Dec. 19, 1967 W. M. WALDBAUER 3,359,413

LAMP POSITIONING MECHANISM

Filed June 29, 1965 4 Sheets-Sheet 1

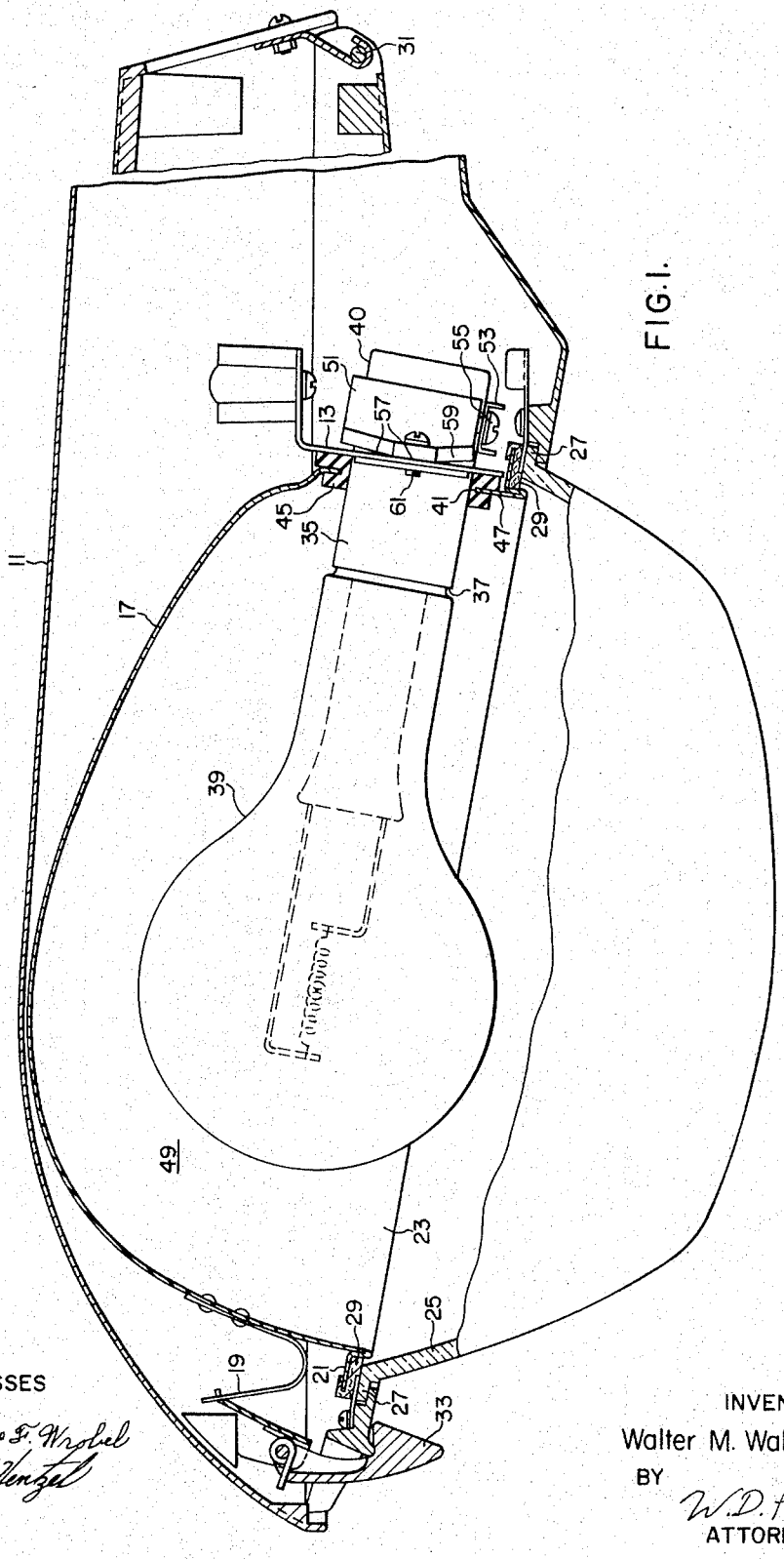

FIG. 1.

WITNESSES

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Dec. 19, 1967 W. M. WALDBAUER 3,359,413

