June 6, 1950 P. F. EARLY 2,510,873

LIGHT FILTER

Original Filed Oct. 16, 1943

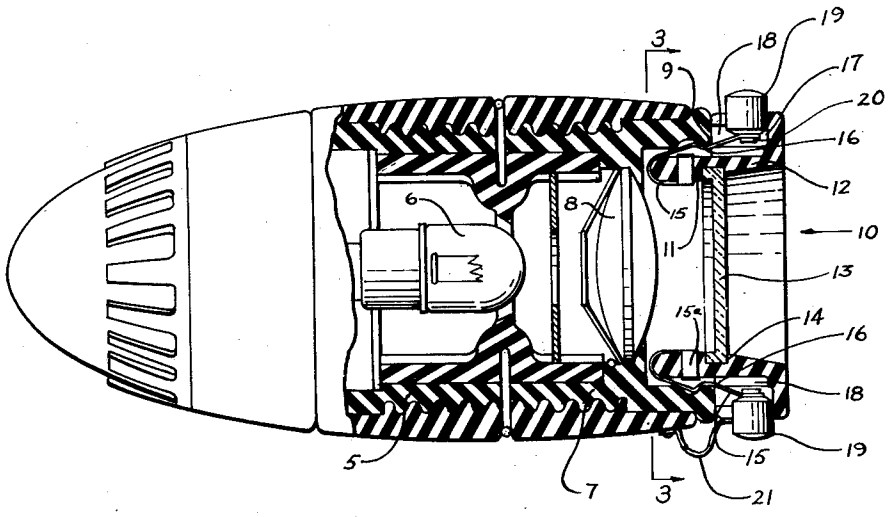


FIG. 1

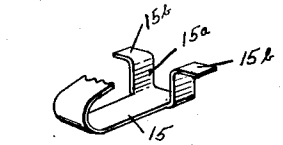


FIG. 4

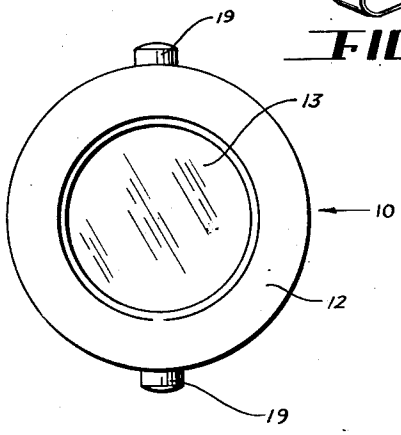


FIG. 2

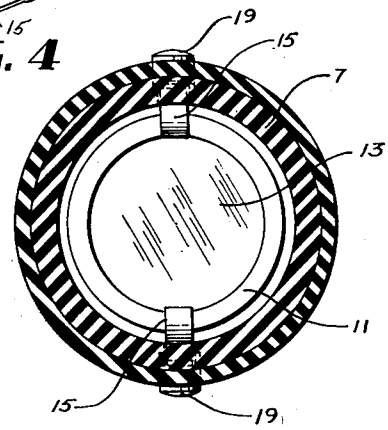


FIG. 3

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LIGHT FILTER

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9 Claims. (Cl. 240—46.59)

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This invention relates to a light filter and is designed primarily for use with a light projecting device when it is desired to subdue the brilliancy of the projected light. The present application is a division of my application filed October 16, 1943, Serial No. 506,482, on which Patent No. 2,404,476, issued July 23, 1946.

One object of the invention is to provide a light filter, or screen, which can be quickly and easily attached to or removed from the body of a light projecting device.

A further object of the invention is to provide a filter with attaching elements which have firm locking engagement with the body of the device, and with means for positively releasing said elements when the filter is to be removed.

A further object of the invention is to provide such a filter which can be inserted in the end portion of a tubular body and when so inserted will constitute a continuation of the body, and will be attractive in appearance and will not be liable to displacement through accident or inadvertence.

A further object of the invention is to provide such a filter which is of a simple and inexpensive construction.

Other objects of the invention may appear as the filter is described in detail.

