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FOREIGN PATENTS

400,038 10/1933 Great Britain..... 240/103B

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[54] **LIGHTING FIXTURE**
11 Claims, 12 Drawing Figs.

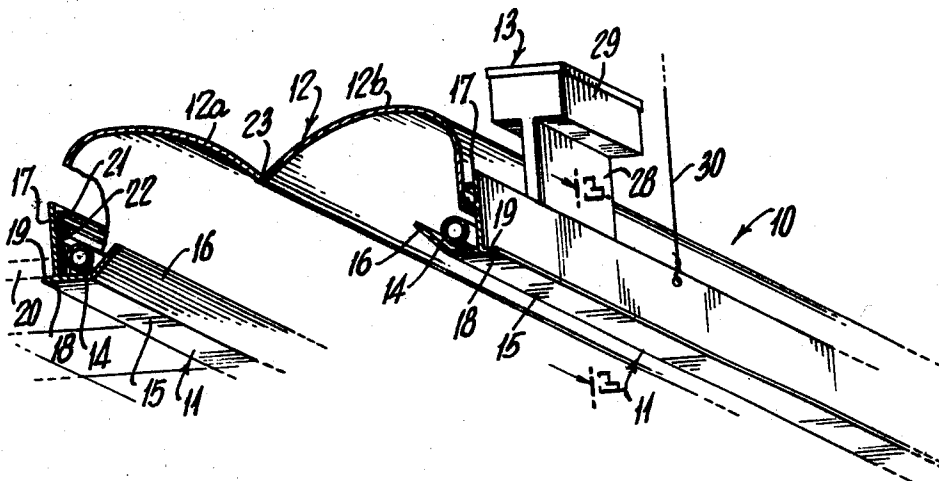
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51.11, 9, 9A, 41.1

References Cited

UNITED STATES PATENTS

2,261,733	11/1941	Pahl	240/103B
2,305,722	12/1942	Livers	240/51.11
2,415,635	2/1947	Hopkins	355/67

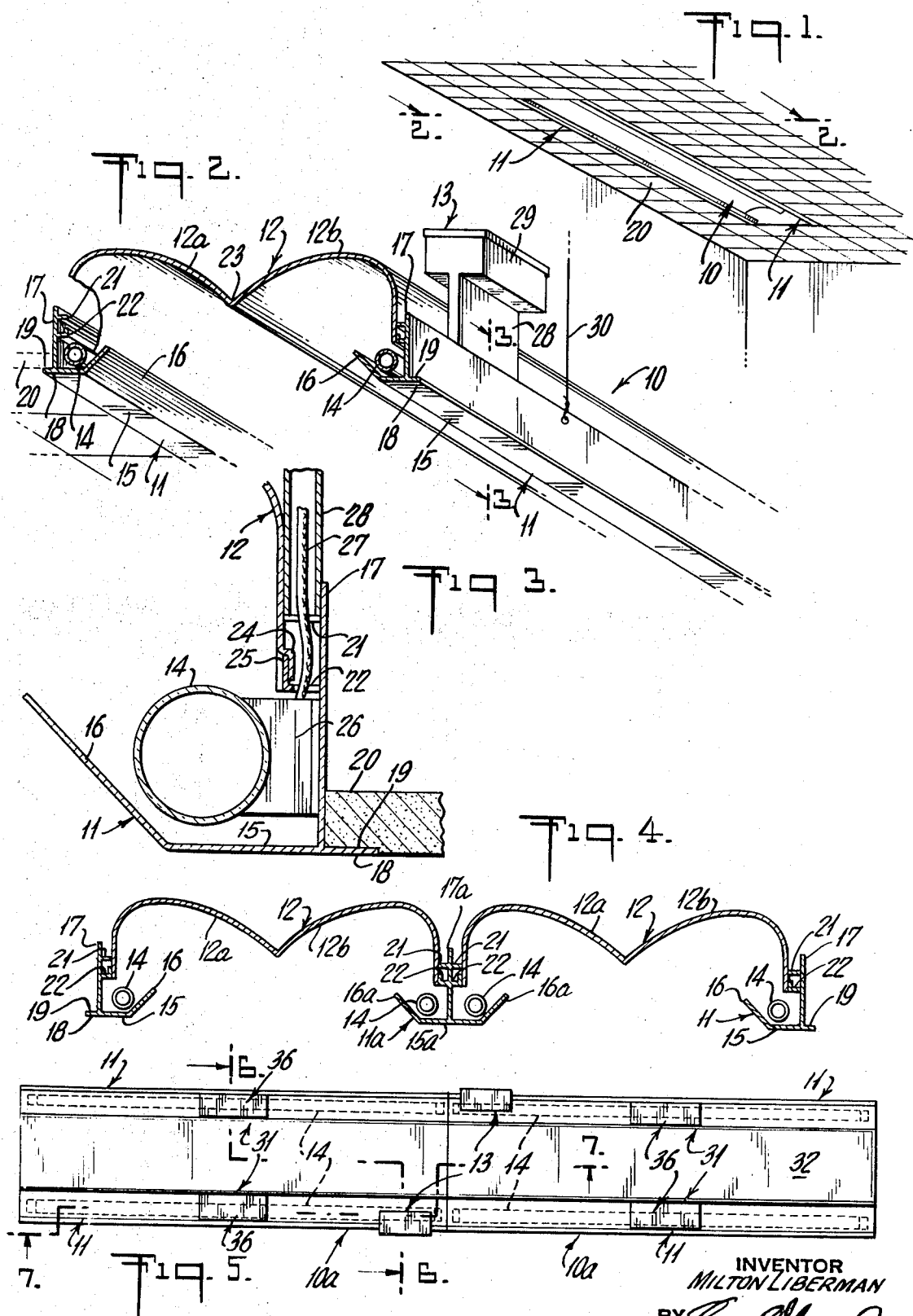
ABSTRACT: A lighting fixture for mounting within a ceiling recess including a pair of spaced elongated elements having recesses containing light sources disposed therein and shielded from direct view and light-reflecting means bridging said elements to reflect the light from the lighting means downwardly, the elements and reflectors being adapted to be placed in end-to-end relationship to form a lighting fixture of any desired length and the elements further include means for supporting adjacent ceiling elements when used in connection with hung ceilings and the reflectors may be integrated with air-conditioning means and auxiliary incandescent illumination.