LAMP POSITIONING MECHANISM

Filed June 29, 1965 4 Sheets-Sheet 2

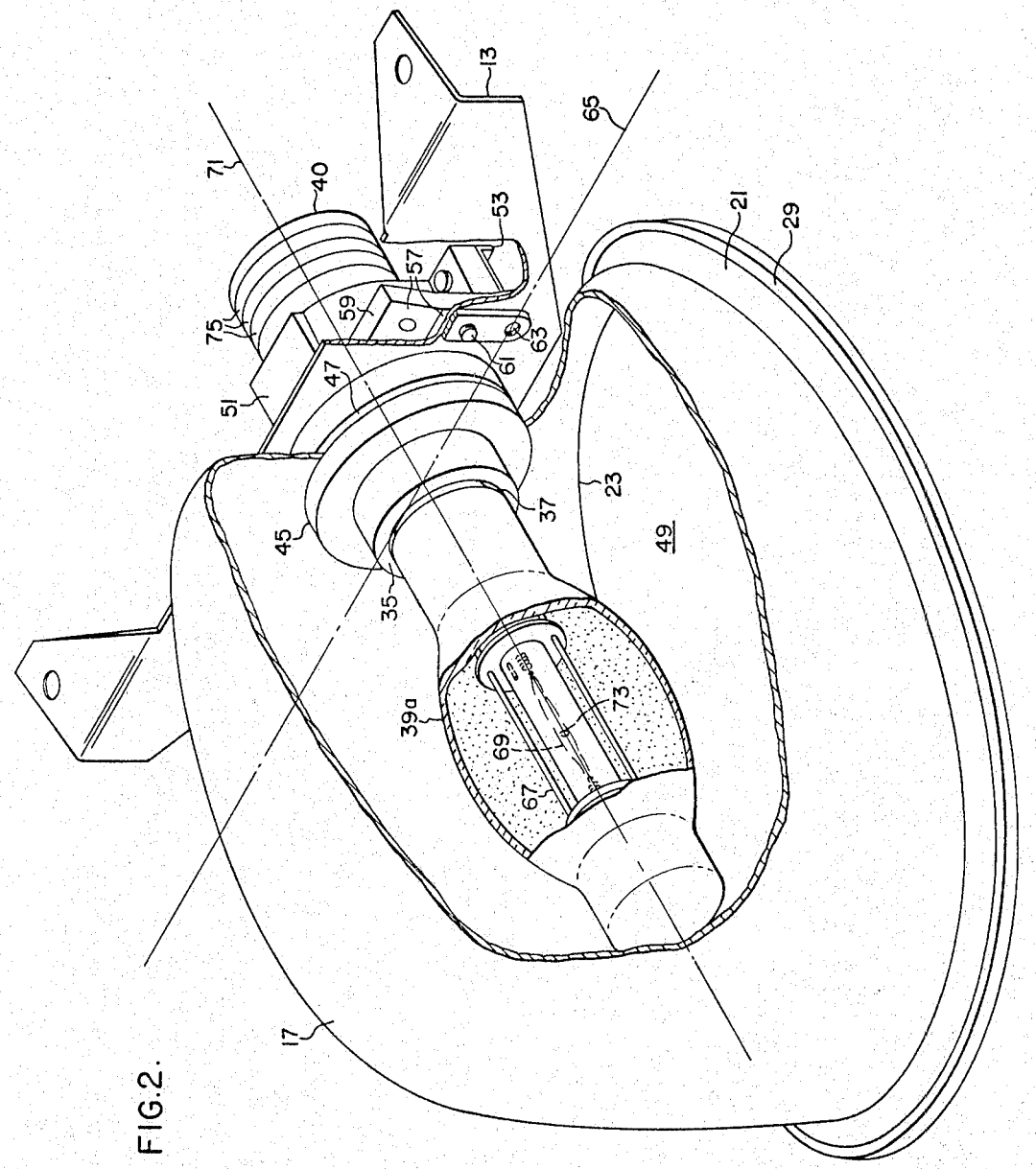

FIG.2.

