

PATENT SPECIFICATION

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(54) GUIDE NUMBER DIAL

(71) KABUSHIKI KAISHA SUNPAK, a Body Corporate organized under the laws of Japan, of 203-14-8, 1-chome, Ebisu, Shibuya-ku, Tokyo, Japan, 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:—

10 The present invention relates to guide number dials (exposure calculators) for flash devices.

When a photograph is taken by using a flash device, the photographing conditions for the camera are usually set by merely adjusting the diaphragm of the camera according to the distance between the object to be photographed and the lens of the camera. These conditions are set

20 irrespective of the shutter speed. Known flash devices usually have a guide number dial made of two juxtaposed discs or rings, one of which is provided with a distance scale and a photosensitivity scale (ASA and/or DIN speed ratings) and the other of which is provided with a diaphragm (f-number) scale and an arrow mark. When the arrow mark is set to the appropriate photosensitivity of a film being used, markings of f-number and of distances will

30 become associated or paired with each other as they lie adjacently on the respective discs or rings, whereby the necessary diaphragm value can be easily obtained for the distance of the object to be photographed. Such flash devices may satisfactorily be used under ordinary photographing conditions. Recently, auto-electronic photo-flash devices have come

40 into existence. Such devices include a light-measuring circuit and permit automatic control of the quantity of light discharged. When the diaphragm value is set beforehand in this auto-electronic photo-flash, the discharge of light is automatically stopped

when the measured brightness of the object to be photographed has reached a suitable value. In this case, the diaphragm value that may be selected is not always unique; two or more diaphragm values may be selected and the quantity of light discharged is automatically controlled according to the selected diaphragm values. When the auto-electronic photo-flash has two or more selectable diaphragm values, it is necessary to indicate the selected diaphragm value to agree with the diaphragm values for the camera. In the past, the selected diaphragm value was shown by a coloured mark or arrow along the 60 corresponding graduation in the diaphragm scale on the guide number dial.

With such a guide number dial, it is troublesome to ascertain or select one diaphragm value out of the many indicated by the coloured arrow or mark. Consequently, many users have often made mistakes in correctly determining the appropriate diaphragm value, especially where there are many selectable diaphragm values.

An aim of the present invention is to eliminate or reduce the above-described drawbacks of known guide number dials.

According to the present invention there is provided a camera flash unit guide number dial adapted for manual or automatic flash operation and having at least two automatic modes, comprising:

an indication member having a first window for indicating one of the two parameters that determine the guide number, namely a diaphragm value or a distance value, a scale along said first window provided with indications of the other of said two parameters, a second indicating window for a flash unit operating mode and a third, film photosensitivity-indicating window;

a shaped intermediate member displace-

able relative to the indication member and carrying at least three mode indication marks alignable with said second window, one of said marks being indicative of manual control of the flash unit operation, while the other marks are indicative of different automatic control of the flash unit operation, and

a scale member displaceable relative to the other two members and having a first scale with indications of said one parameter alignable with the first window and a second scale with indications of photosensitivity alignable with said third window, the arrangement being such that when manual mode of control has been selected said first window is unobtured by said intermediate member while when any one mode of automatic control has been selected, displacement of the intermediate member obturates the first window to the extent of permitting only one value of said one parameter to be observed by the user.

The invention is described, by way of example only, with reference to the accompanying schematic drawing, wherein

Figure 1 is a plan view of each component of the guide number dial according to the preferred embodiment of the present invention, and

Figure 2 is a plan view of the assembled guide number dial of the embodiment shown in Figure 1.

Referring to the preferred embodiment of a guide number dial shown in the drawing, this comprises three interconnected plates i.e. a generally rectangular indication plate 1 (which is uppermost or outermost, as seen by a user), an intermediate plate 2, and a scale plate 3 carrying f-number markings along one longer edge and ASA and/or DIN markings 18 adjacent the opposite longer edge. The intermediate plate 2 is disposed below the bottom surface of the indication plate 1, and the scale plate 3 is disposed below the bottom surface of the intermediate plate 2.

The indication plate 1 is a stationary plate. The intermediate plate 2 is reciprocable with respect to the indication plate 1 in a direction parallel with the shorter sides of the latter. The scale plate 3 is reciprocable with respect to the indication plate 1 in a direction parallel with the longer sides of the latter. The indication plate 1 is provided with an elongated diaphragm value-indicating window 4 in the central portion thereof but offset from the central longitudinal axis of symmetry; it also has a film sensitivity (speed) indicating window 5 hereafter ASA window—but of course it could be a DIN window or a DIN and ASA window—alongside window 4 for indicating the photosensitivity of the film in use. There is an elongated opening 7 ad-

jacent to the window 5.

