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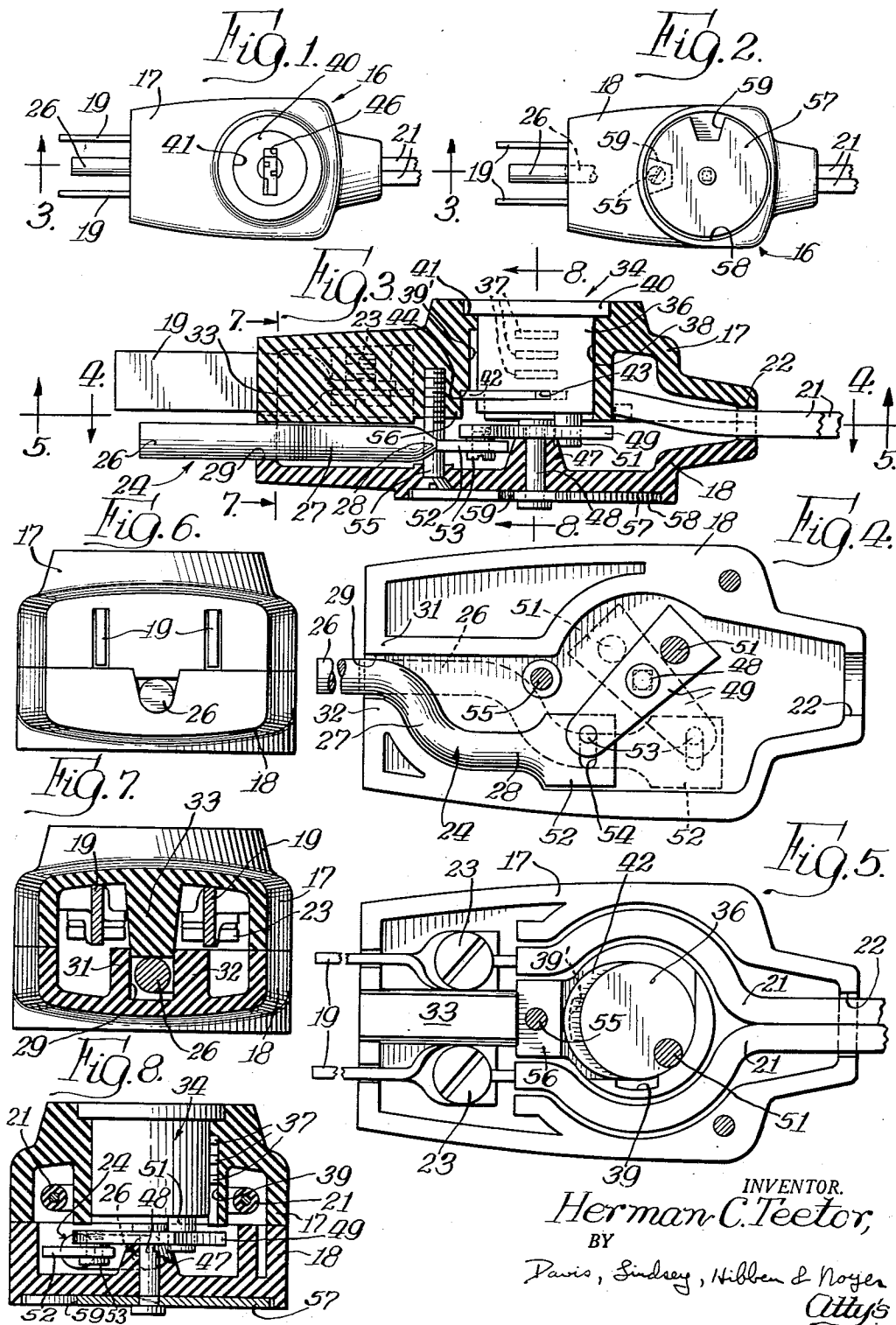
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2,759,159

