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PATENT SPECIFICATION
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Index at acceptance:—Class 98(i), A2a9.

COMPLETE SPECIFICATION

Improvements in Focussing Devices for Photographic Cameras

I, LUCIEN JULES EMILE ANDRÉ DODIN, of 1, Place Charles Le Roux, Nantes, (Loire-Inferieure) France, a French Citizen, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to a device for sighting the image given by the objective in a photographic camera and enabling it to be accurately focussed.

(1) Ordinarily focussing on ground glass is not very accurate, and the luminosity of the image which is seen is very much reduced by diffusion. On the other hand, focussing may be effected for any objective.

(2) Ordinarily, focussing by means of (single or combined) convergent lenses, called "field lenses" which concentrate the rays on the observer's pupil through an eyepiece so that the virtual image appears sharp when rays are correctly focussed by the camera objective, allows a much better luminosity inasmuch as there is no longer any diffusion of the light received. On the other hand, the power of the objective conditions the focal distance of the field lens used and the system is ill-adapted to deal with objectives of different focal lengths such as are met with in cameras with interchangeable objectives, particularly reflex focusing adjustment. Focussing is also rather inaccurate as in the case of the focussing screen.

The device according to the present invention for sighting the image given by the objective in a photographic camera and enabling it to be accurately focussed comprises the combination of a device comprising two pairs of crossed refracting wedge prisms for producing an exaggerated local distortion of a part of the image if the image is not in focus arranged symmetrically about a very

finely ground glass screen with the prism faces remote from the screen parallel, one pair being in front of and the other 50 behind the screen which is disposed in a plane perpendicular to the optical axis of the objective, which plane when adjustment is effected is made to coincide with the plane of sharpness of the image, with 55 a system of field lenses forming part of an eyepiece the lenses being arranged in front of and behind the pairs of prisms.

The accuracy of focussing with the aid of the prismatic device is excellent, but 60 the portion of the image observed is of low intensity.

This invention is founded on the experimental observation of the facts that:

(a) The use of a ground glass is consistent with the use of prisms and field lenses provided the grain of the ground glass is sufficiently fine for a small portion only of the light to be diffused; 70

(b) That the simultaneous use of a ground glass with very fine grain and of a field lens as aforesaid renders it less necessary to make the focal length of the field lens agree accurately with the focal 75 length of the objective, so that it is possible to use objectives of varying focal length whilst at the same time retaining a mean value of the focal distance of the field lens system. 80

The advantages resulting from the device according to the invention are therefore important, since it is thus possible to produce an apparatus for sighting and focussing the image in a 85 photographic camera which, as compared with normal systems of focusing on ground glass, has the advantages, to a great extent, of the field lens devices, as regards luminosity of the image and at the same time provides 90 much greater accuracy in the adjustment than that obtained by sighting the image on ground glass or through a field lens,

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due to the aforesaid action of the prismatic device, which advantages are realised whilst at the same time enabling objectives of different focal length to be used with the same focussing device.

The device according to the present invention is diagrammatically shown in Fig. 1; Fig. 2 shows diagrammatically the aspect of what is observed in the device before the object is properly focussed, and Fig. 3 shows diagrammatically the respective location of the prisms.

1 is the objective of the camera. On the optical axis are arranged co-axial with such axis at 2 and 2¹ the two plano-convex lenses constituting together the field lens which brings back the luminous rays to the pupil of the eye 3 which observes through a magnifying sight 4. Between the individual lenses 2 and 2¹ are arranged the prisms 5 and 5¹ forming the first pair of prisms and the prisms 6 and 6¹ forming the second pair of prisms. Between the two lenses and the two systems of prisms a thin glass 9 with parallel faces is provided, the face P of which is ground to a very fine grain.

The prisms are arranged with their edges perpendicular to the horizontal axial plane H of the objective, whilst the intersection of the planes through their hypotenuse takes place on the optical axis, one prism of each pair being arranged on one side of the said horizontal plane and the other prisms on the other side of said plane and one face of each prism lying in said plane. The elements composing each system of prisms on the same side of the axial plane aforesaid are symmetrically arranged together relatively to a plane perpendicular to the optical axis.

The edges A and A¹ of each pair of prisms corresponding to the angles of deviation of the prisms, lie in planes ϕ and ϕ^1 respectively. Said planes ϕ and ϕ^1 are parallel and symmetrical with respect to the vertical axial plane V.

The faces of the prisms opposite to their deviation edges A and A¹ lie in the parallel planes ϕ_1 and ϕ respectively.

In practice, the orthogonal projection of the prisms on a plane perpendicular to the optical axis represent the two halves of a rectangle, separated by the horizontal axial plane H. In this way there is obtained two sets of two vertical crossed prisms, in each of which sets one of the prisms refracts parallel to the axis the rays proceeding from the edge on the corresponding horizontal diameter of the objective, and the other prism likewise refracts the rays proceeding from the opposite edge, the coincidence of the rays taking place when the focal point of the

objective falls on plane P.

