

Nov. 23, 1937.

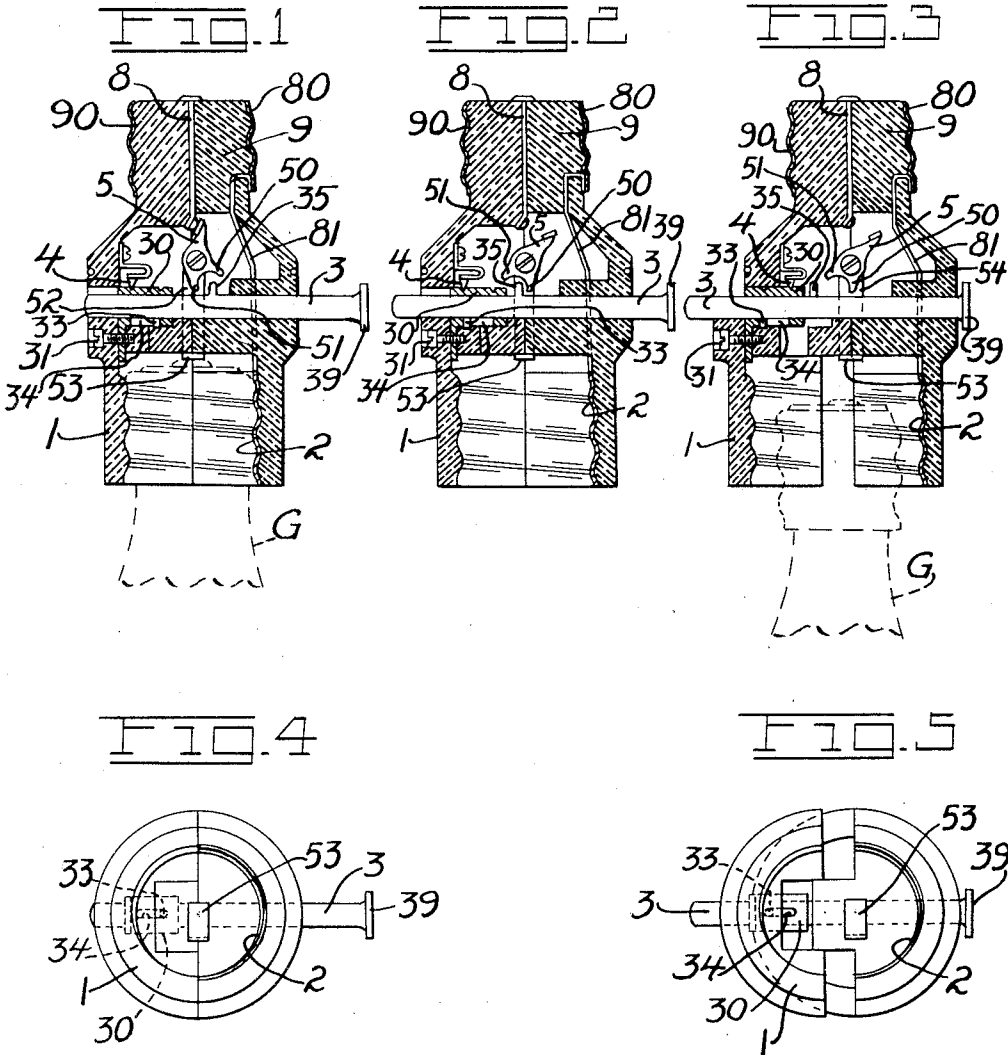
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2,099,944

