

Sept. 1, 1925.

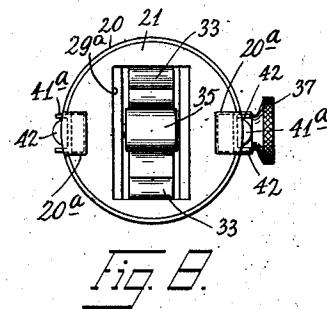
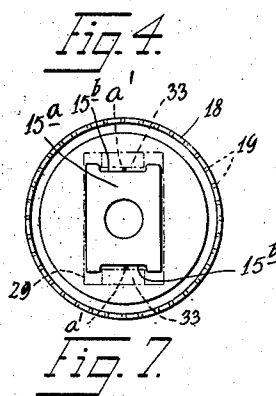
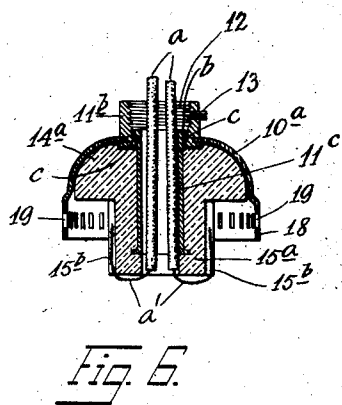
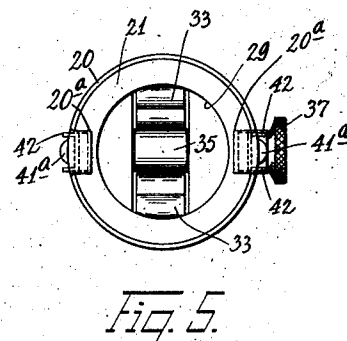
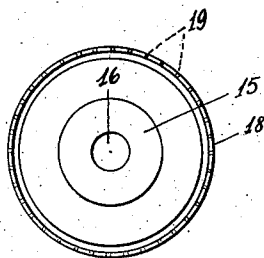
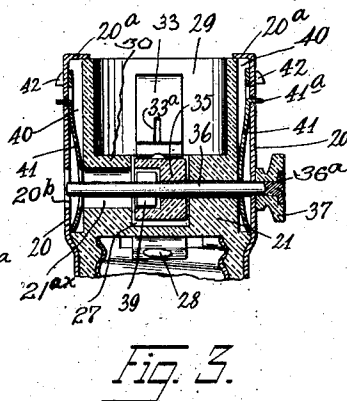
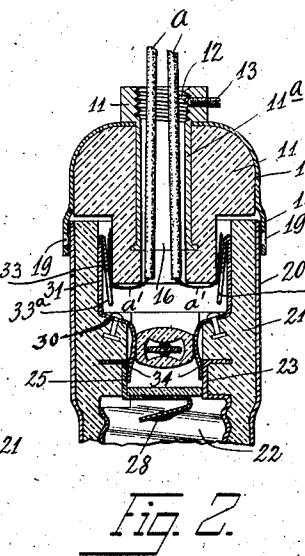
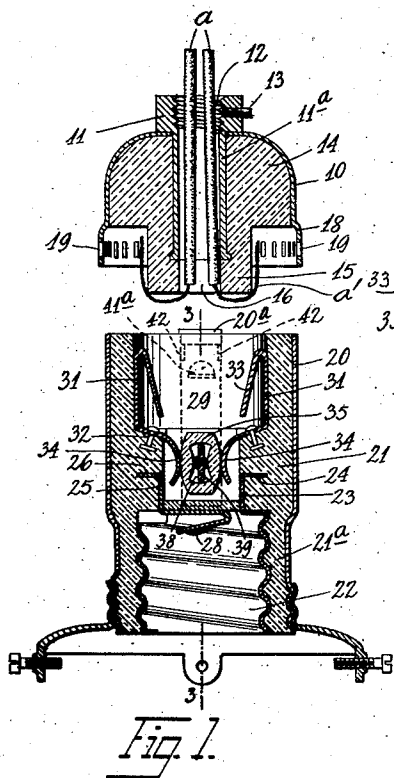
1,551,876

P. HARTMANN

ELECTRICAL CONNECTION DEVICE

Filed June 8, 1921

2 Sheets-Sheet 1



Poul Hartmann INVENTOR.

