

[54] **FLOODLIGHT HAVING QUICK RELEASE
SUPPORT FOR LAMP ENVELOPE**

[75] Inventor: **Kenneth R. Faux, Sr.**, Mequon, Wis.

[73] Assignee: **Phoenix Products Company, Inc.**,
Milwaukee, Wis.

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[51] Int. Cl. **F21v 17/00**

[58] Field of Search **240/41.55, 90**

[56] **References Cited**

UNITED STATES PATENTS

2,644,076	6/1953	Keegan	240/41.55 X
3,018,364	1/1962	Wenman	240/90
3,018,365	1/1962	Wenman et al.	240/90

Primary Examiner—Fred L. Braun
Attorney—Ira Milton Jones

[57] **ABSTRACT**

A floodlight fixture has a cup-shaped housing in which a lamp is enclosed with the maximum diameter portion of its glass envelope axially clamped between fixed and movable steadying rings. The movable ring has a hinged connection with the fixed one, to swing to a lamp releasing position, and is quickly releasably latched in its lamp engaging position. The latch and the hinge connection are arranged to bias the movable ring axially toward the fixed one. Hinge connection bias cooperates with fingers on the movable ring to detentwise hold it in its lamp releasing position.

6 Claims, 5 Drawing Figures

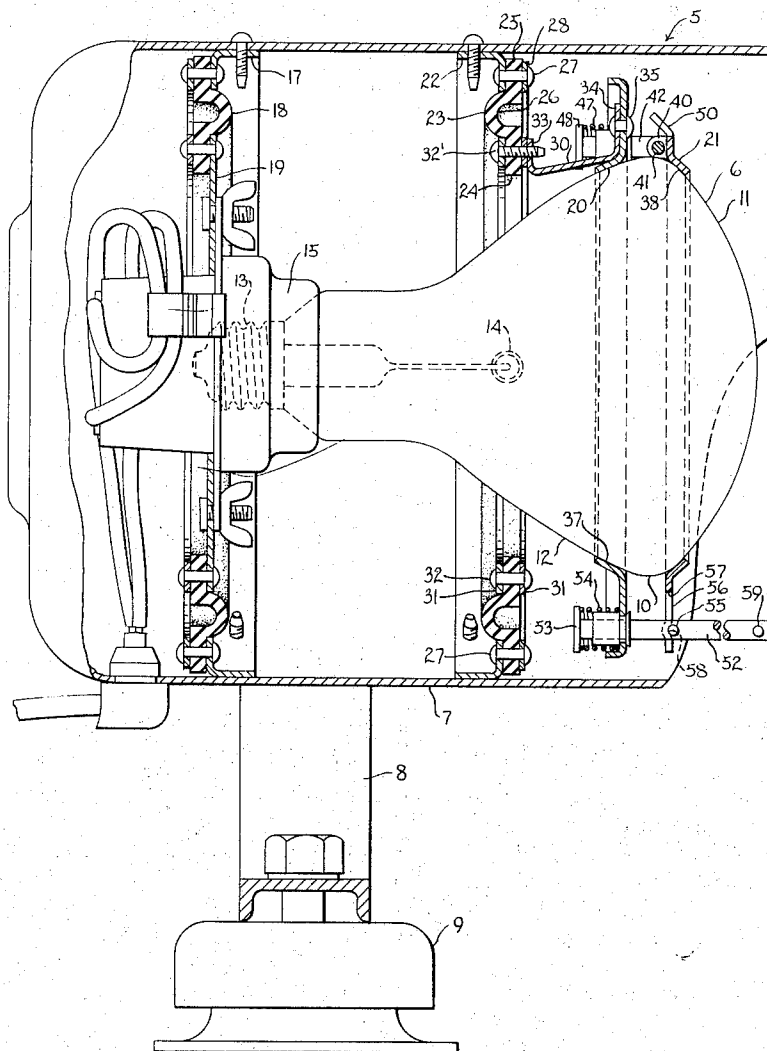


FIG. 1.

