

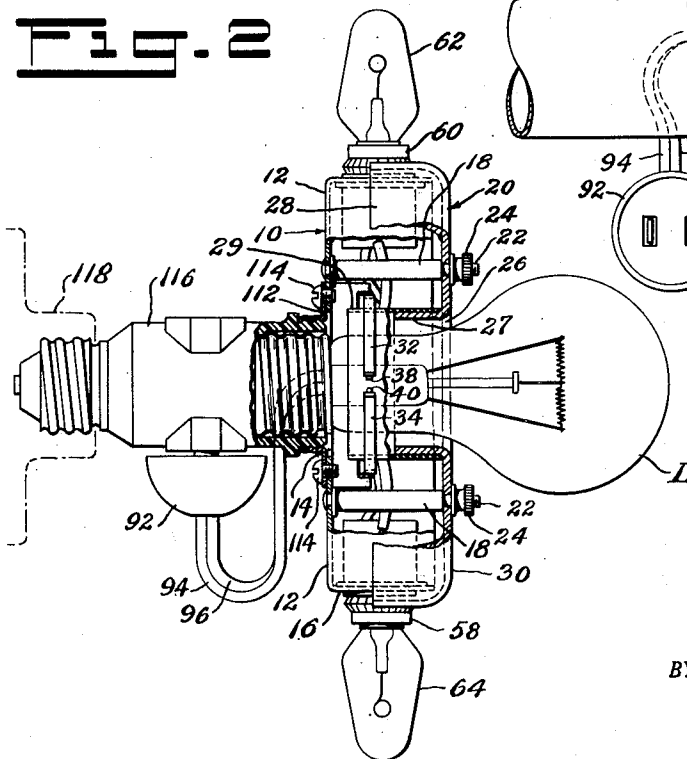
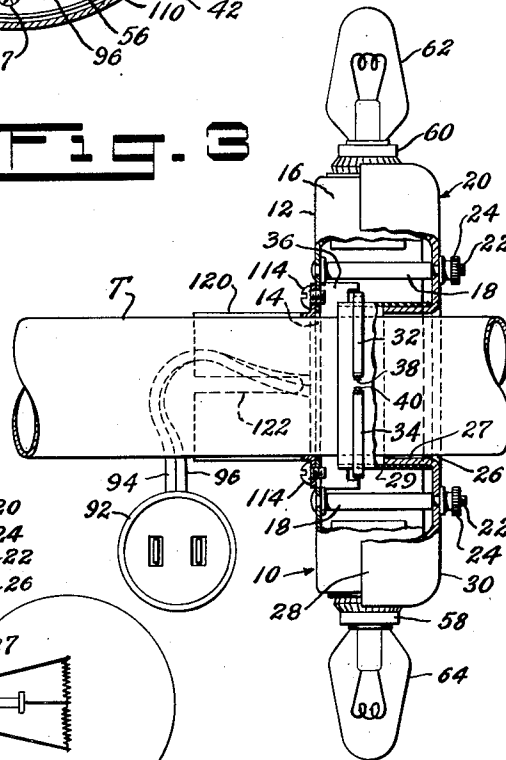
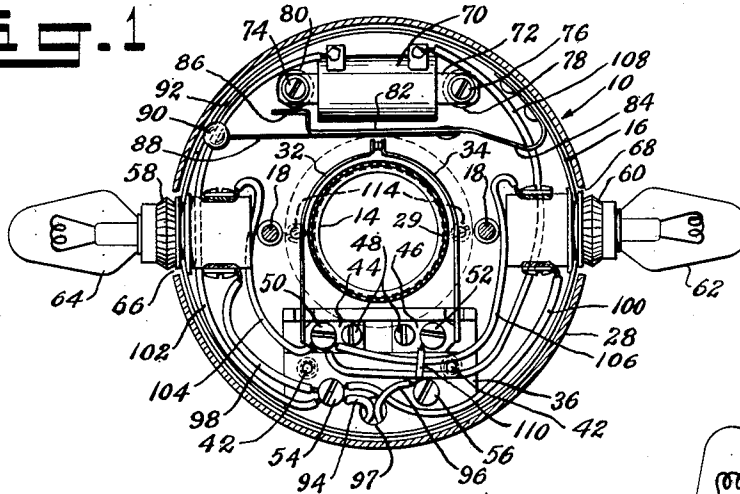
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ILLUMINATION FAILURE WARNING DEVICE

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ILLUMINATION FAILURE WARNING DEVICE

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My invention relates to electric light failure warning devices and is directed more particularly to an automatic device for warning of failure of an electric source of illumination and at the same time providing an auxiliary or substitute source of illumination until the failure is corrected.

