June 30, 1970 W. R. AIKENS 3,517,853

LIGHT FIXTURE FASTENING MEANS

Filed Feb. 10, 1969 2 Sheets-Sheet 1

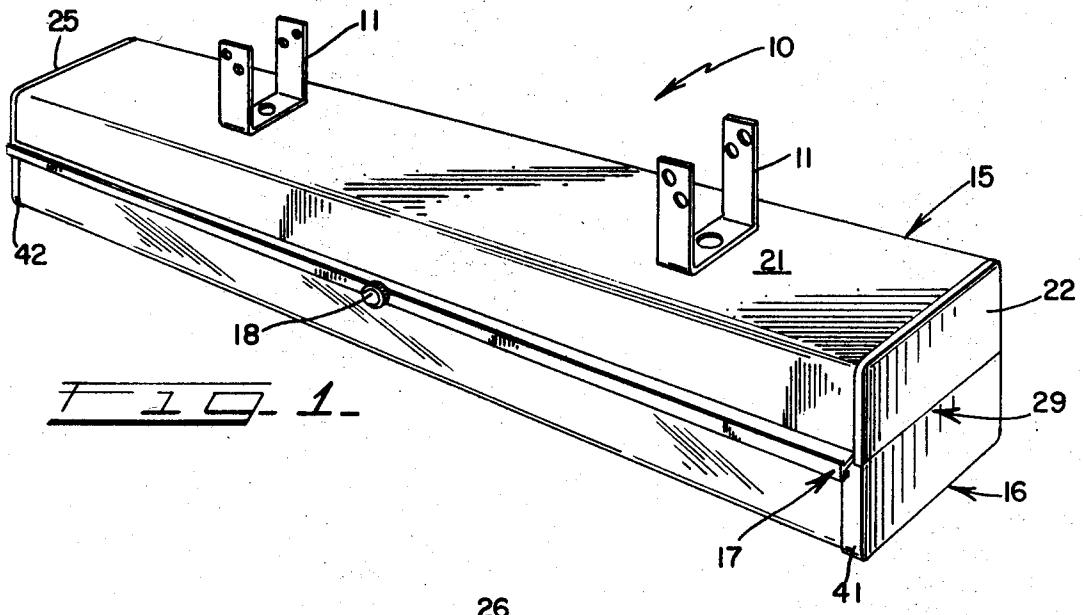


FIG. 1

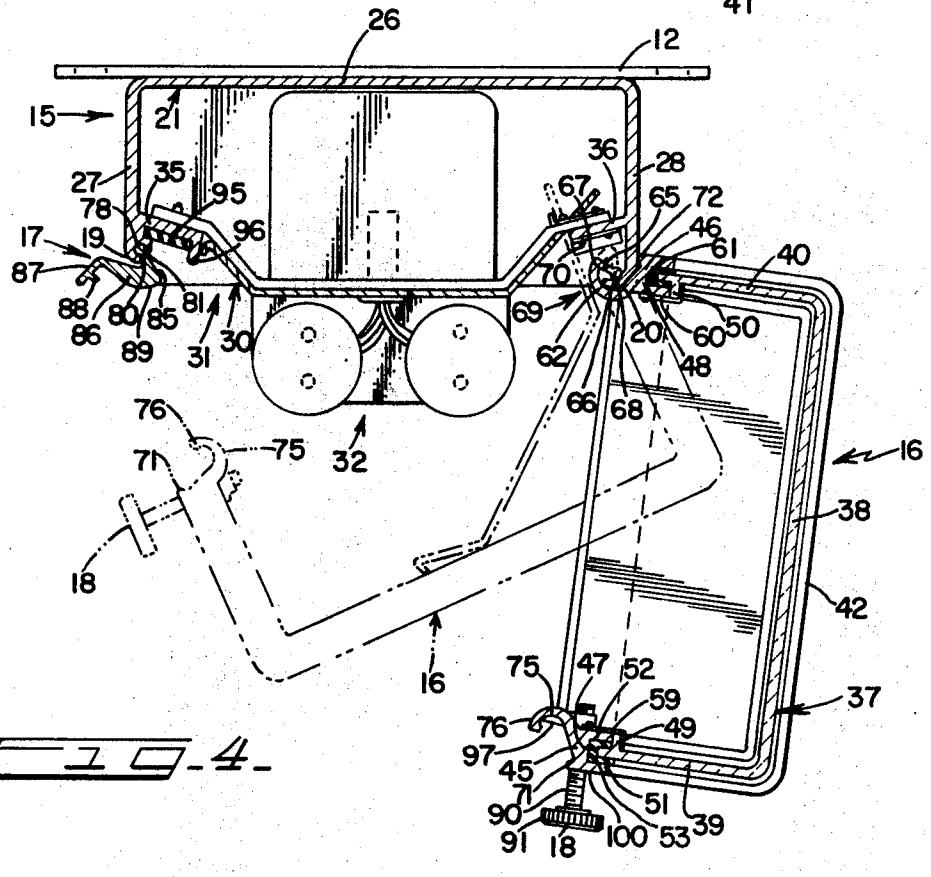