BY

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2 Sheets-Sheet 2

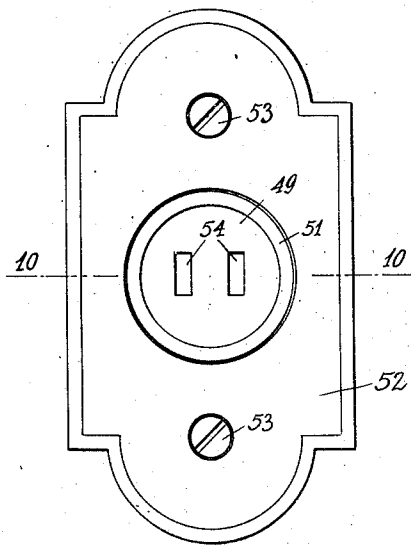


*Fig. 9.*

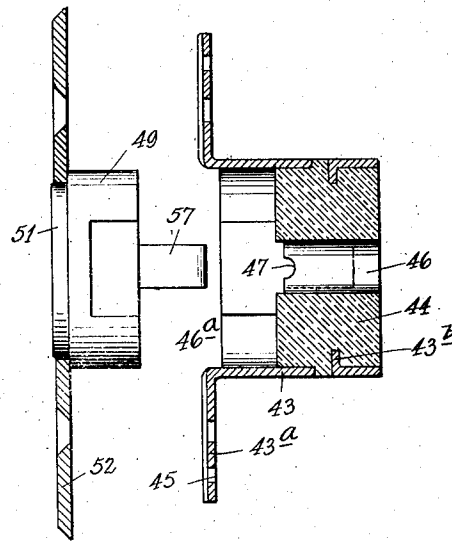


*Fig. 11.*

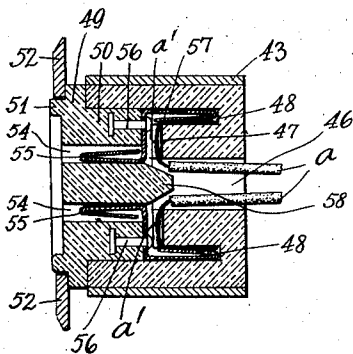


*Fig. 10.*

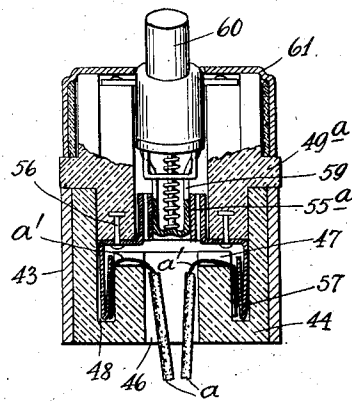


*Fig. 12.*

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Patented Sept. 1, 1925.

1,551,876

# UNITED STATES PATENT OFFICE.

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## ELECTRICAL CONNECTION DEVICE.

Application filed June 8, 1921. Serial No. 475,876.

*To all whom it may concern:*

Be it known that I, POVL HARTMANN, a subject of the King of Great Britain, and resident of the borough of Brooklyn, county of Kings, city and State of New York, have invented certain new and useful Improvements in Electrical Connection Devices, of which the following is a specification.

My invention relates to electrical connection devices of the type commonly known as socket connections, lamp sockets, outlets and switches and has for its object to provide a novel construction of maximum simplicity and low cost of production, and in which the labor of assembling in the shop and connecting up at the point of use is reduced to the simplest form and requiring no special skill in the workman. Other more specific objects of the invention will appear from the description hereinafter and the features of novelty will be pointed out in the appended claims.

In the accompanying drawings, which show examples of my invention without defining its limits, Figure 1 is a longitudinal section illustrating a socket connection with the elements thereof disconnected; Fig. 2 is a similar view showing said elements operatively connected; Fig. 3 is a sectional view on the line 3—3 of Fig. 1; Fig. 4 is an end view of the male element of the connection; Fig. 5 is an end view of the female element thereof; Figs. 6, 7 and 8 are views illustrating another form of male element and a co-operating female element; Fig. 9 is a face view of a wall outlet embodying my invention; Fig. 10 is a section thereof on the line 10—10 of Fig. 9; Fig. 11 is a view, partly in section, looking at right angles to Fig. 10 showing the elements of the outlet disconnected from each other, and Fig. 12 is a sectional view showing the invention applied to a switch.

