

March 17, 1953

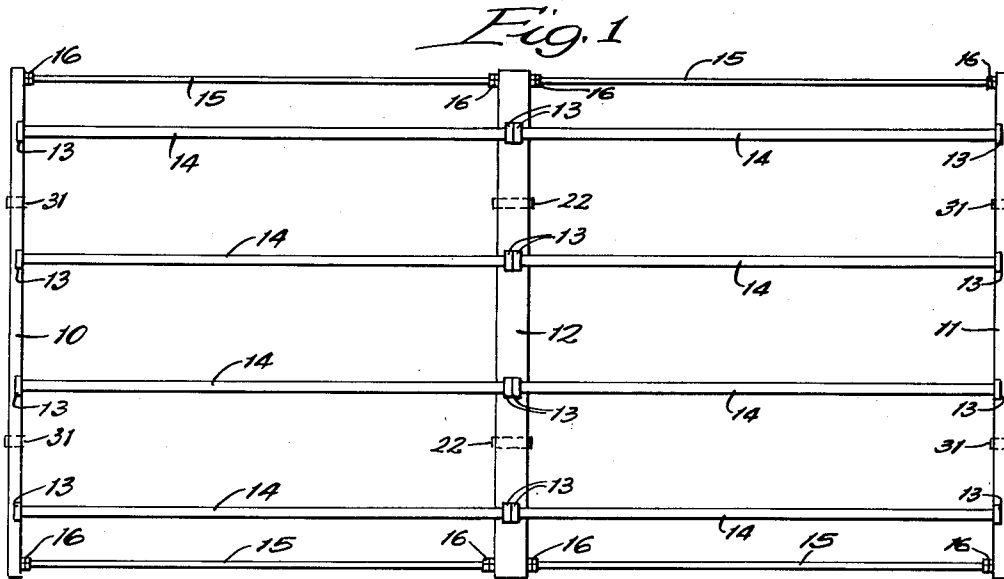
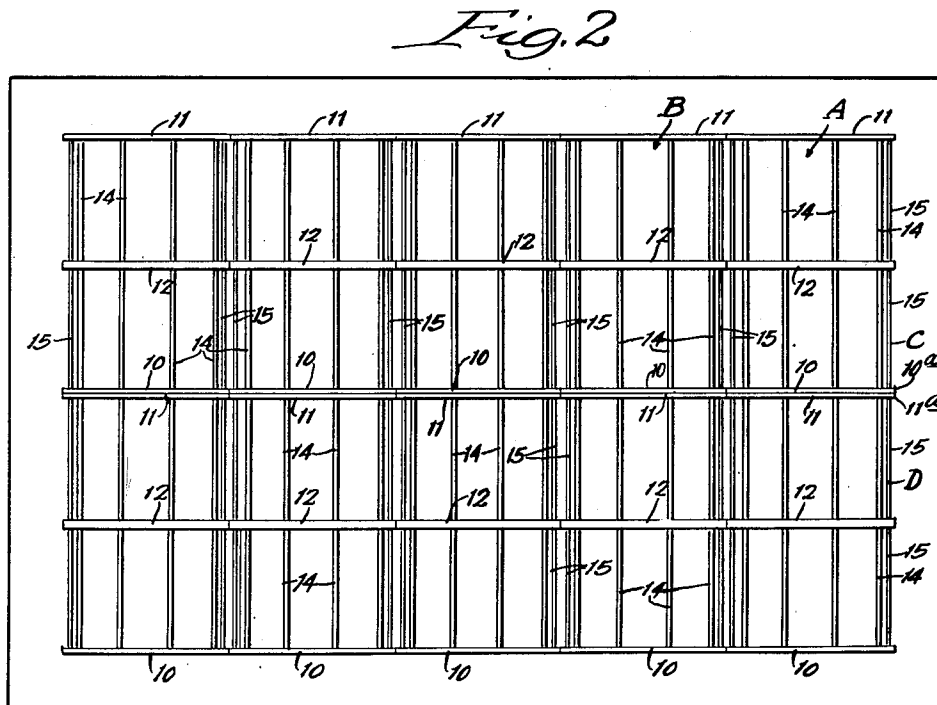
E. P. KOCHALE, JR., ET AL