FIG. 4

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LIGHT FIXTURE FASTENING MEANS

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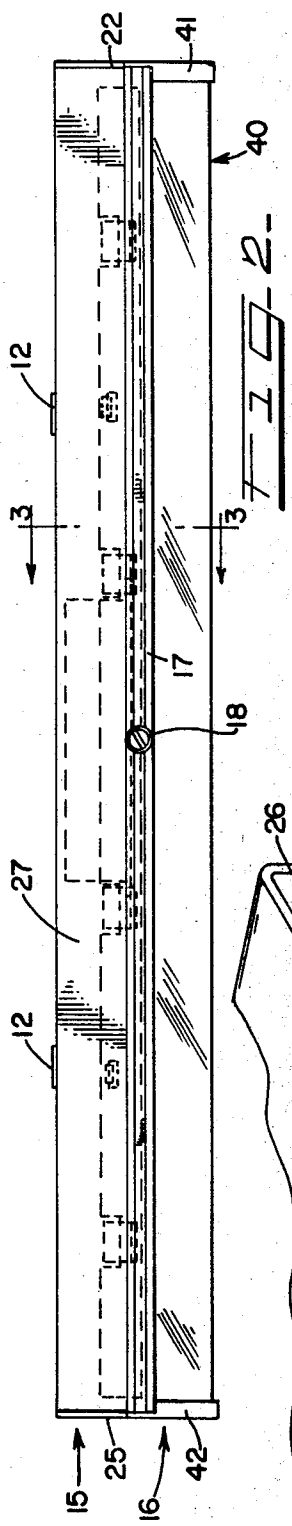


