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Clark

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[54] **SOLDERLESS ELECTRICAL OUTLET ASSEMBLY FOR SERVICE CORD**

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[52] **U.S. Cl.**.....**339/97 R,** 339/164 R, 339/166 R

[51] **Int. Cl.**.....**H01r 11/20,** H01r 9/06

[58] **Field of Search**.....339/97, 154, 156, 163, 164, 339/166, 170

[56] **References Cited**

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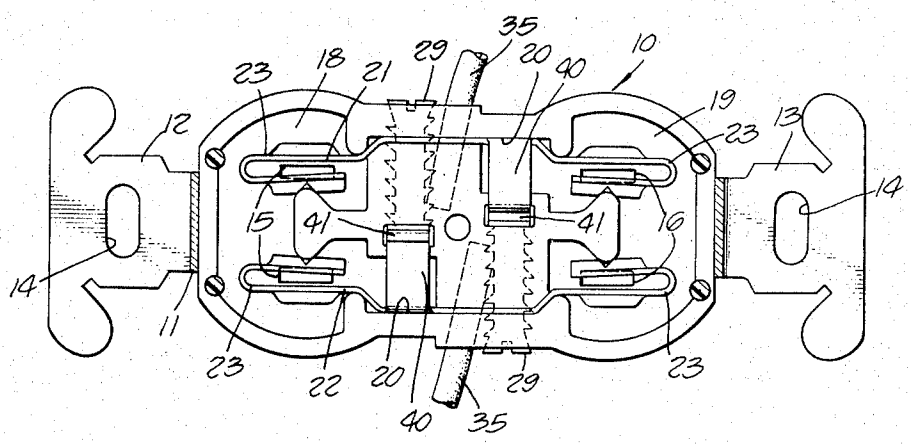
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Primary Examiner—Marvin A. Champion
Assistant Examiner—William F. Pate, III
Attorney—W. D. Sellers et al.

[57] **ABSTRACT**

A solderless electrical outlet assembly utilizing a threaded shank effective to complete assembly of the components as well as to provide mechanical and electrical connections between an insulated conductor and a female contact strip. The screw employed for this purpose seats in a threaded well molded into the main body of the outlet assembly. The screw threads cut through the wire insulation prior to penetrating the surface of the conductor.

20 Claims, 5 Drawing Figures



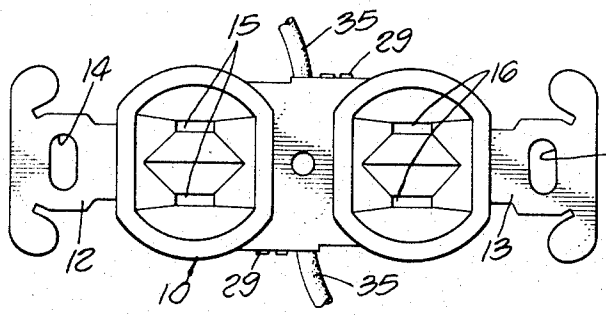


FIG. 1.

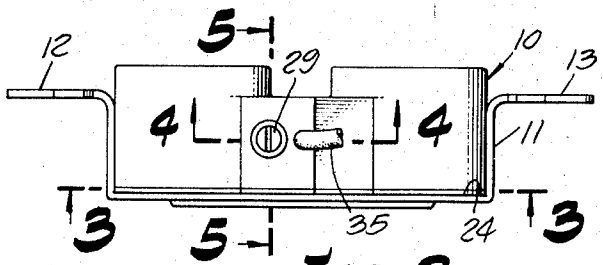


FIG. 2.

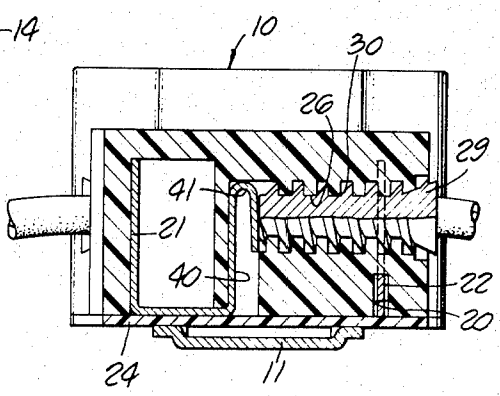


FIG. 5.

