

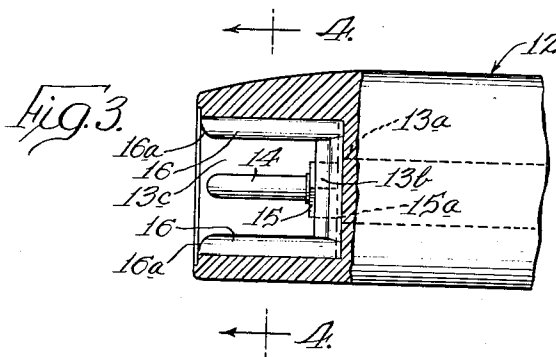
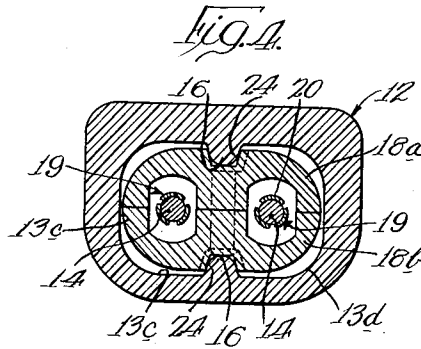
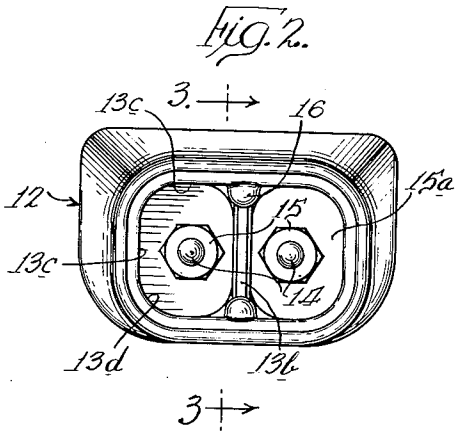
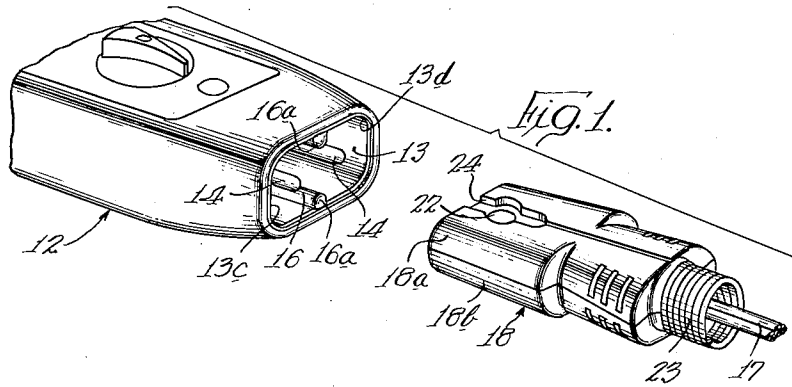
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APPLIANCE PLUG AND RECEPTACLE

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APPLIANCE PLUG AND RECEPTACLE

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This invention relates generally to electrical connectors and, more specifically, to receptacles and plugs of the type used on electrical appliances having removable cord and plug sets.

In recent years, a trend has developed toward the use of many portable electrical appliances in the home. Most of these appliances are in the nature of automatic cooking appliances of various types. It is fairly commonplace to find homes equipped with as many as four or five of these appliances, such as toasters, egg cookers, waffle bakers, coffee makers, frypans, etc. All of these appliances are characterized by the use of high wattage electrical heating elements mounted integrally therein. In supplying electrical energy to these heating elements, a power cord, or a cord and plug set as it is commonly termed, is conventionally employed which serves to connect a pair of terminals on the appliance with a conventional wall type electrical outlet found in most homes today.

In an effort to make the portable electrical appliances as efficient and quick operating as possible, manufacturers have increased the wattage and current carrying capacity of most of the appliances to the limit which could be accommodated on the usual household circuit. At the present time, many of these appliances draw from 1,000 to 1,300 watts or approximately 9 to 12 amperes on the conventional 110 v. circuit. With the appliance circuits carrying currents of this magnitude, much difficulty has been encountered in providing easily detachable cord units which will continuously conduct such currents in a satisfactory manner. It has been found that excessive heat is generated and failure often occurs at the point where the appliance power cord is detachably secured to the terminals of the electrical appliance.

