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SAFETY ELECTRIC SOCKET

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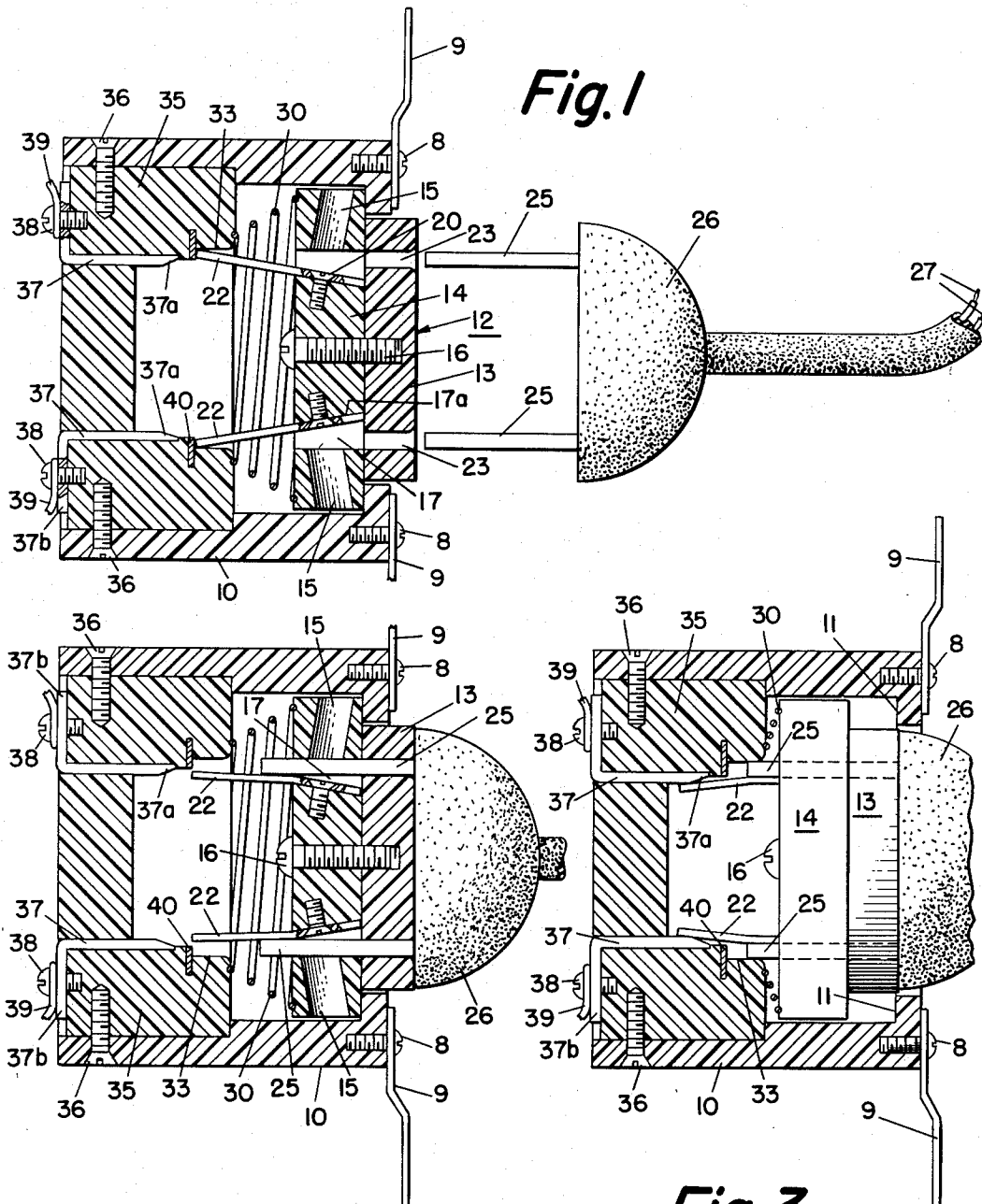


Fig. 2

Fig. 3

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SAFETY ELECTRIC SOCKET

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This invention relates to an electrical safety socket. More specifically, this invention relates to an electrical socket adapted for use with an ordinary electrical plug connected to any suitable electrical apparatus which is to be supplied with electrical current from the socket.

