

SPECIFICATION

Flash Camera Having Exposure Control Means

5 The present invention relates to flash cameras of the type equipped to make exposures with a combination of flash and ambient light.

When taking a photograph at high levels of ambient light, it is often desirable to use a source of artificial illumination, such as a flash bulb or electronic strobe flash unit, to provide
10 supplementary light to the shaded portions of a photographic subject. When a source of artificial illumination is used in high ambient light, the camera and flash apparatus are operated in a mode commonly referred to as "fill-in flash." In
15 fill-in flash applications, the supplementary light should lighten the shadows but not eliminate them.

U.S. Patent 4,074,288 is one of many references which describe cameras which include
20 means for sensing the level of ambient light and control means for controlling the ratio of ambient to flash light reaching the film during an exposure as a function of the level of ambient light. The control means is responsive to the sensing of low
25 ambient light to provide exposure predominantly by flash light.

In high ambient light conditions the control means quenches the flash prior to the time it would be quenched in low ambient light,
30 automatically providing less flash light than in low ambient light conditions. This automatically provides fill-in flash.

However, fill-in flash having a magnitude high enough to adequately fill in shadows in high
35 ambient light will reduce contrast too much in intermediate ambient light conditions, such as those found on a cloudy day. For the best photographic effect, the ratio of ambient light to flash light should be changed for different scene
40 contrasts.

It is an object of the invention to provide an automatic fill-in flash camera generally of the type described but in which the preferred fill-in flash
45 ratio is provided for both high ambient light and intermediate ambient light conditions.

According to the present invention there is provided a photographic camera having a flash capability and comprising means for sensing the level of ambient scene illumination, and exposure
50 control means, responsive to a low level of ambient illumination to provide exposure predominantly by flash illumination, an intermediate level of ambient illumination to provide exposure according to a first
55 predetermined ratio of ambient to flash illumination, and a high level of ambient illumination to provide exposure according to a second predetermined ratio of ambient to flash illumination, the first predetermined ratio being
60 higher than the second ratio.

A camera constructed according to the invention then automatically provides full flash when needed, fills in shadows in bright sunlight,

65 but does not wash out shadows on dull or cloudy days.

The present invention will now be described, by way of example, with reference to the accompanying drawings in which:

Fig. 1 is a front perspective view of a
70 photographic camera incorporating the exposure control means of the present invention;

Fig. 2 is an exploded view of a portion of the exposure control means constructed in accordance with the teachings of the invention;

75 Figs. 3 and 4 are front and rear views, respectively, showing the exposure control means of Fig. 2 in its cocked position prior to the initiation of an exposure;

Fig. 5 is a rear view similar to Fig. 4 but
80 showing the exposure control means in its shutter open position;

Fig. 6 is a rear view similar to Fig. 4 but showing the exposure control means in its shutter closed position;

85 Fig. 7 is a front view similar to Fig. 3 but showing the setting of the exposure control means in low-ambient light when the flash unit is turned off;

Fig. 8 is a front view similar to Fig. 3 but
90 showing the setting of the exposure control means in low ambient light when the flash unit is turned on; and

Fig. 9 shows in partly schematic and partly box form, an electric circuit suitable for use with the
95 apparatus of Figs. 1 and 2.

Because photographic camera and electronic flash apparatus are well known, the present invention will be directed in particular to elements forming part of, or cooperating more directly with,
100 the present invention. It is to be understood that camera and flash elements not specifically shown or described herein may be selected from those known in the art.

Referring now to the drawings there is shown
105 in Fig. 1 a photographic camera 10 having an ambient light sensor 12 (termed "daylight sensor" in Fig. 9), a flash light sensor 14 (termed "flash sensor" in Fig. 9), and an electronic strobe flash unit 16, a lens 18 and a shutter release 20.
110 In accordance with the present invention, the camera is provided with exposure control means, including apparatus 50 shown in Fig. 2 and circuitry 100 shown in Fig. 9, for controlling the exposure of film received in the camera in a
115 manner so that the ratio of ambient light to flash light varies as a function of the level of ambient light. In the specific embodiment, the apparatus 50 in cooperation with the circuit 100, automatically adjusts the position of a diaphragm
120 blade 22, movable relative to an exposure aperture 23 provided in a mounting plate 33, to provide one of a plurality of different size exposure apertures in accordance with the intensity of the ambient light illuminating the
125 scene to be photographed. In the course of adjusting the position of the diaphragm blade 22, an attached first series of light attenuating means, for example, neutral density filters 24, passes in

