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HEAVY DUTY LIGHTING FIXTURE SWIVEL

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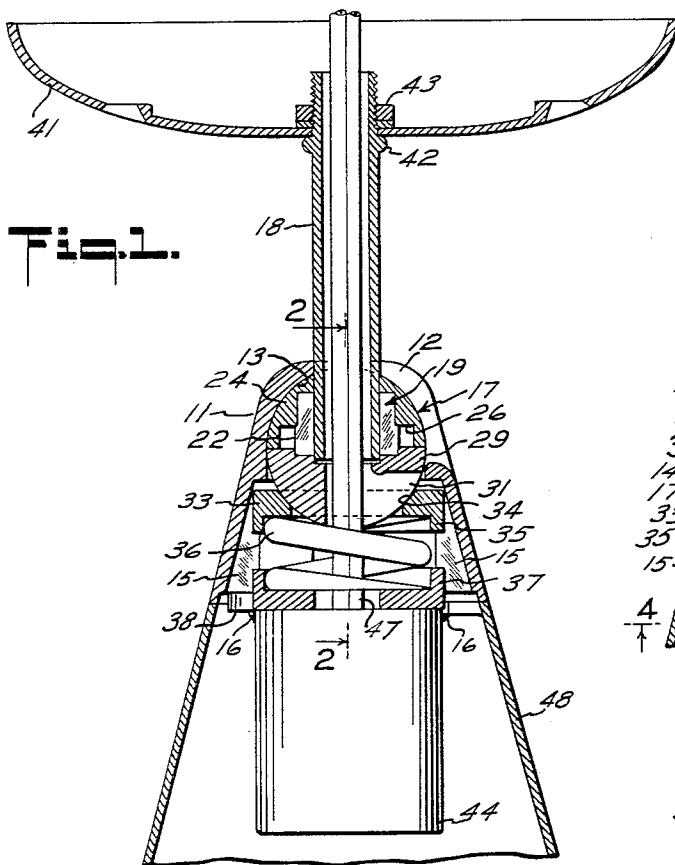


Fig. 1.

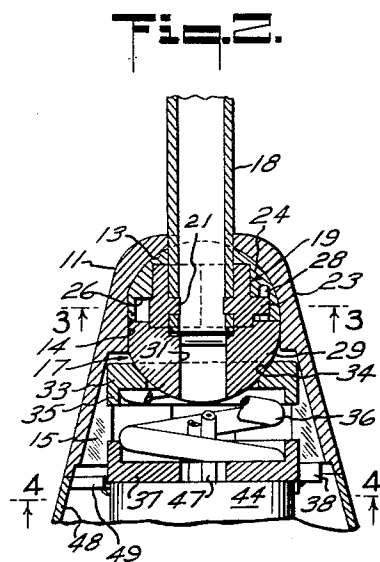


Fig. 2.

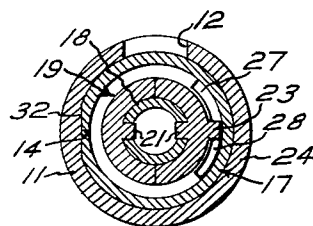


Fig. 3.

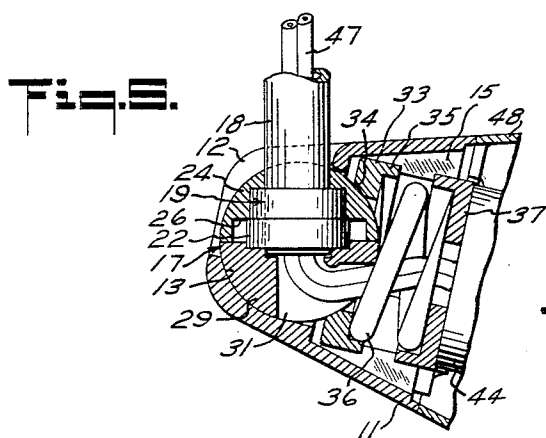


Fig. 5.

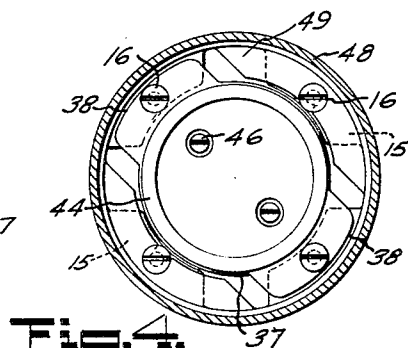


Fig. 4.

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HEAVY DUTY LIGHTING FIXTURE SWIVEL

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3 Claims. (Cl. 287—87)

The present invention relates to a heavy duty swivel for lighting fixtures particularly adapted to provide the fullest extent of light fixture positioning and retaining any set position without slippage in the presence of shock or vibration.

