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Pettyjohn, Jr.

[11] **3,796,870**

[45] **Mar. 12, 1974**

[54] **RECESSED SQUARE FLUORESCENT LUMINAIRE**

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[52] **U.S. Cl.** ..... **240/51.11 R**, 240/9 R, 240/78

[51] **Int. Cl.** **H05b 33/02**

[58] **Field of Search** ..... 240/51.11 R, 9 R, 9 A, 240/78; 52/28

[56] **References Cited**

UNITED STATES PATENTS

3,755,667	8/1973	Price	52/28 X
3,591,794	7/1971	Dail et al.	240/51.11 R X
3,372,270	3/1968	Quin et al.	240/51.11 R X

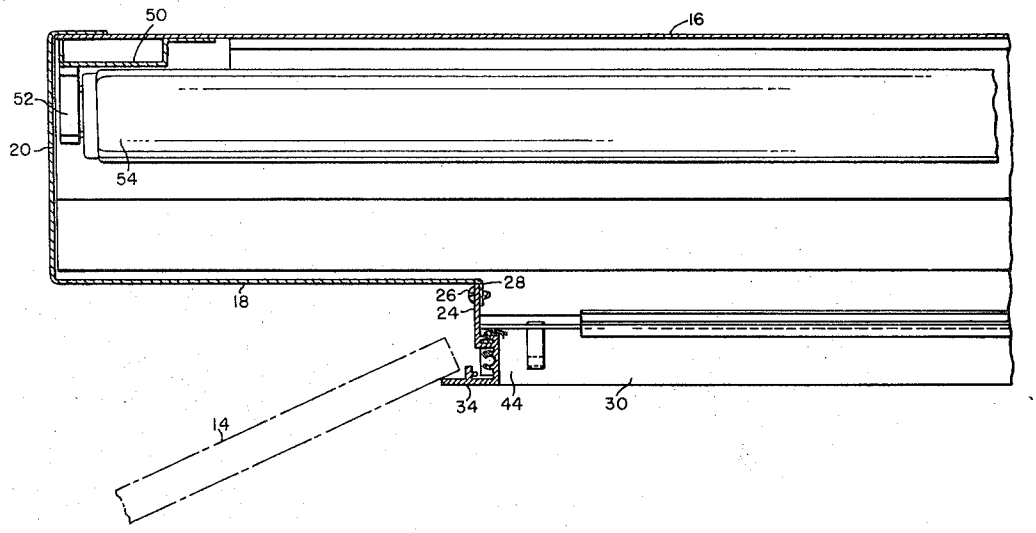
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Attorney, Agent, or Firm—B. R. Studebaker

[57] **ABSTRACT**

A fluorescent luminaire of the recessed type for use in a modular ceiling system. The luminaire displays only a three-foot square opening in the ceiling system but will receive through the opening and mount within the luminaire, conventional four-foot fluorescent lamps thereby shielding the ends of the lamp and the lamp holders from view as well as providing a new light exit shape with conventional lamps.

