Jan. 17, 1950 L. V. GROVER 2,494,755

QUICK DISCONNECT SOCKET

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FIG. 1

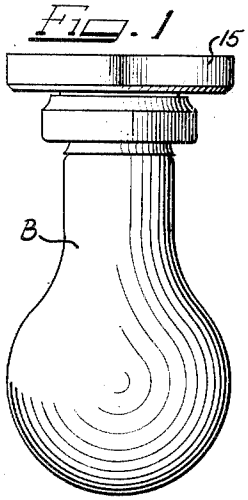


FIG. 2

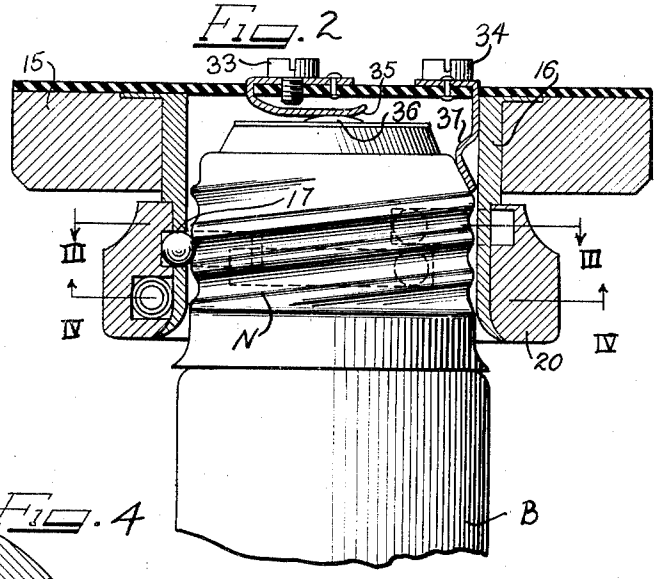


FIG. 4

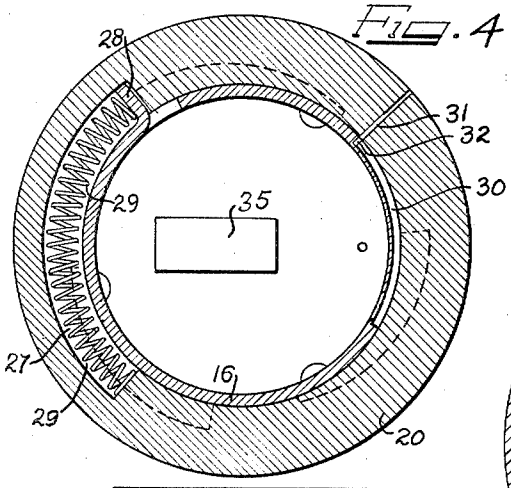


FIG. 3

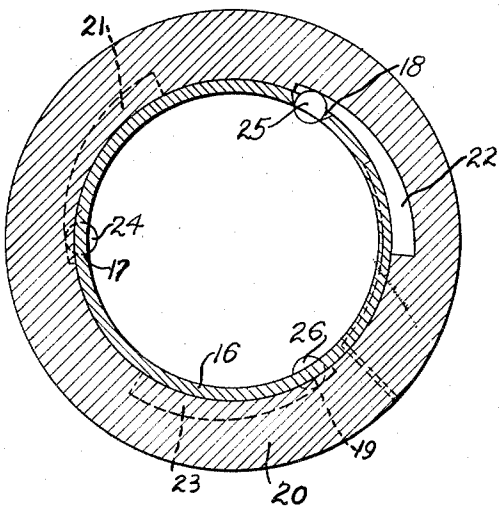
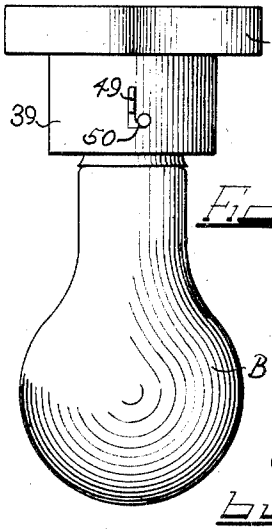


