

March 24, 1942.

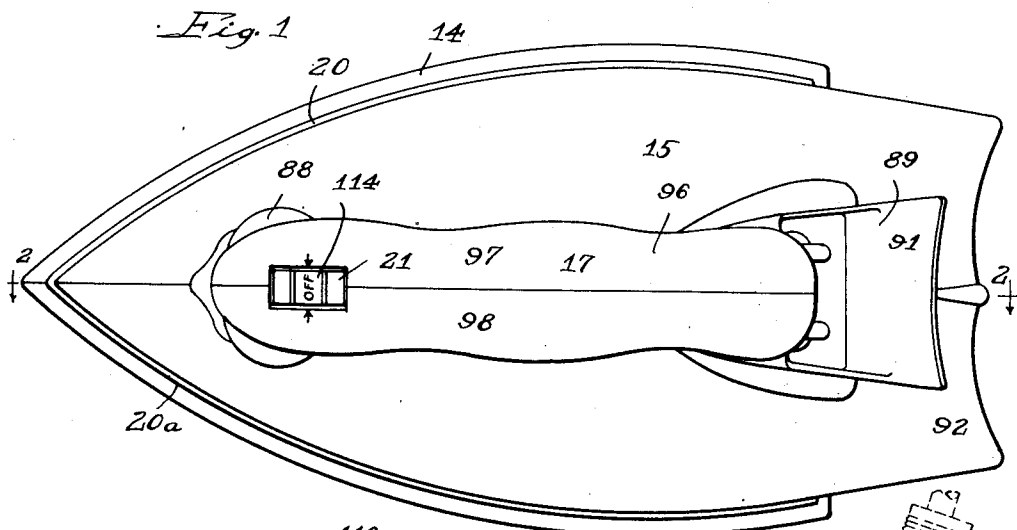
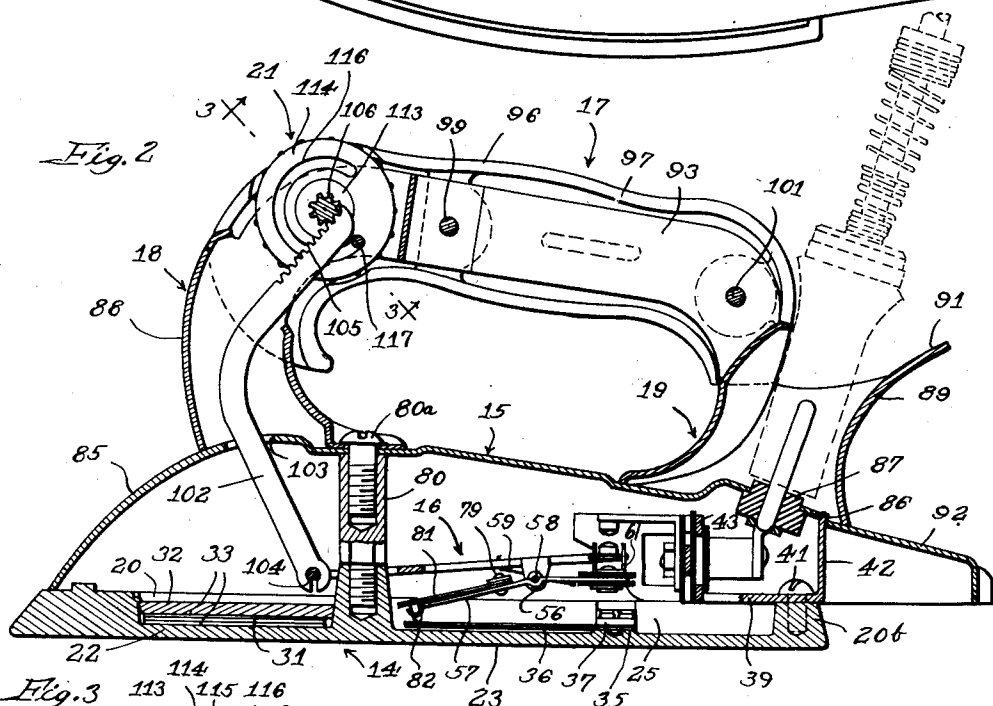
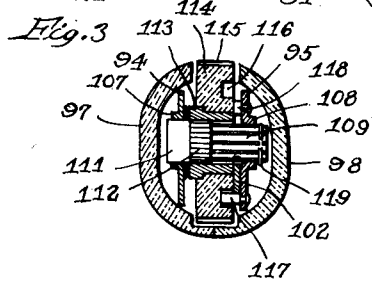
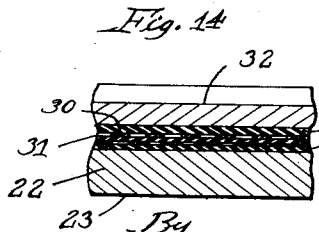
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2,277,439

