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PATENT SPECIFICATION 746,201

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COMPLETE SPECIFICATION.

Improvement in Lenses.

We, J. H. DALLMEYER LIMITED, a British Company, BERTRAM LANGTON and PETER WILLIAM HUNT, both British Subjects, and all of Church End Works, Willesden, London, N.W.10, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement :—

The invention relates to large aperture lenses suitable for photographic and cinematograph and projection purposes, comprising two compound negative meniscus components placed between two single positive elements in such a way that the concave surfaces of the negative components are adjacent to and facing the iris diaphragm.

The purposes of the present invention are to increase the angular field and still obtain a high degree of correction for all aberrations, to obtain the aperture of F/1.9 and to improve the resistance to atmospheric attack.

In the objective according to the present invention we achieve these results by placing two compound negative meniscus doublet components between two single positive elements with the concave surfaces of the negative elements of the negative components adjacent to and facing the diaphragm. The components are unsymmetrical about the central diaphragm.

The same glass is used in all the four positive elements and has a higher refractive index than that used in the two negative elements which are also made of the same glass as each other, and the V value of the glass used for the positive elements does not exceed the V value of the glass used for the negative elements by more than 25.

The radius of curvature of the internal contact surface of the front negative meniscus component is greater than .7 of the focal length of the objective, and the focal length of the front negative component is less than half the focal length of the back negative component, while the focal length of the back positive element is less than that of the front positive element.

To obtain a large angular field adequately illuminated the separation of the two negative components is restricted to not more than .47 of the vertex length of the objective, and we increase the clear aperture of the back element. At the same time to obtain a high state of correction of the aberrations we use a glass of very high refractive index and V value for all four positive elements. This glass has better weathering qualities and is therefore more resistant to atmospheric attack than the Dense Barium Crown usually employed in this type of objective.

Numerical data of a convenient practical example illustrated in the accompanying drawing of the objective according to the invention are given in the following table in which the radii of curvature are designated by R_1, R_2 . . . counting from the front, the positive sign indicating that the surface is convex towards the front and the negative sign that it is concave to the front. The thickness of each individual element along the axis is denoted by T_1, T_2 . . . and the axial air spaces between the components by S_1, S_2 . . . . The table also gives the mean refractive index and V value of each element.

[*Price* 3*s.* 0*d.*]

Equivalent Focal Length = 1.0″	Field 63°	Glass	Aperture F/1.9	
Radii.	Thickness.	Separation.	N*d*.	V.
R_1 = .5248				
	T_1 = .086		1.6910	54.8
R_2 = 1.347				
		S_1 = .008		
R_3 = .4153				
	T_2 = .086		1.6910	54.8
R_4 = .8895				
	T_3 = .020		1.6535	33.5
R_5 = .2722				
		S_2 = .220		
R_6 = − .2947				
	T_4 = .020		1.6535	33.5
R_7 = − .7709				
	T_5 = .100		1.6910	54.8
R_8 = − .3786				
		S_3 = .025		
R_9 = 7.040				
	T_6 = .080		1.6910	54.8
R_{10} = − .7880				

An objective as described above may have a field of 63° with an aperture of F/1.9 while producing an image well corrected for all aberrations.

What we claim is :—

1. An objective consisting of two compound negative meniscus doublet components placed between two single positive elements in such a way that the concave sides of the negative elements of the negative components are adjacent to and facing the diaphragm, and in which the components are unsymmetrical about the central diaphragm and the refractive index of all the positive elements is greater than the refractive index of both the negative elements, and in which all the positive elements are made of the same type of glass, also both negative elements are made of the same type of glass, and the radius of curvature of the internal contact surface of the front negative meniscus component is greater than .7 of the focal length of the objective.

2. An objective as claimed in the preceding claim in which type of glass used in the positive elements is more resistant to atmospheric corrosion than Dense Barium Crown usually employed in this type of objective.

3. An objective as claimed in Claims 1 and 2 in which the refractive index of the positive elements is greater than 1.65.

4. An objective as claimed in any of the preceding claims which has a field of 63° at an aperture of F/1.9.

5. An objective substantially as described herein with reference to the accompanying numerical data and drawing.

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PROVISIONAL SPECIFICATION.

Improvement in Lenses.

We, J. H. DALLMEYER LIMITED, a British Company, BERTRAM LANGTON and PETER WILLIAM HUNT, both British Subjects, and all of Church End Works, Willesden, London, N.W.10, do hereby declare this invention to be described in the following statement :—

The invention relates to lenses suitable for photographic, cinematographic and projection purposes, comprising two compound meniscus components placed between two single positive elements in such a way that the concave surfaces of the negative meniscus components are adjacent and enclose the iris diaphragm. The system is corrected for spherical aberration, coma, astigmatism, distortion, curvature of field and chromatic aberration. The principal purpose of the invention is to provide a very large field together with a large aperture and still obtain a high degree of correction for the usual aberrations.

According to our invention we achieve our aims by using glass of very high refractive index and V value for the positive elements.

This enables us to increase the clear aperture of the rear element and so obtain a larger field and still retain adequate correction for the oblique aberrations.

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746,201 COMPLETE SPECIFICATION
1 SHEET

This drawing is a reproduction of the Original on a reduced scale.