6 Claims, 4 Drawing Figures



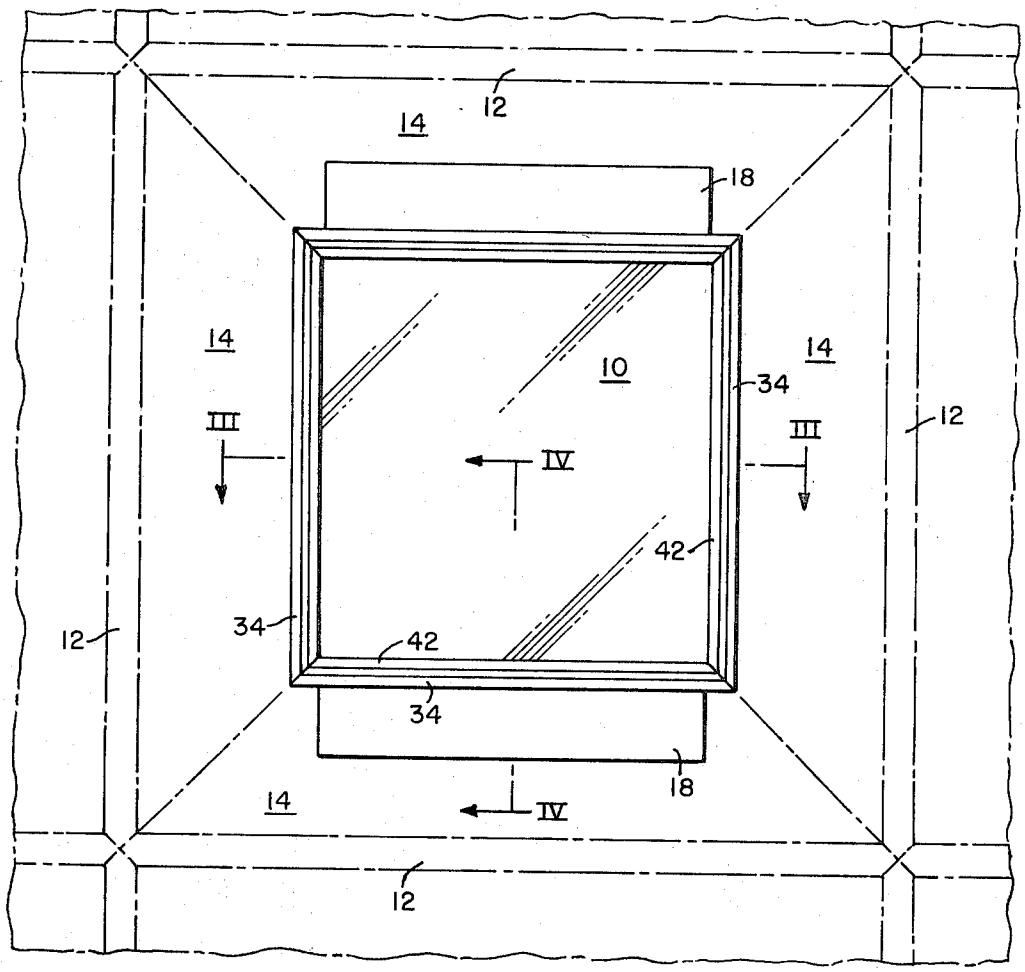

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FIG. 1

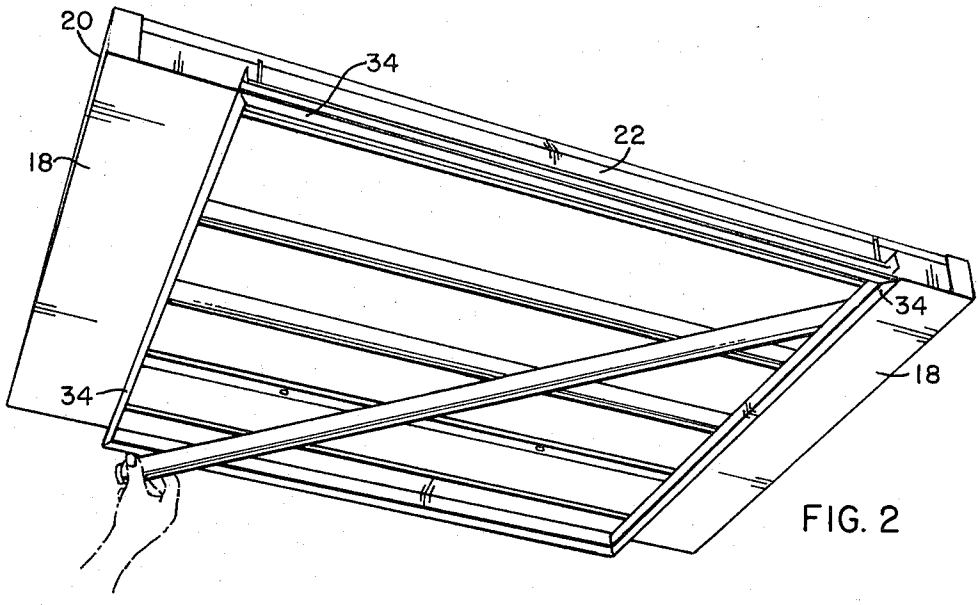

