March 28, 1950 L. LUDWIG 2,502,385

IRON PLUG

Original Filed March 14, 1944

Fig. 1

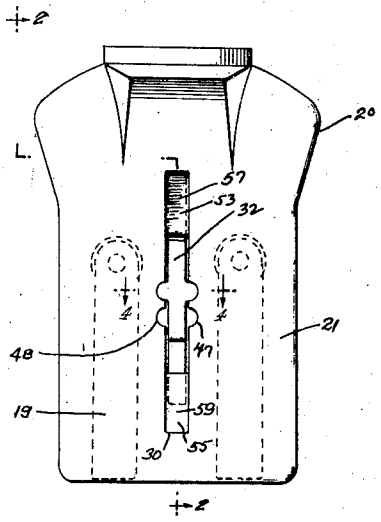


Fig. 2

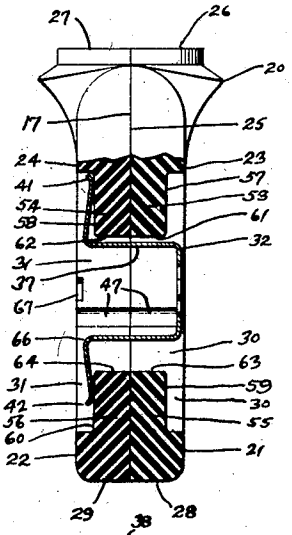


Fig. 3

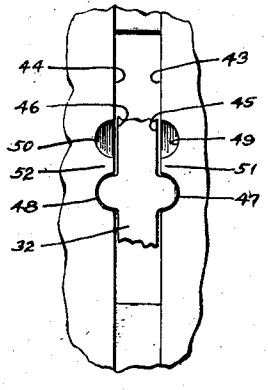
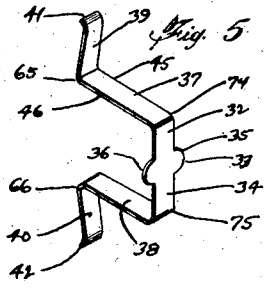


Fig. 4



Fig. 5



LOUIS LUDWIG
INVENTOR.

BY Lawrence L. Colbert
ATTORNEY

Patented Mar. 28, 1950

2,502,385

UNITED STATES PATENT OFFICE

2,502,385

IRON PLUG

Louis Ludwig, New York, N. Y.

Original application March 14, 1944, Serial No. 526,415. Divided and this application August 21, 1945, Serial No. 611,775

3 Claims. (Cl. 173—332)

1

This invention relates generally to electrical connection plugs, and more particularly to electrical connection plugs for connecting pressing irons with a source of electrical energy, and is a division of application Serial No. 526,415, filed March 14, 1944, now abandoned.

Among the objects of the present invention lies the provision of electrical iron plug structure which is quickly and easily assembled or disassembled for the purpose of connecting conductors with the electrical contact elements within the plug.

Another object herein lies in the provision of structure of the class described which is operatable by the use of only such simple tool or tools as are usually available to the user.

A feature of the present invention lies in the fact that the plug parts are properly manipulated by persons having relatively little skill.

In the present plug structure the plug is constituted by a plurality of plug body members which are resiliently retained in juxtaposition by the locking element. The resiliency of the locking element permits the use of the present plug with a plurality of irons in which a substantial difference in iron terminals is encountered. Thus the terminals and the body members of the plug may be temporarily displaced with respect to each other while the plug has the contact elements therein in engagement with said terminals, yet after the plug is removed from the said iron the locking element acts to urge the body members to their original positions.

Another feature of the invention lies in the fact that the body members, which together form the plug, may be of substantially identical construction so that not only do they present a symmetrical appearance but mold cost is thereby reduced and the locking element may be suitably engaged by insertion initially through either of the body members.

An important object of the present invention lies in the coaction between the locking element and the body members of the plug whereby the plug body members are maintained in predetermined spatial interrelation without the use of additional aligning means.

Another object of the invention lies in the provision of structure wherein the locking element requires principally the movement of only a single latch element to effect the complete locking.