SADIRON

Original Filed Aug. 30, 1935

3 Sheets-Sheet 1



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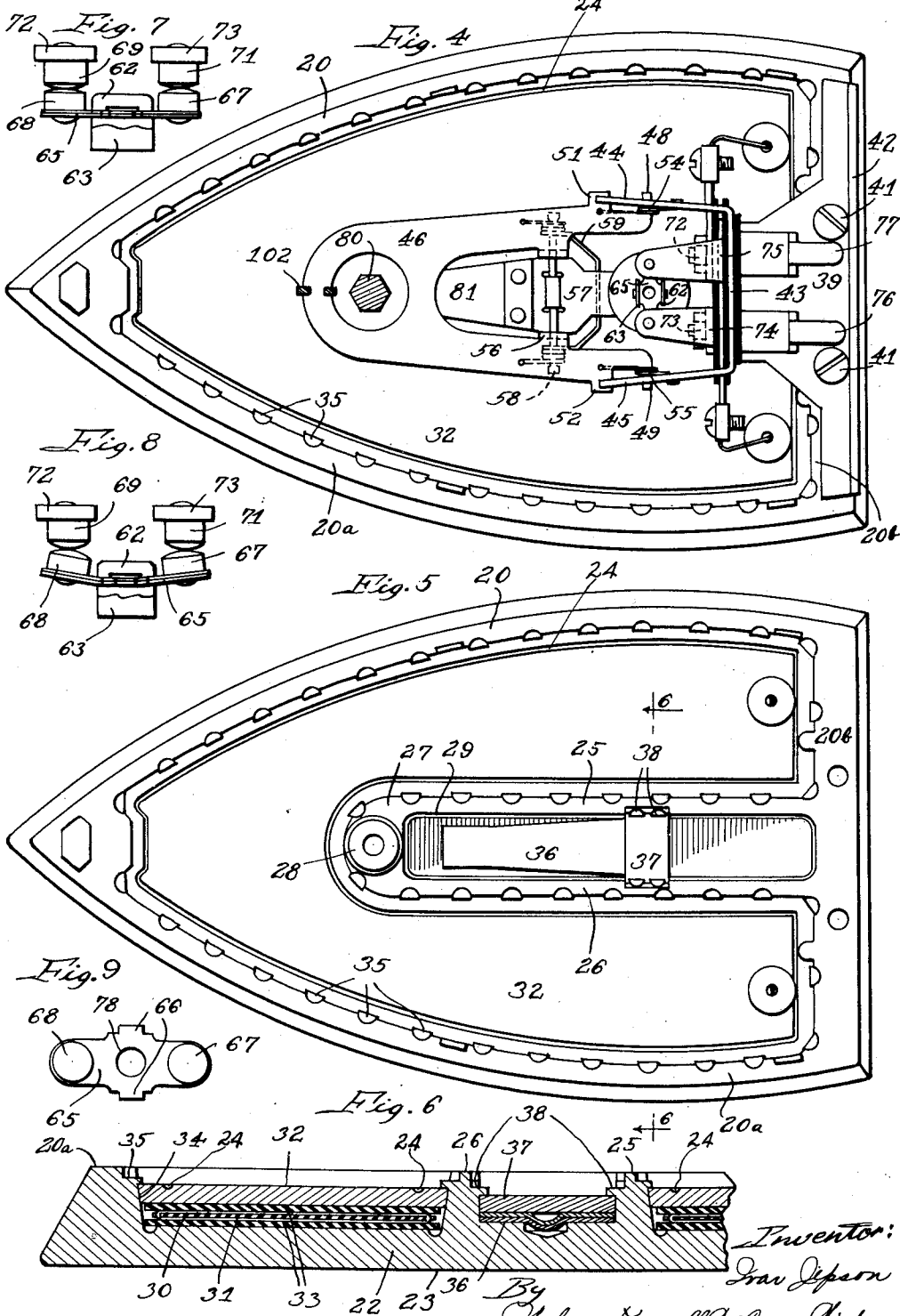
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SADIRON

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3 Sheets-Sheet 2



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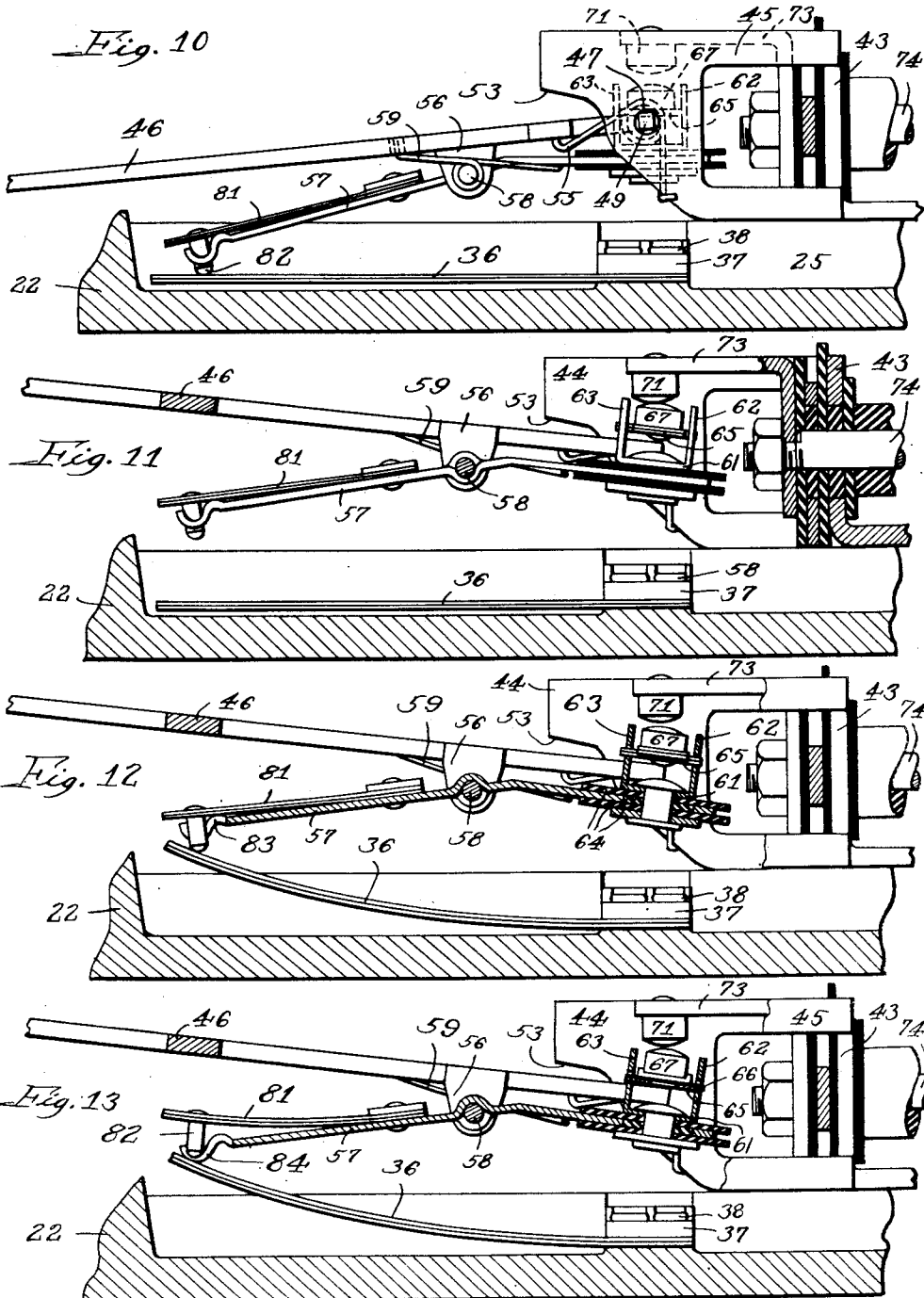
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2,277,439

SADIRON

Original Filed Aug. 30, 1935

3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,277,439

SADIRON

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Application August 30, 1935, Serial No. 38,533
Renewed August 14, 1939

24 Claims. (Cl. 219—25)

This invention relates to electric sadirons of the automatic type adapted for domestic use.

