March 16, 1965 W. L. LIPSCOMB 3,173,616

COMBINED LUMINAIRE AND AIR-FLOW MEANS

Filed Oct. 16, 1961 2 Sheets-Sheet 1

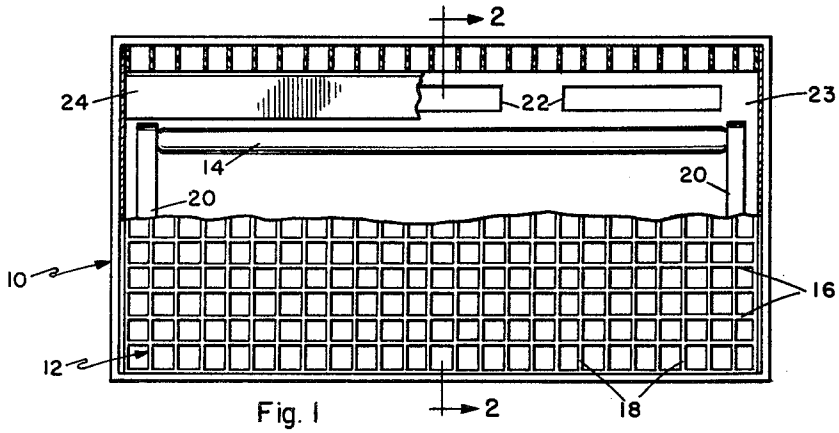


Fig. 1

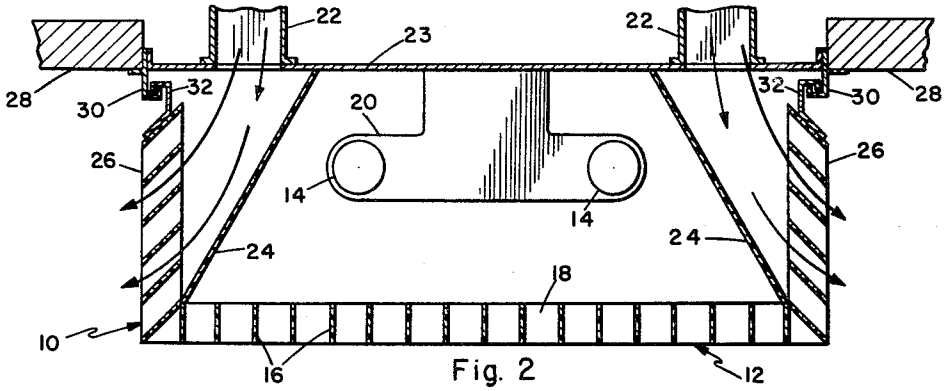


Fig. 2

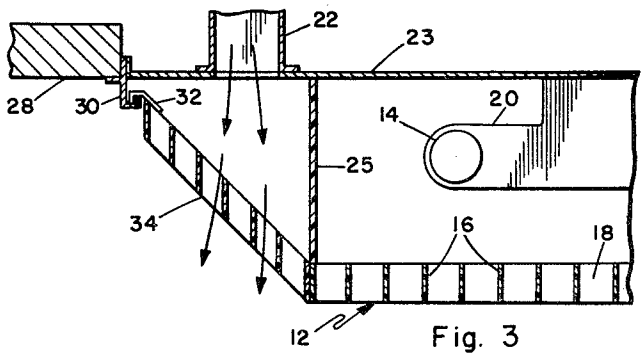


Fig. 3

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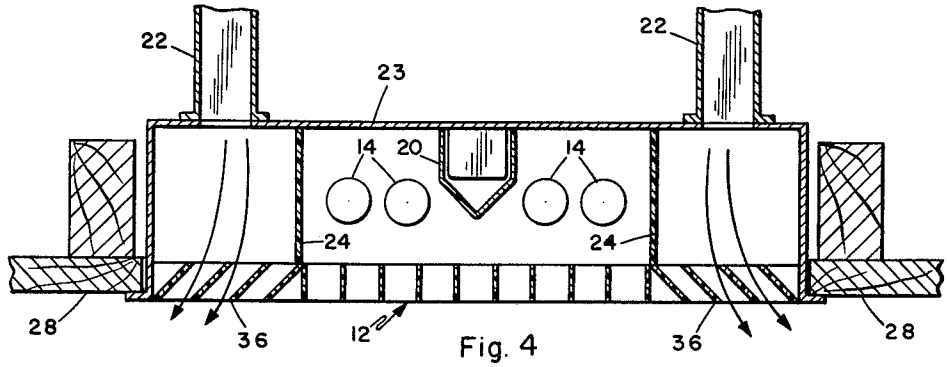


