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COMPLETE SPECIFICATION

Supplementary Attachment Device for Mirror Reflex Cameras

5 We, FRANKE AND HEIDECHE G.M.B.H. a German body corporate, trading as ROLLEI-WERKE FRANKE AND HEIDECHE of 196 Salz-

10 dahmlumerstrasse, Braunschweig, 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:—

15 This invention relates to a supplementary optical device for attachment to a photographic camera and also intended for connection to the fluorescent screens of oscillographs, radar, television or X-ray screen image equipment, and is particularly concerned with an optical device for use with a twin-lens mirror reflex view-finder camera provided with exposure and view-finder chambers arranged within a common housing, the view-finder chamber being provided with a ground glass focusing screen. In such cameras the images formed at the exposure plane and on the ground glass screen are usually of the same size and scale.

25 Such equipment is usually provided for measurement and adjustment purposes with a grid or co-ordinate system, but for technical reasons, this can usually not be arranged exactly in the actual plane of the fluorescent screen. Furthermore, once the system or grid has been introduced into the equipment or the tube, it cannot be varied or altered. While such a coordinate, grid or like lattice system can be produced by electrical means and can be superimposed electrically with the screen image, this is not possible without expensive electrical equipment or for any desired pattern formation. Furthermore, such a type of electrically produced grid system cannot always be exactly reproduced without careful setting and adjustment.

40 The invention has for an object to avoid the provision of a grid or lattice in the oscillograph tube or on the fluorescent screen, while

45 permitting an exact and sharp formation of the image of both the grid and the fluorescent screen image itself to be produced at the exposure plane in the camera. In addition, the grid, pattern or the original can be very easily replaced and can always be exactly reconstructed.

50 According to the invention, there is provided a supplementary optical device attachable to a twin-lens photographic camera of the kind referred to, comprising a semi-transparent mirror adapted to be positioned in the path of light rays directed towards the camera exposure objective to reflect part of said light rays, by way of a second mirror, towards the camera view-finder objective, means adapted to direct light rays of an additional image towards said semi-transparent mirror to be partially reflected thereby towards said exposure objective and partially reflected, by way of said second mirror, towards said view-finder objective, and compensating optical systems respectively arranged so as to be positioned in front of the view-finder objective and behind the holder of said additional image and so dimensioned as to form, at least within a predetermined range, images of the same size and scale at the exposure plane and on the focusing screen of the camera.

75 By means of an optical system interposed between the semi-transparent mirror and the transparency or image support, it is possible, in conjunction with the camera optical system, to obtain a transparency image in the camera at the scale 1:1. In this manner, a photographic exposure of the fluorescent screen image, either positive or negative, can be introduced, for example, as image support and serve directly for comparison with the following additional processes on the oscillograph screen. With the comparison of processes which are variable as a function of time, it is quickly and readily possible in this way not only to detect changes, but also to fix

such changes at any time immediately by photography, together with the original condition.

By means of the partially transparent mirror, it is possible for both images to be completely superimposed. Nevertheless, a mirror can be used which, depending on the nature of the split-field or coincidence range finder, fully reflects a part of the path of rays but fully transmits the other part, so that both images are not completely superimposed, but are produced in juxtaposition or concentrically of one another; in this way, it would be possible, for example, for an image of the dial and hands of a clock to be formed on the periphery of the picture, while that of the oscillogram or the directly photographed picture is in the centre.

The invention is of particular value, not only in connection with comparative measurements and observations of general type in a laboratory, but also for a number of uses in practice, television and radar control in the operation of ships and aircraft and in general traffic, the checking of cheques, bank notes and signatures by means of television instruments, in medicine when comparing X-ray screen image exposures and television operation exposures for establishing pathological changes, and many other spheres where there is not only to be a comparison of exposures but where it is desirable, necessary or expedient for the comparison and the changes to be fixed photographically. It is in this connection quite immaterial whether the comparison exposure in the comparison with the fluorescent screen image is used as a positive or negative, or as a black-and-white picture or a coloured exposure. When using direct photographic development processes, as for example the Polaroid-Land (Regd. Trade Mark) process, it is possible, by means of the arrangement according to the invention, in connection with radar location, to make the exposure of the instantaneous condition and then to introduce as comparison image the transparency obtained in a few seconds, so that short-period changes of the radar image can readily be detected and, if desired, they can also be fixed together with the original picture.

