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[54] **READILY REPLACEABLE JEWEL LAMP ASSEMBLY FOR JACK PANELS**
8 Claims, 3 Drawing Figs.

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[51] **Int. Cl.** **G09f 9/14**
[50] **Field of Search** ..... 340/381, 383; 240/52.1, 102 A, 152

[56] **References Cited**
UNITED STATES PATENTS

3,473,015 10/1969 Haas et al. 240/152

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ABSTRACT: A readily replaceable jewel lamp assembly for jack panels has a metal sleeve structure and a molded jewel cap so dimensioned as to provide an assembly which will maintain itself frictionally in position in a panel aperture. The metal sleeve forming part of the assembly at all times functions to grip a miniature lamp whether the assembly is within or outside of the plastic panel support. Once the assembly and lamp are free of the panel support, the miniature lamp may be readily removed and replaced. The metal sleeve is provided with suitable slots and is so shaped that one end of such sleeve, remote from the jewel cap, may be readily sprung to insert or remove the miniature lamp. The jewel cap itself telescopes an end of the metal sleeve so that the two will remain locked so long as the assembly is disposed within the aperture of the panel. The construction essentially depends upon the spring of metal as distinguished from plastic so cold flow of plastic has minimal effect upon the characteristics of the entire assembly.

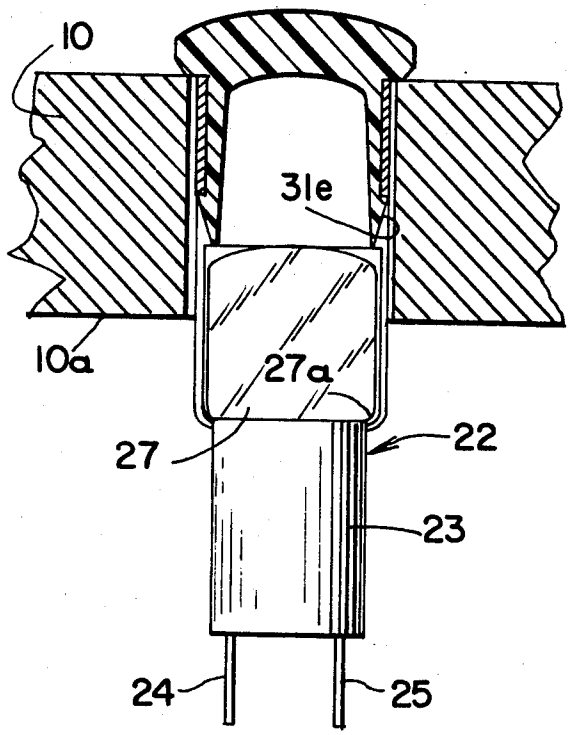


FIG. 1

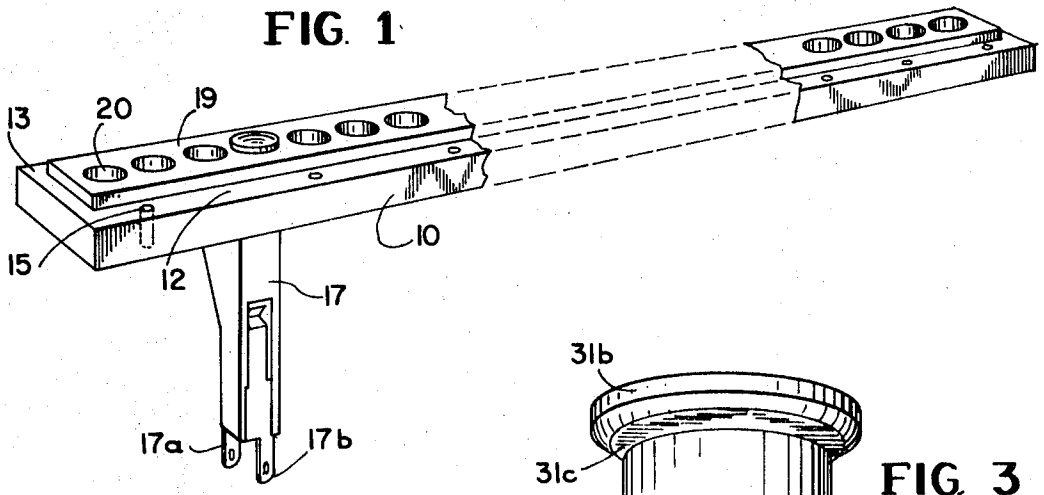
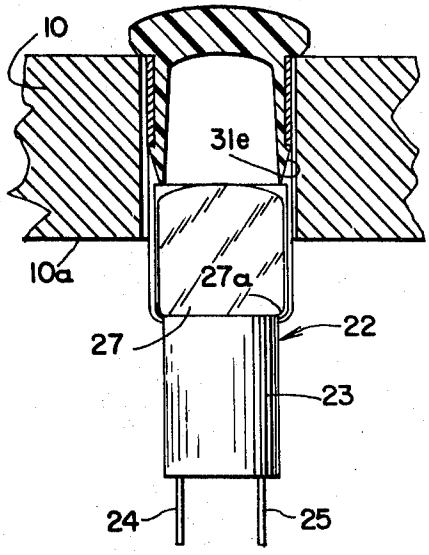


