Feb. 24, 1948. E. F. MANGOLD 2,436,586

SOCKET PLUG FOR ELECTRICAL OUTLETS

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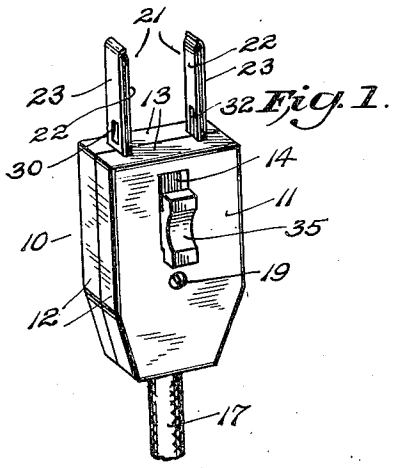


Fig. 1.

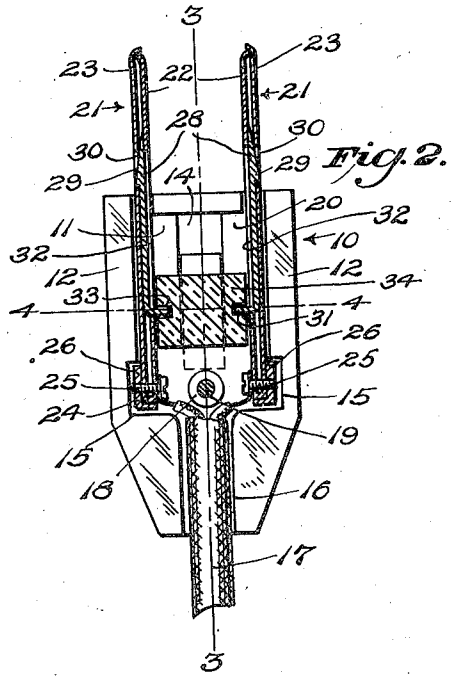


Fig. 2.

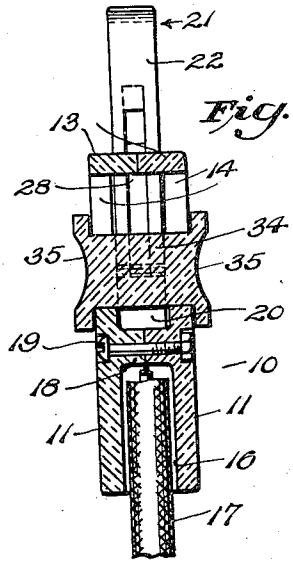


Fig. 3.

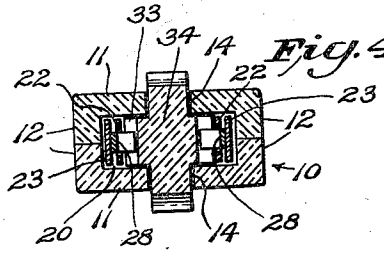


Fig. 4.

Fig. 9.

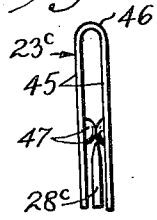
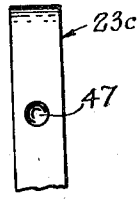


Fig. 10.



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Fig. 5.

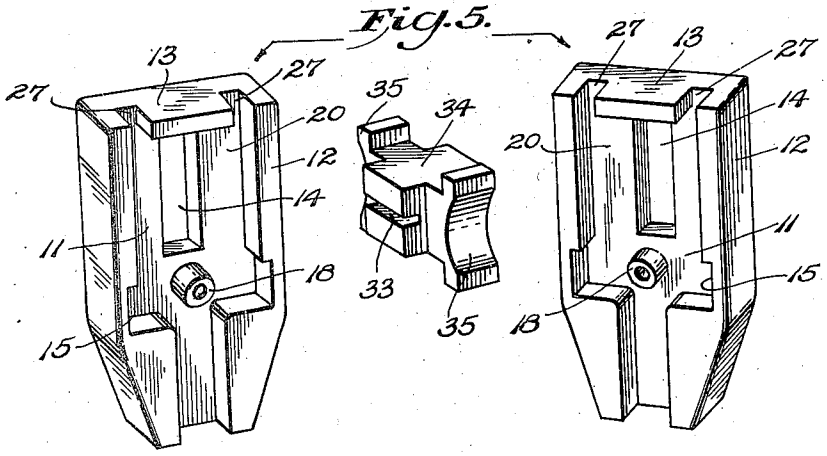


Fig. 6.

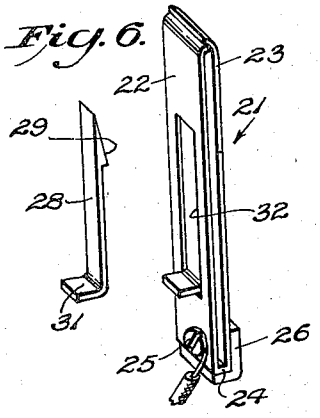


Fig. 7.

