Dec. 31, 1946. J. W. KILDUFF ET AL 2,413,505

FLUORESCENT LIGHTING FIXTURE

Filed March 6, 1944 3 Sheets-Sheet 1

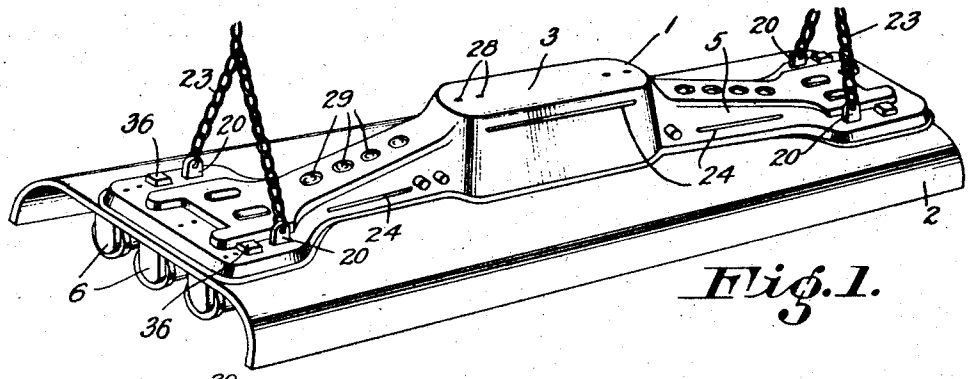


Fig. 1.

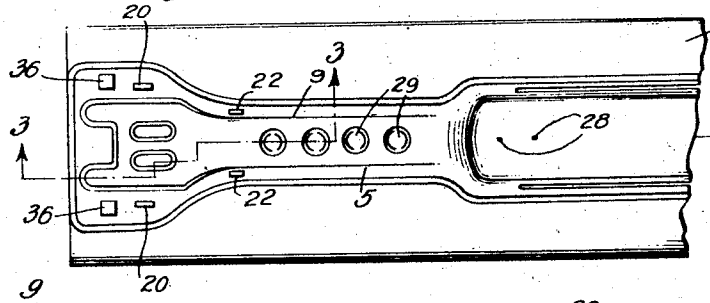


Fig. 2.

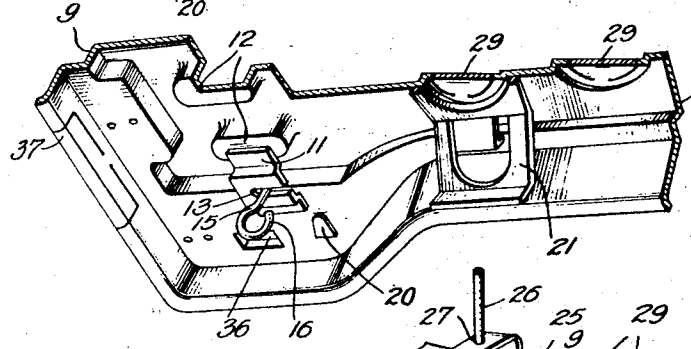
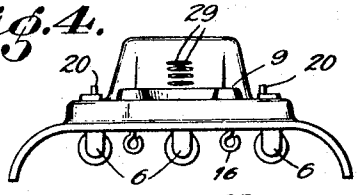


Fig. 3.

Fig. 4.



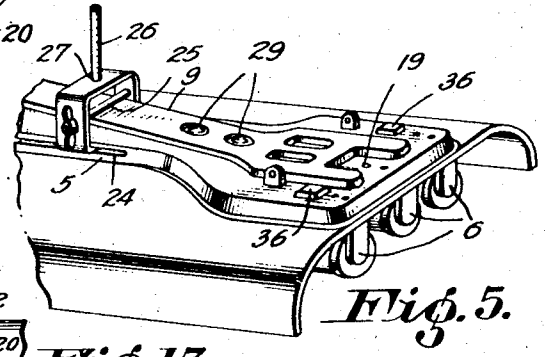


Fig. 5.

