

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

L'OREAL USA, INC.,

Petitioner,

v.

BRIGHTEX BIO-PHOTONICS, LLC,

Patent Owner.

PTAB Case No. IPR2025-00971

Patent No. 9,542,595

**DECLARATION OF MILAN SONKA, PH.D. IN SUPPORT OF PETITION
FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 9,542,595**

TABLE OF CONTENTS

I.	INTRODUCTION	1
A.	Qualifications	2
1.	Education	2
2.	Relevant Work Experience	2
3.	Publications	3
4.	Curriculum Vitae.....	4
B.	Materials Reviewed.....	4
C.	The Alleged Prior Art and Summary of my Opinions	5
II.	LEGAL PRINCIPLES USED IN MY ANALYSIS.....	6
A.	Level of Ordinary Skill in the Art.....	7
B.	Claim Construction Standard	8
C.	Priority Date of the Claims.....	9
D.	Anticipation	10
E.	Obviousness.....	10
III.	OVERVIEW OF THE TECHNOLOGY.....	16
A.	Technology Background	16
B.	Overview of the '595 Patent.....	21
IV.	CLAIM CONSTRUCTION	31
V.	IN MY OPINION, ALL CLAIMS OF THE '595 PATENT ARE UNPATENTABLE.....	31
A.	Ground 1: Bandic Renders Obvious Claims 5, 6, and 11 of the '595 Patent.....	31
1.	Summary of Bandic	31
2.	Bandic discloses or renders obvious each element of claim 5.....	35
a.	5[pre]: A method for analyzing a skin of a subject and identifying a cosmetic product for the subject, comprising:	35

b.	5[a]: at an electronic device with one or more processors and memory storing one or more programs for execution by the one or more processors:	37
c.	5[a1]: calibrating colors of a first digital image, wherein the first digital image depicts at least a portion of a face of the subject, and the first digital image includes a plurality of pixels;.....	41
d.	5[a2]: displaying the first digital image;	45
e.	5[a3]: dividing the display of the first digital image into two sides, wherein one side of the first digital image is displayed with no cosmetic product applied, and one side of the first digital image is displayed with a simulated application of a cosmetic product;.....	48
f.	5[a4]: transferring the first digital image; and.....	49
g.	5[a5]: transferring information of a cosmetic product, wherein skin pixels in the plurality of pixels are identified, color space values are identified from the skin pixels, and the cosmetic product is identified at least based on the color space values.	51
3.	Bandic discloses or renders obvious each element of Claim 6.	65
a.	6[pre]: An electronic device, comprising:	65
b.	6[a]: one or more processors; and	65
c.	6[b]: memory storing one or more programs for execution by the one or more processors, the one or more programs causing the electronic device to perform a method comprising:	65
d.	6[b1]: calibrating colors of a first digital image, wherein the first digital image depicts at least a portion of a face of the subject, and the first digital image includes a plurality of pixels;.....	65
e.	6[b2]: transferring the first digital image;	65

f.	6[b3]: displaying the first digital image;	66
g.	6[b4]: dividing the display of the first digital image into two sides, wherein one side of the first digital image is displayed with no cosmetic product applied, and one side of the first digital image is displayed with a simulated application of a cosmetic product; and	66
h.	6[b5]: transferring information of a cosmetic product, wherein skin pixels in the plurality of pixels are identified, color space values are identified from the skin pixels, and the cosmetic product is identified at least based on the color space values.	66
4.	Bandic discloses or renders obvious each element of Claim 11.	66
a.	11[pre]: A non-transitory computer readable storage medium storing one or more programs for execution by one or more processors of an electronic device, the one or more programs causing the electronic device to perform a method comprising:	66
b.	11[a]: calibrating colors of a first digital image, wherein the first digital image depicts at least a portion of a face of the subject, and the first digital image includes a plurality of pixels;.....	67
c.	11[b]: transferring the first digital image;	67
d.	11[c]: displaying the first digital image;	67
e.	11[d]: dividing the display of the first digital image into two sides, wherein one side of the first digital image is displayed with no cosmetic product applied, and one side of the first digital image is displayed with a simulated application of a cosmetic product; and	67

f.	11[e]: transferring information of a cosmetic product, wherein skin pixels in the plurality of pixels are identified, color space values are identified from the skin pixels, and the cosmetic product is identified at least based on the color space values.	68
B.	Ground 2: Rubinstenn103 in view of Bandic Renders Obvious Claims 5, 6, and 11 of the '595 Patent.	68
1.	Summary of Rubinstenn103 and Combining its Embodiments	68
2.	Motivation to Combine	72
a.	Combining Rubinstenn103's Embodiments.....	72
b.	Rubinstenn103 would be combined with Bandic.....	74
3.	Rubinstenn103 in view of Bandic disclose or render obvious each element of claim 5.....	79
a.	5[pre]: A method for analyzing a skin of a subject and identifying a cosmetic product for the subject, comprising:	79
b.	5[a]: at an electronic device with one or more processors and memory storing one or more programs for execution by the one or more processors:	81
c.	5[a1]: calibrating colors of a first digital image, wherein the first digital image depicts at least a portion of a face of the subject, and the first digital image includes a plurality of pixels;.....	83
d.	5[a2]: displaying the first digital image;	86
e.	5[a3]: dividing the display of the first digital image into two sides, wherein one side of the first digital image is displayed with no cosmetic product applied, and one side of the first digital image is displayed with a simulated application of a cosmetic product;.....	87
f.	5[a4]: transferring the first digital image; and.....	91

g.	5[a5]: transferring information of a cosmetic product, wherein skin pixels in the plurality of pixels are identified, color space values are identified from the skin pixels, and the cosmetic product is identified at least based on the color space values.	94
4.	Rubinstenn103 in view of Bandic disclose or renders obvious each element of Claim 6.....	98
a.	6[pre]: An electronic device, comprising:	98
b.	6[a]: one or more processors; and	98
c.	6[b]: memory storing one or more programs for execution by the one or more processors, the one or more programs causing the electronic device to perform a method comprising:	99
d.	6[b1]: calibrating colors of a first digital image, wherein the first digital image depicts at least a portion of a face of the subject, and the first digital image includes a plurality of pixels;.....	99
e.	6[b2]: transferring the first digital image;	99
f.	6[b3]: displaying the first digital image;	99
g.	6[b4]: dividing the display of the first digital image into two sides, wherein one side of the first digital image is displayed with no cosmetic product applied, and one side of the first digital image is displayed with a simulated application of a cosmetic product; and	99
h.	6[b5]: transferring information of a cosmetic product, wherein skin pixels in the plurality of pixels are identified, color space values are identified from the skin pixels, and the cosmetic product is identified at least based on the color space values.	100
5.	Rubinstenn103 + Bandic disclose or renders obvious each element of Claim 11.	100

a.	11[pre]: A non-transitory computer readable storage medium storing one or more programs for execution by one or more processors of an electronic device, the one or more programs causing the electronic device to perform a method comprising:	100
b.	11[a]: calibrating colors of a first digital image, wherein the first digital image depicts at least a portion of a face of the subject, and the first digital image includes a plurality of pixels;.....	100
c.	11[b]: transferring the first digital image;	101
d.	11[c]: displaying the first digital image;	101
e.	11[d]: dividing the display of the first digital image into two sides, wherein one side of the first digital image is displayed with no cosmetic product applied, and one side of the first digital image is displayed with a simulated application of a cosmetic product; and	101
f.	11[e]: transferring information of a cosmetic product, wherein skin pixels in the plurality of pixels are identified, color space values are identified from the skin pixels, and the cosmetic product is identified at least based on the color space values.	101
C.	Ground 3: Rubinstenn103 in view of Rubinstenn300 and Bandic Renders Obvious Claims 1, 2, 3, and 4 of the '595 Patent.	101
1.	Rubinstenn300	101
2.	Motivation to Combine	103
3.	Rubinstenn103 in view of Rubinstenn300 and Bandic disclose or render obvious each element of Claim 1.	107
a.	1[pre]: A method for analyzing a skin of a subject and identifying a cosmetic product for the subject, comprising:	107

