Dec. 15, 1970 M. H. KRUGER 3,548,187

LIGHTING FIXTURE

Filed Nov. 30, 1967 3 Sheets-Sheet 1

FIG 10

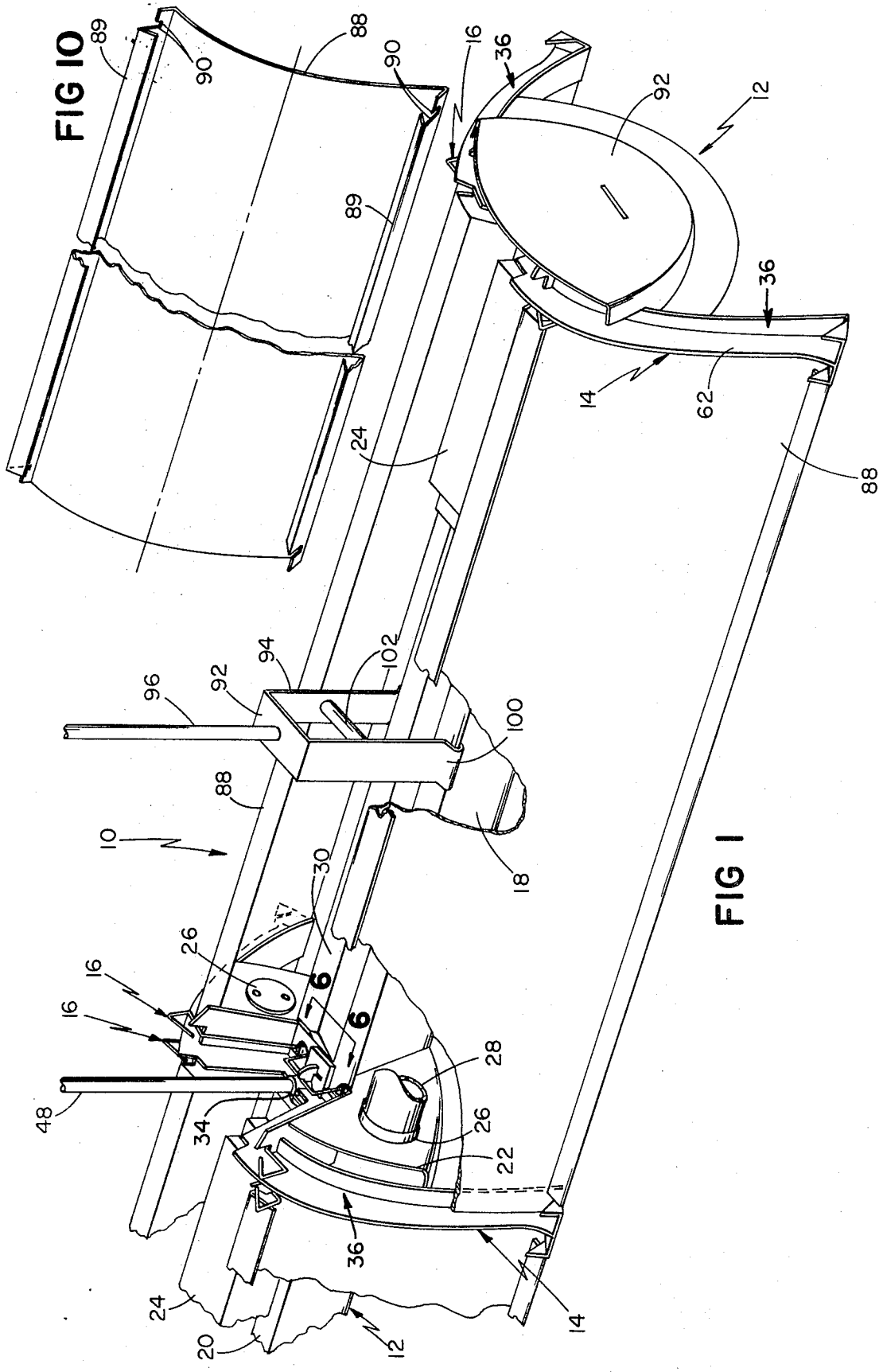



FIG 1

Dec. 15, 1970 M. H. KRUGER 3,548,187

LIGHTING FIXTURE

Filed Nov. 30, 1967 3 Sheets-Sheet 2

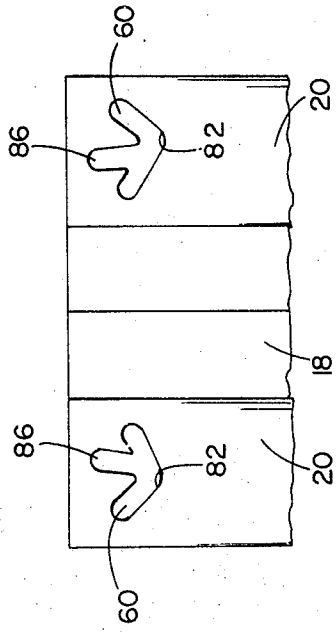



FIG 5

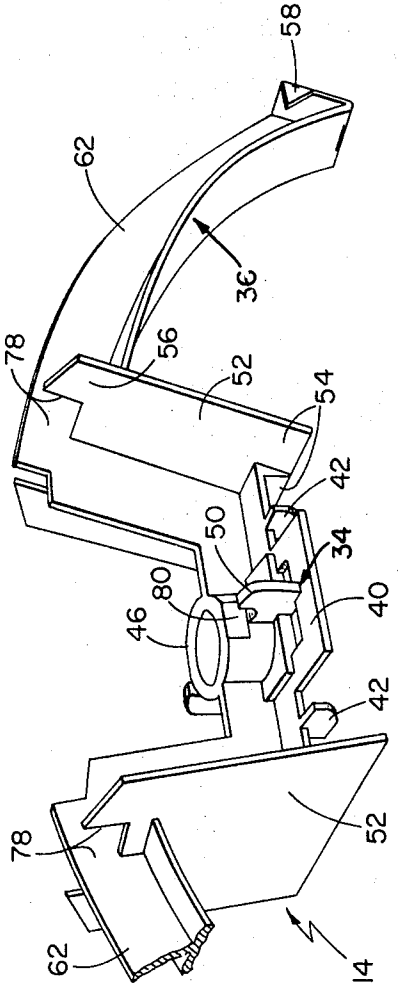



FIG 2

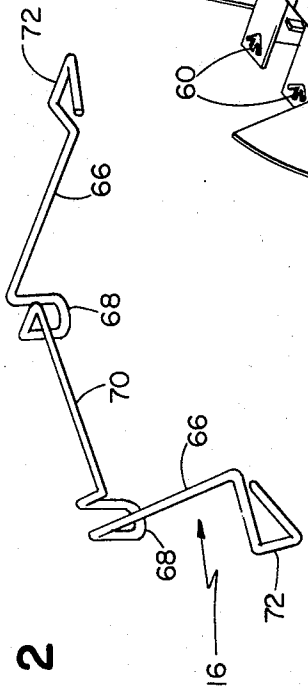



FIG 3

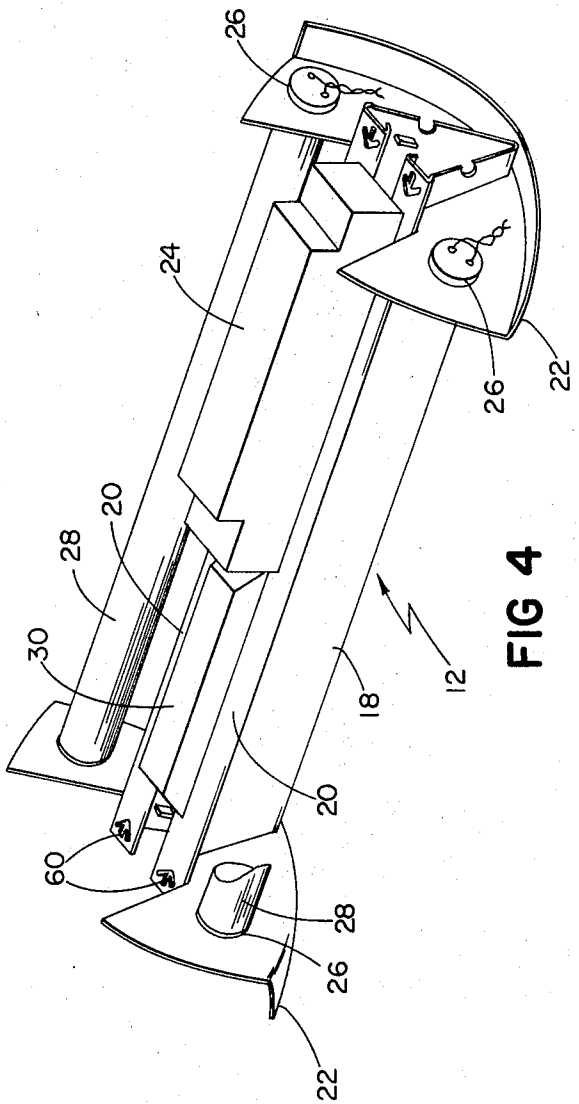



FIG 4

Dec. 15, 1970 M. H. KRUGER 3,548,187

LIGHTING FIXTURE

Filed Nov. 30, 1967 3 Sheets-Sheet 3

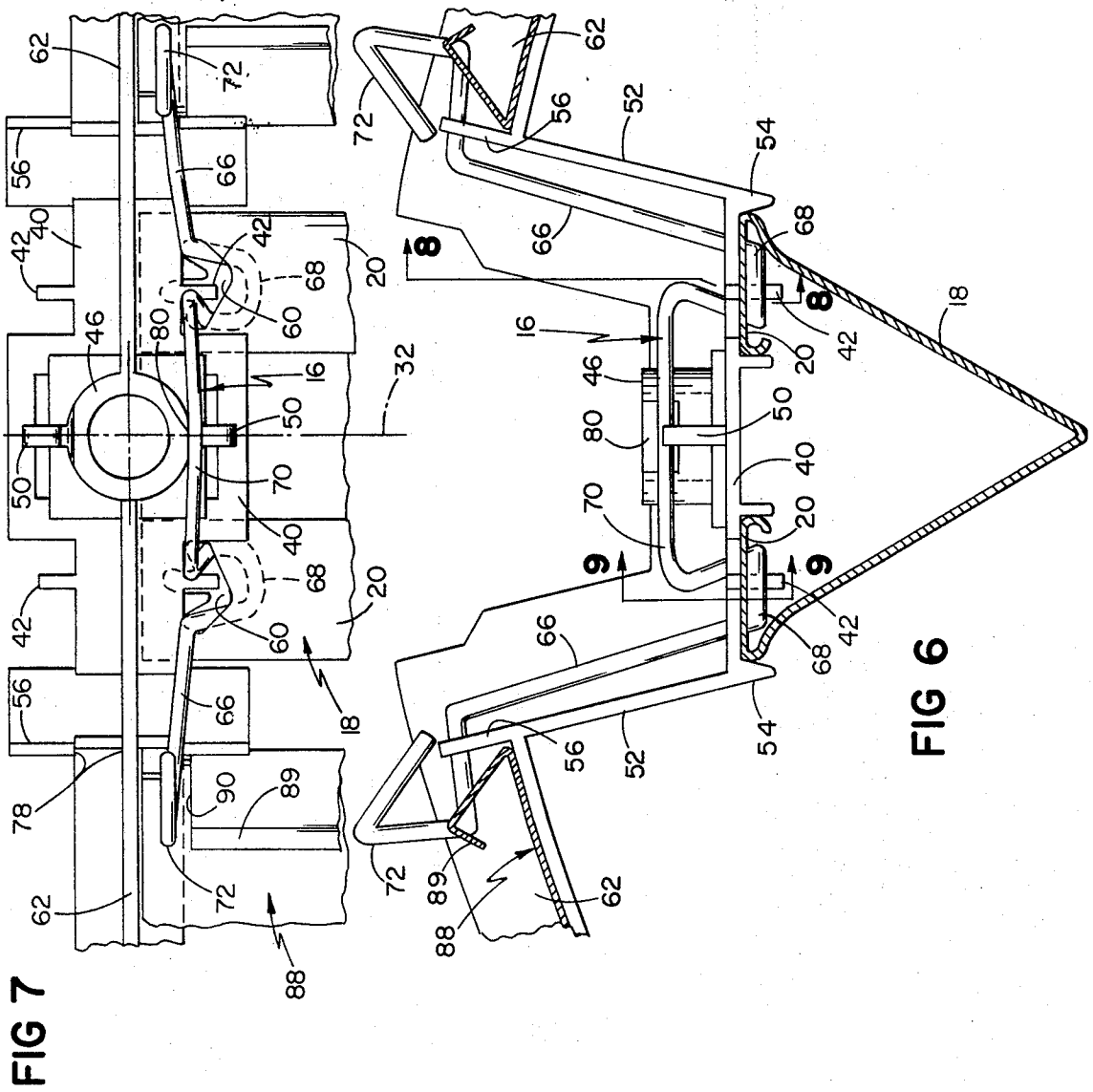



FIG 7

FIG 6

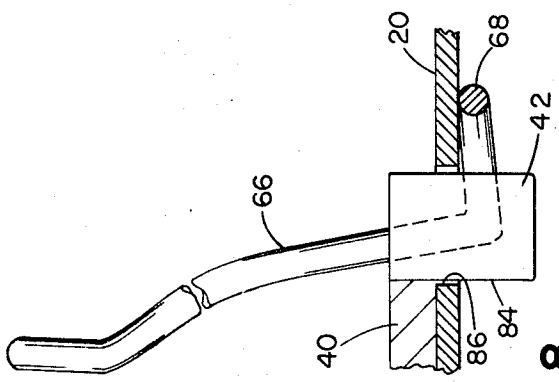



FIG 8

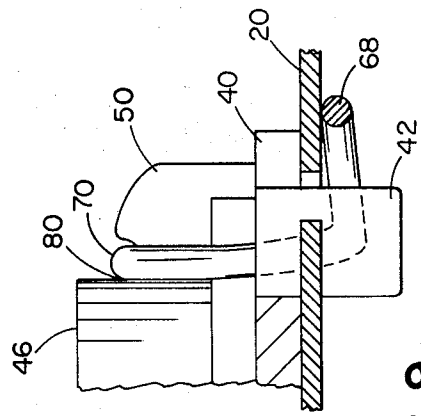



FIG 9

