

April 8, 1958

N. E. LOOMIS
CONTROL CONNECTOR PLUG

2,830,166

Filed Dec. 3, 1956

2 Sheets-Sheet 1

FIG. 1.

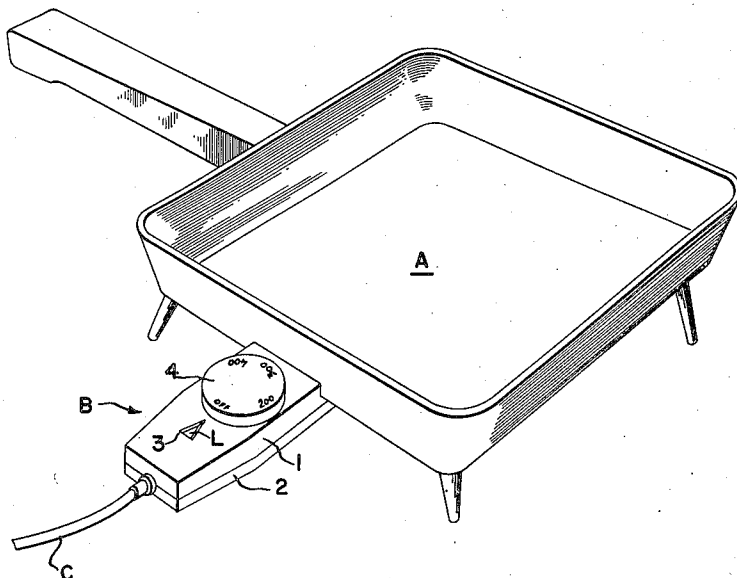


FIG. 2.

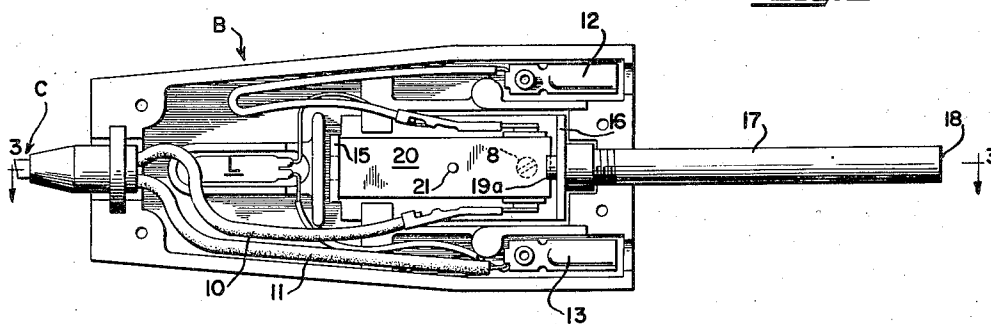
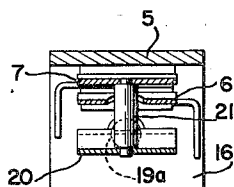


FIG. 3.



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Fig. 3.

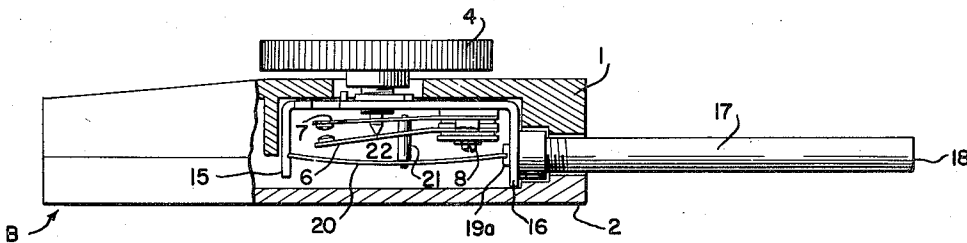
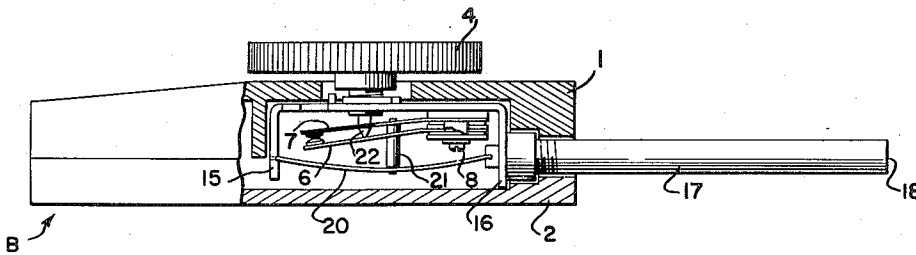


Fig. 4.