ELECTRIC PLUG WITH DISABLING MEANS

Filed March 7, 1955

2 Sheets-Sheet 1



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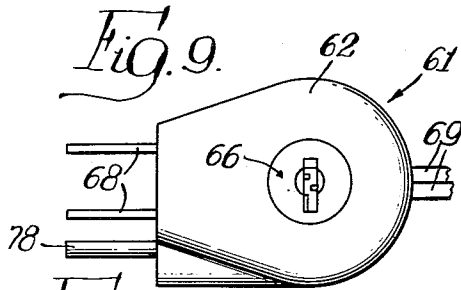
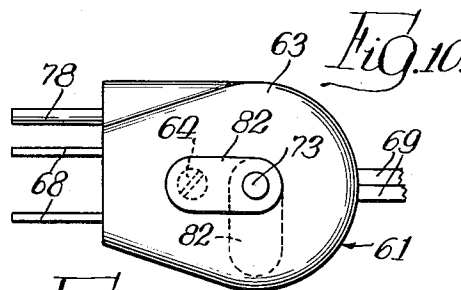
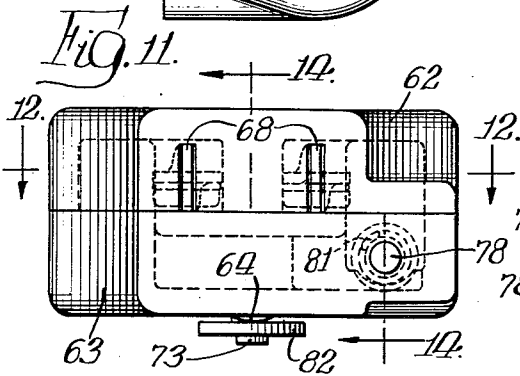
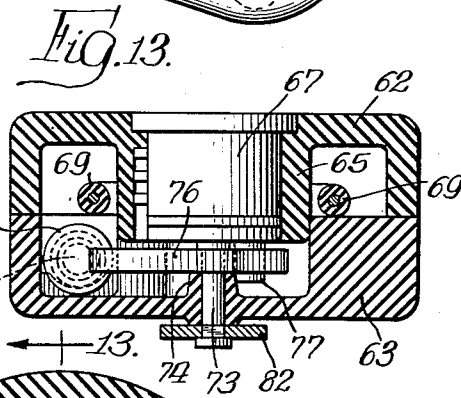
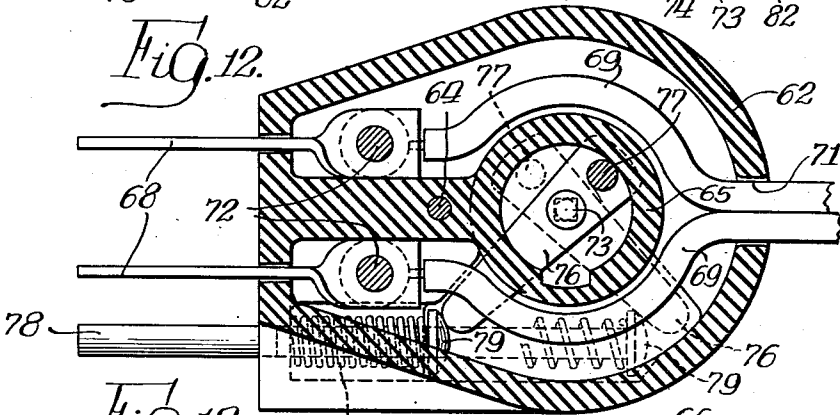
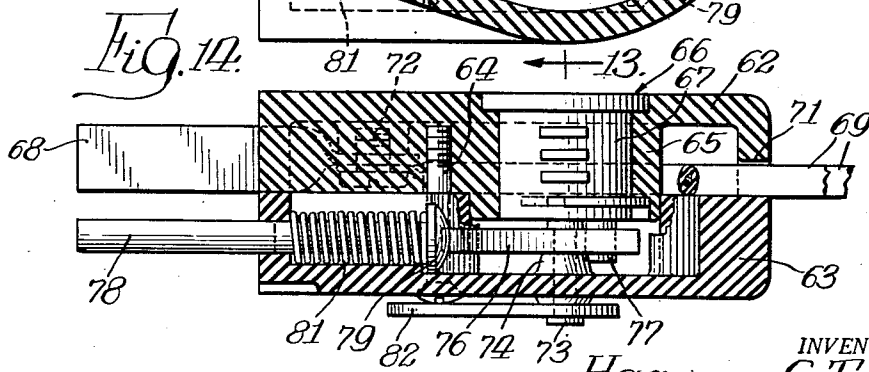
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ELECTRIC PLUG WITH DISABLING MEANS

