United States Patent

Converso

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[54] **RECESSIBLE FIXTURE SUPPORT**

[72] Inventor: **Victor E. Converso,** 77 Seventh Avenue, New York, N.Y. 10011

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Related U.S. Application Data

[63] Continuation of Ser. No. 785,482, Dec. 20, 1968, abandoned.

[52] **U.S. Cl.**.....**94/1.5,** 240/1.2

[51] **Int. Cl.**.....**E01c 23/16**

[58] **Field of Search** 94/1.5; 240/1.2

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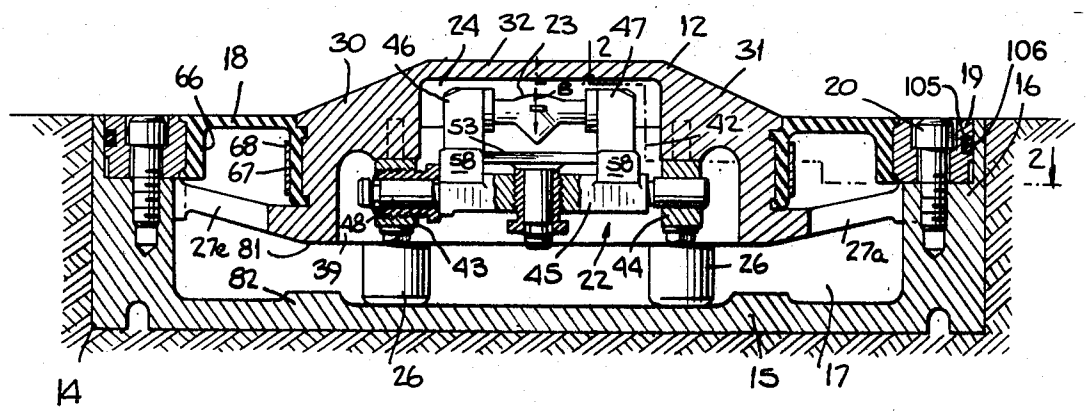
Primary Examiner—Jacob L. Nackenoff

Attorney—George C. Bower

[57] **ABSTRACT**

A supporting receptacle is embedded with the annular rim flush with the embedding surface. A conically shaped lamp support is attached to a mounting ring secured to the rim or the receptacle by an annular resilient diaphragm and is normally positioned with the lamp and conical surfaces above the embedded rim and a body portion recessed within the receptacle. The body portion has radial extending means distributed circumferentially around the lamp support for engaging the rim to conduct heat away from the lamp support and for engaging the receptacle to pivot the lamp support into a recessed position on the passing of a moving member.

14 Claims, 9 Drawing Figures



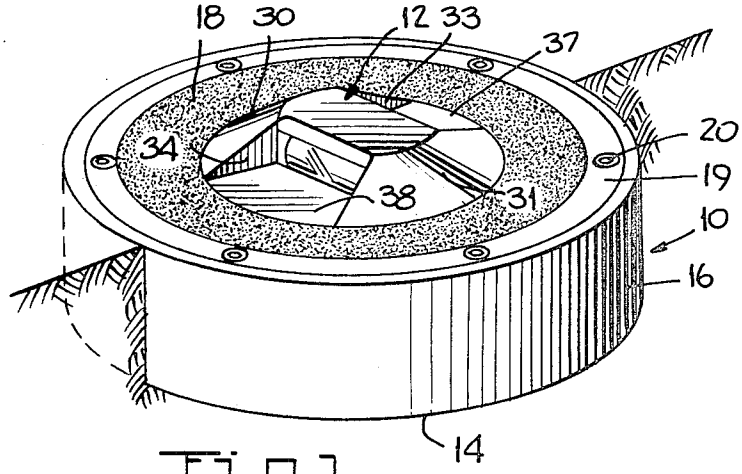


Fig. 1.