FIG. 2

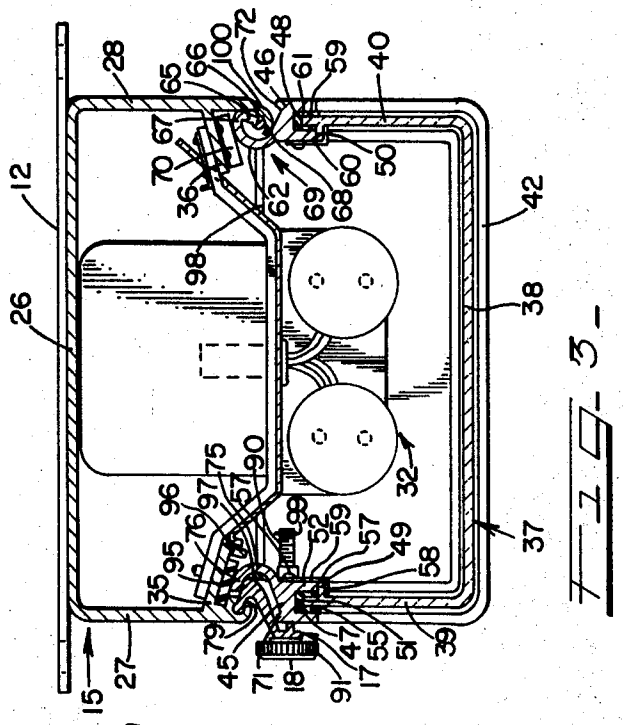


FIG. 3

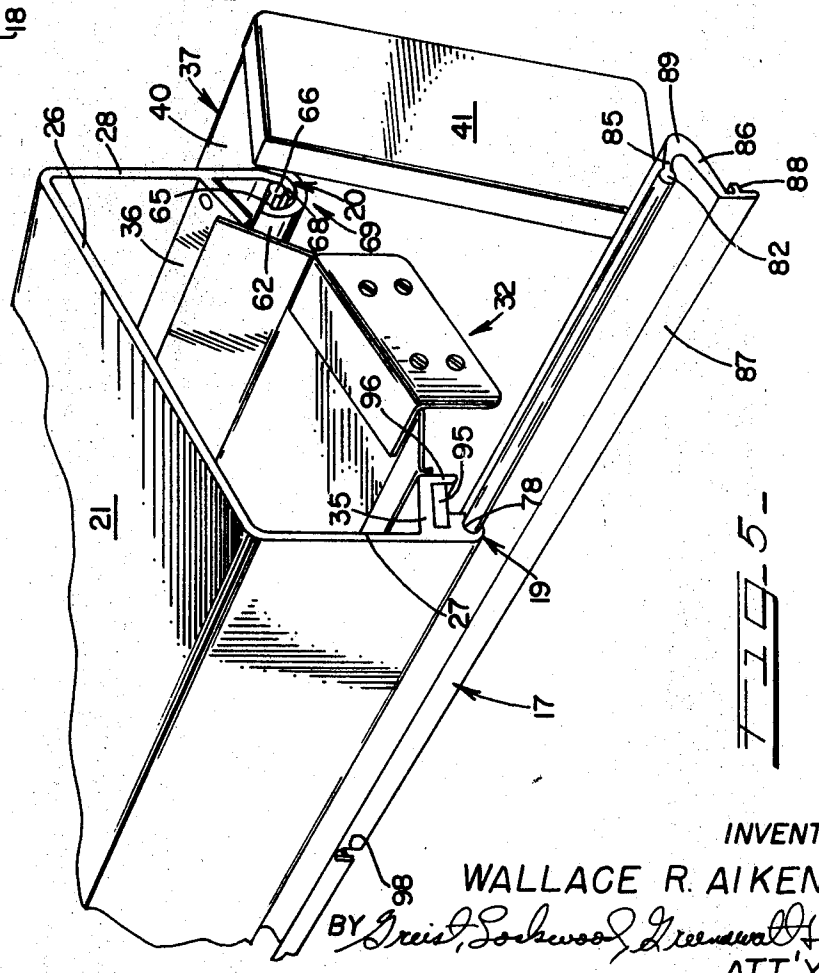


FIG. 5

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LIGHT FIXTURE FASTENING MEANS

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Int. Cl. B65d *43/16, 51/10*
U.S. Cl. 220—31 9 Claims

ABSTRACT OF THE DISCLOSURE

A light fixture including an elongated housing having edge portions defining an opening, a lens door for covering the opening, and a locking assembly for opening the door to provide access to the lamp, for closing the door, and for retaining the door in a closed position. The locking assembly includes a locking bar, which extends along one of the edge portions and which is mounted for movement between open and closed positions, the lens door includes a latch extending along one edge thereof which is engaged and supported by the locking bar, and the locking bar is held in the closed position by one or two fasteners.

BACKGROUND OF THE INVENTION

Field of the invention

The field of this invention is that of light fixtures, particularly elongated light fixtures adapted to receive tubular lamps, such as fluorescent lamps.

Description of the prior art

In many present day light fixtures, a lens door for protecting the lamp(s) in the fixture and for diffusing or softening the light from the fixture is positioned in the path of the light from the light fixture and secured to the housing of the light fixture around the periphery thereof. Usually the lens door is only releasably fastened to the housing to permit opening or removal of the lens door for the purpose of replacing defective lamps in the fixture. In one such fixture, the lens door is secured to the housing by a plurality of fasteners positioned about the periphery of the door. In another such fixture, one edge of the lens door is hingedly connected to one edge of the housing and fasteners are positioned around the unhinged periphery of the lens door for releasably securing the door to the housing.

When the light fixture is an elongated light fixture, such as a fluorescent light fixture, it is often times awkward, cumbersome and inconvenient to remove or unfasten the fasteners, and then remove or open the lens door to replace defective lamps. In some instances, as the fasteners are unfastened or removed, the lens door may swing down with a jolt resulting in damage to the lens door. Furthermore, a plurality of fasteners projecting from and about the periphery of the fixture, not only detract from the appearance of the fixture, but also presents projections, which can injure, scratch, or cut one handling the fixture.

