United States Patent

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[54] **FRAMELESS AIR-HANDLING FIXTURE LENS SUPPORT**
9 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** ..... **240/51.11,** 240/9 A
[51] **Int. Cl.** **H05b 33/02**
[50] **Field of Search** ..... 240/51.12, 51.11, 128, 134, 9, 9 A, 147, 41.5, 41.55, 151; 339/50, 57; 220/55 H, 55 K; 292/128, 122

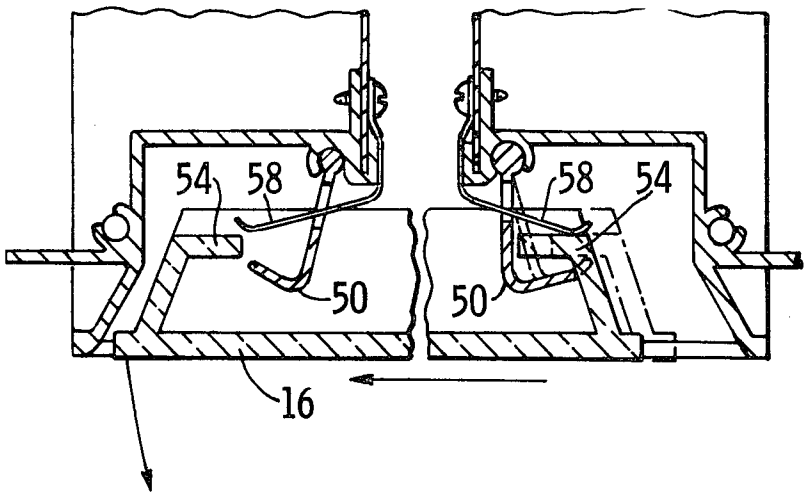
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ABSTRACT: An interior lighting fixture of the air-handling type including a pair of spring-urged lens support members along the lower edge of the fixture sidewalls having outwardly directed flanges on the lower ends thereof which coact with complementary inwardly directed flanges along the length of the frameless lens to support the lens, provide for lens centering with respect to the fixture and for the simple and quick removal of the lens from the fixture. The fixture also includes a lamp holder and a ballast compartment pivotally mounted within the fixture housing to permit access to the ballast elements when the compartment is in its swing-down position.



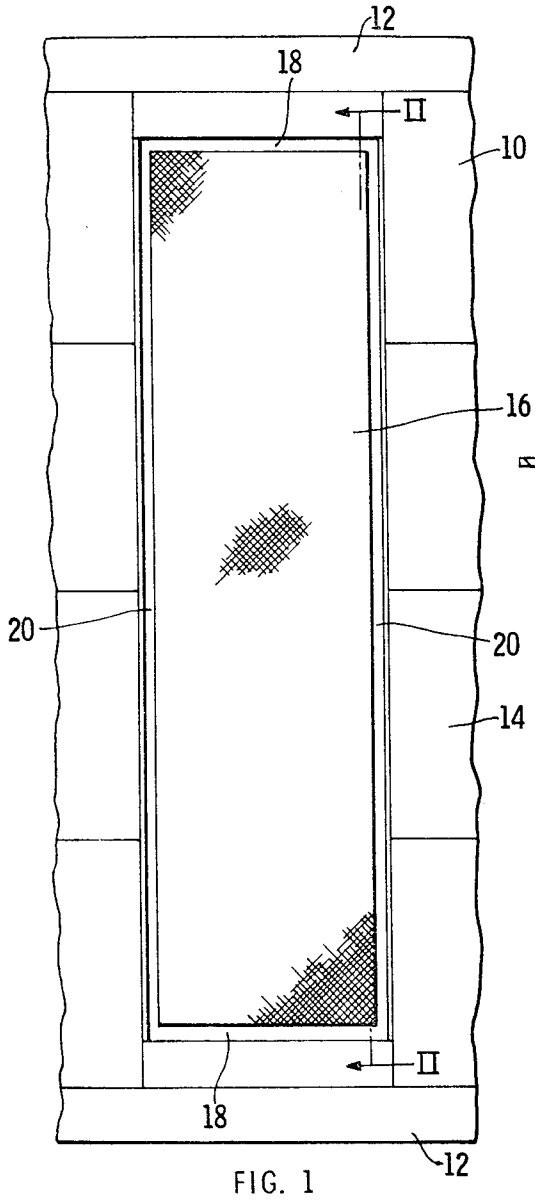
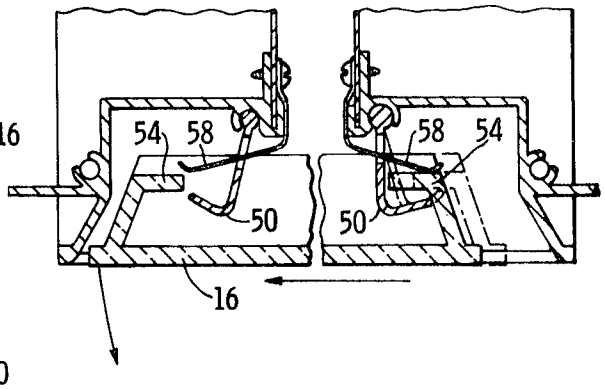


