Feb. 7, 1939. C. V. DAME 2,146,011

ELECTRIC SOCKET

Filed Sept. 28, 1935

Fig. 2

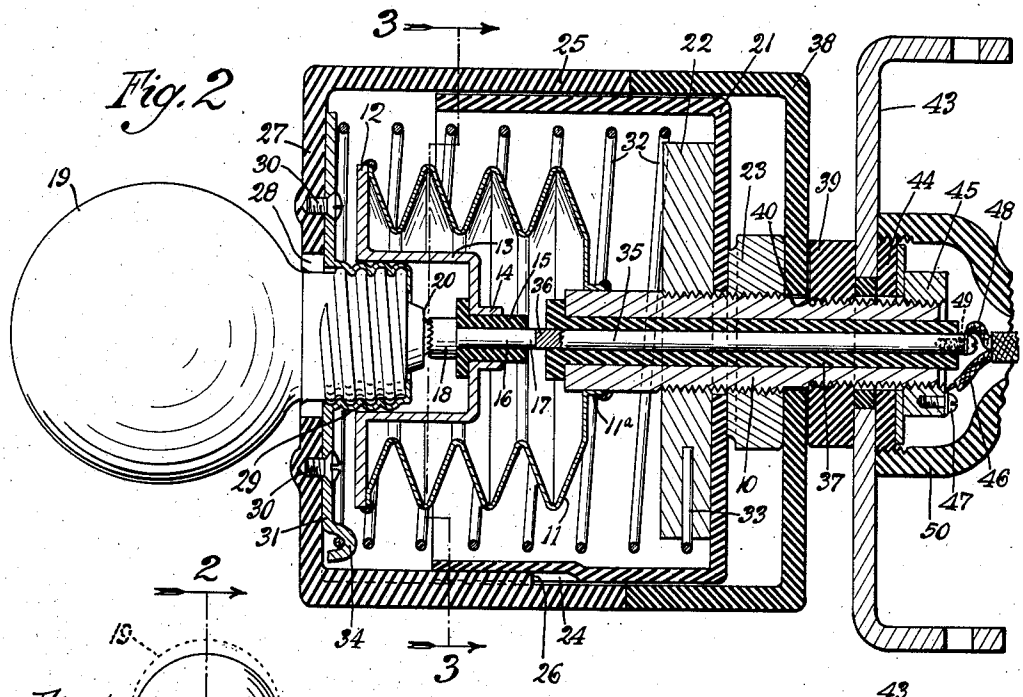


Fig. 1

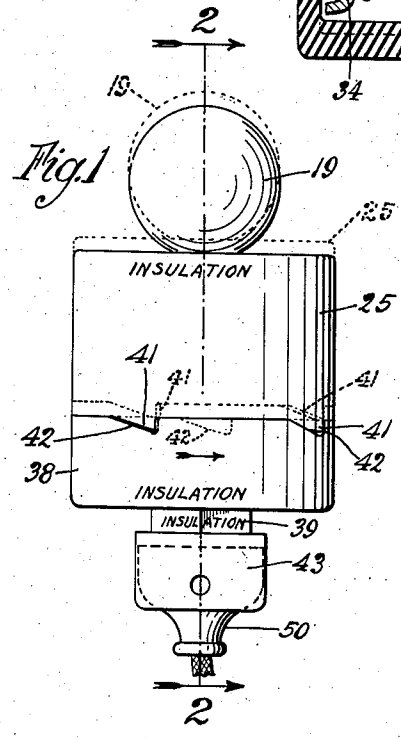
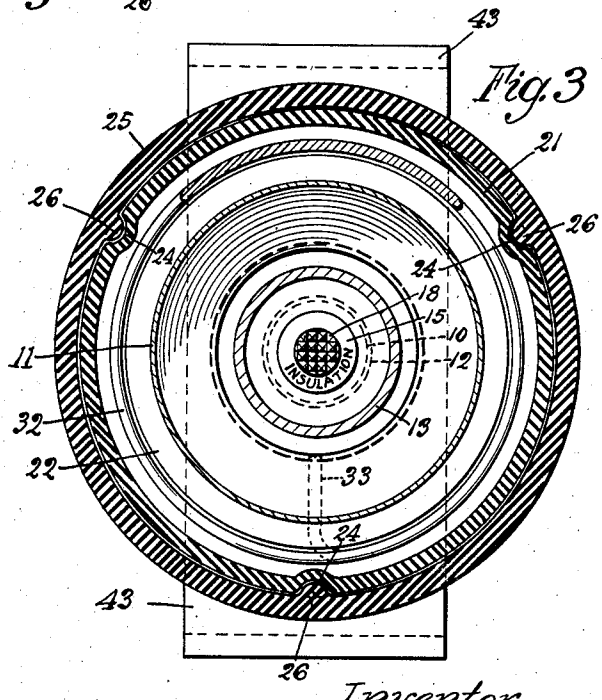


