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A. P. BEREJKOFF

2,405,809

INDICATOR LAMP

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Fig. 3.

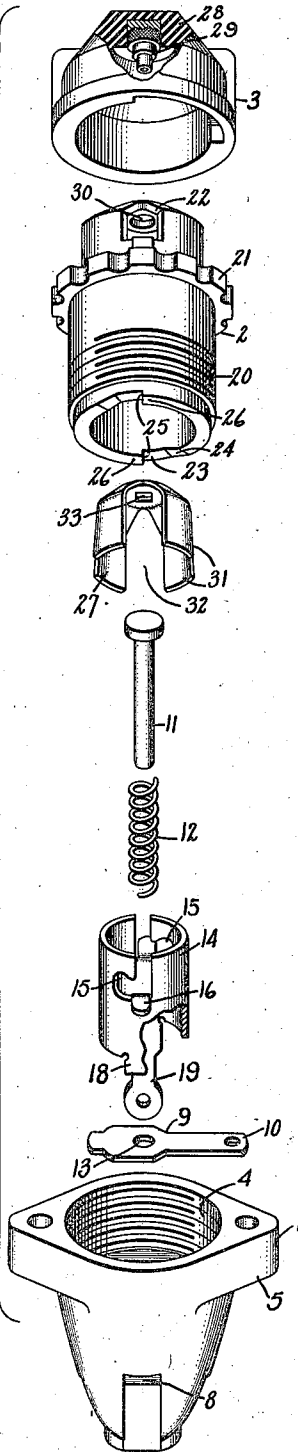


Fig. 2.

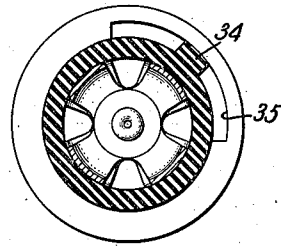


Fig. 1.

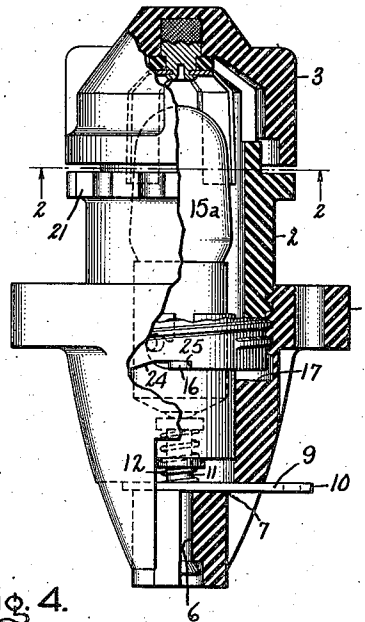
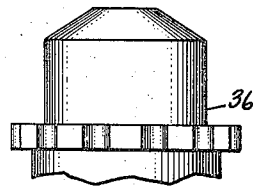


Fig. 4.



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UNITED STATES PATENT OFFICE

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INDICATOR LAMP

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11 Claims. (Cl. 177—329)

1

The present invention relates to indicator lamps such as are used for example in radio transmitters, in electronic devices and in power stations as a means of indicating an electric circuit condition, that is, as a visual indication of the opening or closing or failure of an electric circuit. Where a condition of several circuits has to be watched it has been customary to use different colored indicator or pilot lamps. In certain instances, as on aircraft and in vehicles, it is desirable to provide means for dimming and blacking out the indicator lamp. The bulbs of these lamps are small and have to be replaced from time to time. Difficulties have heretofore been experienced in the replacing of lamp bulbs. In many constructions the bulbs cannot be easily reached and manipulated in and out of their sockets upon removal of a cap of the lamp housing. In other constructions it has often occurred that the cap jammed in the base of the housing, especially when connected thereto by a screwthread.

One object of my invention is to provide an improved construction of indicator lamps whereby jamming or freezing in position of the cap in the base is precluded. Another object of my invention is to provide an indicator lamp in which the bulb can be readily replaced, and still another object of my invention is to provide an improved shutter arrangement for a lamp whereby it can be readily dimmed and blacked out.

For a consideration of further objects of my invention and of what I believe to be novel and my invention, attention is directed to the following description and the claims appended thereto in connection with the accompanying drawing.

In the drawing, Fig. 1 illustrates an indicator lamp according to my invention; Fig. 2 is a section along line 2—2 of Fig. 1; Fig. 3 is a perspective exploded view of the lamp; and Fig. 4 shows a modification of a part of the lamp of Figs. 1 to 3.