ELECTRICAL CONNECTER

Original Filed March 25, 1933

3 Sheets-Sheet 1



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FIG. 10

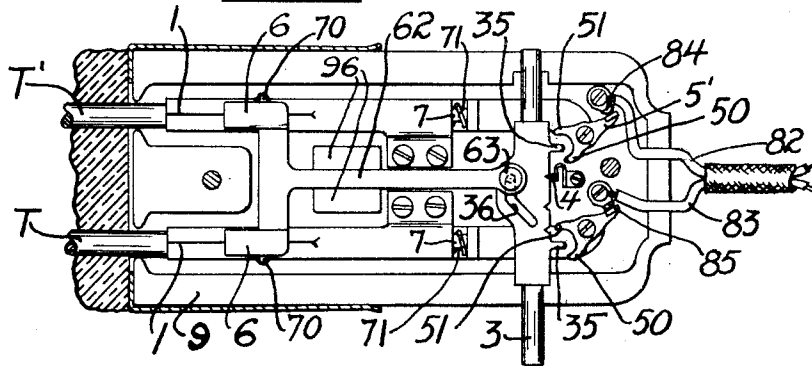


FIG. 11

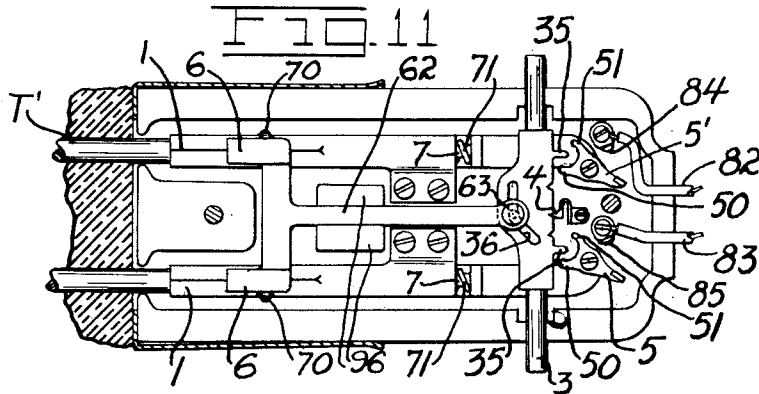
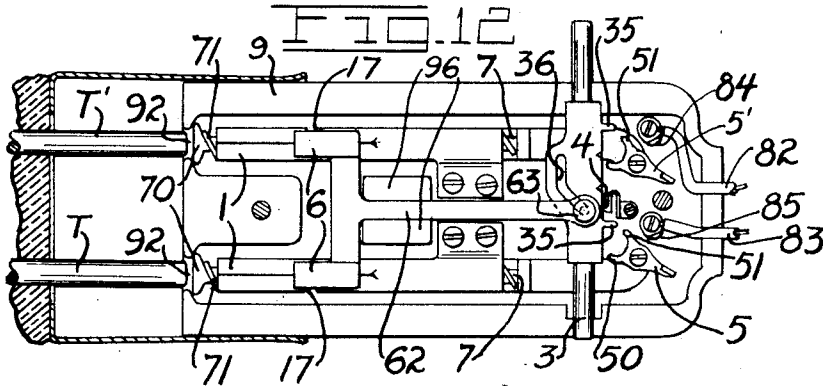


FIG. 12



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ELECTRICAL CONNECTER

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19 Claims. (Cl. 200—50)

My invention relates, in general terms, to a means whereby a device operated by or using electric current can be connected to a source of current.

5 According to the present invention, means are provided for engaging a terminal or terminals of the current-consuming device by means incorporated in the connecter, and for releasing the same at will for ready disconnection, and the invention is concerned in part with the means for accomplishing such movement of the parts of the connecter. Since with the consuming device disconnected there is the ever-present possibility of accidentally touching a charged member of the connecter, thus causing a shock to pass through the body of the person touching it, or overloading the circuit, the invention is further concerned with a means operable upon release of the terminal of the consuming device to automatically cut off the supply of current to the terminal-engaging means, so that there can be no possibility of overloading or of accidentally receiving a shock therefrom. Such means can be readily incorporated in or associated with a switch, whereby the supply of current to the terminal or terminals of the consuming device can be readily controlled and turned on or off as the user may desire without effecting disconnection or disengagement of the consuming device from the connecter, yet must be turned off to effect disengagement.

In this specification the term "consuming device" is intended to comprise any member which utilizes electric current, such as a lamp, an electric iron, a motor, and the like. The terminal, to which reference has been made, may constitute the screw base of a lamp, a plug of any sort, or a device such as the two prongs of an electric iron, toaster, or the like. The connecter may assume various forms, such as a socket for reception of the ordinary screw base of a lamp bulb, or the jack into which the prong terminals of an iron, toaster, or the like appliance are inserted.

45 In general, then, it is an object of my invention to provide a connecter with which a terminal may be easily engaged and disengaged.

It is a further object to provide such a connecter having means operable upon or prior to disconnection of the terminal to cut off the supply of current to the members with which the terminal is immediately engaged.

It is a further object to devise such a connecter which is readily disconnected from the terminal, and which has incorporated therein

switch means to control the normal supply of current to the terminal while connected, and further, to provide means associated with the switch means to effect disconnection of the supply of current to the members which immediately engage the terminal, upon release thereof.

With these and other objects in mind, as will be ascertained as this specification progresses, my invention comprises the novel parts, and the novel arrangements and combinations thereof, as shown in the accompanying drawings, as described in this specification, and as will be more particularly defined by the claims which terminate the same.

