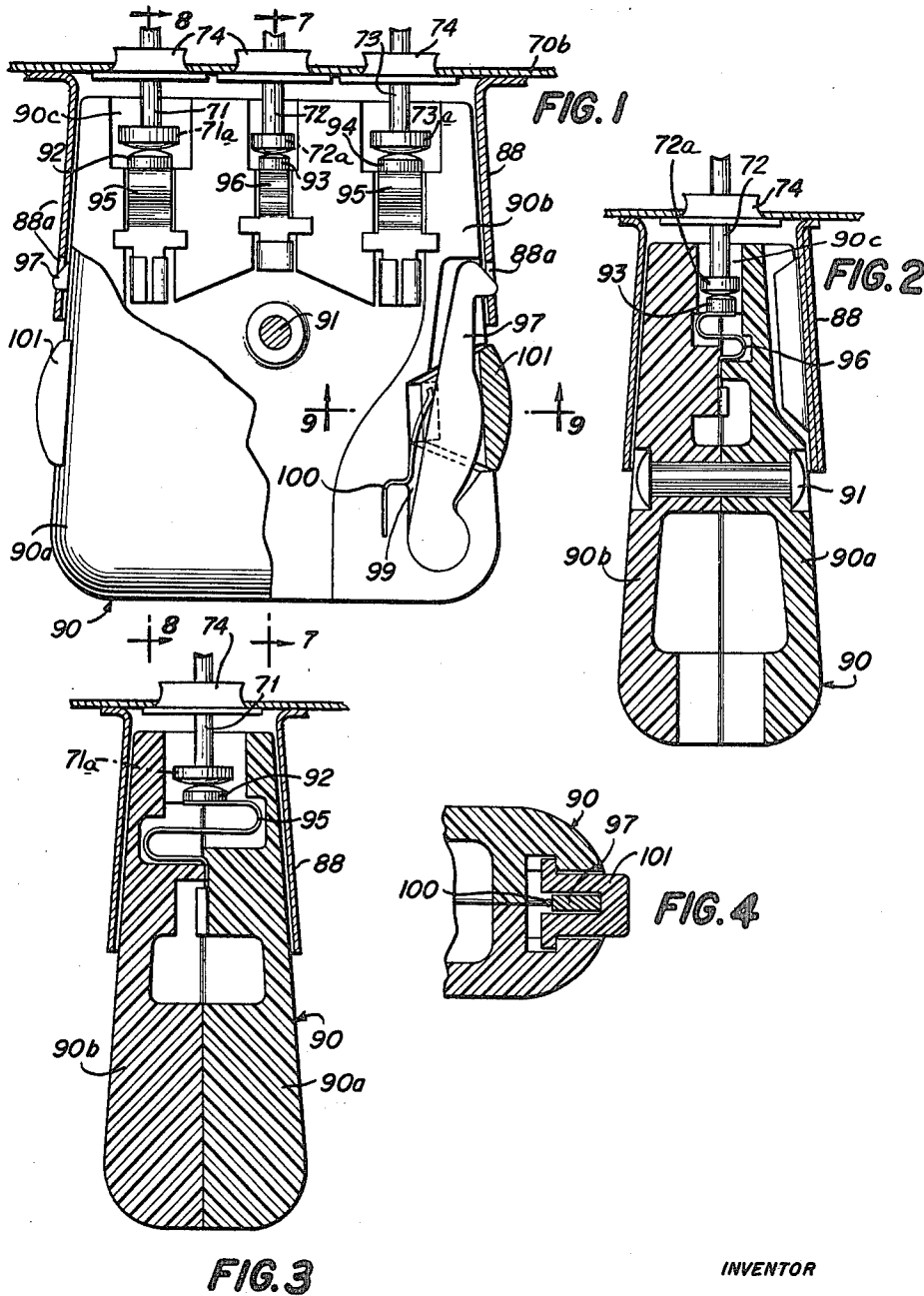


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ELECTRIC CONNECTOR FOR REMOTELY CONTROLLED
ELECTRIC HEATING AND COOKING VESSELS
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1

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ELECTRIC CONNECTOR FOR REMOTELY CONTROLLED ELECTRIC HEATING AND COOKING VESSELS

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4 Claims. (Cl. 339-91)

The present invention relates to remotely controlled electric heating and cooking vessels and, more particularly, to an electric connector arrangement for cooking vessels with built-in heating units which may be accurately controlled at all times with respect to temperature from a control unit remote with respect to the vessel. This invention is a division of copending application Serial No. 590,694 (series of 1948), filed June 11, 1956, which matured to Patent Number 3,098,918, issued on July 23, 1963, and assigned to the same assignee as the instant application.

