Sept. 8, 1925. 1,553,102

H. D. PIERCE

ELECTRICAL CONNECTER

Filed Oct. 4, 1922

Fig. 1.

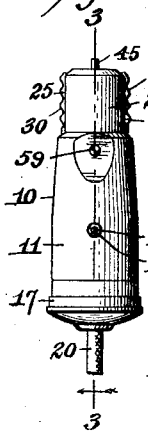


Fig. 2.

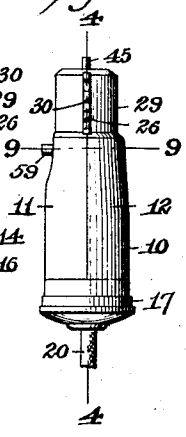


Fig. 4.

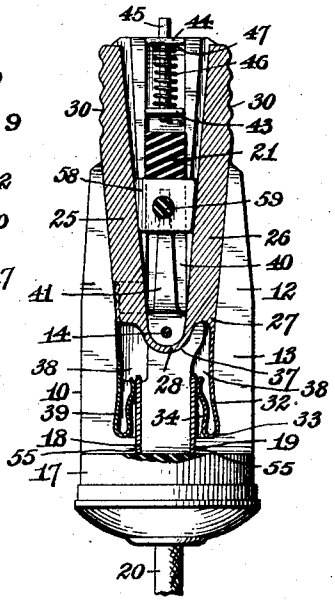


Fig. 5.

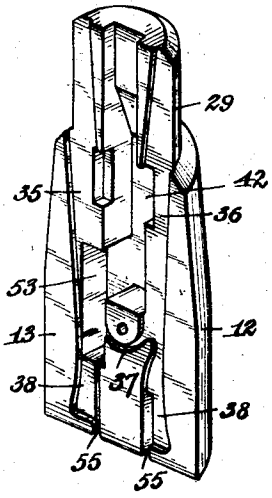


Fig. 3.

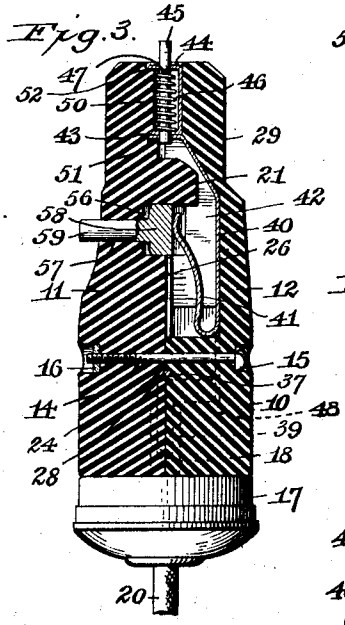


Fig. 7.

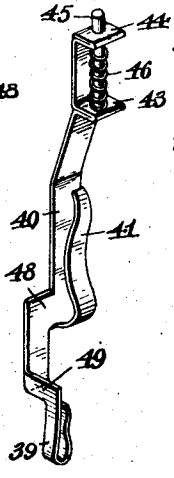


Fig. 8.

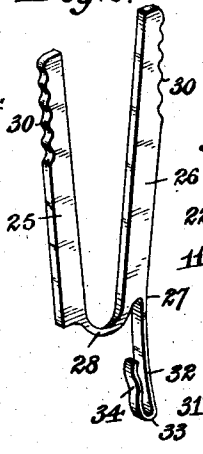


Fig. 6.

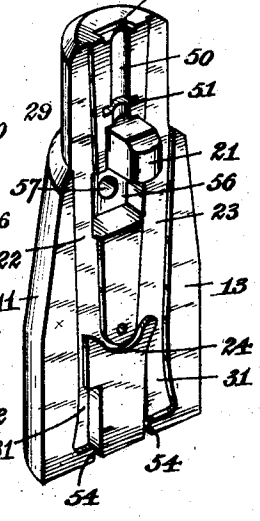
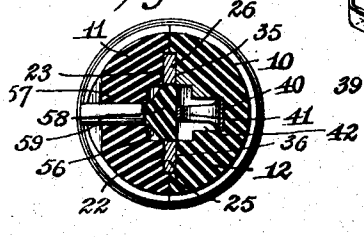


Fig. 9.



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UNITED STATES PATENT OFFICE.

HERBERT D. PIERCE, OF HAMBURG, NEW YORK.

