Nov. 11, 1952 K. VERSEN 2,617,619

SUPPORTING ARM FOR ELECTRICAL FIXTURES

Filed April 3, 1951

Fig. 1

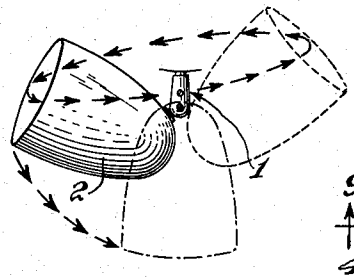


Fig. 3

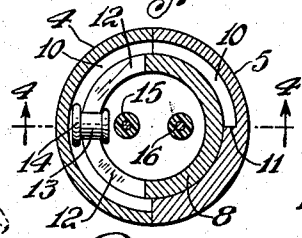


Fig. 5

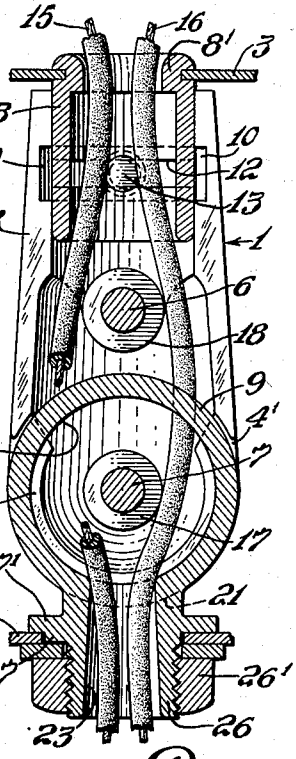


Fig. 4

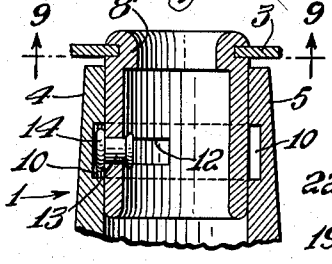


Fig. 2

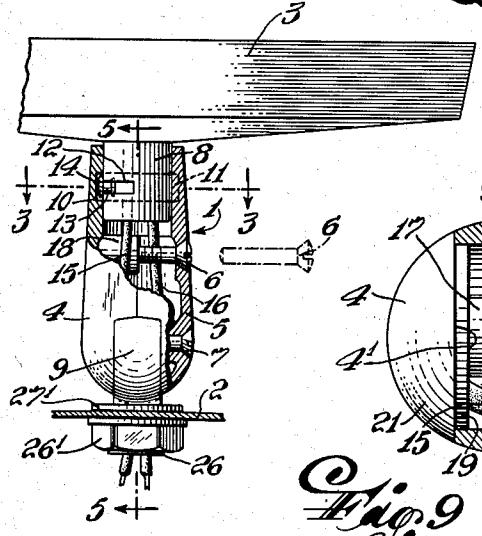


Fig. 6

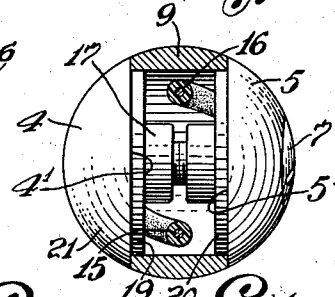


Fig. 7

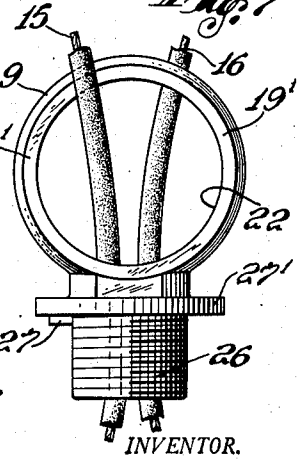


Fig. 9

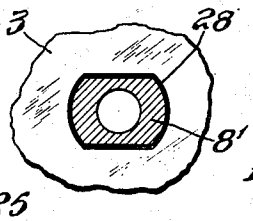


Fig. 10

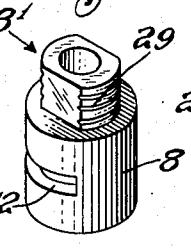
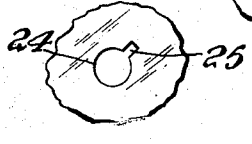


Fig. 8



INVENTOR.
Kyrt Versen
BY
ATTORNEY

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SUPPORTING ARM FOR ELECTRICAL FIXTURES

Kurt Versen, Tenafly, N. J.