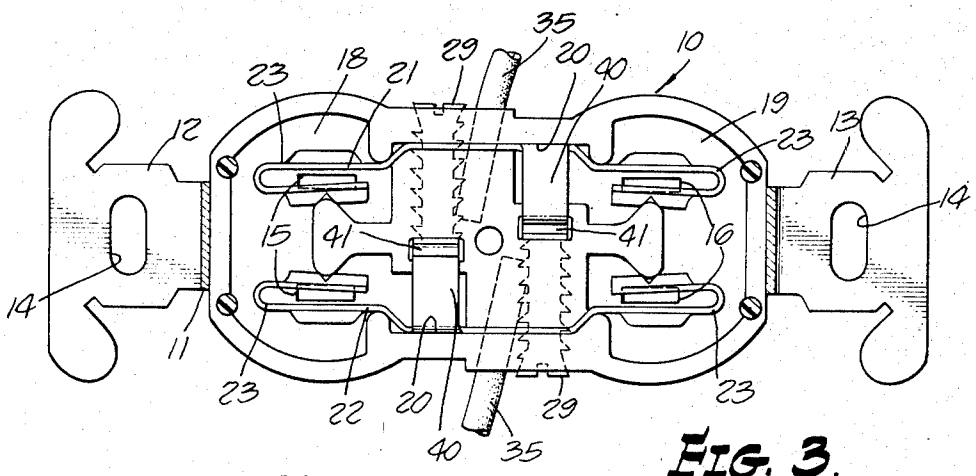


FIG. 3.

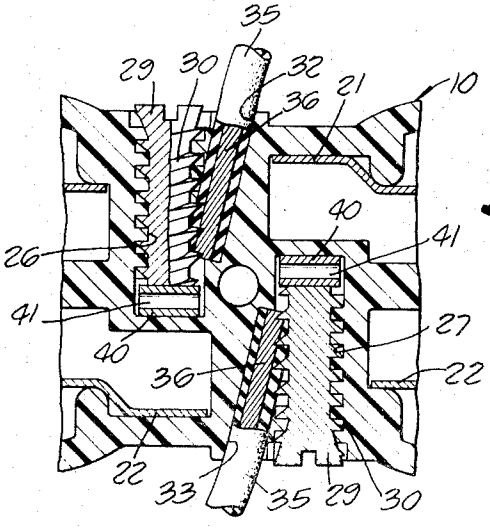


FIG. 4.

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SOLDERLESS ELECTRICAL OUTLET ASSEMBLY FOR SERVICE CORD

This invention relates to electrical outlets, and more particularly to an improved solderless outlet assembly utilizing a single screw to anchor the parts assembled as well as to provide electrical contact between the screw, an insulated conductor and a contact strip of the outlet assembly.

Many proposals have been made for improvements in electrical outlet assemblies in an effort to provide a unit of lower cost, improved reliability and greater simplicity as respects the assembly of its components and the connection thereto of an insulated conductor. These have included proposals for providing a solderless connection between the internal conductor strip and power supply conductors. However, these various proposals are subject to numerous shortcomings and disadvantages sought to be eliminated by the present invention.

Thus in an exemplary embodiment of the principles of this invention there is provided a one-piece, molded housing of tough insulative material having a pair of recesses providing a snug fit with a pair of resilient contact strips having provision for mating contact with the prongs of a service cord, switch components, lamps, etc. Threaded bores molded into the main body accommodate separate conductive screws the threads of which extend into an associated well sized to snugly seat an insulated conductor. The threads cut through the conductor insulation and then penetrate into the conductor at a number of points to provide a positive mechanical and electrical connection with the conductor. The screw also makes firm contact with one of the outlet conductor strips as it approaches its fully tightened condition. For this purpose, each strip includes a tang which projects into the screw well where it makes a high strength rubbing connection with the screw as the screw approaches its fully tightened position. Accordingly the screw serves multiple functions including anchoring the conductive strips assembled to the housing, making positive electrical contact with these strips, and completing a solderless connection and mechanical anchorage to one of the power supply wires without need for stripping or removing any part of its installation.

Accordingly it is a primary object of this invention to provide an improved, simplified, rugged, solderless, electrical outlet assembly.

Another object of the invention is the provision of a solderless outlet assembly having positive provision for making electrical contact and mechanical anchorage to the end of an insulated conductor.

Another object of the invention is the provision of an electrical outlet assembly requiring no tools to complete assembly of conductors to its contacts and involving merely insertion of an insulative wire into the two wells followed by tightening of the associated anchorage screw.

Another object of the invention is the provision of an outlet connection having simple, readily operated means for simultaneously completing mechanical and electrical connections between the female conductor strip and an insulated power supply wire.

These and other more specific objects will appear upon reading the following specification and claims and upon considering in connection therewith the attached drawing to which they relate.

