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(54) ELECTRONIC FLASH UNIT

(71) We, AGFA-GEVAERT AKTIEN-GESELLSCHAFT, a body corporate organised according to the laws of the Federal Republic of Germany, of Leverkusen, Federal Republic of Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to an electronic flash unit with a reflector for the flash tube.

It has previously been proposed to make the reflector pivotable in response to a manual operation.

The present invention provides an electronic flash unit comprising a housing, a hollow member of which the outer surface is part cylindrical and which is so mounted within the housing as to be rotatably about its axis, which axis is fixed with respect to the housing, an elongate flash tube and a reflector for the flash tube, the reflector being fixed with respect to the rotatable member, the arrangement being such that the axis of the flash tube coincides with, or is parallel to, the axis of the rotatable member, the housing being light-transmitting over the area of emission of light from the flash tube and reflector over a range of angular positions of the rotatable member with respect to the housing, and a part of the cylindrical outer surface of the rotatable member being accessible to permit manual rotation of the rotatable member relative to the housing to adjust the direction of emission of light from the flash unit.

Advantages of such a flash unit are that it can be made compact and that the reflector can be pivoted in a simple manner without the outer form of the housing being altered by the pivoting. Further, with such means for pivoting the reflector, the risk of inadvertent pivoting of the reflector, for example, when placing the unit in a bag, is reduced.

Preferably, the housing is formed with

an aperture in the side remote from the directions of emission of light from the unit, through which aperture the part of the part cylindrical outer surface of the rotatable member is accessible to permit manual rotation of the rotatable member.

The rotatable member and the reflector may be shaped and arranged to fit together along their edges that extend parallel to the axis of the flash tube.

Advantageously, the housing has a partially cylindrical cavity which is coaxial with the rotatable member and within which the rotatable member is located.

Advantageously, the manually accessible part of the outer surface of the rotatable member is knurled or otherwise rough over a part of its area to facilitate manual rotation of the rotatable member.

There is advantageously provided stop means arranged so to restrict the angle through which the rotatable member can rotate as to ensure that light from the flash tube and reflector is, for all angular positions of the rotatable member relative to the housing, incident substantially only on the light-transmitting part of the housing. The stop means may comprise a pin-and-slot arrangement. Preferably, the stop means is arranged to restrict to 90° the angle through which the rotatable member can be rotated relative to the housing.

The outer surface of the rotatable member is preferably provided with a scale for indicating the orientation of the reflector with respect to the housing.

An electronic flash unit constructed in accordance with the invention will now be described, by way of example, with reference to the accompanying drawings, in which:—

Fig. 1 is a side view, partially in section, of the electronic flash unit; and

Fig. 2 is a rear view of the electronic flash unit.

Referring to the accompanying drawings, the electronic flash unit comprises a housing denoted generally by the reference numeral 1, an electronic flash tube 2 and a

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reflector 3. The reflector 3 is rigidly secured to a rotatable member 4, the outer surface of which substantially coincides with a part of an imaginary cylinder, the rotatable member being pivotable about the axis 5 of the imaginary cylinder. The upper portion of the flash unit housing 1 is also in the form of part of a circular cylinder, which is made up over a part of its circumference by a part cylindrical member 6 which is light-transmitting, and over another part of its circumference by a part cylindrical member 7 which is opaque. The back portion 8 of the housing extends in a plane that is tangential to the cylindrical upper portion of the flash unit, whereas the front portion of the housing 9 is set back from a plane tangential to the front part of the member 6. The upper end part of the back portion 8 of the housing extends upwards and inwardly to meet the rotatable member 4, and the upper edge of that inwardly extending part and the lower edge of the opaque part cylindrical member 7 together define, in part, an aperture 10 through which the outer surface of the rotatable member 4 is accessible to the user to permit pivoting of the reflector 3. The part of the outer surface of the rotatable member 4 that is accessible through the aperture 10 is knurled as shown at 11. At one or each end of the rotatable member 4, there is provided a part circular slot 12 which is centred on the axis of rotation of the rotatable member and which subtends an angle of 90° at that axis. The slot 12 is engaged by a pin 13 which is firmly secured to the housing of the electronic flash unit housing 1. The slot 12, in conjunction with the pin 13, restricts to 90° the angle through which the reflector 3 and the rotatable member 4 can pivot to 90° and ensure that the edges of the reflector 3 do not extend beyond the axially extending edges of the light-transmitting part cylindrical member 6.

The outer surface of the rotatable member 4 is provided with a scale 14 for indicating the orientation of the reflector 3.

WHAT WE CLAIM IS:—

1. An electronic flash unit comprising a housing, a hollow member of which the outer surface is part cylindrical and which is so mounted within the housing as to be rotatably about its axis, which axis is fixed with respect to the housing, an elongate flash tube and a reflector for the flash tube, the reflector being fixed with respect to the rotatable member, the arrangement being such that the axis of the flash tube coincides with, or is parallel to, the axis of the rotatable member, the housing being light-

transmitting over the area of emission of light from the flash tube and reflector over a range of angular positions of the rotatable member with respect to the housing, and a part of the cylindrical outer surface of the rotatable member being accessible to permit manual rotation of the rotatable member relative to the housing to adjust the direction of emission of light from the flash unit.

2. An electronic flash unit as claimed in claim 1, wherein the housing is formed with an aperture in the side remote from the directions of emission of light from the unit, through which aperture the part of the part cylindrical outer surface of the rotatable member is accessible to permit manual rotation of the rotatable member.