In the accompanying drawings I have shown 15 the principles of my invention incorporated in two forms of connecters, to illustrate typical ways in which the essence of the invention may be embodied, all without restriction to any specific form of connecter other than as defined by the claims.

Figures 1, 2 and 3 are sectional views through a lamp socket embodying my invention, showing the same in three different positions.

Figures 4 and 5 are bottom plan views of the same, corresponding respectively to the positions of Figures 1 and 3.

Figures 6, 7 and 8 are longitudinal sectional views through a connecter formed as a jack for connection to household electrical appliances embodying my invention, and illustrating three different positions of the parts, and Figure 9 is a transverse section through the same on the line 9—9 of Figure 6.

Figures 10, 11 and 12 are plan views of the latter form of the invention, with the upper half of the connecter casing removed, and illustrating parts in different positions.

Referring to the form of Figures 1 to 5 inclusive, which shows my invention embodied in a simple form, a base 9 is provided with means for connection to a source of current, being, for example, screw threaded, as indicated at 90, to be screwed into the standard screw socket. The connection might be any which is found desirable, and the base 9 might be provided merely with connections to which may be secured the ends of lead-in wires, as in the ordinary lamp socket, and as shown in the other figures. However, in the form shown in Figures 1 to 5, a lead 8 is intended for connection to one side of the current main, and a shell 20 is similarly to be connected to the other side of the main, and from the shell 20 a lead 31 conducts current to an internal metallic thread 2 with which may be engaged the

shell of the screw base of a lamp globe, the globe being indicated at G. Thus there is direct connection from the current source to the shell 2, in the form illustrated in these figures.

5 The shell 2 constitutes one part, preferably a half, of a screw socket in this instance, or more generally speaking, constitutes one jaw of a pair of separable jaw members. The other jaw 1 is not, in this form, an electrical conductor, and is preferably made of insulating material. This jaw 1
10 is mounted in the base 9 for movement towards and from the complementary jaw 2, being mounted, in the form shown, for transverse sliding movement.

15 The support for the movable jaw 1 may be formed by means of a pin 3 which is guided in the base 9 for transverse sliding movement, and which has secured to it a member 30 which in turn is secured by a screw 31 to the jaw 1. The
20 member 30 is conveniently formed with two notches corresponding to different positions of the pin 3, and a spring catch 4 is engageable in these notches to maintain the pin 3 in any one of the positions which may be selected. By a lost
25 motion arrangement involving the pin 33 and a slot 34 in the member 30, the pin 3 may assume three distinct positions.

The pin 3 is also provided with a finger 35 which is engageable with each of two horns 50 and 51
30 of a switch arm 5. This switch arm is supported from the base 9, for example, in a metal bracket 52, the lower part of which, at 53, is positioned to contact with the center contact point of the lamp base.

35 In the position shown in Figure 1 the switch arm 5 is in contact with the lower end of the lead 8, and the jaws 1 and 2 are closed. The pin 33 is at the right hand end of the slot 34. Therefore if a lamp base is in place between the jaws,
40 current will be passed to the lamp base by the leads to the metallic member 2, previously referred to, and through the lead 8, the switch arm 5, the bracket 52, and the point 53. If it is desired to turn off the supply of current to the lamp
45 while still retaining the lamp in the socket, the right-hand end of the pin 3 is pressed to move it transversely of the base 9, to the left, to move the pin 33 to the left hand end of the slot 34 in the member 30, and to engage the finger 35 with
50 the horn 51 of the switch arm 5, and thus to throw the switch arm to the "off" position shown in Figure 2. The switch arm 5 would normally have means, as is customary in switches, to retain it in the "on" and the "off" positions, such means not
55 being illustrated since they are common in the art.

Now if it is desired to release the terminal member, that is, the base of the lamp bulb, from the socket, it is only necessary to press the pin 3
60 farther to the left, whereupon the pin 33, which, it will be remembered, has moved to the left-hand end of the slot 34, presses the movable jaw 1 outward away from the fixed jaw 2, separates the jaws, and causes the terminal of the lamp globe to be released. The spring catch 4 is now engaged
65 with the right hand notch in the member 30. Figure 3 shows the parts in this position.