SUMMARY OF THE INVENTION

In view of the difficulties incurred with prior art light fixtures, one object of the invention is to provide a locking means for securing a lens door to the housing of a light fixture which is simple to manipulate, prevents damage to the lens door, and facilitates removal of defective lamps from the fixture.

Another object of the invention is to provide a light fixture having a locking means which utilizes only one or two fasteners for holding the lens door to the housing.

A further object of the invention is to provide a light fixture which has a smooth clean appearance.

A further object of the invention is to provide a light fixture having a locking means which tightly closes off the space between one edge portion of the housing and the one edge of the lens door which is secured to the one edge portion of the housing.

A still further object of the invention is to provide a light fixture having a hinge assembly which allows the lens door to be hingedly connected to the housing for swinging movement from a fully closed position to a fully opened position, and which permits complete detachment of the lens door from the housing only when the lens door is in a predetermined, partially opened position.

Still another object of the invention is to provide an elongated light fixture having a lens door connected to the elongated housing of the fixture and a locking means for holding and supporting an edge of the lens door against an edge portion of the housing substantially along the entire length thereof.

Still another object of the invention is to provide a light fixture having an elongated locking bar which is secured to one edge portion of the elongated housing of the fixture, and which engages part of one edge of the lens door substantially along the entire length of the door to securely hold the lens door to the housing when the locking bar is fastened to the lens door.

The invention achieves the above and other objects and advantages, including those inherent in the invention, by providing a light fixture including an elongated housing having edge portions which define an opening for receiving at least one lamp into the housing, a door covering the opening, and a locking assembly for retaining the door in a closed position, which assembly facilitates and simplifies opening and closing of the door when access to the lamp is desired. The locking assembly includes an elongated locking bar extending along a substantial portion of the entire length of one of the edge portions and having a shoulder portion for engaging a latch fixed to and extending along a substantial length of one edge of the lens door. The locking bar is mounted for movement between open and closed positions relative to the housing and, when the locking bar is in the closed position, the shoulder portion engages and supports the latch along a substantial length thereof. The locking bar is held in the closed position by at least one releasable fastener.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a light fixture utilizing the locking bar of the invention;

FIG. 2 is a side elevational view of the light fixture shown in FIG. 1;

FIG. 3 is a vertical sectional view, on an enlarged scale, taken along lines 3—3 of FIG. 2;

FIG. 4 is a vertical sectional view similar to FIG. 3 and showing the light fixture in an open position; and,

FIG. 5 is a fragmentary perspective view of a portion of the light fixture shown in FIG. 1 with the light fixture open, with one housing end cap removed, and with the locking bar partially removed from the housing.

DESCRIPTION OF THE PREFERRED EMBODIMENTS OF THE INVENTION

A light fixture embodying the principles of this invention is indicated by the reference numeral **10** in FIG. 1. The fixture **10** is preferably of the type which is particularly adapted to be secured to a ceiling or to the underside of a roof. For this purpose, in the illustrated embodiment, mounting brackets **11** (FIG. 1) or mounting brackets **12** (FIG. 2) are provided on the top surface of the fixture. The brackets **11** (FIG. 1) are particularly designed for securing the fixture **10** to a beam, such as, by way of example, a ceiling beam in a factory, in a rail-

road station, or in municipal rapid transit station, while the brackets **12** (FIG. 2) are particularly designed for securing the fixture **10** to a flat surface, such as a ceiling.

The principal component parts of the light fixture **10** shown in FIG. 1 are: a housing **15**, a lens door **16** connected to the housing **15**, a locking bar **17** secured to the housing **15**, and at least one fastener **18** for securing the locking bar **17** to the lens door **16**. Preferably, the housing and locking bar are extruded aluminum parts. In the illustrated embodiment, and as best shown in FIGS. 4 and 5, the locking bar **17** is pivotally secured to a first edge portion **19** of the housing **15**, while the lens door **16** is hingedly connected to a second edge portion **20** of the housing **15** which is opposite and parallel to the first edge portion **19**.

