Nov. 7, 1967 F. F. STUBE ET AL 3,351,751

COMBINED LAMP HOUSING AND LENS

Filed June 21, 1965 2 Sheets-Sheet 1

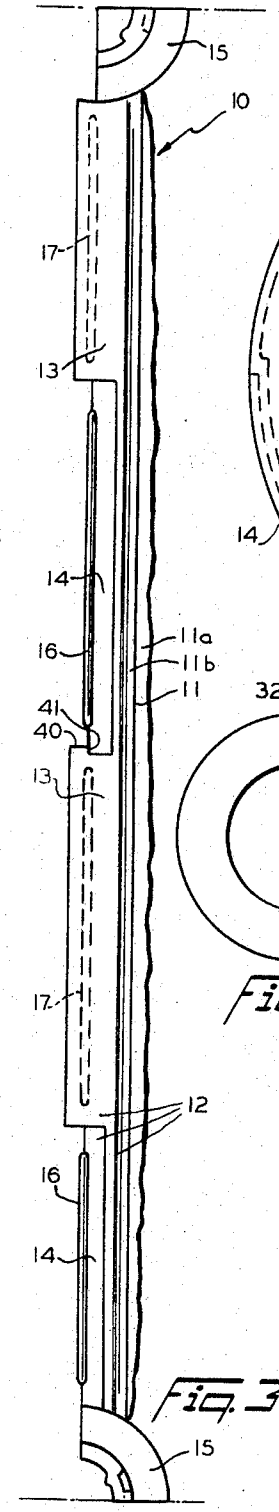


Fig. 3

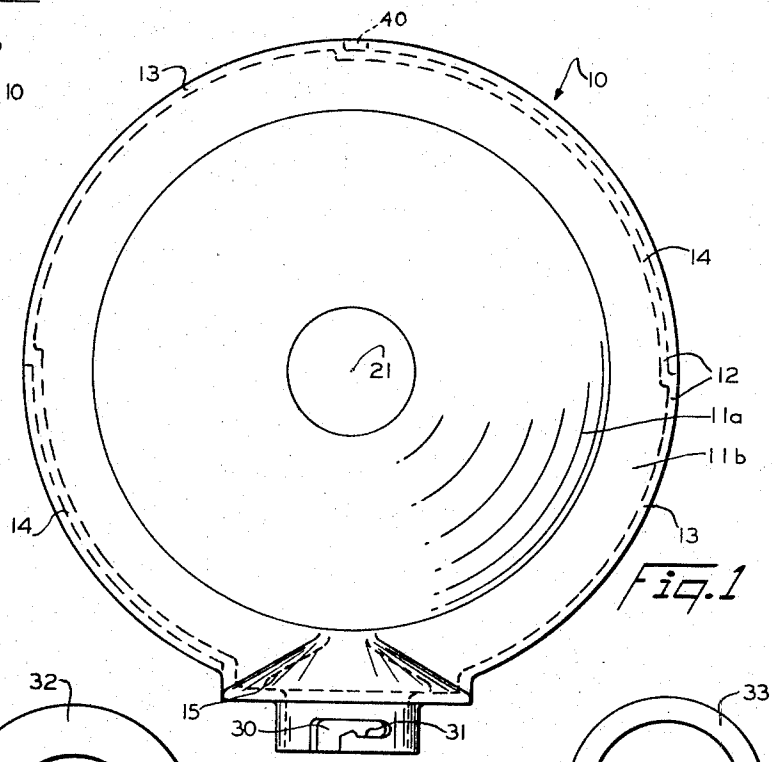


Fig. 1

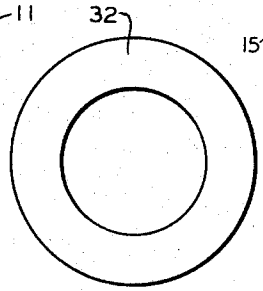


Fig. 9

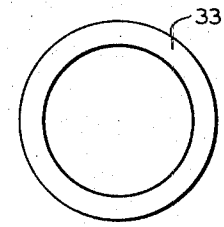


Fig. 10

