The present invention relates to wiring devices having provisions for connecting wires by simply inserting the bared conductor wires in holes in the wiring device. More particularly the invention relates to such devices having provision for releasing the wires in a simple manner and without the necessity for special tools.

It is therefore an object of the present invention to provide an electrical wiring device which may be electrically connected to conductor wires by removing a portion of the conductor wire insulation and inserting the bared conductor wire in a hole in the device.

It is another object of the present invention to provide an electrical wiring device of the foregoing type in which the wire gripping assembly consists of a single piece of metal.

It is still another object of the present invention to provide an electrical wiring device of the foregoing type from which a wire may be released by inserting a screwdriver into a slot in the side of the device so that the wiring device may be removed or replaced without the necessity for any special tools or procedure.

It is a further object of the present invention to provide a receptacle for an electrical plug wherein the wire holding assembly and the female contacts for each polarity are formed of a single piece of metal thereby requiring only one metal part for each polarity. Other objects and advantages will be apparent from a consideration of the following description in conjunction with the appended drawings in which:

FIG. 1 is a front elevational view of an electrical receptacle according to the present invention;

FIG. 2 is a side elevational view of the receptacle shown in FIG. 1;

FIG. 3 is a rear elevational view of the receptacle shown in FIG. 1;

FIG. 4 is a vertical sectional view of the receptacle taken along the line 4—4 in FIG. 2;

FIG. 5 is a vertical sectional view of the receptacle taken along the line 5—5 in FIG. 4 and showing a conductor wire in place in the receptacle;

FIG. 6 is a horizontal sectional view taken along the broken line 6—6 in FIG. 4 and showing a conductor wire in place in the receptacle.

Referring now to the drawings and particularly to FIGS. 1, 2 and 3, there is shown at 10 a housing for the receptacle which is constructed of a non-conducting material such as plastic. A cover 11 is provided to complete the enclosure for the receptacle. The housing cover 11 is also constructed of a non-conductive material which would ordinarily be the same material used for the housing base 10. A mounting plate 12 which may be of metal fits between the housing cover 11 and the housing base 10. The mounting plate 12 is provided with elongated holes 13 so that the plate may be screwed to a standard outlet box thereby retaining the attached receptacle in place in the outlet box.

Cover 11 is provided with two projecting receptacle units 14 which will extend through a cover plate normally provided as a part of the installation. The receptacle units 14 have slots 15 for the entrance of prongs of an electrical plug.

Although the receptacle shown is adapted to receive a two prong plug, the invention is not limited to such a device and might also be adapted to receptacles for three prong plugs and in fact may be adapted to wiring devices other than receptacles such as switches, sockets and the like.

The housing cover 11 is retained on the housing base 10 by means of screws 20. The screws 20 also serve to holding the mounting plate 12 in position. The rear of the housing 10 is provided with four holes 16A and 16B for the entrance of conductor wires where are to be electrically connected to the receptacle. The wires placed in the two holes 16A on the right hand side of the housing will be electrically connected to one contact of each of the receptacle units. The two wires inserted in the holes 16B on the left hand side will be similarly electrically connected to the other contact of each receptacle unit.

It is obviously necessary to provide only two holes in order to electrically connect the receptacle to the power line. The provision for four holes is made to allow the receptacle to be connected in parallel at a point in the middle of an electrical power line. For example, the two wires from the main distribution box would be connected to the two upper holes 16A and 16B and two additional wires would be connected to the lower holes in order that the wiring could be continued to other fixtures in the circuit without the necessity for soldering or otherwise connecting the wires together.

Releasing slots 17 are provided in the corners of the housing 10 at points adjacent respective conductor wire holes 16A and 16B. A screwdriver may be inserted in the release slot 17 to remove the conductor wires from the receptacle in a manner which will later be described.

The internal construction of the receptacle is shown in FIGS. 4, 5 and 6. A dividing wall section 18 is provided in the receptacle housing to separate the two sides of the housing having contacts of opposite polarity. The dividing section reduces the possibility of a short circuit by isolating the two halves of the receptacle. The dividing section may be formed as an integral part of the housing base 10. Channels 19 are provided in the housing having shoulders 21 at each end so that a contact and connecting member 22 may be slide into the channels and retained in position by the shoulders 21.

The contact and connecting members 22 are constructed of a conductive resilient material such as an alloy of copper. The contact members 22 may be fabricated from sheet material by stamping or otherwise cutting and bending them to the desired shape. Thus it may be seen that the receptacle shown is constructed of only 7 parts, the housing, housing cover, the mounting plate, two screws, and two contact members. All of the parts are of simple construction and adapted to be inexpensively manufactured.

The female contacts for the receptacle are formed by the upright sections 23 of the U-shaped contact member 22.

Each upright section 23 is divided into two prong members 24 which are so placed that a prong of a plug inserted in the slots 15 will be frictionally engaged on either side by the prongs 24 and electrical contact will be established between the receptacle and the plug.

The wire gripping section of the contact member 22 is formed by providing a T-shaped slot consisting of a longitudinal cut 25 in the contact member 22 and a transverse cut 26 extending from the outside edge of the contact member 22 to the longitudinal cut 25. The cuts 23 and 26 thus define leaf members 27 and 28. The ends of the leaf members 27 and 28 are bent forward whereby increasing the distance between the end of the leaf 27 and the end of the leaf 28 and facilitating the introduction of a conductor wire 34 between the ends of the leaves 27 and 28.

