

July 21, 1964

W. L. SCHOTT ETAL
SOLDERLESS RIGHT ANGLE PLUG CONNECTOR

3,141,718

Filed Jan. 3, 1962

Fig. 2

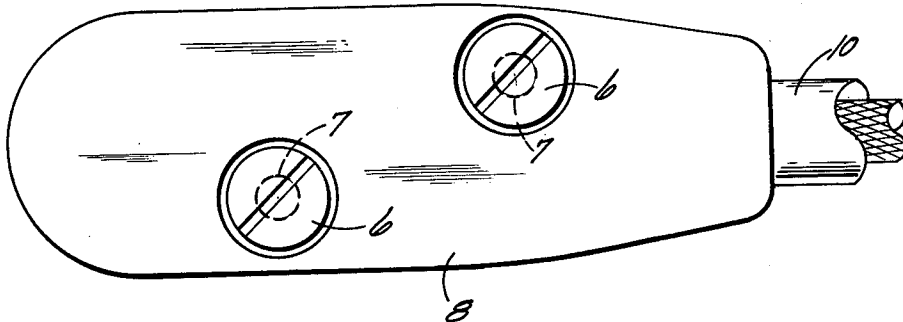


Fig. 1

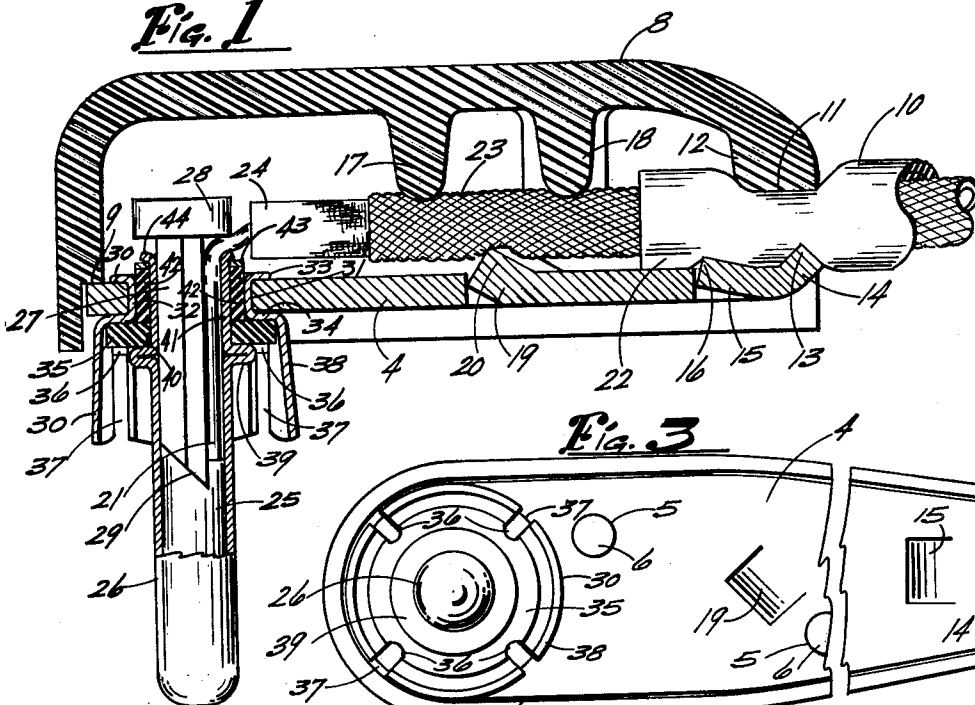
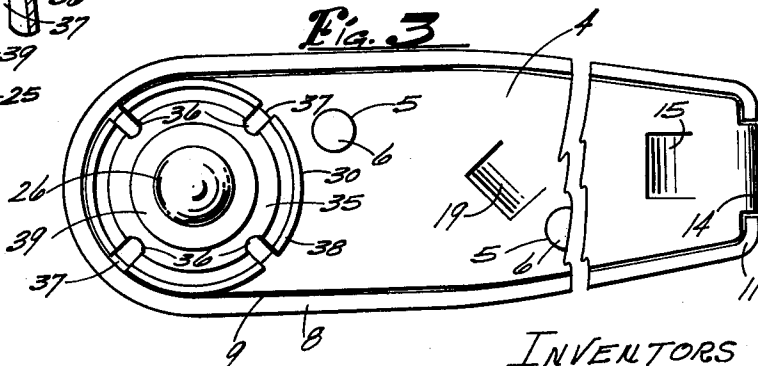


Fig. 3



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3,141,718

SOLDERLESS RIGHT ANGLE PLUG CONNECTOR

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Filed Jan. 3, 1962, Ser. No. 174,331

3 Claims. (Cl. 339-103)

This invention relates to a new and improved solderless right angle plug connector adapted to fit any R.C.A. type phonograph pin jack, for interconnecting phonographs with speakers, amplifiers, microphones, tuners, tape recorders, and other miscellaneous electronic equipment.

