

PATENT SPECIFICATION

(11)

1 557 702

20

1 557 702

- (21) Application No 8717/76 (22) Filed 4 Sep 1976
 (23) Complete Specification Filed 31 Aug 1977
 (44) Complete Specification Published 12 Dec 1979
 (51) INT. CL.² F21V 25/12
 (52) Index at Acceptance
 F4R 262 266 268 27X 27Y 28Y
 312 314 316 463 46Y 511 633
 (72) Inventor JAMES CALDWELL

(19)



(54) IMPROVED INCREASED SAFETY ENCLOSURES FOR ENERGY SERVICES IN ANTI-ENVIRONMENTAL ATMOSPHERES, WITH PARTICULAR APPLICATION TO LUMINAIRES, MOTOR STARTERS, AND HEATING APPLIANCES.

(71) We, DASHGLOW LIMITED, A British Company of 30 City Road, London E.C.1, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:-

The invention relates to a lighting fitting particularly, but not exclusively, fittings for use in an explosive, hazardous, remotely hazardous, hygienic, dust or anti-environmental atmosphere.

With such fittings, the lamp is contained in an enclosure the pressure in which is maintained at a value different from the ambient pressure. Usually such enclosures would be evacuated, partially or otherwise, and maintained at a state of vacuum according to the requirements of their usage, and so constructed that a vacuum or pressure operated electrical switch or switches operated by a failure or predetermined reduction of vacuum inside the enclosure or enclosures would individually or collectively isolate the apparatus inside the enclosures from an electricity supply or any other risk medium, or alternatively, be arranged to give early alarm with subsequent isolation, so as to allow for remedial action.

According to the present invention, there is provided an electrical lighting fitting comprising a housing defining two enclosures thermally insulated from each other, a lamp, and control equipment for the lamp, the lamp being disposed in one of the enclosures and the control equipment being disposed in the other enclosure the said one enclosure being maintained at a pressure other than the ambient pressure and being provided with means for detecting a change in pressure therein the said means for detecting the change in pressure being operative to discontinue the electrical supply to the fitting in the event of a predetermined pressure change.

In order that the invention may be more

clearly understood, several embodiments of the invention will now be described, by way of example, with reference to the accompanying drawings, in which:-

Figure 1 shows a side sectional elevation of a lighting fitting.

Figure 1A shows a sectional plan view of the fitting of Figure 1 taken along the line X-X.

Figure 2 shows side elevational and plan views of an alternative form for an armature of the fitting shown in Figure 1.

Figure 3 shows a plan view similar to Figure 1A, but with additional parts of the fitting shown in position.

Figure 4 shows views of an alternative armature to that shown in Figures 1, 2 and 3.

Figure 5 shows a modification of the arrangement shown in Figure 4.

Figure 6 shows a part of an infra-lamp fitting.

Figure 7 shows a fitting which is a well glass fitting.

Figure 8 shows a fitting which is a fluorescent tube fitting, and

Figure 9 shows a fitting incorporating a low pressure sodium lamp with a protective transparent inner enclosure of synthetic plastics material.

Figure 1 is a diametrical cross section through one form of improved enclosure for a luminaire, showing a central body arrangement of an armature 1 carrying a lamp 2 and its lamp holder 3 mounted in a central cooling chamber 4 which is integral with a lamp enclosure top plate 5.

The top plate 5 is arranged to carry a gasket 6 and lamp glass 6a. Fixing hooks 7 which extend through fixing eye holes 8 are connected to spring strained wires to hold the lamp glass basket in position. Similarly, curtain wire type springs may be used instead of the spring strained wires. All external fixing devices are of stainless steel construction.

The top plate 5 also carries wiring and

50

55

60

65

70

75

80

85

90

access holes 9 and fixing holes 7a and 9 to auxiliary component boxes 33 to 37 which are mounted around the central armature.

5 The central armature cooling chamber 4 (Figure 1) and 1a (Figure 2) may be of varying shapes to suit requirements and may serve for mounting any or all of the following equipment, namely, one or more pressure switches 11 main and/or auxiliary fuses, 12, 10 thermal cut-out 13, light cell 14 and isolating switch 15. It may be fitted with an access hole and gasket if required.

15 The auxiliary component boxes 33 to 37 may be of any convenient shape, size or number as shown on Figures 1 4 and 5 for example, and are used for the temperature zoning of auxiliary components to suit their particular limitations of usage.

20 Sealing and gasketry 32 (Figure 1) of all enclosures may vary from conventional practice to the use of high temperature adhesives of all types.

25 In the preferred form shown in Figure 1, the glass lighting chamber will consist of the glass tube 6a with a bottom plate 6b or bowl held together by adhesive. Alternatively a well glass may be used.

30 These glasses will be held in position by a metallic non-corrodible basket already mentioned and located in position by adhered protuberances 6c.

35 Separate pneumatically operated electrical switches for "ON" and "OFF" and other controls may be mounted in the central armature 1 and 1a (Figure 2) or in the auxiliary component boxes 33 to 37. Suitable provision for capillary tube entry will be made. They may alternatively be of an enclosed type suitable for mounting on the top plate 9a and 10 of the armature.