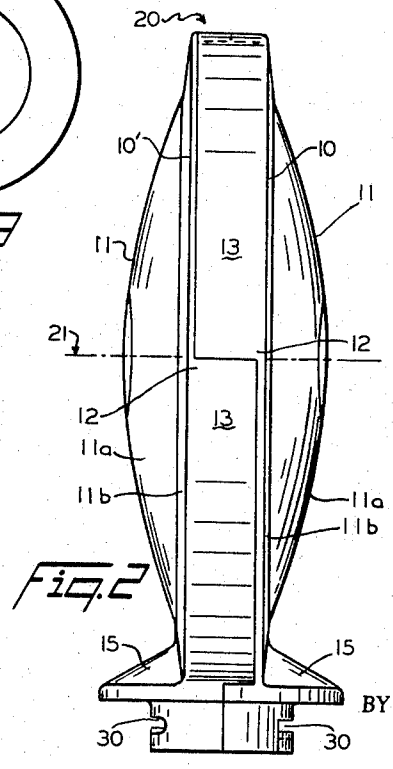


Fig. 2

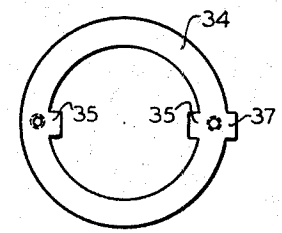


Fig. 11

INVENTORS
FRED. F. STUBE AND
EDWARD J. NITSCH
BY
Burns & Jenney
Att'ys.

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COMBINED LAMP HOUSING AND LENS

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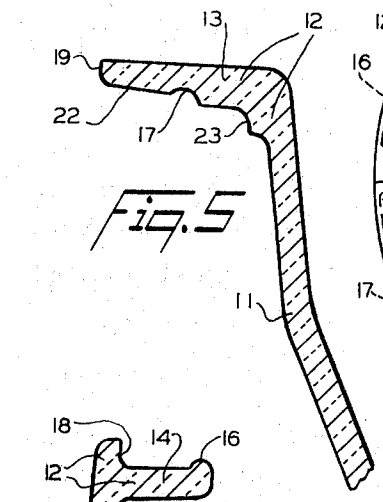


