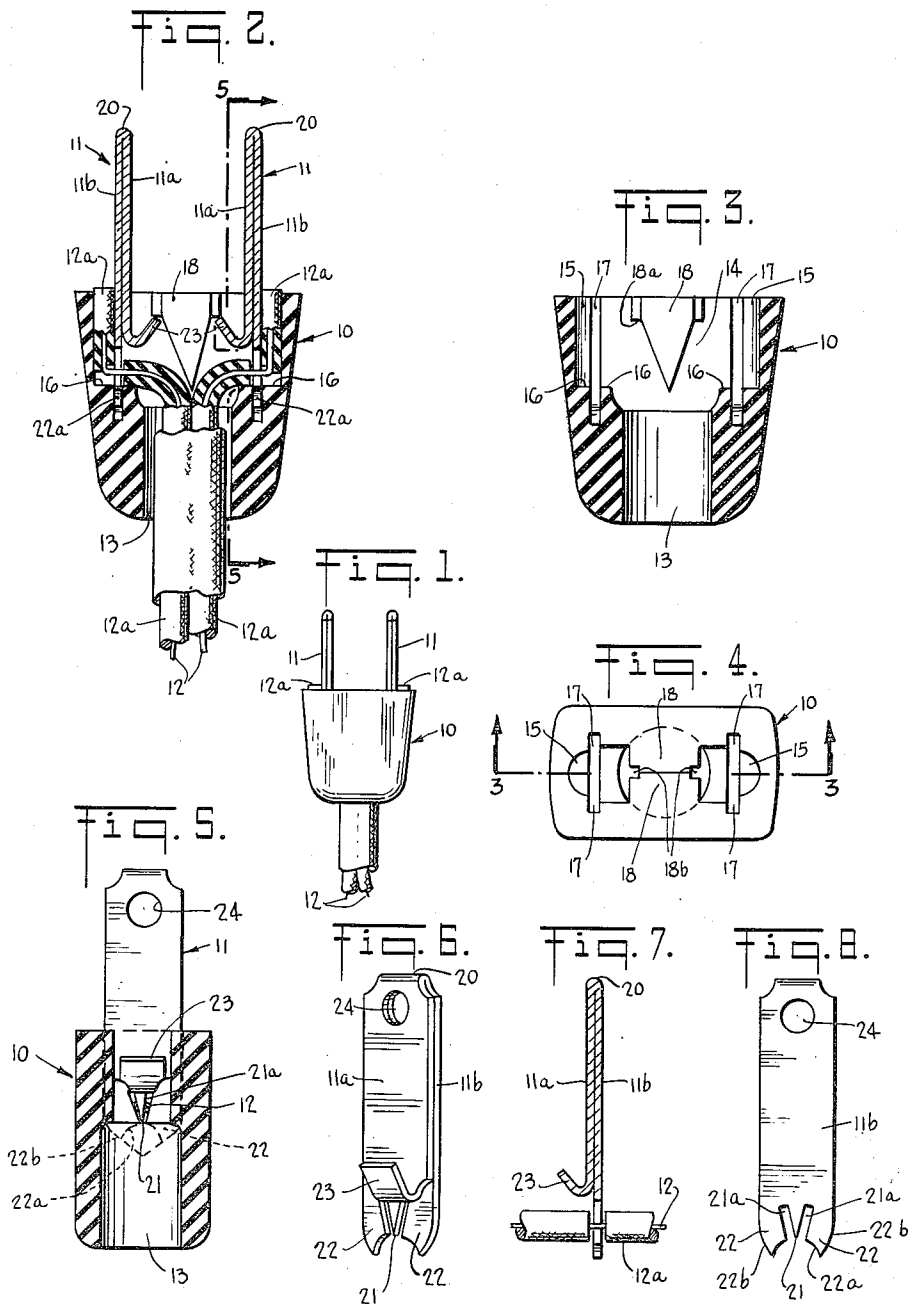


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J. A. GALVAO
ELECTRIC PLUG WITH BLADES HAVING ELEMENTS
FOR PIERCING AND CLAMPING INSULATED CORDS
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INVENTOR.

JOSEPH A. GALVAO

BY

Irving Seidman

ATTORNEY

UNITED STATES PATENT OFFICE

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ELECTRIC PLUG WITH BLADES HAVING
ELEMENTS FOR PIERCING AND CLAMPING
INSULATED CORDS

Joseph A. Galvao, New York, N. Y.

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This invention relates to electric plug with blades having elements for piercing and clamping an insulated cord and has as its general object the provision of an electric plug designed and constructed in such a manner as to effect positive electrical connection between the component elements of the plug and an electrical conductor applied thereto, said electrical connection being effected automatically and simultaneously with the assembly of the component elements of the plug.

The present application constitutes a continuation in part of my prior application, Serial No. 714,374, filed December 6, 1946, now abandoned.