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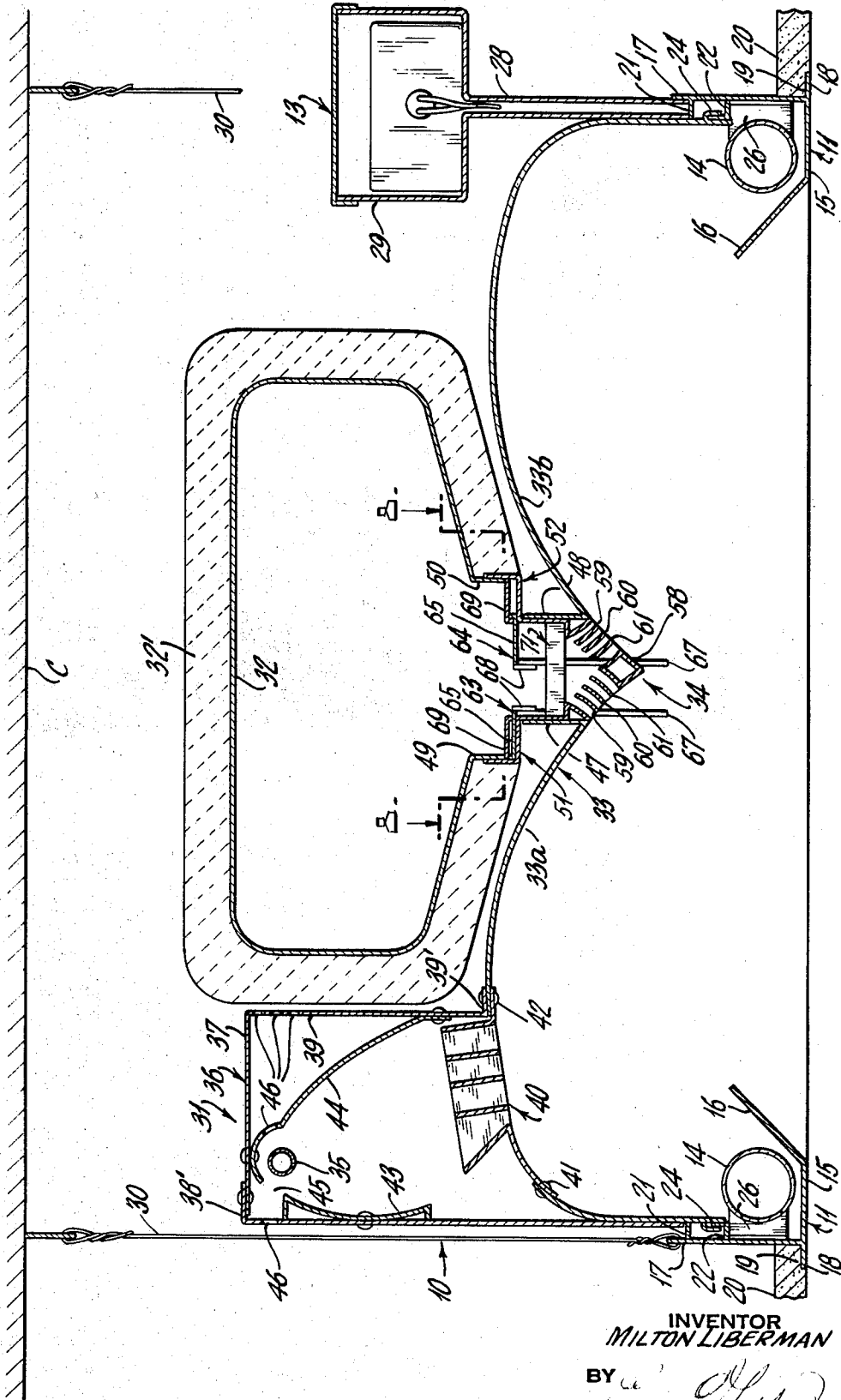
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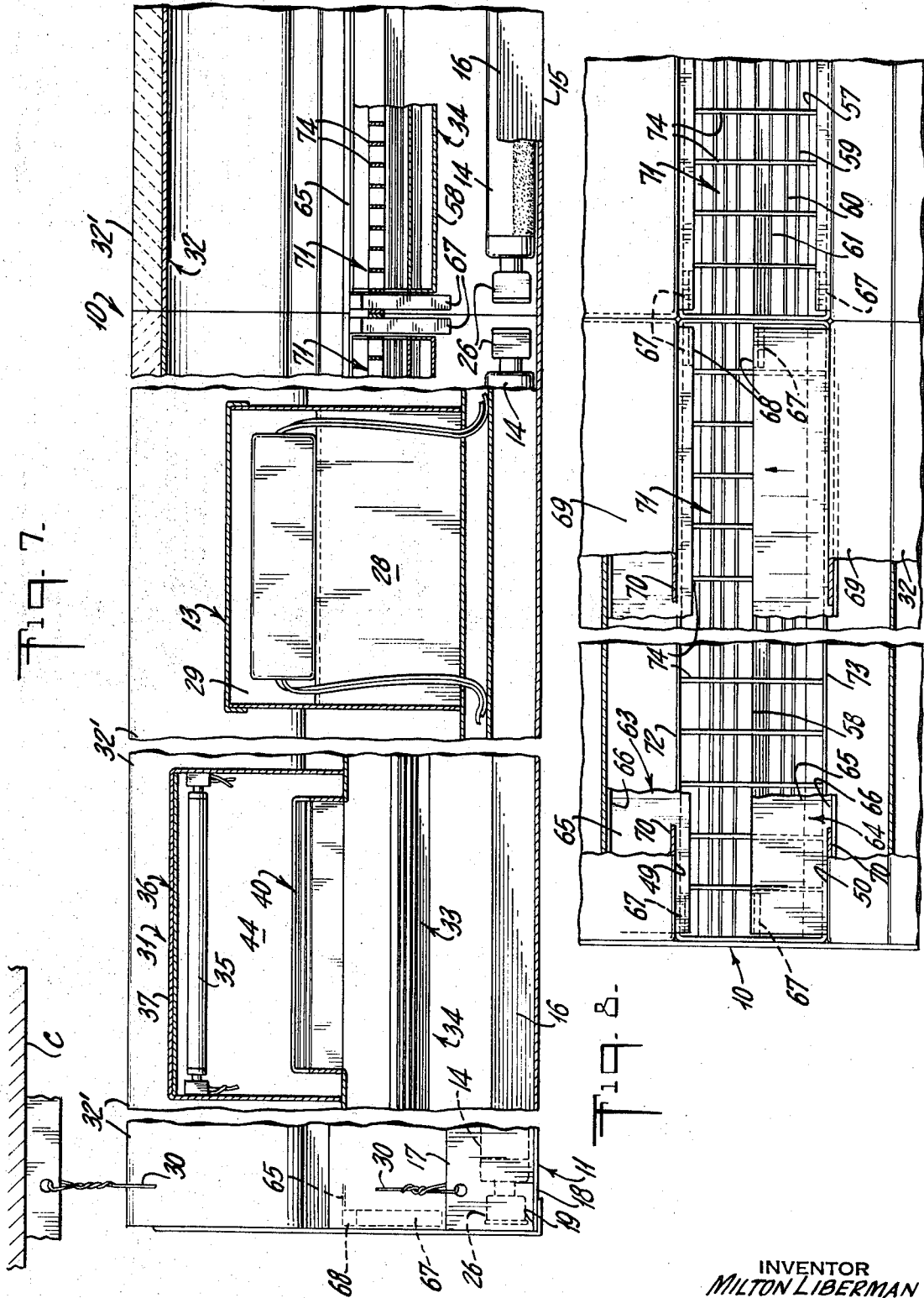