Dec. 19, 1967 W. M. WALDBAUER 3,359,413

LAMP POSITIONING MECHANISM

Filed June 29, 1965 4 Sheets-Sheet 3

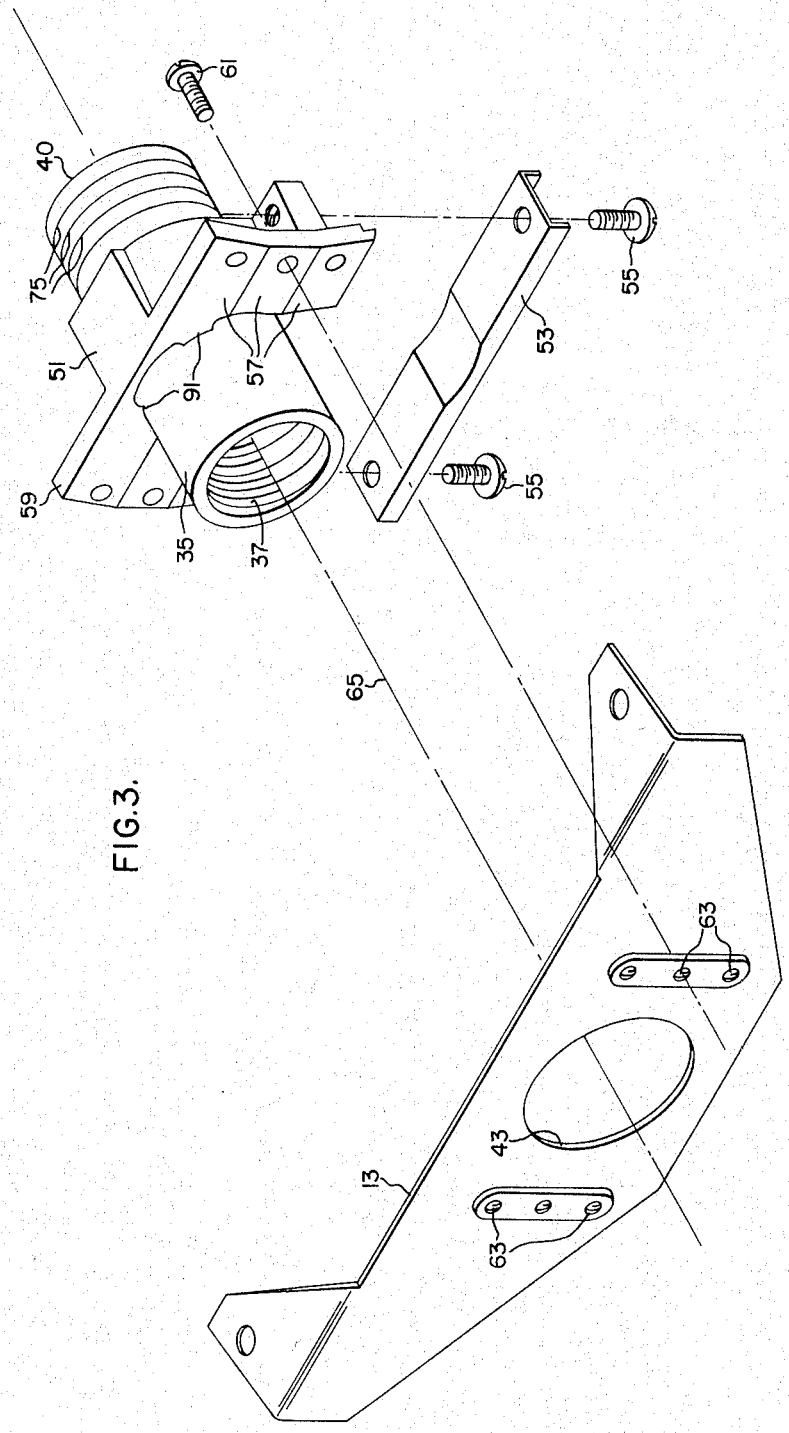

FIG. 3.

