

March 3, 1959

M. MORSE

2,876,426

SELF-GROUNDING ELECTRICAL PLUG

Filed July 18, 1956

2 Sheets-Sheet 1

Fig. 1

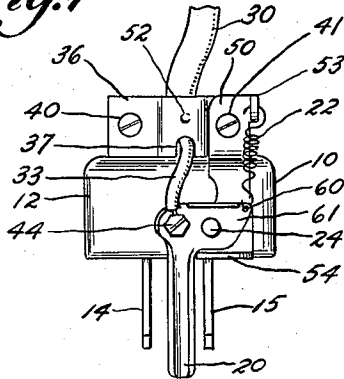


Fig. 2

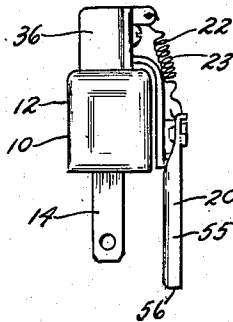


Fig. 3

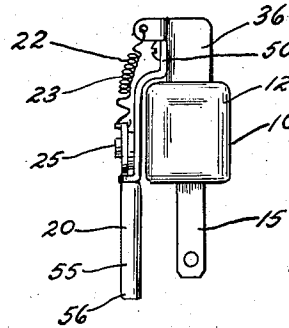


Fig. 4

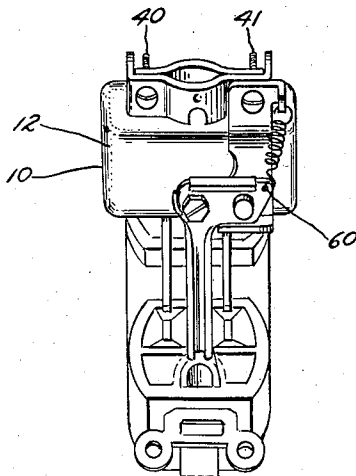
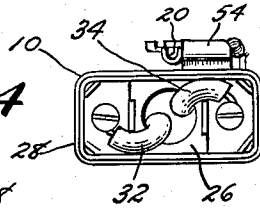