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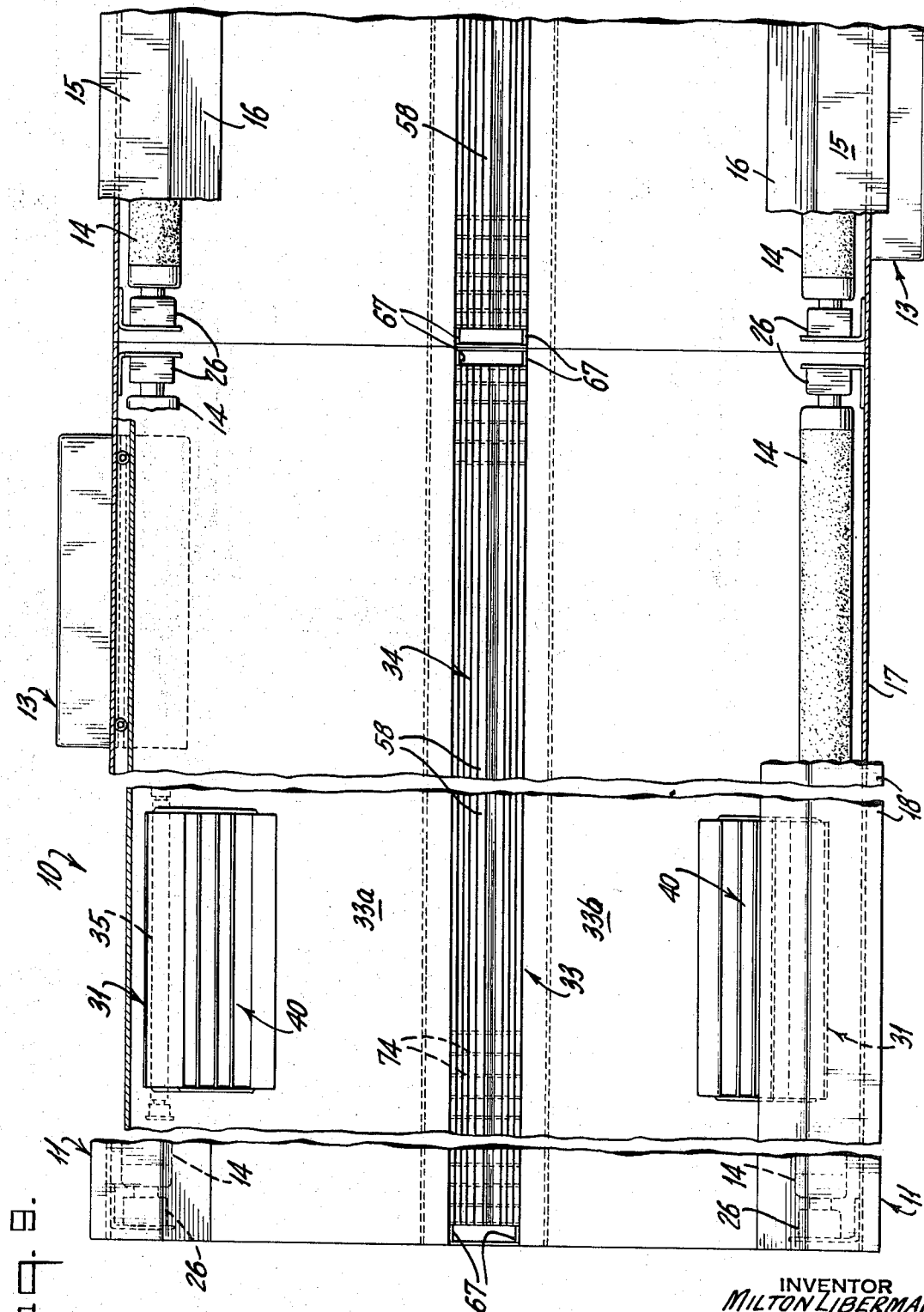
Fig. 6.