Dec. 19, 1967 W. M. WALDBAUER 3,359,413

LAMP POSITIONING MECHANISM

Filed June 29, 1965 4 Sheets-Sheet 4

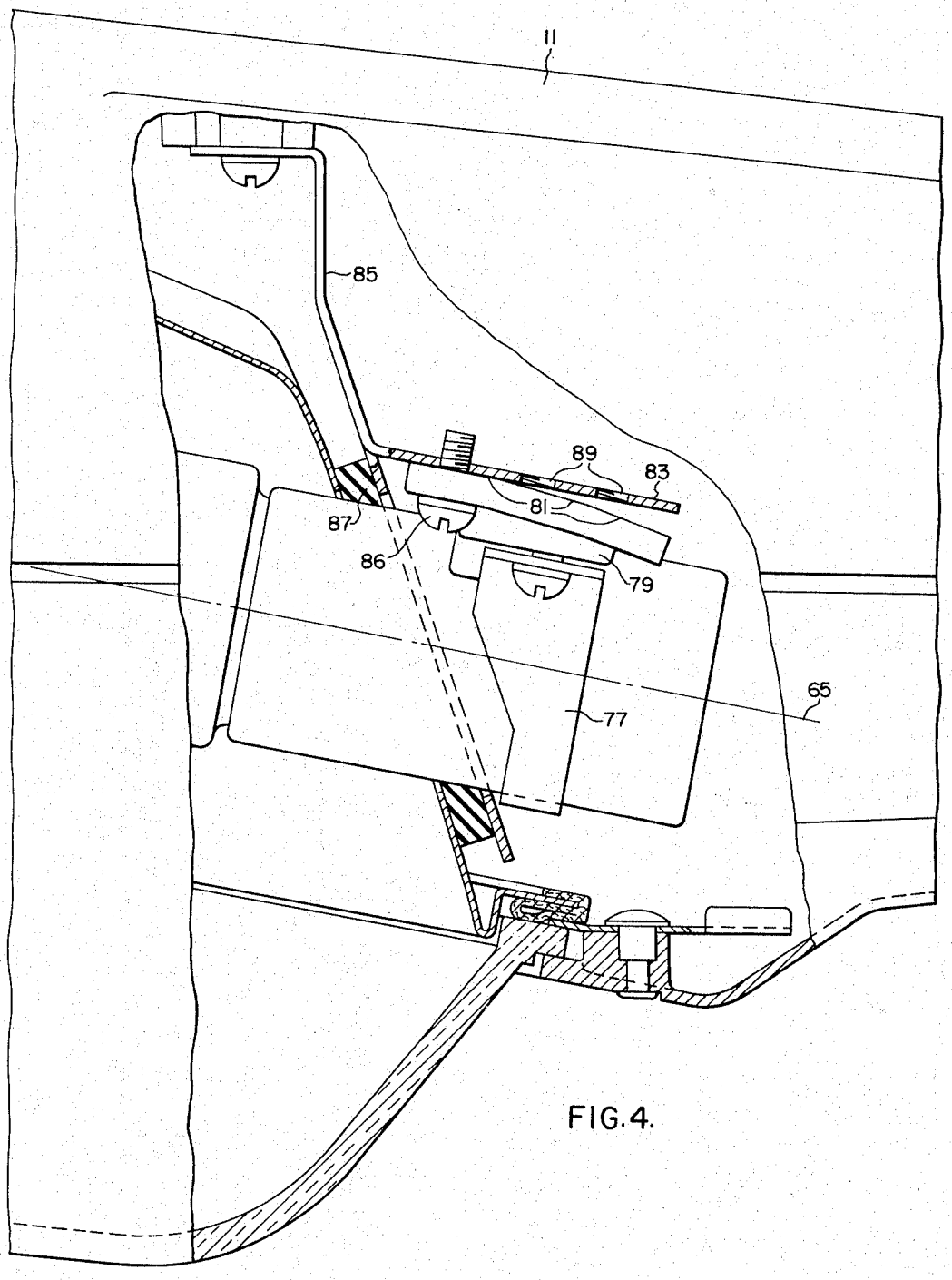

FIG. 4.

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3,359,413

LAMP POSITIONING MECHANISM

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14 Claims. (Cl. 240—25)

ABSTRACT OF THE DISCLOSURE

An apparatus for adjustably positioning a light source within a luminaire housing which includes a sealed optical system. The sealed optical system comprises a reflector and a refractor sealably engaging the reflector about its periphery with a small side aperture toward the rear of the housing through which a movable lampholder extends sealed with respect to the edges of said side aperture. The adjustable mounting apparatus includes a lampholder support which releasably engages the lampholder and when released permits the lampholder to be rotated to thus adjust the rotary position of the light source within the reflector and additionally permits the lampholder to slide in and out of the reflector to thus adjust the depth or longitudinal position of the light source within the reflector. The lampholder support is secured to the luminaire housing and further provides for the tiltable positioning of the lamp within the reflector by means of a reference plane surface on the housing and a plurality of slightly angularly displaced plane surfaces on the lampholder support which may be selectively made coplanar with and adjacent to the reference plane surface on the housing to provide for a series of slightly varying tilts to the lampholder thus defining a series of closely spaced vertical positions of the light source within the reflector without affecting the gasket seal between the lampholder and the reflector.

This invention relates generally to luminaires and more particularly to luminaires having a movable light source contained within a sealed optical enclosure.

It is well known in the art to vary the light distribution pattern of a luminaire by changing the position of the light source with respect to the reflector. Such a luminaire is highly versatile and may be used in widely varying applications. This feature is especially applicable to the street and exterior floodlighting arts in which many diverse environments and atmospheric conditions present themselves.

It is equally well known to provide a sealed optical enclosure around the light source of a luminaire. Insects and dirt are thereby prevented from entering the light source enclosure and adversely affecting the light reflection and light transmission properties of the enclosure. This feature also has application in exterior lighting.

The present invention is a novel means for combining the above features into a single luminaire. To adjust the position of the light source from the outside of the luminaire requires a mechanical communication into the light source optical enclosure. To establish a seal around the light source enclosure requires a simple geometry and a minimum of mechanical communication with the outside. These diagrammatically opposed requirements are overcome by the present invention.

It is therefore an object of this invention to provide a luminaire having a sealed enclosure containing a light source which is positionable therewithin without impairing the sealing qualities of the enclosure.

Another object of this invention is to provide a luminaire in which the light source is easily rotatably positionable within a sealed enclosure.

A further object of this invention is to provide a luminaire in which the light source is easily longitudinally positionable within a sealed enclosure.

Still another object of this invention is to provide a luminaire which is easily tiltably positionable within a vertical plane within a sealed enclosure.

Yet another object of this invention is to provide sealed luminaire which may emit light in any one of a series of light distribution patterns.