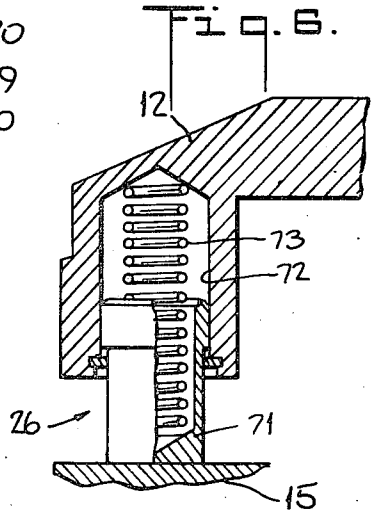
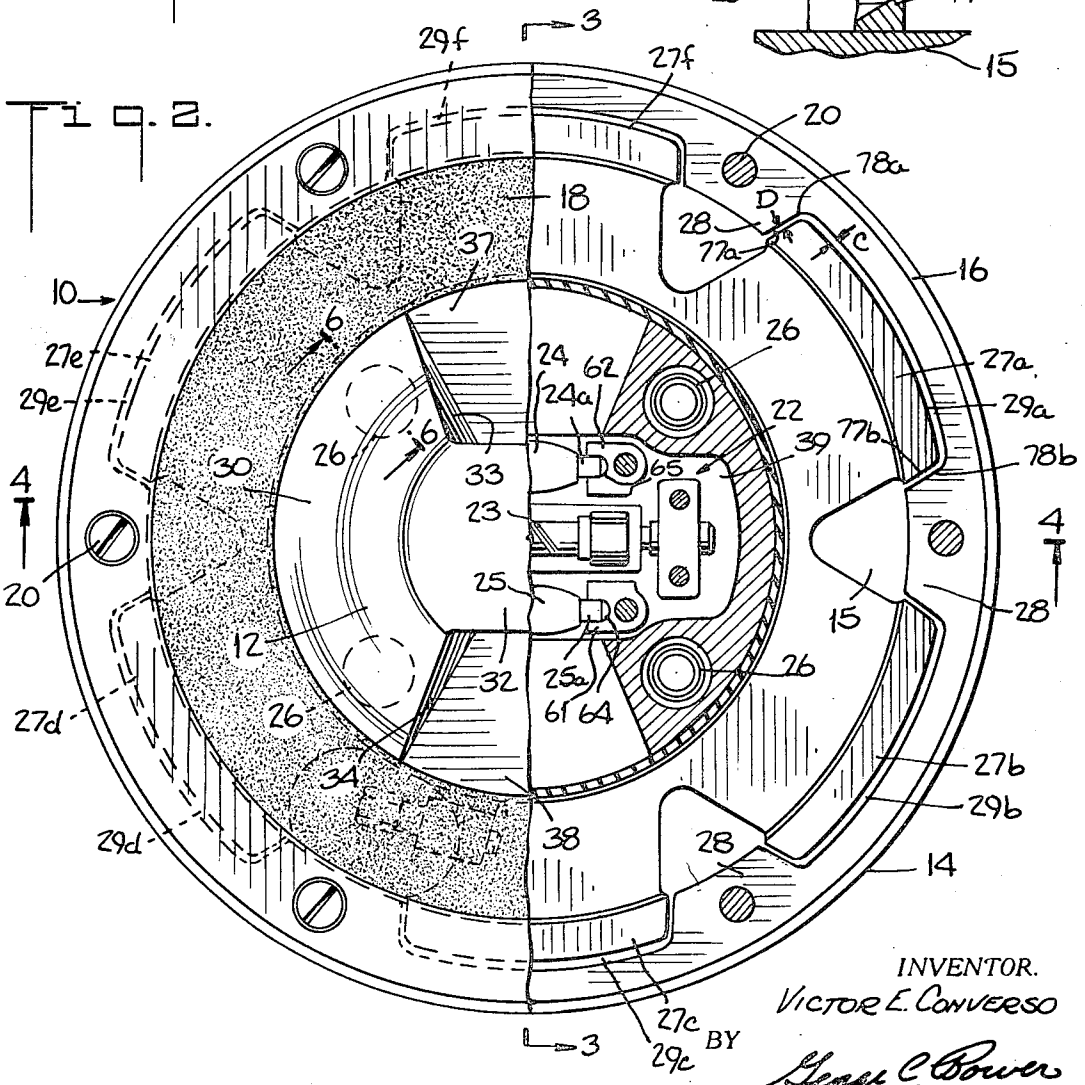


Fig. 6.

Fig. 2.



INVENTOR.
VICTOR E. CONVERSO
BY
George C. Bower
ATTORNEY

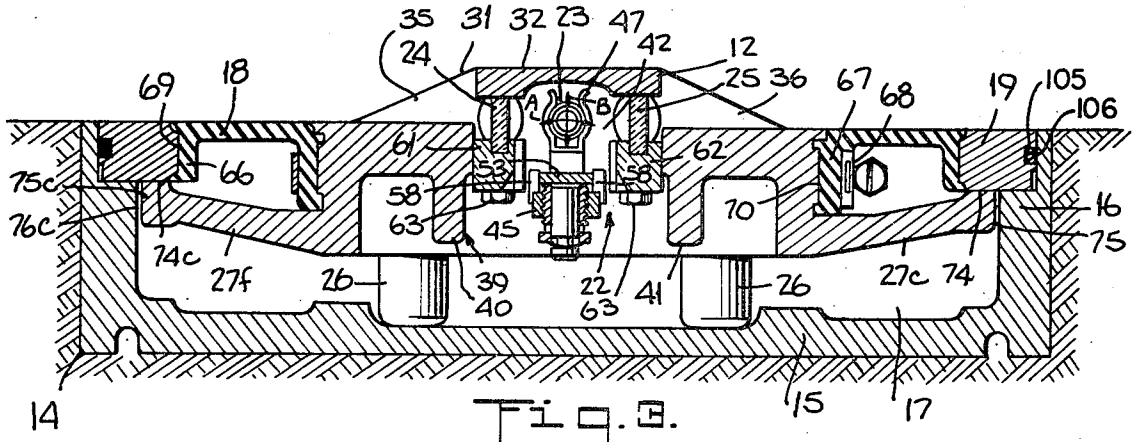


Fig. 3.

