March 7, 1944. F. E. FINLAYSON 2,343,654

SAFETY SWITCHING ARRANGEMENT FOR ELECTRICALLY HEATED APPLIANCES

Filed Dec. 16, 1941 2 Sheets-Sheet 1

Fig. 1.

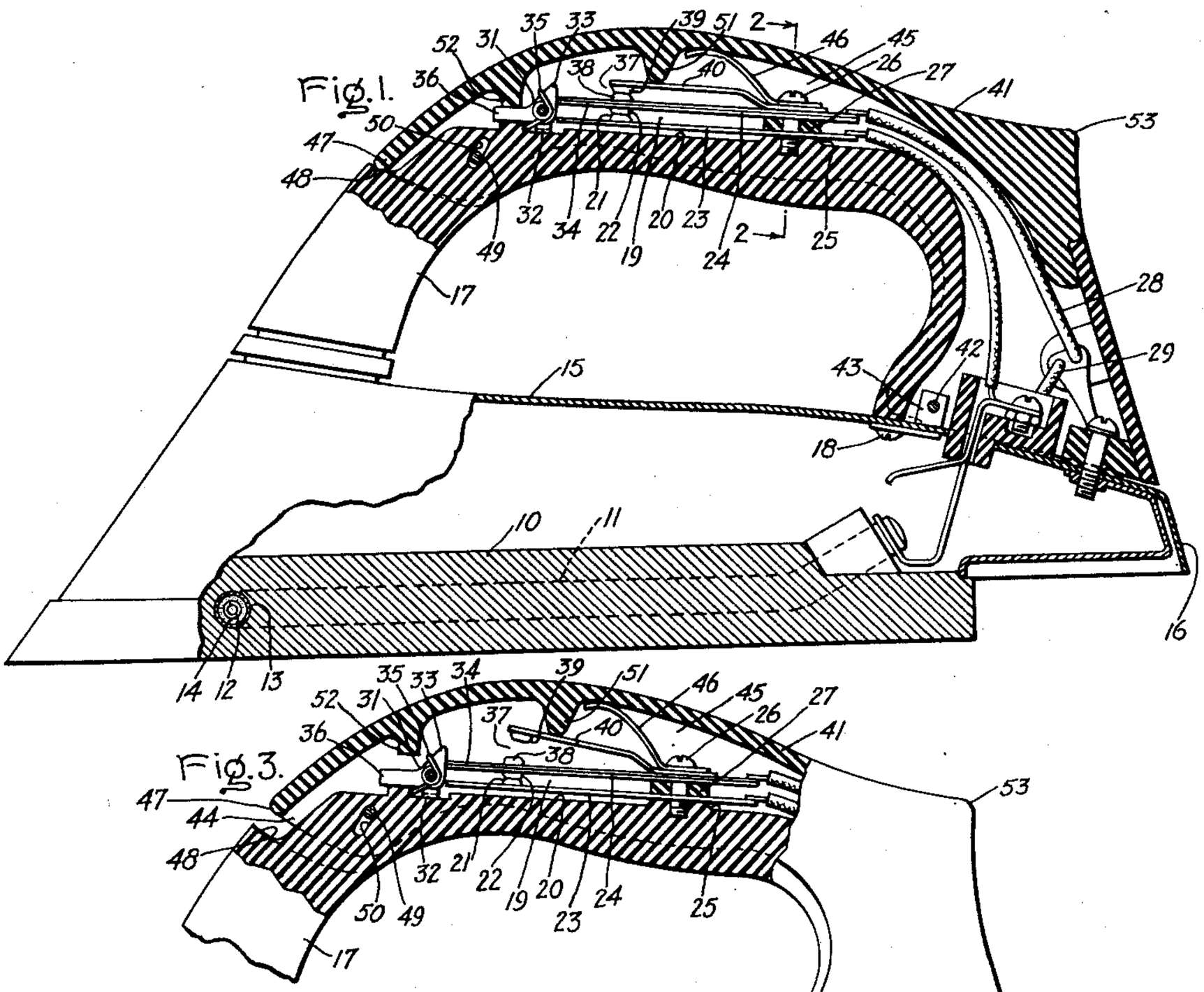


Fig. 3.

