April 4, 1939. S. F. ARBUCKLE ET AL 2,152,834

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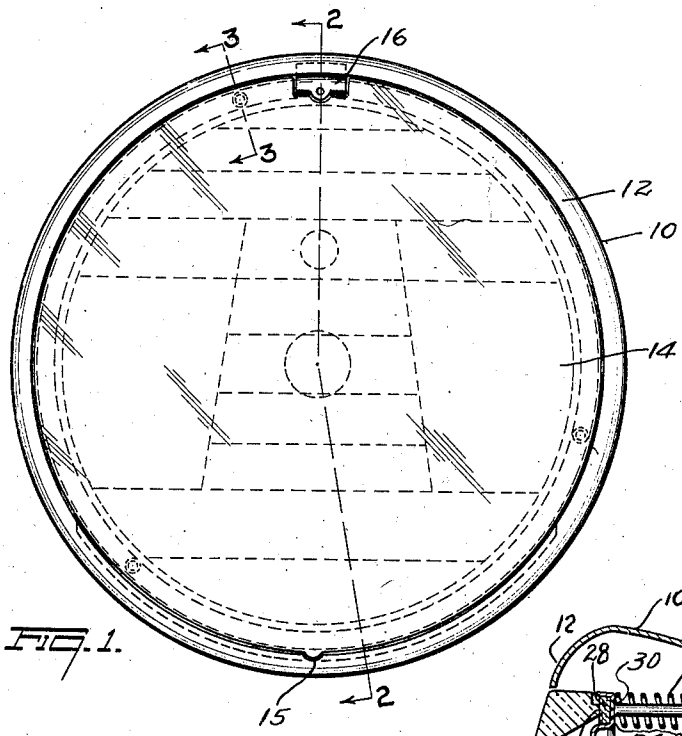



FIG. 1.

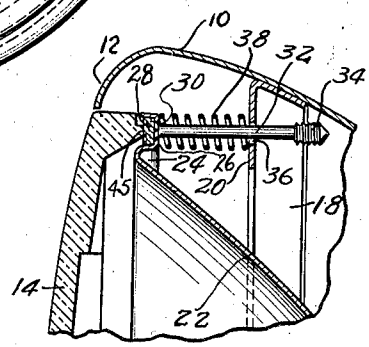



FIG. 3.

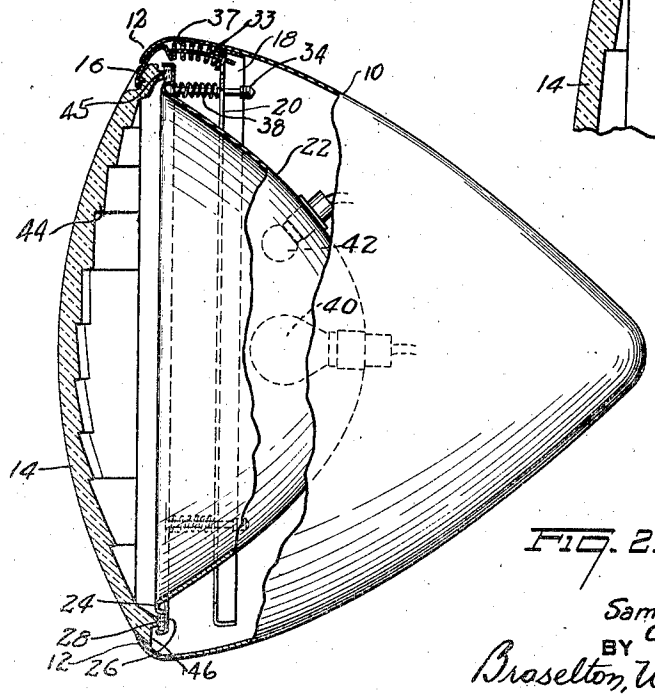



FIG. 2.

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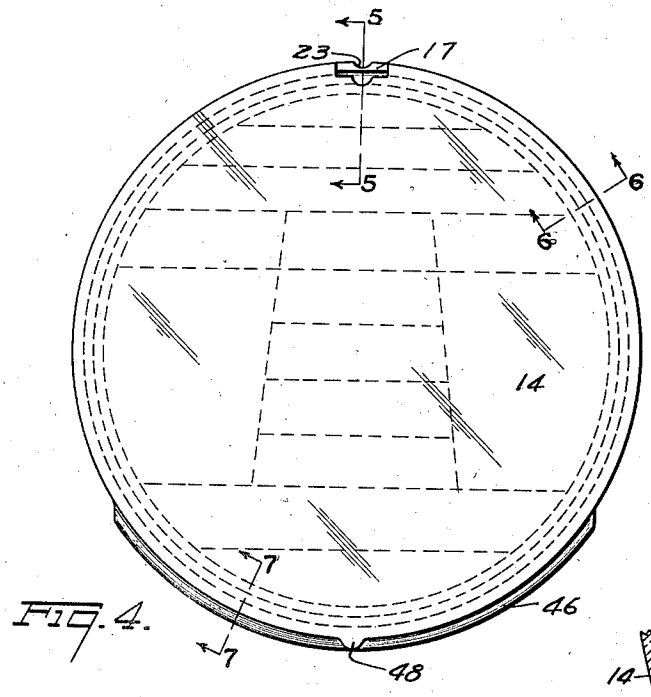



