March 26, 1963 G. LINDAE 3,083,315

HEADLAMPS

Filed Feb. 10, 1959 2 Sheets-Sheet 1

FIG. 1

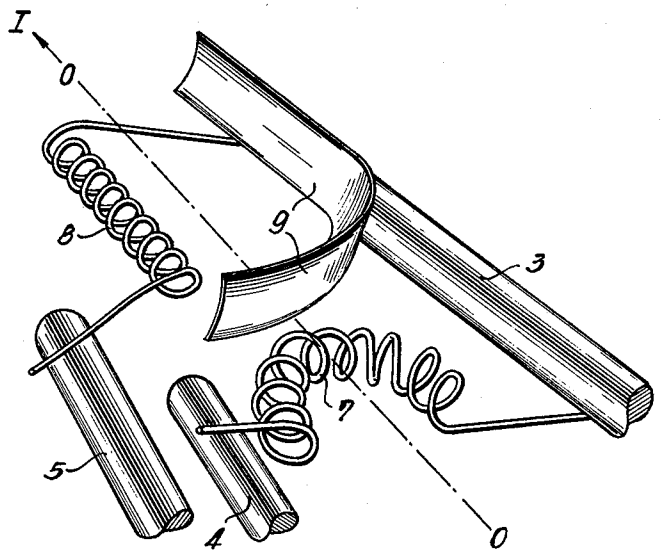
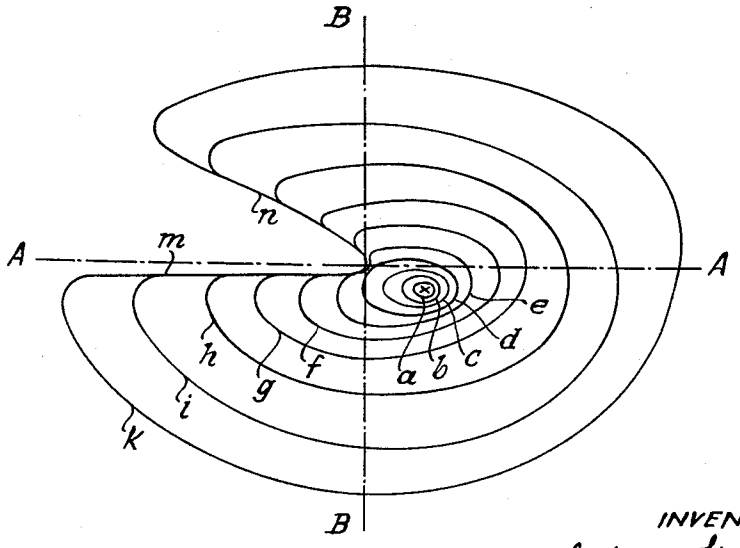


