June 8, 1943. A. M. DRAVING 2,321,469

SOCKET RECEPTACLE

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Fig. 1.

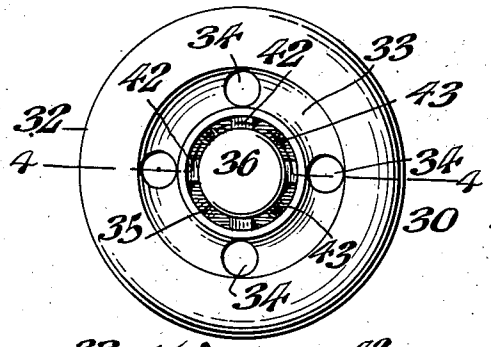


Fig. 2.

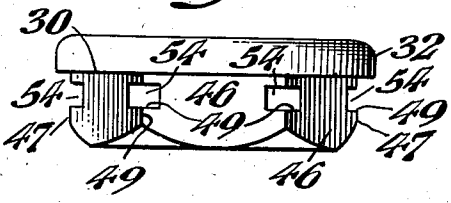


Fig. 3.

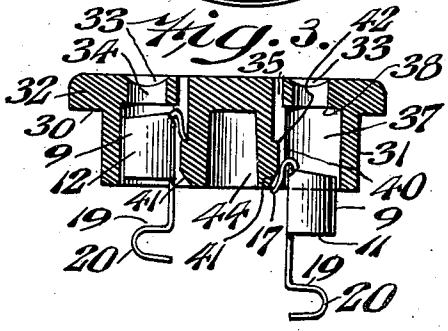


Fig. 4.

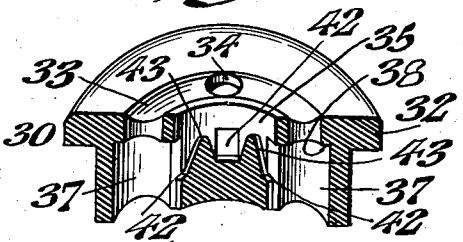


Fig. 5.

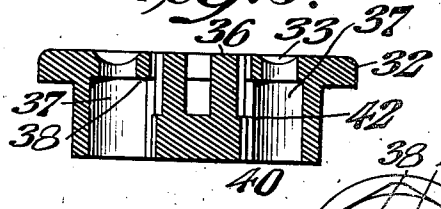


Fig. 6.

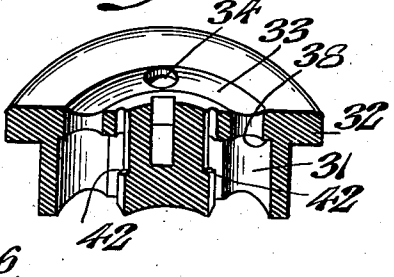
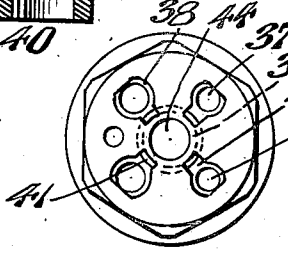


Fig. 7.



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FIG. 8.

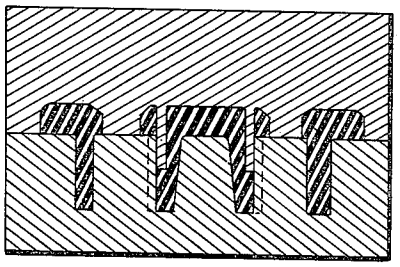


FIG. 9.

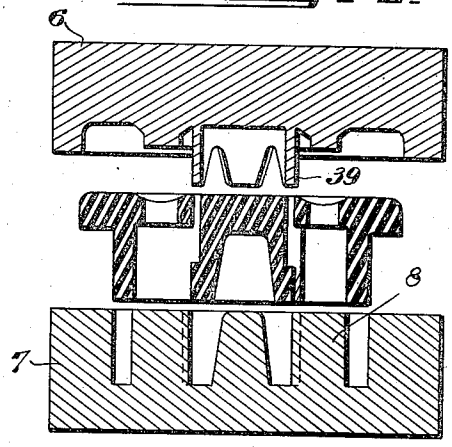


FIG. 10.

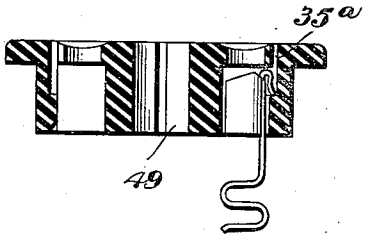


FIG. 13.