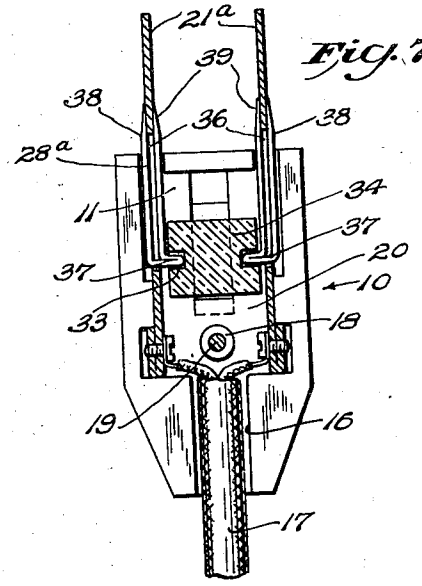
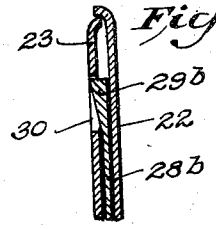


Fig. 8.



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Patented Feb. 24, 1948

2,436,586

UNITED STATES PATENT OFFICE

2,436,586

SOCKET PLUG FOR ELECTRICAL OUTLETS

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Application July 10, 1945, Serial No. 604,241

1 Claim. (Cl. 173—361)

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This invention relates to improvements in electrical outlet plugs, and has for an object to provide a plug in which the spaced prongs thereof will maintain firm and good electrical contact with the conductor terminals of the associated outlet fixture, whereby to minimize current losses, reduce or prevent arcing between the plug prongs and the outlet terminals and maintain the plug in secure association with the outlet by preventing accidental disengagement therebetween.

It is well known that in many instances, the usual contact plug of the prong type fits loosely in the sockets of an outlet fixture. Such looseness is objectionable in many respects, since if the plug is attached, for instance, to the conductor cord of such an appliance as an electrical floor or carpet sweeper, the manipulation of the latter causes readily the disengagement or removal of the plug from the outlet fixture, requiring repeated reinsertions. This is also true of incandescent lamps employed adjacent to machine tools where a slight contacting of the lamp causes its cord plug to be removed from the associated outlet. Furthermore, such looseness is apt to produce electrical arcing between engaging contacts, and thereby forming a fire hazard in addition to the premature deterioration of the fixture construction.

Therefore, in accordance with the present invention and to overcome the objects noted, among others, present in standard outlet plug construction, I have provided an improved contact plug in which the prongs thereof, upon insertion in the sockets of an associated outlet, are adapted to be laterally expanded, whereby to obtain improved current-transmitting engagement with the socket terminals by which the advantages outlined are obtained.

For a further understanding of the invention, reference is to be had to the following description and the accompanying drawings, wherein:

Fig. 1 is a perspective view of a pronged contact plug formed in accordance with the present invention;

Fig. 2 is a vertical sectional view taken through the plug;

Fig. 3 is a similar view on the plane indicated by the line 3—3 of Fig. 2;

Fig. 4 is a transverse horizontal sectional view taken on the plane disclosed by the line 4—4 of Fig. 2;

Fig. 5 is a group view showing in perspective and in a separated state the casing halves of the plug and the thumb-actuated prong-expanding runner;

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Fig. 6 is a similar view disclosing one of the prongs of the plug and its associated expanding wedge;

Fig. 7 is a vertical sectional view taken through a modified form of a contact plug embodying the features of the present invention;

Fig. 8 is a similar view of a still further modified form.

Fig. 9 is a fragmentary edge elevational view of another modified form of plug construction;

Fig. 10 is a front elevational view of the structure disclosed in Fig. 9.

Referring more particularly to the drawings, the numeral 10 designates the casing of my improved plug. The casing is preferably formed in two halves, each of which being formed from a suitable insulating material. Each casing half is of integral construction and embodies a front wall 11, perpendicular side walls 12 and a top wall 13. The front wall is provided in the middle thereof with a slot 14. The side walls are inwardly recessed as at 15 and terminate in spaced order to form a groove 16 for the reception of a cord 17 leading to the motor, or other energizing unit, of an electrical current-consuming appliance, not shown.

Further, each casing half includes a boss 18 having openings formed therein, so that when said casing halves are placed together, as in Fig. 3, the openings in the bosses thereof align to receive a threaded element, such as the screw bolt 19. When assembled, the casing provides an internal chamber 20 in which is positioned the inner portions of a pair of spaced contact-forming prongs 21. Each of these prongs is formed to provide a pair of resiliently separable inner and outer bars 22 and 23, respectively. The lower or inner ends of these bars are joined by an intermediate web 24.

