Jan. 19, 1943. M. M. KISTNER 2,308,515

ELECTRICAL CORD CONNECTOR

Filed Oct. 18, 1940

Fig. 1

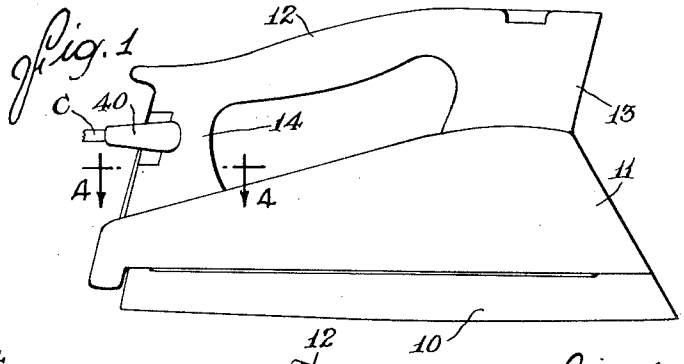


Fig. 2

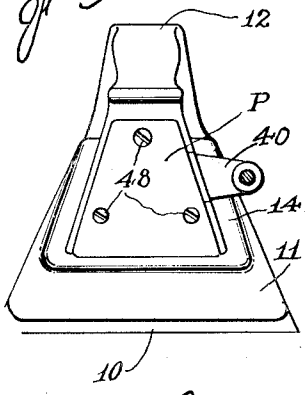


Fig. 3

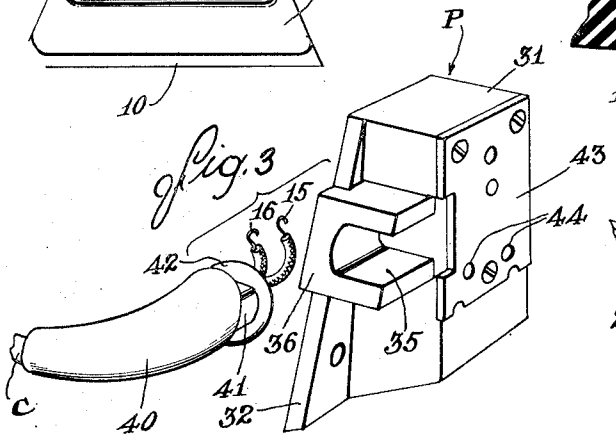


Fig. 5

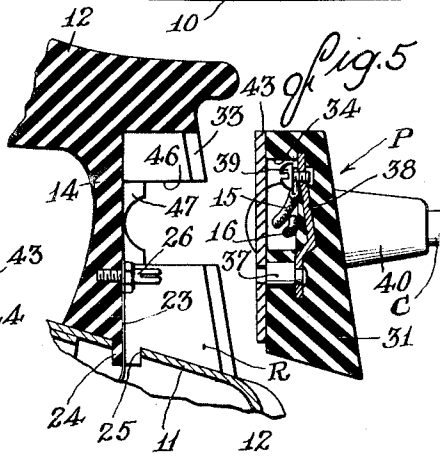


Fig. 4

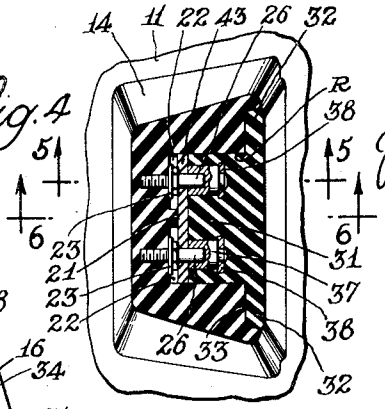


Fig. 6

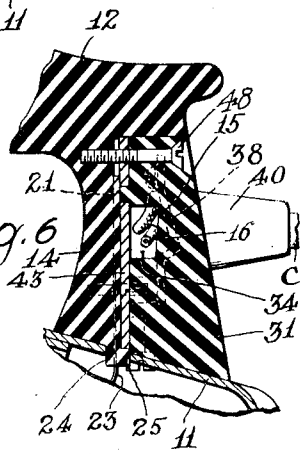
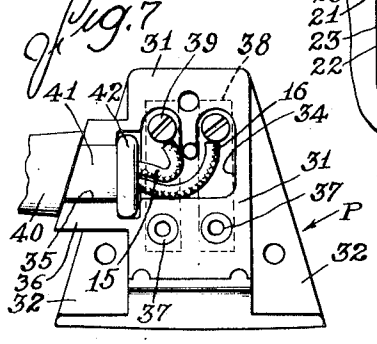


Fig. 7



INVENTOR

Merrill M. Kistner

By Parker, Carlson, Pegram & Hutton

ATTORNEYS

Patented Jan. 19, 1943

2,308,515

UNITED STATES PATENT OFFICE

2,308,515

ELECTRICAL CORD CONNECTOR

Merrill M. Kistner, Lakeside, Mich.

