Sept. 5, 1939. H. W. KOST 2,172,248

LENS ASSEMBLY

Filed April 21, 1937

Fig. 1

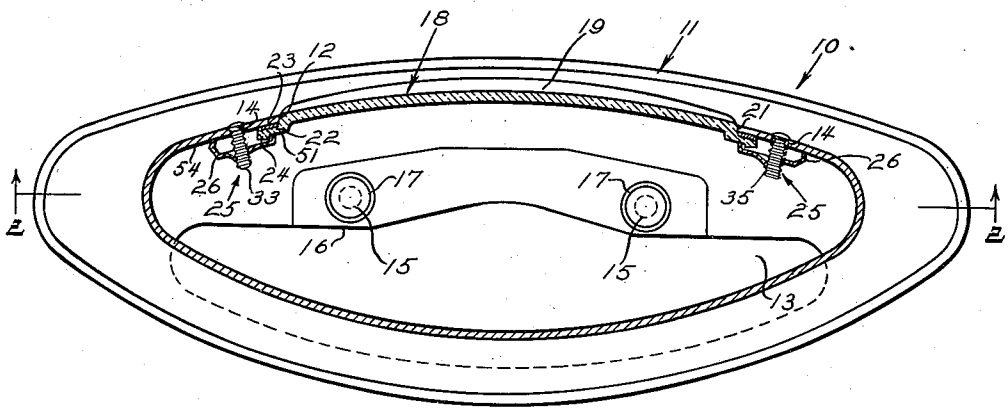
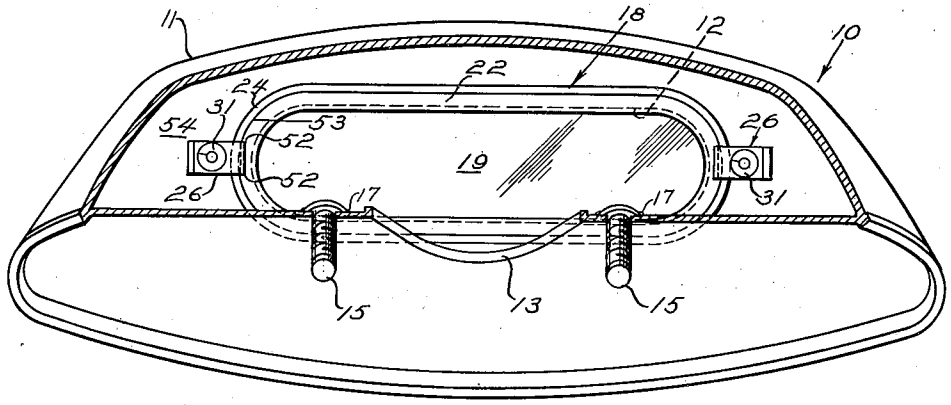


Fig. 2



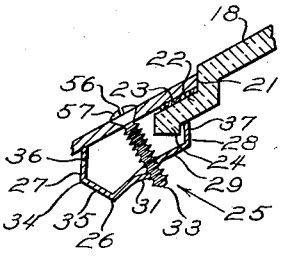


Fig. 3

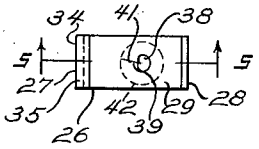


Fig. 4

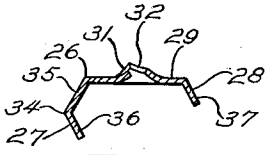


Fig. 5

Inventor

Harold W. Kost

By Strauch & Hoffman

Attorneys

Patented Sept. 5, 1939

2,172,248

UNITED STATES PATENT OFFICE

2,172,248

LENS ASSEMBLY

Harold W. Kost, Detroit, Mich., assignor to Prestole Devices, Inc., Detroit, Mich., a corporation of Michigan

Application April 21, 1937, Serial No. 138,239

3 Claims. (Cl. 240—151)

The present invention relates to a novel lens assembly and more particularly to a lens assembly for use in lights, such as automobile lamps.

The lens supporting member or casing in lamps of this character are now manufactured by die stamping processes, the metal casing, having the necessary openings therein for receiving the lens. The lens is disposed in the opening provided therefor and clamped against the casing by a suitable clip and screw. It often happens that the workman in drawing the clip down tightly fractures the lens. As a consequence, the broken lens must be discarded and the workman's time is lost thereby materially increasing the cost of production. Furthermore, even though the lens is properly assembled and tightened originally, vibration of the lamps in use causes the screws to loosen and permits vibration and consequent breakage of the lens.

It is; therefore, the primary object of the present invention to provide a lens assembly having means for securing the lens in place in such a manner that breakage of the lens is obviated when the securing means is tightened.