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17 Claims. (Cl. 339—37)

This invention relates to improvements in electric connector or attachment plugs and more particularly to an electric plug having novel means for selectively disabling the plug when desired in order to prevent its use.

In the case of many types of electrically operated devices and appliances, such as radio and television sets, record players, power tools, etc., it would be extremely desirable to have an inexpensive and convenient means for preventing unauthorized use of the device, e. g. by children or others. Along these lines, it has been suggested heretofore to provide a separate cover or shield adapted to be locked around and to enclose the contact prongs of the attachment plug on the electric cord of the device or appliance and thereby prevent the device from being used without permission. Other suggestions toward the same end have also been made but there are various objections to the different schemes heretofore proposed on the grounds that they are too inconvenient and cumbersome in use or that they are not entirely effective and safe.

Accordingly, it is a primary object of the present invention to provide an improved electric plug having novel means for disabling the plug at will in order to prevent unauthorized use thereof.

A further object of the invention is to provide in an electric attachment plug a novel key locked mechanism for disabling the plug and rendering it inoperable.

Another object of the invention is to provide a novel electric plug having means for disabling the plug and rendering it inoperative without disrupting the electrical circuit of the plug.

Still another object of the invention is to provide a novel electric plug having means for disabling the plug and locking the same in inoperative position and at the same time preventing dismantling of the plug when it is in locked inoperative position.

An additional object of the invention is to provide a novel electric plug having means for rendering the plug inoperative when desired which is simple, effective, and completely safe to use.

Other objects and advantages of the invention will become apparent from the subsequent detailed description taken in conjunction with the accompanying drawings wherein:

Fig. 1 is a top plan view of an attachment plug comprising one specific embodiment of the invention;

Fig. 2 is a bottom plan view of the plug shown in Fig. 1;

Fig. 3 is a longitudinal sectional view on an enlarged scale as taken along the line 3—3 of Fig. 1;

Fig. 4 is a plan view showing the internal construction of one-half of the plug as seen along the line 4—4 of Fig. 3;

Fig. 5 is a plan view showing the interior construction of the other half of the plug as seen along the line 5—5 of Fig. 3;

Fig. 6 is an end view of the plug as seen from the left-hand end in Fig. 3;

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Fig. 7 is a transverse sectional view as taken along the line 7—7 of Fig. 3;

Fig. 8 is a transverse sectional view as taken along the line 8—8 of Fig. 3;

Fig. 9 is a top plan view of an electric plug comprising a modified embodiment of the invention;

Fig. 10 is a bottom plan view of the device shown in Fig. 9;

Fig. 11 is an end view on an enlarged scale of the device shown in Fig. 9 as seen from the left-hand end thereof;

Fig. 12 is a longitudinal sectional view as taken along the line 12—12 of Fig. 11 but with part of the mechanism omitted for clarity;

Fig. 13 is a transverse sectional view as taken along the line 13—13 of Fig. 12; and

Fig. 14 is a longitudinal sectional view as taken along the line 14—14 of Fig. 11.