In the accompanying drawings, Fig. 1 is a side view partly in section and partly in elevation of a light projecting device equipped with my improvide filter; Fig. 2 is an end elevation of the light projecting device and filter of Fig. 1; Fig. 3 is a transverse section taken on the line 3—3 of Fig. 1 and looking in the direction of the arrows; and Fig. 4 is a detail view of a portion of one of the attaching devices.

In these drawings I have illustrated one embodiment of my invention and have shown the same as applied to a light projecting device of the type commonly called a "cockpit lamp" and designed primarily for use in military aircraft, where ease of operation and positive reliability are essential. However, it is to be understood that the filter may take various forms and may be used with light projecting devices of various kinds without departing from the spirit of the invention.

The light projecting device here shown by way of illustration comprises a tubular body including a rear portion 5, in which a lamp 6 is supported, and a front portion 7 adapted to support a lens 8 and which is adjustable toward and from the rear portion, as shown and described in the above mentioned application. The front portion

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of the body projects forwardly a short distance beyond the lens and is preferably of an internal diameter slightly greater than the diameter of the lens, thus enabling the filter to be inserted therein without obstructing the light from the lens. This forward portion of the body is provided adjacent its open front end with an internal shoulder, preferably a bead 9 extending entirely about the opening.

The filter comprises a holder 10 which is adapted to be inserted in the open front end of the body and is preferably annular in form. As here shown, the holder has an inner portion 11 of an external diameter slightly less than the internal diameter of the end portion of the body, and an outer portion 12 of an external diameter approximating the external diameter of the end portion of the body. This outer portion is spaced from the inner end of the holder such a distance that it will contact with the end of the body when said inner end has been fully inserted in the latter, and thus positively limit the inward movement of the holder. The filtering element 13 is supported in the holder at a suitable distance from the inner end thereof and is here shown as a circular disk having its peripheral edge portion seated in a groove 14 in the holder. The filtering element may be of any suitable translucent material, such as glass or a suitable plastic, and may be of any desired color, usually red.

Yieldable attaching elements 15 are secured to the inner portion of the holder and extend forwardly between the same and the body. These attaching devices are here shown as resilient fingers the inner ends of which are bent about and rigidly secured to the inner end of the holder and the outer ends of which extend beyond the front end of the body. Preferably the inner end of each finger is provided with outwardly extending parts 15*a* adapted to be inserted through an opening in the holder and to have their ends 15*b* bent laterally into contact with the holder (Fig. 4). Each attaching element is provided between its ends with a part adapted to have retaining engagement with a fixed part on the body. As here shown, each finger is bent to form therein a recess 16 to receive the bead 9 on the body and is held in firm but yieldable engagement with the bead by the resiliency of the finger. The inner portion of each finger slopes from its inner end to the recess 16, so that the insertion of the holder in the body will depress the finger as it moves over the bead and the recessed portion of the finger will embrace the bead when it is brought into line therewith.

The enlarged outer portion of the holder is provided with radial sockets 17, which constitute guideways, and with openings 18 through which the fingers 15 may extend into the inner ends of the respective guideways. Plungers, or push buttons, 19 are slidably mounted in the guideways and are operatively connected with the respective fingers, as by screws 20. Thus the push buttons are held normally in their outer positions and may be pressed inwardly to move the fingers out of retaining engagement with the bead. Preferably the holder is connected with the body by a flexible connection or chain 21 to prevent its loss when not in use.

To attach the filter to the light projecting device it is only necessary to insert the inner end thereof in the open end of the body and exert thereon sufficient pressure to move the attaching fingers into retaining engagement with the bead. The bead being continuous the filter may be so inserted with the attaching elements in any positions about the axis of the body. When the filter is to be removed the push buttons are actuated to disengage the fingers from the bead and the filter is withdrawn by grasping the outer portion thereof and pulling it out of the body. Preferably two attaching devices are provided and these are arranged on opposite sides of the holder so that they may be simultaneously actuated by the thumb and finger of the hand which grasps the holder. The outer dimensions of the filter are such that when in place in the body it constitutes an extension of the latter and imparts to the projecting device as a whole a harmonious and pleasing appearance.

While I have shown and described one embodiment of my invention I wish it to be understood that I do not desire to be limited to the details thereof as various modifications may occur to a person skilled in the art.