Prior to my invention the industry engaged in making electric sadirons of this type was confronted with the problem of obtaining a commercially satisfactory iron of improved efficiency. This involved the objective of a relatively light weight iron, high wattage current input, and control of the current automatically as by means of a thermostat switch mechanism. Included in this objective was the desire for improved heat transfer closely controlled by the thermostat mechanism, together with the desire to provide a structure which would have long life in service.

An important object of the invention is the provision of a generally improved sadiron construction, wherein the temperature of the ironing surface is more accurately under the control of the thermostatic mechanism, and wherein the thermostat construction is such as to accurately control such temperature and prevent variations from the desired temperature.

Another important object is the provision of a sadiron construction having improved means for preventing undue frequency in the current interruptions.

A further object of the invention is the provision of a sadiron having a sole plate and heating element of improved construction.

Another object of the invention is the provision of a sadiron having improved means for adjusting the thermostat mechanism.

Other objects and advantages will be apparent from the following description and the accompanying drawings, in which—

Figure 1 is a top view of a sadiron embodying my invention;

Fig. 2 is a vertical section taken longitudinally through the iron along the line 2—2 of Figure 1;

Fig. 3 is a section on the line 3—3 of Fig. 2;

Fig. 4 is a top view of the iron with the handle and cover removed showing the top of the sole plate and the thermostat mechanism;

Fig. 5 is a top view of the sole plate with the thermostat mechanism removed;

Fig. 6 is a section on the line 6—6 of Fig. 5;

Fig. 7 is a view of the contacts and the contact strip showing the position of the parts at the moment the contacts are closed;

Fig. 8 is a view similar to Fig. 7 showing the position of the parts after the contacts have been closed for some time;

Fig. 9 is a top view of the lower contacts and the contact strip;

Fig. 10 is a side view of the thermostat mechanism with the parts occupying their "off" position;

Fig. 11 is a view similar to Fig. 10 but partly in section showing the position of the parts at

the moment the thermostatic switch has been manually closed;

Fig. 12 is a view similar to Fig. 11 showing the position of the parts at the beginning of an ironing period just after the switch has been automatically opened for the first time;

Fig. 13 is a view similar to Fig. 12 showing the position of the parts when the switch is automatically opened at an intermediate point in an ironing period, and

Fig. 14 is a fragmentary section through the sole plate taken at right angles to Fig. 6.

The invention contemplates, though it is not necessarily limited to a light weight sadiron having a heating element in close proximity to the ironing surface thereof so that this surface very rapidly responds to the heating effect of the heating element, the action of the heating element being controlled by a thermostat so constructed as to control the heating element so as to maintain the ironing surface at the proper temperature to prevent this temperature from either overrunning at certain times as is common in sadirons of the prior art, or in turn dropping below a satisfactory ironing temperature when placed in service. The invention further contemplates improved construction of the sole plate, the heating element, the thermostat mechanism, the control mechanism therefor, and the general organization of the iron to accomplish the results mentioned.

Directing attention first to Figs. 1 and 2 of the drawings which show a preferred embodiment of the invention, the numeral 14 designates generally the sole plate of the iron, the numeral 15 designates a shell covering the sole plate, the numeral 16 designates a thermostatic mechanism located above the sole plate and within the shell, the numeral 17 indicates the handle of the iron, the numerals 18 and 19 designate generally handle supports for attaching the handle to the iron, and the numeral 21 designates generally manual control means for the thermostatic mechanism. The sole plate 14, best shown in Figs. 2, 5 and 6, consists of a metal body designated generally by the numeral 22 having a plane or nearly plane ironing surface 23 on the lower side thereof and marginal upstanding side walls 20 and 20a and a rear wall 20b defining a top cavity 24. The cavity 24 covers most of the upper surface of the sole plate, as will be seen from Fig. 5, with the exception of a strip extending from the rear of the sole plate forward along the longitudinal center line thereof. This area is defined by longitudinally extending walls 25 and 26 and a forward wall 27, the latter of which carries an upstanding boss 28 for a purpose which will presently appear. Between the walls 25 and 26 is a recess 29 extending downward to the top of the plate. The sole plate is as thin

as can be made while still retaining sufficient rigidity in the plate to prevent distortion and to provide for substantially uniform heat transfer to the ironing surface. A heating element 31 is positioned on the top of the plate between the marginal side walls so as to cover substantially the entire area therebetween, and a metal plate 32 is positioned on top of the heating element, sheets of mica or other insulation 33 being placed on either side of the heating element as shown in Fig. 6. The side walls are in this instance sloped outwardly from top to bottom as shown at 34 and the plate 32, which prior to its assembly has its edges substantially at right angles with respect to its face, is inserted between the walls under considerable force so as to cause the side edges of the plate to conform to the sloping side walls, whereupon the metal of the side walls is staked over at spaced intervals as shown at 35 to hold the plate firmly in place. Through this means it will be seen that the metal plate 22, the heating element 31, and the plate 32 are formed into a unitary whole occupying no more and even a lesser space than has heretofore been occupied by the sole plate alone; yet this arrangement replaces the conventional sole plate, heating element, and pressure weight of prior art constructions, performing the functions of these elements in an improved manner. Through this means the heating element is held against the plate 22 under very high pressure so as to facilitate the rapid and uniform transfer of heat to the ironing surface. This action is further facilitated by employing flat resistance wire 30 (Fig. 14) in the heating element which increases the area of contact between the heating element and the insulation and consequently the conductive area of the heating element. The recess 29 has a raised seat 35 (Fig. 2) upon which one end of a primary thermostat element comprising a bimetallic blade 36 rests, the same being held thereon by a metal plate 37 held in place by staking of the walls 25 and 26, as shown at 38. The bimetallic blade extends forward from the seat 25 in slightly spaced relation to the bottom of the recess 29, as best shown in Fig. 2, and is so positioned that upon increasing temperature the free end of the thermostat moves away from the bottom of the recess.