A further important object of the present invention resides in providing a lens assembly with a securing clip having a thread formed therein designed to automatically lock the securing clip to the screw so as to avoid accidental loosening.

Another object of the present invention resides in providing a lens securing assembly for use in securing a lens in a lamp with a resilient securing clip designed to yield when abnormal stresses are imposed and thus prevent breakage of the lens.

A further object of the present invention resides in providing a securing clip for use in a lens assembly with a thread formed by the thickness of said clip and protruding above the face of the clip to provide a conical protuberance designed to be drawn into snug contact with a cooperating screw upon tightening of the screw to thereby lock the screw against undesired rotation.

Another object of the present invention resides in providing a lens assembly with an attachment clip designed to be deformed to a point of destruction without breakage of the lens.

Further objects of the present invention will appear as the description thereof proceeds with reference to the accompanying drawing wherein:—

Figure 1 is a vertical sectional view through an automobile tail lamp showing the novel lens assembly of the present invention.

Figure 2 is a sectional view taken on line 2—2 of Figure 1 looking in the direction of the arrows.

Figure 3 is an enlarged fragmental view of the upper left hand fastener of Figure 1.

Figure 4 is an enlarged plan view of the clip of the present invention illustrating the manner in which the thread is formed therein, and,

Figure 5 is a sectional view of the clip provided by the present invention.

With continued reference to the drawing wherein like reference numerals are used to indicate the same parts throughout the several figures of the drawing, numeral 10 indicates an automobile tail lamp embodying the novel lens assembly of the present invention.

Lamp 10 comprises a one piece sheet metal casing or lens supporting member 11 having an elongated lens receiving opening 12, a bulb receiving opening 13 and small screw receiving apertures 14 located adjacent the ends of opening 12. Suitable supporting screws 15 are secured to casing 11 adjacent the upper edge 16 of opening 13 by welding, soldering or the like indicated by numeral 17.

A lens 18 of glass or similar transparent or translucent material having an embossed central portion 19 providing a shoulder 21 adapted to fit the wall of opening 12 is provided for closing the said opening. A flange 22 surrounds portion 19 and overlies the inner portion of casing 11 immediately adjacent opening 12. A suitable gasket 23 of cork or like material is preferably interposed between flange 22 and casing 10 so as to cushion lens 18 and prevent ingress of water or the like around lens 18. Flange 22 at its extreme outer edge is provided with a thickened portion or ridge 24.

Lens 18 is secured in opening 12 by means of novel fasteners 25 adapted to yieldingly retain flange 22 of lens 18 in contact with gasket 23 and prevent the imposition of breaking stresses upon lens 18 when fastener 25 is tightened during assembly operations. To this end fastener 25 comprises a sheet metal spring clip 26 having a pair of depending legs 27 and 28 connected by a bridge or body portion 29 having a conical protuberance 31 providing a helical thread 32 adapted to receive a screw 33.

Leg 27, as clearly seen in Figure 3, is substantially longer than leg 28 and is bent at 34 to provide an outwardly sloping portion 35 and inwardly bent portion 36. Leg 28 on the other hand consists of an outwardly sloping portion 37 terminating on a plane passing through point 34 of leg 27 parallel to body portion 29.

Protuberance 31 protrudes from the face of body portion 29 opposite that from which legs 27 and 28 extend. Protuberance 31 may be formed by providing body portion 29 with an opening 38 of irregular outline as illustrated in Figure 4. A portion of the wall of said opening extends radially as indicated by numeral 39. The remainder of the wall of opening 38 is spiraloid in form, that is, the distance from the center of the hole increases constantly from the radius passing through portion 39 in a clockwise direction. A slit 41 extends into body portion 29 of clip 26 from the straight portion 39 as illustrated. Protuberance 31, of clip 26 is formed by pressing the portion between dotted line 42 and opening 38 out of the plane of body portion 29 into frustro-conical form as seen in Figure 5 which shows clip 26 in its final form. This pressing step results in protuberance 31 of conical form, containing a truly circular opening in plan corresponding in size to the diameter of the screw 33 at the bottom of the thread, and the wall of which is disposed in the form of a helix having substantially the pitch of the screw intended to be threaded into engagement with the sheet metal clip.

In forming protuberance 31 it will be understood that the opening is enlarged to approximately the size and to the form of the minimum cross-sectional area of the screw intended to be threaded therethrough. The straight wall 39 is disposed at the highest point of the helix above the plane of clip 26 and in threading screw 33 into engagement with said clip the thread passes between said straight portion 39 and the lower adjacent portion of the clip as illustrated in Figure 3.

It, of course, will be understood that clip 26 may be formed in its entirety by a single stamping operation by using suitable dies.

