

PATENT SPECIFICATION

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(54) IMPROVEMENTS IN OR RELATING TO CAMERAS

(71) We, KARL VOCKENHUBER, of 118, Pötzleinsdorferstrasse, Vienna 18, Austria, and RAIMUND HAUSER, of 2 Goldeggasse, Vienna 4, Austria, both Austrian citizens, do hereby declare this invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, in and by the following statement:—

This invention relates to a camera and is more specifically concerned with controlling the extent to which light incident on the film is filtered to reduce diffraction phenomena at small diaphragm aperture settings.

In accordance with the present invention a camera is provided with an adjustable diaphragm and a grey filter spot positionally controlled by an element which responds automatically to the use of an artificial light source by only introducing the filter spot into the film light path in the vicinity of the diaphragm if no source of artificial light is used.

It has been found that with bright scenic conditions diffraction phenomena can occur on the diaphragm when adjusted to the smallest aperture setting. This impairs the sharpness of the image and the resultant picture lacks "brilliance". The adverse affects of such diffraction phenomena are avoidable by introducing a grey or neutral density filter in the optical path, or by providing the lens in the vicinity of the diaphragm with a large punctiform grey filter spot corresponding in diameter to the setting of the diaphragm aperture at which the diffraction phenomena occur. This has the disadvantage that the grey filter spot is always present even when shots are being taken under artificial lighting conditions when there is a small scenic brightness. This difficulty is aggravated further when daylight films are being used to take shots under poor artificial lighting conditions because it is necessary to use a conversion filter and the attenuating affect of this supplements the attenuating affect of the grey filter.

In accordance with a second aspect of the

invention a camera is provided with an adjustable diaphragm and a grey filter spot positionally controlled by an element automatically responsive to the connection to the camera of an artificial light source and the speed of the film with which the camera is loaded, the grey filter spot occupying a first position at which it intercepts the optical path of light in the vicinity of the diaphragm if no source of light is connected to the camera when loaded with a high-speed film, the filter spot being moved automatically to an ineffective second position as regards attenuation of the optical path if the camera is loaded with low-speed film and no source of artificial light is connected to the camera, and to an ineffective third position if a source of artificial light is connected to the camera.

Preferably the camera is provided with a conversion filter which is positionally controlled by a member which also controls the position of the grey filter spot. The grey filter spot may be separate from the conversion filter or it may comprise a grey filter spot formed on the conversion filter.

Suitably a device which responds to the fitting of an artificial light source to a mount provided for it on the camera also controls the grey filter spot position.

Films of different speeds are available in the trade.

High speed films are those which react quickly to incident light and are normally used for indoor or artificial lighting conditions. Low speed films react more slowly but have a smaller grain. They therefore require a higher level of illumination than a high speed film and may be designed for indoor use with artificial light, or for outdoor use with natural light. If an outdoor or daylight film is to be used under artificial lighting conditions a conversion filter is necessary to adjust the quality of the incident light to that which suits the film. Likewise if an indoor film is to be used outdoors a conversion filter of a different type is necessary.

When using films having a low speed, the insertion of a grey filter spot into the camera

optical path is undesirable because the poor image quality under artificial light conditions, as compared with films of high speeds, is still further impaired. Preferably, an element which may be constructed as a slidable feeler or push-rod is used to sense automatically whether a cartridge cassette fitted to the camera is that of a high speed film or a low speed film. If it is a low speed film cassette, the slider feeler may be arranged to move the grey filter spot out of the camera optical path. It is advantageous to use a conversion filter in the camera optical path in order to adapt a film intended for use in artificial light to daylight conditions and conveniently the grey filter spot is formed as a spot on the conversion filter. In daylight conditions the conversion filter and the grey spot are present in the optical path when a high speed film cassette is fitted to the camera. If a low speed film is being used in daylight conditions the grey filter spot is moved out of the optical path but the conversion filter is left in. On the other hand, if an illuminating system for providing artificial light is fitted to the camera, an arrangement is suitably provided to sense such fitting and to move the conversion filter and the grey filter spot out of the camera optical path.

The invention will now be described in more detail, by way of examples, with reference to the accompanying largely diagrammatic drawings, in which:—

Figure 1 shows a diaphragm and associated filter control mechanism in a cine camera viewed in the direction of the optical path followed by a beam of light entering the camera which uses Super-8 film cassettes;

Figure 2 is a partial section through Figure 1 and taken in the plane of the optical path;

Figure 3 shows a modified form of support for use with conventional daylight films; and,

Figure 4 shows the cine camera with an attachment fitted to it providing an illuminating system in order to illuminate artificially an object being photographed.