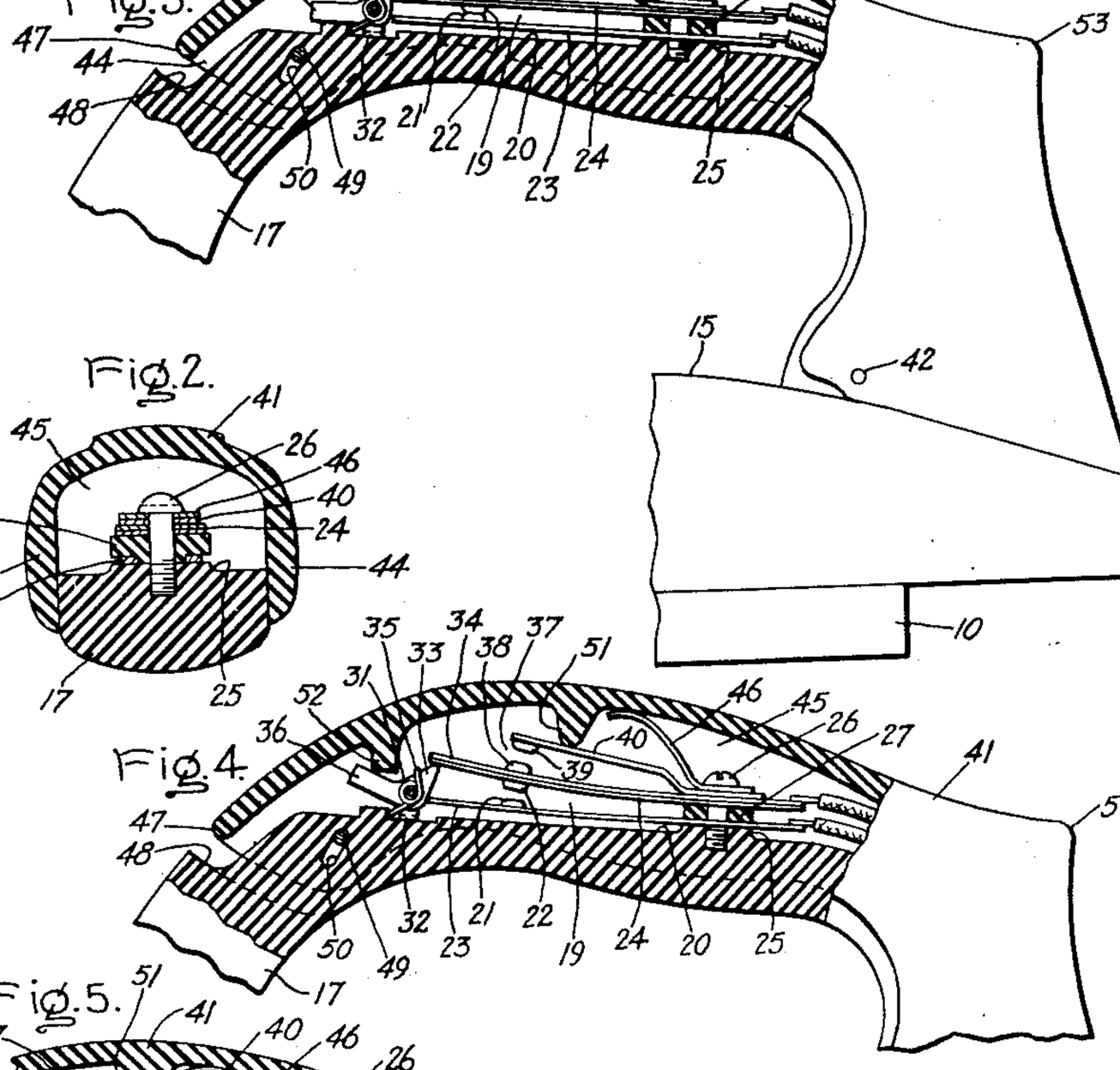
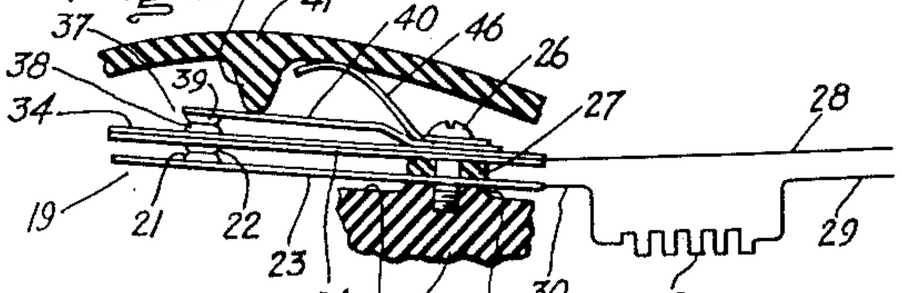


Fig. 2.

Fig. 4.

Fig. 5.



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SAFETY SWITCHING ARRANGEMENT FOR ELECTRICALLY HEATED APPLIANCES

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Fig. 6.