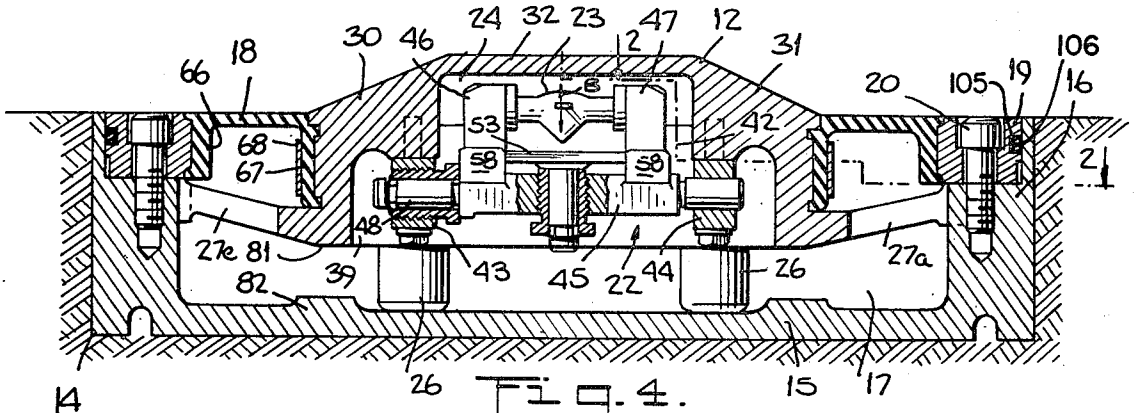


Fig. 4.

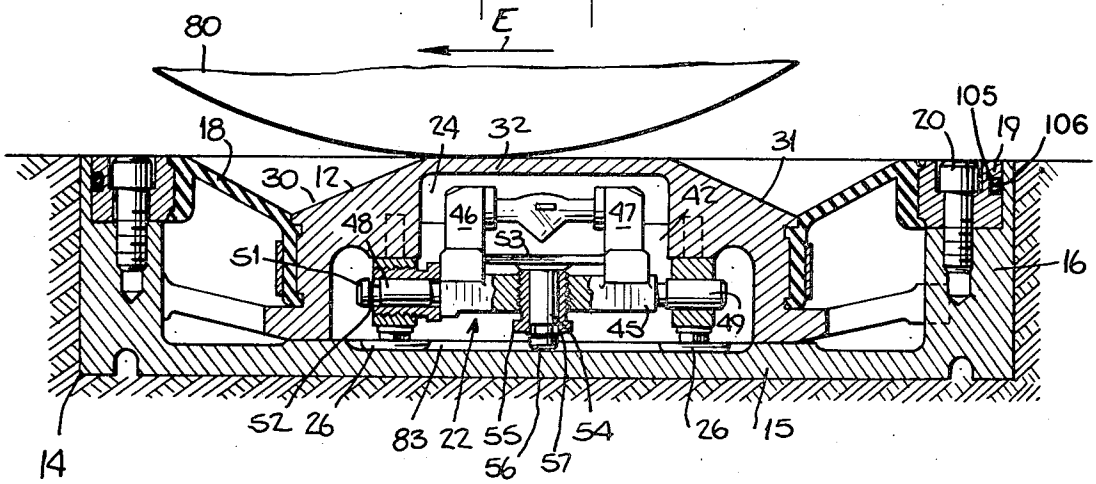


Fig. 5.

INVENTOR.
VICTOR E. CONVERSO
BY
George C. Rowe
ATTORNEY

Fig. 7.

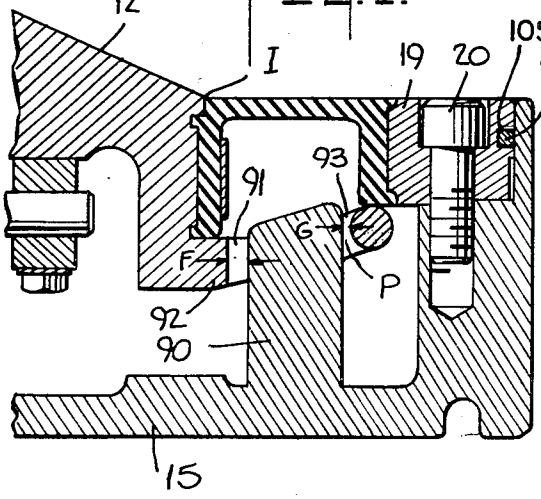


Fig. 8.

