

# PATENT SPECIFICATION



Application Date: Oct. 12, 1927. No. 27,031 / 27.

298,769

Complete Left: July 12, 1928.

Complete Accepted: Oct. 18, 1928.

## PROVISIONAL SPECIFICATION.

### Improvements in Lenses.

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 to be as follows:—

5 The present invention relates to extremely large aperture lenses of the type described in the Specification of Letters Patent No. 157,040 where two  
10 meniscus lenses of dispersive power are placed between two meniscus lenses of collective power.

15 In the specification referred to, it was shown that it was possible to construct a lens having an aperture of F/2 and flat field of 50° by using doublet dispersive components with the proper choice of glass.

20 In order to construct a system of larger aperture (F/1.5), the dispersive meniscus components are, in the present invention,

made triple, the elements of each of the triple components consisting of a dispersive element of glass of high refractive index cemented between a dispersive element of glass of lower refractive index on the side toward the diaphragm, and a double convex element, also of glass of lower refractive index, on the side remote from the diaphragm. 25 30

Dated the 11th day of October, 1927.

HORACE WILLIAM LEE,  
KAPELLA LIMITED,

The common seal of Kapella Limited was hereunto affixed in the presence of:—

WM. TAYLOR,  
A. WARMISHAM,

Directors.

T. E. HUDSON,

Secretary.

## COMPLETE SPECIFICATION.

### Improvements in Lenses.

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:—

35 The present invention relates to extremely large aperture lenses of the type described in the Specification of Letters Patent No. 157,040 where two meniscus lenses of dispersive power are placed between two meniscus lenses of collective power.  
40 45

In the specification referred to, it was shown that it was possible to construct a lens having an aperture of F/2 and flat field of 50° by using doublet dispersive components with the proper choice of glass.

50 In order to construct a system of larger aperture (F/1.5), the dispersive meniscus  
[Price 1/-]

components are, in the present invention, made triple, the elements of each of the triple components consisting of a dispersive element of glass of high refractive index cemented between a dispersive element of glass of lower refractive index on the side toward the diaphragm, and a double convex element, also of glass of lower refractive index, on the side remote from the diaphragm. 55 60

Data of a lens made according to this invention, corrected for spherical and chromatic aberrations, coma, astigmatism, curvature of the field and distortion, and suitable for use in photography, cinematography, micrography and the like, are appended; the diagram shews the form of the lens. The radii, thicknesses and separations are given in terms of the focal length of the system. The numbers after the specification of the optical properties of the glass used are those in the catalogue of Messrs. Chance Bros. & Co. Ltd., 75

	Radii.	Thicknesses and Separations.		$n$ D	V	
	$R_1 + 1.10$	$D_1$	.084	1.616	59.5	No. 3465
5	$R_2 - 6.97$	$S_1$	.01	1.		
	$R_3 + .53$	$D_2$	.18	1.5837	56.1	7472
10	$R_4 - .81$	$D_3$	.02	1.6501	33.6	5093
	$R_5 \infty$	$D_4$	.02	1.5523	51.4	1078
	$R_6 + .38$	$S_2$	.20	1.		
15	$R_7 - .39$	$D_5$	.02	1.5523	51.4	1078
	$R_8 \infty$	$D_6$	.02	1.6715	32.3	3994
20	$R_9 + .45$	$D_7$	.18	1.6126	56.7	1453
	$R_{10} - .51$	$S_3$	.01	1.		
	$R_{11} + 3.9$	$D_8$	.07	1.616	59.5	3465
25	$R_{12} - .88$					

Aperture F/1.5. Flat field 50°.

The radius is reckoned positive when convex to the oncoming light.

30 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:—

35 A flat-field lens system for photography, kinematography, micrography and the like, corrected for spherical and chromatic aberrations, coma, astigmatism and distortion, consisting of two simple collective elements enclosing two meniscus dispersive components placed with their concavities face to face, each  
40 dispersive component comprising three elements cemented together, a dispersive element of glass of high refractive index being placed between a dispersive ele-

ment of glass of lower refractive index on the side towards the other dispersive component and a double convex element, also of glass of lower refractive index, on the side towards the outer simple collective element.

Dated the 10th day of July, 1928.

HORACE WILLIAM LEE,  
KAPELLA LIMITED,

The common seal of Kapella Limited was hereunto affixed in the presence of:—

WM. TAYLOR,  
A. WARMISHAM,  
Directors.  
T. E. HUDSON,  
Secretary.

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