Application October 18, 1940, Serial No. 361,763

6 Claims. (Cl. 219—25)

The invention relates to cord connectors for portable electrical appliances and more particularly to an improved cord connector for electric irons.

One object of the invention is to provide a cord connector of the above general character embodying novel means for establishing connections between the conductors of a supply cord and the operating elements of an iron in which the parts subject to deterioration by heat are effectively protected from the heat of the iron.

Another object is to provide an improved cord connecter for electric irons embodying separable plug and receptacle elements incorporated in the handle of the iron in a novel manner to improve the appearance of the same and to eliminate any interference by these parts with the efficient use of the iron.

Other objects and advantages of the invention will become apparent from the following detailed description of the preferred embodiment illustrated in the accompanying drawing in which:

Figure 1 is a side elevational view of an electric iron embodying the features of the invention.

Fig. 2 is an end elevational view of the iron.

Fig. 3 is a perspective view of the connecting plug as viewed from the inner or receptacle engaging side, the supply cord being shown disconnected from the plug.

Fig. 4 is a horizontal sectional view of the rear standard of the handle structure including the cord connecting device incorporated therein taken along the line 4—4 of Fig. 1.

Figs. 5 and 6 are vertical sectional views of the rear standard of the handle structure including the connecting plug taken respectively along the lines 5—5 and 6—6 of Fig. 4.

Fig. 7 is an end elevational view of the plug as viewed from the inner side showing the supply cord connected thereto.

By way of illustration the invention has been shown incorporated in a steam-electric pressing iron having an ironing body comprising a base or shoe 10 of the usual triangular shape and a shell or casing 11 rigid with the base. A handle 12 is fixed to the top of the shell for manual manipulation of the iron. The handle, which is preferably formed of a dielectric molded plastic material, includes a suitable gripping portion terminating in generally vertical front and rear supports or standards 13 and 14 adapted for attachment to the shell 11. The electric heating element for the shoe 10 and other operating and control elements of the iron such as the thermostatic temperature control device are housed in the shell.

Current for energizing the heating element of the iron is supplied from any suitable source through a flexible supply cord C which ordinarily includes a pair of insulated conductors 15 and 16 enclosed in a rubber or woven fabric sheath. Such cords of course have a much shorter life than the ironing device itself, hence replacement of the cord is necessary from time to time. To facilitate such replacement the cord is terminated in a plug P of novel and advantageous construction removably insertable in a receptacle R in the handle structure to effect a quickly detachable connection between the wires 15 and 16 and the electrical elements of the ironing device. The construction also facilitates manufacture as the cord can be readily attached to the iron body after latter has been completely assembled and tested.

By reason of the novel form of the plug P and the receptacle R, the actual connection of the wires with the conducting elements of the plug is made at a substantial distance from the upper surface of the shell 11 so that the connection is effectively protected from the heat of the iron. Moreover, the plug is so constructed that a substantial mass of dielectric material is interposed between the shell and the connection. This dielectric mass, together with the dielectric material in the handle structure which substantially encloses the plug, is thus effective to electrically and thermally insulate the ends of the conductors at their point of attachment to the plug. This arrangement eliminates one of the primary causes of cord failure encountered in the operation of electric ironing devices.

Referring now to Figs. 4, 5 and 6 the receptacle R is formed in this instance by an outwardly and downwardly opening recess in the rear face of the standard 14 which as will be seen from the drawing, is of substantial cross sectional dimensions. The recess may be generally rectangular in horizontal section and desirably extends from the lower end of the standard to a point adjacent the junction of the standard with the gripping portion of the handle. A rib 21 (Fig. 4) integral with the standard and projecting from the vertical inner wall of the recess defines a pair of laterally spaced parallel grooves 22 for the reception of the electrical leads 23 preferably in the form of flat conductor strips. Where the standard meets the shell the grooves continue through a depending lug 24 shaped to fit snugly in an opening 25 in the shell. The leads 23 are

held in place in their respective grooves by terminals 26 threaded or otherwise anchored in the standard. These terminals are in electrical contact with the leads and their outer ends are arranged to project rearwardly and form prongs for cooperation with appropriate contact members of the plug P to provide a low resistance connection between the supply cord and the leads. It will be understood that the inner ends of the leads 23 are connected to the thermostatic control device and heating element of the iron in conventional manner.