It will be observed that it is not possible, except by unscrewing the lamp bulb, to release the same
70 from the jaws 1 and 2, except after the switch arm 5 has been moved to the "off" position. If the base of the lamp is modified from the form shown, so that it is connected to the jaws by other than screw means, that is to say, by such means as can
75 only be disconnected by separating the jaws 1 and

2, it will be evident that it will not be possible to release the lamp base without having first opened the switch arm 5 and cutting off the supply of current to the jaws. It will also be evident that the switch arm 5 might be duplicated, and the current cut off within the base from the metallic member 2 as well as from the contact 53, thus to break within the base the supply of current to any part which might be contacted by the hand.

In the remaining figures the principle illustrated above has been incorporated in a device wherein the switch arms are duplicated, and the current supply is completely cut off from the jaws. The connector illustrated in these figures is such a jack as is commonly employed upon the end of an extension cord for connection to two projecting prongs of an electric appliance, for instance, an electric iron, and there is incorporated in this device a means to prevent reengagement or reengagement of the terminals T and T' should the switches be turned on after disengagement of the terminals from the jaws. This will prevent any possibility of a child, for instance, inserting a nail or pin into the jaws and thereby receiving a shock, due to the current having been connected again to the jaws while the terminals T and T' are disconnected.

In this form the base is formed as a casing consisting of two members 9 and 91, as is customary, into which run the two leads 82 and 83. These terminate in contact points 84 and 85, respectively, within the cavity of the casing, and switch arms 5 and 5' are mounted as before to contact with the respective contact points, or to be moved from engagement therewith. Since the jaws and all connections are identical on each side of the line in this device, it will be necessary to describe one only, that connected to the switch arm 5.

The pin 3, in the central portion within the base, is formed with a finger 35 for engagement with the horns 50 and 51 of the switch arm 5. It is also provided with three notches within which is engageable the spring finger 4. The jaws 1 and 2 may in this instance both be metallic members and electrically connected to the switch arm 5, the jaw 2 being fixed to the casing member 9, and the jaw 1 being mounted thereon for movement toward and from the jaw 2. Movement of the jaw 1 is controlled by a wedge member 6 movable lengthwise of the jaw, and cooperating with an inclined surface 60 upon the upper casing member 91 to move the jaw 1 towards the jaw 2 as the wedge member 6 is moved to the left. To control movement of the wedge member 6 it is supported upon an arm 62 which carries a pin 63 receivable in a cam slot 36 in the pin 3. The arm 62 is suitably guided in spaced guides 96 on the casing member 9 so that it cannot move otherwise than lengthwise of the casing.

The slot 36 has a transversely extending section and an angularly inclined section. So long as the pin 63 is in the transverse section, as shown in Figures 10 and 11, its movement in one direction or the other will only serve to open or to close the switch arms 5 and 5', bringing them into contact with their respective contact points 85 and 84. While the pin 63 is in this transverse portion of the cam slot 36, no longitudinal movement of the wedge members 6 is accomplished, but when the pin 3 is pressed into the position shown in Figure 12, bringing the pin 63 into the angularly inclined portion of the slot 36, the wedge members 6 are moved to the right, and are withdrawn from the complementary incline 60, thereby permitting the jaw 1 to swing open.

When the jaw is open the terminals T and T' can be withdrawn or inserted freely, but when the wedge member 6 has been moved to the left from the position of Figures 7 and 12 into the position shown in Figures 6, 10 and 11, the jaws are closed, and if a terminal is in place between the jaws, the terminal is clamped and held in connection with the terminals. However, it will be noted that here, as in the first form, the terminals can not be disconnected until the switch arms 5 and 5' have been thrown to the "off" position.

To prevent engagement of the terminal with the jaws, if the switch has been thrown to the "on" position after disengagement of the jaws, and to prevent insertion of a pin or nail, and thereby obtaining contact with the jaws when the switch is in the "on" position, I provide a member 7 which may be termed a "closure member", and which in one sense functions as an ejector, being movable longitudinally between the jaws 1 and 2 to eject a terminal which is between the jaws. Preferably this is in the form of a pin having a head 70, and movement of the member 7 is controlled by a spring 71.

When the jaws are open, as in Figures 7 and 12, the spring 71 throws the member 7 to the left, and it closes the aperture 92 in the casing, through which the terminal T may enter. However, as long as the jaws remain open the terminal may be inserted, pushing back the head 70 in opposition to the spring 71 to place the terminal again between the jaws, but it will be remembered that the jaws are only open when the switch is in the "off" position. If with the closure member 70 in front of the aperture 92 the switch is thrown to the "on" position, the jaws close behind the head 70, as in Figure 8, and the terminal T may not now be inserted. The member 70 would be made of insulating material; consequently no contact can be had with any live part of the device, either by the terminal T or by a nail or pin mischievously inserted through the aperture 92. Upon again moving the switch to the "off" position, the jaw 1 is permitted to swing open, and now the member 7 may be pressed inward to permit insertion of the terminal T, whereupon, the head 70 being received in a recess 17 provided in the jaw 1 for the purpose, the jaw 1 may again be closed upon the terminal, completing the connection thereto.