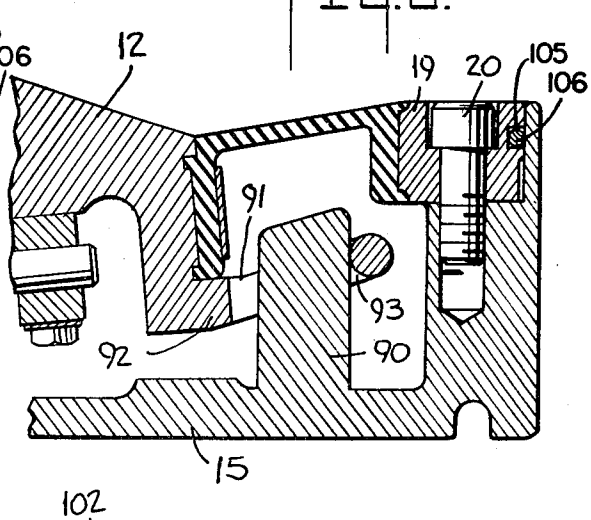
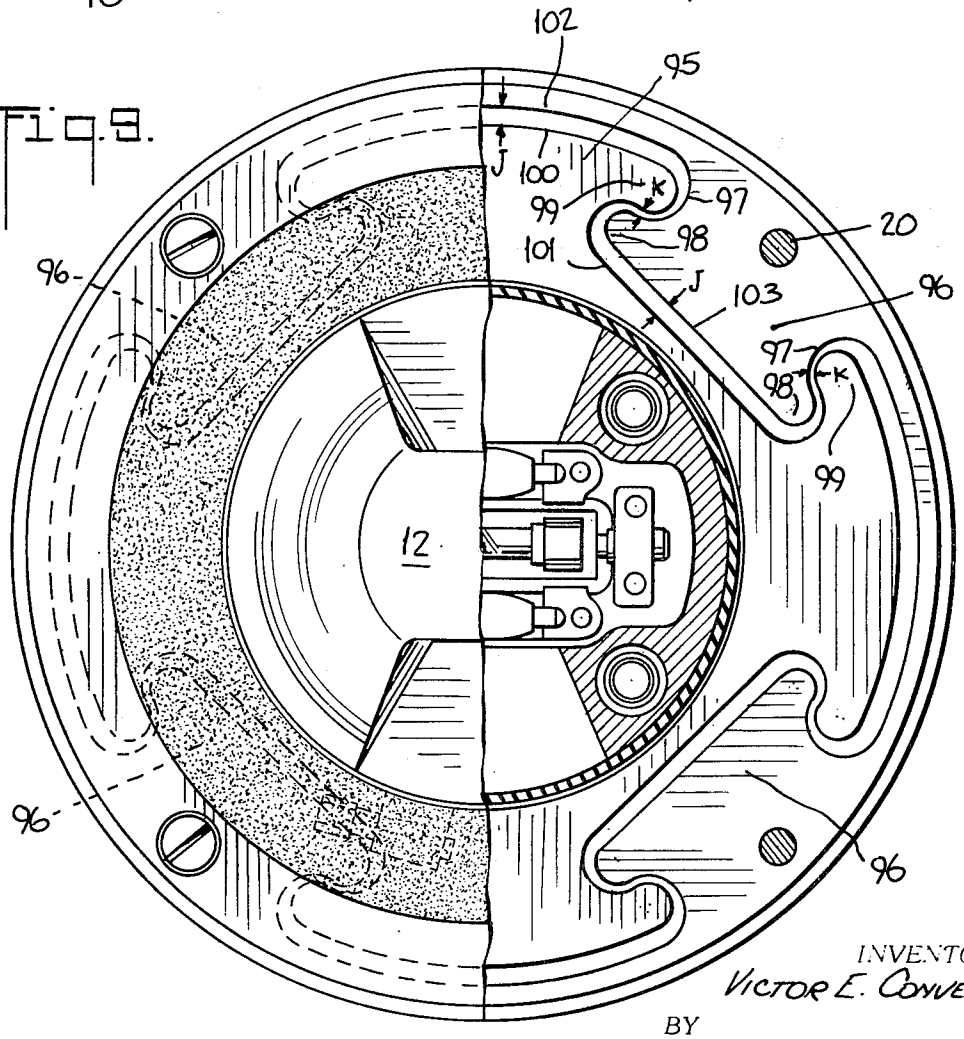


Fig. 9.



INVENTOR.
VICTOR E. CONVERSO
BY
George C. Bower
ATTORNEY

RECESSIBLE FIXTURE SUPPORT

RELATED APPLICATIONS

This is a continuation of my abandoned patent application Ser. No. 785,482 filed on Dec. 20, 1968 and entitled "Recessible Lamp Support."