The plug P is preferably constructed of the same dielectric material as the handle 12. As herein shown the plug is formed with an elongated generally rectangular body 31 adapted to fit snugly in the receptacle R and having laterally projecting flanges 32 at opposite rear side edges which fit in correspondingly shaped grooves 33 in the rear face of the standard. The outer surface of the plug is desirably shaped to conform to the lines of the handle so that there are no projecting parts to interfere with the usual handling of the iron. Moreover, the fitting of the plug in the handle in this manner improves the general appearance of the iron.

Referring now to Figs. 6 and 7 the inner face of the plug body 31 is recessed adjacent its upper end to form an outwardly opening chamber 34. This chamber also opens at one side to a generally U-shaped passage 35 extending through a shouldered portion 36 projecting laterally from the body of the plug. Below the chamber are a pair of transversely spaced socket members 37 positioned for registration in assembly with the terminals 26. The socket members are affixed at their inner ends to suitable conductor arms 38 of heat resisting material which extend in parallelism into the upper portion of the chamber 34, the members and the arms being embedded in the plug in the molding operation leaving only the outer ends of the members and the upper ends of the arms exposed. Terminal screws 39 are threaded into the exposed ends of the conductor arms to provide for the connection of the cord conductors 15 and 16. It will be apparent that with this arrangement the point at which the cord conductors are connected with the arms 38 is spaced substantially above the shell 11 and the substantial mass of the plug body is interposed between the shell and the connection to provide a high degree of heat insulation.

The cord C is introduced into the chamber 34 of the plug through the U-shaped passage 35 in the shoulder 36. To avoid undesirable bending of the cord at the point of entry into the plug, the end of the cord is enclosed in a flexible protective sheath 40 of rubber or other suitable material. The protective sheath is desirably molded to provide a gradual right angle bend. The section of the sheath adjacent the end of the supply cord is formed with a peripheral groove defining a reduced portion 41 adapted to be received in the passage 35. A flange 42 on the extreme end of the sheath fits within the chamber 34 and acts to lock the sheath to the plug. With the cord thus secured in place the insulation may be stripped from the ends of the wires 15 and 16 and these wires electrically connected to the conductor arms 38 by means of the terminal screws 39. A cover plate 43 (Figs. 3–6) preferably of insulating material, is suitably secured to the face of the plug body 31 to close the chamber 34, the plate being apertured as at 44 to permit the terminals 26 to pass into the sockets 37.

As shown in Fig. 5 the side portion of the standard 14 forming one wall of the receptacle R is notched as at 46 to receive the projecting shoulder 36 of the plug. This notch extends substantially perpendicular to the standard 14 so that the cord C enters the same at a convenient angle and is directed rearwardly of the iron by the curved protective sheath 40. The base of the notch 46 is formed to provide a concave seat 47 for engaging the reduced portion 41 of the sheath, the combined depth of this seat and the U-shaped passage 35 being such that the sheath is slightly compressed when the plug is inserted into the receptacle. This firmly locks the sheath and the enclosed cord to the iron. Entry of the terminals 26 in their respective sockets 37 upon assembly of the plug with the receptacle establishes an electrical connection between the conductors 15 and 16 and the leads 23 extending to the operating elements of the iron. The plug is then detachably secured to the standard as by screws 48. In this way the plug is rigidly held in place so that a positive low resistance connection is maintained between the terminals 26 and their cooperating sockets thus effectively preventing heat generation at this point which would adversely affect the cord connections.

It will be apparent from the foregoing that the invention provides a novel cord connecting device for portable electric appliances such as electric irons. The connecting device includes plug and receptacle elements which are incorporated in the handle structure in a novel and advantageous manner so that they are out of the way and do not interfere in the least with the operation of the iron. With this arrangement the plug may be shaped to conform to the lines of the handle with substantial improvement in the appearance of the ironing device as a whole. Due to the location of the cord inlet and particularly the union of the conductors 15 and 16 with the conductor arms of the plug, the parts of the cord and connecting device subject to deterioration or loss of pliability from heat are spaced substantially from the heated parts of the iron and are fully enclosed in the handle structure. Moreover, the substantial mass of the dielectric handle and plug interposed between the point at which the cord conductors are connected to the conductive elements of the plug serves to insulate the cord and electrical connections against the heat of the iron. Accordingly, one of the primary causes of cord failure is eliminated and the useful life of the cord is materially increased.

The present invention has been shown and described in connection with an ironing device of the type described and claimed in my copending application Serial No. 338,962, filed June 5, 1940.