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COLLAPSIBLE LIGHTING STRUCTURE FOR ELONGATED TUBULAR LAMPS

Filed June 10, 1950

2 SHEETS—SHEET 1



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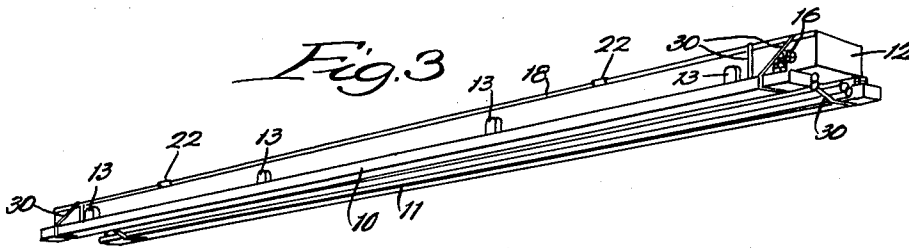
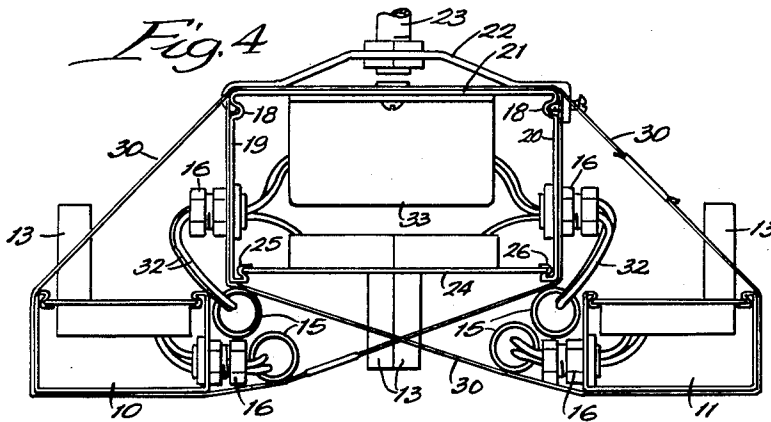
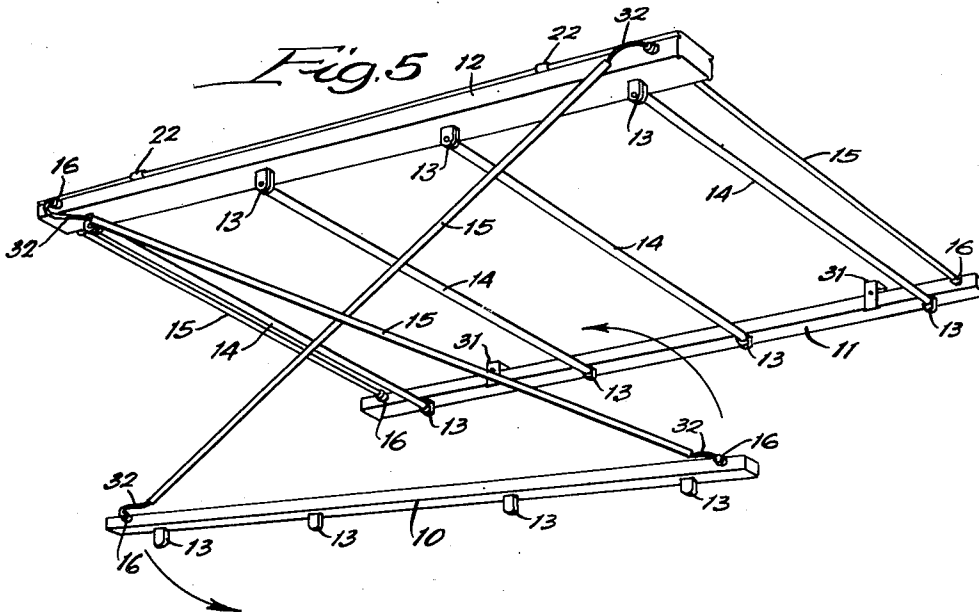
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2 SHEETS—SHEET 2



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UNITED STATES PATENT OFFICE

2,632,096

COLLAPSIBLE LIGHTING STRUCTURE FOR
ELONGATED TUBULAR LAMPSErnest P. Kochale, Jr., Oak Park, and William A.
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5 Claims. (Cl. 240—51.11)

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This invention relates to fluorescent lighting fixtures and more particularly to an assembly of the type described which may be collapsed into a compact package for shipping or storage and which may be opened up during installation, properly to position the fluorescent tubes throughout the ceiling structure with an expenditure of minimum effort and labor.