Briefly, these and other objects are achieved by providing a bottom opening concave reflector supported at the front end of a luminaire housing. A refractor covers the bottom opening of the reflector and sealably engages the reflector around its periphery. The reflector has a smaller side aperture opening toward the rear of the housing. A movable lampholder extends through the side aperture and supports a light source within the reflector interior. In order to seal the side aperture a washer shaped flexible gasket is provided around the lampholder adjacent the reflector. A sealed optical enclosure is formed for the light source by the sealed refractor-reflector arrangement and the lampholder in the side aperture, with the flexible gasket thereabout. The portion of the lampholder extending outside of the reflector is releasably engaged by a lampholder support. When released from this support the lampholder may be rotated, thus allowing adjustment of the rotary position of the light source within the reflector. Further, when so released the lampholder may be slid in and out of the reflector, thus allowing adjustment of the depth or longitudinal position of the light source within the reflector. The lampholder support is releasably secured to the luminaire housing. When released, the lampholder support together with the lampholder may be tilted and easily resecured to the housing along any one of a series of tilted positions. The tilted positions are only slightly angularly displaced and are determined by a series of plane surfaces on the lampholder and a reference plane surface on the housing which become coplanar and adjacent as the lampholder support and lampholder are tilted. This series of slightly varying tilts define a series of closely spaced vertical positions of the light source within the reflector. The plane surfaces of the lampholder support and the housing are geometrically arranged to establish a single axis of pivot on which the lampholder tilts. By locating this axis proximate the geometric center of the seal established by the flexible gasket, the gasket seal is disturbed only slightly when the lampholder is tilted. Thus the gasket retains its sealing characteristics regardless of the tilting action effected in the lampholder.

For a better understanding of the invention reference should be had to the accompanying drawings, wherein:

FIGURE 1 is a side elevational view, shown partly in section, of the preferred embodiment of the invention, illustrating the preferred tilting mechanism and flexible gasket arrangement;

FIG. 2 is a perspective, partially-cut-away view of the embodiment shown in FIG. 1;

FIG. 3 is an exploded perspective view of the tilting mechanism of the preferred embodiment; and

FIG. 4 is a side elevational view, partly in section, of a second embodiment of the invention showing an alternate tilting mechanism and an alternate gasket arrangement.

Referring now to FIG. 1, an elongated shallow luminaire housing **11** is shown horizontally disposed with a portion broken out. A rigid support plate **13**, which extends vertically is suspended from the top portion of the housing **11**. The plate **13** is generally vertical and is positioned generally perpendicular to the length dimen-

sion of the housing near the middle. The forward portion of the housing 11 contains an inverted bowl shaped reflector 17. The reflector 17 is spring biased against the vertical plate 13 by means of a bent, resilient metallic strip 19, located in the extreme front end of the housing 11. The reflector 17 has an outwardly extending flange 21 around its bottom opening 23. A high-temperature plastic or glass refracting member 25 is provided beneath the reflector 17. The glass refractor 25 has a similar outwardly extending flange 27 which engages the reflector flange 21. In order to seal the junction between the flanges 21 and 27, a tubular extruded gasket or a compressible felt sealing strip 29 is provided. The glass refractor 25 and the bottom half of the housing 11 open downwardly by means of a hinge or shoulder rivet 31 which is affixed to the housing 11 at extreme rear. A latching device 33 is provided in the extreme front end of the housing 11 to hold the bottom half of the housing and the glass refractor 25 closed. When closed, the latch 33 exerts pressure which compresses the felt strip 29 and establishes the seal. Such a luminaire is generally described in U.S. Patent No. 3,065,338, dated Nov. 20, 1962.

FIG. 2 shows an elongated cylindrical lampholder 35 positioned near the center of the housing 11 and extending into the reflector 17. The forward end of the cylindrical lampholder 35 contains a threaded lamp socket 37 which supports a light source 39 within the reflector 17. The light source may be either the incandescent-filament type 39 as in FIG. 1 or the arc-vapor type 39*a* shown in FIG. 2. The rear portion 40 of the cylindrical lampholder 35 extends out of the reflector 17 through the reflector aperture 41 and through the vertical plate 13 by means of an aperture 43 provided therein which is coincident with the reflector aperture 41. A large washer shaped flexible gasket 45 is provided between the reflector 17 and the vertical plate 13 and around the lampholder 35. The flexible gasket 45 has a deep groove 47 about the outer periphery thereof. The edges of reflector aperture 41 fit into this deep groove 47 to seal and secure the flexible gasket 45. The flexible gasket 45 is compressed by the spring bias relationship between the reflector 17 and the vertical plate 13 which further retains and seals the flexible gasket 45. The flexible gasket 45 forms a seal around the reflector aperture 41, which in conjunction with the felt strip seal 29 provides a sealed enclosure 49 for the light source 39. This sealed enclosure 49 includes the reflector 17, the glass refractor 25, and the cylindrical lampholder 35. The seals prevent bugs, dirt, and moisture from entering the sealed enclosure 49 and impairing the performance thereof.

