

Nov. 29, 1966

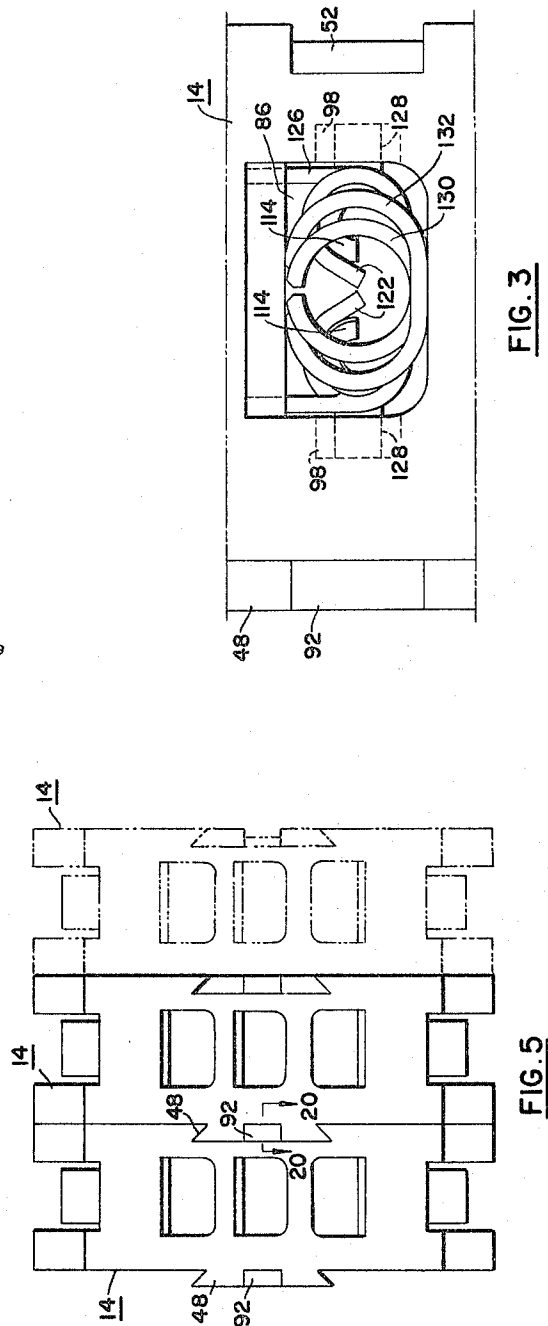
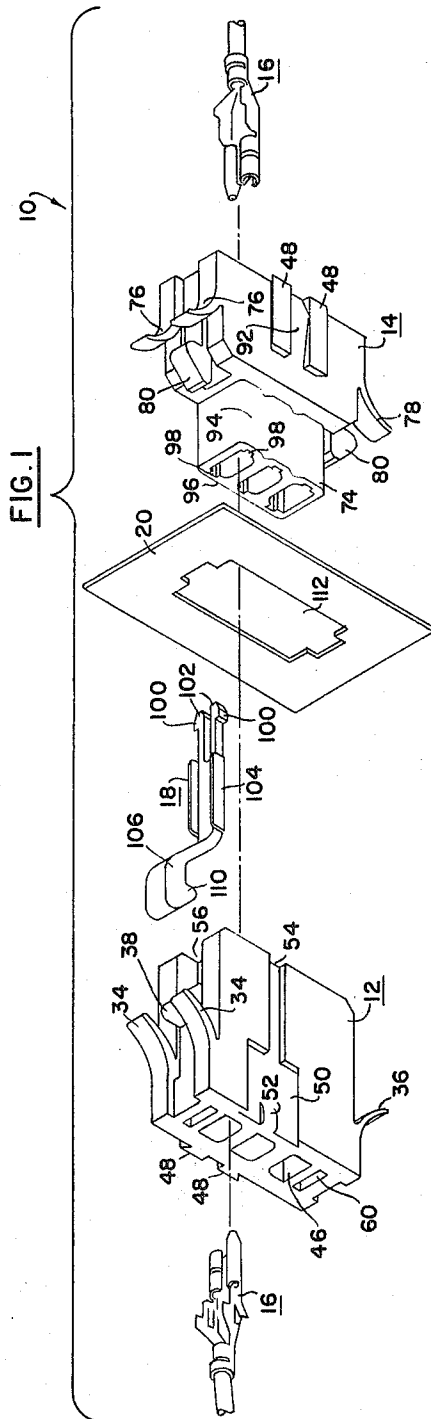
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3,289,145