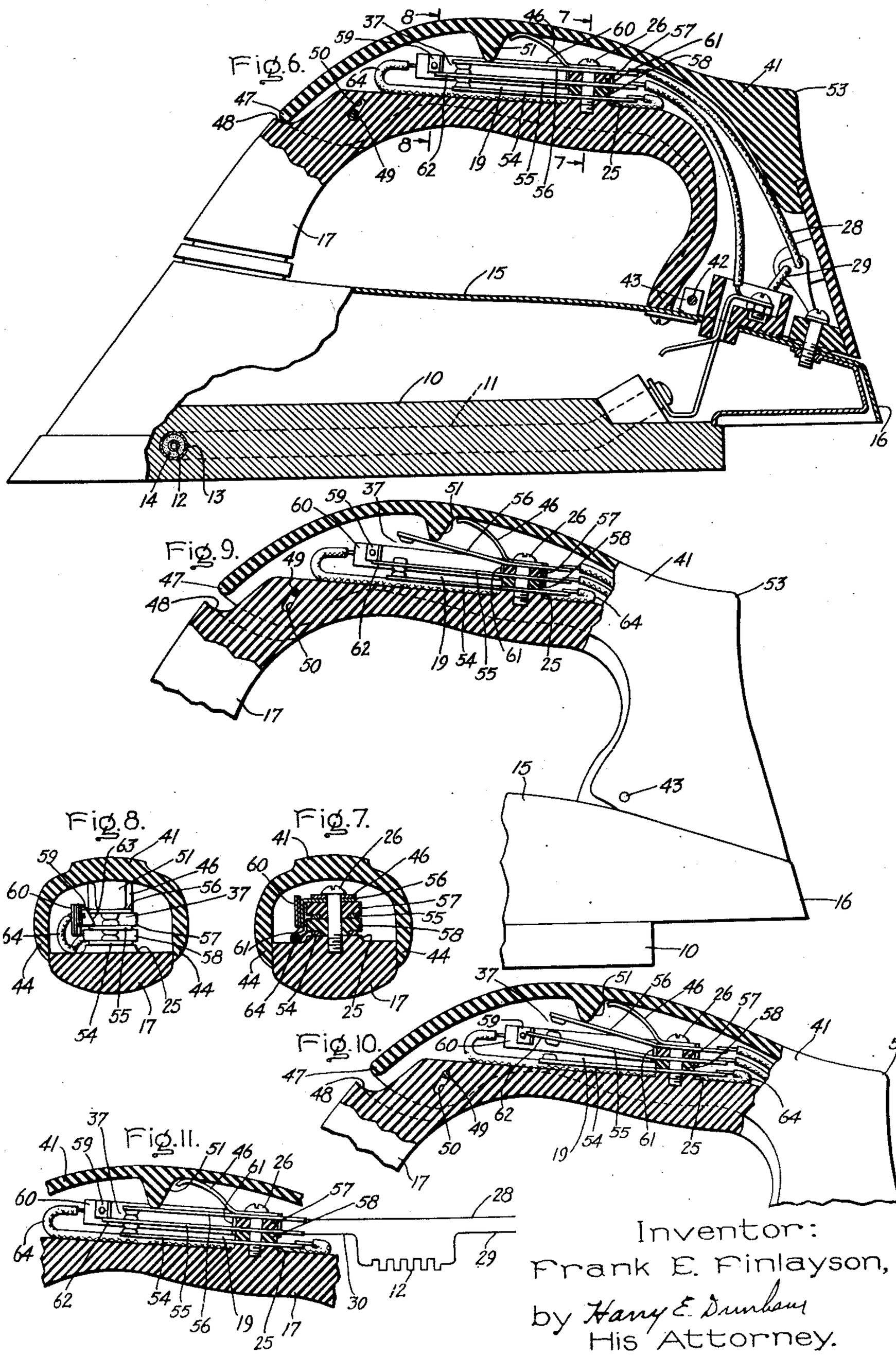

Fig. 9.

Fig. 8.

Fig. 7.

Fig. 10.

Fig. 11.

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UNITED STATES PATENT OFFICE

2,343,654

SAFETY SWITCHING ARRANGEMENT FOR ELECTRICALLY HEATED APPLIANCES

Frank E. Finlayson, Ontario, Calif., assignor to General Electric Company, a corporation of New York

Application December 16, 1941, Serial No. 423,170

3 Claims. (Cl. 219—25)

My invention relates to electrically heated devices and more particularly to portable electrically heated appliances such as flatirons and has for its general object the provision of a new and improved safety switching arrangement for automatically disconnecting such devices from the power supply in case the operator neglects to do so.

In the use of electrically heated appliances, such as electric flatirons, damage resulting from fire or scorching may occur if the iron is left unattended in the horizontal or ironing position while connected to the power supply. In order to preclude the possibility of such damage it is not uncommon to provide an automatic switching arrangement in connection with the handle of the iron whereby the heating circuit is closed when the handle is grasped and automatically opens when it is released. While such arrangements are effective to prevent damage referred to above they have certain operating disadvantages. For example, during an ironing operation, an operator frequently lays the iron aside temporarily while arranging the articles to be ironed. As a result the handle is grasped and the safety switch operated at frequent intervals and a resultant sparking in the contacts causes undesirable and annoying radio interference. Furthermore, in such arrangements, since the safety switch shuts off the heating current each time the iron is temporarily laid aside, the iron has a tendency to cool down to a point where the ironing operation may be rendered unsatisfactory. Also, frequent operation of the safety switch causes the contacts to deteriorate rapidly because of sparking.

The difficulties referred to above may be overcome by the provision of means for delaying the opening of the safety switch after the handle of the flatiorn is released by the operator so that the safety switch is opened only if the operator leaves the iron unattended for a period exceeding that of the setting of the time delay means. This arrangement prevents too frequent operation of the safety switch and the resulting difficulties arising from contact wear and radio interference.