BACKGROUND OF THE INVENTION

This invention relates to recessible mountings for fixtures normally positioned above a surface and readily recessing below the surface on impact. Many of the previous recessible fixture mountings have had too great a depth making it prohibitive to install in existing installations. Others have not functioned under or not withstood the high impact of wheels or snowplow blades. Another limitation has been the wattage of the bulb. Heat dissipation places a limitation on the resilient material supporting the recessible fixture.

It is the purpose of this invention to provide a recessible lamp mounting that can withstand high impact forces and carry high wattage illuminating devices.

OBJECTS OF THE INVENTION

An object of the invention is to provide a resiliently mounted, recessible lamp support with means for preventing excessive stress from being applied to the resiliently mounting.

Another object of the invention is to provide pivot means for tilting a resiliently mounted lamp support into a recessed position.

Another object of the invention is to provide a resiliently mounted, recessible lamp support that is capable of withstanding large forces and carrying high wattage lamps.

Another object of the invention is to provide a resiliently mounted recessible support with means for dissipating lamp heat by conduction to ground.

SUMMARY OF THE INVENTION

A fixture support comprises a fixture supporting member with an annular resilient diaphragm attached to a metal ring secured to the annular rim of a receptacle. The fixture supporting member has means extending towards the annular rim and engaging the metal ring in a raised position and engaging the annular rim on recessing in the receptacle.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of an embedded recessible lamp mounting fixture.

FIG. 2 is a top view of a recessible lamp mounting fixture with a portion sectionally shown along section lines 2—2 of FIG. 4.

FIG. 3 is a sectional view taken along lines 3—3 of FIG. 2.

FIG. 4 is a sectional view taken along lines 4—4 of FIG. 2.

FIG. 5 illustrates the lamp mounting fixture in recessed position along section lines 4—4 of FIG. 2.

FIG. 6 is a fragmentary sectional view taken along lines 6—6 of FIG. 2 illustrating resilient support for returning the lamp mounting support to the raised position.

FIG. 7 is a fragmentary sectional view of another embodiment taken along section similar to section along lines 4—4 of FIG. 2 illustrating a pivot means.

FIG. 8 is a fragmentary sectional view similar to FIG. 7 illustrating a pivoted position.

FIG. 9 is a top view of a recessible lamp mounting fixture with a portion sectionally shown as in FIG. 2 to illustrate another pivot means.

DETAILED DESCRIPTION

Referring to FIGS. 1 to 5 a recessible lamp mounting fixture **10** is illustrated for embedment within a roadway, runway, taxiway or the like **11**. A center fixture supporting member **12** is normally in a raised position and recessible to a depressed position on engagement and passage of a wheel, snowplow or the like. A receptacle **14** has a bottom **15** and an annular rim **16** forming a chamber **17**. An annular resilient diaphragm **18** is secured to the fixture supporting member and to an annular ring **19**. The ring **19** is fastened by fastening means **20** to the annular rim **16** of the receptacle **14**. This forms the ring and rim as an integral rim means. In the fixture supporting member **12** is a lamp mounting **22** supporting an incandescent bulb **23**. Transparent sealing lenses **24, 25** are provided on each side of the bulb **23**. Extending from the bottom of the member **12** and engaging the bottom **15** of the receptacle are four resilient supports **26** (FIG. **6**) forcing the fixture support member **12** to the normally raised position. Within the chamber **17**, the fixture supporting member **12** has radial projections **27***a–f*. The projections extend from the bottom of the fixture supporting member to the annular rim **16** and are evenly circumferentially spaced around the fixture to form a flange-like or radial extending means. This flange-like means is distributed circumferentially around the fixture supporting member. The flange-like means is underneath the resilient diaphram and has a radial dimension substantially greater than the thickness. The rim has evenly spaced bosses **28** for receiving the bolts **20** and forming axially extending grooves **29***a*-f receiving the projections **27***a–f*. Other means may be used to attach the ring **19** to the receptacle **14**. In the various embodiments the ring **19** has an annular groove **105** with an O-ring **106** to seal the ring and the rim.

The fixture supporting member **12** has two conical segments **30, 31** with conical walls sloping downward from a center bridge piece **32** protectively extending over the bulb **23**. These conical segments **30,31** form an exterior surface. The conical segments have sloped flared sides **33, 34** and **35, 36** (FIGS. **2** and **3**), respectively, defining two radical channels **37, 38** through which light from the bulb **23** passes.

On the underneath side of the fixture supporting member is a recess **39** extending crosswise to the channels and underneath the conical segments. The sides of the recess are formed by walls **40, 41**. A rectangular shaped opening **42** extends to the cross-piece **32** and intersects with the channels **37, 38**.