APPLIANCE CONNECTOR

Filed April 9, 1964

6 Sheets-Sheet 1



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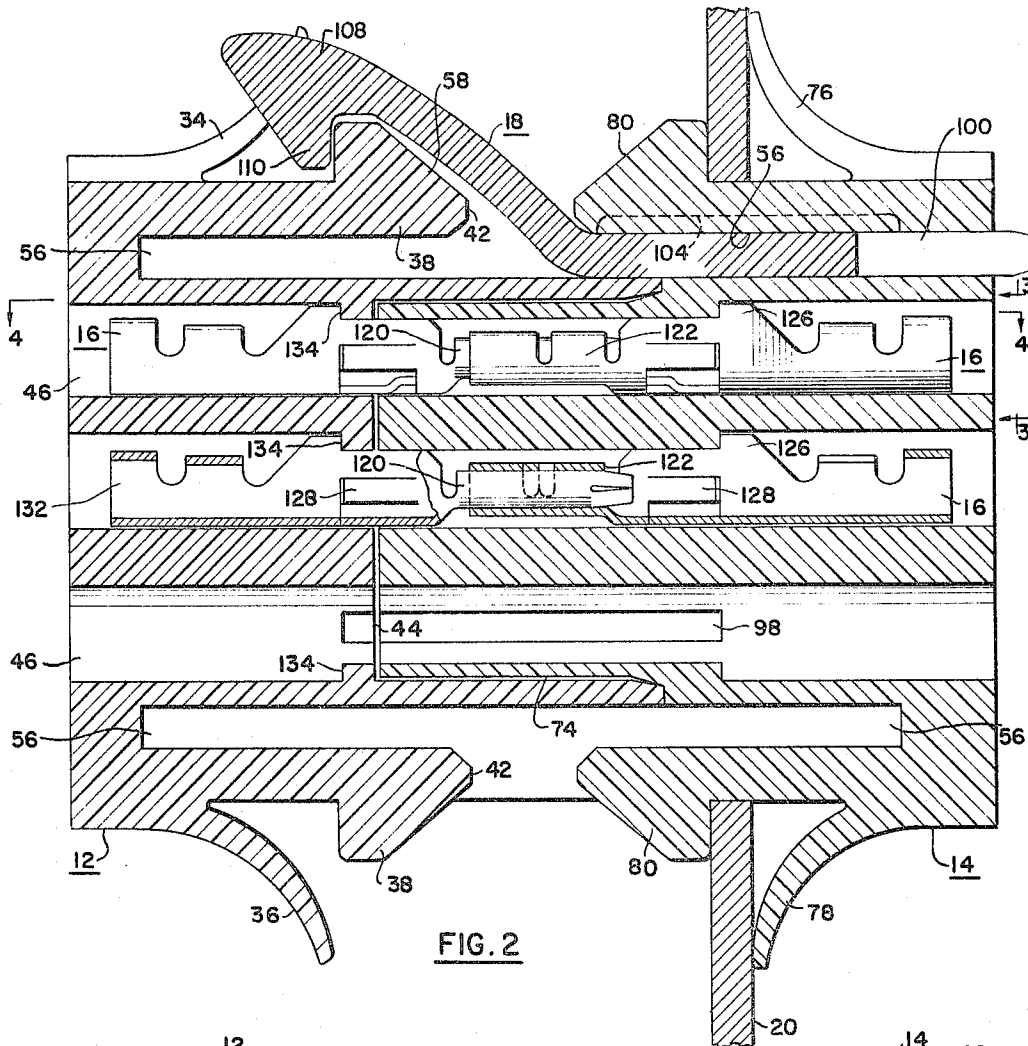