ELECTRICAL CONNECTER.

Application filed October 4, 1922. Serial No. 592,250.

To all whom it may concern:

Be it known that I, HERBERT D. PIERCE, a citizen of the United States, residing at Hamburg, in the county of Erie and State of New York, have invented certain new and useful Improvements in Electrical Connecters, of which the following is a specification.

This invention relates to improvements in electrical connecters, and more particularly to such as are designed for use as plugs.

While my invention is particularly designed and shown in the accompanying drawings as a plug connecter, it is to be understood that the principle involved may be embodied in electrical connections other than plugs; also that the invention may be embodied in or used in connection with incandescent lamps.

The primary object of my invention is to provide a simple and inexpensive connecter of the kind referred to in which few parts are included, and which will permit of making connection with a threaded socket by simple movement lengthwise of the plug into the socket.

While the invention is adapted for connection with a threaded socket, by what may be termed a push or thrust movement into the socket, where an absolutely tight fit is desired at all times, it may be found necessary to rotate the plug after being inserted into the socket by such thrust movement, although a spring-projected contact is provided to assure proper contact without rotating the plug after being thrust into the socket. Rotation of the plug is therefore necessary only when the plug and the socket to which the plug is connected are subjected to vibrations, and even in such cases it will often be found that the mere insertion of the plug into the socket by a thrust movement will so tighten the plug within the socket that it cannot be rotated.

A further object of my invention is to provide a connecter of this kind, which can be removed from its socket by a direct pulling action.

From the foregoing it will be apparent that the connection of the wire to the plug will not be strained, as often occurs with the ordinary plug now in use, which requires rotation, necessitating turning and twisting of the cord connected thereto.

With the above and other objects in view, the invention consists in the novel features of construction and in the arrangement and combination of parts to be hereinafter described, and more particularly pointed out in the subjoined claims.

In the drawings:—

Fig. 1 is a front elevation of a connecter illustrating my invention in a representative manner.

Fig. 2 is a side elevation of the same.

Fig. 3 is an enlarged longitudinal section taken on line 3—3, Fig. 1, looking in the direction of the arrow crossing said line, the cap being shown in elevation.

Fig. 4 is an enlarged longitudinal section taken on line 4—4, Fig. 2, the cap being shown in elevation.

Fig. 5 is a perspective view of one of the sections of the body portion.

Fig. 6 is a perspective view of the other section of the body portion.

Fig. 7 is a detached perspective view of one of the contact members having a projector spring formed as part thereof.

Fig. 8 is a detached perspective view of the other contact member having spring-strained connecter elements forming part thereof.

Fig. 9 is an enlarged transverse section taken on line 9—9, Fig. 2.

The connecter illustrated in the drawings in the form of a plug, comprises a body portion 10, which is formed of two parts or sections 11, 12, each section having flat contacting faces 13, which are adapted to lie in contact with each other, and these sections are secured together by means of a screw bolt 14 passed transversely therethrough, the head of the bolt being preferably recessed, as at 15, while the nut 16 applied to the bolt is also recessed at a point in the body portion diametrically opposite the recessed head. The threaded end of the screw bolt is adapted to terminate within the recess having the nut 16 therein so that a smooth exterior is provided for the plug.

17 designates a cap of ordinary construction, it having spaced contact arms 18, 19, extending inwardly therefrom and adapted to be thrust into the body portion of the plug. These contact arms or contacts are parallel, as shown in Fig. 4, and the two stretches of wire insulated from each other and forming part of the current-conducting cord 20 in the usual way, are adapted to be connected to these contacts in a manner well known. This is not illustrated in detail.

owing to the fact that a cap of this kind is commonly used and well known.

The inner side of each section 11, 12 is recessed and section 11 has a projection 21 extending outwardly therefrom into section 12 and it also has two outwardly-diverging shallow depressions 22, 23 at opposite sides of the projection 21. Said shallow depressions being connected together by a curved depression 24 of like depth. In said shallow depressions 22, 23, connecter elements 25, 26, respectively, are entered, said connecter elements forming part of a contact member 27 and being connected together by a curved portion 28 serving as a spring. Said curved portion or spring tends to spread the connecter elements and cause them to assume a diverging relation outwardly at all times.