Fig. 3



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ELECTRIC SOCKET

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6 Claims. (Cl. 173—346)

This invention relates to improvements in electric sockets.

One object of the invention is to provide a socket for an electric light bulb or the like which locks the bulb against turning and becoming loose in the socket during use but which can readily be removed for replacement when desired. Thus the socket is of advantage where the lamp is subjected to vibrations which result in loose contacts with resultant flickering or extinguishment of the light as on air planes, trains, automobiles, or other vehicles or on or adjacent heavy machines which set up vibrations during operation, or in electric signs or street lights which frequently work loose in the sockets due to vibrations imposed by street cars, trucks and other vehicles. The elimination of loose lamps and consequent arcing at the lamp terminals also renders the lamp of advantage in mines, for example, where arcing may result in an explosion of accumulated gas.

Another object of the invention is to provide a switch which preferably, although not necessarily, is built into the socket, the switch contacts being sealed within a chamber to exclude external air or to retain an inert gas if desired to render safe the opening or closing of a circuit in an explosive atmosphere, as in a gas-choked coal mine, for example.

Other objects of the invention relate to various features of construction and arrangement of parts which will be apparent from a consideration of the following specification and accompanying drawing, wherein:

Figure 1 is an elevation of a combined lamp socket and switch embodying the present improvements.

Figure 2 is an enlarged sectional view taken on line 2—2 of Figure 1.

Figure 3 is a sectional view taken on line 3—3 of Figure 2.

In the drawing 10 is a tubular metal supporting member to the forward end of which is secured a bellows 11 as by means of a flange 11*a*. Flange 11*a* forms an air or gas tight connection with the member 10. The forward end of the bellows is provided with a wall 12 which carries a cup-shaped central portion 13 shown as provided with an annular flange 14 which supports and forms an air tight connection with an insulating bushing 15. Tightly secured in the bushing is a conducting member 16, the inner end 17 of which forms a contact member, and the outer end 18 of which constitutes a terminal for making contact with the terminal of an electric plug or lamp 19 or other like current consuming device.

The face of the terminal 18 is formed to provide interlocking engagement with the terminal of the contacting member such as the terminal 20 of the lamp 19. In the form shown the face of the terminal 18 is knurled or milled as is also the terminal 20 of the lamp base. Thus when the terminals 19 and 20 are in contact rotation of the lamp is prevented.

Mounted on the tube 10 is a cup-shaped shield 21 which is held in position by a conducting plate 22 and a nut 23 screw threaded on the tube. The shield 21 which preferably is of insulating material such as "Bakelite" for example, is provided with a number of guiding channels 24, three of which are shown, see Figure 3. Slidably positioned on the exterior of the shield 21 is a casing 25 which is provided with interior ribs 26 slidably disposed within the channels 24. The coacting ribs and channels prevent relative rotation of the casing 25 with respect to the shield 21.

The forward end 27 of the casing 25 has a central opening 28 therein aligned with which is a socket receptacle 29 which is secured to the wall 27 by means of screws 30 passing through a flange 31. While a screw socket is illustrated, it will be obvious that other types of sockets may be employed, if desired.