In my copending application Serial No. 404,451, filed July 29, 1941, which is assigned to the same assignee as the present invention, I have disclosed and claimed an arrangement operating in conjunction with the main control thermostat of an electrically heated device, such as a flatiron, for providing the desired time delay in the opening movement of the handle-operated safety switch. While this arrangement operates in a satisfactory manner it is limited in its application to flatirons and other control devices utilizing main heat-control thermostats.

It is an object of my invention to provide a new and improved control system for an electrically heated appliance.

Another object of my invention is to provide an improved delayed action safety switch for a portable electrically heated appliance which will operate to disconnect the heating element of the appliance from the power supply a predetermined time after the operator releases the operating handle.

Another object of my invention is to provide an improved delayed action safety switch for an electric flatiron which is simple in construction, dependable in operation, and inexpensive to manufacture.

A still further object of my invention is to provide an improved delayed action safety switching system for an electric flatiron which does not depend for its operation upon the main heat control theremostat of the iron.

Further objects and advantages of my invention will become apparent as the following description proceeds and the features of novelty which characterize my invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

Briefly, according to the illustrated embodiment of my invention, a safety switch is connected in series circuit relation with the heating element of an electric flatiron and means are provided for automatically opening the switch when the operator releases the handle of the iron. In order to provide time delay in the operation of a safety switch, a switch of the thermally actuated type is used, electric heating means being provided for causing actuation of the switch. In the illustrated arrangement the safety switch is actuated by means of a bimetallic strip which is also connected in series circuit relation with the heating element of the iron. The bimetallic strip has a high electrical resistance so that the electric heating means and the thermally responsive actuating means are combined into one element. In order to control the operation of the safety switch I provide means in the form of a handle lever operated control switch arranged to disable the thermostatic switch by shunting the current conducting heat generating portion of the bimetallic strip. Also, I provide means for latching the safety switch in the open circuit position, the latching means and the control switch being controlled jointly by the handle operated lever.

My invention will be better understood by ref-

erence to the following description taken in connection with the accompanying drawings in which Fig. 1 is an elevation view partly in section, of an electric flatiron embodying a delayed action safety switching system constructed in accordance with my invention; Fig. 2 is a cross-sectional view of the handle taken along the line 2—2 of Fig. 1 looking in the direction of the arrows and showing certain details of construction of the safety switch and the control switch therefor; Figs. 3 and 4 are views similar to Fig. 1 except that the safety switch and the control switch are shown in different operative positions; Fig. 5 is a diagrammatic illustration of the circuit connections for the flatiron shown in Fig. 1; Fig. 6 shows a modified arrangement of the safety switch; Fig. 7 is a cross sectional view taken along the line 7—7 of Fig. 6 showing certain details of construction of the modified switching arrangement; Fig. 8 is a cross sectional view taken along the line 8—8 of Fig. 6 showing further details of switch construction; Figs. 9 and 10 are similar to Fig. 6 except that the modified safety switch and the control switch are shown in different operative positions; and Fig. 11 is a diagrammatic view showing the circuit connections for the modified arrangement shown in Fig. 6.

Referring to Figs. 1 to 5 of the drawings I have shown my invention applied in one form to an electrically heated flatiron having a sole plate 10 that is formed of any suitable material such as cast iron or aluminum. Cast within the sole plate 10 is a sheathed heating element 11 preferably of the type described and claimed in the U. S. patent to C. C. Abbott 1,367,341, dated February 1, 1921. As shown, this heating element comprises a helical resistance heating element 12 mounted in a tubular metallic sheath 13 and supported in spaced relation with reference to the sheath by a compacted layer of insulating material 14 which preferably will be powdered magnesium oxide. Heating elements of this type can be easily bent to the desired shape and the heating element is usually formed roughly in the shape of a horseshoe having its terminal at the heel of iron and its apex at the toe of the iron.

The iron is provided with a cover 15 secured to the sole plate 10 by fastening means not shown. The cover 15 has a portion 16 extending rearwardly of the sole plate and forming a heel stand for supporting the iron in an upstanding position. The iron is also provided with a handle 17 formed of suitable heat insulating material and secured to the upper portion of the cover 15 by suitable fastening screws one of which is shown at 18.

In order to provide means for automatically disconnecting the iron from the power supply when it is left unattended in a horizontal or ironing position, I provide a safety switch indicated generally at 19 which is connected in series circuit relation with the heating element 12 of the iron. The safety switch 19 is a thermally actuated type and is mounted on an upper flattened surface 20 of the handle 17. In this position the switch 19 is spaced from the sole plate 10 at a sufficient distance so that it is substantially unaffected by the heat generated thereby. As shown, the safety switch comprises a stationary contact 21 and a relatively movable cooperating contact 22. The stationary contact 21 is carried on a metallic switch arm 23 while the movable contact 22 is carried by a bimetallic switch arm 24. The switch arms 23 and 24 are mounted upon a projection 25 extending upwardly from the upper surface 20 of the handle 17 by means of a screw 26. The switch arms 23 and 24 are maintained in spaced relation by means of an insulating washer 27 which also electrically insulates the switch arms from each other.