In the example shown in Figs. 1 to 5 inclusive I have illustrated the invention as applied to a socket connection, which comprises a male member consisting of a shell 10 of suitable metal and a bushing 11 which may be internally screw-threaded in the usual manner, as indicated at 12, and which further may be provided with the customary set screw 13 whereby the male member is fixed in its intended location. The bushing 11, as shown, may be provided with a tubular neck 11<sup>a</sup> which has its inner end

diverging outwardly, as shown in Fig. 1. The male member further comprises a body or plug 14 of suitable insulating material constructed with an integral extension 15 and having an axial bore 16 in registry with the bore of the bushing 11, as shown in Figs. 1 and 2. As shown in Fig. 1, the shell 10 projects beyond the body or plug 14 in the form of an annular, peripheral flange 18 provided with a plurality of apertures 19. In constructing the male member shown in Figs. 1 and 2, the insulating material of which the plug or body 14 and extension 15 is constructed is preferably molded in the shell 10 and about the neck 11<sup>a</sup> of the bushing 11 so as to provide an intimate connection between the parts and to avoid the use of screws, screw-threading or other type of extraneous fastening devices for securing the body 14 and shell 10 together; in the preferred construction the neck 11<sup>a</sup> extends into and lengthwise of the extension 15 and thus serves to stiffen the same, and at the same time securely fixes the bushing 11 in place, the diverging end of said neck 11<sup>a</sup> resisting any tendency of the bushing 11 to shift in an outward, axial direction. The bushing 11 preferably also overlaps the shell 10 and thus adds to the security of the connection.

The female member of the connection comprises a shell 20 of suitable metal in which the body 21 of suitable insulating material is located, said body 21 being provided with a tubular extension 21<sup>a</sup> interiorly lined with the screw-threaded shell 22 which is formed with a projecting contact section 23 having at its end a transverse flange 24 which extends into the body 21. A second contact section 25 is located opposite to the section 23 and is similarly provided with a transverse flange 26 which also projects into the body 21 the latter being formed at the indicated points with an axial passage 27 closed at its inner end, the section 25 extending beyond and across said closed end in the form of a resilient contact member 28. The axial passage 27 communicates with an interior chamber 29 of the body 21 which corresponds in cross-sectional form to the shape of the plug extension 15, an annular shoulder 30 being preferably located at the juncture of the passage 27 and chamber 29, as shown in Fig. 1. Metallic strips 31 extend along the surface of the chamber 29

at diametrically opposite points and along the annular shoulder 30, to which they may be secured in any suitable manner, as by means of rivets 32 embedded in the body 21.

5 The strips 31 are continued at one end in the form of resilient contact members 33 extending in the chamber 29 and at their opposite ends terminate in resilient tongues 34 which extend into the axial passage 27.

10 A switch member 35 is located between the tongues 34 and is carried by a shaft 36 which is journaled in the body 21 and at its external end is provided with an operating head 37; the connection between the

15 shaft 36 and member 35 is effected by providing the latter with a recess 38 in which a projection 39 on the shaft is located.

On its outer surface the body 21 is preferably provided with lengthwise extending

20 depressions 40 in which flat springs 41 are located, said springs being each formed with a pair of integral lugs 42 preferably stamped therefrom and which project outwardly beyond the shell 20, as shown in Fig. 3, the

25 shell being suitably slotted at the proper points for the accommodation of said lugs and preferably being extended over the springs 41, as indicated at 20<sup>a</sup>; in addition, the springs 41 are provided at intermediate

30 points with lips 41<sup>a</sup>, preferably stamped therefrom and extending through and beyond the shell 20, and whereby said springs and the lugs 42 may be depressed to in-

35 operative positions, as will appear more fully hereinafter.