A spring 32 is anchored to the plate 22 as by extending an end into a hole 33, and bears at its upper end against the flange 31 and has its upper free end disposed in engagement with a loop 34 formed integral with the flange. The respective ends of the spring may, if desired, be welded or soldered to the plate 22 and the flange 31 to provide suitable electrical connections with the same. The spring 32 surrounds the bellows 11 and exerts tension which tends to move the casing 25 to the right as viewed in Figure 2. The force exerted by the spring 32 is sufficient to overcome the tendency of the bellows 11 to expand in the opposite direction and hence when a lamp, for example, is in position in the socket receptacle 29 as shown in Figure 2, the spring holds the contacts at the teminals 18 and 20 together. Due to the interlocking engagement of the terminals as above described, rotation of the lamp in a direction to separate the terminals and cause arcing at the same or flickering of the light, is prevented.

Extending through the tube 10 is a conductor 35 having a terminal 36 at its inner end which is adapted to contact with terminal 17 of the members 16. The conductor 35 is positioned

in an insulating sleeve 37 which insulates the conductor 35 from the tube 10, the sleeve forming air tight contact with both the tube and the conductor.

A switch operating member 38 of cup-shape and in effect forming a portion of the casing of the device, is rotatably mounted on the tube 10 and held in position between the nut 23 and a nut 39 which is threaded on the tube 10 and abuts shoulder 40 of the tube. The member 38 can thus be rotated on the tube 10. The diameter of the member 38 preferably is the same as the diameter of the casing section 25 and abuts the same as shown in Figures 1 and 2. The edge of the member 25 is provided with teeth or extensions 41 forming inclined planes which normally seat in correspondingly shaped recesses 42 formed in the adjacent edge of the member 38. It will thus be seen that by rotating the member 38 to the right as viewed in Figure 1, the casing 25 will be moved axially against the action of the spring 32. Such movement of the casing carrying with it the lamp 19 permits the bellows 11 to expand or distend to the left as viewed in Figure 2, and thus effect the separation of the terminals 17 and 36 to open the circuit of the lamp.

Upon turning the member 38 to bring the respective members and recesses 41 and 42 into registration, the spring 32 will move the casing 25 to the right as viewed in Figure 2, overcome the thrust of the bellows, and move the terminals 17 and 36 into contact to close the circuit.

When it is desired to remove a lamp from the socket the casing section 25 is moved manually to the left as viewed in Figure 2 against the action of the spring 32 a distance beyond the distensible action of the bellows 11, thus effecting relative movement of the socket receptacle 29 within the cup-shaped member 13 and causing the terminal 20 of the lamp to move out of contact with the terminal 18. With the casing 25 and associate parts held in such position, the lamp can be removed and a new one placed in position. The spring 32 will thereafter move the parts into the position shown in Figure 2.

A supporting bracket 43 is shown clamped upon the tube 10 between the insulating nut 39 and an insulating nut 44. On the outer end of the tube is shown a metal nut 45 to which one conductor 46, for supplying current to the device, is attached as by means of a screw 47. Another conductor 48 is shown attached by a screw 49 to the end of the conducting rod 35. An insulating shield 50 through which the conductors extend may be threadedly attached to the nut 44 to shield the upper ends of the conductors 46 and 48. The circuit through the device is thus established through conductor 48, rod conductor 35, conductor 16 to the terminal 20 of the lamp, and thence through the shell or screw socket 29, flange 31, spring 32, conducting plate 22, tube 10, nut 45 to the second conductor 46.

From the above it will be seen that the circuit of the lamp is broken by effecting the separation of the terminals 17 and 36 and that these terminals are enclosed in the air tight chamber formed by the bellows 11 and associated parts. If desired, the chamber may be filled with a suitable gas, such as nitrogen, to inhibit arcing at the make or break of the circuit.

When the casing section 25 is in the dotted line position shown in Figure 1, the shield 21 prevents accidental contact with the interior conductors through the gap between the separated edges of the casing members 25 and 38.