FIG. 5



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Fig. 6

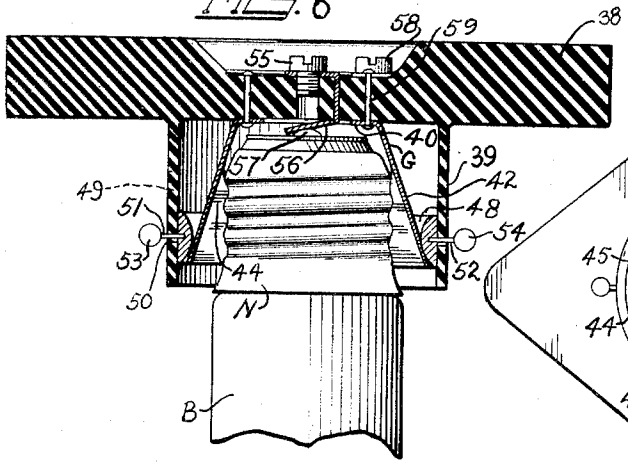


Fig. 7

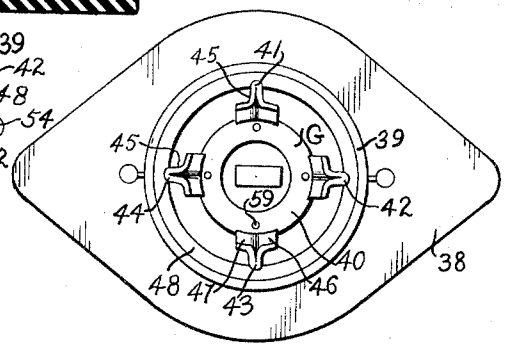


Fig. 8

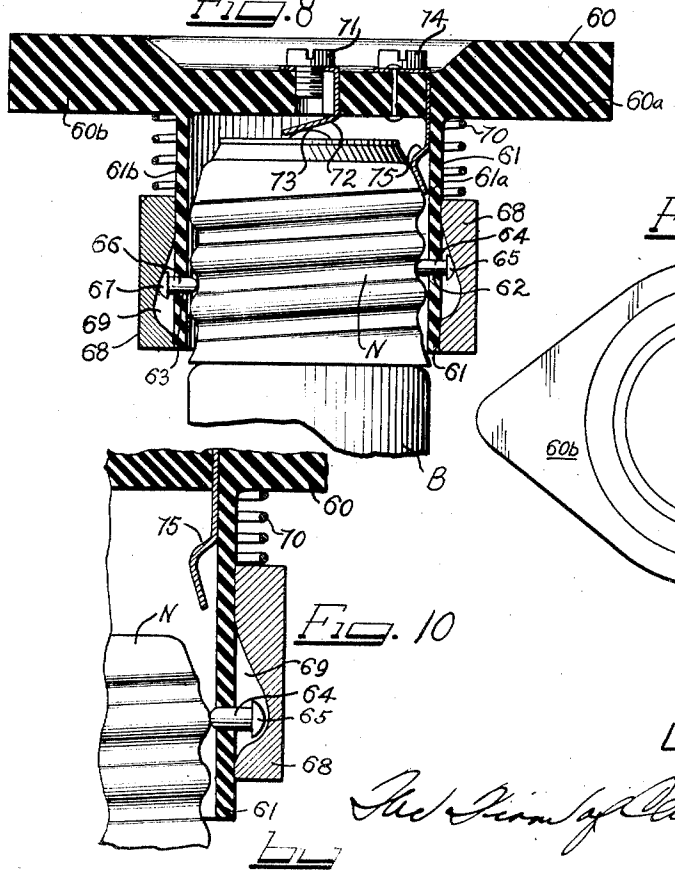


Fig. 9

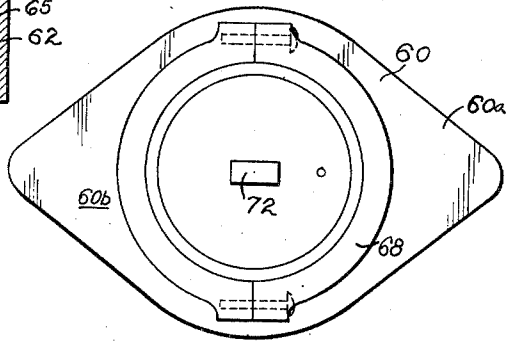


Fig. 10

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QUICK DISCONNECT SOCKET

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Application November 1, 1946, Serial No. 707,303