Fig. 4.

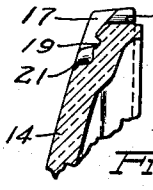



Fig. 5.

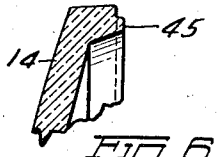



Fig. 6.

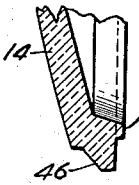



Fig. 7.

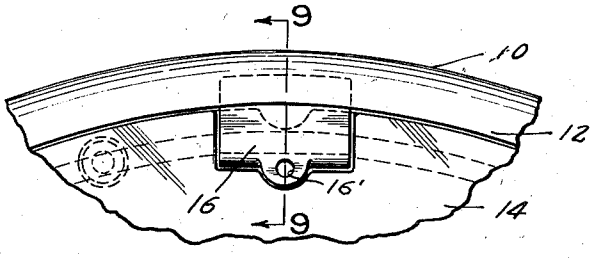



Fig. 8.

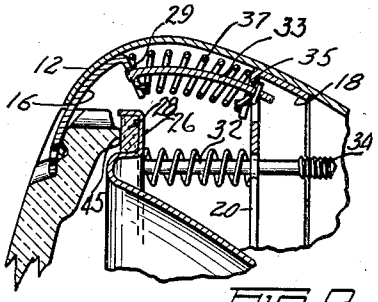



Fig. 9.

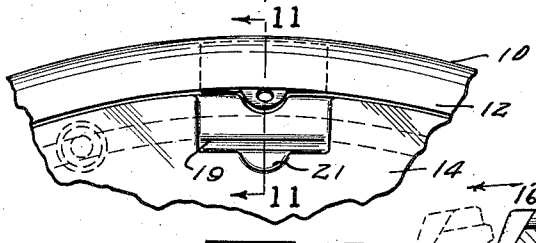



Fig. 10.

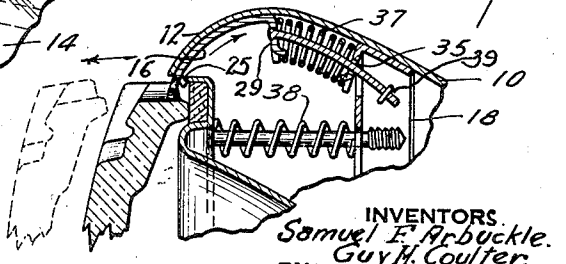



Fig. 11.

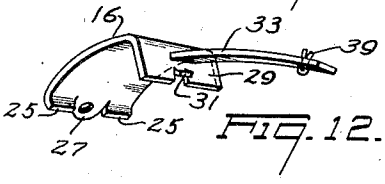



Fig. 12.

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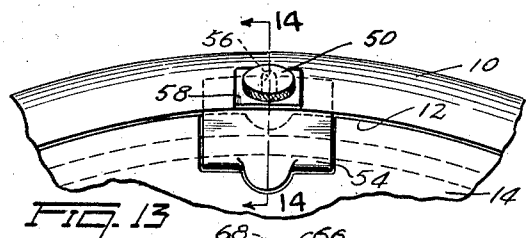



FIG. 13

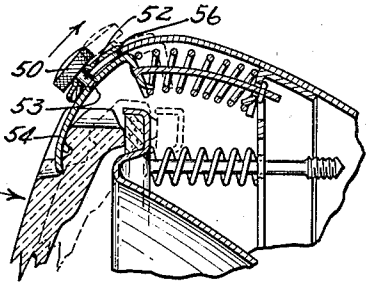



FIG. 14.

