UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Case IPR2017-00046
Patent No. 6,685,730 B2

December 18, 2017 Oral Hearing

Sienna0046DX01

Six Instituted Grounds

1. Claims 57–59 under 35 U.S.C. § 102(b) as unpatentable over Tankovich III;

2. Claims 58 and 59 under 35 U.S.C. § 102(e) as unpatentable over Anderson I;

3. Claim 59 under 35 U.S.C. § 102(b) as unpatentable over Tankovich II;

4. Claims 58 and 59 under 35 U.S.C. § 103(a) as unpatentable over Tankovich I and Anderson I;

5. Claims 58 and 59 under 35 U.S.C. § 103(a) as unpatentable over Tankovich II and Anderson I; and

6. Claim 57 under 35 U.S.C. § 103(a) as unpatentable over Tankovich III and Anderson II.

Institution Decision at 36.

‘730 Patent Instituted Claims: 57, 58 and 59

57. A method for reducing wrinkles in tissue comprising the steps of:

delivering nanoparticles that absorb light at one or more wavelengths to the tissue; and

exposing said nanoparticles to light at one or more wavelengths that are absorbed by the nanoparticles.

Ex. 1001 at 20:17-22.

Claim Construction: Nanoparticles

57. A method for reducing wrinkles in tissue comprising the steps of:

delivering nanoparticles that absorb light at one or more wavelengths to the tissue; and

exposing said nanoparticles to light at one or more wavelengths that are absorbed by the nanoparticles.

Ex. 1001 at 20:17-22 (Emphasis added).

Nanoparticles

- Common sense, consistent with the understanding of a PHOSITA, dictates that a "nanoparticle" is a particle whose size is "nano," that is, in the 10^{-9} range of standard length units (e.g., meters).
- The plain and ordinary meaning of the term is confirmed in the dictionary definition of nanoparticles" as "a microscopic particle whose size is measured in nanometers." Ex. 1010 (M-W Dictionary) at 4.

Petition at 9-11; Reply at 6; Ex. 1010 at 4.

Nanoparticles

The inventors of the '730 patent confirm the basic understanding of the meaning of "nanoparticles" by providing an explicit definition:

"As used herein, 'nanoparticle' **is defined as** a particle having dimensions of from 1 to 5000 nanometers, having any size, shape or morphology."

Petition at 10; Reply at 6; Ex. 1001 at 5:62-64 (emphasis added).

Nanoparticles

Board construed “nanoparticle” as:

a “particle having a diameter of from 1 to 5000 nanometers, having any size, shape or morphology.”

Institution Decision at 6.

Nanoparticles

- “Subsequent to the Order instituting Reexamination, Rice filed a second Preliminary Amendment in Reexamination Control No. 90/013,883 amending each of challenged claims 57-59.” POPR at 1 and 2.
- “The claims as amended, now recite the phrase ‘plasmonic nanoparticles’ instead of ‘nanoparticles.’” POPR at 2.

POPR at 1-2.

Patent Owner Improperly Imports Additional Claim Limitations

- Rice's construction of "nanoparticles" appends the additional limitation:

  "that exhibit a plasmon resonance."

- Rice Construction is Wrong:
  - Neither plain meaning nor the specification's **express definition** are limited to plasmon resonance
  - Rice improperly relies on preferred embodiments
  - The '730 patent also states its "nanoparticles may be fullerenes," which are insulating (and thus non-plasmonic) under ordinary circumstances

Reply at 7-8.

‘730 Specification Definition of “nanoparticles” is not limited plasmonic particles

As used herein, “nanoparticle” is defined as a particle having dimensions of from 1 to 5000 nanometers, having any size, shape or morphology. For example, they may be metal colloids such as gold colloid or silver colloid. The nanoparticles may be fullerenes which are available in both nanosphere and nanotube structures.

Ex. 1001 at 5:62-67.

Fullerenes are nonplasmonic

"Under normal conditions fullerenes are insulators."

Ex. 1015 (Monakov) at 8.

Reply at 8 and Ex. 1015 (Monakov).

Rice Expert Agrees

19 A. "Under normal conditions,

20 fullerenes are insulators."

