Oct. 16, 1923. 1,470,824

E. H. FREEMAN

ELECTRICAL CONNECTOR DEVICE

Filed July 21, 1919

Fig. 1.

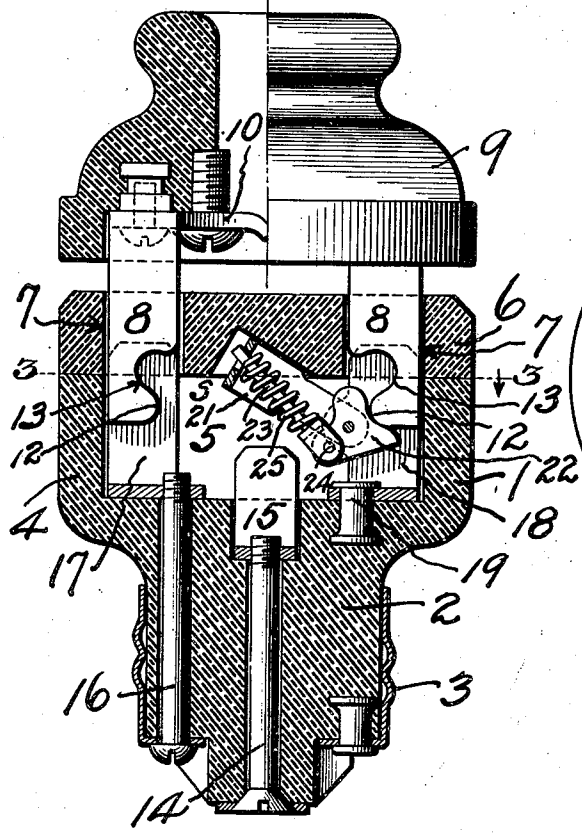


Fig. 3.

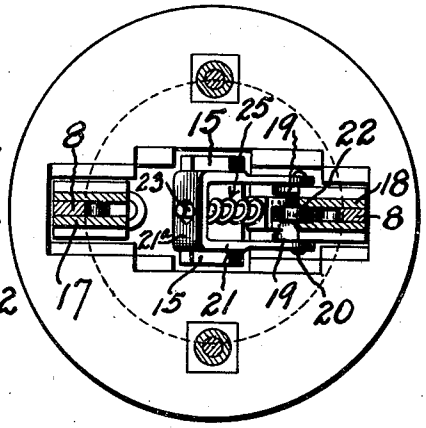


Fig. 2.

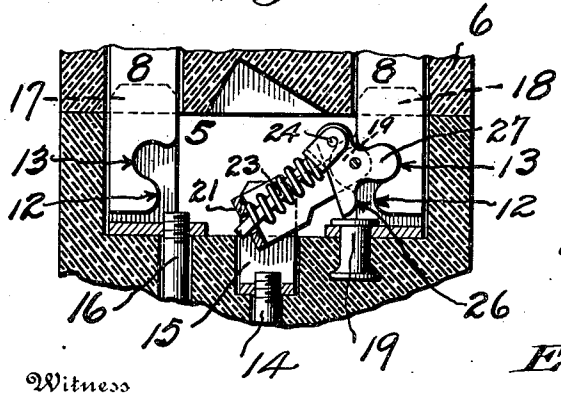
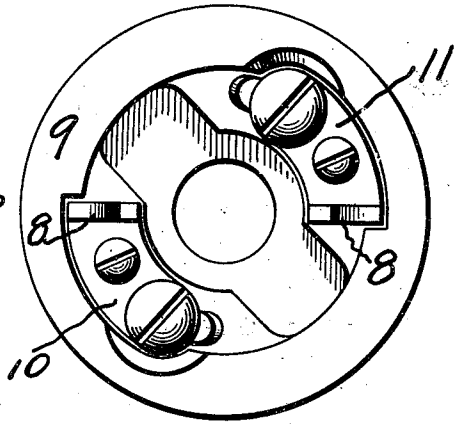


Fig. 4.



Witness

Chas. L. Griesbauer

Inventor

Edgar H. Freeman,

By

Attorney

Patented Oct. 16, 1923. 1,470,824

UNITED STATES PATENT OFFICE.

EDGAR H. FREEMAN, OF TRENTON, NEW JERSEY, ASSIGNOR TO E. H. FREEMAN ELECTRIC COMPANY, A CORPORATION OF NEW JERSEY.

ELECTRICAL CONNECTOR DEVICE.

Application filed July 21, 1919. Serial No. 312,289.