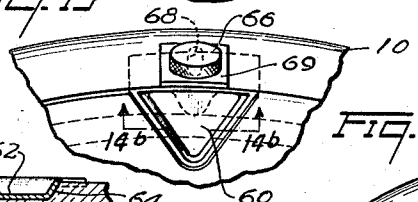



FIG. 14a

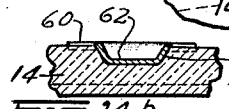



FIG. 14b

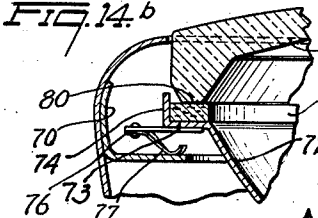



FIG. 16.

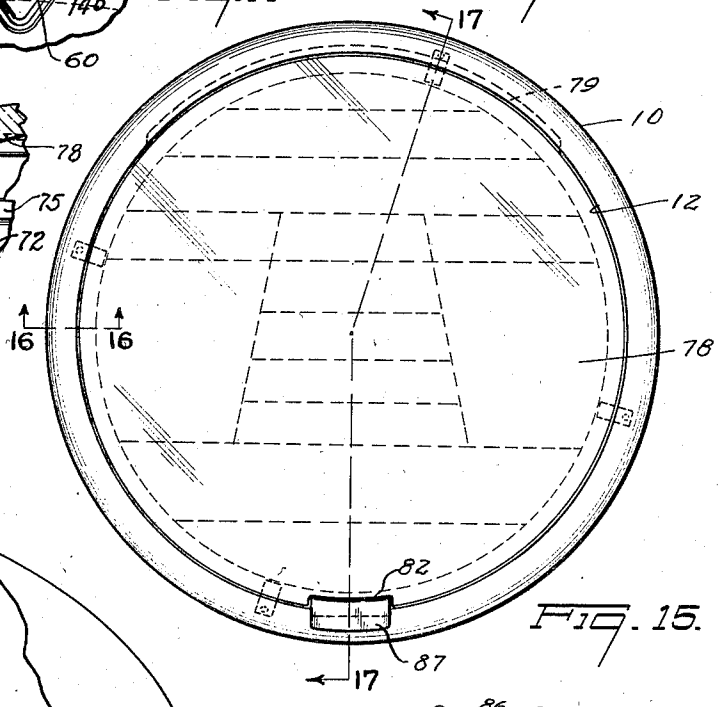



FIG. 15.

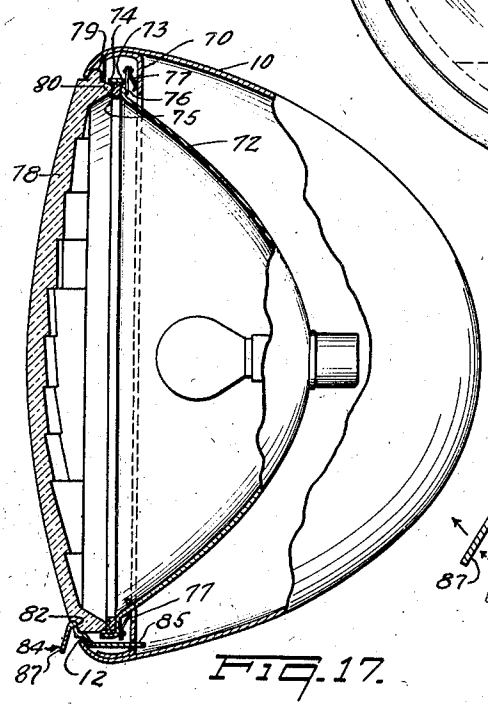



FIG. 17.

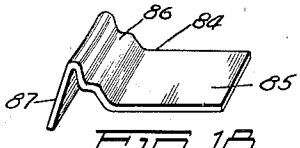



FIG. 18.

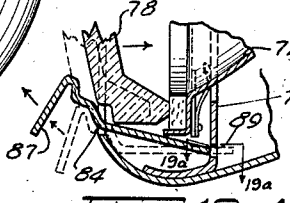



FIG. 19.