The lamp mounting **22** has two blocks **43, 44** (FIG. **4**) fastened to the inner sides of the conical segments **30, 31** and a beam **45** extending crosswise between the blocks to support the clip type lamp holders **46, 47** into the opening **42**. The holders securely clamp the bulb **23** in position to emit light through the channels **37, 38**. As illustrated in FIGS. **4** and **5**, the beam **45** is pivotally mounted in the blocks **43, 44** by pins **48, 49** which sets the position of the bulb over an arc A. The pin **48** is pivotally mounted in locking means formed by the

sleeve bolt **50**, a bolt **51** and a spring washer **52** for locking the beam at a given setting. The holders **46, 47** are mounted on a bar **53** supported by a pin **54** slideably mounted in a locking means formed by the sleeve bolt **55**, bolt **56** and spring washer **57**. The bulb is adjustable in direction B (FIG. **4**). Alignment is held by the blocks **58** at the corners of the beam and bar.

The lenses **24, 25** are held against the cross-piece **32** by members **61, 62** fastened to the conical segments by bolts **63** (FIG. **3**). The lenses **24, 25** have flanges **24***a*, **25***a* fitting in grooves **64, 65** in the members **61, 62**.

The diaphragm **18** is ring-shaped and has a U-shape cross-section with flanges **66, 67** for securing the diaphragm to the fixture support member **12** and the ring **19**, respectively. The flanges **66, 67** may be secured in any suitable manner such as by bonding or by a clamp **68**. The diaphragm has a small thickness in relation to the width. The ring **19** and the fixture support member **12** have substantial axially and circumferentially extending surfaces **69, 70** respectively for securing the flanges thereto.

Four resilient supports **26** are positioned on opposite sides of the recess **39** and underneath the corners of the conical segments to force the fixture support member in the normally raised and illuminating position. As illustrated in FIG. **6**, a cylindrical cup-shaped foot **71** reciprocates in the cylindrical bore **72** with a helical spring **73** seating in the bottom of the bore and foot.

A particular feature of this lamp mounting fixture is the flange-like means with radially extending projections **27***a–f*. These are formed as part of the fixture support member **12** and extend from the lower or recessed portion portion thereof to the rim **16**. The flange-like means has a radial dimension substantially greater than its thickness. The curved ends fit in curved slots **29***a–f* and are of generally square cross-section with flat upper surfaces **74** and cylindrically shaped peripheral surfaces **75** to match with the cylindrically shaped axially extending wall surfaces **76** on the rim. The surfaces have a spacing or clearance C permitting transverse movement of the fixture supporting member in relation to the receptacle. The edge surfaces **78** *a* and *b* of the rim have a clearance or space D permitting very limited rotational movement of the member **12** and function as guide means. The diaphragm **18** through the fastening ring **19** positions the projections in the curved slots. In the normally raised position, the upper surfaces **74** engage the ring **19** along the under surfaces over the slots **29***a–f*. The heat generated by the lamp is transmitted to the member **12** through the projections **27***a–f* of the ring **19** and rim **16**. The heat is finally dissipated into the ground. This conduction heat maintains the fixture support member at temperatures which do not adversely affect the diaphragm or require that special resilient material be used. Thus, a greater selection of diaphragm materials are available.

Another feature of the mounting is the recessibility of the member **12** on engagement by a high speed wheel or snowplow. On engagement by a wheel **80** (FIG. **5**) moving in direction E. the edge surfaces **77***b* of the projection **27***c* and edge surfaces **77***a* of projection **27***f* engage the surfaces **18***b* and a respectively of the bosses **28**. The clearance C is greater than the clearance D so that the edge surfaces of the projections engage the edge surfaces of the ring before the peripheral surfaces **75** of the projections engage the rim. The side of member **12** engaged by the wheel is depressed tilting the member **12** with the far side raised. As the wheel moves over the remainder of the member **12** is depressed recessing the entire member. The circumferential under surface **81** engages the annular raised portion **82** on the bottom. This maintains a space **83** (FIG. **5**) for the wires (not shown) passing through the bottom **15** of the receptacle. On completion of the passage of the wheel the resilient supports **26** and diaphragm **18** return the member **12** to the elevated position. The transverse force is absorbed through the member **12** and projection **27***a–f* rather than to the diaphragm **18**. The projections fitting in the curved slots limit the twisting of the fixture supporting member in relation to the rim. This limits the torsional force applied to the diaphragm.

In FIGS. **7** and **8** and FIG. **9**, preferred embodiments are illustrated in which the projection engages with the receptacle at a pivot point P which is in back of the point of impact I on the member **12**. This point will preferably be radially greater than the diameter of the member **12**. Under the initial impact the member **12** will rotate about the pivot point P and recess into the receptacle at an angle.