Fig. 5

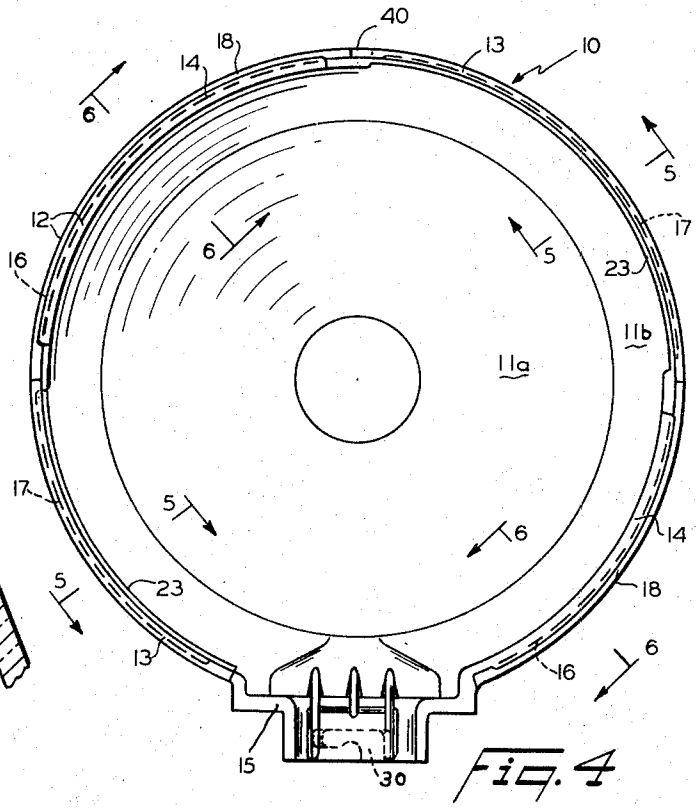


Fig. 4

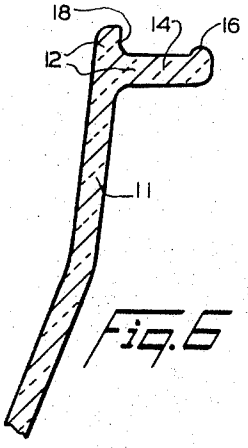


Fig. 6

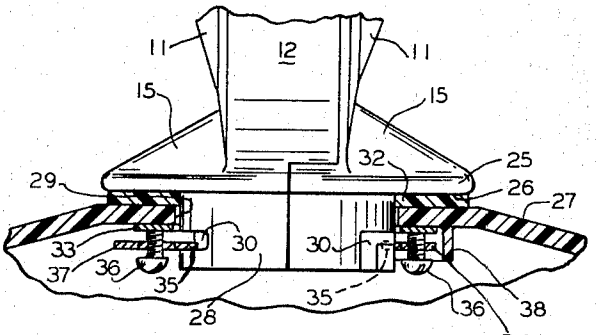


Fig. 7

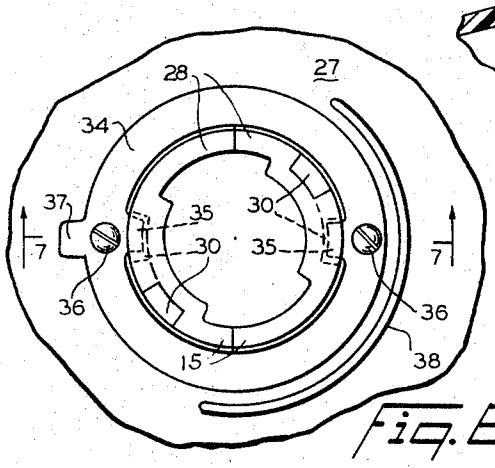


Fig. 8

INVENTORS
FRED. F. STUBE AND
EDWARD J. NITSCH
Burns & Jenney
Att'ys.

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3,351,751

COMBINED LAMP HOUSING AND LENS

Frederick F. Stube, Syracuse, and Edward J. Nitsch, Camillus, N.Y., assignors to R. E. Dietz Company, Syracuse, N.Y., a corporation of New York

Filed June 21, 1965, Ser. No. 465,605
8 Claims. (Cl. 240—10.6)

ABSTRACT OF THE DISCLOSURE

A warning lamp has two oppositely facing lens portions, each portion having rim therearound projecting toward the other lens portion. Each rim is divided symmetrically on either side of a medial line across the lens into a plurality of alternating inner and outer layer segments. The inner segments having a radially outward projecting bead and the outer segments projecting farther than the inner segments and having a groove adapted to overlie the inner segment bead, the segments being so radially disposed as to have an outer segment overlying each inner segment of the opposite portion. Each portion has a tongue projecting circumferentially past the medial line and adapted to interlock with the tongue of the other half, and each portion has a rounded neck diametrically opposite the tongue and projecting oppositely to the rim, each neck forming with the neck of the other portion an annular neck adapted to be engaged with a battery case.

This invention relates to warning lenses and more particularly to a warning lens which, when joined together back-to-back with an identical lens, forms a combined twin-lens and lamp housing, the combined lens-housing being further adapted to be secured and locked to a battery case or other receptacle so as to be releasable therefrom only from the interior of the receptacle.

The primary object of the invention is to provide a lens for a warning light having an integral axially projecting rim portion which has locking means thereon for interengagement with a similar rim portion on an identical lens placed back-to-back therewith to form a protective housing for a lamp bulb between the lenses.

