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F. KUHN ET AL
ELECTRICALLY HEATED LAUNDRY IRON

2,233,615

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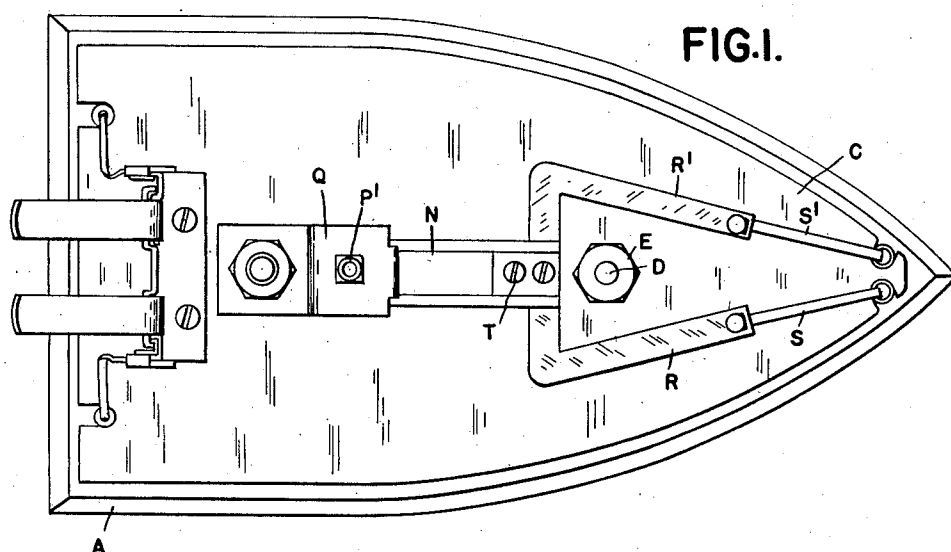


FIG. 1.

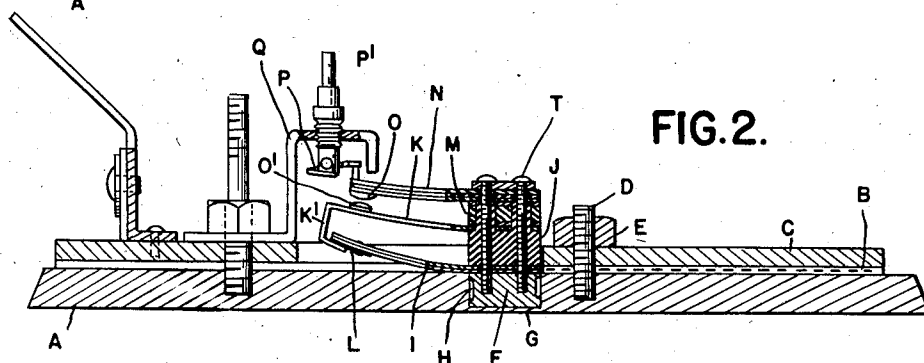


FIG. 2.

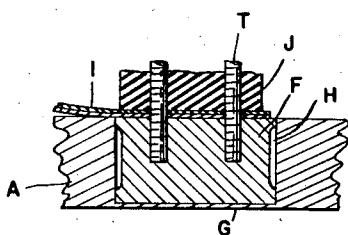


FIG. 3.

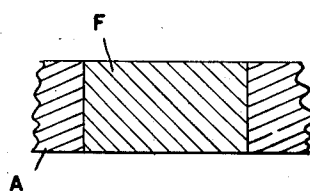


FIG. 4.

