

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ABILITY OPTO-ELECTRONICS TECHNOLOGY CO., LTD,

Petitioner,

v.

LARGAN PRECISION CO., LTD.,

Patent Owner.

IPR2020-01339

Patent No. 8,988,796 B1

Before MINN CHUNG, NORMAN H. BEAMER,
and JOHN D. HAMANN, *Administrative Patent Judges*.

BEAMER, *Administrative Patent Judge*.

DECISION

Granting Institution of *Inter Partes* Review

35 U.S.C. § 314

I. INTRODUCTION

On July 21, 2020, Ability Opto-Electronics Technology Co., Ltd. (“Petitioner”) filed a Petition (“Pet.”) pursuant to 35 U.S.C. §§ 311–319 to institute an *inter partes* review of claims 1–11 and 15–25 of U.S. Patent No. 8,988,796 B1 (“the ’796 patent”). Paper 1. Petitioner also filed the Declaration of William T. Plummer, Ph.D. in support of the Petition. Ex. 1007 (“Plummer Decl.”). On November 23, 2020, Largan Precision Co., Ltd. (“Patent Owner”) filed a Preliminary Response (“Prelim. Resp.”). Paper 7. Pursuant to our authorization, Petitioner and Patent Owner subsequently filed reply and sur-reply briefs, respectively, further addressing the issue of discretion under 35 U.S.C. § 314(a). Papers 8, 9 (“Reply”; “Sur-Reply”).

The standard for instituting an *inter partes* review is set forth in 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted unless the information presented in the Petition and any preliminary response shows that “there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.”

For the reasons explained below, we institute an *inter partes* review as to all challenged claims and on all grounds raised in the Petition.

II. BACKGROUND

A. The ’796 Patent

The ’796 patent, titled “Image Capturing Lens System, Imaging Device And Mobile Terminal,” was filed on December 13, 2013, issued on

March 24, 2015, and specifies a foreign application priority date of October 29, 2013. Ex. 1001, codes (54), (22), (45), (30).

The '796 patent describes several embodiments of a compact image capturing lens system with four lens elements suitable for use in a mobile terminal. *Id.* at Abstr., 1:13–16. Figure 1A of the '796 patent is reproduced below.