Broadly speaking, the objects of the invention are achieved by providing in an electric plug a retractable or shiftable disabling element which can be projected from the plug casing at will adjacent the contact prongs of the plugs so as to prevent the prongs from being inserted in a socket or outlet in the usual manner. A key operated lock is also provided for locking the disabling element in its projected position so that once the plug is disabled and the key removed it cannot again be rendered operative except by use of the key to unlock the disabling mechanism.

Referring first to Figs. 1 to 8 of the drawings, an electric attachment plug 16 is shown having a two-part casing 17—18 of suitable insulating material such as plastic or the like. A pair of parallel contact prongs 19 of the usual type are provided in the upper casing section 17 and project from one end thereof for insertion in an electric socket or outlet. An electric cord, comprising in this instance two insulated wires or conductors 21, enters the casing 17—18 through an aperture 22 at the opposite end thereof and the wires 21 extend through arcuate or curved channels in the housing section 17 and are secured to the inner ends of the contact prongs 19 by means of a pair of screws 23.

The mechanism for selectively disabling the plug and rendering it inoperative when desired comprises a shiftable elongated rod or plunger 24 having a straight end portion 26 adapted to be projected from the end of the casing 17—18 and disposed between the contact prongs 19 and to one side thereof, as clearly seen in Fig. 6. The inner portion of the retractable plunger 24 has an offset portion 27 (Fig. 4), the interior of the casing section 18 being shaped accordingly, and a straight inner end portion 28 disposed in offset parallel relation with respect to the opposite end portion 26. The inner end portion 28 of the plunger 24 is operably connected to an actuating mechanism, as hereinafter described, for effecting projection and retraction of the plunger relative to the plug casing. For aligning the sections 17 and 18 of the plug casing and also for guiding the travel of the plunger 24 during its back and forth movement, the casing section 18 has an outlet 29 formed by a pair of integral spaced parallel wall portions 31 and 32 (Fig. 7), and the opposite casing section 17 has an integral depending rib 33 which is received between the wall portions 31 and 32 when the casing is completely assembled. Consequently, as best seen in Fig. 7, the projecting end 26 of the plunger 24 is completely guided on all sides thereof during axial shifting movement of the plunger so as to insure proper operation thereof. The wall portions 31 and 32 and the rib 33 also serve to isolate the inner ends of the current carrying prongs 19 from the plunger 24.

For actuating the disabling element or plunger 24, a rotary locking mechanism is utilized which has a suitable

operating connection for converting rotary movement of the lock to reciprocating rectilinear movement of the plunger 24. Thus, a lock 34 having a rotary cylindrical barrel portion 36 with a plurality of spring-pressed tumblers 37 of the usual construction is mounted in a bore 38 in the casing section 17 intermediate the conductors 21. A pair of grooves 39 and 39' in the casing receive the projecting ends of the tumblers 37 when the barrel 36 is rotated to either of its extreme positions for locking and unlocking the plunger 24. The lock 34 is retained in position in the casing section 17 by means of a collar 40 at the outer end of the barrel 36 which seats in a counterbore 41 and by an arcuate key or spline 42 which is received in a peripheral groove 43 in the barrel 36 and coacts with a shoulder 44 in the casing section 17. As hereinafter explained in connection with the operation of the device, the barrel 36 is adapted to be rotated about its axis by means of a key (not shown) which is inserted through an axial opening 46 (Fig. 1) and releases the tumblers 37 from the groove 39 in the usual manner to permit rotation of barrel 36 by twisting of the key.

The casing section 18 is formed with an integral upright boss or projection 47 having a rotatable pin 48 mounted therein coaxially with the lock barrel 36. The inner end of the pin 48 projects beyond the boss 47 and a pivot lever 49 is secured intermediate its ends to the projecting inner end of the pivot pin 48 for rotation therewith. One end portion of the lever 49 is connected to the lock barrel 36 by means of a connecting pin 51 extending rigidly from the inner axial end of the rotatable barrel 26 and in eccentric relation with respect to the axis of rotation thereof and fitting loosely and detachably in an aperture in the lever 49 so that rotary movement of the lock barrel 36 will cause pivotal movement of the lever 49 about the axis of the pin 48. The opposite end of the lever 49 is connected to a flattened end 52 on the plunger 24 by means of a connecting pin or screw 53 which extends loosely through a transverse slot 54 in the flattened end portion 52 and is threadably secured in the end of the lever 49.

