June 7, 1949. T. ATHERTON ET AL 2,472,690

ELECTRICAL PLUG

Filed Dec. 21, 1944

FIG. 1.

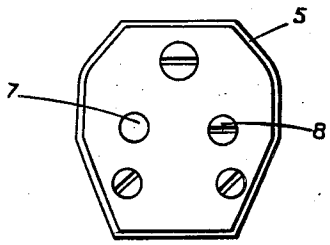



FIG. 2.

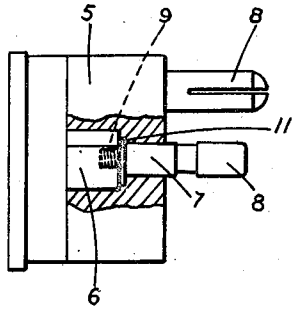



FIG. 3.

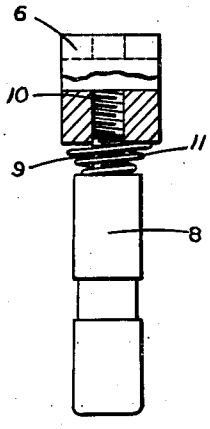
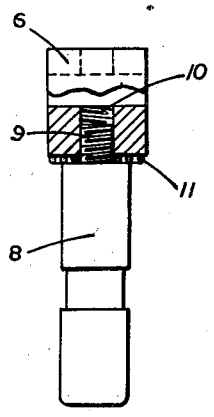



FIG. 4.




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Patented June 7, 1949 2,472,690

# UNITED STATES PATENT OFFICE

2,472,690

## ELECTRICAL PLUG

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Application December 21, 1944, Serial No. 569,195
In Great Britain January 10, 1944

1 Claim. (Cl. 173—361)

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This invention has reference to electric plugs and has for its object to provide means whereby the pins are more effectively secured in the plug body than hitherto, thereby ensuring the easy insertion of the pins with a sound electrical contact, and also allowing for the easy removal of the pins, while overcoming any danger of their being left in the socket when the plug is withdrawn.

According to this invention an electrical plug made of insulating material is provided with sockets or recesses to house live terminals to which wires are connected, each socket having an aligned hole in the face of the plug for the pin to pass through, one or more of the terminals having a screwed hole and one or more of the pins having a screwed end, a spring made of conducting metal turned in the same direction and in the form of a truncated cone with its smaller end toward the pin hole in the face of the plug, being placed in the socket below the terminal whereby as the screwed end of the pin is pushed through the hole in the face of the plug from outside the spring will be compressed and flattened before the pin screw can be screwed into the hole in the terminal, and will be more flattened and compressed as the pin is screwed home, thus forming an electrically conducting lock washer, the smallest coil of which will close on the pin screw as it is unscrewed from the terminal, so making it more difficult to get the pin out than to get it in.

The invention is more particularly set forth with reference to the accompanying drawings in which—

Fig. 1 is a front elevation of a plug

Fig. 2 is a side elevation of the plug partly in section

Fig. 3 is an elevation of a pin just entering a terminal block the surrounding plug being omitted; and

Fig. 4 is a similar view showing the pin screwed home.

As shown in the drawings the plug 5, which is made of insulating material has cavities in which live terminals 6 are housed, the plug having holes 7 through which the pins 8 project. One of the pins 8 has a screwed end 9 adapted to screw into a corresponding hole 10 in its terminal 6. In the cavity containing this terminal is a spring 11 made of conducting material, in the form of a truncated cone placed so that its narrower end is toward the pin hole 7, the arrangement being shown more clearly in Figs. 3 and 4 where the pin and terminal are removed from the plug.

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For a right-handed screw on the pin, a right-handed spring is used and vice versa.

When the pin 8 is inserted in the hole 7, the spring must be compressed and flattened before the screw on the pin can enter and be screwed into the hole 10 in the terminal, and the spring, being compressed and flattened when the pin is screwed home as far as it will go acts as a lock washer. It is found that a very slight engagement of the pin screw 9 with the screwed hole 10 in the terminal 6 will, with the pressure of the spring, hold the pin firmly in place, thus ensuring that the pin will be held in the plug and a proper electrical contact will be maintained even if the pin be carelessly inserted and not properly screwed home. Consequently if a plug provided with a pin not properly screwed home be inserted in a socket member, the pin will still be mounted on the plug and not left behind in the socket when the plug is withdrawn.

It will be appreciated that any left-hand or unscrewing rotation of the pin tends to "screw up" the spring and cause it to grip tighter on the pin screw, so that a definite and substantial pull must be applied to the pin to remove it; on the contrary it is quite easy to insert the pin.

What we claim as our invention and desire to secure by Letters Patent is:

An electrical plug comprising a body of insulating material provided with recesses extending inward from one face of the body and openings of smaller diameter extending inward from the opposite face of the body in coaxial alinement with said recesses, a spring of conducting material in the form of a truncated cone housed and retained at its wider end in one of said recesses whereby it hangs with its narrower end in the axially alined opening of smaller diameter, an electric terminal block disposed in said recess and resting on the wider end of said truncated cone spring, said terminal block having a threaded opening therein of smaller diameter than and coaxial with the opening of smaller diameter in the plug, a contact pin of the same diameter as said plug-opening of smaller diameter, said pin having at one end a projection of smaller diameter than the pin thereby forming a shoulder between said pin and projection, said being exteriorly threaded in the same direction as the coil of said spring for engagement with the threaded opening in said terminal block thereby to cause said shoulder to engage and press inward the smaller end of said spring whereby when said pin is screwed home in said

threaded opening the spring is entirely within the recess of larger diameter.

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