- b. 1[a]: at an electronic device with one or more processors and memory storing one or more programs for execution by the one or more processors: 108
 - c. 1[a1]: calibrating colors of a first digital image, wherein the first digital image depicts at least a portion of a face of the subject, and the first digital image includes a plurality of pixels, and wherein calibrating colors of the first digital image is based on a second digital image of one or more color standards; 108
 - d. 1[a2]: transferring the first digital image, but prior to transferring the first digital image, transferring the second digital image of one or more color standards; 112
 - e. 1[a3]: using the second digital image of one or more color standards to correlate one or more colors of one or more color standards and one or more colors of the skin pixels, wherein at least one color space value is identified in accordance with a correlation between the one or more colors of one or more color standards and the one or more colors of the skin pixels; and 114
 - f. 1[a4]: transferring information of a cosmetic product, wherein skin pixels in the plurality of pixels are identified, color space values are identified from the skin pixels, and the cosmetic product is identified at least based on the color space values. 117
- 4. Rubinstenn103 discloses or renders obvious Claims 2-3. 118
 - a. 2: The method of claim 1, wherein transferring the first digital image is one of sending or receiving the digital image. 118

b.	3: The method of claim 1, including: transferring a modified image, wherein the modified image is prepared based on the first digital image, and at least a portion of the modified image shows a simulated effect of application of the cosmetic product.	118
5.	Rubinstenn103 in view of Bandic and Rubinstenn300 discloses or renders obvious Claim 4.	120
a.	4: The method of claims 1, wherein the first digital image further depicts one or more color standards.	120
D.	Ground 4: Rubinstenn103 in view of Bandic and Rubinstenn300 renders obvious claims 9 and 13 10 and 15, 7 and 12, and 8 and 14.....	121
1.	9: The electronic device of claim 6, wherein the method includes: transferring a modified image, wherein the modified image is prepared based on the first digital image, and at least a portion of the modified image shows a simulated effect of application of the cosmetic product.	121
2.	13: The computer readable storage medium of claim 11, wherein the method includes: transferring a modified image, wherein the modified image is prepared based on the first digital image, and at least a portion of the modified image shows a simulated effect of application of the cosmetic product.	122
3.	10: The electronic device of claim 6, wherein the first digital image further depicts one or more color standards. ...	122
4.	15: The computer readable storage medium of claim 11, wherein the first digital image further depicts one or more color standards.	122
5.	7: The method of claim 6, wherein calibrating colors of a first digital image is based on a second digital image of one or more color standards.....	123
6.	12: The computer readable storage medium of claim 11, wherein calibrating colors of the first digital image is based on a second digital image of one or more color standards.....	123

7.	8: The electronic device of claim 7, wherein the method includes, prior to transferring the first digital image, transferring the second digital image of one or more color standards.....	123
8.	14: The computer readable storage medium of claim 11, wherein the method includes, prior to transferring the first digital image, transferring the second digital image of one or more color standards.....	124
VI.	CONCLUSION.....	124

EXHIBIT LIST

Exhibit	Reference
1001	U.S. Patent No. 9,542,595 (“the ’595 patent”)
1002	Prosecution History of the ’595 patent
1003	Declaration of Dr. Milan Sonka
1004	Curriculum Vitae of Dr. Milan Sonka
1005	U.S. Patent App. Pub. No. 2011/0301441 (“Bandic”)
1006	U.S. Patent No. 7,634,103 (“Rubinstenn103”)
1007	U.S. Patent App. Pub. No. 2003/0063300 (“Rubinstenn300”)
1008	Nina Bhatti et al., <i>Mobile cosmetic advisor: an imaging based mobile service</i> , Multimedia on Mobile Devices (Jan. 27, 2010)
1009	Hsien-Che Lee, <i>Introduction to Color Imaging Science</i> , Cambridge Univ. Press (2005)
1010	Milan Sonka et al., <i>Image Processing, Analysis, and Machine Vision</i> , Chapman and Hall Publishers (1993)
1011	U.S. Patent App. Pub. No. 2004/0108384
1012	János Schanda, <i>Colorimetry: Understanding the CIE System</i> , John Wiley & Sons, Inc. (March 1, 2007)
1013	Yoshi Ohno et al., <i>CIE Fundamentals for Color Measurements</i> , IS&Ts NIP16: 2000 International Conference on Digital Printing Technologies (2000) (accessible at https://tsapps.nist.gov/publication/get_pdf.cfm?pub_id=841491 (Accessed May 6, 2025))
1014	Color Calibration Chart, Jason-Jones.com (January 19, 2010) (accessible at https://jason-jones.com/articles/107-photography/303-color-calibration-chart)

I. INTRODUCTION

1. I, Milan Sonka, Ph.D., have been retained by Petitioner L'Oréal USA, Inc. ("Petitioner") to investigate and opine on certain issues relating to United States Patent No. 9,542,595 ("the '595 patent") in their Petition for Inter Partes Review. The Petition requests that the Patent Trial and Appeal Board ("PTAB" or "Board") review and cancel claims 1-15 of the '595 patent.

2. The opinions set forth in this declaration are based on my personal knowledge, my professional judgment, and my analysis of the materials and information referenced in this declaration and its exhibits.

3. I am being compensated for consulting services including time spent testifying at any hearing that may be held. I am also reimbursed for reasonable and customary expenses associated with my work in this case. I receive no other forms of compensation related to this case. My compensation does not depend on the outcome of this post-grant review or the co-pending district court litigation, and I have no other financial interest in this post-grant review.

4. I understand that the '595 patent has been assigned to Brightex Bio-Photonics, LLC.

5. This declaration is based on the information currently available to me. To the extent that additional information becomes available, I reserve the right to continue my investigation and study, which may include a review of documents and

information that may be produced, as well as testimony from depositions that have not yet been taken.

A. Qualifications

6. I have summarized in this section my educational background, career history, publications, and other relevant qualifications.

7. In general, I have a broad knowledge of image processing, a solid grounding in the specific technologies employed by imaging systems, and a historical perspective based on active personal participation in the medical image processing industry. I can develop application-relevant image analysis methods, approaches, and systems in 2D, 3D, 4D, and generally n-D images.

1. Education

8. I earned a Ph.D. degree in Technical Cybernetics, with a specialty in Digital Image Analysis, from Czech Technical University of Prague, Czechoslovakia in 1983 and a Master of Science in Electrical Engineering with a specialty in Technical Cybernetics from the same University in 1979.

2. Relevant Work Experience

9. I am a Professor of Electrical & Computer Engineering, a Professor of Ophthalmology & Visual Sciences, and a Professor of Radiation Oncology – all at the University of Iowa. I am an IEEE Fellow, an AIMBE Fellow, a MICCAI Fellow, Fellow of the National Academy of Inventors, and Fulbright Specialist.

10. I have been a faculty member at the University of Iowa since 1990. I was the Founding Co-Director of the Iowa Institute for Biomedical Imaging and I have maintained that position since 2007. I have been serving as the Institute's Director from 2010 to 2016. I currently serve as co-director of this institute.

11. I have been Director of the Iowa Initiative for Artificial Intelligence since 2019. I continue serving in that role.

3. Publications

12. My research interests include medical imaging and knowledge-based image analysis with emphasis on cardiovascular, pulmonary, orthopedic, dermatology, cancer, and ophthalmic image analysis.

13. I am the first author of four editions of "Image Processing, Analysis and Machine Vision" book (1993, 1998, 2008, and 2014). I am co-editor of "Medical Image Analysis" book (2024). I co-authored or co-edited 20 other books/proceedings. I have published more than 230 journal papers and over 450 other publications.

14. I am past Editor-in-Chief of the IEEE Transactions on Medical Imaging and past member of the Editorial Board of the Medical Image Analysis journal.

15. I am a co-inventor on 13 patents, most of which relate to image processing and analysis.

16. I have received more than \$30 million in research funds as principal investigator, most from the National Institutes of Health to support my research on medical image analysis. My scholarship and leadership in machine learning and medical image analysis are well established.

17. To bring results of this research work to clinical practice, I have co-founded two medical imaging companies—Medical Imaging Applications LLC, and VIDA Diagnostics Inc.