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FIG. 2

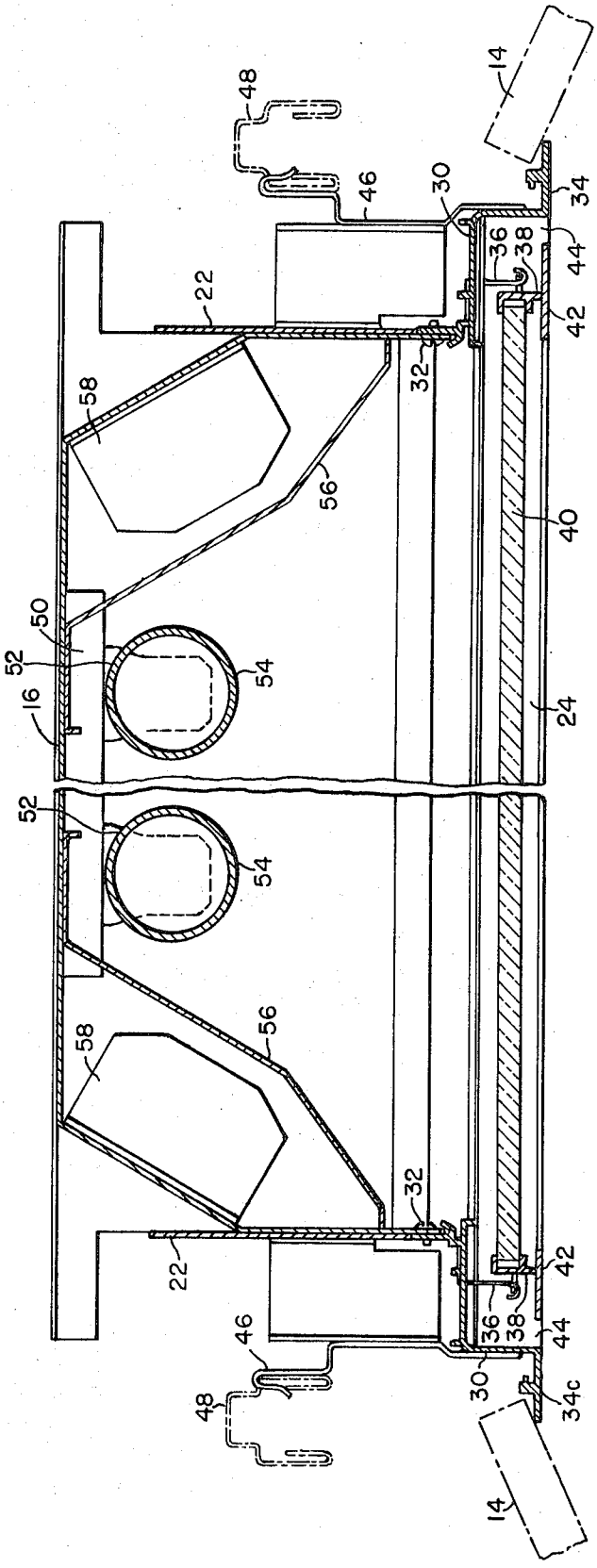

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34c
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FIG. 3

