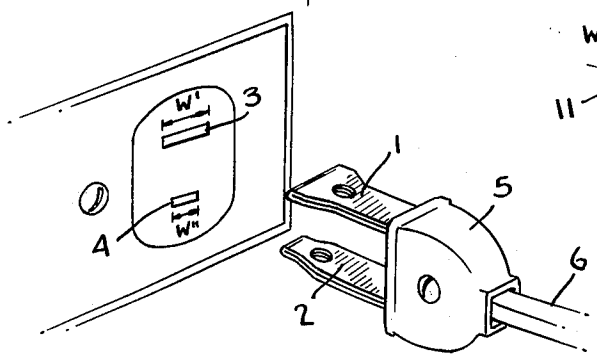
Sept. 22, 1964 F. KLUMPP, JR 3,149,898

POLARIZED ELECTRIC PLUGS

Filed Feb. 13, 1958

Fig. 1.



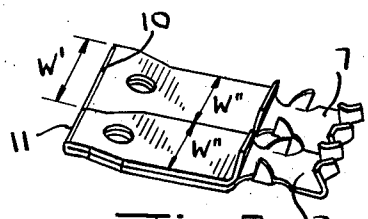


Fig. 3.

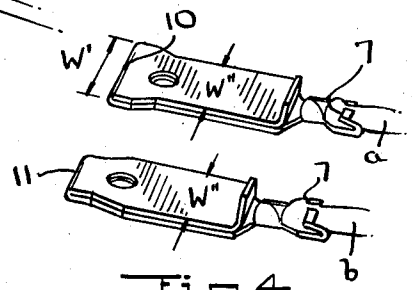


Fig. 4.

Fig. 2.

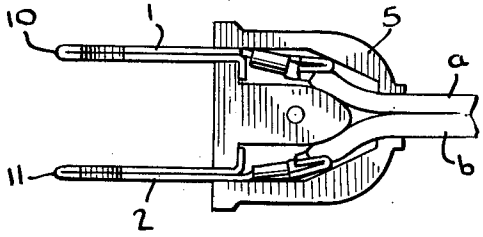


Fig. 5.

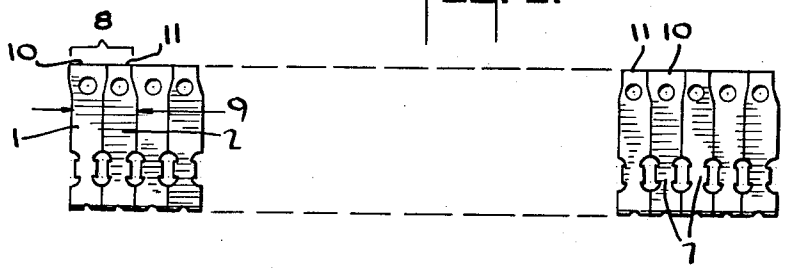
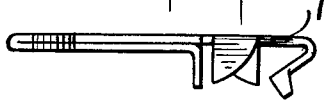


Fig. 6.



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POLARIZED ELECTRIC PLUGS

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The present invention relates to polarized contact blades for electric plug caps.

In my prior U.S. Patent #2,476,738, there is disclosed a blade and cap assembly for connecting line cords to standard electric outlets. In recent years, there has been an increased tendency to construct electrical equipment and appliances with a portion of the equipment or appliance attached to one side of the electric line. Thus, so-called "A.C.–D.C." house receivers, by the nature of the voltage doubling circuits employed must necessarily operate with their chassis connected to one side of the supply line. With such receivers, a hazard is presented if the line cord should be plugged in with a polarity that places the chassis of the receiver at line potential above ground. Thus, a person standing at ground potential may receive a severe shock by touching the exposed chassis of such a receiver. With the advent of "A.C.–D.C." television receivers, the hazard is increased because of the high potentials utilized in the power supply thereof and the possible breakdown to chassis of parts thereof.

As a result of these dangers, it has become standard practice to manufacture electric outlets with one contact opening to receive a blade having a given width, and the other contact opening having a different width. Then if the blades of the inserted line cord plug are given the appropriate width dimension the plug can be inserted into the outlet in only one way, i.e., with only one polarity.