4. Curriculum Vitae

18. A copy of my curriculum vitae is attached as EX1004 to this declaration.

B. Materials Reviewed

19. My opinions expressed in this declaration are based on my education and experience as an engineer, as well as the documents and materials identified in this declaration, including the '595 patent, its prosecution history, the prior art references and background materials discussed in this declaration, and the other references specifically identified in this declaration. I have considered these materials in their entirety, even if only portions are discussed here.

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1007	U.S. Patent App. Pub. No. 2003/0063300 (“Rubinstenn300”)
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1009	Hsien-Che Lee, <i>Introduction to Color Imaging Science</i> , Cambridge Univ. Press (2005)
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1011	U.S. Patent App. Pub. No. 2004/0108384
1012	János Schanda, <i>Colorimetry: Understanding the CIE System</i> , John Wiley & Sons, Inc. (March 1, 2007)
1013	Yoshi Ohno et al., <i>CIE Fundamentals for Color Measurements</i> , IS&Ts NIP16: 2000 International Conference on Digital Printing Technologies (2000) (accessible at https://tsapps.nist.gov/publication/get_pdf.cfm?pub_id=841491 (Accessed May 6, 2025))
1014	Color Calibration Chart, Jason-Jones.com (January 19, 2010) (accessible at https://jason-jones.com/articles/107-photography/303-color-calibration-chart)

20. I have also relied on my own experience and expertise in imaging, image processing, analysis, and computer vision.

C. The Alleged Prior Art and Summary of my Opinions

21. I understand that Petitioner basis its Petition off the following prior art references, and I further understand that these prior art references are before the alleged priority date of the ’595 patent.

Prior Art
Bandic (U.S. Patent App. Pub. No. 2011/0301441) , published on December 8, 2011 (EX1005)
Rubinstenn103 (U.S. Patent No. 7,634,103) , issued on December 15, 2009 (EX1006)
Rubinstenn300 (U.S. Patent App. Pub. No. 2003/0063300) , published on April 3, 2003 (EX1007)

22. I have reviewed the '595 patent and its prosecution history, as well as the other references and documents discussed within this declaration, and I am of the opinion that all claims of the '595 patent are rendered obvious according to the prior art references named above. A summary of my opinions associated with the Petitioner's grounds are identified below:

Ground	Claim(s)	Reference(s)
1 (§103)	5, 6, 11	Bandic
2 (§103)	5, 9, 11	Rubinstenn103, Bandic
3 (§103)	1, 2, 3, 4	Rubinstenn103, Rubinstenn300, Bandic
4 (§103)	9, 13, 10, 15, 7, 12, 8, 14	Rubinstenn103, Rubinstenn300, Bandic

II. LEGAL PRINCIPLES USED IN MY ANALYSIS

23. I am not an attorney and offer no legal opinions. I have been informed about certain aspects of the law for purposes of my analyses and opinions. I have been asked to apply the following legal principles to my analysis, and I have done so.

A. Level of Ordinary Skill in the Art

24. I understand that in analyzing questions of invalidity and infringement, the perspective of a person having ordinary skill in the art (“POSITA”) is often implicated, and the Court may need assistance in determining that level of skill.

25. I understand that the claims and written description of a patent must be understood from the perspective of a POSITA. I have been informed that the following factors may affect the level of skill of a POSITA: (1) the educational level of the inventor; (2) the type of problems encountered in the art; (3) the prior-art solutions to those problems; (4) the rapidity with which innovations are made; (5) the sophistication of the technology; and (6) the educational level of active workers in the field. A person of ordinary skill in the art is also a person of ordinary creativity in the art.

26. I understand that Petitioner proposed in the Petition that as of March 25, 2013, a POSITA for the technology of the ’595 patent would have had a (1) Bachelor’s degree in electrical engineering, computer engineering, biomedical engineering, or comparable field of study such as physics, and (2) approximately two to three years of practical experience in image analysis. Additional experience can substitute for the level of education, and vice-versa.

27. I agree with this level of ordinary skill for the '595 patent. Based on my experience, I understand and know of the capabilities of a person of this skill level as of the time the '595 patent was filed. I am familiar with how a POSITA would have understood and used the terminology found in the '595 patent at the time of its filing, and with the state of the art at that time.

28. My analysis and opinions presented herein regarding the claims of the '595 patent have been and are based on the perspective of a POSITA as defined above as of March 25, 2013, the priority date for the '595 patent. As described above and as shown in my CV, I have extensive experience in the fields of imaging, image processing, image analysis, imaging systems, computer vision, and their applications in the relevant timeframe.

B. Claim Construction Standard

29. I understand that claim terms generally are construed in accordance with the ordinary and customary meaning they would have to a POSITA at the time of the invention in light of the claim language, the specification, and the prosecution history. I understand that dictionaries and other extrinsic evidence may be considered as well, though such evidence is typically regarded as less significant than the intrinsic record in determining the meaning of the claim language.

30. In making this Declaration, I have been asked to review the terms in the '595 patent claims to determine what a POSITA would have understood those terms to have meant at the time of the alleged invention. In addition, I have been informed that, in an *inter partes* review proceeding, the claim terms under consideration are to be construed using the same claim construction standard used in a civil action under 35 U.S.C. § 282(b), which is articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc), and its progeny. I further understand that under the *Phillips* standard, the claim terms are given their ordinary and customary meaning, as would be understood by a POSITA at the time of the invention, consistent with the specification and the prosecution history. My opinions regarding the meaning of claim terms of the '595 Patent are based on the construction of the claim terms using the *Phillips* standard in view of the specification and the prosecution history of the '595 patent.

C. Priority Date of the Claims

31. I have been informed that a U.S. patent application may claim the benefit of the filing date of an earlier patent application if the earlier patent application disclosed each limitation of the invention claimed in the later-filed U.S. patent application. I have also been informed that priority is determined on a claim-by-claim basis so that certain claims of a patent may be entitled to the

priority date of an earlier-filed patent application even if other claims of the same patent are not entitled to that priority date.

32. I have also been informed that a patented claim is invalid if the claimed invention was patented, described in a printed publication, or in public use, on sale, or otherwise available to the public before the effective filing date of the claimed invention, or the claimed invention was described in an issued patent or a published patent application that was effectively filed before the effective filing date of the claimed invention.

D. Anticipation

33. I understand that to be valid, a patent claim must be novel, and that a claim is invalid if it is anticipated by a single prior art reference. I further understand that a reference anticipates if it discloses each and every element of the claim and enables a POSITA to make and use the claimed invention without undue experimentation.

E. Obviousness

34. I also understand that even if a claim of a patent is not anticipated, that claim is still invalid if the differences between the claimed subject matter and the prior art are such that the subject matter as a whole would have been obvious to a POSITA at the time the invention was made.

35. I understand further that the condition “at the time the invention was made” in an obviousness determination is imposed to rule out impermissible hindsight. Accordingly, permissible reasoning takes into account only knowledge which was within the level of ordinary skill in the art at the time the claimed invention was made and does not include knowledge gleaned from the applicant’s disclosure in the patent under analysis. I also understand that an opining expert is required to analyze prior art from the perspective of a POSITA and may not simply provide his or her own personal conclusions.

36. I also understand that an obviousness determination includes several factual inquiries, including: (1) determining the scope and content of the prior art; (2) ascertaining the differences between the claimed invention and the prior art; (3) resolving the level of ordinary skill in the pertinent art; and (4) taking into consideration any secondary indicia (objective evidence) of non-obviousness.

37. I also understand that such objective evidence of non-obviousness may include: (1) a long felt but unsolved need that was satisfied by the claimed invention; (2) commercial success attributable to the claimed invention; (3) unexpected results achieved by the claimed invention; (4) praise by experts of the claimed invention with factual support; (5) taking of licenses under the patent by others for reasons related to the alleged non-obviousness of the claimed invention; (6) the failure of others; (7) the teaching away of others; (8) skepticism by experts; and (9) evidence

that competitors in the marketplace have copied the invention instead of using the prior art. I also understand that, in order to establish nonobviousness, there must be a demonstrated relationship, or nexus, between any such secondary indicia and the claimed invention, i.e., there must be objective evidence of non-obviousness attributable to the claimed invention.