Contiguous to the webs 24, the said bars are provided with aligning apertures for the reception of screws 25, the threaded shanks of the latter being received within threaded openings provided in a pair of L-shaped anchor members 26, the latter being confined in the recesses 15 when the casing halves are joined in order to hold the prongs against longitudinal displacement and retain the same securely in connection with the casing. Also, the screws 25 are used to unite the conductor wires of the cord 17 with said prongs. The intermediate portions of the prongs 21 extend through registering slots 27 provided in the top walls 13, and project upwardly or longitudinally forwardly from the top walls. The outer ends of the prongs may be integrally joined or

the same may be separable, as disclosed in Fig. 2, the same forming rounded surfaces adapted for insertion in the standard sockets of an outlet fixture, not shown.

In order to expand the prongs laterally upon their insertion into the outlet sockets, I employ between the bars 22 and 23 of each prong a wedge element 28. The outer or upper end of each wedge element is beveled as at 29 and is received partially in an opening 30 formed in the outer bar of each prong. The wedge element is slidably positioned between the inner and outer bars of said prongs and at its lower end is inwardly and laterally bent as at 31, passing through a slot 32 provided in the associated inner bar 22. These inwardly bent ends of the wedge elements are positioned in grooves 33 provided in the sides of a slidable runner member 34, the latter being slidably received in the slots 14 of the casing 10, projecting exteriorly of the outer faces of said casing to provide thumb-engaging outer extremities 35.

In the use and operation of the plug, the outwardly projecting ends of the prongs 21 are inserted, as usual, in the receiving slots or sockets of a standard outlet fixture. Simultaneously with this insertion, the user applies thumb pressure to the runner extremities 35, causing the runner to slide upwardly and outwardly. This movement on the part of the runner is transmitted to the wedge elements 28, moving the beveled outer ends thereof forwardly so that the same spread or laterally separate the bars 22 and 23 of said prongs. By such outward flexing or spreading of the prong bars, the latter are brought into firm and secure frictional engagement with the associated outlet terminals, such engagement preventing accidental separation of the plug from the outlet, overcomes arcing between the prongs and their engaging contacts and produces good current-transmitting characteristics with low resistance values.

It will be noted that the prongs are expanded by the simple act of inserting the same into the outlet sockets so that no additional time is required in effecting the connection. The construction is simple yet rugged and does not add sensibly to the structural complexity of standard plugs in which rigid one-piece prongs are employed.

My construction is, of course, subject to certain variation or modification without departing from its fundamental principles. For example, as shown in Fig. 7, the prongs 21*a* are longitudinally slotted as at 36, and, in connection with each thereof, I employ a wedge element 28*a*. Each of the latter elements comprises a metallic strip bent upon itself and formed intermediately with a flange 37, adapted to be received in one of the runner grooves 33. Above the flange 37, each wedge element includes spaced arms 38 which are arranged on opposite sides of the prongs 21*a*, the arms 38 terminating at their outer ends in beveled extremities 39. By advancing the runner element forwardly, the arms 38 are moved into wedging engagement with the outlet terminals in order to have firm and locking contact therewith.

In the modified form of the invention disclosed in Fig. 8, the wedge element 28*b* has its outer beveled end 29*b* arranged in reverse order to that

disclosed in Fig. 2, so that the wedge elements 28*b* are moved inwardly to expand the prong arms instead of outwardly or forwardly, as in the preferred form of the invention.

In Figs. 9 and 10 of the drawings, a further modified form of the invention has been disclosed, in which the prong 23*c* of the plug is of looped formation having spaced parallel legs 45 which are joined at their outer ends by the curved web 46. The legs 45 have their inner surfaces provided with adjoining semi-circular enlargements or beads 47, which may be struck inwardly from the material from which the legs 45 are formed. A slidable wedge element, shown at 28*c*, may be advanced between these enlargements or beads to flex the legs 45 outwardly, whereby to maintain the same in firm holding engagement with associated contacts.

While I have described what I consider to be several practical embodiments of my invention, nevertheless, I reserve the right to employ all other variations or modifications thereof that may be said to fall fairly within the spirit and scope of the following claim.

I claim:

A socket plug for electrical outlets, comprising a casing composed of separable sections which, when assembled, provide an internal chamber having side walls formed with vertically extending and transversely registering slots, a pair of spaced metallic prongs, each of said prongs having spaced parallel legs, said prongs being positioned within said chamber and having forwardly projecting portions extending beyond an end wall of said casing, means for securing the inner ends of said prongs to said casing within the internal chamber thereof and for uniting the same with associated electrical conductors entering an end of said casing opposed to the outwardly projecting ends of said prongs, a runner element slidably mounted in said chamber, said element having exteriorly projecting manipulating extremities mounted for sliding movement in the slotted side walls of the casing sections, the inner legs of said prongs within said chamber being vertically slotted, and expansion devices joined with said runner element and extending through the slots in the inner legs of said prongs for disposal between said legs, said devices serving upon sliding actuation of said runner element to expand and contract the effective width of said prongs.

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