The bimetallic switch arm 24 is arranged with the metal having the higher coefficient of expansion on the lower side so that as the bimetallic switch arm becomes heated the free end carrying the movable contact 22 deflects upwardly and thereby opens the safety switch 19.

Electric power is supplied to the heating element of the iron from a source not shown by means of the supply conductors 28 and 29. As will be seen by reference to Fig. 5 of the drawings the heating element 12 is connected to the power supply through conductors 28 and 29 by a circuit which may be traced as follows: the power supply conductor 28, the bimetallic switch arm 24, the contacts 21 and 22 of the safety switch 19; the switch arm 23; the conductor 30; the heating element 12; and the power supply conductor 29. Thus, it will be seen that both the safety switch 19 and the bimetallic switch arm 24 are connected in series circuit relation with the energizing circuit of the heating element 12. The dimensions of the bimetallic switch arm 24 lying between the contact 22 and the point of attachment of the power supply conductor 28 are chosen such that this portion of the switch arm has a relatively high electrical resistance. Thus, when the power is applied to the iron, the heating current in traversing the bimetallic switch arm 24 causes it to heat up so that eventually the free end thereof deflects upwardly and opens the contacts of the safety switch 19. The same effect could, of course, be obtained by other electric heating means, such as a heating coil placed in heat exchange relation with the bimetallic switch arm 24 and connected in series circuit relation with the contacts of the safety switch 19. The illustrated arrangement, however, is preferred because of its simplicity and low cost.

For the purpose of releasably latching the safety switch in the open circuit position once it has been opened by the heating action of the bimetallic switch arm 24, I provide a latch member 31 rotatably mounted upon a projection 32 extending upwardly from the flat surface 20 of the handle 17. The latch member is mounted for rotation about an axis extending transversely to the longitudinal axis of the bimetallic switch arm 24 and has a portion 33 which is adapted to frictionally engage the free end 34 of the bimetallic switch arm 24. A coil spring 35 is provided for biasing the latch member 31 for rotation in the clockwise direction, as viewed in Fig. 1 of the drawings. When the bimetallic switch arm 24 becomes stressed sufficiently by heating to overcome the frictional resisting force between the projection 33 and the free end 34 of the switch arm, the switch arm 24 deflects upwardly permitting the latch projection 33 to rotate in a clockwise direction under the force of the biasing spring 35 so that the projection 33 moves underneath the free end 34 of the switch arm and latches it in the open circuit position, as shown in Fig. 4 of the drawings. The latch 31 in rotating also engages the outer end of the switch arm 23 and exerts a downward force thereon separating the contacts 21, 22, the switch arm 23 being stressed so that the free end thereof tends to move upwardly.

For the purpose of rotating the latch member 31 in a counterclockwise direction to release the

latch from the free end of the bimetallic switch arm 24 there is provided a projection 36. The projection 36 is adapted to be actuated by means of a pivotally mounted handle lever as will be more fully described below.

It will be apparent from the foregoing description that when the electric iron is connected to a source of power supply the bimetallic switch arm 24 will become heated sufficiently after a predetermined time delay to deflect upwardly and cause the safety switch 19 to become latched in the open circuit position and thereby disconnect the heating element 12 from the power supply. In order to prevent the opening of the safety switch when the iron is properly attended during normal use I provide manually operated means for disabling the electric heating means which would otherwise cause actuation of the safety switch 19. In the illustrated embodiment of my invention the disabling means comprises a control switch 37 arranged to control a shunt circuit which, when completed, acts to divert heating current around the bimetallic switch arm 24 and thereby preclude any substantial heating action therein.

The control switch comprises a contact 38 carried on the bimetallic switch arm 24 and mounted in back-to-back relation with the contact 22 of the safety switch 19. Cooperating with the contact 38 is a contact 39 carried upon the free end of a short circuiting spring strip 40 the opposite end of which is mounted adjacent the fixed end of the bimetallic switch arm 24 and held in electrical contact therewith by means of the screw 26. When the control switch 37 is closed the spring strip 40 forms a low resistance shunt path which diverts the heating current flowing in the energizing circuit of the iron around the bimetallic switch arm 24 and thereby prevents actuation of the thermally actuated safety switch. The spring arm 40 is stressed so that the control switch 37 is biased to the open circuit position shown in Fig. 3 of the drawings.

For the purpose of automatically controlling the latch member 31 and the control switch 37 to give the desired protective action, I provide a pivotally mounted handle lever 41. The handle lever 41 is pivotally mounted on the cover 15 by means of a pivot pin 42 which extends through the lever and is supported on upstanding lug member 43 secured to the cover by means of the screw 18. As thus shown in Fig. 2 of the drawings, the handle lever 41 has a U-shaped cross section the downwardly extending side walls 44 being arranged to slidably engage the vertical side walls of the handle 17 and form in conjunction with the handle an enclosed space 45 in which the latch 31, safety switch 19 and the control switch 37 are located. The contour of the lever is so shaped relative to the handle 17 that a smooth gripping surface is provided which is adapted to be grasped by the operator during the ironing operation. The handle lever 41 is arranged to be vertically movable between two controlling positions and is biased to the upper controlling position by means of a spring 46 which is stressed so as to exert an upward force on the under side of the handle 41. In the illustrated arrangement, the spring 46 is conveniently mounted on the handle 17 by means of the screw 26 which also holds in proper relative position the shunt spring 40, the bimetallic switch arm 24, and the switch arm 23. The downward movement of the handle is limited by engagement of an end portion 47 with a cut-away portion 48 on the handle 17. To limit the upward movement of the handle, a pin 49 extends through and is mounted in the vertically extending side walls of the handle lever. The pin 49 projects through an elongated slot 50 in the handle 17 and engages the upper edge of the slot to limit the upward movement of the handle lever. The elongated slot 50 permits sufficient travel of the pin 49 to accommodate the downward movement of the handle lever.

