron up to the desired limit under the varying conditions to which such devices are subjected. For example, the primary coil may have sufficient capacity to heat the sad iron to the desired degree of temperature, when such sad iron is not in use, while the auxiliary coil N may have sufficient addi-

tional heating capacity to meet the requirements of use under circumstances of greatest heat radiation. In such case, when the device is not in use, the thermostatic bar G will occupy the circuit breaking position so long as the primary circuit remains closed, and the heat of the sad iron will thus be maintained at the required temperature. As soon as the iron is put into use, its movement over the surface of the goods to be ironed, causes an increase of heat radiation and the bar G will then close the circuit through the screw H and by making and breaking the circuit repeatedly, will maintain a substantially even temperature under the varying conditions of use.

Referring to Fig. 4, it will be observed that in addition to the primary circuit L and secondary circuit N controlled by the thermostatic bar G and contact screw H, I have provided a third circuit which I have termed the supplemental circuit. This circuit is established through a conducting wire or coil O, thermostatic bar P, contact screw Q, and heating coil R, this circuit being also in parallel with the primary circuit through the coil L. The thermostatic bar P may be conveniently secured to the opposite side of the support G' from that occupied by the bar G. The thermostatic bar P is characteristically different in its operation from the thermostatic bar G, this difference being secured either by using different materials or by using strips of different thickness from those composing the bar G, or by adjusting the contact screw Q into a different relation to the bar P from that of the screw H to the bar G, whereby one of the thermostatic bars will have a greater distance to travel in order to effect the contact than the other. In either case, there will be a difference in operation to the extent that different degrees of heat will be required to make and break the circuits through the auxiliary and supplemental coils respectively. For example, the adjustment may be such that at a temperature of 310° F. both of the thermostatic bars G and P will have moved away from their respective contact screws, the primary circuit remaining closed. When the temperature has dropped to 305° F., the thermostatic bar P may be adapted to close the circuit through the supplemental coil R. In case the temperature continues to drop until it approximates 300° F., the thermostatic bar G may be adapted to then close the circuit through the auxiliary coil N, whereupon the heating capacity of the three coils should be such as to cause an increase of heat under any conditions, the bar G being first to move away from the contact screw H under the influence of the additional heat. If the heat then continues to rise, it will probably be due to a change in conditions involving less

rapid radiation and these conditions will be met by the action of the thermostatic bar P in separating from the contact screw Q. It will of course be understood that the contact screws H and Q in Fig. 4 may be adjusted in the manner shown and described with reference to the contact screw H in Fig. 2, so that in case there should be a radical change in the conditions of use, the set screws may be varied by an adjustment of the pointers K' to meet the new conditions. In any event, however, the adjustment of the set screws should be such that the variations in the total current carried by the several coils (due to the action of any given thermostat), will be comparatively slight and the action of the different thermostats will take place at different periods. Any desired number of thermostatically controlled coils may be employed and the current supply and heat increased or diminished, step by step, in proportion to the requirements and with such slight variations for each step, that arcing will not only be prevented, but the increase or decrease in heat will be rendered so gradual that a substantially constant temperature may be maintained at the surface of the iron.

It will be understood that the several coils may be embedded in a heat distributing material composed of a body S of asbestos fiber and cement, or any other suitable substance. A body of asbestos fiber and cement has been found to be well adapted for this purpose, since it possesses sufficient resistance to the radiation of heat to secure thorough distribution.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A heating unit consisting in the combination with feeding conductors, of a set of heating coils embedded in common in a body of heat distributing material, with each coil extending substantially into heating relation to all portions of said body, one of said coils being in permanently closed circuit with the feeding conductors, and the other of said coils having a thermostatic switch directly exposed to the heat of said body and arranged to close and open a circuit with the feeding conductors, said coils being arranged in parallel.

2. A heating unit, consisting in the combination of a set of heating coils, a set of feeding conductors, a thermostatic switch controlling the flow of current from the feeding conductors through one of the coils, and a thermostatic switch controlling the flow of current through another of said coils and operating at a different temperature from that required to operate the first mentioned switch.

3. A heating unit, consisting in the combination of a set of heating coils, a set of

feeding conductors, a thermostatic switch
controlling the flow of current from the
feeding conductors through one of the coils,
and a thermostatic switch controlling the
5 flow of current through another of said
coils and operating at a different tempera-
ture from that required to operate the first
mentioned switch, and another heating coil

arranged in continuous circuit with said
feeding conductors.

In testimony whereof I affix my signature 10
in the presence of two witnesses.

CLARENCE A. SHALER.

Witnesses:

ALVIN J. BRONSON,
LOUIS SCHULTZ.