It is preferable that the two ends of the pin 3 be so formed that they may be readily distinguished by feeling, to which end a head 35 has been formed upon one end only of this pin.

What I claim as my invention is:

1. In a device for connecting an electric terminal to a source of current, means to engage and retain the terminal, switch means controlling the supply of current to the terminal when thus engaged, and switch-operating means operable only after the switch means is in the "off" position to move the terminal retaining means positively into disengaged position, thereby to free the terminal.

2. In a device for connecting an electric terminal to a source of current, means movable into respective positions to engage and disengage the terminal, means controlling the supply of current to the terminal, and operating means controlling both the aforesaid means to connect and to cut off the current supply while the terminal engaging means is in operative position, and further operative to move the terminal-engaging means into inoperative position after the current

supply means has been moved to the "off" position.

3. In a device for connecting an electric terminal to a source of current, means movable into respective positions to engage and disengage the terminal, means controlling the supply of current to the terminal, and operating means controlling both the aforesaid means to connect and to cut off the current supply while the terminal-engaging means is in operative position, and further operative to move the terminal-engaging means into inoperative position after the current supply means has been moved to the "off" position, and to effect positive disconnection of the terminal.

4. In a device for connecting an electric terminal to a source of current, means movable into respective positions to engage and disengage the terminal, switch means controlling the supply of current to the terminal, operating means controlling both the aforesaid means to connect and to cut off the current supply while the terminal engaging means is in operative position, and further operative to move the terminal from engaged position after the switch means has been moved to the "off" position, and means to prevent engagement of the terminal with the first means while the switch means is in the "on" position.

5. In a device for connecting an electric terminal to a source of current, means movable into positions to engage and disengage the terminal, respectively, switch means movable into an "on" and an "off" position to control the supply of current to the terminal, and operating means movable into three positions, upon movement into the first position moving the switch means into "on" position, upon movement from such position to a second position moving the switch means into "off" position, and only upon further movement beyond the "off" position into its third position moving the first means into disengaged position.

6. In a device for connecting an electric terminal to a source of current, means movable into positions to engage and disengage the terminal, respectively, switch means movable into an "on" and an "off" position to control the supply of current to the terminal, operating means movable into three positions, upon movement into the first position moving the switch means into "on" position, upon movement from such position to a second position moving the switch means into "off" position, and upon further movement beyond the "off" position into its third position moving the first means into disengaged position, and closure means automatically movable upon movement of the operating means towards the third position into a position to block engagement of the terminal with the first means, said operating means and said closure means being interengageable to retain the latter in blocking position upon movement of the operating means from its third position.

7. In a device for connecting an electric terminal to a source of current, means movable into positions to engage and disengage the terminal, respectively, switch means movable into an "on" and an "off" position to control the supply of current to the terminal, operating means movable into three positions, upon movement into the first position moving the switch means into "on" position, upon movement from such position to a second position moving the switch means into "off" position, and upon further movement beyond the "off" position into its third position moving the first means into disengaged position,

and ejector means associated with the first means and automatically operable upon movement of the operating means towards the third position to effect disengagement of the terminal from the

5 first means.
 8. In a device for connecting an electric terminal to a source of current, means movable into positions to engage and disengage the terminal, respectively, switch means movable into an "on" and an "off" position to control the supply of current to the terminal, operating means movable into three positions, upon movement into the first position moving the switch means into "on" position, upon movement from such position to a second position moving the switch means into "off" position, and upon further movement beyond the "off" position into its third position moving the first means into disengaged position, ejector means associated with the first means and automatically operable upon movement of the operating means towards the third position to effect disengagement of the terminal from the first means, means to maintain the ejector means in the latter position, yieldable under the influence of pressure of the terminal towards the engaging means, and means to lock the ejector means in ejected position upon movement of the operating means into its first or switch-on position, thereby to prevent engagement of the terminal with the engaging means.