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Fig. 10.

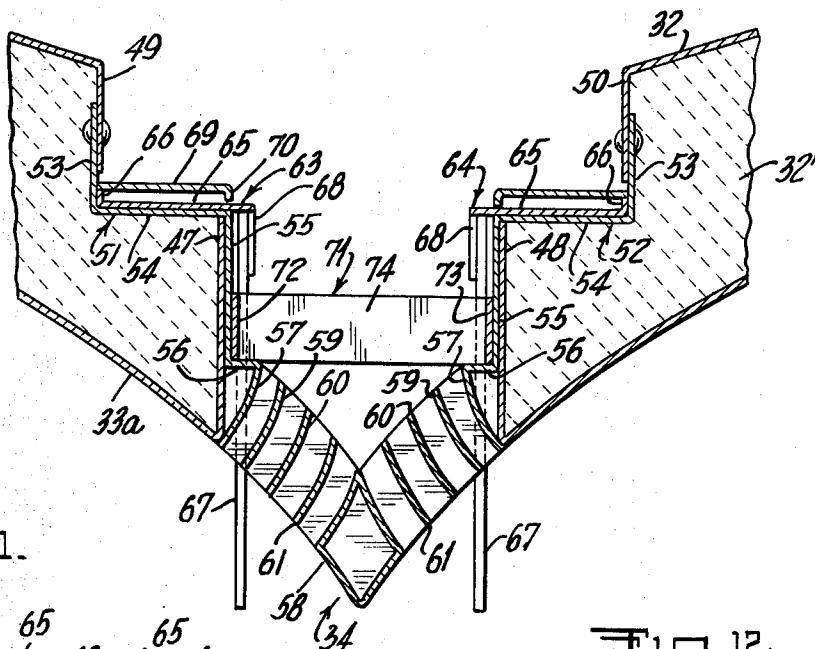


Fig. 11.

