

Nov. 23, 1943.

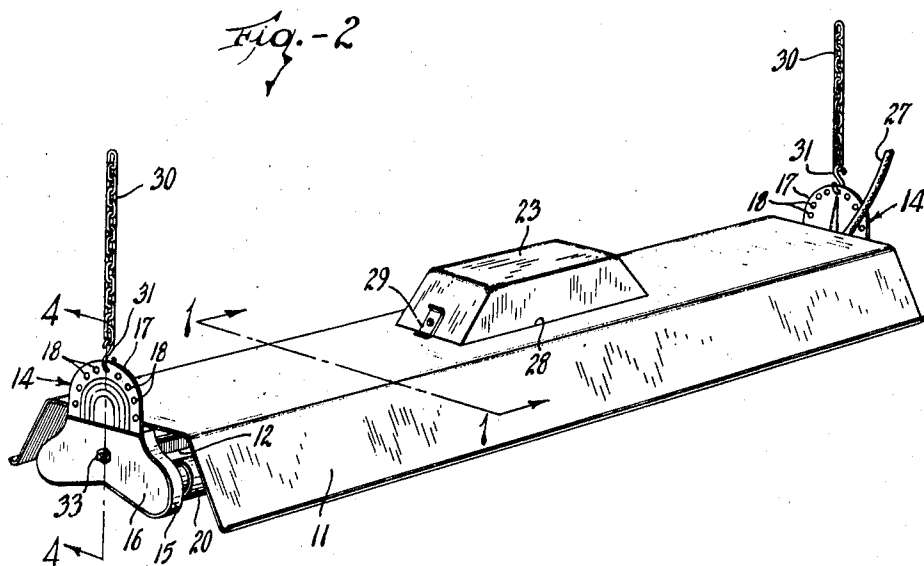
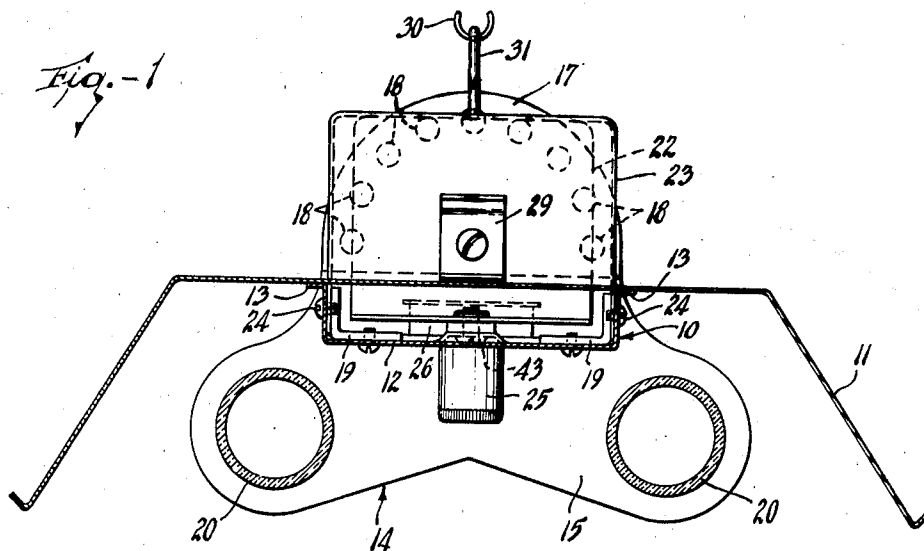
N. H. VACHA

2,335,218

LIGHTING FIXTURE

Filed Dec. 3, 1941

2 Sheets-Sheet 1



INVENTOR
NORMAN H. VACHA

BY

Chas. E. Frye

ATTORNEYS

Nov. 23, 1943.