In constructing the female member, the insulating material which comprises the body 21 is also preferably molded into connection with the shells 20 and 22 so as to

40 also provide a most intimate union between said elements, the rivets 32 being embedded in said body at the proper points during the molding thereof; the use of screws, screw-threads and other fastening means for se-

45 curing the body and shell together is thus also avoided in the construction of the female member of the connection in the illustrated form. It will be understood that the shell 20 and body 21 are formed with regis-

50 tering openings 20<sup>b</sup> and 21<sup>ax</sup> respectively at the proper point to permit the passage of the shaft 36 and switch member 35, these parts being embodied in the structure by inserting the shaft 36 from the left in Fig. 3

55 and then placing the head 37 upon the projecting end thereof and fixing it in place, for instance, by splitting and turning over the end of said shaft to form projections 36<sup>a</sup>, as shown in Fig. 2, whereby the head

60 is held against rotation relatively to said shaft.

To unite the male and female members in an operative and electrical manner, the customary terminal wires  $\alpha$ ,  $\alpha$  are threaded

65 through the bushing 11 and neck 11<sup>a</sup> thereof,

and the ends of said wires are stripped of insulation, this being done either before or after the threading thereof through the bushing. These stripped ends  $\alpha'$  are then

70 each bent transversely and outwardly from the axial bore 16 across the end face of the extension 15 and back along said extension 15, as shown in Figs. 1 and 2. The extension 15 is then inserted into the chamber 29, with

75 the wires in the position indicated and the stripped ends  $\alpha'$  thereof in registry with the contact members 33 which are depressed against their resiliency and thus lie in firm contact with the ends  $\alpha'$  of the wires  $\alpha$  when

80 the extension 15 is fully seated in the chamber 29, as shown in Fig. 2. The contact members 33 are preferably slit lengthwise, as indicated at 33<sup>a</sup>, so as to exert a scraping or cleaning action upon the wire ends  $\alpha'$

85 as the two elements are united. As this takes place, the lugs 42 of the springs 41, by contact with the flange 18, are pressed inwardly, this being readily possible because of the rounded edges of said lugs 42, and finally snap into the apertures 19 which

90 are brought into registry therewith, it being understood that each lug 42 of each spring snaps into an independent aperture 19, the latter being spaced in proper relation to

95 each other to secure this result; in this way the male and female members of the connection are securely locked against unintentional separation and yet may be easily disconnected when desired by simply pressing

100 the lips 41<sup>a</sup> inwardly to move the lugs 42 out of the apertures 19 and thus permit a ready separation of the male and female elements. When the parts are connected as

105 described, the ends  $\alpha'$  of the wires  $\alpha$  are firmly clamped against unintentional withdrawal and at the same time a perfect electrical connection is made between said wires and the contact members 33 without the use

110 of any terminal screws or other similar devices, the operation of completing the electrical connection being reduced to the utmost simplicity.

To close the circuit which has been thus established, the switch member 35 is rotated

115 by a manipulation of the head 37 and, by exerting a camming action on the tongues 34, forces them outwardly into engagement with the contact sections 23 and 25 and thus brings the inner shell 22 and the contact

120 member 28 into connection with the source of electricity with which the wires  $\alpha$  are connected. As the tongues 34 are brought into contact with the sections 23 and 25, the ends of said tongues will exert a rubbing or

125 scraping action upon said sections whereby the latter are maintained in a clean condition and an efficient, electrically perfect contact is always assured. By rotating the switch member 35 to release its pressure

130 upon the tongues 34, the latter will move

toward each other by their inherent resiliency and away from the sections 23 and 25, thus breaking the circuit. The inner shell 22 may be used to receive a lamp, plug or any other device through which the electrical current is to be transmitted for use.

By providing the shell 10 with a large number of apertures 19 which are arranged to co-operate in pairs to receive the double lugs 42 of the springs 41, it is always possible to so unite the parts as to bring the actuating head 37 of the switch member 35 into the most accessible position, in contradistinction to the usual screw-threaded connection in which the final position of the switch-actuating device depends entirely upon the particular screw-threads and is haphazard and oftentimes is such as to be most difficult to reach.