FIG. 2



INVENTOR
Gerhard Lindae
BY Michael S Striker
Attorney

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2 Sheets-Sheet 2

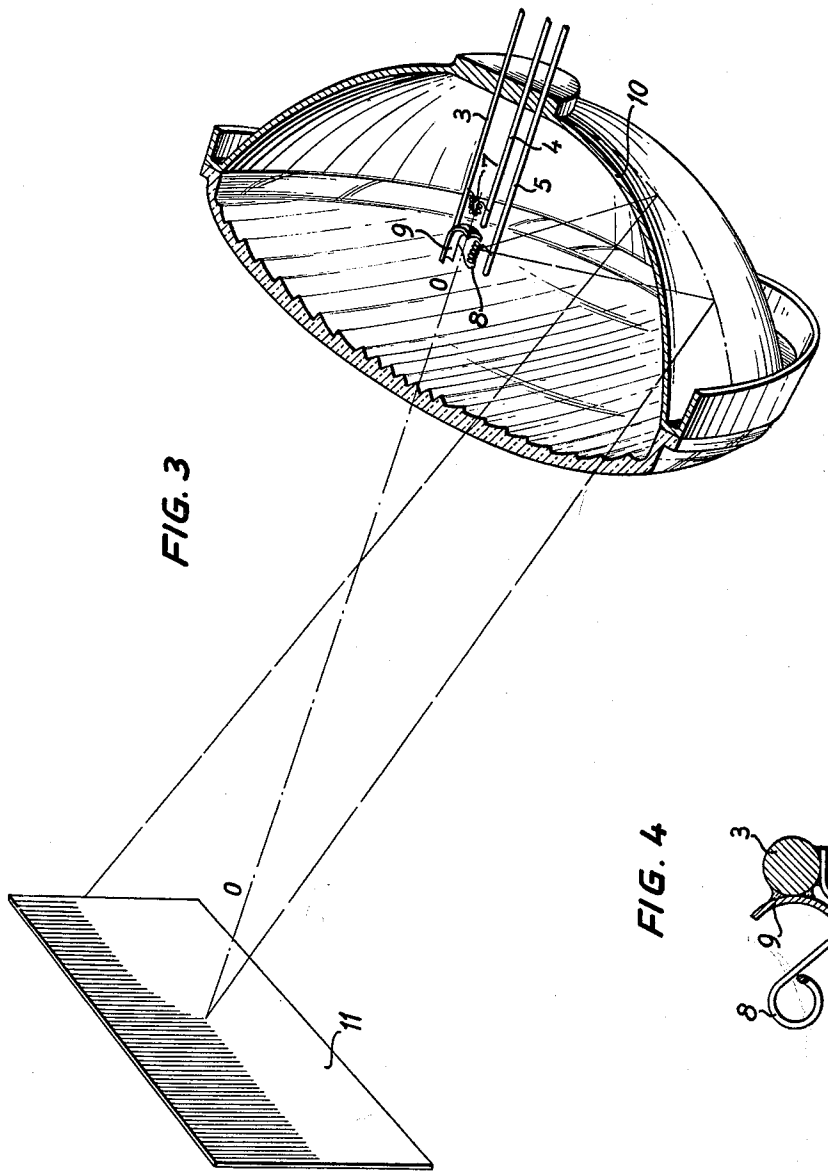

FIG. 3

FIG. 4

INVENTOR
Gerhard Lindae
BY Michael S. Striker
Attorney

United States Patent Office

3,083,315

Patented Mar. 26, 1963

3,083,315

HEADLAMPS

Gerhard Lindae, Fellbach, near Stuttgart, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Feb. 10, 1959, Ser. No. 792,389
Claims priority, application Germany Feb. 13, 1958
4 Claims. (Cl. 313—117)

The present invention relates to headlamps which are adapted to be used with automobiles or the like.

One of the objects of the present invention is to provide a headlamp of this type which will have a downwardly directed low-beam having on the side of the oncoming traffic a well-defined shadow area.

Another object of the present invention is to provide a headlamp of the above type with a screen which will cooperate with a low-beam filament and reflector of the headlamp to provide a shadow zone directed toward the oncoming traffic without appreciably diminishing the efficiency of the headlamp.

A further object of the present invention is to provide a headlamp which will reliably accomplish the above objects while at the same time composed of simple rugged elements which are capable of operating over a long period of time without maintenance.

With the above objects in view the present invention includes in a headlamp a reflector having an optical axis and a low-beam filament in the reflector extending parallel to the optical axis. A relatively narrow elongated opaque strip extends, in accordance with the present invention, parallel to the low-beam filament at substantially the same elevation as the same to provide a light distribution which has a well-defined shadow area directed toward the oncoming traffic.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

FIG. 1 is a perspective view of the structure of the invention with the reflector of the lamp omitted for the sake of clarity;

FIG. 2 is a diagram showing the light distribution provided by the structure of the invention;

FIG. 3 is a perspective view showing the structure of FIG. 1 in a headlamp which is fragmentarily illustrated, FIG. 3 also showing a screen used to determine the light distribution pattern; and

FIG. 4 is a transverse sectional view taken along line 4—4 of FIG. 1 in the direction of the arrows.

Referring to FIGS. 1 and 3 it will be seen that the lamp of the invention includes a conventional reflector **10** and connecting conductors 3—5 extending into the interior of the reflector and being substantially parallel to the optical axis O of the reflector. The connecting conductors **3** and **4** are electrically connected with and carry a high-beam filament coil **7** which is curved as indicated in FIG. 1 and which is located about the focal point or focus of the reflector. This construction provides a high-beam having very little stray light and used on free roads as long as there is no oncoming traffic. The direction of travel of the vehicle carrying the lamp is shown by the arrow I in FIG. 1.