A further important object is to provide a support portion on such a lens which, when the lens is engaged with an identical lens, forms with the identical support portion on the other lens a passage to the space between the lenses through which a bulb support for a lamp may pass and which support portion has means for locking the combined lens-housing to a battery case or other receptacle

A still further object is to provide positive lock means on such a lens whereby, when the lens is engaged with an identical lens and the combined housing and twin-lens assembly is locked to a battery case, the two lenses cannot be disengaged or released from the battery case except from the inside of the case.

Other objects and advantages will become apparent from the following description taken in conjunction with the accompanying drawings in which:

FIGURE 1 is a front elevational view of a lens according to the invention;

FIGURE 2 is a side elevational view thereof in engagement with an identical lens facing in the opposite direction;

FIGURE 3 is a developed view on a reduced scale of the rim portion of the righthand lens of FIG. 2;

FIGURE 4 is a rear elevational view of the lens of FIG. 1;

FIGURES 5 and 6 are enlarged fragmentary sectional views on the lines 5—5 and 6—6 of FIG. 4;

FIGURE 7 is an enlarged fragmentary view of the lower portion of FIG. 2, shown locked to the top of a battery case, the case and locking means being shown in section.

FIGURE 8 is fragmentary bottom plan view of the parts shown in FIG. 7; and

FIGURES 9, 10 and 11 are plan views of the locking means of FIG. 7.

In the drawings a lens and housing half **10** is shown in FIGURE 1 and shown interengaged with an identical half **10'** in FIGURE 2 to form a combined twin-lens and housing. Each half comprises a dished lens face portion **11** and an axially projecting annular rim **12**.

The face portion **11** comprises a light-collimating portion **11***a* and an annular light reflecting portion **11***b*, as more fully explained and described in the copending application Ser. No. 414,103 of Robert E. Dawson, filed Nov. 27, 1964.

The rims **12** are equiangularly divided into alternate outer layer arcuate segments **13** and inner layer arcuate segments **14**. The two upper arcuate segments shown in FIGURE 1 are each one quarter of the rim circumference long, i.e.: each arcuate segment of the rim is subtended by an angle of 90 degrees. The two lower arcuate segments are somewhat shorter, being separated at the bottom by the support or neck portion **15** of the lens half. The division between segments **13** and **14** at the top of the lens is diametrically opposite the center of the neck portion **15** so that while the face portion **11** is symmetrical, the rim **12** is divided symmetrically on either side of a vertical medial line extending across the face of the lens but the rim is not symmetrical, except inversely, since the portions **13** on either side lie opposite the portions **14** on the other side. When the two halves are interengaged back-to-back as shown in FIGURE 2 the arcuately longer upper outer layer segment **13** of one half overlies the longer inner layer segment **14** of the other half and the arcuately shorter lower outer layer segment **13** of the one half overlies the shorter inner layer segment **14** of the other half.

Each inner layer segment **13** is provided with a radially projecting rounded bead **16** therealong best seen in FIG. 6 and, as best seen in FIG. 5, each outer layer segment **13** is provided with a corresponding groove **17** along its inner surface in which the bead is to be engaged. Beads **16** and grooves **17** are centered in a common plane, being shown aligned in FIG. 3. It will be noted, referring to FIGS. 5 and 6, that the rim **12** is provided with a shoulder **18** along the inner layer segments **14** against which the outer edges **19** of the outer layer segments **13** is engaged when the beads **16** are engaged in grooves **17**.

When two lens-housing halves **10** are engaged, as shown in FIG. 2, to form a twin-lens and housing **20**, the face portions **11***a* of the two halves have a common axis **21** passing through the lens centers. The lenses face in opposite directions and there is an enclosed space between the lenses in which a lamp bulb may be supported. The lens housing halves **10** are preferably molded of a transparent plastic material so that each lens half is identical to the next one formed in the same mold. This plastic material has considerable elasticity and resilience.