Fig. 4

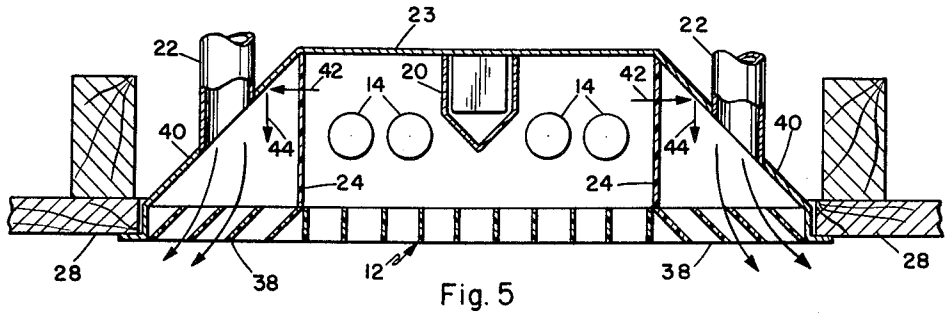


Fig. 5

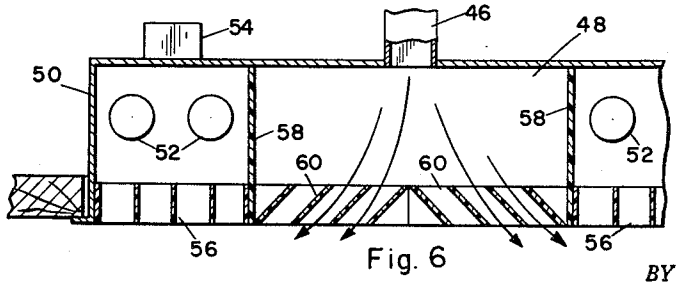


Fig. 6

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COMBINED LUMINAIRE AND AIR-FLOW MEANS

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2 Claims. (Cl. 240—9)

This invention relates to a lighting fixture, and more particularly to a lighting fixture that incorporates into its structure, properly oriented surfaces and passages for directing the movement of air.

BACKGROUND

The ceilings of many modern offices, waiting rooms, stores, restaurants, and the like are currently cluttered up by luminaires, air conditioning outlets, heated air outlets, used-air intakes, openings for loud speakers, and the like. This multiplicity of units not only produces an unattractive appearance, but increases the cost of building and servicing the equipment associated with all these separate openings.

OBJECTS AND DRAWINGS

It is therefore the principal object of my invention to provide an improved ceiling-mounted structural element.

It is another object of my invention to provide a novel structure that combines the functions of a luminaire and air flow passageways.

It is a further object of my invention to provide a combined luminaire and air flow means that can direct air at a desired angle.

The attainment of these objects and others will be realized from the following specification, taken in conjunction with the drawings in which:

FIGURE 1 is a cut-away bottom view of my luminaire;

FIGURE 2 is a sectional view taken on line 2—2 of FIGURE 1;

FIGURE 3 is a fragmentary sectional view of another embodiment of my invention;

FIGURE 4 is a sectional view of a further embodiment of my invention;

FIGURE 5 is a sectional view of another embodiment of my invention; and

FIGURE 6 is a sectional view of still another embodiment of my invention.

BRIEF DESCRIPTION OF THE INVENTION

Broadly stated, my invention contemplates a ceiling structure that directs most of the light downward, and causes air to be brought into or exhausted from the room in a controlled direction.

If desired, the air movement may be in a direction axial of the principal louver, which direction will ordinarily be vertical, or may be given a sidewise component.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to FIGURES 1 and 2, a viewer looking upwards at my combined luminaire and air flow structure **10** would see a bottom portion **12** that is of the open-cell eggcrate type. The purpose of eggcrate portion **12** is to direct light downward, but to prevent a viewer from the side from seeing the bright fluorescent lamp **14**. Eggcrate portion **12** will ordinarily be constructed of cellular material comprised of walls in two sets **16** and **18**, the walls of each set being in spaced parallel relation and the two sets being disposed normal to each other and in the same general plane. The walls may be discrete, or the entire eggcrate bottom may be an integral unit that has been molded, bonded together, or formed from interlocking slats.

A lamp-supporting and socket assembly **20** positions the lamps **14**, and includes wiring, ballast units and the like in the well known manner. The assembly **20** includes

and is supported by a plate **23** which is provided with air ducts **22** and these air ducts may be connected to an air heater, an air cooler, an air humidity control system, an exhaust fan, or to any other similar device. The proximal ends of air ducts **22** are shown to be delivering air to my structure, although they can just as easily be withdrawing air. While FIGURE 1 indicates the use of six rectangular air ducts, any desired number, of any suitable shape may be used.

An air baffle **24** is positioned adjacent the end of air duct **22**, and causes the air to flow through the sidewalls **26** of my structure. As best shown in FIGURE 2 sidewalls **26** comprise passageways that direct the air at the desired angle. Side walls **26** may comprise slats that are suitably positioned and supported but will ordinarily be eggcrate structure wherein the longitudinal slats are angled while the transverse slats are vertical. Side walls **26** and baffle **24** constitute the air flow portion of the combined luminaire and air flow structure. The vertical baffle **25** has a function similar to the above described baffle **24** in separating the lighting fixture portion per se from the air duct portion per se, and these baffles constitute thermal barriers aiding in insulating the lighting fixture portion.