FIG. 2



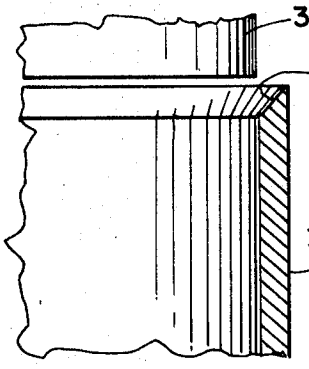
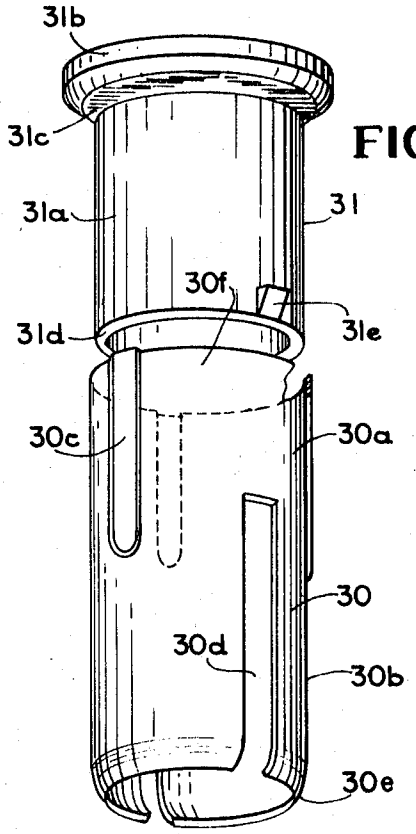


FIG. 4

FIG. 3



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READILY REPLACEABLE JEWEL LAMP ASSEMBLY FOR JACK PANELS

This invention relates to a jewel assembly primarily for use in panels for communication and instrumentation systems although not limited to miniature construction. In many switchboards for use with signal and/or communication equipment, panel strips having closely spaced, aligned aperture therethrough, are used for receiving and retaining jewel assemblies including a signal lamp. The lamp is usually connected so when energized it may indicate the status of a circuit. As an example, panel strips of this character may have suitable lengths, having rows of ¼-inch (or larger) apertures therethrough, adjacent apertures being closely spaced.

The dimensions herein given and the spacing represent standard prevailing in the industry for small jewels used in large quantities in telephone systems. It is understood, however, that the invention is not limited to any particular jewel size although the advantages of the invention are best appreciated in connection with small jewel assemblies.

A panel containing a large number of jewels closely spaced and installed in a complicated wiring system presents problems not only in connection with the large number of jewel lamps in a rather limited space, but also presents problems in connection with disposing a jewel assembly in position or removing a jewel assembly from a panel for renewing a burned out jewel lamp. Lamps used in connection with such small jewel assemblies are of the incandescent type, each requiring about 1 watt of electrical energy for operation. The panel members for receiving and supporting jewel assemblies are usually of rigid plastic, such as Bakelite or other suitable material, and have a large number of closely spaced lamp jewel assemblies supported therein under adverse conditions for dissipation of heat.

A substantial portion of a jewel assembly, particularly the lamp, is disposed within or near the body of the panel member providing jewel support so that temperature buildup, due to lamp energization, occurs. Hitherto, jewel assemblies have consisted of translucent plastic parts not supporting and usually free of a small lamp. Such jewel assemblies rely on snug-fitting plastic in the panel. A continuous energization of lamps with the limited heat radiation conditions existing has resulted in jewel assemblies reaching temperatures of well over 100° F.

It is well known that plastics are subject to cold flow and this manifests itself in a jewel assembly becoming loose in its panel mounting. Cold flow occurring in conventional jewel assemblies results in reduction or disappearance of frictional retaining force necessary to hold a jewel assembly in position. In addition, the lamp associated with a jewel is difficult to handle from the front of a panel.