FIG. 2

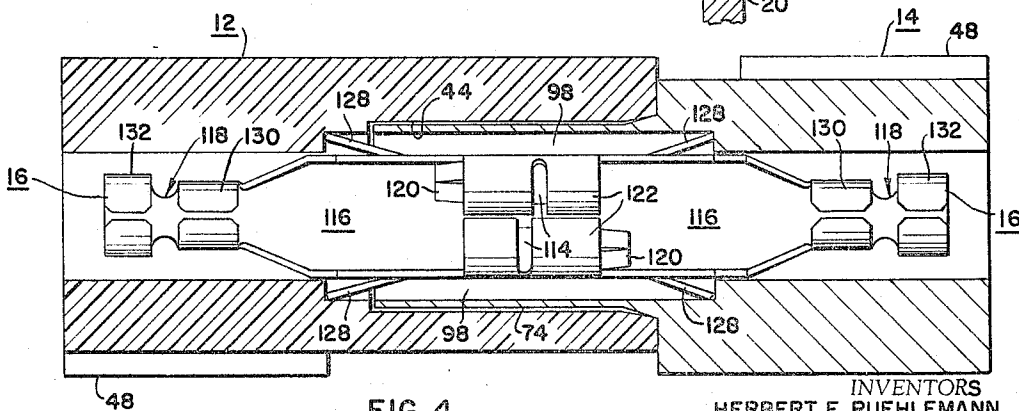


FIG. 4

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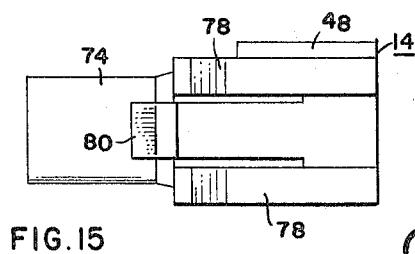
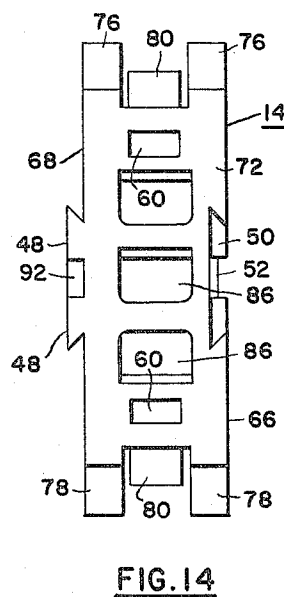
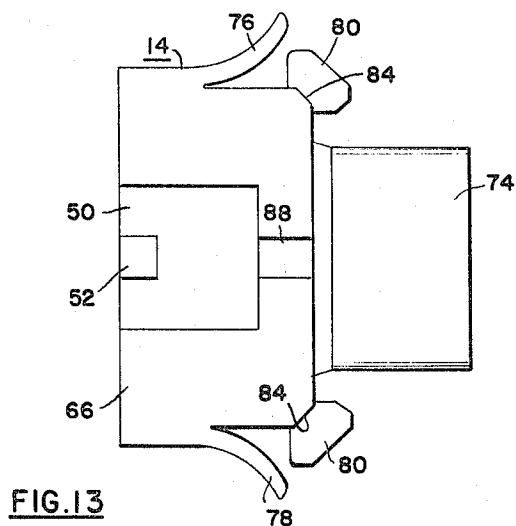
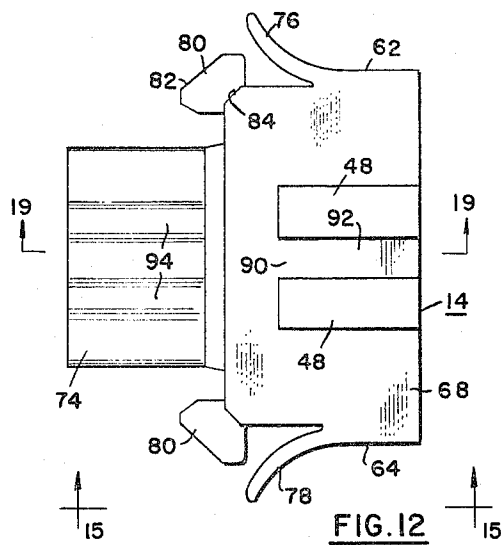
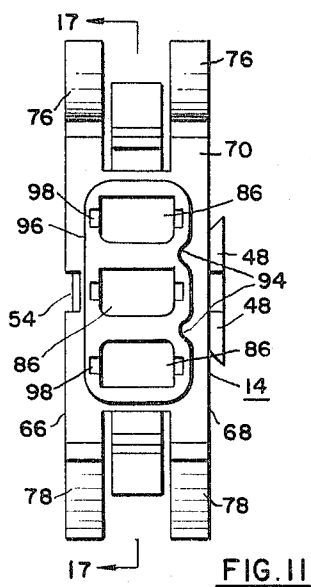
