

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
Petitioner,

v.

COREPHOTONICS, LTD.,
Patent Owner.

IPR2020-00878
Patent 10,330,897 B2

Before BRYAN F. MOORE, MONICA S. ULLAGADDI, and
JOHN R. KENNY, *Administrative Patent Judges*.

MOORE, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining Some Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

Apple, Inc. (“Petitioner”) requested an *inter partes* review (“IPR”) of claims 1–6 and 8–30 (the “challenged claims”) of U.S. Patent No.

IPR2020-00878
Patent 10,330,897 B2

10,330,897 B1 (Ex. 1001, “the ’897 patent”). Paper 1 (“Petition” or “Pet.”). Corephotonics, Ltd. (“Patent Owner”) did not file a Preliminary Response.

On November 3, 2020, we instituted trial. Paper 7 (“Inst. Dec.” or “Decision to Institute”). Patent Owner filed a Response. Paper 12 (“PO Resp.”). Petitioner filed a Reply. Paper 14 (“Pet. Reply”). Patent Owner filed a Sur-Reply. Paper 19 (“Sur-Reply”). An oral argument was held on June 9, 2021, and a transcript was entered into the record. Paper 28 (“Tr.”).

We have jurisdiction to conduct this *inter partes* review under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons discussed herein, we determine that Petitioner has shown, by a preponderance of the evidence, that claims 1, 2, 4–6, 9–15, 17, 18, 20–23, and 25–29 of the ’897 patent are unpatentable and that Petitioner has not shown, by a preponderance of the evidence, that claims 3, 8, 16, 19, 24, and 30 of the ’897 patent are unpatentable.

II. BACKGROUND

A. *The Challenged Patent (Ex. 1001)*

The ’897 patent issued on June 25, 2019, based on an application filed May 10, 2018, which claimed priority back to a provisional application filed Nov. 19, 2017. Ex. 1001, codes (22), (45), (63). The ’897 patent concerns an optical lens assembly with five lens elements. *Id.* at code (57). Figure 1A of the ’897 patent is reproduced below.

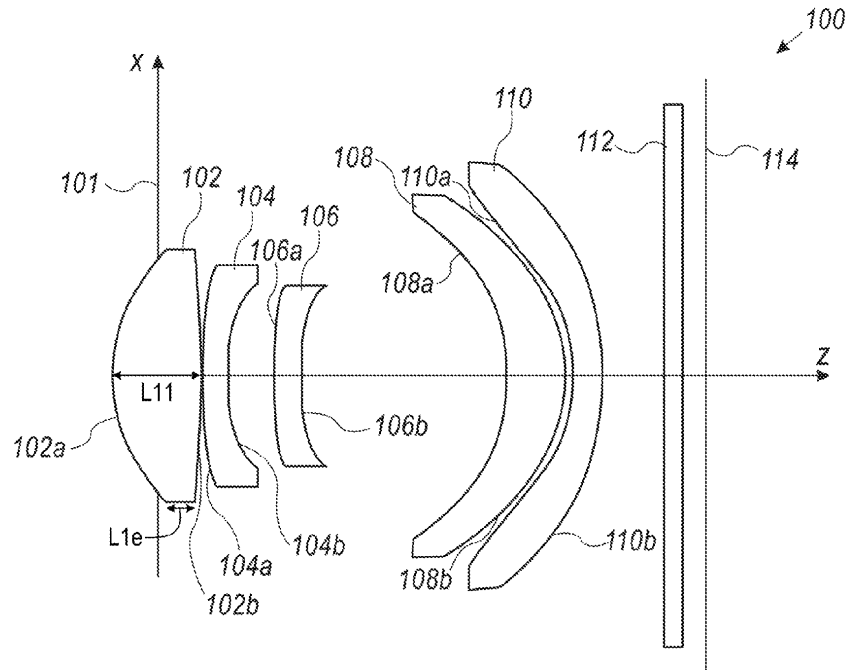


FIG. 1A

Figure 1A of the '897 patent illustrates an arrangement of lens elements in a first embodiment of an optical lens system.