Referring to FIGS. 3, 4 and 5, the housing **15** includes an inverted, generally U-shaped, channel portion **21**. The channel portion **21** is closed off at each end by end caps **22** and **25** (FIGS. 1 and 2). The end caps **22** and **25** are preferably die cast aluminum parts. The channel portion has a flat top portion **26** and downwardly extending side portions **27** and **28**. The lower edge portions **19** and **20** (FIG. 4) of side portions **27** and **28**, together with the lower edge portions **29** and **30** (FIGS. 1 and 4) of end caps **22** and **25**, define an opening **31** in the housing **15** which is adapted to receive a lamp socket assembly **32**. In the illustrated embodiment, the lamp socket assembly **32** is of the type adapted for mounting elongated lamps, such as fluorescent lamps.

A first elongated bracket **35** extends from the inner surface of the side portion **27** substantially along the entire length thereof, and a second elongated bracket **36** extends from the inner surface of the side portion **28** substantially along the entire length thereof. Each bracket **35** and **36** is spaced away from the respective lower edge portion **19** or **20** of the side portion **27** or **28**, and together form housing supports for mounting the lamp socket assembly **32**.

In the illustrated embodiment, the lens door **16** includes a U-shaped lens **37** having a flat bottom portion **38** and first and second upwardly extending side portions **39** and **40**. The lens door **16** also includes lens end caps **41** and **42** (FIGS. 1 and 2) which close off the ends of the lens **37**, and lens door frame members **45** and **46** (FIGS. 3 and 4) secured respectively to the upper edges **47** and **48** of the side portions **39** and **40** of the lens **37**. Preferably, the end caps **41** and **42** are die cast aluminum parts, and the frame members **45** and **46** are extruded aluminum parts. The lens **37** is made out of a clear or a translucent material such as glass or plastic. In one preferred embodiment of the invention, the lens **37** is made from a white translucent polycarbonate plastic material sold under the trademark Lexan.

It is to be understood, of course, that the lens door **16** can be formed in a different manner. For example, with a deeper housing **15**, the lens door **16** can be essentially flat, rather than U-shaped or channel shaped as shown in FIGS. 1 to 5. A U-shape has the advantage, however, of providing easy access to the lamps mounted in the lamp socket assembly **32** when the lens door **16** is opened.

Each side portion **39**, **40** includes a holding rib portion **49**, **50**, which extends from the inner surface of the respective side portion **39**, **40** substantially along the entire length thereof. The rib portions **49** and **50** provide means by which the frame members **45** and **46** can be firmly secured to the upper edges **47** and **48** of the lens **37**. Since both of the frame members **45** and **46** are, in part, mirror images of each other, and since they are secured to the upper edges **47** and **48** of the side portions **39** and **40** in the same way, only the securing or fastening of the frame member **45** to the side portion **39** will be explained in detail, it being understood that the frame member **46** is secured to the side portion **40** in like manner.

The lower portion of the frame member **45** has two downwardly extending leg portions **51** and **52** which define therebetween an elongated slot **53** adapted to receive and hold the upper edge **47** of the side portion **39**. The rib portion **49** is spaced a short distance below the upper edge **47** and is engaged by the leg portion **52** of the lower portion of the frame member **45**. Preferably, a gasket or gasket material **55** is positioned in the slot **53** to provide a snug or tight fit between the frame member **45** and the upper edge **47** of the side portion **39**.

At least one L-shaped retaining clip **56** is secured to the frame member **45** by a screw, rivet or other suitable fastener **57** for holding the side portion **39** to the frame member **45**. The clip **56** includes a short leg **58**, which engages the rib portion **49** and holds the same against the leg portion **52** of the frame member **45**, and a long leg **59**, which is secured to the frame member **45** by the fastener **57**.

The lower portion of the frame member **46** is essentially identical to the lower portion of the frame member **45** and is received over the upper edge **48** of the side portion **40** with a leg portion thereof engaging the rib portion **50** which is spaced a short distance below the upper edge **48**. A clip **60**, similar to clip **56** is secured to the frame member **46** to hold the rib portion **50** of the side portion **40** to the frame member **46**. Preferably, a gasket or gasket material **61**, similar to gasket **55**, is interposed between the upper edge **48** of the side portion **40** and the lower portion of the frame member **46**. If desired, a plurality of clips **56** and **60** can be secured to the frame members **45** and **46** to better hold lens **37** to the frame members **45** and **46**. Alternatively, the clips **56** and **60** can be elongated and secured to the frame member **45** by a plurality of fasteners **57** to better hold lens **37** to the frame members **45** and **46**.