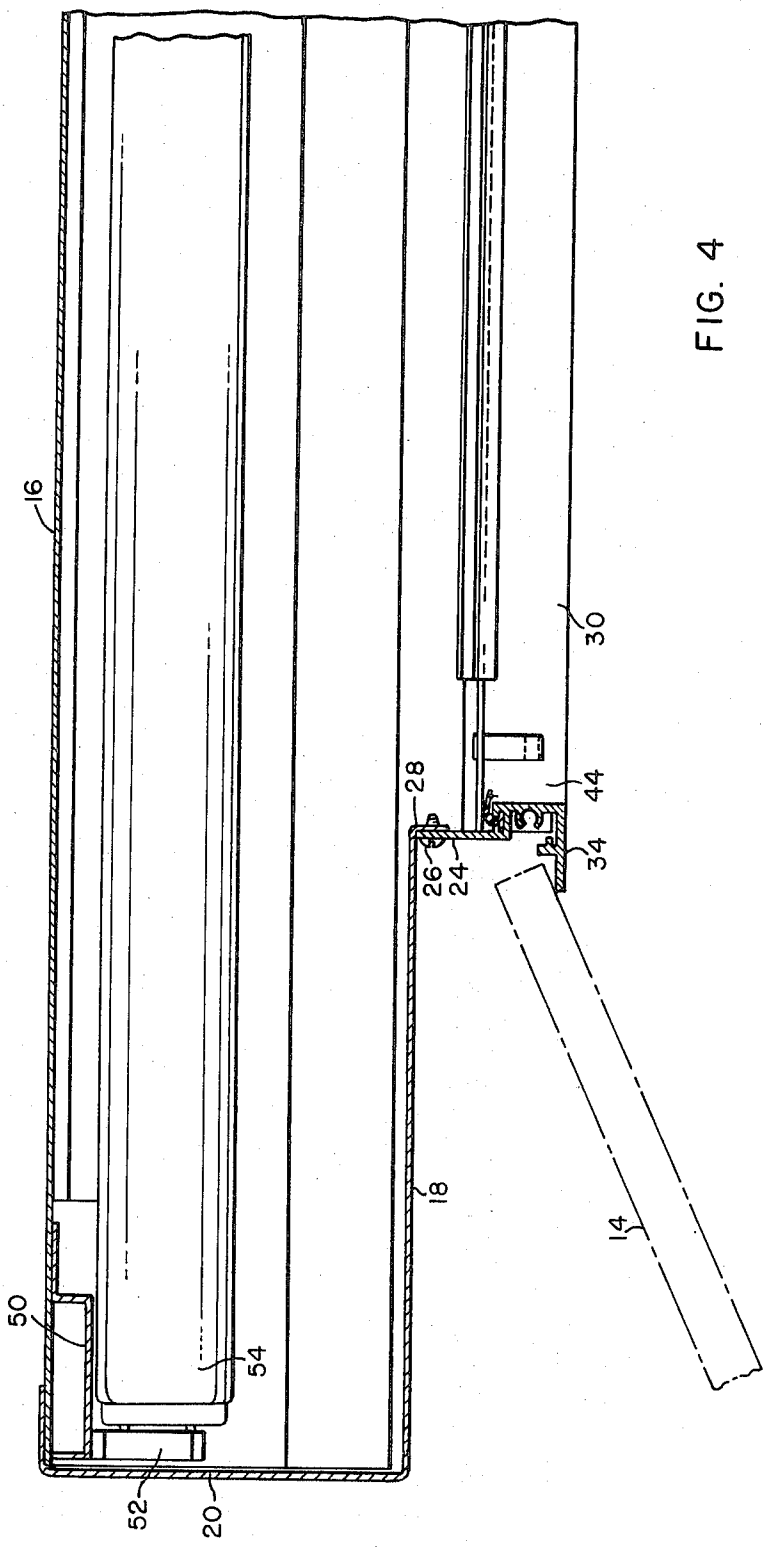


FIG. 4

RECESSED SQUARE FLUORESCENT LUMINAIRE

BACKGROUND OF THE INVENTION

Fluorescent luminaires employing the conventional 40 watt fluorescent lamp are almost uniformly 1×4 or 2×4 in external appearance. This is of course to facilitate utilization of the standard 40 watt fluorescent lamp which is 48 inches in length. The four foot dimension or length of the fixture of course facilitates the replacement of lamps but also means that the ends of the lamps lie directly above the translucent fixture door. As is well known, as fluorescent lamps age the light output becomes less at the ends of the lamp due to a darkening of the bulb and hence there is no longer uniform brightness across the lens opening. This phenomanon not only detracts from the appearance of the luminaire but also reduces the light output of the fixtures as compared to its original brightness level as the lamps age.