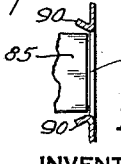



FIG. 19a

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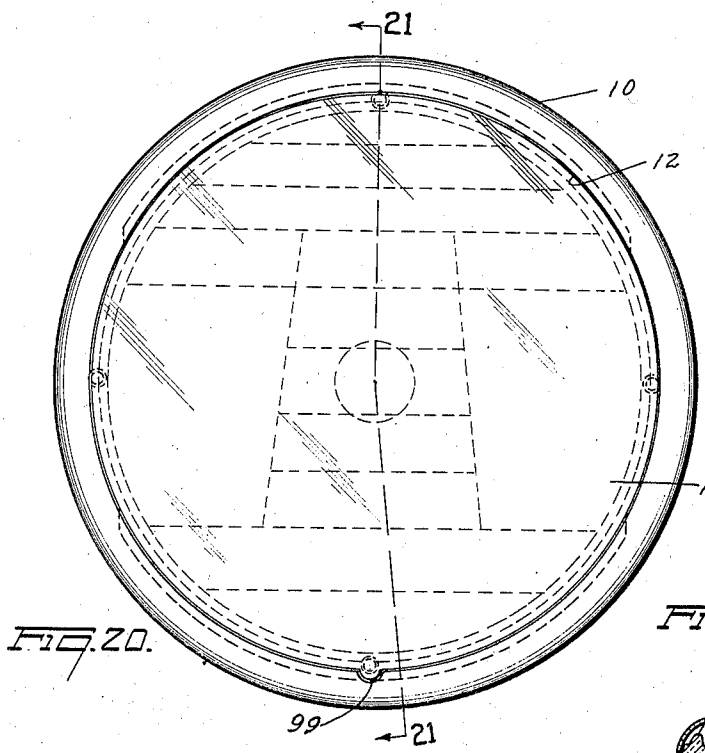



FIG. 20.

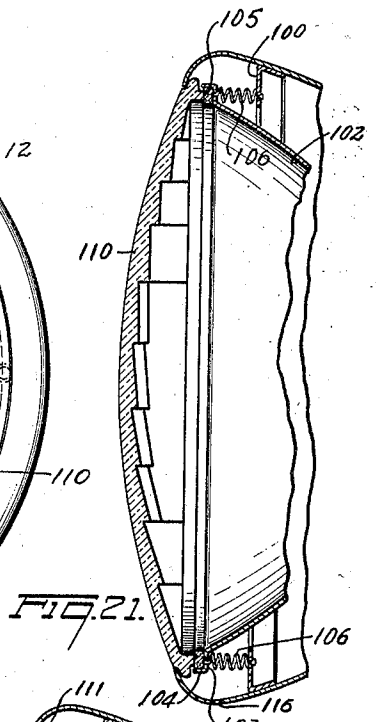



FIG. 21.

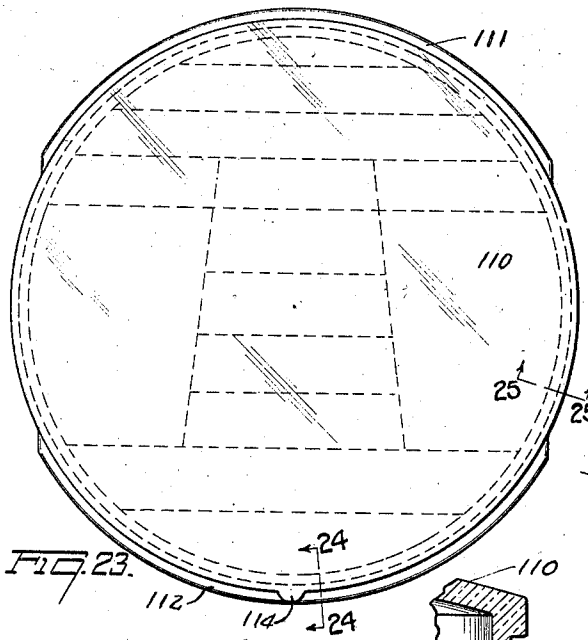



FIG. 23.

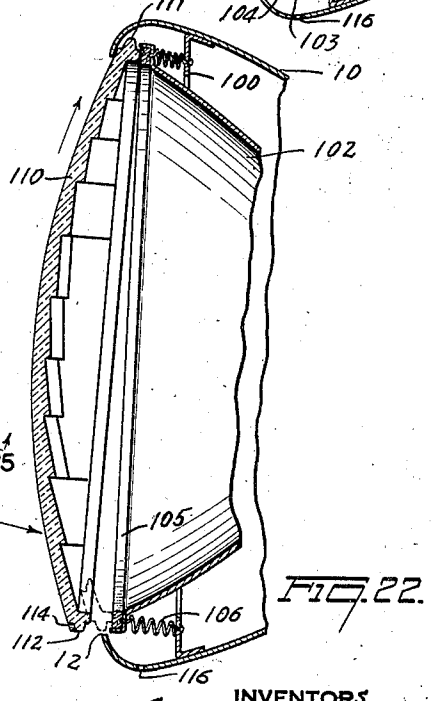



FIG. 22.




FIG. 24.




FIG. 25.