When it is desired to render the attachment plug inoperative to prevent unauthorized use of the device or appliance to which the plug is connected, the user merely inserts the proper key in the opening 46 of the lock and rotates the barrel 36 thereof so that the pivot lever 49 is rocked to the position shown in full lines in Figs. 3 and 4 whereby to project the end portion 26 of the plunger 24 into disabling position with respect to the contact prongs 19 of the plug. When the plunger 24 is thus shifted to fully projected position, the user then withdraws the key from the lock and the tumblers 37 are automatically projected into the groove 39 whereupon the barrel 36 is held against rotation and the plunger 24 is thereby locked in its projected position and cannot be retracted except by operation of the lock 34 with the proper key. Obviously, when the plunger 24 is in its fully projected and locked position relative to the contact prongs 19, it will be impossible for a child or other unauthorized person to insert the attachment plug in the usual electric socket or outlet because the projecting end 26 of the plunger will prevent insertion of the prongs 19 to the extent necessary to make electrical contact.

In order to use the attachment plug in the normal manner, the lock 34 is unlocked by means of the key so as to rotate the barrel 36 and the lever 49 in the opposite direction to the dotted line position of Fig. 4 wherein the plunger 24 is shown in fully retracted position thereby rendering the plug operable in the normal manner. Of course, when the key is withdrawn, the tumblers 37 are automatically projected into the groove 39' for holding the lock barrel in this position.

As is usual in an electric attachment plug, the casing sections 17 and 18 are detachably secured together so as to permit dismantling of the plug when necessary for

installation. Thus, an elongated screw 55 extends through an opening in the casing section 18, the head portion of the screw being recessed therein, and is threadably secured in an internal wall portion 56 of the opposite casing section 17 for detachably connecting the same. An important feature of my invention is the provision of guard means for preventing access to the screw 55 when the plug is in locked disabled condition thereby minimizing the opportunity for tampering with or dismantling the plug when it is in locked position. In the present instance the guard means is in the form of a disk 57 which is mounted in a circular recess 58 at the outer side of the casing section 18 and is secured rigidly to the outwardly projecting end of the pivot pin 48 for rotation therewith. The disk 57 has a peripheral notch or opening 59 which is large enough to overlie and permit access to the head portion of the screw 55 when the notch 59 is in register therewith. As will be evident from Figs. 2 and 3 in particular, the notched disk 57 is so oriented with respect to the lever 49 that when the mechanism is in fully locked and disabled position, the notch 59 is remote from the head of the screw 55 and a solid portion of the guard disk 57 thus overlies and shields the screw so that it is impossible to remove the screw for dismantling the plug without completely breaking the locking mechanism. In this connection, it will be understood that the guard disk 57, the pin 48, and the pivot lever 49 rotate as a unit and consequently when the mechanism is in locked position it is impossible to rotate the guard disk 57 because of the rigid connections between it and the locked barrel 26. On the other hand, when the mechanism is unlocked and the plunger 24 is retracted as shown in dotted lines in Fig. 2 and 4, the disk 57 is automatically rotated to a position wherein the notch 59 registers with and overlies the head of the screw 55 so that the plug can readily be taken apart in the usual manner.

Referring now to Figs. 9 to 14 of the drawings a somewhat different disabling mechanism involving the same general principles will now be described. In the first described embodiment of the invention, the casing construction is substantially symmetrical and the disabling end 26 of the projectable plunger 24 is movable along the center line of the plug but embodies an offset relation at its opposite or inner end to accommodate the operating connection with the rotary lock barrel 36. In the modified plug designated at 61 in Figs. 9 to 14 a non-symmetrical casing arrangement is utilized but the retractable plunger has a straight configuration.