When an electric cooking appliance contains an electric heating element and a heat sensing device in intimate contact with the bottom of the vessel, a suitable enclosure must be provided to protect these units from moisture during the cleaning operation subsequent to the use thereof. The enclosure should not only be watertight but must be hermetically sealed in order that a vacuum be maintained to reduce the pressure variations during the heating cycle. Hermetically sealing an enclosure presents problems in electrically communicating between the internal heating element and a suitable power supply and also between the sensing device and control system since this communication requires that terminals pass through the enclosure. Normally an easily damaged ceramic seal is employed to seal the terminals which are adapted to receive an electric power connector. Considerable danger of breaking the ceramic seal is encountered whenever an ordinary commercially available connector is either inserted or withdrawn with a slight angular or bending motion. Once the ceramic seal is broken, expensive repairs would be required in an effort to salvage the appliance. Since the electric cooking appliance normally requires from 10 to 15 amperes, a sound electrical contact between the terminal and the connector is essential to prevent arcing. If too great a tension or pressure is employed between any of the terminals and the ordinary plug, the ceramic seals could easily be broken during the inserting or withdrawing of the plug. Also if the alignment between the terminals and the openings in an ordinary plug is not perfect, the seals would be subjected to dangerous bending stresses.

Accordingly, it is an object of the present invention to provide a terminal plug that will have good electrical contact with each terminal of a hermetically sealed cooking vessel without causing damage to the terminal seals.

It is a further object of the present invention to provide a terminal plug that will greatly minimize the danger of breaking the ceramic terminal seals when the plug is inserted or withdrawn therefrom.

It is another object of the present invention to provide a connector whereby the alignment between the terminals and the corresponding openings in the connector is not critical.

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

For a better understanding of the present invention,

2

reference may be had to the accompanying drawings in which:

FIG. 1 is a top plan view, partly in section, of an improved electric connector;

FIG. 2 is a sectional view taken on line 7-7 of FIG. 1, assuming that FIG. 1 shows the complete structure;

FIG. 3 is a sectional view taken on line 8-8 of FIG. 1, also assuming that FIG. 1 shows the complete structure; and

FIG. 4 is a fragmentary sectional view taken on line 9-9 of FIG. 1, assuming that FIG. 1 shows the complete structure.

To supply electrical energy to a heating element in a hermetically sealed chamber under a cooking vessel or pan, not shown, it is customary to provide a so-called plug receptacle for the reception of a cooperating plug connector. As illustrated in the drawings, a plug receptacle 88 is provided which is secured by suitable fastening means 89 to the exterior of the vertical wall 70b of the pan, so as to enclose and protect from damage during service the portions of three electric receptacle terminals 71, 72 and 73 extending outside the hermetically sealed chamber. As best shown in FIG. 1 of the drawings, the walls defining the protective plug receptacle 88 are provided on either side with a pair of openings 88a, the purpose of which will become apparent from the ensuing description.