FIG. 1

FIG. 4



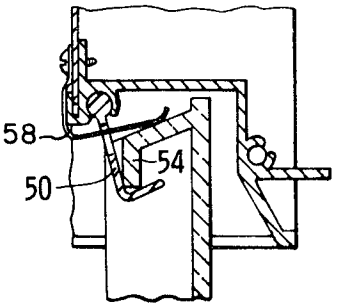


FIG. 5

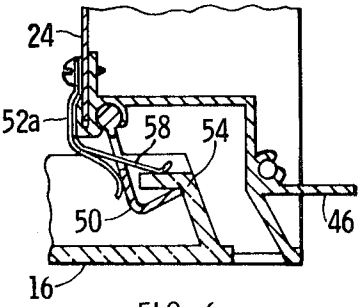


FIG. 6

WITNESSES

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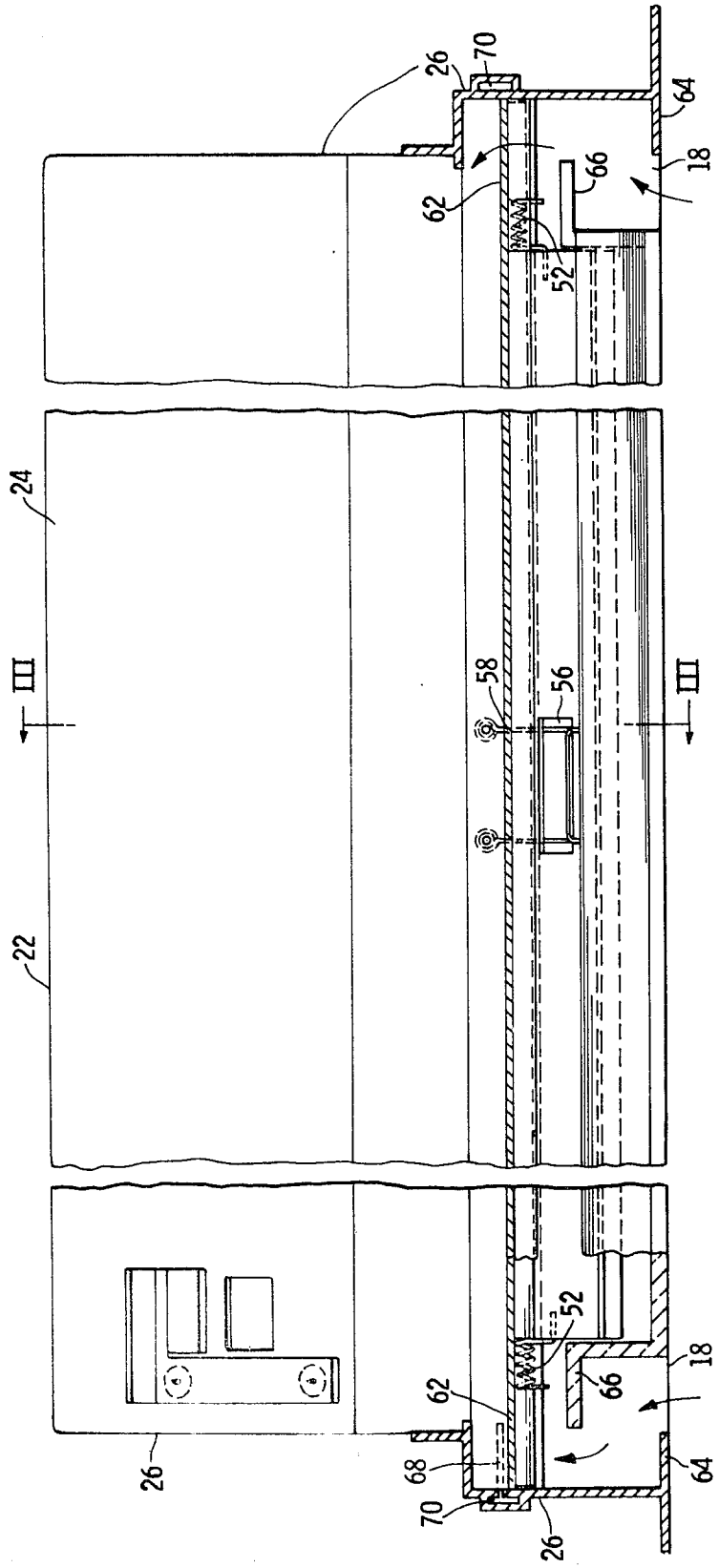