In most fluorescent lighting installations for ceilings or the like, it is desirable to cover the ceiling with a full pattern of fluorescent tubes. For such purpose, the tubes are generally arranged in parallel spaced rows with the tubes extending in end to end relation across the room. More often, the tubes appear to form endless parallel rows to reach across the room with or without reflectors associated therewith to minimize glare and to give the desired lighting effect.

For installation, it has been the practice first to position wire channels in the ceiling and then fix one row of lamps on each wire channel in parallel relation therewith. An objection to this technique of installation resides in the need for properly positioning the wireways in the ceiling to give the proper spacing for the lamps and in order to suspend the wireways at a uniform level, since the ceilings themselves do not have the same level throughout. As a result, adjustments are invariably required after the installation has been completed and under such circumstances such adjustments are difficult to achieve.

Another serious objection to the practice heretofore employed with fluorescent lighting fixture assemblies resides in the practice of shipping each of the parts in separate packages. This not only entails considerable expense and labor in tallying the parts, wrapping the parts carefully to minimize breakage, but considerable labor of a high quality is required properly to assemble the parts in position of use in the ceiling structure. Frequently, one or more of the parts are found to be missing, with the result that the installation is undesirably delayed.

In the past, it has required a number of men to effect installation, since the principal parts must be held adjacent the ceiling structure, by two or more men, while others are employed for fixing the unit in its assembled relation.

It is an object of this invention to provide a fluorescent lighting fixture assembly which can be properly installed with a minimum of labor and effort.

Another object is to provide a lighting fixture assembly which may be preassembled as a completely wired unit that can be collapsed into a

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compact package for shipment and storage and which may be opened up during installation into a structure that can be properly mounted in an expedient and efficient manner.

A further object is to produce a fluorescent lighting fixture assembly of the type described, formed of relatively few simple parts that are interconnected to form a completely wired unit which may be collapsed to provide a compact package that can be systematically opened up during this installation to minimize the labor required and to minimize the possibility of error in installation, and it is a related object to provide a lighting fixture assembly which can be readily associated with additional units of like character to give a desired pattern of fluorescent lights in a ceiling structure.

These and other objects and advantages of this invention will hereinafter appear and for purposes of illustration but not of limitation, an embodiment of the invention is shown in the accompanying drawings in which:

Figure 1 is a plan view of a lighting fixture embodying features of this invention in its mounted relation;

Figure 2 is a plan view showing the assembly with multiple units of the type shown in Figure 1 arranged for the purpose of giving a planned lighting arrangement in a schoolroom or the like;

Figure 3 is a perspective view of the lighting fixture shown in Figure 1 in its collapsed position in which it is packaged;

Figure 4 is an enlarged end view of the package shown in Figure 3 showing the arrangement of parts during an early phase of the installation;

Figure 5 is a perspective view of the lighting fixture shown in Figures 1 and 3 illustrating the technique for extending the parts from the collapsed position toward their extended position for effecting the mounted relation.

In its mounted relation, a fluorescent lighting fixture embodying features of this invention comprises a pair of elongate side strips 10 and 11 widely spaced apart parallel relation and a heavier center strip 12 of substantially equal length disposed in parallelism between the two side strips. The center strip carries the fluorescent ballasts and each of the center and side strips 10, 11, and 12 carry a number of fluorescent lamp holders or sockets 13 having substantially the same longitudinal spacing to support a number of fluorescent tubes 14 crosswise between the strips. Rigid tubing members 15 connect the end portions of the respective strips 10, 11, and 12

to form with the strips a rigid frame having the appearance of the figure 1. The electrical connectors or wiring 16 connecting the lighting elements are arranged to pass through the tubing members 15. The ends of the tubing members 15 may be inserted into or removed from threadless connectors 16 rigid with the strip sections to effect the assembled or disjointed relation respectively. It will be understood that other suitable connecting or coupling means might be employed.