The socket of the present construction is adapted to supply current only when the plug is fully inserted therein, but will not supply current if the plug is only partially inserted in the socket. Furthermore, if any metallic objects should be inserted into the socket, such as a hairpin or wire, no electrical contact will be made which might cause short circuits or shock the person introducing such objects in the socket. According to the present invention, the plug which is inserted in the present socket not only acts as a conductor, but also as a key which operates an internal electrical switch for making and breaking the electrical circuit. This is accomplished by interposing between the prongs of the plug and the terminals of the socket an electrical bridge which operates only when the plug is fully inserted.

Further details and advantages of the invention will be apparent from the following specification and the accompanying drawings, wherein

Figure 1 is a vertical sectional view showing a socket constructed in accordance with the present invention and a plug about to be placed therein,

Figure 2 is a view similar to Figure 1 showing the plug partially inserted within the socket, the prongs of the plug being fully inserted but without making electrical contact, and

Figure 3 is a view similar to Figure 1 showing the plug fully inserted so as to complete the electrical circuit for supplying current.

Referring to the drawings, the socket is comprised of a housing indicated by the numeral 10. The housing may be made of any suitable material, such as molded plastic material or other suitable dielectric material, such as rubber, glass, ceramic and the like. The housing 10 is adapted to retain therein a movable or floating block assembly, designated generally by numeral 12, which is formed of two portions 13 and 14 retained together by a screw 16. The block 13 is provided with two suitably spaced channels 23 which are adapted to receive therein the prongs 25 of a plug 26 connected to electrical wires 27 for supplying current to any suitable electrical equipment. The blocks 13 and 14 are made of any suitable dielectric material, such as plastic, rubber and the like. The block 14 is provided with an interior opening 17 which is preferably bevelled inwardly at its side portions 17a for retaining thereon a pair of resilient metal electrical contact members 22 which are retained in place by means of screws 20. The block 14 is also provided with bores or openings 15 so as to permit the insertion of a screwdriver or other tool therethrough for fastening the screws 20 in proper position on block 14. The channels 23 communicate with the opening 17 so that it is possible to insert prongs 25 of plug 26 therethrough as shown in

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Figure 2. If desired, blocks 13 and 14 may be integrally formed of plastic or rubber as a single element.

The housing 10 is provided with inwardly extending shoulder portions 11 for limiting the outward travel of the movable block 12 as well as for retaining the block 12 within the housing 10. A coiled spring 30 normally tends to urge the block 12 against the shoulder portions 11 of the housing 10 as shown in Figure 1.

A fixed block 35 is provided at the opposite end of the housing 10 which is fixedly retained therein by means of screws 36 or any other suitable means. The fixed block 35 is provided with suitable openings for receiving and retaining therein electrical contact elements 37. The electrical elements 37 are retained by screws 38 which also serve to connect same to suitable power leads 39. The fixed block 35 is provided with an internal cavity portion within which the electrical resilient contact members 22 are adapted to be moved. Friction or abutment members 40 are positioned within the inner surface of the cavity of the fixed block member 35 as shown in Figure 1. The friction members 40 are preferably made of metal in order to withstand frictional wear upon contact thereon of the spring contact members 22. As shown in Figure 1, the spring contact members 22 are adapted to be releasably retained by the friction members 40 so as to be out of electrical contact with the contact members 37. If desired, fixed block 35 and housing 10 may be formed integrally of dielectric plastic material, rubber and the like. The block member 35 thus functions as an end wall for the housing 10. The housing 10 is provided with straps 9 retained by screws 8 for securing the housing in a suitable outlet box.