In order from an object side to an image side, optical lens assembly 100 comprises: optional stop 101; first plastic lens element 102 with positive refractive power having a convex, object-side surface 102a; second plastic lens element 104 with negative refractive power having a meniscus, convex, object-side surface 104a, with an image side surface marked 104b; third plastic lens element 106 with negative refractive power having a concave, object-side surface 106a, with an inflection point and a concave image-side surface 106b; fourth plastic lens element 108 with positive refractive power having a positive meniscus with a concave, object-side surface 108a and an image-side surface marked 108b; fifth plastic lens element 110 with negative refractive power having a negative meniscus with a concave, object-side surface 110a and an image-side surface marked 110b. *Id.* at 3:24–41.

In Table 1, reproduced below, the '897 patent discloses radii of curvature, R , for the lens elements, lens element thicknesses and/or distances between each of the lens elements, and a refractive index, Nd , for each lens element.

TABLE 1

#	Comment	Radius R [mm]	Distances [mm]	Nd/Vd	Diameter [mm]
1	Stop	Infinite	-0.466		2.4
2	L11	1.5800	0.894	1.5345/57.095	2.5
3	L12	-11.2003	0.020		2.4
4	L21	33.8670	0.246	1.63549/23.91	2.2
5	L22	3.2281	0.449		1.9
6	L31	-12.2843	0.290	1.5345/57.095	1.9
7	L32	7.7138	2.020		1.8
8	L41	-2.3755	0.597	1.63549/23.91	3.3
9	L42	-1.8801	0.068		3.6
10	L51	-1.8100	0.293	1.5345/57.095	3.9
11	L52	-5.2768	0.617		4.3
12	Window	Infinite	0.210	1.5168/64.17	3.0
13		Infinite	0.200		3.0

Table 1 of the '897 patent sets forth optical parameters for the optical lens assembly.

Id. at 4:35–50. The '897 patent discloses that, in Table 1, reproduced above

[T]he distances between various elements (and/or surfaces) are marked “L mn ” (where m refers to the lens element number, $n=1$ refers to the element thickness and $n=2$ refers to the air gap to the next element) and are measured on the optical axis z , wherein the stop is at $z=0$. Each number is measured from the previous surface. Thus, the first distance -0.466 mm is measured from the stop to surface 102 a , **the distance L11 from surface 102 a to surface 102 b (i.e. the thickness of first lens element 102) is 0.894 mm**, the gap L12 between surfaces 102 b and 104 a is 0.020 mm, the distance L21 between surfaces 104 a and 104 b (i.e. thickness d_2 of second lens element 104) is 0.246 mm, etc. Also, $L21=d_2$ and $L51=d_5$.

Id. at 4:14–50.

Challenged claims 1 and 17 are independent. Challenged claims 2–6 and 8–16 depend directly or indirectly from claim 1 and challenged claims 18–30 depend directly or indirectly from claim 17. Independent claim 1 is reproduced below.

1. A lens assembly, comprising:

a plurality of lens elements arranged along an optical axis and spaced apart by respective spaces,

wherein the lens assembly has an effective focal length (EFL), a total track length (TTL) of 6.5 millimeters or less and a ratio $TTL/EFL < 1.0$,

wherein the plurality of lens elements includes, in order from an object side to an image side, a first group comprising lens elements L_{1_1} , L_{1_2} and L_{1_3} with respective focal lengths f_{1_1} , f_{1_2} and f_{1_3} and a second group comprising lens elements L_{2_1} and L_{2_2} ,

wherein the first and second groups of lens elements are separated by a gap that is larger than twice any other gap between lens elements,

wherein lens element L_{1_1} has positive refractive power and lens element L_{1_2} has negative refractive power and

wherein lens elements L_{2_1} and L_{2_2} have opposite refractive powers.

Id. at 8:21–36.

B. Asserted Grounds of Unpatentability

Petitioner advances the following challenges supported by the declaration of Dr. José Sasián (Ex. 1003).

Claim(s) Challenged	35 U.S.C. §¹	Reference(s)/Basis
1, 4, 9–15, 17, 20, 25–29	102	U.S. Patent No. 9,128,267 to Ogino et al. (“Ogino,” Ex. 1005)

¹ The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (September 16, 2011) (“AIA”), included revisions to 35 U.S.C. §§ 102 and 103 that became effective on March 16, 2013. Because the ’897 patent issued from an application filed after March 16, 2013, we apply the AIA

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