The low-beam is provided by the coiled filament **8** located in the reflector forwardly of its focal point and extending substantially parallel to the optical axis. The ends of the filament **8** are fixed to the connecting conductors **3** and **5** as by being welded thereto so that filament **8** is electrically connected with and carried by the connecting conductors **3** and **5**.

The connecting conductor **3** simultaneously serve as a support for a small narrow elongated opaque band or strip **9** which extends substantially parallel to and is located beside the filament **8** at substantially the same elevation as the filament **8**. At its end which is nearest to the high beam filament **7** and the rear end of the reflector **10** the strip **9** is curved toward and extends across the optical axis so that the strip **9** has at its rear end a portion extending angularly from the remainder of the strip **9** through a vertical plane in which the optical axis is located when the lamp is mounted on a vehicle, the filament **8** and strip **9** being located on opposite sides of this vertical plane at an elevation somewhat higher than the optical axis. The strip **9** is of arcuate cross section, as shown most clearly in FIG. 4, and has a concave surface directed toward the filament **8**. This strip **9** may be made, for example, of sheet steel which may be nickelled and is fixed to the connecting conductor **3** as by being welded thereto.

The above-described structure of the invention is mounted with the parts in the position illustrated so that the filament **8** is located on the same side of the optical axis as the oncoming traffic while the screen member **9** is on the same side of the optical axis as the edge of the road distant from the oncoming traffic, so that the optical axis is between the oncoming traffic and the latter edge of the road. When the light from the lamp of the invention is projected onto a screen such as the screen **11** shown in FIG. 3, the lamp of the invention will provide the light distribution indicated in FIG. 2, when the low-beam filament **8** is energized. The optical axis O—O intersects the screen at the point O. The light distribution is shown with respect to the horizontal axis A—A and the vertical axis B—B which intersect each other at the point O. The curves *a–k* connect points of equal light intensity which, starting from the brightest area surrounded by the curve *a* become of gradually less light intensity toward the outermost curve *k*. The screening strip **9** provides in cooperation with filament **8** and reflector **10** a substantially sector-shaped well defined shadow zone extending between the substantially horizontal limit *m* between the light and dark areas in a clockwise direction, as viewed in FIG. 2, to approximately 30° around the point O to the boundary *n* between the light and dark areas. The horizontal boundary *m* between the light and dark areas is located slightly beneath the horizontal axis A—A.

The location of the filament **8** somewhat higher than the optical axis will cause the low-beam to be directed downwardly.

As may be seen from FIG. 3, the strip **9** will have no influence on light directed from the left side of the reflector, as viewed in FIG. 3, toward the screen **11** on the right side of the point O, while it will interrupt light passing from the filament **8** toward the right side of the

reflector, as viewed in FIG. 3, so as to produce the light distribution pattern illustrated in FIG. 2.

The small strip 9 has substantially no influence on the light distribution provided when the high-beam filament 7 is energized.

It will be noted from FIG. 2 that the lamp of the invention provides a light distribution extending all the way across the road on which the vehicle is travelling including the outer edge of the road while the region of weakest relatively dim light between the lines *m* and *n* of FIG. 2 is directed toward the oncoming traffic so as to eliminate glare. Inasmuch as only a relatively small sector of light is dimmed by the strip 9, almost full use of the light is obtained. Thus, when the low-beam filament of the lamp of the invention is energized the vehicle can travel at a relatively high speed since glare with respect to oncoming traffic is avoided and the safety of travel on the side of the road where the travelling vehicle is located is greatly increased.

Since the lamp of the invention provides a highly efficient light distribution when the low-beam filament is energized, it is unnecessary to use in the lamp of the invention lens elements heretofore necessary to provide the desired light distribution and undesirably influencing the focussing and range of the high-beam. Thus, with the structure of the invention a sharper focussing and substantially greater range of the high-beam is provided, as compared to conventional headlamps. When the low-beam filament of the lamp of the invention is energized, the drivers of vehicles in the oncoming traffic are protected against glare. The greater brightness of the low-beam light beyond the region of dim light directed toward the oncoming traffic is not only of advantage to the driver of the vehicle provided with lamps constructed according to the invention, but also of advantage to the drivers of the vehicles in the oncoming traffic since this light sharply orients the side of the road opposite from the oncoming traffic and provides therefore greater safety when vehicles travelling in opposite directions pass each other.