Both the inner layer rim segments **14** and the outer layer rim segments **13** extend axially of the lenses but it should be noted that a portion of the inner surface of segments **13**, from the groove **17** out to the end **19** of this portion of the rim is tapered outwardly to provide a camming portion **22**, as best seeen in FIG. 5, whereby the bead **16** along the inner layer segment **14** may be snapped into the groove **17** by reason of the resilience of the material of which the lenses are molded. The outer layer rim segments **13** are of necessity axially longer than the inner layer segments **14** so the junction between segments **13** of the rim and the lens portion **11** is thickened at **23** as shown.

The neck portion 15 of each half is semicircular, as best seen in FIGS. 7 and 8, so that when the halves are joined they form a hollow completely circular neck 15—15, as shown in FIG. 8. The neck 15—15 has a flange 25 providing a flat surface 26 for supporting the lens-housing 20 on a battery case 27 or other receptacle, as shown in FIG. 7. A divided annular portion 28 projects downward from the flange 25 through an appropriate hole 29 in the top of the battery case.

As best seen in FIG. 1, the neck 15—15 is provided with bayonet slots 30 in diametrically opposite sides of the annular portion 28. Slots 30 extend from the lower end of the annular neck portion 28 upward a short distance and then extend around portion 28 less than a quarter turn, and then extend back down again short of the bottom end of the neck to form a seat portion 31. Slots 30 are spaced from flange 25 a distance exceeding the thickness of the top of the battery case 27 and a resilient washer 32 around portion 28 is interposed between surface 26 and the case 27.

A metal brake washer 33 is placed around neck portion 28 within the case 27 and below this a locking washer 34 surrounds the portion 28. Washer 34, best seen in FIG. 11, has two radially inward projecting tongues or lugs 35 lying in the slots 30. Two screws 36 threaded through appropriate diametrically opposite holes in the locking washer extend upward against the brake washer 33 and hold the lugs 35 releaseably locked against the seats 31 formed in the slots.

Locking washer 34 is also provided with a radially outward projecting stop lug 37. A pendant arcuate rib 38 immediately adjacent the washer 34 is provided on the lower surface of the top of battery case 27, as shown, to provide stops at either end which cooperate with the lug 37 to limit the turning of the lens-housing 20 with respect to the case 27.

A positive lock is provided at the top of the lens-housing 20 diametrically opposite the neck 15—15 by the interengaged tongues 40, best seen in FIG. 3. At the junction between the upper or arcuately longer segments 13 and 14 of each lens 10, the outer layer sgement 13 has a tongue 40 projecting circumferentially so as to extend past the similar tongue 40 of the other lens and to overlie its mating segment 14 when the lenses 10, 10, are snapped together. One tongue 40 then lies behind the other tongue 40, each tongue forming a shoulder 41, the two shoulders being interengaged. The engagement of the tongues 40, one behind the other, prevents the separation of the two halves at this extremity of the lens-housing until the segments 13 and 14 have been separated.

In assembling the lens-housing 20, the tongues 40 of the two lenses 10, 10, are first engaged by rotating one lens with respect to the other. The two lenses are then brought into registry with the segments 13 of each lens opposite the segments 14 of the other lens, and the neck portions 15 of the two lenses are then forced together. Each segment 13 is thereby forced over its cooperating segment 14 of the other lens, the portion 22 of the rim forcing a slight bending apart of the mating segments until the beads 16 snap into the grooves 17 of the mating segments.

In assembling the lens-housing 20 to case 27, the resilient washer 32 is first placed around the annular portion 28 of the neck and the portion 28 is inserted through the hole 29 in the top of the case. Brake washer 33 and then locking washer 34 are placed around the portion 28 of the neck inside the case 27, tongues 35 being inserted in the ends of slots 30. The tongues are then pushed down into the grooves and the washer 34 rotated with respect to the neck 15—15 until the tongues 35 overlie the seats 31 of the slots. Screws 36 are then screwed against the brake washer 33 forcing the washer 34 away from washer 33 thereby forcing tongues 35 against the seats 31.