I claim as my invention:

1. The combination with an ironing device having an ironing body and an electric heater therefor, of a handle including a gripping portion and a supporting standard adapted to be secured at its lower end to the body, said standard being formed of insulating material and having one face recessed to provide an outwardly opening receptacle, terminals fixed to the standard at the inner wall of the receptacle for terminating leads extending to the operating elements of said ironing device, a plug of insulating material shaped on one side to fit into the receptacle and on the other side to conform to

the contour of the standard so as to form therewith a substantially unbroken surface, socket members imbedded in said plug and positioned to disengageably receive said terminals when the plug is inserted in the receptacle, a chamber formed in said one face of the plug above said socket members, other terminals in said chamber for disengageable connection with the conductors of a supply cord, and conducting members electrically connecting said other terminals with said socket members.

2. The combination with an ironing device having an ironing body and an electric heater therefor, of a handle including a gripping portion and a supporting standard adapted to be secured at its lower end to the body, said standard being formed of insulating material and having one face recessed to provide an outwardly opening receptacle, terminals fixed to the standard at the inner wall of the receptacle for terminating leads extending to the operating elements of said ironing device, a plug of insulating material shaped on one side to fit into the receptacle and on the other side to conform to the contour of the standard so as to form therewith a substantially unbroken surface, socket members imbedded in said plug and positioned to disengageably receive said terminals when the plug is inserted in the receptacle, a supply cord having a pair of conductors, and means for disengageably connecting said conductors with said socket members.

3. In an ironing device, in combination, an ironing body having electrical heating means, a handle including a gripping portion and a supporting standard of insulating material secured to the body, an outwardly opening recess in one face of said standard, spaced parallel grooves in one wall of the recess opening into the ironing body, conductive leads extending from the ironing body into said grooves, terminal members mounted on said one wall within the respective grooves and electrically connected with said leads, a plug adapted to substantially fill the recess, a current supply cord terminating in said plug, and connecting means carried by said plug for electrically connecting the conductors of the cord with said terminals, said terminal members and connecting means adapted to make and break the connection upon insertion and removal of the plug.

4. The combination with an ironing device having an ironing body and an electric heater therefor, of a handle including a gripping portion disposed between front and rear supporting standards adapted to be secured to the ironing body, said handle being formed of molded plastic material, a receptacle defined by an outwardly opening recess in one face of the rear standard, terminals electrically connected with the operating elements of the ironing device and anchored in the standard at the base of the receptacle, a plug shaped to fit in said receptacle, socket members carried by said plug positioned to engage said terminals upon insertion of the plug into the receptacle, a chamber in said plug spaced from said socket members, means in said chamber for detachably connecting the conductors of a supply cord to said socket members, a shouldered portion extending laterally from one side of the plug, a passage extending from said chamber through said shouldered portion of the plug dimensioned to receive the supply cord and an enclosing protective sheath, a notch in the standard at one side of said receptacle for receiving the shouldered portion of the plug, and a seat formed at the base of said notch for engaging the protecting sheath of the supply cord and cooperating with the shouldered portion of the plug to compress the sheath when the plug is inserted in the receptacle.

5. The combination with an ironing device having an ironing body and an electric heater therefor, of a handle including a gripping portion and a supporting standard adapted to be secured at its lower end to the body, said standard being formed of insulating material and having one face recessed to provide an outwardly opening receptacle, spaced parallel grooves in one wall of said receptacle opening into the ironing body, conductive leads extending from the ironing body into said grooves, terminals fixed to the standard on said wall of the recess for terminating the conductive leads, a plug of insulating material shaped on one side to fit into the receptacle and on the other side to conform to the contour of the standard so as to form therewith a substantially unbroken surface, socket members carried by said plug and positioned to disengageably receive said terminals when the plug is inserted in the receptacle, a chamber formed in said one face of the plug above said socket members, other terminals in said chamber for disengageable connection with the conductors of a supply cord, and connecting members electrically connecting said other terminals with said socket members.

6. The combination with an ironing device having an ironing body and an electric heater therefor, of a handle including a gripping portion and a supporting standard adapted to be secured at its lower end to the body, said standard being formed of insulating material and having one face recessed to provide an outwardly opening receptacle, spaced parallel grooves in one wall of the receptacle opening into the ironing body, conductive leads extending from the ironing body into said grooves, terminals electrically associated with said leads and supported by said standard within said receptacle, a plug of insulating material shaped on one side to fit into the receptacle and on the other side to conform to the contour of the standard so as to form therewith a substantially unbroken surface, socket members carried by said plug and positioned to disengageably receive said terminals when the plug is inserted into the receptacle, a supply cord having a pair of conductors and means for disengageably connecting said conductors with said socket members.

MERRILL M. KISTNER.