



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 1 065 437 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
03.01.2001 Bulletin 2001/01

(51) Int. Cl.⁷: **F21S 8/10**, F21V 14/02
// F21W101:10

(21) Application number: **00305444.2**

(22) Date of filing: **28.06.2000**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **29.06.1999 CZ 235299**

(71) Applicant: **AUTOPAL S.R.O.**
Novy Jicin 741 01 (CZ)

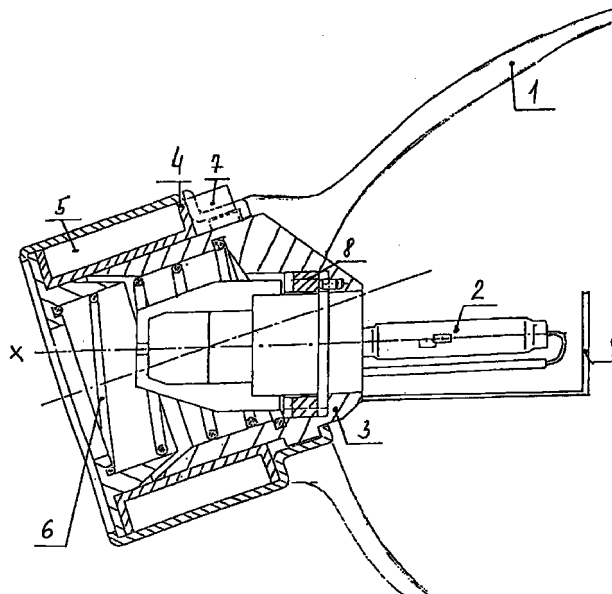
(72) Inventors:
• **Cejnek, Milan**
Novy Jicin 741 01 (CZ)

• **Vejbor, Petr**
Olomouc 779 00 (CZ)
• **Strambersky, Libor**
Senov U Noveho Jicina 742 42 (CZ)
• **Specka, Jaroslav**
Nove Mesto Nad Metuji 549 01 (CZ)

(74) Representative:
Godwin, Edgar James
MARKS & CLERK,
57-60 Lincoln's Inn Fields
London WC2A 3LS (GB)

(54) **Headlight system for motor vehicles**

(57) A headlight system for motor vehicles which comprises a reflector (1), a light source (2), an opaque shield (9) and an actuating member, which member provides for changing of the light source (2) position between the position for the low light beam mode and that for the high light beam mode, whereby the light source (2) is mounted in this actuating member and the resulting force vector induced by this actuating member is situated in proximity of the light source (2) alone.



EP 1 065 437 A2

Description

Field of the Invention

[0001] The present invention relates to a headlight system for motor vehicles. More particularly, the present invention relates to a headlight system of reflector design, whereby, the mechanical construction of said headlight provides for moving the light source in said reflector with the objective to change distribution of light in the space.

[0002] Further, in one position of said light source, the light beam is running convergently (divergently) below a distinct light/dark boundary for the purpose of illumination by the low light beam and in the other position of the light source the light beam is roughly collimated for the purpose of the high light beam illumination.

Background of the Invention

[0003] A change in the light source position within said headlight can be used to modify the light beam exiting from a headlight. By shifting the light source off the parabolic reflector focus it is caused that the reflected light beam is no more collimated.

[0004] Also, by vertical shifting of the light source relative to the parabolic reflector the light beam exiting from said parabolic reflector is also shifted vertically. A number of the dual-filament bulbs is based on these physical principles, whereby, they use the geometric layout of filaments for the low and the high light beam modes. Therefore, if a light source is used, it is possible to switch between the low and the high light beams by switching between the light source positions relative to the parabolic reflector. In prior art, the mechanisms disclosed, providing a shift of the light source from one specified position to another specified position, are designed so that they use a guiding path where an actuating member, which is not a part of the parabolic reflector, shifts a light source carrier in the longitudinal direction (patents US 5,769,525, DE 19741377, DE 19710632). A disadvantage of such constructions is that a design space is necessary to mount in an external actuating member, both the parabolic reflector and the actuating member have to be adjusted simultaneously, whereby, the actuating member is not mounted in the area of the parabolic reflector and, more to it, it is sensitive to shocks. The resultant force vector directed out of the actuating member is not situated in the axis of the movable light source carrier what causes that such a mechanism tends to get jammed.

Summary of the Invention

[0005] The above mentioned disadvantage of an actuating member is avoided in case of a headlight system for motor vehicles, more particularly, by a headlight

system of reflector design, where, the mechanical construction of said headlight is comprised of a nearly parabolic reflector, a light source of any kind and a mechanism providing for a change in the light source position between one and the other specified positions. Switching between the low light beam and the high light beam modes is realised by altering the light source positions in a parabolic reflector.

[0006] Inside the reflector in proximity of its optical axis a light source is placed in a movable cylindrical sleeve so that the reference plane of the light source is approximately perpendicular to the optical axis. The sleeve inclination angle is determined by the angle of the part delimited between the two specified positions of the light source and the optical axis. The movable sleeve is mounted in a housing, which housing determines the path of said movable sleeve. A coil is wound up in the housing, which housing forms the coil former. The coil serves to generate electromagnetic field. When the coil terminals are connected to electric voltage, electromagnetic field is generated. The so induced electromagnetic force attracts the movable sleeve. The housing is provided with contact surfaces that guarantee exact positioning of the movable sleeve. The elastically deformable element placed on the movable sleeve ensures positioning of the light source for the low light beam. The light source position for the high light beam is provided by connecting the terminals of the coil with electric voltage what induces such electromagnetic force that this force attracts the movable sleeve with the light source into the high light beam position.