Prior devices to accommodate this arrangement have employed such varying width blades, but have been uneconomic of material and difficult to assemble in quantity as will later be described.

The object of the invention is to provide contact blade sets for use in polarized plugs that are effective, easy to manufacture, economical of material, and can be used in standard electric outlets.

Although the drawings show the embodiment of the invention as practiced in conjunction with the teachings of my Patent #2,476,738, as will be seen, the principles of the invention can be applied independently.

Today, most standard electric sockets are polarized with two contact blade openings adapted to receive two different widths of contact blade, one width being the standard width clearing a blade of approximately ¼ of an inch and the second width clearing a blade of about 5/16 of an inch.

The polarized electric socket openings thus adapted can receive a standard non-polarized electric plug cap assembly which has both blades of ¼ of an inch width without regard to polarity. If a polarized plug is used having one blade with a 5/16 of an inch width, however, the larger dimension of the 5/16 of an inch blade prevents its insertion in other than the desired polarity.

It has been common practice to manufacture electric blades from long strips of metal as shown in my U.S. Patent #2,558,052, which in turn result in long strips of blades that are assembled automatically by machine to a line cord and in properly detached pairs, as generally shown in my U.S. Patent #2,727,236.

As previously manufactured, blades for polarized plugs could not easily be manufactured in strips and assembled in standard machines because of the variation in blade widths.

The use of a ¼ of an inch blade and a 5/16 of an inch blade has previously resulted in an additional 1/16 of an inch of material being utilized for each polarized plug assembly amounting to 525 feet of additional material for each 100,000 plugs, a relatively small quantity of manufacture for this device.

The device according to the present invention may be manufactured and assembled in strips and standard equipment designed for non-polarized plug blades without substantial change. In addition, the device of the present invention utilizes the same amount of material as the blade for the standard non-polarized plug.

Other objects and advantages of this invention residing in the novel features of construction arrangement in combination of parts, will become more apparent from the description of the specific embodiments hereinafter following. It will be understood that certain features of the invention may be utilized other than in the entire arrangement disclosed.

FIGURE 1 shows a polarized electric outlet with the polarized contact blades in an electric plug cap, in position for insertion.

FIGURE 2 is a plan section view showing a pair of polarized blades with line cord attached and seated in a plug cap.

FIGURE 3 shows a pair of polarized contact blades before separation and before the attachment of conductors.

FIGURE 4 shows a pair of polarized contact blades after separation and attachment of conductors.

FIGURE 5 shows a strip of polarized contact blades in a manufacturing strip, prepared for separation and attachment as shown in FIGURE 4.

FIGURE 6 is a side view of the strip shown in FIGURE 5.

In the drawings like numbers refer to corresponding parts.

FIGURE 1 shows blades 1 and 2 contained in a plug 5 with an attaching line cord 6. The plug is prepared for attaching an appliance, not shown, to an electric outlet having openings 3 and 4. As may be seen in this figure, the openings 3 and 4 have widths equal to w' and w'' respectively. The difference in size is exaggerated in this drawing over the standard variation to illustrate the principle. In practice, however, this difference is sufficient to prevent making contact between the outlet and the plug blades with improper polarity.

The plug blades are discretely shown in FIGURE 3 in pairs as they are manufactured. In order to satisfy the requirement of assembly by machinery already available, the central portion of both blades 1 and 2, must have the same width, w''. Under present U.S. standards, this dimension can be ¼ of an inch. Each of the blades 1 and 2 can be provided with termination of either the solder or solderless type. For machine assembly, however, the solderless type is preferable and such a termination is shown in FIGURE 3 at 7 and corresponds to that shown in my aforesaid U.S. Patent #2,476,738.

The pair shown in FIGURE 3 is a portion of the blade strip shown in FIGURE 5. Arrows 8 indicate the width of a pair of polarized blades 1 and 2. Bracket 9 indicates the width of a pair of blades as measured at the center of the blade. Both dimensions shown at 8 and 9 are made equal to each other and to the dimension of the width of a pair of ordinary contact blades.