To all whom it may concern:

Be it known that I, EDGAR H. FREEMAN, a citizen of the United States, residing at Trenton, in the county of Mercer and State of New Jersey, have invented a certain new and useful Improvement in Electrical Connector Devices, of which the following is a specification.

This invention relates to electrical connectors, and has particular reference to an improvement in devices for obtaining a large area of contact between the current carrying parts before the circuit is closed.

In lighting and other circuits using a heavy current, it is necessary to provide a connector wherein the contacting parts engage substantially throughout their full contacting area before the circuit is completed to prevent sparking, arcing or the burning out of the contacts themselves. To this end therefore, it is also desirable as well as necessary that means be provided whereby a quick make and break may be obtained between the contacting parts after the latter have passed into and out of full telescopic relation, or at least to such a degree as to effectively safeguard against the conditions above set forth under all conditions of use.

Accordingly, the present invention proposes to provide a novel simple and practical connector device wherein the electrical circuit is closed by a snap switch automatically actuated by the movement of one contact carrying member toward the other.

With the foregoing general object, and other special objects in view, which will more readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts, hereinafter more fully described, illustrated and claimed.

A practical embodiment of the invention is shown in an attached plug, in the accompanying drawings, in which:—

Figure 1 is a vertical sectional view of the entire plug with the cap inserted in the plug body to substantially its full limit.

Figure 2 is an enlarged sectional view of the switch portion of the plug body, showing the snap switch shifted to its closed position.

Figure 3 is a cross sectional view on the line 3—3 of Figure 1.

Figure 4 is a bottom plan view of the cap of the attachment plug.

Similar reference characters designate corresponding parts throughout the several figures of the drawings.

In carrying the present invention into effect it will of course be understood that the same is susceptible of embodiment in various forms of electrical devices such as wall or base board receptacles, or attachment plugs as illustrated in the drawings, since the principle of operation and the general structural features and characteristics are readily adaptable to any of these types of devices.

In the attachment plug embodiment of the invention as shown in the accompanying drawings, the numeral 1 designates a receptacle body having the reduced end portion 2 for receiving the metallic screw shell contact 3, and the upper enlarged portion 4 having an interior switching chamber 5 which may be closed by an insulating cover disk 6 which is in effect a part of the body 1, and provided with the openings 7 for receiving the contact blades 8 of the plug cap 9.

The said plug cap 9 is preferably fitted with the usual wire binding terminals 10 and 11 as shown in Figure 4 for securing the ends of the wires in electrical contact with the blades 8 permanently carried by the cap. The said contact blades 8 are preferably of duplicate formation or design to facilitate their insertion within the receptacle in the usual manner without reference to the particular openings therein, but it will be observed that each of said blades is provided at its lower end with the switch operating nose 12 and a notch or recess 13 for receiving a portion of the switch operating mechanism as will presently appear.

Referring now to the receptacle body 1 it will be observed that the same is provided with a center plug contact screw 14 whose head portion is adapted to engage with the center contact of a socket in the usual manner, while the opposite end thereof has fitted thereto a centrally located contact blade 15, the same constituting the center contact of the receptacle body and cooperating with the switch device S to be presently referred to. The screw shell contact 3 of the plug part 2 is electrically connected by the screw 16 with the base of the substantially U-shaped receptacle terminal 17 which is adapted to telescopically receive one of the contact blades 8, while at the opposite side of the switch chamber 5, there is provided a

second and similar terminal 18, the same being riveted or otherwise secured as at 19 to the porcelain body 1 and adapted to receive the other contact blade carried by the plug cap 9.

One of the novel and distinctive features of the present invention is found in connection with the terminal 18 which is not only constructed to accommodate one of the switch blades 8, but also supports the automatically operated switch mechanism S. As will be more clearly observed from Figures 2 and 3 the opposite relatively resilient arms or walls of the terminal 18 are provided with the offset ears 19 for receiving a pin 20 constituting an axis for an oscillatory switch frame 21, and also providing an axis and support for a novel switch frame actuating cam 22.

By reference to Figures 2 and 3 it will be apparent that the switch frame 21 is of substantially U-shaped formation with its ends pivotally mounted on the pin 20 while the web portion 21[a] thereof is provided with an opening for slidably receiving one end of a switch throwing arm 23 the opposite end of which is pivotally connected as at 24 with the cam 22, eccentric to the axis thereof. The said switch throwing arm 23 is surrounded by a coil spring 25 which serves to place the switch frame 21 under tension whereby when the cam 22 is moved the switch frame will be quickly shifted or snapped from the top toward the base of the switch chamber, or vice versa, in order to quickly make or quickly break electrical contact between the switch frame 21 and the center contact 15 which as shown in Figure 3 is also of substantially U-shaped formation and receives the sides of the frame between its relatively resilient arm portions to thus insure a positive contact.