This device makes it possible to concentrate on the pupil, through a magnifying sight, if necessary, the rays which form the real image, of which the eye would otherwise only receive a portion, and to perceive the complete image, the central part of which is observed through the prisms.

This is achieved according to this invention by using a plane ground glass of very small grain size, so as to be semi-transparent, arranged with its ground face in the symmetrical plane of the prisms perpendicular to the optical axis which coincides with the exact adjustment plane, when the halves of the image cut by the prisms coincide.

In operating the device (see Fig. 2) the observer sees through the device the complete image in the surface 7 (lying in plane P) corresponding to the photographed field. Before the adjustment has been effected on a portion, preferably linear, of the object, it gives an image 8 through the object, and said image in the central rectangle corresponding to the prisms 5 and 6 appears cut into two separate sections 8¹ and 8¹¹.

By causing, by any known means, the distance between the objective and the plane P to vary, the sections 8¹ and 8¹¹ are displaced and they may be brought into coincidence so as to re-establish the continuity of the image 8.

At that moment the plane P is exactly at the focussing distance and this adjustment, due to the coincidence of the images, is much more accurate than the adjustment made by simple vision on the focussing screen or through the field lens only.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. Device for sighting and focussing the image in a photographic camera, characterised by the combination of a device comprising two identical pairs of crossed refracting wedge prisms for producing an exaggerated local distortion of a part of the image if the image is not in focus arranged symmetrically about a very finely ground glass screen with the prism faces remote from the screen parallel, one pair being in front of and the other behind the screen which is disposed in a plane perpendicular to the optical axis of the objective, which plane when adjustment is effected is made to coincide with the plane of sharpness of the image, with a system of field lenses forming part of an eye piece the lenses being arranged

in front of and behind the pairs of prisms.

2. Device for sighting and focussing the
image in a photographic camera, substan-
tially as herein described with reference
5 to the accompanying drawings.

Dated this 23rd day of July, 1945.

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Patent Agents for the Applicant.

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[This Drawing is a reproduction of the Original on a reduced scale.]