It is to be understood that the outer end of the plug is reduced in diameter, as at 29, and this reduced portion is somewhat smaller than the internal diameter of the socket into which the connecter or plug is to be inserted. Furthermore, the outer edges of the connecter elements are substantially parallel for a short distance from their outer ends, and these parallel edges are corrugated, as at 30, the corrugations of the two connecter elements being out of line transversely so that they correspond to the thread of a socket into which the connecter or plug is to be inserted. In other words, the two sets of corrugations may be said to form a screw-thread, discontinued along two regions.

The shallow depressions 22, 23 are continued inwardly beyond the shallow curved depression 24, as at 31, and one of said continuations receives a contact element 32 extending from the inner end of one of said connecter elements. Said contact element is curved upon itself, as at 33, to provide a recurved spring arm 34. The shallow diverging depressions 22, 23 and the continuations 31 thereof have a depth approximately one-half the thickness of the connecter elements 25, 26, and one-half the width of the contact element 32 and to receive the half extending from section 11, section 12 is also provided with shallow diverging depressions 35, 36, connected by a curved portion 37, said shallow depressions 35, 36, being continued toward the inner end of section 12, as at 38. The continuation of depression 36 receives the contact element 32 while the continuation of depression 35 receives a contact element 39 constructed similar to the contact element 32 and forming part of a two-point contact member 40 having a spring 41 thereon. When the two sections 11, 12 are placed together, the shallow depressions, the curved depressions, and the continuations of said shallow depressions of both sections register.

Section 12 is provided with a comparatively deep depression 42 arranged centrally therein in which the two-point contact member 40 and its spring 41 are arranged. Said two-point contact member is formed of a flat strip of metal doubled upon itself near its outer end to form an outstanding arm 43, and at its outer end said strip of metal is also bent upon itself to form an arm 44, which is spaced from the arm 43, each arm being perforated to receive a contact pin 45 having a spring 46 coiled around the same, one end of said spring bearing against the arm 44 and the other end thereof against a stop pin 47, which is normally in contact with the inner side of the arm 43. The contact pin is guided for movement in both arms and projects outwardly a distance beyond the outer face of the outer arm 43, being so retained by the spring 46. The flat strip is offset, as at 48, and the offset portion directed inwardly and provided with a right-angled portion 49 having the contact element 39 extending inwardly from the outer end of said right angle portion.

The spring 41 is formed by bending a portion of the strip, separated from the offset portion 48, upon itself.

Section 11 of the body portion is provided between its outer end and the projection 21 thereon with a semi-cylindrical depression 50, and extending across said depression near its inner end is a transverse depression 51 somewhat deeper than said semicylindrical depression, while at the outer end of section 11, a depression 52 is formed, thus when the two parts or sections of the connecter or plug are placed together, the arm 43 enters the depression 51 while the arm 44 enters the depression 52 and at the same time, the semi-cylindrical depression 50 receives the spring 46 and contact pin 45.

It is to be noted that the insertion of the arm 43 in the transverse depression 51 prevents lengthwise movement of the two-point contact member 40. To receive the offset portion 48 and the right-angled portion 49 of said member 40, the comparatively deep depression 42 in section 12 is enlarged laterally, as at 53.

From the foregoing it will be apparent that when the two-point member 40 is positioned within part or section 12, the contact element 39 is entered partly in the continuation 38 of the shallow depression 35 in section 12 and partly in the continuation 31 of the shallow depression 23 in section 11.

Section 11 has slots 54 extending from its inner end into the continuations 31 of the shallow depessions 22 and 23, while section 12 has similar slots 55 extending from its inner end to the continuations 38 of the shallow depressions 35, 36. When the two parts or sections 11 and 12 are connected together, the slots 54 and 55 are in alinement

and form two spaced openings within the plug or connecter adapted to have the contact elements or arms 18 and 19 of the cap 17 passed therethrough and extend into the continuations 31 and 38 of the depressions in the two sections. When inserted through the openings thus formed, said contact elements or arms 18, 19 lie in contact with the contact elements 32 and 39, and thus maintain electrical connection between the cap, having the cord 20 connected thereto, and the connecter elements 25, 26 as well as the two-point contact member 40.

The connecter elements 25, 26 are current conductors, and when the plug or connecter is inserted into a socket, they establish connection between the wall of the socket and the plug or connecter, while the axial contact pin 45 in the plug makes connection with the axial contact of said socket, thus establishing a circuit through the cord 20 to light a lamp, operate a motor, or serve in various other electrical capacities.