In many places, such as in multiple dwelling buildings, factories, laboratories, hospitals, schools, institutions and other public buildings, for example, it is highly desirable or even required by law to have continuous illumination in hallways, stairways, at entrances, exits, in cellars, etc. The continuous electrical illumination supplied in such places by the usual filament-type lamps or fluorescent tubes is often interrupted by burn-outs or breakage without knowledge of the superintendent or other person in charge, resulting in a dangerous darkened condition in the area. In order to eliminate such failure of illumination and the attendant danger thereof, it is the principal object of my invention to provide a simple device for use in association with a source of electric light which gives an audible warning upon failure of the light and which also supplies auxiliary lighting upon such failure until the fault is corrected.

Another object of my invention is to provide a device of the character described which can be used with either filament-type lamps or fluorescent tube lamps and which is entirely self-contained, thereby eliminating the necessity for wiring to externally located batteries, bells, transformers, etc., as required in former warning devices.

Another object is to provide a device of the character described that is generally annular in shape and adapted in installation to be mounted in surrounding relation to either the neck of a filament-type lamp and the lamp fixture or to one end of a fluorescent lighting tube.

Another object is to provide a device of the above nature which comprises a cylindrical base structure having a vibratory signalling clapper and a cover for the base structure having a spaced cylindrical skirt portion surrounding the periphery of the base structure and adapted to be repeatedly struck by the signalling clapper to provide a loud ringing signal when the device is in actuated or warning condition.

Still another object is to provide a device of the above nature which can readily and simply be installed by anyone without the use of tools and which can be simply plugged in for electrical connection.

Further objects and advantages of my invention will become apparent as the following description proceeds and the features of novelty which characterize my invention will be pointed out with particularity in the claims annexed hereto and forming a part of this specification.

In the drawings, wherein like reference numerals denote corresponding parts throughout the several views,

Fig. 1 is a top view of a device embodying my invention with the end portion of the cover broken away to show interior construction;

Fig. 2 is a side view, with portions of the housing

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broken away, of the device shown in Fig. 1 installed for use with a filament-type of electric lamp; and

Fig. 3 illustrates the device adapted for use with a fluorescent tube.

- 5 In brief, my invention contemplates the use of a pair of arcuate bi-metallic electric contact elements supported in an annular housing so as to be controlled by heat radiating from a lamp or filament tube extending through the central opening in the housing. The housing comprises a shallow, cylindrical base member which contains an electromagnetic clapper mechanism and sockets for one or more auxiliary lamps. The auxiliary lamps and the clapper mechanism are connected in series with the bi-metallic electric contacts forming a normally-closed switch, and a source of current supply, so as to be energized when the lamp or fluorescent tube with which the device is being used fails. A cover having a peripheral skirt spaced from and surrounding the cylindrical base member completes the housing. The clapper extends through an opening in the side of that base member so as to repeatedly strike the cover when the device is actuated, whereby the cover serves as a bell for giving a loud and clear signal warning of the lamp's failure. The auxiliary lamps serve as temporary lighting until the defective lamp can be replaced.

- Referring now in detail to the drawings, the warning device embodying the invention comprises a base member 10 having an annular wall 12 with a central opening 14, said annular wall being integrally formed with a short, cylindrical wall 16 extending outwardly of the periphery of said annular wall. A pair of supporting posts 18 are riveted or otherwise securely fixed at one end at diametrically opposite positions against the inner surface of the annular wall 12 for the purpose of assembling thereto a cover member 20, similar in shape to that of base member 10 but preferably heavier, and of somewhat larger diameter. To this end the outer ends of the supporting posts 18 are of reduced diameter and threaded as at 22 for passage through complementary holes in the cover member 20, whereupon said cover member can be secured in place by a pair of thumb nuts 24 to form a housing with said base member. The base member 10 and the cover 20 are coaxially assembled relative to each other so that the central opening 26 of said cover member is in alignment with the central opening 14 of said base member. The cover 20 is formed with a short inwardly-extending sleeve 27 surrounding the central opening 26. Fitted over the inner end of the sleeve 27 is a thin cylindrical sleeve 29 of non-electrically conductive material. The cylindrical wall 28 of cover 20 is outwardly spaced from the cylindrical wall 16 of the base member 10, and the inner surface of the annular wall 30 of said cover is spaced from the outer edge of said cylindrical wall, whereby the only mechanical contact between said base member and said cover is through the supporting posts 18.