Attached to the top of the sole plate adjacent the rear thereof is a bracket designated generally by the numeral 39 secured by means of screws 41, the bracket having an upstanding portion 42 at the rear end of the sole plate and an upstanding portion 43 forwardly thereof, the portion 42 closing the rear end of the iron and the portion 43 acting to support the switch part of the thermostat mechanism. The bracket portion 43 extends forwardly along each side as shown at 44 and 45 to provide ears for the pivotal support of a switch yoke indicated generally by 46, the ears 44 and 45 having openings as shown at 47 for the reception of fingers 48 and 49 on the end of the yoke. The yoke has abutments 51 and 52 adapted to abut against shoulders 53 adjacent the ends of the ears 44 and springs 54 and 55 positioned to urge the abutments 51 and 52 against the shoulders 53. The yoke 46 carries a pair of spaced depending ears 56 upon which a switch lever 57 is pivotally carried by means of a pin 58 spanning the space between the ears, and a spring 59 acts between the switch lever and the yoke to urge the switch lever in a counter-clockwise direction facing the figures.

The rear end of the switch lever 57 carries a U-shaped supporting member 61 having upstanding ears 62 and 63, and is insulated from the lever by means of insulating washers 64. A contact strip, indicated generally by the numeral 65 and best shown in Fig. 9, is loosely supported between the ears 62 and 63 on projections 66 on opposite sides of the contact bar. This bar carries contact points 67 and 68 adapted to cooperate with contact points 69 and 71 carried on conductor brackets 72 and 73 supported on the bracket portion 43 on bolts 74 and 75 insulated from the bracket portion. The bolts 74 and 75 also carry terminal members 76 and 77 for connection with a conventional source of electrical supply. One of the brackets 72 and 73 is connected directly to one of the terminal members while the other of said brackets is electrically connected to the heating element so that the current flows from one of the terminal elements through the strip 65 and associated contacts, thence through the heating element and to the other of the terminal member. The contacts 69 and 71 are interposed in the circuit through the heating element so that the bridging of these points acts to close the circuit through the heating element, this bridging of the contacts being accomplished by means of the contacts 67 and 68 and the contact strip 65. The strip 65 is formed of bimetallic material and is so shaped that when cold, the strip will be substantially plane as shown in Fig. 7, and is so mounted that the strip bows upwardly at its ends as shown in Fig. 8 at more elevated temperatures. The cross-section of this strip is such that the current flowing through the strip is caused to heat the same by resistance so as to cause the same to bow in the manner described upon the passage of current therethrough. The strip has a hole as shown at 78 (Fig. 9) the size of which may be used to determine the cross-sectional area of the strip, and consequently the resistance to the passage of current. The loose mounting of the strip serves to bring about uniform contact pressure between the contacts 67 and 68 and the contacts 69 and 71.

The forward end of the switch lever 57 inclines downwardly and has attached thereto, adjacent the pivot point thereof as shown at 79, a secondary bimetallic blade 81, the forward end of this blade carrying a pin 82 extending downward through an opening 83 in the end of the switch lever. This secondary blade is mounted so that the free end thereof warps upward away from the switch lever under increasing temperature, as shown in Fig. 13. The forward end of the switch lever may be arcuately curved as shown at 84 for contact with the free end of the primary thermostatic element 36.

The operation of the thermostat mechanism is shown in Figs. 10 to 13 inclusive. When the yoke 46 is moved to the position shown in Fig. 10, the pin 82 engages the thermostat element 36 and the switch lever 57 is rotated in a clockwise direction to such an extent that the contact cannot be closed even when the thermostat element moves to its cold position. This represents a position in which the current is permanently cut off from the heating element and the position normally occupied by the parts when the iron is cold. When the current is turned on at the start of an ironing period, the iron being cold, the yoke 46 is moved to an elevated position, such as shown in Fig. 11, whereupon the switch lever 57 is rotated in a counterclockwise direction under the

action of the spring 59 until the contacts are closed causing current to flow through the heating element. This represents the lowest operating temperature of the iron. Continued elevation of the yoke 46 causes the pin 82 to move away from the thermostat element 36 thereby increasing the temperature at which the iron will be automatically maintained. Thus, through regulation of the position of the yoke 46, the operating temperature of the iron is regulated. The position of the parts in Fig. 11 indicates one of such operating positions of the parts. As the current flows through the heating element the ironing surface of the sole plate is heated, and this heat is transmitted to the thermostat element 36 at a relatively rapid rate by conductivity through the point of support thereof and by convection and radiation along the free portion of the blade. As a result, the thermostatic element warps upward into the position shown in Fig. 12 contacting the pin 82 and causing rotation of the switch lever in a clockwise direction against the tension of the spring 59, thereby separating the contacts and opening the circuit through the heating element. For proper control of the iron the thermostat element 36 should at this point immediately begin to move downward due to the fact that the production of heat in the iron has stopped and the iron is losing heat by radiation. However, this action does not actually occur. The heating element is placed in close proximity to the ironing surface and heats this surface very rapidly and more rapidly than this heat can be transmitted to the thermostat element 36. Consequently, the action of the thermostat lags behind the actual temperature rise on the ironing surface and after the flow of current to the heating element has been cut off the temperature of the thermostat element may remain constant or may actually increase due to the dissemination of heat through the thermostat mechanism. In other words, as the temperature rises rapidly in the sole plate the heat must be conducted through to the thermostatic element and if the thermostatic element is set to normally break when this element reaches a temperature of 500°, for example, by the time it does reach this temperature, when the iron is plugged in for the first time, the ironing surface has reached a much higher temperature, possibly 100° higher. After the iron has been in service for a few moments, the heat is disseminated through the thermostat mechanism so that the next time the contacts are closed the temperature of the thermostat element will more nearly correspond with that of the ironing surface and the contacts will be opened at the temperature for which the thermostat is set. Therefore, the temperature of the ironing surface would overrun to a considerable extent when the iron first comes up to temperature if controlled solely by this thermostat element. The secondary thermostat element 81 functions to prevent this initial overrunning of the temperature, its action being illustrated in Fig. 13 wherein it will be seen that the bimetallic blade 81 has warped away from the switch lever so as to withdraw the pin 82 from contact with the thermostatic element 36, thus causing the element 36 to move farther in order to open the contacts, the effect of this action being to automatically increase the temperature setting of the thermostat mechanism. The pin 82 thus only functions when the iron is being brought up to temperature at the beginning of an ironing period and it acts to cause