In the embodiments of FIGS. **7** and **8**, the bottom **15** has posts **90** extending through openings **91** in the projections **92** of the flange-like means. The radially inner clearance F is greater than the radially outer clearance G so that the rounded surfaces **93** will engage the respective post. One or two of the surfaces **93** will engage a respective post causing member **12** to pivot clear of the passing wheel or blade. The surfaces **93** will slide as member **12** is depressed.

In FIG. **9**, the flange-like means comprise four projections **95** are evenly spaced circumferentially with bosses **96** therebetween in a dovetail relation. The bosses **96** have grooves **97** with axial beads **98**. The projections have rounded axially extending edges or heads **99** fitting in the grooves **97** and overlapping with the boss beads **98**. The circumferentially extending surfaces **100** and **101** of the member **12** have clearances J with the surfaces **102** and **103** of the projections and the edges **99** and the beads **98** have clearances K which is smaller than clearance J. Thus, the respective edges and beads engage to form pivot points P while the clearances J permit the member **12** to tilt.

It is thus seen that two features have been combined to product a recessible lamp mounting capable of withstanding high impact forces and carrying high wattage lamps while retaining versatility in selection of materials to be used. The projections are utilized to carry the heat of the lamp to ground and to transmit high impact force also to ground through the receptacle. The projections are also utilized as part of a detached pivot which flips the center mounting down in a recessed position. By placing the pivot point so that it is in a sense in back of the point of impact the small downward component of the impact swings the fixture support into a recessed position. The recessible lamp mountings shown in FIGS. **2** and **9** correspond to the actual design in proper proportions.

Various modifications and changes may be made in the foregoing embodiments without departing from the invention as set forth in the appended claims.

Having thus described my invention, what I claim is:

1. A recessible fixture support comprising
a receptacle with a bottom and an annular rim extending therefrom to form a chamber with said bottom,
a fixture supporting member in said chamber having an exterior portion normally positioned above said rim and a recessed portion on its underside,
a resilient diaphragm extending around said fixture supporting member,
means for securing said diaphragm to said rim for resiliently mounting said fixture supporting member on said receptacle,
said fixture supporting member having spaced flang-like means radially projecting from said recessed portion of said fixture supporting member and having a radial dimension substantially greater than the thickness, said flange-like means being underneath said resilient diaphragm,
guide means on said receptacle and operatively engaged by said flange-like means to restrict circumferential movement of said fixture supporting member,
said guide means and said flange-like means being slightly spaced apart and contacting on radial movement of said fixture supporting member to pivot said fixture supporting member into said chamber.

2. A recessible fixture support as set forth in claim 1 wherein said flange-like means has circumferentially spaced projections and said guide means comprises a plurality of inwardly extending bosses on said rim circumferentially overlapping with said circumferentially spaced projections of said flange-like means,
said projections being spaced from said bosses when said fixture supporting member is centered in relation to said rim and said projections engaging said bosses on radial movement of said fixture supporting member.

3. A recessible fixture support as set forth in claim 2 wherein
said rim has an inner inwardly extending means overlapping said flange-like means on the upper side of said flange-like means to transmit heat from said fixture supporting member to said receptacle.

4. A recessible fixture supporting member as set forth in claim 2 wherein said bosses each have vertical extending side surfaces and the clearance between said projections and said side surfaces is less than between said projections and said rim so that on radial movement of said fixture supporting member said projections engage said side surfaces and pivot about these engagements.

5. A recessible lamp support as set forth in claim 1 wherein means for securing said diaphragm to said receptacle is a ring around said diaphragm and attached thereto.

6. A recessible fixture support as set forth in claim 5 wherein
said ring is attached to said rim and extends inwardly to overlap with said flange-like means and is engaged by said flange-like means.

7. A recessible fixture support comprising
a receptacle with a bottom and an annular rim extending axially therefrom to form a chamber with said bottom,
a fixture supporting member having an exterior portion normally positioned above the level of the top edge of said rim and a recessed portion in said chamber,
a resilient diaphragm extending around and secured to said fixture supporting member,
means for securing said diaphragm to said rim for resiliently mounting said fixture supporting member on said receptacle,
said fixture supporting member having flange-like means radially projecting from said recessed portion of said fixture supporting member and underneath said resilient diaphragm,
said flange-like means having circumferentially arranged holes and said receptacle has posts extending into said holes for engagement by said flange-like means on radial movement of said fixture supporting member to pivot said fixture supporting member into said chamber.

8. A recessible fixture support comprising
a receptacle with a bottom and an annular rim extending therefrom to form a chamber with said bottom, said rim having a top edge,
a fixture supporting member having an exterior portion normally positioned above the level of said top edge and a recessed portion in said chamber,
a resilient diaphragm extending around and secured to said fixture supporting member,
means for securing said diaphragm to said rim for resiliently mounting said fixture supporting member on said receptacle,
said fixture supporting member having circumferentially spaced flange-like projections radially extending from said recessed portion of said fixture supporting member and underneath said resilient diaphragm,
said rim having inwardly extending portions for restricting the circumferential movement of said fixture supporting member and said flange-like projections engaging said rim on radial movement of said fixture supporting member to pivot said fixture supporting member into said chamber.

