Feb. 15, 1938. H. K. FOSTER 2,108,708

ELECTRICAL CONNECTER

Filed March 20, 1934

FIG. 1.

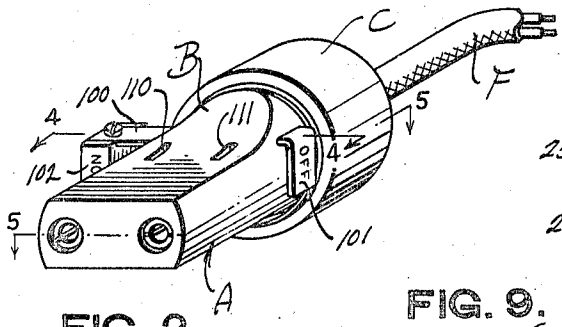


FIG. 5.

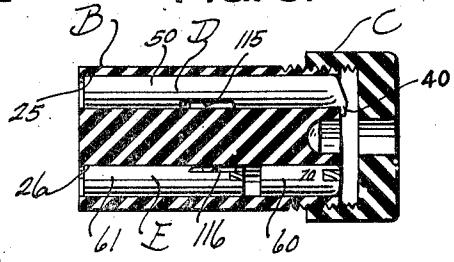


FIG. 2.

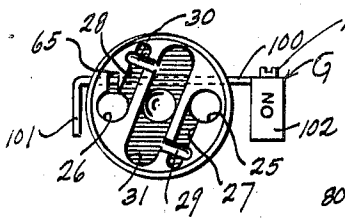


FIG. 9.

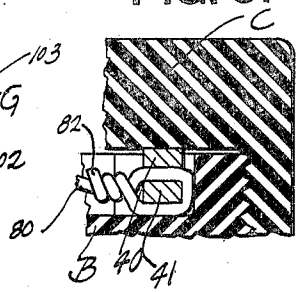


FIG. 6.

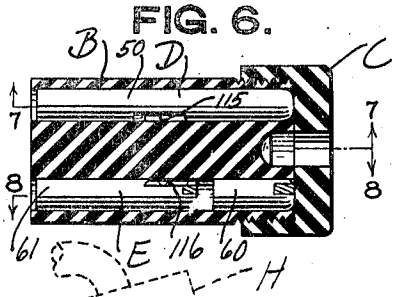


FIG. 3.

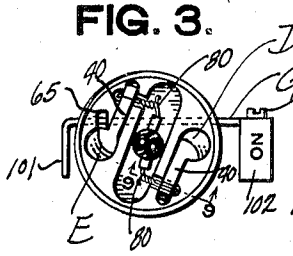


FIG. 10.

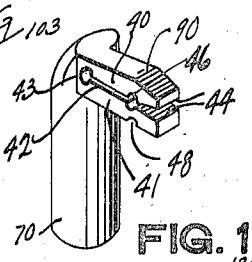


FIG. 7.

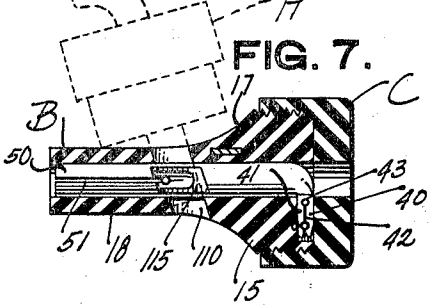


FIG. 4.

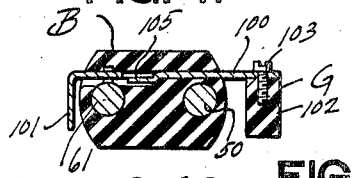


FIG. 13.

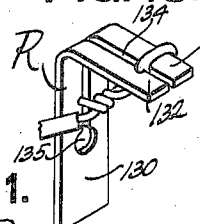


FIG. 8.

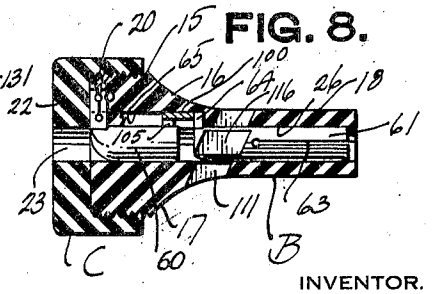


FIG. 12.