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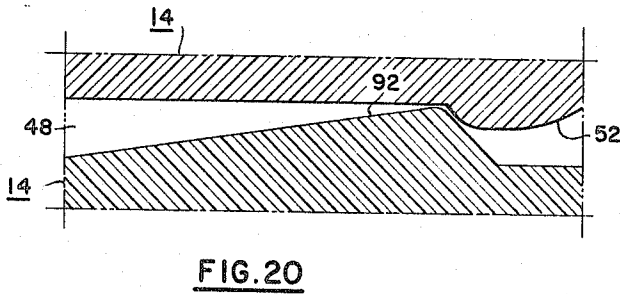
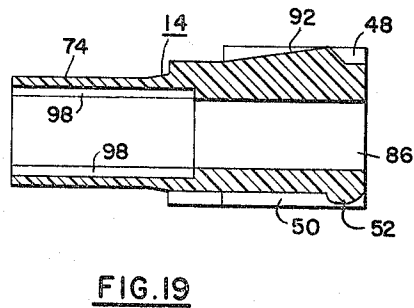
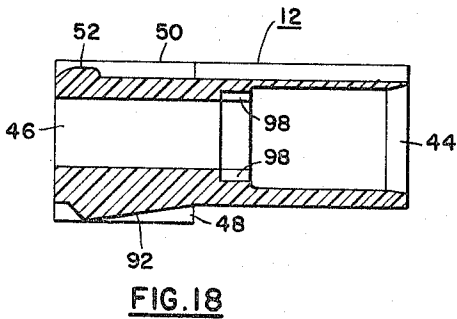
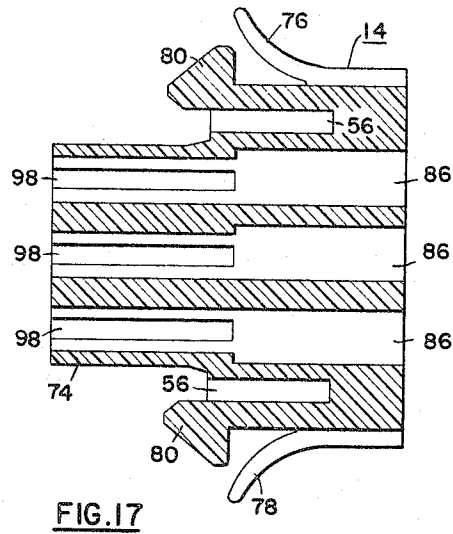
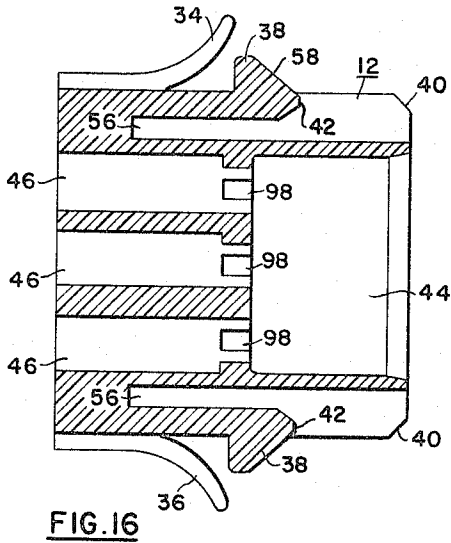
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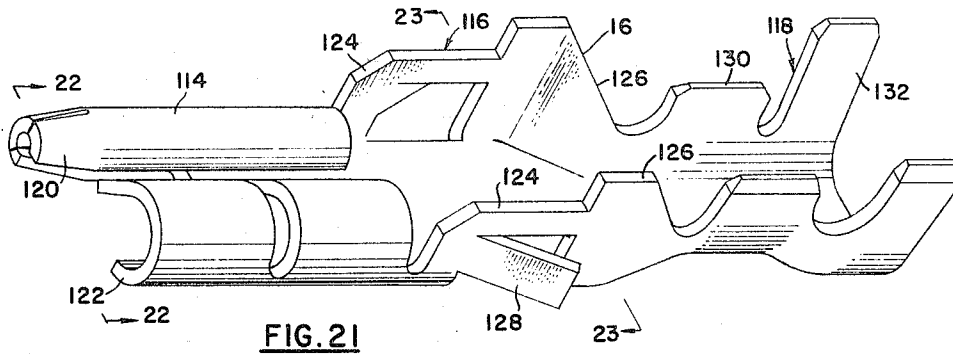