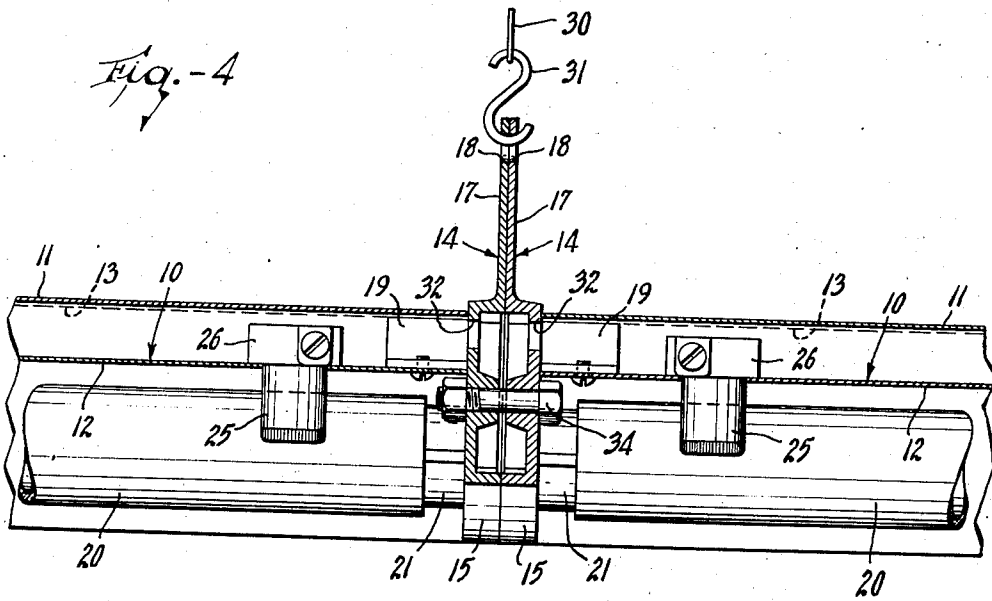
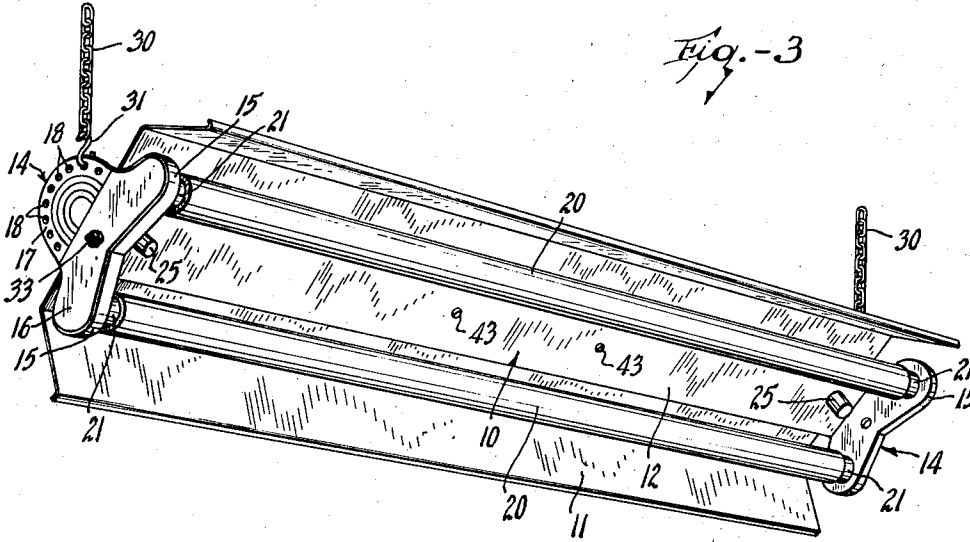
N. H. VACHA

2,335,218

LIGHTING FIXTURE

Filed Dec. 3, 1941

2 Sheets-Sheet 2



INVENTOR
NORMAN H. VACHA

BY

Ely & Frye
ATTORNEYS

UNITED STATES PATENT OFFICE

2,335,218

LIGHTING FIXTURE

Norman H. Vacha, Cleveland, Ohio, assignor to
John C. Virden Company, Cleveland, Ohio, a
corporation of Ohio

Application December 3, 1941, Serial No. 421,467

4 Claims. (Cl. 240—78)

This invention relates to an improvement in lighting fixtures. More particularly, this invention relates to a fluorescent lighting fixture which requires a minimum of time and labor for maintenance and is, therefore, especially suited for use in industrial plants or similar locations where the presence of dust and dirt is likely to reduce the efficiency of a fluorescent lamp.

