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C. L. JOHNSTON ET AL

SAFETY DEVICE AND SWITCH

Filed March 6, 1922

Fig. 1.

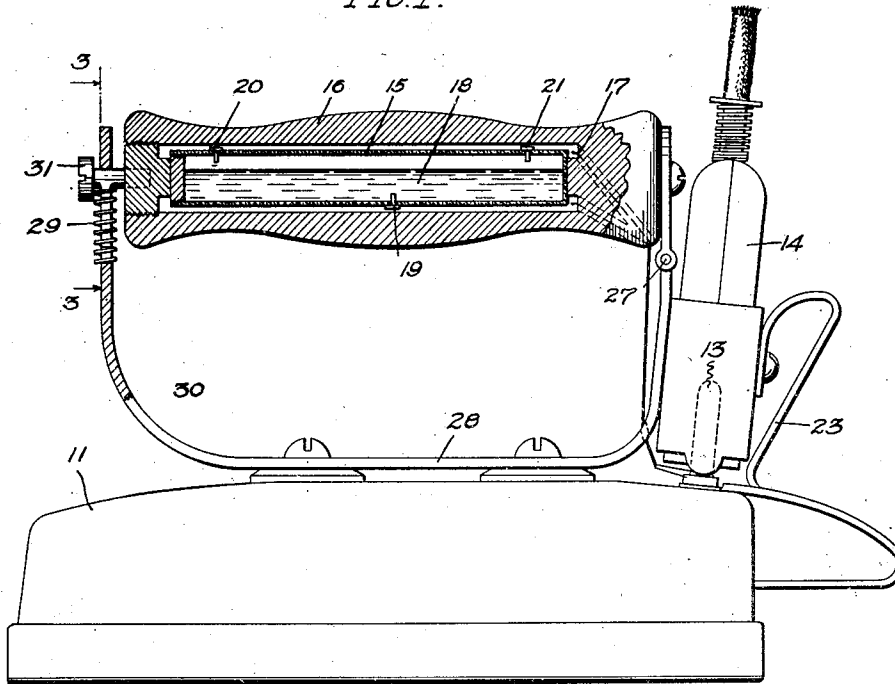
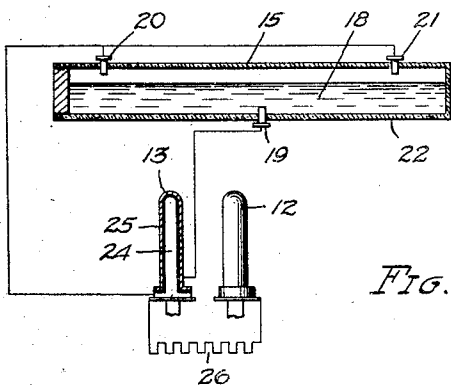


Fig. 2.

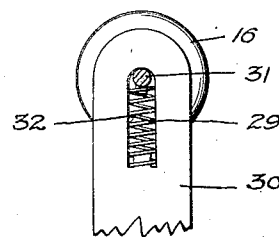


Fig. 3.

WITNESS:
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UNITED STATES PATENT OFFICE.

CLARENCE L. JOHNSTON, OF OAKLAND, AND CARL M. F. FRIDEN, OF PIEDMONT,
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SAFETY DEVICE AND SWITCH.

Application filed March 3, 1922. Serial No. 541,597.

To all whom it may concern:

Be it known that we, CLARENCE L. JOHNSTON, a citizen of the United States, and a resident of the city of Oakland, in the county of Alameda and State of California, and CARL M. F. FRIDEN, a subject of Sweden and a resident of Piedmont, in the county of Alameda and State of California, have invented a new and useful Safety Device and Switch, of which the following is a specification.

Our invention relates to a system for use in the operation of an electric household device, such as a flatiron. It is well known that many destructive fires result from inadvertently allowing the electric current to flow through the heating elements of flatirons while they are not in use. This inadvertence is quite likely to occur with an ordinary electric flatiron, since very often the person who is ironing may go to another part of the house intending to return to the iron in a short time; however, circumstances are apt to arise that require a considerably longer absence than anticipated. Other occurrences such as sheer forgetfulness, may also result in leaving the current on with the attendant danger of producing a temperature at or near the flatiron sufficiently high to ignite paper or fabric. It is one of the objects of our invention to prevent such occurrences, and to insure the stoppage of the current flow unless the household device is actually in use.