FIG. 21

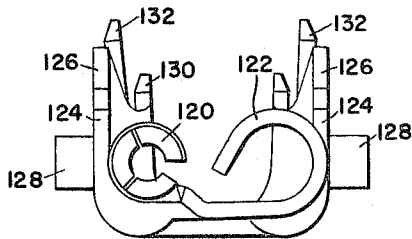


FIG. 22

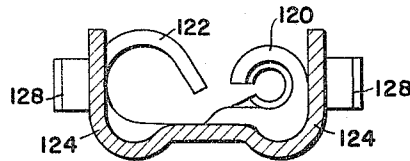


FIG. 23

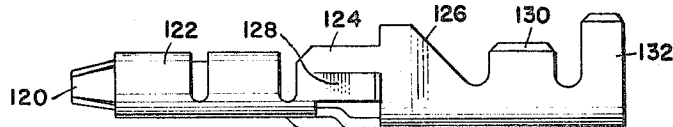


FIG. 24

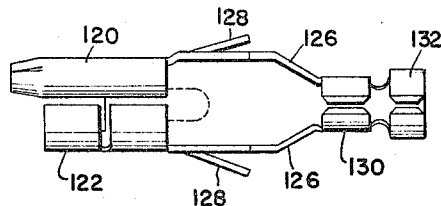
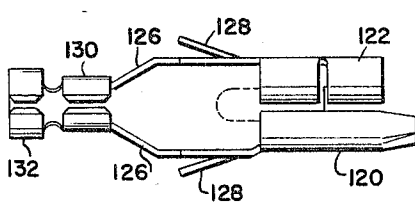


FIG. 25

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APPLIANCE CONNECTOR

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8 Claims. (Cl. 339-176)

This invention relates to an appliance connector and more particularly to an improved device of this general class.

In the wiring of electrical appliances, such as, vending machines, washing machines and dish washers, it is necessary to provide means whereby power may be brought to one or more appliances. Because the appliances generally must be fed with a relatively high current, the appliance must be provided with a connector that can safely handle the electrical load. It has been discovered in connection with the present invention that an appliance connector should possess at least the following desirable features:

- (1) The mating insulating elements thereof should be susceptible to being locked together for purposes of safety.
- (2) It should be possible to associate or gang several of the appliance connectors together.
- (3) The contacts of the appliance connector must safely handle the electrical load.

It is therefore an object of the present invention to provide a single appliance connector that has a locking feature, a ganging feature and a contact which will safely handle the usual appliance electrical load.

Yet another object of the present invention is to provide an appliance connector of great versatility wherein the receptacle and plug members thereof may be interchanged as desired with further versatility being obtained with the locking means being associated with either the receptacle or the plug element as desired in use, and a single contact construction being utilized in either the receptacle or plug elements.

Still another object of the present invention is to provide an appliance connector wherein the plug and receptacle elements thereof may be ganged together in varying patterns and with the contacts in the elements being so designed as to permit the interchanging of receptacles and plug elements.

Still another object of the present invention is to provide a contact of "hermaphroditic" construction which will receive in mating relationship another contact of identical construction but with the insulator for the respective contacts having a polarizing feature in order to avoid mismatching.

Yet another object of the present invention is to provide an appliance connector with insulating casings that can be molded under modern production techniques, and with a contact that can be produced also in accordance with modern mass production techniques.

The foregoing as well as other objects of the present invention are achieved by providing an appliance connector comprising a receptacle insulator and a plug insulator each of which have contact chambers in order to receive a hermaphroditic contact of improved construction. A locking lug is provided that can be received on either the receptacle or the plug insulator with the other insulator having a shoulder so that the locking lug will be snapped in place thereon to provide a positive lock. Both the receptacle and the plug insulators have tongues projecting from one side thereof and slots formed in another side thereof so that both receptacle and plug insulators may be ganged together in varying patterns. The re-

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ceptacle and plug elements are so contoured to mate in but one relationship and therefore have a polarizing feature. The contact of the present invention has a head section composed of a pin and a barrel in order to receive a barrel and the pin of a contact having a head section of identical construction. The contact further includes a locking lance and a spaced shoulder so that it may be simply snapped in place in either the receptacle or the plug insulator.

Other objects and many of the attendant advantages of the invention will become readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

FIG. 1 is a perspective exploded view of an appliance connector embodying the present invention in relationship with a panel of an appliance;

FIG. 2 is an enlarged view partly in section of the elements of the appliance connector of FIG. 1 assembled together and in mating relationship;

FIG. 3 is a rear elevational view taken along the lines 3-3 of FIG. 2;

FIG. 4 is a sectional view taken along the lines 4-4 of FIG. 2;

FIG. 5 is a rear elevational view partly in phantom showing several insulators of the present invention ganged together;

FIG. 6 is an elevational view taken of one side of a receptacle insulator of the present invention;

FIG. 7 is a front elevational view of the receptacle insulator of FIG. 6 taken along the lines 7-7 of FIG. 6;

FIG. 8 is a rear elevational view of the receptacle insulator of FIG. 6;

FIG. 9 is a view similar to FIG. 6 but taken from the other side of the receptacle insulator along the lines 9-9 of FIG. 7;