It is another object of the invention to achieve positive electrical connection between the electrical conductors and the contact prongs without the necessity for removing any insulation whatsoever from the conductors and without causing any injury to the conductor.

A further object is to provide electric plug prongs formed with cam surfaces and slits at the lower ends with a spur between the slits so that when the prongs are pushed into the socket formed in the body the spur penetrates the portion of the wire extending across the bottom of the channels of the socket and the lower cam surfaces of the lower ends of the prongs cause them to be bent inwardly or towards each other by the lower or bottom of the inclined channels and thus into gripping engagement with portions of the wire which are disposed in the slits during penetration of the wire by the spur.

It is a further object of the invention to provide an electric plug of the character described which comprises a minimum number of elements assembleable to a durable and rugged unit and which may be fabricated cheaply and easily.

The foregoing objects together with additional objects and advantages will readily appear in the course of the following description taken in connection with the accompanying drawing which illustrates a preferred embodiment of the invention, and wherein:

Fig. 1 is a front view of an electric plug embodying the features of the invention.

Fig. 2 is an enlarged longitudinal sectional view through the plug with contact prongs and conductors in assembled condition.

Fig. 3 is a longitudinal sectional view taken along line 3-3 of Fig. 4 and shows the insulating body portion of the plug solely.

Fig. 4 is a top plan view of the insulating body portion of the plug.

Fig. 5 is a sectional view taken along line 5-5

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of Fig. 2 and clearly illustrates the interrelationship between the claw-like projecting end of one of the contact prongs and its associated electrical conductor in final assembly.

Fig. 6 is a perspective view illustrating a contact prong which is employed in the electric plug of the invention.

Fig. 7 is a longitudinal sectional view through line 7-7 of Fig. 6 and shows the manner in which the insulation of the conductor is pierced or removed by the prong in final assembly.

Fig. 8 is a rear view of the prong illustrated in Fig. 6 clearly showing the integral, pointed, claw-like projection and inwardly notched, conductor-receiving end structure thereof.

Referring now to the drawing in detail, 10 designates an insulating plug body adopted to carry a spaced pair of contact prongs 11, insertable therewithin, a pair of conductor wires 12 being associated with said plug body and said contact prongs in a manner to be fully described hereinafter. The plug body 10 is preferably of integral construction and is formed of insulating material such as rubber, gutta percha, synthetic plastic or any other suitable material and is provided with a central opening 13 for the reception of the conductor wires 12 carrying insulation 12a, said opening extending upwardly from the bottom of the plug body 10 for approximately half the length thereof and communicating with the upper interior cavity 14 of said plug body.

The upper interior cavity 14 of the plug body 10 is provided at each end with a vertically disposed concave groove 15 for the reception of each of the pair of insulated conductor wires 12. A substantially horizontal shoulder wall 16 extends from the bottom of each groove 15 to the central opening 13.

Adjacent each groove 15 a pair of channels 17 is provided extending downwardly from the top face of the plug body 10 to a point below the shoulder-wall 16. The bottoms of channels 17 are V-shaped in form for the purpose hereinafter described. The top of the plug body 10 is formed with a central portion 18 integral with said body and extending downwardly for a short distance within the interior cavity 14 to form an internal shoulder 18a for a purpose to be hereinafter described.

The contact prongs 11 are of relatively thin, flexible material such as brass, bronze or other conducting metal and are doubled as at 20 to provide a double-legged prong comprising an inner leg 11a and an outer leg 11b. The outer leg 11b of contact prong 11 is formed at its lower

extremity with a pointed, claw-like projection or spur 21 adapted to pierce the insulation of conductor wires 12 when said prongs are inserted within each pair of channels 17 and pressed downwardly upon said conductor wires in a manner to be more fully described hereinbelow. The spur 21 is defined by slits 21a which lead from the lower end of the outer edge or recess 22a and also from the outer wall with arms 22 disposed at opposite sides of the spur 21. The arms 22 have their lower outer ends formed with arcuate edges 22b and forming portions of the recess 22a at the inner lower end of the outer leg 11b for locating and receiving each insulator wire 12 and the outer arcuate edges 22b of the arms 22 have their lower portions or arms 22 moved inwardly or towards one another by the V-shaped bottom of the channel 17 so that the arcuate edges 22b act as cam surfaces when the prongs 11 are forced downward into the channels 17. The lower end of inner leg 11a is formed with an integral upwardly bent lug 23 for firmly anchoring the contact prong 11 within the plug body 10, said upwardly bent lug being so arranged as to abut inner shoulder 18a of central portion 18 of plug body 10 when the contact prong 11 has been fully inserted and pressed downwardly within each pair of channels 17. Each prong may be further provided with the conventional opening 24 to assure positive contact with the terminals of an electrical outlet (not shown).

In actual use the conductor cord carrying separate conductor wires 12 is passed into the plug body 10 through the central opening 13 after which each separate conductor wire 12 carrying its insulation 12a is directed by the V-shaped member to the right and left and disposed within each of the vertical grooves 15 with the top of each of said wires preferably extending slightly beyond the top surface of plug body 10 as illustrated in Figs. 1 and 2.