The indicator lamp (Figs. 1 to 3) comprises a housing molded from plastic material and including a base 1, a cap 2, and a hood 3. The base 1 has a cylindrical chamber with a threaded wall 4 and outer ears or lugs 5 for mounting the lamp on a switchboard or like support. The lower portion of the base has a central bore 6, a pair of diametrically opposite openings 7 (Fig. 1) and another pair of diametrically opposite openings or slots 8 circumferentially spaced from the first pair (Fig. 3). A center contact member 9 with a terminal end portion 10 is supported

2

in the openings 7 of the base. During assembly, the center contact 9 is moved into the interior of the base and the terminal end 10 is passed through one of the openings 7. A plunger 11 with a spring 12 surrounding the plunger are located in the housing. During assembly the spring 12 is positioned on the plunger and the lower end of the plunger is passed through an opening 13 of the center contact and through the bore 6 of the base. Thereupon the lower end of the plunger 11 is riveted over, as shown in Fig. 1, to locate and to retain the plunger in the casing. The plunger is biased upward by action of the spring which is firmly seated between the head of the plunger and the center contact 9, thereby making a good electrical connection between them.

A lamp socket 14 is accommodated in the base. This lamp socket has upper diametrically opposite slotted portions 15 which are adapted to make a bayonet connection with diametrically opposite pins projecting from the base of a bulb 15a. Diametrically opposite projections 16 are formed at the lower ends of the bayonet slots 15. When the socket is assembled with the housing the projections 16 are located above an annular shoulder 17 in the base, thus limiting downward movement of the socket and preventing its lower end from coming into contact with the terminal member 10. The lower end of the socket 14 has two other diametrically opposite projections 18, 19 of which the latter forms a terminal or lug. The projections 18, 19 when assembled with the base are passed through the pair of openings 8 and thereupon bent outward to lock the socket to the base and also to provide a terminal for connection to an electric circuit. The terminal 19 of the socket 14 conducts current to the shell of the bulb base whereas the center contact of the bulb is connected through the plunger 11 and the spring 12 to the aforesaid terminal 10. During insertion of a light bulb into the base the bulb is forced towards the upper end of the plunger whereby the plunger is biased downward against the force of the spring 12 until the bulb can be rotated into bayonet connection with the slots 15. A substantial portion of the bulb projects out of the base which facilitates removal and insertion of the bulb. The plunger with the spring 12 tends to force the bulb out of the base. This force is transmitted to the socket 14 which thereby is forced outward. This outward movement, however, is limited by the engagement of the

3

lateral projections 18, 19 with the upper walls in the slots 8.

The cap of the housing is essentially cylindrical and has a threaded portion 20 for engagement with the threaded portion 4 of the base. The cap has an outer scalloped flange 21 to facilitate handling during assembly and dismantling. The upper portion of the cap has a cylindrical side wall and a conically shaped top. Four circumferentially equally spaced openings 22 are formed in the upper side wall and the top through which light may be radiated or transmitted from the bulb. As these openings are formed in the top as well as in the side wall, light can be seen when the indicator lamp is viewed at different angles from the front or from the side. Means are provided to lock the cap in the base in order to prevent loosening due to vibration and also to preclude an excessive strain being put on the screwthreads of the cap and the base. This means includes the aforementioned diametrically opposite projections 16 on the socket and diametrically opposite notches 23 formed in the end face of the cap. Each of these notches has an inclined entrance surface 24 and a vertical riser or stop surface 25. The cap and the base have a right-hand thread. The thread and the socket and base are so dimensioned that upon assembly of the cap with the base the lateral projections 16 will first make contact with the end face of the cap at points 26 near the vertical risers 25, or substantially circumferentially spaced in the direction of rotation from the entrance surface 24. Once such contact is made and the cap is turned about another 100 degrees the socket is forced into the base against the biasing force of the spring 12 until the projections 16 of the socket are permitted to enter the notches 23. When this happens the socket moves slightly outward in the base. Further turning movement of the cap into the base then is precluded because of the engagement of the projections 16 with the vertical riser or notch surfaces 25. Thus, this arrangement precludes overturning and excessive stresses on the threaded portions which is especially important with a housing made of plastic or fragile material and which also may result in jamming or freezing together of the threaded portions.