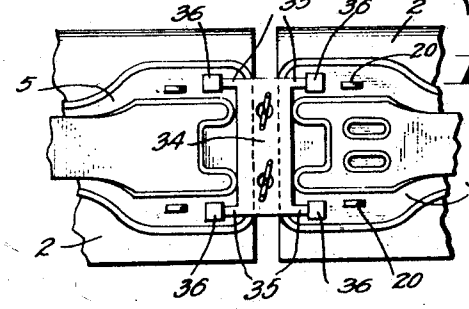


Fig. 13.

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FLUORESCENT LIGHTING FIXTURE

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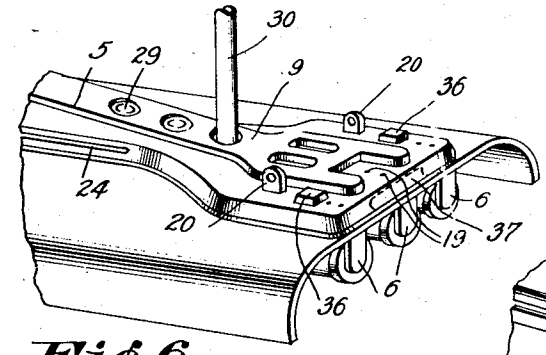


Fig. 6.

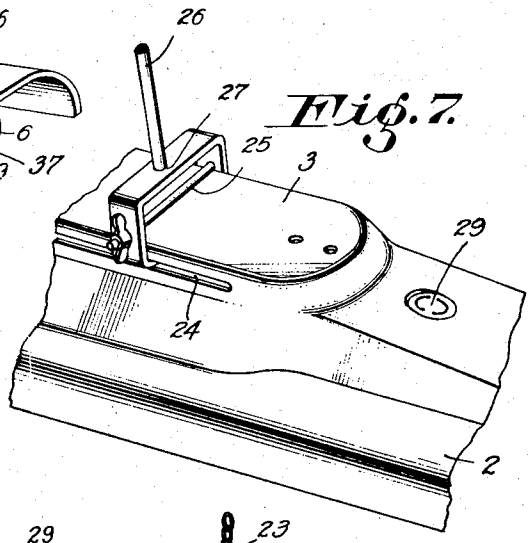


Fig. 7.

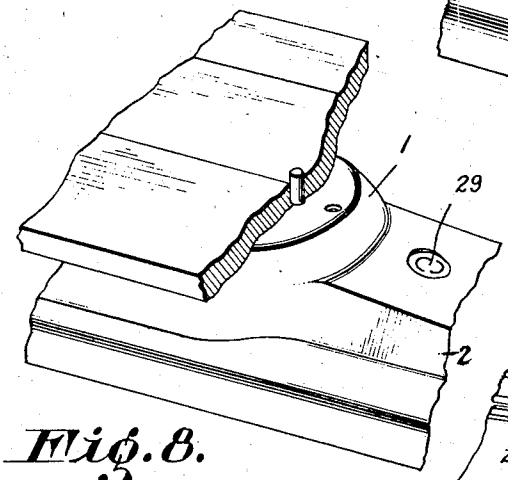


Fig. 8.

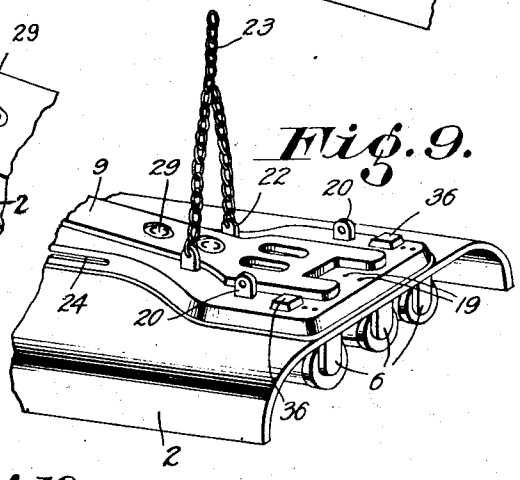


Fig. 9.

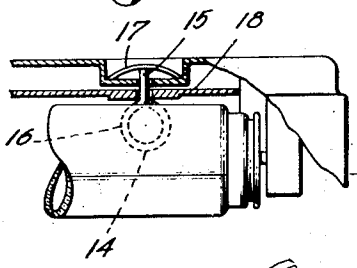


Fig. 10.