The 1×4 and 2×4 recessed fluorescent luminaires dictate an interior ceiling architecture which has as its basic concept the rectangle and although this configuration does not significantly detract from a planar ceiling system, with the advent of individual vaulted ceiling modules, the ceilings assume an asymetrical appearance. A vaulted ceiling concept in which the luminaires provide a square appearance and hence will fit neatly into a square ceiling module provides for a significantly improved esthetic appearance as well as more equal light distribution. Heretofore the use of conventional 40 watt fluorescent lamps in a square appearing fluorescent luminaire has not been achieved in dimensions of less than a four foot square.

SUMMARY OF THE INVENTION

The recessed fluorescent luminaire of this invention although suitable for use in planar ceiling systems is particularly adapted for use in the vaulted ceiling systems of modern architecture in that the sloped sides of the vaulted walls are uniform as for example when the 3×3 luminaire lens is positioned at the top of a ceiling vault whose bottom edge is a five foot square. The luminaire of this invention permits the utilization of conventional 40 watt fluorescent lamps and conventional 40 watt fluorescent lamp ballasts in a ceiling system which includes a 3×3 luminaire lens. Because of the high volume, the 40 watt lamp and the 40 watt ballast are probably by far the most economical in terms of light output per dollar since the vast majority of commercial industrial and public lighting is with 40 watt, four foot fluorescent lamps. The utilization of four foot, 40 watt fluorescent lamps in a 3×3 square fixture is accomplished in accordance with the present invention by providing in a fluorescent luminaire of the recessed type, a rectangular housing having a top wall, parallel side walls, parallel end walls and a bottom wall with the relative length of the end walls to the side walls being in a ratio of about 3:4. A substantially square opening is provided in the bottom wall with each side edge of the opening in the bottom wall being approximately equivalent in length to the end walls. Lamp holders are mounted on the interior surface of the end walls with the lamp holders being constructed and arranged to receive fluorescent lamps of a length approximately 1/3 greater than a side of the opening.

Lamping and relamping of the fixture is simply and easily accomplished by dropping the lamp and rotating it through about 45° so that the 48 inch length can be easily removed through the approximately 51 inch diagonal of the 3′×3′ opening.

BRIEF DESCRIPTION OF THE DRAWING

The many advantages and features of this invention will become more readily apparent and better understood as the following detailed description is considered in connection with the accompanying drawing in which:

FIG. 1 is a bottom plan view of the luminaire of this invention disposed in a typical modular ceiling system;

FIG. 2 is a perspective view illustrating the removal of a fluorescent lamp from the luminaire of this invention;

FIG. 3 is a sectional view taken along the line III—III of FIG. 1 with the center portion thereof broken away; and

FIG. 4 is a sectional view taken along the line IV—IV of FIG. 1;

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now in detail to the drawing, wherein like reference characters represent like parts throughout the several views, there is illustrated in FIG. 1 a bottom plan view of the luminaire of this invention generally designated **10**. The luminaire **10**, as illustrated, is disposed in a five foot square modular ceiling system of the cove of vault type. The ceiling system illustrated in FIG. 1 includes the ceiling support frame members **12** in the form of five foot square grid pattern which serves to support the bottom edges of the cove or vault side walls **14**. The upper edges of the side walls **14** are supported by the ceiling flange of the luminaire bottom opening in a manner which will be later described.

The fluorescent luminaire of this invention includes a top wall **16** and a parallel bottom wall **18**, a pair of parallel end walls **20** and a pair of parallel side walls **22**. An opening in the bottom wall **18** is defined by an end plate **24** scured as by screws **26** to the downwardly directed flange **28** and a pair of parallel side runners **30** secured to side walls **22** by for example screws **32**. Each of the end plates and side runners terminate at their bottom edge in a flat exposed ceiling flange **34** which serves to provide a picture-frame effect for the opening in the bottom wall in which the lens or light transmitting luminaire door is hung. The ceiling flange **34** forms a peripheral lip which also serves to support the upper end of the cove or vault side wall ceiling panel members **14** to provide for a finished ceiling effect. A pair of door hinge and latch hangers in the form of hook members **36** are mounted on each side runner **30** and serve to both latch and hinge the door frame **38** which carries the light transmitting refractor or lens member **40**. The door frame **38** co-acts with the hook members **36** in a conventional manner to provide either a hinge or a latch and is further provided with a bottom flange **42** to effect a frame within a frame appearance with the ceiling flange **34**. The space **44** between the exposed flanges **34** and **42** provide for either air entrance or exit to or from the luminaire if it is desired that the luminaire be one of the air handling type.