United States Patent Office 3,548,187 Patented Dec. 15, 1970



3,548,187

# LIGHTING FIXTURE

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Filed Nov. 30, 1967, Ser. No. 686,872
Int. Cl. H05b 33/02
U.S. Cl. 240—51.11 16 Claims

## ABSTRACT OF THE DISCLOSURE

A lighting fixture comprising a lighting assembly, a support assembly and at least one spring element. Cooperating portions of the lighting assembly and support assembly define a joint system. Each assembly includes a first surface which engages a first surface of the other assembly, and a second surface at an angle to the first surface which engages a second surface of the other assembly. The spring element engages the two assemblies. The spring element shown has elongated tension legs which are rotated to assemble the fixture, and force the first and second surfaces respectively together. Shown also is a reversible reflector construction.

This invention relates to lighting fixtures.

It is a primary object of the present invention to provide a lighting fixture that may be quickly, inexpensively and solidly assembled in the field with a minimum of labor and equipment. Other objects include providing a lighting fixture of the type mentioned in which a single unitary support structure can engage and properly align the ceiling post, housing, reflectors, and end plates of the overall fixture.

The invention accomplishes these and other objects by providing a lighting fixture including a joint system defined by cooperating portions of a lighting assembly, a support assembly and a spring element. The cooperating portions of each assembly include a first surface engaging the first surface of the other assembly in face-to-face relationship and a second surface at a substantial angle to the first surface engaging the second surface of the other assembly. The spring element engages the two assemblies and forces the first and second surfaces, respectively, together. In preferred embodiments the support assembly comprises a symmetrical yoke including a central portion for engaging a pair of lighting assemblies and outer portions for supporting pairs of reflectors.

