

- [54] **VEHICLE HEADLIGHT**
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FOREIGN PATENTS OR APPLICATIONS

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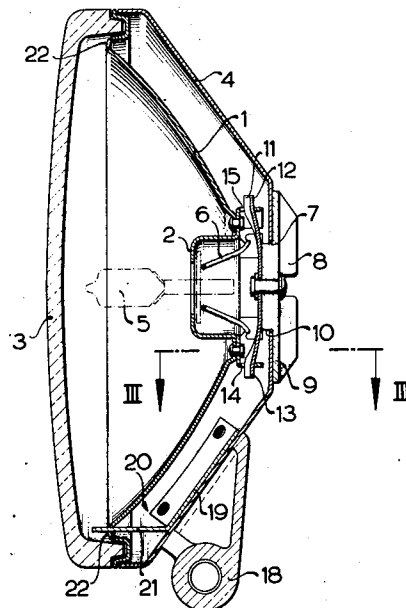
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 240/41.55
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- [58] Field of Search...240/41.3, 41 R, 41 BM, 41 SB,
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[57] **ABSTRACT**

In a vehicle headlight housing has an open side and an opposite closed side, and in the open side is received a replaceable lighting unit comprising a reflector having a light-emitting opening, a bulb-socket mounted on the reflector, a light bulb in the socket, and a protective lens extending across and closing the opening of the reflector. Releasable securing means is provided for releasably securing the lighting unit to the housing and comprises abutment means fast with the reflector externally thereof and spring means on the housing movable between an inoperative position and an operative position in which latter it lockingly engages the abutment means, with actuating means being provided for moving the spring means to its operative position.

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21 Claims, 4 Drawing Figures