The handle lever is provided with a first downwardly extending projection 51 which is arranged to engage the spring strip 40 and effect a closure of the control switch 37 when the handle lever is moved to the lower position. The handle lever is also provided with a second downwardly extending projection 52 which is arranged to engage the projection 36 of the latch member 31 and cause a counterclockwise rotation of the latch and a release of the latch projection 33 from the end portion 34 of the switch arm 24 when the handle is moved to the lower position.

When the iron is supported in the upstanding or non-ironing position on the heel stand 16, there is no danger from fire or scorching and it is desirable to maintain the safety switch 19 in the closed position independently of any action on the part of the operator so that the iron can be left unattended in this position during initial heating and between the ironing periods. To accomplish automatic closure of the control switch 37 so that the thermally actuated safety switch 19 will remain in the closed position when the iron is in the upstanding position, the pivotally mounted handle lever 41 is provided with an abutment 53 which is adapted to engage the supporting surface when the iron is supported in the upstanding position on the heel stand. In this position the abutment 53 is so located relative to the pivot pin 42 that the weight of the iron causes the handle lever to pivot to the lower or closed circuit position for the control switch shown in Fig. 1. Hence the thermally actuated safety switch remains closed when the iron is in the vertical position.

In operation let it be assumed that the iron is connected to a source of supply and that the operator places the iron in an upstanding position on the heel rest 16 so that the handle lever 41 is actuated to the lower position shown in Fig. 1 of the drawings. In this position the control switch 37 is actuated to the closed position by the projection 51 on the handle lever and most of the heating current flowing through the heating element 12 passes through the shunt spring 40 since, as pointed out before, the spring 40 has a low electrical resistance as compared with the bimetallic switch arm 24. Therefore relatively little current flows through the switch arm 24 so that there is little or no heating action therein, and the thermally actuated safety switch 19 remains in the closed position. When the sole plate 10 has reached the desired temperature, the operator grasps the handle 17 and uses the iron in the normal manner. Since the handle of the iron is grasped by the operator while in use the handle lever is maintained in the same lower position as when the iron is supported on the heel stand.

Now if the operator should release the handle of the iron and leave it unattended in the horizontal ironing position where damage would be likely to occur, the handle lever 41 immediately moves upwardly to the position shown in Fig. 3 of the drawings under the influence of the biasing

spring 46. The upward movement of the projection 51 permits the spring shunting member 40 to move the control switch 37 to the open circuit position as shown. This breaks the low resistance shunting circuit through the spring shunting member 40 so that all of the heating current flowing to the heating element 12 must pass through the bimetallic switch arm 24. The heating current flowing through the bimetallic switch arm 24 causes it to heat up whereupon the free end 34 tends to move upwardly. After a predetermined time delay depending upon the time required to heat the bimetallic switch arm 24 to develop a stress sufficient to overcome the friction between the free end 34 and the latch projection 33, the bimetallic switch arm moves upwardly to the position shown in Fig. 4 of the drawings thus opening the safety switch 19 and breaking the heating circuit to the iron. In this position the latch member 31 rotates to the position shown preventing reclosure of the safety switch when the bimetallic switch arm 24 cools due to the interruption of the heating current. Thus, it is seen that the heating element of the iron is effectively disconnected from the source of power supply so that further heating action is precluded and no damage will result. When it is desired to use the iron again it is merely necessary to move the handle lever 41 to the lower position shown in Fig. 1. As pointed out before, this may be done either by grasping the handle of the iron or by placing the iron in an upstanding position on the heel rest 16. When the handle lever 41 is so moved from the upper to the lower position, the projection 52 of the handle lever engages the projection 36 of the latch member and causes it to rotate in a counterclockwise direction and thereby release the projection 33 from the free end 34 of the switch arm 24 so that the safety switch is free to return to the closed position. The bimetallic switch arm 24 having cooled down moves the safety switch 19 to the closed position and reconnects the heating element to the power supply so that the sole plate 10 is again heated. The downward movement of the handle lever 41 also causes the projection 51 to close the control switch 37 reestablishing the low resistance shunt circuit around the bimetallic switch arm 24 thereby preventing a reopening of the safety switch 19 by disabling the heating means. If the operator again releases the handle for longer periods than required to heat up and open the safety switch 19, the circuit to the heating circuit will again be broken as described above.