In an alternative, non-illustrated embodiment, the window 5 and opening 7 are not separate but constitute one opening.

Along the opening 7 there is an arrow-head or like mark 7a on the plate 1. The opening 7 serves for guiding therein a knob 6 upstanding from the scale plate 3 to enable the latter to be moved.

The indication plate 1 is further provided at one (bottom) end portion thereof with a guide opening 9 elongated in a direction at right angles to the axis of the window 4 and that of the opening 7 for guiding therein a mode shifting knob 8 upstanding from the intermediate plate 2. By "mode shifting" is meant shifting or changing the auto-electronic photoflash between a mode of automatic control of the quantity of light to be discharged and a manual control mode. As will be explained below, it also effects a unique unambiguous selection of diaphragm value when the auto-electronic photoflash has two or more selected diaphragm values. To this end, there are two discrete positions of the intermediate plate 2 that may be selected for automatic control. Still further, the indication plate 1 is provided with a mode indicating window 10. A distance scale 11 is provided along the window 4.

This indication plate 1 is not necessarily made of an independent flat material as in the illustrated embodiment; it may be formed integrally on the surface of photoflash.

The intermediate plate 2 is generally T-shaped; it comprises a slotted head portion 12 which carries the knob 8 and a stem portion 13 of uniform width extending from the head portion 12 at right angles thereto. The stem portion has two windows 15 and 16 spaced from each other both along the length and across the width of the stem portion 13. The head portion 12 is provided with mode indicating marks 14, M, A and A. "M" appears in the mode indicating window 10 when the mode shifting knob 8 is in the lowermost position in the guide opening 9 as seen in Figure 2, and two "A"s adjacent thereto indicate two modes of automatic control of the quantity of light being discharged. It is desirable that these "A"s be drawn in different colours, for example the "A" next to the "M" is yellow while the other "A" is green.

The width of the stem portion 13 is such that when "M" is selected, it is wholly displaced from below the diaphragm value indicating window 4 so that it cannot be seen by a user at all; he or she will see only the markings 17 of the scale plate 3. When either one of the two "A" modes has been selected, the stem portion 13

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underlies the window 4 with one only of the two windows 15,16 enabling only one digit on the diaphragm scale 17 to be observed. For instance, when a film having a photosensitivity of ASA100 is used in this embodiment, the knob 6 is shifted until the number 100 appears in the window 5 aligned with the arrowhead 7a. Then, when "M" is selected by shifting the knob 8, the associated distance and f-number markings 11 and 17 will be mutually aligned, as shown in Figure 2. By shifting the knob 8 to the next position, with the (yellow) A under the windows 10, the stem portion 13 will overlie the markings 17 except for the window 15. The window 15 (and the window 16 also) is so dimensioned that only one f-number indication from the markings 17 will be visible therethrough, in this example 5.6 (at 4 metres). When the next (green) "A" mode is selected by further shifting the knob 8 and thus the intermediate plate 2, the window 16 will be aligned with the window 4 and thus only one reading—in this case 2.8 at 8 metres—of the diaphragm value 17 will be possible.

The intermediate plate 2 is moved with the shifting actions of filters (not shown) provided on the front surface of a light-receiving element. The filters are shifted to an opaque one when "M" appears in the window 10, a dark ND one when the upper "A" appears therein (as viewed in Figure 2) and a one which is brighter by two degrees (stops) when the lower "A" appears therein. The intermediate plate 2 may be moved by electrically changing the time constant of integration circuit instead of changing filters as mentioned above.

The scale plate 3 may be provided with a recess in which the knob 6 is inserted. The window 15 may be quadrilateral window or one side of it may be constituted by the edge of the stem portion 13. The word "window" should accordingly be construed broadly throughout the specification and claims incorporating a complete frame opening in one member or an opening framed or defined by more than one member.

The guide number dial of this embodiment is assembled by arranging the intermediate plate 2 and scale plate 3 below the indication plate 1 while inserting the knobs 6 and 8 in the elongated opening 7 and guide opening 9, respectively, as mentioned above.