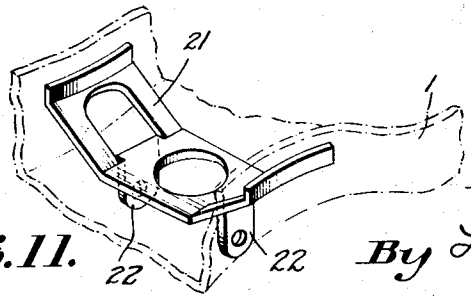


Fig. 11.

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FLUORESCENT LIGHTING FIXTURE

Filed March 6, 1944 3 Sheets-Sheet 3

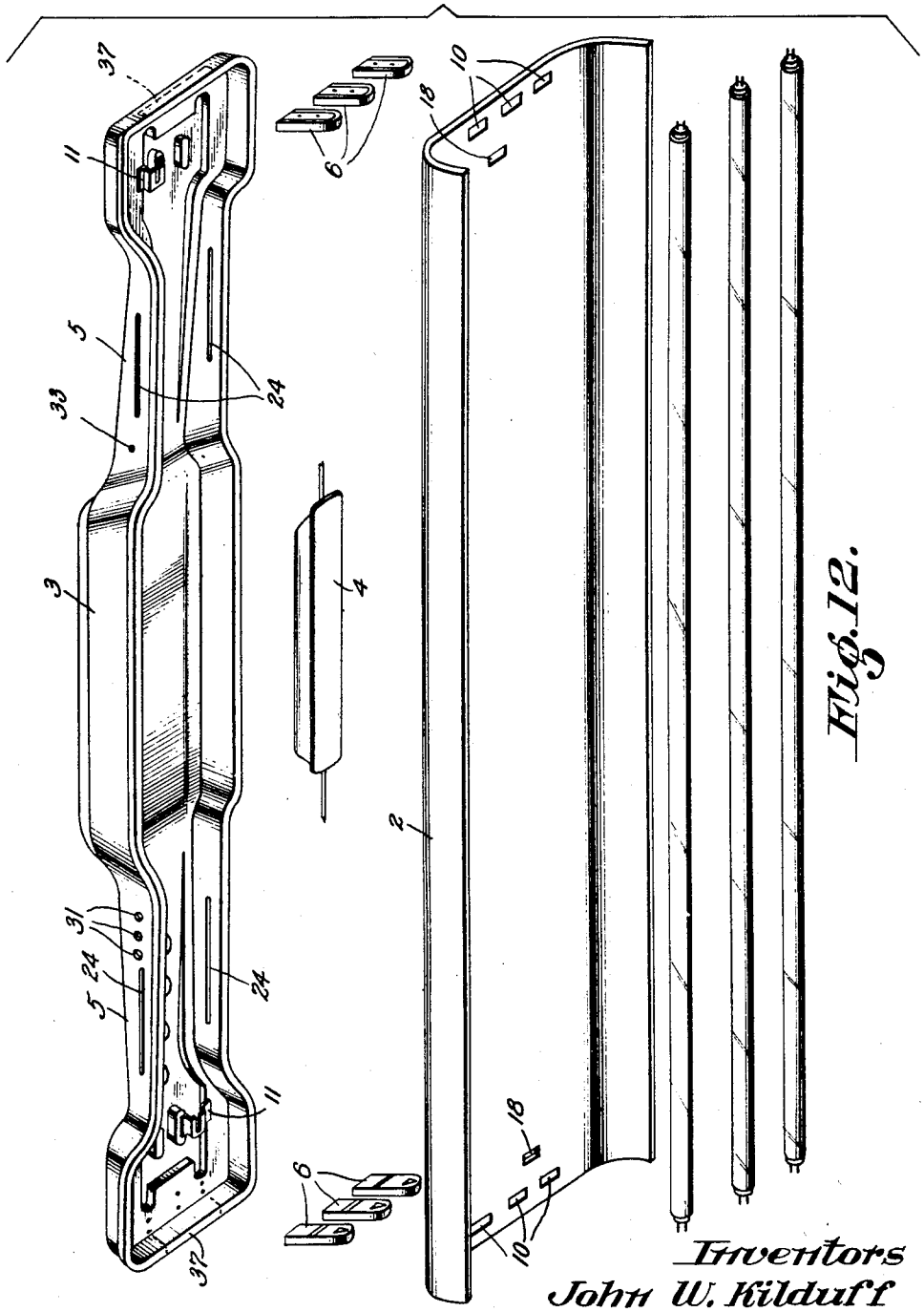


Fig. 12.

