Jan. 2, 1962 W. J. CHESKE 3,015,682

FLUORESCENT BALLAST CLOSURE MEANS AND METHOD OF APPLYING SAME

Filed Oct. 23, 1959

Fig. 1.

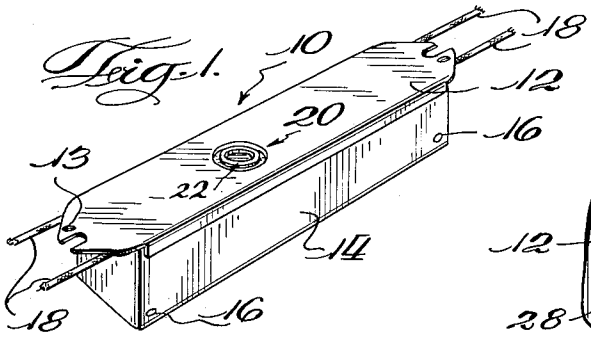


Fig. 2.

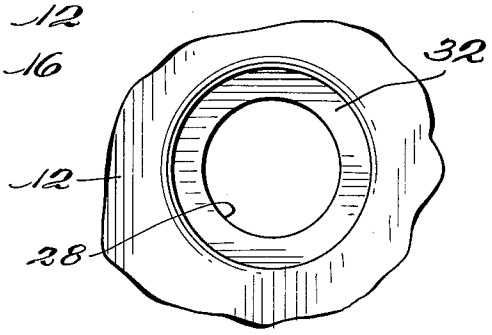


Fig. 6.

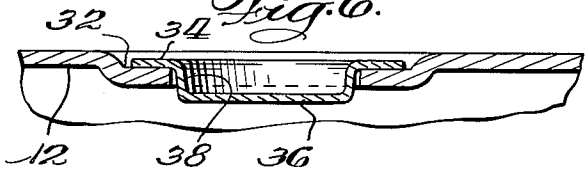


Fig. 3.

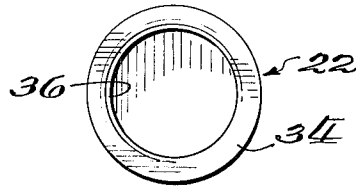
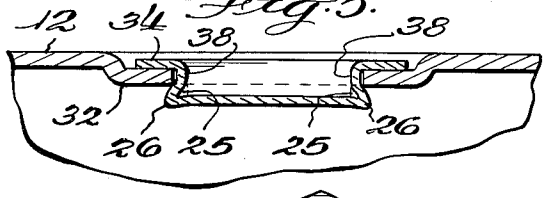


Fig. 5.



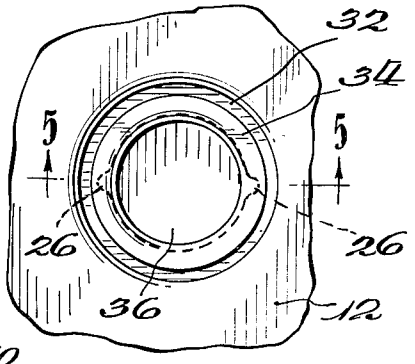


Fig. 4.

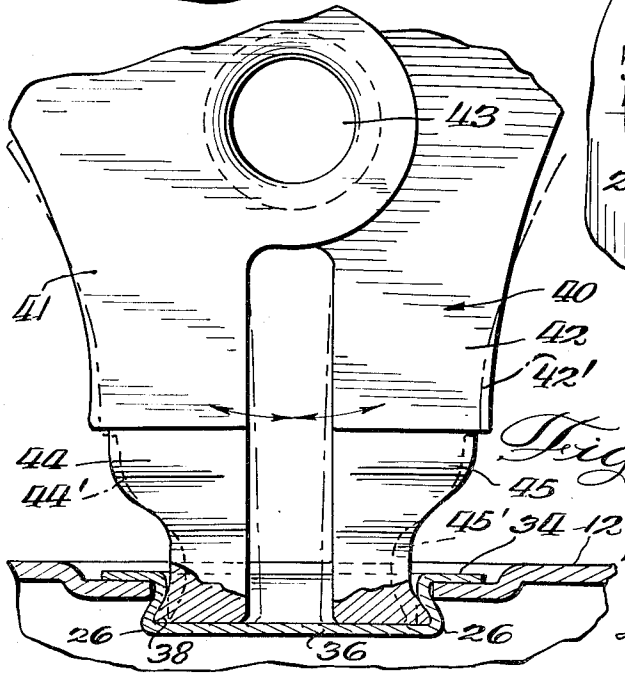


Fig. 7.