Fig. 7

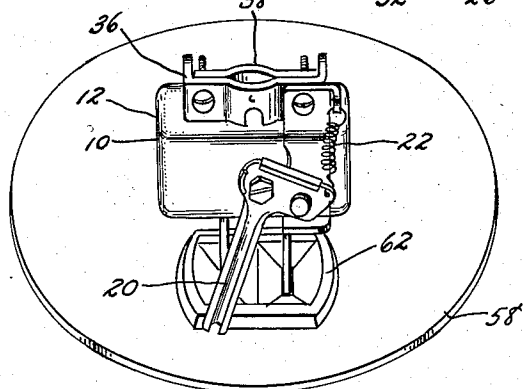


Fig. 5

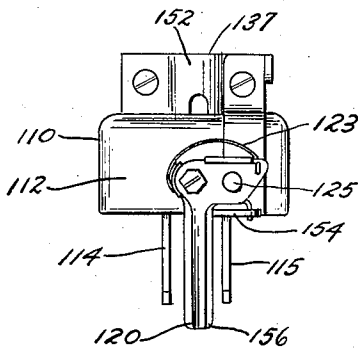


Fig. 8

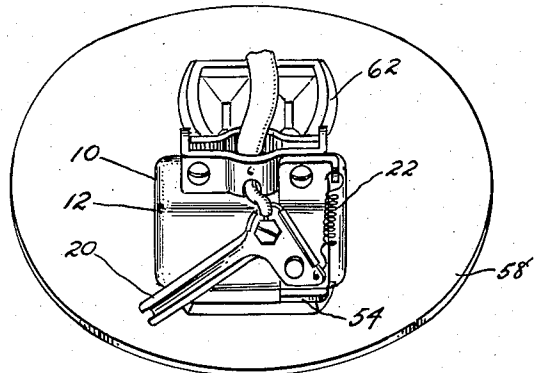


Fig. 6

March 3, 1959

M. MORSE

2,876,426

SELF-GROUNDING ELECTRICAL PLUG

Filed July 18, 1956

2 Sheets-Sheet 2

Fig. 9

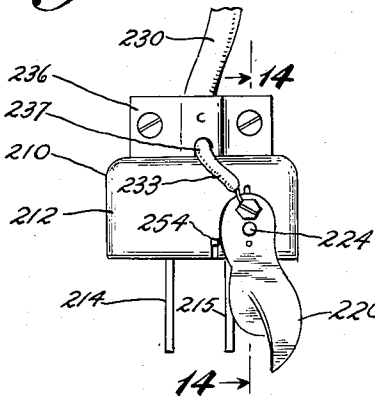


Fig. 10

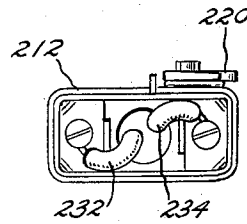
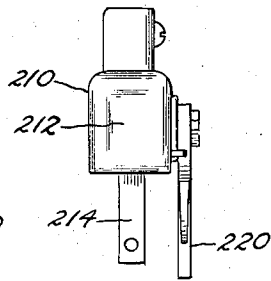


Fig. 11

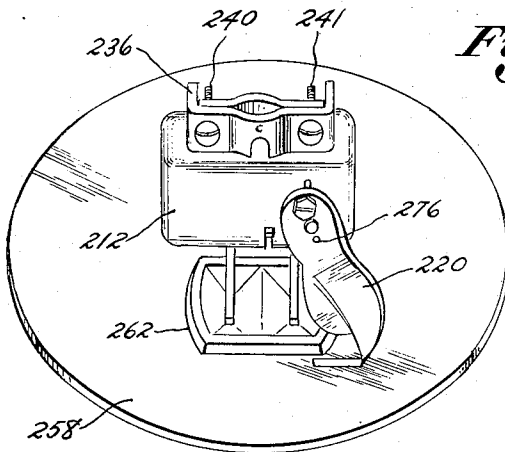


Fig. 12

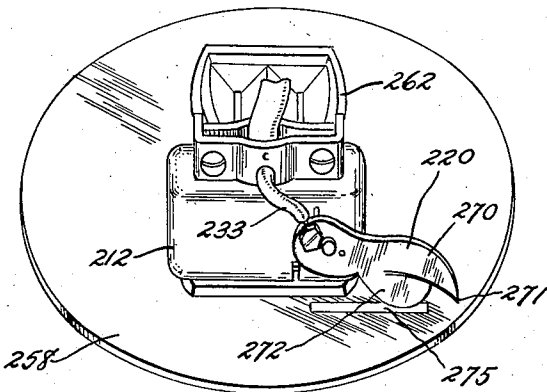
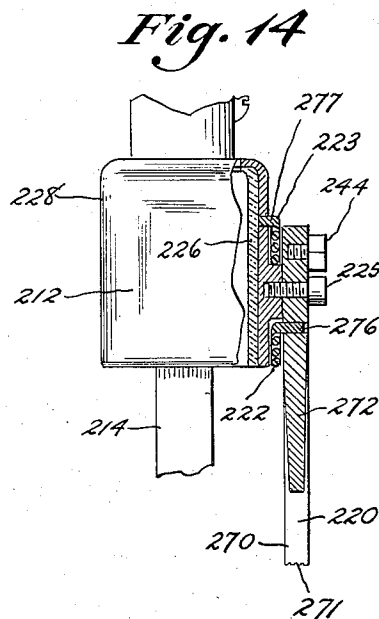


Fig. 13



1

2,876,426

SELF-GROUNDING ELECTRICAL PLUG

Milton Morse, New York, N. Y.

Application July 18, 1956, Serial No. 598,596

3 Claims. (Cl. 339-14)

This invention relates generally to electrical connection plugs and more particularly to those adapted to connect a plurality of conductors to corresponding elements of a receptacle and to simultaneously make a ground connection.

The desirability of automatically making a ground connection simultaneously with a power source connection is well recognized. Usually an extra opening is provided in the receptacle adapted to receive a correspondingly shaped and sized prong on the plug. This presents the disadvantage that the receptacle and plug must be matched. Most often this is not the fact and the user attempts to solve the problem by cutting or breaking off the grounding prong. This loses the entire ground effect so that if the user is grounded (as when working while standing on a damp floor) and the appliance which he may be holding develops a grounding (short of a live wire to the casing of the appliance) he may take a severe shock.

One method of obtaining a ground is to have a ground wire (usually one of three) in the power cord of the appliance or tool and to have it terminate in a screw which is used to replace the cover plate holding screw in a standard receptacle. This is bothersome and inconvenient and since the user can get power without it, he usually ignores it.

