June 17, 1930. A. R. GOLDRICK 1,765,330

ELECTRICAL SWIVEL CONNECTER

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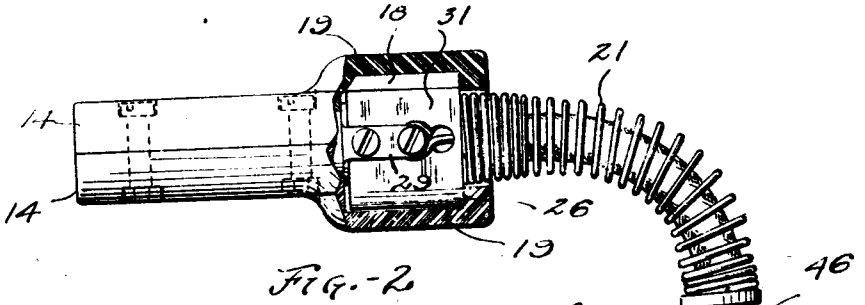


Fig.-2.

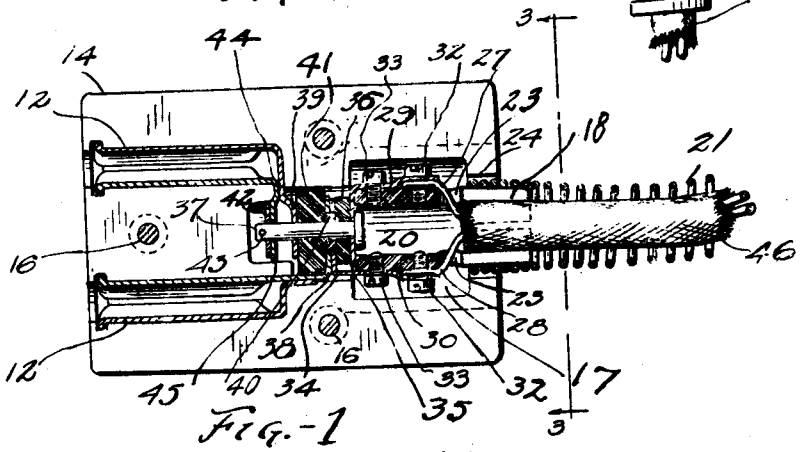


Fig.-1

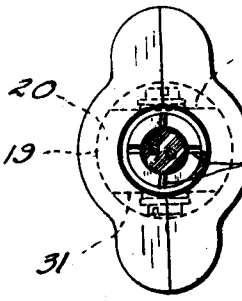


Fig.-3

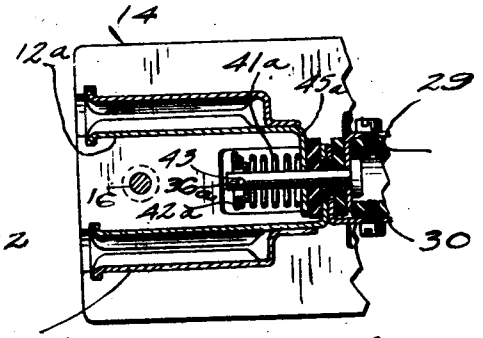


Fig.-4

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ELECTRICAL SWIVEL CONNECTER

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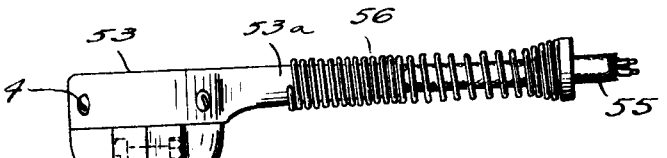