Lens 18 is assembled with respect to casing 11 and secured in place in the following manner. Gasket 23 is secured in place adjacent opening 12 by means of a suitable adhesive and lens 18 is positioned in opening 12 from the inside of casing 11 with embossed portion 19 extending through opening 12 and flange 22 in engagement with gasket 23. Clips 26 are then passed through opening 13 and positioned with their opening 38 in alignment with one of the apertures 14 and leg 28 in engagement with surface 51 of lens 18 and corners 52 of leg 28 in contact with surface 53 of ridge 24. Leg 27, accordingly, rests upon inner surface 54 of casing 11 and portion 29 of clip 26 extends over ridge 24 and in spaced relation thereto.

Screw 33 is then passed through aperture 14 and the point of the screw is inserted into opening 38 of clip 26, the thread of the screw passing between the spaced portion 39 and the lower adjacent portion of clip 26 as the screw is turned into engagement with clip 26. A kerf 56 in head 57 of screw 33 is adapted to receive a screw driver for turning the screw into clip 26.

The pitch of screw 33 exceeds somewhat the thickness of the metal sheet and the edge of the opening 38 constitutes one convolution of a cylindrical helix having a pitch approximately equal to that of the screw. Screw 33 is turned until the thread 32 formed by the wall of opening 38 engages in the spiral groove of the screw spaced from head 57 a distance corresponding to the normal spacing of the screw receiving opening from the head 57. Further rotation of the screw causes the conical protuberance 31 to be flattened, that is, moved toward the plane of the body portion 29 of clip 26. As the conical protuberance is flattened the size of opening 38 is again restricted and the wall of opening 38 is forced into frictional or biting engagement with the screw at the bottom of the groove in which said wall is engaged. The rotation of the screw can be continued with increasing engagement between the wall of the opening and the bottom of the screw until the engagement is such that the screw will be firmly held in the sheet metal elements, and any vibration of the structure will not result in reverse rotation or unthreading of the screw.

If desired, the turning of the screw can be continued until the conical protuberance 31 is brought almost to the normal plane of the body portion 29, or under some circumstances the portion of metal forming the protuberance may assume a camber thus enhancing the gripping effect of the clip on the shank of the screw. The gripping effect may be still further enhanced by roughening the wall of opening 38 so as to present minute or small teeth that bite into the shank of the screw when the size of the opening is reduced in drawing the screw taut.

Since clip 26 is made of spring metal and is supported by legs 27 and 28 which respectively engage casing 11 and the relatively strong flat surface 51 of lens 18, the normal tightening of screw 33 as pointed out above will cause a slight deformation of resilient clip 26 and will not impose undue stresses on lens 18 and cause breakage of the lens. As a matter of fact, lens 18 cannot be broken even though the workman assembling the lens is grossly negligent in tightening screw 33 since the clip 28 will be deformed and will break before undue stresses will be imparted to lens 18. Furthermore, since leg 28 engages portion 51 over a relatively great area of maximum strength the possibility of breakage, irregardless of the yieldability of clip 26, is greatly lessened.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiment is therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

1. In combination a lens supporting member having an opening therein for receiving a lens and apertures for receiving securing screws; a lens having an embossed portion thereon projecting through said opening, a flange thereon for engaging said member in the region of said opening, and a ridge at the edge of said flange extending in the opposite direction from said embossed portion; screws disposed in said apertures with their heads in engagement with said member and their shanks extending away from said member in the substantial direction of said ridge; resilient sheet metal clips, each of which has a bridge portion, depending legs and a helical thread in said bridge portion, one of said clips being provided for each screw and disposed with one of said legs engaging said member and the other of said legs engaging said flange inwardly of said ridge whereby said bridge portion spans said ridge and said thread is positioned for en-

gagement with its associated screw; and means on said screw heads whereby said screws may be threadedly engaged with said helical thread and turned to draw said clip into engagement with said lens and said member to yieldingly secure said lens in position.

2. The combination defined in claim 1 wherein said helical thread is formed by a conical protuberance which flattens under the pressure developed incident to turning said threaded element and causes said helical thread to grip said element and lock it against accidental displacement.

3. In combination, a lens supporting member having an opening therein for receiving a lens, and apertures for receiving securing screws; a lens of sufficient size to close said opening and bear upon said member in the region surrounding said opening and having a ridge at the edge of said lens extending in a direction away from said supporting member; screws disposed in said apertures with their heads in engagement with said member and their shanks extending away from said member in the substantial direction of said ridge; resilient sheet metal clips, each of which includes a bridge portion, depending legs and a threaded opening, one of said clips being provided for each screw and disposed with one of said legs engaging said member and the other of said legs engaging said flange inwardly of said ridge whereby said bridge portion spans said ridge and said thread is positioned for engagement with its associated screw; and means on said screw heads whereby said screws may be threadedly engaged with said threaded opening and turned to draw said clip into engagement with said lens and said member to yieldingly secure said lens in position.

HAROLD W. KOST.