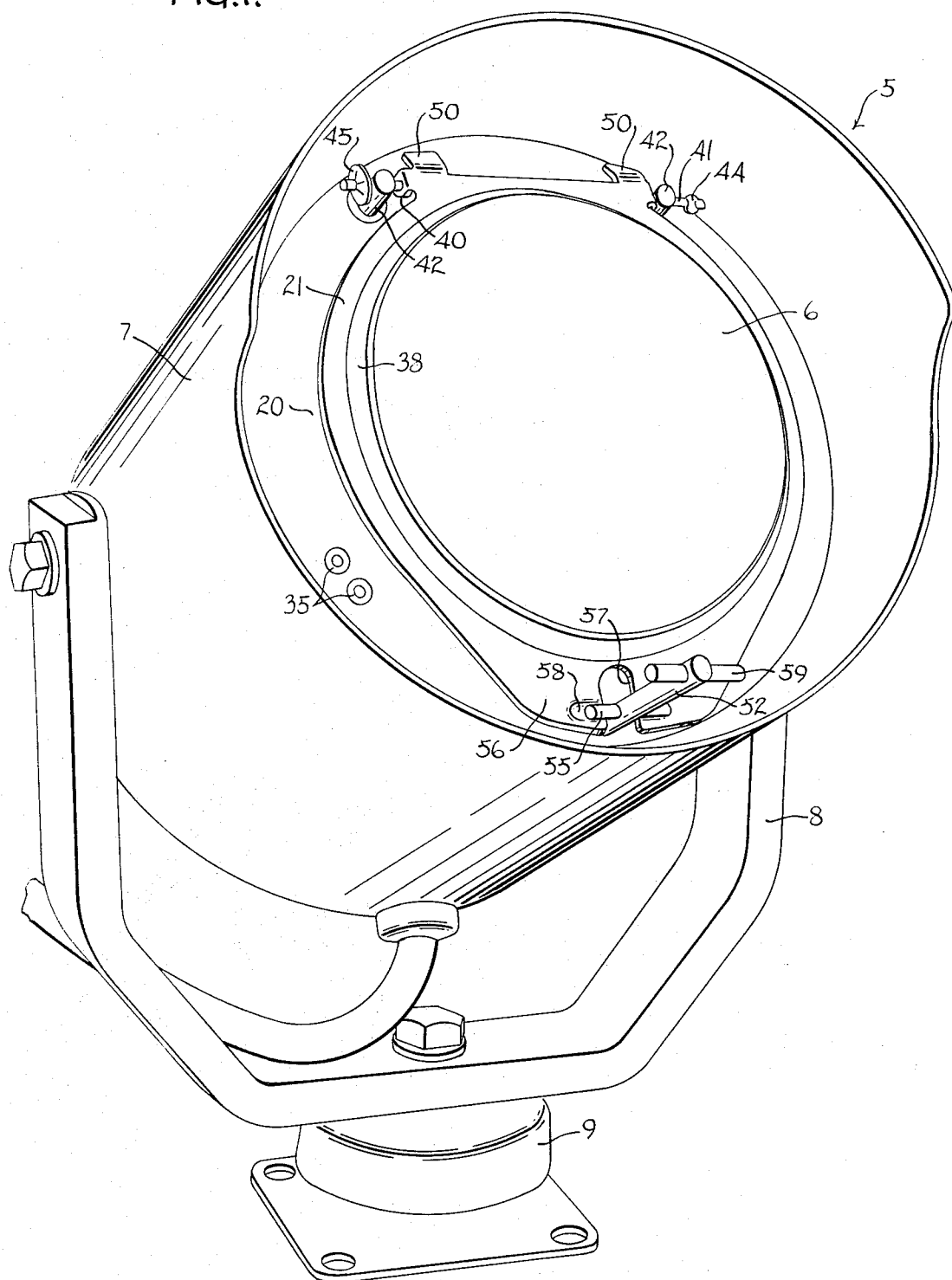


FIG. 2.