front of the ambient light sensor 12 located behind mounting plate aperture 13, and an attached second series of corresponding light attenuating means, for example, neutral density filters 26 passes in front of the flash light sensor 14 located behind mounting plate aperture 15. Upon completion of the selection of the appropriate exposure aperture, the exposure control circuit 100 operates in a timing mode (1) to terminate the light emission from the electronic strobe flash unit 16 when the flash light sensor 14 has sensed a predetermined amount of flash light reflected from a photographic subject (not shown) and (2) to cause an electromagnet 28 to close a shutter mechanism 31 to thereby terminate an exposure interval when the ambient light sensor 12 has sensed a predetermined amount of ambient scene light reflected from the subject. Different fractional amounts of the incident ambient scene light and flash light are transmitted by the filters 24 and 26 onto the ambient light sensor 12 and the flashlight sensor 14, respectively, because the fractional light transmission versus diaphragm blade position relationship of the first series of filters differs from the fractional light transmission versus diaphragm blade position relationship of the second series of filters. Consequently, the light transmission control/diaphragm blade position arrangement of the present invention provides a different ratio of ambient to fill-in flash exposure light for each and every exposure aperture provided by the diaphragm blade 22. Lower ratios of ambient to fill-in flash exposure light are provided at the smaller camera apertures where the ambient scene illumination is high and the scene contrast is, therefore, also likely to be high. Higher ratios of ambient to fill-in flash exposure light are provided at the intermediate sized camera aperture where the ambient scene illumination is intermediate and the scene contrast is likely to be low ("flat"). In low light, the largest aperture is used and the exposure is predominantly by flash.

In the specific embodiment shown in Figs. 2 to 8, the diaphragm blade 22 is provided with three exposure apertures 32a, 32b, and 32c, the sizes of which provide relative apertures of f12.8, f18 and f30, respectively. Attached to the diaphragm blade 22 at a position underlying the exposure aperture 32a are a pair of neutral density filters 24a and 26a, respectively. The densities of the filters 24a and 26a are 0 and 0.3, respectively. Similarly, a pair of neutral density filters 24b and 26b are attached to the diaphragm blade 22 at a position underlying the exposure aperture 32b and a pair of neutral density filters 24c and 26c are attached to the diaphragm blade 22 at a position underlying the exposure aperture 32c. The densities of the filters 24b, 24c, 26b, and 26c are 0.7, 1.1, 0 and 0.5, respectively.

The diaphragm blade 22 is mounted on the front side of the mounting plate 33 by a pair of pins 35 which cooperate with a pair of slots 36 provided in the blade 22. The blade 22 is biased by a spring 34, having one end connected to the

plate 33 and the opposite end connected to the blade 22, for sliding movement from left to right as shown in the drawings, but is normally held in a latch position by a bifurcated pivotable control member 37 which is coupled (by means not shown) to the shutter release 20. When the camera operator depresses the shutter release 20 to initiate a photographic cycle, the control member 37 is released, prior to shutter opening, for pivotable movement in a clockwise direction (Fig. 2). The diaphragm blade 22 follows the control member arm 37a under the urging of the spring 34 and slides from left to right along with the attached neutral density filters 24 and 26. In the initial, latched position of the diaphragm blade 22 shown in Fig. 3, the filter 24c is located in front of the ambient light sensor 12, the filter 26c is located in front of the flash light sensor 14 and the aperture 32c is aligned with the mounting plate exposure aperture 23 and the camera picture taking lens 18. As described hereinbelow, the diaphragm blade 22 is clamped in its initial position at high ambient light levels by energization of the electromagnet 28. At lower ambient light levels the electromagnet 28 is initially de-energized. This permits the diaphragm blade 22 to move along its path of travel under the urging of spring 34. As the diaphragm blade 22 moves along its path of travel, the filters 24b and 24a are successively located in front of the sensor 12, the filters 26b and 26a are successively located in front of the sensor 14 and the apertures 32b and 32a are successively aligned with the picture taking lens 18. The circuit 100 controls the selection of the aperture 32b or 32a by controlled the time of energization of the electromagnet 28. The filters 24 and 26 are mounted off center with respect to the apertures 32 to allow for sufficient time for the circuit 100 to determine the proper aperture size with respect to ambient conditions prior to the opening of the shutter 31.