40 The armature may be attached to a conduit box 23 of a fixed electrical wiring installation by means of a coaxial threaded plug 20. The base portion of the plug 20 shall carry two 45 screwed stud holes for the mounting of substantial fixing pillars for the lamp holder 17. Alternatively, a threaded two or three wire jack plug, each arranged that they themselves are sealed may be used. In a fixed 50 wiring conduit box, sealing will be effected in situ by means of epoxy putty.

55 Conventional methods of sealed wiring entry and exit using epoxy putty or equivalent when or where necessary are other alternatives.

The body of the conduit suspension box 23 supporting the fitting may be of any approved construction, with a suspension hook fitted for easy wiring.

60 A heat reflecting and light focussing reflector 24 has a heat insulating truncated cone insert 24a fitted around the lampholder 3.

65 For the purpose of relamping and cleaning the glass, the metal cage holding the glass will have two high tensile stainless stranded wires 29 passed through two elongated holes 27

each having two bobbins 28 adjacent to the holes, such that they located in a "HOLD" position permitting only a small movement of the basket and glass after the fixing springs 7 have been released. The bobbin 28 can then be rotated to pass through the elongated holes 27 and permit the glass to be lowered to the cleaning position.

70 The lowering wires may be stored on hooks 30 when not in use or may be loose and fitted with loops to thread through the holes for fixing on the hooks 30 with the connection 31a made of a semi-permanent nature affixed for maintenance purposes. A secret 75 key 31 locking feature can be fitted to the connection 20.

80 For the application of pressure to charge the enclosure, a Schrader valve with a captive sealing cover nut can be fitted to the armature top plate 9a, 10.

85 An emergency tungsten lamp 25 may be mounted in the fitting (Figure 1) and controlled by a relay 26 in one of the auxiliary control boxes.

90 In the above arrangement, in the event of a predetermined pressure rise in the enclosure housing the lamp 2, the pressure switch 11 acts to discontinue the supply to the lamp. Thus in a hazardous environment, where, for example, the atmosphere may contain explosive mixtures of gases, the danger of an explosion due to ingress of gases into the lamp enclosure on damage to that enclosure is reduced. Similarly, where the enclosure is maintained at a pressure above the ambient, the switch 11 may be made to react to discontinue the electrical supply to the lamp in the event of pressure drop on damage to the enclosure.

105 The lamp of the fitting may be tungsten filament, tungsten ballasted mercury, mercury vapour fluorescent tubes and bulbs, high pressure sodium, low pressure sodium and metal halide lamps.

110 WHAT WE CLAIM IS:-

1. An electrical lighting fitting comprising a housing defining two enclosures thermally insulated from each other, a lamp, and control equipment for the lamp, the lamp being disposed in one of the enclosures and the control equipment being disposed in the other enclosure the said one enclosure being maintained at a pressure other than the ambient pressure and being provided with means for detecting a change in pressure therein the said means for detecting the change in pressure being operative to discontinue the electrical supply to the fitting in the event of a predetermined pressure change.

125 2. An electrical lighting fitting as claimed in Claim 1, in which the means for detecting a change in pressure comprises a pressure switch.

130 3. An electrical lighting fitting as claimed in Claim 2, in which the pressure switch is set



access holes 9 and fixing holes 7a and 9 to auxiliary component boxes 33 to 37 which are mounted around the central armature.

5 The central armature cooling chamber 4 (Figure 1) and 1a (Figure 2) may be of varying shapes to suit requirements and may serve for mounting any or all of the following equipment, namely, one or more pressure switches 11 main and/or auxiliary fuses, 12, 10 thermal cut-out 13, light cell 14 and isolating switch 15. It may be fitted with an access hole and gasket if required.

15 The auxiliary component boxes 33 to 37 may be of any convenient shape, size or number as shown on Figures 1 4 and 5 for example, and are used for the temperature zoning of auxiliary components to suit their particular limitations of usage.

20 Sealing and gasketry 32 (Figure 1) of all enclosures may vary from conventional practice to the use of high temperature adhesives of all types.

25 In the preferred form shown in Figure 1, the glass lighting chamber will consist of the glass tube 6a with a bottom plate 6b or bowl held together by adhesive. Alternatively a well glass may be used.

30 These glasses will be held in position by a metallic non-corrodible basket already mentioned and located in position by adhered protuberances 6c.

35 Separate pneumatically operated electrical switches for "ON" and "OFF" and other controls may be mounted in the central armature 1 and 1a (Figure 2) or in the auxiliary component boxes 33 to 37. Suitable provision for capillary tube entry will be made. They may alternatively be of an enclosed type suitable for mounting on the top plate 40 9a and 10 of the armature.

45 The armature may be attached to a conduit box 23 of a fixed electrical wiring installation by means of a coaxial threaded plug 20. The base portion of the plug 20 shall carry two screwed stud holes for the mounting of substantial fixing pillars for the lamp holder 17. Alternatively, a threaded two or three wire jack plug, each arranged that they themselves are sealed may be used. In a fixed 50 wiring conduit box, sealing will be effected in situ by means of epoxy putty.