It is to be noted that by reason of the two parts or sections 11 and 12 having the shallow depressions 22, 23 and 35, 36, formed therein, respectively, they are spaced apart along their reduced outer ends, thus providing spaces through which the corrugated end portions of the connecter members 25, 26 extend. It is to be understood that only the corrugated marginal portions of these connecter members are exposed, the curved portion or spring 28 tending to keep the connecter elements or contacts 25, 26 projected, with their outer edges in contact with the side walls of the shallow depressions in the two parts or sections 11, 12.

The connecter section 11 has a comparatively deep depression 56 adjacent the projection 21, and a cylindrical opening 57 extending outwardly from said deep depression. Fitted into said depression 56 is a wedge-like locking element 58 provided with a push pin 59. The spring 41, which may be termed a projector spring, bears against the inner side of said locking element, as best shown in Fig. 9, serving at all times to press said element outwardly and maintain said push pin in projected position. Opposite edges of said locking element normally lie in contact with the inner edges of the two connecter elements 25, 26, and are retained in such position by the projector spring 41, and when so positioned said connecter elements have their corrugated marginal portions projected beyond the surface of the reduced outer end of the plug or connecter, as clearly shown in Fig. 1, said connecter elements being so retained and being thus prevented from becoming accidentally disconnected from the threads of a socket into threaded engagement with which they may be held.

When pressing against the outer end of the push pin 59, the wedge-like locking element is forced into the deep depression 42 of section 12 against the action of the projector spring 41 and is thus moved away from its position between the two connecter elements 25 and 26, thus allowing said elements to be forced inwardly. When, therefore, the locking element is moved out of line with the two connecter elements 25 and 26, and the plug is inserted into a socket, the force of the thrust or power of the push exerted will cause the corrugations to ride over the internal threads of the socket, which is allowed by reason of said connecter members moving inwardly and outwardly during such action, or when removing the plug from a socket the pulling action will cause said elements to move inwardly and become disconnected from the threads of the socket. It is clear therefore that when connecting the plug with the socket, or disconnecting the same from a socket, the push pin 59 is depressed to allow the connecter elements 25, 26 to move inwardly, and when disconnected from the socket or after being withdrawn from the socket, release of the push pin will cause the projector spring 41 to position the locking element 58 between the two connecter elements 25, 26, retaining them in spread relation.

Owing to the fact that the contact element of pin 45 is spring projected, the mere insertion of the plug into the socket will assure proper electrical connection between the two, under ordinary conditions. If, however, for any reason the socket into which the plug is to be inserted is imperfect and the contact pin 45 does not make contact with the axial contact of the socket, the plug may be rotated to cause the same to be forced into the socket to a greater extent until an electrical connection is made.

In Fig. 9, opposite edges of the locking element 58 are shown slightly flared inwardly, and this is sufficient to allow free movement of said element between the two connecter elements 25, 26 and also assures proper locking action of said connecter elements so that the corrugated marginal portions, or the threaded portions, as they may be referred to, cannot be forced into the plug.

Having thus described my invention, what I claim is:—

1. A connecter having a reduced outer end slotted at diametrically opposite points, a pair of spring-connected connecter elements within said connecter projecting outwardly through the slots of said reduced outer end, the projecting portions of said connecter elements being corrugated with the corrugations of one connecter element out of line transversely with those of the other connecter element, and a push pin extending outwardly laterally through said connecter and

having a widened portion at its inner end adapted to fit between said connecter elements, said widened portion being moved out of contact with said connecter elements when depressing said push pin.

2. An electrical connecter having a body portion, a contact member within said body portion supporting a spring-pressed contact pin arranged axially in said connecter and projecting from the outer end thereof, a projector spring on said contact member spaced spring-strained connecter elements within said connecter having their marginal portions projecting from said connecter at diametrically opposite points and lying at opposite sides of said contact pin, a locking element positioned between said connecter elements normally retained in contact with the inner edges of said connecter elements by said projector spring, and a push pin projecting from the side of said connecter and adapted to force said locking element out of contact with said connecter elements against the action of said projector spring.