Upon completion of the exposure aperture size determination, the circuit 100 operates to independently control the duration of (1) the ambient light exposure interval and (2) the flash light exposure interval.

Referring now to Fig. 9, the exposure control circuit 100 generally comprises an aperture size control and ambient light exposure duration control circuit 102, a battery 104 and a flash light exposure duration control circuit 106.

The aperture size control and ambient light exposure duration control circuit 102, which includes the ambient light sensor 12, the electromagnet 28, switches S_1 , S_2 , S_3 , and integrating capacitor 108, and a light sensitive switch 110, controls the state of the electromagnet 28 and ultimately controls the setting of the diaphragm blade 22 and the closure of the shutter 31. The flash light exposure duration control circuit 106 includes the flash light sensor 14, a DC-DC converter 112, a capacitor 114, a flash lamp 116, a trigger circuit 118, a quench circuit 120, and switches S_4 , and

S_2 , and controls the duration of the flash light emission produced by the flash unit 16.

The aperture size control and ambient light exposure duration control circuit 102 first operates to control the adjustment of the diaphragm blade 22 and then to control the duration of the ambient light exposure interval. When the camera operator trips the shutter release 20, the shutter release moves downwardly against the restoring force of a spring (not shown). During the initial downward movement, the switch S_1 is closed to energize the light sensitive switch 110. At this position in the movement of the shutter release 20, switch S_1 is closed, switch S_2 is open and switch S_3 is closed. A predetermined fraction of the reflected ambient scene light (the fraction being dependent upon the density of the particular filter 24a, 24b, or 24c that is positioned in front of the sensor 12) is transmitted onto the ambient light sensor 12. The ambient light sensor 12 receives the transmitted fractional light, generates a current related to the ambient scene brightness and applies such a current to the light sensitive switch 110. The light sensitive switch 110 itself forms no part of the present invention and accordingly will be described in the present specification generally. A light sensitive switch suitable for use in the present invention is disclosed in U.S. Patent No. 4,037,237. In the aperture size control mode of operation of the circuit 102, the light sensitive switch 110 provides a reference current proportional to a predetermined scene brightness which is compared to the photocurrent produced by the ambient light sensor 12. When the photocurrent is greater than the reference current, the light sensitive switch 110 energizes the electromagnet 28. The energization of the electromagnet 28 stops the diaphragm blade 22 by bringing a holding latch 38 into engagement with one of the two blade protuberances 40 or 42, corresponding respectively to the apertures 32b or 32c, respectively.

In the illustrative embodiment shown in the drawings, the camera 10 has an f:12.8, 100mm lens 18 with the following depths of field:

- 3.5 ft. to 14 ft. at f:12.8
- 3.5 ft. to infinity at f:18
- 3.0 ft. to infinity at f:30, and a maximum shutter speed of 1/300 of a second. The electromagnet 28 operates in this embodiment under the following conditions as directed by the light sensitive switch 110:

- At high ambient light levels, for example, at greater than 150 foot-lamberts the electromagnet 28 is energized immediately and the latch 38 engages protuberance 42 clamping the diaphragm blade 22 at the f:30 aperture 32c.

- At intermediate ambient light levels, for example, between 150 foot-lamberts and 50 foot-lamberts the electromagnet 28 is not energized until the filter 24b is positioned in front of the daylight sensor 12. This causes the latch 38 to engage the blade protuberance 40 and

- clamp the diaphragm blade 22 at the f:18 aperture 32b.

- At low ambient light levels, for example, below 50 foot-lamberts with the electronic flash unit 16 turned off, the electromagnet 28 remains de-energized, a low light indicator (not shown) is activated and a flash defeat button 39 is moved downwardly so that it engages a diaphragm blade projection 44, stopping the diaphragm blade 22 in a position at which the f:18 aperture 32b is aligned with the lens 18. (See Fig. 8.)

- At low ambient light levels, for example, below 50 foot-lamberts with the electronic flash unit 16 turned on, the electromagnet remains de-energized, the flash defeat button is moved upwardly and the diaphragm blade advances until the blade projection 44 engages a frame stop 43 provided on the mounting plate 33, aligning the f:12.8 aperture 32a with the picture taking lens 18. (See Fig. 7.)

- Upon completion of the exposure aperture size determination, the switch S_2 is closed in preparation for shutter timing by further downward movement of the shutter release 20. Because the switch S_3 is series connected with switch S_2 , the closure of S_2 shunts the capacitor 108 to ground. The capacitor is thus discharged before the start of the shutter timing operation. When the capacitor 108 is discharged, the electromagnet 28 is energized, if it had previously remained de-energized to increase the effective size of the exposure aperture 23.