- Means responsive to heat being radiated by a lamp or fluorescent tube passing through the housing constituted by the base member 10 and cover member 20 is provided, said means comprising a pair of arcuately spaced bi-metallic elements 32, 34, mounted at one end to an insulating block 36 and having their outer ends extending toward each other around the outer surface of the sleeve 29 when the cover member 20 is in place.

- The outer ends of the bi-metallic elements 32, 34 have electrical contacts 36, 38, normally in contact engagement with each other (as illustrated in Fig. 1) but adapted to separate and break contact (as illustrated in Figs. 2 and 3) when said bi-metallic elements are heated by normal operation of the fluorescent tube or filament lamp with which the device is being used. The electrically insulating sleeve 29 protects the bi-metallic elements

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against damage upon inserting the lamp with which the device is to be used. It also offers protection against accidental shock if a tool should be inserted within the central opening of the housing by mistake.

The insulating block 36 may be secured within the base member 10 as by a pair of screws 42. The mounted ends of the bi-metallic elements 32, 34 are preferably spot welded to respective mounting lugs 44, 46 fastened to the insulating block 36 by screws 48. Electrical connection screws 50, 52 are threaded in respective openings in the lugs 44, 46 for wiring hereinbelow to be described. The insulating block 36 is also provided with a pair of terminal screws 54, 56 for anchoring the electrical wiring, as will be more particularly described below.

Mounted in diametrically opposed openings in the cylindrical wall 16 of the base member 10 are a pair of electrical sockets 58, 60 equipped with low wattage emergency lighting lamps 62, 64, as can best be seen in Fig. 1. The cylindrical wall 28 of the cover member 20 is provided with arcuate recesses 66, 68 to allow the sockets 58, 60 to extend through.

Secured within the base member 10 at a position opposite the insulating block 36 is a magnetic coil unit 70 having a laminated core 72. The coil unit is preferably mounted by means of machine screws 74, 76 extending through openings in the ends of the core 72 through respective sleeve spacers 78, 80, and into the annular wall 12 of the base member 10. An iron armature 82 having a flexible loop end portion 84 riveted or otherwise fastened to the cylindrical wall 16 of the base member 10 has its other end bent into a stepped portion 86 extending in spaced relation along one end of the core 72 to be attracted for vibratory motion when the coil 70 is excited by alternating current, as hereinbelow described. A clapper 88 is fastened to, and extends outwardly of, the armature 82. The clapper 88 terminates in a ball 90 which extends partially through an arcuate recess 92 in the cylindrical wall 16 of the base member 10. The clapper 88 is so disposed relative to the cylindrical wall 28 of the cover member 20 that when the electro-magnetic coil 70 is energized by alternating current, the armature 82 will vibrate and the clapper ball 90 will repeatedly strike the inner surface of the inner wall to sound a loud and clear alarm.

Considering now the electrical wiring of the device, it will be seen that an electrical plug 92 is interconnected with the terminal screws 54, 56 by a pair of wires 94, 96 extending through an opening 97 in the insulating block 36 and the annular wall portion 12 of base member 10. The terminal screw 54 is also connected with one terminal each of the sockets 58 and 60 and the coil 60 by insulated wires 98, 100 and 102 respectively. The remaining terminals of each of the sockets 58 and 60 and the coil 70 are connected to the connector screw 50 by insulated wires 104, 106 and 108 respectively. The connector screw 52 connected with the bi-metallic element 34 is connected to the terminal screw 54 by a short piece of insulated wire 110. It will thus be apparent that the sockets 58 and 60 and the magnetic coil 70 are all connected in parallel with the plug 92 through the contacts 38, 40 of the bi-metallic elements 32, 34.