Washer 34 now being locked to the neck 15—15, the lens-housing 20 is thereby locked to the case 27 but, although braked by screws 36 engaged against washer 33, the lens-housing can be turned from one side to the other with respect to the case until the stop tongue 37 engages one end or the other of the rib 38. It will be noted that the rib is of such arcuate length as to limit this turning to about 180°.

To disassemble the light, screws 36 are first loosened, washer 34 then rotated with respect to the neck 15—15, and the tongues 35 withdrawn from the slots 30. All three washers can then be removed and neck 15—15 withdrawn from the hole 29.

The two halves 10 then can be easily separated by pulling apart the neck portions 15. Since beads 16 and grooves 17 are rounded they may be forced out of engagement and, the separation being first at the neck portions, a prying action results which flexes the interlocked rim segments successively rather than simultaneously.

To those familiar with the art, it will be understood that the battery case 27 is conventionally provided with a bottom cover or base which can be fastened to a barricade, and a locking device is provided for locking this base to the case 27. A bulb support and a flasher device, as well as batteries, are secured in the case, the bulb support including a long stemmed socket extending through neck 15—15 for securing the bulb or lamp between the lenses and axially thereof. By locking the lens-housing to the case 27 by means of the screws 36, which are accessible only from within the case, therefore, all the parts are secured by locking the case and its base together. Since warning lights are frequently left untended on barriers, etc., this locking of the parts together helps to prevent pilfering as well as preventing accidental separation of the parts.

As will be apparent to those familiar with the art, the invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The embodiment disclosed is therefore to be considered in all respects as illustrative rather than restrictive, the scope of the invention being indicated by the appended claims.

What is claimed is:

1. A combined lamp housing and lens consisting of two identical oppositely facing halves of translucent material, each half comprising a symmetrical lens face portion having a central lens axis and a rim around the face portion projecting axially toward the face portion of the other half, the rim of each half being divided symmetrically on either side of a medial line extending across the face portion into alternate inner layer segments and outer layer segments, the inner layer segments on each side of the line being disposed opposite the outer layer segments of the other side of the line, each outer layer segment overlying and engaging with a cooperating inner layer segment of the other half when one half is turned about the line and forced back-to-back against the other half with the medial lines parallel, a bead along the outer surface of each inner layer segment and a cooperating groove along the inner surface of each outer layer segment, the grooves of the outer layer segments being adapted to overlie and contain the beads of the inner layer segments when the halves are forced together, whereby the halves are locked together.

2. A combined lamp housing and lens consisting of two identical oppositely facing interlocked halves of resilient translucent material, each half comprising a symmetrical lens face portion having a central axis and a rim around the outer edge of the face portion projecting axially toward the face portion of the other half, the rim of each half being divided symmetrically on either side of a medial line extending across the face portion into a plurality of inner layer segments and outer layer segments, the inner layer segments alternating with outer layer segments around the rim, each inner layer segment having a bead along its outer surface and each outer layer segment having a cooperating groove along its inner surface, the

outer layer segments projecting axially farther than the rim layer segments and being adapted to overlie corresponding inner layer segments of the other half when the halves face in opposite directions and are forced together back-to-back, the grooves of one half being adapted to overlie and engage the beads on the other half.

3. A combined lamp housing and lens consisting of two identical oppositely facing interengaged halves of resilient translucent material, each half comprising a circular lens face portion having a central axis and an annular rim around the face portion projecting axially toward the face portion of the other half, the rims providing an enclosed space between the halves when the halves are interengaged, the rim of each half being divided symmetrically on either side of a medial line extending across the face portion into a plurality of inner layer arcuate segments and outer layer arcuate segments, the inner layer segments alternating with the outer layer segments in circumferential order around the rim, the outer layer segments being axially longer than the inner layer segments and adapted to overlie the inner layer segments of the other half when the halves are interengaged, each inner layer segment having a radially outward projecting rounded bead extending circumferentially along its axial end, each outer layer segment having a cooperating groove in its radially inner surface overlying and engaging the beads of the other half when the halves are interengaged, each half having a neck portion projecting axially opposite to the rim and projecting radially along its medial line, the neck portions providing a passage to the space between halves when the halves are interengaged.