This invention provides a jewel assembly which can include a jewel lamp and has outstanding advantages over present day jewel assemblies in being free of cold flow problems; maintaining its mechanical characteristics for unimpaired retention in a panel; and for functioning at all times as a holder for a lamp so that the latter may be inserted into or removed from its jack socket. As a result of the invention, the new jewel makes it possible to remove the jewel assembly and the lamp for such assembly summarily and reposition the jewel assembly and a lamp entirely from the front of a panel without special tools.

The invention contemplates the combination of a metal sleeve and a molded jewel cap to provide a jewel assembly which will maintain itself frictionally in position in a panel aperture indefinitely under normal conditions of temperature without gradual deterioration of retention due to cold flow. The metal sleeve forming part of the new jewel assembly is so constructed that it can at all times function as a gripping means for retaining a lamp when the jewel assembly is within or outside of the body of the plastic panel support. Once the jewel assembly and lamp are free from the panel support, the lamp itself may be easily removed and replaced. The metal sleeve and molded jewel cap cooperate so that the two remain tightly coupled together as an assembly as long as the jewel assembly is within a panel support, but may be easily separated when the jewel assembly is free of such panel support.

The invention will now be described in connection with the drawings wherein:

FIG. 1 is a perspective view of a panel board member showing a jack rigidly attached thereto at the bottom of said panel board member and having a jewel assembly positioned in said panel member in appropriate relation.

FIG. 2 is an enlarged detail of a portion of the panel member showing the jewel assembly in position in said panel member, this view omitting the jack and showing portions of the jewel assembly in section.

FIG. 3 is an exploded perspective view with certain parts broken away showing the new jewel assembly.

FIG. 4 is an enlarged view of portions of the jewel assembly to show the bevel edge of the metal sleeve portion of the jewel assembly.

Referring to the drawing, molded plastic panel strip **10** has longitudinal jack-mounting side portions **12** and **13** along the length thereof, such side portions having suitable small apertures **15** therethrough at spaced intervals. Apertures **15** may be threaded or not and are provided for the purpose of not only mounting panel strip **10** in a large panel frame, but also for securing jacks **17** or other devices thereto by suitable screws. Disposed between side portions **12** and **13** is panel body portion **19** whose top surface is above the level of the top surfaces of portions **12** and **13**. Panel portion proper **19** has a number of aligned apertures **20** therethrough, such row of apertures extending for the length of panel member **10**. As a rule, panel member **10** is of molded thermoset plastic having suitable strength and having electrically insulating qualities. The structure so far described in the art has been used widely in telephone and communication systems.

One popular size of such panel member has each aperture **20** substantially one-fourth of an inch in diameter with the thickness of the entire panel member at face **19** being substantially three-eighths of an inch. Spacing between adjacent apertures **20** will vary but in general the spacing may be less than the diameter of an aperture **20**. In some instances, a spacing less than one-eighth of an inch is provided between adjacent apertures while in other instances the spacing between adjacent apertures may be less than one-sixteenth of an inch. The particular details with regard to the amount of spacing between adjacent apertures forms no part of the present invention and is determined largely by customer requirements.

While one jack **17** is illustrated, it will be understood that a full complement of jacks may be provided, there being one jack for each aperture **20**. A jack is generally bolted to panel member **10** along the bottom face along one of the side regions **12** or **13**. Generally, each jack **17** contains two spring contact clips **17*a*** and **17*b*** rigidly secured to the jack body. Spring clip **17*a*** and **17*b*** are adapted to be connected by wires to a suitable source of electric current and function to energize a conventional miniature lamp generally indicated by **22**. Lamp **22** has plastic cylindrical base **23** with two stiff wire contact pins **24** and **25** extending below the bottom of base **23**. Cemented in the top end of base **23** is glass lamp bulb **27**. Bulb **27** is cylindrical and contains a filament therein. Lamp **22** is small enough to be disposed within aperture **20** of panel member **10**. Bulb **27** has bottom portion **27*a*** curved inwardly to extend into the interior of base **23**. Thus, bulb portion **27*a*** constitutes a minute but definite neck. Lamp **22** as illustrated, including neck portion **27*a***, is conventional and has long been used in connection with jewel assemblies. The present invention takes advantage of neck portion **27*a*** for lamp retention.