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Patented Apr. 4, 1939

2,152,834

# UNITED STATES PATENT OFFICE

2,152,834

## LAMP

Samuel F. Arbuckle and Guy H. Coulter, Highland Park, Mich., assignors to United Lens Corporation, Detroit, Mich., a corporation of Delaware

Application July 25, 1935, Serial No. 33,121

9 Claims. (Cl. 240—41.5)

This invention relates to improvements in lamps and particularly to an improved arrangement of headlamp construction for automotive vehicles.

The invention relates to an arrangement of lamp casing and lens construction wherein the opening of the lamp casing is entirely closed solely by the lens.

The invention embraces the formation of a headlamp casing of an integral construction and a particular lens arrangement which is of simple construction and readily assembled with the headlamp casing to provide a substantially closed arrangement wherein the lens forms the sole cover for the opening of the casing.

A further object of the invention is the provision of a headlamp construction wherein the lens is of particular configuration to be assembled within and retained as a front cover for headlamp casing of integral construction and wherein a seal is resiliently effected for the reflector.

A further object of the invention is the provision of a lamp of this character wherein the lens is formed with retaining means so that assembly and disassembly may be made without the use of special tools.

Still a further object of the invention is the provision of a lens of a character for completely enclosing the forward portion of a lamp casing and which is integrally formed with retaining means of a character which will properly locate the lens with respect to the lamp casing.

Another object is the provision of a headlamp construction wherein the lens forms the sole cover for the opening in the lamp casing whereby rims and special tools and retaining devices have been entirely eliminated and the assembly of the lamp greatly facilitated and simplified.

Further objects and advantages are within the scope of this invention such as relate to the arrangement, operation and function of the related elements of the structure, to various details of construction and to combinations of parts, elements per se, and to economies of manufacture and numerous other features as will be apparent from a consideration of the specification and drawings of a form of the invention, which may be preferred, in which:

Figure 1 is a front elevational view of a headlamp of our invention;

Figure 2 is a side elevational view partly in section showing a form of invention of retaining the lens within the integrally formed casing;

Figure 3 is an enlarged fragmentary sectional view showing a form of means for resiliently retaining the reflector within the headlamp casing and of effecting a seal between the lens and reflector construction;

Figure 4 is a front elevational view of the lens per se as illustrated in the assembly view of Figure 1;

Figure 5 is an enlarged fragmentary vertical sectional view through the lens taken on the line 5—5 of Figure 4;

Figure 6 is an enlarged fragmentary vertical sectional view through the lens taken on the line 6—6 of Figure 4;

Figure 7 is an enlarged fragmentary vertical sectional view through the lens taken on the line 7—7 of Figure 4;

Figure 8 is a fragmentary elevational view showing one form of retaining means for the lens in the headlamp casing;

Figure 9 is an enlarged fragmentary vertical sectional view showing the form of lens retaining means illustrated in Figure 8, this view being taken on the line 9—9 of Figure 8;

Figure 10 is a view similar to Figure 8 showing a lens retaining means in retracted position;

Figure 11 is a fragmentary vertical sectional view taken substantially on the line 11—11 of Figure 10;

Figure 12 is an isometric view of a particular form of lens retaining means forming an element of our invention;

Figure 13 is a fragmentary elevational view showing another form of lens retaining means of our invention;

Figure 14 is an enlarged fragmentary detail sectional view taken substantially on the line 14—14 of Figure 13.

Figure 14*a* is a view similar to Figure 13 showing still another form of lens retaining means of our invention;

Figure 14*b* is a fragmentary detail sectional view taken substantially on the line 14*b*—14*b* of Figure 14*a*;

Figure 15 is a front elevational view of a headlamp of our invention wherein a lens retaining means is positioned at the lower portion of the headlamp;

Figure 16 is an enlarged fragmentary sectional view taken substantially on the line 16—16 of Figure 15;

Figure 17 is a partial vertical sectional view, the section being taken substantially on the line 17—17 of Figure 16;

Figure 18 is an isometric view of a lens retaining element of our invention;

Figure 19 is an enlarged fragmentary detail view showing the method of assembly of the lens retaining means of Figure 18 of our invention;

Figure 19*a* is a detail sectional view taken on the line 19*a*—19*a* of Figure 19;

Figure 20 is a front elevational view of still a further form of the invention wherein the lens is retained within the headlamp casing by means of particular lens configuration;

Figure 21 is a substantially vertical sectional view taken substantially on the line 21—21 of Figure 20;

Figure 22 is a view similar to Figure 21 showing the method of assembling the lens and associated parts of the headlamp;

Figure 23 is a front elevational view of a lens illustrated in Figure 22;

Figure 24 is an enlarged fragmentary sectional view taken substantially on the line 24—24 of Figure 23;

Figure 25 is an enlarged fragmentary sectional view taken substantially on the line 25—25 of Figure 23.