the thermostat element 36 to open the circuit through the heating elements when the thermostat element 36 is at an actual temperature lower than that desired at the ironing surface, and subsequently acts to increase the setting of the thermostat mechanism as the heat becomes disseminated therethrough, the action of the thermostat element 81 being proportional to the degree of dissemination. After the thermostat mechanism has been brought up to temperature, the pin 82 is completely withdrawn and remains in the position shown in Fig. 13 until the iron has cooled down, though it may possibly function to a slight extent when the iron is set to maintain a very low temperature.

Referring now to Figs. 7 to 9, inclusive, the contact bar 65 carrying the contacts 67 and 68 serves to conduct the current between these two contact points, and is made of bimetallic material of such size that the current flowing therethrough heats it up sufficiently to cause it to bend upwardly. Therefore, when the contacts are closed and current is passing through the contact bar, it bends so that the primary thermostat element 36 must act through a greater distance in order to separate the contacts and open the circuit through the heating element. Thereupon the temperature of the contact bar starts to drop and the bar returns toward its cold position as shown in Fig. 7. Simultaneously the remainder of the iron is cooling, causing the primary thermostat element 36 to move in a direction to again close the contacts which would normally occur very shortly but for the return of the contact bar 65 toward its plane shape, thereby requiring the primary element to move through a greater distance in order to close the contacts. The closing of the contacts is thus delayed. This delay can be increased or decreased by changing the size and area of the contact bar. In this particular instance the contact bar is of such size that the contacts are broken about every four minutes, resulting in about fifteen to twenty cycles per hour. It has been found that without this feature these slow action thermostats tend to cause opening and closing of the contacts very rapidly and with but a slight change of temperature in the sole plate. This rapid making and breaking of the circuit is undesirable for a number of reasons, among them being the undue radio interference.

The top of the sole plate is covered by a cover shell 85 (Fig. 2), the lower edge of which has contact with the marginal side flanges of the sole plate, the cover enclosing the thermostat mechanism. The cover shell is held onto the sole plate by means of a spacer bolt 80 and a bolt 80a, and the rear of the shell is closed by the upstanding portion 42 of the bracket 39 which has a tongue 86 received in an opening of the cover. The shell also has a pair of openings for the reception of insulators 87 through which the terminal posts 76 and 77 pass. A hollow front handle support 88 is attached to the top of the shell, and a rear handle support 89 is also carried on the shell around the terminal posts 76 and 77. The rear edge of the handle support 89 projects outwardly as shown at 91 and cooperates with the overhanging portion 92 of the cover to form a heel rest for the iron. The handle support 89 has a forwardly extending strap 93 and the handle support 88 has a pair of rearwardly extending straps 94 and 95 (Fig. 3) meeting the strap 93 and being attached thereto by any suitable means, as, for example,

by spot welding. The straps 93, 94 and 95 form a central support for a handle 96 and serve to support the handle on the handle supports 88 and 89. The handle 96 is preferably formed of insulating material in order that the same shall not become excessively hot. In this instance it is molded from synthetic resins in two halves 97 and 98 which are secured together by means of bolts 99 and 101 passing through the handle straps.

Means for adjusting the thermostat mechanism 16 is carried in the fore part of the iron and includes a rod 102 passing through a narrow slot 103 in the top of the cover and attached at its lower end to the forward end of the switch yoke 46, as shown at 104. The rod 102 extends upward through the hollow handle support 88 and has a rack 105 along one side adjacent its upper end. The rack cooperates with a pinion member 106 carried in openings in the straps 94 and 95, the openings being surrounded by flanges 107 and 108 which serve to provide a bearing area for the pinion member. The pinion member has a tooth portion 109 which rides within the flange 108 and a larger bearing portion 111 which rides in the flange 107. The bearing portion 111 is knurled, as shown at 112, and cooperates with the internally knurled sleeve 113 which in turn carries a wheel 114 of insulation material, such as synthetic resin. The wheel 114 is of such diameter that it projects slightly beyond the upper edge of the handle and has annularly spaced ribs 115 to facilitate the manual rotation of the wheel. The wheel also has a groove 116 within which is received a pin 117 carried on the strap 95, the groove and pin limiting the amount of rotation of the wheel. A pin 118 in the strap 95 bears against the side of the wheel to prevent side-play. A spring ring 119 acts to retain the pinion member in place in its bearing. It will be seen from Figs. 2 and 3 that the rod 102 passes between the pinion member and the pin 117, which engage opposite edges thereof, and between the wheel 114 and the strap 95, which prevent lateral movement of the rod, and by these means the movement of the rod is effectively guided. Upon rotation of the wheel 114 it will be observed that the pinion causes longitudinal movement of the rod 102, thereby raising or lowering the front end of the yoke 46 rotating the yoke about its pivotal points and thereby varying the relationship between the switch lever 57 and the thermostat member 36. It will also be observed that calibration of the thermostat, that is, the setting of the thermostat and control mechanism so that the temperature maintained by the thermostat will correspond to that indicated on the wheel 114, is accomplished entirely outside the body of the iron and by adjusting or setting the relative positions of the rack 105, the pinion member 106 and the wheel 114. Advantageously the edge of the wheel is of such width as to carry notations either as to actual temperatures or the setting for the different materials being ironed. Attention is directed to the fact that the control for the thermostat is entirely enclosed so that there is no possibility of mechanical damage to the control mechanism which might accidentally and unknowingly change the relationship between the parts and so result in an ironing temperature different from that for which the wheel 114 is set. The wheel is located on a heat insulated part of the iron in such a position as to be conveniently accessible to the thumb of the opera-