9. A recessible fixture support comprising
a receptacle with a bottom and an annular rim extending therefrom to form a chamber with said bottom, said rim having top edge,
a fixture supporting member having an exterior portion normally positioned above the level of the top edge of said rim and a recessed portion in said chamber,
a resilient diaphragm extending around said fixture supporting member,
means for securing said diaphragm to said rim for resiliently mounting said fixture supporting member on said receptacle,
said fixture supporting member having flange-like means radially projecting from said fixture supporting member and rigidly a part thereof, said flange-like means extending underneath said resilient diaphragm and having a radial dimension substantially greater than the thickness and having circumferentially arranged spaces,
said annular rim having an inner wall shaped to form vertical, inwardly extending means fitting in said spaces in said flange-like means to restrict the cir-

cumferential movement of the fixture supporting member and said flange-like means being slightly spaced from said inner wall and engaging said wall to permit tilting of said chamber on radial movement of said fixture supporting member.

10. A recessible fixture support comprising

a receptacle with a bottom and an annular rim extending therefrom to form a chamber with said bottom, said rim having a top edge,

a fixture supporting member in said chamber having an exterior portion normally positioned above the level of said top edge and a recessed portion on its underside,

a resilient diaphragm extending around said fixture supporting member,

means for securing said diaphragm to said rim for resiliently mounting said fixture supporting member on said receptacle,

said fixture supporting member having spaced flange-like means radially projecting from said recessed portion of said fixture supporting member and having a radial dimension substantially greater than the thickness, said flange-like means being underneath said resilient diaphragm, said flange-like means has circumferentially spaced radially extending projections,

said annular rim having inwardly extending bosses circumferentially overlapping with projections of said flange-like means to restrict the circumferential movement of said fixture supporting member,

said projections having generally circumferentially and vertically extending beads and said bosses having generally circumferentially and vertical extending beads in radial overlapping relation with said beads of said bosses being radially within said projection beads and said beads having a lesser clearance than said annular rim and said flange-like means whereby said respective beads engage on radial movement of said fixture supporting member and provide pivotal points for tilting and recessing of said fixture supporting member on application of radial impact forces thereto.

11. A recessible fixture support as set forth in claim 10 wherein said rim bosses and said beads thereon have a length substantially equal to the width of said rim.

12. A recessible fixture support comprising

a receptacle with a bottom and an annular rim extending therefrom to form a chamber with said bottom, said rim having a top edge,

a fixture supporting member in said chamber having an exterior portion normally positioned above the level of said top edge and a recessed portion on its underside,

a resilient diaphragm extending around said fixture supporting member,

means for securing said diaphragm to said rim for resiliently mounting said fixture supporting member on said receptacle,

said fixture supporting member having spaced flange-like means radially projecting from said recessed portion of said fixture supporting member underneath said resilient diaphragm,

said annular rim having an inwardly extending means overlapping said outwardly extending flange means,

said inwardly extending rim means having outwardly facing surfaces and said flange-like means having inwardly facing surfaces spaced outwardly from said outwardly facing surfaces by a clearance less than the spacing of said flange-like means and said annular rim for said fixture supporting member to pivotally recess into said chamber upon the contacting of said surfaces on radial movement of said fixture supporting member under a generally horizontal impact force.

13. A recessible fixture support for holding a heat producing lamp comprising

a receptacle with a bottom and an annular rim means extending there from to form a chamber with said bottom, said rim means having a top edge spaced from said bottom and having inwardly extending means at said top edge,

a fixture supporting member in said chamber having an exterior portion normally positioned above the level of said top edge in the raised position and having a recessed portion on its underside, said exterior portion holding a lamp above the level of the top edge when the raised position for radiating a desired light beam,

a resilient diaphragm extending around said fixture supporting member,

means for securing said diaphragm to said rim means to resiliently mount said fixture supporting member on said receptacle,

said fixture supporting member having spaced flange-like means radially projecting from said recessed portion of said fixture supporting member, and engaging said inwardly extending means when in the raised position for transmission of heat from the lamp to the receptacle and the embedding ground, said flange-like means having a radial dimension substantially greater than the thickness, said flange-like means being underneath said resilient diaphragm,

said flange-like means being slightly spaced from said rim means and contacting said rim means on radial movement of said fixture supporting member to pivot said fixture supporting member into said chamber.

14. A recessible fixture support as set forth in claim 13 wherein said inwardly extending means has a downwardly facing surface means and said projections have upwardly facing surface means engaging said downwardly facing surface means for transmission of heat.

* * * * *