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

2

In the drawings, similar reference characters designate corresponding parts throughout the several views of each embodiment.

Figure 1 is a front elevational view of an iron plug showing a first embodiment of the invention in a locked condition thereof.

Figure 2 is a sectional view as seen from the plane 2—2 on Figure 1.

Figure 3 is an enlarged fragmentary elevational view taken similarly to Figure 1 but showing the latch element shifted to an open position thereof.

Figure 4 is an enlarged fragmentary sectional view as seen from the plane 4—4 on Figure 1.

Figure 5 is a view in perspective of the locking element of the first embodiment of the invention.

Turning now to the embodiment of the invention illustrated in Figures 1 to 5 inclusive, the iron plug is generally indicated by reference character 20. In a well-known manner the plug 20 may be composed of a plurality of plug body members 21 and 22. While the plug body members are of substantially identical construction, for the purpose of clarity in this disclosure, the member 21 may be referred to as a front body member and the member 22 may be referred to as a rear body member. The body members 21 and 22 are of irregular configuration and as is well known may be molded of any suitable insulated material such as plastic or hard rubber. The plug 20 may be provided with any of the well known types of electrical contact elements 18 and 19.

The body members 21 and 22 may thus be molded from the same mold and each of the members 21 and 22 has an outer face 23 and 24, an inner face 25 and 17, cord entrance ends 26 and 27, iron prong or contact post receiving ends 28 and 29 and irregularly shaped orifices 30 and 31, respectively. The particular shape and interwall spacing of the orifices 30 and 31 are correlated to the locking element 32 as will more fully appear hereinbelow.

The locking element generally indicated by reference character 32 is best seen in Figure 5, the locking element in said figure having an appearance assumed by the locking element when not under tension and removed from the plug 20. The locking element 32 has a general U shape with laterally directed extensions on the ends of the arms of the U. Thus the element 32 includes the latch element 33 which is carried by the latch element carrying portion 34. As shown in Figure 5 the latch element 33 may be integral and coplanar with the portion 34 and may include the latch members 35 and 36. Extending substantially perpendicularly from the ends of the por-

tion 34 are the legs 37 and 38. Extending preferably at an angle of less than 90° from the legs 37 and 38 are resilient clamping fingers or portions 39 and 40. The tips 41 and 42 of the fingers 39 and 40 are preferably rounded so that they may have a proper sliding action upon the particular surface of the body member 21 or 22 against which they bear, as the case may be. The entire locking element 32 is preferably blanked and formed from a planar piece of resilient material such as spring steel, phosphor bronze or the like.

Each of the orifices 30 and 31 is preferably of a width substantially equal to or slightly greater than the width of the legs 37 and 38 and the portion 34 so that the locking element may penetrate each of said orifices. In actual practice then the distance between the wall 43 and the wall 44 may be only a few thousandths of an inch greater than the distance between the edge 45 and the edge 46 of the locking element 32. The spacing of these parts as shown in the drawings is exaggerated for the purpose of clarity. In order to permit the movement of the locking element 32 through the body members 21 and 22 the lateral opposite walls of the orifices 30 and 31 are provided with grooves 47 and 48. The shape of the grooves 47 and 48 is correlated to the shape of the extremities of the latch element 33; that is to say, the latch members 35 and 36. The outer faces 23 and 24 of the body members 21 and 22 adjoining the walls 43 and 44 near the grooves 47 and 48 are provided with indentations 49 and 50, which correspond with the shape and size of the latch members 35 and 36 so that when said latch members are fully seated in the indentations 49 and 50 the outermost surfaces of the said latch members are substantially coplanar or slightly below the outermost level of the outer faces 23 or 24. The indentations 49 and 50 are located preferably close to the grooves 47 and 48 since the closer they are to said grooves, the less longitudinal movement of the locking element is required in order to properly make up or dismantle the plug 20. It is desirable, however, that the indentations 49 and 50 not be so close to the grooves 47 and 48 that the abutments 51 and 52 are of such small size as to undesirably reduce their stability.

