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3,036,288

WIRING DEVICE

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Filed Feb. 24, 1958, Ser. No. 717,190

5 Claims. (Cl. 339-159)

This invention relates generally to electric wiring devices and more particularly to an adapter for electrical wall outlets into which one or more electrical plugs may be inserted for connection to a source of electrical energy.

Many such wiring devices have been constructed in the past and all such devices basically consist of a number of insulating parts, a number of conducting parts, and fastening means to secure the metal parts to the insulating parts. The main utility of the present invention is found in the production of low cost, mass produced household wiring devices in which the elimination of additional parts and the reduction of the number of manufacturing and assembly steps can greatly reduce the final cost of such devices.

This invention comprises a wiring device in which the number of parts to be assembled is a minimum. The present invention eliminates the use of conventional fastening means by incorporating a resilient fastener on the electrical conductors to secure the conductors to the insulating member. The insulating member is shaped so that the conductors located therein are shielded from the exterior when the device is placed in a wall receptacle. Accordingly, the use of an insulating cover member is not necessary. All of the conductors are shaped alike. Another advantage of the present invention is that the male contact arms are located at right angles to the female contact arms so that two devices may be mounted on a standard duplex outlet with all of the female contact arms exteriorly engageable.

Accordingly, the principal object of my invention is to provide a novel wiring device having a minimum number of parts.

Another object of my invention is to provide a wiring device having a hollow housing and a conductor mounted therein whereby the conductor is secured to the housing by means of integral resilient engaging means on the conductor.

Another object of my invention is to provide a wiring device having a hollow housing and a pair of spaced conductors mounted therein in which the device is assembled by merely inserting the conductors into the housing.

An additional object of my invention is to provide a molded, one-piece housing having a pair of opposed side walls and formed by a one-piece female mold die wherein each wall is provided with an inwardly extending opening therein.

Another more particular object of my invention is to provide a wiring device having a cup-shaped housing with a pair of spaced passages located therein, and also having a pair of conductors provided with integral resilient cantilever arms located within the passages, whereby the cantilever arms secure the conductor to the housing.

Still another object of this invention is to provide a wiring device having a one-piece cup-shaped housing of insulating material, a pair of spaced conductors each having a male contact arm and female contact arms located within the housing, and in which the male contact arms are disposed at right angles to the female contact arms.

These and other objects and advantages of this invention will be more easily understood from the following detailed description of one particular embodiment

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of this invention, with reference to the attached drawings, in which:

FIGURE 1 is an end elevational view of a wiring device constructed in accordance with the principles of this invention;

FIGURE 2 is a sectional view of the device shown in FIG. 1 and taken substantially along the line II-II of FIG. 3 and having certain portions of the housing broken away for clarity;

FIGURE 3 is a plan view of the open side of the wiring device shown in FIGS. 1 and 2 and having the cover removed; and,

FIGURE 4 is a side elevational view of a conductor employed in the wiring device shown in FIGS. 1 to 3.

Referring to the drawings, it will be noted that a receptacle constructed in accordance with the principles of this invention may comprise an elongated hollow housing 10 constructed of an insulating material such, for example, as a molded insulating material and being rectangular in plan and elevation. The receptacle is provided with a pair of spaced conductors 32 located within the housing, and may have a cover portion 48 to close the open side thereof.

The housing 10 is provided with a top wall 9, side walls 11, and end walls 13. Each of the end walls 13 and top wall 9 is provided with a pair of spaced rectangular slots 14 extending therethrough to the interior of the housing 10. The elongated sides of the slots 14 are parallel to the side walls 11 and are aligned with each other so that the slots located adjacent each side wall 11 are coplanar. A pair of spaced parallel guide passages 12 extend along the end walls 13 and top wall 9 between each set of slots, respectively, to provide a means for locating the prongs of a male plug in the slots 14.