9. In a device for connecting an electric terminal to a source of current, jaws separable to release such terminal, and movable one towards the other to engage the same, a switch movable into an "on" and an "off" position to control the supply of current to said jaws, operating means movable into three positions, upon movement into the first position moving the switch into "on" position, upon movement from such position to the second position moving the switch into "off" position, and jaw-closing means associated with said operating means, and operable thereby upon movement from the second position to the third position to open the jaws.

10. In a device for connecting an electric terminal to a source of current, jaws separable to release such terminal, and movable one towards the other to engage the same, a switch movable into an "on" and an "off" position to control the supply of current to said jaws, operating means movable into three positions, upon movement into the first position moving the switch into "on" position, upon movement from such position to the second position moving the switch into "off" position, jaw-closing means associated with said operating means, and operable thereby upon movement from the second position to the third position to open the jaws, and a member spring-pressed outwardly through and beyond the jaws into position to prevent entrance of the terminal between the jaws, but yieldable when the jaws are open to permit entrance of the terminal, the jaws when closed by movement of the operating member into its first position engaging said member to retain it in its outward position, thereby to prevent engagement of the terminal with the jaws while the switch is in "on" position.

11. A device as in claim 9, the jaw-closing means comprising a wedge movable longitudinally of a jaw and a cooperating member to press the wedge towards the jaw to close it, and cam means connected to said wedge and associated with the operating means to move the wedge into jaw-closing position only as the operating means moves from its second to its third position.

12. A device as in claim 9, wherein the jaw-closing means comprises a pin projecting from the operating means, and the movable jaw has a slot receiving said pin, and permitting free movement thereof as the operating means moves between its first and second positions, the pin being engageable with an end of the slot to move the jaw away from the opposite jaw as the operating means moves from its second to its third position.

13. A device as in claim 10, the spring-pressed member being formed as a headed pin, the head being of a size to pass between the jaws when open, but to engage the end of the jaws when closed, thereby to deny entrance of the terminal between the jaws.

14. An electrical connector to connect an electric terminal to a source of current, comprising a base and a switch point connected to the source, means associated with the base for engagement with the terminal, electrical connections between said engaging means and said switch point, including a switch arm, switch-operating means operatively engageable with said switch arm to move the same between "off" and "on" positions, without disengagement of the engaging means and also connected to the engaging means for operation thereof to disengage the terminal, by movement beyond the "off" position of the switch arm.

15. In a device for connecting an electric terminal to a source of current, means movable to engage and to disengage said terminal, and means to supply current to said terminal when so engaged, said latter means including a gap which is opened by movement of the first means in the direction to disengage the terminal, and said engaging means being disengageable only by further movement of said latter means beyond the gap-opening position.

16. In a device for connecting an electric terminal to a source of current, switch means movable between an "on" position and an "off" position, locking means operating to lock a terminal against disconnecting movement prior to initiation of movement of said switch means from "off" position toward "on" position, and releasing means inoperative to move said locking means to unlocked position prior to termination of movement of said switch means from "on" position to "off" position, said locking means normally operating after termination of movement of the switch means from "on" position to "off" position to lock the terminal against disconnecting movement, but said releasing means being operable at the option of an operator to unlock said locking means, and thus to release the terminal, only after completion of the movement of the switch means from "on" position to "off" position.

17. A socket device for receiving an electric terminal shaft, comprising switch means movable between an "on" and an "off" position, socket means normally retaining a terminal shaft, said switch means preventing releasing movement of said socket means while in the "on" position, and shaft-ejector means restrained from movement while said switch means are in the "on" position, and movable to eject the terminal only after said switch means have reached the "off" position.

18. In a device for connecting an electric terminal to a source of current, terminal engaging means to physically engage and lock the terminal against disconnecting movement when in terminal engaged position, switch means interposed be-

tween said terminal engaging means and the source to electrically connect the two, and switch-operating means cooperating with said terminal engaging means to maintain the latter in locked engagement with the terminal while the switch means is in the "on" and in the "off" positions, and said switch-operating means being optionally operable only after moving the switch means to "off" position to permit movement of said terminal engaging means away from the terminal engaged position to enable the terminal to be disconnected.

19. In a device for connecting an electric terminal to a source of current, terminal engaging means to physically engage and lock the terminal

against disconnecting movement when in terminal engaged position, switch means interposed between said terminal engaging means and the source to electrically connect the two, and switch-operating means cooperating with said terminal engaging means to maintain the latter in locked engagement with the terminal while the switch means is in the "on" and in the "off" positions, and said switch-operating means being further movable, at the operator's option, only after moving the switch means to "off" position for moving said terminal engaging means to release and positively disconnect the terminal.

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