Guiding cylinders 29 are provided on the cover 11 in positions which are co-axial with the holes 16 in the
housing base 10. Each cylinder 29 has an opening 21 which is large enough to accommodate the largest size wire to be used with the receptacle. The guide cylinders 29 are adapted to receive the ends of the conductor wire 24 and retain them in insulated relationship from one another. The cylinders are formed as an integral part of the housing cover 11. A reinforcing web 32 extends between the cylinders 29 and projects rearward so that it touches the center of the contact member 22. The center of the contact member 22 is thus supported so that the contact member is not bent or distorted when the conductor wire 34 is forced into the slot 26.

The manner in which conductor wire is contacted and gripped in the receptacle is shown in FIGS. 5 and 6 where a conductor wire 34 having the insulation 33 which has been stripped away along the end portion of the wire is shown in position in the receptacle. It will be noted from FIG. 5 that any force on the conductor wire 34 tending to withdraw it from the receptacle will increase the grip of the leaves 27 and 28 and thereby substantially prevent the withdrawal of the wire 34 without breaking either the wire or the contact member 22. In view of the positive action of the gripping portion of the contact member 22 it is necessary to provide means for releasing the conductor wire 34.

A slot 17 therefore has been provided in proximity to each of the conductor wire holes 16A and 16B. As may be seen from FIGS. 4 and 5, the slot extends into the corner of the housing base 10. In FIG. 4 it may be seen that the slot extends toward the center of the receptacle to a distance where it intersects a leaf 27 of the contact member 22. In FIG. 5 it may be seen that the slot extends forward in the housing to a point forward of the normal position of a leaf 27. Thus a tool such as a screw-driver may be inserted in the slot and the leaf 27 may thereby be pressed forward.

It should be noted that the leaves 27 are longer than the leaves 28 and thus are more resilient. As the leaf 27 is pressed forward the distance between the end of the leaf 27 and the leaf 28 is increased thereby releasing the grip on a wire inserted in the slot 16 so that it may be withdrawn and the receptacle thereby disconnected from the conducting wire.

It is of particular importance that the slot 17 extend along the side of the receptacle housing so that the releasing tool such as a screw-driver may be inserted from the side of the receptacle. Previous duplex receptacles of this general type have had resilient gripping members and a releasing aperture which opened only to the rear of the leaves 27. In such a case it was necessary to insert the releasing tool from the rear of the receptacle. The necessity for inserting the releasing tool from the rear is a distinct disadvantage in that wiring devices of this general type are commonly installed in an outlet box so that access to the rear of the receptacle or other wiring device cannot be had unless the device is virtually removed from the box.

Once the wiring device has been installed in the box and the conducting wires have been connected there is frequently insufficient slack in the wire leads to allow the receptacle or other wiring device to be removed from the box to a sufficient extent to allow a releasing tool to be inserted from the rear. It will be observed that the construction of the receptacle shown allows a releasing tool to be inserted from the side and make it possible to release the receptacle from the lead wires without removing it entirely from an outlet box in which it is installed.

Previous types of wiring devices with releasing slots in the rear were provided with wooden pegs or called for small nails to be used to release the wiring device. This was necessary because there was normally insufficient room to insert an ordinary screw-driver from the rear of the receptacle once it had been installed in an outlet box. It will be noted that the receptacle shown and described herein may be released from the lead wires by an ordinary long handled screw-driver which is customarily used in installing the fixture. It is therefore unnecessary to provide a special tool for releasing a wiring device of this type and hence the removal operation is greatly facilitated.

From the foregoing explanation it may be seen that a wiring device is provided which is easily installed and removed and which is constructed of a relatively small number of easily fabricated and inexpensive parts.

Although a particular type of electrical duplex receptacle has been described it should be understood that the present invention may be applied to many types of wiring devices and that the scope of the invention is not limited to the particular embodiment shown. Rather, the scope of the invention is to be limited solely by the appended claims.

What is claimed is:

1. An electrical receptacle comprising a hollow body of insulating material forming a housing with at least a side wall portion, an end wall portion and a rear wall portion, said rear wall having a hole for the insertion of a conductor wire, at least one U-shaped wire gripping contact member of resilient conductive sheet material, a channel in said housing for retaining said contact member in place with the base of the U adjacent the rear of said housing, means formed integrally with the respective legs of said U-shaped contact member for establishing electrical contact between each leg and a prong of a respective electrical plug inserted in said receptacle, a first cut in the base of said contact member located across the forward projection of said hole and extending from one edge transversely across a part of the base of said contact member and a second cut in the base of said contact member joining the end of said first cut and extending longitudinally of the base of said contact member substantially perpendicular to the said first cut to provide leaf means, the portions of said contact member adjacent said first cut and on either side thereof being bent forward at an angle of less than 90° to facilitate ingress of a conductor wire, the said second cut extending a substantial length on one side of the first cut to cause the bent forward portion on this side of the first cut to be more resilient than the bent forward portion on the opposite side, said housing further having an aperture for the insertion of a releasing tool located adjacent said leaf means on the said one side of said first cut, whereby a conductor wire inserted in said hole will force apart the edges of the contact strip at said first cut and be gripped thereby but may readily be removed by inserting a tool in said aperture to bend forward the more resilient of the edges at said first cut and release said wire.

2. An electrical receptacle as claimed in claim 1 characterized in that said receptacle further includes a wire receiving portion having a bore coaxial with said conductor wire hole whereby a conductor wire inserted in said hole and forced through said cut is received and retained by the bore in said wire receiving portion.

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