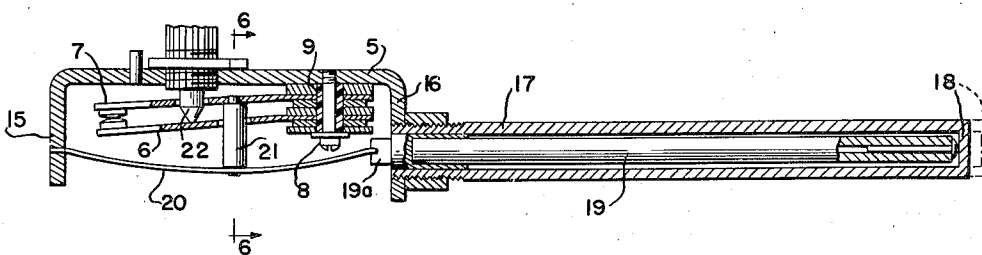
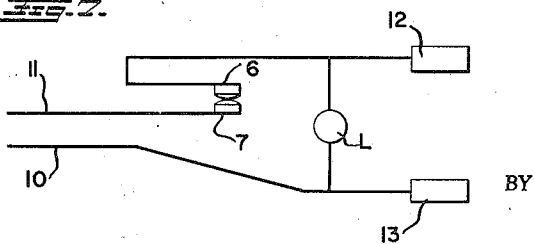


Fig. 5.

Fig. 7.



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CONTROL CONNECTOR PLUG

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Application December 3, 1956, Serial No. 625,747

4 Claims. (Cl. 219-44)

This invention relates to an electrical connector, more particularly to a plug for use in connection with cooking utensils having an electrical heating element.

A primary object of the invention is to provide a circuit including contacts which when engaged will permit current to be supplied to the utensil, said contacts being manually controlled by a suitable dial, and also automatically controlled in the respect that the circuit will be automatically opened or broken when the heat in the utensil has reached the point of the dial setting to avoid overcooking or burning the contents of the utensil.

A further object of the invention is to provide a simple, practical and reliable construction for automatically opening or breaking the circuit through the use of a bowed spring arranged in operative relation to said contacts. Said spring being actuated upon the occurrence of the relative differential length between a metallic, thermally responsive hollow conductor plug and a vitreous, non-thermally responsive element shielded within the plug, and movable in response to the longitudinal elongation of the plug to cause the contacts to separate.

With the above and other objects in view which will more readily appear as the nature of the invention is better understood, the same consists in the novel construction and arrangement of parts hereinafter more fully described, illustrated and claimed.

A preferred and practical embodiment is shown in the accompanying drawings in which:

Fig. 1 is a perspective view of a cooking utensil with the connector plug applied.

Fig. 2 is a bottom plan view of the upper section of the shell or casing and its contents, the bottom section having been removed.

Fig. 3 is a side elevation of the connector shell, partly in section taken on the line 3-3 of Fig. 2, illustrating contacts in closed position, according to the selected dial setting.

Fig. 4 is a view similar to Fig. 3 with the contacts separated, as for example, when the dial is in the "Off" position, or when they have been automatically separated.

Fig. 5 is an enlarged vertical sectional view of the bracket which supports the contacts and the metallic tubular thermally responsive member as well as the internal vitreous rod.

Fig. 6 is a cross-sectional view on the line 6-6 of Fig. 5.

Fig. 7 is a detailed circuit diagram.

Similar reference characters designate corresponding parts throughout the several figures of the drawing.

Referring to Fig. 1, it will be seen that the utensil A has the present connector plug B applied thereto. This plug includes a casing or shell comprising upper and lower sections 1 and 2 which receive the cord C having the usual line wires which are connected to the terminal contacts presently to be described.

The upper section 1 is provided with a window 3 for exposing a lamp so that when the circuit is closed, the

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lamp will be lighted to indicate that the plug is supplying current to the usual heating element of the utensil.

The upper section 1 is also provided with a rotatable dial 4 having suitable indicia thereon to indicate the degree of heat, and, also to show that when the circuit is broken, the lamp L will be dark and the contacts for breaking the circuit, are open.

The sections 1 and 2 house therebetween a bracket 5 which is of substantially U-shaped formation. This bracket supports a pair of spring contacts 6 and 7 in the form of spring blades with points or tips which may be engaged or disengaged to control the circuit. These blades are biased to normally engaging relationship, and are only separated to open the circuit upon manipulation of dial 4, or a bowed spring 20, as will later appear. Said blades are assembled at one end to the body of the bracket by a fastening 8 having an insulating sleeve 9 thereabout for passing through registering openings in the fixed or anchored ends of said blades 6 and 7.

The points of these contact blades when in engaging relation as shown in Figs. 3 and 5 permit current to flow from the cord C through the line wires 10 and 11 (Fig. 2) of the cord C to supply current to the plug terminals 12 and 13, which receive the usual prongs on the utensil and which are, in turn, connected to the heating elements encased in the utensil.

As will be apparent from the circuit diagram in Fig. 7, the contacts 6 and 7 are in the circuit including the terminals 12 and 13, and the lamp L is connected in parallel by the wire 14 which bridges the wires 10 and 11 across terminals 12 and 13.