As before, the plug 61 has a two-part casing comprising separate sections 62 and 63 which are detachably secured together by means of a screw 64. The casing section 62 has a transverse tubular portion 65 in which is mounted a lock 66 of the same type hereinbefore described having a rotary barrel 67. The casing section 62 also has mounted thereon the usual pair of projecting contact prongs 68 extending from one end of the casing, and an electric cord consisting of two insulated conductors 69 enters the opposite end of the casing through an opening 71. The ends of the conductors 69 are fastened to the contact prongs 68 by suitable screws 72.

In generally similar fashion to the first described embodiment, a pivot pin 73 coaxial with the barrel 67 is rotatably mounted in a boss 74 extending integrally and inwardly from the outer wall of the casing section 63, and a pivot lever 76 is secured intermediate its ends to the inner end of the pivot pin 73 for rotation with the latter. An eccentrically mounted connecting lug 77 projects from the inner axial end of the lock barrel 67 and detachably engages one end of the pivot lever 76 for actuating the latter in response to operation of the lock.

The disabling means in this modification of the invention comprises a straight elongated shiftable pin or plunger 78 which is mounted for axial movement in the casing section 63 in parallel but non-symmetrical relation with

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respect to the contact prongs 68. The inner end of the plunger 78 has an enlarged rounded head portion 79 and a coil spring 81 surrounds the plunger 78 and coacts with the head 79 and the end wall of the casing section 63 for normally urging the disabling pin or plunger 78 into retracted position as shown in dotted lines in Fig. 12. The opposite end of the pivot lever 76, i. e. opposite to the end having the eccentric connection with the rotary lock barrel, engages the head portion 79 of the plunger 78 for depressing the same against the action of the spring 81. Thus, referring particularly to Fig. 12, when the plug is to be locked in disabled position, rotation of the lock barrel 67 by a key causes the pivot lever 76 to be locked in the position shown in full lines in Fig. 12 wherein the spring 81 is compressed by the action of the end of the pivot lever 76 against the plunger head 79 and the plunger 78 is thereby held in fully projected plug-disabling position so as to prevent insertion of the contact prongs 68 in a socket in the usual manner. During unlocking, rotation of the lock barrel 67 in the reverse direction shifts the pivot lever 76 to the dotted line position shown in Fig. 12 whereupon the compressed spring 81 automatically expands and restores the plunger 78 to its normal inwardly retracted position as also shown in dotted lines in Fig. 12.

As a guard means for preventing tampering with and dismantling of the plug during locked position thereof, an elongated guard element or finger 82 is rigidly secured at one end thereof to the projecting end of the pivot pin 73 exteriorly of the casing section 63 and is of sufficient length to overlie the head of the screw 64 for shielding the same. The finger 82 being rotatable as a unit with the pivot pin 73 and the pivot lever 76, it will be evident from Fig. 10 that when the plunger 78 is in its locked projected position for disabling the plug, the finger 82 is disposed in overlying protective relation with respect to the head of the screw 64. On the other hand, when the plug is unlocked for normal operation, the guard finger 82 is automatically rotated to the dotted line position shown in Fig. 10 thereby rendering the screw 64 fully accessible.

From the foregoing, it will be seen that my invention provides a very effective means for disabling an electric plug and rendering the same inoperative at will. In operation, the device is exceedingly simple to use and does not entail any separate covers or the like. The fact that the locking mechanism is operable by an ordinary key is a distinct advantage and makes the device highly attractive to parents and others who desire to prevent unauthorized use of electrical devices and appliances. Moreover, the provision of guard means to deter tampering with the locked mechanism is an additional important feature of the invention. Also the disabling means for the plug is completely mechanical in its operation and does not involve any disruption or connection with the electrical contact prongs and wiring connections of the plug. Thus, the device can be used with complete safety and readily complies with all safety regulations.