The device of this invention is particularly adapted for industrial and office use although it may of course be equally well employed in the home or any other application. Lamp fixture swivels generally suffer from the fault of slippage or variation from adjusted position upon the occurrence of vibration or shock transmitted thereto as, for example, through building walls from machinery or moving vehicles. In an attempt to overcome this difficulty swivel motion has been limited in some devices, however, this lack of complete freedom of movement is undesirable in that interference is experienced in exact light placement. A further noted difficulty with many conventional swivels for lighting fixtures is the tendency of spring members therein to weaken with prolonged use and extended temperature cycling so that the swivel fails to hold the set position. One further limitation commonly found in conventional swivels of this general category is the failure thereof to provide full 360 degree rotation, or alternatively failure to protect against repeated swivel rotation whereby lamp wires therethrough may be subjected to twisting and eventual breaking.

The present invention provides an improved lighting fixture swivel of a heavy duty type which maintains a set position despite substantial shocks and/or vibrations. Also, the swivel herein described protects wires passing therethrough against twisting and yet provides a full 360 degree rotation and substantially a ninety degree pivotal motion whereby a light fixture mounted thereon is movable to point in substantially any direction except backwards.

It is an object of the present invention to provide a lighting fixture swivel having full freedom of positioning through a solid angle of substantially 180 degrees.

It is another object of the present invention to provide a lighting fixture swivel that is resistant to shock and vibration as regards maintenance of set position.

It is a further object of the present invention to provide a heavy duty swivel accommodating 360 degrees of rotary motion and substantially 90 degrees of pivotal motion together with means maintaining any swivel position within the aforesaid limits.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawings accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawings and description may be adopted within the scope of the invention as set forth in the claims.

Referring to the drawings:

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Figure 1 is a longitudinal center sectional view of the heavy duty swivel of the invention together with associated lighting fixture and mounting means.

Figure 2 is a partial longitudinal section through the swivel taken at 2—2 of Figure 1.

Figure 3 is a transverse sectional view taken at 3—3 of Figure 2.

Figure 4 is a transverse sectional view taken at 4—4 of Figure 2 below the swivel proper.

Figure 5 is a central longitudinal sectional view through the swivel in pivoted position.

Considering now the structural details of the illustrated embodiment of the invention there is provided a rigid generally conical housing 11 having a slot 12 formed longitudinally thereof through the side and extending to substantially the center of the rounded housing top. This housing 11 is hollow and has formed interiorly thereof at the small top end a hemispherical ball seat 13 with a flat 14 formed on one side thereof parallel to the slot 12 and positioned ninety degrees about the cone from the slot. Adjacent the lower end of the housing, circumferentially spaced portions of the housing wall are enlarged or thickened as indicated at 15 and are provided with four axially extending tapped bores spaced equidistant apart about the bottom housing circumference to accept machine screws 16 for purposes noted below.

Within the housing there is provided a split ball 17 seated in the ball seat 13 of the housing at the top thereof and having a stem pipe 18 extending therefrom through the housing slot 12. As regards the construction and connection of the split ball 17 and stem 18, there is provided about the lower end of the stem 18 a split collar 19 with each half thereof having an integral pin 21 extending radially inward to mate with opposed apertures through the hollow stem. This collar has an outwardly flanged bottom end 22 with a lug 23 extending radially outward from one point on same. The split ball 17 includes an upper hemispherical half 24 engaging the housing seat 13 with an axial opening therethrough for accommodating passage of the stem 18 and an expansion of this opening accommodating the split collar 19. A shoulder 26 about the opening in the half ball 24 receives the collar flange 22 with the collar 19 fitting snugly in the ball for rotation relative thereto. The collar lug 23 contacts a portion of the shoulder 26 thereabout and an arcuate groove 27 is formed in this shoulder 26 outwardly of the collar and of an extent greater than ninety degrees. A curved stop 28 is fitted within this slot 27 in slidable relation thereto and extending beyond the shoulder to contact the collar lug 23. The extent of the arcuate groove 27 and stop 28 slidable therein is related so that the groove is twice the stop length plus at least the width of the collar lug 23. In this manner the ball and stem are relatively rotatable from the position of Figure 3 one full turn upon the collar 19 with the lug moving the stop to the other groove end at the end of ball rotation and thereby arresting further movement of the ball. There is also included as a part of the ball 17 a lower hemispherical half 29 having an axial aperture therethrough and an indented upper surface mating with the end of the collar 19 that extends beyond the upper ball half 24. A slot 31 is formed radially through the lower ball half from the axial aperture thereof and extending from the lower end to a position short of the upper surface of the lower ball half so that the axial aperture is in effect combined therewith to produce a lower ball half opening communicating with the hollow stem 18.