Due to its superior light distribution and economy of current, fluorescent lighting is being adopted widely in industrial plants and similar locations where a high level of illumination is desirable. A primary objection to fluorescent lighting fixtures in locations where appreciable amounts of dust and grime are present is that maintenance costs, and particularly the dusting of the tubes and the cleaning of reflectors, may offset the operating economy. An apparently inherent characteristic of a fluorescent tube is its low light intensity per unit of area of its surface, as compared, for example, with an incandescent bulb. Thus, both fluorescent tubes and their reflectors must have a large surface area to produce a large amount of light. As a result, small amounts of dust collected on the surfaces of fluorescent tubes and their reflectors will seriously reduce the efficiency of fluorescent lighting fixtures. Therefore, to obtain the optimum amount of light from a fluorescent lighting fixture, the fixture must be cleaned thoroughly and frequently.

In the fluorescent lighting fixtures available heretofore, it was necessary to remove one or more fluorescent tubes before the reflectors could be removed for washing. This operation was time consuming and resulted in the breakage of the fluorescent tubes. Furthermore, such fixtures required that the light be switched off while a fixture was being cleaned. It is an object of this invention to provide a fluorescent lighting fixture with a reflector which may be quickly and readily removed for cleaning without removing or switching off the fluorescent tubes. The advantages of my fixture are that a great savings of time in maintenance is afforded, breakage of tubes during cleaning is reduced to a minimum, and work on machines illuminated by my fixture is not necessarily stopped during cleaning of the reflector and tubes.

Another object and advantage of a fixture made according to this invention is that starting switches may be readily replaced without removing the fluorescent tubes. In fact, all electrical parts of my fluorescent lighting fixture, except the tube sockets, may be inspected and replaced

after the fixture is installed without removing or otherwise handling the tubes.

It is also an object of my invention to provide a simple and inexpensive but strong fixture which will protect the fragile ceramic tube sockets and cover the ballast, wiring, and starting switch sockets. A still further object of my invention is to provide a fluorescent lighting fixture which may be easily installed at a wide range of angles for directional control of the light. Fixtures made according to my invention may also be readily fastened end-to-end for continuous line lighting.

Other objects and advantages of my invention will be apparent from the disclosure in the following specification, claims, and drawings in which:

Fig. 1 is a cross-sectional view taken along the line I—I of Fig. 2;

Fig. 2 is an isometric view of my fixture, viewed from above;

Fig. 3 is an isometric view of my fixture hung in a tilted position and viewed from below; and

Fig. 4 is a fragmentary longitudinal section showing two of my fixtures joined end-to-end.

In the drawings, in which like reference characters refer to like parts, the fixture is comprised of a chassis 10 and removable reflector 11. The chassis 10 is comprised of a longitudinally extending shallow channel member 12, preferably provided with flanges 13, and end members 14 secured to each end of the channel 12. The end members 14 comprise a lower laterally extending box portion 15, provided with a removable cover 16, and an upper hanger plate portion 17 provided with a plurality of hook holes 18. The back of the box portion 15 is provided with a boss 19 to which the channel 12 is secured.

Each chassis 10 carries two fluorescent tubes 20 mounted in sockets 21 located in the box portions 15 of the end members 14. The sockets 21 are preferably located below and to each side of the channel 12. Each box portion 15 is provided with an opening 32 to permit wiring to be led from the channel 12 to the sockets 21.