As described above, my alarm device may be used with filament-type electric lamps or fluorescent tube lamps. In order to apply the device for use with filament-type lamps, a screw collar 112 is provided, said screw collar being removably fixed against the outer surface of the annular wall 12 of the base member 10 and in surrounding relation with respect to the opening 14 therein by two or more screws 114 (see Fig. 2). Thus, the warning device can readily be screwed upon the threaded end of an electrical adaptor 116. Use of the adaptor 116 conveniently allows plugging in the electrical plug 92 for energizing the device without the necessity of special wiring. The adaptor 116 is screwed in the usual ceiling

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or wall lamp receptacle 118 at the place where the device is to be installed. As will be apparent from Fig. 3, when the lamp L is lighted by current supplied through the adaptor 116, heat from the neck of the lamp will raise the temperature of the bi-metallic switch members 32, 34, whereupon they will separate to open the energization circuit to the auxiliary lighting lamps 62, 64 and the alarm coil 70 supplied through connecting plug 92. When the lamp L burns out or fails for any other reason other than failure of current supply, the bi-metallic switch members 32, 34 will cool off and thereupon close their electric contacts 38, 42 to close the above-described energization circuit to the emergency auxiliary lamps 62, 64 and the electromagnetic warning coil 70. Emergency lighting and audible warning of the lamp failure will continue until the inoperative lamp is replaced.

Fig. 3 illustrates the device according to the invention applied for use with a fluorescent lighting tube T. For this purpose a friction collar 120 is used instead of the screw collar 112, said friction collar having slots 122 allowing resiliency in the collar for secure mounting about one end of the tube T. The plug 92 for energizing the device will be plugged into any convenient outlet. The heat radiated from the end of the fluorescent tube T when in operation is sufficient to maintain the contacts 38, 40 open. Failure of the tube T will result in audible warning and emergency lighting by the auxiliary lamps 62, 64 as described above in connection with Fig. 2.

Obviously many modifications and variations of my invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claims, the invention can be practiced otherwise than as specifically described.

What I claim is:

1. A device for warning of electric lamp failure, comprising an annular structure having a central opening adapted to receive a body portion of the lamp, normally closed electric switch means in said structure responsive to heat radiated by the lamp when in operation, said switch means being operative to open-circuit when the lamp is in operation, electro-mechanical sounding means in said structure, circuit means including said switch means and said sounding means for energizing said sounding means when said electric switch means is closed, whereby said alarm will be sounded upon failure of the lamp, and auxiliary electric lighting means mounted on said annular structure, said electric lighting means being connected in parallel with said electro-mechanical sounding means whereby said alarm will be sounded and said auxiliary electric lighting means will be energized upon failure of the lamp.

2. The invention as defined in claim 1 including means removably secured to said annular structure for mounting said structure upon an electric lamp receptacle.

3. The invention as defined in claim 1 including means removably secured to said annular structure for mounting said structure in surrounding relation about one end of a fluorescent lighting tube.

4. The invention as defined in claim 1 wherein said annular structure comprises a cylindrical base portion and a cylindrical cover portion and spacer means between said cover portion and said base portion for holding said cover portion in spaced relation with respect to said base portion, said electro-mechanical sounding means being fixed to said base portion and having a vibratory clapper structure operative to strike said cover portion when said electro-mechanical sounding means is energized.

5. The invention as defined in claim 1 including an insulating sleeve within said central opening for shielding said heat-responsive switch means.

6. In a device for warning of failure of an electric lamp, the combination comprising, a housing member having an end wall and a peripheral side wall, a central opening in said end wall, normally closed-circuited thermally-controlled switch means within said housing and

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surrounding said central opening, a centrally-apertured cover member fixed in spaced relation to the end of said housing and having a peripheral portion surrounding said peripheral side wall in spaced relation thereto, electromagnetic strike means mounted on said housing, said strike means having a striker ball extending through an opening in said side wall and being operative to strike the peripheral portion of said cover member, said housing member and said cover member forming together an annular structure to receive therein a body portion of the electric lamp, and circuit means interconnecting said switch means and said electromagnetic striker means to energize said electromagnetic striker means when the lamp is inoperative and to de-energize said electromagnetic striker means when the lamp is operative.

7. The warning device according to claim 6 including a threaded collar fixed to said end wall in surrounding relation to said central opening therein, whereby the warning device can be screwed upon the threaded end portion of a filament lamp receptacle.

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8. The warning device according to claim 6 including a slotted collar fixed to said end wall in surrounding relation to said central opening therein, whereby the warning device can be frictionally held in surrounding relation to a fluorescent tube lamp.

9. The invention as defined in claim 6 including an auxiliary lamp mounted in said housing member, said lamp being connected in parallel with said electromagnetic striker means.

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