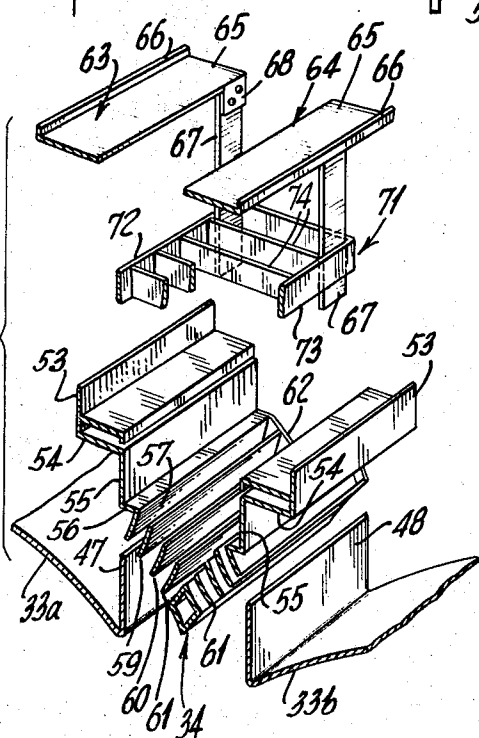
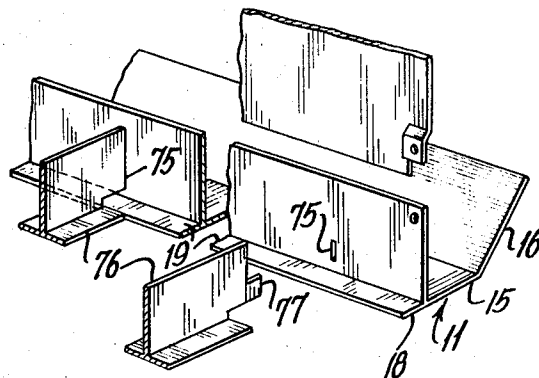


Fig. 12.



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LIGHTING FIXTURE

This invention relates to lighting fixtures and more specifically to a novel and improved lighting fixture construction which simplifies fabrication and installation of the fixture and which may be readily coordinated with air-conditioning equipment and incandescent light sources.

Ceiling lighting fixtures and particularly lighting fixtures adapted to be coordinated with hung ceilings generally involve housings recessed within the ceiling and lenses closing the openings in the housing to distribute the light emitted from the light sources. Other types of ceiling fixtures are frequently secured to the surface of the ceiling and include means for directing a portion of the light upwardly toward the ceiling and the remainder of the light downwardly for general illumination. Substantial efforts have been made to provide good general illumination while at the same time baffling the lamps and particularly fluorescent lamps from direct view. This invention overcomes the problems heretofore encountered in known lighting fixtures and particularly fluorescent fixtures by providing a novel and improved organization and arrangement of elements whereby the fluorescent lighting sources are disposed within elongated recesses and reflecting means bridge the elements to reflect light emitted from the lamps downwardly for general lighting. With this arrangement the lamps are readily accessible for replacement, are completely hidden from view and multiple fixtures can be arranged in integrated side-by-side relationship and end-to-end relationship so that any desired lighting configuration can be obtained.

Another object of the invention resides in the provision of a novel and improved fixture wherein spaced elongated elements are utilized having recesses therein for receiving the lamps and which elements are so arranged and constructed to facilitate formation by extrusion processes which greatly reduces the cost of the fixture. A reflector is supported by and between the elements and the elongated elements are also provided with means for supporting adjoining ceiling portions when the fixture is utilized in combination with a conventional hung ceiling.

Still another object of the invention resides in the provision of a novel and improved fixture integrally coordinated with air-conditioning means in a manner that will have a minimum effect on the fluorescent tubes utilized as the light sources and may be tinted to blend with room decors.

Still another object of the invention resides in the provision of a novel and improved fluorescent light fixture which may also embody incandescent illumination in order to more nearly approach natural lighting conditions.

Still another object of the invention resides in the provision of a novel and improved lighting fixture characterized by its simplicity, versatility, ease of installation and relatively low manufacturing costs.