The channel 12 carries the ballast 22 for the tubes 20 midway between the end members 14, the ballast 22 being secured in the channel 12 by means of stud bolts 43 located centrally of the channel 12. The ballast 22 is preferably of a properly phased high power factor type to minimize the stroboscopic effect of the tubes 20. A ballast housing 23 is removably secured to the channel 12 by means of the cap screws 24 so that the ballast 22 is normally protected from dust,

Preferably adjacent the end members 14, two central openings are punched in the bottom of the channel 12 to receive the starting switches 25. Above each opening is a starting switch socket 26 removably secured to the channel 12. Wiring (not shown for simplicity of illustration) is carried in the channel 12 to connect the ballast, starting switches and tube sockets. All metal elements in the chassis 10 and housing 23 are electrically connected and the power cable 27 connecting the ballast 22 to the source of power preferably has a third ground wire connected to the chassis 10 so that the chassis is thus grounded.

The reflector 11 is a trough-shaped member provided with a baked porcelain or similar reflecting finish on its inner surface. The reflector extends from one end member to the other end member, sufficient space being allowed adjacent at least one end member to permit the cable 27 to extend from the channel 12 to the source of power. Midway between the ends of the reflector an opening 28 is punched in the central portion of the reflector to permit the reflector to fit down over the ballast housing and rest on the flanges 13 of the channel 12. Any suitable releasably securing means may be employed to secure the reflector 11 to the chassis 10. A very simple and effective means shown in Figs. 1 and 2 comprises several catches 29 pivotally mounted on the sloping ends of the ballast housing 23. The catches 23 are preferably somewhat resilient so that they are sprung slightly when they are turned to engage the reflector 11. The coating of the outer surface of the reflector 11 is preferably thin or brittle enough so that it will be scratched through by the catch 29 and thus be grounded to the chassis 10. Since the inner surface of the reflector may insulate the reflector from the channel 12, unless the reflector 11, usually of metal, is thus grounded, a dangerous condition may be created due to currents induced from the wiring in the channel 12.

My fixture is readily installed for use by hooking each of the hanger plates 17 to a drop chain 30 by means of the double hooks 31. If the fixture is to be hung in a horizontal position, as shown in Fig. 2, the hooks 31 are simply passed through the central holes of the arcuately arranged hook holes 18. If the fixture is to be hung in a tilted position, each of the hooks 31 are passed through a laterally displaced hook hole, as shown in Fig. 3. If vibrations tend to cause the fixture to swing, the hanger plates may be bolted to a rigidly mounted bracket, the arcuately arranged hook holes 18 permitting the fixture to be fastened at a wide range of angles.

If it is desired to mount a plurality of fixtures so that a continuous line of lighting is secured, the cover plates 16 are removed from the box portions 15 of adjacent ends of a plurality of chassis by removing the short bolts 33 which hold the cover plates 16 in the box portions 15. The adjacent end members 14 are then held in abutment by a long bolt 34 substituted for the short bolts 33, as shown in Fig. 4. Suitable power cables for connecting the aligned fixtures may be passed through the openings 32 in the adjacent end members. When the end members are secured together as shown in Fig. 4, they may be prevented from twisting with respect to each other by pinning through adjacent hook holes or providing the end members with suitable inter-fitting keys. The contacting vertical surfaces of the abutting end members tend to prevent the

joined fixtures from sagging, but the joint is preferably supported, as by the chain 30 and hook 31 shown in Fig. 4.

After the fixture is installed, it is easily cleaned by simply turning the catches 29 and lifting off the reflector 11 for washing. Because the tubes 20 are spaced laterally from the channel 12, any dust which may collect on the tubes may be easily brushed off when the reflector is removed. After the reflector is washed, it is quickly replaced by simply dropping it over the ballast housing and turning the catches 29. Thus, my fixture may be cleaned without removing the tube from the fixture. Consequently, breakage of the tube, due to handling, is reduced to a minimum and is usually eliminated entirely.

