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M. B. WOOD

2,075,256

CIRCUIT ISOLATING PLUG

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Fig. 1.

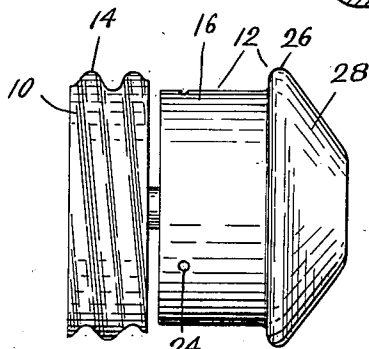
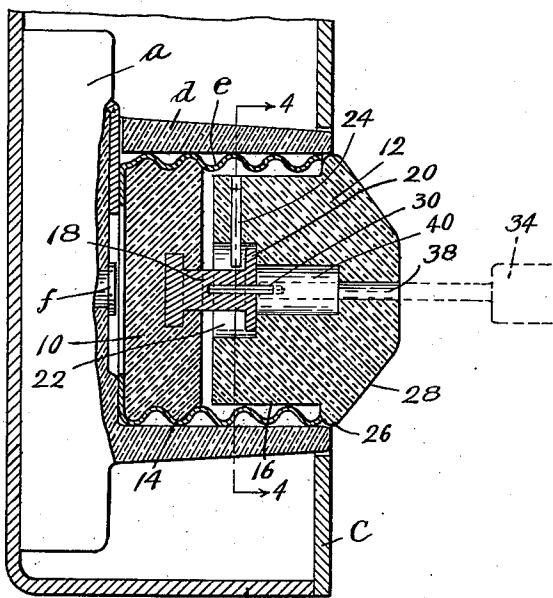


Fig. 2.

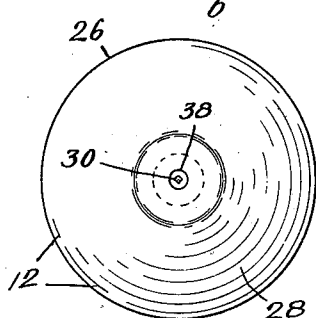


Fig. 3.

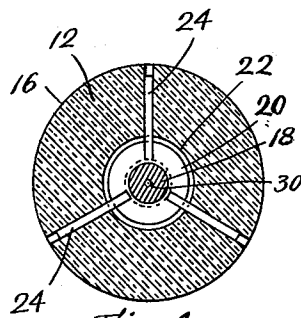


Fig. 4.

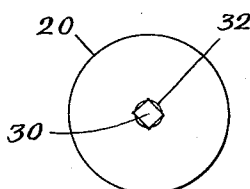


Fig. 5.

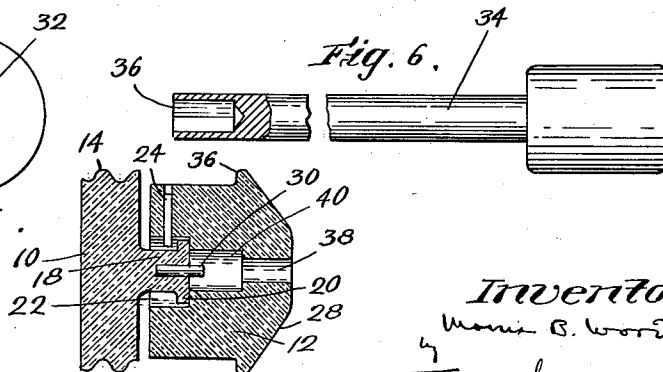


Fig. 6.

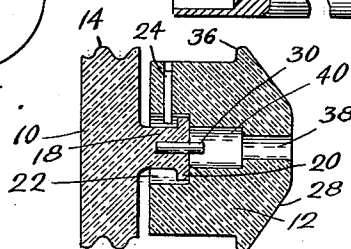


Fig. 7.

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UNITED STATES PATENT OFFICE

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CIRCUIT ISOLATING PLUG

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9 Claims. (Cl. 173—356)

This invention relates to circuit isolating plugs that are adapted to be inserted in a fuse plug receptacle or the like for the purpose of preventing the completion of the circuit associated with the receptacle and thereby for preventing the use of electric power.