FIG. 3 shows a saddle shaped lampholder support 51 which straddles the rear portion 40 of the cylindrical lampholder 35. A curved cinch bar 53 is provided across the open bottom of the saddle member 51. The cinch bar 53 holds the cylindrical lampholder 35 in position by means of two vertically orientated cinching screws 55. The saddle member 51 may be mounted on the generally vertical plate 13 in three positions having slightly different tilts. The plate 13 provides a reference plane for the tilts. The tilts correspond to three flat surfaces 57 on mounting shields 59 which extend from either side of the saddle member 51. The flat surfaces determine three slightly angularly displaced and intersecting planes. The mounting shield 59 has a center flat surface and one slightly beveled flat surface both thereabove and therebelow. To change the tilt position of the light source 39, the saddle member 51 and cylindrical lampholder 35 are tilted with respect to the luminaire housing 11 until one of the three flat surfaces 57 is coplanar with the vertical plate 13. Two horizontally disposed mounting screws 61 are then inserted into holes provided in each of the three surfaces 57. The mounting screws 61 engage threaded holes 63 which are coincidently provided on the support plate 13. The mounting screws may be readily inserted and tightened with one hand, which is an important consideration when the mounted, elevated luminaire is being adjusted.

When changing the tilt of the cylindrical lampholder 35 it is desirable to minimize the displacement of the flexible gasket 45, thereby not destroying its sealing action. To accomplish this the three flat surfaces 57 are arranged geometrically to define a horizontal axis of pivot 65 (see FIG. 2) for the saddle member 51 and the cylindrical lampholder 35 which passes through the flexible gasket 45. The pivot axis 65 is proximate the intersection of a vertical plane through the flexible gasket 45 and a horizontal plane through the center of the cylindrical lampholder 35. The points of the flexible gasket 45 which lie directly on the pivot axis 65 are not displaced at all by the tilting. As the points become more remote from the pivot axis 65, the effect of the tilting becomes more noticeable. This effect would tend to destroy the sealing action except for the flexibility of the gasket 45, and the location of the pivot axis 65. Because the tilting is slight, the gasket 45 is flexible, and the pivot axis 65 is close to the center of the gasket 45, the sealing action of the flexible gasket 45 is not affected by changing the tilt position of the cylindrical lampholder 35.

The present invention is not limited to the flat mounting surfaces 57 as described above. These surfaces are flat to provide a plane by which the saddle member 51 can be stably mounted to the vertical plate 13. The mounting surface on the saddle member 51 could also comprise a series of pointed projections, any three of which will stably position the saddle member 51. The stability in this case is similar to that of a three-legged stool, that is, three points determine a plane. Another embodiment of the mounting surfaces could be a series of parallel projections or edges, any two of which will form a stable base into which the saddle member 51 may be mounted. In short, any plane-determining means will suffice to establish the tilts for the saddle member 51 and the lampholder 35.

The light source 39 may be rotated within the reflector 17 by twisting the rear portion 40 of the cylindrical lampholder 35 when the cinching bar 53 has been loosened. The flexible gasket 45 fits snugly around the lampholder 35 and will allow the rotation, but will prevent dirt and moisture from entering the reflector 17 as described above. The light source 39 is rotated to position the arc tube supporting structure 67 in a vertical plane. The arc tube supporting structure 67 obstructs the light and the vertical positioning will limit the shadow to street region directly under the luminaire. Because the light intensity is greatest in this region, the obstruction caused by the arc tube supports 67 is less noticeable. Further, by arranging the arc tube supporting structure 67 symmetrically with respect to the reflector 17 the symmetry of the light distribution pattern is preserved. This discussion applies equally well to the incandescent lamp, filaments and filament supports shown in FIG. 1.

Also, while the cinching bar 53 is loose, the depth at which the cylindrical lampholder 35 extends into the reflector 17 may be adjusted. This is done by pushing or pulling on the rear portion 40 of the lampholder 35. As a result the light center of the arc 69 may be positioned within the reflector 17 anywhere along a line determined by the longitudinal axis 71 of the lampholder 35. The focal point 73 of the reflector 17 is along this axis 71. The contour of the reflector 17 is such that if the light center of the arc 69 is positioned forward of this focal point 73 (that is on the street side) the light distribution pattern is narrowed. Conversely, if the arc 69 is positioned rearwardly of the focal point 73 (that is on the curb side) the light distribution pattern is widened. The narrow beam is suitable for downtown lighting where a more intense light is desirable. The wide beam is more suitable for highway use where less light is required, allowing the luminaires to be fewer and farther between. The depth

position of the light source **39** is indicated by the ring depth markers **75** around the rear portion **40** of the lampholder **35**.