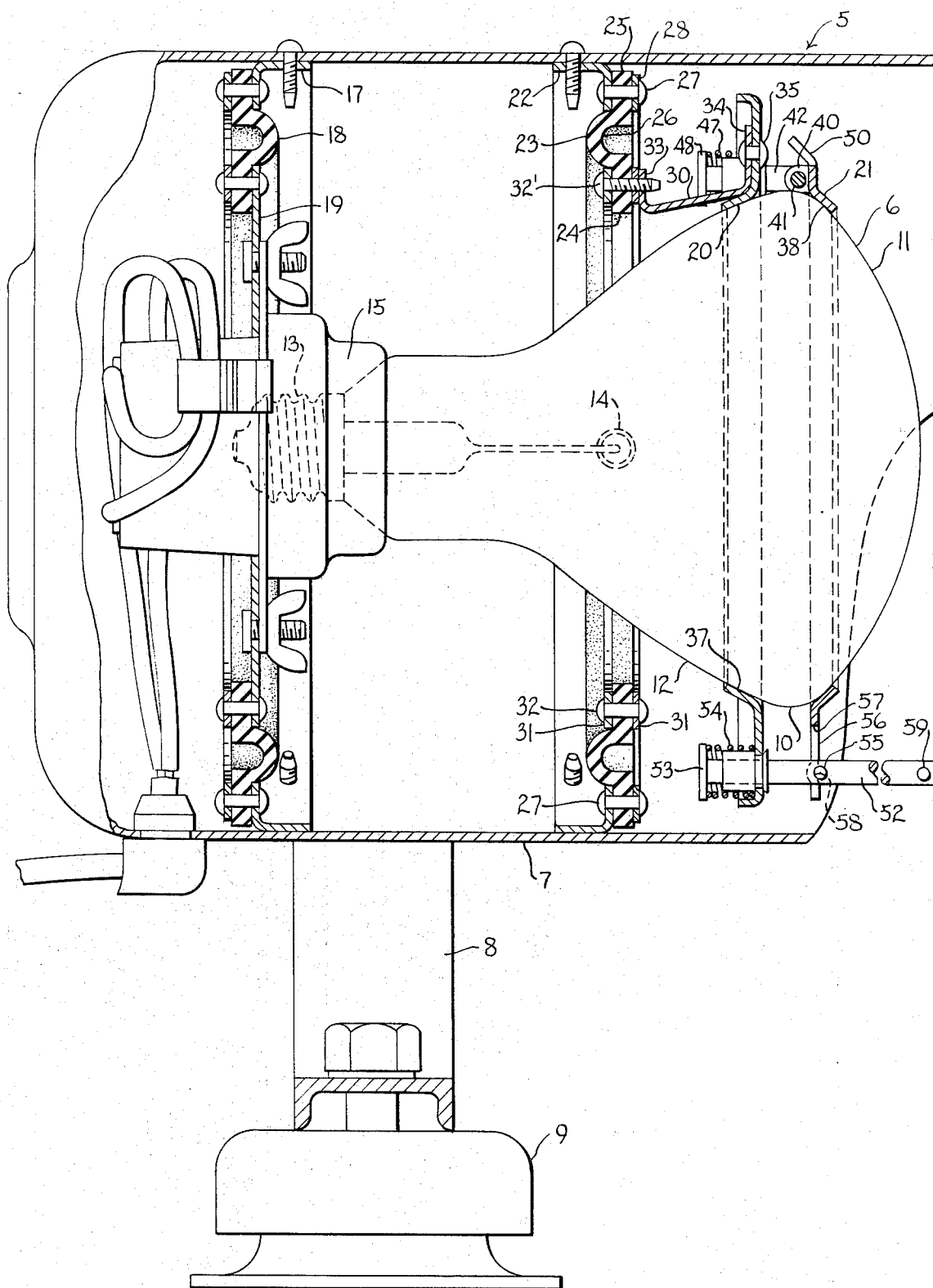


FIG. 3.

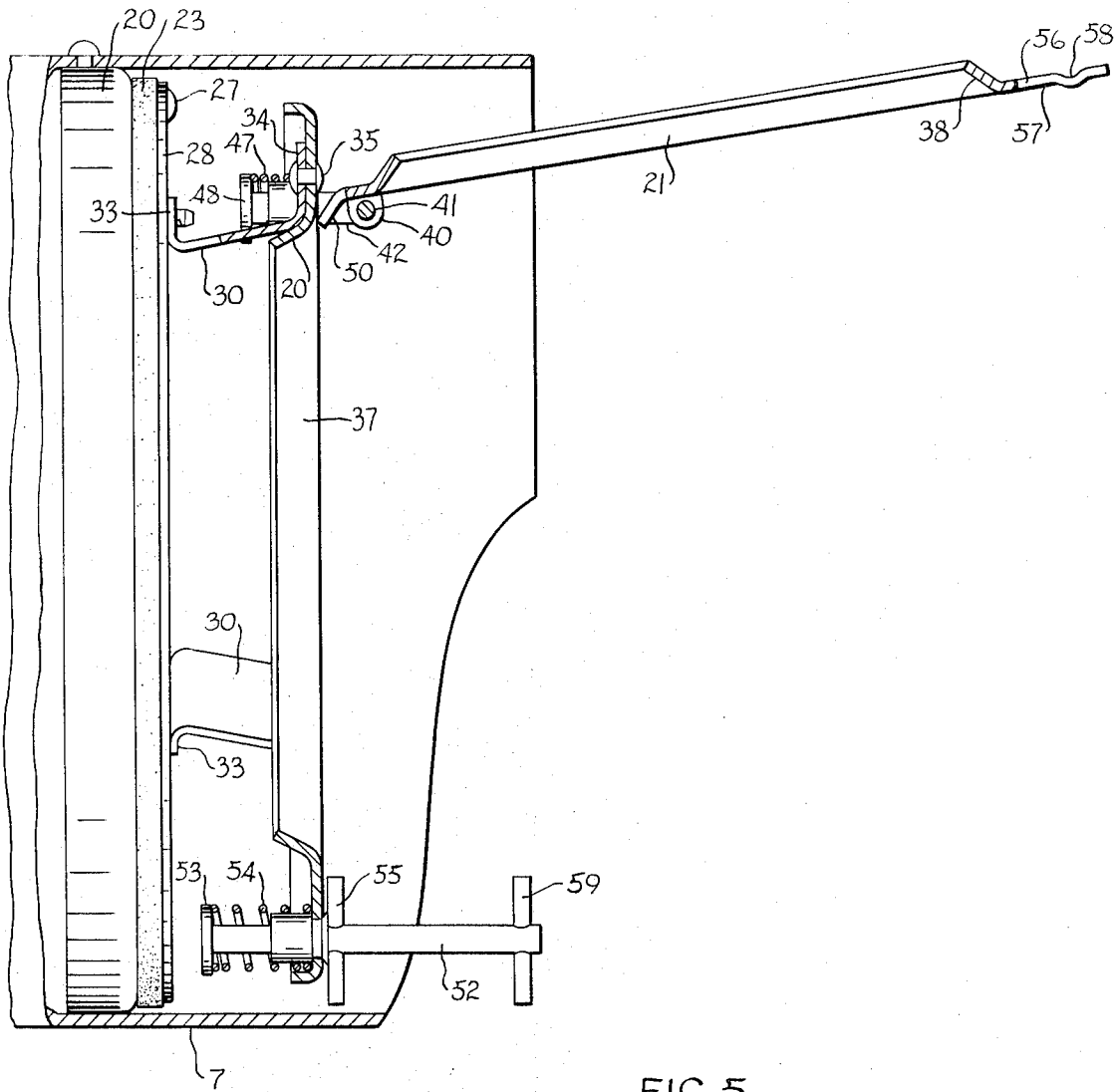


FIG. 5.