38. I further understand that near simultaneous invention by two or more equally talented inventors working independently may or may not be an indication of obviousness when considered in light of all the circumstances.

39. I understand that a conclusion of obviousness can be based on a combination of multiple prior art references. I understand that rationales that may support a conclusion of obviousness include:

(A) Combining prior art elements according to known methods to yield predictable results;

(B) Simply substituting one known element for another to obtain predictable results;

(C) Using known techniques to improve similar devices (methods, or products) in the same way;

(D) Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;

(E) Using an obvious to try solution, i.e., choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;

(F) Applying known work in one field of endeavor to yield variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art;

(G) Applying some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference disclosures to arrive at the claimed invention.

40. I further understand that an analysis of obviousness should recognize that market demand, rather than scientific literature, often drives design trends.

41. I also understand that if a technique has been used to improve one device, and if a POSITA would recognize the technique would improve similar devices in the same way, then using that technique would be obvious to a POSITA unless actual application of that technique is beyond his or her skill.

42. I also understand that practical and common-sense considerations should guide an analysis of obviousness, because familiar items may have obvious uses beyond their primary purposes. I further understand that applying common sense does not require a specific hint or suggestion in a particular reference. Rather,

applying common sense requires a reasoned explanation that avoids conclusory generalizations and false deductions.

43. I also understand that, when addressing a problem, a POSITA will often be able to fit together the disclosures of multiple publications. In this regard, I understand that an analysis of obviousness may consider inferences and creative steps that a POSITA would normally employ.

44. I also understand that a particular combination of prior art may be proven obvious merely by showing that it was obvious for a POSITA to try that combination. For example, when there is a design need or a market pressure to solve a problem, and/or there exists a finite number of identified, predictable solutions with a reasonable expectation of success, a POSITA has good reason to pursue the known options within his or her technical grasp. I understand that if this leads to anticipated success, it is likely that the result is not of innovation but of ordinary skill and common sense.

45. I also understand that a combination of familiar elements according to known methods is presumed to be obvious when that combination does no more than yield predictable results. Work known in one field of endeavor may prompt variations of that work for use in either the same field or a different field, based on design incentives and other market forces. If a technique has been used to improve

some device, and a POSITA can implement a predictable variation of that technique, then that variation is likely unpatentable.

46. I further understand that to be proper for use in an analysis of obviousness, a reference must teach art that is analogous to the claimed invention. I also understand that under a correct analysis, any need or problem known in the field of endeavor at the time of the invention and addressed by the claimed invention can provide a reason for combining the elements in the manner claimed.

47. I understand that a claim can be obvious in light of a single reference, without the need to combine references, if the elements of the claim that are not found explicitly or inherently in that single reference can be supplied by the common sense or technical knowledge of a POSITA. For example, combining two embodiments disclosed adjacent to each other in a prior art patent likely does not require a leap of inventiveness.

48. I also understand that a claimed invention may be obvious if it merely involves simple substitution of one known element for another to obtain predictable results.

49. I understand further that, in an analysis of obviousness, two items of prior art need not be like two puzzle pieces that must fit together perfectly. For example, a claimed invention may be found obvious if a POSITA would view rearrangement as an obvious matter of design choice.

50. I also understand that an analysis of obviousness requires a comparison between the properly construed claim language and the prior art on a limitation-by-limitation basis.

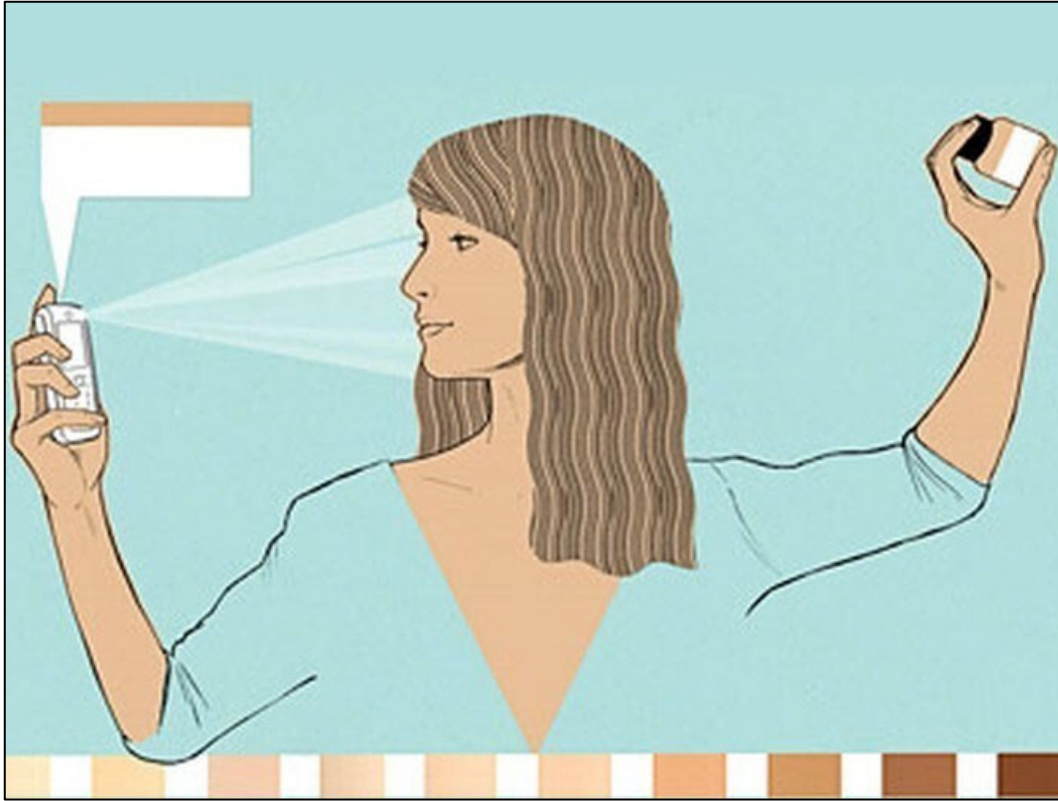
III. OVERVIEW OF THE TECHNOLOGY

A. Technology Background

51. At the time of the '595 Patent's priority date (March 2013), the technology of "systems and methods for recommending cosmetic products for users with mobile devices" – the exact title of the '595 patent – was already considerably mature with existing systems developed, tested, and reported in archival literature.

52. A paper titled "Mobile Cosmetics Advisor: An Imaging Based Mobile Service" was presented at the SPIE Multimedia on Mobile Devices conference in 2010 and published the same year in SPIE Proceedings on Electronic Imaging (EX1008). The paper provides a state-of-the-art description of a mobile-device system considered a leading innovative technology at that time. The paper received considerable attention. It received the best paper award at the conference¹ (EX1008 at 1 -- "Best Paper Award") and this innovative work was featured in the Oprah magazine in February 2009. EX1008 at 9. *See* figure from the Oprah Magazine below:

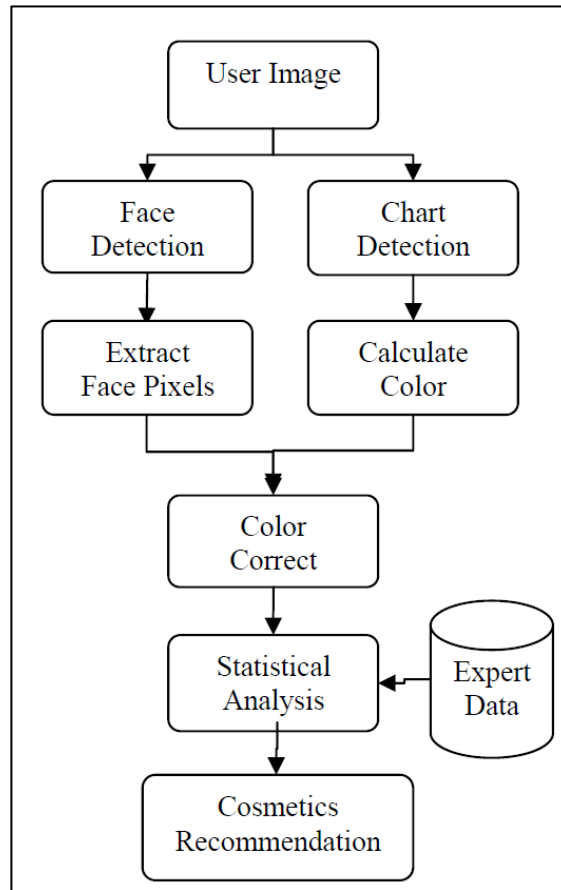
¹ Also accessible at <https://www.spiedigitallibrary.org/conference-proceedings-of-spie/7542/1/Mobile-cosmetics-advisor-an-imaging-based-mobile-service/10.1117/12.840303.short>.