Referring to Figures 1 and 2, a diaphragm vane 4 is arranged in the path of rays of a main lens 1 and a front lens attachment 2, and is situated between them. Movement of the vane is controlled by a diaphragm-adjusting motor 3 although a galvanometer may also be used to this purpose. The light beam incident on the film and emanating from an object is defined, in cross-section, by the diaphragm vane 4 and a mask 5 forming the diaphragm aperture together with the vane 4. A filter support 7 is disposed behind the diaphragm aperture, seen in the direction of the incident light, and has an arm pivotally arranged about an axis 6. A conversion filter 8 is carried by the filter support 7 the arm of which is biased by a spring 9 in a

clockwise sense, so that the filter 8 is resiliently biased into the path of rays of the lens. A second arm of the filter support 7 extends into a slot 10 arranged on the camera casing for coacting with an illuminating system 15 mountable in the socket as shown in Figure 4. A feeler slider 12 provides an element which abuts the filter bearing arm of the filter support 7 and is provided in the vicinity of the filter support 7 with a ramp surface 11. The slider 12 is mounted in a cartridge housing of the camera.

If now a super-8 cartridge 13 with a low speed film is inserted into the camera, the feeler slider 12 is moved to the position shown in Figure 2 as there is no recess in the cartridge casing where the feeler slider 12 abuts. If the photograph is made at sufficient light intensity, for instance in sunlight, the insertion of a conversion filter is already necessary per se with a super-8 high speed film, as these films are artificial light films. Since however the spring 9 holds the conversion filter 8 in the path of rays of the lens, no further manipulations are required. As the photograph is made with a low speed film, the feeler slider 12 resiliently abutting the cartridge 13 is displaced in the direction of the optical axis until the ramp surface 11 is displaced beyond the range of the arm of the filter support 7 bearing the conversion filter 8. The conversion filter itself is provided with a neutral density spot 14 which is used with high speed artificial light films. However the ramp surface 11 of the feeler slider 12 is displaced beyond the position of the support 7, and as the spring 9 biases the filter support 7 in a clockwise sense, related to Figure 1, the neutral density spot on the conversion filter 8 is brought automatically behind the mask 5 to the operating position III, where it is out of the optical path of rays.

In cartridges with high speed films a recess 16 is provided in the cartridge wall opposite the position of the feeler slider 12, so that the cam surface 11 moves into the range of movement of the filter support 7 and causes a small deviation of the same in counterclockwise sense. The neutral density spot 14 then assumes the operating position II which is within the path of rays of the lens under daylight conditions.

With poor light conditions artificial light has to be used and with super-8 films the conversion filter has to be removed from the path of rays. The illuminating system 15 when fitted to a mounting socket on the camera shortens the effective length of the slot 10 by moving a projection member into it so that the arm of the filter support 7 in the slot 10 is pressed downwards against the force of the spring 9. This moves the conversion filter 8 with the neutral density spot 14 to the rest position I, in which the filter 8 as

well as the neutral density spot 14—which with photographs taken in artificial light or similar light conditions have to be removed from the path of rays of the lens—are rendered ineffective.

Figure 3 shows only schematically how the filter support 7 is equipped for the use of a daylight film. For the exposure of a daylight film it is necessary, as already stated, to insert a conversion filter 17 into the path of rays for the lens for shots with artificial light, and, because of the relatively small light intensity, the neutral density spot 14a is kept outside the path of the rays. The filter support 7a could then have the shape and disposition illustrated in Figure 3. With shots in daylight the filter support 7a is deviated in a counter-clockwise sense whereby, in dependence on the film speed, either the neutral density spot 14a is inserted into the path of rays of the lens in the case of high speed films, or it is removed altogether from the path of rays in the case of low speed films.

Finally, it may be mentioned that the device which controls the position of the grey filter spot need not necessarily be built into the lamp socket. The operating arrangement for the neutral density spot could for instance be controlled by a colour temperature meter for measuring the spectral composition of light.

In the illustrated embodiment the diaphragm cooperates with the mask, behind which the neutral density spot 14 is arranged at high film speed. With diaphragm systems without such a mask it may suffice to adjust the neutral density spot 14 eccentrically with respect to the optical axis.

WHAT WE CLAIM IS:—

1. A camera provided with an adjustable diaphragm and a grey filter spot positionally controlled by an element which responds automatically to the use of an artificial light source by only introducing the filter spot into the film light path in the vicinity of the diaphragm if no source of artificial light is used.

2. A camera as claimed in claim 1, having a sensor responsive to the shape of a loaded cassette signifying that it contains high-speed or low-speed film, and which holds the grey filter spot out of the film light path when the camera is loaded with low-speed film.