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UNITED STATES PATENT OFFICE

2,413,505

FLUORESCENT LIGHTING FIXTURE

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Application March 6, 1944, Serial No. 525,286

7 Claims. (Cl. 240—78)

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This invention relates to an electric lighting fixture and is particularly adapted for fluorescent lighting, and to such a fixture wherein the auxiliary equipment therefor is housed in an elongated supporting enclosure to be hereinafter designated as a chassis to which a reflector is attached.

An object of the invention is to provide a chassis for a fluorescent fixture which is designed to offer a maximum of strength and rigidity while employing a minimum of material thereby reducing the total weight of the device.

Another object of the invention is to provide a lighting fixture chassis of the above-indicated type in which universal means are provided for installing the fixture whether such installation be in a position directly in engagement with the supporting surface or whether it be by a flexible support such as a chain or cable.

A further object of the invention is to provide a fixture chassis in which adequate provision is made to receive auxiliary operating devices and electrical supply lines.

A further object of the invention is to provide a high efficient and rigid beam-like configuration to the chassis such configuration not only acting to provide maximum strength but also providing specific areas for the attachment of supplementary installing devices.

A further object of the invention is to provide a fluorescent fixture embodying a means for detachably securing a reflector to the chassis such means being so situated that it is available for operation in a convenient position below the unit.

A further object of the invention is to provide a supporting chassis for a fixture in which auxiliary operating units are attached to specially developed abutments and bosses to readily and rigidly receive such units.

A further object of the invention is to provide a fluorescent lighting unit in which each of the major elements is so interconnected that each element forms a mutual reenforcement by reason of its association with the other elements.

Briefly, the device consists of a unitary elongated chassis and a reflector attached thereto. The casing is hollow and generally channel-shaped in cross-section. The chassis desirably may be moulded from plastic or drawn to the desired configuration from sheet metal by suitable dies.

The mid-section of the chassis presents a relatively large deeply-drawn portion which offers a maximum of rigidity to stresses imposed thereon by installation and also offers resistance to lateral distortion from a true plane. This central portion of the chassis provides a chamber to receive a ballast unit and other operating devices.

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The chassis presents end sections which are reduced in size and desirably taper in depth outwardly. The end portions of these end sections are expanded laterally to present chambers within which lamp holding sockets are received. The tapered end sections are provided on their top wall with a raised area of reduced width which function as reenforcing ribs.

The bottom of the chassis is open and its lower marginal edges lie in a true plane. The reflector is detachably held in engagement with the bottom edges of the chassis thus serving as a closure for the chassis since the reflector extends for the full length of the chassis and slightly beyond its extremities. As a result of this construction free access to all of the units housed within the chassis is readily had by removing the reflector. The reflector is provided with apertures through which the sockets are projected when the reflector is secured in position upon the chassis.

The plurality of knock-out apertures are provided in the chassis for convenience in installing the necessary lead-in wires and for the reception of such elements as hanging rods, conduits stems, or other installing devices. Knock-out apertures are also provided for the reception of starter units and controlling switches.

Additional means are provided for installing the fixture through the medium of a specially-designed hanger which embraces the walls of the chassis and interlocks there within grooves formed in the walls within which the ends of the hangers are received. Hangers of this type are adjustable lengthwise of the fixture and may be clamped in any desired position in the grooves along the side walls.

In the drawings,

Figure 1 is a perspective view of a completed lighting fixture unit embodying the invention;

Figure 2 is a plan view of the unit with a portion thereof broken away;

Figure 3 is an under-sided view in perspective of one end of the device shown partially in section and with certain parts thereof removed;

Figure 4 is an end view of the apparatus;

Figure 5 is an enlarged perspective view of one of the end portions of the invention;

Figures 6, 7, 8, and 9 are detailed views illustrating various methods of supporting the fixture;

Figure 10 is a detail view illustrating the means for attaching the reflector;

Figure 11 is a detail view in perspective of a

plate used to reenforce the end portions of the fixture, the plate being shown upside down and the chassis in dotted lines;

Figure 12 illustrates an exploded view of the invention showing the parts in proper relative position to be assembled; and

Figure 13 is a detail view of a tie plate employed for series installation.