53. This paper describes a “cosmetic recommendation system [that] is composed of image processing, chart detection, color correction, skin pixel extraction, and statistical classification of skin color to a database of expert opinions.” EX1008 at 3. In other words, it describes a method for analyzing a skin of a subject, identifying a cosmetic product for the subject, using an electronic device, calibrating colors of a digital image, displaying a face of the subject, identifying the skin pixels, representing the image in standardized color space, transferring the digital image, and transferring information of a recommended cosmetic product to the subject.

54. The paper authors identified the beauty and cosmetics industry as one of the areas of highest consumer spending and solved the problem of recommending

a beauty product using a mobile device, following the steps shown in the following flowchart (Fig. 2 of the cited paper). EX1008 at 2, 3.

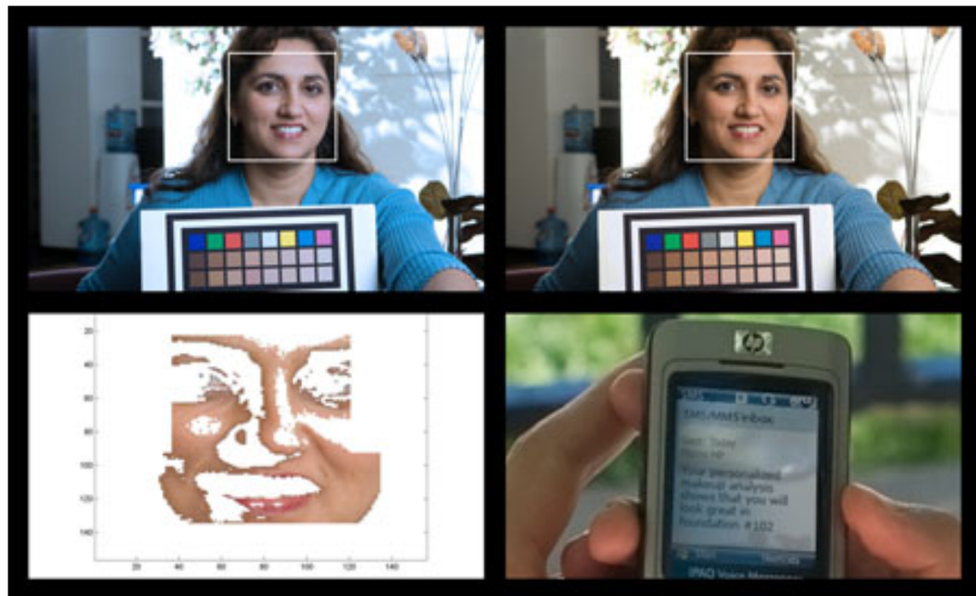


55. Properly matching the skin tone of the user with the beauty product was identified as a must for the product to work effectively. EX1008 at 2. The customer's face was first imaged by a mobile phone. EX1008 at 2-3. Accurate perception of a person's skin coloration was identified as the most critical factor in determining a proper shade of cosmetic. EX1008 at 2-3. This was solved by simultaneously imaging the subject's face and a color standard chart (*see* upper left panel of Figure

1 reproduced below) and performing color correction (calibration to sRGB color standard, upper right of Figure 1 below). EX1008 at 2-3.

56. Once the color-calibrated image was available in sRGB standard, skin pixels were identified (lower left), beauty product selected using machine learning, and beauty product recommendation received on the mobile device. EX1008 at 3-9.

57. The main steps described above are shown in the following figure (Fig. 1 of the cited paper):



58. The authors recognized the potential difficulty of simultaneous image acquisition of a subject and the color standard chart and suggested several ways how to make sure such a color standard chart is easily available to the customers. EX1008 at 4-5. They also designed several fashionable options, including a color-standard necklace that can be worn by the subject at the time of face imaging with a mobile

device, removing the need to hold a color standard chart close to the face – shown here (Fig. 3 of the cited paper) (EX1008 at 4):

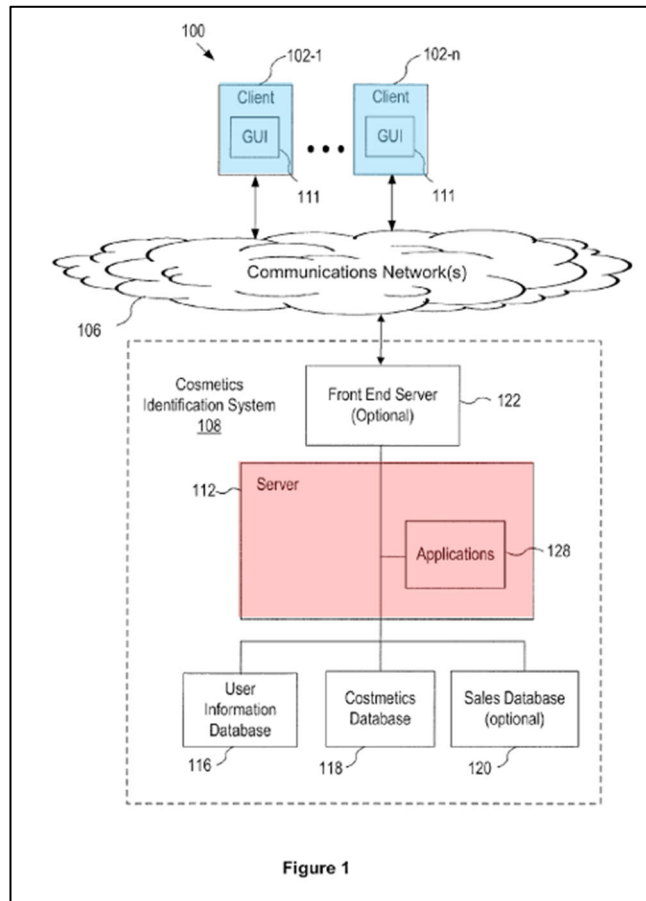


59. The paper reports a number of performance testing studies, which have shown that their system gives a distribution of predictions comparable to that found between two cosmetic experts under different lighting conditions and different consumer imaging devices and different cosmetic product lines. EX1008 at 7-8.

60. The paper also describes a need for image capture quality control and for communicating advice how to improve the captured images so that their quality is sufficient for reliable cosmetic product recommendation. *E.g.*, EX1009 at 9-10.

also refers to as a “subject” or “user.” *See id.* at 1:48-53. In general, the method/system included (1) transferring a digital image that contains a portion of the subject’s face (plurality of pixels form that image), (2) identifying the skin pixels from the image, identifying color space values from the skin pixels, and identifying a cosmetic product based on the color space values, and (3) transferring information about the identified cosmetic product. *Id.* at 1:51-58, 1:61-2:2, 2:6-14.

64. An overview of the ’595 patent’s alleged invention is depicted in Figure 1. Figure 1, which is annotated below, described a **client device 102** (also referred to as a **client**), which could be an “[i]nternet kiosk, personal digital assistance, cell phone, gaming device, desktop computer, laptop computer, handheld computer,” etc. EX1001 at 3:6-7, 3:12-17. The “[c]lient 102 is connected to cosmetics identification system 108 via communications network(s) 106.” EX1001 at 3:19-21. The communications network(s) 106 could be the Internet, “a local area network (LAN), wide area network (WAN), a metropolitan area network,” an intranet, etc. EX1001 at 3:53-60. The cosmetics identification system 108 contains a **server 112** (to communicate with the **client 102** over the network 106) that contains an applications 128 module. EX1001 at 3:26-27, 3:39-41, 3:61-62.