Application April 3, 1951, Serial No. 218,995

12 Claims. (Cl. 248—278)

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The present invention deals with a swivel and more particularly with a swivel pivoted supporting arm for electrical fixtures.

Electrical fixtures of the type having a lamp secured thereto by means of a supporting arm are usually provided with either an immoveable supporting arm or a supporting arm adapted for angular movement, e. g. angular movement in a horizontal or vertical plane or both planes, the purpose of the angular movement being to position the lamp for desired illumination. Jointed supporting arms for providing angular movement are known but have the disadvantage in that the joint interferes with the wiring or electrical conductors to the lamp and such conductors are, therefore, usually located externally of the joint or of the supporting arm, which detracts from the appearance of the fixture. For greater directional movement, it is advantageous to provide a supporting arm having a combination of joints including a swivel means. In the latter case the swivel and other joints are usually separated from each other by a substantial length of the supporting arm to allow greater freedom of movement, but which detracts from the appearance of the fixture in that the structure is somewhat bulky.

Swivel structures containing electrical wiring are limited with respect to rotary motion since the contained electrical wiring may be broken or disconnected if the rotary motion is substantially beyond 360 degrees. Therefore, swivel structures containing electrical wiring have been provided with a maximum rotary movement mechanically limited to approximately 270 degrees and less although a rotary movement of 360 degrees is more desirable since, in such case, a lamp may be positioned for providing illumination from every useful angle without breaking or disconnecting the electrical wiring.

It is an object of the present invention to provide a swivel pivoted supporting arm for electrical fixtures. It is another object of the present invention to provide a supporting arm for electrical fixtures whereby all pivoted movement originates in a single substantially short housing. It is a further object of the present invention to provide a supporting arm for an adjustable member comprising a single substantially short housing encasing a swivel means capable of 360 degrees rotary movement and another pivot capable of a movement in a vertical plane of about 180 degrees and more from the plane of rotation. Other objects and advantages of the present invention will become apparent from the description hereinafter following and the drawings forming part hereof in which:

Fig. 1 illustrates an elevational view of a swivel

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pivoted supporting arm according to the present invention,

Fig. 2 illustrates an elevational view of a swivel pivoted supporting arm partly broken away to show the assembled swivel structure,

Fig. 3 illustrates a sectional view of the swivel structure along the lines 3—3 of Fig. 2,

Fig. 4 illustrates a sectional view of the swivel structure along the lines 4—4 of Fig. 3,

Fig. 5 illustrates an elevational view of a swivel body member along the lines 5—5 of Fig. 2,

Fig. 6 illustrates an elevational end view of the swivel body showing a pivot bearing according to the present invention,

Fig. 7 illustrates a pivot ring cooperative with the pivot bearing of Fig. 6,

Fig. 8 is a fragmentary view of a detached sheet metal body such as a canopy or a reflector,

Fig. 9 is a fragmentary view along lines 9—9 of Fig. 4, and

Fig. 10 is a perspective view of a detached swivel bearing.

According to the present invention, I provide a substantially short housing which, as a single unit, comprises a supporting arm for an adjustable member such as a lamp reflector in an electrical fixture and which encases a swivel means and another pivot to impart both a rotary motion of 360 degrees and a vertical movement of about 180 degrees and more from the plane of rotation, such as described in my co-pending application Serial No. 146,200, filed February 25, 1950, now abandoned, and of which this is a continuation-in-part.