To effect an exposure, a latch lever 60 is pivoted counterclockwise about pivot 61 by control member arm 37b as shown in Fig. 5 to release the shutter mechanism 31. The shutter mechanism 31 is a conventional two-blade system, which is shown in Fig. 4 in its "cocked" position preparatory to actuation to effect an exposure. The shutter mechanism includes a pair of shutter blades 29 and 30 which are slidably mounted upon the mounting plate 33 by means of the pins 35 and slots 46 and 47, respectively, for movement relative to the exposure aperture 23. When the blade 29, which is the "opening" blade in this embodiment, is in its cocked position, it is retained against the bias of a spring 48 by the latch lever 60 which is biased by a spring 62 into latching engagement with an ear 64 provided on the blade 29. The opening blade has a second ear 66 positioned to engage and hold the blade 30, which in this embodiment is the "closing" blade, in its cocked position against the bias of a spring 49. In their respective cocked positions, opening blade 29 is retained in a covering relationship with respect to the exposure aperture. When the blades are in their respective cocked positions, the spring 48 urges the opening blade 29 towards an uncovering position with respect to the exposure aperture 23 and the spring 49 urges the closing blade 30 towards a covering position overlying the exposure aperture.

When the latch lever 60 is rotated out of engagement with the ear 64 on the opening blade 29, the blade 29 is released for movement under

the influence of spring 48 to an uncovering position with respect to the exposure aperture 23 to thereby initiate an exposure interval. When the opening blade 29 moves away from its cocked position, it moves out of engagement with one of the contacts of a normally closed switch S_3 , thereby causing that switch to open. The movement of opening blade 29 away from its cocked position also moves ear 66 out of engagement with the closing blade 30. Closing blade 30 is, however, retained in its cocked position by the holding latch 38 of energized electromagnet 28 which engages a protuberance 68 provided on the blade 30.

When the switch S_3 is open, a charge is developed on the capacitor 108 by the photocurrent from the ambient light sensor 12. After an interval of time related to the ambient scene brightness the voltage on the capacitor 108 exceeds that of a reference voltage provided by the light sensitive switch 110. The light sensitive switch 110 then de-energizes the electromagnet 28 which allows the closing blade 30, under the urging of spring 49, to cam the holding latch 38 upwardly, via protuberance 68, and then to move to a covering position overlying the exposure aperture. De-energization of the electromagnet 28, also releases the diaphragm blade 22 if the blade 22 is held in either the f:30 or f:18 aperture positions. However, the shutter blade 30 closes before the diaphragm blade 22 begins to move.

The flash light exposure duration control circuit 106 operates as follows. The switch S_4 is closed to energize the circuit 106 by moving the flash unit 16 to the operative position shown in dotted lines in Fig. 1. When the circuit 106 is energized the capacitor 114 is charged by the converter 112. The movement of the flash unit 16 to its operative position also causes the flash defeat button 39 to move upwardly to a position out of the path of movement of the blade projection 44.

After the completion of the exposure aperture size determination the switch S_5 is closed during further downward movement of the shutter release 20. When the switch S_5 is closed, the light sensitive switch 110 sends a command signal to the trigger circuit 118 to trigger the flashtube 116. The capacitor 114 then begins to discharge through the flashtube. The flash light sensor 14 receives a fractional portion of the flash light incident on the filter 26a, 26b or 26c aligned therewith and supplies a current to the quench circuit 120 that is related to the intensity of such flash illumination. When the total amount of flash light received by the sensor 14 reaches a predetermined value the quench circuit 120 interrupts the discharge of the capacitor 114. This action in turn causes the termination of the light emission from the flashtube 116.

In accordance with the present invention, the densities of the two series of filters 24a, 24b, and 24c and 26a, 26b and 26c are chosen so that the variation in the fraction of incident ambient scene light transmitted by the filters 24a, 24b and 24c onto the ambient light sensor 12 is not

proportional to the variation in the fraction of incident flash light transmitted by the filters 26a, 26b and 26c onto the flash light sensor 14. The densities of the filters 26c, 26b, and 26a (0.5, 0 and 0.3) vary the fraction of incident flash light transmitted onto the flash sensor 14 in a sequence that first increases and then decreases as a function of the level of ambient light and the position of the diaphragm blade 22. The particular filter density values listed provide a three to one ambient to fill-in flash lighting ratio when aperture 32c (f:30) is selected, a five to one ambient to fill-in flash lighting ratio when aperture 32b (f:18) is selected and exposure predominantly by flash light when aperture 32a (f:12.8) is selected.

