

[54] **ELECTRICAL PLUG LOCK**

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[51] Int. Cl. **H01r 13/54**

[58] Field of Search 339/14, 74, 75, 95, 195,
339/196

[56] **References Cited**

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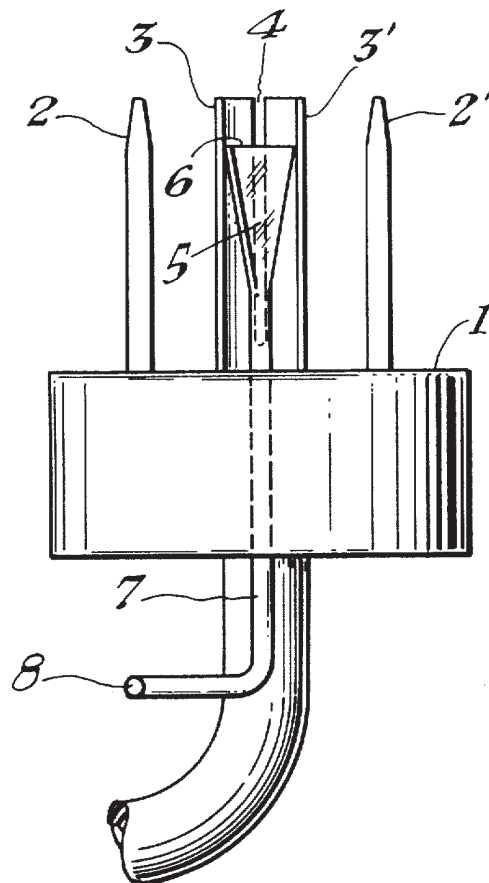
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Primary Examiner—Joseph H. McGlynn

[57] **ABSTRACT**

A standard, grounded three-conductor male electrical plug is made to positively lock in place in its complementary female socket by friction pressure by means of a single tapered cam member which is connected to the plug body in such a way as to move longitudinally and to rotate within the split, scored ground connector of the male plug.

5 Claims, 4 Drawing Figures



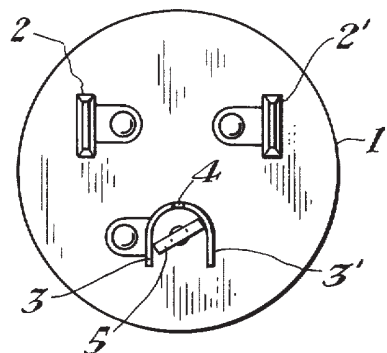


Fig. 2.

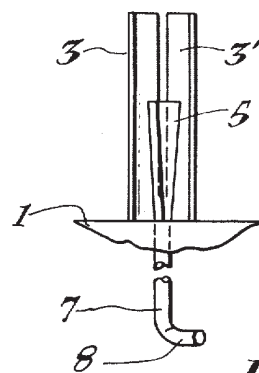


Fig. 4.

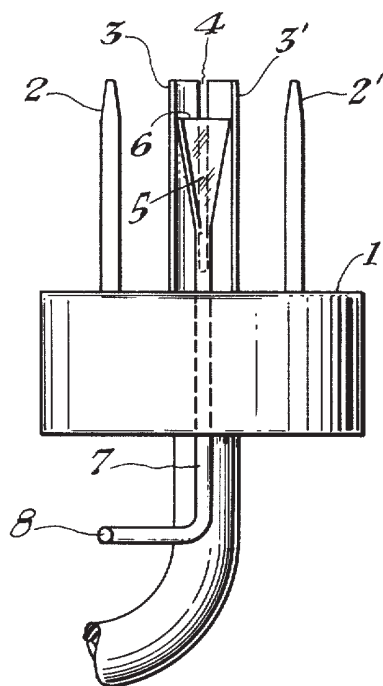


Fig. 1.

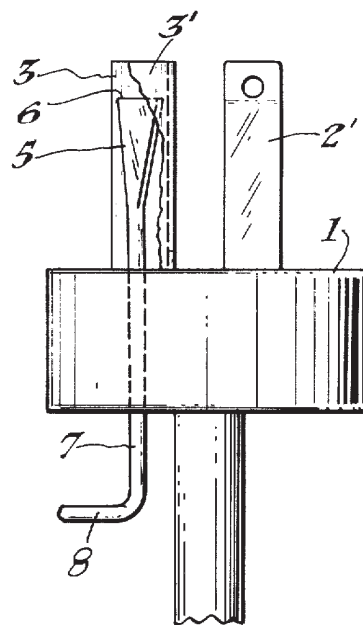


Fig. 3.

ELECTRICAL PLUG LOCK**BACKGROUND OF THE INVENTION**

A problem long associated with using both household and industrial electrical appliances is that cord tension and cord weight combine to loosen the plug in its socket and to eventually break the electrical connection at the plugsocket interface. This problem is compounded with the use of hand power tools due to their necessary portability.

Previous devices have attempted to solve this problem in a variety of ways. Some have suggested a modification of the current-carrying electrodes of the male plug to admit a locking pin in a fixed position with respect to the female socket once the plug is inserted into the socket. Since such an arrangement provides for no variation in plug or socket dimensions, it is usually coupled with a requirement that the female socket be specifically modified to obtain the desired rigid connection. (Thorin U.S. Pat. No. 2,049,093).