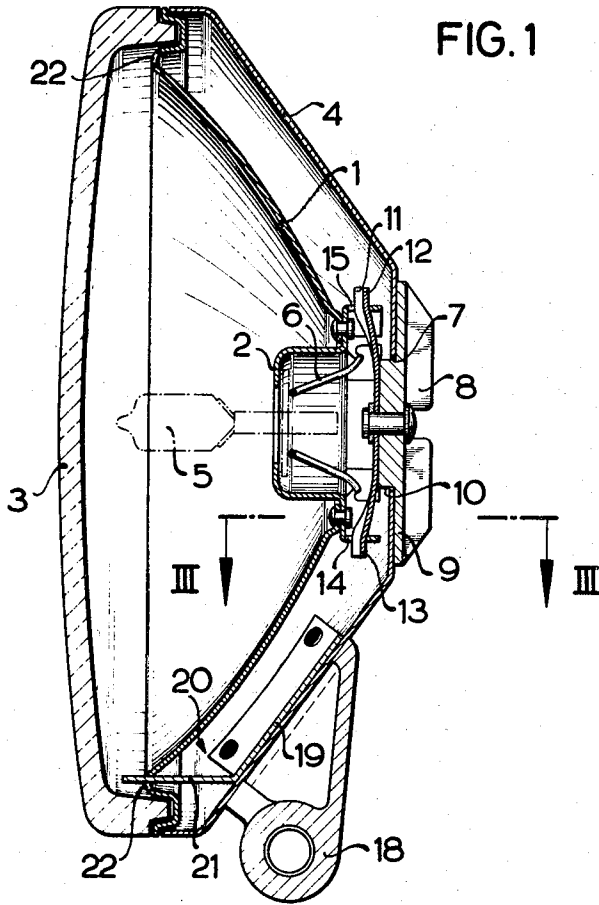


FIG. 1

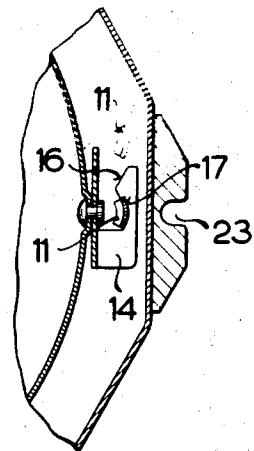


FIG. 3

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FIG. 2

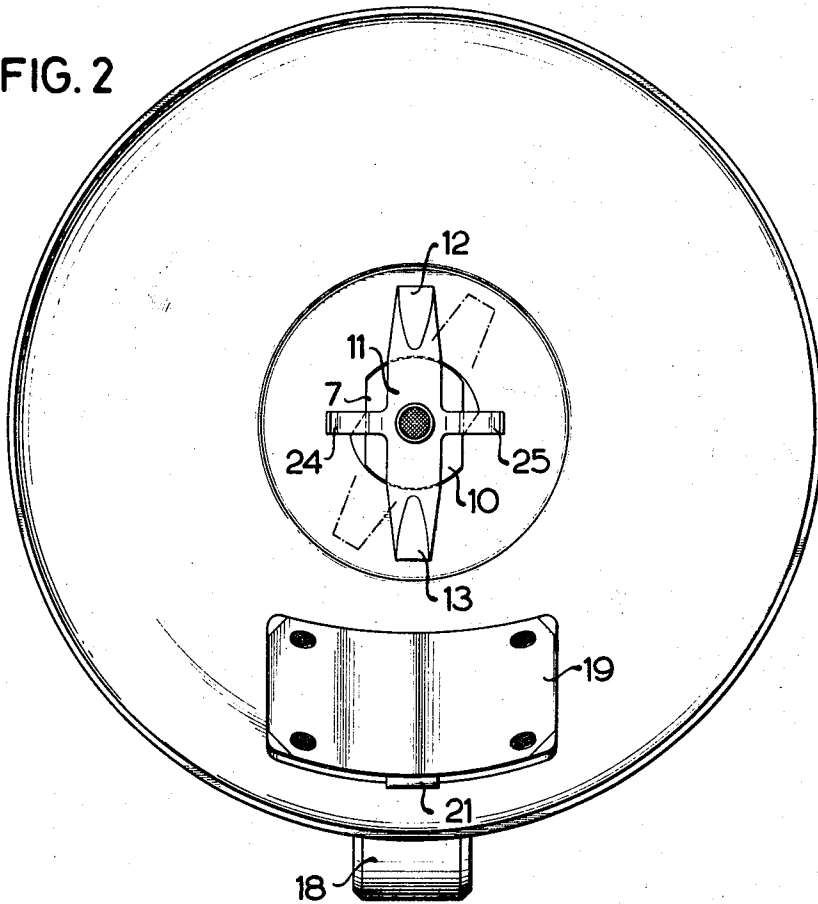
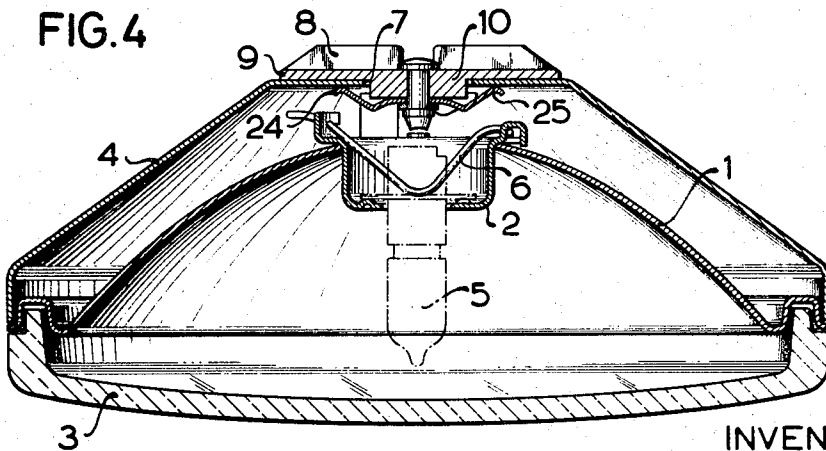


FIG. 4



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VEHICLE HEADLIGHT

BACKGROUND OF THE INVENTION

The present invention relates generally to a light, and more particularly to a searchlight or headlight for motor vehicles.

It is intended that for purposes of the present disclosure the term "headlight" as employed herein in the specification and in the appended claims be a reference to any type of vehicle light having the constituent components discussed in more detail herein, irrespective of whether it in fact is used as the head end or front end of a vehicle to provide forward illumination or not.