It is therefore among the objects of the present invention to avoid the above described disadvantages and to provide a power or electrical attachment plug which will automatically make a ground connection as long as the prongs carrying the power will enter the receptacle which may be of a standard type.

Another object therein lies in the provision of an electrical connection plug which may be used with special grounding receptacles, without affecting the automatic grounding result.

Another object lies in the provision of devices of the class described which are simple in construction thereby providing long trouble-free operation.

A feature of the invention is that the present self-grounding plug may be easily substituted for older plugs lacking its operational features, by an unskilled person using only simple tools.

A still further object lies in the provision of structure which obtains a positive ground under adverse conditions.

These objects and other incidental ends and advantages will more fully appear in the progress of this disclosure and be pointed out in the appended claims.

In the drawing, similar reference characters designate corresponding parts throughout the several views.

Figure 1 is a front elevational view of a first embodiment of the invention.

Figure 2 is a side elevational view as seen from the left of Figure 1.

Figure 3 is a side elevational view as seen from the right side of Figure 1.

2

Figure 4 is a bottom plan view of Figure 1.

Figure 5 is a perspective view showing the plug of Figure 1 partially inserted into an ordinary receptacle.

Figure 6 is a perspective view showing a stage following Figure 5 with the plug almost fully inserted into the receptacle.

Figure 7 is a perspective view showing the plug of Figure 1 partially inserted into a grounding receptacle.

Figure 8 is a front elevational view of a second embodiment of the invention.

Figure 9 is a front elevational view corresponding generally to Figure 1 but showing a third embodiment of the invention.

Figure 10 is a side elevational view as seen from the left of Figure 9.

Figure 11 is a bottom plan view of Figure 9.

Figure 12 is a perspective view like Figure 5 showing the plug of Figure 9 partially inserted in a receptacle.

Figure 13 is a perspective view like Figure 6 showing the plug of Figure 9 almost fully inserted into the receptacle.

Figure 14 is an enlarged fragmentary elevational view corresponding to Figure 10 with certain parts shown in section.

Turning to the first embodiment of the invention shown in Figures 1 to 7, the plug generally indicated by reference character 10 comprises broadly a body 12, at least one power prong 14, a grounding element 20, resilient means 22; and mounting means 24.

The body may be of any resin construction, here shown as having an insulated core 26 and a metal shell 28. Prongs 14 and 15 may be secured to the core in a well known manner. While two power prongs 14 and 15 are shown, which is usual, any desired number may be used. The power cord 30 may have two of its power conductors 32 and 34 enter the plug body between the stationary cord clamp 36 and the movable cord clamp 38, the latter being drawn against the cord 30 by screws 40 and 41 which pass freely through the clamp 36 and threadedly engage the clamp 38.

The clamp 36 has an opening 37 through which the ground conductor 33 may pass to be engaged under the hexagon head screw 44 on the grounding element 20.

The mounting means 24 comprises structure to connect the grounding element 20 to the plug body 12 in a shiftable manner. The means 24 may include a bracket 50 of irregular configuration which has a flat portion adapted to engage the outer surface of the clamp 36 with the inner edge of the bracket abutting against the outwardly curved cord gripping portion 52 which prevents it from twisting. The bracket 50 has an orificed ear 53 which anchors one end of the spring 23, and said bracket extends downward in Figures 1 to 3 following generally the exterior of the shell 28. At its free end the bracket 50 has a detent 54 which serves to position the grounding element 20 in its most longitudinally extended position, as seen on Figure 1. A rivet 24 may pivotally connect the grounding element 20 to the bracket 50.

The grounding element 20 may have a finger portion 55 of any desired shape depending upon the particular type of receptacle for which it is intended to be used, but it is highly desirable that the free end 56 be rounded so that it may slide over the surface of the box or cover plate 58 as said end 56 touches the cover plate 58.

The principal axis of the finger portion is laterally offset with respect to a line passing through the rivet 25, said line being parallel to the longitudinal axis of one of the prongs 14, 15. The grounding element has the screw 44 described above, and has an orifice 60 which anchors the forward end of the spring 23. The spring 23 is contractible and urges the grounding ele-

3

ment to rotate in a counter-clockwise direction up against the detent 54 (Figure 1), the spring 23 urges the end 56 against cover plate 58 or any other corresponding grounded surface next to the receptacles 62. The grounding element is easily deflected when the plug is partially inserted and increased spring tension puts a maximum of pressure on the grounding element against the grounding place when the plug is fully inserted into a receptacle.