In the form shown in Figs. 6 and 7 the male member of the connection is constructed in such a manner that the shell 10<sup>a</sup> and bushing 11<sup>b</sup> are rotatable as a unit relatively to the body or plug 14<sup>a</sup> and tubular neck 11<sup>c</sup> which are connected in the form of a unit, the body 14<sup>a</sup> preferably being molded or cast upon the neck 11<sup>c</sup> which, in this form, is separate from the bushing 11<sup>b</sup>. The loose connection between the combined neck 11<sup>c</sup> and body 14<sup>a</sup> and the combined shell 10<sup>a</sup> and bushing 11<sup>b</sup> may be effected in any suitable manner as by providing the neck 11<sup>c</sup> with an annular flange *b* which projects upon an annular shoulder *c* formed in the bushing 11<sup>a</sup>. The assembling of the parts may be accomplished by first uniting the shell and bushing and the body and tubular neck, the latter at this stage being minus the flange *b* and projecting beyond the body 14<sup>a</sup>, and then inserting the projecting end of said neck into the bushing and spinning it over upon the shoulder *c* to form the flange *b* and thereby uniting the parts against separation in an axial direction without interfering with the relative rotation thereof. In this form the extension 15<sup>a</sup> with which the body 14<sup>a</sup> is provided is preferably of rectangular form and provided with surface recesses 15<sup>b</sup>, as shown in Fig. 7, the chamber 29<sup>a</sup> of the female member in such case being correspondingly formed, as illustrated in Fig. 8. Otherwise the construction and operation of this form of connection may be the same as in the form shown in Figs. 1 to 5, the extension 15<sup>a</sup> projecting into the chamber 29<sup>a</sup> with the wire ends *a'* lying in the recesses 15<sup>b</sup> and in contact with the contact members 33 in the same way as previously described; the male and female elements of the connection may also be locked against separation in the manner shown and described with respect to Figs. 1 to 5 inclusive.

With the arrangement described it is possible to rotate the body 14<sup>a</sup> relatively to the

shell 10<sup>a</sup> and bushing 11<sup>b</sup> or vice versa whenever, for any reason, this is desired as for, instance, to facilitate the connection of the bushing with the element to which it is to be attached. It is also possible with the form under discussion to rotate the body 14<sup>a</sup> after the bushing 11<sup>b</sup> has been secured in place to bring the wires *a'* and contact members 33 into registry in a position in which the operating head 37 is in the most favorable location. When the male and female members are connected in the manner indicated in Fig. 2, relative rotation of the parts will be prevented by the contact members 33 which lie within the surface recesses 15<sup>b</sup>, as shown by dotted lines in Fig. 7, and which themselves are locked to the shell 10<sup>a</sup> by means of the springs 41 and lugs 42.

In Figs. 9, 10 and 11 the invention is embodied in a wall outlet which, as shown, comprises a shell 43 of suitable metal in which the body 44 of suitable non-conducting or insulating material is molded as in the previous form, said shell 43 being provided with transversely extending members 43<sup>a</sup> in which apertures 45 are formed for the accommodation of suitable fastening devices whereby the shell 43 and body 44 are fixed in their intended location. The members 43<sup>a</sup> may be formed by initially constructing the shell 43 as a tube and then cutting parts therefrom to leave connected sections which are bent transversely to provide said members 43<sup>a</sup>, as shown in Fig. 11. The shell 43 may further include lugs 43<sup>b</sup> preferably stamped therefrom and embedded in the body 44 to resist any tendency of the shell and body to separate in axial directions. The body 44 is constructed with an axial passage 46 and with transverse grooves 47 which extend therefrom into registry with recesses 48 and communicate with an interior chamber 46<sup>a</sup>. The other member of the outlet comprises a body 49 of suitable insulating material having an extension 50 and a shouldered portion 51 arranged to fit into a suitable opening of the customary face or wall-plate 52 which, as usual, is provided with openings for the accommodation of fastening screws 53. The body 49 is further provided with spaced apertures 54 into which the contact members of a customary plug are inserted in the well known way and with resilient contact devices 55 located in said apertures 54, said devices 55 being continued across the end face of the body 49 and secured thereto by rivets 56, as shown in Fig. 10, said rivets being embedded in the body 49 during molding thereof, as in the previous form. The devices 55 are further continued in the form of resilient tongues 57 adapted to extend into the recesses 48. In the preferred form the body 49 is provided with a tapering lug 58, as shown in Fig. 10.