FIG. 2

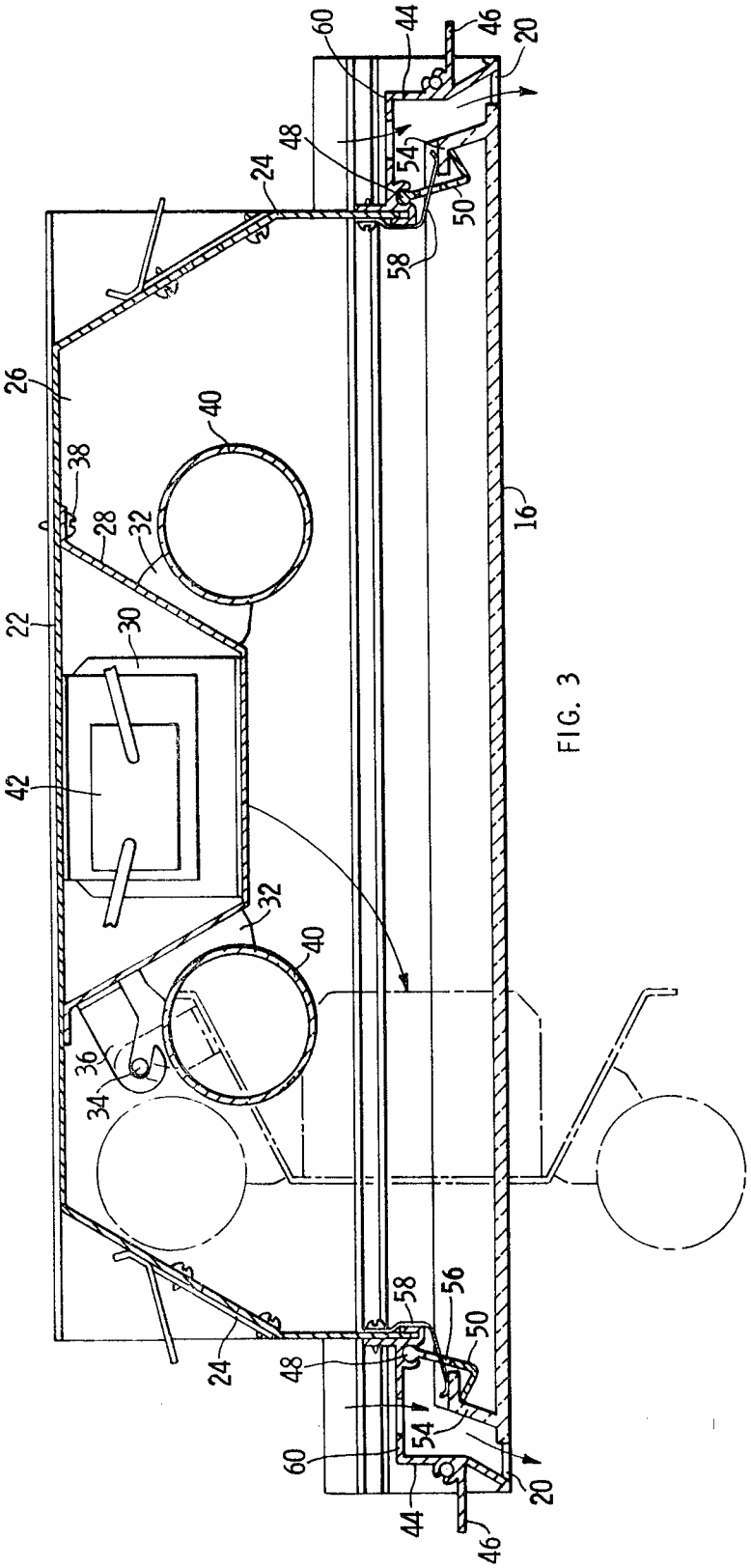

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FIG. 3

FRAMELESS AIR-HANDLING FIXTURE LENS SUPPORT

BACKGROUND OF THE INVENTION

This invention relates to interior lighting fixtures and more particularly, to an air-handling-type interior fluorescent lighting fixture having a frameless refractor or lens separating the interior of the fixture from the space to be illuminated. The term "frameless lens" refers to a glass or plastic lens or refractor which has no metallic frame around the edges to serve as a support or provide a means to connect the refractor or lens to the luminaire housing. Typical of present day frameless lens-type fixtures are disclosed in U.S. Pat. No. 3,275,822 to V. S. Wince et al. and U.S. Pat. No. 3,397,308 to G. P. Wakefield et al. It has been a general practice in the prior art to connect the frameless lens to the fixture by means of rigid connections or supports which require the maintenance of stringent tolerance requirements in the manufacture of the plastic lens in order for the lens to fit the fixed supports on the fixture and still permit ease of installation or removal of the lens. Since many of the frameless lens-type fixtures also accommodate air handling through the fixture, expansion and contraction of the lens with the varying temperatures associated with the air-handling function complicates the design criteria for the dimensioning of the fixed supports since the support and latch mechanisms do not generally provide for relative adjustment with respect to each other.

The lens support mechanism of the present invention overcomes the disadvantages of the prior art devices in that tolerance variations are of no significance since the support mechanisms are relatively movable with respect to each other in response to variable dimensions of the lens. The relative movement of the support mechanisms further provide for a self-centering action which aligns the lens with respect to the fixture and limits the possibility of shadows at the edges of the lens when the lens is not properly centered and further eliminates the possibility of a reduced light-transmitting opening through the lens which can be caused by defective lens support.

SUMMARY OF THE INVENTION

It is an object of this invention to provide a lens support for a frameless, air-handling, lighting fixture lens which permits ease of installation and removal of the lens.

Another object of this invention is to provide a lens support mechanism for a frameless lens which is adaptable to support plastic or glass lenses with a wide variance in manufacturing tolerances.

A further object of this invention is to provide a frameless, air-handling fixture lens support which provides positive spring-urged retention while additionally centering the lens with respect to the luminaire housing.