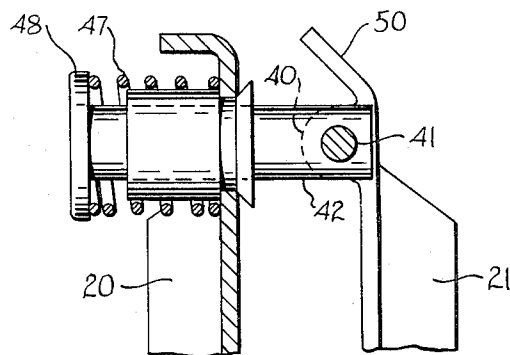
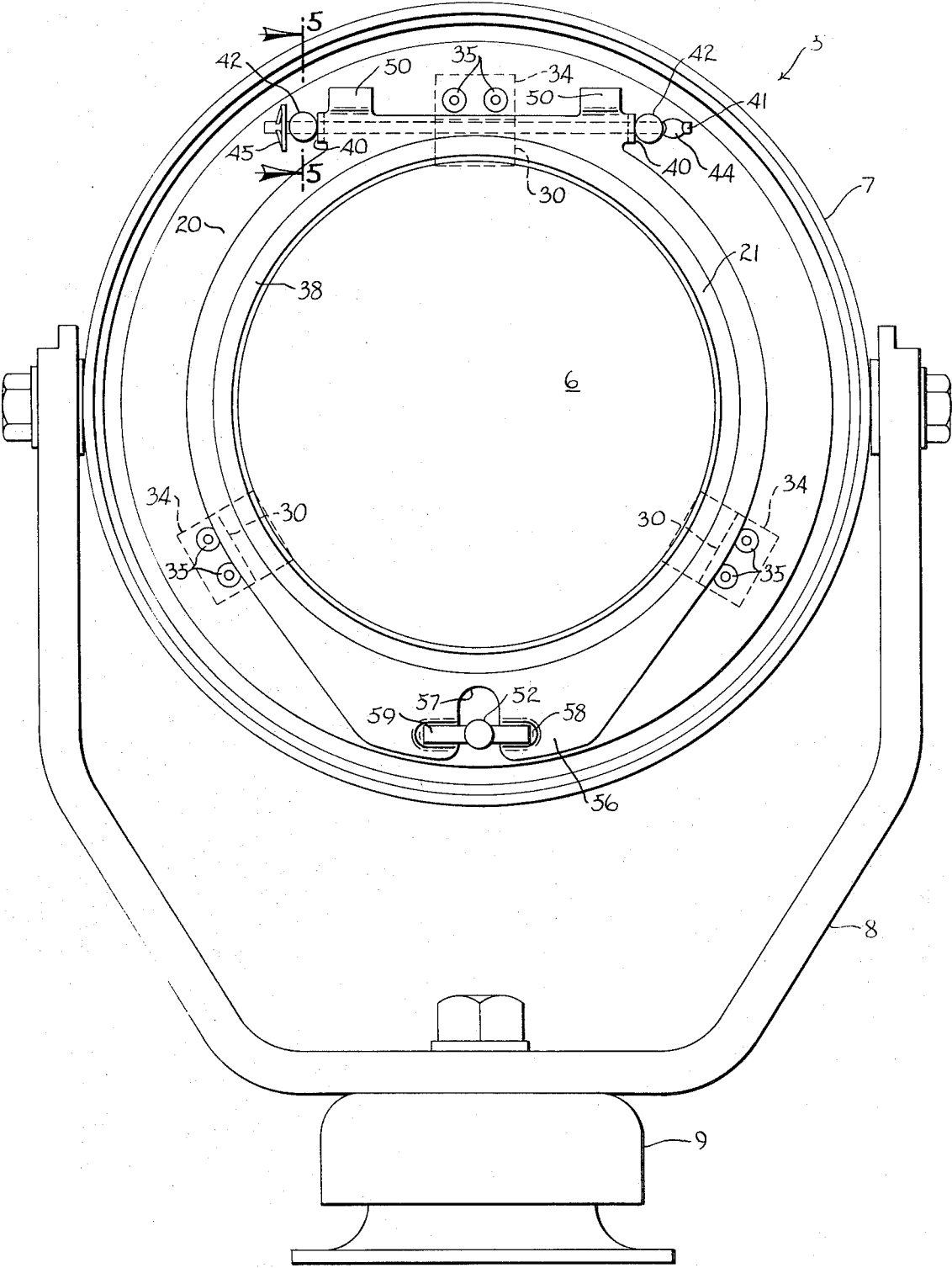


FIG. 4.



FLOODLIGHT HAVING QUICK RELEASE SUPPORT FOR LAMP ENVELOPE

This invention relates to electric floodlight fixtures that provide a protective enclosure and mounting for a lamp, and the invention is more particularly concerned with means in the lamp housing of such a fixture for removably supporting the glass envelope of a lamp in a manner that enables it to withstand vibrations and shocks and permits the lamp to be quickly and easily replaced.