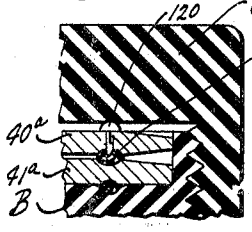
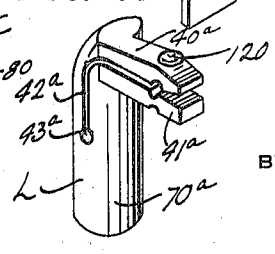


FIG. 11.



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Patented Feb. 15, 1938 2,108,708

UNITED STATES PATENT OFFICE

2,108,708

ELECTRICAL CONNECTER

Herbert K. Foster, Riverside, N. J.

Application March 20, 1934, Serial No. 716,526

5 Claims. (Cl. 173—332)

This invention relates to improvements in electric connecters such as base plugs, electric appliance plugs, electric attachment sockets and the like.

The primary object of the invention is the provision of an improved electric wire connecter having improved means to facilitate and render secure the attachment of electric wires to the terminals or contact prongs of sockets or plug.

A further object of the invention is the provision of an improved electric wire connecter, such as a base plug, appliance plug or socket, having improved means for attachment of terminal wires to the contact terminals or prongs without screws, removable parts or tools of any sort.

A further object of the invention is the provision of an improved electric wire connecter in the form of an electric appliance plug having improved means for attachment of another plug thereto.

A further object of this invention is the provision of improved simple switch mechanism for electric appliance plugs and the like.

Other objects and advantages of the invention will be apparent during the course of the following detailed description.

In the accompanying drawing, forming a part of this specification, and wherein similar reference characters designate corresponding parts throughout the several views,

Figure 1 is a perspective view of an electric appliance plug having the improved features of the present invention embodied therein.

Figure 2 is a plan view of the cap end of the body of the plug, showing the recessing thereof for the reception of parts of the terminal contacts, and showing a switch arm associated therewith.

Figure 3 is a view similar to Figure 2, but with the contact terminals and wires associated therewith, in place.

Figures 4 and 5 are cross sectional views taken substantially on their respective lines in Figure 1 of the drawing, and respectively showing switch mechanism and terminal contacts; the cap of the plug being shown partially removed in Figure 5.

Figure 6 shows the parts arranged as in Figure 5, but with the cap screwed tight upon the terminals.

Figures 7 and 8 are cross sectional views taken substantially on their respective lines in Figure 6 of the drawing.

Figure 9 is an enlarged cross sectional view taken substantially on the line 9—9 of Figure 3, but additionally showing the cap of the plug in place binding the wire to its terminal and in the cavity of the body of the plug provided therefor.

Figure 10 is a perspective view of one form of terminal contact.

Figure 11 is a perspective view of another form of terminal contact.

Figure 12 is a cross sectional view taken through a portion of a plug showing how the terminal contact of Figure 11 is associated therewith for clamping a wire in place.

Figure 13 is a perspective view of another form of terminal contact.

In the drawing, wherein for the purpose of illustration are shown preferred and modified forms of the invention, the letter A may generally designate the improved electric wire connecter, which in the specific embodiment shown is an electric appliance plug, such as used for heaters, toasters, and the like, but which may be an electric wire connecter of any type, such as an attachment plug, base plug, socket for electric lights, or the like; the essential invention residing in the improved terminal contacts and their association with the wires to be attached therewith; the improved switch mechanism, and the association of a detachable plug with the improved connecter in an improved manner.

The appliance plug A may generally include a body B and a cap C having improved terminal contacts D and E associated therewith for the securement of electric wires thereto, as shown in Figure 3 of the drawing. An improved switch mechanism G is provided in association with the terminals D and E, and improved means is provided in the plug or connecter A for detachably connecting an additional plug or electric wire connecter H thereto, as shown in Figure 7 of the drawing.

The body or casing B, as well as the cap C, are preferably made of any type of insulation, such as ordinarily used for electric plugs or connecters, although a synthetic resin, such as "Bakelite", is preferred. In the case of an electric appliance plug, such as shown, the body B is provided with an upper cylindrical portion 15, tapering convergently at 16 and 17 towards the flattened socket inserting end 18 of the plug. The outer periphery of the cylindrical portion 15 is screw threaded for detachable connection of the cap C thereon. This cap C is internally screw threaded at 20 and has a top wall 22 which may be provided with a central or axial opening 23 therein for insertion of the electric cord F.