Fig.-5

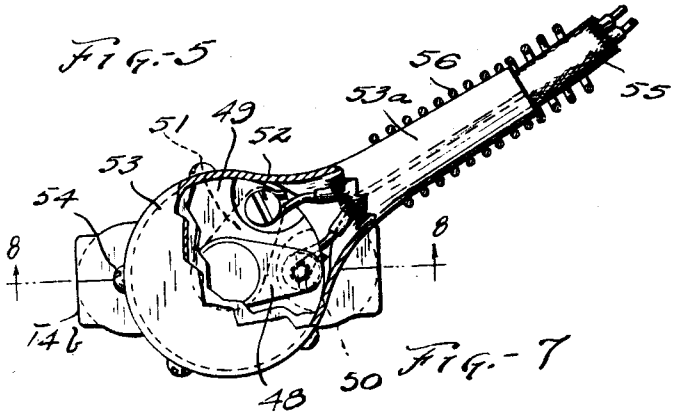


Fig.-7

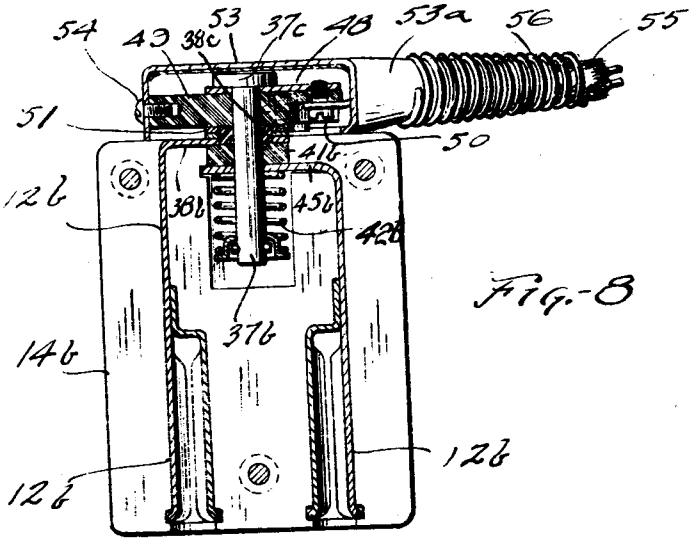


Fig.-8

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ELECTRICAL SWIVEL CONNECTER

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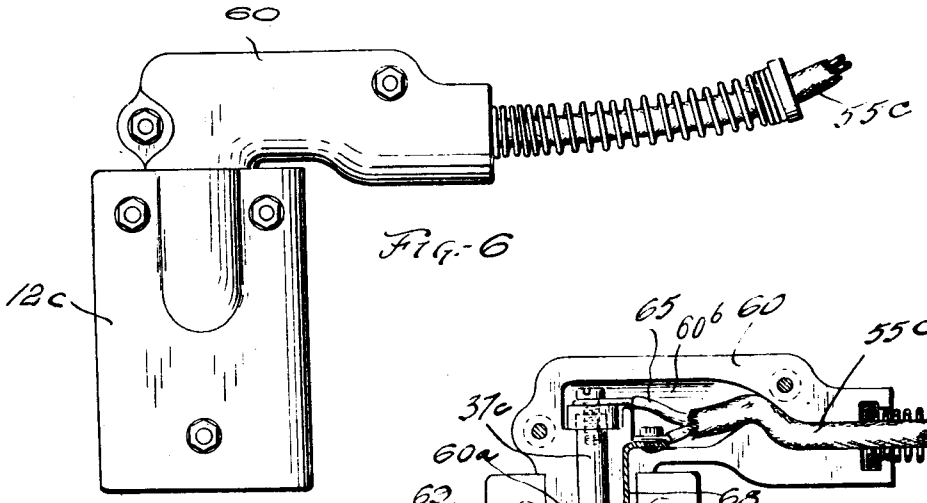