The chassis 1 of the apparatus constitutes the housing and support for the necessary auxiliary operating units and also serves as a support for the reflector 2. The reflector 2 is slightly longer than the lamps and is curved downwardly along its side edges in a manner to properly direct the light coming from the lamps. The chassis 1 is designed not only to readily receive the auxiliary units but also the metal thereof is so distributed and shaped that it provides maximum strength with minimum weight.

The chassis is so designed that its bulk is greatly reduced which lends to it an attractive and stream-lined appearance. This reduction in volume is accomplished moreover without sacrificing ample space for the reception of the necessary auxiliary elements enclosed by it.

The central portion of the chassis constitutes a chamber 3 within which a ballast unit 4 is secured. The chamber 3 is of substantial proportions and channel-shaped in cross-section thereby presenting a rigid mechanical structure. The end sections 5 are reduced in size and taper in depth outwardly. The outer portions of the end sections are expanded laterally to form a chamber within which a plurality of lamp sockets 6 are situated.

To increase the rigidity of the chassis the top walls of the end sections 5 are provided with areas which are raised above the plane of the top walls and extend lengthwise of the sections 5 to constitute reenforcing ribs 9 which provide additional supporting strength to the chassis.

The reflector 2 may be made of any suitable material such as metal, composition or plastic and desirably is shaped to provide correct reflection characteristics to insure even light distribution. The reflector is coated with a material having a high coefficient of reflection.

The bottom edge of the chassis lies in a true plane and is adapted to engage the flat upper surface of the reflector. The reflector thus functions as a closure for the bottom of the chassis and is provided with a plurality of apertures 10 through which the sockets 6 project.

It is highly desirable to provide means for readily attaching and removing the reflector for replacement or cleaning purposes and also to gain access to the elements enclosed within the chassis. To accomplish this end the present invention provides a quick detachable fastening device. A bracket member 11 is welded or otherwise secured to the inner-face of the top wall of the chassis adjacent the outer extremity of the end sections 5. Bosses 12 are struck down from the reenforcing ribs 9 to provide attaching surfaces for the brackets 11. These surfaces lie in substantially the same plane as the main upper wall of the chassis. The brackets 11 are each provided with a slot 13 extending part way of the width thereof at its midsection. A spring-actuated fastener member 14 having a shank 15 and a handle portion 16 is received within the bracket with the shank extending through the slot 13. A leaf spring 17 is arc-shaped and bears at its outer ends upon the bracket 11 and bears at its mid section against a head upon the upper end of the shank 15 thereby acting to yieldingly draw the fastening member upward into locking position.

The reflector is provided with a pair of slots 18 of substantially the same width and as long as the diameter of the handle portion 16 of the fastening member. The slots 18 are so positioned in the reflector that when it is applied to the chassis its position will be correctly aligned with the lamps for proper operation of the fixture. To apply the reflector the handle portions 16 of the fastening members are pulled downwardly against the action of the spring 17 and given a quarter turn which results in locking the reflector upon the chassis.

The lamp sockets 6 are of conventional design and adapted to receive fluorescent lamps. They are mounted in the enlarged outer portions of the end sections 5 of the chassis by means of screws 19 extending downward through the top wall thereof. The alignment of the sockets is maintained by providing a projection thereon which is received in an aperture in the chassis. The presence of the projection within the aperture maintains proper alignment of the sockets.

Various means are provided for installing the lighting unit. For certain types of installation it is desirable to suspend the fixture by the flexible chain, cable, or the like. For this purpose a pair of supporting ears 20 are provided at or adjacent the extremities of the fixture. These ears 20 may be constructed in any suitable manner. They are herein illustrated in the form of angle members one arm of which projects vertically through the upper wall of the chassis and is perforated to receive a chain or the like while the other arm is secured upon the inside face of the chassis.

A feature of the invention resides in a means of reenforcing the chassis at or adjacent the junction between the end sections proper and the expanded outer portions thereof. The reenforcing means desirably take the form of relatively heavy plates 21 which are generally U-shaped and designed to be received within and secured by spot welding or other means to the side and top walls of the end sections of the chassis.