EX1001 at Fig. 1 (annotated).

65. The '595 patent generally describes that the **client 102** displays an image (which could include a facial image of a subject), transmits the image to a **server 108**, where the server calibrates the image, analyzes it to recommend a cosmetic, and then divides the image such that one side shows the normal image and the other side shows a simulated application of the cosmetic on the subject's face.

66. Many of these steps are shown in Figure 5 (which is annotated in colors and shown below to highlight the certain steps recited in the specification and claims). Specifically, the '595 patent describes that the **client 102** may **display**

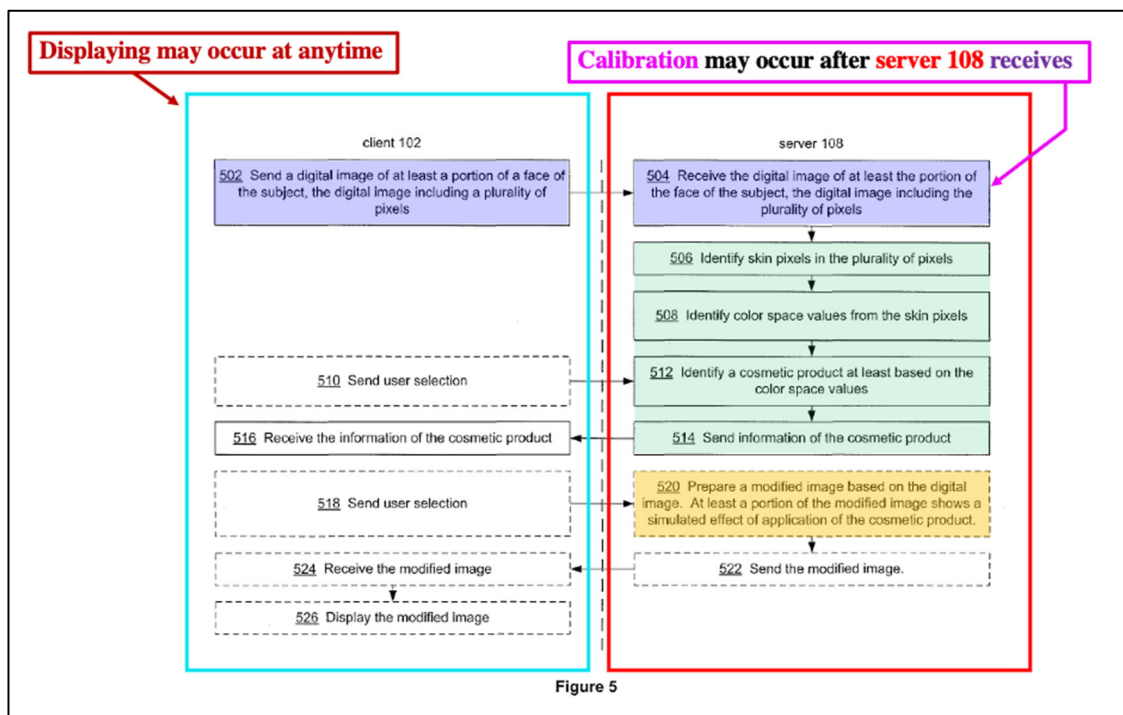
images on its display device. EX1001 at 6:21-22 (“Client 102 . . . includes display device 301), 7:2-4 (describing the client 102 has an “image display module 320 for displaying one or more images on display device). The ’595 patent does not describe when exactly the **client 102** must **display** the digital image, but it can be done before the client sends the digital image. *See id.*

67. The client **102** **sends** a digital image of the user’s face to the **server 108**. EX1001 at 8:20-22. The **server 108** **receives** the digital image (which contains multiple skin pixels). EX1001 at 8:20-24. While not pictured in Figure 5, additional information is also sent to enable image calibration in the next steps: (i) if no information about imaging conditions is sent (or if information to use a “generic” calibration model is transferred), the calibration employs a generic set of calibration equations (EX1001 at 8:40-9:21); (ii) if information about illumination conditions is sent, illumination-specific calibration models is used (EX1001 at 9:24-29, 12:38-42); (iii) if an image of a color standard (e.g., a color wheel) is acquired (preferably) under the same lighting conditions, such an image is transferred prior to the image of the face and used for determining the calibration parameters (EX1001 at 11:35-47, 12:32-36); (iv) if an image of the face is acquired together with an image of a color standard (e.g., positioned below the user’s chin), it is used for determining the calibration parameters (EX1001 at 12:5-11, 12:32-36).

68. **Server 108** calibrates the image once the image and associated calibration-information are received. EX1001 at 12:12-47; EX1001 at 12:22-24 (“in some embodiments, colors in the digital image are calibrated”).

69. The **server 108** then identifies specific skin pixels in the digital image, identifies (calibrated) color space values from the skin pixels, identifies a cosmetic product based on the color space values, and then sends information about the cosmetic product to the client 102 (all steps shown in the green shaded area). EX1001 at 8:25-26, 8:40-41, 9:54-55. The **server 108** can then **prepare a modified image based on the digital image**, such as dividing the digital image into two sides where one side has no cosmetic product applied and the other side has a simulation of the cosmetic applied. EX1001 at 10:33-40.

70. The modified image can then be sent to the client 102, which can display the modified image. EX1001 at 11:6-9.



EX1001 at Fig. 1 (annotated).

71. Independent claim 5 recites similar limitations, but they are listed in a different order than what Figure 5 and the specification generally describe. Nothing in the claim or the specification requires that the steps must be performed in the order as recited in the claim. Claim 5, which reflects much of the '595 patent's discussion is reproduced below.²

5. A method for analyzing a skin of a subject and identifying a cosmetic product for the subject, comprising:

² I use Figure 5 as an example to describe the steps discussed in the '595 patent, but I understand that this does not limit the claims to only Figure 5's embodiment, and the steps are not limited to this particular order.

at an electronic device with one or more processors and memory storing one or more programs for execution by the one or more processors:

calibrating colors of a first digital image, wherein the first digital image depicts at least a portion of a face of the subject, and the first digital image includes a plurality of pixels;

displaying the first digital image;

dividing the display of the first digital image into two sides, wherein one side of the first digital image is displayed with no cosmetic product applied, and one side of the first digital image is displayed with a simulated application of a cosmetic product;