As shown, the center strip, which is of greater cross section in order to carry the greater load of the ballasts, may be formed of a rectangularly shaped housing having a continuous indenture 18 or groove in the side wall portions 19 and 20 adjacent the upper wall 21. The center strip 12 is positioned in the ceiling structure by clamping members 22 secured by hangers 23 or fastening means, such as toggle bolts, lag screws or the like, from the ceiling and which seat in the indenture to establish a firm gripping relation. Holder plates 24 firmly seated in facing grooves 25 formed in flanges 26 integral with the lower ends of the side walls, mount the fluorescent lamp holders 13 and the like.

The side strips 10 and 11, which may be of lesser cross section than the center strip, may be similarly formed of a rectangular housing having a continuous indenture in the side walls and with plates positioned across the open end for mounting the lamp holders. By way of comparison, for eight foot lengths of strips, the center strip may be required to carry a total load of about 70 pounds while the load on the side strips may amount to about 10-14 pounds.

The novel feature of this invention resides in a novel arrangement of parts which permits the assembly to be collapsed into a compact package for the purpose of shipment and storage and which may be opened up in a convenient and expedient manner into the mounted relation previously described. It will be apparent under such conditions, that the entire structure may be pre-assembled at the factory or at a more convenient station and then shipped in collapsed condition for installation in an expedient manner which will hereinafter be described.

When packaged for shipment as a completely wired unit, the fluorescent tubes 14 are removed from their lamp holders 13 and the tubing members 15 are disjointed from the strips 10, 11, and 12 by disconnection through the end connector 16. The parts are however, loosely held together by the electrical wiring or conductors connecting the various strips. When disjointed, the parts may be collapsed in a manner to bring all of the relatively rigid parts having substantially the same length into parallel side by side relation to form a compact package.

By way of illustration, description will be made to the manner of collapsing the unit from extended position. After the tubings have been disjointed from the side and center strips, the side strips 10 and 11 may be turned about their center to bring the ends of the center strip adjacent the opposite ends of the side strip while the tubing members which connect the respective ends are disposed in parallel relation therebetween. In this manner the side strips and the tubings may be brought into closely spaced side by side relation, in which position, they may be securely positioned with one or more straps or bands 30. It is best to provide separate straps or bands for holding each side section to the center strip in order to facilitate the ease of installation, as will hereinafter be described.

A wire unit capable of supporting eight fluorescent lamps arranged in a uniform pattern over a ceiling area of about 130-200 square feet may be collapsed to form a compact package measuring about 96 by 18 by 6 inches. The unit may be accurately installed with the services of two persons of ordinary skills. For installation, the outer wrapping may be removed to expose the collapsed unit which may then be raised to ceiling position and there secured by spaced clamps 22 which have been previously hung by hangers 23 from the ceiling structure. The clamping members engage the continuous indenture 18 below the top wall 21 of the center strip. While the package is thus suspended from the ceiling, the straps 30 are removed to release one end section at a time from their bound relation. Upon release, the respective end sections are extended, as shown in Figure 5, by turning the side strip about its center. Other clamping members or ceiling brackets 31 may be employed operatively to engage the side strips 10 or 11 at spaced apart points for the purpose of fixing the respective side strips in the desired extended position. The tubing members 15 are then inserted into the adjacent end connectors 16 rigidly to secure the parts together in their assembled relation. The through circuit conductors or wiring 32 are already connected to the ballasts 33 and the lamp sockets.

After one side strip has been thus secured in its assembled relation the straps 30 holding the other side section to the center strip are released so that the other section can be extended or secured in the same manner. After the mounted relation has been established, the fluorescent tubes 14 may be inserted in their sockets 13 to complete the installation of the ceiling fixture.