The above and other objects and advantages of the invention will become more apparent from the following description and accompanying drawings forming part of this application.

In the drawings:

FIG. 1 is a fragmentary view of a ceiling having a lighting fixture mounted therein in accordance with the invention;

FIG. 2 is a cross-sectional view in perspective of FIG. 1 taken along the line 2-2 thereof;

FIG. 3 is a cross-sectional view of FIG. 2 taken along the line 3-3 thereof;

FIG. 4 is a cross-sectional view of a modified embodiment of the lighting fixture shown in FIG. 2 wherein two lighting fixtures are mounted in side-by-side relationship;

FIG. 5 is a diagrammatic plan view of two lighting fixtures as shown in FIG. 2 placed in end-to-end relationship and embodying auxiliary incandescent lighting sources and together with air-conditioning means;

FIG. 6 is a cross-sectional view of FIG. 5 taken along the line 6-6 thereof;

FIG. 7 is a cross-sectional view of FIG. 5 taken along the line 7-7 thereof;

FIG. 8 is a cross-sectional view of FIG. 6 taken along the line 8-8 thereof;

FIG. 9 is a bottom view of the fixture shown in FIG. 5 with parts broken away;

FIG. 10 is an enlarged fragmentary section of the air-conditioning outlet of the fixture shown in FIG. 6;

FIG. 11 is an exploded perspective view of a fragmentary section of the air-conditioning outlet; and

FIG. 12 is an exploded perspective view of a fragmentary section of an elongated element of the lighting fixture in accordance with the invention to illustrate its cooperation with T-bars used to support a hung ceiling.

The lighting fixture in accordance with the invention embodies an improved arrangement of elements which simplifies the fabrication of the lighting fixture and enables it to be adapted for use in a variety of applications. As will be shown, the lighting fixture essentially embodies a pair of spaced elongated elements which may be interconnected with the T-bar construction of a hung ceiling. A generally concave reflector is supported by the longitudinal elements and reflects light emitted from fluorescent tubes downwardly for general lighting. If desired, incandescent lamps may be integrally coordinated with the reflector to provide a combination of incandescent and fluorescent lighting. When air conditioning is to be employed the fixture may be provided with a longitudinal duct to discharge air through louvers disposed centrally of and throughout the extent of the reflector for discharging air downwardly. With this improved fixture the longitudinal elements carrying the fluorescent tubes may be extruded of a suitable metal such as aluminum and may be formed in any desired length. The reflectors as will be shown may also be formed in any desired length to meet particular lighting requirements. Should it be desired to place fixtures in adjoining side-by-side relationship a single longitudinal element may be utilized between the fixtures which element is arranged to support two sets of fluorescent tubes separated by a central baffle so that one set of tubes forms part of one lighting fixture while the other set of tubes forms part of the adjoining lighting fixture.

Referring now to the drawings and more specifically to FIGS. 1 to 3, the numeral 10 denotes one embodiment of a lighting fixture in accordance with the invention having a pair of spaced longitudinal elements generally denoted by the numeral 11, a reflector 12 spanning the elements 11 and ballast-containing means 13 for operating the fluorescent tubes 14.

Each longitudinal element 11 has a flat bottom plate 15, an upwardly and outwardly inclined baffle 16 along the inner edge of the plate 15 and an upwardly extending plate 17 spaced from the outer edge 18 of the plate 15 to provide a ledge or flange 19 for supporting adjoining ceiling elements 20. Each vertically disposed plate 17 includes an inwardly extending flange 21 and an inwardly extending L-shaped member 22 spaced below the flange 21. The reflector 12 may have any desired configuration though it is preferably formed of two generally concave sections 12a and 12b which are joined at the center to form in effect a downwardly extending V-shaped portion 23. The substantially vertically disposed outer edges of the reflector 12 are provided with offset tabs 24 spaced along the length thereof to engage the upwardly extending legs 25 of the L-shaped members 22 and flanges 21 to support the reflector in position on the elements 11 and provide an enclosed wireway.

The fluorescent lamps 14 are supported within the recesses or coves formed by the baffles 16 and vertically disposed plates 17 so that they are completely shielded from direct view. The lamps are held in position by sockets 26 of conventional configuration and are interconnected by leads 27 of which one is illustrated in FIG. 3 to a conventional ballast contained within the housing 13. The ballast housing 13 includes a hollow rectangular column 28 which may be secured in any suitable manner to one of the vertically disposed plates 17 of an element 11 and carries a rectangular enclosure 29 housing the ballast.