Another object of our invention is to provide a switch which is operated to connect a flatiron to the source of supply by the movement of the iron over the work, and to disconnect the flatiron when it is stationary in a horizontal position.

Another object of the invention is to provide a switch which operates to close the circuit through the heating element when the flatiron is stood up on end.

Another object of our invention is to provide a flatiron the connections for which may be completed, while it is in position for operation, by depressing the handle toward the work.

The invention possesses other advantageous features, some of which, with the foregoing, will be set forth at length in the following description where we shall outline in full one form of the invention which we have selected for illustration in the drawings accompanying and forming part of the present

specification. In the drawings, we have shown one embodiment of our invention, but it is to be understood that we do not limit ourselves to this form, since the invention as set forth in the claims may be embodied in other forms as well.

Referring to the drawings:

Figure 1 is a view showing our invention applied to an electric flatiron;

Fig. 2 is a wiring diagram showing how the safety switch may be connected with the household device; and

Fig. 3 is a detail of the flatiron handle connection, taken from line 3—3 of Fig. 1.

In the present instance our invention is shown as applied to an electric flatiron 11, adapted to be connected to a source of electrical energy by means of a pair of projecting contact posts 12 and 13. These posts are arranged to cooperate with the connection plug 14 in the ordinary manner. This plug 14 forms a part of a flexible lead of the usual construction.

An automatic switch 15 is made a part of the iron 11. This switch is for convenience carried by the handle 16 which has a longitudinal aperture 17 for accommodating this switch. This switch may be so constructed that it completes the connection for the flatiron when the flatiron is in a horizontal position only in response to the normal reciprocation of the iron, as in the course of ironing. If the iron is stationary and in the horizontal position the connection cannot be maintained. This effect is produced by using a conducting liquid, such as mercury, indicated at 18 for completing the electric circuit between the contact piece 19 and either of the other contact pieces 20 and 21. The contact piece 19 is continually immersed in the mercury 18, and as the iron is reciprocated longitudinally, the mercury splashes around the pieces 20 and 21 alternately, whereby they are placed in electrical connection with the piece 19. This automatic switch is arranged to control the connections of the iron 11. It has been found by experience that the ordinary operation of the iron sets up wave motion in the mercury which is sufficient to maintain the contacts closed enough to keep the iron properly heated. The mercury 18 is contained in a closed tube 22 of insulating material, through which the contacts 19, 20 and 21 project, so that proper external connections may be made. The tube

22 is preferably exhausted of air, so that injurious arcing between contacts may be avoided. For this purpose also, it is preferable to operate the iron on alternating current.

The tube 22 is arranged so that its axis is parallel with that of the iron, so that the mercury 18 splashes against the ends of the tube as it is reciprocated. Also, when the iron is stood on end on the support 23, there is sufficient mercury within the tube to provide electrical connection between contacts 19 and 21. The connections for the iron are in this position continuously maintained; and this arrangement is useful for initially heating the iron before ironing is commenced. There is no danger, in this position of the iron, of the production of a dangerous temperature, because the bottom surface of the iron is exposed and radiates a good deal of heat. The level of the mercury is low enough, however, to clear the bottom of the contact posts 20 and 21 when the iron is stationary and horizontal.

The wiring diagram of Fig. 2 shows how the automatic switch is connected. In order that irons already in use or on the market may be readily equipped with the automatic switch, it is desirable to provide external connections for the switch. In the present instance this is taken care of by substituting a post 13 of special construction for that ordinarily used. This post is made up of two separate conducting parts, an internal plug-like member 24, and an external tube-like member 25. These two parts are insulated from each other by mica or other good insulation material. The part 24 is connected to the heating element 26, while the other part 25 is connected to one terminal of the switch. The other terminal of the switch is connected to the part 24 as indicated. In this way when the plug 14 is in place, the switch 15 is in series relation with the heating elements 26. Both contact pieces 20 and 21 are connected together to form one of the terminals of switch 15, since, as stated hereinbefore, these contact pieces are in use alternately as the iron is reciprocated. An ordinary contact post may be used from which the contact post 13 is to be made. Ordinarily, standard irons are utilized, and one of its contact posts modified in accordance with this arrangement. It is thus rendered unnecessary to alter any of the internal connections of the flatiron.