transferring the first digital image; and

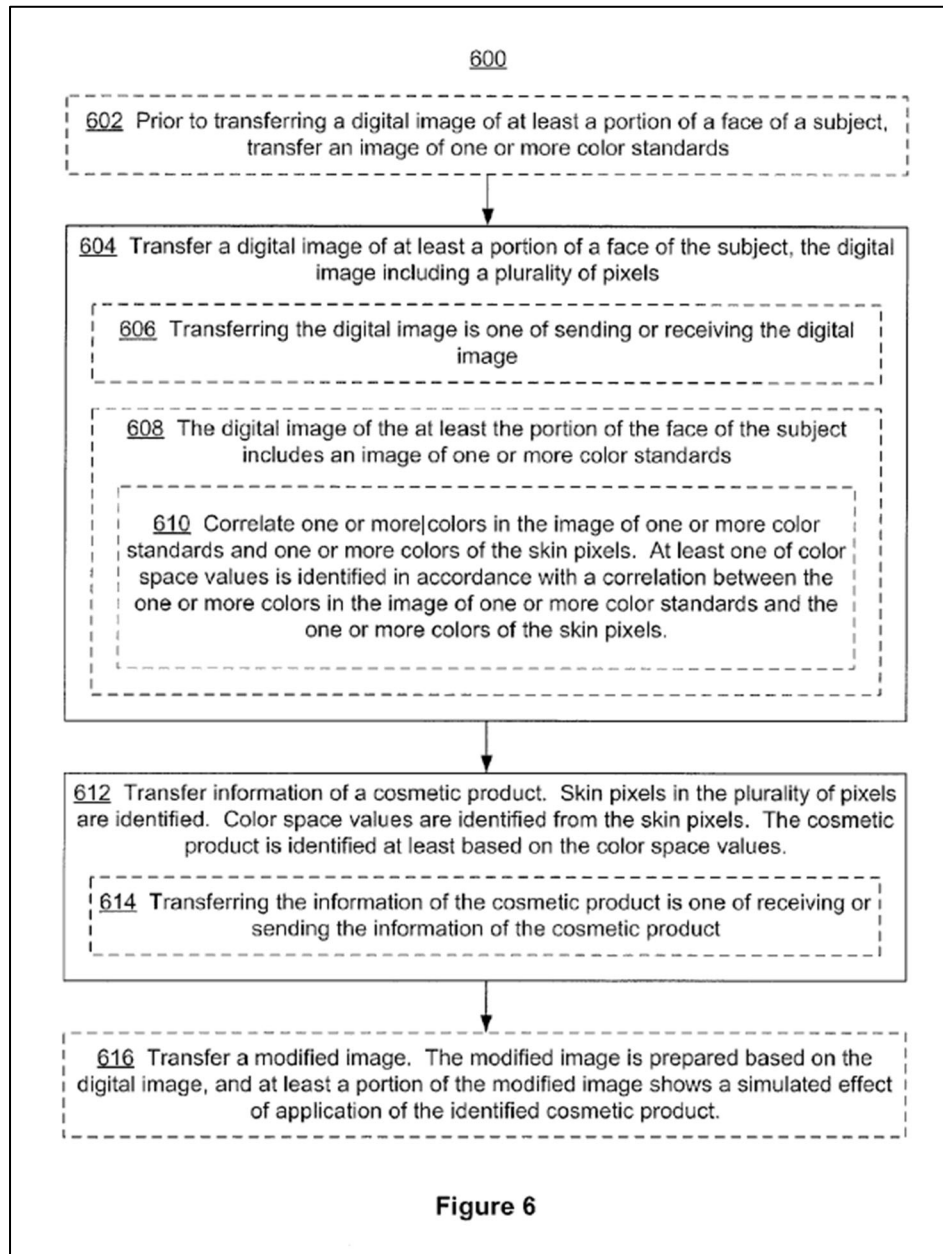
transferring information of a cosmetic product, wherein skin pixels in the plurality of pixels are identified, color space values are identified from the skin pixels, and the cosmetic product is identified at least based on the color space values.

EX1001 at 13:46-67. Notably, the “first digital image” is within many limitations. Claim 5 recites “the first digital image depicts at least a portion of a face of the subject, and the first digital image includes a plurality of pixels;” and other limitations further require “displaying the first image,” “dividing the display of the first digital image into two sides” with and without a simulated application of a cosmetic product, “transferring the first digital image,” etc. *See id.* This first digital image as taught is represented, transferred, and displayed in many renditions, such as prior to calibration (*id.* at Figs. 5, 6), after calibration (*id.* at Figs. 5, 6), in a specific

color space representation (*id.* at 8:40-9:31, Figs. 5,6), and after simulated cosmetic product application (*id.* Figs, 4B, 4C, 5, 6). While the pixel values change across these renditions, the '595 patent suggests that the first image retains the crucial characteristic common to all these renditions, i.e., it always depicts the same user face or body region and the pixel value transformations across such renditions are merely color-space representation changes formally defined by more or less complex pixel-value transcribing formulas not affecting the image content per se. As such, the first digital image as used in '595 patent refers to any and all such variants or renditions of the original image, e.g., acquired by camera 307 and initially displayed on display 301. *See id.* at Figs. 3, 5, 6.

72. Claim 5 is representative of two other independent claims—claims 6 and 11. *See* EX1001 at 14:1-22 (reciting similar steps for claim 6's electronic device with a processor and memory), 14:18-58 (reciting similar steps for claim 11's non-transitory computer readable storage medium). Claims 6 and 11 respectively recite an electronic device or a non-transitory computer readable storage medium that perform methods, and while some of the steps are in different orders from claim 5 (e.g., the claims recite calibrating, displaying, dividing and then transferring), nothing in the claims appear to recite that the steps must be performed in specific order.

73. Independent claim 1 is related to claims 5, 6, and 11, but includes “a second digital image of one or more color standards,” where calibrating of the first digital image of at least a portion of a face of a subject is done based on the second image, the second image is transferred before the first image, and the second digital image is used to correlate one or more colors. *See generally* EX1001 at 13:6-33. This corresponds to the above-described calibration scenario, described above in ¶ 67, which states that (iii) if an image of a color standard (e.g., a color wheel) is acquired under (preferably) the same lighting conditions, such an image is transferred prior to the image of the face and used for determining the calibration parameters – EX1001 at 11:35-47, 12:32-36. Figure 6 recites some of the steps listed in claim 1. *See* EX1001 at Fig. 6 (below).



74. Independent claims 1, 5, 6, and 11 teach the use of “an electronic device with one or more processors and memory storing one or more programs for execution by the one or more processors.” *E.g.*, EX1001 at 13:9-12 (claim 1), 13:48-50 (claim 5), 14:1-6 (claim 6), 14:38-42 (claim 11). These claims disclose that such an electronic device, among other functions, executes “transferring the first digital

image; . . . and transferring information of a cosmetic product.” *E.g.*, EX1001 at 13:19-21 & 13:29 (claim 1), 13:62 & 13:63 (claim 5), 14:11 & 14:18 (claim 6), 14:47 & 14:54 (claim 11).

IV. CLAIM CONSTRUCTION

75. I understand that Petitioner has not proposed any terms for construction. After having reviewed the ’595 patent and its prosecution history, I agree that no terms for construction are necessary to resolve any disputes identified in this Petition.