Ex. 1016 (Dmochowski Deposition) at 64:19-20.

Reply at 8 and Ex. 1016 (Dmochowski Deposition) at 64:19-20.

Rice Expert Agrees

24 Q. So if the entire nanoparticle is
25 an insulating material, can it be
plasmonic?
3 A. As I sit here now, I don't see how
4 you could do that because you want to have
5 free-ranging electrons forming a conduction
6 band; and if you lack that, then you -- you
7 can't have plasmonics.

Reply at 8 and Ex. 1016 (Dmochowski Deposition) at 61:24-62:7.

Rice relies on unnamed Preferred Embodiments

"The '730 Patent includes a general definition of 'nanoparticle' (Ex. 1001,Col. 5:62-67); however, the specification of the '730 Patent expressly requires additional limitations to the general meaning of 'nanoparticles' not found in the general definition but apparent from the specification."

POR at 14 and Ex. 1001 at 5: 62-67.

‘730 File History

- ‘730 File History shows that the Examiner allowed patent claims 57, 58 and 59 in the first action

Allowable Subject Matter

Claims 1-58 and 60-65 are allowed.

Ex. 1009 (File History) at 75 (application claim 60 became patent claim 59)

Reply at 9-10 and Ex. 1009 (File History) at 75.

‘730 File History

- ‘730 File History shows that the Examiner rejected application claim 59 in the first action

Claim 59 is rejected under 35 U.S.C. 102(e) as being anticipated by Esenaliev (6,165,440). Esenaliev discloses a method of heating tissue comprising:

delivering nanoparticles that absorb light to tissue to be heated; and

exposing the nanoparticles to light at one or more wavelengths that are absorbed by the nanoparticles (col. 4, lines 8-14, col. 4, line 53-col. 5, line 25 and lines 54-67 and col. 7, lines 1-16).

Ex. 1009 (File History) at 75.

Reply at 9-10 and Ex. 1009 (File History) at 75.

‘730 File History

- No mention of plasmonic behavior in the file history

Rejection of Claim 59 under 35 USC § 102(e)

The Examiner has rejected claim 59 under 35 USC § 102(e) over U.S. Patent 6,165,440 to Esenaliev. While Applicants disagree with the Examiners rejection, Applicants nevertheless have cancelled claim 59 in this response, without prejudice, in order facilitate the prosecution of this application and to place the application in condition for allowance. Applicants reserve the right to file a continuation application in order to demonstrate the patentability of claim 59 and any other claims which Applicants may wish to pursue.

Reply at 9-10 and Ex. 1009 (File History) at 75, 103-104.

Claim Construction: Preamble

57. A method for reducing wrinkles in tissue comprising the steps of:

delivering nanoparticles that absorb light at one or more wavelengths to the tissue; and

exposing said nanoparticles to light at one or more wavelengths that are absorbed by the nanoparticles.

Ex. 1001 at 20:17-22 (Emphasis added).

Preamble Deserves No Patent Weight

- "Generally, the preamble does not limit the claims." *Allen Eng'g Corp. v. Bartell Indus., Inc.*, 299 F.3d 1336, 1346 (Fed. Cir. 2002).
- "[W]here a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention." *Catalina Mktg. Int'l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002).

Reply at 10-11.

Preamble Deserves No Patent Weight

The non-preamble steps of challenged method claims 57, 58 and 59 of the ’730 patent are identical:

“comprising the steps of:

delivering nanoparticles that absorb light at one or more wavelengths to the tissue; and

exposing said nanoparticles to light at one or more wavelengths that are absorbed by the nanoparticles.”

Reply at 13 and Ex. 1001 20: 19-22, 26-29 and 31-34.

Preamble Deserves No Patent Weight

- The non-preamble steps of challenged method claims 57, 58 and 59 of the ’730 patent (“the steps of” delivering nanoparticles … and exposing said nanoparticles to light …”) define a structurally complete invention, and
- the preamble states a mere purpose or intended use for the invention reducing (*i.e.*, “for reducing wrinkles,” “for resurfacing tissue,” and “of ablating tissue”).

Petition at 13-17; Reply at 10-11 and Ex. 1001 20:17, 24 and 30.

