

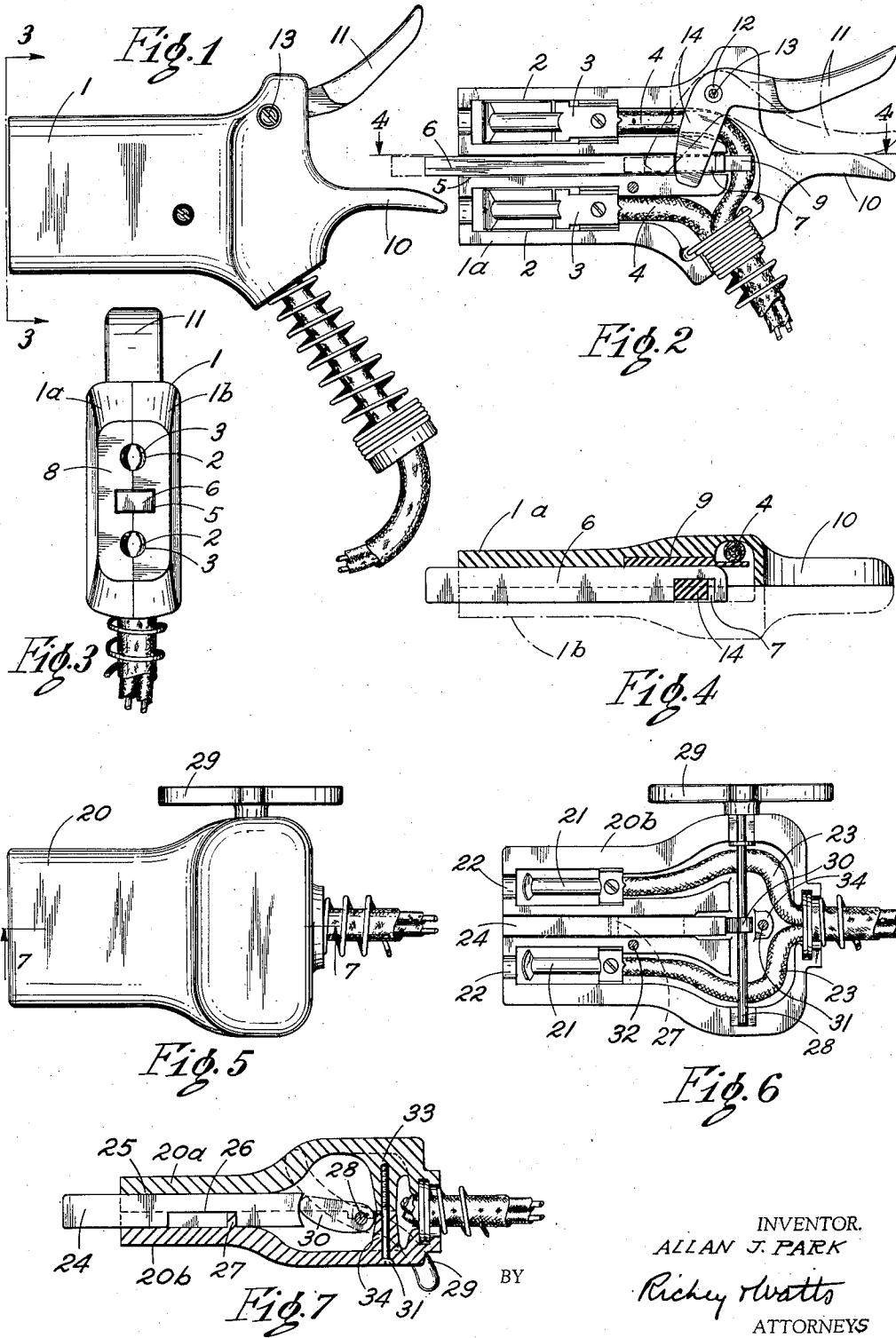
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ELECTRICAL CONNECTER

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ELECTRICAL CONNECTER

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This invention relates to electrical connectors, such as plugs for electrical appliances and the like, and is particularly concerned with an electrical plug which may be simply, easily, quickly and positively disengaged from cooperating terminals.