Though the invention has been illustrated as incorporated for use in vehicle headlamp constructions, it is to be understood that its use is contemplated in all types of lamps or light projecting apparatus and wherever the same may be found to have utility.

Referring to the drawings and particularly Figures 1 to 3 thereof, the structure illustrated as incorporating a form of the invention is shown as a headlamp or light projecting apparatus suitable for use on automotive vehicles, and includes an outer casing or housing 10. The casing 10 is formed at its open end with an inturned flange 12 preferably provided with a notch or recess 15. The flange 12 serves to support a lens or light emitting closure 14, providing in the embodiment illustrated the sole means to enclose the open end of the casing 10. The lens or closure 14 is secured in position by a locking or retaining member 16 preferably located substantially opposite the notch 15 and adjacent the top of the casing. Interiorly of the casing 10 is secured a support 18 of annular formation provided with an inwardly directed flange portion 20 serving to support the retaining member 16 and a reflector or light projecting means 22.

The reflector 22 is provided with a radial projection or flange 24 having a groove 26 to receive a suitable gasket or sealing means 28 of cork or other sealing material. The groove portion 26 is provided with a plurality of spaced openings 30 adapted to receive reflector positioning elements or screws 32 having enlarged end portions 34 adapted to have threaded engagement with openings 36 in the flange 20 during assembly, the end portions 34 serving as stops upon being projected through the openings 36. The unthreaded portions of screws 32 are surrounded by expansive springs 38 the extremities of which contact with the flanges 20 and 24 tending to separate the flanges and resiliently hold the reflector 22 in spaced relation with respect to the support 18. Arranged in the reflector 22 are lamps 40 and 42 provided with suitable light sources or filaments (not shown).

The lens 14 as illustrated is provided with a smooth convex exterior surface and a concave interior surface having horizontal prisms 44, but it is to be understood that other types of lenses having different prism arrangement may be used. As particularly illustrated in Figures 1, 2 and 7, the lower portion of the lens 14 is provided with an extension or projecting flange 46, the forward surface of which is engageable with the inturned flange 12 of the casing 10. A positioning lug or tongue 48 is provided in the lens adjacent its lower edge adapted to engage the recess 15 in the edge of the casing 10. The upper edge of lens 14 is provided with a recessed portion 17 as illustrated in Figure 5. The recess 17 is preferably formed with a horizontally disposed groove 19 and notch 21. The edge portion of the lens adjacent the recess 17 has a second notch or recess 23 to properly position the lens in the lamp and to facilitate installation or removal thereof as will hereinafter appear. An annular wall or extension 45 is provided on the inner surface of the lens 14 to engage with gasket 28 to seal the reflector 22 from ingress of moisture and other foreign matter.

The movable lens retaining member 16 includes a body portion of arcuate configuration adapted for sliding engagement with the interior surface of flange 12 on the lamp casing, a pair of inturned lugs 25 being provided adjacent a projection 27 at one end of the member 16 adapted to respectively engage the groove 19 and slot 21 of the lens 14. The other end of member 16 is provided with an angularly disposed portion 29 formed with a struckup projection 31. A guide member 33 is riveted or otherwise secured at one end to the portion 29, the other end of member 33 projecting through an opening 35 in the ring member 18. The member 16 is resiliently urged into engagement with the lens 14 by means of a spring 37 surrounding the guide member 33, the ends of the spring being engageable with projection 29 and ring member 18, projection 31 serving to properly position the spring 37 with respect to the guide member 33. Means such as a cotter key 39 may be secured in the end of guide member 33 to limit its outward movement and thus prevent dislodgement of the retaining member 16 when the lens is removed from the lamp casing.

In order to remove the lens 14 from the casing 10, the retaining member 16 is moved upwardly from the position shown in Figure 8 to the position illustrated in Figure 10 and this operation, while same may be performed by moving the member 16 by a finger, the same is readily accomplished by inserting a suitable instrument or tool in the opening 16' in the member. Due to the expansive characteristics of the uppermost spring 38, the lens is forced outwardly beyond the edge of the casing when member 16 is retracted thus permitting removal of the lens by raising the same to free the flange 46 from the casing flange. The lens 14 is installed by first positioning the lens projection 46 rearwardly of edge 12 of the lamp casing so that the lug 48 engages the recess 15. The upper portion of the lens is then moved rearwardly so that the wall 45 engages gasket 28 to move the reflector 22 rearwardly against the pressure of springs 38. Retaining member 16 is held in its uppermost position until lens 14 is in proper position, at which time member 16 is moved into engagement with the lens recess 17 under the force of spring 37 so that the lips 25 of the retaining member 16 engage the groove 19 in the forward face of the lens.