The upper portion of the frame member **46** is formed with a generally C-shaped flange **62** extending therefrom. A pivot bar portion **65** having a rounded end portion **66** extends from the outer end **67** of the flange **62** and is adapted for engagement with, and for being supported by, a rim portion **68** which extends inwardly into the opening **31** from the lower edge of the side portion **28** of the housing **15**. The flange **62** and the rim portion **68** form a hinge assembly **69** for hingedly or pivotally connecting the lens door **16** to the housing **15**.

At least one leaf spring **70** is connected to the lower surface of bracket **34** and is adapted to engage the outer periphery or surface of the C-shaped flange **62** to thereby bias the rounded end portion **66** of the flange **62** against the rim portion **68**.

The frame members **45** and **46** each have similarly formed ridge portions **71** and **72** which extend upwardly from the frame members **45** and **46** and which extend along the outer edges of the lens door **16** substantially the entire length thereof. The ridge portion **71** engages locking bar **17**, when the locking bar **17** is secured to the lens door **16** in overlying relationship to the ridge portion **71**, to provide a stabilizing point of contact between the locking bar **17** and the frame member **45**, as shown in FIG. 3, while the ridge portion **72** provides a stop means which engages the side portion **28**, when the lens door **16** is in the fully opened position, as shown in FIG. 4.

The upper portion of the frame member **45** is formed with a flange **75** (similar to the flange **62**) extending therefrom. Although the flange **62** includes a pivot bar portion **65**, the flange **75** does not. Instead, the outer end portion **76** of the flange **75** forms a latch portion or latch means which engages, and is supported by the locking bar **17** when the locking bar **17** engages and is held to the outer side surface **77** (FIG. 4) of the frame member **45**. If desired, the frame members **45** and **46** can be initially extruded from the same mold. Then, the frame members **45** can be formed from the frame mem-

bers 46 by cutting the pivot bar portions 65 off of the frame members 46.

As best shown in FIGS. 3, 4, and 5, a partially cylindrical bore 78 (FIGS. 4 and 5) is formed in the side portion 27 adjacent or near the lower edge 19. The bore 78 extends substantially the entire length of the housing 15. A slot 79 (FIG. 3), defined by side walls 80 and 81, extends from and along the bore 78 and opens into the opening 31 (FIGS. 3 and 4). Portions of the locking bar 17 are received in the bore 78 and the slot 79.

The locking bar 17 includes a rounded portion 82 which is received in the bore 78, a latch supporting shoulder portion 85 connected to the rounded portion, a brace portion 86 connected to the shoulder portion and a fastener receiving strip portion 87 connected to the brace portion 86. Preferably, a seating rig 88 is formed on the strip portion 87 and extends substantially the entire length of the locking bar 17. The rib 88 is adapted to engage, or seat against, the outer surface 77 of the frame member 45, when the locking bar 17 is fastened to the lens door 16, to provide another stabilizing point of contact between the locking bar 17 and the frame member 45. In a preferred embodiment of the invention, the connection or junction between the shoulder portion 85 and the brace portion 86 is thickened, as indicated at 89 in FIGURES 4 and 5, to strengthen the locking bar 17.

The shoulder portion 85 and the brace portion 86 are preferably connected to each other at an acute angle whereby, when the locking bar 17 is secured to lens door 16, the brace portion 86 forms a supporting arm for the shoulder portion 85.

In assembling the fixture 10, the rounded portion 82 of the locking bar 17 is slid into the bore 78, and held to the housing 15 by the cylindrical wall of the bore 78, with a part of the shoulder portion 85 received in the slot 79. As shown in FIGS. 3 and 4, the width of the part of the shoulder portion 85 received in the slot 79 is less than the diverging width of the slot 79, to allow for limited arcuate movement of the locking bar 17 between a closed position, where the shoulder portion 85 engages the latch portion 76, and an open position, where the shoulder portion 85 engages the side wall 80 of the slot 79. The extent of arcuate or pivotal movement of the locking bar 17 is limited by the side walls 80 and 81 of the slot 79.

