PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Improvements relating to Focusing Devices for Photographic Cameras

I, LUCIEN JULES EMILE ANDRÉ DODIN, a French Citizen, of 1, rue Tixador, Le Canet-Plage, Pyrénées-Orientales, France, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement :—

The present invention relates to a focusing device for photographic cameras.

It has previously been proposed to use in conjunction with a diffusing focusing screen, a crossed-prism system associated with a local part of the field of view and which operates to cause a sharp division of part of the image whenever the object to be photographed is not properly in focus. Such a prism system may comprise two identical symmetrical wedge prisms with a fine wedge angle, and with parallel triangular edge faces, in parallel planes perpendicular to the planes of the converging faces, the prisms being joined by triangular edge faces with the prisms orientated so that the converging faces of the two prisms converge in opposite directions.

In use the prism system is arranged so that the line of intersection of the plane containing the forward one of the two converging faces of each prism with the plane containing the corresponding forward face of the other prism, lies in a plane containing the diffusing surface of the focusing screen, and in some cases there is difficulty in correctly assembling the prisms in the focusing screen.

According to the present invention there is provided a focusing device comprising the combination of a diffusing focusing screen and an optical unit, the said optical unit comprising a plano-convex field lens secured to a prismatic portion having a circular peripheral contour of the same diameter as the lens, one end of the prismatic portion being formed by a circular face perpendicular to its axis and its opposite end being formed by two identical half-elliptical faces disposed in different planes inclined at the same angle to the plane of the circular face and intersecting so that the minor axes of the half ellipses are aligned and parallel to the said circular face, the lens and prismatic portion being joined to form the said optical unit by their plane circular faces with their circular peripheral contours in registration and the unit so formed being held in position in the screen with its optical axis perpendicular to the screen, the said minor axes lying in the plane of the diffusing surface of the screen and the parts of the said elliptical faces lying on the opposite side of the said axes from the lens projecting from such diffusing surface.

The compact unit, comprising the field lens and the prismatic portion and having a cylindrical contour, can be readily passed into a hole of corresponding diameter in the diffusing focusing screen, e.g. a ground-glass focusing screen, and then adjusted for position until the correct position is found, whereupon the unit can be secured to the screen, e.g. by gluing, in that position.

The prismatic portion of the focusing device virtually comprises two wedge-prisms presenting when the device is in use, two oppositely inclined faces to the light rays coming from the camera objective and these prisms function in known manner. It will be understood, however, that the apparent form of the prismatic portion is not that of two wedge-prisms in a truly geometric sense since the device is given a cylindrical side contour to correspond with the outside contour of the field lens.

The prismatic portion may be made in two identical parts secured together in face to face contact in a diametrical plane passing through the circular face of the portion, perpendicular to the said aligned minor axes. These two identical parts may each have the form of a right-triangular wedge prism having a small wedge angle cut so that in one aspect it has a semi-circular contour, and so that it comprises a curved

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and tapering edge face, a flat triangular edge face diametral to the curved edge face and two converging major faces one of which is semi-circular and perpendicular to the wide end edge of the triangular face. The prismatic portion of the optical unit will then be formed by inverting one of the two prism parts with respect to the other and joining the two parts by their flat triangular faces so that the two semi-circular faces lie in the same plane and form a complete circular face. The other major faces of the two parts, which will be half-elliptical faces, will then lie in planes which lie at equal angles to the circular face of the device and intersect so that the minor axes of the half-ellipses are aligned, and lie parallel to the said circular face. The prismatic portion so formed may be joined to a plano-convex lens to form the unit, e.g. by gluing.

The optical unit may alternatively be moulded in one piece and it is also possible to mould the diffusing focusing screen integral with the unit with assured accuracy of the relative positions of the screen and unit.

The field lens will function in usual manner to concentrate the image forming rays on the pupil.

There will be no difficulty in selecting a suitable wedge-angle for the prism-like parts constituting the prismatic portion of the optical unit. The angle will generally be less than 20°.

In order that the present invention may be the more readily understood, reference is hereinafter made to the constructional form illustrated in the accompanying drawings in which :—

Figure 1 is an elevational view of the optical unit set in place in the diffusing focusing screen, and Figure 2 is another view of the assembly shown in Figure 1 looking along the optical axis towards the diffusing surface of the screen.

In these drawings :—

Figure 1 is a plane-convex field lens ;

Figures 2 and 3 are the prism-like parts forming the prismatic portion of the optical unit.