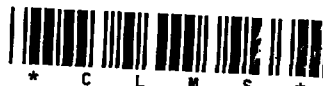
Actual choice of fill-in flash ratio depends on expected use of the camera. Such other ambient fill-in flash lighting ratios could be provided by the simple expedient of changing the densities of filters 24a, 24b, 24c and 26a, 26b, and 26c as appropriate. Alternatively, a switch could be provided which would turn off the flash altogether in intermediate light level conditions providing the entire exposure by ambient light.

In the embodiment shown, the operator can choose either flash or no flash by control of switch S_4 . If no flash is chosen, adjustment must be made in shutter timing for the lack of flash light. This can be done by making the shutter timing circuit responsive to flash light or by adjusting the constants of the shutter timing circuit when flash is not be used. Although shown in the specific embodiment, the non flash mode of operation is not part of the invention and is therefore optional. Thus, the invention can be used in a camera which has no operator control of flash. In such a camera, in low ambient light, exposure would always be predominantly by flash and in high ambient light exposure would always include a fill-in flash while in intermediate ambient light a small amount or no fill-in flash would automatically be used. Although three light conditions are shown and discussed, the response of the exposure control means could vary over more than three levels or continuously over the light level range using more filters or a variable aperture instead of filters.

Claims

1. A photographic camera having a flash capability and comprising means for sensing the level of ambient scene illumination, and exposure control means, responsive to a low level of ambient illumination to provide exposure predominantly by flash illumination, an intermediate level of ambient illumination to provide exposure according to a first predetermined ratio of ambient to flash illumination, and a high level of ambient illumination to provide exposure according to a second predetermined ratio of ambient to flash illumination the first predetermined ratio being higher than the second ratio.

2. A photographic camera according to Claim 1 wherein the exposure control means is adapted to



the influence of spring 48 to an uncovering position with respect to the exposure aperture 23 to thereby initiate an exposure interval. When the opening blade 29 moves away from its cocked position, it moves out of engagement with one of the contacts of a normally closed switch S_3 , thereby causing that switch to open. The movement of opening blade 29 away from its cocked position also moves ear 66 out of engagement with the closing blade 30. Closing blade 30 is, however, retained in its cocked position by the holding latch 38 of energized electromagnet 28 which engages a protuberance 68 provided on the blade 30.

When the switch S_3 is open, a charge is developed on the capacitor 108 by the photocurrent from the ambient light sensor 12. After an interval of time related to the ambient scene brightness the voltage on the capacitor 108 exceeds that of a reference voltage provided by the light sensitive switch 110. The light sensitive switch 110 then de-energizes the electromagnet 28 which allows the closing blade 30, under the urging of spring 49, to cam the holding latch 38 upwardly, via protuberance 68, and then to move to a covering position overlying the exposure aperture. De-energization of the electromagnet 28, also releases the diaphragm blade 22 if the blade 22 is held in either the f:30 or f:18 aperture positions. However, the shutter blade 30 closes before the diaphragm blade 22 begins to move.

The flash light exposure duration control circuit 106 operates as follows. The switch S_4 is closed to energize the circuit 106 by moving the flash unit 16 to the operative position shown in dotted lines in Fig. 1. When the circuit 106 is energized the capacitor 114 is charged by the converter 112. The movement of the flash unit 16 to its operative position also causes the flash defeat button 39 to move upwardly to a position out of the path of movement of the blade projection 44.

After the completion of the exposure aperture size determination the switch S_5 is closed during further downward movement of the shutter release 20. When the switch S_5 is closed, the light sensitive switch 110 sends a command signal to the trigger circuit 118 to trigger the flashtube 116. The capacitor 114 then begins to discharge through the flashtube. The flash light sensor 14 receives a fractional portion of the flash light incident on the filter 26a, 26b or 26c aligned therewith and supplies a current to the quench circuit 120 that is related to the intensity of such flash illumination. When the total amount of flash light received by the sensor 14 reaches a predetermined value the quench circuit 120 interrupts the discharge of the capacitor 114. This action in turn causes the termination of the light emission from the flashtube 116.

