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HEADLAMP CONSTRUCTION

Filed March 10, 1939

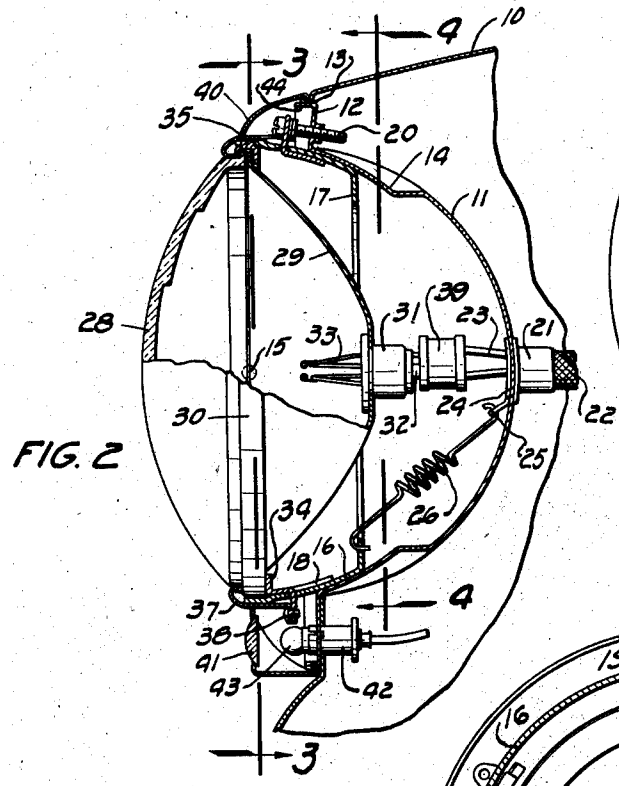


FIG. 2

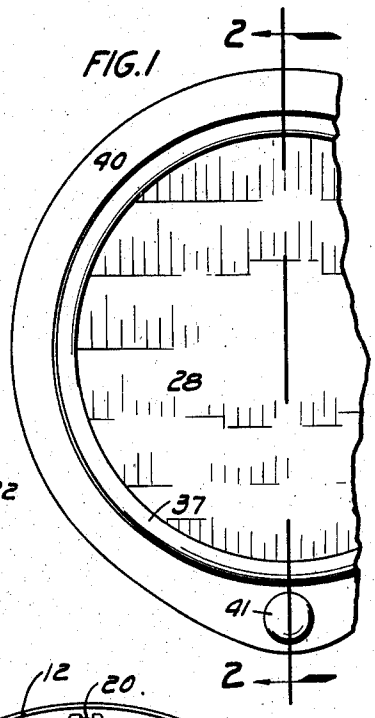


FIG. 1

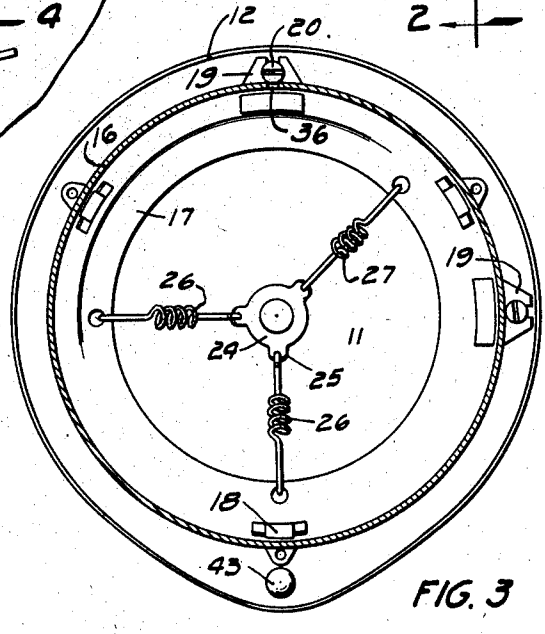


FIG. 3

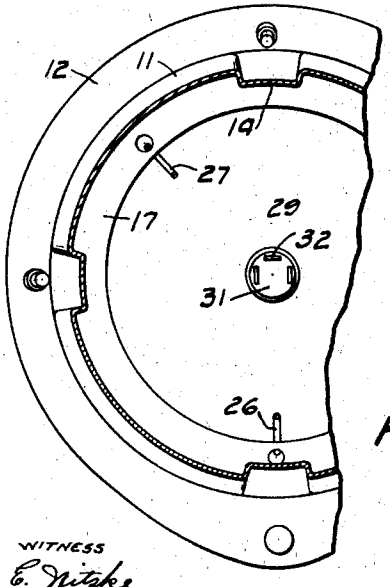


FIG. 4

WITNESS
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HEAD LAMP CONSTRUCTION

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3 Claims. (Cl. 240—41.5)

The object of our invention is to provide a headlight construction especially adapted for use on automobiles. An important feature of this invention is in the means for more rigidly retaining the lamp in an adjusted position.

Another equally important feature of the invention is in oscillating the bulb, reflector and lens, around a center which lies in the vertical plane of the stationary lamp ring. Thus, the edge of the bulb unit moves fore and aft through the lamp ring opening so that very little clearance between the ring and the bulb unit is required to compensate for all positions of adjustment. If the bulb unit is oscillated around a center spaced forwardly or rearwardly from the plane of the lamp ring then a correspondingly greater clearance between the ring and bulb is required which, of course, detracts from the appearance of the headlamp.

This invention is particularly desirable in headlamps which use the projector type of headlight bulb. In this type of bulb the lens, reflector and filament are assembled as a hermetically sealed unit, which unit, as a whole, must be adjusted to the correct focus on the car and rigidly held in this position. With our improved design focusing can be readily accomplished by overcoming a relatively light force while the bulb unit is held in the lamp housing under a comparatively heavy spring pressure.

In the past many lamp designs provided means for tipping the reflectors but these devices have proved inadequate with the projector bulb because such bulbs invariably weigh many times that of common reflectors. Consequently, a much greater retaining force is required to hold the projector bulb in position than is required with the conventional reflector. When the usual adjusting devices are enlarged sufficiently to adequately retain such bulbs in their