55 Conventional methods of sealed wiring entry and exit using epoxy putty or equivalent when or where necessary are other alternatives.

The body of the conduit suspension box 23 supporting the fitting, may be of any approved construction, with a suspension hook fitted for easy wiring.

60 A heat reflecting and light focussing reflector 24 has a heat insulating truncated cone insert 24a fitted around the lampholder 3.

65 For the purpose of relamping and cleaning the glass, the metal cage holding the glass will have two high tensile stainless stranded wires 29 passed through two elongated holes 27

each having two bobbins 28 adjacent to the holes, such that they located in a "HOLD" position permitting only a small movement of the basket and glass after the fixing springs 7 have been released. The bobbin 28 can then be rotated to pass through the elongated holes 27 and permit the glass to be lowered to the cleaning position.

70 The lowering wires may be stored on hooks 30 when not in use or may be loose and fitted with loops to thread through the holes for fixing on the hooks 30 with the connection 31a made of a semi-permanent nature affixed for maintenance purposes. A secret key 31 locking feature can be fitted to the connection 20. 75

80 For the application of pressure to charge the enclosure, a Schrader valve with a captive sealing cover nut can be fitted to the armature top plate 9a, 10. 85

An emergency tungsten lamp 25 may be mounted in the fitting (Figure 1) and controlled by a relay 26 in one of the auxiliary control boxes.

90 In the above arrangement, in the event of a predetermined pressure rise in the enclosure housing the lamp 2, the pressure switch 11 acts to discontinue the supply to the lamp. Thus in a hazardous environment, where, for example, the atmosphere may contain explosive mixtures of gases, the danger of an explosion due to ingress of gases into the lamp enclosure on damage to that enclosure is reduced. Similarly, where the enclosure is maintained at a pressure above the ambient, the switch 11 may be made to react to discontinue the electrical supply to the lamp in the event of pressure drop on damage to the enclosure. 100

105 The lamp of the fitting may be tungsten filament, tungsten ballasted mercury, mercury vapour fluorescent tubes and bulbs, high pressure sodium, low pressure sodium and metal halide lamps. 110

WHAT WE CLAIM IS:-

1. An electrical lighting fitting comprising a housing defining two enclosures thermally insulated from each other, a lamp, and control equipment for the lamp, the lamp being disposed in one of the enclosures and the control equipment being disposed in the other enclosure the said one enclosure being maintained at a pressure other than the ambient pressure and being provided with means for detecting a change in pressure therein the said means for detecting the change in pressure being operative to discontinue the electrical supply to the fitting in the event of a predetermined pressure change. 115

2. An electrical lighting fitting as claimed in Claim 1, in which the means for detecting a change in pressure comprises a pressure switch. 120

3. An electrical lighting fitting as claimed in Claim 2, in which the pressure switch is set 125 130

to react to a fall in pressure to discontinue the electrical supply to the lamp.

5 4. An electrical lighting fitting as claimed in Claim 2, in which the pressure switch is set to react to a rise in pressure to discontinue the electrical supply to the lamp.

10 5. An electrical lighting fitting as claimed in any preceding claim, in which the two enclosures are thermally insulated from each other by means of a heat reflecting screen.

15 6. An electrical lighting fitting as claimed in Claim 5, in which the screen coaxially surrounds the lamp holder and also serves as a light focussing reflector.

20 7. An electrical lighting fitting as claimed in any preceding claim, in which the lamp is tungsten filament, tungsten ballasted mercury, mercury vapour fluorescent tubes or bulbs, high or low pressure sodium or metal halide.

8. An electrical lighting fitting as claimed in any preceding claim, in which the said one enclosure is partially defined by a well glass.

25 9. An electrical lighting fitting as claimed in any of Claims 1 to 7, in which the said one enclosure is partially defined by a glass tube closed at its lower end by a glass plate.

30 10. An electrical lighting fitting as claimed in Claim 9, in which the tube and plate are connected by adhesive.

11. An electrical lighting fitting as claimed in Claim 10, in which the adhesive is an epoxy resin.

12. An electrical lighting fitting as

35 claimed in any of Claims 8 to 11, in which the glass partially defining the said one enclosure is supported in a basket.

40 13. An electrical lighting fitting as claimed in Claim 12, in which the basket is supported from a plate surrounding and fixed to the body of the fitting by means of detachable springs.

45 14. An electrical lighting fitting as claimed in Claim 13, in which the basket is also connected to the body of the fitting by elongate flexible elements enabling the glass to be gently lowered from the lamp after detachment of the springs to enable lamp maintenance.

50 15. An electrical lighting fitting as claimed in any preceding claims, in which the supply to the lamp is through a screw connection.

55 16. An electrical lighting fitting as claimed in any preceding claim, in which the supply to the lamp is through a jackplug connection.

60 17. An electrical lighting fitting substantially as hereinbefore described with reference to Figures 1, 1A, 2 and 3, or Figure 4 or Figure 5 or Figure 6 or Figure 7 or Figure 8 or Figure 9 of the accompanying drawings.

Agents for the Applicants

65 WILSON GUNN & ELLIS
Chartered Patent Agents
41 Royal Exchange
Manchester M2 7DB