FIG. 4 shows another embodiment of the tilting mechanism of the present invention. An inverted saddle member **77** straddles the cylindrical lampholder **35** and is open at the top rather than the bottom. The overhead cinching bar **79** now fits over the inverted saddle member **77**. The top surface of the cinching bar **79** widens out and provides three slightly angularly displaced flat surfaces **81**. These three surfaces **81** are generally horizontal and as the lampholder **35** is tilted they engage a rigid generally horizontal support plate **83** which extends from a generally vertical support plate **85** affixed to the luminaires housing **11** just above the cinching bar **79**. The mounting screws **86** are conveniently inserted through the mounting surface from below. As described in the first embodiment, these three mounting surfaces **81** are geometrically arranged to pivot the lampholder **35** about a horizontal pivot axis **65**, proximate the center of flexible gasket **87**. To keep this axis **65**, the positioning of the threaded screw holes **89** provided in the overhead horizontal plate **83** are very slightly out of line with the corresponding mounting holes provided in each of the three flat surfaces **81**. While realigning the holes after changing the tilt of the lampholder **35**, the cinching bar **79** and saddle member **77** may be slid forward or rearward slightly with respect to the horizontal plate **83**. The flexible gasket **87** in this embodiment requires a higher degree of flexibility than the flexible gasket **45** in the first embodiment. Note that the position of the flexible gasket **87** in FIG. 4 is different than the flexible gasket **45** shown in the previous figures. In the second embodiment the gasket **87** is located entirely between the reflector **17** and the support plate **85**. The spring bias relationship between the reflector **17** and the support plate **85** holds the flexible gasket **87** in place. Clearly, the features of each embodiment may be incorporated in the other embodiments.

The lampholder **35** is an elongated cylinder as described above and preferably is made of an insulative porcelain or ceramic material. Porcelain commonly has a two percent manufacturing tolerance which will cause the surface of the lampholder **35** to be somewhat irregular. In addition, often particles of sand will project from the surface of the porcelain and contribute to the unevenness. Due to these irregularities it is difficult to get a smooth fit between the inside curve of the saddle members and the surface of the lampholder. Two raised holding flanges **91** (see FIG. 3) are provided on the inside of the saddle members **51** and **77** which overcome this difficulty. The lampholder is pushed against these holding flanges **91** as the cinching bar is tightened into place.

As a further alternative embodiment, while three plane-determining means have been shown in the form of the flat surfaces **57** and **81** in the foregoing embodiments, these could be replaced by two or four or more flat surfaces, to vary the number of lamp positioning settings possible.

It will be apparent to those skilled in the art that the objects of the invention have been achieved by providing a sealed enclosure for a light source. The snugness and flexibility of the lampholder gasket allows the lampholder to be rotatably and longitudinally positioned. The filament supports may be positioned so as not to effect the symmetry of the light distribution pattern by rotating the lampholder. The lampholder is tiltable about an axis positioned proximate the gasket, and the gasket seal is not disturbed by the tilting action. By tilting and longitudinally positioning the lampholder the light distribution pattern may be varied.

Although this invention has been described with respect to a particular embodiment thereof, it is not to be so limited as changes and modifications may be made therein which are within the intended scope of the invention.

I claim as my invention:

1. In combination with a luminaire comprising a housing, a concave reflector supported within said housing, said reflector having a periphery and an aperture provided in said reflector, a lampholder extending into said reflector through said aperture and adapted to support a light source within said reflector, flexible gasket means adjacent said reflector and said lampholder for establishing a seal therebetween, a refractor sealably engaging said reflector around the periphery thereof, and a lampholder adjusting means for adjusting the tilt of said lampholder and light source to any one of several predetermined positions within said reflector without disturbing the sealing action of said flexible gasket means, said lampholder adjusting means comprising:

a lampholder support affixed to said lampholder and releasably mounted to said housing, said lampholder support having a series of plane-determining means thereon which establish a predetermined series of slightly angularly displaced intersecting planes;

reference plane-determining means affixed to said housing and disposed in predetermined relation with respect to said series of plane-determining means;

means for releasably securing said lampholder support to said reference plane-determining means along any one of said series of plane-determining means which is adjacent and substantially coplanar with respect to said reference plane-determining means;

said lampholder pivoting slightly about an axis when it is adjusted from one predetermined tilt to another predetermined tilt; and

each of said series of plane-determining means and said reference plane-determining means together with the securing means being positioned with respect to one another to cause the axis of pivot of said lampholder during tilting of same to be proximate the geometric center of said flexible gasket; whereby adjustment of said lampholder from one predetermined tilt to another predetermined tilt does not disturb the seal between said reflector and said lampholder.

2. The luminaire as specified in claim **1**, wherein said plane-determining means include a plurality of flat surfaces.

3. The luminaire as specified in claim **1**, wherein said lampholder is an elongated cylinder, said flexible gasket has a washer-like configuration and is disposed generally perpendicular to the axis of said lampholder, and said axis of pivot is proximate the intersection of a plane through the axis of said lampholder and a plane determined by said flexible gasket.

4. The luminaire as specified in claim **1**, wherein said reference plane means is a rigid support plate provided adjacent said reflector, proximate said lampholder, said reflector being spring biased against said support plate, said flexible gasket being at least partially disposed between said reflector and said support plate and retained therebetween by the spring bias relationship.

5. The luminaire as specified in claim **1**, wherein said lampholder is an elongated cylinder and is releasably engaged by said lampholder support, and said lampholder when released being rotatably adjustable about and longitudinally adjustable along its longitudinal axis.