A circuit isolating plug of this general type is intended to be inserted in and removed from the receptacle only by an authorized person, as a representative of the concern from which the electric power is purchased.

An object of the present invention is the provision of a circuit isolating plug of improved construction so arranged that, while it can readily be removed from its isolating position by a person having the proper key, can not be removed readily by an improvised key that can be made by the tools that the usual householder may possess or by other devices that are conveniently accessible to the householder.

Another object of the invention is the provision of a circuit isolating plug having a lower insulating screw-threaded part that is adapted to be screwed into the fuse plug base and an upper insulating part that is swivelled to the screw-threaded part, the screw-threaded part having a polygonal, and especially a square stem by which the screw-threaded part can be rotated to insert it into and to remove it from the fuse plug base and the upper part overlying and shielding the stem from operative engagement with the usual implements found around a house but permitting the insertion of a special key which can engage the stem, the cross-section of the square stem being so small that any ordinary tool or device that the householder may make will be cut by or will slide off the stem without rotating the plug and the key having a stem receiving socket that can not be readily duplicated by the average householder.

A further object is generally to improve the construction of circuit isolating plugs.

Fig. 1 is a sectional detail of the circuit isolating plug embodying the present invention inserted in circuit isolating position in a fuse plug receptacle.

Fig. 2 is a side elevation of the plug of Fig. 1.

Fig. 3 is an end view of the plug of Fig. 2.

Fig. 4 is a section taken along line 4—4 of Fig. 1.

Fig. 5 is an enlarged end view of the stem holding hub of the screw-threaded portion of the plug.

Fig. 6 is a plan view partly in section of the proper operating key for the plug.

Fig. 7 is a sectional view of a modified form of plug.

The circuit isolating plug embodying the present invention comprises an inner or lower section 10 and an outer or upper section 12 both being composed of a suitable insulating material, as for instance, hard rubber, a molded condensation product and the like. The inner section 10 is formed with external screw-threads 14 thereon and the outer section 12 has a smooth cylindrical body 16 the diameter of which is not greater than the root diameter of the screw-threads 14. The inner section 10 is formed or provided with a central forwardly-extended axially located hub 18 having at its outer end a radially outstanding flange 20 that is located in a central recess 22 formed in the inner face of the outer section 12, the flange 20 being adapted to be seated upon the bottom wall of the recess. The outer section 12 is secured rotatably and non-detachably to the inner section by a plurality of metal pins 24 which are fixed in radial passages in the cylindrical portion 16 and have their inner ends projected into the recess 22 behind the flange 20, the pins being spaced axially from the flange a sufficient amount so that the outer section 12 is loosely connected or swivelled to the hub 18. The pins lie close to the inner face of the outer section 12 so that they are disposed entirely within the fuse plug base or receptacle when the isolating plug is inserted therein, and the ends of the pins preferably are sunk below the surface of the outer section 12 so that the pins can not come in contact with the screw-threaded terminal shell of the receptacle. The outer portion of the outer section 12 is provided with a peripherally outstanding shoulder 26 which is adapted to overlie the end of the screw-threaded metal shell of the fuse plug base and to be disposed within the recess of the base in which the shell is located. The outer section, above and contiguous with the shoulder, is provided with a dome-shaped or conical head or end face 28 that is smooth and by reason of its smooth and sloping face can not be forcibly engaged by the fingers or a tool and manipulated in any such manner as to detach the outer section from the inner section or to cause the rotation of the inner section when the plug is in circuit isolating position. The hub 18 is provided with an axially directed polygonal stem 30 that is square in cross-section and is composed of a highly tempered and tough steel. The hub 18 of Figs. 1 through 5 is composed of a metal as brass that is molded or otherwise imbedded