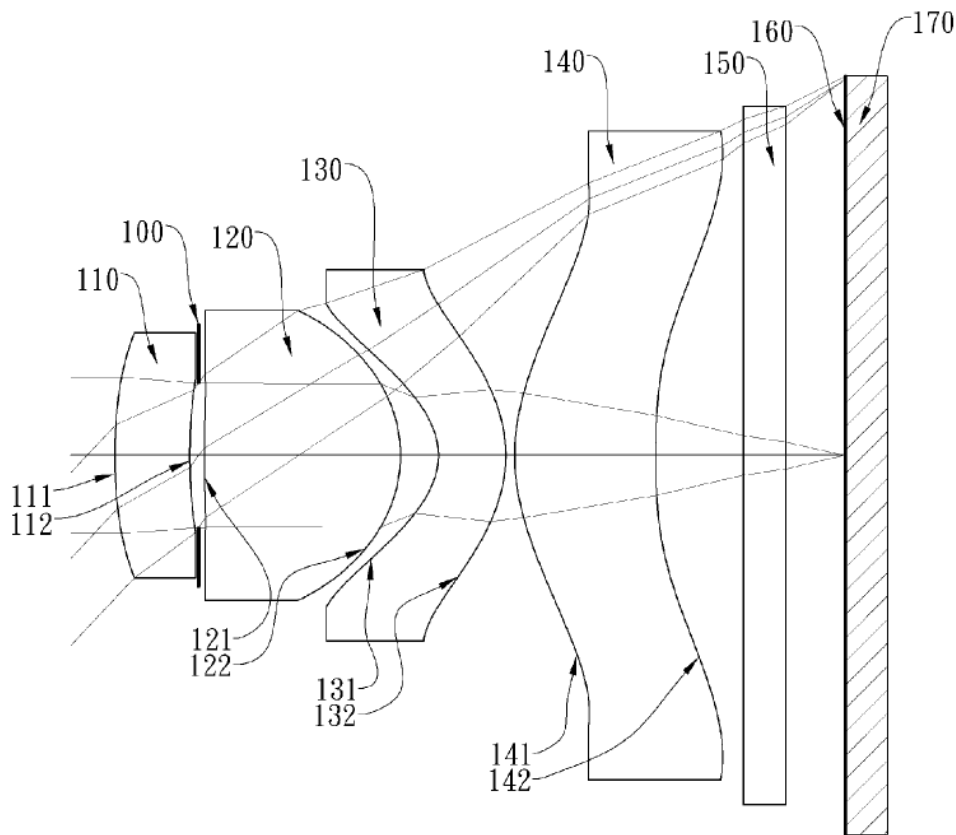


Fig. 1A

Figure 1A is a schematic view of one embodiment of the compact image capturing lens system, depicting (i) first lens 110 with convex object-side surface 111 and concave image-side surface 112; (ii) aperture stop 100; (iii) second lens 120 with convex object-side surface 121 and convex image-side surface 122; (iv) third lens 130 with concave object-side surface 131 and convex image-side surface 132; (v) fourth lens 140 with convex object-

side surface 141 and concave image-side surface 142; (vi) IR-cut filter 150; and (vii) image sensor 170. *Id.* at 7:15–50. In addition, image-side surface 142 of fourth lens 140 has a convex shape in the off-axis region. *Id.* at 7:43–45.

Table 1 of the '796 patent is reproduced below.

TABLE 1

Embodiment 1								
f = 1.17 mm, Fno = 2.20, HFOV = 46.7 deg.								
Surface #		Curvature Radius	Thickness	Material	Index	Abbe #	Focal Length	
0	Object	Plano	Infinity					
1	Lens 1	1.666 ASP	0.256	Plastic	1.650	21.4	9.56	
2		2.139 ASP	0.031					
3	Ape. Stop	Plano	0.019					
4	Lens 2	5.712 ASP	0.671	Plastic	1.544	55.9	0.82	
5		-0.464 ASP	0.130					
6	Lens 3	-0.228 ASP	0.230	Plastic	1.634	23.8	-1.06	
7		-0.480 ASP	0.030					
8	Lens 4	0.679 ASP	0.483	Plastic	1.535	55.7	1.52	
9		3.062 ASP	0.300					
10	IR-cut filter	Plano	0.145	Glass	1.517	64.2	—	
11		Plano	0.204					
12	Image	Plano	—					

Note:
Reference wavelength is 587.6 nm (d-line).

Table 1 specifies values of various optical parameters for the components of Figure 1A — *viz.*, for each surface number, the table specifies the radius of curvature, thickness, type of material, index of refraction, Abbe number, and focal length. *Id.* at 9:5–6, 9:55–58; *see* Plummer Decl. ¶ 39.

The surfaces of the lenses of the embodiments of the '796 patent are “aspheric,” meaning that they do not conform to the simple shape of the surface of a sphere, but rather are defined via a more complex surface equation. Plummer Decl. ¶ 40. In particular, the embodiments of the '796

patent specify that the lens surfaces are defined by an equation described and set forth below.

The equation of the aspheric surface profiles of the aforementioned lens elements of the 1st embodiment is expressed as follows:

$$X(Y) = (Y^2 / R) / (1 + \text{sqr}(1 - (1 + k) \times (Y / R)^2)) + \sum_i (A_i) \times (Y^i),$$

where,

X is the relative distance between a point on the aspheric surface spaced at a distance Y from the optical axis and the tangential plane at the aspheric surface vertex on the optical axis;

Y is the vertical distance from the point on the aspheric surface to the optical axis;

R is the curvature radius;

k is the conic coefficient; and

A_i is the i-th aspheric coefficient.

Ex. 1001, 7:52–8:2; *see* Plummer Decl. ¶ 40. The above excerpt from the '796 patent sets forth an equation for aspheric surfaces and defines the variables and coefficients used in that formula. Table 2 of the '796 patent is reproduced below.

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