tor and in such a position that there is no possibility of the hands of the operator coming into contact with heated portions of the iron. The action of the control is smooth and positive. The manually operable means for adjusting the thermostat mechanism is claimed in my Patent No. 2,266,708, granted Dec. 16, 1941, a division of this application.

Attention is directed to the general structure of the iron, as best illustrated in Fig. 2, from which it will be seen that the iron is capable of storing only a very small amount of heat. The structural features formerly employed in sad-irons for the purpose of providing heat storage capacity have been substantially eliminated and the parts have been reduced to skeleton form so as to reduce the capacity for the storage of heat to a minimum. The sole plate proper is formed of metal as thin as possible without impairing the required rigidity and freedom from warpage, and is provided with marginal flanges which serve as abutments for the cover. The heating element is placed between the marginal flanges and is held therein by a relatively thin sheet material which serves to apply pressure to the top of the heating element to improve the heat conducting characteristics of the structure. Likewise, the heating element is itself formed of flat resistance wire so as to increase the conductive area. The heating element is insulated from the sole plate, and the superimposed cover plate by thin sheets of insulation material such as mica. An object of this sole plate construction is to maintain a minimum thickness so that the heat will be rapidly transmitted to the ironing surface and throughout the various parts of the structure, and likewise will be rapidly drained away under the ironing operations. This construction, wherein the heat storage capacity is held to a minimum, materially facilitates control over the temperature of the ironing surface.

Another advantage in the construction lies in the fact that because of the total absence of the conventional pressure plate and heat storing element, the top of the sole plate is left entirely free for the positioning of the thermostat mechanism which permits of improved control mechanism.

Attention is directed to the fact that the entire switch mechanism is carried on the bracket 39 as well as the terminal posts 76 and 77 which materially simplifies and cheapens construction.

Attention is also directed to the fact that I have also provided a greatly improved thermostat mechanism wherein correction is automatically made for the tendency of a sadiron to over-run upon the initial approach to the ironing temperature, and wherein the frequency of the make and break of the contacts is controlled to a greater nicety.

Attention is also directed to the fact that I have provided a novel sole plate assembly wherein distribution of the heat of the pressure plate is utilized as a means of obtaining improved ironing efficiency and also as a means of preventing warpage of the assembly or its component parts incident to extreme temperature changes under high wattage thermostatic control.

It will occur to those skilled in the art that many changes in detail come within the spirit of this invention. The specific description of the details illustrated is not to be regarded as a limitation. The only limitations intended are

those expressly stated in the claims or required by the prior art.

I claim:

1. The combination in a sadiron of a body including a sole plate and a cover therefor characterized by the lack of a member functioning primarily as a heat storage element, said sole plate having a thermostat element responsive to the temperature thereof and a heating element for heating the same, a switch mechanism overhanging the sole plate and actuated by said thermostat element, a pair of terminal posts, and a bracket attached to the sole plate and constituting the entire means of support for said switch mechanism and said terminal posts.

2. The combination in an electric iron of a sole plate comprising a relatively thin metal plate having a lower ironing surface and upstanding marginal walls defining a top cavity, a heating element in said cavity, and a cover plate in the cavity above the heating element, the walls of said recess being staked over the edge of said cover plate to retain the same in place and urge the heating element into the cavity and form a unitary sole plate structure.

3. The combination in an electric iron of a sole plate comprising a thin metal plate having a lower ironing surface and upstanding marginal walls defining a top cavity, a relatively thin heating element and cover plate seated within said cavity, the cover plate acting to retain the heating element therein, a bracket attached to the upper surface of said sole plate adjacent one end thereof and overhanging said plate, and thermostat switch mechanism carried entirely on said bracket in the space over said sole plate.

4. The combination in a sadiron of a sole plate having an ironing surface and electrical heating means therefor, and thermostat mechanism comprising a temperature responsive element located to be thermally responsive to said ironing surface, a switch lever, contact means carried on the switch lever and movable therewith to open and close the circuit through the heating means, means for pivotally supporting the switch lever in a position to be rotated by said temperature responsive means, and means for manually adjusting the relationship between said temperature responsive element and said switch lever to predetermine the temperature of the iron.

5. The combination in a sadiron of a sole plate having an ironing surface and electrical heating means therefor and thermostat mechanism comprising a temperature responsive element located to be thermally responsive to said ironing surface, a fixed contact, a switch bar carrying a movable contact for cooperation with said fixed contact to open and close the circuit through the heating means, means for pivotally supporting said contact bar between the fixed contact and the temperature responsive element in a position to be rotated by the latter about its pivotal support to move the movable contact, said supporting means being manually adjustable to vary the relationship between the contact bar and the temperature responsive element to predetermine the temperature of the iron.

6. The combination in a sadiron of a sole plate having an ironing surface and electrical heating means therefor and thermostat mechanism comprising a temperature responsive element located to be thermally responsive to said ironing surface, a fixed contact, a rotatable switch lever having a contact at one end engageable with the fixed contact to close the circuit through the

heating means, a supporting member for rotatably supporting the switch lever from a point intermediate its ends with the opposite end thereof adjacent the temperature responsive element in a position to be rotated thereby to open said circuit at a predetermined temperature of the ironing surface, and means for manually varying the position of said supporting member to predetermine the temperature of the iron.