The jewel assembly includes metal sleeve **30** and molded jewel cap **31**. Sleeve **30** is of any desired metal such as brass (although other metals may be used) and preferably has some elasticity. The thickness of the metal used may vary within limits and will depend in some measure upon the desired stiffness of the sleeve parts. Metal sleeve **30** has top portion **30*a*** and bottom portion **30*b***. Top portion **30*a*** has a number of elongated bosses **30*c*** extending longitudinally of cylindrical

sleeve 30 for a substantial part of the thickness of panel portion 10. The sleeve length itself is somewhat greater than the maximum thickness of panel element 10, this maximum being measured at face 19. As an example, with a three-eighths of an inch thick panel member 10 (this is usually standard for that face) sleeves 30 may have a length about seven-sixteenths of an inch so that bottom portion 30*b* can project somewhat below the bottom face 10*a* of the panel member. As an example, bosses 30*c* may extend down toward bottom portion 30*b* almost one-half of the sleeve length.

The width of bosses 30*c* should be great enough to insure a desired frictional fit within aperture 20. Sleeve 30 has a number of bosses 30*c* at angularly spaced intervals and, as illustrated, may have three such bosses spaced at 120° apart. The top edge 30*f* of sleeve 30 is preferably bevelled internally.

Bottom portion 30*b* of sleeve 30 has extending from the bottom end thereof longitudinal slots 30*d* at circumferentially spaced intervals. As shown here, two diametrically opposed slots 30*d* are provided, such slots extending preferably over one-half the sleeve length beyond the blind ends of bosses 30*c* toward the top end of the sleeve. The blind ends of slots 30*d* terminate in flat edges. Slots 30*d* are angularly staggered with respect to bosses 30*c*. Due to the fact that two slots are provided whereas three bosses are provided, the angular stagger will not be uniform. However, that is of no importance.

The width of slots 30*d* will vary depending upon the desired stiffness of the sleeve metal. Bottom end portion 30*e* of sleeve 30 is curved inwardly toward the axis of the sleeve. The amount of curvature of sleeve portion 30*e* and the thickness of sleeve metal at the bottom and the width of slots 30*d* are correlated so that lower sleeve portion 30*b* may be sprung over bulb 27 of lamp 22 when the jewel assembly is free of its panel member 10. Actually, if sufficient force is applied, bulb 22 and sleeve 30 can be made to separate even when the entire jewel assembly is in position in aperture 20 in panel support member 10.

Cap 31 is of suitable glass or plastic having any desired color and is translucent. The glass or plastic must be moldable and if plastic is used, translucent material can be selected. Cap 31 has sleeve body portion 31*a* and enlarged top head portion 31*b*. Sleeve portion 31*a* merges into head portion 31*b* by neck portion 31*c*. The size of head portion 31*b* is great enough so that it will overlie the plastic immediately beyond the circumference of aperture 20 in the panel support. Preferably cap portion 31*b* is dome shaped as illustrated and the wall is thick enough and transparent enough so that light from lamp 22 will be visible from outside of the jewel cap. The outer diameter of jewel sleeve 31 is somewhat smaller than the inside diameter of sleeve 30. Bottom portion 31*d* of the jewel proper has wedge-shaped bosses 31*e* extending radially outwardly from the cap sleeve wall. The shape, dimensions and orientations of bosses 31*e* is such that the slope of the wedge provides for a locking fit at the blind ends of slots 30 *d* when the jewel cap is inserted into the top end of the sleeve.

Sleeve 30 has an outside diameter less than the inside diameter of mounting panel member aperture 20. Thus, sleeve 30 may have an outer diameter of several thousandths of an inch less than the one-fourth of an inch diameter of aperture 20. Boss 30*c* on metal sleeve 30 extends outwardly from sleeve 30 by several thousandths of an inch so that a tight fit of sleeve 30 within aperture 20 is provided. By having the angular width of bosses 30*e* great enough and controlling the rise of boss 30*c* above the outer surface of sleeve 30, a satisfactory fit of sleeve 30 in aperture 20 can be provided. When cap portion 31*b* is forced away from the panel surface (as by inserting a thin blade below the edge of cap portion 31*b*) removal of the assembly by pulling on cap 31*b* will pull sleeve 30 out with the jewel cap. If cap 31 is applied correctly to sleeve 30, boss 31*e* will catch at the blind end of slot 30*d* and lock the sleeve and cap together. The inwardly curved metal end portion 30*e* should have a sufficiently thin edge to fit around neck 27*a* of the bulb. By proper selection of width and length of sleeve slots 30*d*, gauge of sleeve metal, the grip of the lower end of sleeve 30 on lamp 22 may be predetermined to provide good retention.