In accordance with the present invention, the densities of the two series of filters 24a, 24b, and 24c and 26a, 26b and 26c are chosen so that the variation in the fraction of incident ambient scene light transmitted by the filters 24a, 24b and 24c onto the ambient light sensor 12 is not

proportional to the variation in the fraction of incident flash light transmitted by the filters 26a, 26b and 26c onto the flash light sensor 14. The densities of the filters 26c, 26b, and 26a (0.5, 0 and 0.3) vary the fraction of incident flash light transmitted onto the flash sensor 14 in a sequence that first increases and then decreases as a function of the level of ambient light and the position of the diaphragm blade 22. The particular filter density values listed provide a three to one ambient to fill-in flash lighting ratio when aperture 32c (f:30) is selected, a five to one ambient to fill-in flash lighting ratio when aperture 32b (f:18) is selected and exposure predominantly by flash light when aperture 32a (f:12.8) is selected.

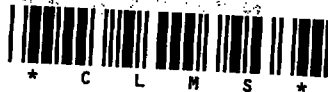
Actual choice of fill-in flash ratio depends on expected use of the camera. Such other ambient fill-in flash lighting ratios could be provided by the simple expedient of changing the densities of filters 24a, 24b, 24c and 26a, 26b, and 26c as appropriate. Alternatively, a switch could be provided which would turn off the flash altogether in intermediate light level conditions providing the entire exposure by ambient light.

In the embodiment shown, the operator can choose either flash or no flash by control of switch S_4 . If no flash is chosen, adjustment must be made in shutter timing for the lack of flash light. This can be done by making the shutter timing circuit responsive to flash light or by adjusting the constants of the shutter timing circuit when flash is not be used. Although shown in the specific embodiment, the non flash mode of operation is not part of the invention and is therefore optional. Thus, the invention can be used in a camera which has no operator control of flash. In such a camera, in low ambient light, exposure would always be predominantly by flash and in high ambient light exposure would always include a fill-in flash while in intermediate ambient light a small amount or no fill-in flash would automatically be used. Although three light conditions are shown and discussed, the response of the exposure control means could vary over more than three levels or continuously over the light level range using more filters or a variable aperture instead of filters.

Claims

1. A photographic camera having a flash capability and comprising means for sensing the level of ambient scene illumination, and exposure control means, responsive to a low level of ambient illumination to provide exposure predominantly by flash illumination, an intermediate level of ambient illumination to provide exposure according to a first predetermined ratio of ambient to flash illumination, and a high level of ambient illumination to provide exposure according to a second predetermined ratio of ambient to flash illumination the first predetermined ratio being higher than the second ratio.

2. A photographic camera according to Claim 1 wherein the exposure control means is adapted to



provide the entire exposure by ambient illumination in response to sensing the intermediate level of ambient illumination.

3. A photographic camera according to Claim 1
5 or 2 wherein the exposure control means includes means for sensing flash illumination reflected from the photographic subject, means for controlling the energisation of a flash source as a function of the sensed flash illumination, flash
10 illumination attenuating means for attenuating the flash illumination transmitted to the flash illumination sensor, and means for adjusting the attenuating means as a function of the level of ambient illumination.
- 15 4. A photographic camera according to Claim 3 comprising ambient illumination attenuating means for attenuating the ambient illumination transmitted to the ambient illumination sensing means.
- 20 5. A photographic camera according to Claim 4 comprising an adjustable exposure aperture, and means for adjusting the size of the exposure aperture as a function of the sensed level of ambient illumination, wherein the means for
25 adjusting the size of the aperture and the means

for attenuating the transmitted flash illumination and ambient illumination are coupled for adjustment together.

- 30 6. A photographic camera according to Claim 4 or 5 wherein the flash illumination and ambient illumination attenuating means each comprise a plurality of neutral density filters having different transmission densities.
- 35 7. A photographic camera according to Claim 4 or 5 wherein the flash illumination and ambient illumination attenuating means comprise variable apertures.
- 40 8. A photographic camera according to any one of Claims 5—8 wherein the fractional light transmission of the flash illumination attenuation means is different to the fractional light transmission of the ambient illumination attenuating means for each exposure aperture.
- 45 9. A photographic camera according to any one of the preceding claims wherein the first predetermined ratio of ambient to flash illumination is 6 to 1 and the second predetermined ratio is 3 to 1.
- 50 10. A photographic camera substantially as hereinbefore described with reference to, and as illustrated in the accompanying drawings.

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