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(54) IMPROVEMENTS IN PHOTOGRAPHIC CAMERAS

(71) We, BALDA-WERKE PHOTOGRAPHISCHE GERÄTE UND KUNSTSTOFF GMBH & CO. KG., a German Company of 16—20 Steinmeisterstrasse, 498 Bunde 1, 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:—

This invention relates to a device for the forming of an image of position variable markings in the viewfinder of a camera, in which variation of the position of a marking element results in a corresponding alteration of a marking image in the viewfinder.

It is known to measure the range from camera to subject with the assistance of variable markings. For example it is possible to choose as a reference dimension for the measurement the chin-crown-spacing of the person to be photographed. In addition there can also be used as reference dimension the so-called "variable sighting circle". In such "variable sighting circles" the marking (circle mask) is imaged in the viewfinder through an optical system and deflecting mirror. According to the position of the circle mask the sighting circle appears as a larger or smaller circle in the viewfinder. So that the circle is always imaged sharply in the viewfinder, the provision of an aspheric lens is required between the first deflecting mirror and the circle mask, which lens permits the circle to appear always sharply defined in all positions of the mask. The range adjustment is effected according to the manner in which the sighting circle surrounds the head of the person to be photographed. In this method of range measuring the knowledge is utilised that differences in size between the heads of children and the heads of adults are slight and do not affect significantly the sharp focussing of the camera.

The essential disadvantage of the known system lies in that the provision of an optical system between the circle mask and the

deflecting mirror is necessary for the sharp imaging of the sighting circle in the viewfinder. Such an optical system is expensive.

Also other systems, the function of which depends upon the focussing of an object of previously known size are relatively expensive.

The invention is based on the problem of constructing a more simple and more economical device of the initially mentioned type.

According to the invention there is provided a device for forming an image of a positionally variable marking in the viewfinder of a camera wherein variations in position in the axial direction of a marking element in the form of a reflecting surface appear as variations in the marking image transversely to such axial direction by reason of at least one mirror arranged inclined relative to said axial direction.

It is proposed that for the development of a ring shaped image the mirror has a conical surface in the centre of which the marking element is displaceable in the axial direction of the cone.

In other embodiments of the invention the mirror is formed as the walls of a pyramid with rectangular base.

Further characteristics of the invention are given in the following description in combination with the drawings. These show:

Figure 1 a perspective elevation of the optical arrangement of a biaxial viewfinder with a conical or funnel-shaped mirror

Figure 2 a horizontal cross-section through a viewfinder with moveable marks and a lever for transferring to the marks movement of the objective lens

Figure 3 the arrangement of the transfer lever from the front

Figure 4 the viewfinder image of the viewfinder shown in Figure 2

Figure 5 a vertical section through a second embodiment with a fixed mark and a distance-variable second mark

Figure 6 the viewfinder image of the embodiment shown in Figure 5,

Figure 7 a third embodiment for a size-variable reticle

Figure 8 the viewfinder image of the embodiment according to Figure 7

5 Figure 9 a further embodiment with size-variable reticle

Figure 10 the viewfinder image according to the embodiment of Figure 9

10 Referring first to the embodiment according to Figures 1 to 4, a reticle mask 3 is provided next to a viewfinder lens 1, seen through by the eye 2 of a viewer. This reticle mask carries in its centre an inner reflecting cone-shaped shell 4, in which a central elongate member 5 is displaceable in the direction of the cone axis. The conical mirror 4 points to a mirror 7, which is arranged fixed in the camera casing (not illustrated). A partially translucent mirror 8 is arranged parallel to the mirror 7 and in the path of a light ray 10 emerging from lens 1. A positive lens 9 is arranged between the mirror 7 and the partially translucent mirror 8. An eyepiece lens 11 is positioned to receive both light passing through and light reflected by the partially reflective mirror 8 so that the view presented to the eye 2 includes images of the reticle 3 and member 5.

25 For simplifying purposes, in the perspective illustration according to Figure 1 only the reflective cone-shaped shell surface 4 is illustrated, which in the section according to Figure 2 sits in the practical embodiment in the middle portion of the light frame mask 3.

35 The central member 5 is connected with a light collection lens 12, which is guided in a circular cylindrical channel 13. The lens 12 or the member 5 respectively is connected with a fixed transfer lever 15 mounted pivotally at 14. The transfer lever engages with pin 16 in an annular groove of the lens carrier 17. In one operation of the lens carrier for the range adjustment the transfer lever 15 according to Figure 2 is pivoted with its left end upwardly or downwardly. The pivoting movement is transferred to the lens 12 and to the member 5.

50 The member 5 comprises a tube having at one end a central reflecting surface in the form of a cone of height "h" and cone angle corresponding with the cone angle of the mirror 4, i.e. with sides inclined at 45° to the axis of the cone. The reflecting surface carried by member 5 is illuminated by light collected by lens 12 and directed inside the tube. An annular image of the reflection surface is developed on the fixed mirror by means of the conical mirror 4. The imaged ring is transferred by means of the lens 9 to the half-permeable mirror 8 and this transmitted ring image appears in the viewfinder.