The fixture as described is particularly useful with hung ceilings and may be supported by a plurality of guy wires 30 or other suitable supports. Furthermore, by reason of the par-

ticular configuration of the lighting fixture in accordance with the invention the reflector 12 may be arranged with any desired curvature to provide for either concentrated lighting or general illumination as may be desired. For general illumination the reflector would preferably take the configuration as illustrated in FIG. 2 so that substantially all of the light emanating from the lamps 14 is reflected downwardly and at the same time distributed uniformly through a relatively wide angle. If desired, the inner surfaces of the recesses containing the fluorescent lamps 14 may be provided with reflective coatings in order to improve the efficiency of the fixture. Inasmuch as the fixture thus far described does not include a lens, the lamps 14 can be easily replaced and the entire fixture may be easily and quickly cleaned by conventional vacuuming and other cleaning processes. Furthermore, the elements 11 can be readily extruded of aluminum or other suitable material and may therefore be formed in any desired lengths. Since the reflector 12 may be easily formed by suitable metal-forming machines it can be made of any desired length. In normal practice, however, the fixtures would be made in 2, 4, 8, and 16-foot lengths to accommodate standard fluorescent lamps 14.

Referring now to FIG. 4, it will be observed that two or more fixtures in accordance with the invention may be mounted in side-by-side relationship in which case the central element 11a would be utilized between adjoining fixtures. The element 11a is substantially the equivalent of two elements 11 placed in back-to-back relationship and comprises a single bottom plate 15a outwardly extending baffles 16a, a single vertical plate 17a carrying outwardly extending flanges 21 and L-shaped members 22 as previously described.

A modified embodiment of the invention is illustrated in FIGS. 5 through 11 and like numerals are used to denote corresponding elements of the embodiment of the invention shown in these FIGS. and that illustrated in FIGS. 1 to 3 inclusive. FIG. 5 is a plan view of two lighting fixtures in accordance with the invention placed in end-to-end relationship and embodying incandescent lamps and air-conditioning means. The fixtures are generally denoted by the numerals 10a and include longitudinal elements 11, incandescent lighting sources 31, and an air-conditioning duct 32. The ballasts 13 are interconnected with the fluorescent lamps 14 with each ballast being arranged to operate two fluorescent lamps. The structural details of each fixture 10a as shown in FIG. 5 is illustrated more clearly in FIGS. 6 through 11. Referring to these FIGS., it will be observed that the elements 11 are identical to the elements 11 illustrated and described in connection with FIGS. 1 to 3. The reflector denoted herein by the numeral 33 has a configuration similar to that of the reflector 12 except that the central V-shaped portion generally denoted by the numeral 34 is provided with louvers for the discharge of air from the insulated longitudinal conduit or air duct 32. The incandescent light sources which in the instant embodiment of the invention are in the form of tubular quartz lamps 35 are positioned within housings generally denoted by the numeral 36 and one or more of such lamps may be disposed along the length of each lighting fixture section 10a.

More specifically, each housing 36 is of generally rectangular configuration having a top wall 37, and sidewalls 38 and 39. The sidewall 38 extends downwardly and is secured to the side of the reflector 33. The upper end of the sidewall 38 has an inwardly extending flange 38' which is riveted to the top wall 37. The sidewall 39 is integrally formed with the top wall 37 and has a bottom flange 39' which is riveted to the reflector 33. A louver assembly generally denoted by the numeral 40 generally conforms with the shape of the reflector and is secured to a rectangular opening in the reflector by rivets 41 and 42. Reflectors 43 and 44 are disposed within the housing 36 with the reflector 43 being riveted to the sidewall 38 and the reflector 44 being secured at the lower end to the sidewall 39 and upper end to the top wall 37. The reflectors are spaced one from the other to form a gap 45 and the sidewall 38 has an opening 46 to provide for the flow of air through the housing

36. It is evident that any number of incandescent lamp assemblies 31 may be included on one or both sides of the lighting fixture to provide the desired amount of incandescent light.

When the fixture in accordance with the invention is utilized with air-conditioning means, the reflector 33 is provided with a louver assembly 34 which is more clearly illustrated in FIGS. 10 and 11.

When the louver assembly 34 is utilized, the reflector 33 may be formed in two sections 33a and 33b, and the inner ends of the reflector are bent upwardly to form upwardly extending legs 47 and 48. The air-conditioning duct 32 having insulation 32' about the outer side thereof has a bottom opening with the edges of the opening bent downwardly to form legs 49 and 50. The duct 32 is coupled to the reflector portions 33a and 33b by members 51 and 52. Each of the members 51 and 52 has a vertical portion 53 riveted to the adjoining legs 49 and 50, respectively. The lower end of the vertical portion 53 has a horizontal portion 54, a vertical portion 55 and a second horizontal portion 56. The outer edge of the horizontal portion 56 carries a first louver 57. The bottom of the louver assembly comprises an essentially diamond-shaped element 58 which may be formed by extrusion or other suitable means and louvers 59 and 60 and 61 are spaced between the diamond-shaped element 58 and the first louver 57. The opposite side of the louver assembly is formed in the same manner and corresponding elements are denoted by like numerals. The louvers 59, 60, and 61 and the diamond-shaped tubular member are secured in position one relative to the others by end brackets 62.