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FLUORESCENT BALLAST CLOSURE MEANS AND METHOD OF APPLYING SAME

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9 Claims. (Cl. 174—52)

This invention relates generally to the encapsulation of fluorescent ballast assemblies with materials such as pitch, tar and the like, and more particularly concerns the provision of novel closure means for canisters containing assemblies of electrical components for fluorescent ballasts whereby same may be filled with such materials in processes involving the minimum amount of exposure of the said electrical components, and said invention is also concerned with the provision of a novel method of applying said closure means with great accuracy, efficiency and rapidity.

Fluorescent ballasts of the character with which this invention is concerned are generally encased in metal canisters comprising open elongate rectangular containers each having a base and surrounding side walls, and a cover member having means for attaching same to a fixture housing fluorescent lamps or other electrical connecting means. The components comprising the electrical means of said ballast are disposed within the container and means are provided for electrically connecting said components to leads which in turn connect same within the fluorescent lamp circuit. Means are provided allowing passage thereof through the canister. The compact nautre of said ballasts necessarily requires a substantial percentage of the available spatial area within said canister to be devoted to the arrangement of said components, and gives rise to problems of heat dissipation, insulation of said components from the canister, vibratory movements therein which may cause substantial undesirable auditory effects, and sealing said ballast as a unit from the passage of moisture and/or dust thereinto from the exterior thereof.

The art has long known the use of asphaltic filler materials such as pitch compounds and the like in the prevention of the various disadvantages and problems enumerated above. The art has also long recognized that the older methods of applying said materials to the ballasts, which involve the filling of said ballasts with the covers off and the components therein actually exposed to the moisture and dust laden atmosphere, often did not provide adequate protection for said components against the effects of moisture and the like. Inadequate fill and resulting air pockets were also created within the components and canister in structures filled by gravity.

The art also has recognized that the most efficient method of adequately insuring proper fill of said ballasts would be to fill same with the material and having as little of the interior of said ballast exposed to the air. This process involved the forcing of very hot pitch like material into the ballast and then sealing same. Although the "pressure filling" process was most desirable, the impassable barrier preventing its widespread use, especially in the mass production quantities and speeds required by manufacturers of these units, was the failure of the art to provide adequate sealing means for said canisters which insure a tight closure therefor and which may be readily and speedily installed.

Some suggestions involved the swaging by soldering means of caps of various types. Some closures were suggested whereby bayonet type caps were used, usually requiring complicated flange means both on the

cover and upon the cap proper. Moreover, most of these suggestions required the cap to penetrate so deep into the ballast canister that said cap would touch one of the components causing a shorted connection and inoperability thereof. The presence of films or even substantial quantities of the pitch material upon the entry area of the said material interfered with proper swaging, most types of solder being unable to form a bond through said films or material. In addition, swaging also demanded too substantial a quantity of labor, thereby increasing cost of manufacture and thereby rendering such process uneconomical.

It is the primary object of this invention to provide a novel closure for a fluorescent ballast and to provide a method for utilizing said closure so as to substantially eliminate the disadvantages of prior devices enumerated above.

Another object of this invention is to provide a simple closure structure whereby a fluorescent ballast may be potted with its cover secured to the canister shell and utilizing processes known as "pressure filling" to accomplish the potting thereof.

A further object of the invention is the provision of a simple dish-like closure member for a ballast canister which may be readily inserted in means provided in the said canister and secured in sealing relationship thereto.

A still further object of the invention is the provision of a thin dish-like closure member for a ballast canister adapted for use to seal said canister after same has been force-filled with pitch material and the like, said closure also adapted to be permanently sealed therein by expanding small portions of the walls thereof while said closure is seated within an opening provided in said canister.

Another object of the invention is the provision of a method whereby said closure member may be applied to said canister and permanently sealed therein, said method comprising seating said closure in an opening provided in said canister after same has been filled with pitch material or the like, and expanding said closure while same is within said opening, said points of expansion being of small dimension and arranged at the juncture of the base of said closure and its wall.

Still additional objects and advantages of the invention comprising the novel closure means and method of applying same will become evident from the description and drawings illustrating in detail a preferred embodiment thereof and as described in the appended claims. It should be stated that numerous changes in size, dimensions, and other minor details therein are contemplated by the invention without departing from the scope and teachings thereof as defined in the language of the claims commensurate with the advance in the art contributed by the invention.