Plug connectors that require soldering are often too much trouble for the do-it-yourself type customer and are objectionable otherwise because of the danger of there being loose particles of solder free to roll around and cause electrical trouble. It is, therefore, the principal object of our invention to provide a plug connector designed to avoid the objections mentioned and enable a customer without a soldering iron to do a good job of completing a positive noise-free pressure connection without solder, the connector being suitable for use with regular shielded cable and requiring only the stripping of insulation from the wire on a short length on the end of the cable for a lead, insertion of this bare wire into the hollow plug of the connector and insertion thereafter of a small plastic pin with a press fit alongside the wire to complete a pressure connection, followed by the fastening of a plastic cover or shell to the base plate of the connector to grip the cable firmly between the base plate and the shell and prevent the wire from pulling out of the plug.

The invention is illustrated in the accompanying drawing in which—

FIG. 1 is a longitudinal section on an enlarged scale through a solderless right angle plug connector made in accordance with our invention, the same being shown approximately five times full size, and

FIGS. 2 and 3 are top and bottom views, respectively, of FIG. 1.

The same reference numerals are applied to corresponding parts in these views.

Referring to the drawing, 4 is an elongated metallic base plate which has two longitudinally and laterally spaced screw threaded holes 5 provided therein for reception of two screws 6 entered in registering holes 7 provided in the elongated plastic shell or housing 8. The screws 6, when tightened, draw the base plate 4 up tightly against an annular shoulder 9 defined in the shell 8 and cause the clamping of a length of the end portion of a shielded cable 10 between the plate and shell. The shell 8 has a slot 11 in the end wall 12 thereof through which the cable 10 extends and in which it is firmly gripped between the end of the slot and the sharp square edge portion 13 of an upwardly bent lug 14 provided on the adjacent end of the base plate 4 that is impressed into the shielding material of the cable, another lug 15 being struck up from the base plate near the lug 14 in upwardly diverging relationship to the lug 14 to have its sharp square edge portion 16 similarly impressed into the cable to the extent illustrated, the corner portions 13 and 16 together resisting endwise movement of the cable 10 in either direction once the screws 6 have been properly tightened. To further insure good clamping action, there are spaced parallel webs 17 and 18 molded integral with the shell 8 intermediate the ends thereof on opposite sides of a lug 19 that is struck upwardly from the base plate 4, and the sharp right angle corner portion 20 of this lug is impressed into the cable 10 to the extent illustrated in FIG. 1 to cooperate with the lug 15, which extends in the same general direction as the lug 19, to

resist pulling out of the cable. The lug 19, as appears in FIGS. 1 and 3 has its edge portion 20 in a horizontal plane parallel to the horizontal plane of edge portion 16 but inclined at an angle of approximately 45° with respect thereto with a view to more securely fasten the cable 10 and providing a longer and more positive conductive connection with the shielding means 23 surrounding the flexible cable 10.