This connection conventionally takes the form of a pair of terminal studs extending in parallel relationship from the side of the appliance and a plug member, which is secured to the appliance cord and provided with a pair of apertured terminals which are slidably received on the terminal studs. The detachable connection between the appliance and the power cord is located between the two pairs of terminals which are slidably engaged and held in contact by some form of resilient means. To minimize the danger of electrical shock to the operator, it is conventional for these terminal studs to be received within a recess or receptacle on the appliance. The plug member is designed to enter the recess or receptacle to engage the terminal studs and forms a closure for the opening to the recess while the studs are energized. With the studs in such a receptacle, it is impossible for the operator to touch the energized studs after they have been initially engaged by the plug member.

It is desirable, therefore, that the plug member fit snugly enough into the appliance receptacle to protect the operator against inadvertent contact with the energized terminal studs. It should also be appreciated that walls of the recess may perform a guiding and supporting function for the plug as it is applied to the terminal studs. Thus, the walls may guide the plug as to the proper direction and position for entry of the relatively small terminal into the mating openings in the plug. The walls may also prevent damage to the studs through deflection of the plug after it has been applied to the studs.

For the recess walls to perform this supporting func-

tion satisfactorily, it is necessary for there to be a fairly close fit between the plug and the receptacle walls. As a consequence of the manufacturing tolerances in the plug and the portion of the appliance defining the receptacle, it may be difficult to obtain the desired amount of support without occasionally encountering an interference fit between the plug and the recess walls. The problem may be particularly troublesome as a result of the shrinkage and distortion which occurs in many molded plastic parts. It would, therefore, be desirable to provide means in a terminal receptacle to reduce the manufacturing tolerances which must be maintained to achieve a receptacle which guides and supports a mating plug member.

It is, therefore, an object of the present invention to provide an improved appliance receptacle which adequately guides and supports a mating plug member.

It is an additional object of the invention to provide an appliance receptacle having ribs formed thereon to guide and support a mating plug member.

It is a further object to provide a receptacle and plug having cooperating ribs and grooves symmetrically arranged so that the plug can be inserted in either of two ways to permit easy assembly of the plug into the receptacle.

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 a part of this specification.

For a better understanding of the present invention reference may be had to the accompanying drawings in which:

FIG. 1 is a perspective view of an appliance receptacle and a plug embodying the present invention;

FIG. 2 is an elevational view of the appliance receptacle of FIG. 1;

FIG. 3 is a sectional view taken along line 3-3 of FIG. 2; and

FIG. 4 is a sectional view taken along line 4-4 of FIG. 3, assuming FIG. 3 shows the plug and receptacle assembled.

Referring now to the drawings, there is shown an embodiment of the present invention in the form of an appliance receptacle as included in the handle of an electric frying pan and a plug unit therefor. In FIG. 1, there is shown a portion of the handle of an electric frying pan 12 which is preferably formed of a molded insulating material such as one of the many synthetic resins. The complete frying pan of the type illustrated in part in drawings may take the form of the one disclosed in detail in my copending United States patent application Serial No. 395,824, filed December 2, 1953, now Patent No. 2,744,995. For the purpose of accommodating the separable electrical connection to the appliance, the terminus of the handle has been formed with a plug recess 13. The recess 13 opens toward the free end of the handle and is adapted to receive a plug connector member in a manner well understood in the art. To conduct electrical energy to the heating element of the frying pan, there is provided a pair of elongated terminal studs 14, which are mounted in a bottom wall 13a of recess 13. The elongated terminal studs 14 are insulated from each other and secured to the base of the recess 13 by means of hexagonal nuts 15 which are threadably received on the terminal studs to retain them in assembled relation to the handle member 12. To distribute the force of assembly nuts against the wall 13a, a pair of washer plates 15a are assembled between the nuts 15 and the insulating wall 13a. To maintain the washer plates 15a in spaced relation and insulated from each other, the bottom wall 13a

has a transversely extending rib 13b which is located between the plates 15a. It should be understood that suitable electrical connections are provided in the interior of handle 12 to connect the terminal studs 14 to the heating element for the electrical appliance which, in the illustrated embodiment, is a frying pan.

To permit the slidable insertion of a suitable connecting member into the recess 13, outwardly extending walls 13c, which define the recess 13, are parallel and describe a generally rectangular enclosure having rounded corners 13d. Intermediate the edges of the wider walls of the recess 13, guiding ribs or key members 16 extend longitudinally of the recess along the walls 13c. To facilitate the entry of the cooperating plug into recess 13, the outer ends of guiding ribs 16 are provided with rounded ends 16a to guide the plug into the recess. With the exception of the key members 16, the electrical receptacle comprising the recess 13 and terminals 14 is similar to those known in the art and is described generally in my above-mentioned copending application. The guiding ribs 16 are provided to guide and support an electrical connector which is received on the terminals 14.