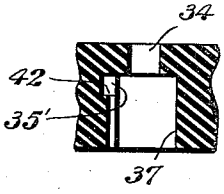


FIG. 12.

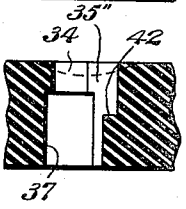


FIG. 11.

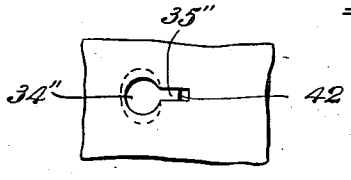


FIG. 14.

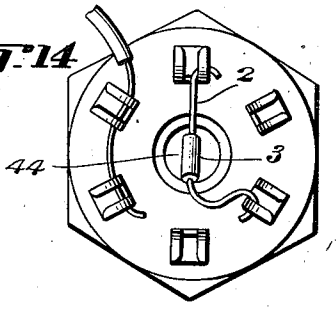
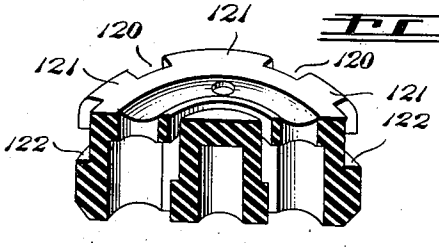


FIG. 15.



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Patented June 8, 1943

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UNITED STATES PATENT OFFICE

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SOCKET RECEPTACLE

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Application July 12, 1938, Serial No. 218,754

3 Claims. (Cl. 173—328)

This invention relates to socket receptacles.

It is among the objects of this invention: to provide improvements in the art of socket receptacles; to provide improvements in contacts for socket receptacles; to provide a molded socket receptacle of economy, high insulating and contact efficiency, and with enhanced ornamental appearance; to provide a socket receptacle or molded base having contact apertures each formed with an internal lateral window in communication therewith so as to lockingly receive an inserted contact element; to provide a metallic element for association with a socket receptacle to create a female plug device; to provide a molded socket receptacle with a lateral recess in communication with a contact aperture so formed as to be susceptible to molding in a two part mold having relative axial separating movements; to provide a molded socket receptacle with a contact aperture so shaped as to enable the contact to be anchored by mere axial insertion without the use of separate securing means or the use of special tools and the like; to provide a molded socket receptacle with a plurality of contact receiving apertures having lateral recesses extending through the face of the socket with molded integral barriers arcuately disposed between adjacent recesses to prevent electrical leakage between adjacent contacts; to provide a molded socket base of extreme economy as to volume of molding material necessary without sacrifice of strength; to provide a combined molded base and contact in which the contact is freely flotable and self-aligning with an inserted prong regardless of the accuracy or contour of the latter, but without damage to contacts or molded base, or danger of separation of the base and contact; and many other objects of the invention will become more evident as the description proceeds.

In the accompanying drawings; forming part of this description:

Fig. 1 represents a plan and

Fig. 2 represents a side elevation of an illustrative form of the molded socket base of this invention with which contacts may be associated.

Fig. 3 represents a vertical section through the base shown in Fig. 1.

Fig. 4 represents a vertical section, partially on an arc about a vertical axis, through the illustrative form of base shown in Fig. 1.

Figs. 5 and 6 represent respectively transverse partially arcuate sections through modified forms of molded bases.

Fig. 7 represents a bottom or reflected plan of the base shown in Fig. 3.

Fig. 8 represents a vertical section through the closed two-part mold, as used for the molded base shown illustratively in Fig. 1, with the molded base in position between the mold parts or dies, showing the overlapping elements of the mold dies, prior to the axial separation of the die elements.

Fig. 9 represents an exploded or separated section through the disassembled elements shown in Fig. 8.

Fig. 10 represents a transverse vertical section through a modified form of socket with an illustrative form of contact mounted therein, arranged to secure the benefits of the apertured window for anchoring the contact while enabling guiding relation to the guide prong of a plug-in device.

Fig. 11 represents a fragmentary plan of a molded base showing a modified form thereof in which the lateral recess for the contact aperture is in communication with the prong aperture.

Fig. 12 represents a fragmentary vertical section of the molded socket showing the contact aperture disclosed in Fig. 11.

Fig. 13 represents a fragmentary vertical section through a further modified form of molded socket.

Fig. 14 represents a bottom or reflected plan of a molded base with the contact mounted therein.

Fig. 15 represents a vertical section through a still further modified form of a molded base according to this invention.