[0007] The actuating member can be designed so that it can be disassembled, what makes possible to replace the actuating member for a new one easily, e.g. in case of a breakdown of the actuating member or the light source.

[0008] The light source can be mounted into the mechanism at the front or the back parts of the mechanism.

[0009] An opaque shield is mounted on the movable sleeve, which shield serves to shielding of the bottom part of the reflector. This shield can be movable relative to the movable sleeve, in which case it allows that light rays impinge on the bottom part of the said reflector in the high light beam mode, whereby, the high light beam is intensified or, eventually, the shield can be static relative to said reflector, when this opaque shield specifies an optical reflector area that can be used for the low light beam. For the light source position in the high light beam mode, the optical area that can be used for the high light beam is increased due to the change in the light source position. The difference between the areas for the low light beam and the high light beam modes can be used in optimisation of the high light beam.

[0010] The actuating member can be represented by an electromagnetic device so as by a stepping motor with a linear drive or by a direct-current motor or by an

electromagnet.

Brief Description of the Drawings

[0011] The present invention will now be illustrated in a greater detail with reference to the attached schematic drawing showing the side view of the mechanical and optical layout of the positioning mechanism.

Detailed Description of the Invention

[0012] Referring now to the attached drawing which schematically shows the mechanical and optical principles of a particularly preferred embodiment of a headlight according to the present invention in side view, the headlight comprises a reflector 1 of parabolic shape. Inside the reflector 1 a light source 2 is mounted in proximity of the reflector 1 optical axis which optical axis is also the axis of the headlight. The light source 2 can be represented by an axially placed gas discharge arc or by a halogen lamp spiralled filament. The light source 2 is mounted in a movable sleeve 3, preferably of cylindrical shape, so that the reference plane of the light source 2 is approximately perpendicular to the optical axis. The inclination angle of the movable sleeve 3 is given by the path angle, which path is delimited between the two specified positions of the light source 2 and by the optical axis. The movable sleeve 3 is mounted in a housing 4 which housing delimits the path for the movable sleeve 3. A coil 5, which serves to induce electromagnetic field, is wound up on the housing 4, which housing 4 serves as a coil former. When voltage is applied to the terminals of said coil 5, the coil 5 induces electromagnetic field, which field attracts the movable sleeve 3. On the housing 4 contact surfaces are formed, whereby the contact surfaces provide for an accurate positioning of the movable sleeve 3. The elastically deformable element 6, which is placed on a movable sleeve 3, provides for the low light beam position of the light source 2. Position of the light source 2 for the high light beam is provided for by applying voltage to the coil 5 winding terminals, whereby, the voltage application induces such electromagnetic force that this force attracts the movable sleeve 3 with the light source 2 into the position for the high light beam.

[0013] The opaque shield 9 is static relative to the movable sleeve 3 or it can be static relative to the reflector 1. By the light source 2 position for the low light beam, this opaque shield 9 specifies the optical area of the reflector 1 which can be used in the low light beam mode. By positioning of the light source 2 into the position for the high light beam, the optical area that can be used for the high light beam is increases due to a change in the light source 2 position. The difference between the area for the low light beam and that for the high light beam can be used in optimisation of the high light beam. The whole mechanism, which makes the change in position of the light source 2 possible, can be

dismounted from the reflector 1. The guiding element 7 specifies an exact position of the whole mechanism relative to the headlight 1. The mounting element 8 makes an accurate mounting of the light source 2 relative to the whole mechanism possible.

Industrial Use

[0014] Headlight systems according to the present invention will find use in headlights that allow switching between the low and the high light beam modes, preferably in the headlights of motor vehicles.

Claims

1. A headlight system for motor vehicles which comprises a reflector, a light source, an opaque shield and an actuating member which member is providing for a change in position of said light source between the low light beam position and the high light beam position, **characterised in that** said light source (2) is an integral part of said actuating member so that at least one of its parts forms the inside of a movable sleeve (3) of said actuating member, whereby said integrated part of said light source (2) is situated in proximity of the axis of said movable sleeve (3) where the resultant force vector of said actuating member of said headlight system is present.
2. A headlight system of Claim 1, **characterised in that** said opaque shield (9) is static relative to said reflector (1), whereby,
 - for the low light beam position of said light source (2) said opaque shield (9) defines an optic area of said reflector (1) usable for the low light beam, and
 - for the high light beam position of said light source (2) said optic area of said reflector (1) usable for the high light beam is increased as a consequence of the changed position of said light source (2).
3. A headlight system of Claim 1, **characterised in that** said actuating member is within said reflector (1).
4. A headlight system of Claim 1, **characterised in that** said reflector (1) and said actuating member form an assembly unit.
5. A headlight system of Claim 1, **characterised in that** said actuating member and said light source (2) form an assembly unit.
6. A headlight system of Claim 1, **characterised in that** said opaque shield (9) is movable relative to

said movable sleeve (3).

7. A headlight system of Claim 1, **characterised in that** said opaque shield (9) is static relative to said movable sleeve (3). 5
8. A headlight system of Claim 1, **characterised in that** the mechanism comprises an elastically deformable element (6) which element (6) provides reciprocation and position fixation of said light source (2) in the low light beam position. 10
9. A headlight system of Claim 1, **characterised in that** said actuating member is an electro-mechanical unit, preferably a stepping motor with linear transmission or an electromagnet or a direct-current linear motor. 15
10. A headlight system of Claim 1, **characterised in that** said light source (2) is a spiralled filament of a halogen lamp which lamp is provided preferably with a filament oriented in the transverse or the axial positions. 20
11. A headlight system of Claim 1, **characterised in that** said light source (2) is provided with a gas discharge arc, preferably oriented in the transverse or the axial positions. 25

30

35

40

45

50

55