The use of a supplementary device according to the invention with a twin-lens mirror reflex camera makes continuous observation of the comparison picture possible. For examination of dimensions during manufacture, such as when using television or radar equipment or the like, the tolerance curve can be used as such as measurement image and then directly compared with the actual measurement reading of the instrument to be tested and can optionally be fixed photographically.

It is also possible for the device according to the invention to be used in such a way that a second fluorescent screen instrument is used instead of a transparent image support.

The invention is illustrated by way of example in the accompanying drawings, in which:

Figure 1 is a sectional view of one embodiment of a supplementary optical device shown attached to a twin-lens reflex focusing camera and to an oscillograph; and

Figures 2, 3, and 4 show a modified form of the attachment device suitable for use in a laboratory, Figure 2 being a sectional view corresponding to Figure 1 and Figures 3 and 4 being elevational views at right-angles to one another of the entire arrangement.

Referring to Figure 1, the supplementary optical device consists of a tubular housing 1 with a semi-transparent or partially-reflecting mirror 2 arranged therein at 45° to the tube axis, and a deflecting mirror 3 which is arranged in the path of the view-finder rays of a camera and parallel to the mirror 2. Holding devices 4 and 5 are provided at the ends of the tube. Fitted transversely of the housing 1 on a tubular support 6 is an optical system housing 7 with a transparency or picture holder 8 and an intermediate optical system 11 which is adjustable by means of a screw-thread 9 and a handle 10 and is arranged between the holder 8 and the mirror 2.

The intermediate optical system 11 is preferably so calculated that, in conjunction with the camera exposure lens 12, it gives an image in the camera on the scale of 1:1. Naturally, any other image-forming scale can be used.

For optically compensating for the lengthened path of the view-finder rays, a negative lens system 13 is arranged in front of the view-finder objective 12a, said system consisting of at least two spaced elements so that it can be adjusted by altering the spacing. A lamp 16, which is adjustable for brightness, and a ground glass screen 17 are arranged in a cap 15 which closes the outer end of the housing 7 and can be swung out about the pivot 14. Light-admission apertures 18 are provided at that end of the tube 1 nearer the camera.

The operation of the device will be described in conjunction with an oscillograph 19 and a twin-lens mirror reflex camera 20 having a "Polaroid-Land" attachment 21, the holding device 4 of the housing 1 being attached to the camera and the holding device 5 to the oscillograph.

An image of the object appearing on the fluorescent screen 23 of the oscillograph is projected through the camera objective 12 on

to the film 22. At the same time, a grid system or picture, either a positive or a negative, arranged in the picture holder 8 has an image thereof produced on the film 22 through the semi-transparent or partially reflecting mirror 2. The oscillograph picture and the grid system or picture in the picture holder 8 can be observed on the focusing view-finder ground glass screen, according to the image formed on the film 22. The pictures, which are available in a few seconds when using a "Polaroid-Land" film, can be inserted into the picture holder 8 and used for comparison exposures.

In the embodiment shown in Figures 2, 3 and 4, which is suitable for use in a laboratory, the mirror housing 1 is provided with a holder 24 adjustable on a tripod pillar 25. An image of the original on the support 26 is formed on the film 22 similarly to Figure 1 and at the same time an image of the picture in the holder 9 is also formed, either as a positive or a negative, on the film by the partially reflecting mirror 2. A scale 13a the graduations of which correspond to those on the focusing knob of the camera is provided for reading off the adjustment of the negative lens 13.