The invention relates to molded sockets for plug-in electrical devices, and, also to contacts associated therewith. So far as the contacts per se are concerned they each preferably partake somewhat of the characteristics of the contacts shown and claimed in Draving Reissue Patent #20,162, the broad features of which may be stated in one regards at least, as being the preference that they be substantially oval in cross-section, having a longitudinal clearance or slot between arms or wings and arranged to establish a plurality of lines of electrical contact with an inserted prong.

The molded socket of the invention may take several forms as suggested in some of the figures herein, but in an illustrative form is seen to have certain more or less fundamental and novel characteristics. It is to be borne in mind that the provision of a mounting for the contact ele-

ments which enables the easiest and quickest association with the contacts is the more desirable base provided that its ultimate mounting is also a facile performance. It is a feature of the invention that the contacts herein can be associated with the socket by a simple guided insertion to spring latching or locking in position without sacrificing strength or insulating efficiency and with a very definite increase in the ornamental appearance of the assembly and that the complete socket may be easily and expeditiously mounted.

Referring to Fig. 1 and the related figures, including Fig. 3, a moulded base of the four contact type is disclosed as an integral homogeneous base **30**, having a lower portion **31**, polygonal in external cross-section (illustratively only being hexagonal) beneath an overhanging annular peripheral flange **32**. The top of the socket shows the peripheral flange noted, the smaller concentric annular guide groove **33**, within which the evenly spaced contact prong-receiving apertures in any desired number are in communication, as at **34**. A smaller interrupted deep recess **35**, extends vertically downwardly about the solid central strengthening island **36**, the upper surface of which preferably lies in a plane common to the upper surface of the socket including the peripheral flange **32** and is especially convenient for tube or plug-in device designation or indication. The characteristics of the recess **35**, and its interruptions will become more clear as the description proceeds, especially in connection with the mold and molding steps by the practice of which the socket base is formed as shown in Figs. 12 and 13.

The recess **35** may comprise a complete annular recess as shown in Figs. 1, 3, 4, 5, 8, 9, 15, or a plurality of arcuately aligned spaced apertures, as shown in Fig. 6 etc. The lower end of the base contains a plurality of contact receiving and housing openings **37** of any desired contour or section including cylindrical, oval or angular, each larger than and usually slightly eccentric to and registering with the respective prong apertures **34**, so as to form an internal shoulder or abutment **38**, against which the inserted contact element may abut to form a positive stop therefore in one direction. Each aperture **37**, includes a narrow slot **40**, preferably more or less tapered at its mouth as at **41**, and of such depth and width as to receive and guide the integral ear or tongue **16** and its tip **17** of the appropriate contact. The aperture **37** is of the proper size to loosely receive the appropriate contact, to enable both lateral and axial shifting and adjustment to accord with variations in prong alignment or contour or thickness. It is completely self aligning therewith. At a suitable distance from the lower end of slot **40**, a shoulder **42**, is provided by the overlapping of the recess **35** with the guide slot **40**.

As shown in Fig. 3, the contact **9**, preferred with the socket under discussion is inserted longitudinally vertically from the bottom of the socket with the arms **11**, and **12**, and backing plate, more or less loosely guided and aligned in contact aperture **37**, and with the resilient tongue guided in the longitudinal groove **40** in which it is compressed toward the contact body momentarily during the insertion, until the shoulder **41** is reached over which the resilient tip **17** of the tongue engages to prevent retraction of the contact. This engagement is automatic and follows the mere axial insertion of the contact. The relation of prong aperture **34**, contact aperture **37**, and contact **9** is preferably such that the inserted male contact member guided in the prong aperture is engaged in a resilient channel in which the arms **11** and **12** resiliently engage the prong on one side to form two spaced lines of contact, while forcing the prong and backing portion together to establish at least one more spaced line of contact, as disclosed in said Draving patent, although for general purpose of the instant molded base, any other sort of contact may be utilized, as will be clear.