In the illustrated embodiment, the locking bar 17 is secured to the lens door 16 by the fastener 18 which is in the form of a threaded member having a threaded portion 90 and a knurled knob portion 91. The threaded portion 90 is received in a threaded bore (not shown) in the frame member 45 of the lens door 16. Part of the threaded portion 90, behind the knob portion 91, is received in a notch 92 formed in the fastener receiving strip portion 87 of the locking bar 17. When the fastener 18 is threaded into the frame member 45, with part of the threaded portion 90 received in the notch 92, the underside of the knob portion 91 will engage the strip portion 87 in the area adjacent the notch 92. After the fastener 18 has been tightened this engagement between the knob portion 91 and the strip portion 87 will be sufficient to hold the locking bar 17 to the lens door 16 with the seating rib 88 engaging the outer surface 77 of the frame members 45 substantially along the entire length thereof.

Although, in the illustrated embodiment, only one fastener 18 is shown positioned intermediate the lens door end caps 41 and 42, it is to be understood that two fasteners can be used, preferably at equidistant points from the end caps 41 and 42. Two fasteners are preferred where the fixture 10 is over six feet in length. Furthermore, the locking bar 17 can be divided into two separate sections when two fasteners are used, to facilitate separate fastening of each fastener and the respective locking bar section to the lens door 16. Also, it is to be understood that a locking bar of the type shown and described herein can be utilized in a smaller fixture which does not necessarily have the inherent problems of a long fixture, e.g., the problem of mounting a heavy and/or long lens door to a fixture housing.

When the lens door 16 is in the fully closed position, and the locking bar 17 is secured to the lens door 16, the latch portion 76, is received and held between the lower surface of the bracket 35 and the upper surface of the latch supporting shoulder portion 85 of the locking bar 17, as best shown in FIG. 3. In a preferred embodiment of the invention, the bracket 35, the latch 76 and the shoulder portion 85 extend substantially the entire length of the light fixture 10 to provide uniform contact between the locking bar 17 and the frame member 45 along one edge of the lens door 16, and between the flange 75 of the frame member 45 and the lower surface of the bracket 35, when the lens door 16 is in the closed position.

Preferably, the rim portion 68 and the pivot bar portion 65 also extend substantially the entire length of the housing 15, so that the lens door 16 is hingedly supported by the housing 15 along substantially the entire length of the frame member 46 of the lens door 16.

In one preferred embodiment of the invention, a gasket 95 is secured to the lower surface of the bracket 35 and is adapted to engage the upper surface of the latch portion 76 of the flange 75 along substantially the entire length thereof. Additionally, the bracket 35 can have a downwardly extending flange portion 96 (FIGS. 3, 4 and 5) to locate and hold the gasket 95, and to prevent inward movement of the flange 75 if the frame member 45 should become loosened from the lens 37.

If desired, another gasket 97 can be placed between the thickened part 89, of the shoulder and brace portions 85 and 86, and the inner surface of the curved portion of the C-shaped flange 75, as shown in FIGS. 3 and 4. The gasket 97 can then be extended around the fixture 10 between the end caps 22 and 41, and 25 and 42, to provide a substantially watertight seal between the housing 15 and the lens door 16, when the locking bar 17 is secured to the lens door 16. The extension of the gasket 97 between end caps 25 and 42 is indicated at 98 in FIG. 3.

To open the lens door from the closed position shown in FIG. 4, the fastener 18 is unscrewed or unfastened to a point where the locking bar 17 can be rotated clockwise (viewing the locking bar as shown in FIGS. 3 and 4) so that the latch portion 76 of the flange 75 can move downwardly. Preferably, the thickness of the strip portion 87 and the rib 88, and the length of the fastener 18, are such that the fastener 18 does not have to be completely unscrewed from the lens door 16 to open the lens door 16. Also, it is desirable to secure a stop 99, e.g., in the form of a pin or ring, to the free end of the threaded portion 90 to prevent removal of the fastener 18 from the lens door 16, as shown in FIG. 4. In this way, loss of the fastener 18 is prevented. Also, a person holding the fastener 18 always will have the lens door 16 under control, when opening or closing the lens door 16.