The swivel of my invention is particularly suitable for electrical fixtures in that electrical wiring passes through said swivel and is prevented from disconnecting or breaking while a full 360 degrees rotation is provided, which, when combined with a pivot for movement vertical to the plane of rotation, provides a greater maneuverability for positioning lamps or lamp reflectors for desired illumination than has heretofore been possible. For example, it is apparent that the rotary movement of a swivel, having wiring passing therethrough, must be limited to prevent breakage, etc., of the wiring. It is further apparent that a mechanical stop provided to limit rotary motion in a plane of rotation will limit such motion to substantially less than 360 degrees, which produces a "blind area" or a directional limitation between the maximum rotation possible and 360 degrees, i. e. between about 270 degrees and 360 degrees. I have, therefore, provided a novel structure which permits a stopped but full 360 degrees rotary motion in a plane of rotation and which permits a lamp to be positioned for lighting in any useful direction.

Fig. 1 illustrates the swivel pivoted supporting arm 1 with a lamp reflector 2 secured thereto and which lamp reflector, by virtue of the combination of a swivel and another joint vertically moveable to the plane of rotation of said swivel, may be positioned for illumination from any useful angle substantially as illustrated.

Fig. 2 illustrates the supporting arm or swivel body 1 secured to a plate member or a canopy 3. The swivel body comprises a substantially bilaterally symmetrical housing composed of two parts or halves e. g. jaws, 4 and 5, which are assembled to form said swivel body and are secured to each other by means, for example, of two threaded members or screws 6 and 7.

Rotary motion is provided by means of a tubular swivel bearing 8 coaxial and cooperative with said swivel body, while the vertical movement is provided by means of a pivot ring cooperative with a pivot bearing hereinafter more particularly described.

Figs. 3 and 4 illustrate the swivel of my invention taken along lines 3—3 of Fig. 2 and 4—4 of Fig. 3. The swivel body jaws 4 and 5 contain, near an end thereof, and when assembled as illustrated, an internal groove 10 terminating at the abutment 11. The swivel bearing 8 is provided, near an end thereof, with an arcuate slot 12 formed through its wall and partly along the circumference thereof and such that, when the bearing 8 is positioned in the swivel body formed by jaws 4 and 5, the slot is adjacent to groove 10 during rotation of said housing. A floating stop 13, e. g. a floating rivet, having a head portion 14, is positioned into said slot and slidably retained therein so that said floating stop is moveable along the length of said slot. The head portion 14 is dimensioned to ride or move within the groove 10 and said housing or swivel body is thereby held from disengagement from said swivel bearing 8. Upon rotation of said housing, a normally fixed stop, i. e. a non-floating stop, would prevent rotation of the housing when the stop contacted the abutment 11, e. g. upon a rotary movement less than 360 degrees. However, with the floating stop 13, rotation of the housing is not stopped by contact of the abutment 11 with the head 14 but continues until the floating stop has traversed the entire length of the slot 12. The additional rotation provided by the length of the slot 12 allows the housing to rotate 360 degrees in a plane of rotation and even more if desired depending upon the length of the slot 12. The floating stop, since it imparts a 360 degree rotation to said housing, eliminates the "blind area" or directional limitation in a plane of rotation and still stops the twisting of the wiring within safe limits to prevent disconnecting or breaking of the wiring. However, the fixed stop may be employed in combination with the other embodiments of my invention hereinafter described for use where maximum swivel rotation is secondary to the other advantages provided by my invention.

Fig. 5 illustrates an internal view of one of the swivel jaws, e. g. jaw 4, showing electrical wires or conductors 15 and 16 passing therethrough and preferably separated from each other by means of the projecting anchor structures 17 and 18 to which the screws 6 and 7 are secured. The pivot guides 19 and 20, as shown in Figs. 5 and 6, are substantially ring-like, e. g. a three-quarter ring, with an axis perpendicular to the axis of said housing or swivel body and recessed from the periphery of the curvature of the end 21 of the

housing 1 so that the inner friction surface 22 of the ring 9, as shown in Fig. 7, is rotatably moveable thereon for a movement of approximately 180 degrees and more in a direction vertical to that of the plane of rotation of the swivel pivot structure hereinbefore described without interference to electrical conductors. The swivel ring 9 is provided with an opening 23 through which the conductors 15 and 16 pass for electrical connection to a lamp socket.

The bearings or bearing surfaces 4' and 5' on the jaws 4 and 5 are co-axial with the guides 19 and 20 and cooperate with bearing surfaces on each side of the ring 9, one of said bearing surfaces being designated by the numeral 19'.

