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G. H. JACOB & J. L. HAGADORN.

ELECTRICAL CONNECTION.

APPLICATION FILED JULY 14, 1906.

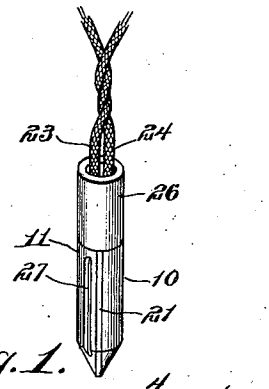


Fig. 1.

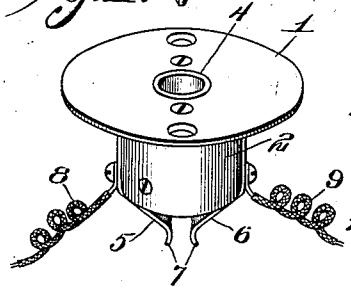


Fig. 7.

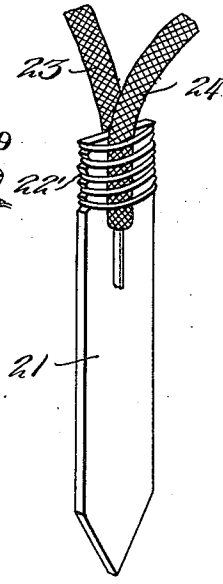


Fig. 2.

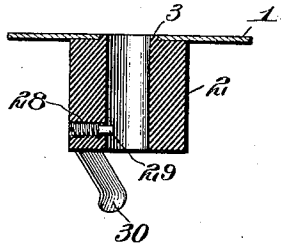


Fig. 3.

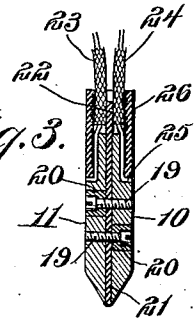


Fig. 4.

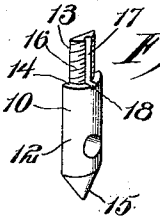


Fig. 5.

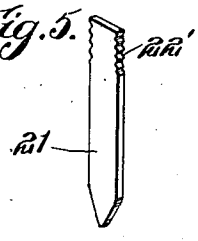


Fig. 6.

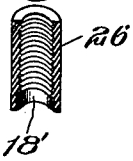
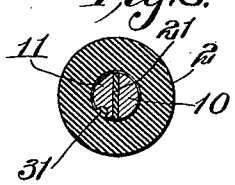


Fig. 8.



Witnesses

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UNITED STATES PATENT OFFICE.

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ELECTRICAL CONNECTION.

No. 886,811. Specification of Letters Patent. Patented May 5, 1908.

Application filed July 14, 1906. Serial No. 326,239.

To all whom it may concern:

Be it known that we, GEORGE H. JACOB and JOHN L. HAGADORN, citizens of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented new and useful Improvements in Electrical Connections, of which the following is a specification.

The invention relates to an improvement in electrical connections designed primarily for use in providing an extension circuit closer for call bell or other signal systems.

The main object of the present invention is the provision of a flush plug for providing electrical connection with the fixed socket, the plug being constructed to carry the conductors of the extension and to insure proper electrical contact of said conductors with the conductors of the socket, whereby to form a continuous circuit by the introduction of the plug into the socket.

Another object of the invention is the provision of means whereby the extension and conductors are secured in fixed relation to the plug.

Another object of the invention is the provision of means whereby the insertion of the flush plug within the socket is rendered impossible except in a predetermined position of the plug, whereby to insure the proper electrical connections and avoid short circuiting at the point of connection.

The invention will be described in the following specification, reference being had particularly to the accompanying drawings, in which:—

Figure 1 is a perspective view illustrating the improved connection, the plug and socket being shown separated, Fig. 2 is a vertical section of the socket, Fig. 3 a vertical section of the plug, Fig. 4 a perspective of one of the plug sections, Fig. 5 is a detailed perspective of the insulating strip, Fig. 6 is a vertical sectional view of the insulating sleeve, Fig. 7 is an enlarged sectional detail illustrating the means for securing the extension circuit conductors to the insulating strip, Fig. 8 is a transverse section showing a modified form of connection between the plug and socket.

Referring particularly to the drawings, it will be noted that our improved connection is to be shown as primarily designed to provide a push button extension for call bell circuits, or other signaling devices, wherein the socket ordinarily utilized to receive and support the push button, is used for the reception of a flush plug of peculiar type and carrying flexible conductors, which conductors by the introduction of the plug provide in effect an extension of the circuit so that the bell or other signaling device may be sounded from any desired point distant from the usual closer.

In the preferred details of structure the socket comprises a floor plate 1 and a depending barrel 2 of insulating material, the barrel being diametrically reduced at its upper end to provide an extension 3 snugly seating within an opening 4 in the plate 1, whereby the wall opening through the socket is of insulating material throughout its length. Spring plates 5 and 6 are secured to diametrically opposite points of the barrel, their free ends depending below the barrel and being bent inwardly and terminating in downwardly projecting lips 7 disposed within the plane of the socket opening. The circuit conductors 8 and 9, which include the source of energy and the alarm, are secured in a preferred manner to the spring strips 5 and 6, so that the circuit is broken only by the normal separation of the lips 7 of the respective contacts 5 and 6.