Now, referring to the drawings in which

FIG. 1 is a reduced perspective of a filled ballast having the novel closure means embodying the invention installed thereon.

FIG. 2 is a fragmentary plan view of a portion of the cover of said ballast prior to the placement of the closure member in position.

FIG. 3 is a plan view of the closure member prior to placement on and securement upon said ballast.

FIG. 4 is a fragmentary top plan view of the cover shown in FIG. 2 but with the closure member secured therein.

FIG. 5 is a section taken along the lines 5—5 of FIG. 4 and in the direction indicated.

FIG. 6 is a view as in FIG. 5 but prior to securement of said closure.

FIG. 7 is an enlarged diagrammatic view illustrating a preferred method of installing said closure.

The ballast **10** of FIG. 1 has a canister body **14** in which are disposed the electrical elements with their leads **18** protruding from suitable openings in the ends (not shown), the canister body being covered by a tightly fitting sheet metal cover member **12** which may be secured upon said canister by rivets **13**, welding or other fastening means. The body **14** and the cover **12** have cooperative ears through which the rivets **13** thread, as well-known in this art.

In the ballast **10**, it may be assumed that the entire ballast has been assembled completely dry, and closed off after the same is ready to be filled with potting compound.

The top of the cover **12** has a circular opening **28** punched or otherwise formed therein, provided in a shallow depression or seat **32** that is formed in the cover. The diameter of the opening is chosen so as to accommodate the dispensing head of compound filling apparatus which may be utilized, and the seat **32** provides an annular socket or the like whose depth is preferably no more than the thickness of the sheet metal from which the cover **12** is formed. The potting compound dispensing head (not shown) is intended to fit onto the seat **32** and when this is done, the hot potting compound is forced into the interior of the canister **14** until the same is full. Completeness of fill is indicated by means such as relief openings **16** provided either in the canister as shown or in the cover **12**. The openings are of small diameter to allow passage of air thereout, but will not allow excess compound to escape. Oozing of compound past the leads **18** also indicates the completeness of fill within the ballast. Any other method of gauging the completeness of fill of said ballast may also be utilized.

In FIG. 1 the ballast is shown with a seat and closure arrangement generally designated in operative position by reference character **20**. Thus far attention has been devoted to the opening **28** and seat **32** provided in the cover **12**. A description of the closure member which is designated generally by reference character **22** will follow. Referring to FIGS. 3 and 6, said closure **22** is annular in configuration, having a center well **35** which provides an annular external male formation **36** of suitable diameter to fit securely within opening **28**. The closure **22** has a rim **34** which is of annular configuration surrounding the well **35** and is of suitable dimensions to seat upon the annular depression **32** and provide a relatively smooth unobstrusive engagement to the top surface of the cover **12**. The wall **38** of the male formation **36** is smooth without any protruding portions, notches or other means thereon for engagement within said opening. The closure **22** is placed in position with its rim **34** seated upon said depression **32**. Once in position, a pair of oppositely spaced shallow depressions **25** are made in the wall **38** of the formation **36** by expanding the said formation at oppositely spaced points through the use of a tool such as shown in FIG. 7. The resulting points of expansion or pimples **26** extend outwardly from said formation **36** permanently securing said closure **22** within the opening **28**.

The tool which may be a pair of pliers **40** having arms **41** and **42** pivotally arranged at **43** so that pressure upon said tool opens jaws **44** and **45** secured upon respective arms **41** and **42**. The closure **22** may be held by said tool though the exertion of light pressure upon the inner wall **38** within the well **35** of said closure. This stage is indicated by the position of said arms **41'** and **42'** and jaws **44'** and **45'** in FIG. 7. The closure may then be placed within the opening **28** with the rim **34** resting in engagement with the seat **32**. When said closure is in proper position, greater pressure may be then exerted whereby the jaws **44** and **45** form said depressions **25** within said wall **38** resulting in said pimples **26**. Pressure upon the tool may be released and the tool removed from the well **36**. The sealing of said ballast after filling thereof is then thus accomplished, no further swaging, soldering, etc. being necessary—a tight, permanent connection being provided by the invention.

The resulting assembly is one which extends only slightly below the surface of the cover **12** and which presents no protuberance whatsoever to the surface of the ballast **10** being completely flush with the cover. There is no chance of damaging any of the component elements within said ballast nor is there a chance of grounding or shorting thereof because of any long plug member.