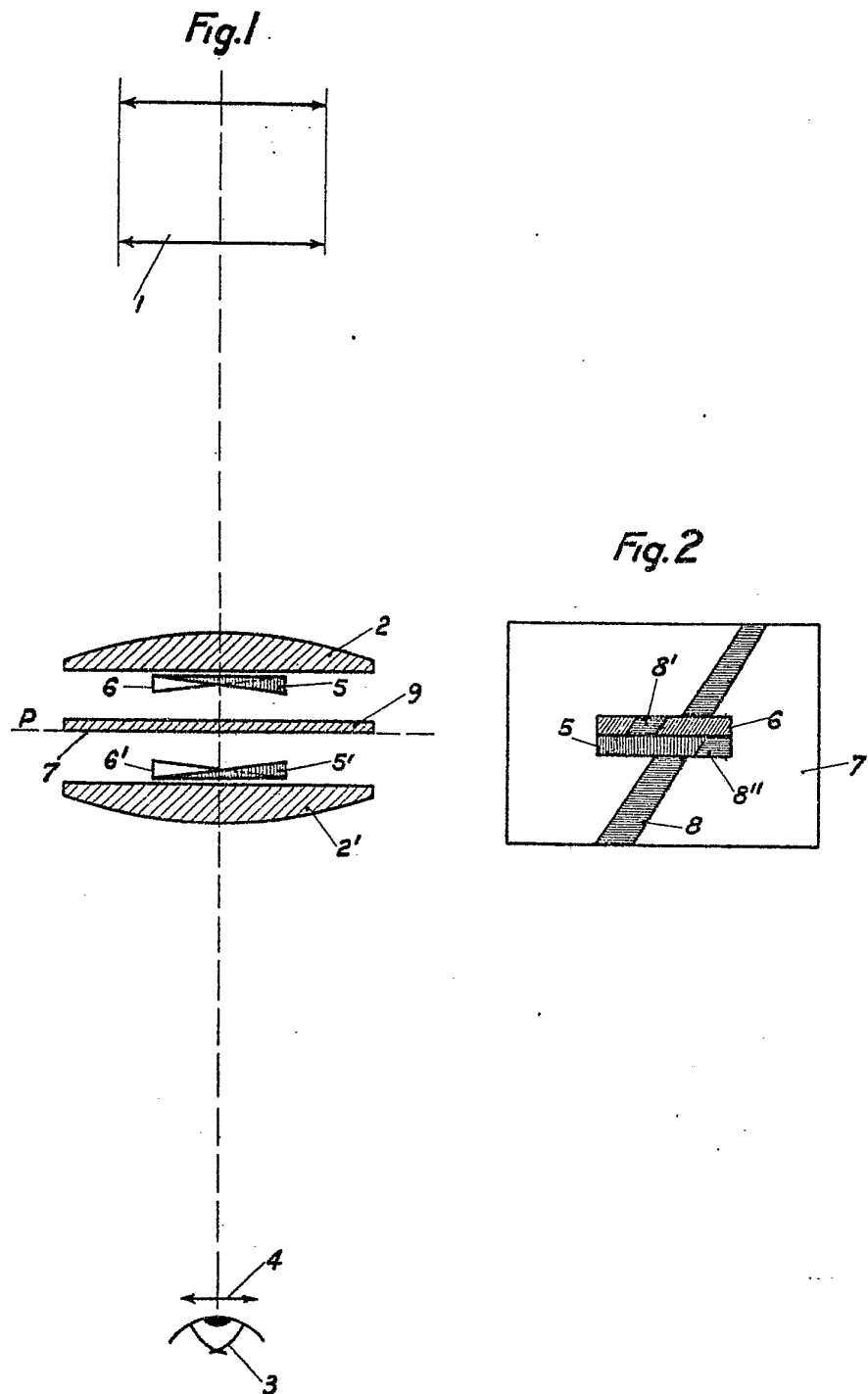


Fig. 3

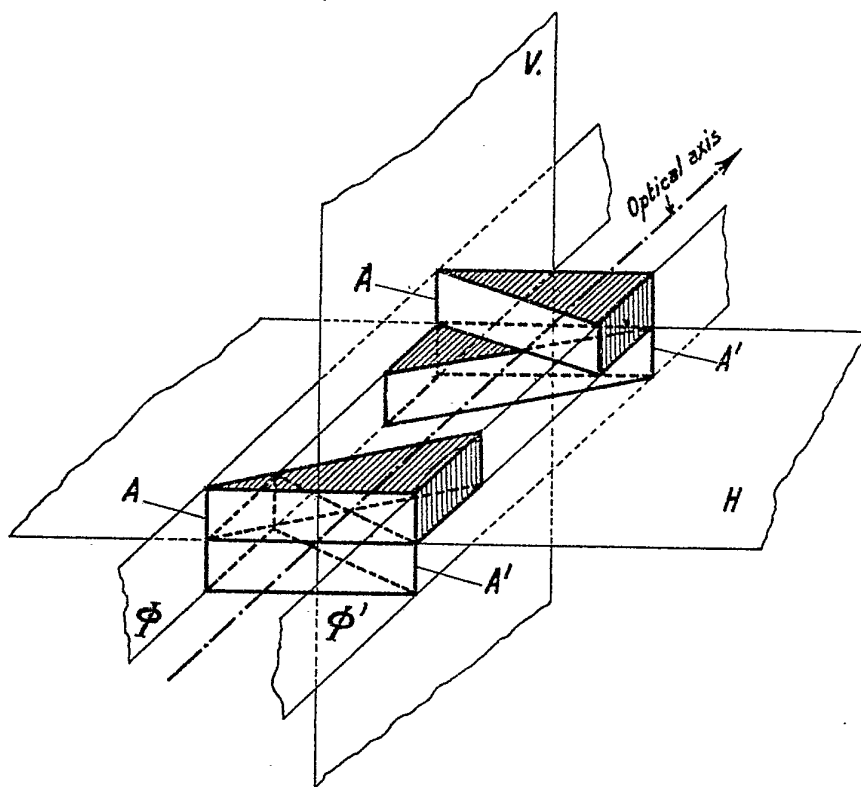
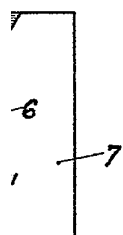


Fig. 1

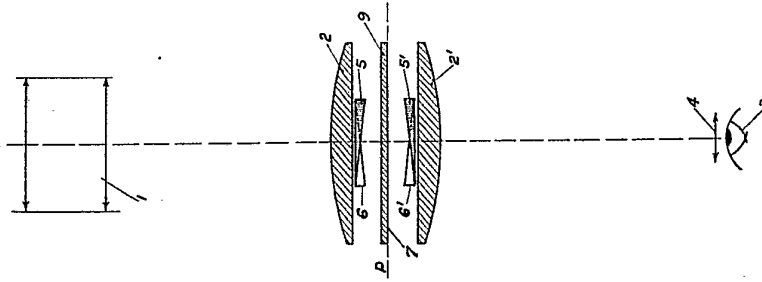


Fig. 2

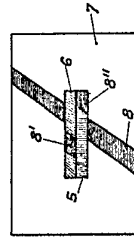
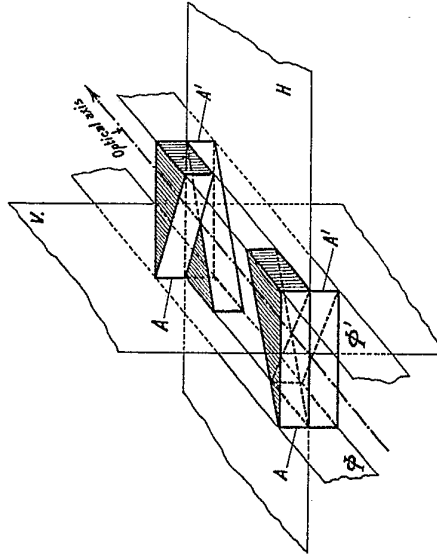


Fig. 3



[This Drawing is a reproduction of the Original on a reduced scale]