The bracket 5 has offset arms 15 and 16 at the opposite ends of the body or medial portion thereof. The arm 16 is provided with a threaded opening for receiving the threaded portion of an aluminum or other metallic tube 17 which has the capacity to elongate when heated. The tube 17 is closed at one end by a wall 18 and is open at the other to receive a vitreous rod 19 which has no thermal response. This rod is provided with a cap with a cross slot therein for receiving one end of the automatic control spring 20. The opposite end of the spring 20 abuts the arm 15 of the bracket 5 in such a manner that the automatic control spring 20 is normally bowed to its maximum arc when the tube 17 is cold and the outer closed end 18 thereof is in abutting relation with the related end of the vitreous rod 19, thus maintaining the automatic spring 20 bowed to its maximum arc.

When the utensil is heated by the flow of current from the terminals 12 and 13 in the conventional manner, the tube 17 tends to elongate. As it elongates, the bowed automatic spring 20 causes the vitreous rod 19 to follow the inner face of the closed end wall 18 of the tube and the spring 20 tends to flatten out.

As will be apparent from Figs. 3, 4, 5 and 6, the medial portion of the spring 20 is provided with a pin 21 which passes through an opening in the blade 6 and therefore has no engagement therewith. The end of the pin 21 opposite the spring 20, however, is in abutting relation to the contact 7.

Assuming that the contacts 6 and 7 are engaged and the circuit to the heating element of the utensil is closed, the heating of the metallic tube 17 will take place and as the degree of heat increases, elongation increases due to the constant pressure exerted by spring 20 against rod 19 which is in constant contact with end wall 18 of said tube. When the predetermined temperature of the metallic tube 17 is reached, as determined by the dial setting, and the rod 19 has moved to the right (Fig. 5) a sufficient distance by following the end wall 18 to the dotted line position, the spring 20 flattens out and moves the

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contacts apart as shown in Fig. 4 and the circuit through leads 10 and 11 is broken.

As will be seen from Figs. 3, 4 and 5, for example, the blade portion of the contact 7 also has an opening through which the shaft 22 of the control dial A passes in order to engage the plate portion of the contact 6 and upon manual manipulation of the dial to "off" position the contacts 6 and 8 will be spread apart. In other words, the pin 21 moves through an opening in the blade 6 to engage blade 7 to automatically separate the contacts while manipulation of the dial A may also cause the opening of the contacts as shown in Fig. 4.

As the tube 17 cools off, the contacts will once engage and the current will reheat the utensil to the predetermined setting and the cycle will be repeated as long as the indicator dial is set at the selected temperature reading.

I claim:

1. In a connector plug for automatically breaking the circuit leading to the heating element of a cooking utensil comprising, an insulating shell, terminals for conductive connection with said heating element, a substantially U-shaped bracket mounted in the shell, a pair of spring contacts insulated from each other and from the bracket and having related ends thereof secured to the bracket while the opposite ends remain free, each of said contacts having openings therein, a metallic tube secured to the bracket and having one end wall thereof closed, a nonthermal responsive rod in said tube, a spring bowed between one arm of the bracket and said non-thermal responsive rod, and a pin passing through the opening in one of said contacts and connected to the other, whereby when the metallic tube elongates under heat, the bowed spring will push the rod to follow the closed end wall and, as the arc of the bowing spring flattens, the pin will move the contact with which it is connected to separate said contact from the other contact and open the circuit leading to said terminals.

2. In a connector plug for automatically breaking the circuit leading to the heating element of a cooking utensil according to claim 1, wherein, the shell is provided with a heat indicating dial including a shaft which when rotated will pass through the opening in the other of said contacts to manually separate the same.

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3. In a connector plug for automatically breaking the circuit leading to the heating element of a cooking utensil according to claim 1, wherein, the metallic tube has its open end threaded into one arm of the bracket.

4. In a connector plug for automatically breaking the circuit leading to the heating element of a cooking utensil comprising an insulating shell provided with an opening on one side thereof and enclosing terminals for conductive connection with said heating element, a support mounted in said shell, said support having a body portion provided with an opening and a pair of arms offset to the same side thereof, one of said arms having an opening, a metallic tube connected to the support at the opening in said arm and having a closed end wall, a non-thermal responsive rod in said tube, a pair of contacts engageable to close a circuit to said terminals, one of said contacts having an opening which is in registry with the opening in said shell and the opening in the body portion of said support heat control means including a dial externally mounted on said shell, a shaft connected to said dial and extending through each of said registering openings in said shell, said support and one of said contacts to operatively engage the other of said contacts thereby selectively spacing the same, a bowed spring confined between one arm of said support and said rod, and a connection between said spring and one of the contacts, whereby when the metallic tube elongates under heat, the bowed spring will push the rod to follow the closed end wall of said tube and, as the arc of the bowing spring flattens, the connection will move the contact with which it is connected to separate said contact from the other contact and open the circuit leading to said terminals.

References Cited in the file of this patent

UNITED STATES PATENTS

939,957 Geissinger Nov. 9, 1909

FOREIGN PATENTS

99,950 Sweden Oct. 1, 1940
543,995 Germany Feb. 12, 1932
648,202 Great Britain Jan. 3, 1951
725,341 Great Britain Mar. 2, 1955