Adaptation of said closure and method of installation to modern mass production, in line or batch type processes of manufacture is readily possible. These adaptations to mass production may be accomplished by retaining the manual operations involving use of said pair of adapted pliers as described herein, or by providing automatic means whereby all the steps are accomplished by a machine. In such latter processes, the closure members are individually picked from a group thereof, held and placed within said opening and then expanded at the desired points automatically; said adaptations being rendered possible due to the unique conception of the invention.

The rapidity of this process is unexcelled and many adaptations thereof are possible utilizing the basic structure and method disclosed herein. It is believed that the invention has been described in sufficient detail so as to enable the same to be practiced by anyone skilled in the art as required by the patent statutes. It is desired to be limited in the scope of the invention only as defined in the appended claims.

I claim:

1. In a ballast for the operation of fluorescent lamps, said ballast including a canister body and a cover member therefor, said canister containing electrical components therein adapted to be immersed in a potting compound, and there being electrical leads extending externally from said canister, said cover having an opening provided therein for forceful introduction of molten potting compound into the interior of said canister; means for seating a closure member upon said cover for closing of said opening, said closure member comprising an annular sheet metal dish adapted to fit within said opening and having means permanently securing same within said opening.

2. The combination as described in claim 1 in which said means for seating said closure member comprises an annular depression formed in said cover member, and said opening is coaxial of said depression.

3. The combination as described in claim 1 wherein said means for permanently securing said closure member within said opening comprises a pair of diametrically opposite expanded portions extending outwardly from base of said closure member.

4. The combination as described in claim 1 wherein said closure member comprises an annular dish-like plug having a well portion and a rim portion, said rim portion adapted to seat upon said seating means, and said well portion being tightly fitted into said opening, and said means for securing said closure within said opening comprises a pair of shallow depressions at the bottom portion of the wall of said well portion and diametrically opposed one to the other.

5. In a ballast for the operation of gaseous discharge lamps including a canister body and cover therefor, said canister adapted to house electrical components for said ballast and having lead wires extending therefrom, pressure relief openings formed therein and adapted to be filled with potting compound, the improvement comprising a depression formed in said cover, said depression having an opening therein adapted for entry of hot potting compound therethrough, and said depression forming seating means, and closure means adapted to seat upon said seating means for sealing said opening from the exte-

rior of said ballast, and means formed within said closure means permanently securing same within said opening, said closure means comprising an annular dish member of thin metal material, said dish having a flat base portion and a wall portion, said portions forming a well therein and said dish having an annular lip portion adapted to seat upon said seating means, and said securing means comprising a pair of opposite shallow depressions within said well portion at the juncture of said wall and said base of said dish member, said depressions thereby forming outwardly extending protrusions preventing the movement of said closure within said opening.

6. In a ballast including a cannister body, a potting-compound-introducing opening in the ballast having an annular seat coaxial therewith defining the edges of said opening, a shallow dish-like sheet metal plug fitted in said opening and having an annular side wall extending at least partially past the opening into the interior of the ballast, lateral projection means in said wall extending radially outward of and beneath said edges permanently to lock said plug in said opening.

7. A method of sealing a ballast canister subsequent to the potting thereof with potting compound and said canister having a closure-receiving opening, said method comprising the steps of seating a dish-shaped closure member having a center well within said opening, inserting an expandable jaw tool in the well formed in said closure and expanding the wall thereof at a pair of opposite points below the opening whereby said closure is permanently installed therein, and removing the tool therefrom.

8. A method as described in claim 7 wherein said dish-shaped closure is grasped and placed within the said opening by means of said expandable-jawed tool.

9. A method of sealing a ballast canister adapted to contain electrical components therein and having leads extending outwardly therefrom and pressure relief openings being provided with said canister, said canister having a cover member tightly secured thereto, said cover member having formed thereon an annular depression defining an opening formed therein and adapted to seat a dish-shaped closure member thereon, and the entire assembly adapted to be filled by force feeding of hot potting compound, said sealing method comprising the steps of grasping the said dish-shaped closure member with the jaws of a pair of expandable pliers, seating said closure within said opening whereby the same is tightly engaged therein, exerting pressure upon the plier tool to expand said jaws, forming a pair of oppositely disposed depressions in the inner surface of said closure member adjacent the lower portion of the wall thereof whereby the said depressions result in outwardly extending shallow protrusions adapted to secure said closure permanently within said opening, and relaxing pressure upon said pliers retracting said jaws and removing same from the well of said closure.

References Cited in the file of this patent

UNITED STATES PATENTS

1,702,159	Grunow	Feb. 12, 1929
2,464,971	Flood	Mar. 22, 1949
2,627,538	Brennan	Feb. 3, 1953