rigidly in the inner section 10 and is provided with an axial hole 32, see Fig. 5, that is somewhat smaller in diameter than the diagonal diameter of the stem 30 and the stem is driven into the hole and thereby is locked or imbedded permanently into the hub. In the modification of Fig. 7 the hub is an integral part of the inner section and the stem 30 is molded or imbedded therein. The stem projects forwardly of the top of the front face of the hub sufficiently so that it can be engaged by a suitable key 34. The key comprises a cylindrical rod of small diameter having a square hole 36 in its inner end that snugly receives the projecting end of the stem 30 so that the stem and consequently the inner section 10 can be rotated in either direction. The outer section is provided with an axial passage 38 by which the key is inserted to engage the stem, the passage 38 having a diameter not greatly exceeding that of the key 34. The passage 38 is provided with an enlarged diameter inner section 40 in which the end of the stem 30 is located. The enlarged passage 40 is provided to locate the wall of the recess so far away from the stem that any flat sided device, as a nail, that can be inserted in the small passage 30, can not be wedged between the wall of the recess and a flat side of the stem 30 sufficiently tightly to permit the rotation of the inner section.

The isolating plug as thus described is adapted to be inserted in the fuse plug base or receptacle *a* of a circuit entrance cabinet *b*, the cabinet usually having a cover *c* that is locked to the body of the cabinet and has an aperture that registers with the plug recess of the base *a* so that the fuse can be removed upon need while preventing access to exposed portions of the electric circuit within the cabinet. The fuse plug base is provided with a neck *d* having a recess therein containing a screw-threaded metal shell *e* that constitutes one of the terminals of the circuit, the base having a center terminal *f* located at the bottom of the recess. The isolating plug embodying the present invention is adapted to be received within the fuse plug base in the manner illustrated in Fig. 1, with the inner screw-threaded insulating portion 10 in screw-threaded engagement with the shell *e* and located at the bottom thereof and overlying the center contact *f*. The enlarged shoulder 26 of the outer section 12 of the plug overlies the top of the screw-threaded shell *e* and lies at least partially within the shell recess of the base so that electrical connection with the shell can not readily be made. The inner end face of the outer section 12 is spaced from the outer face of the inner section 10 by such an amount that even if the outer section is tilted so far as is permitted by the flange 20 and the pins 24 it can not engage the inner section with sufficient force to cause the inner section to be rotated when the tilted outer section is rotated. Thus the plug can be removed only by engaging the stem 30. The stem 30 is of tough steel and is relatively small in cross sectional area, preferably not more than $\frac{1}{8}$ inch or less across a flat side of the stem. This width is so small that any improvised key that does not accurately engage all four faces of the stem will slip on the stem without rotating; and an improvised key that will fit the stem and rotate the plug can not be made readily by the average householder with the usual tool at his command. The recess 36 of the key 34 that is provided for inserting and removing the plug

from the base is intended to be accurately made by a broaching machine and tool not available to the average person. The stem 30 moreover is tempered sufficiently so that the square edges thereof will cut into the relatively soft metal from which the average householder will attempt to form a key and hence will destroy the key. The key 34 that is provided for applying the isolating plug is intended to be in the possession of an authorized person only, as an employee of the concern selling the electric power, and hence will not be available to the householder whose circuit may be isolated from the power main by the plug.

I claim:

1. A circuit isolating plug for a fuse plug receptacle having a recess, a screw-threaded shell located within said recess and a center contact at the bottom of said recess, said plug having an inner externally screw-threaded insulating section that is adapted for screw-threaded engagement with the shell and overlies the center contact, and an outer section that is adapted to lie within the shell and has a freely rotatable connection with said inner section, said outer section having a peripherally outstanding shoulder which is adapted to be located at least partly within the recess and to overlie the end of the shell and also having an exposed smooth and dome-shaped outer end face, said inner section having co-axially therewith a polygonal section-rotating stem which said outer section overlies and said outer section having an axial passage leading from said end face to said stem.

2. A circuit isolating plug having an inner externally screw-threaded section and an outer section having a cylindrical body the diameter of which is not greater than the root diameter of the screw-threads of said inner section, said outer section also having a peripherally outstanding annular shoulder and a dome-shaped end face, said inner section having a section-rotating stem which said outer section overlies and said outer section having a passage leading from its end face to said stem, and means rotatably connecting said sections together and holding said sections in axially aligned but spaced apart relation so that said outer section can be rotated with the confronting faces of the section held from engagement.

