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SHIELD SUPPORT FOR A LUMINAIRE

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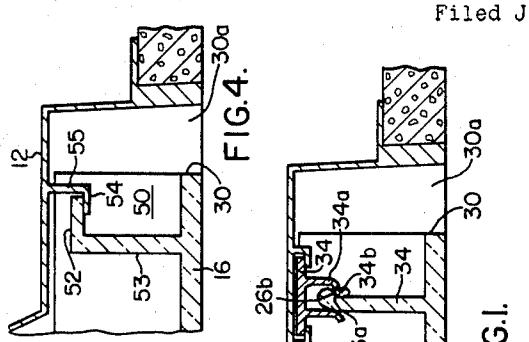
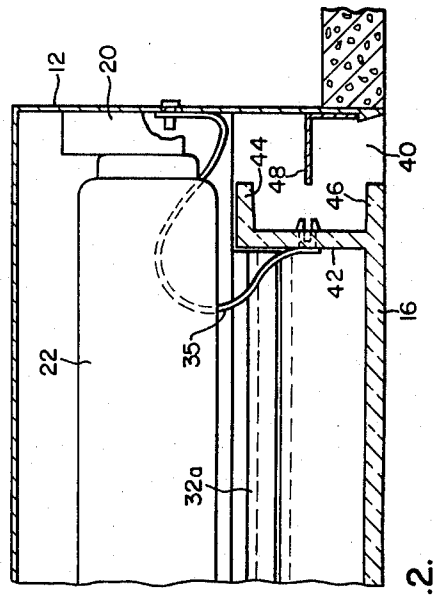


FIG.4.

FIG.1.



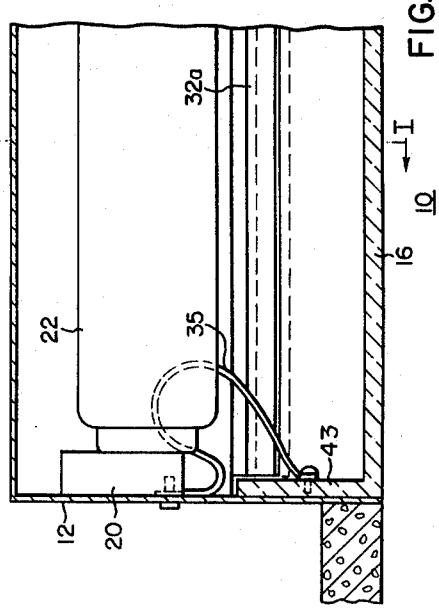
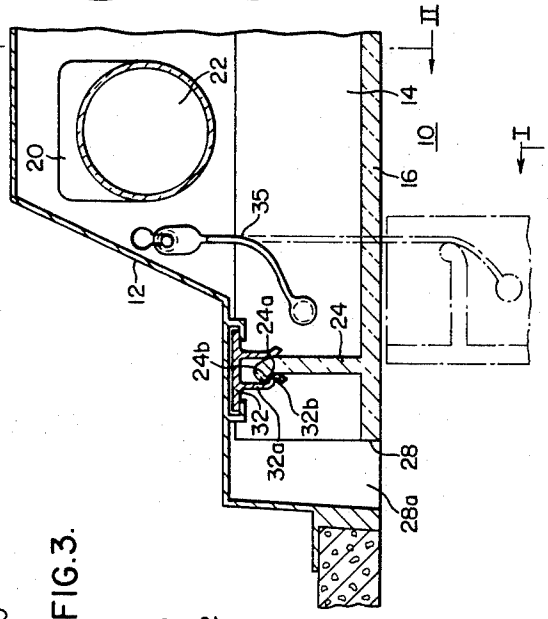


FIG.2.



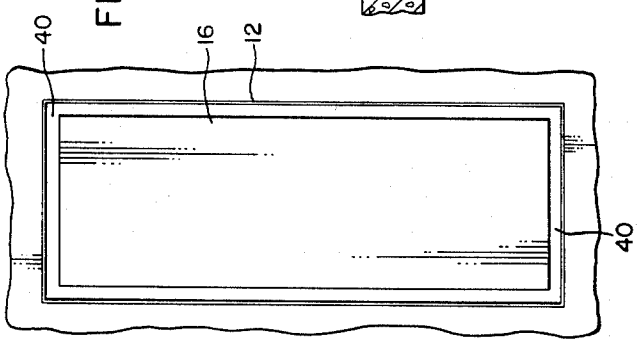


FIG.3.