The operating cam 22 which is carried on the pin or shaft 20 of the terminal element 18 is provided with the blade engaging shoulder 26 and the blade engaging projection 27, the said shoulder 26 being adapted to be engaged by the extreme lower edge of one of the blades 8 when the same are initially thrust into the terminal element 18, and the said projection 27 being pushed into the notch 13 when the blade has reached the limit of its inward movement after having caused the switch frame to engage with the center contact 15 as shown in Figure 3. Thus, it will be apparent that the formation of the cam 22 is such that when the blades carried by the cap are moved into the receptacle terminals, there will be a relatively large area of contact between these two members by the time the lower end of the blade engages with the shoulder 26 of the switch operating cam, and then simultaneously as the blades are pushed inwardly to their limit, to make a full contact, the switch frame 21 will be thrown and quickly close the circuit. On the other hand, upon the withdrawal of the blades 8 when the cap is pulled away from the plug body the blades 8 and terminals 17 and 18 will remain in electrical contact until the outward movement of the blades has been sufficient to cause the rocking of the cam through the medium of the notch 13 and the projection 27, whereupon the circuit will be instantly broken by reason of the spring controlled switch throwing arm 23 operating in a reverse direction due to the shifting of the end 24 thereof by the cam.

From the foregoing it will be apparent that the present invention provides simple and practical means for permitting the contact elements of both the relatively fixed and movable elements of an electrical connector to establish a relatively large area of contact before the circuit is closed, thus fulfilling all of the objects heretofore set forth and at the same time conforming with underwriters' standards and requirements for this type of devices.

Without further description it is thought that the features and advantages of the present invention will be readily apparent, and it will of course be understood that changes in the form, proportion, and other minor details may be resorted to without departing from the spirit of the invention or scope of the appended claims.

I claim:

1. An electrical connector including a body having at one end a plug member provided with socket contacts and at its other end a receptacle portion carrying a center contact and side contacts respectively connecting with said socket contacts, a switch member mounted within the receptacle portion of the body and adapted to engage with said center contact, and a cap member carrying the line wire terminals and a pair of contact blades for engaging with said side contacts, and one of said blades having an actuating engagement with the switch member.

2. A separable attachment plug including a body having a plug member at one end provided with socket contacts and also having a closed switch receptacle chamber opposite the plug, a center contact and a pair of blade receiving terminals arranged within the switch receptacle, said blade receiving terminals each consisting of spaced yielding contact members, and said center contact and blade receiving terminals respectively connecting with said socket contacts, a snap switch carried by one of the blade receiving terminals and having a portion thereof disposed between the contact members forming the same, and a detachable cap carrying contact blades adapted to enter the blade receiving terminals whereby

one of the contact blades engages with the portion of the switch carried by one of the terminals thereby to actuate the switch.

3. A separable attachment plug consisting of a cap and body, the latter having a plug portion provided with socket contacts and a switch chamber, a pair of blade receiving terminals and a centrally located contact arranged within the switch chamber and respectively connecting with said socket contacts, an oscillating switch frame pivotally mounted on one of the blade receiving terminals, a shaft constituting the axis of said frame, a cam mounted on said shaft and having a portion projecting between the arms of one of the blade receiving terminals, a spring-tensioned throwing arm pivotally engaging with said cam and slidably engaging with said switch frame, and contact blades carried by the cap and adapted to enter said terminals.

4. A separable attachment plug consisting of a cap and body, the latter having a plug portion provided with socket contacts and a switch chamber, a pair of substantially U-shaped blade receiving terminals and a centrally located contact arranged in the said switch chamber, a shaft spanning the arms of one of the blade receiving terminals, an oscillating switch frame mounted on said shaft, an operating cam having a resilient throwing connection with said switch frame and also having a portion lying between the arms of the terminal member carrying the switch frame, and duplicate contact blades carried by the cap and provided with notched edge portions, whereby when either one of the same pass between the arms of the blade receiving terminal carrying the switch, the latter will be actuated through the engagement of the notched blade with said cam.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

EDGAR H. FREEMAN.

Witnesses:

OLIVE V. DOWNS,

ELLEN J. LARRABEE.