3 Claims. (Cl. 173—358)

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This invention relates generally to socket fixtures for electric lights and more particularly to quick disconnect sockets. The present invention has to do with the construction of sockets for electric light bulbs, flash bulbs, and the like wherein the application of a bulb to, or removal of a bulb from, a socket may be effected without relative screw action, so that the time required for bulb change may be reduced to a minimum.

In connection with certain and many types of photography, artificial lighting is used. Whenever flash bulbs are used, and the instances are many, it is necessary for a photographer to unscrew a spent bulb and replace it with a fresh bulb which has to be screwed into the flash device. When speed of photography is of the essence, especially in the making of action shots, photographers are delayed unduly by having to make bulb changes. Also in making moving pictures, it is sometimes necessary to change the bulbs of a light bank for achieving different light intensities for securement of different pictorial effects. In such instances the time out for bulb change is considerable, thus adding to the cost of production and lengthening the time necessary for completion of the picture sequence.

It is, therefore, an object of the present invention to provide a bulb socket arrangement to eliminate the screw movement heretofore necessary in connecting and disconnecting a bulb with respect to a socket.

Another object of the present invention is to provide an electrical socket construction wherein the time of bulb change is reduced to a minimum.

A further object of the present invention is to provide an electrical socket having clamping means for engaging the threaded portion of a bulb to connect the bulb to and disconnect it from the socket.

A still further object of the present invention is to provide an electrical socket having relatively movable parts for connection to and disconnection from an electric bulb of the conventional type without screw movement of the bulb.

The invention has for a further object the provision of a socket having relatively movable parts for connection to and disconnection from a bulb of the conventional type, and having spring means for urging said parts into holding engagement with a bulb.

An additional object of the present invention is to provide an electrical socket having clamping means acting transversely of the bulb axis for retaining the bulb in the socket.

The invention further contemplates an electrical socket having means acting with squeeze-grip action against the threaded end of a bulb to hold it in place in the socket.

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Another and yet further object of the present invention is to provide an electrical socket having means to engage the threaded end of a bulb with transversely compressive action, which means are spring urged in holding direction.

A still further object of the present invention is to provide an electrical socket having means applying lateral pressure at axially and circumferentially spaced areas or points to the threaded neck of a bulb inserted in a socket.

The above, other, and further objects of the present invention will be apparent from the following description and accompanying drawings.

Embodiments of the present invention are illustrated in the accompanying drawings, and the views thereof are as follows:

Figure 1 is an elevational view, of one form of the present invention, with an electrical bulb in place in the socket;

Figure 2 is an enlarged axial section through the socket of Figure 1, with the threaded neck portion of a bulb inserted in the socket, and showing the manner of securing the bulb to the socket;

Figure 3 is a horizontal section taken in the plane of line III—III of Figure 2, with the bulb removed;

Figure 4 is a sectional view taken in the plane of line IV—IV of Figure 2, with the bulb removed, and showing the relationship of the parts when the socket is empty;

Figure 5 is an elevational view of another form of socket of the present invention, showing a bulb in the socket;

Figure 6 is an axial section through the socket of Figure 5, with a bulb in place in the socket, and showing the positions of various parts assumed when a bulb is secured in the socket;

Figure 7 is a plan view of the socket of Figures 5 and 6 with the bulb removed, and showing the various parts in normal position;

Figure 8 is an axial sectional view through a socket of a further modification, showing the threaded neck of a bulb secured in the socket;

Figure 9 is a plan view of the socket of Figure 8; and

Figure 10 is a fragmental view of the fixture of Figure 8 showing relation of parts when a portion of the threaded neck of a bulb is part way in the barrel of the socket.

