

PATENT SPECIFICATION



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372,228

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COMPLETE SPECIFICATION.

Improvements in Lenses for Photographic and other Purposes.

We, HORACE WILLIAM LEE, a British Subject, and KAPELLA LIMITED, a British Company, both of 104, Stoughton Street, Leicester, 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 lenses of the kind consisting of a dispersive component placed between two collective components, of which the collective component on the side of the longer conjugate (hereinafter termed the front component) consists of a single element, and that on the side of the shorter conjugate (hereinafter termed the rear component) consists of two simple collective elements. Lenses of this kind are described in Patent Specification No. 224,425.

The object of the present invention is to provide an improved construction whereby increased clearance is obtained between the lens system and the image on the shorter conjugate side. Such abnormal clearance is, for example, necessary to permit a lens of very short focal length to be mounted on the turret of a sub-standard kinematograph camera so as to be used interchangeably with lenses of relatively long focal length.

In lenses of the kind referred to, as hitherto constructed, the focal length of the front component has been substantially less than that of the entire system, and the air spaces between the dispersive component and the front and rear components respectively have been substantially equal. The refractive index of the glass of which the front component is made has in all cases been greater than 1.60.

We attain the object of the present invention primarily by making the focal

[Price 1/-]

length of the front component not less than the focal length of the entire system, and secondarily, in order to maintain definition, we make the said air spaces substantially unequal by placing the dispersive component so that its distance from the outermost surface of the front component is at least 20 per cent greater than its distance from the outermost surface of the rear component.

To further improve the definition, we prefer to make the form of the front component a meniscus, to make the two sides of the dispersive element of unequal curvature, and to place the surface of greater curvature toward the front component.

By effecting the aforesaid improvements in the manner described, we are enabled to use for the front component a glass of lower refractive index and greater stability than any hitherto used for this purpose. This is a substantial improvement in the case of camera lenses which are exposed to the atmosphere and liable to be stained by handling and in other ways.

We now give data for the construction of an example illustrated in section in the accompanying drawing. The notation is that the successive radii of curvature, counting from the front, are called R_1 , R_2 , etc., the sign + denoting that the curve is convex toward the incident light, and - that it is concave toward the same. The axial thicknesses of the elements are denoted by D_1 , D_2 , etc., and the separations of the members by S_1 , S_2 , etc.

The material is defined in terms of the mean refractive index nD , as conventionally employed, followed by the Abbe V number, and by the type number in Messrs. Chance Brothers' optical glass catalogue.

	Equivalent focal length 1".	Aperture F/2.5 "D V	Flat field 50° No.
	$R_1 + 0.583$		
5	$D_1 = 0.07$	1.5732	51.9
	$R_2 + 6.42$		
	$S_1 = 0.2$	1	
	$R_3 - 0.457$		
	$D_2 = 0.03$	1.651	33.7
10	$R_4 + 0.642$		
	$S_2 = 0.083$	1	
	$R_5 + 2.125$		
	$D_3 = 0.06$	1.6252	56.1
	$R_6 - 0.825$		
	$S_3 = 0.01$	1	
15	$R_7 \quad \infty$		
	$D_4 = 0.06$	1.6136	55.8
	$R_8 - 0.517$		
			3265

Clearance between R_8 and the focal plane for an object infinitely distant from $R_1 = 0.88$.

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 lens of the kind referred to, in which the focal length of the front component is not less than the focal length of the entire system.

2. A lens as claimed in Claim 1, in which the distance of the dispersive component from the outermost surface of the front component is at least 20 per cent greater than its distance from the outermost surface of the rear component.

3. A lens as claimed in Claim 1 or Claim 2, in which the surfaces of the dispersive component are of unequal

curvature and the surface of greater curvature is turned towards the front component.

4. A lens as claimed in any of the preceding Claims, in which the form of the front component is a meniscus.

5. A lens as claimed in any of the preceding claims in which the front component has an index of refraction less than 1.60.

Dated the 15th day of October, 1931.

HORACE WILLIAM LEE.

KAPELLA LIMITED.

The Common Seal of Kapella Limited was hereunto affixed in the presence of:—

WM. TAYLOR,

Director.

G. STAFFORD,

Secretary.

[This Drawing is a full-size reproduction of the Original]