3. A camera as claimed in claim 1 or claim 2, in which the element which controls the grey filter spot position also controls the position of a conversion filter.

4. A camera as claimed in claim 3, in which the grey filter spot is formed on the conversion filter.

5. A camera provided with an adjustable diaphragm and having a grey filter spot positionally controlled by an element automatically responsive to the connection to the camera of an artificial light source and the speed of the film with which the camera is loaded, the grey filter spot occupying a first position at which it intercepts the optical path of light in the vicinity of the diaphragm if no source of light is connected to the camera when loaded with a high-speed film, the filter spot being moved automatically to an ineffective second position as regards attenuation of the optical path if the camera is loaded with low-speed film and no source of artificial light is connected to the camera, and to an ineffective third position if a source of artificial light is connected to the camera.

6. A camera as claimed in claim 5, in which the filter spot is controlled by a sensor responsive to the configuration of a cassette signifying that it contains high-speed film or low-speed film.

7. A camera as claimed in claim 6, in which a pivoted member controls the position of the grey filter spot and its first position lies between its second and third positions.

8. A camera as claimed in claim 7, in which the sensor comprises an axially slidable feeler having a ramp surface controlling movement of the filter spot between its first and second positions.

9. A camera as claimed in claim 8, in which the pivoted member is a first order lever resiliently biased to a location at which the grey filter spot is in its second position.

10. A camera as claimed in any one of the preceding claims 5 to 9, in which the grey filter spot is provided on a conversion filter.

11. A camera as claimed in any one of the preceding claims, constructed as a cine camera.

12. A camera as claimed in claim 1, arranged and adapted to operate substantially as described with reference to Figures 1, 2 and 4 of the accompanying drawings.

13. A camera as claimed in claim 12, modified substantially as described with reference to Figure 3 of the accompanying drawings.

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Finally, it may be mentioned that the device which controls the position of the grey filter spot need not necessarily be built into the lamp socket. The operating arrangement for the neutral density spot could for instance be controlled by a colour temperature meter for measuring the spectral composition of light.

In the illustrated embodiment the diaphragm cooperates with the mask, behind which the neutral density spot 14 is arranged at high film speed. With diaphragm systems without such a mask it may suffice to adjust the neutral density spot 14 eccentrically with respect to the optical axis.

WHAT WE CLAIM IS:—

1. A camera provided with an adjustable diaphragm and a grey filter spot positionally controlled by an element which responds automatically to the use of an artificial light source by only introducing the filter spot into the film light path in the vicinity of the diaphragm if no source of artificial light is used.

2. A camera as claimed in claim 1, having a sensor responsive to the shape of a loaded cassette signifying that it contains high-speed or low-speed film, and which holds the grey filter spot out of the film light path when the camera is loaded with low-speed film.

3. A camera as claimed in claim 1 or claim 2, in which the element which controls the grey filter spot position also controls the position of a conversion filter.

4. A camera as claimed in claim 3, in which the grey filter spot is formed on the conversion filter.

5. A camera provided with an adjustable diaphragm and having a grey filter spot positionally controlled by an element automatically responsive to the connection to the camera of an artificial light source and the speed of the film with which the camera is loaded, the grey filter spot occupying a first position at which it intercepts the optical path of light in the vicinity of the diaphragm if no source of light is connected to the camera when loaded with a high-speed film, the filter spot being moved automatically to an ineffective second position as regards attenuation of the optical path if the camera is loaded with low-speed film and no source of artificial light is connected to the camera, and to an ineffective third position if a source of artificial light is connected to the camera.

6. A camera as claimed in claim 5, in which the filter spot is controlled by a sensor responsive to the configuration of a cassette signifying that it contains high-speed film or low-speed film.

7. A camera as claimed in claim 6, in which a pivoted member controls the position of the grey filter spot and its first position lies between its second and third positions.

8. A camera as claimed in claim 7, in which the sensor comprises an axially slidable feeler having a ramp surface controlling movement of the filter spot between its first and second positions.

9. A camera as claimed in claim 8, in which the pivoted member is a first order lever resiliently biased to a location at which the grey filter spot is in its second position.

10. A camera as claimed in any one of the preceding claims 5 to 9, in which the grey filter spot is provided on a conversion filter.

11. A camera as claimed in any one of the preceding claims, constructed as a cine camera.

12. A camera as claimed in claim 1, arranged and adapted to operate substantially as described with reference to Figures 1, 2 and 4 of the accompanying drawings.

13. A camera as claimed in claim 12, modified substantially as described with reference to Figure 3 of the accompanying drawings.

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