Floodlight fixtures of the general type to which this invention relates are exemplified by the W.A. Wenman U.S. Pat. No. 3,018,364; the Wenman et al. U.S. Pat. No. 3,018,365 and the O'Keefe U.S. Pat. No. 3,018,366. The lamp with which any such fixture is intended to cooperate has a glass envelope with a maximum diameter portion near its front end and with coaxial forwardly and rearwardly convergent portions adjacent to its maximum diameter portion. At the rear of the envelope the lamp has terminal means connected with a filament inside the envelope and adapted to be received in a more or less standardized socket. The lighting fixture comprises a generally cup-shaped housing, open at its front, in which the lamp is received and by which it is protected, and which has mounting provisions at its exterior. A socket for the lamp terminals is mounted in the rear portion of the housing. When the unit is likely to be subjected to much vibration and shock, as where it is mounted on large and heavy material handling equipment, the socket is resiliently supported from the housing and the large diameter portion of the lamp envelope is also engaged by supports that are resiliently suspended from the housing so that the lamp as a whole is effectively shock mounted.

In the fixtures of the above mentioned Wenman and Wenman et al patents, the support for the lamp envelope comprised a rear ring which was resiliently mounted in the housing and which had its inner diameter portion formed as a seat that engaged the rearwardly convergent portion of the envelope, rearwardly adjacent to its maximum diameter portion. Cooperating with the relatively fixed rear ring was a removable front ring, the inner diameter portion of which was formed as a seat that engaged the forwardly convergent portion of the envelope. The front ring was in each instance secured to the rear ring in a manner permitting its complete detachment therefrom. To prevent the front ring from being dropped when it was detached for lamp replacement, it was tethered to the housing of the fixture.

In the fixtures of the two patents just mentioned, the front ring had circumferentially elongated keyhole-shaped slots through which thumb screws were threaded into the rear ring. These screws had to be loosened and the front ring then had to be rotated to align the larger portions of its slots with the heads of the screws in order to permit the front ring to be withdrawn forwardly.

Removal and replacement of the front ring in these fixtures was a relatively simple and easy task under favorable conditions. In very cold weather, however, manipulation of the thumb screws and rotation of the front ring became clumsy and difficult for hands encased in heavy gloves or mittens, and even alignment of the thumbscrew holes with the thumb screws, during replacement of the front ring, could be extremely trying

for a man standing on a ladder, buffeted by a high wind and perhaps shivering with cold.

With these considerations in mind it is an object of the present invention to provide a lamp fixture of the character described wherein the support for the large diameter portion of the lamp envelope comprises a pair of rings that are so connected as to be normally inseparable, one of said rings being swingable relative to the other between a lamp retaining position and a lamp releasing position, and wherein very simple and easily manipulated latching means secures the movable ring in its lamp retaining position.

It will be apparent that it is also a general object of this invention to provide a floodlight fixture of the character described which enables a lamp to be changed very quickly and easily, even under extremely adverse conditions, without any necessity for manipulating small parts and without the need for troublesome and time consuming alignment of parts with one another.

Another and more specific object of this invention is to provide a floodlight fixture of the character described having a very simple and inexpensive movable lamp engaging ring that seats against a forwardly convergent portion of a lamp envelope to cooperate with a relatively fixed ring in steadying the envelope, wherein the movable ring is resiliently connected with the fixed ring to provide for yielding axial clamping of the maximum diameter portion of the envelope, and wherein the movable ring has certain integral portions that respectively provide for its hinged connection with the fixed ring, for releasably latching it in its lamp retaining position, and for holding it detent-wise in a forwardly swung, out of the way, lamp releasing position.

With these observations and objectives in mind, the manner in which the invention achieves its purpose will be appreciated from the following description and the accompanying drawings, which exemplify the invention, it being understood that such changes in the specific apparatus disclosed herein may be made as come within the scope of the appended claims.

The accompanying drawings illustrate one complete example of the embodiment of the invention constructed according to the best mode so far devised for the practical application of the principles thereof, and in which:

FIG. 1 is a front perspective view of a lamp fixture embodying the principles of this invention;

FIG. 2 is a vertical sectional view of the lamp fixture shown in FIG. 1;

FIG. 3 is a view generally similar to FIG. 2 but showing the front ring of the fixture swung to its lamp releasing position;

FIG. 4 is a view of the fixture in front elevation; and
FIG. 5 is a fragmentary sectional view on an enlarged scale taken on the plane of the line 5—5 in FIG. 4.

Referring now to the accompanying drawings, the numeral 5 designates generally the floodlight fixture of this invention, which is intended to provide support and protection for a lamp 6. The fixture 5 comprises a generally cup-shaped housing 7 that is open at its front, a U-shaped yoke or bail 8 upon which the housing is pivoted for adjusting up and down motion, and a swivel base 9 upon which the bail is in turn mounted for side-to-side adjustment of the housing and for attachment of the fixture to other structure.

The lamp 6 is a more or less standard floodlight type, with a glass envelope that flares to a maximum diameter portion 10 near its front end. The envelope also has coaxial forwardly and rearwardly converging portions 11 and 12, respectively, just ahead of and just behind its maximum diameter portion. Terminal means 13 on the small diameter rear portion of the envelope, connected with a filament 14 inside the envelope, can be received in a suitable socket 15 inside the housing 7. In this case the socket 15 is illustrated as being of the screw-in type, cooperable with a threaded base on the lamp that comprises its terminal means 13.