As shown in Figure 2, a plurality of such units may be employed and interconnected in a manner to give uniform and complete coverage of fluorescent tubes over an entire room. When such multiple units are employed, it is best separately to mount each packaged unit and then connect the center and side strips of adjacent units lying in end to end relation with coupling members, such as the type described in the co-pending application of Le Brack filed on this same date. Coupling members of the type described and others of similar nature assist in maintaining the proper alignment and rigidity of the combined fixture over the entire area.

In the event that multiple units are employed, the spaced relation of lamp receiving sockets may be varied in certain strip members for the purpose of providing uniform spacing of lamps across the room, or if desired in order to provide a desired concentration of lamps in desired areas of the room. For example, the end units A, positioned to the right in Figure 2, are adapted to mount two sets of four fluorescent tubes while the adjacent inner units B are adapted to mount two sets of three fluorescent lamps, the outermost of which is spaced inwardly from the ends of the side strips to maintain the established pattern. Where units are also mounted in two banks C and D in side by side relation, as shown in Figure 2, the juxtaposed side strips 10a and 11a may be suspended together from single brackets or may otherwise be connected for purposes of establishing a rigid and permanent arrangement.

It will be evident from the description that this invention provides a completely wired fluorescent ceiling unit which may be collapsed into

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a neat compact package for shipment or storage. The packaged unit embodies concepts which make possible the installation of the unit in the ceiling with the expenditure of a minimum amount of labor and time and without the need for extensive adjustment afterwards to achieve the desired level or spacing. The unit is sufficiently flexible to permit multiple assemblies for providing a unitary structure having substantially endless lines of lamps uniformly spaced over the ceiling area.

It will be understood that side and center strip members other than the described channel strip members may be used so long as they provide the desired rigidity and support for the associated units and that other arrangements with respect to the disposition of lamp holders, ballasts and tubing connectors may be made without departing from the spirit of the invention, especially as defined in the following claims.

What is claimed is:

1. A collapsible fluorescent lighting fixture comprising a pair of elongated side strips, a center strip and tubular members disposed between the side strips and the center strip for securing the strips in spaced parallel relation, lamp sockets depending from said strips in corresponding longitudinal distribution, and coupling means for fixing the ends of the tubular members to their respective strips to provide a rigid structure when in the assembled relation and a structure which may be collapsed into a compact package when the tubular members are disjointed from the strip members.

2. A collapsible fluorescent lighting fixture assembly comprising a pair of elongated side strips and a center strip of substantially the same length and rigid members disposed between the end portions of the side strips and the center strip in spaced parallel relation and having lamp sockets thereon, flexible electrical conductors interconnecting the strips to establish the wiring circuits, and coupling means for fixing the ends of the rigid members to their respective strips to provide a rigid structure when in the assembled relation and a structure which may be collapsed into a compact package when the tubular members are disjointed from the strip members.

3. A packaged fluorescent lighting fixture which may be extended to position all of the parts in their mounted relation comprising a pair of

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elongate side strips and a center strip lying in closely spaced side by side relation with one end of the center strip lying adjacent the opposite ends of the side strips when in collapsed position, flexible electrical conductors connecting end portions of the side strips with opposite end portions of the center strip, rigid members arranged between the end portions of the side strips and the opposite end portions of the center strip, and coupling means for securing the rigid members in their assembled relation in the adjacent end portions of the side and center strips.

4. A packaged fluorescent lighting fixture which may be extended to position the parts in their mounted relation comprising a pair of elongate side strips and a center strip arranged in closely spaced side by side relation with one end of the center strip lying adjacent the opposite ends of the side strips when in collapsed position, lamp holders depending from said strips at longitudinally spaced apart points, flexible electrical conductors connecting the electrical circuits and connecting the end portions of the side strips with the opposite end portions of the center strip, tubular members disposed between the end portions of the side strips and the opposite end portions of the center strip and through which the electrical conductors are threaded, and coupling members for rigidly securing the ends of the tubular members in their adjacent end portions of the strips to form a rigid structure when in the mounted relation.

5. A lighting fixture of the type described in claim 4 wherein the center strip is an elongate channel member having continuous indentures along the upper side wall portions to enable the strip to be clamped in mounted relation in advance of the opening of the package to hold the package at ceiling position.

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