7. The combination in an electric sadiron, of an electrically heated sole plate having an ironing surface, a thermostatic element located to be primarily thermally responsive to said ironing surface, contacts for controlling the flow of current to the soleplate, means actuated by said thermostat element for moving said contacts, and means forming part of said first mentioned means located in close proximity to the thermostat element for automatically altering the relationship between the contacts and the thermostat element during initial heating of the iron in response to the change in temperature of the thermostatic mechanism.

8. The combination in a sadiron of a sole plate having an ironing surface and electrical means for heating the same, and thermostat mechanism comprising a temperature responsive element located to be thermally responsive to said ironing surface, a switch lever, contact means carried on said switch lever movable therewith for opening and closing the circuit through the heating means, adjusting means for pivotally supporting the switch lever in a position to be rotated by said temperature responsive element to regulate the position of said contact means, and means on the switch lever to adjust the relationship between the temperature responsive means and the switch lever in response to changes in the temperature of the thermostat mechanism.

9. The combination in a sadiron of a sole plate having an ironing surface and electrical means for heating the same, a temperature responsive element located to be thermally responsive to said ironing surface, a switch lever, contact means carried on the switch lever movable therewith for opening and closing the circuit through the heating means, means for pivotally supporting the switch lever in a position to be rotated by said temperature responsive element to regulate the position of said contact means, and a bimetallic strip on said switch lever to vary the relationship between the temperature responsive means and the contact points in response to changes in the ambient temperature of the iron.

10. The combination in a sadiron of a sole plate having an ironing surface and electrical means for heating the same, a temperature responsive element located to be thermally responsive to said ironing surface, a switch lever having a contact end, contact means on said contact end movable therewith for opening and closing the circuit through said heating means, a bimetallic blade on the opposite end of said lever, means for pivotally supporting the switch lever in a position to be rotated by action of said temperature responsive element on said bimetallic blade upon initial heating of the iron, said bimetallic blade being shaped to move when the temperature of the iron approaches uniformity to an inoperative position for subsequent direct operation of the switch lever by the temperature responsive element whereby to correct the action of the thermostat for the lag in thermal conductivity of the parts.

11. The combination in a sadiron of a sole

plate having an ironing surface and electrical heating means therefor, and thermostat mechanism comprising a temperature responsive element located to be thermally responsive to said ironing surface, and switch mechanism actuated thereby including a bracket, a pair of terminal posts carried on the bracket for supplying current to the iron, fixed contact means on the bracket, a supporting member pivoted on the bracket and normally movable to predetermine the temperature of the iron, a switch lever pivotally supported intermediate its ends on said supporting member for rotation thereon in one direction by said temperature responsive mechanism, a movable contact on said switch lever to engage the fixed contact when the lever is rotated by said temperature responsive element, and spring means for rotating the lever to close the contacts, said bracket being the sole means of support for said switch mechanism.

12. The combination in a sadiron of a sole plate, a heating element therefor, contacts for controlling the flow of electricity to the heating element, temperature responsive means for opening and closing said contacts to maintain a substantially uniform sole plate temperature, and thermally responsive means associated with at least one of said contacts for conducting current to said contact point, said thermally responsive means being adapted to be heated by the flow of current therethrough to move the contact point associated therewith toward the opposite contact when the circuit is closed and away from the opposite contact when the circuit is opened to delay the making and breaking of the contacts.

13. The combination in a sadiron of a sole plate having an ironing surface, electrical means for heating the same, a primary thermostat element located to be thermally responsive to the ironing surface, and switch mechanism actuated thereby comprising opposed contacts relatively movable to open and close the circuit through the heating means, means acting between the primary element and the contacts to open the contacts at a predetermined temperature of the ironing surface, and a contact bar on said last mentioned means for supporting at least one of the contacts, said bar comprising a thermally responsive element adapted to be heated by resistance to the flow of current therethrough to move said contact toward the opposite contact when the current is closed and away from the opposite contact when the contact is opened to delay the making and breaking of the contacts by said primary thermostat element.

14. The combination in a sadiron of a sole plate having an ironing surface, electrical means for heating the same, a primary thermostat element located to be thermally responsive to the ironing surface, and switch mechanism actuated thereby comprising opposed contacts relatively movable to open and close the circuit through the heating means, means acting between said primary element and the contacts to open the latter at a predetermined temperature of the ironing surface, a bimetallic thermostat element associated with said contacts and having an electrical resistance sufficient to be heated above the ambient temperature of the iron by the flow of current therethrough whereby to impart relative approach movement to said contacts when the contacts are closed and relative separating movement when the contacts are opened so as to delay

the making and breaking of the contacts by said primary thermostat element.

15. The combination in a sadiron of a sole plate, a heating element therefor, contacts for providing an open or closed condition of the electric current to the heating element, a thermostat element located to be primarily thermally responsive to said ironing surface to make and break said contacts, means for automatically altering the relationship between the contacts and the thermostat element in response to change in ambient temperature within the iron, to control the initial temperature characteristics thereof, and thermally responsive means associated with at least one of said contacts responsive to the condition of the circuit, of the heating element to move said contact point toward and away from the opposite contact to delay the making and breaking of the contacts.

16. An electric heated iron comprising a relatively thick hard metal sole plate having a recess in one face thereof having outer walls, a flat electric heating element in the recess below the upper edge of certain walls thereof, a clamping plate over the heating element also below the upper edge of said walls, and spaced integral portions of said walls being bent over the clamping plate to provide a substantial contact therewith to hold it tightly against the heating element and form a heat conducting path from the clamping plate to said sole plate.

17. On electrically heated iron comprising a relatively thick hard metal sole plate having a recess in the upper face thereof having outer walls, a flat electric heating element in the recess below the upper edge of the side walls thereof, a clamping plate over the heating element also below the upper edge of the side walls, and spaced integral portions of the side walls being bent over the clamping plate to provide a substantial contact therewith to hold it tightly against the heating element and form a heat conducting path from the clamping plate to said sole plate.

