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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte MARK THOMAS JOHNSON, PETRUS THEODORUS JUTTE,
BASTIAAN WILHELMUS MARIA MOESKOPS, and
RIEKO VERHAGEN

Appeal 2018-008010
Application 14/387,858
Technology Center 3700

Before STEFAN STAICOVICI, FREDERICK C. LANEY, and
ARTHUR M. PESLAK, *Administrative Patent Judges*.

PESLAK, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant¹ appeals from the Examiner's decision to reject claims 1–11. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

¹ We use the word Appellant to refer to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as the assignee of record Koninklijke Philips N.V. Appeal Br. 1.

CLAIMED SUBJECT MATTER

Appellant's invention is directed to a light based skin treatment device. Claim 1, which is the only independent claim, is reproduced below:

1. A light based skin treatment device comprising:

a light source for providing a pulsed incident light beam having a predetermined power and pulse duration for treating a skin by laser induced optical breakdown (LIOB) of hair or skin tissue,

a transparent exit window for allowing the incident light beam to exit the device, and

an optical system for focusing the incident light beam into a focal spot in the hair or skin tissue outside the skin treatment device,

wherein the exit window comprises an outer surface having optical scattering properties such that, for the predetermined power and pulse duration of the incident light beam,

when the outer surface is in contact with a medium having a refractive index equal to a refractive index of the exit window, a dimension of the focal spot is sufficiently small for a power density of the incident light beam in the focal spot to exceed a threshold value for inducing a LIOB phenomenon in the focal spot, and

when the outer surface is in contact with a medium having a refractive index equal to a refractive index of air, a dimension of the focal spot is sufficiently large for a power density of the incident light beam in the focal spot not to exceed the threshold value for inducing a LIOB phenomenon in the focal spot.

REFERENCES

The prior art relied upon by the Examiner is:

Name	Reference	Date
Verhagen '490	US 2010/0063490 A1	Mar. 11, 2010
Grove	US 2009/0204109 A1	Aug. 13, 2009
Verhagen '444	US 2012/0123444 A1	May 17, 2012
"The Physics of Diffraction Gratings" (Thermo RGL, 2002)("Thermo RGL")		

REJECTIONS

- 1) The Examiner rejected claims 1–3 under 3 U.S.C. § 103(a) as unpatentable over Verhagen '490.
- 2) The Examiner rejected claims 4–6 and 8–10 under 35 U.S.C. § 103(a) over Verhagen '490 and Grove.
- 3) The Examiner rejected claim 7 under 35 U.S.C. § 103(a) over Verhagen '490, Grove, and Thermo RGL.
- 4) The Examiner rejected claim 11 under 35 U.S.C. § 103(a) over Verhagen '490 and Verhagen '444.

OPINION

Rejection 1 – Obviousness over Verhagen '490

The Examiner finds that Verhagen '490 discloses most of the limitations of independent claim 1 except for the limitation:

when the outer surface is in contact with a medium having a refractive index equal to a refractive index of air, a dimension of the focal spot is sufficiently large for a power density of the incident light beam in the focal spot not to exceed the threshold value for inducing a LIOB phenomenon in the focal spot.

Final Act. 5–6 (emphasis omitted). Nonetheless, the Examiner finds that:

from physics we know that when light passes from a denser medium to a lighter medium e.g. from glass to air it diverges

instead of converging . . . as a result when the contact medium have some refractive index of air which is lower than the refractive index of the exit window the focal spot of incident laser cannot converge to a small area rather it covers a large area and the energy will not be enough to induce LOIB phenomenon.

Id. at 6. The Examiner concludes that it would have been obvious to one of ordinary skill in the art “to know the optical characteristics of light passing from a denser medium to a lighter medium like air [in that] the ray will [be] refracted further away from normal and this phenomenon will prevent light[] from Verhagen’s device to focus in a small spot where energy density will be high.” *Id.* at 6–7.

Appellant contends that the Examiner’s reliance on “general physics” is not sufficient because “the issue is a matter of how physics is being applied by” Verhagen ’490. Appeal Br. 11. According to Appellant because exit window 14 of Verhagen ’490 is flat, Verhagen ’490 does not satisfy the requirement of claim 1 that when the outer surface of the exit window “is in contact with a medium having a refractive index equal to a refractive index of air” that the power density in the focal spot will not exceed the threshold value for inducing the LIOB phenomenon. *Id.* at 13. In the Answer, the Examiner maintains the rejection, but does not squarely address Appellant’s argument that more than general physics is required to support the rejection. For the following reasons, we do not sustain the rejection of claim 1.

Appellant’s Specification provides that:

Ideally, the LIOB is always generated in the hair or skin tissue. However, in real operation not all hairs or skin tissue are correctly hit and LIOB is generated either in the applied immersion fluid, e.g., water, or in air, if e.g. an air bubble is present. In an extensive series of measurements the inventors have established that the damage to the exit window is far more

severe when the LIOB is generated in air than when the LIOB is generated in immersion fluid or in the target position in the hair or skin.

Spec. 3:23–28 (emphasis added). The Specification also discloses that when a non-flat exit window 41 is utilized, then the light passing through the exit window will be sufficiently diffused such that LIOB will not occur when the exit window borders on air. *Id.* at 9:1–11, Fig. 3a. Although we appreciate the Examiner’s reference to the general principle that light waves passing from a first medium to a second medium that is less dense than the first medium will be refracted, claim 1 requires more than merely showing that the optical scattering properties of the recited exit window result in refraction of the light when passing into “a medium having a refractive index equal to a refractive index of air.” Rather, the claim requires that for “a pulsed incident light beam having a predetermined power and pulse duration” that “a dimension of the focal spot is sufficiently large for a power density of the incident light beam in the focal spot not to exceed the threshold value for inducing LIOB phenomenon in the focal spot.”

As noted above, Appellant’s Specification discloses that LIOB phenomenon can in fact be generated in air so merely stating that the refractive properties of air disperse the light beam does not establish that Verhagen ’490’s exit window has the optical scattering properties recited in claim 1. As the rejection is based on an erroneous factual finding, the conclusion of obviousness cannot stand. *See In re Warner*, 379 F.2d 1011, 1017 (CCPA 1967) (holding that “[t]he legal conclusion of obviousness must be supported by facts. Where the legal conclusion is not supported by facts it cannot stand.”). Therefore, we do not sustain the rejection of claim 1 or claims 2–3 which depend from claim 1.

Rejections 2–4

Claims 4–11 depend directly or indirectly from claim 1. Appeal Br. 24–25 (Claims App.). The Examiner does not rely on the additional disclosure from Grove, Verhagen '444, or Thermo RGL to cure the deficiencies in the rejection of claim 1. Final Act. 7–11. For the reasons discussed above in connection with claim 1, we do not sustain the rejections of claims 4–11.

CONCLUSION

The Examiner's rejection of claims 1–11 is reversed.

More specifically,

DECISION SUMMARY

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1–3	103(a)	Verhagen '490		1–3
4–6, 8–10	103(a)	Verhagen '490, Grove		4–6, 8–10
7	103(a)	Verhagen '490, Grove, Thermo RGL		7
11	103(a)	Verhagen '490, Verhagen '444		11
Overall Outcome:				1–11

REVERSED