Since the fixture here illustrated is intended to be mounted on mobile apparatus such as an earth moving machine, the lamp 6 is yieldingly supported in the housing to enable it to withstand shocks and vibration. To this end the socket 15 is resiliently suspended from the circumferential wall of the housing, and the convergent portions 11 and 12 of the lamp envelope are engaged by rings that are similarly shock mounted, as hereinafter described.

The mounting for the socket 15 is similar to that illustrated and described in Wenman et al. U.S. Pat. No. 3,018,365, to which reference may be made for details. In general it comprises a rigid outer ring 17 which is closely received within the circumferential housing wall 7 near the rear thereof and which is secured to that wall, a resilient connecting ring 18 of rubber or the like which has its outer marginal edge portion secured to the outer ring 17, and a base plate 19 which is secured to inner marginal edge portions of the rubber ring 18 and on which the socket 15 is mounted.

The resilient support for the front end portion of the glass envelope comprises a relatively fixed rear ring 20 that engages the rearwardly convergent portion 12 of the envelope and a front ring 21 that is movable between a lamp releasing position and a lamp retaining position, in the latter of which it engages the forwardly convergent portion 11 of the envelope.

The rear ring 20 has a resilient shock mounting comprising an outer rigid ring 22 which is similar to the rear outer ring 17, and which, like it, fits closely within the circumferential wall of the housing and is secured thereto, being located about midway between the rear outer ring 17 and the open front of the cup-shaped housing. The front outer ring 22 also has secured to it a rubber ring or annular diaphragm 23, similar in configuration to the rear rubber ring 18 in that it has flat substantially coplanar radially inner and outer portions 24 and 25 connected by an intermediate portion 26 of U-shaped cross section. The radially outer portion 25 of the rubber ring 23 is flatwise secured to the front outer ring 22, as by means of rivets 27. A flat, radially narrow metal reinforcing ring 28 flatwise overlies the radially outer portion of the rubber ring to prevent the rivets 27 from tearing through it.

The relatively fixed rear lamp engaging ring 20 is supported from the radially inner flat portion 24 of the resilient ring 23 on circumferentially spaced forwardly projecting legs 30. Overlying the opposite faces of the radially inner portion of the resilient ring 23 are radially narrow flat reinforcing rings 31, which are secured by rivets 32 that extend through them and the rubber ring. The legs 30 are substantially U-shaped, each having a rear out-turned flange 33 that overlies the front reinforcing ring 31 and is secured thereto by screws 32', only one of which appears in FIG. 2, and a front

out-turned flange 34 that flatwise overlies the rear surface of the fixed lamp engaging ring 20 and is secured to that ring as by rivets 35.

The rear lamp engaging ring 20 has its inner marginal edge portion beveled or cambered to provide a frusto-conical seat 37 for the rearwardly convergent portion 12 of a lamp in the housing. The front lamp engaging ring 21 likewise has its inner marginal edge portion beveled or cambered, as at 38, to provide a seat for the forwardly convergent portion 11 of the lamp envelope. The rings 20 and 21 thus cooperate to clamp the large diameter portion of the lamp envelope, and since they are under yielding axial bias towards one another, as explained below, such clamping is effected in a manner to accommodate peculiarities in the shape of the lamp envelope and its thermal expansion and contraction.

According to the present invention, the front ring 21 is hingedly carried by the rear ring 20 to swing between lamp engaging and lamp releasing positions which are respectively illustrated in FIGS. 2 and 3. The hinge connection between the rings 20 and 21 comprises a pair of apertured parallel ears 40 that are formed integrally with the front ring 21, a hinge pin 41 that extends through those ears, and a pair of plunger-like hinge-pin carriers 42 that extend through holes in the rear ring 20 and conjointly support the hinge pin.

Each of the hinge pin carriers 42 has its axis parallel to that of the rear ring and is guided in its hole in that ring for axial back and forth motion. The hinge pin 41 is received in transverse holes in the front end portions of the carriers to extend parallel to the front face of the rear ring. One end of the hinge pin is peened or swaged, as at 44, and a push-on clip 45 at its other end cooperates with the swedging to prevent it from being displaced axially out of the carriers.

It will be seen that the hinge pin is bodily movable back and forth with the carriers 42, towards and from the fixed ring 20. The carriers are urged rearwardly by means of a coiled compression spring 47 that surrounds the rear portion of each and reacts between an enlarged head 48 on the rear end of the carrier and the rear surface of the fixed ring 20.

It will be noted that the hinge pin carriers are located on a line that lies wholly outside the inner diameter of the rear ring 20, so that the hinge pin does not interfere with insertion or removal of a lamp. As shown, the axis of the hinge connection extends horizontally across the top of the rear ring.

The hinge ears 40 on the front ring 21 comprise integral rearwardly bent tabs that lie parallel to one another and are spaced apart by a distance such that they are inwardly adjacent to the hinge pin carriers 42.

Also formed integrally with the front ring are a pair of lug-like detent fingers 50. When the front ring is in its lamp engaging position, flatwise overlying the rear ring and substantially coaxial with it, the detent fingers 50 extend obliquely from it across the hinge pin in a radially outward and rearward direction. Note that before the hinge ears 40 and the detent fingers 50 are bent rearwardly, each finger and its adjacent hinge ear forms an L-shaped projection from the front ring, with the junction of the legs of the L integrally connected with the ring at its outside diameter.