WHAT WE CLAIM IS:—

1. A supplementary optical device attachable to a twin-lens photographic camera of the kind referred to, comprising a semi-transparent mirror adapted to be positioned in the path of light rays directed towards the camera exposure objective to reflect part of said light rays, by way of a second mirror, towards the camera view-finder objective, means adapted to direct light rays of an additional image towards said semi-transparent mirror to be partially reflect-

ed thereby towards said exposure objective and partially reflected, by way of said second mirror, towards said view-finder objective, and compensating optical systems respectively arranged so as to be positioned in front of the view-finder objective and behind the holder of said additional image and so dimensioned as to form, at least within a predetermined range, images of the same size and scale at the exposure plane and on the focusing screen of the camera.

2. A device as claimed in claim 1, wherein the compensating optical system in front of the view-finder objective consists of at least two spaced elements adjustable by altering the spacing.

3. A device as claimed in claim 1 or 2, wherein the holder of the additional image is provided with an illuminating device the brightness of which is adjustable.

4. A device as claimed in any one of claims 1 to 3, wherein the optical system arranged behind the holder of the additional image is adjustable.

5. A device as claimed in any one of the preceding claims, including a holder for attachment to a tripod.

6. A supplementary optical device as claimed in claim 1 substantially as described with reference to and as illustrated in Figure 1 or Figures 2 to 4 of the accompanying drawings.

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5 to the film 22. At the same time, a grid system
or picture, either a positive or a negative, ar-
ranged in the picture holder 8 has an image
thereof produced on the film 22 through the
semi-transparent or partially reflecting mirror
2. The oscillograph picture and the grid system
or picture in the picture holder 8 can be ob-
served on the focusing view-finder ground
glass screen, according to the image formed
10 on the film 22. The pictures, which are avail-
able in a few seconds when using a "Pola-
roid-Land" film, can be inserted into the
picture holder 8 and used for comparison ex-
posures.

15 In the embodiment shown in Figures 2, 3
and 4, which is suitable for use in a laboratory,
the mirror housing 1 is provided with a holder
24 adjustable on a tripod pillar 25. An image
of the original on the support 26 is formed
20 on the film 22 similarly to Figure 1 and at
the same time an image of the picture in
the holder 9 is also formed, either as a positive
or a negative, on the film by the partially
reflecting mirror 2. A scale 13a the graduations
25 of which correspond to those on the focusing
knob of the camera is provided for reading
off the adjustment of the negative lens 13.

WHAT WE CLAIM IS:—

30 1. A supplementary optical device attachable
to a twin-lens photographic camera of the kind
referred to, comprising a semi-transparent mir-
ror adapted to be positioned in the path of
light rays directed towards the camera expo-
sure objective to reflect part of said light rays,
35 by way of a second mirror, towards the camera
view-finder objective, means adapted to direct
light rays of an additional image towards said
semi-transparent mirror to be partially reflect-

ed thereby towards said exposure objective and
partially reflected, by way of said second mir-
40 ror, towards said view-finder objective, and
compensating optical systems respectively ar-
ranged so as to be positioned in front of the
view-finder objective and behind the holder
of said additional image and so dimensioned
45 as to form, at least within a predetermined
range, images of the same size and scale at
the exposure plane and on the focusing screen
of the camera.

2. A device as claimed in claim 1, wherein
50 the compensating optical system in front of
the view-finder objective consists of at least
two spaced elements adjustable by altering the
spacing.

3. A device as claimed in claim 1 or 2,
55 wherein the holder of the additional image
is provided with an illuminating device the
brightness of which is adjustable.

4. A device as claimed in any one of claims
1 to 3, wherein the optical system arranged
60 behind the holder of the additional image is
adjustable.

5. A device as claimed in any one of the
preceding claims, including a holder for at-
65 tachment to a tripod.

6. A supplementary optical device as
claimed in claim 1 substantially as described
with reference to and as illustrated in Figure
1 or Figures 2 to 4 of the accompanying draw-
70 ings.

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