Featured in the combination is a spring having extended moment arms, movement of which cause other portions of the spring to react in different directions to force the pairs of surfaces together. Particularly preferred is a spring formed of wire or rod, of general W configuration, with outer moment arms and inner reaction portions. Also featured is the combination of a reflector panel symmetrical about its central longitudinal axis and a support for removably receiving the reversible reflector, advantageously with interlock along one edge and a spring restraint along the other.

Other objects, features, and advantages will appear from the following detailed description of a preferred embodiment of the present invention, taken together with the attached drawings in which:

FIG. 1 is a perspective view of a lighting fixture embodying the invention;

FIGS. 2–4 are perspective views of components of the fixture of FIG. 1;

FIG. 5 is a plan view of a portion of the housing of FIG. 4;

FIG. 6 is a view of the joint system of the fixture of FIG. 1 taken on line 6—6;



FIG. 7 is a plan view of portions of the fixture of FIG. 1;

FIGS. 8 and 9 are sectional views taken on lines 8—8 and 9—9 of FIG. 6, respectively, and

FIG. 10 is a perspective view of a reflector of the fixture of FIG. 1.

Referring more particularly to the drawings there is illustrated in FIG. 1 a lighting fixture 10 comprising a lighting assembly 12 secured at its opposite ends to a pair of support structures 14 by generally W-shaped steel torsion springs 16. As shown in FIG. 4 lighting assembly 12 comprises an elongated metal housing 18 of generally V-shaped cross-section with longitudinally extending upper ledges 20, a pair of generally semi-circular end members 22 secured to opposite ends of housing 18, and ballast 24 mounted on ledges 20. A pair of lamp sockets 26 for fluorescent lamps 28 are provided on each end member 22. Metal caps 30 are provided for closing the portions of the space between ledges 20 not filled by ballast 24.

Each support structure 14 (FIGS. 2, 6 and 7) is of a metal construction, is symmetrical about its longitudinal and transverse axes 30 and 32 respectively, and includes a central portion 34 and two curved reflector support portions 36 extending downwardly therefrom. Central portion 34 includes a horizontal lower support plate 40, four lugs 42 extending downwardly from plate 40, and a cylindrical cup 46 by means of which the support structure 14 may be secured to a ceiling post 48. Central portion 34 also includes cam members 50 extending upwardly from plate 40 adjacent opposite sides of cup 46 and a pair of side walls 52 secured to opposite longitudinal ends of plate 40. Each side wall 52 includes a housing alignment portion 54 extending below plate 40 and an upper portion 56 extending upwardly from plate 40 to the inner end of reflector support portions 36. A reflector retaining lug 58 is provided at the outer end of each reflector support portion 36. A center dividing and stiffening wall 62 extends upwardly from center portion 34 and support portion 36 along the longitudinal axis 30 for the full length of support structure 14.

As shown in FIGS. 3, 6 and 7, in this preferred embodiment spring 16 comprises a rod formed in a generally W-shaped configuration to provide a pair of elongated moment arms 66 and a foot portion 68 secured to each arm 66 at substantially a right angle to the plane thereof. A central portion 70 in the form of a broad inverted "U" lying in substantially the same plane as arms 66 connects the foot portions 68, and a loop 72 is provided at the outer end of each arm 66.

For securing lighting assembly 12 to a support structure 14, foot portions 68 of spring 16 are inserted into and through openings 60 (FIG. 5) adjacent the ends of ledges 20 of housing 18, with arms 66 and central portion 70 generally parallel and foot portion 68 generally perpendicular to ledges 20. Housing 18, is placed in position below support structure 14 with the upper surface of ledges 20 engaging the bottom surface of plate 40, the sides of housing 18 engaging housing alignment wall portions 54, and one of lugs 42 extending through each opening 60. Spring 16 is then rotated upward about foot portions 68 until central portion 70 of the spring engages a notch in cam member 50 and bears against a stop defined by the bottom of notch 50 and the adjacent front face 80 of cup 46. Further movement of moment arms 66 in the same direction to snap loops 72 into notches 78 in upper wall portions 56 adjacent center wall 72 bends the arms 66 (FIG. 8) and causes the spring 16 to rotate about central portion 70, thereby pressing foot portions 68 upwardly against ledges 20 and thereby forcing plate 40 and ledges 20 into face-to-face engagement, see FIG. 9. The slight rotation of arms 66 about