The flow of air from the duct 32 through the louver assembly 34 is controlled by slidably disposed dampers generally denoted by the numerals 63 and 64. Each damper 63 and 64 has a horizontal portion 65 which rests on the horizontal portion 54 of the associated member 51. The outer edge of the portion 65 has an upwardly formed flange 66 and each end of the damper carries a downwardly extending lever 67 secured to a downwardly formed tab 68. The dampers 63 and 64 are held in position by horizontal members 69 which are secured to the vertical portion 53 of the member 51 and extend inwardly and terminate in a downwardly formed flange 70. With this arrangement the dampers can be controlled by the levers 67. FIG. 6 shows one of the dampers moved inwardly to partially close the opening in the duct 32 while the other damper is in the open position. It is evident that the dampers can be adjusted in any desired manner to affect complete control of the supply of air. A second louver assembly 71 is disposed between the vertical portions 55 of the members 51 and rests on the horizontal sections 56. The louver assembly 71 includes side portions 72 and 73 and spaced transverse baffles 74. With this arrangement excellent air distribution and control is obtained and the major elements forming the louver structure can be extruded to reduce cost of manufacture and assembly.

As pointed out previously, the fixture in accordance with the invention is particularly useful in connection with hung ceilings which are usually supported in spaced relationship from the basic ceiling structure. A hung ceiling is customarily provided with a plurality of T-bars which are spaced to support individual ceiling tiles. FIG. 12 illustrates the coordination of the lighting fixture in accordance with the invention with conventional T-bar construction. In this FIG. a longitudinal element 11 is illustrated and is provided with slots 75 at spaced intervals to accommodate and interlock with T-bars 76. Each T-bar is provided with an outwardly extending tab 77 which is inserted in a cooperating slot 75 and then bent at right angles to hold the T-bar in position with the longitudinal fixture element 11. In this way fixtures in accordance with the invention can be supported from the basic ceiling C, as shown in FIG. 6, and then the T-bars 76 can be installed and supported from the ceiling C. Thereupon the ceiling tiles 20, as viewed in FIG. 2, can merely be placed in position to complete the ceiling.

While only certain embodiments of the invention have been illustrated and described, it is apparent that alterations,

modifications, and changes may be made without departing from the basic concepts of this invention.

I claim:

1. A lighting fixture for use with hung ceilings comprising a pair of spaced parallel, relatively rigid elements each having a substantially flat bottom plate, a baffle plate along the inner edge of each bottom plate, and an upwardly extending plate extending along each bottom plate with at least one upwardly extending plate on one element being spaced inwardly from the outer edge of said bottom plate to form an outwardly extending flange, lighting means supported between said baffle and said upwardly extending plate, concave light-reflecting means bridging said elements and directing light emitted by said lighting means in a downward direction and means for supporting said elements with said bottom plates substantially coplanar with said hung ceiling.

2. A lighting fixture according to claim 1 wherein said concave light-reflecting means comprises two elongated concave sections joined to form a central longitudinal V-shaped portion.

3. A lighting fixture according to claim 1 wherein each upwardly extending plate includes an inwardly extending flange spaced from the upper edge thereof and an L-shaped member below and in spaced relationship to said flange and said reflector includes spaced offset tabs engaging said L-shaped members and flanges.

4. A lighting fixture according to claim 1 wherein said upwardly extending plate on each of said elements is spaced inwardly from the outer edge of said bottom plate.

5. A lighting fixture according to claim 4 wherein each of said upwardly extending plates includes longitudinally spaced

openings for engagement with T-bars of a hung ceiling.

6. A lighting fixture according to claim 1 including a ballast housing disposed above one of said elements and means including a wire-receiving channel securing said ballast housing to said element.

7. A lighting fixture according to claim 1 wherein said reflector includes a longitudinally disposed louver assembly and said fixture further includes a longitudinally disposed air-conditioning duct having an opening communicating with said louver.

8. A lighting fixture according to claim 7 wherein said louver assembly includes dampers for controlling the flow of air through said louvers.

9. A lighting fixture according to claim 1 wherein said reflector includes at least one opening therein, a housing overlying said opening and secured to said reflector and incandescent lighting means disposed within said housing and directing light downwardly through said opening.

10. A lighting fixture according to claim 9 wherein said reflector includes a longitudinally disposed louver assembly, and said fixture further includes a longitudinally disposed air-conditioning duct having an opening communicating with said louver.

11. A lighting fixture according to claim 1 wherein the other of said elements has its upwardly extending plate disposed centrally of said bottom plate and the outer edge of the last said plate includes a second baffle extending along the length thereof, the last said plate supporting one edge of a second reflector in side-by-side relationship to the first said reflector.

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