FIG. 10 is a top or bottom plan view of the receptacle insulator of FIG. 6 taken, for instance, along the lines 10-10 of FIG. 6;

FIG. 11 is a front elevational view of the plug insulator shown in FIG. 1;

FIG. 12 is an elevational view taken of one side of the plug insulator of FIG. 11;

FIG. 13 is a view similar to FIG. 12 but taken along the other side of the plug insulator of FIG. 11;

FIG. 14 is a rear elevational view of the plug insulator of FIG. 11;

FIG. 15 is a top or bottom plan view of the plug insulator of FIG. 11;

FIG. 16 is a sectional view taken along the lines 16-16 of FIG. 7, and FIG. 17 is a sectional view taken along the lines 17-17 of FIG. 11 with the receptacle insulator of FIG. 16 positioned so that the plug insulator of FIG. 17 appears about to enter it;

FIG. 18 is a sectional view taken along the lines 18-18 of FIG. 6, and FIG. 19 is a sectional view taken along the lines 19-19 of FIG. 12 with the receptacle insulator of FIG. 18 positioned so that the plug insulator of FIG. 19 appears about to enter it;

FIG. 20 is a greatly enlarged sectional view taken along the lines 20-20 of FIG. 5;

FIG. 21 is a perspective view of a contact that can be used with the present invention;

FIG. 22 is a front elevational view of the contact of FIG. 21 taken along the lines 22-22 of FIG. 21;

FIG. 23 is a sectional view taken along the lines 23-23 of FIG. 21;

FIG. 24 is a side elevational view on a reduced scale of the contact of FIG. 21; and

FIG. 25 is a top plan view showing two contacts of FIG. 21 about to be mated together.

Referring now to the various figures of the drawing

wherein like reference characters refer to like parts there is shown in FIG. 1 at 10 an appliance connector embodying the present invention. As shown in FIG. 1, the appliance connector 10 comprises a receptacle insulator 12 that is adapted to receive a complementary plug insulator 14. Contacts 16 are received in appropriate contact chambers of the receptacle insulator and the plug insulator, and a locking lug 18 is provided in order to achieve a positive locking of the receptacle insulator and plug insulator if deemed necessary. As further shown in FIG. 1, the appliance connector 10 is adapted to be received through an opening in panel 20 of an electrical appliance.

The details of the receptacle insulator 12 are shown in FIGS. 6 to 10. The receptacle insulator 12 possesses a top 22, a bottom 24, sides 26 and 28, front face 30 and rear face 32. The top 22 includes a pair of fingers 34 (FIG. 1) that may abut against the panel 20 when a reversibility feature of the present invention is placed in operation. FIG. 2 shows a pair of fingers associated with the plug insulator 14 that abut against the panel 20 and have the same function as the fingers 34 would have if the fingers 34 were disposed against the panel 20 when the positions of the receptacle insulator and plug insulator are interchanged. Similar fingers 36 extend from the bottom 24 (FIG. 10).

The receptacle insulator 12 also includes a top and bottom shoulder 38 that extends forwardly of the fingers 34 and 36 (FIG. 6) and, as shown in FIG. 2, is adapted to receive locking lug 18 in a positive locking action. As is apparent from FIG. 6, bevelled edges 40 are formed at the merger of the top or bottom and front walls with both top and bottom shoulders 38 also having a front ledge 42 (FIG. 7). As further noted in FIG. 16, the receptacle insulator 12 includes a large central cavity 44 for reception of the plug portion of the plug insulator 14 as will be described hereinafter. Formed rearwardly of the cavity 44 are individual contact chambers 46 (FIG. 16) for reception of contacts 16 as will be described hereinafter.

As further shown in FIGS. 7 and 9, the side 28 of the receptacle insulator possesses projecting tongues 48 that are adapted to be slid in slots 50 with central key 52 of an adjoining insulator (FIGS. 1 and 5) in order to position the insulators of the present invention in gang. As shown in FIGS. 1 and 6, slot 50 continues forwardly in a narrower slit 54.

It is to be noted that there is an open area 56 (FIG. 1) formed in both top 30 and bottom 32 which extends rearwardly from the front of the receptacle and then immediately inwardly of the shoulder 38 as shown in FIG. 2. The area 56 is designed to receive portions of the locking lug 18 in the position shown in FIG. 2 or in a reversed position as will be described hereinafter. As shown in FIGS. 2 and 6, the shoulder 38 has a forwardly inclined edge 58 in order to enhance the snap action of the locking lug 18 as it is seated in place. Slots 60 (FIG. 8) in communication with an open area 56 extend through rear portions of the receptacle insulator 12 in order to receive the rear portions of the locking lug 18 whenever the locking lug 18 is primarily connected to the receptacle insulator instead of to the plug insulator as illustrated in FIG. 2.