65 As a result of movement of the member 5 due to an adjustment of the objective lens housing 17 from front to back (Figure 2 from

above to below) the size of the ring appearing in the viewfinder changes. In a focussing for infinity the ring alters up to a point indicated by 18 in Figure 4 or disappears altogether.

In the smallest subject-camera range setting the ring obtained has the diameter indicated by 19 in Figure 4.

A further embodiment is shown in Figure 5. In the centre of a reticle 3' there is provided a fixed marking slit 21. A member 5' has a reflecting surface 22 on a prism with rectangular base of which the walls are inclined at 45° to the axis 6', which reflecting surface lies parallel to a fixed mirror surface 23 likewise fixed inclined at 45° to the axis 6'. The breadth of the reflecting surface 22 is so dimensioned that its image 24 appearing in the viewfinder takes the form of a strip parallel to slit 21, as shown in Figure 6.

Movement of the member 5' to the left or right, as shown in Figure 5, alters the spacing between the fixed mark 21 and the moveable mark 24.

90 In the embodiment according to Figure 7 a reflecting surface 25 is arranged around the forward edge of a rectangular slide body 26. The reflecting surface co-operates with a fixed surrounding mirror 27 of truncated rectangular pyramidal form. In this illustrated embodiment the reflecting surface 25 also runs parallel to the mirror surface 27 and inclined at 45° to the slide axis of the slide body 26.

100 The reflecting surfaces 25 are provided on all four edges of the slide body 26, so that a displacement of the slide body to left or right as shown in the drawing results in a greater or smaller frame in the viewfinder.

105 In the embodiment according to Figure 9 there is provided a mirror surface 28 of pyramidal form with rectangular base fixedly arranged around a central aperture. The fixed mirror surface is enclosed by a rectangular frame 30 slidably moveable in the direction of the longitudinal axis 29. The frame 30 has a surrounding reflecting surface 31 on its forward edges. The reflecting surface 31 and the mirror surface 28 run parallel to each other and are inclined at 45° to the longitudinal axis 29. In the centre of the arrangement a control or warning lamp 32 is provided, serving, for example to indicate underexposure. A displacement of the frame 30 to left or right in the drawing leads to an enlargement or diminution of the reticle image in the viewfinder. The advantage of the arrangement illustrated in Figures 9 and 10 resides inter alia in that a continuous all round closed light frame is depicted independent of its particular size at any time. In this arrangement it is additionally possible to provide, by suitable control of

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the indicating lamp 32, for the fading-in of an image symbol in the centre of the viewfinder.

reflecting surface formed on a prism with rectangular base.

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WHAT WE CLAIM IS:—

10 1. A device for forming an image of a positionally variable marking in the viewfinder of a camera wherein variations in position in the axial direction of a marking element in the form of a reflecting surface appear as variations in the marking image transversely to such axial direction by reason of at least one mirror arranged inclined relative to said axial direction.

15 2. A device as claimed in claim 1 wherein said mirror is a cone-shaped inner shell surface and the marking element is mounted for displacement along the axis of the mirror cone.

20 3. A device as claimed in claim 1 wherein said mirror is in the form of the inner shell surface of a pyramid with rectangular base.

4. A device as claimed in claim 1, 2 or 3 wherein the marking element carries a

5. A device as claimed in claim 4 wherein the reflecting surface is carried as an encircling frame around a rectangular slide body.

6. A device as claimed in claim 4 wherein the reflecting surface is arranged on a frame surrounding the mirror.

7. A device as claimed in claim 1, 2 or 3 wherein the marking element is in the form of a conical reflecting surface.

8. A device for forming an image of a positionally variable marking in the viewfinder of a camera substantially as herein described with reference to Figures 1 to 4, Figure 5 and 6, Figures 7 and 8 or Figures 9 and 10 of the accompanying drawings.

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20 3. A device as claimed in claim 1 wherein said mirror is in the form of the inner shell surface of a pyramid with rectangular base.

4. A device as claimed in claim 1, 2 or 3 wherein the marking element carries a

reflecting surface formed on a prism with rectangular base.

5. A device as claimed in claim 4 wherein the reflecting surface is carried as an encircling frame around a rectangular slide body.

6. A device as claimed in claim 4 wherein the reflecting surface is arranged on a frame surrounding the mirror.

7. A device as claimed in claim 1, 2 or 3 wherein the marking element is in the form of a conical reflecting surface.

8. A device for forming an image of a positionally variable marking in the viewfinder of a camera substantially as herein described with reference to Figures 1 to 4, Figure 5 and 6, Figures 7 and 8 or Figures 9 and 10 of the accompanying drawings.

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