Such "headlights" as they will be called hereafter—keeping the above comment in mind concerning the applicability and range of meaning of the term—are already known in a wide variety of constructions. Quite a few, including particularly such auxiliary headlights as are used for driving in fog conditions, are provided with an optical unit constituted by the reflector, the socket and bulb mounted in the reflector, and the lens closing the open side of the reflector. This unit is then mounted via special mounting members on a mounting ring which is hooked at one part of its circumference to a projection provided for this purpose on a housing, whereas at an opposite location of the mounting ring the latter and thereby the unit is connected with the housing by means of screw. Aside from the fact that the screw is necessarily visible in these constructions and is frequently found aesthetically displeasing, it is unavoidable that the screw is exposed to the deleterious influences of wind and weather so that over a period of time it may corrode or, if it is of corrodable material, it may nevertheless become difficult if not impossible to turn because of the entry and accumulation of various contaminants into its threads. Some other constructions of this general type here in question replace the screw with a spring element which is neither externally visible nor subject to the contamination problems just mentioned. However, in these constructions there is the disadvantage that it becomes very difficult to remove the optical unit for purposes of replacing a burned-out bulb, such replacement having usually to be carried out by skilled personnel conversant with the particular construction and knowing where the spring is located and consequently where separation of the ring from the housing is to be effected. Such removal cannot usually be done by the user himself, at least not without probing to find out at which point separation can be effected, with such probing resulting in marings or more serious damage to the headlight.

SUMMARY OF THE INVENTION

It is accordingly, an object of the present invention to overcome the aforementioned disadvantages.

More particularly it is an object of the present invention to provide an improved headlight of the type under discussion which is not possessed of these disadvantages.

In pursuance of the above objects, and others which will become apparent hereafter, one feature of the invention resides in a headlight for motor vehicles and the like which, briefly stated, comprises a housing having an open side and an opposite closed side. A replaceable lighting unit is insertable into the open side and comprises a reflector having a light-emitting open-

ing, a bulb-socket mounted on the reflector, a light bulb in the socket, and a protective lens extending across and closing the opening of the reflector. Releasable securing means is provided for releasably securing the lighting unit to the housing and includes abutment means fast with the reflector externally thereof, spring means on the housing and movable between an inoperative position and an operative position in which latter it lockingly engages the abutment means, and actuating means cooperating with the spring means and turnably mounted on the housing accessible at the closed side thereof turnable to and from an actuating position in which it urges the spring means to its operative position.

Advantageously, the actuating means will be in form of an element having a cylindrical portion which is provided with parallel flat facets at diametrically opposite sides and which is turnably mounted in an opening in the housing at the closed side thereof whose edge portions bounding the opening are configured in the outline of two cylindrical portions which are skew with one another at a predetermined angle, so that the cylindrical portion of the actuating means can be turned only through an angle dictated by the cooperation between the edge portions and its side facets. The spring element is advantageously connected to the cylindrical portion by riveting or the like, and includes a leaf spring which is at least substantially rectangular and has end portions projecting outwardly beyond the cylindrical portion and engages in abutment portions provided for this purpose in the region of the aperture in the reflector in which the socket is located. These abutment portions may be parts of the socket itself, or they may be provided on the reflector. The socket is of course fast in suitable manner with the reflector so that, accordingly, the abutment portions are in effect fast with the reflector also.

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 drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a vertical elevational section through a headlight according to the present invention;

FIG. 2 is a front view of the housing in the embodiment of FIG. 1, showing the interior of the housing with the optical unit omitted for clarity;

FIG. 3 is a fragmentary section of FIG. 1 taken on line III—III of that Figure; and

FIG. 4 is an horizontal section through FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Discussing now the drawing in detail and firstly FIG. 1 thereof, it will be seen that the illustrated exemplary embodiment comprises a housing 4 having an open front side in which there is located a replaceable optical or lighting unit constituted by the reflector 1, a bulb-socket 2 mounted in the reflector, a light bulb 5 mounted in the socket 2 and retained therein by a

spring wire 6, and a protective lens 3 extending across the front opening of the reflector closing the same and protecting the light bulb.

The unit composed of the aforementioned components is releasably accommodated in the open side of the housing 4. Provided for this purpose in accordance with the present invention is a recess or cut-out 7 in the closed side of the housing 4 (also compare FIG. 2) into which there is inserted an actuating means or element 8. It comprises an outer portion 9 configured so as to accommodate itself to the exterior contour of the housing 4 at the closed side of the latter, and a cylindrical pin portion 10 which extends into the recess or cut-out 7 and in the illustrated embodiment is provided with parallel flat facets at two diametrically opposite sides. The edge bounding the cut-out 7 is so configured (compare FIG. 2) as to resemble the outline of two of the pin portions 10 which are arranged with their axes inclined towards one another under a predetermined angle; in this manner the element 8 can be turned in the cut-out 7 only by an angle corresponding to this predetermined angle, as will be evident in particular from a consideration of FIG. 2.