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ELECTRICALLY HEATED LAUNDRY IRON

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7 Claims. (Cl. 219—25)

The invention relates to electrically heated laundry irons of that type in which the heat generation is thermostatically controlled and is responsive to the temperature of the working surface. It is usual in the construction of laundry irons to provide a base of substantial thickness so as to have the requisite weight and rigidity. The heating unit is applied to the upper surface of this base which requires the transmission of heat by conduction through the entire thickness to the bottom or working surface. Thus, when the iron is in use there will be a temperature difference between the upper and lower surface of the base, which is determined by its thickness, the rate of heat absorption in the work and also the thermal conductivity of the material from which it is formed. It is desirable to have the thermostat responsive as nearly as possible to the temperature of the working surface and with certain constructions heretofore devised, as for instance in our former Patent No. 2,070,604 of February 16, 1937, the base is recessed for the reception of the thermostat leaving a relatively thin section between this recess and the working surface. It is not, however, practical to make this section very thin without objectionable loss in rigidity. Consequently, there is still a lag in the transmission of heat through this section, causing a corresponding lag in the response of the thermostat to changing demands in the work. It is the primary object of the instant invention to diminish this lag and to obtain a thermostatic control which more nearly instantaneously responds to changing demands of the work. It is a further object to maintain the rigidity of all portions of the base and still further to obtain various other advantages, as hereinafter set forth. With these objects in view the invention consists in the construction as hereinafter set forth.

In the drawing:

Figure 1 is a plan view of a laundry iron to which our improvements are applied;

Figure 2 is a vertical central longitudinal section therethrough;

Figure 3 is an enlarged section similar to a portion of Figure 2;

Figure 4 is a similar view of a slightly modified construction.

The base A of the iron is preferably formed of steel which has a somewhat higher thermal conductivity than cast iron sometimes used for such construction. B is the electrical heating unit contacting with the upper surface of the base A, C is a clamping plate, D are screw

threaded studs projecting upward from the base and passing through registering apertures in the unit and clamping plate, and E are nuts for engaging said studs and clamping the plate C and unit B to the base.

The thermostatic control for the unit is located above the base A, preferably centrally thereof and in a cut away area of the unit B and clamping plate C. However, instead of being responsive to the temperature of the upper surface of this base, we have provided means for obtaining a response to temperature changes in the working surface. This means comprises a rigid portion of the base extending from its upper surface to near the working surface thereof and which is formed of a material having a much higher coefficient of thermal conductivity than the steel or other material from which the remainder of the base is formed. As illustrated, this element consists of a plug F filling a recess in the base which extends from the upper surface either completely through the base, as shown in Figure 4, or to within a very short distance above the working surface, such for instance as .040 of an inch, as shown in Figure 3. The material selected for this plug may be any metal of high thermal conductivity, but preferably copper, which is nearly as high in conductivity as silver, and is much less expensive. As illustrated in Figure 3, the lower surface of the copper plug is in direct contact with the upper surface of the thin disk G forming an integral part of the base A. It thus forms a reinforcement for this disk which maintains the same as rigid as the other portions of the base. If desired, thermal insulation may be interposed between the side walls of the plug and the adjacent sides of the recess, as for instance by forming a thin air space H. This will confine the flow of heat through the plug to substantially a vertical direction. The thermostatic switch may be of any suitable construction, but as specifically illustrated it includes a bimetallic bar I having one end portion clamped to the upper surface of the plug F and another portion projecting laterally therefrom and inclining slightly upward over the base A. Above the bar I is an insulator block J formed of suitable material, such as lava. On this block is supported a resilient arm K having at its free end a downwardly extending and return-bent portion K' for hooking beneath the free end of the thermostatic bar I with an insulation L therebetween. Above the arm K is an insulator block M on which is supported a resilient arm N having at its outer end a contact O for engaging a cooperating con-

tact O' on the arm K. The arm N is adjusted to different positions by a cam P which is secured to a rotary vertically extending shaft P' journaled in a bracket arm Q clamped to the base. Conductor members R and R' are respectively connected with the arms K and N and extend therefrom to the terminals S and S' of sections of the electrical heating unit. All of the members N, K, R, R', M and J are clamped together by screws T which extend vertically therethrough and into the plug F.