Each contact prong 11 is next inserted within a pair of channels 17 with the conductor wires 12 carrying its insulation 12a interposed between groove 15 and the outer leg 11b of prong 11. Each of said prongs is pushed down until the pointed projection or spur 21 pierces through the insulation 12a of conductor wires 12 and makes firm contact with the said conductor wires, portions of said wire entering the slits 21a and being wedged between the pointed projection 21 and the adjoining arms 22 of outer leg 11b as clearly indicated in Fig. 5. At this point upwardly bent lug 23 of inner leg 11a passes below central portion 18 of plug body 10 and into abutment against internal shoulder 18a thereof to firmly and irremovably secure the contact prong 11. However, if desired, a transverse slot 18b may be formed in central portion 18 to allow insertion of a pointed instrument for bending back upwardly bent lug 23 for the removal of contact prong 11.

It is important to note that each of the vertical channels 17 extends for a short distance below the top surface of shoulder-wall 16, as shown in Fig. 3, and that the outer leg 11b of contact prong 11 has a conductor-receiving notch 22a so that when the prong 11 is fully entered within plug body 10 with the conductor wire 12 carrying its insulation 12a interposed between the outer wall 11b of said prong and the concave groove 15 of said plug body, the terminal end portions of outer leg 11b (shown in dotted outline in Fig. 5) will lie partially below shoulder wall 16 and projection 21 having penetrated or pierced the insulation 17a of conductor wires 12, the arms 22 will be forced towards each other by

action of their cam surfaces or arcuate edges 22b upon the V-shaped bottoms of channels 17 and the wires will be tightly gripped between prong 21 and the arms 22 of outer leg 11b to assure firm and positive contact.

Contact prongs 11 may, of course, be formed from a single thickness of conducting metal rather than having the double-walled construction illustrated in the accompanying drawing and the upwardly bent lug 23 and pointed projection 21 may be formed integrally therewith. Also, the contact prong 11 may be formed with a plurality of projections, if desired, rather than with a single projection as illustrated.

Since certain additional modifications may be made in the electric plug of my invention without departing from the scope thereof, it is intended that all matter contained in the foregoing description and shown in the accompanying drawing be interpreted merely as illustrative and not in a limiting sense.

I claim:

1. In an electric plug, a body of insulation formed with a wire-receiving bore and with sockets open at their outer ends and at their inner ends communicating with the bore and having bottoms formed with walls disposed at an incline, the said sockets having opposed side walls formed with grooves extending from the open outer ends of the sockets to a point below the bottoms thereof, electric wires extending through said bore into said sockets and having portions disposed along the bottoms of the sockets, and contact prongs inserted longitudinally into said sockets through the open ends thereof with their side edges engaged in the grooves of the sockets, each prong having its inner end portion formed with slits leading from its inner end and defining a spur between the slits tapered to a point at its lower end and arms at opposite sides of the spur, the arms having lower ends of their outer side edges extending at an inward incline and constituting cam surfaces, the spurs of said contact prongs penetrating the wires and portions of the wires being engaged in the slits, the arms extending below the bottoms of the sockets and bent towards the spur by action of their cam surfaces upon the inclined walls of the bottoms of said sockets and thereby moved into gripping engagement with the portions of the wires in the slits.

2. In an electric plug, a body of insulation formed with a wire-receiving bore and with sockets open at their outer ends and at their inner ends communicating with the bore and having transversely V-shaped bottoms, electric wires extending through the bores and into said sockets across bottoms thereof, and contact prongs thrust into said sockets through the open outer ends thereof, each prong having a longitudinally extending spur midway the width of its inner end and longitudinally extending arms at opposite sides of its spur, outer side edges of said arms having lower portions disposed at an inward incline and constituting cam surfaces and lower ends of the arms having edges extending upwardly at an inward incline towards the lower end of the prong for centering a wire under the spur when the contact is thrust into a socket and its inner end having straddling engagement with the portion of the wire extending across the bottom of the socket, said prongs having their spurs penetrating the wires and their arms forced towards each other by action of their cam surfaces upon the V-shaped bottoms of said sockets and into gripping en-

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gagement with portions of the wires between the companion spurs and arms.

3. In an electric plug, a body of insulation formed with a wire-receiving socket open at its outer end and its bottom formed with oppositely disposed inclined portions, and a contact prong inserted into said socket through the open outer end thereof, said contact prong having at its inner end a spur tapered to a point for penetrating a conductor wire and arms at opposite sides of said spur formed along their outer side edges with downwardly converging cam surfaces for engaging said oppositely disposed inclined portions of the body and serving to bend the arms towards opposite side edges of the com-

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panion spur and into gripping engagement with portions of the wire penetrated by the spur when the prong is forced into the socket and into engagement with the inclined portions of the bottom of said sockets.

JOSEPH A. GALVAO.

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