Although the invention has been described in connection with certain specific structural embodiments of the invention, it is to be understood that various modifications and alternative structures may be resorted to without departing from the scope of the invention as defined in the appended claims.

I claim:

1. An electric plug comprising a casing, a plurality of contact prongs extending from said casing for insertion in a socket, shiftable means movably associated with said casing adjacent said prongs for projection and relative to the casing for rendering the plug inoperative and operative, respectively, and means including a key actuated lock for moving said shiftable means between operative and inoperative positions.

2. An electric plug comprising a casing, a plurality of contact prongs extending from said casing, key actuated lock means having a rotatable portion mounted in said casing, a disabling member associated with said cas-

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ing adjacent said prongs for shifting movement between projected and retracted positions for rendering the plug inoperative and operative, respectively, and means operatively interconnecting said rotatable portion of said lock means and said disabling member for effecting said shifting movement in response to manipulation of the lock means.

3. An electric plug comprising a casing, a plurality of contact prongs extending from said casing for insertion in a socket, an elongated reciprocable disabling element movably mounted adjacent the prongs for longitudinal shifting movement between extended and retracted positions relative to the casing for rendering the plug inoperative and operative, respectively, key actuated lock means rotatably mounted in said casing, and means operatively interconnecting said lock means and said disabling element for converting rotary movement of the lock means to longitudinal shifting movement of the disabling element, said disabling element being projected into and locked in its extended position for disabling the plug in response to manipulation of the lock means.

4. An electric plug comprising a casing, a plurality of contact prongs extending from said casing, lock means having a key actuated barrel portion rotatably mounted in said casing, an elongated disabling member mounted in said casing adjacent said prongs for longitudinal shifting movement between projected and retracted positions for rendering the plug inoperative and operative, respectively, a pivot lever mounted within the casing for pivotal movement coaxially with said barrel portion, means providing an eccentric operating connection between said barrel portion and one end of said lever, and means providing operating engagement between the other end of said lever and said disabling member whereby to effect shifting of the latter into locked projected position in response to rotary movement of said barrel portion by a key.

5. The device of claim 4 further characterized in that said casing comprises a pair of detachable sections with said barrel portion being mounted in one casing section and said lever being mounted on the other casing section in coaxial relation with said barrel portion, and said eccentric operating connection is detachable to accommodate detachment of said casing sections.

6. The device of claim 4 further characterized in that said last-named means comprises a transverse slot in the end of said disabling member and a connecting pin extending through said slot into said other end of said lever.

7. The device of claim 4 further characterized in that resilient means is provided for normally urging said disabling member into retracted position, and said other end of said lever is engageable with the inner end of said member for projecting the latter against the action of said resilient means.

8. An electric plug comprising a pair of mating casing sections, a pair of spaced contact prongs mounted in one of said casing sections and extending therefrom for insertion in a socket, key actuated rotary lock means mounted in said one casing section, and an elongated disabling member shiftable mounted in said other casing section, said member having a disabling end portion disposed symmetrically relative to said prongs and a parallel offset portion at its other end, and means providing an operating connection between said lock means and said offset portion whereby to effect projection and retraction of said disabling end portion relative to the casing in response to rotary manipulation of the lock means.

9. The device of claim 8 further characterized in that said casing sections have cooperating portions providing a guide channel for said disabling member and isolating the latter from said contact prongs.

10. An electric plug comprising a pair of mating casing sections, a pair of spaced contact prongs mounted in one of said casing sections and extending therefrom for in-

sertion in a socket, key actuated rotary lock means mounted in said one casing section, an elongated straight plunger member having an enlarged head portion and mounted for longitudinal shifting movement in the other of said casing sections and disposed in non-symmetrical relation at one side of said contact prongs, spring means coacting between said other casing section and said head portion for normally urging said plunger into retracted position within the casing, and means providing an operating connection between said lock means and said head portion for projecting said plunger from the casing against the action of said spring means.