The drawings will now be explained.

Referring to Figures 1 to 4, inclusive, the socket therein shown comprises a base 15 with a barrel 16 in it, the interior of the barrel being cylindrical and smooth. Formed in the barrel are circumferentially and axially spaced holes 17, 18, and 19. In section it will be noted that these holes are equidistantly spaced circumferentially of the barrel and in elevation are axially spaced one with respect to another.

Surrounding the barrel 16 and loose on it is a collar 20. Formed in the collar and extending inwardly from its inner or concave surface are a plurality of recesses 21, 22, and 23 which vary in depth from minimum at one end to maximum at the other end, as may be readily noted in Figures 3 and 4.

Within the holes 17, 18 and 19 are balls 24, 25, and 26, with one ball per hole, the ball 24 being in the hole 17, the ball 25 being in the hole 18, and the ball 26 in the hole 19. Referring to Figure 3, it will be noted that the holes, in transverse section, taper inwardly to limit the inward movement of the balls in the holes.

The collar 20 is oscillatable on the barrel 16. In order to limit the extent of relative oscillatable movement of the collar 20 with respect to the barrel 16, any suitable stop means may be employed. The illustrated form of stop means includes a groove 30 formed in the exterior of the barrel 16, and of limited circumferential extent. The collar 20 is provided with a radial aperture 31 to receive a pin 32 the inner end of which projects into the slot 30. Thus relative oscillatory motion between the collar 20 and the barrel 16 is limited by the circumferential extent of the groove 30.

Formed in the concave surface of the collar is a circumferential spring recess 27 of limited extent. The barrel 16 has an outstanding lug 28 projecting into the recess 27. Between one end of the recess 27 and the lug 28, a spring 29 is interposed which functions to normally maintain the lug 28 spaced from the said one end of the slot or recess 27. The position assumed by the collar 20 with respect to the barrel 16 as influenced by the spring 29 constitutes the normal position of the parts when there is no bulb in the socket. The relationship of the various recesses 21, 22, and 23 and the position of the lug 28 with respect to the spring recess 27 is such that when there is no bulb in the socket the parts appear as illustrated in Figures 3 and 4, that is to say, with the balls engaged by the shallow ends of the recesses to thus project the balls into the interior of the collar as shown in Figures 3 and 4, as far as the inner diameters of the holes allow. When the parts are in normal position, as shown in Figures 3 and 4, the pin 32 is against one end of the groove 30, thus limiting counterclockwise movement of the collar 20 with respect to the barrel 16, as viewed in Figure 4.

A conventional electric bulb is indicated at B and is provided with a conventional threaded neck N having conventional screw threads formed in it.

When it is desired to insert a bulb in the socket of the form shown in Figures 1 to 4, inclusive, the operator grasps the collar 20 and moves it clockwise, as viewed in Figure 4, which movement brings the deeper ends of the recesses 21, 22, and 23 approximately into register with the balls 24, 25, and 26, respectively, whereby when the bulb B is pushed into the barrel of the socket, its neck will repel the balls against the bases of the recesses, as may be readily understood. When the bulb is pushed home, the operator releases his

grasp of collar 20 whereupon the spring 29 causes the collar 20 to move in counterclockwise direction as viewed in Figure 4, which movement brings the shallow ends of the recesses 21, 22, and 23 against the balls to urge them outwardly and into squeeze grip holding engagement with the neck N.

The axial spacing of the balls in the barrel is such that the balls, when projected, may be said to constitute threads in the barrel having the same pitch as the threads in the neck N of the bulb.

When it is desired to remove the bulb from the socket, the operator grasps the collar 20 moving it clockwise as viewed in Figure 4, to release pressure of the balls against the bulb neck, whereupon pulling effort applied to the bulb will push the balls into the deeper ends of the recesses 21, 22, and 23 so that the threads of the neck N of the bulb may pass the balls, thus enabling a removal of the bulb by a simple pulling movement.