Purpose or Intend Use: “for reducing wrinkles”, “for resurfacing” and “for ablating”

- “Although the preambles of the claims provide an antecedent basis for the term ‘tissue’ as recited in the body of the challenged claims, we are not persuaded at this time that the entirety of the preamble is limiting.”
- “[W]e determine that the language ‘for reducing wrinkles,’ ‘for resurfacing,’ and ‘for ablating’ is not limiting and does not provide an antecedent basis for any of the claims.”

Institution Decision at 14.

Claim 59: Ablating Tissue

- Plain and Ordinary Meaning:

"removing or destroying tissue, especially by cutting, abrading or evaporating"

Petition at 11-12; Reply at 11 and Ex. 1010 (Merriam-Webster's Dictionary) at at 3.

Claim Construction: Ablating Tissue

Board adopted a construction similar to Petitioner's for purposes of its Institution Decision:

"remove tissue especially by cutting, abrading or evaporating the tissue."

Institution Decision at 7-8.

Claim Construction: Ablating Tissue

- In response, Rice's argues a new construction for "Ablating Tissue":

  "the targeted destruction of tissue"

- Rice improperly imports limitations ("targeted") from the specification, without any intrinsic or extrinsic evidentiary support

Reply at 11-12.

Claim 58: Resurfacing Tissue

- Plain and Ordinary Meaning:

"removal or minimization of wrinkles or other cosmetic defects"

- Patent owner proposes another construction of a preamble term that imposes the limitation "targeted" without providing any justification for its narrowing construction.

Reply at 12-13.

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Claim 57: Reducing Wrinkles

- Plain and Ordinary Meaning

- Patent owner proposes another construction of a preamble term that imposes the limitation "targeted." without providing any justification for its narrowing construction.

- Rice's expert admits that not all forms of "reducing wrinkles" in fact require matrix remodeling of the dermis, let alone targeted remodeling:

"Q. Does reducing wrinkles always involve
targeted matrix remodeling of the dermis. . . .
A. No."

Reply at 13-14 and Ex. 1016 (Dmochowski Depo) at 66:25-67:10 .

Ground 1: Tankovich III teaches all limitations for claims 57-59

" A method for reducing wrinkles", "A method for resurfacing tissue" and "A method of ablating tissue" Ex. 1001 ('730 patent) at 20: 17, 24 and 30.

- Preamble does not warrant patentable weight

Even so, Tankovich III teaches:

- "A contaminant applied topically can also be used to facilitate laser skin resurfacing. The contaminant is infiltrated beneath the surface layers of the stratum corneum, and then the skin surface bearing the contaminant is illuminated so as to remove the surface layers of the stratum corneum." Ex. 1006 (Tankovich III) at 1:40-46.

Petition at 13-17; Reply at 15-16; Ex. 1007 (Suslick decl.) at ¶ 49 and Ex. 1006 (Tankovich III) at 1:40-46.

Ground 1: Tankovich III teaches all limitations for claims 57-59

- "delivering nanoparticles that absorb light at one or more wavelengths to the tissue" Ex. 1001 ('730 patent) at 20:19-20, 26-27 and 31-32.
- Tankovich III expressly teaches:

"For instance an oil or water-based suspension of carbon particles …that absorb light in the near IR region of the spectrum, can be employed as the externally applied contaminant. . . . As one example, the contaminant can be a suspension of carbon particles in the size range from about 0.2 to about 0.01 micron (carbon black) or in the size range up to about 1 micron." Ex. 1006 (Tankovich III) at 9:66-10:2.

"applied to the skin section prior to irradiation…" Ex. 1006 (Tankovich III) at 10:6-19.

"Next, to shock the hair follicles, the contaminated skin section is illuminated with one or two short pulses of light having a frequency highly absorbed by the contaminant particles. Ex. 1006 (Tankovich III) at 10:20-27.

Petition at 14-19; Reply at 14; Ex. 1007 (Suslick decl.) at ¶ 48 and Ex. 1006 (Tankovich III) at 9:66-10:2 10:6-19 and 10:20-27.