the stop at face **80** also forces the portion of the spring adjacent foot portions **68** forward against the front inside surfaces **82** of notches **60** (see FIG. 7), thereby moving housing **18** longitudinally away from support **14** until the rear vertical surfaces **84** of lugs **42** on the support engage the rear inside surfaces **86** of notches **60** in ledges **20** of housing **18**.

As shown in FIG. 1, the symmetrical design of support structures **14** makes it possible to mount any desired number of lighting assemblies in line to provide a lighting fixture of any desired length. A support structure **14** is provided between each pair of lighting assemblies **12**, and also at the opposite ends of the overall lighting fixture **10**. An end cover **92** is secured to the exterior sides of the support structures **14** at the ends of the overall fixtures.

A pair of reversible reflectors **88** (FIG. 10) are mounted in position extending between each pair of support structures **14**. Each reflector, constructed of rolled metal with an enamel coating, comprises a longitudinally extending curved body portion, a pair of ledges **89** extending the length of the reflector along the longitudinal edges thereof, and a notch **90** adjacent each end of each ledge **89**. The curved end portions of each reflector engage the curved reflector support portion **36** of support structure **14**. The reflectors are held in place by end lugs **58** of support structures **14**, and loops **72** of springs **16**, each of which, respectively, engage one of notches **90**.

One of the major advantages of lighting fixtures constructed in accordance with the present invention is that they permit the distance between the supporting ceiling posts **48** to be standardized. When, for example, the new fixtures are to be mounted on existing ceiling posts that are not spaced at the desired standard distance, a supplementary support **94** may be provided for securing housing **18** to the existing ceiling post **96**. As shown (FIG. 1), supplementary support **94** comprises an open metal channel the base **92** of which is secured to ceiling post **96** and the sides of which include gripping portions **100** for engaging housing **18**, and a bolt **102** for drawing gripping portions **100** toward each other for securely holding to housing **18**. It should also be noted that the wiping action of spring **16** incures electrical contact between adjacent lighting assemblies.

Other embodiments within the scope of the following claims will occur to those skilled in the art.

I claim:

**1.** A lighting fixture comprising:

a lighting assembly;

a support assembly,

cooperating portions of said lighting and support assemblies defining a joint system,

the cooperating portions of one of said assemblies including a first portion defining a laterally extending surface and a second portion defining a second surface adjacent to and disposed at a substantial angle to said laterally extending surface,

the cooperating portions of the other of said assemblies defining a first laterally cooperating surface engaging said laterally extending surface of said one assembly and a second cooperating surface adjacent to and disposed at a substantial angle to said laterally cooperating surface engaging the second surface of said one assembly; and

a spring engaging each of said assemblies and forcing said laterally extending surface against said first laterally cooperating surface, and said second surface against said second cooperating surface to form said joint system.

**2.** The combination of claim **1**, including a second support assembly spaced from and secured to said first-mentioned lighting assembly by a second spring element and a pair of reflectors mounted on and extending between said support assemblies, each of said support assemblies including a pair of reflector support portions adapted for engaging end portions of said reflectors.



**3.** The combination of claim **2** wherein each of said reflectors is symmetrical about the longitudinally-extending central axis thereof whereby said reflectors can be reversed.

**4.** The combination of claim **1** wherein said spring includes a first portion engaging said one assembly, a second portion spaced from said first portion and engaging said other assembly, and a portion intermediate said first and second portions engaging said other assembly, said spring being adapted to be rotated about said intermediate portion for moving said second portion into engagement with said other assembly whereby said spring forces said engaged surfaces together.