Another form of lens retaining means is illustrated in Figures 13 and 14. In this form of the invention a knurled knob 50 having a stem portion 52 is secured to retaining member 54 in a suitable manner as at 53. To accommodate the

stem 52 and permit relative slidable movement between the retaining member and the housing, a slot 56 is provided in the wall of casing 10 adjacent the open end 12. A cover 58 preferably carried by the stem 52 so as to be movable with knob 50 is provided to prevent the ingress of moisture and foreign matter through the slot 56. Thus, it will be noted that by the use of the knurled member 50, easy and effective manipulation of the retaining member 54 is provided, without necessitating the use of special tools, the installation and removal of the lens 14 being otherwise similar to the form of the invention hereinbefore described.

In Figures 14*a* and 14*b*, another form of lens retaining member is illustrated wherein the lower portion of retaining member 60 is substantially V-shaped, the central portion being recessed as at 62. To accommodate the recessed portion 62, lens 14 is formed with a similarly recessed portion 64. To manipulate the retaining member 60, a knurled member 66 may be secured thereto in the manner illustrated in Figures 13 and 14, a slot 68 being provided in the casing 10 to permit movement between the member 60 and the casing. A cover 69 is preferably positioned over the slot 68 and movable with the member 66 to at all times cover the slot 68.

A further form of the invention has been illustrated in Figures 15 to 19 inclusive, wherein the casing 10 is provided with an open end 12. In this form of the invention, a reflector and lens positioning member in the form of a ring 70 is fixed within the casing adjacent the open end 12. A reflector 72 provided with a flange portion 73 terminating in an annular extension 74 is received within the opening provided by the ring 70. The flange 73 serves to position a gasket member 75 of cork or other suitable material for effectively sealing the reflector from moisture when a lens 78 is properly positioned within the casing. To the rear of the flange 73 are suitably secured a plurality of spaced mounting elements 76 to which are secured, as by riveting, resilient or spring members 77. The extremities of the spring members 77 are engageable with the ring 70 and tend to yieldingly position the reflector 72 with respect to the ring. The lens 78 of any desired type is preferably provided with a projection 79 along its upper edge. The rear surface of lens 78 is formed with an annular ledge or extension 80 which is adapted to engage the gasket 75. In the front surface of lens 78 and preferably adjacent the lower edge thereof is provided an annular recessed portion 82.

To removably secure lens 78 in the casing, a retaining member or clip 84, illustrated in detail in Figure 18, is provided. Clip 84 is formed with a uniplanar body portion 85 terminating in a stepped portion 86 having a lip 87 disposed angularly with respect thereto. To accommodate the clip 84 and to guide the same during its movement with respect to the casing, a slotted opening 89 is provided in the ring 70. The clip 84 is of a width to correspond to the length of the recess 82 in the lens 78 and the slot 89 in the ring 70, the side walls of the slot 89 having projecting angularly disposed portions 90 to facilitate or guide the entrance of clip 84 into the slot.

To install the lens 78 in the open end of a casing 10, the upper edge of the lens is inserted within the casing so that the projection 79 thereof engages the inner wall of the casing 10. The lower portion of the lens is then moved into contact with the gasket 75 against the tension of springs 77 until the several elements are substantially in the position illustrated in full lines in Figure 19. The clip 84 is then placed in the position illustrated in full lines so that the uniplanar portion 85 may be projected through the opening 89 in the ring 70. The clip 84 is then moved to the position indicated in dotted lines in Figure 19 and the tension of springs 77 then force the reflector and thus the lower portion of the lens outwardly until the lower edge of the lens is in engagement with the stepped portion 86 of the clip, thus retaining the lens and associated parts in position in the casing. To remove the lens from the casing, the lower portion of the lens 78 is forced inwardly and the clip 84 raised upwardly and withdrawn from the casing. The removal of the clip 84 from the casing permits withdrawal of the lens from the open end of the casing, the spring members 77 forcing the reflector 72 and thus lens 78 outwardly along its lower edge to facilitate the latters removal.

A still further form of the invention is illustrated in Figures 20 to 25 inclusive, wherein casing 10 is provided with an open end 12 having a notch or recess 99 in the lower edge thereof. Adjacent the open end of the casing is secured a ring-like member 100 forming an opening to receive a reflector 102. Reflector 102 is provided with a flange portion 103 which terminates in an annular portion 104, the flange 103 serving to position a sealing gasket 105. Between the ring member 100 and the flange 103 in assembled relation are positioned a plurality of resilient members or springs 106 preferably of the expansive type. The springs 106 serve to resiliently mount the reflector 102 and also hold the reflector in spaced relation with respect to the ring 100.