The body B is provided with preferably cylindrical terminal receiving passageways 25 and

26 therethrough, which extend from end to end of the body. The latter in the cap connecting end is provided with elongated recesses 27 and 28, which are disposed in substantial parallelism, and at an end of each open into the respective terminal passageways 25 and 26. This end of the plug body is also provided with transverse recesses 29 and 30 intersecting the recesses 27 and 28 respectively near their ends remote from the respective terminal passageways 25 and 26. A diametrical recess 31 is also provided in this end of the plug body, into which the recesses 29 and 30 open. This recess 31 is of course to receive the end of the cable F and probably portions of the wires thereof which lie at the inner side of the cap C when the latter is attached upon the body of the plug.

While in the particular electric appliance plug shown, the terminals D and E are differently constructed, some plugs, such as base plugs, may be provided with identical terminals or contact prongs. All of them, even including the terminals D and E, are similarly formed at their upper ends for the clamping or connection of electric wires thereto. Thus each of the terminal devices D and E at the ends thereof are provided with right angled extensions which are adapted to fit into the recesses 27 and 28 and to which the wires are attached. These extensions, as shown in Figure 10, preferably consist of upper and lower clamping extensions or fingers 40 and 41, which are somewhat resilient so that the electric wires may be clamped therebetween. They may be differently formed in departure of this general idea, for various purposes. Thus, the bifurcated extension consisting of the upper and lower fingers 40 and 41 at the extreme end of the slit 42 therebetween has an enlarged opening 43 extending from side to side, which is wider than the slit 42 in order that the clamping fingers may act with greater resiliency in clamping upon the wire. The fingers 40 and 41 are flared convergently at 44 from their free ends to a point intermediate their ends, and at this intermediate point the said clamping fingers or extensions are recessed at their slit faces to provide an enlarged passageway 46 for reception of the wire therein. If desired the under-face of the lower finger or extension 41 may be similarly recessed at 48, immediately below the wire passageway 46, since the wire is intended to be wrapped completely around the lower clamping finger 41.

The terminal D in addition to the clamping finger extensions above described includes the cylindrical body 50 removably slidable into the passageway 25 of the plug body B from the upper end thereof. This cylindrical body 50 is socketed at the inserting end of the plug body, and split at 51 (see Figure 7) to receive therein the prongs of the appliance to which it may be connected, such as a heater, toaster, or the like.

The terminal E is of somewhat different construction, since in the appliance A it is intended to provide the special switch G. Therefore the terminal construction E consists of the wire attaching section 60 and the prong connecter section 61, shown in association within the plug body in Figures 5, 6 and 8 of the drawing. The portion 61 is cylindrical in formation, and provided with an open ended socket portion which is split, as shown at 63 in Figure 8 of the drawing, to receive the prong of the electric appliance to which the plug is adapted to be attached. A short right angled anchoring extension 64 (see Figure 8) is provided at the upper, or rather, inner end of the section 61, which slips from the cap attaching end of the plug body downwardly through an anchoring socket or passageway 65, which is radially offset in communicating relation with the terminal passageway 26. This passageway 65 extends only a portion of the length along the terminal passageway 26, terminating in a shelf or shoulder to limit the extreme movement of the terminal section 61, at the position shown in Figure 8 of the drawing. The switch G also aids in holding the terminal section 61 in this position, by reason of resting against the extension 84. Thus the terminal section 61 is anchored securely against longitudinal or rotative movement.

The terminal construction E furthermore includes the section 60 above described, which includes the clamping fingers 40 and 41 above described, and the cylindrical body shank 70, shown in Figure 10 of the drawing, which is insertable into the terminal passageway 26, as shown in Figures 5, 6 and 8 of the drawing. In its extreme position in the plug body B, when the cap C is clamped firmly in position thereon, the facing ends of the sections 60 and 61 are spaced, that is, out of contact and therefore an electrical connection must be made through the switch G in a manner which will be mentioned hereinafter.

Referring to the manner of attaching the wires to the clamping fingers of the terminals and to the cam clamping action of the cap upon the body of the plug, the wire end 80 is either threaded through the passageway 46, defined by recessing the fingers 40 and 41 at the split thereof, or by slipping the wire through the flared end of the slit 42 until the wire comes to rest in the socket formed by recessing 46. The extreme end of the wire 80 is then preferably twisted, as at 82, so that the wire completely encompasses transversely the lower finger 41, as shown in Figure 9.

The top surface of the upper finger 40 is preferably tapered from its body attaching end and also from its free end in a convergent relation to a point 90 between its ends, which is the highest level on the top surfacing of this finger. The peak, as it may be called, is located immediately above the wire receiving passageway 46.