Although the inner surface 22 may be integral with the ring 9, I prefer to provide a removable or insert ring 22' as a bearing means and which is composed of a porous metal impregnated or saturated with a lubricant, e. g. a porous bronze or copper-bronze metal impregnated with oil or graphite and the like lubricants. Such a bearing means has the advantage that it has a suitable gripping action on the bearings 4' and 5' when the retainer 7 is tightened and at the same time provides a constant lubrication and noiseless movement when the pivot ring is adjusted for desired position. As a modification, I may provide other components of my invention, e. g. components having bearing engaging surfaces, such as the inner surface of the jaws 4 and 5 which contact the bearing 8, at least partly with such a metal, e. g. by cladding semi-circular strips of such material onto the said bearing surfaces to form a ring as shown by the reference numeral 22.

When the supporting arm 1 is assembled according to Fig. 2, the threaded members 6 and 7 are turned to a degree of tightness such that the parts 4 and 5 are brought together to impart a pressure against the swivel bearing 8 and the ring 9 so that the ease of movement of the rotatable structures may be regulated for concentric motion under variable degrees of friction and the lamp will maintain any desired position.

The threaded members are shown to be spaced laterally of each other along the longitudinal axis of the housing 1. One of the threaded members is coaxial with the pivot structure bearing and engageable with both bilateral jaws 4 and 5. The other threaded member is shown having an axis perpendicular to the swivel bearing 8 and located in the vicinity thereof and also engageable with both jaws. These members regulate the ease of movement of the housing 1 and swivel ring 9 by imparting a pressure thereon when tightened. By providing such threaded members as described, I provide a means not only for regulating the ease of rotatable movement of the housing but also a means whereby the swivel housing will maintain any position to which it has been moved.

Fig. 8 illustrates a fragmentary view of a detached metal body such as canopy 3 or detached lamp reflector 2. The reflector is provided with an aperture 24 having at least one offset slot 25. This aperture may be provided on any desirable location on the reflector, canopy or other sheet metal body, and cooperates with a substantially cylindrical reflector mounting means 26, shown in Fig. 7, which is tubular and at least a portion thereof being preferably threaded. The reflector mounting means is provided with at least one radially offset lug or seat, e. g., key 27 which engages the slot 25 and securely fixes or anchors the reflector against rotation. The key 27 may abut or may be integral with the underface of

the flange 27 against which the reflector is positioned, when assembled on its mounting, and secured by means of the locking means or nut 26' on the threaded portion of mounting 26.

However, instead of the lug or key 27, I may provide the underface of the flange 27' with at least one raised seat of non-circular shape radially offset with respect of the mounting 26, e. g. a non-circular or flattened rotation locking seat extending outwardly of the periphery of the mounting 26. The locking seat may be of square shape having each of its sides positioned outwardly of the periphery of the said mounting so that the combination of the mounting and seat resembles a threaded bolt having a square head, and the aperture into which the seat fits is of corresponding shape.

Fig. 9 shows the mounting of the swivel bearing 8 on the plate member or canopy 3. The view illustrates a cross section of an end portion of the bearing 8 along lines 9—9 of Fig. 4. The end portion 8' of the bearing 8 is non-circular in cross-section, e. g. having a flat surface and fits into a correspondingly shaped orifice 28, and cooperates therewith so that the swivel bearing is fixed and anchored against rotation within said aperture. The end portion 8' is illustrated by Fig. 10 and may be threaded or unthreaded. In assembled position, Figs. 4 and 5, the extremity of an unthreaded end portion 8' may be spun riveted over the inner face of the plate or canopy as shown, for permanently locking the end portion 8' of the bearing 8, or the end portion 8' may be otherwise secured thereto, e. g. by a threaded nut cooperative with the threaded portion 29 of the bearing 8 as shown by Fig. 10.