Fig.- 6

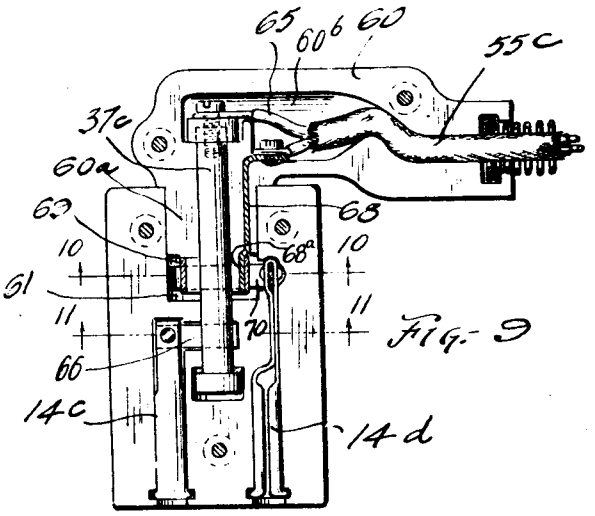


Fig.- 9

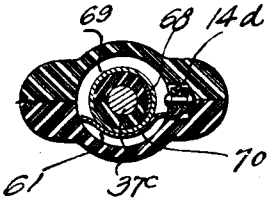


Fig.- 10

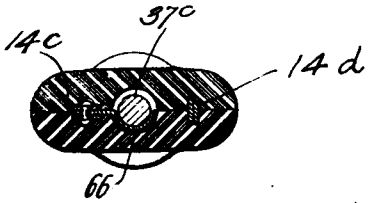


Fig.- 11

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UNITED STATES PATENT OFFICE

ALBERT R. GOLDRICK, OF CLEVELAND, OHIO

ELECTRICAL SWIVEL CONNECTER

Application filed October 22, 1921. Serial No. 509,573.

This invention is directed to new and improved electrical plug connecters adapted for attaching insulated cords having a plurality of conducting wires to movable devices using electric current, and relates more particularly to improved means for electrically connecting such cords to flat irons and similar devices.

Considerable difficulty has been experienced with the plug connecters now in use, in that as the electrical appliance to which the cord is connected is moved and shifted about, twists and distortions accumulate in the cord until the weakest part breaks.

The weakest part of the cord is usually at the connecter end where the insulation is removed to provide a sufficient bare length of the cord wires to be secured to the socket contacts of the connecter. I have found that by permitting the end of the cord to be free to turn independent of the connecter contacts, this breaking is prevented.

The general object of the present invention, therefore, is the provision of electrical plug connecter means adapted to be pivotally secured to the end of an electric cord having a plurality of conductors whereby a twisting, bending, or turning of the cord will not impair the efficiency of the cord conductors.

A more specific object of the invention is to provide an electrical plug cord connecter wherein means are included for maintaining electrical contact between a plurality of cord conductors and the electric terminals of a current consuming device while permitting a turning movement of one end of the cord.

A still further object of my invention is the provision of means in a plug connecter which is adapted to reinforce the end of a flexible cord carrying a plurality of conductors and which may also serve as part of an electrical swivel incorporated in the plug connecter.

My invention is adaptable to a variety of constructions, a few of which are embodied in the accompanying drawings, and the invention is hereinafter more fully described in connection with these drawings. The essential characteristics are summarized in the claims.

In the drawings, Fig. 1 shows a central section of my invention with insulating means therefor, while Fig. 2 is a side elevation of the same device with part of the insulating portion of the connecter in section, to illustrate the arrangement of the cord terminals; Fig. 3 is a section substantially along the line 3—3 of Fig. 1.

In Fig. 4 I have shown a modified form of the means for maintaining the swivel members in contact.

Figs. 5 and 6 are illustrations of alternate constructions embodying my invention while Figs. 7 to 11, inclusive, are various views hereinafter referred to, which show the details of these constructions.

Referring to the various parts by numerals in Fig. 1, I have shown a plug connecter comprised of the usual socket contacts 12 positioned in the usual complementary insulation members 14. These insulation members may be rigidly held together by any suitable means such as the bolts 16.

Positioned within suitable cylindrical recesses 17 formed in the inner faces of the complementary members 14, is a cord terminal reinforcing member 18 which is pivotally connected to the contact sockets 12.

This cord reinforcing member is comprised preferably of a tubular piece of fibre, an enlarged portion 20 of which is adapted to loosely bear upon the cylindrical recessed surfaces 17, as shown at 19 in Fig. 3. The outer portion of the member 18 may be tapered slightly to provide a gripping surface for a suitable reinforcing spring 21. This shank portion may be slotted as shown at 22, whereby the spring 21 may contract the outer end of the tubular member and thereby securely grip that portion of the cord extending therethrough. The stripped ends of the cord

conductors may pass through suitable openings 23 formed in the sides of the tubular member. The outer circumference of the end coils of the spring may bear upon the cylindrical surfaces of an annular rib 24 formed adjacent the recessed surfaces 17. This rib may also serve to restrict the outward movement of the tubular member 18, as shown at 26 in Fig. 2.