It should be noted that an important advantage results from the inherent delayed action in the opening of the safety switch 19 after the control switch has opened upon a release of the handle lever. Thus, the iron is disconnected from the power supply only if the operator leaves the iron unattended for a period exceeding the time required to heat the bimetallic switch arm sufficiently to cause an opening of the switch 19. Thus, a temporary release of the handle, which is customary in normal ironing operation, does not cause an opening of the safety switch so that the difficulties previously encountered arising from frequent operation of the safety switch are obviated.

In Figs. 6 to 11 of the drawings I have shown a modified form of the invention in which the safety switch 19 is controlled by a thermostatically actuated latch. The general arrangement of the parts, however, is the same as previously described and corresponding parts have been given the same reference numerals. This form is described and claimed in my copending application, Serial No. 505,470, filed October 8, 1943, which application is a division of the instant application.

In the modified form of the invention, the contacts of the safety switch 19 and the control switch 37, are carried on three current conducting resilient switch arms 54, 55 and 56 which are secured to the projection 25 by the screw 26. The three switch arms 54, 55, and 56 are electrically insulated from each other and held in parallel spaced relation by the insulating washers 57 and 58. The switch arms 55 and 56 are resilient and are stressed so that they tend to move upwardly to the position shown in Fig. 10 of the drawings and open the contacts of the switches 19 and 37.

The contacts of the safety switch 19 are normally held closed by a thermostatically actuated latch 59 which hooks over the free end 62 of the resilient switch arm 55. The latch 59 is carried on one end of a bimetallic strip 60 the opposite end of which is electrically connected and secured by welding to a tab 61 projecting outwardly and downwardly from the switch arm 56 adjacent the screw 26 (Fig. 7). The bimetallic strip 60 is mounted in a vertical plane as shown and is arranged so that upon being heated the free end carrying the latch 59 deflects to the left, as viewed in Fig. 8, and releases the switch arm 55 so that the safety switch 19 is opened. The latch member 59 is shaped to provide a cam surface 63 which is arranged to cooperate with the end portion 62 of the switch arm 55 so that after the latch has tripped it may be reset by simply exerting a downward force on the end of the switch arm 55. In other words, in the latch resetting operation, as the switch arm 55 is moved downwardly the portion 62 engages the cam surface 63 and pushes the latch and the bimetallic strip 60 to the left, as viewed in Fig. 8. When the contacts of the switch 19 reach the closed circuit position, the latch 59 springs back over the end portion 62 to the position shown in Fig. 8 and thus holds the contacts to the switch 19 closed. The latch 59 is preferably formed of electrically insulating material to prevent a short circuit from the strip 60 to the switch arm 55 through the latch.

The pivotally mounted handle lever 41 is provided with a downwardly extending projection 51 which is arranged to engage the switch arm 56 and effect a closure of the control switch 37 when the handle lever is moved from the upper position shown in Fig. 9 to the lower position shown in Fig. 6. If, at the time the handle lever is moved downwardly from the upper position the contacts of the safety switch 19 are in the tripped or open position shown in Fig. 10, the pressure exerted on the switch arm 56 by the projection 51 not only closes the control switch 37 but also forces the switch arm 55 downwardly to a position in which the contacts of the safety switch are closed and the latch is reset. In other words, it is possible by a downward movement of the handle lever to close both the control switch 37 and the safety switch 19 and to lock the safety switch in the closed position by resetting the latch 59.

Electrical circuit connections for the modified form of the invention are best shown in Fig. 11

of the drawings. It will be noted that one terminal of the heating element 12 is connected directly to one power supply conductor 29 as in the previous arrangement. The other terminal of the heating element 12 is connected by a conductor 30 to the resilient switch arm 55. The resilient switch arm 56 is connected directly to the other power supply conductor 28 so it is apparent that in this modification the contacts of the control switch 37 are connected directly in series with the energizing circuit of the heating element. It will be noted that the free end of the bimetallic strip 60 is electrically connected to the switch arm 54 by a conductor 64. Thus, the power supply conductor 28 and the conductor 30 are also connected by a parallel circuit which includes the bimetallic strip 60, the conductor 64 and the contacts of the safety switch 19. As in the previous arrangement, the bimetallic strip is dimensioned so that it has a relatively high electrical resistance as compared with the parallel circuit path including the contacts of the control switch 37. Thus, when the contacts of the control switch are closed, very little of the heating current passes through the bimetallic strip so that it is not heated and deflected thereby and no movement of the thermostatic latch takes place. However, when the contacts of the control switch are opened, all of the heating current then necessarily passes through the bimetallic strip 60 so that after a period of time the bimetallic strip heats up and the free end moves to the left (Fig. 8) permitting the contacts of the safety switch to move to the open circuit position, whereupon the heating element 12 is deenergized.

In operation when the handle of the iron is grasped by the operator or when the iron is placed in an upstanding position on the heel rest, the handle lever 41 occupies the lower position shown in Fig. 6. The contacts of the safety switch 19 are therefore closed and substantially all of the current flows through the circuit including the control switch 37. Thus, the heating means for the thermostatic latch is effectively disabled and the latch remains in the latched position.