When using fluorescent lighting fixtures, the tubes must be replaced from time to time and the starting switches must also be replaced. The tubes are removed from the fixture by employing the conventional button type sockets which permit the tube to be removed by twisting it in the socket and then removing it laterally. By locating the starting switch sockets centrally of the channel 12 and providing an opening in the channel, the starting switch 25 may be inserted without removing the reflector 11 or either of the tubes. Thus, the reflector 11, tubes 20, and starting switches 25 may each be removed from the fixture without disturbing any other element or part of the fixture. It is an especial advantage that the reflector 11 may be removed for cleaning without switching off the tubes 20, since this usually allows the maintenance crew to clean the fixture without seriously interrupting the work lighted by the fixture.

All wiring in my fixture is covered and concealable when the reflector 11 is in place, since the reflector also serves as a cover for the channel 12. With the reflector removed, however, all wiring is exposed for inspection. In fluorescent lighting equipment, it is seldom that the ballast or starting switch sockets must be replaced but in my fixture even these elements may be replaced without taking down the fixture or removing the tubes. To replace either the starting switch sockets or the ballast, the lights are switched off, of course, and the reflector is removed. A starting switch socket is then replaced by simply removing the defective socket from the upstanding flange in the channel to which it is secured and securing a new socket in place. The ballast 22 is removed by loosening the cap screws 24 to permit the ballast housing 23 to be removed. The ballast 22 is then removed by loosening the stud bolts 43.

In many fluorescent fixtures the ceramic button type tube sockets are exposed so that blows on the end of the fixture, such as when the end of the fixture is hit by a ladder being carried by a workman, will break the tubes and sockets or at least throw the sockets out of line. In my fixture the tubes and sockets are protected from end blows by the end members 14.

The foregoing is a description of a preferred form of my invention. Obviously, this disclosed embodiment may be modified either in whole or in part without departing from the spirit and scope of this invention. Therefore, my invention is not to be limited to the embodiment disclosed or for the specific uses described but is limited only by the appended claims.

What is claimed is:

1. As a manufacture, a fluorescent lighting fixture comprising a longitudinally extending

channel, a fluorescent ballast and ballast housing removably secured in said channel, end members integral with each end of said channel, fluorescent tube sockets carried by said end members, fluorescent tubes being removably mounted in said sockets, said tubes being disposed parallel to but laterally spaced from said channel, wiring connecting said ballast and said tubes lying within said channel, a reflector for said tubes fitted over said ballast housing and covering said wiring in said channel, and means for removably securing said reflector to said channel, said means constituting the sole means for preventing said reflector from being removed from said channel.

2. In a fluorescent lighting fixture as described in claim 1, a starter switch for each fluorescent tube, starter switch sockets mounted in said channel, said starter switch socket, fluorescent tube sockets, and reflector securing means being each so arranged in the fixture and so constructed that said starter switches, fluorescent tubes, and said reflector each may be removed from the fixture independently of any other element in the fixture.

3. A fixture as defined in claim 1 in which said removable securing means are mounted on said ballast housing and, when engaging said reflector, ground said reflector to said housing.

5 4. As a manufacture, a normally dependent fluorescent lighting fixture comprising a chassis, a longitudinally extending reflector normally resting on said chassis, a pair of fluorescent tubes supported below said chassis, end members connected to said chassis beyond the longitudinal 10 ends of said reflector, said end members being adapted to be connected to supporting means, and means for removably securing said reflector to said chassis, whereby said reflector may be removed from said chassis independently of any 15 other element in the fixture, said end members comprising a box portion, fluorescent tube sockets mounted in said box portion, a removable cover for said box portion to protect said sockets, and means to secure said cover in said box portion or to secure said box portion to a similar 20 box portion of another fixture.

NORMAN H. VACHA.