The construction according to the present invention further comprises spring means, in the illustrated embodiment a leaf spring 11 which is suitably secured to the pin portion 10, for instance by riveting so as to turn therewith. It is of substantially rectangular configuration and its end portions 12 and 13 project outwardly beyond the pin portion 10. As the drawing shows (see also FIG. 3) the end portions 12 and 13 of the leaf spring 11 are curved or bent transversely of their elongation in order to more readily engage with cooperating abutment means provided on the reflector, as will be discussed. In addition they are curved away from the inner side of the housing 4 to avoid frictional contact therewith, as particularly clearly shown in FIG. 1. The abutment means may be provided in various different ways; in the illustrated embodiment they are in form of angle members 14 and 15 projecting at right angles to the abutment surface with which the socket 2 engages the marginal zone surrounding the opening in the reflector in which the socket is mounted. This is clearly shown in FIG. 4, for instance. The portions 14 and 15 are provided with cut-outs so that they each have an inclined section 16 over which the end portions 12 and 13, respectively, move when the spring 11 is turned with the pin portion 10, and a subsequent recess 17 into which the respective spring end portions can snap.

An angular member 20 is provided, one arm 19 of which is secured—as by riveting—to the housing wall; preferably as a counterpart to the mounting foot 18 provided at the outer side of the housing 4. The other arm 21 of the member 20 extends through a correspondingly configured aperture 22 in the reflector 1, so that the member 20 together with the aperture 22 provides for an aligning arrangement or keying arrangement which makes it impossible to connect the lighting unit with the housing 4 in any but the precisely preselected and pre-defined relative position desired for them. This is important to assure that whenever the lighting unit is connected with the housing 4, for instance whenever it has been removed for replacement of the bulb and is subsequently reconnected with the housing, the optical axis of the reflector 1 will be

properly oriented with reference to the road surface on which the vehicle is to travel, such orientation being provided by the fact that the housing 4 itself is fixedly mounted on the vehicle so that an enforced positioning of the lighting unit with reference to the housing 4 will always locate the lighting unit in the same relative position with respect to the road.

In many instances, particularly if the headlight is intended as a fog light, it may be very advantageous to provide an additional aperture 22 at a side of the reflector which is diametrically opposite the first-mentioned aperture 22, so that if desired the lighting insert or lighting unit can be mounted in the housing 4 in a second position relative to the latter, namely in a position in which it is turned through 180° with reference to the first-mentioned position. This makes it possible to mount the housing—which has only the single mounting foot 18—both in upright position or if desired in a suspended position on a part of the vehicle. Depending upon in which manner the housing is mounted, the lighting unit is then simply turned through 180° if necessary.

The mounting of the headlight according to the present invention, that is its assembly, is very simple and requires neither skill nor, in most instances, any tools. It is merely necessary to insert the requisite bulb into the socket 2 and to thereupon insert the lighting unit from the front into the open end or open side of the housing 4, taking care that the arm 21 enters into the single—or the desired one of the two—aperture 22. Before the unit contacts the inner wall of the housing—and there may be a sealing ring provided in well known manner to provide a seal between the two—the spring 11 must be turned to the position shown in FIGS. 2 and 3 in broken lines. Subsequently, that is when the reflector 1 contacts the inner side of the housing 4, the element 8 is turned in counterclockwise direction with the result that the end portions of the spring 11 first move over the respective inclines 16 of the associated members 14 and 15, and subsequently snap in the associated recesses 17. This provides for a reliable mounting of the unit in the housing 4, from where it cannot be inadvertently loosened and in which it will not vibrate with reference to the housing. On the other hand, the unit 4 can be very readily disconnected from the housing when necessary.