The socket above described is of the ordinary type used in call bell systems, and particularly designed to be secured in the floor and adapted to contain a push button which on depression would bridge the break between the spring contacts 5 and 6 and close the circuit, with the effect to sound the alarm. Such sockets are well known and largely used for call bell systems in houses, being ordinarily positioned in the floor beneath the table or in the wall for convenient access. It is at times desirable, however, to extend the circuit to provide for operating the signal at a point distant from the socket, and with this particular object in view we have devised the extension forming the subject matter of this invention.

The flush plug designed for coöperation with the socket described and carrying both conductors of the extension circuit is made in duplicate sections 10 and 11. Each of the sections is approximately semicylindrical in cross section having a body 12 and a reduced extension 13 projecting from the upper end of the body, the relative small dimension of the extension providing a shoulder 14 at the junction of said extension and body. The

lower end of the body 12, or that end opposite the extension 13 is gradually reduced in sectional dimension to provide a pointed end 15 which when the sections are assembled provide the plug with an inverted conoidal point to provide for the proper insertion between the lips 7 of the spring contacts of the socket, also so that said plug may be inserted in the socket through a rug or carpet without damaging the weave. The extension 13 is threaded at 16, and formed on its convex surface with a longitudinaly extending groove 17, opening through the upper edge of the section 13 and continuing laterally into and throughout the width of the shoulder 14, as at 18. The sections of the plug are secured together through the medium of screws 19, each seating in one of the sections and in a block 20 of insulating material, whereby to avoid metallic connection between the sections through the medium of the connecting screws. A strip of insulating material 21 is arranged between the plane surfaces of the sections when they are assembled, said strip extending the full width of said surface and being of sufficient thickness to provide the desired insulation. By preference the insulating strip 21 extends above the upper end of the extensions 13 of the plug sections, as at 22. The side edges of the extension 22 are slightly grooved at 22′, in order that the conductors which are connected to said flush plug can be tied with thread to said insulating strip so that any strain on the metallic connections between the conductors and the flush plug will be eliminated.

In assembled form the plug is of cylindrical shape with a reduced cylindrical extension at the upper end, the latter being formed with diametrically opposed grooves and exteriorly threaded.

The conductors 23 and 24 of the extension circuit are stripped of their insulation for a desired distance and respectively seated in one of the grooves 17 of each section of the flush plug, and tied around the groove of the insulating strip 21 at groove in 22, the extreme end of the conductor being bent laterally, as at 25, and seated in the groove extension 18 formed in the shoulder 14 of the section. An insulating sleeve 26 is interiorly threaded for connection with the threads 16 of the plug extension 13, said sleeve being preferably of an external diameter equal to that of the connected body members of the plug sections. The sleeve 26 is designed to seat snugly upon the shoulder 14 of the plug, in which position it will bind the conductors of the extension circuit within the grooves 17 and at the same time overlie and secure the laterally bent ends of said conductors in the grooves 18. The loop end of the wall of the interior opening of the sleeve is free of the threaded formation, to provide a plane portion 18′ which serves to bear upon and force the conductors 23 and 24 into the grooves as the sleeve is screwed to its seat. The conductors are thus secured relative to the plug and respectively in electrical contact with one of the plug sections. The sleeve 26 is preferably of greater length than the extension 13 of the plug, and the projection 22 of the insulating strip 21 is utilized to divide the sleeve opening above the plug extension into two chambers for the passage of the conductors 23 and 24, effectively insulating said conductors from each other, as will be obvious.

Owing to the possibility of so introducing the plug within the socket that one of the sections of the plug 10 will engage both spring contacts 5 and 6 and thereby close the signal circuit at this point we provide one of the plug sections with a groove 27 extending longitudinally of the body 12 thereof and opening through a portion of the point 15 of said section. For coöperation with said groove we secure in the wall of the barrel 2 a screw 28 formed with a plain reduced end 29, which when the screw is in operative position is designed to enter the groove 27 in the block and guide the latter in its movement toward the spring contacts. The relative arrangement of the groove 27 and screw 28 is such that in coöperation the plug is so guided that one section, as 10, will engage one spring contact, while the other section, as 11, engages the other spring contact.

It is, of course, to be understood that the conductors 23 and 24 may be of any length desired and that they are at the terminals opposite the plug provided with any usual or preferred form of push button or other circuit closer.

The extension described is of simple construction, and owing to the relative arrangement of parts possibility of accidentally closing the alarm circuit on the introduction of the plug is absolutely avoided; furthermore, the extension circuit conductors are fixedly secured to the plug in a manner to guard against their accidental disconnection, while at the same time permitting their ready separation when desired by the simple removal of the sleeve 26.