To provide an additional supporting device for the fixture a pair of ears 22 are struck up from the reenforcing plate 21. The ears 22 project vertically upward through suitable apertures in the chassis and have therein one or more apertures within which supporting chains or cables 23 are received. The supporting ears 22 being connected with the reenforcing plates not only provide an alternative position for attaching chains or other supporting means but also constitutes a particularly rigid and strong point of securement since the force due to the weight of the chassis is transferred through the ears 22 to the plate 21 thus distributing the force over a substantial area of the chassis.

Another desirable means for installing the fixture is illustrated in Figures 5 and 7 wherein a hanger 38 is provided for each end of the fixture. The hangers desirably are generally U-shaped in form with their side portions extending downward and embracing the side walls of the chassis. To obtain a positive attachment with the chassis a plurality of depressions or grooves 24 are formed in the side walls of the end sections 5 and also in the side walls of the central section 3. The grooves 24 are elongated to provide for selectively positioning the hangers 38 along the chassis. A clamping bolt 25 passes through the legs of the

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hangers and serves to tighten it upon the chassis in the selected position.

Various means may be employed to secure the hanger to a ceiling, beam or other supporting member. As shown in Figure 7 a rod **26** may be secured to the hanger through the aperture **27** therein. The rod **26** is adapted to be anchored in or secured to the support. It may be more suitable for certain installations to secure the hangers flush against the attaching surface in which case a bolt or screw would be passed through the aperture **27** and into the support. It should be observed that the grooves **24** along the side walls of the chassis not only serve as anchoring points for the hangers but also function as stiffening means to enhance the rigidity of the fixture.

It may be desirable to flush mount the fixture directly upon the supporting surface in which case bolts, screws, or other fastening devices may be pased through apertures **28** in the central portion **3** of the chasis and thence directly into the support as shown in Figure 8 of the drawings. Four holes are provided in this portion of the chassis, two of which receive the means to secure the ballast within its chamber while the remaining two are available for flush mounting the fixture.

For convenience in adapting the fixtures to certain other installation methods, a plurality of knock-out apertures **29** are provided in the top wall of the chassis along the end sections **5** thereof. The apertures provided by the knock-outs are used to insert conduits stems **30** which serve the double purpose of supports for the fixture and conduits for lead-in wires. Additional knock-outs **31** in the chassis side walls provide openings through which starter units **32** may be inserted. If desired also, a knock-out **33** is provided for the installation of a controlling switch such as the conventional Levolier type pull switch.

To illuminate relatively large areas such as large industrial plants or office buildings, it is desirable to install the above described units in series, that is, with their ends joined together to form a continuous and uninterrupted light source. This is accomplished by the use of connecting plates **34** which are provided with attaching tabs **35** which are received and anchored within sockets **36** struck up from the metal of the chassis adjacent its end extremities as illustrated in Figure 13 of the drawings. Means including bolts or other fastening devices are provided for clamping adjacent fixtures together endwise through the medium of the connecting plate **34**.

When a purality of fixtures are connected in series as above described the necesary connecting wires must pass between adjacent fixtures. To provide a clear channel for the wires knock out panels **37** are provided in the end walls of the chassis.

A distinctive feature of the fixture resides in its overall structural contours which are proportioned to present a maximum of rigidity to the application of stresses at any position along its length.

In connection with the strength and durability of the device it should be pointed out that the reenforcing plates **21** are correctly located at the portion of the chassis having the smallest dimensions and to a limited degree possessing, without the plate **21**, less strength than the remaining portions of the device. It has been determined that with the plates **21** welded or otherwise rigidly secured to the side and top walls of the chassis that the resulting structure has more than adequate strength to fullfil all requirements. Additional strength is secured at these points by reason of the fact that the reenforcing ribs **9** bridge over the portions of the chassis containing the plates **21**.

We claim:

1. A fluorescent lighting fixture comprising a chassis of sheet metal open at its bottom, a reflector, means for detachably securing the reflector against and serving to close the bottom of the chassis, a chamber in the chassis situated midway of its length, adjoining end sections of reduced cross sectional size tapering in depth outwardly and expanded laterally at their outer portions to receive a plurality of lamp sockets; a flat top reenforcing rib extending lengthwise substantially the full length of each of said end sections, said ribs being of less width than and raised above the general plane of the top wall of said end sections.