The details of the plug insulator 14 are shown in FIGS. 11 to 15 wherein the plug insulator 14 is shown to possess a top 62 and bottom 64, sides 66 and 68, front face 70, rear face 72 and plug element 74. Fingers 76 (FIG. 1) extend from the top 62 and fingers 78 extend from the bottom 64. Shoulders 80 project between the fingers 76 and 78 as shown in FIG. 12. The shoulders 80 include forwardly inclined edges 82 for use with the locking lug 18 in a manner as described in connection with inclined edges 58 of receptacle 12. Bevelled edges 84 are provided that are comparable to the edges 40 of receptacle 12. The plug insulator 14 also includes contact chambers

86 that are similar in construction but different in some respects from contact chambers 46. The plug insulator 14 further includes tongues 48, slot 50 with key 52 and a narrow slit 88 (FIG. 13) that is somewhat shorter than the slit 54.

As illustrated in FIGS. 4, 16 and 17, the plug element 74 of the plug insulator 14 is adapted to be received in the cavity 44 of the receptacle insulator 12.

Referring now to the tongues 48 of plug insulator 14, it is to be noted that the tongues 48 have a central slot 90 formed between them that is inclined outwardly in a ridge 92 (FIG. 1) for the purpose of achieving a locking action with the key 52 of another insulator (FIG. 20) whenever the insulators are ganged together as in FIG. 5.

As previously stated, the contact chambers 86 of plug 14 extend through the plug 74 whose outer configuration is somewhat corrugated at 94 as indicated in FIG. 1. The contact cavity 44 of the receptacle insulator 12 is similarly corrugated on one side thereof, and thus the plug 74 can be mated in the cavity 44 in but one polarized position. This polarizing feature is enhanced by providing another side of the plug 74 with a straight edge 96 and a similar straight edge in cavity 44. The plug insulator 14 also includes an open area 56 that is comparable to the area 56 of the receptacle insulator 12. The area 56 of plug 14 receives the locking lug 18 in a manner as illustrated in FIG. 2.

Certain internal details of the receptacle insulator 12 and the plug insulator 14 can be seen by an observation of FIGS. 16 to 20. In particular, the details of the contact chambers 46 and 86 are shown. FIGS. 16 and 17 reveal the extension slots 98 that extend for a considerable length of contact chambers 86 of plug 14 (FIG. 17) and for a short portion of the length beyond the cavity 44 of the receptacle insulator 12 (FIG. 16). The slots 98 in both contact chambers 46 and 86 receive locking lances of contacts 16 to hold them in place as will be discussed hereinafter.

As previously discussed, a locking lug 18 (FIGS. 1 and 2) is provided in order to provide a safe, positive lock to hold the receptacle insulator 12 and the plug insulator 14 together. The locking lug 18 essentially includes a pair of rear fingers 100 with heads 102 to provide a snap-in action in slot 60 of either the receptacle or the plug. The locking lug 18 further includes a stem 104 having raised sides that are positioned about the arms (FIG. 2) which terminate in either shoulder 38 or shoulder 80. The stem 104 terminates in a shoulder 108 having a ledge 110 that may be seated immediately behind the shoulder 38 (FIG. 2) of one of the insulator parts in a snap action.

The locking lug 18 itself is snapped into place with respect to either the receptacle insulator 12 or the plug insulator 14 by merely sliding the rear fingers 100 in area 56 and then backwardly into slots 60. The lug 18 is seated in place when the heads 102 which are compressed towards each other in passing through slots 60 snap to their initial condition after passing beyond the insulator.

When the receptacle insulator 12 and plug insulator 14 are brought towards the mating position of FIG. 2, the ledge 110 of the locking lug 18 is caused to ride upon the inclined edge 58 of insulator shoulder 38 until it clears the same and snaps to the position of FIG. 2 immediately after the respective insulator elements and contacts have fully mated.

It is to be noted that the panel 20 (FIG. 1) includes a cut-away area 112 that is adapted to receive portions of either the receptacle insulator or the plug insulator as desired. It is also further to be noted that the locking lug 18 may be received in the open area 56 of either the plug insulator or the receptacle insulator thus giving rise to a considerable degree of interchangeability. Furthermore, the tongues 48 and the slots 50 of receptacle or plug elements may be so formed in the sides of the respective insulators that the insulators can be ganged to-

gether as shown in FIG. 5 with either all receptacle or all plug insulators being ganged together or the two types of insulators being united together in varying patterns in accordance with the particular designs of the varying appliances that are being handled. It is further possible to gang together, for instance, a group of receptacle insulators, and yet permit the complementary plug insulators to be separately insertable in accordance with the demands of the particular situation.