Although I have described the locking means such as the lug and mounting of Fig. 4 cooperative with the plate shown by Fig. 8 to be used on a lamp reflector 2, the same locking means may be used on the swivel bearing 8 in lieu of that described with respect to the end portion 8' and applied to a correspondingly shaped aperture in the canopy 3 for non-permanent locking of the swivel bearing to the canopy. In like manner, the structure shown by Fig. 10 may be used on the swivel ring 9. I thereby provide the supporting arm with a flexibility such that either swivel ring and the swivel bearing may be secured to either the canopy or the reflector, or I may only substitute the orifices of the canopy for the orifices of the reflector and reverse the positioning of the arm 1, or I may provide the canopy and reflector with both types of orifices.

What I claim is:

1. A supporting arm for an adjustable member comprising in combination a single housing containing a swivel structure within one end portion thereof and a pivot structure within another end portion thereof, said swivel structure including a tubular swivel bearing coaxial with said housing, a slot formed through the wall of said bearing partly along the circumference thereof, a floating stop slidably retained in said slot, said pivot structure being mounted on bearing means having an axis perpendicular to the axis of said housing.

2. A supporting arm for an adjustable member comprising in combination a housing containing within an end portion thereof a swivel structure for rotational movement and a pivot structure for movement in a direction vertical to the plane of rotation of said swivel structure, said swivel structure including a tubular swivel bearing coaxial with said housing, a slot formed through the wall of said bearing along the circumference thereof, a floating stop slidably retained in said slot, said housing containing along its inner circumference and substantially at one end thereof an internal groove terminated by an abutment, said floating stop having a head portion engageable with said groove, said pivot structure including a pivot ring, said housing containing a substantially semi-circular pivot bearing having an axis perpendicular to the axis of said housing and said swivel bearing, said pivot ring having an inner surface engageable with said pivot bearing.

3. A supporting arm for an adjustable lamp in an electrical fixture comprising in combination a single housing containing a swivel structure within one end portion thereof and a pivot structure within another end portion thereof, said swivel structure including a tubular swivel bearing coaxial with said housing, a slot formed through the wall of said bearing partly along the circumference thereof, a floating stop slidably retained in said slot, said pivot structure being mounted on bearing means having an axis perpendicular to the axis of said housing, said bearing means being recessed from said end portion of said housing, said pivot structure including an apertured pivot ring having an inner surface engageable with said pivot bearing.

4. A supporting arm for an adjustable lamp in an electrical fixture comprising in combination a single short housing containing a swivel structure within one end portion thereof and a pivot structure within another end portion thereof, said housing being substantially bilaterally symmetrical and formed of two parts, said swivel structure including a tubular swivel bearing coaxial with said housing, a slot formed through the wall of said bearing partly along the circumference thereof, a floating stop slidably retained in said slot, said pivot structure being mounted on bearing means having an axis perpendicular to the axis of said housing, said bearing means being recessed from said end portion of said housing, said pivot structure including an apertured pivot ring having an inner surface engageable with said pivot bearing.

5. A supporting arm for an adjustable member comprising in combination a single housing containing a swivel structure within one end portion thereof and a pivot structure within another end portion thereof, said swivel structure including a tubular swivel bearing coaxial with said housing, said pivot structure being mounted on bearing means having an axis perpendicular to the axis of said housing, said housing being substantially bilaterally symmetrical and formed of two parts, a pair of laterally spaced threaded members, said parts being secured to each other by means of said threaded members, one of said threaded members being coaxial with said pivot structure bearing and engageable with both of said parts, the other of said threaded members having an axis perpendicular to the axis of said tubular swivel bearing and engageable with both of said parts.

6. An adjustable member comprising in combination a plate member, a single housing containing a swivel structure within one end portion thereof and a pivot structure within another end portion thereof, said swivel structure including a tubular swivel bearing coaxial with said housing, an end portion of said tubular swivel bearing being mounted on said plate mem-

ber, the mounted end portion of said swivel bearing having a non-circular cross section, said end portion being engageable with a cooperating orifice in said plate member, said pivot structure being mounted on bearing means having an axis perpendicular to the axis of said housing, said housing being substantially bilaterally symmetrical and formed of two parts, a pair of laterally spaced threaded members, said parts being secured to each other by means of said threaded members, one of said threaded members being coaxial with said pivot structure bearing and engageable with both of said parts, the other of said threaded members having an axis perpendicular to the axis of said tubular swivel bearing and engageable with both of said parts.