3. An electronic flash unit as claimed in claim 1 or claim 2, wherein the rotatable member and the reflector are shaped and arranged to fit together along their edges that extend parallel to the axis of the flash tube.

4. An electronic flash unit as claimed in any one of claims 1 to 3, wherein the housing has a partially cylindrical cavity which is coaxial with the rotatable member and within which the rotatable member is located.

5. An electronic flash unit as claimed in any one of claims 1 to 4, wherein at least the manually accessible part of the outer surface of the rotatable member is knurled or otherwise rough over at least a part of its area to facilitate manual rotation of the rotatable member.

6. An electronic flash unit as claimed in any one of claims 1 to 5, wherein there is provided stop means arranged so to restrict the angle through which the rotatable member can rotate as to ensure that light from the flash tube and reflector is, for all possible angular positions of the rotatable member relative to the housing, incident substantially only on the light-transmitting part of the housing.

7. An electronic flash unit as claimed in claim 6, wherein the stop means comprises a pin-and-slot arrangement.

8. An electronic flash unit as claimed in claim 6 or claim 7, wherein the stop means is arranged to restrict to 90° the angle through which the rotatable member can be rotated relative to the housing.

9. An electronic flash unit as claimed in any one of claims 1 to 8, wherein the outer surface of the rotatable member is provided with a scale for indicating the orientation of the reflector with respect to the housing.

10. An electronic flash unit substantially as hereinbefore described with reference



reflector 3. The reflector 3 is rigidly secured to a rotatable member 4, the outer surface of which substantially coincides with a part of an imaginary cylinder, the rotatable member being pivotable about the axis 5 of the imaginary cylinder. The upper portion of the flash unit housing 1 is also in the form of part of a circular cylinder, which is made up over a part of its circumference by a part cylindrical member 6 which is light-transmitting, and over another part of its circumference by a part cylindrical member 7 which is opaque. The back portion 8 of the housing extends in a plane that is tangential to the cylindrical upper portion of the flash unit, whereas the front portion of the housing 9 is set back from a plane tangential to the front part of the member 6. The upper end part of the back portion 8 of the housing extends upwards and inwardly to meet the rotatable member 4, and the upper edge of that inwardly extending part and the lower edge of the opaque part cylindrical member 7 together define, in part, an aperture 10 through which the outer surface of the rotatable member 4 is accessible to the user to permit pivoting of the reflector 3. The part of the outer surface of the rotatable member 4 that is accessible through the aperture 10 is knurled as shown at 11. At one or each end of the rotatable member 4, there is provided a part circular slot 12 which is centred on the axis of rotation of the rotatable member and which subtends an angle of 90° at that axis. The slot 12 is engaged by a pin 13 which is firmly secured to the housing of the electronic flash unit housing 1. The slot 12, in conjunction with the pin 13, restricts to 90° the angle through which the reflector 3 and the rotatable member 4 can pivot to 90° and ensure that the edges of the reflector 3 do not extend beyond the axially extending edges of the light-transmitting part cylindrical member 6.

The outer surface of the rotatable member 4 is provided with a scale 14 for indicating the orientation of the reflector 3.

WHAT WE CLAIM IS:—

1. An electronic flash unit comprising a housing, a hollow member of which the outer surface is part cylindrical and which is so mounted within the housing as to be rotatably about its axis, which axis is fixed with respect to the housing, an elongate flash tube and a reflector for the flash tube, the reflector being fixed with respect to the rotatable member, the arrangement being such that the axis of the flash tube coincides with, or is parallel to, the axis of the rotatable member, the housing being light-

transmitting over the area of emission of light from the flash tube and reflector over a range of angular positions of the rotatable member with respect to the housing, and a part of the cylindrical outer surface of the rotatable member being accessible to permit manual rotation of the rotatable member relative to the housing to adjust the direction of emission of light from the flash unit.

2. An electronic flash unit as claimed in claim 1, wherein the housing is formed with an aperture in the side remote from the directions of emission of light from the unit, through which aperture the part of the part cylindrical outer surface of the rotatable member is accessible to permit manual rotation of the rotatable member.

3. An electronic flash unit as claimed in claim 1 or claim 2, wherein the rotatable member and the reflector are shaped and arranged to fit together along their edges that extend parallel to the axis of the flash tube.

4. An electronic flash unit as claimed in any one of claims 1 to 3, wherein the housing has a partially cylindrical cavity which is coaxial with the rotatable member and within which the rotatable member is located.

5. An electronic flash unit as claimed in any one of claims 1 to 4, wherein at least the manually accessible part of the outer surface of the rotatable member is knurled or otherwise rough over at least a part of its area to facilitate manual rotation of the rotatable member.

6. An electronic flash unit as claimed in any one of claims 1 to 5, wherein there is provided stop means arranged so to restrict the angle through which the rotatable member can rotate as to ensure that light from the flash tube and reflector is, for all possible angular positions of the rotatable member relative to the housing, incident substantially only on the light-transmitting part of the housing.

7. An electronic flash unit as claimed in claim 6, wherein the stop means comprises a pin-and-slot arrangement.

8. An electronic flash unit as claimed in claim 6 or claim 7, wherein the stop means is arranged to restrict to 90° the angle through which the rotatable member can be rotated relative to the housing.

9. An electronic flash unit as claimed in any one of claims 1 to 8, wherein the outer surface of the rotatable member is provided with a scale for indicating the orientation of the reflector with respect to the housing.

10. An electronic flash unit substantially as hereinbefore described with reference



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to, and as shown in, the accompanying drawings.

11. A still camera having fitted to it an electronic flash unit as claimed in any one of claims 1 to 10.

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