In position the shanks or terminal bodies are of course slipped into the plug passageways 25 and 26, after the wires have been threaded and twisted upon the finger extensions 41. The wires and finger extensions seat in the respective recesses 27 and 28 provided therefor, and the wires of course extend transversely into the common recess 31, as shown in Figure 3 of the drawing. The inner or lower part of the wire twisted beneath the finger 41 lies in abutment with the bottom of the recess, against the plug, and the twisted portion of the wire is jammed into the recess joining the wire receiving recess 31, to hold it in position. In this relation of parts the cap C is screwed into place, coming into a cam action with the peak 90 of the upper wire clamping fingers 42, and forcing the latter in the direction of the lower wire clamping finger 41, for securely and effectively clamping the wire between these clamping fingers. The wire in fact is clamped securely in two positions, that is, against the bottom of the plug recess between the finger 41 and the same, and also between the two fingers, as shown in Figure 9 of the drawing. Instead of divergently tapering the upper surface of the finger 40 in counter direc-

tions, this sloping effect may be on a radius or an arc, since it is primarily intended to have a cam action against the under-surface of the cap when the latter is screwed tight thereagainst, to close the wire opening between the fingers. Also this construction enables the cap to be readily placed and removed without jamming.

Referring to the switch mechanism G, the same is relatively simple, consisting of a contact bar 100 reciprocably slidably mounted in a transverse passageway of the plug body B for rectilinear movement in a line paralleling the flat faces of the body B. The contact bar or switch member 100 at its ends may be provided with suitable extensions 101 and 102, which may be similarly formed if desired, and both may be of insulation material if found preferable. In the simple construction shown one end of the bar 100 is angled at 101 and the other handle 102 is of insulation detachably screw threaded at 103, so that by removal of the handle 102 the bar 100 may be readily slipped out by pulling upon the handle 101. The contact bar 100, as before mentioned, rests against the terminal extension 64, holding the said terminal section 61 in place. The bar 100 bridges the space between the terminal extensions 60 and 61, as clearly shown in Figure 8 of the drawing. In its "off" position the contact bar 100 does not contact the shank end 70 of the terminal extension 60, but in the "on" position an offset, preferably resilient portion 105, struck out from the material of the bar, engages against the extreme end of the shank 70 of the terminal section 60 to bridge the terminal sections 60 and 61. As before mentioned, the bar rests against the contact and anchoring extension 64 above described.

As before mentioned the plug is provided with means for connecting another plug H thereto. To that end the body portion B of the plug is provided with transversely extending diagonal terminal inserting passageways 110 and 111, into which the contact prongs of the terminals of the plug H may be disposed. These passageways 110 and 111 are so arranged that portions of the facing longitudinal edges of the terminals D and E extend slightly thereinto, so that the terminals of the plug H will engage in contact with the terminals of the plug A when they are assembled. Preferably this is accomplished by diagonally recessing the terminal shanks 50 and 61 at 115 and 116 respectively, so that the contact prongs of the plug H have an effective surface contact with the terminals of the plug B when the same are assembled. It is to be noted that the plug H is assembled upon the plug A so that the switch controls passage of current to the appliances connected to both the plugs A and H.

It is to be further noted that the plug H is diagonally disposed, so far as its axis is concerned, in acute angled relation with respect to the longitudinal axis of the plug A. That is for the purpose of limiting the extent of inserting movement of the prongs of the plug H into the body of the plug A, so that the contact terminals of the plug H will not project beyond the opposite side of the reduced portion of the body B of the plug A.

In a modification of the terminal, by way of example, the terminal L shown in Figure 11 of the drawing, the slit 42a between the wire clamping fingers 40a and 41a may be carried downwardly into the shank 70a for a predetermined distance, terminating at an enlarged passageway 43a similar to the passageway 43 of the terminal above described. In this form of invention I may use features above described for the terminals of the plug A, but in addition I may also use an anchoring pin 120, shown in Figures 11 and 12 of the drawing, which has a pointed shank insertable in a passageway in the upper finger 40a, and which has a head forming a peak above the top surface of the finger 40a, against which the under-surface of the cap C engages in order to force the pointed end of the anchoring pin 120 into the wire anchored between the clamping fingers 40a and 41a, for the obvious purposes of anchoring the wire securely and forming a positive contact therewith.