The electrical plugs in common use may be disengaged from cooperating terminals only by pulling on the plug or its cord. Sometimes the plug must be moved from side to side to free it from engagement with the cooperating terminals. Often such sidewise movement distorts the terminals of the plug, thereby reducing the effective contact length of terminals of the plug and sometimes causing arcing at the time the contact is broken. To avoid danger of such arcing when currents high enough to cause pronounced arcing are involved, specific warning is frequently given that the circuit should not be broken by disengagement of the plug from contact with the device with which it is used. In such instances the circuit is preferably broken either by a switch or by a removable plug some distance away from the electrical device. Plugs for electrical ordinary household appliances are often manipulated by unskilled labor, with the result that the operator frequently pulls on the cord to disengage the plug, thereby loosening the wires of the cord where they join the terminals of the plug.

The present invention aims to overcome all these disadvantages in commonly used, present-day plugs and to provide a plug which is adaptable for use with many different appliances and which may take any one of several different forms and which may be disengaged from cooperating terminals by an unskilled person quickly, easily and positively, and without injury to the terminals of the plug due either to distortion thereof or to arcing.

In the drawing accompanying and forming a part of this specification,

Figure 1 is a side elevation of one form of plug embodying the present invention;

Figure 2 is a view of the device of Fig. 1 with one of the housing members removed;

Figure 3 is an end elevational view taken on line 3—3 of Fig. 1;

Figure 4 is a sectional view taken on line 4—4 of Fig. 2;

Figure 5 is a side elevation of a modified form of plug embodying the present invention;

Figure 6 is a view similar to Figure 5, but with one of the two housing parts removed; and,

Figure 7 is a cross-sectional view taken on lines 7—7 of Fig. 5.

Figures 1, 2, 3 and 4 show a preferred form of a plug embodying the present invention. The plug of these figures includes a support or housing 1, consisting of two generally similar parts 1a and 1b. The opposed surfaces of these members are cut away to provide two grooves 2 to receive electrical terminals 21 and cords 4 leading therefrom to the outside of the support or housing 1, and a groove or slideway 5 between grooves 2 for an elongated, axially movable member 6, which member has a notch 7 near its inner end. The grooves 2 and 5 open thru the nose end 8 of the plug 1. A removable member 9 fitted into groove 5, remote from the nose end of plug 1, serves to separate one of the insulated wires 4 from the slidable member 6 and to permit movement of member 6 along its groove without engaging the insulation on such cord.

The end of plug 1, remote from the nose end, is provided with a fixed grip member 10 and a movable grip member 11 which is pivotally mounted on a tubular stud 12 integral with one of the members 1a or 1b and seating in a hole in the other member. One of the attaching screws 13, for securing members 1a and 1b together, may pass thru the opening in this tubular stud 12. The pivoted grip member 11 has a lever portion 14 which seats in the notch 7 of slidable member 6 and serves, when the grip member 11 is moved, to move the member 6 along its groove 5 relative to members 1a and 1b.

The electrical terminals 21 have a certain effective contact length, that is, a certain length over which terminals cooperating with terminals 21 may engage the latter. Preferably, the movable member 6 has a length of movement greater than such effective contact length of terminals 21.