By inserting an assembly including a lamp into aperture 20 of panel member so that lamp contacts 24 and 25 are in properly oriented position with respect to jack contacts, and by adjusting the relative grips of lamp 22 in the bottom end of sleeves 30 and cap 31 in the top end of sleeve 30, it is possible to have a complete jewel assembly, including a lamp, insertable into proper position in a panel mount or removed therefrom.

It is clear that a complete jewel assembly may be fabricated to accommodate any size lamp and any size mounting aperture in a panel. While the invention has particular application to miniature lamp and jewel assemblies, the invention lends itself to use with assemblies larger or smaller than indicated in the exemplary dimensions given.

In order to center a jewel cap relative to an aperture 20 of panel member 10, it is preferred to have at least three angularly spaced bosses 30*c*. By having each boss 30*c* elongated along the length of sleeve 30 as well as providing a number of bosses, the tightness of fit of metal sleeve 30 within a panel member aperture may be easily controlled. This, of course, is in addition to the gauge and nature of the sleeve metal. It is possible to have dimples instead of elongated bosses 30*c* and it is also possible to have more or less than three. The elongated bosses are preferred for ease of manufacture.

The inner end portion of slot 30*d* containing the blind end of the slot may be considered as an opening through the wall of sleeve 30 for accommodating a boss 31*e* when plastic cap 31 is pressed home into locking position. Sleeve portion 31*a* of plastic cap 31 may be provided with as many outwardly projecting bosses 31*e* as may be desired and the angular disposition of such bosses 31*e* may also be desired. Bosses 31*e* may have any desired shape and may be dome shaped. With respect to the number of bosses 31*e*, it is preferred to have as many bosses as there are openings through sleeve wall 30*b*. At least two sleeve slots 30*d* are preferably provided, such slots to be symmetrically disposed about the axis of sleeve 30. The symmetry is desired to insure that jewel lamp 22 will be symmetrically gripped by the sleeve so that the lamp base 23 and contacts 24 and 25 of the lamp extend straight along the sleeve axis and can be appropriately directed. Two opposing slots 30*d* are sufficient for accurate control of the lamp-gripping characteristics of the sleeve. This is true even if each sleeve slot 30*d* is shorter than indicated in the drawing and sleeve 30 has separate openings through wall 30*b* to accommodate plastic cap bosses 31*e*.

The relative positions of bosses 31*e* on the plastic cap wall and wall openings in sleeve 30 may be reversed so that the bosses are on the metal sleeve and openings are through the plastic cap wall.

While metal sleeve 30 of the jewel assembly is shown as having a length somewhat greater than that of cylindrical aperture 20 in panel member 10, it is possible for top end 30*f* of sleeve 30 to be short of top surface 19 of panel member 10. So long as plastic cap 31 is firmly locked to metal sleeve 30 for longitudinal travel of the two within aperture 20 of panel member 10, considerable latitude in the amount of telescoping of plastic cap 31 into metal sleeve 30 may be tolerated. Metal sleeve 30 will usually have some portion of the sleeve length projecting below bottom face 10*a* of the panel member to hold lamp 22 in an appropriate position with respect to the body of panel member 10. The specifications for panel members 10 and the relative positions of lamps 22 with respect to the body of panel 10 will determine how much of lamp 22 will be disposed within aperture 20 and this, in turn, will determine the amount of metal sleeve length which must extend beyond face 10*a* of panel member 10. The convenience and characteristics of the new jewel assembly permits enhancing flexibility with regard to the relative location of jewel lamps 22 and the body of panel member 10. Thus, it is possible to have the length of metal sleeve 30 so that glass bulb portion 27 may lie wholly within or wholly without aperture 20 of panel member 10.

What is claimed is:

1. A jewel assembly for use in a cylindrical aperture extending completely through the body of a panel member in which said jewel assembly is to be mounted, said jewel assembly comprising a generally cylindrical metal sleeve having an outer diameter somewhat less than the inner diameter of said panel aperture, at least one slot extending axially along said sleeve from one sleeve end, said sleeve end having the metal edge portion curved inwardly toward the sleeve axis, said jewel assembly cooperating with a jewel lamp, said jewel lamp having a base to which a glass bulb is cemented with the jewel lamp having a neck of reduced diameter where said glass bulb enters said lamp base, said slotted end of said metal sleeve cooperating with said lamp bulb so that the inwardly curved sleeve metal may be sprung over the jewel lamp to engage the neck portion thereof, a jewel cap of molded plastic having a sleeve portion and an enlarged cap portion, the sleeve portion of said jewel cap being dimensioned to telescope into the inside to the other end portion of said metal sleeve with the enlarged cap extending over the mounting aperture in said panel member to limit the insertion of said jewel cap within the panel member aperture, said jewel cap sleeve portion and said metal sleeve having cooperating boss and aperture means for locking said sleeve portion of the jewel cap to the metal sleeve portion against relative longitudinal movement between the two after they have been telescoped to a predetermined locking position, said metal sleeve being shaped and dimensioned relative to the aperture within the panel member so that a portion of said metal sleeve fits tightly within said panel member aperture to maintain the assembly firmly in position with the enlarged cap end of the plastic overlying the adjacent face of the panel member, the metal sleeve being long enough so that the other end portion thereof may grip an appropriate jewel lamp for maintaining the same in prescribed position with respect to said panel member.

2. The construction according to claim wherein the means for locking said plastic cap to said metal sleeve comprises at least one externally projecting boss in the sleeve portion of said plastic cap cooperating with an opening through wall of said metal sleeve.

3. The construction according to claim 2 wherein the opening through said metal sleeve wall is the blind end part of the slot extending from the one end of said metal sleeve.

4. The construction according to claim 1 wherein said metal sleeve at the other end portion has a plurality of said externally extending bosses at angularly spaced intervals so that a jewel assembly is maintained in position to center the enlarged head of the plastic cap with respect to the aperture in the panel-supporting member.

5. The construction according to claim 4 wherein said plastic cap has a plurality of externally projecting bosses in the sleeve portion of said cap cooperative with openings through the wall of said metal sleeve.

6. The construction according to claim 5 wherein said metal sleeve has more than two externally extending bosses at equal angular intervals and wherein said metal sleeve has two slots at said slotted end, said two slots being opposite each other.

7. The construction according to claim 6 wherein each wall opening in the metal sleeve is the blind end portion of each sleeve slot.

8. A jewel assembly for sue in a circular aperture extending through the body of a panel member in which said assembly jewel is to be mounted, a metal cylindrical sleeve having a length somewhat greater than the length of said panel aperture, said sleeve having an outer diameter somewhat less than the inner diameter of said panel aperture, at least one externally projecting boss formed in said sleeve, at least one slot extending axially along said sleeve from the other end and terminating in a flat blind end, said boss and slot extending for substantial portions of the sleeve length so that the blind ends of the slot and boss extend beyond each other longitudinally of the sleeve, the other end portion of said sleeve having the metal curved inwardly of the sleeve, said other sleeve end portion being so dimensioned relatively to the glass bulb of a jewel lamp for an assembly so that said curved sleeve metal may be sprung over the glass part of the jewel lamp to engage a neck portion of said lamp, said neck portion being located between the bulb and base of a jewel lamp with said neck portion having a reduced diameter so that said sleeve bottom end can lock to said lamp neck, said boss being long enough to lie within the aperture of the panel member when said sleeve is positioned within said panel member aperture, the one end of said sleeve being normally located in the vicinity of a top surface of said panel member, the curved edge of said sleeve being normally located near the bottom face of said panel member with the sleeve slot extending within the panel member aperture for a substantial portion of the thickness of the panel member, said boss and sleeve diameter being so dimensioned as to provide a friction fit of the sleeve member within the panel member, a jewel cap of molded plastic having a sleeve portion and an enlarged heated portion at an end of said jewel cap, the sleeve portion of said jewel cap being adapted to slip into the inside of said metal sleeve at said one end and the enlarged cap extending over the mounting aperture in said panel member when the assembly is positioned therein, said jewel cap sleeve portion at the free sleeve end having an external boss dimensioned so that when said jewel cap is properly oriented and positioned in the one end portion of the sleeve the boss in said cap sleeve extends into the sleeve slot and locks against the blind slot end to retain the jewel cap against being pulled out of said metal sleeve, said assembly and jewel lamp permitting insertion into position in the aperture of said panel member with the jewel lamp being gripped tightly enough for insertion into a jack carried by said panel member, said assembly and lamp being adapted to be pulled outwardly from the top surface of the panel member by application of a sharp edge underneath the overlying jewel cap whereby said assembly will maintain itself tightly in proper position at all times, be free of cold flow affecting assembly retention within the panel member, the retention of said lamp by said sleeve being at a maximum value when said assembly is positioned within the receiving aperture of said panel member, the spring of said metal and slot permitting easy removal and replacement after said assembly is withdrawn.