The interior of the housing is provided with a pair of spaced raised members 16 integral with the inner surfaces of top wall 9 and end walls 13, respectively. The raised members 16 are made integral with the central portion of end walls 13 by a narrow support extension 22 located between spaced slots 14 therein. The raised members 16 extend substantially the full depth of the casing and are of less width than the housing and are spaced from the side walls 11 to provide a pair of conductor passages 15 adjacent each side wall. Each of the conductor passages 15 are provided with four transverse ribs 20 extending inwardly from top wall 9 and being integral with the top wall 9 and having their ends integrally joined to the inner surfaces of adjacent side walls 11 and with the adjacent side of the raised members 16. The ribs 20 terminate at a height considerably less than the height of the housing walls so that the shaped female contact arms (to be described later) may rest thereon. Lateral rib extensions 24 extend from each rib along the adjacent side wall 11 towards the open side of the housing 10 and terminate at substantially the same level as the raised members 16. Located in each corner of the interior of the receptacle are elongated integral ridges 28 having their elongated sides extending parallel to the adjacent end walls 13. The ridges 28 extend the same height as the support ribs 20 and cooperate to form the housing in a manner to be hereinafter more fully described.

The upper surface of each raised member 16 is provided with a laterally extending T-shaped recess 18 having a stem portion 19 and cross portion 52. Referring to FIG. 3, the cross portion 52 of the left-hand recess 18 is provided with a recess extension 21 extending outwardly into the upper conductor passage 15. The right-hand cross portion 52 is provided with a similar recess extension 23 which extends from the cross portion 52 into the lower conductor passage 15. The end walls of the stem portions 19 are provided with shoulders 26

which extend into the recess 18 adjacent the upper surface of raised members 16.

A pair of conductors 32 are adapted to be inserted into the open end of the housing 10 so that female contact portions thereof are located in conductor passages 15 adjacent each set of slots 14, and a male contact portion 34 thereof is located in recesses 18, respectively.

The conductors 32 are constructed of a material having good electrical conductance, resiliency, malleability and strength properties, such for example, as a copper alloy, so that each conductor may be shaped from a one-piece stamping. Each conductor 32 comprises three coplanar female contact arms 40 and 43 which extend outwardly from one edge of transverse portion 41 thereof. An essentially I-shaped center contact arm 43 extends from the central portion of one side of transverse portion 41, and opposed essentially L-shaped arms 40 extend in mirror image relation from opposite ends of the same side edge thereof. The female contact arms 40 and 43 are preferably slightly bowed inwardly towards the raised members 16, respectively, to resiliently engage the male prongs of a conventional plug used with the receptacle. Each of the contact arms 40 and 43 are provided with a struck-out rounded projection 46 to additionally facilitate good contact.

The male contact portion 34 extends laterally from one side at one end of the transverse portion 41 of each conductor 32, and is provided with an opening 42 in the inner end thereof. A cantilever arm 44 extends angularly from the inner edge of the opening 42 towards the remote end of the male contact portion 34. The male contact portion 34 is preferably constructed of a double thickness by initially forming the arm longer than its final length and by bending its remote end back over itself. The male contact portion 34 is also provided with a conventional opening 36 therein adjacent the remote end thereof. The remote corners of the male contact portion 34 are preferably tapered to aid in the insertion of the prong in a conventional outlet receptacle.

To assemble each conductor 32 to the housing 10, the female contact arms 40 and 43 are located in the conductor passages 15 and the inner portion 38 of the male contact portion 34 is located in the cross-portion 52 of a T-shaped recess 18 in a raised member 16. The cantilever arm 44 extends at an acute angle from the portion 38 towards the mouth of the recess 18 and is constructed of such length as to resiliently engage the bottom wall of the stem 19 of the T-shaped recess 18. The inner portion 38 of the male contact portion 34 is forced downwardly into the T-shaped recess 18 until the cantilever arm 44 passes over shoulder 26 therein. Motion of the conductor 32 out of the recess 18 is then prevented by the cantilever arm 44, for upon attempting such motion, the cantilever arm 44 bites into the relatively soft side wall of the recess 18. Additionally, the location of the male contact portions 34 in planes at right angles to the planes of the female contact portions 40 and 43 allow the use of two receptacles with a standard duplex wall outlet wherein all of the slots 14 of each receptacle are accessible to be engaged by standard male plugs.