3. A circuit isolating plug comprising an inner externally screw-threaded insulating section and an outer section that is free from screw-threads and has a recess in the face thereof that confronts said inner section, said inner section having a hub which is located within and is adapted to seat on the bottom of said recess, means carried by said outer section which is loosely engageable with said hub to hold said sections rotatably connected against detachment, said hub having a projecting stem by which said inner section is adapted to be rotated and said outer section having a passage leading from its end face to said stem into which passage a suitable tool can be inserted to engage the stem and rotate said inner section.

4. A circuit isolating plug comprising an inner externally screw-threaded insulating section having a forwardly extended hub terminated in an annular flange, an outer section having a recess in the bottom of which said flange is seated and also having pins which are disposed behind said flange and which hold said sections rotatably connected against detachment, said hub having a forwardly extended section-rotating stem that

said outer section overlies, and said outer section having a passage that extends from the end face thereof to said stem into which passage a suitable tool can be inserted to engage said stem and rotate said inner section.

5 5. A circuit isolating plug comprising an inner externally screw-threaded insulating section and an outer insulating section having a cylindrical body the diameter of which is not greater than
10 the root diameter of the screw-threads of said inner section and having a recess in one end thereof, said inner section having a forwardly projecting axially disposed hub terminated in an annular flange that is located within and is
15 adapted to seat upon the bottom of said recess, pins carried by said outer section and disposed behind said flange whereby to connect the two sections rotatably together against detachment, said hub having a forwardly extended stem by
20 which said inner section is adapted to be rotated and said outer section having a passage leading from its end face to said stem into which passage a suitable tool can be inserted to engage said stem and rotate said inner section, said two sections having confronting end faces that are held
25 in spaced relation by said hub.

6. A circuit isolating plug comprising an inner externally screw-threaded insulating section, and axially aligned therewith an outer section having
30 a freely rotatable non-detachable connection with said inner section, said inner section having a forwardly projecting axially located stem which said outer section overlies and by which said inner section is adapted to be rotated, said outer
35 section having an axially directed passage leading from its end face to said stem, said stem comprising a rod of tough tempered metal of polygonal cross-section that is imbedded in said inner section and is so small in its cross-sectional
40 dimensions that it inhibits sufficiently firm engagement by a make-shift tool that can be inserted through the passage in said outer section to unscrew said inner section from a socket in which it is seated.

45 7. A circuit isolating plug comprising axially aligned inner and outer sections, said outer section having a recess and said inner section having external screw-threads and a forwardly-extended axially-disposed hub that is located in

said recess, said outer section having pins that project into said recess and loosely engage said hub and hold said sections rotatably and against detachment, said hub having a forwardly-extended metal stem of square cross section and small cross-sectional dimensions, and said outer section having a passage for a stem engaging inner-section rotating tool that leads from the end face thereof to said stem, said passage being internally enlarged at said stem.

8. A circuit isolating plug comprising axially aligned inner and outer sections, said inner section having external screw-threads and a forwardly-extended axially-disposed metal stem of polygonal cross-sectional area and small cross-sectional dimensions, means rotatably connecting said sections and holding them against detachment, and said outer section overlying said stem and having a relatively large axial passage in which said stem is located and a relatively small passage that is axially aligned with said stem and leads from the end face of said outer section into the body thereof and communicates with said large passage, said passage admitting the entrance of a tool to engage said stem and rotate said inner section.

9. A circuit isolating plug comprising an inner section of insulating material having external screw-threads and an axially disposed hub provided with an outstanding annular flange at its end, an outer section that is aligned with said inner section and has a recess in the inner end face thereof in which said hub is rotatably located, said outer section having pins which are disposed behind said flange and hold said sections rotatably connected against detachment, said hub having a forwardly-extended axially-disposed metal stem of square cross-section and small width of its flat sides, said outer section having a recess that contains said stem and is much greater in its cross sectional dimension than said stem, and said outer section also having an axial passage of small cross section that leads from said last named recess to the outer end face of said section, said passage admitting the entrance of a tool to engage said stem and rotate said inner section.

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