As seen in Figure 6, when the grounding element is fully deflected it is limited by the edge 61 striking the detent 54.

Turning now to the second embodiment in Figure 8, to avoid repetition certain of the parts corresponding to the first embodiment are given the same reference characters with the addition of a prefix "1." It differs from the first embodiment principally in the substitution of a leaf spring 123 of which one end is anchored in the detent 154.

In the third embodiment of the invention, illustrated in Figures 9 to 14 inclusive here again certain of the parts corresponding to the prior described embodiments are given the same reference characters with the additional prefix "2."

The third embodiment differs from the first embodiment principally in the elimination of the bracket 50, and the construction and mode of operation of the grounding element 220.

While the bracket 50 could be used as a support for the pivotal mounting means 224, the third embodiment shows that when the bracket is eliminated, the grounding element 220 may be movably mounted on the body 212.

The grounding element 220 includes a scraping and cleaning member 270, and a contact member 272. The member 270 may have a serrated sharp edge 271 which is adapted, when it is pushed across the surface of the cover plate 258 by the action of inserting the plug 210 into the receptacle 262, to scrape away, with a chisel-like or abrading effect, the paint, lacquer, dirt, or corrosion which may exist on the said plate 258. Since the cover plate 258 is, by wiring codes, required to be connected to ground through the BX cable sheath, conduit or pipe, or a separate conductor, when the contact member 272 is pressed against the cleaned area 275 by the spring 223 a positive ground is obtained. The contact member 272 is preferably narrower than the cleaning member 270 so that it can fit into the groove which may be formed by the cleaning member.

The spring 223 may be a spiral with one end 276 inserted in an orifice in the element 220 and the other end 277 inserted in an orifice in the shell 228 (Figure 14). The spring 223 normally urges the element 220 to rotate in a clockwise direction as viewed in Figures 9, 12, and 13. Rotation in both directions of element 220 is limited by suitable means such as the detent 254.

The mounting means 224 may be a screw 225 as shown, or the same may be provided with a shoulder which will act as a bearing (not shown) for the element 220, or a rivet like the rivet 25 may be used.

4

I wish it to be understood that I not desire to be limited to the exact details of construction shown and described for obvious modifications will occur to a person skilled in the art to which the present invention pertains.

I claim:

1. A self-grounding electrical attachment plug comprising: a plug body; at least one power prong on said body; and a grounding element, pivotally mounted upon said plug body; said grounding element having at least two positions, one position in which the grounding element is spaced and parallel with respect to said prong; and a second position in which it is swung about its pivotal mounting to be disposed offset with respect to said power prong, and resilient means for urging said grounding element to said first position; said grounding element including a scraping and cleaning member, and a contact member on a free end thereof, said scraping and cleaning member having means for cutting a clean surface upon a metallic cover plate surrounding a receptacle, said contact member being arranged to contact said cleaned surface upon the seating of said plug within said receptacle, said grounding element having a principal axis which is disposed offset with respect to the axis of pivotal mounting between said plug body and said grounding element.

2. Electrical self-grounding attachment plug construction comprising: a plug body having at least one power prong, a grounding element having an elongated grounding prong thereon, said grounding element being pivotally connected to said plug body, said grounding prong having a principal axis, said axis being offset with respect to the axis of pivotal interconnection between said grounding element and said plug body.

3. A self-grounding electrical attachment plug comprising: a plug body, at least one power prong on said body, and a grounding element including a grounding prong having a principal axis, said grounding element being pivotally mounted on said plug body; said principal axis being disposed offset with respect to the axis of pivotal interconnection between said grounding element and said plug body; said grounding element having at least two positions, one position in which said grounding element is spaced and parallel with respect to said power prong on said plug body, and a second position in which it is swung about its axis of pivotal mounting to be disposed in non-parallel relation with respect to said power prong, and resilient means for urging said grounding prong to said first position.

References Cited in the file of this patent

UNITED STATES PATENTS

2,323,736 Tousley ----- July 6, 1943

FOREIGN PATENTS

498,681 Great Britain ----- Jan. 9, 1939
794,339 France ----- Dec. 12, 1935