The location of the automatic switch 15 within the handle 16 permits the use of the handle itself for operating the switch. For this purpose the handle 16 may be pivotally supported at 27 on the handle supporting frame 28. By pressing the handle downward, the tube 22 is tilted sufficiently to connect contact pieces 19 and 20 continuously. In order to keep the handle in its

horizontal position while no pressure is exerted upon it, a spring 29 is located in the arm 30 of frame 28, exerting a pressure against the shank of a screw 31 fixed to the handle 16. This shank plays within a slot 32 located in the arm 30, as most clearly shown in Fig. 3. The spring 29 is made strong enough so that only upon a substantial pressure on handle 16 is the tube 22 tilted sufficiently to provide a closed circuit. The control of the circuit is thus accomplished either by the pressure of the hand grasping the iron, or by the movement of the iron itself. It is of course to be understood that the iron and the switch may be arranged to be operated only by one of the two modes of operation, and not by both. For many purposes it may be better to leave the control of the switch solely to the reciprocation of the iron. Under such circumstances the handle 16 is non-pivotally attached to the frame 28.

It is evident that our invention may be applied to other electrically operated devices, such as corn poppers, where it becomes unnecessary or dangerous to maintain the connection if the device remains stationary.

We claim:

1. In combination, an electrically heated device, and a switch operative by the operative movement of the device to close the circuit for the device.

2. In combination, an electric flatiron, means for connecting the flatiron to a source of electrical energy, and a switch responsive to the operative movement of the flatiron whereby it acts to disconnect the flatiron when it is in operative position but stationary.

3. In combination, an electric flatiron, contacts controlling the flatiron circuit, and a liquid conductor responsive to the operative movement of the flatiron for connecting the contacts of the flatiron.

4. In combination, an electric flatiron, a hollow tube arranged to be movable with the flatiron, contacts projecting within the tube, and a liquid conductor in the tube, arranged to complete the connections for the flatiron through the contacts upon operative movement of the flatiron.

5. In combination, an electrically heated flatiron and a switch arranged to automatically open the electric circuit of the iron when the iron is at rest in a horizontal position and to close said circuit by the movement of the flatiron.

6. In combination, an electrically heated flatiron, and a switch arranged to automatically open the electric circuit of the iron when it is brought to rest in the horizontal position and to close the circuit when the iron is stood on end.

7. In combination, an electric flatiron, a hollow tube movable with the flatiron, and

contacts controlling the flatiron circuit projecting into the tube, said tube holding a liquid conductor arranged to splash about the contacts and complete the circuit for the flatiron upon operative movement thereof.

8. In an electric flatiron, a hollow pivotally supported handle, a tube located within the handle and adapted to hold a liquid conductor, and contacts within the tube arranged to control the circuit of the flatiron upon pivotal movement of the handle.

9. In an electric flatiron, a hollow handle, contacts within the handle controlling the circuit of the flatiron, and a liquid conductor within the handle arranged to connect the contacts upon longitudinal movement of the flatiron.

10. In an electric flatiron, a hollow handle and a switch controlling the circuit for the flatiron located within the handle comprising a hollow tube, contacts projecting within the tube, and a liquid conductor within the tube, the arrangement being such that the liquid conductor connects the contacts upon movement of the flatiron in a longitudinal direction.

11. A controlling switch for an electrically operated device having a handle, comprising a pair of contacts, and a fluid conductor for connecting the contacts to complete the electrical circuit for said device

by a wave motion of the fluid conductor upon an operative movement of the device.

12. An electrically heated device, comprising a handle and closed tube carried by the handle, contacts therefor, and a fluid conductor in the tube arranged to complete the electrical circuit to said heated device in response to a wave motion of said fluid caused by the operative movement of the device.

13. In an electrically heated instrument, means for connecting the instrument to a source of electrical supply, and a switch responsive to the operative movement of the device to permit the flow of electrical current to said device.

14. In an electric flatiron, a container movable with the flatiron, a contact at each end of the container and near the top thereof, said contacts being disposed in a line substantially parallel to the main longitudinal axis of the flatiron, another contact between the pair before mentioned and disposed near the bottom of the container, and a liquid conductor in said container arranged to connect either of the pair of contacts with the lower one only upon longitudinal movement of the iron.

In testimony whereof, we have hereunto set our hands.

CLARENCE L. JOHNSTON.
CARL M. F. FRIDEN.