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SHIELD SUPPORT FOR A LUMINAIRE

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ABSTRACT OF THE DISCLOSURE

A luminaire having a housing defining a bottom opening and a light transmissive shield mounted within and closing off the bottom opening which is releasable from the housing under certain temperature conditions. Resilient thermoplastic clip means are provided along the parallel longitudinal edges of the housing opening which releasably grip the shield and which soften under elevated temperature to release the flammable shield from the ceiling. The luminaire may further include a baffled air entrance path when air handling is required.

This invention relates generally to luminaires having releasable shield or refractor supports and, more particularly, to such luminaires wherein the shield is released when the support means is raised to a predetermined temperature.

The shields of refractors for luminaires are often made of plastic materials which are generally flammable. Such flammable shields are required to be supported in such a way that in the event of a fire, the shield is released from the housing. Thus, burning in place is avoided.

Another difficulty with plastic shields is the tendency to sag between the supports therefor, unless supported along closely spaced positions. Further, the shields in air-handling luminaires accumulate dust from the return air that passes therethrough, and they must be cleaned periodically.

It is therefore an object of this invention to provide a luminaire having improved support for the shield thereof.

It is a further object of this invention to provide a luminaire having a support for the shield thereof which releases the shield when the temperature of the support reaches a predetermined value.

It is an additional object of this invention to provide a luminaire having a support and a safety fastener for the shield thereof both of which release the shield when the temperature thereof reaches a predetermined value.

It is another object of this invention to provide a luminaire having a releasable support for the shield thereof which prevents the shield from sagging.

It is a further object of this invention to provide a luminaire having a support for the shield thereof which prevents shadows around the periphery of the shield.

It is an additional object of this invention to provide a luminaire having an improved air return passage.

It is still a further object of this invention to provide a luminaire having an air return passage which aids in removing dust from the return air.

Briefly, these and other objects are achieved by providing a clip means connected to the luminaire for supporting the shield. The clip is formed of a thermoplastic material which has a low softening point. In the event of a fire, the clip softens and releases the shield from the housing. The clip means extend substantially the entire longitudinal dimension of the shield to support the shield in a non-sag manner. The clip means are light transmitting and eliminates shadows around the edges of the shield. If the luminaire is of the air-handling type, the return air passage for the luminaire is equipped with baffle means which direct the air returning therethrough through a tortuous path. As the return air turns along the path, dust and particles of foreign matter settle out of the air before the air passes into the luminaire enclosure. Less dust is deposited on the shield.

For a better understanding of the invention, reference should be made to the accompanying detailed description and drawing in which:

FIGURE 1 is a sectional view, taken on the line I—I in FIG. 2, of a luminaire with the center portions broken away and showing the present shield support;

FIG. 2 is a fragmentary sectional view taken along line II—II of FIG. 1, showing the return air passage into the luminaire;

FIG. 3 is a bottom plan view of a modified luminaire showing the open space about the periphery of the shield therefor; and

FIG. 4 is a fragmentary sectional elevational view of a modified shield support.

Referring to FIGURE 1, there is shown a luminaire **10** having a housing **12** with a bottom opening **14**. A shield **16**, which is at least partially light transmitting, is disposed over the bottom opening **14** forming a luminaire enclosure **18** with the housing **12**. Lampholders **20** are affixed to the housing **12** and support light sources **22** within the luminaire enclosure **18** for illuminating the region below the luminaire **10**. Upwardly projecting support members **24** and **26** are connected to the shield **16** and extend along a substantial portion of the longitudinal dimension thereof proximate the longitudinal edges **28** and **30** of the shield **16**. The support members **24** and **26** are provided with grooves **24***a* and **26***a*, respectively. Downwardly projecting support members **32** and **34** are connected to the housing **12** and extend along a substantial portion of the longitudinal dimension thereof proximate the upwardly projecting support members **24** and **26**, respectively. Clips **32***a* and **34***a* are positioned along each of the downwardly projecting support members **32** and **34** for engaging the grooves **24***a* and **26***a*. The engagement between the grooves **24***a* and **26***a* and the clips **32***a* and **34***a* include inclined surfaces **24***b*, **26***b*, **32***b*, and **34***b* respectively, which tend to spread the clips when the shield **16** is subjected to a downward force. Thus, the shield supporting engagement is readily disengaged by a predetermined downward force on the shield **16**. It is to be understood that the positions of the clips and grooves may be reversed without interfering with the operation thereof. That is, the clips **32***a* and **34***a* may be connected to the edges of upwardly projecting support members **24** and **26**, respectively, and grooves **24***a* and **26***a* may be provided in downwardly projecting support members **32** and **34**, respectively. Also, only one inclined surface may be included in each engagement between the clips and grooves.