Also attached to the side runners **30** are means for mounting the luminaire in the ceiling in the form of a plurality of luminaire hanger members **46** which are

employed to hang the luminaire from the ceiling system luminaire support channels **48.** Cooperation between the hanger members **46** and the support channels **48** serve to mount the bottom wall a sufficient distance above the ceiling to permit the side walls or ceiling panels **14** to be positioned below the bottom wall **18.**

Within the luminaire housing attached to the top wall at each end of the luminaire are lamp holder support brackets **50** which support a plurality of pairs of fluorescent lamp holders **52** which serve to mount a pluarlity of **40** watt fluorescent lamps **54.** The bottom edge of the lamp holders **52** are situated within the luminaire housing a distance above the bottom wall **18** which is greater than the diameter of a **40** watt fluorescent lamp in order that the lamps may be droped within the housing to a level below the adjacent fluorescent lamps to provide room for rotating the lamp within the housing so that it overlies the diagonal of the three foot square opening. A wire way cover **56** is mounted between the side walls and the top wall in either one or both of the sides of the luminaire depending on the number of lamps in the fixture. The wireway cover serves to provide a housing within a housing for the electrical service such as wires and 40 watt rapid-start ballasts **58.**

In the preferred embodiment of this invention the side walls **22** are approximately 4 feet in length and the end walls approximately 3 feet in length to provide the housing with a length-to-width ratio of approximately 4:3 with the opening defined by the ceiling flanges **34** being approximately equivalent to the end walls **20** to provide a 3 feet square opening in the bottom wall of the luminaire. As will be apparent from FIGS. **2** and **4,** the ends of the 4 foot, 40 watt fluorescent lamps mounted in the lamp holders **52** overlie the bottom wall portion **18** and are thus hidden from view through the luminaire door or lens **40.** As will be apparent from most conventional fluorescent luminaires during life, the ends of the fluorescent lamps will begin to darken and detract from the uniform light output of the luminaire. This phenomenon will not be visible in the luminaire of this invention since about 6 inches at each end of the **48** inch fluorescent lamps will be completely hidden from view. Even though the opening in the bottom wall **18** is only 3 feet square the geometry permits the 4 foot fluorescent lamps to be removed through the bottom opening as illustrated in FIG. **2** by dropping the lamps from the lamp holders and turning the lamp so that it overlies the approximately 51 inch diagonal of the 3 feet square opening. In this position the lamps can then be readily removed from the lamp cavity through the luminaire door opening. The luminaire of this invention has the unique facility of employing 4 foot, 40 watt fluorescent lamps, the most economical light sources available, in a fixture which provides the appearance of a 3 × 3 square as opposed to the conventional 1×4 and 2×4 rectangular fluorescent fixtures which in the past almost universally were employed to accommodate the 40 watt fluorescent lamp. Additionally, it provides for a luminaire in which the ends of the lamps, the portions having the lowest light output during later life of the lamp are completely shielded in terms of their appearance effect on the lens or light outlet of the luminaire. The foregoing has been accomplished by providing a luminaire which includes a housing with a length-to-width ratio of approximately 4:3 and an approximately square opening in the bottom wall thereof with each side of that opening being approximately equivalent to the width of the housing and having within the lamp cavity spaced lamp holders constructed and arranged to receive fluorescent lamps of the length approximately equivalent to the length of the luminaire with the ratio of the space between the lamp holders and a side of the opening being also approximately 4:3.