The operation of the plug of Figs. 1, 2, 3 and 4 will be readily understood by those skilled in the art. When cooperating terminals of an electrical appliance are engaged in terminals 21 of plug 1, the grip member 11 will be in approximately the position shown in Fig. 1, with one end of member 6 lying substantially flush with the nose end 8 of plug 1. In order to remove plug 1, or to break the connection between its terminals 21 and the cooperating terminals associated therewith, an operator needs only to take hold of grip members 10 and 11 between the thumb and first finger of one hand and force member 11 toward member 10. As grip member 11 moves toward member 10, the arm 14 pushes against member 6 and forces it against the part of the appliance which carries the cooperating terminals. Since member 6 cannot move because of such contact against the ap-

pliance, plug 1 moves relative to member 6 and pulls terminals 21 out of contact with the cooperating terminals. It will be noted that the plug may be disengaged from an appliance without moving the latter, which is an important advantage with heated appliances. It is desirable that such relative movement of plug 1 and member 6 should be greater than the length of effective contact between terminals 21 and their cooperating terminals, so that the electrical connection may be quickly and completely broken and arcing may be avoided.

In the embodiment of the present invention shown in Figs. 5, 6 and 7, the support or housing 20 consists of two parts, 20a and 20b. Terminals 21 are located in grooves near the nose end of the housing in alignment with end openings 22 and are connected to insulated wires 23 leading thru the opposite end of the housing. Between the terminals 21 is disposed an elongated member 22 axially movable in groove 25 formed in opposed faces of members 20a and 20b and opening thru the nose end of the housing. Member 24 has a notch 26 near one end in which is located a retaining lug 27 integral with member 20b. A shaft 28 is located between meeting portions of members 20a and 20b near one end thereof, and at its outer end carries a hand grip 29 by which it may be rotated. Shaft 28 carries a cam 30 in alignment with slidable member 24 and engageable with one end thereof. Parts 20a and 20b may be held in assembled position by screws 31 and 32. Preferably screw 31 passes thru studs 33 and 34. These studs abut against each other and stiffen the plug and stud 33 acts as a stop to limit the movement of cam 30.

The operation of the device of the plug of Figs. 5, 6 and 7 is generally the same as that of Figs. 1 to 4. When the terminals 21 are brought into engagement with cooperating terminals, the end of the member 24 is substantially flush with the nose end of the housing 20. When the plug is to be dislodged from the cooperating terminals, the operator simply turns the hand grip 29, thereby rotating shaft 28 and moving the cam 30 against slide 24 and forcing the end thereof against the member carrying the cooperating terminals. The housing 20 is thereby forced away from those cooperating terminals and the contact between them and terminals 21 is thus quickly, easily and positively broken.

Having thus described my invention so that those skilled in the art may be able to understand and practice the same, what I desire to secure

by Letters Patent is defined in what is claimed.

What is claimed is:—

1. An electrical plug comprising a support having electrical terminals and a fixed grip portion, a member normally housed within said support but movable axially between said terminals to a projecting position in which the end adjacent said terminals is located beyond the end of the support, and a grip member pivoted to said support and movable toward and away from said fixed grip portion, such pivoted grip member being operatively associated with said axial member within said housing to move said member to said projecting position when the pivoted grip member is moved towards said fixed grip portion.

2. An electrical plug comprising a housing having electrical terminals and an axially movable notched member therebetween, said member being normally disposed wholly within said housing but movable to a projecting position where one end projects beyond the terminal end of said housing, and an arm projecting from and pivoted to said housing and engaging in the notch of said member within the housing to move the member to said projecting position.

3. An electrical plug comprising a housing having openings at one end and fixed and movable grips near the other end, electrical terminals in one end of the housing to engage cooperating terminals and having their ends near certain of said openings, a member in the housing between said terminals and slidable in one of said end openings, said movable grip member operatively engaging said slidable member within said housing and serving when moved toward said fixed grip to move one end of the slidable member far enough beyond the end of said housing substantially to disengage the electrical terminals in the housing from their cooperating terminals.

4. An electrical plug comprising a housing having an interior space, electrical terminals of given contact length in one end of said housing, an axially movable member in said housing having a greater length of movement beyond the said end of the housing than the contact length of said terminals, a member extending thru the housing wall into said space and mounted to rotate about a fixed axis, said member having a cam like portion in said space and engageable with said axially movable member to project one end of the latter beyond the said end of the housing a distance greater than the effective contact length of said terminals.

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