June 10, 1958 E. H. ROSE 2,838,750

MULTI-DIRECTIONAL FLASHLIGHT LENS ADAPTERS

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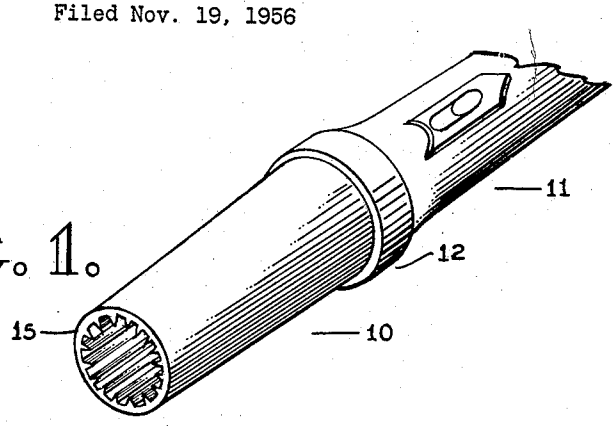
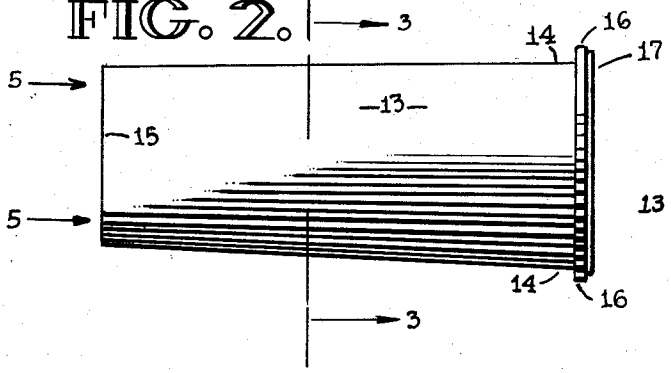


FIG. 1.

FIG. 2.



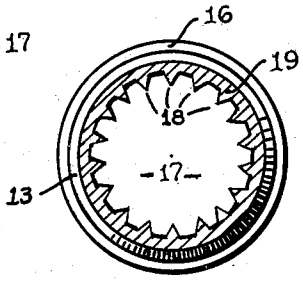
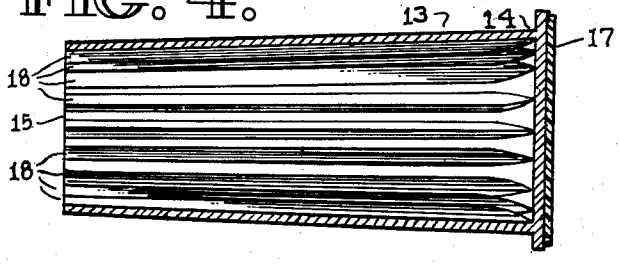


FIG. 3.

FIG. 4.



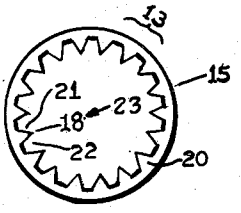


FIG. 5.

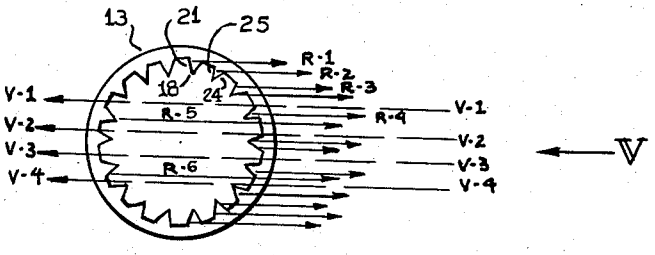


FIG. 6.

INVENTOR

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MULTI-DIRECTIONAL FLASHLIGHT LENS ADAPTERS

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7 Claims. (Cl. 340—321)

This invention relates to devices used on conventional flashlights for coloring the light and concentrating the beams emitted therefrom, and more particularly it relates to a multi-directional lens adapter, attachable to a conventional flashlight, which colors the light cast laterally of the white concentrated beam and is further provided with a plurality of reflecting surfaces effective to direct the light in all directions radially of the concentrated beam.