The socket is provided with a terminal 33 and another terminal 34. The terminal 33 is in conductive relationship with a leaf contact 35 which engages the central contact 36 at the end of the bulb, while the terminal 34 is in electrical contact with a second leaf contact 37 which bears against a portion of the metal neck of the bulb, so that when the bulb is in place in the socket, as illustrated in Figures 1 and 2, the filament of the bulb is in electrical connection with the source of supply. Both of the terminals 33 and 34 are mounted on an insulated plate secured to the base 15.

Referring to Figures 5, 6, and 7, the socket there shown includes a base 38 and a barrel 39. Within the barrel is a member which, for want of a better term, will herein be referred to as a gripping member G.

The gripping member G is formed from flat metal stock, of conductive material and comprises a ring base 40 from which project fingers 41, 42, 43, and 44. The fingers project at obtuse angles with respect to the plane of the ring base 40, as may be noted in Figure 6. Every one of the fingers 41, 42, 43, and 44 is formed with a crimped back bone 45 and lateral flanges 46 and 47 extending in opposite directions from the back bone, as may be readily noted in Figure 7. The inner faces of the lateral flanges 46 and 47 of every one of the fingers are corrugated to correspond to the threads in the neck N of a bulb B. It will be observed that the fingers are arranged 90° apart and are bendable with respect to the ring base 40. The fingers are spring stressed to normally lie away from threaded engagement with the neck N of a bulb, so that the normal positions of the several fingers are such that the threads of their lateral flanges are not normally in position for threaded engagement with the neck of a bulb.

To move the fingers together into clamping engagement with the neck N of an inserted bulb, a collar 48 is axially movable within the barrel 39 surrounding the free ends of the fingers, as may be noted in Figure 6. Formed in the barrel 39 at diametrically opposite portions of the collar, are axial slots 49 which, at the ends thereof adjacent the open end of the collar, have circumferential slot portions 50. In other words, the slots are L-shaped in elevation. Extending through each of the slots is a pin 51 having its inner end entered in the collar 48. Extending through the other of the slots is a pin 52 having its inner end

entered in the collar 48. The outer ends of the pins are provided with heads 53 and 54 respectively.

When it is desired to insert a bulb B in the socket of Figures 6 and 7, the operator grasps the heads 53 and 54 of the pins moving the pins through the circumferential portions 50 of the slots and then moving the pins axially through the axial portions 49 of the slots toward the base 38 of the socket. This movement of the pins carries the collar inwardly toward the base, allowing the free ends of the fingers 41, 42, 43, and 44 to spread by spring action so that the neck end of a bulb may be inserted in the socket. When the bulb is inserted and bottomed in the socket, the pins are then moved in the axial portions 49 of the slots away from the base until the circumferential portions 50 are reached, whereupon the pins are moved into the circumferential portions to thus lock the collar 48 about the free ends of the fingers, holding the corrugations in the faces of the flanges 46 and 47 of the several fingers in threaded engagement with the neck of the bulb.

The socket is provided with a central terminal 55 in electrical connection through a leaf contact 56 with the button 57 on the end of the neck of the bulb. A second terminal 58 is electrically connected by a metal connection such as a pin 59 with a ring base 40 of the gripping member G, thereby electrically connecting the bulb to the circuit to which the socket is connected.

Referring to the form of the invention illustrated in Figures 8 to 10, inclusive, the socket there shown includes a base 60 and a barrel 61. For assembly purposes, it has been found preferable to make the base in two parts 60*a* and 60*b* with the barrel in two parts 61*a* and 61*b*. When assembled the base and barrel appear as shown in Figures 8 and 9.

Projecting radially through the barrel 61 is a hole 62 and circumferentially spaced from the hole 62 is another hole 63. The holes 62 and 63 are spaced axially as well as circumferentially, with reference to each other. Extending through the hole 62 and into the interior of the barrel 61 is a pin 64 having a head 65 outwardly of the barrel. In like manner a pin 66 extends through the hole 63, which pin has a head 67. The pins 64 and 66, projecting into the interior of the barrel 61 at right angles to the axis of the barrel, may be said to constitute threads for engaging the threads in the neck N of an inserted bulb B. Surrounding the barrel 61 is a collar 68 having its inner or concave surface formed with a recess 69 which varies in radial depth from minimum, adjacent the base portion of the collar, to maximum, near the opposite face of the collar, as is clearly shown in Figure 8. The recess is, in transverse direction, inclined with respect to the axis of the collar, the inclination being substantially such as to conform to the inclination of the threads in neck N of a bulb B. The convex surface of the recess engages the heads 65 and 67 of the pins 64 and 66 respectively, tending to urge the pins inwardly of the collar.