If now the operator releases the handle, the handle lever immediately moves to the upper position shown in Fig. 9. This permits the control switch 37 to open and break the shunting circuit so that the heating current flows through the parallel path including the bimetallic strip 60 and the safety switch 19. If the operator fails to depress the handle lever 41 before the bimetallic strip becomes heated sufficiently to trip the latch 59, the safety switch 19 springs open to the position shown in Fig. 10 and breaks the heating circuit so that the iron is shut off. When the bimetallic strip 60 cools as a result of the heating current interruption, the latch 59 moves back to its initial position and the end portion 62 of the arm 55 rides above the cam surface 63.

When the handle lever is again moved to the lower position, the switches 37 and 19 are reclosed and the latch 59 reset as described above so that the iron is again in condition for normal operation. If the operator again releases the handle, the above described operation is repeated.

From the foregoing it will be apparent that I have provided a novel safety switching system for a portable electrically heated appliance such as a flatiron which is simple in construction and yet reliable in operation. By arranging the handle lever to control a control switch which in turn controls the energization of the heating means for a thermostatically actuated safety switch rather than having the handle lever control a safety switch directly as in previous arrangements, the inherent time delay action of a thermostatically actuated switch is advantageously used to prevent unnecessary operation of the safety switch when the handle of the iron is released only temporarily thereby greatly reducing contact wear, radio interference and other difficulties outlined above.

Also, the safety switch, the control switch and the latching means are arranged in a simple and compact unit which is particularly well suited for mounting in the handle of an electric flatiron. Another advantage of my invention is that it may be applied equally well to an automatic or a non-automatic electrically heated device, since its operation does not depend on the operation of a main heat control thermostat as in the arrangement disclosed in my above mentioned copending application.

While I have shown and described particular embodiments of my invention, it will occur to those skilled in the art that various changes and modifications may be made without departing from my invention, and I, therefore, aim in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of my invention.

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

1. In an electric flatiron and the like provided with a handle and a heating element, a thermally actuated safety switch comprising a bimetallic thermostat and a switch arm in substantially parallel relation with it, the thermostat and switch arm having corresponding ends fixed and their other ends free to move, a first set of cooperating contacts carried by said free ends, an energizing circuit for said heating element established by said contacts when closed and including said thermostat and switch arm, whereby when said circuit is established said thermostat is heated by the passage of current through it to open said contacts and disrupt said circuit, a latch for holding said thermostat in its open contact position, a second switch arm having one end fixed and its other end free to move, a second set of cooperating contacts on the free end of said second switch and the free end of said thermostat, an energizing circuit for said heating element established by said first and second set of cooperating contacts when closed including said switch arms but excluding said thermostat, means biasing said second switch to open said second set of contacts, and manually operable means associated with said handle constructed and arranged to operate said second switch to close said second set of contacts, and also to operate said latch to release said thermostat to close said first set of contacts when said handle is grasped by an operator.

2. In a flatiron provided with a heating element, a handle for operating the iron having a longitudinal hand-grasping portion, said portion being defined by a lower part fixed to the iron and an upper part movable relatively to the lower part, and the two parts defining an internal chamber, a pair of switch arms and a thermostat in said chamber arranged in gen-

erally parallel relation, with the thermostat inserted between said switch arms, corresponding ends of said arms and thermostat being fixed and the other ends thereof being free to move, a first pair of cooperating contacts on the free ends of the first switch arm and thermostat and a second pair of cooperating contacts on the free ends of said second switch arm and thermostat, the first pair when closed while the second are open establishing an energizing circuit for said heating element that includes said first switch arm and said thermostat, and the two pairs of contacts when closed establishing an energizing circuit for said heating element that excludes said thermostat, the thermostat when included being heated by the passage of current through it to move to separate said first pair of contacts to disrupt said energizing circuit, a latch for holding said thermostat in its circuit-disrupting position, means biasing said second switch arm to open said second pair of contacts, and said movable handle part when moved toward the fixed handle part engaging said latch to release said thermostat to close said first pair of contacts, and engaging said second switch arm to move it to close said second pair of contacts.

3. In an electric flatiron and the like provided with a handle and a heating element, a thermally actuated safety switch comprising a bimetallic thermostat and a switch arm, the thermostat and switch arm having fixed ends and their other ends free to move, a first set of cooperating contacts carried by said free ends, an energizing circuit for said heating element established by said contacts when closed and including said thermostat and switch arm, whereby when said circuit is established said thermostat is heated by the passage of current through it to open said contacts and disrupt said circuit, releasable holding means for holding said thermostat in its position to hold said contacts open, a second switch arm having one end fixed and its other end free to move, a second set of cooperating contacts on the free end of said second switch arm and the free end of said thermostat, an energizing circuit for said heating element established by said first and second set of cooperating contacts when closed including said switch arms and shorting said thermostat, means biasing said second switch to open said second set of contacts, and manually operable means associated with said handle constructed and arranged to operate said second switch to close said second set of contacts, and also to operate said holding means to release said thermostat to close said first set of contacts.

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