The foregoing objects are accomplished in accordance with the present invention by providing in an interior lighting fixture of the fluorescent type, a housing having a top portion and downwardly extending side and end walls which define an open bottomed optical cavity. Light source mounting means is mounted within the optical cavity and a pair of lens support means having flange extensions thereon are mounted adjacent the bottom end of each of the sidewalls. A frameless lens having complementary flanges thereon closes off the open bottom of the optical cavity and the flange extensions on the lens support means coact with the flanges on the frameless lens to thereby support the lens within the opening. Spring means are included which urge the flanges on the lens support means into contact with the flanges on the lens to thereby center the lens with respect to the bottom opening while retaining the lens in the open bottom of the lamp cavity.

The light source mounting means of this invention further includes a ballast mounting compartment which is pivotally mounted to the housing and which is swingable down about a pivotal mounting to provide access to the ballast compartment.

BRIEF DESCRIPTION OF THE DRAWING

The foregoing objects and others along with many of the attendant advantages of the present invention will become more readily apparent and better understood as the following detailed description is considered in connection with the accompanying drawings, in which:

FIG. 1 is a plan view of the interior fluorescent lighting fixture of the present invention disposed in the ceiling of a room;

FIG. 2 is a sectional view taken along the line II—II of FIG. 1 with a portion of the lens broken away;

FIG. 3 is a sectional view taken along the line III—III of FIG. 2;

FIG. 4 is a sectional view similar to FIG. 3 with portions of the luminaire housing and lens broken away illustrating the method by which the lens is removed from the housing;

FIG. 5 is a sectional view similar to the right-hand side of FIG. 4 illustrating the lens hanging in a light source access position; and

FIG. 6 is a sectional view similar to the right-hand side of FIG. 4 illustrating an alternative embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now in detail to the drawings wherein like reference characters represent like parts throughout the several views there is illustrated in FIG. 1 a typical lay-in-type sealing generally designated **10** having mounted therein a frameless lens-type fluorescent lighting fixture. When viewed from the illuminated space there can be seen the 2-inch ceiling runners **12**, ceiling panel members **14** and the frameless luminaire lens **16** having air return slots **18** at each end thereof and air supply slots **20** along the sides thereof.