If the searchlight provided with the present invention is large, then the pressure exerted by the spring 11 must of course be very significant. In that case it may not be possible to turn the element 8 manually and it is then advantageous to provide the portion 9 of the element 8 with suitable engaging means—such as projections, recesses, facets or the like—or in form of a slot 23, bores or similar possibilities, with which a tool can cooperate for effecting the necessary turning.

If the element 8 consists of an electrically conductive material the connection to mass can be omitted because of the electrically conductive connection between housing 4 and socket 2. However, for various reasons including expenses of manufacture it is preferred at this time to make the element 8 of synthetic plastic material, for instance by injection molding. Because it is of course always advantageous to be able to omit a separate mass connection to the bulb, it is advantageous to provide the spring 11 with two

sliding contacts 24 and 25 which are so configured that their ends engage the inner side of the housing wall 4 under spring pressure. Thus, they provide an electrically conductive connection between the housing 4 and the socket 2 even if the element 8 itself is electrically non-conductive. In addition the contacts 24 and 25 serve in effect as braking means for the element 8, meaning that before the unit is inserted into the housing 4 and connected with the same, they tend to hold the spring 11 in the position illustrated in broken lines in FIGS. 2 and 3.

It will be appreciated that the embodiment illustrated in the drawing is not only exemplary but also rather simple in nature. Modifications are clearly possible and will offer themselves readily to those skilled in the art. Thus, if for instance the headlight or searchlight is large, it may be advantageous or even necessary to provide several of the springs 11 which then cooperate with corresponding abutment means on the reflector. As pointed out before, the abutment means need not themselves be directly a part or unitary with the reflector, but can be provided on the bulb socket, or vice versa. They can for instance be provided as separate elements secured to the reflector at the exterior thereof, in the region of the marginal zone bounding the open end in which the socket 2 is itself mounted. Also, while the cooperation between the abutment means and the spring has been shown as essentially corresponding to the operation of a bayonet-type closure, it is clear that the locking cooperation may be different and that the abutment means may for instance be simply in form of strip-like portions stamped from and bent outwardly of the material of the reflector 1 itself.

It is advantageous but not necessary that the portion 9 of the element 8 is so configured that it conforms to the outer contour of the housing 4. Preferably but again not necessarily the housing 4 will be flattened at the closed side in the region where the opening for the element 8 is provided and then the portion 9 will at least substantially complete the original housing form which the housing would have were it not for the flattening. The reason for this is that such headlights or searchlights are frequently mounted in such a manner that not only their front but also their rear side can be seen so that aesthetic considerations make this type of construction desirable. For the same reasons the color of the portion 9 will advantageously also be made to correspond or harmonize with the color of the housing. By resorting to the present invention it is not only possible to very quickly and without any difficulty remove the lighting unit from the housing to replace a damaged bulb, but to reconnect it with equal ease. The possibility of screws not turning precisely when it is most necessary that they do so, for instance if the bulb must be replaced on a dark highway, is avoided just as the aesthetically displeasing presence of the screws in the first place is overcome. Similarly, the necessary replacement work can be done by anyone without requiring skill, whereby the possibility of damage to the unit, inherent heretofore in the type of construction utilizing a concealed spring, is also overcome.

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 constructions differing from the types described above.

While the invention has been illustrated and described as embodied in a headlight, 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 protected by Letters Patent is set forth in the appended

1. A headlight for motor vehicles and the like, comprising a housing having an open side and an opposite closed side; a replaceable lighting unit insertable into said open side and comprising a reflector having a light-emitting opening, a bulb-socket mounted on said reflector, a light bulb in said socket, and a protective lens extending across and closing said opening; and releasable securing means for releasably securing said lighting unit to said housing, said securing means including abutment means fast with said reflector externally thereof, spring means provided on said housing and being movable between an inoperative position in which it is disengaged from and an operative position in which it is lockingly engaged with said abutment means, and actuating means cooperating with said spring means and turnably mounted on said housing accessible at said closed side and turnable to and from an actuating position in which it urges said spring means to said operative position.

2. A headlight as defined in claim 1, said housing having an aperture at said closed side; and further comprising cooperating abutment faces on said actuating means and bounding the edges of said aperture for limiting the angular displacement of said actuating means during turning of the same.

3. A headlight as defined in claim 2, said actuating means comprising a first portion located exteriorly of said housing and aperture, and a substantially cylindrical second portion rigid with said first portion and having a pair of diametrically opposite flat facets constituting said abutment faces on said actuating means.