The formation of the locking shoulder and the variation in ornamental and electrical effects incident thereto are shown in Figs. 3, 4, 5 and 6, among others. The feature is an interesting attribute of the use of a two-part mold such as is shown in Figs. 8 and 9, wherein the elements are axially relatively movable to create the desired overlap by the juxtaposition of oppositely separable mold elements. This provides what may be designated as a "window" **42** which in one form or another is common to the several different forms of contact receptacles. As shown in Fig. 13, the upper lateral recess **35'** may terminate below or in a line with the lower end of the prong aperture so as to be open on only that side which communicates with contact aperture **37**, or may be in communication with the prong aperture **34** throughout its axial length, as shown in Figs. 11 and 12, or may be a continuation of a vertical recess **35''** leading through the upper surface of the base **30**, as shown in Figs. 1, 3, 4, 5, 6, 8, etc. The prong aperture-spaced vertical recess **35**, which terminates in the shoulder **42** is easily formed by the molding forming ring **39** (Fig. 9) of upper die **6**, of suitable construction, and illustratively is formed in hills and valleys or serrations symmetrically disposed on its edge so as to impart the desired hill and valley contour to the lower or upwardly presenting surface of the recess **35**, with the windows **42** in the lower parts or valleys of the recess, and with vertical separating partitions, baffles or walls **43** extending in the finished molded base as hills upwardly on, each side of the windows **42**. These insulating barriers **43** may terminate within the arcuate recess **35**, as shown for instance in Fig. 4, or may terminate in the plane of the upper surface of the base **30**, as shown in Fig. 6. The lower half portion of the two part mold has upwardly extending pins **8** of the contour required to form the contact apertures **37**. It will be evident that with the two part mold separable perpendicularly of the molded base, the sockets can be turned out rapidly and cheaply and with any desired number of contact apertures, according to predetermination in the mold and each will be separated from the adjacent ones by higher or lower solid walls of the molding material, so that electrical leakage and the like between contacts is substantially obviated.

It may be noted that the island **36** in the center of the form illustrated in Figs. 1 and 3, is preferably hollow or cored out beneath, as at **44** in order to save material and form a housing to receive resistor **3**, or the like, as shown in Fig. 14. On the contrary as shown in Fig. 5, the central axial portion may be substantially solid except for a small or large upwardly disposed and presenting aperture, which may receive guide prongs or the like, (not shown), or, as shown in Fig. 10, the central part may be completely omitted so as to form the guide prong receiving aperture **49**, suitably vertically or longitudinally grooved, and

with the window forming annular recess 35a on the outer periphery of the base, outwardly of the prong apertures, in place of the inner location of recess 35 in Fig. 1, for instance. In Fig. 10, the contacts are reversed before insertion in the contact apertures.

It will be understood that with the invention thus far disclosed the contacts can be simply pushed in from the lower end until the short supporting tongue snaps over the shoulder into the appropriate window 42, whereby the contact body is actually loosely held, but is furnished with upper and lower positive stops between which, and laterally the contact "floats" so as to align itself with any inserted prong, but without danger of coming out of the socket as a result of either a push or a pull thereon.

In the average and usual situation as indicated in Fig. 2, for instance, it is preferred that the longitudinal edges 47 be interrupted by a transverse substantially planar cut groove recess or indentation 54, which may be formed by a sawcut or the like after the molding has been completed, or may be formed during the molding process in any desired manner.

A further modification of the provision of the external mounting lugs as formed by an axially separable two part mold, is shown in Fig. 15, in which the upper peripheral bead of the molded socket is interrupted by vertical recesses 120 separating the bead into teeth or lugs 121, and which recesses extend to termination in the upwardly presenting shoulder portions 122. The modification of the upper half of the two part axially separable molds to secure this construction will be obvious.

I claim as my invention:

1. A molded socket having an annular recess in one surface, a plurality of socket contact openings in the opposite surface communicating respectively with the recess and with each other through the recess, said socket having a transverse shoulder in each of said openings leading into the recess arranged to be engaged by contacts in said openings, and separating means disposed in the recess between shoulders to minimize leakage between socket contacts, and a plurality of tube contact openings in the first mentioned surface each communicating with a respective socket contact opening.

2. A molded socket having an annular recess in one surface, a plurality of socket contact openings in the opposite surface communicating respectively with the recess and with each other through the recess, said socket having a transverse shoulder in each of said openings leading into the recess arranged to be engaged by contact in said openings, and separating means disposed in the recess between shoulders to minimize leakage between socket contacts, a plurality of tube contact openings in the first mentioned surface each communicating with a respective socket contact opening, each of said socket contact openings having a longitudinal guide groove extending into the shoulder to facilitate guided engagement of the shoulder by a portion of said contact.

3. A socket receptacle comprising a molded insulating base having a plurality of female contact openings annularly arranged and extending inwardly in one face and a plurality of prong contact apertures annularly arranged and extending inwardly in the opposite face to registering communication with the respective female contact openings, a secondary annular recess concentric to the annularly arranged prong contact apertures extending inwardly of the said opposite face to overlapping lateral communication with the respective female contact openings to form a plurality of lateral shoulders in the female contact openings inwardly of the first mentioned face, and integral separating means between said shoulders in said annular recess to minimize leakage between contacts.

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