housings then the adjusting devices become excessive in size and lose their sensitivity of adjustment. We retain the bulb in a spherical socket by the direct force of a group of tension springs all of which combine to retain the bulb firmly in its socket. However, the springs at one edge of the bulb unit are arranged to exert a greater tangential force than that at the opposite edge so that the bulb tends to rotate in one direction in its socket by a force equal to the difference in spring pressure employed. The adjusting means must, therefore, overcome only the difference in spring pressure to oscillate the bulb even though the total spring pressure retains the bulb unit in its socket.

This feature will be brought out more fully in the specification, together with other departures from conventional practice.

Both vertical and lateral adjustment of the lamp is required and it has been a customary practice to accomplish vertical adjustment by pivoting the bulb unit around a pair of horizontal trunnions, disposed one on each side of the unit. In such device to provide lateral adjustment it was necessary to swing one of the trunnions fore and aft. This not only required considerable mechanism, but also had the disadvantage that, due to the many parts employed, the lamps soon become out of adjustment. This was especially true where the heavier projector bulb was used. In our improved construction both the vertical and horizontal adjustments are made by oscillating the bulb unit in a relatively large spherical socket, so that a firm support is assured. No claim is made herein to the spherical socket, per se, nevertheless, forming such socket with its center substantially in the plane of the lens ring is claimed herein.

With these and other objects in view, our invention consists in the arrangement, construction and combination of the various parts of our improved device, as described in the specification, claimed in our claims and illustrated in the accompanying drawing, in which:

Figure 1 is a front view through our improved headlight construction.

Figure 2 is a sectional view, taken upon the line 2—2 of Figure 1.

Figure 3 is a sectional view, taken upon the line 3—3 of Figure 2, and

Figure 4 is a sectional view, taken upon the line 4—4 of Figure 2.