The cap 2 in the arrangement of Figs. 1 to 3 is made from non-transparent plastic material. Light is transmitted only through the openings 22 in the cap. The indicator lamp includes means for controlling the amount of light transmitted through the openings 22 and for producing different color effects. This means includes the aforementioned hood 3 and a spring shutter 27. The hood 3 is made from plastic material which is transparent or translucent and may be of any desirable color. A translucent colored material is preferable because it produces greater diffusion of light. The hood has a conically-shaped end portion 28 with a molded brass insert 29. The top of the cap has a central opening 30. The shutter 27, which is punched and formed from suitable spring material, in the present example has four circumferentially equally-spaced spring portions or lobes 31 forming openings 32 between them. The brass insert 29 serves to connect and support the hood and the shutter on the cap.

During assembly the hood is attached to the non-transparent or black cap by placing it over the end face of the cap with the insert 29 projecting through the opening 30 in the end face. The shutter then is inserted into the cap and secured

4

to the insert 29. To this end the shutter has a square opening 33 for receiving the end of the insert 29. A secure connection of the shutter to the insert then is accomplished by spinning over the latter. The cap 2 has a lateral projection 34 which projects into an inner groove 35 extending over 90 angular degrees in the hood 3. Before the insert is spun over, the shutter 27 is angularly positioned so that the four lobes are in alignment or agreement with the walls of the cap 2 between the slots 22. When thus positioned the projection 34 is located in the center of the groove 35. In this position a maximum amount of light is transmitted through the openings 22 because the lobes of the shutter 27 are located between said openings. If now the hood is rotated in either direction the lobes of the shutter move gradually in front of the openings 22, thereby dimming the light and finally blacking out the light as the projection 34 reaches either end of the groove 35.

The spring shutter has spring contact with the cylindrical side walls of the cap 2 and it acts as a means for supporting the colored hood on the cap.

During operation the electric circuit to be watched is connected directly or indirectly to the terminals 10 and 19. If it is desired to dim the indicator or pilot lamp the hood 3 is turned more or less in either direction from the position in Fig. 2. The cap 2 with the hood 3 and the shutter 27 form a unit united by the metal insert 29. When it becomes necessary to replace a bulb this unit is removed from the base and a new bulb is inserted into the base.

In many cases in which the dimming feature of the lamp is not required the shutter and the hood are omitted and the lamp is provided with a closed cap 36, as shown in Fig. 4. This cap is made of plastic transparent or translucent material in any desirable color. The upper part of the cap forms a cylinder with a conical top without any openings. In all other details the cap is the same as that in Figs. 1 to 3 except that it does not have the projection 34 and the openings 30 and 22.

Having described the method of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof, I desire to have it understood that the apparatus shown is only illustrative and that the invention may be carried out by other means.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. Indicator lamp comprising a housing having a base and a cap connected thereto, the base having a central bore and a side wall with two pairs of diametrically opposite openings, a plunger with a spring disposed in the base and projecting through the bore, a center contact member with a terminal positioned in one pair of openings and engaging the spring, and a lamp socket disposed in the base and having diametrically opposite projections projecting through the other pair of openings, one of the projections forming a terminal, said socket having another pair of projections for engaging the cap.

2. Indicator lamp comprising a housing having a base and a cap screw connected thereto, the base having a central bore and a side wall with two pairs of diametrically opposite openings, a plunger with a spring projecting into the bore, a center contact member with a terminal positioned in one pair of openings and engaging the spring, and a lamp socket disposed in the base

5

and having diametrically opposite projections projecting through the other pair of openings, one of the projections forming a terminal, said socket having another pair of lateral projections, the cap having notches in its end face for receiving the lateral projections to prevent unscrewing of the cap from the base.

3. Indicator lamp comprising a housing having a base and a cap made of plastic material, the base having a chamber with a threaded portion, the cap having an outer threaded end portion screwed into the threaded portion of the base and an end face with a notch, the notch having a slanted entrance surface and a vertical end surface, a socket positioned in the base and having a lateral projection positioned in the notch to prevent loosening of the cap on the base due to vibration and to preclude excessive strain and jamming between the threaded portions of the bore and the cap, the socket having a bayonet slot, a lamp bulb having a base portion positioned in the slot, means including a spring biased plunger disposed in the base for engaging the base of the lamp bulb and forcing the bulb with the socket outward towards the end face to establish firm engagement between the notch and the socket projection.