As the front ring is swung about its hinge connection towards its lamp releasing position, the fingers 50 engage the front surface of the rear ring, and they slide along it with continued raising of the front ring. As the

detent fingers swing through an arc, the hinge pin and its carriers 42 are compelled to move forwardly against the bias of the springs 47. In the final stages of movement of the front ring 21 to its lamp releasing position the fingers 50 thus effect an over-center detent action by which the front ring 21 is readily releasably held in its raised position, in which its axis is approximately normal to that of the rear ring, as illustrated in FIG. 3. In that position the front ring presents no obstruction to manipulation of a lamp for removal or insertion. The front ring can be raised to that position or flipped down from it with extreme ease, even by a person wearing bulky mittens.

The front ring is readily releasably confined in its lamp engaging position by means of a latch which is located diametrically opposite the axis of the hinge connection, at the bottom of the lamp housing, and which comprises a shaft-like latch member 52 that extends through a hole in the rear ring 20. The hole is of such size as to guide the latch member 52 for rotation and for axial motion. The latch member is biased axially rearward by means of a coiled compression spring 54 which embraces its rear end portion and reacts between an enlarged head 53 thereon and the fixed ring 20.

When the front ring 21 is out of its lamp engaging position, the limit of rearward motion of the shaft member in response to the spring 54 is defined by a cross-pin 55 through the shaft member, which then engages the front surface of the rear ring. That cross-pin also serves to engage the front ring and latch it in its lamp retaining position. More specifically, the front ring has an integral laterally outwardly projecting tab-like extension 56 which is diametrically opposite the hinge connection and in which there is a radially outwardly opening slot 57 that is wide enough to receive the latch member with ample clearance. When the latch member is rotated to a position in which its cross-pin 55 is substantially aligned with the slot 57 (i.e., oriented vertically), the front ring can swing without hindrance. To lock the front ring in its lamp retaining position, the shaft-like member 52 is pulled forwardly against the bias of its spring 54 and is then rotated to engage the cross-pin over the front surface of the tab-like extension at opposite sides of the slot 57. For greater latching security the tab-like extension can have shallow forwardly opening grooves 58 at opposite sides of the slot 57, extending transversely to that slot, in which the opposite arms of the cross-pin 55 tend to seat with a detent action as the latch member is rotated to its locking position.

To facilitate rotation and forward movement of the latch member, it is provided with a T-handle 59 at its front, comprising a second cross-pin. The T-handle cross-pin is oriented parallel with the cross-pin 55 so that it will clear the edges of the slot 57 as the front ring is raised and lowered. Because of the easily gripped T-handle, and because the latch member needs to be rotated only 90° between its locking and releasing positions, it can be readily manipulated even with hands encased in heavy mittens.

It is also noteworthy that when the front ring is locked in its lamp retaining position the springs 47 on the hinge pin carriers cooperate with the spring 54 on the latch member to impose a yielding rearward force upon the front ring, effectively distributed all around it, whereby the front ring cooperates with the rear ring to

impose a yielding clamping force upon the lamp envelope and the yieldability of which allows the front ring to accommodate itself to the shape of the lamp envelope.

From the foregoing description taken with the accompanying drawings it will be apparent that this invention provides inexpensive but very effective means for securely supporting the glass envelope of a flood-light lamp in a protective housing, and wherein such support is provided in a manner that protects the lamp against shock and vibration and permits it to be quickly and easily replaced even under very adverse conditions.

Those skilled in the art will appreciate that the invention can be embodied in forms other than as herein disclosed for purposes of illustration.

The invention is defined by the following claims:

I claim:

1. A housing for a lamp of the type that comprises an envelope enclosing a filament and terminal means at the rear of the envelope for connecting the filament with a source of current, the envelope having a maximum diameter portion spaced forwardly of the terminal means and having coaxial portions forwardly and rearwardly adjacent to the maximum diameter portion which respectively face towards the front and the rear of the envelope, said housing being of the type comprising a forwardly opening enclosure having socket means at its rear in which the terminal means is readily detachably receivable and having a rear ring spaced forwardly of the socket means and providing a forwardly facing seat against which said rearwardly facing portion of the envelope is coaxially engageable, means cooperable with said rear ring to readily releasably hold the envelope of a lamp, the last named means comprising:
 - A. a pair of elongated hinge-pin carriers axially slidably extending through said rear ring at circumferentially spaced locations along a line which is wholly located radially outwardly of the inside diameter of the rear ring;
 - B. spring means reacting between the carriers and the rear ring to bias the carriers rearwardly;
 - C. a hinge pin extending through the carriers forward of the rear ring, said hinge pin being supported by the carriers for bodily back and forth motion and being biased rearwardly by said spring means;
 - D. a front ring having an inner diameter portion that provides a seat coaxially engageable with said forwardly facing portion of a lamp envelope, said front ring also having
 1. a pair of spaced apart ears through which said hinge pin extends to pivot the front ring for swinging motion between a lamp retaining position coaxially overlying the rear ring and a forwardly swung lamp releasing position in which the front ring is substantially normal to the rear ring,
 2. finger means extending obliquely rearwardly and radially outwardly over the hinge pin to engage the front surface of the rear ring as the front ring is swung toward its lamp releasing position, said finger means cooperating with said spring means to provide an overcenter connection between the rings by which the front ring is detent-wise held in its lamp releasing position, and
 3. a radially outwardly projecting tab portion circumferentially spaced from the hinge pin and