The body members 21 and 22 from the ends 26—29, inclusive, extend toward each other into the orifices 30 and 31 to form the projections 53, 54, 55 and 56. Each of the projections 53—56, inclusive, has a resilient finger engaging surface channels 57—60, inclusive, respectively, and a leg engaging surface 61—64, inclusive, respectively.

The parts are preferably inter-related in size and position so that when the latch members 35 and 36 are in the grooves 47 and 48 the leg 38 may have the outer surface thereof in slidable contact with the leg engaging surfaces 63 and 64, and when the latch members 35 and 36 are engaged in the depressions or indentations 49 and 50 the leg 37 may have the outer surface thereof in slidable engagement with the leg engaging surfaces 61 and 62. The clearance between the outer surface of the leg 37 and the surfaces 61 and 62 in Figure 2 is exaggerated for the purpose of clarity in the drawing and disclosure.

The length of the legs 37 and 38 is preferably such that when the inner surfaces of the latch members 35 and 36 are in contact with the innermost surfaces of the depressions 49 and 50, the tips 41 and 42 only of the fingers 39 and 40 engage finger receiving surfaces 58 and 60. Thus when the body members 21 and 22 are separated from each other while the locking element 32 is in a locked position thereof, the fingers 39 and 40 may flex about the bends 65 and 66 to assume positions which are more nearly 90° or even greater than 90° with respect to the legs 37 and 38.

Operation

Assuming the parts to be completely disassembled, appropriate conductors (not shown) are connected to the electrical contacts 18 and 19 and these are seated between the body members 21 and 22 in suitably arranged depressions therefor (not shown) with the plug body members in juxtaposition as shown in Figure 2. At this point it is permissible to insert the latch element 33 into the grooves 47 and 48 in either of the body members 21 or 22; and likewise it is immaterial whether the finger 39 or the finger 40 is uppermost. Assuming, for the purpose of example, that the latch element 32 is inserted first into the body member 22, the locking element 32 may be moved to the right as viewed in Figure 2 and then, by the use of a suitable tool, such as a screw driver (not shown) the locking element 32 may be moved to the right of the outer face 23 or outwardly thereof.

In this last mentioned position the lower or outer surface of the leg 38 is in slidable contact with or close proximity to the leg engaging surfaces 63 and 64 and the fingers 39 and 40 form angles of greater degree with the legs 37 and 38, respectively. Now the latch element is moved upwardly to a position in which the latch members 35 and 36 are opposite the depressions or indentations 49 and 50. Now, upon release of the pressure exerted against the latch element, the resiliency of the fingers 39 and 40 in returning to a position of less strain, retract the latch members 35 and 36 into the indentations 49 and 50. When the latch members 35 and 36 are thus engaged within the indentations 49 and 50, movement of the locking element 32 longitudinally of the plug 20 or vertically, as viewed in Figures 1–3 inclusive, is prevented.

By virtue of the construction just described it may be seen that the plug body members 21 and 22 may be separated from each other temporarily in order that they may be shifted in position to accommodate an unusual spread of the electrical contacts 18 and 19. Such movement of the body members 21 and 22 away from each other is controlled by the locking element 32 and particularly the flexure of the fingers 39 and 40 about the bends 65 and 66. It is important to note that the body members 21 and 22 may not be rotated about each other, about an axis perpendicular to the inner faces 25 or 17, a very substantial amount. This is so because of the engagement of said body members with the locking element and particularly the legs 37 and 38 thereof. The amount of axial displacement, as described, which may occur will be affected by the amount of clearance between the edges 45 and 46 of the locking element 32 and the walls 43 and 44. The bends 74 and 75 also may flex.

Upon a perusal of Figure 2 in which the plug 20 is shown in the locked and closed position thereof, it will be seen that where desired, the locking element 32 may be inserted from the right and moved toward the left so that the latch element 33 may engage the depressions in the body member 22. One of these depressions 67 is seen in Figure 2.

While in the disclosed embodiment of the in-

vention the locking element 32 acts to prevent rotational movement or lateral movement in co-action with the walls of the orifices in the body members of the plug, longitudinal movement of the plug body members 21 and 22 with respect to each other is only frictionally inhibited by the locking element 32 and other suitable keying means may be incorporated to prevent this movement, as for example the electrical contacts 18 and 19 or parts thereof may engage oppositely disposed depressions or sockets in the opposed inner faces 25 and 17.