4. A headlight as defined in claim 3, said spring means comprising at least one spring element within said housing rigid and turnable with said second portion.

5. A headlight as defined in claim 4, said spring element comprising at least one elongated leaf spring having opposite end portions which project outwardly beyond the periphery of said second portion.

6. A headlight as defined in claim 5, at least said end portions being slightly bowed in direction transversely to the elongation of said leaf spring.

7. A headlight as defined in claim 5, said housing having an inner surface at said closed side, and wherein at least said end portions of said leaf spring are inwardly spaced from and out of contact with said inner surface.

8. A headlight as defined in claim 1, said reflector having an additional opening opposite said light-emitting opening, and said socket being lodged in said additional opening; and wherein said abutment means is located in the marginal zone of said reflector bounding said additional opening.

9. A headlight as defined in claim 8; further comprising rivet means connecting said socket with said reflector; and wherein said abutment means is unitary with said socket means.

10. A headlight as defined in claim 9, said abutment means comprising a plurality of lugs projecting from said socket and each provided with a cut-out including a first portion bounded by an inclined elongated edge and a second portion communicating with said first portion; and wherein said spring means comprises a corresponding plurality of projecting end portions each slidable over as associated elongated edge, and receivable with a snap action in the respective second portion, upon turning of said actuating means to said actuating position.

11. A headlight as defined in claim 1, said abutment means being electrically conductively connected with said socket; and wherein said spring means and actuating means consist at least in part of electrically conductive material for conductively connecting said socket and said housing when said actuating means is in said actuating position.

12. A headlight as defined in claim 1; further comprising keying means for preventing securing of said unit to said housing in other-than-predetermined positions of the same relative to one another.

13. A headlight as defined in claim 12, said keying means being provided on one of said unit and housing.

14. A headlight as defined in claim 12, said keying means being provided on said unit and on said housing.

15. A headlight as defined in claim 12, said keying means comprising an angle member having one arm fast with said housing and an other arm projecting within said housing toward said open side thereof, and at least one recess in said reflector arranged to at least in part receive said other arm when said reflector and housing are in predetermined position relative to one another.

16. A headlight as defined in claim 1, said housing having at said closed side a predetermined external contour; and wherein said actuating means comprises an outer body portion provided exteriorly of said closed side and having a configuration complementary to said external contour.

17. A headlight as defined in claim 16, said housing having at said closed side an external flat facet deviat-

ing from said external contour, and wherein said actuating means comprises an outer body portion overlying said flat facet and having an outline which at least approximately follows said external contour.

18. A headlight as defined in claim 1; and further comprising engaging portions on said actuating means for enabling engaging and turning of the latter to and from said actuating position with the help of a tool.

19. A headlight for motor vehicles and the like, comprising a housing having an open side and an opposite closed side; a replaceable lighting unit insertable into said open side and comprising a reflector having a light-emitting opening, a bulb-socket mounted on said reflector, a light bulb in said socket, and a protective lens extending across and closing said opening; and releasable securing means for releasably securing said lighting unit to said housing, said securing means including abutment means fast with said reflector externally thereof, spring means including at least one leaf spring on said housing and movable between an inoperative position and an operative position lockingly engaging said abutment means, and actuating means cooperating with said spring means and turnably mounted on said housing accessible at said closed side and turnable to and from an actuating position in which it urges said spring means to said operative position.

20. A headlight for motor vehicles and the like, comprising a housing having an open side and an opposite closed side; a replaceable lighting unit insertable into said open side and comprising a reflector having a light-emitting opening, a bulb-socket mounted on said reflector, a light bulb in said socket, and a protective lens extending across and closing said opening; and releasable securing means for releasably securing said lighting unit to said housing, said securing means including abutment means fast with said reflector externally thereof, spring means on said housing and movable between an inoperative position and an operative position lockingly engaging said abutment means, and actuating means fast with and carrying said spring means and being turnably mounted on said housing accessible at said closed side and turnable to and from an actuating position in which it urges said spring means to said operative position.

21. A headlight as defined in claim 20, said actuating means comprising a main portion of electrically insulating material, and at least one contact of electrically conductive material carried by said main portion in biased sliding engagement with said housing and adapted for electrically conductive contact with said socket.

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