Referring now to the drawing in which a preferred embodiment of the invention is illustrated:

FIG. 1 is a front plan view of an illustrative embodiment of the invention outlet assembly fully assembled and ready for installation in an outlet box;

FIG. 2 is a side elevational view of FIG. 1;

FIG. 3 is a cross sectional view taken along line 3—3 on FIG. 2 showing details of the interior construction;

FIG. 4 is a fragmentary cross sectional view on an enlarged scale taken along line 4—4 on FIG. 2; and

FIG. 5 is a cross sectional view on an enlarged scale taken along line 5—5 on FIG. 2.

Referring more particularly initially to FIGS. 1 and 2, there is shown a suitable construction embodying the principles of the present invention, the outlet assembly having a main body **10** molded from high strength plastic material. This main body may be secured in an outlet junction box by means of U-shaped metal strap **11** embracing the opposite ends and back and provided with tabs **12,13** at its opposite ends. These tabs are provided with openings **14** to receive fastener screws securable to the junction box in well known manner. The front face of the main body includes a pair of rectangular openings **15,16** disposed to receive the male prongs of a service cord connector plug.

Referring now to FIG. 3 showing the main body from its rear face, it will be observed that the interior is provided with cavities **18,19** at its opposite ends which are interconnected along the opposite interior sidewalls of the main body by a pair of narrow slots or recesses **20** snugly seating similarly shaped long strips **21,22** of resilient conductive material. The opposite ends of each of these strips include a U-shaped return bend portion **23** at least one leg of which is positioned in the path of the male prongs of a service cord plug as its prongs are inserted through openings **15,16**.

It will be noted that the mid lengths of strips **21,22** are deformed to interfit with obstructions or irregularities in slots **20** thereby to prevent displacement of the strips lengthwise of these slots. It will be understood that the strips are assembled edgewise into slots **20** from the back edge of the main body and that the strips cannot move in any direction when in their fully assembled position, the strips being initially held against displacement from slots **20** by means of a back cover plate **24** best shown in FIG. **5**.

The mid portion of main housing **20** is provided crosswise thereof with a pair of threaded wells **26,27** each having a coarse thread of square cross section. These wells have parallel sidewalls and receive a specially formed metallic anchor screw **29** formed along the major portion of its length with a thread **30** of V-shape in cross section. The side wall of this thread facing its kerfed head is radially disposed whereas its opposite face slopes inwardly at an acute angle to the first mentioned sidewall. The thread crest is very sharp and hardened so that it will cut into the electrical conductor without becoming blunted or dulled. The length of screw **29** is accurately controlled and its inner end is preferably disposed in a plane normal to the screw axis. The kerfed head flares as is clearly shown in FIGS. **4** and **5**, and seats snugly with a complementally shaped recess at the outer end of well **26**, thereby accurately controlling the fully assembled position of the screw in the well.

A second pair of wells **32** are formed in main body **10** on an axis inclined acutely to the axes of wells **26** with the inner ends of wells **32** intersecting the sidewall of wells **26,27** near the inner ends of the latter. It is important that the inner section and the relative inclinations of the axes of these wells be so related that the crest of threads **30** will cut through the insulation **35** of a conductor **36** and penetrate into the conductor itself at several points along the conductor as the screw reaches its fully assembled position in the well. The fully assembled condition of these screws is determined by the bottoming out of the screw heads in the countersunk outer ends of the wells.

Each of the metal conductor strips **21,22** includes a portion or tang **40** which extends into the wells **26,27** and terminates in a reverse bend or U-shape portion **41** best shown in FIG. **5**. The free resilient leg of this U-shaped portion is positioned to bear against the flat inner end of screw **29** as the latter is fully tightened. Accordingly the screw has wiping contact with this leg and flexes it inwardly as the screw reaches its fully assembled position thereby completing contact between the conductors **36** and the respective ones of the conductive strips **21,22**. As will be appreciated, the strong frictional contact between the solderless connector screws and tang portions **40,41** presses portions **40,41** against the adjacent sidewalls of the main body and against the ends of the screw with the result that these frictional forces are highly effective in anchoring the strips against movement in the main body **10**.

The mode of assembly and manner of use of the described outlet assembly will be readily apparent from the foregoing detailed description of the components and their relative relationship to one another. The strips **21,22** are fitted into recesses **20,20**, it being understood that one edge of the mid lengths of these strips is cut away as is best shown along the right hand side of FIG. **5** to avoid contact with screws **29**. Although the invention has been illustrated as applied to an outlet for service cords it will be recognized and understood that the invention principles are equally suitable for use on outlets of all types and purposes including switches, lamps, etc.