Having described the means by which I prefer to prevent twisting of the bared end of the cord, I will now describe the means by which the current is conducted through the connecter from the cord end to the socket contacts 12. I have found that the ends of the cord conductors 27 and 28 may be effectively secured to suitable swivel leads 29 and 30, respectively, which may be mounted on flattened surfaces 31 of the rotatable member 18. Screws 32 serve to clamp the ends of these swivel leads upon the looped ends of the conductors, while suitable screws 33 serve to permanently secure the leads to the member 18. The inner ends of these leads are shaped in the form of a washer bent inwardly and disposed coaxially with the rotatable member 18. I prefer to have these washer or contact portions 34 and 35 a sufficient distance apart to provide space for an insulating washer 36 which is adapted to be maintained in position by a swivel pin 37. All of the above mentioned parts constitute a rotatable unit secured to the end of the cord and suitably housed by the insulating members 14.

To obtain conduction from the contact members mounted on the tubular member 18, I have extended the walls of the socket contacts 12 which may terminate in contact surfaces 38 and 39 similar in form to the contact portions 34 and 35. These portions may be maintained in proper contact with the portions 34 and 35, respectively by suitable means later described, the portion 34 being electrically connected to the portion 38 by direct contact while the former is electrically connected through the swivel pin 37. A small fibre washer 40, co-axial with the swivel pin serves as an insulating means between the contacts 34 and 38, and the swivel pin 37.

All of these conductors may be maintained in contact by exerting a spring pull on the swivel pin 37. Hence by forming the ends of the walls of one of the socket contacts into a fork spring with suitable apertures for the swivel pin, the fork spring may exert pressure between the large insulating washer 41 and the metallic contact washer 42 which is held in position on the swivel pin by a small retaining pin 43. The fork spring portions of the socket walls may be welded as shown at 44, thus the extensions 39 and 45 may be pressed toward each other when the retaining pin is inserted, thereby providing a spring pressure upon all of the washers and contact members which are co-axial with the swivel pin.

Hence as the cord 46 is turned or twisted while in the position illustrated in Fig. 2, no twisting or bending takes place at the point where the bare conductors are secured to the swivel and no twists can accumulate as the end of the cord is free to turn.

In Fig. 4 I have illustrated a modified form of spring construction for maintaining the swivel members in contact. The swivel construction is substantially the same as illustrated in Fig. 1, with a swivel pin 36^a, however, of sufficient length to provide for the retention of a helical spring 41^a adapted to be compressed between a retainer member 42^a removably secured to the end of the pin and the contact extension 45^a of the socket wall 12^a.

The swivel construction may be embodied in many forms, and as an instance of the adaptability of my invention to various specific structures, I have illustrated the connecter plug in Figs. 5, 7 and 8, in combination with an external swivel member pivotally secured to the plug contacts in a manner similar to that hereinbefore described. In this device, however, the walls of the socket contacts 12^b may extend upwardly in suitable slots formed in the complementary body members 14^b and terminate in inwardly extending contact portions 38^b and 45^b. A suitable insulating member 41^b serves as a spacing means.

A swivel pin 37^b may pass through suitable apertures formed in the insulating member 41^b and contact portions 38^b and 45^b. The upper end of this pin may have an upset head 37^c in contact with a conductor plate 48 which is secured to a fibre disc 49 by a lead wire clamp screw 50. A similar plate 51 may be secured to the underside of this disc member by a lead wire clamp screw 52.

The lower end of the swivel pin may be arranged as hereinbefore set forth in the description of the device illustrated in Fig. 4. A resilient member 42^b serves to maintain the various conductor plates in contact. The current may thus flow through the top conductor plate and thence through the swivel pin to the socket contact 45^b. The other current path may be through the bottom conductor plate thence directly to the socket contact 38^b; a washer 38^c serving to insulate the last named conductor member from the swivel pin.

A suitable metallic casing 53 formed somewhat in the shape of a deep spoon may be secured to the fibre disc by screws 54. The casing may be lined with suitable insulating material to prevent short circuits.

A tubular shank portion 53^a formed integrally with the casing may be split to permit a contraction thereof upon the cord 55 when

the spring 56 is mounted thereon. The cord conductors are thus protected from twists.

All of the elements contained by the casing are relatively rigid therewith including the swivel pin; hence all of these members may be rotated by a movement of the cord.