4. The combined lamp housing and lens defined in claim 3 in combination with a battery case having a hole in the top thereof, the neck portions of the interengaged halves forming an annular portion projecting through the case hole and having a flange supported on the case top, the annular portion having bayonet slots in diametrically opposite sides thereof, the slots extending upward from the annular portion and thence partially around the annular portion and thence down again toward the end to form a seat in the slot, a washer around the annular portion within the case, the washer having radially inward projecting tongues lying in the slots, and screw means threaded in the washer and operative by being advanced toward the case top for forcing the tongues against the slot seats.

5. The combined lamp housing and lens defined in claim 3, characterized by each half having a tongue projecting circumferentially past the medial line from that portion of the outer layer segment diametrically opposite the neck portion which is adapted to overlie the interengaged inner layer segment of the other half, whereby the tongues of the interengaged halves normally prevent separation of the halves at the side opposite the neck portions.

6. A lens for combined twin-lens lamp housing and lens means of resilient translucent material, comprising a dished circular lens face portion having a central lens axis and an integral axially projecting annular rim, the rim being divided symmetrically on either side of a medial line extending across the face portion into a plurality of alternately disposed inner and outer layer arcuate segments, the inner layer segments having portions along their axially outer ends bearing a radially outwardly projecting rounded bead therealong, the outer layer segments being axially longer than the inner layer segments and having portions along their axial ends whose inner surface radii are substantially equal to the radii of the outer surfaces of the inner layer portions, the outer layer portions having grooves along their inner surfaces centered in a common plane with the inner layer bead centers, the rim including a semicircular neck portion projecting radially therefrom along the medial line of symmetry and projecting axially opposite to the inner and outer layer segments; the neck portion forming, with the neck portion of an identical lens facing in the opposite direction with beads and groves interengaged, an annular neck providing a passage to the space between the lens face portions of the two lenses.

7. The lens defined in claim 6 having a tongue projecting circumferentially of the lens past the medial line from that end of the outer layer segment diametrically opposite the neck portion, the tongue extending axially beyond the adjacent inner layer segment, whereby the lens, when snapped together with an identical lens facing in the opposite direction with beads and grooves interengaged, can only be disengaged by pulling the lenses apart at the neck portions side.

8. A warning light including a hollow battery case having a circular orifice in the top thereof; a lamp; a combined lamp housing and twin lenses assembly consisting of two identical oppositely facing interengaged halves, each half comprising a circular outwardly dished lens face portion having a central lens axis, an axially projecting annular rim encircling the face portion, the rim being divided symmetrically on either side of a medial line across the face portion into a plurality of arcuate segments removably interengaged with cooperating segments of the other half, the two halves enclosing a space therebetween, the rim of each half including a semicircular neck portion forming with the neck portion of the other half a hollow neck through which the lamp is supported in said space, the neck having a flange therearound supported on the case top and having an annular portion below the flange projecting through the case top orifice, the annular portion having diametrically opposite bayonet grooves therein extending from the lower end of the annular portion upward and thence circumferentially and thence downward to a seat in the annular portion; a brake washer around the neck annular portion within the case; a lock washer around the annular portion below the brake washer, the lock washer having radially inward projecting lugs lying in the bayonet slots, and screw means threaded in the lock washer and bearing against the brake washer for removably securing the lugs engaged in the groove seats; the lock washer having a radially outward projecting lug and the case having formed therein stop means adjacent the lock washer, the stop means being engageable by the outwardly projecting lug, whereby the combined lamp housing and twin lens assembly can be turned with respect to the case from side to side within limits established by said stop means.

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NORTON ANSHER, *Primary Examiner.*

DAVID L. JACOBSON, *Assistant Examiner.*