Structure **10** which includes bottom portion **12**, air baffle **24** and side walls **26** may be mounted on the ceiling or acoustical mats **28** by means of devices such as channel brackets **30** and **32**; or alternatively the structure **10** may be mounted so that its bottom portion **12** is flush with the ceiling **28**.

It is an important feature of my invention that air baffles **24** be transparent or translucent, so that exposed parts of the air duct portions such as the sidewalls **24** and **34** do not appear too dark. These light-transmitting air baffles would also allow lateral distribution of diffused light while assisting in providing adequate light shielding, and it is also noteworthy that the ceiling **28** adjacent to the installation is also adequately lighted to prevent development of dark spots.

The embodiment of my invention shown in FIGURE 2 is one wherein the air movement has a horizontal component as well as vertical. At times it is desirable to minimize the sideward movement of the air, and the embodiment of my invention shown in FIGURE 3 may be used for this purpose.

As shown, it is substantially the same as the previous embodiment, except that the passageways of sidewall **34** are positioned at such an angle that the cells thereof are vertical.

It will be noted that in FIGURE 2 the passageways are disposed at approximately 45 degrees to the vertical, although this can be varied. The same sidewalls may be used in the embodiment of FIGURE 3, by positioning the sidewall at such an angle that the passageways are vertical. Alternatively, a sidewall with passageways at a different angle may be used.

In the embodiment of FIGURE 3, the slats of sidewall **34** may be light conducting, whereupon lamp **14** will illuminate the ceiling to a controlled extent. Alternatively, the slats of sidewall **34** may be opaque.

In FIGURE 4, I show an embodiment of my invention that may be mounted in any suitable manner with its bottom portion **12** flush with ceiling **28**. The lamp **14**, lamp supports **20**, air ducts **22** and baffles **24** are substantially as previously described. Sidewalls **36** serve the same function as before, but may take a somewhat different form due to the fact that they are positioned above the ceiling.

As shown, air from ducts **22** traverses the sidewalls **36**, and is directed into the room by the slats of the sidewall. FIGURE 4 illustrates a slat orientation that gives the air a sidewise and a vertical component.

FIGURE 5 illustrates another flush-mounted embodi-

ment of my invention particularly adapted to direct light through the sidewall **38**. To achieve this result, baffle **24** is transparent or translucent, and wall **40** of sidewall **38** is constructed of or coated with a reflective material. Thus, light from the lamp **14** follows the path indicated by arrows **42** and **44** and is directed into the room. Another very important embodiment of my invention is illustrated in FIGURE 6 wherein the air duct **46**, preferably with a plenum **48** is centrally located in a unitary installation as before and the lighting fixture portion, illustrated as a casing **50**, lamps **52**, ballast and wiring **54**, and grid **56**, is disposed laterally outwardly of the air duct structure. This general configuration is adaptable to installations of rectangular, circular or other general shape, and has certain advantages including economical construction, while retaining all the above mentioned beneficial features. The baffle **58** may be chosen to provide adequate heat shielding while also providing the desired light transmission inwardly to prevent a dark spot at the grid **60** at the mouth of the plenum **48**.

It should be noted that in all the illustrated embodiments, the upper plate **23** is continued as a unitary supporting structure for both the air duct portion as well as the lighting fixture portion.

The amount of light entering the room through sidewalls **38** may be controlled by the transmission and reflective characteristics of baffle **24** and wall **40**; in this way establishing whether sidewalls **38** are bright or dim.

ADVANTAGES

It will be understood that my novel ceiling element has several advantages over prior-art structures. It consolidates the air flow and light fixtures into a single unit, thus permitting the architect to produce a cleaner appearing, uncluttered ceiling. The air flow may be into or out of the room, and may provide warm or cool air, or may exhaust stale air. The continuous movement of air through the sidewalls and/or bottom portion tends to prevent dust from settling thereon, and maintains the

luminaire in a clean state, thus minimizing maintenance. The combined lateral light transmission and air flow permits diversified and highly efficient planning, and finally, the light distribution and air flow may be primarily vertical, or may be given a definite horizontal component.

It is understood that minor variations from the form of the invention disclosed herein may be made without departure from the spirit and scope of the invention, and that the specification and drawing are to be considered as merely illustrative rather than limiting.

I claim:

1. A structure comprising;
   - an elongated, supporting plate member,
   - a lighting fixture portion having a light source secured to said supporting plate,
   - an air duct operatively connected to said supporting plate and having a proximal end and
   - a combine integral luminaire and air flow structure, including a light transmitting imperforate baffle engaging said supporting plate member between said light source and the proximal end of said air duct, removably secured to said supporting plate member having portions enclosing said lighting fixture and proximal end of said air duct.

2. The structure of claim 1 wherein said enclosing portions include panels of generally eggcrate formation.

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