To enclose the open end of the casing 10, a lens 110 is provided which is preferably formed with peripheral projections or extensions 111 and 112 on the upper and lower edges respectively. At the lower front edge of lens 110 is formed a projection 114 engageable with the recess 99 in the casing when the lens is positioned therein.

To install lens 110 within the casing, the projection 111 is preferably inserted within the casing so that the front surface of the lens engages the open end 12 of the casing, to permit the projection 112 to be swung inwardly against the tension of the lowermost spring 106 and at the same time clear the lower edge of the casing. The lens is then moved downwardly until projection 114 engages the recess 99, at which time the peripheral projections 111 and 112 are in engagement with the surface of the inturned flange of the open end of the casing. Springs 106 exert sufficient force upon the reflector flange 103 and the lens to securely and positively hold the lens in position. To remove the lens from the casing, the upper part of the lens is moved rearwardly and then upwardly against the tension of spring 106 to permit the lower portion of the lens and projection 112 to be swung outwardly. The lens is then moved downwardly until projection 111 is free from the upper edge of the casing. The gasket 105 seals the space between the lens and the reflector when the several elements are in assembled relation. However, due to construction of the lens which permits its withdrawal and installation within the casing, a slight clearance is necessary and a certain amount of moisture may collect between the casing and the exterior of the reflector. If desired, an opening

116 may be provided in the lower portion of the casing to permit moisture which may collect within the casing to drain therefrom.

It is apparent that, within the scope of the invention, modifications and different arrangements may be made other than is herein disclosed, and the present disclosure is illustrative merely, the invention comprehending all variations thereof.

What we claim is:

1. A lamp comprising a casing having an inturned circular flange integrally formed at its open end, a reflector within said casing, a lens of a diameter which substantially corresponds to the diameter of the inner edge of said circular flange engageable with said reflector and having a projection underlying said casing flange, a retaining element engageable with said lens to secure the lens in said casing, means to urge said lens into engagement with said casing, and means to form a seal between said lens and said reflector.

2. A lamp comprising a casing having an inturned annular flange integrally formed at its open end, a lens having a major peripheral portion fitting said open end and having a projection underlying said flange whereby said lens may be inserted within and removed from said casing without distortion thereof, a recess in said lens, and retaining means engageable with said recess for securing the lens adjacent said flange.

3. A lamp comprising a casing having an inturned continuous annular flange integrally formed at its open end, a lens formed with a peripheral contour fitting said open end and having a projection underlying said flange, means within said casing to urge said projection into engagement with said flange, and a retaining element having a portion exterior of said casing for removably securing said lens in said casing.

4. A lamp comprising a casing having an inturned continuous annular flange at its open end, locating means on said flange for positioning a lens, a lens fitting said open end and having a projection underlying said flange, a second projection on said lens engageable with said locating means, and retaining means adapted to be manipulated from the outside of said casing and engageable with a portion of said lens for securing the lens adjacent said flange.

5. A lamp comprising a casing having a flange at its open end, a lens fitting said open end and having a projection underlying said flange, retaining means engageable with a portion of said lens for securing the lens adjacent said flange, and a manipulating member secured to said retaining means.

6. A lamp comprising a casing having a flanged open end, a reflector within said casing, a lens engageable with said reflector and having a projection underlying said flanged end, a recess in said lens, a removable retaining element engageable with the recess in said lens to secure the lens in said casing, and means to urge said lens into engagement with said retaining element and said casing.

7. A lamp comprising a casing having an inturned open end, a reflector within said casing, a support for said reflector, a lens engageable with said reflector and having a projection underlying said inturned open end, retaining means engageable with said lens to secure the lens in said casing, resilient means between said reflector and said support to urge said lens into engagement with said casing, and sealing means between said lens and said reflector.

8. A headlamp comprising a housing having a lens receiving opening, and a lens fitting in the aperture in the housing, and provided at one side with means for interlocking with the housing to prevent axial separation thereof, and means at the other side of the lamp engaging an indenture in the lens for drawing the lens toward the housing and into clamping engagement therewith.

9. A headlamp comprising a housing having a lens receiving opening, a ring within the housing, a lens provided at one side thereof with means for interlocking with the edge of the opening to prevent axial separation of the lens and housing, means at the other side of the lens engaging an indenture therein for drawing the lens toward the housing and into clamping engagement therewith and means associated with said ring for resiliently urging the lens into engagement with the housing.

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