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PATENT SPECIFICATION



Application Date: Dec. 21, 1934. No. 36634/34. **427,008**

(Patent of Addition to No. 377,532: dated Nov. 14, 1931.)

Complete Specification Accepted: April 12, 1935.

COMPLETE SPECIFICATION

Improvements in Lenses for Photography and the like

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

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ERRATUM

SPECIFICATION No. 427,008.

In the heading on page 1, for "377,532" read "377,537"

THE PATENT OFFICE,
May 15th, 1935.

30 We find, however, that lenses of such large aperture and wide angle as have been attained by the said invention, when used for projection, are liable to have the cement between said contact surfaces damaged by the heat of the projection lamp; and the object of the present invention is. 35 while dispensing with such cement, to retain and ensure the necessary exact corre-

axial thicknesses of the elements are noted by D_1, D_2 , etc., and the separations 65 of the components by S_1, S_2 , etc.
The material is defined in terms of the mean refractive index n_D , as conventionally employed, followed by the type number in Messrs. Chance Brothers' optical glass catalogue of 1934. The Abbe V 70 number is also given:—

[Price 1/-]

427 63 C

Price 75p

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Improvements in Lenses for Photography and the like

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 described in our patent specification No. 377,537 and comprising two separate members each comprising three elements of which one is dispersive and the other two collective, each dispersive element being combined with one of said collective elements to form a meniscus dispersive component, said components being placed with their concave surfaces facing one another, the remaining two collective elements being outermost, one at each end of the system.

In that specification we described each meniscus dispersive component as comprising two elements with their two adjacent surfaces in contact. The ordinary object of putting such surfaces in contact is that they may be cemented together. We find, however, that lenses of such large aperture and wide angle as have been attained by the said invention, when used for projection, are liable to have the cement between said contact surfaces damaged by the heat of the projection lamp; and the object of the present invention is, while dispensing with such cement, to retain and ensure the necessary exact corre-

lation of the two elements in each case, to make the elements such that they may be separately cleaned and re-assembled with less liability to damage or displacement by any small particle of dirt between their surfaces. This we accomplish by making the adjacent surfaces of the two elements such that they are in contact at their peripheral edges only, and include between them an air space of collective meniscus form. This entails modifications of the curvatures of other of the lens surfaces, particularly of the surfaces numbered 5, 6 and 8 in the drawings and data contained in the aforesaid specification, in order to maintain the corrections; and we now give data for the construction of a lens according to this invention embodying such modifications. These will be understood by reference to the accompanying drawing which shows, in section, a lens system according to the invention. 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 towards 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 components by S_1 , S_2 , etc.

The material is defined in terms of the mean refractive index n_D , as conventionally employed, followed by the type number in Messrs. Chance Brothers' optical glass catalogue of 1934. The Abbe V number is also given:—

[Price 1/-]

Price 75/-

EXAMPLE.						
	Equivalent Radii.	focal length	Thickness.	Separation.	"D.	Aperture f/2. V. No.
R ₁	+ .765	D ₁	.081		1.610	53.3 610533
R ₂	+ 3.948			S ₁ .005		
R ₃	+ .401	D ₂	.15		1.615	56.1 615562
R ₄	+ 1.035			S ₂ .001		
R ₅	+ 1.045	D ₃	.043		1.6134	36.9 613369
R ₆	+ .2575			S ₃ .22		
R ₇	- .316	D ₄	.045		1.6469	33.7 648338
R ₈	+ .495			S ₄ .0015		
R ₉	+ .500	D ₅	.157		1.6437	48.3 645483
R ₁₀	- .4165			S ₅ .005		
R ₁₁	+ 1.4	D ₆	.081		1.6234	56.3 623562
R ₁₂	- 1.01					

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. Lenses as described and claimed in British patent specification No. 377,537, modified by the introduction, between each dispersive element and the collective element next thereto, of an air-space having the form of a collective meniscus lens.
2. A lens as claimed in claim 1, in which each dispersive element is in con-

tact at its peripheral edge with the collective element adjacent thereto. 15

Dated the twentieth day of December, 1934.

HORACE WILLIAM LEE.
KAPELLA LIMITED.

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

J. RONALD TAYLOR, Director.
G. STAFFORD, Secretary.

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