A considerable number of devices attachable to flashlights and intended to concentrate or color the rays thereof in order to make them suitable for signalling and warning purposes, have been available heretofore, but those coming within the range of my observation and knowledge have been so conformed that they either sacrificed a considerable amount of lighting efficiency or were inadequate in certain functional respects. Some of these devices were conformed substantially in the manner of detachable caps of colored translucent material which were intended to be slipped over the end of the flashlight to color the light emitted therefrom for danger warning and signalling purposes, but under conditions of normal use these devices often became loose and were lost or they were not available at the moment and place of an emergency.

Others of these early devices partially diverted or otherwise cut down the rays of the main projected beam, and still others were of tubular design and were so widely spaced from the main light beam that insufficient light impinged upon the inner surfaces of the tubes to be visible circumferentially from any distance.

In the main, most of the devices heretofore available either were never ready for use when needed, or completely diverted the flashlight from its normal use, or imposed compromises making the devices highly inefficient for any useful purpose.

My invention has been made with the foregoing considerations in mind and has been reduced to practice by means of a series of progressively refined prototypes and resolved into the present preferred form which is believed to overcome all of the objections to previously available devices as set forth above, thereby fulfilling its several original objectives.

One important object of my invention is the provision of a device being adapted for attachment to a conventional flashlight and providing means by which the flashlight may be utilized for signalling and warning purposes without impairing its efficiency when used as a conventional flashlight in the normal manner.

Another important object of my invention is the provision of a device of the character described being so conformed that it is quickly installable in place of the conventional cover glass of flashlights presently available and in general use.

Another important object of my invention is the provision of a device of the character described which is provided with a colored diffusing lens being adapted in conformation so as to concentrate and utilize scattered

light rays disposed laterally from the main beam of the flashlight, making the colored light readily visible from any direction circumferentially and laterally of the main beam of the flashlight.

An additional important object of my invention is the provision of a device of the character described having a laterally reflecting lens section of rigid construction adapted to withstand the stresses and rough handling to which a flashlight is subjected in normal use.

In brief, my invention consists of a device which is easily attached to a conventional flashlight in place of the circular cover glass. The device includes a generally tubular main body portion terminated at one end in an outwardly extended circumferential flange. A disc of clear plastic is positioned against the outer surface of the flange to close the axial opening therein. From this closed end the tubular body is tapered through progressively diminished diameters to an axially spaced end opening of lesser diameter.

A plurality of longitudinally extended ridges is disposed in the inner periphery of the tubular body, each ridge being in respective co-planar alignment with the axial centerline of the tube. These ridges are generally triangular in cross section and are disposed with their apexes positioned radially of the axis of the tube so that their flat diagonally disposed sides are thus adapted to collect light emitted laterally of the main projected beam of the flashlight, making the light readily visible from any point circumferentially of the tube.

The tubular main body is conformed of either plain or fluorescent plastic material, and is colored red, green, amber, etc., in accordance with the principal warning or signalling function for which it is to be used.

Certain variations in the above embodiment and additional objects of my invention will become apparent to persons conversant with the general art upon inspection of the following detailed specification together with the references made therein to the accompanying drawings, of which:

Figure 1 is a diagrammatic view in perspective showing the flashlight adapter of my invention attached to a conventional flashlight;

Figure 2 is a side elevational view of the adapter;

Figure 3 is a sectional view taken along the line and in the direction indicated by the arrows 3—3 in Figure 2;

Figure 4 is a vertical half section, taken longitudinally, showing the manner in which the ridges are disposed interiorly of the tubular body of the adapter;

Figure 5 is a frontal end view of the device as seen from the direction of the arrows 5—5 in Figure 2; and,

Figure 6 is a schematic diagram showing the manner in which light is reflected from the diagonal edges of the triangular interior ridges in the tubular body of the device.

Reference is again made to Figure 1 which shows in perspective a flashlight adapter device constructed according to my invention, attached to a conventional flashlight. The figure is intended principally to show the method of attaching the device, designated generally by the numeral **10**, to the body of the flashlight **11** by means of the cover glass retaining ring **12**.

Further details of the device are shown in Figure 2 including a generally tubular body section **13** which is tapered from its large end **14** to the outwardly extended end of lesser diameter **15**. At its large end **14**, the tubular body **13** is terminated in an outwardly extended circumferential flange **16**. A clear plastic disc **17** is positioned against the outer face of the flange **16** so as to exclude dust or moisture from the flashlight lamp and reflector when the device is attached as shown in Figure 1.