2. A fluorescent lighting fixture comprising a hollow elongated chassis of sheet material open at its bottom, a reflector, means for detachably securing the reflector against and acting to close the bottom thereof, said chassis having a chamber situated midway of its length, adjoining end sections of reduced size tapering in depth only outwardly and expanded laterally at their outer extremities to form relatively wide shallow chambers; a plurality of lamp holding sockets secured therein, a rib upon the top wall of and extending lengthwise to substantially the ends of said end sections, said ribs being flat on top and of less width than and raised above the general plane of the top wall thereof, a reenforcing plate of U-shaped form fitting within and secured to the side and top walls of said end sections adjacent the inner boundary of said shallow end chambers thereby acting to reenforce the chassis.

3. A fluorescent lighting fixture comprising the elements defined in claim 2 together with a pair of ears secured to the said reenforcing plates and projecting upward through the top wall of the chassis adapted to receive a flexible fixture supporting means.

4. A fluorescent lighting fixture comprising a hollow elongated one piece chassis of sheet material open at its bottom, a reflector, means for detachably securing the reflector against and acting to close the bottom thereof, said chassis having a chamber situated midway of its length to receive ballast units or other devices, end sections of reduced size tapering in depth outwardly and expanded laterally at their outer extremities to form relatively wide shallow chambers, a plurality of lamp holding sockets secured in said chambers, a reenforcing rib extending lengthwise along the top wall of and to the outer end extremities of said end sections, said ribs being of less width than and raised above the general plane of the top wall thereof, said reenforcing ribs having a portion thereof depressed to the general level of the said top wall adjacent the end extremities thereof, a channel shaped socket member at each end of the chassis secured at one of their ends to the said depressed portions and at their other ends to the side margin of said top wall, said socket members being adapted to receive and support said reflector attaching means.

5. A fluorescent lighting fixture comprising a hollow elongated one piece chassis of sheet material open at its bottom, a reflector, means for detachably securing the reflector to the bottom

of the chassis, said chassis having a chamber situated midway of its length to receive a ballast unit or other devices, end sections of reduced size tapering in depth outwardly and expanded laterally at their outer extremities to form relatively wide shallow chambers; a plurality of lamp holding sockets secured in said chambers, a reenforcing rib disposed lengthwise of and extending for substantially the full length of said end sections, said ribs being raised above the general plane of the top walls of said end sections and having a portion of their area at their outer ends depressed to the plane of said top wall, a channel shaped socket member within each end of the chassis secured at one of their ends to the said depressed portion and at their other ends to the side margin of said top walls, said sockets having means for detachably receiving said reflector securing means.

6. A fluorescent lighting fixture comprising an elongated, unitary, open bottom combination housing and supporting chassis, a relatively large chamber at the midportion of its length, for the reception of lamp operating units, a pair of end sections of reduced width tapering in depth outwardly and having their outer end portions expanded laterally to form relatively wide compartments, a plurality of lamp holding sockets secured in said compartments, a reflector, means for detachably securing the reflector to said chassis, said means including one or more spring actuated manually operable latch members, apertures in said reflector through which said latch members project, said latch members having finger holds operable in one position to secure the reflector and in another position to release it, and rigid socket members secured to the top wall of said chassis to detachably receive said latch members.

7. A fluorescent lighting fixture comprising a reflector elongated to exceed slightly the length of the lamps used, a unitary combination housing and supporting chassis, of substantially the same length as the reflector, a relatively large chamber situated midway of its length for the reception of lamp operating units, a pair of end sections of reduced width tapering in depth outwardly and having their end portions laterally expanded to form relatively wide compartments, a plurality of lamp holding sockets secured in said compartments, means for detachably securing the reflector to said chassis, said means including one or more spring actuated manually operable latch members, apertures in said reflector through which said latch members project, said latch members having finger holds operable in one position to secure the reflector to the chassis, and in another position to release the reflector therefrom, reenforcing plates of relatively heavy metal having substantially the conformation of and secured to the inside of each of said end sections and means on said plates to which a flexible fixture supporting means may be secured.

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