Ground 1: Tankovich III teaches all limitations for claims 57-59

- "delivering nanoparticles that absorb light at one or more wavelengths to the tissue" Ex. 1001 ('730 patent) at 20:19-20, 26-27 and 31-32.
- Tankovich III expressly teaches:

"For instance an oil or water-based suspension of carbon particles …that absorb light in the near IR region of the spectrum, can be employed as the externally applied contaminant. . . . As one example, the contaminant can be a suspension of carbon particles in the size range from about 0.2 to about 0.01 micron (carbon black) or in the size range up to about 1 micron." Ex. 1006 (Tankovich III) at 9:66-10:2.

"applied to the skin section prior to irradiation…" Ex. 1006 (Tankovich III) at 10:6-19.

"Next, to shock the hair follicles, the contaminated skin section is illuminated with one or two short pulses of light having a frequency highly absorbed by the contaminant particles. Ex. 1006 (Tankovich III) at 10:20-27.

Petition at 14-19; Reply at 14; Ex. 1007 (Suslick decl.) at ¶ 48 and Ex. 1006 (Tankovich III) at 9:66-10:2 10:6-19 and 10:20-27.

Ground 1: Tankovich III teaches all limitations for claims 57-59

- "exposing said nanoparticles to light at one or more wavelengths that are absorbed by the nanoparticles." Ex. 1001 ['730 patent] at 20:21-22, 28-29 and 33-34.
- Tankovich III expressly teaches:

"Next, to shock the hair follicles, the contaminated skin section is illuminated with one or two short pulses of light having a frequency highly absorbed by the contaminant particles." Ex. 1006 (Tankovich III) at 10:20-27.

Petition at 14-19; Reply at 14; Ex. 1007 (Suslick decl.) at ¶ 49 and Ex. 1006 (Tankovich III) at 10:20-27.

Ground 1: Tankovich III teaches all limitations for claims 57-59

- Rice's only dispute centers on its proposed narrowing interpretations of "nanoparticles" and preamble terms
- Tankovich III in fact teaches metal nanoparticles (such as copper) which exhibit plasmonic behavior

Ex. 1006 (Tankovich III) at 51:21-24; Ex. 1016 (Dmochowski Depo) at 125:13-126:15; Ex. 1017 (Jain Depo) at 96:12-15; Ex. 2075 (Suslick Depo) at 75:6-77:24.

Reply at 15 and Ex. 1006 (Tankovich III) at 51:21-24.

Ground 2: Anderson I teaches all limitations for claims 58 and 59

"A method for resurfacing tissue" and "A method of ablating tissue" Ex. 1001 ('730 patent) at 20: 24 and 30.

- Preamble does not warrant patentable weight

Even so, Anderson I teaches:

- "Treatments are actually 'cures'—producing a permanent anatomic, microsurgical effect on the skin. This includes skin resurfacing,…." Ex. 1002 (Anderson I) at 1:43-45.
- "[s]elective photothermolysis or controlled skin ablation" Ex. 1002 (Anderson I) at 1:46-47.

Petition at 20, 22-23; Reply at 15; Ex. 1007 (Suslick decl.) at ¶¶ 58 and 61 and Ex. 1002 (Anderson I) at 1:43-47.

Ground 2: Anderson I teaches all limitations for claims 58 and 59

"delivering nanoparticles that absorb light at one or more wavelengths to the tissue" Ex. 1001 ('730 patent) at 20:19-20, 26-27 and 31-32.

Suitable materials useful in the invention include metal oxides, such as aluminum oxide, iron oxides, carbon particles (graphite and amorphous carbon particles) and natural and synthetic chromophores. The term "chromophore" is art recognized and is intended to include those compounds which absorb energy at a given wavelength, often by sites of unsaturation, carbon-oxygen bonds, and/or charged species, or combinations thereof. Suitable chromophoric groups

Ex. 1002 (Anderson I) at 5:47-54.

Petition at 21-22; Reply at 16; and Ex. 1002 (Anderson I) at 5:43-54.

Ground 2: Anderson I teaches all limitations for claims 58 and 59

"delivering nanoparticles that absorb light at one or more wavelengths to the tissue" Ex. 1001 ('730 patent) at 20:19-20, 26-27 and 31-32.