The above described stem and ball and included elements are assembled in the noted order and there is

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provided a flat 32 on one side thereof parallel to the stem axis and to the ball slot 31 and the assembly is disposed in the conical housing 11 with the ball flat 32 against the housing flat 14 so that the ball is held against rotation about the axis of the stem and is rotatable or pivotable about an axis normal thereto with the stem movable along the housing slot 12. The ball and stem are maintained within the housing by a floating spring retainer 33 formed as an annulus with a tapered inner bearing surface 34 contacting the ball 17 beneath same. This retainer 33 has a depending peripheral flange 35 forming with the remainder of the under surface thereof a spring receiving configuration. Directly beneath the floating spring retainer 33 is disposed a very strong large diameter heavy duty compression spring 36 fitting within the retainer flange 34 and bearing upon the under side of the retainer to force same upwards against the ball 17. This heavy duty spring is pressed against the retainer by an annular compression plate 37 having an inset upper surface to receive the spring and a pair of radial apertured lugs 38 through which the screws 16 extend for threading into two of the tapped bores in the lower housing and noted above. Tightening of the screws 16 forces the compression plate 37 upwards to compress the spring 36 against the floating spring retainer whereby the latter is pressed against the ball 17 and firmly seat same between the retainer surface 34 and the curved housing seat 13. It will be appreciated that the degree of tightening of the screws 16 holding the compression plate determines the spring force upon the ball 17 tending to prevent movement of same and with appropriate dimensioning of the collar and lower ball half recess receiving same sufficient spring pressure will also bend the collar against the lower ball half to impede rotation of the stem in the ball. In many instances it is desired to adjust spring tension so that the ball and stem may be moved by the application of substantial force thereto, however in those installations wherein only an initial swivel adjustment is required the spring may be sufficiently compressed after initial fixture adjustment to substantially preclude relative movement of any of the swivel elements.

Insofar as the application of the above described heavy duty swivel is concerned, the stem 18 extends through a mounting plate 41 adapted for attachment to a wall or ceiling and the stem has a small peripheral flange 42 beneath a threaded stem end so that a nut 43 threaded on the stem end extending through the plate clamps the plate between nut and flange. A conventional lamp socket 44 is readily attached to the under side of the compression plate 37 as by screws 46 threaded through the socket into tapped bores in the compression plate. Electrical wiring 47 extends through the hollow stem 18 and through the ball 17, spring 36 and central openings in retainer 33 and compression plate 37 into electrical connection with the lamp socket 44. A lamp shade 48 formed, for example, as a conical extension of the housing 11 is readily attached to the swivel by screws 16 extending through inward shade tabs 49 and threaded into the bottom threaded bores in the housing 11.

Operation and use of the improved lighting fixture is quite simple in that the cone or housing 11 is rotatable 360 degrees about the stem axis as limited by the ball lug 23 and stop 28. The ball is held against rotation in the housing about the stem axis by the mating ball flat 14 and cone flat 32 so that the ball and housing together are rotatable on the stem collar 19 as limited by the stop 28 and engaging collar lug 23. The full 360 degree rotation

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provides a complete housing displacement rotationally and yet prevents repeated housing rotation in the same direction so as to preclude undue twisting of the electrical conductors. In addition the cone is pivotable upon the ball some ninety degrees by swinging same to pivot the stem along the housing slot 12. These degrees of motion provide for orienting the lighting fixture in any desired forward position and the slot 31 in the ball 17 prevents kinking or pinching of the electrical conductors in pivoted housing position.

Although the swivel described above may be formed of a variety of materials it is preferred to employ a die-cast high purity corrosion resistant alloy so that with the heavy duty spring of large diameter stock an extremely long lived device results. Although the spring is engineered to provide very long life even under large amplitude temperature cycling additional longevity is provided by the spring compression adjustment whereby compensation may be provided for any long term spring fatigue.

What is claimed is:

1. A lighting fixture swivel comprising an axially symmetric housing having an axial slot through a wall thereof and defining a ball seat therein with a flat surface parallel to said slot, a spring loaded ball seated in said housing and having a flat side mating with said housing flat for confining said ball movement to limited rotation about an axis normal to said housing slot, said ball having an internal coaxial recess with an internal arcuate groove extending outwardly therefrom with an arcuate stop slidably disposed within the groove, a stem extending through said housing slot into rotatable relation with said ball, said stem having a collar affixed to its end and rotatably disposed within said recess with a radial projection on the collar engageable with said stop, said stop being slidable to permit and limit relative rotation of said stem and ball to substantially a full 360°.

2. A lighting fixture swivel comprising a hollow stem having a split collar affixed to one end thereof with a radial projection thereon, a split ball having an internal recess receiving said collar in attachment with said stem end and defining an internal circumferential groove with a stop slidably disposed therein for engagement with said collar projection and said groove having a length substantially equal to twice the length of said stop plus the width of said collar projection whereby stem rotation in said ball is limited to substantially one full turn, and housing means having a slotted wall and seating said ball under spring pressure with said stem extending through said housing slot.

3. A swivel as claimed in claim 2 further defined by a floating ball retainer having a ball seat thereon engaging said ball, a compression plate secured in variable position on said housing, and a spring compressed between said floating ball retainer and said compression plate for urging said ball onto intimate seated relation with respect to said housing.

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