11. An electric plug comprising a casing having a pair of mating sections, a fastener for detachably securing said sections together, a plurality of contact prongs extending from the casing for insertion in a socket, shiftable disabling means associated with said casing adjacent said prongs and adapted to be projected relative to the casing and locked in projected position to prevent insertion of the prongs in the socket and also adapted to be retracted relative to the casing for normal operation of the plug, and guard means movable in response to projection of said disabling means for shielding said fastener whereby to prevent access to the fastener when the plug is disabled.

12. An electric plug comprising a casing having a pair of mating sections, a fastener for detachably securing said sections together, a plurality of contact prongs extending from the casing for insertion in a socket, shiftable disabling means mounted in said casing adjacent said prongs and adapted to be projected from the casing to prevent insertion of the prongs in the socket and also adapted to be retracted within the casing for normal operation of the plug, manually operable lock means for locking said disabling means in its projected position, and a guard member movably mounted at the exterior of said casing and having an operative connection with said lock means for moving the guard member into shielding relation overlying said fastener in response to manipulation of the lock means to project said disabling means whereby to prevent access to the fastener when the plug is disabled.

13. An electric plug comprising a casing having a pair of mating sections, a fastener for detachably securing said sections together, a plurality of contact prongs extending from the casing for insertion in a socket, shiftable disabling means mounted in said casing adjacent said prongs and adapted to be projected from the casing to prevent insertion of the prongs in the socket and also adapted to be retracted within the casing for normal operation of the plug, rotary lock means mounted in said casing and operatively connected to said disabling means for projecting the latter and locking the same in projected position upon rotary manipulation of the lock means, and a guard member rotatably mounted at the exterior of the casing and operatively connected to said lock means for moving the guard member into shielding relation overlying said fastener in response to projection of said disabling means by rotary manipulation of the lock means whereby to prevent access to the fastener when the plug is disabled.

14. An electric plug comprising a casing having a pair

of mating sections, a fastener for detachably securing said sections together, a plurality of contact prongs extending from the casing for insertion in a socket, shiftable disabling means mounted in said casing adjacent said prongs and adapted to be projected from the casing to prevent insertion of the prongs in the socket and also adapted to be retracted within the casing for normal operation of the plug, lock means including a rotatable portion mounted in said casing, a pivot member journaled in said casing coaxially with said rotatable lock portion, actuating means carried on said pivot member and providing an operating connection between said rotatable lock portion and said disabling means for projecting the latter in response to rotary manipulation of the lock, and a guard member also carried on said pivot member and located exteriorly of said casing, said guard member being rotatable into shielding relation overlying said fastener in response to projection of said disabling means by manipulation of the lock means whereby to prevent access to the fastener when the plug is disabled.

15. The device of claim 14 further characterized in that said guard member comprises a rotatable disk having a peripheral notch registrable with the fastener when the disabling means is in retracted position so as to permit access to the fastener, said notch being out of register with said fastener when the disabling means is projected from the casing.

16. An electric plug comprising a casing having a pair of mating sections, a fastener for detachably securing said sections together, a pair of contact prongs extending from the casing for insertion in a socket, movable means associated with said casing and adapted to be locked in plug-disabling position for disabling the plug by preventing circuit-completing insertion of at least one of said prongs in the socket, and guard means movable in response to operation of said movable means for shielding said fastener whereby to prevent access to the fastener when the plug is disabled.

17. An electric plug comprising a casing having a pair of mating sections, a fastener for detachably securing said sections together, a pair of contact prongs extending from the casing for insertion in a socket, movable means mounted in said casing for disabling the plug by preventing circuit-completing insertion thereof in the socket, manually operable lock means for locking said movable means in plug-disabling position, and a guard member movably mounted at the exterior of said casing and having an operative connection with said lock means for moving the guard member into shielding relation overlying said fastener whereby to prevent access to the fastener when the plug is disabled.

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