It may thus be seen that the present plug may be assembled and disassembled rapidly without the use of any special tools and that when in an assembled condition the parts are arranged so as to co-act with each other to properly support the electrical contacts and to articulately integrate the plug body members to provide a unitary useful electrical contact plug. In securing the plug body members in assembled relation, no threaded parts are required either in the insulating material of which the plug body members are composed or in specially fabricated threaded metal inserts. This results not only in less expensive construction but also in time saving because no screws need be inserted and turned or turned to remove. A quick snap action is obtained as the locking element is shifted from the relatively disengaged or open position thereof to the locked position thereof and vice versa.

It may thus be seen that I have disclosed a novel and useful electrical iron plug construction having a minimum of easily fabricated parts and which may be quickly and conveniently assembled and disassembled without the use of special tools and without time consuming screw insertion operations.

I wish it to be understood that I do 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.

I claim:

1. An electrical contact plug comprising: a first plug body member having a first orifice therein, said first plug body member having a depression at the border of said orifice and a wall within the orifice which has a groove therein; a second plug body having a second orifice therein, said second plug body member having a wall within the orifice which has a groove therein; said orifices being in register to provide a single through opening which has a single through groove; and a resilient locking element having a laterally extending enlargement and clamping portions thereon; said locking element being positionable within said walls to retain said body members in juxtaposition; during the assembly of the plug, said locking element in an unlocked position being axially insertable into said opening to the extent permitted by said clamping portions, the enlargement moving along said groove; said locking element, after the enlargement has passed through the groove, being longitudinally shiftable to a position in which the enlargement is opposite said depression and urged toward said depression by the resiliency of the locking element.

2. An electrical contact plug comprising: a plug body composed of complemental body members each having an elongated orifice, each of said body members having a wall within the orifice which has a groove therein; one of said body

members having a depression extending laterally from its elongated orifice; said orifices being in register to provide a single elongated through opening having a pair of channels which are substantially parallel and spaced from each other a substantial distance along the said single through opening, a locking element having two legs joined at juxtaposed ends thereof by a latch element carrying portion; a latch member projecting laterally from said carrying portion and transversely of the single elongated through opening, each of said legs having a laterally extending clamping portion engageable with one of the channels; during the assembly of the plug, said locking element being insertable into the single through orifice accompanied by movement of the latching member along said through groove; said assembly being completed by a shifting of the latching element longitudinally of the elongated single through orifice, placing the latching member opposite said depression into which it is drawn by the resiliency of the latching element; whereby said complemental body members are maintained in juxtaposition, said locking element inhibiting movement of the body members with respect to each other transversely of the elongated openings and about an axis extending through said orifices.

3. An electrical contact plug comprising: a plug body composed of complemental body members each having an elongated orifice, each of said body members at the border of the orifice therein having a wall which has a groove therein; one of said body members having a pair of depressions extending laterally in opposite direction from its elongated orifice, said orifices being in register to provide a single elongated through opening having a single through groove; a locking element having a pair of legs which are substantially parallel and spaced from each other a substantial distance along the said single through orifice, said legs being joined at juxtaposed ends thereof by a latch element carrying portion; a pair of latch members projecting laterally in opposite direction from said carrying portion and transversely of the single elongated through opening, each of said legs having a laterally extending clamping portion; during the assembly of the plug, said locking element being insertable into the single through orifice accompanied by movement of the latching member along said single through groove; said assembly being completed by a shifting of the latching element longitudinally of the elongated single through opening, placing the latching member opposite said depression into which it is drawn by the resiliency of the latching element; whereby said complemental body members are maintained in juxtaposition, said locking element inhibiting movement of the body members with respect to each other transversely of the elongated openings and about an axis extending through said opening and axially with respect to said opening by said clamping portions and said latch members.

LOUIS LUDWIG.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,201,579	Grohsgal	May 21, 1940