Referring to Figure 8, it will be noted that, as the collar 68 is moved downwardly on the barrel 61, i. e., away from the base 60, the recess will tend to move the pins into the barrel. For normally maintaining the collar 68 in maximum spaced relation with respect to the base 60, and for urging the pins into the barrel, a spring 70 is

utilized, interposed between the base 60 and the adjacent face of the collar 68. Downward movement of the collar 68 on the barrel 61 is limited by engagement of the heads of the pins with the shallow portion of the recess in the collar.

The normal position of the collar 68, under influence of the spring 70, is at or near the open extremity of the barrel 61. When in such position the pins are moved inwardly of the barrel to their maximum extent. When it is desired to insert a bulb in the socket of Figure 8, the operator moves the collar 68 towards the base 60, by such action, thus bringing the maximum depth of the recess 69 opposite the heads of the pins, as is shown in Figure 10, whereby the entering neck of the bulb will push the pins outwardly against the recess in the collar thus allowing entrance of the neck into the socket. When the neck is bottomed in the socket, the operator releases his grasp of collar 68, whereupon the spring 70 moves the collar towards the free end of the barrel and, by so moving, exerts end pressure against the pins to hold their inner ends in grooves of the threaded neck end of the bulb thus securing the bulb in place in the socket.

The socket is provided with a terminal 71 electrically connected by a leaf contact member 72 to the central contact 73 at the end of the neck portion of the bulb. A second terminal 74 is in electrical connection with a spring leaf 75 positioned to make surface engagement with a portion of the metal neck of the bulb, thus placing the bulb in electrical connection with the socket.

It will be noted that my invention provides a socket for electric bulbs wherein the bulbs may be applied to and removed from the socket by push-pull movement. It is unnecessary to screw the bulb into or out of the socket to connect or remove it. Thus the time consumed in changing bulbs is reduced to a minimum.

It will, of course, be understood that various details of construction may be varied through a wide range without departing from the principles of this invention and it is, therefore, not the purpose to limit the patent granted hereon otherwise than necessitated by the scope of the appended claims.

I claim as my invention:

1. An electrical socket for a lamp bulb having a threaded neck, comprising a tubular member having apertures through the wall thereof spaced both circumferentially and axially of the member, the axial spacing being in keeping with the pitch of the threads on the neck of the bulb to be carried, a holding element lodged in each of said apertures, an annular member moveable on said tubular member and having a recess varying in depth for each said holding member, and resilient means urging said annular member into a position with the shallower parts of said recesses contacting said holding elements.

2. An electrical socket for a lamp bulb having a threaded neck, comprising a tubular member having apertures through the wall thereof spaced both circumferentially and axially of the member, the axial spacing being in keeping with the pitch of the threads on the neck of the bulb to be carried, a holding element lodged in each of said apertures, a collar around said tubular member and rotatable relatively thereto, said collar having a recess of varying depth therein for each said holding member, and an extra recess, means projecting into said extra recess from said tubular

member, and a spring in said extra recess abutting said means and an end of the extra recess to urge said collar toward a position with the shallower portions of the first said recesses contacting said holding elements.

3. An electrical socket for a lamp bulb having a threaded neck, comprising a tubular member having apertures through the wall thereof spaced both circumferentially and axially of the member, the axial spacing being in keeping with the pitch of the threads on the neck of the bulb to be carried, a holding element lodged in each of said apertures, an annular member movable axially on said tubular member and having a recess varying in depth for each said holding member, and resilient means around said tubular member urging said annular member toward a position with the shallower parts of said recesses contacting said holding elements.

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