A further and simpler form of wire connecting terminal R is shown in Figure 13, consisting of a flat shank 130, having right angled bifurcated fingers 131 and 132 at an end thereof, the slit 134 therebetween being carried downwardly into the shank 130 and terminating in an enlarged passageway 135, to insure sufficient springiness and yielding of the fingers 131 and 132, so that the same will clamp against the wire when it is anchored therebetween, as shown in Figure 13.

It is to be distinctly understood that the improved features of my invention are applicable to various types of plugs and electric light sockets, and that the terminal shank may be flat or of any other shape. If desired the body and cap portions of the plug may be provided with flush outer surfaces and they may be assembled together by means other than relative screw threading.

It is apparent from the foregoing that an improved electric wire connecter has been provided which enables the secure attachment of the wires to the terminal or contact portions thereof without the use of any tools, and without the use of screws. The improved electric wire connecter is remarkably simple insofar as the number of parts are concerned, when it is considered that the same embodies not only means for effectively and positively anchoring the wires to the terminal parts, but also includes an efficient switch and additional plug-in feature. Of course the switch feature may be optional, and it is to be noted that there is no spring provided, although simple means may be provided to produce a click when snapping the switch "off" and "on", if desired.

Various changes in the shape, size, and arrangement of parts may be made to the forms of invention herein shown and described, without departing from the spirit of the invention or the scope of the claims.

I claim:

1. In an electric conductor connecter, the combination of an insulated body provided with a pair of paralleling terminal-receiving passageways extending therethrough, each passageway opening into an elongated recess at a face of an end of said body, said face having a centrally disposed recess and a pair of transverse recesses, one communicating between one of said elongated recesses and said centrally disposed recess and the other communicating between the other of said elongated recesses and said centrally disposed recess; a pair of substantially L-shaped resilient terminal contacts in said passageways and elongated recesses, said terminal contacts having means to secure electric conductors thereto with said conductors disposed between the faces of said elongated recesses and said terminal

contacts and extending into said transverse recesses and said centrally disposed recess; and means to force said faces of said terminal contacts into contact with conductors disposed in said elongated recesses.

2. In an electric wire connecter the combination of an insulation body having a wire-connecting terminal disposed therein, said terminal having a resilient contact finger; means assembling the wire and terminal in the insulation body, so that the wire contacts said finger, including a portion of said finger provided with a wire-receiving groove; and additional means movably connected with the insulation body for additionally clamping said finger against said wire in electrical contact therewith, said last mentioned means consisting of a cap having a screw threaded connection with the insulation body and the finger having a cam peak thereon disposed with its highest point immediately above said groove, said cam peak being engageable with the cap as the latter is screwed upon the body to move the finger into clamping engagement with the wire without distorting said groove to any perceptible degree.

3. In an electrical wire connecter, the combination of an electrical appliance plug having terminals provided with appliance prong-inserting sockets therein, said plug including a flattened end adapted to be inserted into a conventional appliance socket having a mouth larger in length than in width, the width of said flattened end being less than the length of a conventional plug prong, and said flattened end having diagonally-disposed prong-inserting sockets extending therethrough, each of said last named sockets having a mouth at each of its ends, said last named prong-inserting sockets intersecting the terminals of the said appliance plugs and disposed so that the prongs of an additional plug, inserted in the said mouths at one end of said last-named plug-inserting sockets, will contact with the terminals of the appliance plug and will fall short of the other mouths of said last-named sockets, whereby, because of the greater length of said diagonally disposed prong-inserting sockets as compared with the length of a prong-inserting socket which might extend widthwise through said flattened end, there will be no projecting prong ends to lead to a short circuit.

4. As an article of manufacture, a substantially L-shaped contact terminal for electrical conductors, comprising a terminal shank having a pair of relatively spaced apart conductor wire clamping fingers thereon, of springy material, defining a slit, each finger being provided with a transverse wire-receiving groove, said grooves facing said slit and facing each other and one of said fingers being provided with a like wire-receiving groove substantially paralleling said transverse wire-receiving grooves and facing away from said slit.

5. As an article of manufacture, an electrical terminal for connection of wire and similar conductors, comprising an electrical terminal body having a conductor attaching portion thereon provided with a slot, a pair of complementary recesses facing each other and said slot, and a bore extending from an outer face of said portion into said slot and to one of said recesses; and a movable prong, having a pointed end, extending from said outer face through said bore and into said slot and said one of said recesses, with its pointed end extending toward the other of said recesses into biting contact with a conductor attached to said portion.

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