The prism-like parts are not of true geometric prism form but have curved tapering edge faces, 12, 13 flat triangular faces 4, 5, semi-circular major faces 8, 9, and inclined major faces lying intersecting planes. These major faces are half-elliptical faces, being in fact, faces formed by taking an oblique transverse section of a half-cylinder, and the planes in which they lie so intersect that the minor axes of the half-ellipses are aligned and lie parallel with the circular face formed by the two semi-circular major faces 8, 9 and perpendicular to the plane 7 which is the plane in which the two prism-like parts are joined by their triangular faces 4, 5.

The prismatic portion, formed by the joined prism-like parts 2 and 3, is joined by its circular face to the flat circular face of the plano-convex lens 1 so that the curved edge faces 12, 13 of the prism-like parts form an extension of the circular contour 15 of the lens.

The parts 1, 2 and 3 may be assembled to form the unit by gluing with a transparent material, e.g. Canada Balsam in a hot state.

The resulting cylindrical unit is slidable in a cylindrical hole 16 of approximately the same diameter as the unit, formed in the diffusing focusing screen 19 which has a diffusing surface 18. The screen may be a ground-glass screen. The point of intersection 6 of the inclined faces is brought into the plane of the diffusing surface 18 of the screen, and the unit may be fixed to the screen, e.g. by gluing. For this purpose fish glue may be used, so diluted as to avoid separation of the three parts of the unit previously hot glued, e.g. by means of Canada Balsam as hereinbefore stated.

The focusing device may be rapidly and economically constructed. Small variation in the thickness of the prisms or the lens, or the diffusing screen will not prevent accurate positioning of the unit with the minor axes of the half elliptical faces in the plane of the diffusing surface of the screen since the unit can be adjusted for position in relation to the screen in the manner hereinbefore stated before it is glued in position.

Economy may be favoured by leaving the contacting faces of the parts 1, 2 and 3 unpolished, this polishing being unnecessary in the event that the parts are glued as by Canada Balsam.

It is possible to construct the unit in one piece, e.g. by hot stamping or casting or moulding under pressure from a transparent plastic material. The unit may also be formed integrally with the focusing screen.

What I claim is :—

1. In or for a photographic camera, a focusing device comprising the combination of a diffusing focusing screen and an optical unit, the said optical unit comprising a plano-convex field lens secured to a prismatic portion having a circular peripheral contour of the same diameter as the lens, one end of the prismatic portion being formed by a circular face perpendicular to its axis and its opposite end being formed by two identical half-elliptical faces disposed in different planes inclined at the same angle to the plane of the circular face and intersecting so that the minor axes of the half-ellipses are aligned and parallel to the said circular face, the lens and prismatic portion being joined to form the said optical unit by their plane circular faces with their circular peripheral contours in registration and the unit so formed being held in position in the screen

with its optical axis perpendicular to the screen; the said minor axes lying in the plane of the diffusing surface of the screen and the parts of the said elliptical faces lying on the opposite side of the said axes from the lens projecting from such diffusing surface.

2. A focusing device as in Claim 1, wherein the prismatic portion of the optical unit is made in two identical parts secured together in a diametral plane passing through the circular face of the said portion and perpendicular to the aligned minor axes.

3. A focusing device having the same form as that according to Claim 1, but modified in that the prismatic portion and the plano-convex lens constituting the optical unit are moulded in one piece.

4. A focusing device as in Claim 3 moulded under pressure from a transparent plastic material.

5. A focusing device as in Claim 3 or 4, wherein the one-piece moulding which includes the optical unit, also includes a diffusing focusing screen extending from around the said unit with its diffusing surface in a plane containing the minor axes of the half-ellipses.

6. A focusing device as in Claim 1 or 2, wherein the circular face of the prismatic portion of the optical unit and the plane face of the lens are secured together, in unpolished condition, by an adhesive material of the same index of refraction as that of the material from which the prismatic portion and lens are formed.

7. A focusing device substantially as herein described with reference to and as illustrated in the accompanying drawings.

8. A photographic camera comprising a focusing device according to any preceding claim.

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681,928 COMPLETE SPECIFICATION
1 SHEET
This drawing is a reproduction of the Original on a reduced scale.

Fig.1

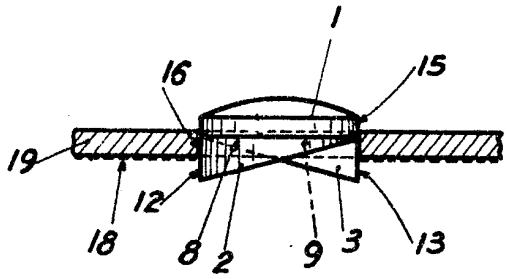

Fig.2