- having a radially outwardly opening slot therein;
- E. a shaft rotatable and axially slidable in a hole in the rear ring that is in register with said slot when the front ring is in its lamp retaining position; and
- F. a cross pin through said shaft, engageable over said tab at opposite sides of the slot therein to secure the front ring in its lamp retaining position and which can be aligned with the slot, upon rotation of the shaft, to free the front ring to be swung to its lamp releasing position.
2. The lamp housing of claim 1, further characterized by:
- G. other spring means reacting between said rear ring and the shaft to bias the latter rearwardly.
3. The lamp housing of claim 2, further characterized by:
- H. the first mentioned spring means comprising a coiled spring surrounding each of said carriers and bearing against an enlarged head on the rear thereof; and
- I. said other spring means comprising a coiled spring surrounding said shaft and bearing against an enlarged head on the rear thereof.
4. The lamp housing of claim 1, further characterized by:
- J. a T-handle on said shaft, spaced forwardly of the cross-pin and extending substantially parallel thereto.
5. Supporting means for a lamp envelope in which a filament is enclosed and which has a maximum diameter portion and coaxial portions adjacent thereto that face generally in opposite directions, said supporting means comprising:
- A. a relatively fixed ring having an inside diameter portion that provides a seat engageable with one of said coaxial portions of a lamp envelope;
- B. a pair of elongated hinge pin carriers which are mounted on the fixed ring with their axes substantially parallel to the axis of the fixed ring, said hinge pin carriers being axially movable relative to the fixed ring, being spaced apart circumferentially around the fixed ring, and having their axes intersecting a line that lies wholly outside the inside diameter of the fixed ring;
- C. a hinge pin conjointly carried by said carriers, overlying one surface of the fixed ring and movable with said carriers toward and away from said one surface;
- D. spring means reacting between said carriers and the opposite surface of the fixed ring to urge the hinge pin bodily toward the fixed ring;
- E. a movable ring having an inner diameter portion that provides a seat coaxially engageable with the other of said coaxial portions of a lamp envelope, said movable ring also having apertured ears cooperating with said hinge pin to provide a hinge connection between the rings that enables the movable ring to swing between a lamp engaging position in which it coaxially overlies the fixed ring and a lamp releasing position in which the movable ring is substantially normal to the fixed ring;
- F. a shaft-like member extending through one of said rings in circumferentially spaced relation to the hinge connection and constrained substantially to rotation and axial movement relative to said one ring;

- G. cooperating means on said shaft-like member and on the other ring providing a releasable connection between them that is engageable upon rotation of said shaft-like member and by which the same is held against axial motion in the direction of flatwise separation of the rings;
- H. biasing means reacting between the shaft-like member and said one ring to urge the shaft-like member in its axial direction that draws the rings flatwise towards one another when said releasable connection is engaged; and
- I. detent means fixed on said movable ring, projecting toward the fixed ring and across the hinge pin at the side thereof remote from the center of the movable ring, said detent means being slidably engageable, under the bias of said spring means, against the adjacent surface of the fixed ring upon swinging of the movable ring to its lamp releasing position to afford an overcenter connection between the rings by which the movable ring is detentwise releasably held in its lamp releasing position.
6. Supporting means for a lamp envelope in which a filament is enclosed and which has a maximum diameter portion and coaxial portions adjacent thereto that face generally in opposite directions, said support means comprising:
- A. a relatively fixed ring having an inside diameter portion that provides a seat engageable with one of said coaxial portions of a lamp envelope;
- B. a movable ring having an inside diameter portion that provides a seat engageable with the other of said coaxial portions of a lamp envelope;
- C. cooperating means on said fixed and movable rings providing a hinged connection between them by which the movable ring can be swung between a lamp engaging position in which the rings are in substantially coaxial flatwise parallel relation and a lamp releasing position in which the movable ring is substantially normal to the fixed ring, said hinge connection means providing for limited relative movement between the rings in directions parallel to the axis of the fixed ring;
- D. biasing means operatively associated with said hinge connection means for yieldingly urging the hinge connection means on the movable ring in the direction toward the fixed ring;
- E. detent means fixed on said movable ring adjacent to said hinge connection, projecting toward the fixed ring and across the hinge pin at the side thereof remote from the center of the movable ring, said detent means being slidably engageable, under the bias of said biasing means, against the adjacent surface of the fixed ring upon swinging of the movable ring to its lamp releasing position to afford an overcenter connection between the rings by which the movable ring is detentwise releasably held in its lamp releasing position;
- F. a shaft-like member axially slidable and rotatable in a hole in one of said rings that is circumferentially spaced a substantial distance from said hinge connection;
- G. cooperating means on said shaft-like member and on the other ring providing a releasable connection between the shaft-like member and said other ring that is engaged by rotation of the shaft-like member; and
- H. biasing means reacting between the shaft-like member and said one ring to urge the shaft-like member in its axial direction that draws the rings flatwise towards one another when said releasable connection is engaged.