3. An electrical connecter divided longitudinally to form two sections, said sections having flat contact faces lying in contact with each other and depressions arranged lengthwise therein, a contact member lying within the depression of one of said sections and having spaced arms projecting therefrom extending into the other section, a contact pin slidable in said arms, a spring surrounding said contact pin, a retainer pin extending through said contact pin and having one end of said spring bearing thereagainst, the other end of said spring bearing against one of said arms to cause said contact pin to be projected axially from the outer end of said connecter, a pair of spring-connected diverging connecter elements within the depressions of said sections having their outer edges parallel along their outer ends, said parallel outer edges being corrugated and having the corrugations of one element out of line with those of the other, and electrical connection for said connecter elements and said contact member.

4. An electrical connecter comprising a longitudinally divided body portion having two sections lying in contact with each other and having the outer ends of said sections reduced in diameter, said sections having depressions in their inner faces, a contact member within the depressions of said sections having a spring-projected contact pin at its outer end and a contact element at its inner end, and a pair of spring-strained connecter elements also within the depressions of said sections having corrugations at their outer ends and having the corrugated portions thereof projecting from said reduced outer portions at diametrically opposite points, one of said connecter elements having a contact element at its inner end adapted for co-operation with said first-mentioned contact element.

5. An electrical connecter comprising a plug divided longitudinally into two sections lying in contact with each other and having registering outwardly-diverging shallow depressions in its inner side, registering curved depressions connecting the inner ends of said diverging shallow depressions and registering continuations extending inwardly from said diverging shallow depressions, a connecter member comprising two outwardly-diverging connecter elements connected at their inner ends by a curved portion, said connecter elements fitting into the registering diverging shallow depressions of said sections and the curved portion connecting the same fitting into the registering curved depressions connecting said shallow depressions, one of said connecter elements having a contact element extending into one of the continuations of each of the shallow depressions of said sections, and a contact member between said sections having a spring-pressed contact pin at its outer end positioned between said connecter elements and a contact element at its inner end fitting into the continuation of the other shallow depression of each said sections.

6. An electrical connecter divided longitudinally to form two sections lying in contact with each other, spring-strained diverging electrical connecter elements between said sections projecting with their outer ends from opposite sides of said connecter at diametrically opposite points and having means at their projecting portions for connection with a socket, one of said sections having a longitudinal depression, a contact member within said depression formed of a strip of metal bent upon itself at and near its outer end to form two spaced arms, a contact pin slidable in said spaced arms, a retainer pin extending transversely through said contact pin and normally bearing against the outer of said arms, a coil spring around said contact pin and bearing with one end against said retainer pin and with its other end against the other of said arms, said contact member having a portion bent upon itself to form a spring, a push pin in one of said sections having a portion extending outwardly therefrom, and a locking element at the inner end of said push pin against which the spring of said contact member bears, said locking element being normally positioned by said spring between said diverging connecter elements.

7. In an electrical connecter comprising a body portion having a reduced outer end, a contact member in said body portion having a contact element at each end, and a connecter member within said body portion comprising two diverging elements con-

nected at their inner ends by a curved portion and having their outer marginal portions at their outer ends projecting from said reduced outer end at diametrically opposite points for co-operation with one of the contact elements of said contact member, said outer marginal portions being parallel and provided with corrugations, the corrugations of one of said marginal portions being out of line with those of the other, one of said diverging elements having a contact element at its inner end for co-operation with the other contact element of said contact member.

8. An electrical connecter having spring-projected inwardly-yielding connecter elements projecting from diametrically opposite points, said connecter comprising two sections lying in contact with each other, one of said sections having an elongated depression opening at the outer end thereof, a contact member in said depression formed of a strip of metal bent upon itself at and near its outer end to form two spaced arms and having an offset portion between its ends, a portion bent upon itself at said offset portion to form a spring and having a portion extending at right angles to said offset portion at the inner end thereof, said right angled portion being continued at a right angle and bent upon itself to form a contact element, a contact pin slidable in said spaced arms, means to keep said contact pin projected axially from said connecter, and a contact element in connection with said connecter elements.

9. An electrical connecter, comprising a longitudinally divided body portion having two sections lying in contact with each other, a contact member within said sections having a spring-projected contact pin at its outer end and a contact element at its inner end, and two connecter elements also within said sections having a curved spring portion at their inner ends integral therewith serving to force the outer ends of said connecter elements outwardly from said body portion at diametrically opposite points, one of said connecter elements having a contact element at its inner end adapted for co-operation with said first-mentioned contact element.

In testimony whereof I affix my signature.

HERBERT D. PIERCE.