In Figs. 6, 9, 10 and 11, I have illustrated still another embodiment of my invention. This device, however, may be comprised of a pair of complementary plug body members 12^c having a pair of socket contacts 14^c and 14^d positioned in suitable cavities formed therein. A pivot pin 37^c may be rigidly carried by articulate members 60 having suitable cavities for cord 55^c. These insulating members may have cylindrical extensions 60^a which constitute a pivot bearing fitting the cavities 61 formed in the complementary members 12^c.

The two pairs of articulate insulating members may be maintained in pivotal relation by the pin 37^c which may be rigid with the members 60. This pin may also serve as a conductor; the lead wire 65 being attached to one end while a brush member 66 carried by the socket contact 14^c see Fig. 11 may be in rubbing contact with the other end. A second conductor may be positioned in a suitable slot formed in the members 60 and may extend into the cavity 60^b formed in the members 60. The other lead wire may be attached to this projecting end. The other end of the conductor member 68 may terminate in an offset portion 68^a which may be in contact with a brush ring 69. The brush ring 69 may serve to maintain the pivotal ends of the articulate members 60 in alignment. A spring brush 70 secured to the other socket contact 14^d may rest in rubbing contact with the ring and thus complete the other conductor line. In the last two embodiments the cord rotates the pivotal members but no provision is made for permitting the end of the cord to rotate axially. In the first described device, which I consider the preferred form, the cord may be twisted or rotated without causing an accumulation of distortions which would eventually break the cord.

The construction is such that the individual parts of the device may be economically made and an efficient assembly obtained at a very practical cost.

Having thus described my invention, I claim:—

1. In a flat iron plug connecter, the combination of a pair of complementary contact insulating members, a pair of socket contacts formed to receive the terminal plugs of a flat iron and positioned within the insulating members and means in swivel connection with said complementary members for electrically connecting the strands of an electric cord to said socket contacts said means being adapted for positively gripping the outer insulating cover of an electrical cord so that the outer insulating cover receives all of the torsional strains thereby protecting the bared cord strand ends.

2. In an electric flat iron plug connecter, the combination of a pair of complementary insulating members, socket contacts positioned in suitable cavities formed in the insulating members, means within said complementary members including a central pin and two coaxial disk contacts spaced longitudinally of the central pin, one contact engaging the pin and the other being insulated therefrom for forming electrical pivotal connections between the individual conductors of an electric cord and said socket contacts, an insulating member carrying the conductor connecting portions of said means and adapted to positively grip the outer covering of such a cord so that no torsional strain is placed on the individual conductors.

3. In an electric flat iron plug connecter, the combination of a pair of complementary insulating members, socket contacts carried by the insulating members, said insulating members having complementary cavities formed therein disposed along a line intermediate the socket contacts, a member disposed in said complementary cavities and retained in turnable relation to the complementary members, said member extending longitudinally of the said complementary members, said socket contacts having conductor extensions leading to said cavities, said turnable member having conductors mounted thereon and means disposed entirely within the complementary members for pivotally connecting the socket contact extensions to the conductors on the turnable member.

4. An electric swivel connecter comprising in combination rotatable elements and stationary elements, the stationary elements including socket contact members and a pair of complementary recessed insulating members adapted to be fitted together to provide cavities therein, the said socket contact members and the said rotatable elements being disposed in the cavities in such relation that the axis of the rotatable elements is disposed intermediate the socket contacts, the said rotatable elements including a longitudinally extending pin, a contact carrying member of insulating material and disc contacts coaxially aligned with said pin and carried by said member, contact discs in the same alignment carried by said sockets, and insulating means adjacent said pin whereby the contact discs may be arranged in sets adapted to carry current of opposite polarity with the sets of discs insulated from each other.

5. In a flat-iron plug connecter, the combination of a pair of cavitary insulating members, female plug contacts disposed in the cavities of said insulating members, a swivel

structure attached to said cavitary members, having a turning axis extending substantially parallel to said female plug contacts and disposed along an axis intermediate the plug contacts, a cord gripping means carried by one part of said swivel structure, electrical conductor means extending between said female plug contacts and another part of the swivel structure and means for connecting the current carrying strands of an electrical cord to the first named part of the swivel means.

In testimony whereof, I hereunto affix my signature.

ALBERT R. GOLDRICK.