Others utilize a specially modified male plug with both live electrodes adjustable in a direction transverse to the socket opening in order to achieve a pinching effect. (Heuneman U.S. Pat. No. 2,775,744).

Still others modify the live electrodes of the male plug to admit a rotating key which locks into the female socket by means of a rotating lever arm. (Miller et al. U.S. Pat. No. 2,885,650).

SUMMARY OF THE INVENTION

Therefore, to overcome the foregoing difficulties of the prior art, the present invention utilizes an adjustable tapered cam, operated by a lever arm which extends through an opening in the male plug body at a point directly in line with the longitudinal axis of the plug's ground connector. This ground connector is split longitudinally into two sections which are scored on their outer surfaces. The tapered cam is adjusted longitudinally between the split sections and then rotated in a manner such that the tapered cam edges are brought into contact with the inside of the split ground connector sections thereby expanding the space between the split sections. This conversion of rotational to linear motion at a particular longitudinal position causes the scored outer surfaces of the split sections to come in contact with the female socket ground connector thereby effecting a positive pressure fit.

The general object of this invention is to provide means to lock a male electrical plug in place in a standard female electrical socket such that the connection will not be accidentally broken.

A specific object of this invention is to effect said locking action without expensive modification of existing male plugs.

A further object of this invention is not only to effect said locking action without recourse to modifications of the female electrical socket, but to effect said locking in spite of dimensional tolerances normally found in both plugs and sockets.

A further object of this invention is to effect said locking action without necessitating contact of the locking mechanism with any normally current-carrying electrode.

A further object of this invention is to effect said locking action without resort to separate keys which may be easily misplaced and lost rendering breaking of the circuit impossible under emergency circumstances.

Yet a further object of this invention is to equip said locking means with a positive visual indicator to communicate to the user the mode, whether locked or unlocked, of the electrical connection.

DESCRIPTION OF THE DRAWINGS

For the purposes of illustration a form of this invention is shown which is presently preferred.

FIG. 1 is a front view of the male plug showing the split ground connector and the rotating cam in one position.

FIG. 2 is a plan view of the plug shown in FIG. 1.

FIG. 3 is a side view of the male plug showing the scored outer surfaces of the ground connector.

FIG. 4 is another view of the split ground connector with the rotating cam in another position.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings in detail, wherein like numerals indicate like elements, there is shown in FIG. 1 a standard male electrical plug 1. In this view both the live conductors 2 and 2' and the ground connector 3 and 3' are shown. The ground connector 3 and 3' is split longitudinally at 4 into bifurcated projecting sections 3 and 3' as shown. Notice in FIG. 3 that the outer surfaces of the ground connector sections referred to above are scored at 5 for better friction contact with the female socket.

Turning concentrically inside the split ground connector is a tapered cam 6 which, in addition to rotating, is also free to move longitudinally within the ground connector in order to compensate for any dimensional variations, of either the plug 1 or the socket into which the plug 1 is inserted. The tapered cam 6 extends through a hole in the plug body 1 where the cam shaft bends at substantially a 90° angle to form a lever arm 8 of non-conducting material for positioning the cam.

In actual operation the plug 1 is inserted into a standard female grounded socket (not shown) with the wide lateral axis of the tapered cam 6 disposed parallel to the scored sides of the split ground connector 3 and 3' furcations. In this position the split sides 3 and 3' of the ground connector are aligned most closely together to facilitate plug insertion. After the plug is in place in the socket, the tapered cam 6 is displaced inwardly by movement of the shaft 7 along the plug's longitudinal axis to a desired position and then lever 8 is rotated such that the wide transverse axis of the tapered cam 6 is brought into contact with the insides of the bifurcations 3 and 3'. This causes the bifurcations 3 and 3' to diverge with respect to one another, making positive friction contact with the inside walls of the female socket. If lever 8 can not be rotated all the way into a locked position, that is, placing card 6 at a 90° angle to the scored sides 5, the shaft 7 may be moved downward to the position shown in FIG. 4 and locked.

The instant invention has been shown and described herein in what is considered to be the most practical and preferred embodiment. It is recognized, however, that departures may be made therefrom within the scope of the invention and that obvious modifications will occur to a person skilled in the art.

What I claim is:

1. A positive connection means for a three-way male electrical connector that is not normally electrically

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connectable to a positive or negative electrical terminal comprising:

a body,

a male ground connector member with two projection sections, connected to said body,

a cam means movably positioned between said sections to move said sections apart to secure said grounded connector in a locked position in a female outlet,

a shaft connected to said cam means with a portion of said shaft positioned outside said body for easy access,

said shaft movable directly between a plurality of positions by sliding said shaft in order to position the cam at a desired position along said sections, and said shaft rotatable less than three hundred and sixty degrees to move said cam into engagement with said sections to lock said connector in a female socket.

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2. A three-way male connector as in claim 1 wherein, said ground connector is split longitudinally into bifurcated sections.

3. A three-way male connector as in claim 1 wherein, said ground connector member includes a base and a projecting portion, said projecting portion being longitudinally split along substantially the entire length of said projecting portion.

4. A three-way male connector as in claim 3 wherein, said projecting portion including outer surfaces with linear scores in a cross-hatch fashion, said scores running at an angle to said ground connectors longitudinal axis.

5. A three-way male connector as in claim 4 wherein, said shaft is longitudinally movable within said ground connector, and said shaft includes a transverse lever.

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