Referring now to FIG. **2** there is illustrated, in section, the housing of the luminaire which includes a top portion **22**, sidewalls **24** and end walls **26** (FIG. 3) which define the open-bottomed optical cavity.

Referring now to FIG. **3** it will be seen that an electrical component mounting bracket **28** which serves as a wire way for the electrical wiring, a mounting housing for the ballast elements **30** as well as a mounting frame for the lamp holders **32**, is pivotally mounted to pins **34** by means of a pair of hooks or latches **36**. The pins **34** are mounted on the interior surface of each of the end walls **26**. The electrical component compartment **28** is then secured at its other end to the underside of housing top member **22** by means of threaded screws **38**. The fluorescent lamps **40** are mounted in the lamp holders **32** at each end of the electrical component compartment **28**. Electrical connection to the ballast components is made through a disconnect plug and receptacle combination **42** and is necessary to permit the incoming electrical wires to be disconnected from the ballast and lighting circuits in order that by the removal of threaded screws **38** the electrical component compartment can be moved to its swing-down position about pivot pins **34** as illustrated in phantom in FIG. **3** for the purpose of changing parts or repairing the ballast components. Additionally, the hooks or latches **36** are so constructed that the entire electrical component carrying compartment **28** can be removed from the pins **34** to provide for the quick interchangeability of the entire electrical system and lighting circuits within the luminaire housing.

Secured to the bottom edge of each of the sidewalls **24** is an air supply and lens mounting bracket **44** which also serves through flange **46** to mount the luminaire within the sealing. The inner end of bracket **44** carries an elongated circular trough or socket **48** within which is rotatably mounted a flanged lens support member **50** which extends substantially for the length of the sidewalls. The lens support members **50** are substantially L-shaped with the bottom flange projecting outwardly from the luminaire housing. As best seen in FIG. **2** a pair of coil springs **52** are also mounted in the trough or socket **48** and urge the lens support members outwardly of the fixture. The lens support members **50** may be constructed of

metal as is the remainder of the luminaire housing or alternatively they may be constructed of a clear plastic of suitable strength for purposes of eliminating any shadow on the lens edges. The lower flange on the lens support members **50** coacts with an inwardly directed flange **54** on the top side of the lens **16** with the coaction of these two flanges serving to retain the lens **16** in the open bottom of the optical cavity. The lens support member **50** may also be provided with a central aperture **56** through which a holddown spring **58** may extend. The holddown spring **58** which extends through the aperture **56** in the lens support member **50** overlies the flange **54** on the lens **16** to thereby inhibit the raising of the lens due to the action of air return through air return slots **18**.

When it is desired to mount a lens **16** within the luminaire housing (FIG. 4) the flange **54** on one end of the lens **16** is brought into its holding position with respect to its complementary lens support member **50**. The lens support member **50** is then forced toward the interior of the luminaire housing against the action of the springs **52** to permit the flange **54** on the other side of lens **16** to come to the position illustrated on the left-hand side of FIG. 4. The lens support member **50** on the right-hand side of FIG. 4 is then permitted to return to its normal position to bring the lens flange **54** into coaction with the lens support member **50** at the other side of the luminaire in order for the positions illustrated in FIG. 3 to be reached. The lens **16** may also be quickly removed from the luminaire housing by reversing the action and moving the lens **16** either to the right or left against the spring action of the lens support member **50** on that side to permit the flange **54** to clear the lens support member **50** on the other side and the fixture can then be completely removed. Alternatively, the lens **16** may be permitted to hang from one of the lens support members as illustrated in FIG. 5 while lamps are being changed or repair work is being accomplished on the ballast components.