It is to be noticed that it is not necessary to provide a cover 48 for the receptacles. A cover is usually provided for the purposes of securing the conductors 32 to the housing 10 and additionally for preventing the exposure of the female conducting portions of the receptacle to the exterior of the housing. The present invention does not necessitate the use of a cover for the conductors 32 are self secured to the housing 10 in the manner previously described. By the provision of a cup-shaped housing, all female conducting parts are unexposed to the exterior of the housing, even through the open side of the housing, for the latter side is provided with narrow contact passages 15 therein. The close proximity of the inner surfaces of side walls 11 with the side walls

of raised members 16, and the recessing of the transverse portion 41 in the conducting passages 15 prevent even a child from touching the female contact portions of the conductors 32 with his fingers. This becomes more apparent when it is realized that the accompanying illustrations of my invention are essentially twice the actual size of the receptacle.

A simple cover 48, constructed of an insulating material, such, for example, as pressed paper, may be provided for the receptacle having a pair of spaced aligned elongated slots (not shown) therein. The cover slots are aligned to permit the two male contact portions 34 to pass therethrough and are constructed of such sizes to frictionally engage the male contact portions 34 when the cover is assembled to the housing. The cover 48 is shaped to conform with the inner edges of the housing walls 13 and 11 and is forced over the male prongs 34 until one side thereof rests flush with the upper surface provided by the raised members 16 and the rib extensions 24.

As pointed out above, a pair of parallel guide passages 12 are provided along the outer sides of end walls 13 and top wall 9. The guide passages 12 provide a means for "blind" insertion of the male prongs of a conventional plug into the slots 14 of the housing. The guide passages 12 additionally serve to allow the molding of the housing 10 to be made with a one-piece male and one-piece female die. As is known, the usual manner of providing openings in the opposed side walls of a hollow, cup-shaped, one-piece housing is to provide the female die with outwardly extending projections along the inner side walls thereof. By providing such projections thereon, the molded housing cannot be removed from the female die unless the latter is disassembled, necessitating the use of a two-piece female die and an extra manufacturing step. Viewing FIGURE 2, however, it is to be noted that inner surfaces 39 of the guide passages 12 located on end walls 13 of the housing are actually outer side surfaces on the ridges 28, respectively, which are located in the corners of the housing. The surfaces 39 are aligned with the inner surfaces 51 of the side walls 13. The forming of the guide passages 12 is made by appropriate projections of the female molding die while the forming of the surfaces 51 and the ridges 28 are made by the male molding die. It can therefore be seen that slots 14 in side walls 13 are formed by the use of a one piece female die, for the housing may be merely lifted out of the cavity in the female die without difficulty or interference from inwardly extending projections on opposed side walls of the cavity.

As can be appreciated, this invention provides for quick assembly by unskilled personnel at a low assembly cost. To assemble the receptacle, the conductors are merely inserted into the housing until the cantilever arms 44 pass over the shoulders 26 of the T-shaped slot 19. Both conductors 32 are assembled to the housing in this manner and the cover 48 may then be merely force fitted over the male contact portions 34 into flush engagement with the upper surface provided by the raised members 16 and the rib extension 24. Assembly costs are also lowered by the use of a one-piece female molding die wherein the housing 10 is merely lifted therefrom without disassembling the die.

This invention also provides for the utilization of merely one shape of conductor for the conductors 32. The upper and lower contact chambers 15 are similarly shaped and the recesses and raised members therein are mounted in an opposed relation. By the provision of cantilever arms 44 on portions of the conductors 32, the conductors 32 are secured to the housing by merely inserting them into the preformed T-shaped slots 19 therein. Accordingly, the use of additional securing means is eliminated.