While the particular solderless electrical outlet assembly for service cord herein shown and disclosed in detail is fully capable of attaining the objects and providing the advantages hereinbefore stated, it is to be understood that it is merely illustrative of the presently preferred embodiment of the invention and that no limitations are intended to the detail of construction or design herein shown other than as defined in the appended claims.

I claim:

1. A solderless electric outlet assembly comprising a molded main body of non-conductive material having recess means opening through one face thereof accommodating and accurately positioning a pair of conductor strips, said main body having a first pair of threaded wells opening through the wall thereof, a second pair of wells opening through the wall of said main body and inclined acutely to the axis of an associated one of said threaded wells and opening through the sidewall of the latter near its inner end, said second wells being sized to have a close sliding fit with electrical conductor wire means, said conductor strips each having a portion projecting into the inner end of a respective one of said first wells, and a conductive screw installable in said first wells after conductor wire means has been inserted into said second wells, and said screw having sharp edges spiral crests which cut into and form a strong interlocking mechanical and electrical contact with said conductive wire means as the inner end portion of the screw makes firm electrical contact with said portion of an associated one of said conductor strips thereby to provide an effective solderless connection between one of said wire means and one of said conductive strips.

2. An outlet assembly as defined in claim **1** characterized in that the portions of said strips in contact with said screws extend crosswise of the inner ends of said first wells.

3. An outlet assembly as defined in claim **1** characterized in that said wire means includes an outer insulative sheath through which the crests of the threads of said screws cut before penetrating into the wire itself.

4. An outlet assembly as defined in claim **1** characterized in that said screws have an outwardly flaring head which bottoms against a complementally shaped entrance end to said first pair of wells to limit the tightening movement of said screws as the same make full contact with said wire means and said portion of said conductive strips.

5. An outlet assembly as defined in claim **1** characterized in that the thread along the side wall of said first wells is substantially larger and of different cross sectional shape than the thread of said screws to accommodate insulation dislodged by the screw thread.

6. An outlet assembly as defined in claim **4** characterized in that the axes of said first wells lie generally crosswise of said main body and generally parallel to the outer face of said main body.

7. An outlet assembly as defined in claim **1** characterized in that said screws lock said strips and said wire means assembly to said main body.

8. An outlet assembly as defined in claim **6** characterized in that said first and second pairs of wells open outwardly from the opposite lateral sides of said main body.

9. An outlet assembly as defined in claim **1** characterized in that said main body and said strips extend parallel to one another along the opposite longer sides of said main body with their resilient ends adapted to make pressure contact with the male prongs of separate service cord male prongs.

10. An outlet assembly as defined in claim **9** characterized in that said first and second pair of wells are located midway between the opposite ends of said strips.

11. An outlet assembly as defined in claim **10** characterized in that said screws are insertable into said first wells from the opposite lateral sides of said main body.

12. An outlet assembly as defined in claim **1** characterized in that at least one end of said conductive strips is positioned to have wiping resilient contact with the respective prongs of a service cord plug when inserted through passages therefor formed in said main body.

13. An outlet assembly as defined in claim **12** characterized in that said conductive strips are similarly formed and positioned opposite separate pairs of passages each adapted to receive the prongs of a service cord plug.

14. A solderless electrical outlet assembly comprising an elongated main body of non-conductive material, said main body having slots opening through one face of said main body, a pair of conductive strips having a close assembly fit in said slots, said main body having first and second pairs of wells extending thereinto at an acute angle to one another with the inner ends of their adjacent side walls merging, said first wells being threaded to mate with the sharp crest of the threads of a conductive hardened screw, said second wells being sized to have a snug sliding fit with an insulated wire the surface of which is penetrated at more than one point by the crest of said screw when properly installed in said first wells, and tang means on said strips in pressure contact with a respective one of said screws when fully tightened.

15. An outlet assembly as defined in claim 12 characterized in that said screws are effective to hold said strips immovably assembled in said main body when fully tightened.

16. An outlet assembly as defined in claim 14 characterized in that said tang means is in pressure contact with one end of the associated screw when the latter is tightened.

17. An outlet assembly as defined in claim 14 characterized in that said tang means is resilient and in pressure contact with the inner end of the associated screw when the latter is tightened.

18. An outlet assembly as defined in claim 15 characterized in that the outer ends of said screws are located remote from one another and facing in opposite directions.

19. An outlet assembly as defined in claim 18 characterized in that said insulated wires project toward one another from the opposite sides of said main body.

20. An outlet assembly as defined in claim 14 characterized in the provision of a non-conductive cover for said recesses housing said conductive strips.

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