In assembling the wall outlet described, the wires *a* are passed through the axial passage 46 and the stripped ends *a'* thereof are bent transversely into the grooves 47 and then back into the recesses 48, after which the extension 50 of the body 49 is inserted into the chamber 46<sup>a</sup> with the tongues 57 extending into the recesses 48 into firm contact with the stripped ends *a'* of the wires *a* to effect the electrical connection in the same way as previously described. The fastening screws 53 are then passed through the plate 52 and screwed into suitable openings in the members 43<sup>a</sup> to complete the outlet and fix the parts against unintentional separation.

In this form also the use of screws, screw-threading and similar devices for fastening the parts together is done away with and the necessity for terminal screws and other similar devices for connecting the wires *a* is avoided, so that the assembling of the parts to complete the electrical connection is also reduced to the utmost simplicity. The tapering lug 58, when the outlet is assembled, extends between the wires *a* or the stripped ends *a'* thereof and prevents the same from contacting with each other and producing a short circuit.

In Fig. 12 the invention is shown embodied in a switch, the one member of the device being constructed and arranged in the same manner as in Figs. 10 and 11; in the present instance, however, the body 49<sup>a</sup> carries a switch member 59 operated by means of a handle 60 and thrown into and out of engagement with the contact devices 55<sup>a</sup>, which correspond to the contact devices 55 of Fig. 10, but are arranged so as to permit the switch member 59 to pass between said contact devices and out of contact therewith with a minimum of effort. The form now being described may also include a cover 61 provided with an opening through which the handle 60 extends and secured to the body 49<sup>a</sup> by means of one or more suitable screws or the like. The method of assembling the switch elements of this form of my invention to include the same in an electrical circuit is the same as in the form shown in Figs. 9, 10 and 11.

In all forms of my invention the construction of the electrical connection, of whatever form it may be, and its assembling at the point of use or, in other words, on the job, are reduced to the simplest form and the use of terminal screws, screw-threading for effecting a union of the parts and for connecting the wires, and other devices of a similar character is entirely avoided. By directly molding the insulating or non-conducting bodies directly into the metallic shells, a most intimate union is provided without the aid of extraneous fastening de-

vices and the possibility of unintentional separation is reduced to a minimum.

Various changes in the specific form shown and described may be made within the scope of the claims without departing from the spirit of my invention.

I claim:

1. In an electric lamp socket, the combination of a socket cap having a body of insulating material through which the conductors pass, an extension of said insulating body over which the bare ends of the conductors are bent to the opposite sides thereof, a body of insulating material carrying the lamp contacts and supply contacts therefor, the said supply contacts being disposed on opposite sides of a recess in the second insulating body into which the extension of the first insulating body extends, the said contacts having resilient portions tapered inwardly and clamping the bare ends of said conductors in spaced relation when the said extension is inserted in the said recess.

2. In an electrical connection, the combination with supply wires having bared ends, of an attachment plug comprising two insulating bodies, one of said insulating bodies being formed with a passage for the supply wires and an annular extension surrounding the passage and over which the bared ends of the supply wires are bent, the other of said insulating bodies being formed with a cylindrical recess to receive the annular extension on the first mentioned insulating body, resilient electrical contacts carried within the recess to yieldingly engage the bared ends of the supply wires, and clamp them against the annular extension, and means to secure the two insulating bodies together.

3. In an electrical connection, the combination with supply wires having bared ends, of an attachment plug comprising two insulating bodies, one of said insulating bodies being formed with a passage for the supply wire and an annular extension surrounding the passage and over which the bared ends of the supply wires are bent, said annular extension being formed with grooves in which the bared ends rest, the other of said insulating bodies being formed with a cylindrical recess to receive the annular extension on the first named body, resilient electrical contacts carried within the recess and adapted to extend into the grooves when the plug is in assembled relation to yieldingly engage the bared ends of the supply wires and clamp them against the annular extension, and means to detachably connect the two insulating bodies.

In testimony whereof I have hereunto set my hand.

POVL HARTMANN.