18. The combination in an electric iron of a permanently assembled sole plate comprising a metal body having a lower ironing surface, upstanding rigid marginal walls, and a relatively thin central area for the rapid transfer of heat to the ironing surface, said area being defined by said marginal walls, said upstanding walls providing a rigid frame-like structure of substantial cross section around said central area to prevent warpage and distortion of said central area throughout the temperature range to which it is subjected, a heating element of relatively thin sheet form having one side thereof seated against said central area, a thin rigid cover plate seated against the opposite side of said heating element and having permanent marginal heat transmitting connection with said marginal walls, and spaced walls extending longitudinally on said central area having marginal connection with said cover plate to prevent warpage of the cover plate and of said central area.

19. A light weight automatic electric sadiron comprising in combination, a thin metal sole plate having a lower ironing surface and upstanding marginal walls of heavy cross section defining a top cavity, a comparatively thin heating element seated in said cavity covering substantially the entire area of the ironing surface except for a predetermined central area, a thin rigid pressure plate seated on the heating element in said cavity and having heat flow mar-

ginally to the marginal walls of the sole plate, means permanently uniting the pressure plate to the sole plate, the pressure plate having an open central area substantially conforming to that of the heating element, means connecting the pressure plate to the sole plate in said central area to prevent distortion of the pressure plate when heated, and a thermally responsive device associated with the sole plate for controlling the supply of electric current to the heating element, including a thermally responsive element located in said central area adjacent to the sole plate.

20. A light weight electric sadiron comprising a comparatively thin metal sole plate having a lower ironing surface and upstanding marginal walls defining a top cavity, a heating element seated in said cavity, a relatively thin cover plate seated on the heating element within said cavity and permanently united at its marginal edges to the marginal walls of said sole plate, a switch, a thermally responsive element located in close relation to the sole plate and arranged to actuate said switch to control the supply of electric current to the heating element, and means for altering the relationship between said thermally responsive element and said switch upon each actuation of said switch to delay the opening and the closing of the switch.

21. An automatic electric sadiron having, in combination: a permanently assembled sole plate structure comprising a sole plate proper the ironing surface of which is composed of a major area of relatively thin cross section and having upstanding marginal side walls of relatively heavy cross section forming a cavity, a thermostat well area in said cavity centrally between said side walls, a heating element of sheet form substantially covering and having one side thereof seated on said thin section, a pressure plate substantially covering and seated on the opposite side of said heating element and permanently united to said marginal side walls to hold the heating element under pressure against said thin section and provide a heat conducting path between said heating element and the marginal side walls for heat transfer to the heavy section of the sole plate, means spaced interiorly from said marginal walls holding the pressure plate pressed down against the heating element; a thermostat element disposed in said well area; and thermostat switch mechanism responsive to the thermostat element and removably mounted on the sole plate structure for controlling the supply of electric current to the heating element, the arrangement being such that said thermostat switch mechanism may be removed from said sole plate without disturbing the assembled relation of said sole plate, heating element, and pressure plate.

22. An automatic electric iron having a sole plate unit comprising a sole plate body having a lower ironing surface, a rigid uniformly thin central area adapted for rapid heat transfer to the ironing surface, and a relatively thick rigid flange marginally around said central area providing abutment walls defining a top cavity; a heating element of sheet form in said cavity substantially covering and seated against said central area; a relatively thin rigid pressure plate in said cavity covering said heating element, the pressure plate being pressed into said cavity with its marginal edges in heat conducting engagement with said abutment walls and with its underside pressed against the top of the heating element to hold said element under substan-

tially uniform pressural contact against said central area; and means connecting said pressure plate at spaced points along its periphery to said abutment walls and further connecting said pressure plate to said central area medially between said walls; the sole plate unit having rapid heat transfer in operation from the heating element by heat flow directly through said central area to the ironing surface and by heat flow draining marginally from said pressure plate through said walls to the ironing surface, said means maintaining the sole plate body and the pressure plate in coaction with the heating element to prevent warpage of the unit and separation of said sole plate body and pressure plate from the heating element under high wattage current input under automatic control.

23. An automatic electric sadiron having, in combination: a sole plate unit comprising a sole plate body having a lower ironing surface, a relatively thin rigid central area adapted for rapid heat transfer to the ironing surface, rigid upstanding walls marginally around said central area defining a top cavity, upstanding walls in said cavity medially between said marginal upstanding walls defining a thermostat well, a heating element of sheet form in said cavity substantially covering and seated against said central area except said thermostat well, a relatively thin rigid pressure plate in said cavity overlying said heating element, and means marginally connecting said pressure plate to said marginal and medial upstanding walls to hold the heating element under substantially uniform pressural contact against said central area; a thermostat in said well; and thermostat switch mechanism removably mounted on top of the sole plate unit, operative between the thermostat and the heating element to automatically control high wattage current input to the heating element; the sole plate unit having rapid heat transfer in operation from the heating element to the ironing surface by direct heat flow through said central area and by heat flow draining marginally from the pressure plate through said upstanding walls, the sole plate body and the pressure plate being maintained in said pressural contact with the heating element without warpage or separation therefrom under said high wattage current input.

24. An automatic electric sadiron comprising a sole plate having upstanding marginal walls of comparatively heavy cross section defining a top cavity, a heating element seated in said cavity covering substantially the entire area thereof except for a predetermined central area, a pressure plate seated on the heating element having marginal shape substantially corresponding to the contour of said marginal walls and having a central opening substantially corresponding to said central area, means uniting the pressure plate to the sole plate along said marginal walls and through said central area to hold the heating element in substantially uniform pressural contact with the sole plate and to provide a path of heat transfer from the pressure plate to the sole plate both marginally and centrally, and a thermostat control including a heat responsive element located in said central area for controlling the supply of electric current to the heating element, whereby distribution of the heat of the pressure plate serves as a means for preventing warpage of the sole plate, heating element, and pressure plate assembly.

IVAR JEPSON.

CERTIFICATE OF CORRECTION.

Patent No. 2,277,439.

March 24, 1942.

IVAR JEPSON.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 5, second column, line 32, claim 8, for "adjusting" read --adjustable--; page 6, first column, line 43, claim 13, for "clase" read --close--; and second column, line 32, claim 17, for "On" read --An--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 9th day of June, A. D. 1942.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.

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