What is claimed is:

1. A fluorescent luminaire of the recessed type for use in a modular ceiling system, said fluorescent luminaire comprising:

a substantially rectangular housing having a top wall, parallel side walls, parallel end walls and a bottom wall with the relative lengths of said end walls to said side walls being in a ratio of about 3:4;

a substantially square opening in said bottom wall, each side of said opening in said bottom wall being approximately equivalent to the length of said end walls; and

lamp holders mounted on the interior surface of said end walls, said lamp holders being constructed and arranged to receive fluorescent lamps of a length approximately 1/3 greater than a side of said opening.

2. A fluorescent luminaire according to claim **1** wherein door means is releasably retained in said opening in said bottom wall thereby closing off said opening.

3. In a modular ceiling system, a fluorescent luminaire of the recessed type, said luminaire comprising:

a housing having a length-to-width ratio of approximately 4:3 and an approximately square opening in the bottom wall thereof with each side of said opening approximately equivalent to the width of said housing,

spaced lamp holder pairs within said housing constructed and arranged to receive fluorescent lamps of a length approximately equivalent to the length of said luminaire whereby the ratio of the space between said lamp holder pairs and a side of said opening is approximately 4:3.

4. A luminaire according to claim **3** wherein said approximately square opening includes a ceiling flange there around and a framed translucent lens is mounted within said flange.

5. A fluorescent luminaire of the recessed type for forming a part of modular ceiling system, said fluorescent luminaire comprising:

a substantially rectangular housing having a top wall, parallel side walls, parallel end walls joining to said side walls, and a bottom wall, with the relative lengths of said end walls to said side walls being in a ratio of about 3:4;

a substantially square opening in said bottom wall, each side of said opening in said bottom wall having a length substantially equal to the length of each said end wall;

means for mounting said luminaire in said ceiling with said bottom wall substantially parallel to said ceiling but recessed therefrom by a sufficient amount to permit ceiling panel members to be positioned below same;

a plurality of pairs of fluorescent lamp holders mounted proximate the interior surface of said end walls and recessed from said bottom wall by a dis-

tance which is greater than the diameter of the fluorescent lamps to be received, and each pair of said lamp holders adapted to receive and retain a fluorescent lamp having a length about 1/3 greater than the length of each said side of said opening;

retaining members depending from the periphery of said opening in said bottom wall and terminating in peripheral lip means adapted to retain ceiling panel members; and

light-transmitting shield means substantially occupying said opening in said bottom wall, whereby said luminaire is adapted to receive and operate fluorescent lamps having a length which substantially exceeds the length dimension of the bottom wall opening, and said bottom wall is screened by ceiling panel members to provide a uniform appearance.

6. A fluorescent luminaire of the recessed type for forming a part of a modular ceiling system, said fluorescent luminaire comprising:

a substantially rectangular housing having a top wall, parallel side walls, parallel end walls joining to said side walls, and a bottom wall, with said side walls being a predetermined amount longer than said end walls;

a substantially square opening in said bottom wall, each side of said opening in said bottom wall having a length substantially equal to the length of each said end wall;

means for mounting said luminaire in said ceiling with said bottom wall substantially above said ceiling recessed therefrom by a sufficient amount to permit ceiling panel members to be positioned and supported below same;

a plurality of pairs of fluorescent lamp holders mounted proximate the interior surface of said end walls and recessed from said bottom wall by a distance which is greater than the diameter of the fluorescent lamps to be received, and each pair of said lamp holders adapted to receive and retain a fluorescent lamp having a length which is a predetermined amount greater than the length of each said side of said opening;

retaining members depending from the periphery of said opening in said bottom wall and terminating in peripheral support means adapted to retain ceiling panel members; and

light-transmitting shield means supported proximate and substantially occupying said opening in said bottom wall, whereby said luminaire is adapted to receive and operate fluorescent lamps having a length which substantially exceeds the length dimension of said bottom wall opening, and remaining portions of said bottom wall are adapted to be screened by underlying ceiling panel members to provide a uniform appearance.

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