The adapter **10** is attached by unthreading the retaining ring **12** from the end of the flashlight **11** and remov-

ing the conventional glass lens normally secured thereunder. Then the ring 12 is slipped over the small end 15 of the tube 13 until it engages the flange 16, and is then re-threaded onto the flashlight and tightened in the normal manner.

A plurality of ridges such as 18 is disposed interiorly of the tube 13 as is clearly shown in Figures 1, and 3 to 6. Figure 3, which is an axio-diametric sectional view taken along the line and in the direction of the arrows 3—3 in Figure 2, shows the manner in which the ridges 18 are integrally conformed with the body section 19. Also seen in Figure 3 is a portion of the outer surface of the tapered periphery of the tube 13, and the outwardly extended forwardly disposed surface of the flange 16, and centrally thereof the plastic disc 17.

The positioning of the longitudinal ridges 18 within the tubular body 13 is clearly shown in the vertical sectional view of Figure 4. Each of the ridges, such as 18, is disposed with its longitudinal apex in respective and individual uniplanar alignment with the axial centerline of the tubular member 13, but none of the ridges 18 is parallel to the axis due to the taper in the circumference of the tube from its large end 14 to the smaller end 15.

As indicated in the elevational view of Figure 5, which shows the front 20 of the tube 13 as seen from the direction of the arrows 5—5 in Figure 2, each of the ridges, such as 18, is provided with slanting longitudinally extended sides such as 21 and 22 which align in separate planes angularly disposed on opposite sides of the axial centerline, indicated at 23, of the tubular body 13. Since the axial centerline 23 is also the centerline of the source of illumination of the flashlight, any light emitted laterally of the central projected light beam falls upon and is reflected by the slanting sides such as 21 and 22 of the ridges 18. To prevent the lateral light from being carried along the sides or through the triangular body areas of the ridges and emitted outwardly in the same direction as the main projected light beam, the end edge 20 is coated with an opaque substance such as metallic paint or foil. As a result, the colored light is retained within the tube and the end edge of the tube is substantially invisible when viewed while in use from the direction in which the main beam is projected.

Furthermore, although the tubular body of the device is tapered through diminished diameters from the large end 14 to the small end 15, sufficient space is provided in the open end 15 to permit passage of the projected beam therethrough, yet prevent the simultaneous emission of scattered rays of angular light. Thus the ridges limit the angular dispersion of scattered light but do not cut down or intercept the main projected beam of a properly adjusted flashlight. Only the laterally scattered light is needed to produce a uniform brilliantly colored glow throughout the entire length of the tubular body of the device.

As a result of this careful relative dimensioning, a flashlight with a device attached projects white light forwardly and axially of the flashlight with as much efficiency as when used singly, and the tubular portion of the device confines the random scattered light attendant upon the generation of the main beam, and is thereby activated so that it glows laterally and circumferentially with brilliant fluorescent red or other predetermined color.

The schematic diagram of Figure 6 illustrates broadly the ratio of reflective to non-reflective longitudinal areas of the tubular body 13. When viewing the device in the direction of the arrow V in the figure, the spectator would see various reflecting surfaces, such as 21 of the ridge 18, and 25 of the ridge 24, as indicated by the arrows R–1, R–2, R–3, R–4, etc., together with reflections from ridges on the opposite side of the tube as indicated by the arrows R–5 and R–6, and because of the spacing of the ridges interiorly of the tube, at only a few planes of vision such as V–1, V–2, V–3 and V–4, would there be no ridges present to reflect colored light from the wall of the tube.

It is to be understood, of course, that this diagram and description are purely illustrative and are presented merely to indicate the relatively high reflectivity of a tube having ridges conformed and disposed therein in this general manner.

In actual tests at medium distance, the entire tube appears to glow with over-all uniform intensity, but upon closer examination certain longitudinal sections of the periphery of the tube such as those indicated by the lines V–1 to V–4, are actually less brilliantly illuminated than other areas, thereby proving the efficacy of the ridged inner conformation of the device.

As will be readily understood, the triangular longitudinal ridges stiffen the device axially to a substantial degree, and provide rigidity in the extended body of the adapter comparable to that of the flashlight case itself.

Although in order to comply with the statute the present invention has been shown and described in considerable detail in the form of a single embodiment, it is to be understood that these details are subject to change and modification, and the embodiment is open to substantial variation and the invention itself is amenable to adaptation into a plurality of embodiments and therefore is not to be restricted to the form set forth herein nor otherwise limited except as may be indicated by the extent of the following claims.