The operation of the safety plug will now be apparent from the construction previously described. With the plug 26 and its prongs 25 fully retracted as shown in Figure 1, the electrical contact elements 22 will abut against the portion of friction members 40 which extend beyond wall portion 33 of fixed block 35. Upon moving the plug 26 further to the left, to the position shown in Figure 2, the prongs 25 of the plug 26 will press upon the spring electrical contact members 22 and deflect them toward the central axis of the plug as shown in Figure 2, whereby they will be released from engagement with the friction members 40. Upon moving the plug 26 further toward the left, as shown in Figure 3, the spring electrical contact members 22 will then ride up the bevelled end portions 37a of the contact members 37 and attain frictional engagement therewith in the locked position shown in Figure 3. In this position, the spring members 22 will then make electrical contact with the electrical contact members 37 and will remain in such locked position. It will be understood that the use of the plug 26 as an actuator of the circuit closing device per se permits greater latitude in the dimensioning of contacts within the receptacle. Thus, spring contacts 22 and fixed contacts 37 may be of any width or shape to provide the most effective surface of contact notwithstanding the relatively short overlap between them, as shown in Figure 3. Although the elements 37 are shown as being aligned with channels 23, they may be either split or offset so as not to be in direct alignment with channels 23 so that in event a wire or other metal object should be mischievously inserted in the channels 23, no electrical contact will be made. By similarly splitting or offsetting the spring contact members 22 when the plug 26 is fully inserted, the members 22 will make electrical contact with the fixed contacts 37 even when offset. When the plug is pulled manually to the right the spring contact members 22 will then assume their initial locked position again shown in Figure 1 due to the action of spring 30 which will move the block assembly 12 against the housing shoulder portion 11.

The present socket construction provides means for making electrical contact with a source of current only by fully inserting the plug therein. Partial insertion of the prong members of a plug will not supply electrical current so that it will not be possible to short circuit across the prongs of a plug which is partially inserted therein. It will also be observed that only one motion is required to connect the plug and socket. In other words, by merely inserting the plug directly into the socket by a straight thrust into the socket, an electrical contact will be made. Previous constructions have been provided with circular or rotatable doors interposed between the contact members which have to be actuated by one or more motions before it is possible to insert the plug therein. In the present construction, the plug is inserted in its normal manner by a direct thrust and no other manipulative movements are required to produce contact. Likewise, upon retraction of the plug from the present construction, there is no period during which both terminals of the plug are partially exposed and conducting electricity. In previous constructions, this makes for a dangerous situation in which the two terminals may be crossed even when the face of the plug is more than a half inch away from the face of the socket. In the present construction, the electrical connection is broken by the time face-to-face contact between the plug and a member of the socket is interrupted. Thus, there is no exposure of live terminal electrical contacts. The present invention thus provides a safety socket which acts not only as a conductor and terminal, but also can be activated electrically only by fully inserting a plug therein which acts as a key to operate an electrical switch, making and breaking the electrical circuit. The entire mechanism is fully safe at all times and will protect the operator from exposure to any electrical currents unless the plug is fully inserted into the socket.

It is to be understood that the foregoing description of my invention is an illustrative embodiment thereof and that changes and modifications may be made which are intended to be included within the scope of the appended claims.

I claim:

1. An electrical safety socket construction comprising a housing, fixed electrical contact elements supported in said housing, a movable member retained in said housing, said movable member being provided with spring electrical contact members, said movable member also being provided with openings for receiving the prong members of a plug, abutments in said housing for normally engaging said spring electrical contact members and maintaining them out of electrical contact with the said fixed electrical contact elements supported in said housing, said spring contact members being adapted to be sprung inwardly of said socket member upon insertion of the prongs of the plug member therein and released from engagement with said abutments to bring said spring contact members into contact with the said fixed electrical contact elements in said housing for completing electrical circuit therewith.