Anderson I states that "[a] sufficient amount of the material infiltrates the psilosebaceous unit." Ex. 1002 (Anderson I) at 4:25-29.

A PHOSITA would understand, from Anderson I's discussion of infiltration of the psilosebaceous unit and/or delivery by liposome encapsulation technology, that the disclosed energy activatable material, including "carbon particles," should be of size in the range from 1 to 5000 nanometers. Ex. 1007 (Suslick decl.) at ¶ 59 (relying of Ex. 1011 (Vogt)).

Petition at 21-22; Reply at 16; Ex. 1002 (Anderson I) at 4:25-29 and Ex. 1007 (Suslick decl.) at ¶ 59.

Ground 2: Anderson I teaches all limitations for claims 58 and 59

"delivering nanoparticles that absorb light at one or more wavelengths to the tissue" Ex. 1001 ('730 patent) at 20:19-20, 26-27 and 31-32.

Anderson I teaches "exposure to energy (light)" of the nanoparticles "with a wavelength that corresponds to the absorption peak" in order to "increase the local absorption of light in tissue and lead to selective thermal damage of sebaceous glands." Ex. 1002 (Anderson I) at 10:33-38; Ex. 1007 (Suslick decl.) at ¶ 60.

Petition at 21-22; Reply at 16; Ex. 1002 (Anderson I) at 4:25-29 and Ex. 1007 (Suslick decl.) at ¶ 59.

Ground 2: Anderson I teaches all limitations for claims 58 and 59

"Exposing said nanoparticles to light at one or more wavelengths that are absorbed by the nanoparticles" Ex. 1001 ('730 patent) at 20:21-22, 28-29 and 34-35.

Anderson I discusses "exposure to energy (light)" of the nanoparticles "with a wavelength that corresponds to the absorption peak" in order to "increase the local absorption of light in tissue and lead to selective thermal damage of sebaceous glands." Ex. 1002 (Anderson I) at 10:33-38 and Ex. 1007 (Suslick decl.) at ¶ 60.

Petition at 22-23; Reply at 16-17; Ex. 1002 (Anderson I) at 10:33-38 and Ex. 1007 (Suslick decl.) at ¶ 60.

Ground 3: Tankovich II teaches all limitations for claim 59

"method of ablating tissue" Ex. 1001 ('730 patent) at 20:30.

- Preamble does not warrant patentable weight

Even so, Tankovich II teaches:

- "in addition to vaporizing carbon [nanoparticles] below the skin surface will vaporize a thin surface of tissue," resulting in "vaporization of a surface layer of epidermal tissue about 2-3 microns thick." Ex. 1005 (Tankovich II) at 7:7-13.
- The vaporization of epidermal tissue corresponds to the claimed "ablating tissue." Ex. 1007 (Suslick decl.) at ¶ 66.

Petition at 26; Ex. 1007 (Suslick decl.) at ¶ 66 and Ex. 1005 (Tankovich II) at 7:7-13.

Ground 3: Tankovich II teaches all limitations for claim 59

"delivering nanoparticles that absorb light at one or more wavelengths to the tissue" Ex. 1001 ('730 patent) at 20:32-33.

- "[t]he first step . . . is to topically apply a layer of carbon solution to the skin surface . . . comprised of 1 micron [1000 nanometers] graphite powder in baby oil," Ex. 1005 (Tankovich II) at 3:47-50.
- "[g]raphite is very absorptive of laser energy at the 1.06 µm wavelength." Ex. 1005 (Tankovich II) at 4:7-8 and Ex. 1007 (Suslick decl.) at ¶ 67.

Petition at 26-27; Ex. 1007 (Suslick decl.) at ¶ 67 and Ex. 1005 (Tankovich II) at 3:47-50 and 4:7-8.

Ground 3: Tankovich II teaches all limitations for claim 59

"exposing said nanoparticles to light at one or more wavelengths that are absorbed by the nanoparticles" Ex. 1001 ('730 patent) at 20:34-35.