It will be apparent that while the lamp terminal 20 and the conductor terminal 18 are held against separation due to vibration, arcing is effectually prevented therebetween. Any arcing which should occur between the terminals 17 and 36 due to excessive vibration sufficient to overcome the tension of spring 32, will take place within the sealed chamber formed by the bellows. Such arcing and resulting impairment of the contacts 17 and 36 can be inhibited by charging the chamber with a gas, such as nitrogen, if desired. This arrangement thus provides a socket device comprising a switch which may be used safely in an explosive atmosphere such as in a gas filled mine, for example, without danger of explosion.

While I have shown and described an embodiment of my improvements for the purpose of illustration, I do not wish to be restricted specifically thereto except as so limited by the appended claims.

I claim:

1. A device of the class described comprising a sealed chamber having distensible side walls and a movable end wall, a conductor terminal in said chamber, a contact member carried by said end wall and arranged to contact with said terminal when said side walls are contracted and provided with an exterior terminal, a receptacle adjacent said exterior terminal for receiving a current consuming element adapted to make electrical contact with said exterior terminal, and means for effecting the distension of said side walls to effect the separation of said contact member and conductor terminal.

2. A combination lamp socket and circuit interrupting device comprising a support, a sealed chamber having a distensible wall supported thereby, a pair of cooperating electric circuit closing contacts in said chamber, one of said contact members having a portion extending exteriorly of said chamber, tension means for compressing said member and retaining said contacts together, a terminal connected to said exterior portion of said contact, means for supporting the terminal end of a lamp in contact with said terminal, and means for releasing said tensioning means to enable said distensible member to distend and effect the separation of said contacts.

3. A circuit controlling device comprising a sealed chamber having distensible side walls, a pair of cooperating contact members therein having portions extending to the exterior of said chamber for connection in an electric circuit, including a movable terminal of a current consuming device, means acting constantly on said chamber in a direction for compressing said side walls to move said contacts into circuit closing relation and for moving said movable terminal of said device into circuit closing relation with the exterior portion of one of said contacts, and means operable manually in opposition to said compressing means to enable said side walls to distend and separate said contacts to open the circuit.

4. A device of the class described comprising a sealed chamber having flexible bellows-like side walls, a pair of axially aligned contacts in said chamber having portions extending to the exterior thereof for connection in an electric circuit including a movable terminal of a current consuming device, a spring acting on said chamber in a direction to compress the same and move said contacts into circuit closing relation

and for moving said movable terminal into circuit closing relation with an exterior portion of one of said contacts, and manually operable means actuatable against the action of said spring to remove the tension of the same from said chamber to enable said walls to distend and separate said contacts.

5. A circuit controlling device comprising a sealed chamber having inherently distensible side walls and a movable end wall, a pair of cooperating circuit controlling contact members in said chamber having portions adapted to be connected in an exterior circuit, one of said contact members being carried by said end wall and movable thereby into circuit opening or circuit closing position with respect to the other contact, a terminal for a current consuming device, resilient means acting on said terminal of said device tending to retain the same in contact with said movable contact and acting also on said chamber member to contract the same for effecting the disposition of said contacts in one of said circuit controlling positions, and means operable manually in opposition to said contracting means for enabling said chamber member to distend and move said movable contact into the other circuit controlling position.

6. A device of the class described comprising a closed chamber forming member having distensible side walls and a movable end wall, a pair of cooperating contact members in said chamber for controlling an electric circuit, one of said contact members being carried by and movable with said end wall and provided with a terminal at the outer end, said side walls having an inherent tendency to distend to separate said contacts, an outlet receptacle adjacent said terminal for receiving a terminal of a current consuming element, a movable support for said receptacle, means for moving said support in a direction tending to retain said terminals in contact and to compress said side walls to move said contacts together for closing the circuit of said element, and means for manually moving said support in opposition to said compressing means to enable said side walls to distend to separate said contacts to open the circuit of said element.

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