Having now fully described my invention, what I claim as new and desire to secure by Letters-Patent is:

1. In a light projecting device comprising a tubular body having an open front end, means for supporting a lamp in said body and a lens supported in spaced relation to the open end thereof, a filter including a tubular holder having an inner portion to extend into said open end of said body and an outer portion to project beyond said body, a filtering element supported by said holder, attaching devices carried by said holder and extending into the open end of said body, said body having within the same parts cooperating with said attaching devices to retain said holder therein, and means operable from the exterior of said device to disengage said attaching devices from said body.

2. In a light projecting device comprising a tubular body having an open front end, means for supporting a lamp in said body and a lens supported in spaced relation to the open end thereof, a filter including a tubular holder having an inner portion to extend into said open end of said body and an outer portion to project beyond said body, a filtering element supported by said holder, resilient members secured to the inner portion of said holder on opposite sides of the latter extending outwardly therefrom, said members and said body having cooperating parts to retain said holder in the open end of said body, and actuating members movably mounted in the outer portion of said holder and connected with the respective resilient members to disengage the latter from said body.

3. In a light projecting device, a tubular body open at its front end and having within the same and adjacent said open end an internal circumferential bead, a lens supported in the rear of said bead, a filter including an annular holder having an inner portion to extend into the open end of said body and an outer portion to project beyond said body, a filtering element supported in said holder, and resilient fingers secured to the inner portion of said holder and extending outwardly therefrom, said fingers having parts to yieldably engage said bead and retain said holder in the open end of said body.

4. In a light projecting device, a tubular body open at its front end and having within the same and adjacent said open end an internal circumferential bead, a lens supported in the rear of said bead, a filter including an annular holder having an inner portion to extend into the open end of said body and an outer portion to project beyond said body, a filtering element supported in said holder, resilient fingers secured to the inner portion of said holder and extending outwardly therefrom, said fingers having parts to yieldably engage said bead and retain said holder in the open end of said body, and actuating members movably supported on the outer portion of said holder and operable to move said resilient members out of engagement with said bead.

5. In combination with a light projecting device including a tubular member having an open end portion, a filter comprising an annular holder having a part adapted to extend into the open end of said tubular member, an attaching element secured to the inner end portion of said part of said holder, extending outwardly beyond said part exteriorly of said holder and having a yieldable part adapted to have retaining engagement with said tubular member, and a filtering element carried by said holder.

6. In combination with a light projecting device including a tubular member having an open end portion, a filter comprising an annular holder having a part adapted to extend into the open end of said tubular member, an attaching element secured to said part of said holder, extending outwardly from its point of connection therewith and having a yieldable part adapted to have retaining engagement with said tubular member, an actuating device supported by said holder outwardly beyond that portion of the latter which extends into said tubular member and arranged to disengage said retaining part of said attaching element from said tubular member, and a filtering element carried by said holder.

7. A filter for a light projecting device comprising an annular holder having end portions of different diameters, a resilient finger secured to the smaller end portion of said holder extending externally thereof toward the larger end portion of said holder and having between its ends a retaining part, an actuating member supported by the larger end portion of said holder and connected with said finger to move said retaining part thereof to an inoperative position, and a filtering element carried by said holder.

8. A filter for a light projecting device comprising an annular holder having an inner end portion and an outer end portion of greater diameter than said inner portion, said outer portion having a guideway, a resilient attaching element secured to said inner portion and extending outwardly to a point adjacent said guideway, said resilient element having a retaining part spaced from the outer end thereof, an actu-

ating member movably supported in said guideway and operatively connected with the outer portion of said resilient element, and a filtering element supported in said annular holder.

9. A filter for a light projecting device comprising an annular holder having an inner end portion and an outer end portion of greater diameter than said inner portion, said outer portion having a substantially radial guideway, resilient fingers secured to said inner portion extending into the respective guideways and each having between its ends a retaining part, actuating members slidable in the respective guideways and connected with said fingers, and a filtering element in said holder.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
231,702	DeGrange	Aug. 31, 1880
831,803	Schindewolf	Sept. 25, 1906
1,214,363	Peters	Jan. 30, 1917
1,933,896	Dupuis et al.	Nov. 7, 1933

FOREIGN PATENTS

Number	Country	Date
113,554	England	Feb. 28, 1918
498,677	France	Oct. 25, 1919