- "irradiat[ing] the skin surface withNd:YAG laser pulses of about 3 J/cm2 at a wavelength of 1.06 µm [1060 nanometers]," Ex. 1005 (Tankovich II) at 4:3-5 and Ex. 1007 (Suslick decl.) at ¶ 68.
- "[g]raphite [nanoparticles are] very absorptive of laser energy at the 1.06 µm wavelength." Ex. 1005 (Tankovich II) at 4:6-7.

Petition at 27; Reply at 18-19; Ex. 1007 (Suslick decl.) at ¶ 68 and Ex. 1005 (Tankovich II) at 4:3-7.

Ground 4: claims 58-59 are obvious over Tankovich I and Anderson I.

It would have been obvious to a PHOSITA to include the radiation-absorbing carbon particles of dimension “10-20 nm” from Tankovich I in Anderson I’s system to facilitate Anderson I’s goal of delivering its carbon nanoparticles to desired tissues.

Petition at 28-35 and Reply at 19.

Ground 4: claims 58-59 are obvious over Tankovich I and Anderson I.

Rice is wrong that Tankovich I teaches that the particles explode.

- Tankovich I makes no mention anywhere of any explosion or mechanical damage associated with its treatment. Ex. 1004 (Tankovich I) at Abstract.
- Rice's citation to Tankovich I for alleged "explosive potential" (Ex. 1004 (Tankovich I) at 1:67-2:8.) says nothing of explosion, but merely describes rubbing carbon nanoparticles on the skin.

Reply at 21.

Ground 4: claims 58-59 are obvious over Tankovich I and Anderson I.

Anderson I's discussion of various Tankovich patents (including Tankovich I)

- "very short pulses cause unwanted mechanical injury,"
- "[s]uch mechanical injury can be avoided by using pulses longer than about 0.1 milliseconds,"
- "the preferred range of pulse duration is 0.1-100 ms, and the ideal pulse duration is about 10-50 ms."

Ex. 1002 (Anderson I) at 7:37-53.

Reply at 22-23 and Ex. 1002 (Anderson I) at 7:37-53.

Ground 5: claims 58-59 are obvious over Tankovich II and Anderson I.

- Tankovich II expressly recites "1 micron graphite powder." Ex. 1005 (Tankovich II) at 3:49-50.
- Anderson I teaches methods for "skin resurfacing . . . [and] controlled skin ablation" using carbon particles. Ex. 1002 (Anderson I) at 1:44-50.
- It would have been obvious to modify Anderson I's method using carbon particles of 1 micron size delivered to the infundibulum of skin and irradiated with light for at least the same reasons discussed above in modifying Anderson I according to Tankovich I.

Petition at 21, 26-27, 36-40; Reply at 23; Ex. 1005 (Tankovich II) at 3:49-50 and Ex. 1002 (Anderson I) at 1:44-50.

Ground 6: claim 57 is obvious over Tankovich III and Anderson II.

- Rice admits that Anderson II teaches a method of reducing wrinkles. POR at 45.
- Anderson II recognized a need for controlling the depth of the treatment. Ex. 1003 (Anderson II) at 4:24-32.
- Tankovich III solves the Anderson II problem by using radiation-absorbing nanoparticles. Ex. 1006 (Tankovich III) at 16:41-48.
- It would have been obvious to modify Anderson II's method using Tankovich III's "carbon particles in the size range from about 0.2 to about 0.01 micron (carbon black) or in the size range up to about 1 micron" at least the same reasons discussed above in modifying Anderson II according to Tankovich I. Ex. 1006 (Tankovich III) at 9:65-10:2.

Petition at 14, 18, 41-45; Reply at 24-26; Ex. 1006 (Tankovich III) at 16:41-48 and Ex. 1003 (Anderson II) at 4:24-32 and 9:65-10:2.

CERTIFICATE OF SERVICE

I hereby certify, pursuant to 37 C.F.R. sections 42.6 and 42.105, that a complete copy of Petitioner's Demonstrative Exhibits is being served, pursuant to the parties' service agreement, via electronic mail (e-mail) upon the following, on the 13th day of December, 2017, the same day as the filing of the above-identified documents in the United States Patent and Trademark Office/Patent Trial and Appeal Board, and the provision of a courtesy copy by e-mail to the Patent Trial and Appeal Board:

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