Since numerous changes in the above-described construction and different embodiments of the invention may

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be made without departing from the spirit and scope thereof, it is intended that all matter contained in the foregoing description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

I claim as my invention:

1. A wiring device comprising a one-piece molded hollow housing having an open side and having intersecting enclosure walls, at least one slot for passage of conductive blades through each of an intersecting pair of said walls, at least one conductor stably positioned in said housing having portions thereof aligned with said slots for engagement with said blades, respectively, a groove in each of said intersecting pair of walls extending from said slots to the intersection of said walls, respectively, raised inner portions of said housing aligned with said grooves and integral with said intersecting walls, respectively, said grooves of at least one intersecting wall having a depth not less than the depth of said slot, said raised portions having outer surfaces forming the innermost side of said slot grooves, whereby said housing can be formed with the use of a single piece female molding die.

2. A wiring device comprising a hollow housing of insulating material having an open side and intersecting walls comprising the other sides, a pair of spaced conductors positioned in said housing and having, respectively, a plurality of substantially coplanar female contact arms, means for securing said conductors to said housing, slots in said housing walls aligned respectively with said female contact arms, grooves extending respectively from said slots to at least one end of each associated housing wall and forming guidance means for conductive prongs to be inserted into said housing through said slots for engagement with said female contact arms, the grooves along the walls transverse to said housing open side having a depth not less than the depth of an adjacent one of said slots and having the bottom sides, respectively, constituted by integral underset portions of said transverse walls, respectively, whereby said housing with said slots can be molded with the use of a single piece female die.

3. A wiring device including a hollow integral housing having an open side and intersecting walls comprising the other housing sides, a slot in at least one of the walls transverse to said open side, a groove having a depth not less than the depth of said slot extending from said slot transversely of said open side to an end of said transverse wall, said transverse wall having an integral underset portion positioned to provide the bottom side of said

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groove, whereby said housing with said slot can be molded with the use of a single piece female die.

4. A wiring device comprising a housing of insulating material, one side of said housing being at least partially open, at least one unitary generally planar conductive element having a plurality of female contact portions and being insertable for assembly with said housing through said housing open side, said conductive element having a portion substantially transverse to the general plane of said conductive element and to said housing open side, and means integral with said transverse portion for frictionally engaging an adjacent housing portion, and said conductive element having a male contact portion being extended outwardly of said housing through its open side from said transverse conductive element portion.

5. A wiring device comprising a housing of insulating material, one side of said housing being at least partially open, at least one unitary generally planar conductive element having a plurality of female contact portions and being insertable for assembly with said housing through said housing open side, said conductive element having a portion substantially transverse to the general plane of said conductive element and to said housing open side, and a cantilever lug integral with said transverse portion frictionally and bitingly engaging an adjacent housing portion to hold said conductive element inwardly of the latter, and said conductive element having a male contact portion being extended outwardly of said housing through its open side from said transverse conductive element portion.

References Cited in the file of this patent

UNITED STATES PATENTS

1,730,873	Barnett	Oct. 8, 1929
1,866,865	Slade et al.	July 12, 1932
1,926,228	Clark	Sept. 12, 1933
2,055,329	Benander	Sept. 22, 1936
2,145,447	Klingon	Jan. 31, 1939
2,183,016	Gilbert	Dec. 12, 1939
2,245,068	Chirelstein	June 10, 1941
2,264,144	Thoresen	Nov. 25, 1941
2,298,342	Brus	Oct. 13, 1942
2,318,484	Herman	May 4, 1943
2,636,096	Di Blasi	Apr. 21, 1953
2,685,072	Berman	July 27, 1954
2,702,893	Paulson	Feb. 2, 1955
2,734,177	Gilbert	Feb. 7, 1956
2,923,911	Demurjian	Feb. 2, 1960