What I claim as my invention and wish to secure by United States Letters Patent is:

1. A multi-directional lens adapter, being attachable to a conventional flashlight without any structural modification thereof, comprising: a generally tubular main body having a large end and a small end and being progressively tapered therebetween, said tubular body being conformed of a rigid fluorescent material of a predetermined color; means for attaching said tubular body to a conventional flashlight in place of the cover glass thereof; closure means positioned over said large end of said tubular body, said closure means being conformed of rigid uncolored transparent material; longitudinal ridge means disposed interiorly of said tubular body effective to reflect light radially thereof, and means at said small end of said tubular body effective to prevent the emission of colored light edgewise and longitudinally thereof.

2. The invention in accordance with claim 1 in which the opening in said small end of said tubular body is of slightly greater diameter than that of the main light beam projected forwardly by said flashlight.

3. The invention as set forth in claim 2 wherein said means for attaching said adapter to a conventional flashlight, comprises: said tubular body being terminated at its large end in an outwardly extended circumferential flange, said flange being dimensioned circumferentially substantially the same as the cover glass of said conventional flashlight and said closure means being affixed to the face of said flange disposed outwardly from said tubular body.

4. A multi-directional flashlight lens adapter, attachable to a conventional flashlight, comprising: a generally tubular main body conformed of rigid fluorescent material of a predetermined color, said tubular body having a large end and a small end and being progressively tapered therebetween; said small end of said tubular body being of slightly greater diameter than that of the main light beam projected forwardly by said flashlight; said tubular body being terminated at said large end in an outwardly extended circular flange, dimensioned circumferentially substantially the same as a flashlight cover glass, for attaching said tubular body to a flashlight in place of the cover glass thereof; a circular disc of generally rigid clear transparent material being affixed to the face of said flange disposed outwardly from said tubular body and effective to close the axial aperture therein;

means at said small end of said tubular body effective to prevent the emission of colored light edgewise and longitudinally thereof; and, longitudinal ridge means for reflecting colored light radially of said tubular body, including a plurality of longitudinally disposed ridges integrally conformed with said tubular body and spaced equidistantly interiorly thereof, said ridges being generally triangular in cross sectional conformation with one side thereof joining the inner surface of said tubular body and the inwardly extended longitudinal apex thereof being disposed in uniplanar alignment with the axial centerline of said tubular body.

5. The invention in accordance with claim 4 and further characterized by the sides of each of said triangular ridges disposed inwardly from the inner surface of said tubular body being aligned in planes disposed oppositely and laterally of said axial centerline of said tubular body.

6. The invention in accordance with claim 5 wherein said means effective to prevent the emission of colored light longitudinally of said tubular body, comprises: the edgewise area of said small end of said tubular body including the areas of said triangular ridges terminated in alignment therewith being coated with an opaque substance whereby said colored light collected within said tubular body is retained within said body and is not visible from a point toward which the main light beam of said conventional flashlight is projected.

7. A multi-directional lens adapter, attachable to the lamp end of a conventional flashlight, said flashlight having a cover glass and a cover glass retaining ring

threaded on the lamp end thereof, comprising: a generally tubular main body being adapted in conformation to manufacture by the injection molding process having a large opening at one end and a smaller opening at the other end and being progressively tapered through diminishing diameters therebetween, said tubular body being of lesser diameter at the large end thereof than the central opening in said cover glass retaining ring, and being terminated at its large end in an outwardly extended circumferential flange, said flange being dimensioned circumferentially substantially the same as said cover glass; a disc of rigid clear plastic attached to the side of said flange opposite from said tubular body; a plurality of longitudinally extended triangular ridges integrally conformed with said tubular body around the inner periphery thereof, the longitudinal apex of each of said ridges being in individual co-planar alignment with the axial centerline of said tubular body; said tubular body and said ridges therein being conformed of generally rigid fluorescent material of predetermined color, and an opaque coating covering the surface of the end face of said tubular body and said ridges.

References Cited in the file of this patent

UNITED STATES PATENTS

1,548,252	Breuss	Aug. 4, 1925
2,253,952	Desimone	Aug. 26, 1941
2,486,998	Szeklinski	Nov. 1, 1949
2,549,103	Krauss	Apr. 17, 1951
2,680,844	Smith	June 8, 1954