4. Indicator lamp comprising a housing having a base and a cap made of plastic material, the base having a chamber with a threaded portion, the cap having an outer threaded end portion screwed into the threaded portion of the base and an end face with a notch, the notch having a slanted entrance surface and a vertical end surface, a socket positioned in the base and having a lateral projection positioned in the notch to prevent loosening of the cap on the base due to vibration and to preclude excessive strain between the threaded portions of the base and the cap, a lamp bulb having a base portion positioned in said socket, means including a spring biased plunger disposed in the base for engaging the base of the lamp bulb and forcing the bulb with the socket outward towards the end face, the threaded portions of the cap and the base and the notch being so dimensioned as to effect first contact between the projection and the end face of the cap at a point near the vertical end surface of the notch.

5. Indicator lamp comprising a housing having a base and a cap made of plastic material, the base having a chamber with a threaded portion, the cap having an outer threaded end portion screwed into the threaded portion of the base and an end face with a notch, the notch having a slanted entrance surface and a vertical riser surface, a lamp socket positioned in the base and having a lateral projection positioned in the notch, a lamp bulb having a base portion positioned in said socket, means including a spring biased plunger disposed in the base for engaging the base of the bulb and forcing the bulb with the socket outward towards the end face of the cap, the cap having an end portion made of non-transparent material with a plurality of spaced openings through which light is radiated from the bulb, and a shutter for controlling the transmission of light through the openings.

6. Indicator lamp comprising a housing having a base and a cap made of plastic material, the base having a chamber with a threaded portion, the cap having an outer threaded end portion screwed into the threaded portion of the base and an end face with a notch, the notch having a slanted entrance surface and a vertical riser

6

surface, a lamp socket positioned in the base and having a lateral projection positioned in the notch, a lamp bulb having a base portion positioned in said socket, means including a spring biased plunger disposed in the base for engaging the base of the bulb and forcing the bulb with the socket outward towards the end face of the cap, the cap having an end portion with an opening through which light may be transmitted, a rotatable colored light-transmitting hood enclosing the end portion, and a shutter supported on the hood for controlling the amount of light transmitted through the opening and the hood.

7. Indicator lamp comprising a housing having a base and a cap screw-connected to the base, a socket in the base for supporting a lamp, the cap having a cylindrical end portion with a conical top, circumferentially spaced openings each being formed partly in the end portion and partly in the top, a hood made of plastic light-transmitting material with a metal insert rotatably supported on the cap and a shutter having circumferentially spaced lobes secured to the metal insert for controlling the amount of light transmitted through said openings.

8. Indicator lamp comprising a housing having a base, a receptacle positioned in the base for supporting a lamp bulb, a cap adapted to enclose the bulb and being secured to the base, said cap having an end portion with a central opening and a plurality of circumferentially spaced openings, a hood made of light-transmitting material surrounding the end portion and having a pivot projecting through the central opening, and means rotatably securing the hood to the end portion and for controlling the amount of light transmitted through the openings comprising a shutter located within the cap and secured to the pivot.

9. Indicator lamp comprising a housing having a base, a receptacle positioned in the base for receiving a lamp bulb, a cap adapted to enclose the bulb and being secured to the base, said cap having an end portion with a central opening and a plurality of circumferentially spaced openings, a hood made of light-transmitting material surrounding the end portion and having a pivot projecting through the central opening, means for rotatably securing the hood to the end portion and for controlling the amount of light transmitted through the openings comprising a shutter located within the cap and secured to said pivot, and means for limiting rotation of the hood on the cap comprising a circumferentially extending groove formed in the hood and a projection on the cap extending into the groove and arranged to be centrally located in the groove when a maximum amount of light is transmitted through the openings and to engage either end of the groove when no light is transmitted.

10. Indicator lamp comprising a housing having a base and a cap made of plastic material, a receptacle disposed within the housing for mounting a lamp bulb, the cap having a cylindrical end portion with a conical top and a plurality of circumferentially spaced openings each formed in both the end portion and the top, and means for controlling the transmission of light through the openings comprising a hood made of light-transmitting material enclosing the end portion and having a pivot projecting through a central opening in the top and a shutter made of spring material and having a plurality of lobes frictionally engaging the walls inside the

7

cylindrical end portion and being securely fastened to the pivot.

11. In an indicating device for use with lamps, a housing having a base and a cap, the base having a chamber provided with a threaded portion, the cap having an outer threaded portion 5 screwed into the threaded portion of the base and also having an end face provided with a

8

notch, a lamp socket for receiving a lamp, said socket being positioned in the base and having a lateral projection positioned in the notch to prevent loosening of the cap on the base, and 5 spring means biasing the lamp socket outwardly to position said projection in said notch.

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