2. An electrical safety socket construction comprising a housing, fixed electrical contact elements supported in said housing, a movable block member retained in said housing, said movable block member being provided with spring electrical contact members, said movable block member also being provided with openings for receiving the prong members of a plug, abutments in said housing for normally engaging said spring electrical contact members and maintaining them out of electrical contact with the said fixed electrical contact elements supported in said housing, said spring contact members being adapted to be sprung inwardly of said socket member upon insertion of the prongs of the plug member therein and released from engagement with said abutments, said movable block member being adapted to be further moved inwardly of said housing to bring said spring contact members into contact with the said fixed electrical contact elements in

said housing for completing electrical circuit therewith.

3. An electrical safety socket construction comprising a housing, fixed electrical contact elements supported in said housing, a movable member retained in said housing, a spring interposed between said housing and said movable member, said member being provided with spring electrical contact members, said spring electrical contact members being normally positioned out of electrical contact with said electrical contact elements by action of said spring, said movable member also being provided with openings for receiving the prong members of a plug, abutments in said housing for normally engaging said spring electrical contact members and maintaining them out of electrical contact with the said fixed electrical contact elements supported in said housing, said spring contact members being adapted to be sprung inwardly of said socket member upon insertion of the prongs of the plug member therein and released from engagement with said abutments, said movable member being adapted to be further moved inwardly of said housing to bring said spring contact members into contact with the said fixed electrical contact elements in said housing for completing electrical circuit therewith.

4. An electrical safety plug member comprising a housing, a fixed block member retained in one end of said housing, said fixed block member being provided with channels for retaining therein a pair of fixed electrical contact elements, said contact elements being connected to a source of suitable electrical power, said fixed block member being provided with an internal recess within which said electrical contact elements extend, the ends of said electrical contact members being provided with bevelled portions, a movable member retained in said housing, said housing being provided with a shoulder portion for retaining said movable member therein and limiting the outward movement thereof, said movable member being provided with extending spring electrical contact members, abutments in said housing for normally engaging said spring electrical contact members and maintaining them out of electrical contact with the said fixed electrical contact elements supported in said housing, said movable member being provided with channel portions for receiving therein the prong members of a plug, said spring electrical contact members being adapted to be bent inwardly toward the axis of said plug member upon engagement of same by the prong members of said plug for release from engagement with said abutments, a spring member interposed between said fixed block member and movable member for normally urging said movable member against the said shoulder portion of said housing, said spring contact members being adapted to be retained in engagement with said abutments when said block is positioned on said shoulder portion of said housing, said spring contact members being adapted to be engaged in electrical contact relation to the fixed contact members retained in said fixed block member for supplying current to said spring electrical contact members when said movable block member is moved fully inwardly of said housing by said plug member.

5. An electrical safety plug member comprising a housing, an end wall closing in one end of said housing, said end wall being provided with channels for retaining therein a pair of fixed electrical contact elements, said contact elements being connected to a source of suitable electrical power, said housing being provided with an internal chamber within which said electrical contact elements extend, the ends of said electrical contact members being provided with bevelled portions, a movable block member retained in said housing, said housing being provided with a shoulder portion for retaining said movable block member therein and limiting the outward movement thereof, said movable block member being provided with extending spring electrical contact members, said movable block member being provided with channel portions for receiving therein the prong members of a plug,

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abutments in said housing for normally engaging said spring electrical contact members and maintaining them out of electrical contact with the said fixed electrical contact elements supported in said housing, said spring electrical contact members being adapted to be bent inwardly toward the axis of said plug member upon engagement of same by the prong members of said plug for release from engagement with said abutments, a spring member interposed between said end wall and movable member for normally urging said movable block member against the said shoulder portion of said housing, said spring contact members being adapted to be retained in engagement with said abutments when said block is positioned

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on said shoulder portion of said housing, said spring contact members being adapted to be engaged in electrical contact relation to the fixed contact members retained in said end wall for supplying current to said spring electrical contact members when said movable block member is moved fully inwardly of said housing by said plug member.

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