FIG. **6** is substantially identical to the lower right-hand lens support mechanism of FIG. 3 with the exception that in this embodiment the coil springs **52** springs been replaced by a leaf spring **52***a* which similarly urges the lens support member **50** away from the interior of the fixture to both mount and center the lens **16** in the open bottom of the fixture. Similarly, the lens flange portion **54** is moved toward the interior of the fixture against the action of spring member **52***a* to mount the lens or remove the lens from the fixture.

The essentially free-floating lens **16** will be centered with respect to the luminaire bottom opening since the spring members **52**, or alternatively **52***a*, are of substantially similar strength and will act against each other to thereby center the lens with respect to the opening. Furthermore, the construction of the present invention provides for a positive holding and retaining function in mounting the lens within the bottom opening and is also not affected by substantial variances in the tolerances of lens manufacture because of the essentially free-swinging action of the lens under only the spring tension of the lens mounting members **50**.

The fixture of the present invention may or may not be of the air-handling variety. The fixture illustrated does provide for air to be supplied to the space to be illuminated over the fixture through openings in the top member **60** of the luminaire-mounting and lens-retaining bracket **44** and out through opening **20**. Air may be returned through the fixture from the illuminated space through openings **18** between the end wall **26** and the lens **16** through a plurality of openings along the edge of frame member **62**. A light trap box is provided in the ends of the luminaire through which the air is returned through the mechanism of flange **64** on the mounting frame, flange **66** on the ends of the lens **16** and if desired a baffle **68** which may be mounted in the slots **70** in sidewalls **26**.

As will be seen from the foregoing the luminaire of the frameless lens type of the present invention provides a simple positive and quick-acting mechanism for mounting a frameless lens in a fluorescent luminaire.

I claim as my invention:

1. An interior lighting fixture of the fluorescent type comprising in combination;
   - a housing having a top portion and downwardly extending side and end walls defining an open-bottomed optical cavity;
   - light source mounting means mounted within said optical cavity;
   - a pair of lens support means having a flange extension thereon, said lens support means being pivotally mounted adjacent the bottom end of each of said sidewalls and extending for substantially the entire length of said sidewalls;
   - lens means, having complementary flanges thereon extending for the length of said lens means, closing off the open bottom of said optical cavity, said flange extensions of said lens support means coacting with the flanges on said lens means to thereby support said lens in either a closed or open position; and
   - spring means urging said flanges on said lens support means into contact with said flanges on said lens to thereby retain and center said lens in said open bottom of said lamp cavity.

2. An interior lighting fixture according to claim 1 wherein said flange extensions on said lens support means extend outwardly of said fixture and said complementary flanges on said lens means extend inwardly toward the center of said fixture and overly said flange extensions.

3. An interior lighting fixture according to claim 2, wherein said spring means urges said lens support means and hence said flange extensions outwardly of said fixture to engage with said complementary flanges on said lens means.

4. An interior lighting fixture according to claim 1, wherein said light source mounting means includes a ballast mounting compartment, said light source mounting means being pivotally mounted within said housing and swingable down about said pivotal mounting to thereby provide access to said ballast compartment.

5. An interior lighting fixture of the fluorescent type comprising;
   - a housing having a top portion and downwardly extending side and end walls which define an open-bottomed optical cavity;
   - light source mounting means and light source ballast components mounted within said optical cavity;
   - a pair of substantially L-shaped lens support means pivotally mounted adjacent the bottom end of each of said sidewalls and extending for substantially the entire length of said sidewalls;
   - flanged lens means having side flanges extending along the length thereof closing off the open bottom of said optical cavity with the bases of said substantially L-shaped lens support means coacting with the flanges on said flanged lens means to thereby support said lens within said opening in either a closed or open position.

6. An interior lighting fixture according to claim 6 wherein said bases of said substantially L-shaped lens support means extend outwardly of said fixture and said flanges on said flanged lens means extend inwardly toward the center of said fixture and overlie the bases of said substantially L-shaped lens support means.

7. An interior lighting fixture according to claim 7, wherein said spring means urge said substantially L-shaped lens support means outwardly of said fixture to engage with said flanges on said flanged lens means.

8. An interior lighting fixture according to claim 5, wherein said light source mounting means and ballast compartment is pivotally mounted to said housing and swingable down about said pivotal mounting to thereby provide access to said ballast compartment.

9. An interior lighting fixture according to claim 5 wherein holddown spring means are associated with said lens support means and overlie the flanges on said flanged lens means to thereby retain said flanges against the bases of said L-shaped lens support means.

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