A contact that may be used with insulators 12 and 14 and which can operate at 110 volts A.C. and 15 amps. is shown at 16 in FIG. 21. The contact 16 of FIG. 21 includes a head section 114, a body section 116 and a tail section 118.

The head section 116 consists of a male element 120 and a female element 122. The male element 120 is in the nature of a taper pin and the female element 122 is in the nature of a barrel or a receptacle as illustrated in FIG. 22. It is to be noted that the male and female elements 120 and 122 will mate with similarly constructed male and female elements (FIG. 25), and thus the contact 16 is hermaphroditic in the sense that it can mate with a contact of like construction.

The body section 116 of the contact includes a forward panel 124 and a rear panel 126 with a locking lance 128 extending from each of the panels 124.

The tail section 118 consists of forward circular wings 130 (FIG. 3) and rearward trough-like wings 132 in order to grasp a bared lead of an outside circuit and to be crimped thereupon.

The mating of contacts 16 is illustrated in FIG. 25 wherein a male element 120 of the right-hand contact is about to enter the female element 122 of the left-hand contact with the female element 122 of the right contact about to be entered by the male element 120 of the left contact.

The contacts 16 are inserted into the insulators 12 and 14 from the rear thereof as generally indicated in FIG. 1. The seated contacts are shown in FIGS. 2 and 4 wherein the locking lance 128 has been permitted to spring free in extension slots 98 to its original position once it has cleared a narrower area in the contact chamber as best shown in FIG. 4. Thus, withdrawal of the contact 16 is prevented. Further forward movement of the contact 16 is restrained by means of the engagement of rear contact panel 126 with a narrow section 134 of the insulator (FIG 2).

It is thus seen that an extremely versatile appliance connector is provided by the present invention. The receptacle insulator and plug insulator are polarized and are essentially interchangeable with respect to panel 20 because of fingers 34, 36, 76 and 78. The locking lug 18 is of such construction that it may be seated upon either the receptacle insulator or the plug insulator as desired. The locking lug 18 includes a shoulder that will snap into locking position when the plug insulator is mated with the receptacle insulator irrespective of whether the locking lug is initially secured to the insulator or the plug. In addition to the foregoing feature, the insulators of the present invention include tongues and slots so that they may be ganged together in varying patterns. Furthermore, the contact of the present invention has high current carrying capacity and still is hermaphroditic.

Obviously, many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore, to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

We claim:

1. In combination at least two insulators ganged together in a locking action, each of said insulators having side walls, one of said insulators having a pair of tongues projecting from a side wall thereof, a depression formed between said tongues having a ridge inclined outwardly toward said tongues, the other insulator including a projecting key along a side wall thereof and slots adjacent said key with said locking action being achieved by the interfitting of said tongues and said slots with said ridge being snapped behind said key.

2. The invention of claim 1 wherein said insulators each include at least one contact chamber having contacts seated therein.

3. The invention of claim 1 including fingers extending from said insulators adapted to be positioned against an appliance panel.

4. An appliance connector comprising at least one interfitting receptacle insulator and plug insulator, each having at least one contact chamber having a contact seated therein, a separable locking lug including a locking shoulder adapted initially to be associated with one of said receptacles and said plug, said locking lug also including a stem terminating in at least one finger having a head, said plug and said receptacle having a slot adapted to receive said stem with said head being detachably locked in a snap-in action, said receptacle and said plug each having a seating shoulder, whereby said locking lug may be seated upon either said receptacle or said plug with the locking shoulder of said lug snapping into locking engagement on one of said seating shoulders to lock said insulator and plug together.

5. The invention of claim 4 wherein said insulator and plug will mate in but one position.

6. The invention of claim 4 wherein a side of said insulator and said plug includes at least one tongue and another side of said insulator includes at least one slot whereby at least two insulators of identical construction may be ganged together.

7. The invention of claim 4 including fingers extending from said insulators adapted to be positioned against an appliance panel.

8. A contact comprising a body section, a head section and a tail section extending therefrom, said head section including a tapering male element and a female element in the nature of a barrel, whereby said contact head section will mate with a head section having a male and female element of like construction, said contact further including a pair of locking lances adjacent the sides thereof adapted to spring to an initial position when properly seated in an insulating casing.

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