Referring to the accompanying drawing, we have used the reference numeral 10 to indicate an automobile fender having a circular headlamp receiving opening 13 in its forward portion. A lamp housing 11 is provided, this housing being drawn to the shape of half a sphere with a flange 12 projecting outwardly therefrom. The flange 12 is adapted to be spot welded or otherwise secured to the fender 10 over the opening 13 with the spherical portion projecting into the fender. A bulb unit is adjustably secured in the housing 11, as will later be described.

Four spherical bearing surfaces 14 are coined in the outer portion of the housing 11 at equally spaced points therearound, the surfaces all coinciding with the surface of a sphere having a center at 15. The center 15 is substantially in a vertical plane through a stationary lens ring which will later be described. The purpose in coining

the four surfaces 14 is to insure accurate spherical bearing surfaces for the lamp adjusting device. From a manufacturing standpoint it is much easier to accurately coin four spots in the lamp housing than to draw the entire housing to an exact spherical shape.

A projector bulb frame 16 is formed as a ring shaped member having a spherical periphery which is adapted to accurately seat upon the spherical surfaces 14. The inner edge of the frame 16 is provided with an inwardly extending flange 17 and a plurality of brackets 18 are secured at various points around the ring, which brackets extend outwardly therethrough. A pair of adjusting brackets 19 is secured to the frame 16, one at the upper edge thereof and one spaced 90 degrees therefrom. Each of the brackets 19 is provided with radially extending slot therein which receives the body portion of an adjusting screw 20, these screws being threaded into the lamp flange 12. Adjustment of the screws 20 inwardly will thereby move the adjacent bracket 19 and adjacent portion of the frame 16 inwardly and thus cause the frame to swing around the center 15.

A ferrule 21 extends through the back of the housing 11, which ferrule is secured to a flexible conduit 22 through which the electrical wiring 23 is extended. A spring anchor flange 24 is attached to the inside end of the ferrule 21 at the same time that the ferrule 21 is secured in position. The anchor 24 has three ears 25 extending radially therefrom.

A pair of tension coil springs 26 extend from two of the ears 25 to the flange 17, which springs are diametrically opposed to the brackets 19 respectively. A compensating spring 27 extends between the anchor and flange 17 in position between the two brackets 19. The two springs 26 being opposite the brackets 19, urge the adjacent portions of the frame 16 inwardly with a greater pressure than is exerted by the single compensating spring 27. For this reason the adjusting screws 20 are always under a tension, with a force amounting to the difference between the force exerted by the two springs 26 and that of the spring 27. It should be kept in mind, however, that the frame 16 is drawn back into its socket by the combined force of all three springs, whereas the pressure upon the adjusting screws is only the difference between the force of the two springs 26 and that of the spring 27. Thus the springs may be made quite stiff to hold the frame in its socket under a relatively high total spring pressure and still the adjusting force will need be comparatively light.

The projector bulb used in this lamp forms no part of this invention but is described herein to more clearly illustrate the application of this invention to this type of bulb. The bulb consists of a spherical lens 28 which is placed over a parabolical shaped reflector 29. The reflector may be formed of either metal or glass, but in either event the lens and reflector are hermetically sealed along their abutting edges by a rim 30. A base plug 31 is sealed in the center of the reflector along its axis which plug is provided with lead-in terminals 32 fixed therein which extend through the reflector and make electrical connection with a pair of filaments 33. If the reflector 29 is formed of metal the inner surface is silver plated, while if it is formed of glass silver is deposited thereon in the conventional method of manufacturing glass reflectors. The interior of the bulb unit is evacuated after assembly. In some installations it may be desirable to seal a standard bulb into the reflector in place of the filaments 33 but in either case the unit is evacuated. Each of the brackets 18 is provided with an inturned ear 34 against which the rim 30 bears to form a seat for the bulb unit. A locating lug 35 is formed at one point on the rim 30, which lug fits into a slot 36 in the frame 16 to thereby accurately locate the bulb in the supporting member 16. This is essential in automobile headlamps because the location of the filaments in the bulb and the prism design of the lens 28 must be predetermined in order to secure the correct light pattern upon the road surface. The bulb unit is held against the ears 34 by means of a ferrule 37 which is secured to the brackets 18 by means of screws 38.