The cable 10 has an elongated end portion 21 stripped of insulation to serve as the lead, the outer sheathing 22 being removed from the braided wire or shielding covering 23 on a short length of the end portion gripped between the lug 19 and the webs 17 and 18, and there is only the inner insulation covering at 24 left next to the stripped end 21. The bare end 21 is entered in the bore 25 of the hollow brass terminal plug or pin 26 and then the plastic pin 27 is pressed in alongside the wire by pressure on the flat head 28 for a good pressure type or drive fit electrical connection, requiring no soldering. This appeals to the do-it-yourself customers who do not happen to have a soldering iron available or do not happen to have one of the kind suitable for such small work. The hexagonal cross-section of the shank of the pin 27 is of advantage from the standpoint that it permits making the shank large enough to fit snugly in the bore 25 and yet provide space in the bore next to the facets on the shank for the wire to be wedged tightly in the bore alongside the shank, lengthwise thereof. The cutting off of the inner end of the pin on a 45° angle as indicated at 29, facilitates starting the pin into the bore 25 next the bared wire 21. A brass spacer contact ring or collar 30 is disposed in insulated concentric relationship to the terminal plug or pin 26 and is in conductive relation to the metallic shield 23 by virtue of its being mounted in the circular hole 31 provided in the metallic base plate 4 in concentric relationship to the plug or pin 26, said collar 30 having a reduced cylindrical neck portion 32 entered in hole 31 and swedged in place, as shown at 33. In this swedging operation, the annular shoulder 34 defined on the collar 30 around the neck 32 is pressed tightly against the outer side of the base plate 4, making the collar 30 rigid with the base plate. A washer 35 of insulation material for insulated support of plug or pin 26 is secured inside the collar 30 in abutment with the annular shoulder 34 by four circumferentially spaced inwardly bent lugs 36 defined at the inner ends of longitudinal slots 37 provided in the cylindrical wall or skirt portion 38 of the plug body 26. The hollow terminal plug or pin 26 has an annular shoulder 39 provided thereon near its upper end where the pin is entered in a center hole 40 provided in the washer 35, and the pin 26 has an extension 41 reaching to a level above the swedged end 33 of neck 32 and surrounded by a bushing 42 of insulation material that rests on the washer 35 and a brass washer 43 resting on the bushing 42, the upper end 44 of the extension 41 being swedged over the washer 43 to make the hollow pin or plug 26 rigid with washer 35 and therefore also rigid with collar 30. With this construction the bare end 21 of the wire is clamped directly between the plastic pin 27 and the bore 25 of the pin 26 and between the head 28 of the pin 27 and the swedged end 44 of the plug or pin 26, and there is no danger whatsoever of a careless person failing to get the bare end 21 of the wire fully insulated from the base plate 4.

In operation, the do-it-yourself type customer purchases the connector with the screws 6 fastening the plastic shell 8 to the base plate 4, and inasmuch as the plastic pin 27 is long in relation to the distance between the plate 4 and the inside of the shell 8, the pin is retained against displacement from the bore 25 of the terminal plug or pin 26, and there is no danger of its falling out and being lost when the screws 6 are removed for removal

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of the plastic shell 8 from the base plate 4 preliminary to the connection of a shielded cable to the connector in the manner shown. The hexagonal shape of the shank of the plastic pin 27 is important from the standpoint that it enables providing the plastic pin of a diameter to fit fairly snugly in the bore 25 and yet provide enough room between the facets on the shank and the cylindrical bore 25 for reception of the bare wire 21 with a tight press fit. The customer can make this highly satisfactory pressure type or drive electrical connection in a fraction of the time it would take to do as good a job soldering the connection, and it must be remembered that a good percentage of the do-it-yourself type customers are not skilled in the art of soldering and there is also a good percentage of such customers who either have no soldering irons or may not have the right size suitable for such a small soldering job. The collar 30, thoroughly insulated from the lead 21, engages the face of a socket or casing in a circle around the jack in which the plug 26 is entered, and in that way provides a conductive connection between the socket or casing and the shielding means 23 on the flexible cable 10 through the base plate 4, thereby protecting the lead 21 for the radio frequency energy from disturbing influences.

It is believed the foregoing description conveys a good understanding of the objects and advantages of our invention. The appended claims have been drawn to cover all legitimate modifications and adaptations.

We claim:

1. An electrical connector of the character described comprising an elongated metallic base plate having an opening provided in one end portion thereof, a hollow metallic plug mounted on said plate in said opening in insulated relation thereto and extending at right angles from said plate for entry in a jack, an elongated hollow shell of insulation material enclosing said plate on the opposite side from said plug and having a notch provided in one end thereof remote from the opening in said plate receiving an elongated end portion of a cable extending into said shell lengthwise of said plate, said cable having

an elongated bare wire extending from its inner end at right angles into said plug for electrical connection therewith, a pin having a drive fit in the hollow metallic plug and compressing said bare wire between it and the inside of said plug for electrical connection therewith, projections on said plate and in said shell in transverse relation to and engaging the cable from opposite sides to secure the same between said plate and shell against endwise movement when the latter are secured together, and means for securing said plate and shell together.

2. An electrical connector as set forth in claim 1 wherein the pin has a flat head of enlarged diameter provided on the outer end thereof to limit movement of the pin into said plug and facilitate driving the pin home into the plug and also compress a right angle bent portion of the bare wire between the head and the end of the hollow metallic plug at the entrance to the bore in said plug.

3. An electrical connector as set forth in claim 1, wherein the cable includes a surrounding shield of conductive material in insulated relation to the wire, but in conductive relation to said base plate through one of said projections on said plate engaging the cable, and said connector including a contact collar of conductive material in spaced concentric relation to and insulated from said plug but mounted in the opening in the metallic base plate so as to be in conductive relationship to said plate and through it with the conductive shield of said cable.

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