6. A luminaire for providing a series of light distribution patterns which are determined by slight variances in the position of a light source within a sealed optical enclosure, which retains its sealing characteristics regardless of the positioning of the light source therein, said luminaire comprising:

a housing;

a rigid support plate means affixed to said housing;

a concave reflector supported within said housing, said reflector having a periphery about the concave opening, said reflector being spring biased against said plate means, said reflector contoured to form any one of said series of light distribution patterns when the light center of the light source is placed in a corresponding one of a series of closely spaced predeter-

mined points within said reflector, said reflector provided with an aperture proximate said plate means;

a lampholder extending through said aperture and adapted to support the light source within said reflector;

flexible gasket means mounted around said lampholder and adjacent to said reflector for establishing a seal therebetween;

a refractor sealably engaging said reflector about the periphery of the concave opening, said reflector and refractor and lampholder and gasket means forming the sealed optical enclosure for the light source;

a lampholder support supporting said lampholder from the outside of the sealed enclosure and releasably mounted within said housing, said lampholder support provided with a series of plane-determining means which establish a predetermined series of slightly angularly displaced intersecting planes;

reference plane-determining means provided on said plate means and disposed with respect to said series of plane-determining means to determine a series of slightly angularly displaced tilts at which said lampholder support may be mounted with respect to said reflector;

means for releasably mounting said lampholder support to said plate means at any one of said series of tilts and positioning the light center of the light source in any one of said series of closely spaced predetermined points within said reflector;

said series of tilts defining an axis of pivot for said lampholder and said lampholder support which is proximate the geometric center of the seal established between said reflector and said lampholder by means of said flexible gasket.

7. The luminaire as specified in claim **6**, wherein said plane-determining means include a plurality of flat surfaces.

8. The luminaire as specified in claim **6**, wherein said lampholder is an elongated cylinder, said flexible gasket has a washer-like configuration and is disposed generally perpendicular to the axis of said lampholder, and said axis of pivot is proximate the intersection of a plane through the axis of said lampholder and a plane determined by said flexible gasket.

9. The luminaire as specified in claim **6**, wherein said flexible gasket has a washer-like configuration and has a groove around the external periphery thereof, said groove engaging the edges of the aperture of said reflector to retain said flexible gasket.

10. The luminaire as specified in claim **6**, wherein said lampholder is an elongated cylinder and is releasably engaged by said lampholder support, and said lampholder when released being rotatably adjustable about and longitudinally adjustable along its longitudinal axis.

11. The luminaire as specified in claim **6**, wherein a second rigid plate means is provided directly above said lampholder support and said reference plane-determining means is provided on said second plate means.

12. A luminaire for providing a series of light distribution patterns which are determined by slight variances in the position of a light source within a sealed optical enclosure, which retains its sealing chracteristics regardless of the positioning of the light source therein, said luminaire comprising:

an elongated and generally horizontally disposed housing;

a rigid support plate means affixed to said housing and extending generally vertically therein;

a bottom opening concave reflector supported within said housing at one end thereof and spring biased against said plate means, said reflector contoured to form any one of said series of light distribution patterns when the light center of the light source is placed in a corresponding one of a series of closely spaced predetermined points within said reflector, said reflector provided with a side aperture proximate said plate means;

an elongated cylindrical lampholder extending through said side aperture and adapted to support the light source within said reflector;

flexible gasket means mounted around said lampholder and adjacent to said reflector proximate said side aperture for establishing a seal therebetween;

a refractor positioned beneath said reflector and sealably engaging said reflector about the periphery of the bottom opening, said reflector and refractor and lampholder and gasket means forming the sealed optical enclosure for the light source;

a lampholder support supporting said lampholder from the outside of the sealed enclosure and releasably mounted within said housing, said lampholder support provided with a series of flat surfaces which determine a series of slightly angularly displaced mounting planes for mounting said lampholder support against said plate means;

a flat reference plane provided on said plate means and disposed with respect to said series of flat surfaces to determine a series of slightly angularly displaced tilts at which said lampholder support may be mounted with respect to said reflector;

means for releasably mounting said lampholder support at any one of said series of tilts and positioning the light center of the light source in any one of the series of closely spaced predetermined points within said reflectors;

said series of tilts defining an axis of pivot for said lampholder and said lampholder support which is proximate the geometric center of the seal established between said reflector and said lampholder by means of said flexible gasket.

13. The luminaire as specified in claim **12**, wherein said flexible gasket has a washer-like configuration and said axis of pivot is proximate intersection of a plane determined by said flexible gasket, and a plane passing through the longitudinal axis of said lampholder.

14. The lumniaire as specified in claim **12**, wherein said lampholder support has a saddle shaped configuration and is provided with a cinch bar means adjustably secured across the opening, said lamphoider being disposed within said lampholder support and releasably retained therein by said cinch bar means, said lampholder being rotatably and longitudinally adjustable with respect to its longitudinal axis when said cinch bar means is loosened and said lampholder is released from said lampholder support.

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