To close the lens door 16 from the open position shown in FIG. 4, the lens door 16 is raised upwardly to bring the latch portion 76 of the flange 75 into engagement with the gasket 95. The locking bar 17 is then pivoted downwardly counterclockwise (viewing the locking bar 17 as shown in FIGS. 4 and 5) to bring: (a) the shoulder portion 85 into engagement with the lower surface of the latch portion 76 of the flange 75; (b) the brace portion 86 into engagement with ridge 71 on the frame member 45; and, (c) the seating rib 88 into engagement with the outer surface 77 of the frame member 45. These three points of engagement between the locking bar 17 and frame member 45 provide for a secure and stable locking of the lens door 16 to the housing 15, when the fastener 18 is screwed or threaded into the frame member 45.

If desired, ridge portions 71 and 72 can be omitted from the frame members 45 and 46 whereby the brace portion 86 will engage a flat surface on frame member 45 when the lens door is closed, and movement of the lens door

16 will be limited by engagement of a flat surface on the frame member 45 with an inclined outer surface 100 (FIG. 3) on the lower edge portion 20 of the housing 15 when the lens door is opened.

The locking assembly described herein and illustrated in the drawings, is particularly adapted for outdoor use. The component parts of the assembly are simple to manipulate and are adapted to withstand the corrosive nature of the elements in the atmosphere and the changes in temperature which occur throughout the year. However, the construction of this locking assembly can be utilized for indoor lighting fixtures also.

It will thus be seen, by reference to the foregoing specification and to the appended claims, that the present invention provides a novel locking means for securing a lens door to a housing of a light fixture, which means, and the resulting assembly, have a number of advantages and characteristics including those pointed out herein and others which are inherent in the invention.

I claim:

1. A light fixture including an elongated housing having edge portions defining an opening for receiving at least one lamp therein, a lens door for covering said opening, and means for opening said door to provide access to said lamp, for closing said door and for retaining said door in a closed position, said means including a locking bar extending along a substantial portion of the entire length of a first one of said edge portions defining said opening, said bar having a shoulder portion and being mounted for movement between open and closed positions relative to said housing, said lens door having latch means which is fixed to, and extends along, a substantial length of one edge of said lens door and which is adapted to be engaged, and supported by, said shoulder portion of said locking bar along a substantial length thereof, and fastening means for holding said locking bar in said closed position with said shoulder portion supporting said latch means.

2. The light fixture of claim 1 in which said locking bar is mounted for pivotal movement about an axis which is parallel to said first one of said edge portions so that said shoulder portion can move through an arc when moving between said open and closed positions.

3. The light fixture of claim 1 in which said fastening means is in the form of a threaded member having a portion thereof received in said door and in which said locking bar has means thereon for receiving a portion of said threaded member to retain said locking bar in a position in engagement with said latch means.

4. The light fixture of claim 1 including a hinge means, extending along a second one of said edge portions opposite said first one of said edge portions, for hingedly connecting said lens door to said housing.

5. The light fixture of claim 1 in which said locking bar has a seating rib adapted to engage said lens door along and adjacent to said one edge of said lens door, when said locking bar is in said closed position.

6. The light fixture of claim 1 in which said locking bar includes a brace portion adapted to overlie and engage a portion of said lens door extending along said one edge of said lens door when said locking bar is in said closed position.

7. The light fixture of claim 1 in which said housing has an elongated bracket spaced away from said first one of said edge portions and extending substantially the entire length of said housing, and said flange portion is received and held between said bracket in said housing and said shoulder portion of said locking bar when said locking bar is in said closed position.

8. The light fixture of claim 1 including a hinge means for hingedly connecting a second one of said edge portions to said lens door opposite said first one of said edge portions, said hinge means including means which permits said lens door to be detached from said housing when said lens door is in a predetermined partially opened position and which prevents detachment of said lens door from said housing when said lens door is in any other position.

9. The light fixture of claim 1 in which said housing has a partially cylindrical bore extending substantially the entire length of said housing adjacent said first one of said edge portions and said locking bar includes a rounded portion which is received in said bore and which is adapted to be slid into and out of said bore when assembling and disassembling said light fixture.

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