The extension is, of course, to be used at any point or points where it is desirable to extend an electric circuit for any purpose, as it is obvious that the conductors 23 and 24 may lead to a lamp, a motor, or other object requiring the use of electric current, and in this particular connection it is to be particularly noted that the body of the respective plug sections is less in length than the distance from the plate 1 to the free ends of the contacts 5 and 6 so that it is impossible in the use of the plug described for the operator to receive the current while introducing the plug, as the exposed metallic portions of

the plug will of necessity be below the plate 1 before said sections engage the spring contacts of the socket.

In use the plug is preferably inserted so that the upper edge of the sleeve 26 is flush with the surface of the plate 1, the relative lengths of the parts being such that when the plug is in this position the lips 7 of the spring contacts engage the cylinder plain surface of the respective sections, in which position the spring character of the contacts form an effective aid in holding the plug against accidental displacement. The lip 7 may, if preferred, be slightly concaved in transverse section, as at 30, whereby to more snugly embrace the cylindrical surface of the plug sections, as will be evident.

The metallic portions of the plug and socket are preferably of brass and the insulating sections of hard rubber, though it is to be understood that the use of any desired metal or insulating material is contemplated.

In Fig. 8 is illustrated a slightly modified construction for guiding the flush plug in its longitudinal movement in the socket. In this form of the parts the barrel wall is integrally formed with an inwardly extending projection 31, which is designed to coöperate with the groove 27 in the plug, and guide the plug in movement in an obvious manner.

Having thus described the invention, what is claimed as new, is:—

1. The combination with a socket including spaced contacts of a signal circuit, of a plug and conductors, said plug comprising independent sections insulated from each other, and means for securing the respective conductors in electrical contact with the respective sections, said means serving to secure the respective sections together.

2. A flush plug for extension circuits comprising duplicate sections, a strip of insulation arranged between the sections, circuit conductors, and means for removably securing the conductors to the respective sections, said means serving to secure the sections together and support the strip of insulation therebetween.

3. A plug for extension circuits comprising duplicate sections of semicylindrical form in section, means for securing the sections together, a strip of insulation disposed lengthwise between the sections, an extension provided on each section, a right angle groove formed in the section to receive the appropriately formed terminal of the conductor, and means for securing said conductors within the grooves.

4. A plug for extension circuits comprising duplicate sections of semicylindrical form in section, means for securing the sections together, a strip of insulation disposed lengthwise between the sections, an extension provided on each section, a right angle groove formed in the section to receive the appropriately formed terminal of the conductor, and a sleeve designed to removably engage the extension and bind the conductors in the respective grooves.

5. A plug for extension circuits comprising duplicate sections of semicylindrical form in section, means for securing the sections together, a strip of insulation disposed lengthwise between the sections, an extension provided on each section, a right angle groove formed in the section to receive the appropriately formed terminal of the conductor, and a sleeve designed to removably engage the extension and bind the conductors in the respective grooves, said sleeve being of greater length than the extension to provide an insulated housing for a portion of the conductors beyond the extension.

6. A plug for extension circuits comprising duplicate sections of semicylindrical form in section, means for securing the sections together, a strip of insulation disposed lengthwise between the sections, an extension provided on each section, a right angle groove formed in the section to receive the appropriately formed terminal of the conductor, and a sleeve designed to removably engage the extension and bind the conductors in the respective grooves, said sleeve being of greater length than the extension to provide an insulated housing for a portion of the conductors beyond the extension, the insulating strip between the sections extending within said housing and separating the respective conductors.

7. The combination with a socket including diametrically opposed spaced contacts, and a plug comprising insulated sections designed for respective engagement with the respective contacts, and means for guiding the plug within the socket to properly dispose the sections thereof with relation to the contact, said means serving to limit the movement of the plug within the socket to dispose the upper end of the plug flush with the upper surface of the socket.

8. The combination with a socket including diametrically opposed spaced contacts, and a plug comprising insulated sections designed for respective engagement with the respective contacts, a screw seated in the socket and projecting within the plane of the central opening therein, the plug being formed with a groove to receive the screw in the longitudinal movement of the plug, whereby to guide the plug to properly dispose the sections thereof with relation to the spring contact, said groove and screw coöperating to limit the movement of the plug within the socket to dispose the upper end of the plug flush with the upper surface of the socket.

9. The combination with a socket including spaced contacts of a signal circuit, of a plug and conductors, the plug including in-

dependent sections and a removable sleeve designed to bind the sections together and engage and secure the conductors to the respective sections of the plug.

10. The combination with a socket including spaced contacts of a signal circuit, of a plug and conductors, said plug comprising independent sections formed with conductor receiving grooves, and a sleeve having threaded connection with the socket and overlying the grooves, a portion of the sleeve being plain to force the conductors into the grooves in the operation of the sleeve.

11. A plug for extension circuits comprising duplicate sections of semicylindrical form, means for securing the sections together, circuit conductors secured to the respective sections, and a strip of insulation disposed between the sections, said strip being grooved to receive and hold a flexible connection adapted to be wound about the conductors and the strip.

In testimony whereof, we affix our signatures in presence of two witnesses.

GEORGE H. JACOB.
JOHN L. HAGADORN.

Witnesses:
EDW. H. CARLISLE,
NELLIE B. CARLISLE.