Preferably, the clips have sufficient resilience or spring to allow removal and replacement of the shield **16** for shield cleaning and luminaire maintenance. When so removed, the shield is preferably suspended by a safety support or flexible suspending means such as cords **35** provided at each longitudinal end of the shield **16**. The cord **35** is long enough to suspend the shield **16** below the luminaire **10** and out of the way of the maintenance man. The cord **35** eliminates the need of the maintenance man to hand the removed shield **16** down to a second maintenance man, or otherwise dispose of the shield **16**. Further, the cord provides a safety support in case the shield should inadvertently become released from the supports therefor. As can be seen in FIGS. 1 and 2, the cord **35** is in a slack position when the shield **16** is installed in the luminaire **10**. The dotted line portion of FIGURE 1 shows the shield **16** as suspended from the cord **35** during maintenance.

The clips **32***a* and **34***a* and the cords **35** are formed of an organic thermoplastic material which distorts and/or softens at a predetermined low temperature. The clips are exposed to the region below the luminaire **10** through the peripheral spaces **28***a* and **30***a* along the longitudinal edges **28** and **30** of the shield **16**. A fire in this region will heat the clips to a temperature above the low softening temperature. The clips are then spread apart by the coaction of the above-mentioned inclined surfaces and the weight of the shield **16**, and the shield **16** is released. The cords **35**, which are also softened by the fire, cannot suspend the shield **16**, and the shield **16** falls. Preferably, the combustion temperature of the shield **16** is greater than the softening temperature of the clips and cords to prevent the shield **16** from initially catching fire while in place within, or suspended from, the luminaire **10**. It is desirable that the clips are thin enough to allow relatively easy weakening. For example, the clips **32** and **34** may be formed of polyvinylchloride, approximately 1/32 of an inch, which starts to soften at a temperature of about 140° F. The cords **35** are preferably formed of nylon about 1/16 of an inch in diameter which softens at a temperature of from about 150 to about 186° F. The shield **16** is preferably formed of polystyrene or acrylic. Other materials may be employed for the cord **35** and the shield **16**. Generally, the clips may be formed of any of the materials listed in the table presented below. The softening temperature range for each material is also given. Other thermoplastic materials may be employed.

Table

Material:	Softening temperature Range in ° F.
Ethyl cellulose	115–185
Polyvinyl chloride	120–160
Acrylic polymers	140–190
and copolymers thereof	140–200
Acrylonitrile-butadiene-styrene	140–200
Styrene-acrylonitrile	140–205
Cellulose acetate	140–220
Cellulose acetate butyrate	140–220
Polyvinylchloride acetate	150–175
Cellulose propionate	155–220

Referring to FIG. 2, there is shown a return air passage **40** at one end of luminaire **10** opening from the illuminated region into the luminaire enclosure **18**. The shield **16** has an end wall **42**, which forms one side of the return passage **40**. The end wall **42** has an upper baffle **44** and a lower baffle **46** extending longitudinally and generally horizontally therefrom. The housing **12** has an intermediate baffle **48** extending generally horizontally towards the end wall **42**, transversely into the passage **40**, at a height intermediate the baffles **44** and **46**.

The baffles force the air returning from the illuminated region to follow a tortuous path through the passage **40** which contains five ninety degree turns. These multiple turns cause the return air to change directions many times and release the dust and particles of foreign matter carried therein. The dust may deposit on the upper surface of the baffles. To facilitate cleaning of the baffles, the intermediate baffle **48** may be removable. As mentioned hereinbefore, the shield **16** is removable.

The upper baffle **44** has the additional function of preventing line-of-sight vision into the luminaire enclosure **18** from the room **23**. The passage **40** is wide to minimize the air pressure drop thereacross. Without baffle **44** the wide passage **40** would permit a clear view into the luminaire **10**.

In order to prevent the return air from entering the enclosure **18** at points other than the passage **40**, the support members **24**, **26**, **32** and **34** desirably extend continuously along the longitudinal dimension of the shield **16**. The clip and groove engagement forms a generally air tight continous seal. Also, such a continuous support will prevent the shield **16** from sagging.

It is to be understood that a return air passage similar to passage **40** may be used at each end of the luminaire **10**. Further, the passage **40** may not be employed at all, if desired. In the latter case, the luminaire **10** would not be of the air-handling type, and both ends thereof would appear as the end **43** shown in FIG. 2 without the passage.

Referring to FIG. 3, there is shown the peripheral opening around the shield **16**. This peripheral opening includes the longitudinal peripheral spaces **28***a* and **30***a*, and the return air passages **40** at each longitudinal end of the shield **16**. The upwardly projecting support members are light transmitting, allowing this peripheral opening to be illuminated by the light sources **22** and objectionable shadows are eliminated therefrom.