For the purpose of connecting the source of electricity to the electric frying pan 12, a power cord 17 and plug unit 18 are provided. A flexible type of two conductor insulated cord is employed which may be connected to a suitable electrical outlet. The plug 18 may be of generally conventional construction having an insulated housing which serves to support the contacting members of the plug in insulated spaced relation. Serving as contacting members and secured to the ends of the two conductor power cord 17 are a pair of apertured terminal members 19. Each terminal member 19 is made up of two or more contacting elements 20 which define an aperture within which the terminal studs 14 may be received. The aperture defined by the contacting elements 20 is of smaller diameter than the terminal studs 14. Thus, when the terminal studs 14 are inserted in the apertured terminal members 19, the contacting elements 20 are deflected outwardly as is well known in the cord and plug art. In resisting the outward deflection, the contacting element 20 are resiliently biased against the terminal studs 14. The adequacy of this biasing force, as well as the smoothness of the mating surfaces of the studs 14 and contacting elements 20, determines whether or not a low resistance conduction path will be achieved at the plug connection. The plug 18, which supports the apertured terminal members 19, is composed of a pair of housing members 18a and 18b which are secured together by means of a rivet 22. The housing formed by the abutting plastic members 18a and 18b is adapted to enclose and support the connections between the flexible conductor 17 and the spaced apertured terminal members 19. A suitable cord guide 23 comprising a coiled spring member is threadably received on the end of plug 18 from which conductor 17 extends.

As can be seen in FIG. 4, the apertured terminals 19 are spaced and aligned to be received upon the appliance terminal studs 14. In order that the plug 18 may be slidably received within the recess 13 without encountering the key members 16, the plastic housing members 18a and 18b are formed with a pair of axially extending grooves 24 which receive the ribs 16 when the plug 18 is received in the appliance receptacle. In that the key members or ribs 16 are centrally located on the longer of the walls 13c and the grooves 24 are centrally located on the members 18a and 18b, the plug 18 may be inserted with either half of the plug housing uppermost. With the ribs 16 and grooves 24 so arranged, the plug 18 will not have to be selectively inserted into recess 13; when-

ever plug 18 is held in the flat position it may be slid axially into the recess 13. It should be appreciated from the sectional view of FIG. 4 that the walls 13c of the recess 13 are spaced from the walls of the plug 18 around the entire periphery of the plug. The guide ribs 16 are, however, in sliding engagement with the grooves 24 of the plug 18. The support and guiding action of the receptacle upon the plug is brought about entirely by the cooperation between the guiding ribs 16 and the grooves 24. By reducing the area of engagement between the plug and the receptacle to the ribbed and grooved area, manufacturing problems are reduced considerably while retaining all of the functional advantages. It is much easier to maintain the respective tolerances on the ribs and grooves for sliding interengagement than it would be on the plug and receptacle walls themselves.

By constructing the two ribs and grooves symmetrical with respect to a vertical plane through the axis of the receptacle and plug combination, the modified plug construction constituting the invention does not hinder the normal process of inserting the power plug into the appliance receptacle.

Although there has been described and illustrated a specific embodiment of the present invention, it will be understood that various changes and modifications will occur to those skilled in the art, and it is aimed in the appended claims to cover all such 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. In an electrical appliance, a member having a socket therein, terminal studs extending along said socket, an electrical plug member of molded insulation adapted to be inserted into said socket and connectors carried in said member for engaging said terminal studs, said socket and said member being of such relative sizes and configurations that a substantial clearance is provided therebetween around substantially the entire peripheries thereof when said member is positioned in said socket with the connectors in engagement with said studs, said socket having a pair of ribs extending along opposite sides thereof in positions parallel with said studs, said plug member having grooves on opposite sides thereof for fitting closely over said ribs.

2. In an electrical appliance, a tubular socket, a pair of terminal studs extending along said socket in parallel positions and spaced from the side walls of said socket, said socket having a pair of opposed ribs parallel with said terminal studs and lying in a plane equidistant from each terminal stud, a plug body adapted to fit loosely in said socket and having a pair of grooves extending longitudinally thereof for fitting closely over said ribs, and a pair of electrical connectors carried by said plug body in positions fitting over said terminal studs when said plug body is inserted into said socket.

References Cited in the file of this patent

UNITED STATES PATENTS

1,157,026	Mechenmoser	Oct. 19, 1915
1,645,261	Sutherland	Oct. 11, 1927
1,976,779	Grant et al.	Oct. 16, 1934
2,408,556	Hasenwinkle	Oct. 1, 1946
2,444,046	Jacobs	June 29, 1948
2,745,938	Brandler	May 15, 1956
2,765,449	Tuchel	Oct. 2, 1956

FOREIGN PATENTS

159,505	Switzerland	Apr. 1, 1933
616,550	Germany	July 31, 1955