7. An adjustable lamp fixture comprising in combination a lamp reflector having an orifice, a single housing containing a swivel structure within one end portion thereof and a pivot structure within another end portion thereof, said swivel structure including a tubular swivel bearing coaxial with said housing, said pivot structure being mounted on bearing means having an axis perpendicular to the axis of said housing, said pivot structure including a lamp reflector mounting means, said mounting means being tubular and having a flange thereon, the underface of said flange having a raised non-circular seat thereon, said seat being engageable with said orifice having a corresponding shape in said reflector in mounted position on said reflector mounting means, said housing being substantially bilaterally symmetrical and formed of two parts, a pair of laterally spaced threaded members, said parts being secured to each other by means of said threaded members, one of said threaded members being coaxial with said pivot structure bearing and engageable with both of said parts, the other of said threaded members having an axis perpendicular to the axis of said tubular swivel bearing and engageable with both of said parts.

8. An adjustable lamp fixture comprising in combination a canopy, a lamp reflector, a single housing containing a swivel structure within one end portion thereof and a pivot structure within another end portion thereof, said swivel structure including a tubular swivel bearing coaxial with said housing, an end portion of said tubular swivel bearing being mounted on said canopy, the mounted end portion of said swivel bearing having a non-circular cross section, said end portion being engageable with a cooperating orifice in said canopy, said pivot structure being mounted on bearing means having an axis perpendicular to the axis of said housing, said pivot structure including a lamp reflector mounting means, said mounting means being tubular and having a non-circular head, said head being engageable with a cooperating orifice in said reflector in mounted position on said reflector mounting means, said housing being substantially bilaterally symmetrical and formed of two parts, a pair of laterally spaced threaded members, said parts being secured to each other by means of said threaded members, one of said threaded members being coaxial with said pivot structure bearing and engageable with both of said parts, the other of said threaded members having an axis perpendicular to the axis of said tubular swivel bearing and engageable with both of said parts.

9. A supporting arm for an adjustable member comprising in combination a single housing containing a swivel structure within one end

portion thereof and a pivot structure within another end portion thereof, said swivel structure including a tubular swivel bearing coaxial with said housing, said pivot structure comprising a ring member mounted on bearing means having an axis perpendicular to the axis of said housing, said ring member being composed at least in part of a porous metal impregnated with a lubricant, said housing being substantially bilaterally symmetrical and composed of two parts, a pair of laterally spaced threaded members, said parts being secured to each other by means of said threaded members, one of said threaded members being coaxial with said pivot structure bearing means and engageable with both of said parts, the other of said threaded members having an axis perpendicular to the axis of said tubular swivel bearing and engageable with both of said parts.

10. A supporting arm according to claim 9, wherein said pivot structure comprises an outer ring member and an inner insert ring member, said inner ring member being composed of a porous metal impregnated with a lubricant.

11. An adjustable fixture comprising in combination a pair of apertured plates, a single housing containing a swivel structure within one end portion thereof and a pivot structure within another end portion thereof, said swivel structure including a tubular swivel bearing coaxial with said housing, said pivot structure being mounted on bearing means having an axis perpendicular to the axis of said housing, said pivot structure including a mounting means for one of said plates, said mounting means being tubular and having a flange thereon, the underface of said flange having a raised non-circular seat thereon, said seat being engageable with said aperture having a corresponding shape in one of said plates in mounted position on said mounting means, said swivel bearing having an end portion thereof mounted on said other plate, the mounted end portion of said swivel bearing having a non-circular cross section, said end portion being engageable with said aperture having a corresponding shape in said other plate, said housing being substantially bilaterally symmetrical and formed of two parts, a pair of laterally spaced threaded members, said threaded members being laterally spaced longitudinally of said housing, said parts being secured to each other by means of said threaded members, one of said threaded members being coaxial with said pivot structure bearing and engageable with both of said parts, the other of said threaded members having an axis perpendicular to the axis of said tubular swivel bearing and engageable with both of said parts.

12. An adjustable fixture according to claim 11, wherein one of plates is a lamp reflector and the other of said plates is a canopy.

KURT VERSEN.

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