When the guide number dial of this embodiment is manually operated fully to discharge the light, i.e. set to the "M" mark of the mode indicating window 10, the light receiving element (not shown) is covered so that the light measuring circuit is de-actuated. At this time, the diaphragm

value indicating window 4 is uncovered to allow the diaphragm scale 17 on the scale plate 3 to be observed. Therefore, when the knob 6 is moved to allow a figure representative of the photosensitivity of film in use to appear in the ASA window 5, the relation between the distance between the object to be photographed and the lens of camera and the diaphragm value is known with reference to the distance scale 11 and diaphragm scale 17. When the flash lamp is automatically operated the knob 8 is moved to allow "A" to appear in the mode indicating window 10. Then, the light receiving element is uncovered to receive light and the light measuring circuit is actuated so that the quantity of light can be automatically controlled. At this time, the diaphragm value indicating window 4 is covered by the stem portion 13 of the intermediate plate 2, and only one digit on the diaphragm scale 17 appears in either the opening 15 or the opening 16.

The preferred guide number dial may also be used by observing the diaphragm value on the diaphragm scale 17 according to the diaphragm value setting of the camera. In this case again, only one digit can be observed during the operation of the knob 8 and thus no error can be made.

As has been described in detail above, the diaphragm scale 17 in this embodiment is allowed to be observed from the diaphragm value indicating window 4 and the intermediate plate 2 is disposed between the indication plate 1 and the scale plate 3. Then, during an automatic operation of the guide number dial, only one diaphragm value can be observed from the openings provided in the intermediate plate 2. This allows the diaphragm values to be easily selected without errors. When the guide number dial is set to an automatic mode, only one digit is observed from the opening 15 or 16 and no other digits can be observed. Accordingly, the diaphragm of the camera can be set to the value without hesitation. In the embodiment as described above, only two diaphragm values can be selected when the quantity of light to be discharged is automatically controlled but of course more values can be provided. Even when more than two selectable diaphragm values are provided, only one digit appears by the operation of the knob 8, and the diaphragm value can be selected without confusion. The selection of diaphragm value can be effected without hesitation and errors even when a film of different photosensitivity is used.

In a prior art guide number dial where the diaphragm value is selected according to coloured marks, the selectable diaphragm values are limited to two. According to the guide number dial of the present

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invention, however, no confusion and errors occur even when three or more selectable diaphragm values are provided.

Alternative and non-illustrated embodiments of the invention may include a cylindrical concentric arrangement of the members 1, 2 and 3 (i.e. the plates "rolled up", as it were, into cylinders); a transposition of the indications 11 and 17; and the provision of coloured lines associated with specific distance values e.g. a yellow line associated with 4 metres, and a green line associated with 8 metres.

WHAT WE CLAIM IS:—

1. A camera flash unit guide number dial adapted for manual or automatic camera operation and having at least two automatic modes, comprising:

an indication member having a first window for indicating one of the two parameters that determine the guide number, namely a diaphragm value or a distance value, a scale along said first window provided with indications of the other of said two parameters, a second indicating window for a flash unit operating mode and a third, film photosensitivity indicating window;

a shaped intermediate member displaceable relative to the indication member and carrying at least three mode indication marks alignable with said second window, one of said marks being indicative of manual control of the flash unit operation while the other marks are indicative of different automatic control of the flash unit operation, and

a scale member displaceable relative to

the other two members and having a first scale with indications of said one parameter alignable with the first window and a second scale with indications of photosensitivity alignable with said third window, the arrangement being such that when manual mode of control has been selected said first window is unobtured by said intermediate member while when any one mode of automatic control has been selected, displacement of the intermediate member obturates the first window to the extent of permitting only one value of said one parameter to be observed by the user.

2. A guide number dial according to claim 1 wherein said members are superposed flat plates.

3. A guide number dial according to claim 2, wherein said intermediate member is T-shaped, the stem of which has two spaced apart and mutually offset windows therein.

4. A guide number dial substantially as herein described with reference to and as shown in the accompanying drawing.

5. An electronic flash device including a guide number dial according to any preceding claim.

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a shaped intermediate member displaceable relative to the indication member and carrying at least three mode indication marks alignable with said second window, one of said marks being indicative of manual control of the flash unit operation while the other marks are indicative of different automatic control of the flash unit operation, and
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the other two members and having a first scale with indications of said one parameter alignable with the first window and a second scale with indications of photosensitivity alignable with said third window, the arrangement being such that when manual mode of control has been selected said first window is unobscured by said intermediate member while when any one mode of automatic control has been selected, displacement of the intermediate member obscures the first window to the extent of permitting only one value of said one parameter to be observed by the user.

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