To make electrical connection with the terminal contacts 71a, 72a and 73a extending into the plug receptacle 88 there is provided, in accordance with the present invention, an improved plug connector 90, best shown in FIGS. 1, 2, 3 and 4 of the drawings. As illustrated, this plug connector is preferably formed of two molded parts 90a and 90b clamped together by a suitable rivet 91 or other fastening means. Housed within the connector 90 are a plurality of spring biased contacts, specifically designated as 92, 93 and 94, for respectively engaging the terminal contacts 71a, 72a and 73a through opening 90c in the connector which are sufficiently large to accommodate for slight misalignment between the corresponding contacts. These spring biased contacts are each designated as being supported on a separate spring structure member shaped somewhat in the form of a sine wave. The contacts 92 and 94 which carry the main heating current are illustrated as being supported on a somewhat heavier conductor 95, best shown in FIG. 3 of the drawings. The contact 93 on the other hand is supported on a smaller, but similar, spring conductor 96. These spring conductors 95 and 96 bias the associated contacts 92, 93 and 94 in a direction to make good sliding electrical connections with the respective terminal contacts 71a, 72a and 73a when the plug connector 90 is inserted into the receptacle 88. The spring conductors 95 and 96 are electrically connected with the appropriate conductors in a power cord, not shown. To make sure that such connections are maintained, the plug connector 90 is preferably provided with a pair of latch members 97 for making latching engagement with the openings 88a in the plug receptacle 88, as clearly shown in FIG. 1 of the drawings. The latch members 97 are preferably disposed in suitable recesses, such as 99, defined in the connector 90. A suitable spring wire 100, provided for each latch member 97, biases it into latching position. Preferably, a pair of manually actuated members 101 extend outside the plug connector 90 for ready manual engagement by the operator to release the latches 97. These manually actuated members 101 have the configuration shown best in FIG. 4 of the drawings to permit ready assembly thereof before the housing parts 90a and 90b are secured together.

Since the present invention illustrates an electrically heated appliance, rather heavy electrical loads of 10 to 15

amperes can be expected and safeguards must be present to insure the terminal contacts 71 and 73 will enjoy a long service life to circumvent the expense involved in the replacement of said contacts. The individually biased contact springs must be adjusted so that the contacts 71a, 72a and 73a are forced into good electrical connection and yet the pressure must not be great enough to crack brittle ceramic moisture seals 74. The correct individual pressure is insured because the latching arrangement will lock the connector 90 into the plug receptacle 88 in the identical position each time.

In view of the fact that the flat contacts are forced into electrical connection by biasing springs, the alignment between the terminals 71, 72 and 73 and the contacts 92, 93 and 94, respectively, is not critical to either good electrical contact or causing damage to the brittle ceramic seal 74. Thus, the likelihood of breaking hermetic seal 74 due to improper alignment is completely eliminated. Also, the limited clearance between the outside of the connector and the inside of the receptacle coupled with the ample clearance between the terminal contacts and the corresponding openings in the connector guarantees that the ceramic seal 74 will not be broken due to the operator inserting or withdrawing the connector with an angular motion. Therefore, the terminal contacts are subjected to only compressive forces and whereby avoiding damage to ceramic seals.

While there has been illustrated and described one embodiment of the present invention, it will be obvious to those skilled in the art that various changes and modifications thereof may be made, and it is intended in the appended claims to cover all those changes and modifications as fall within the true spirit and scope of the present invention.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. An electric connector for use with a receptacle having a terminal, comprising a hollow insulating support member enclosing at least one electrically conductive compression spring each having a substantially sinusoidal shape with an electric contact surface near one end thereof, said support member defining an opening affording access to said contact surface, said spring being disposed in front of said opening and oriented so that its principal axis of compression extends through said opening, said spring connected to said member at a point remote from said contact surface so that the engagement between said contact surface and terminal causes said spring to bias said support member away from the recep-

tacle, and manually releasing means on said member adapted to lock said member in engagement with the receptacle whereby said spring urges said contact surface into good electrical connection with the terminal and only a compressional force is exerted therebetween.

2. The connector of claim 1 wherein said releasing means includes latch means pivotally mounted on said support member, spring means biasing said latch means outwardly to a locking position, and manually actuatable means straddling said latch means and nested partially within said support member whereby compressing force applied to said actuating means depresses said latch means for releasing said support member from the receptacle.

3. The connector of claim 1 wherein said support member comprising two mold parts which are clamped together and securely hold therebetween the end of said spring remote from said contact surface.

4. The connector of claim 1 wherein said support member has an outside surface adapted to mate with the receptacle whereby the connector must be inserted into the receptacle in such a manner that the principal axis of compression of said spring is in alignment with the receptacle terminal.

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