**5.** The combination of claim **1** wherein said spring element comprises a member that has at least two spaced apart force applying portions and an elongated arm portion, said force apply portions constructed and arranged relative to said lighting assembly and said support assembly so that rotation of one with respect to the other produces forces tending to urge said engaged surfaces together, said elongated arm portion constituting a moment arm adapted to produce said rotation with movement of the arm to a stressed position, and a detent associated with one of said assemblies adapted to retain said moment arm in said stressed position.

**6.** The combination of claim **5** wherein a reflector is positioned adjacent said detent and said moment arm, said member being so constructed and arranged whereby stressing of said moment arm and engagement with said detent locks said reflector in place.

**7.** The combination of claim **6** wherein said detent is a portion of said support assembly, said support assembly having an extended reflector support portion arranged to receive and seat said reflector, the end portion of the moment arm being arranged to hold the reflector in seated position as said stressed moment arm engages the detent on said support assembly.

**8.** The combination of claim **7** wherein said fixture is an elongated fluorescent fixture, said support assembly being located at one end of said fixture, a second similar support assembly and spring are located at the opposite end of said fixture, each of said support assemblies includes a reflector support portion defining an arcuate seat, an arcuate reflector extends between and is supported upon said seats, and the springs at said support assemblies are adapted to releasably secure said reflector in place.

**9.** The combination of claim **1** including a second lighting assembly positioned on the side of said support assembly opposite said first-mentioned lighting assembly, cooperating portions of said second lighting assembly and said support assembly defining a second joint system, and a second spring element engaging said support assembly and said second lighting assembly and forcing said cooperating portions thereof together.

**10.** The combination of claim **1** wherein said support assembly is substantially symmetrical about its longitudinal and transverse axes.

**11.** The combination of claim **10** wherein said support member includes a pair of reflector support portions on opposite sides of central portion, each of said reflector support portions including a generally arcuate surface adapted for engaging a portion of a reflector.

**12.** The combination of claim **1** wherein said support assembly includes a central portion defining a generally horizontal lower surface and a lug extending downwardly from said lower surface, said lower surface and said lug engaging cooperating portions of said lighting assembly.

**13.** In a lighting fixture comprising opposed end members for mounting elongated bulbs therebetween, a longitudinal member structurally joining said end members, support members for securing said fixture to the ceiling, and a reflector extending along each side of said fixture for reflecting light downwardly, the improvement where-

in each of said reflectors is of generally arcuate form and symmetrical about the longitudinal axis through the center of the body of the reflector, and each of said support members includes a pair of symmetrically opposed reflector support portions in the form of an outwardly and upwardly facing arcuate seat for removably receiving said reflectors, said reflectors and support portions cooperatively arranged to permit reversal of said reflectors replacing the exposed lower reflector edge with the previous upper edge.

**14.** The lighting fixture of claim **13** wherein each of said support portions includes adjacent one end thereof a member shaped to interlock with and secure one edge of the reflector supported thereby, and including a spring at the other end of each of said support portions for securing the other edge of the reflector supported by said each support portion.

**15.** A lighting fixture comprising:

a lighting assembly;

a support assembly; and

a substantially W-shaped connector including:

a pair of foot portions;

a central portion intermediate said foot portions; and

an elongated arm portion on the side of each of said foot portions opposite said central portion,

each of said assemblies defining a surface engaging a cooperating surface of the other of said assemblies,

one of said assemblies including a pair of spaced foot engagement surfaces each of which engages one of said foot portions,

the other of said assemblies including:

a central engagement surface intermediate and spaced from said foot engagement surfaces for engaging said central portion, and

a pair of arm engagement surfaces spaced from said central engagement and said foot engagement surfaces, one of said arm portions engaging each of said arm engagement surfaces,

said connector being rotatable about said central portion with said central portion engaging said central engagement surface for moving said arm portions into engagement with said arm engagement surfaces whereby said spring forces said cooperating surfaces of said assemblies together.

**16.** The combination of claim **15** wherein said foot portions are disposed at a substantial angle to said arm and said central portions, said foot engagement surfaces are substantially parallel, and said arm engagement surfaces are disposed at a substantial angle to said foot engagement surfaces.


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U.S. Cl. X.R.

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