Referring to FIG. 4, there is shown a releasable pivotal mechanism **50** which may be used in place of the groove and clip engagement along one edge of the shield **16**. The mechanism **50** comprises a horizontal portion **52** extending from the upwardly projecting support member **53**, and a horizontal member **54** extending from downwardly projecting support member **55**. The horizontal portions **52** and **54** overlap to support the shield **16** along the edge **30** thereof. If the clip and groove engagement along the other longitudinal edge **18** is released, the releasable pivotal mechanism **50** becomes disengaged and the shield **16** falls away. Numerous modifications of the mechanism **50** are possible.

It will be apparent to those skilled in the art that the objects of this invention have been achieved by providing a shield support which softens in the event of a fire and releases the shield. The shield is supported along substantially all of the longitudinal dimension thereof to prevent sag. In the case of an air-handling luminaire, less dust accumulates on the shield because the return air passage is provided with plural baffles for causing the return air to flow through a tortuous path.

Since numerous changes may be made in the above described apparatus and different embodiments of the invention may be made without departing from the spirit thereof, it is intended that all matter contained in the foregoing description or shown in the accompanying drawings, shall be interpreted as illustrative and not in a limiting sense.

I claim as my invention:

1. In combination with a luminaire comprising: a housing having a bottom opening, lampholder means mounted within said housing and adapted to support light source means for illuminating the region below said luminaire, and a shield which is at least partially light transmitting disposed over the bottom opening in said housing; the improved support for said shield comprising:

upwardly projecting support means connected to said shield and extending along a substantial portion of the longitudinal dimension thereof proximate at least one longitudinal edge thereof;

support means connected to said housing and extending along a substantial portion of the longitudinal dimension thereof proximate said upwardly projecting support means;

resilient clip means positioned along one of said support means; and

groove means provided in the other of said support means and releasably gripped by said clip means to support said shield along a substantial portion of the longitudinal dimension thereof, at least one of said groove means and said clip means having at least one inclined surface which tends to spread said clip means,

the shield supporting engagement between said clip means and said groove means being readily disengaged by exerting a predetermined downward force on said shield, and said clip means comprising organic thermoplastic material which softens at a predetermined low temperature for allowing said groove means to be released from said clip means by the

downward force exerted by the weight of said shield when said clip means is raised above said predetermined softening temperature.

2. The combination as specified in claim 1, wherein said shield is formed of an organic plastic which is combustible when raised above said predetermined temperature at which said clip means softens.

3. The combination as specified in claim 1, wherein a flexible safety fastening means is connected between said luminaire and said shield, said safety fastening means comprising an organic thermoplastic material which softens at a predetermined low softening temperature for allowing said shield to fall from said luminaire when the temperature of said fastening means is raised above its softening temperature and said clip means and said groove are disengaged.

4. The combination as specified in claim 1, wherein said clip means is positioned on said support means which is connected to said housing, and said groove means is provided in said upwardly projecting support means for engaging said clip means.

5. The combination as specified in claim 1, wherein an elongated flexible suspending means is connected between said shield and said luminaire for suspending said shield in a position below said luminaire when said clip means and said groove means are disengaged, said suspending means being in a slack position when said clip means and said groove means are engaged, said suspending means comprising organic thermoplastic material which softens and breaks at a predetermined low temperature for allowing said shield to fall when said suspending means is raised above its softening temperature and said clip means and said groove means are disengaged.

6. The combination as specified in claim 1, wherein end walls are provided proximate each longitudinal end of said shield, at least one of said end walls having an air return passage adjacent thereto which opens from the region to be illuminated and into said luminaire, said upwardly projecting support means extending continuously along the entire longitudinal dimension of said shield, said support means which is connected to said housing extending continuously along the longitudinal dimension of said housing, and both said support means forming with each other a substantially airtight engagement.

7. The combination as specified in claim 6, wherein an end wall of said shield has upper baffle means and lower baffle means projecting therefrom and extending into said air return passage, and said housing has intermediate baffle means at an intermediate height between said upper baffle means and said lower baffle means, said baffle means causing the return air to flow through a tortuous path and release any dust therefrom before passing into said luminaire.

8. The combination as specified in claim 1, wherein said groove means and said clip means are positioned proximate one longitudinal edge of said shield, and releasable pivotal means are connected to said shield and said housing proximate the other longitudinal edge of said shield.

9. The combination as specified in claim 8, wherein said releasable pivotal means includes overlapping horizontal support portions which are respectively connected to said shield and said housing.

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