Of course, the above-described structure of the invention applies to those countries where vehicles keep to the right of the road so that the oncoming traffic is on the left. In those countries where vehicles are required to keep to the left side of the road, so that the oncoming traffic is on the right, the filament 8 would be on the right side of the optical axis and the screening strip 9 on the left side of the optical axis.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of lamps differing from the types described above.

While the invention has been illustrated and described as embodied in headlamps, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be secured by Letters Patent is:

1. In a headlamp for an automobile or the like, in combination, a reflector having a focus and an optical axis; a high beam filament located in the region of said focus; a low beam filament located in the reflector at a higher elevation than said focus and high beam filament, when the reflector is mounted on the automobile, and laterally on one side of the axis extending substantially parallel thereto; and an elongated opaque strip having a length considerably greater than its width and being curved transverse to its elongation, said strip being located in the reflector at the elevation of said low beam filament, on the opposite side of said axis and concave toward said low beam filament, said strip having one portion extending substantially parallel to said low beam filament and another portion extending from one end of said one portion nearer to said focus than the other end thereof transverse to said low beam filament toward said axis.

2. In a headlamp for an automobile or the like, in combination, a reflector having a focus and an optical axis; a high beam filament located in the region of said focus; a low beam filament located in the reflector at a higher elevation than said high beam filament, when the reflector is mounted on the automobile, and laterally on one side of said axis and extending substantially parallel thereto; and an elongated opaque strip having a length considerably greater than its width and being curved transverse to its elongation with its concave side directed toward said low beam filament, said strip being located in the reflector at the elevation of said low beam filament, on the opposite side of said axis, said strip having one portion extending substantially parallel to said low beam filament and another portion extending curved substantially parallel to the portion of the reflector located rearwardly of said other strip portion from one end of said one portion nearer to said focus than the other end thereof toward said axis.

3. In a headlamp for an automobile or the like, in combination, a reflector having a focus and an optical axis; a high beam filament located in the region of said focus, an elongated low beam filament located in said reflector and being wound in a spiral of selected diameter about an axis extending substantially parallel to said optical axis to one side of the latter and said axis of said low beam filament spiral being located, when said reflector is mounted at the automobile, at an elevation higher than that of said optical axis of said reflector; and an elongated opaque strip having a width at least equal to the diameter of said low beam filament spiral and a length considerably greater than said diameter and being curved in a direction transverse to its lengths, said strip extending symmetrically to a horizontal plane passing through the said axis of said low beam filament spiral and substantially normal thereto on the opposite side of said optical axis with its concave side directed toward said low beam filament, said strip having one portion extending substantially parallel to said low beam filament and another portion extending curved substantially parallel to the portion of the reflector located of said other strip portion from one end of said one portion nearer to said focus than the other end thereof toward said axis.

4. In a headlamp for an automobile or the like, in combination, a reflector having a focus and an optical axis; a high beam filament located in the region of said focus; a low beam filament located in the reflector at a higher elevation than said high beam filament, when the reflector is mounted on the automobile, and laterally on one side of said axis and extending substantially parallel thereto; a pair of connecting conductors extending into said reflector, connected electrically to and supporting said low beam filament; and an elongated opaque strip having a length considerably greater than its width and being curved transverse to its elongation with its concave side directed toward said low beam filament, said strip being carried by one of said connecting conductors in the reflector at the elevation of said low beam filament, on the opposite side of said axis, said strip having one portion extending substantially parallel to said low beam filament and another portion extending curved substantially parallel to the portion of the reflector located rearwardly of said other strip portion from one

end of said one portion nearer to said focus than the other end thereof toward said axis.

References Cited in the file of this patent

UNITED STATES PATENTS

1,716,048	Graves	June 4, 1929
1,793,398	Hamberger	Feb. 17, 1931
1,923,181	Albers	Aug. 22, 1933
2,006,140	Honing	June 25, 1935
2,144,438	Birdseye	Jan. 17, 1939
2,171,336	Hayden	Aug. 29, 1939
2,858,467	Meese	Oct. 28, 1958
2,869,011	Verbeek	Jan. 13, 1959

FOREIGN PATENTS

167,698	Australia	Mar. 11, 1954
213,223	Australia	Aug. 18, 1955