With the construction as above described in operation, the thin disk G which comes in direct contact with the work, such for instance as a damp garment, will take the temperature thereof, while the plug F forms a medium for the rapid transmission of heat between this disk G and the thermostatic bar I. Thus, if there is a drop in temperature in the surface of the work heat will rapidly flow from the bar I through the plug F and disk G. On the other hand, if the temperature of the work is higher than desired, it will flow in the opposite direction through the disk G, plug F and into the thermostatic bar I. The bar I is preferably so arranged that an increase in temperature therein will cause a deflection in a downward direction which movement is transmitted through the hook portion K' to the bar K withdrawing the contact O' from the contact O and breaking the circuit of the electrical heating resistor. When the temperature in the bar I drops a deflection in an upward direction results, which by releasing the hook K' will permit the contacts O' and O to reengage each other. The temperature at which the circuit is broken may be adjusted by rotation of the shaft P' and cam P, causing a corresponding movement of the arm N in either an upward or a downward direction.

What we claim as our invention is:

1. In an electrically heated instrument, a metallic base and heat distributing member of substantial thickness provided with a bottom surface for contacting with the work having a portion of its cross section of higher thermal conductivity than the remaining portion thereof, an electrical heating unit in contact with the upper surface of the latter portion for supplying heat therethrough to said work contacting surface, and a thermostatic control for said unit in thermally conductive relation to said portion of higher thermal conductivity and responsive therethrough to the temperature of the work.

2. In an electrically heated laundry iron, a metallic base and heat distributing member of substantial thickness, provided with a bottom surface for contacting with the work, a plug extending through said base into a proximity to said work contacting surface and formed of a material having a higher coefficient of thermal conductivity, an electrical heating unit in contact with a portion of the upper surface of said base for supplying heat therethrough to said work contacting surface, and a thermostatic control for said unit in thermally conductive relation to the

upper surface of said plug and responsive therethrough to the temperature of the work.

3. In an electrically heated laundry iron, a base of substantial thickness having a recess in the central portion thereof extending into proximity to the lower surface of said base leaving only a thin disk forming the bottom of said recess, a plug formed of a material having a higher coefficient of thermal conductivity filling said recess and contacting with the disk bottom thereof, an electrical heating unit contacting with a portion of the upper surface of said base, and a thermostatic control for said unit in thermally conductive relation to the upper surface of said plug.

4. An electrically heated laundry iron comprising a metallic base and heat distributing member of substantial thickness provided with a bottom surface for contacting with the work having a centrally located aperture extending there-through, a plug formed of material having a higher coefficient of thermal conductivity filling said aperture with its lower surface flush with the lower surface of said base, an electrical heating unit in contact with a portion of the upper surface of said base, for supplying heat therethrough to said work contacting surface and a thermostatic control for said unit in thermally conductive relation to the upper surface of said plug and responsive therethrough to the temperature of the work.

5. An electrically heated laundry iron comprising a metallic base, a member formed of a material having a substantially higher coefficient of thermal conductivity extending through said base into proximity to the working surface thereof, an electrical heating unit adapted to heat the upper surface of said base, and a thermostatic control for said unit in thermally conductive relation to said member.

6. An electrically heated laundry iron comprising a base of substantial thickness having a recess therein, a plug formed of a material having a higher coefficient of thermal conductivity inserted in said recess and having its lower end extending into proximity to the lower working surface of said base, means for partially insulating said plug from the side walls of said recess, an electrical heating unit adapted to heat the upper surface of said base, and a thermostatic control for said unit in thermally conductive relation to said member.

7. An electrically heated laundry iron comprising a base of substantial thickness formed of a ferrous metal and having a recess therein, a plug formed of a material having a coefficient of thermal conductivity on the order of that of copper, said plug being inserted in said recess and extending into proximity to the lower working surface of said base, an electrical heating unit adapted to heat the upper surface of said base, and a thermostatic control for said unit in thermally conductive relation to said member.

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