Thus, when the bulb unit is assembled into the frame 16 and the ferrule 37 is screwed in place the bulb and frame oscillate as a unit for all adjustment purposes. A socket 39 is fastened to the wires 23, which socket is inserted over the terminals 32 just before the bulb is placed in the frame. A lamp rim 40 is detachably secured to a forwardly extending ledge 44 which projects from the outer edge of the flange 12, the rim 40 having an opening therein sufficient to allow the ferrule 37 to be freely inserted therethrough. The center of oscillation of the bulb lies in the plane of the rim 40 so that appreciable oscillation of the bulb and frame 16 is permitted with very little clearance between the rim 40 and the ferrule 37. It is, of course, necessary to remove the rim 40 before adjustment of the lens is made, and with this construction no interference between the rim and the ferrule 37 can occur in any position of adjustment.

It will be noted that the bottom portion of the rim 40 is provided with a bull's-eye lens 41 and that a parking light socket 42 is mounted in the rim 12 directly at the rear of the bull's-eye 41. A parking light bulb 43 is fixed in the socket 42 and is connected by suitable wiring to the electrical system of the vehicle.

Two important advantages result from our improved lamp construction. The projector bulb unit, which invariably weighs several times that of the former reflector, is retained resiliently in the lamp housing by relatively heavy spring pressure while the adjusting mechanism which oscillates the bulb unit only is required to counteract a relatively small spring pressure to adjust the bulb.

Another advantage arises in oscillating the bulb unit around a center which lies in the plane of the lamp rim as in this way the clearance between the lamp rim and the bulb assembly may be made very small and still be able to compensate for all of the variations in the adjusted positions of the bulb.

Some changes may be made in the arrangement, construction, and combination of the various parts of our improved headlight construction without departing from the spirit of our invention and it is our intention to cover by our claims such changes as may reasonably be included within the scope thereof.

We claim as our invention:

1. A headlamp of the character described comprising, a combined reflector and filament and lens unit, an annular frame adapted to receive said unit, said frame having a spherical surface thereon the center of which lies within said unit, a spherical lamp housing having a complementary spherical surface thereon adapted to receive said spherical frame surface for limited oscillation, a

pair of tension springs extending between said frame and said housing at points spaced substantially 90 degrees apart around said frame, a pair of adjusting screws extending between said frame and said housing spaced diametrically opposite to said springs, respectively, and a compensating spring extending between said housing and said frame, said compensating spring coacting with said frame at a point between said adjusting screws.

2. A headlight of the character described comprising, a projector bulb, a frame adapted to receive said bulb, said frame having a spherical surface thereon the center of which lies within said bulb, a spherical lamp housing having a plurality of spherical surfaces thereon adapted to receive said spherical frame surface for a limited oscillation of said bulb therein, a pair of tension springs extending between said frame and the center of said housing spaced substantially 90 degrees around the periphery of said frame, adjusting screws extending between said frame and said housing in substantially diametrical alignment with said springs, respectively, and a compensating spring extending between said frame and said housing diametrically opposed to the direction of the resultant force of said first-mentioned springs whereby said adjusting means need only counteract the difference in spring pressure between said springs.

3. A head lamp of the character described, comprising, a reflector unit consisting of a reflector and lens and frame, said frame having a spherical surface thereon, the axis of which is aligned with the axis of said reflector, a lamp housing having a complementary spherical surface thereon adapted to receive said spherical frame surface for universal oscillation, a pair of tension springs extending between said frame and said housing at points spaced substantially less than 180° apart whereby said unit is resiliently urged to oscillate in one direction by the combined force thereof, adjusting means extending between said frame and said housing to selectively fix the distance therebetween at said adjustment points, and adjustment points being substantially opposite said pair of springs, a compensating spring between said frame and said housing substantially aligned with and opposing the resultant of said pair of springs, all of said springs resiliently urging said frame into engagement with said housing.

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