

PATENT SPECIFICATION



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COMPLETE SPECIFICATION.

Improvements in or relating to Photographic Objectives.

We, OPTISCHE ANSTALT C. P. GOERZ AKTIENGESELLSCHAFT, of 45/46, Rhein-strasse, Berlin-Friedenau, Germany, a German company, 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 improvements in spherically chromatically and astigmatically corrected three-lens cemented objectives, of the kind known as wide-angle objectives. A more or less pronounced disadvantage of such wide-angle objectives is their comparatively low luminosity.

The present invention aims at obviating this disadvantage by providing a particular construction comprising a positive meniscus on the side of the diaphragm and with its concave surface facing the latter, a central bi-concave lens and an outer bi-convex lens, the two last-mentioned lenses being of material having a higher refractive index than that of the meniscus.

According to this invention the bi-concave lens is made of flint glass of high refractive index, the refractive index difference between the said lens and the meniscus being very wide, and at least

0.1. The convex lens is made of baryta flint and has a higher refractive and a higher dispersive power than the glass of the central bi-concave lens.

The above-described combination of glasses of dissimilar nature in a known kind of objective has the advantage of rendering comparatively small the strong marginal astigmatic defects in wide-angle images without detrimentally increasing these defects for acute-angle images.

There is no difficulty in making a double objective with the objective according to the invention for image angles of over 100° with satisfactory correction and for an aperture ratio of 1:9.

A constructional example of the objective according to the invention is illustrated in the accompanying drawing. The thickness of the lenses L^1 , L^2 , L^3 is d^1 , d^2 , d^3 respectively and the radii of curvature of the lens surfaces are, in sequence, r^1 , r^2 , r^3 , r^4 . The diaphragm is B^1 and the distance between the latter and the concave surface of the meniscus is $\frac{\Delta}{2}$.

In a construction of the objective, the constants for a focal length of $f=100$ are as follows:

$$L^1 \quad r^1 = +19.5 \quad d^1 = 3.4 \quad nD = 1.6584 \quad nG = 1.6825 \\ r^2 = +28.2$$

$$L^2 \quad r^3 = +10 \quad d^2 = 0.8 \quad nD = 1.5991 \quad nG = 1.6196$$

$$L^3 \quad r^4 = -23.4 \quad d^3 = 1.4 \quad nD = 1.4634 \quad nG = 1.4723$$

$$\frac{\Delta}{2} = 1.6.$$

Image angle about 100° . Aperture ratio 1:9.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to

be performed, we declare that what we claim is:—

1. A cemented photographic three-lens

[Price 1/-]

- objective corrected spherically, chromatically and astigmatically and constituted by (1) a positive meniscus adjacent to the diaphragm and with a concave surface facing the latter, (2) a central bi-concave lens, and (3) a bi-convex lens, the two last-mentioned lenses being of material having a higher refractive index than that of the meniscus, characterised in that the central bi-concave lens is of highly refractive flint glass the refractive index of which is higher by at least 0.1 than that of the meniscus, the bi-convex lens being of baryta flint having a higher refractive index and higher dispersive power than the glass of the bi-concave lens.
2. A double objective comprising two objectives constructed as claimed in Claim 1. 20
3. The photographic objective substantially as described with reference to the accompanying drawing. 20
- Dated this 17th day of December, 1923.
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[This Drawing is a full-size reproduction of the Original]