Returning to FIGURE 3, the projecting end of blade 1 begins to increase in width with a taper beginning a short distance from the end, and finally reaching the dimension w'. In practice it has been found convenient to let the beginning taper begin at about ¼ of an inch from the end, increasing to the width dimension w' of 5/16 of an inch for the remaining 3/32 of an inch of the blade. This increase in the width dimension of the pro-

jecting end of blade 1 is achieved by reducing the projecting end 11 of blade 2 a corresponding amount to the increase in blade end 10. The blades may then be said to have interreciprocal width dimension.

In manufacture a strip of metal is cut, bent and formed as shown in general in my U.S. Patent #2,558,052, until a strip is developed as shown in FIGURE 5. In the end view this strip will appear as shown in FIGURE 4, and is suitable for assembly with line cords and separation. Upon separation and attachment, the blades, now in pairs will be separated as shown in FIGURE 4, with conductors *a* and *b* attached to the now crimped terminals 7.

To form a complete assembly, the blade pairs are then inserted in an appropriate cap 5, the line cord still in electrical and mechanical attachment.

In application the narrow end of blade 2 does not affect its performance in providing an electric contact, and fits into the standard electric socket opening. The wide end 10 of blade 1, however, is too wide to fit into the outlet opening 4 and can only be received by outlet opening 3. The narrower width of the center portion of blade 1 does not affect its electrical efficiency as a contact.

The contact blades can, if desired, be alternatively of solid construction, or manufactured by stamping or even casting.

The terms and expressions which we have employed are used as terms of description and not of limitation, and I have no intention, in the use of such terms and expressions, of excluding any equivalents of the features shown and described or portions thereof, but recognize that various modifications are possible within the scope of the invention claimed.

I claim:

1. A polarized electric plug comprising, an insulating cap, at least two conductive blades each having one end inserted in the said cap, said conductive blades having midsections of substantially equal width, discrete means for connecting the said one end each of said blades to electrical conducting means, the free end of the first of said conductive blades projecting from the said cap and having a width enlarged from the width of the said midsection, said enlarged width being larger than at least one female outlet of a cooperating electrical receptacle and smaller than a second female outlet of the said electrical receptacle, and the free end of the said second conductive blade projecting from the said cap having a reduced width complementary in outline with the free end of the

said first conductive blade, the said reduced width of second conductive blade being smaller than the female outlets of the said cooperating electrical receptacle.

2. In a polarized electric plug, conductive blade elements comprising first and second conductive blades having longitudinal axes with midsections of substantially equal width, discrete means for coupling the ends of each of said blades within the plug to electrical conductors, the projecting end of the first of said conductive blades having a progressively increasing width along its longitudinal axis approaching the projecting end of the first said blade, said increasing width at its maximum, being larger than at least one female outlet of a cooperating electrical receptacle and smaller than a second female outlet of the said electrical receptacle, and the projecting end of the said second conductive blade having a progressively reducing width along its longitudinal axis approaching the projecting end of the second said blade, said reduced width of the said second blade having a complementary outline with the projecting end of the said first conductive blade, the reducing width of the said second conductive blade being at its maximum smaller than the female outlets of a cooperating electrical receptacle.

3. An electrical connector plug comprising and insulating housing and a plurality of spaced electrical contact prongs projecting from said housing, one of said prongs having a body portion of a given width and a given form terminating in an end portion with a leading edge having a width larger than said given width, and a second of said prongs having a body portion of said given width terminating in an end portion having a form complementing said given form providing a leading edge having a width smaller than said given width.

References Cited in the file of this patent

UNITED STATES PATENTS

1,180,648	Hubbell	Mar. 15, 1915
1,615,302	Hartmann	Jan. 25, 1927
2,134,008	Sharp	Oct. 25, 1938
2,162,265	Loomis	June 13, 1939
2,231,349	Reutter	Feb. 11, 1941
2,558,052	Klumpp	June 26, 1951
2,596,528	Carlson	May 13, 1952
2,605,318	Morgenstern	July 29, 1952
2,835,959	Martines	May 27, 1958

FOREIGN PATENTS

621,316	Great Britain	Apr. 7, 1949