V. IN MY OPINION, ALL CLAIMS OF THE ’595 PATENT ARE UNPATENTABLE

76. In my opinion, all claims of the ’595 patent are unpatentable for the reasons I discuss below.

A. Ground 1: Bandic Renders Obvious Claims 5, 6, and 11 of the ’595 Patent.

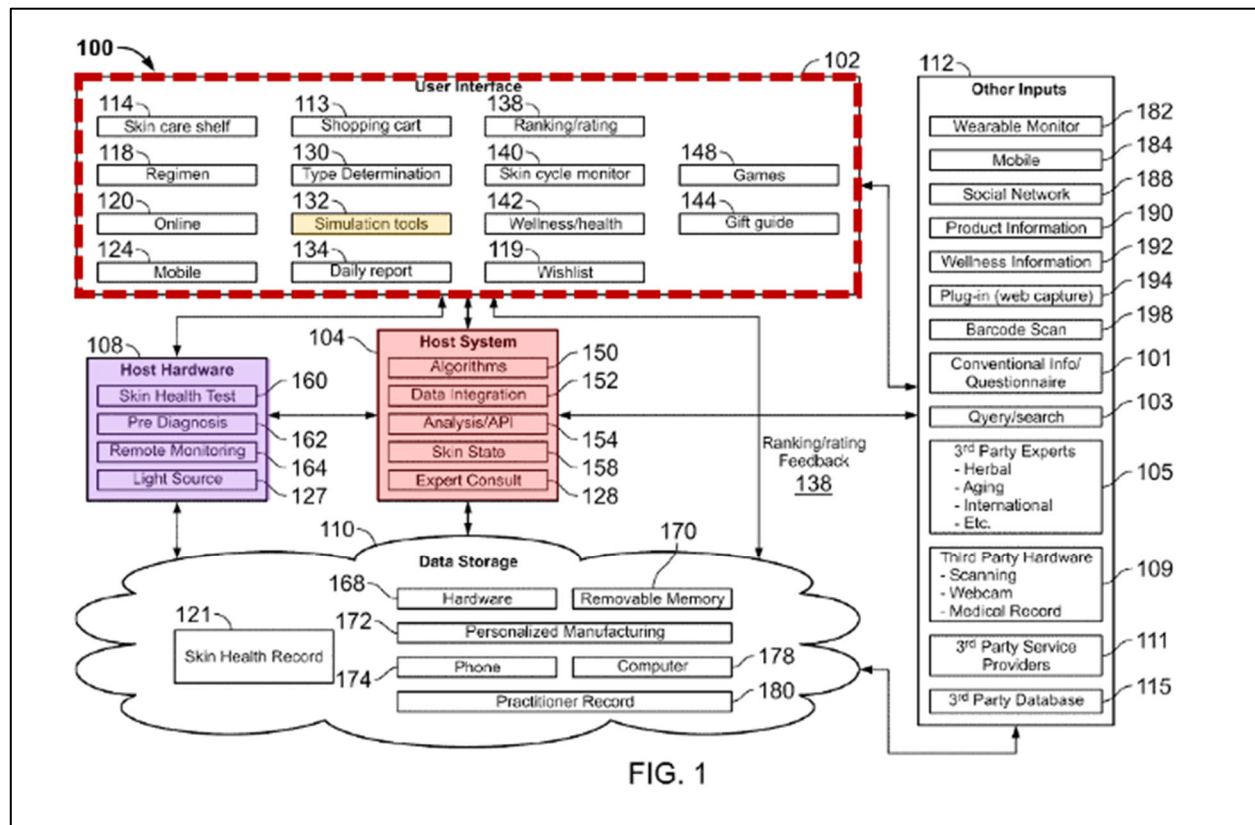
1. Summary of Bandic

77. Bandic (published on December 8, 2011) relates to methods and apparatus that collect dermal images, analyzing those images, and make skin condition assessments including “skin care recommendation.” Bandic, ¶ 0006. Bandic also relates to image processing techniques and to “determining a skin photo type of a captured image in a Red Green Blue (RGB) color imaging system” Bandic, ¶ 0007. While Bandic has many inventive aspects, one of its aspects relates to determining cosmetics for a person. Bandic, ¶ 0075 (“according to a first aspect of the present invention, a method for determining skin characteristics and cosmetic

features using color analysis may include a step of analyzing color of skin images in a pixel by pixel manner in a Red Green Blue (RGB) color system for an acquired digital image.”), Bandic, ¶ 0076 (“According to the first aspect, a method for determining skin characteristics and cosmetic features using color analysis includes a step of generating a sample of most frequent standard RGB (sRGB) colors responsive to analyzing color of skin images in a pixel by pixel manner in the RGB color system for the acquired digital image after converting colors obtained in device dependent RGB color system into device independent standard RGB color system (sRGB).”).

78. Bandic’s system is similar to the ’595 patent’s system in my opinion. Bandic describes a system that comprises “**host hardware 108**, such as an **imaging device 108** . . . **a user interface 102** interfacing with the host hardware 108,” and “a **host system 104** for processing and analyzing captured information such as by

employing an algorithm 150.” Bandic, ¶ 0303 (describing Fig. 1 (color added)).



79. The **host hardware 108** can be an “imaging device 108 to capture images of skin structures,” such as a webcam or an iPhone camera module. *Id.*, ¶¶ 0304, 0311. The “**user interface 102** may be operable as an application running on a **device 108**, a computer, server, . . . a mobile platform 123, and the like.” Bandic, ¶ 0460.

80. The **host hardware 108** or the **user interface 102** may contain a display that displays images taken:

The device 108 may have a display for viewing the area to be imaged. For example, a user may use the display with positioning tools to obtain exact images over time, such as a series of images taken over different days. The display

may be integral to the device 108 or may be a separate display. For example, the device 108 may be connected to a monitor, such as that of a computer, using a wired connection or a wireless connection. In an embodiment, a user interface 102 to the device 108 may display a real time view of the imaging. Bandic, ¶ 0318.

Likewise, the term “digital imaging or digital image acquisition” refers to creation of digital images, typically from a physical object. The term is often assumed to imply or include the processing, compression, storage, printing and display of such images. Bandic, ¶ 0530.

81. The **host system 104** may be a device that offers processing and data/program storage memory, it may be a server interfacing with image capture peripheral devices, providing image analysis, recommending beauty products, etc. For example, Bandic states that “a host system 104 may comprise algorithms 150, data integration 152, analysis tools/API's 154, a skin state 158, an expert consult 128, and the like.” Bandic, ¶ 0384. It further states, “a skin analysis system 104 may be used to interface with the device 108, store images, deploy algorithms 150, track a skin state 158” Bandic, ¶ 0459. “[P]roduct information 190 may be an input 112 to the system 104 and user interface 102. A database of product information 190 may comprise product, name, claims, manufacturer information, ranking and ratings ...” Bandic, ¶ 0480. “[A] plug-in web capture 194 may be an input 112 to the system 104 and user interface 102.” Bandic, ¶ 0482. “[T]hird party hardware 109 may be an input 112 to the system 104 and user interface 102. The system may connect with various third party hardware 109, such as existing imaging solutions,

camera devices, computers, lighting systems, sports devices such as pedometers, and the like.” Bandic, ¶ 0486.

82. Bandic also performs similarly to the ’595 patent’s system in my opinion. The imaging **device 108** may transmit images to an analysis facility 154 (which is part of the **host system 104**), and the **host system 104** uses its algorithms 150 to analyze the image in an analysis block 154. Bandic, ¶¶ 0312, 0392. The analysis 154 analyzes the image in a pixel by pixel manner and calibrates the colors of the image by converting the device dependent RGB (e.g., red green blue) colors to device independent “standard” RGB values. Bandic, ¶¶ 0427, 0429.

83. The algorithm 150 further analyzes (block 154) the image using an RGB color analysis to determine a skin state (block 158). Bandic, ¶¶ 0427-0429, 0431, 0436, 0388, 0392. Based off the skin state 158, a cosmetic may be recommended to the user. *E.g.*, Bandic, ¶ 0498. A **simulation tool 132** in the **user interface 102** can use the skin state 158 to simulate a “cosmetic regimen 118,” which may “include a split image with the original face on one half and a new simulated output on the other half.” Bandic. ¶ 0423.

2. Bandic discloses or renders obvious each element of claim 5.

a. 5[pre]: A method for analyzing a skin of a subject and identifying a cosmetic product for the subject, comprising:

84. In my opinion, Bandic discloses or renders obvious this limitation.

85. Bandic discloses that a purpose of the invention is to conduct “[r]eal-time analysis of digitally captured skin characteristics . . . [to perform] skin regimen recommendation” Bandic, ¶ 0053; *see also, e.g., id.*, ¶¶ 0006, 0057, 0067, 0293 Fig. 1 (system for recommending and having a product recommendation module). Bandic further discloses that its “[a]lgorithms 150 may be used to analyze 154 non-medical concerns, such as the effectiveness of a medical, non-medical, or cosmetic regimen 118” Bandic., ¶ 0388; *see also* Bandic, ¶¶ 0303, 0384.

86. Bandic also describes that an analysis (block 154) may be used to determine a skin state (block 158), which can be used to “make a quantitative assessment of . . . cosmetic indications, such as . . . skin color.” Bandic, ¶ 0392. Additionally, Bandic describes that by using a skin state, a new product or regimen (e.g., which can be for cosmetic purposes) can be recommended. Bandic, ¶ 0498 (“[g]iven the current skin state 158, a new product or regimen 118 may be recommended.”), 0466 (“useful in recommendation of a cosmetic product.”). Bandic further discloses “a method for determining skin characteristics and cosmetic features using color analysis [that] may include a step of analyzing color of skin images in a pixel by pixel manner in a Red Green Blue (RGB) color system for an acquired digital image.” Bandic, ¶ 0075; *see also id.*, ¶ 0456, 0292 (a “product” according to Bandic includes a “cosmetic”).

87. Given these disclosures, it is my opinion that a POSITA would understand that Bandic teaches or renders obvious this limitation.

b. 5[a]: at an electronic device with one or more processors and memory storing one or more programs for execution by the one or more processors:

88. In my opinion, Bandic discloses or renders obvious this limitation. For the claimed aspect about “*an electronic device*,” it would be obvious to a POSITA that Bandic’s host hardware 108, host system 104, user interface 102, and data storage 110 could all be integrated into an electronic device. I expand on this below.

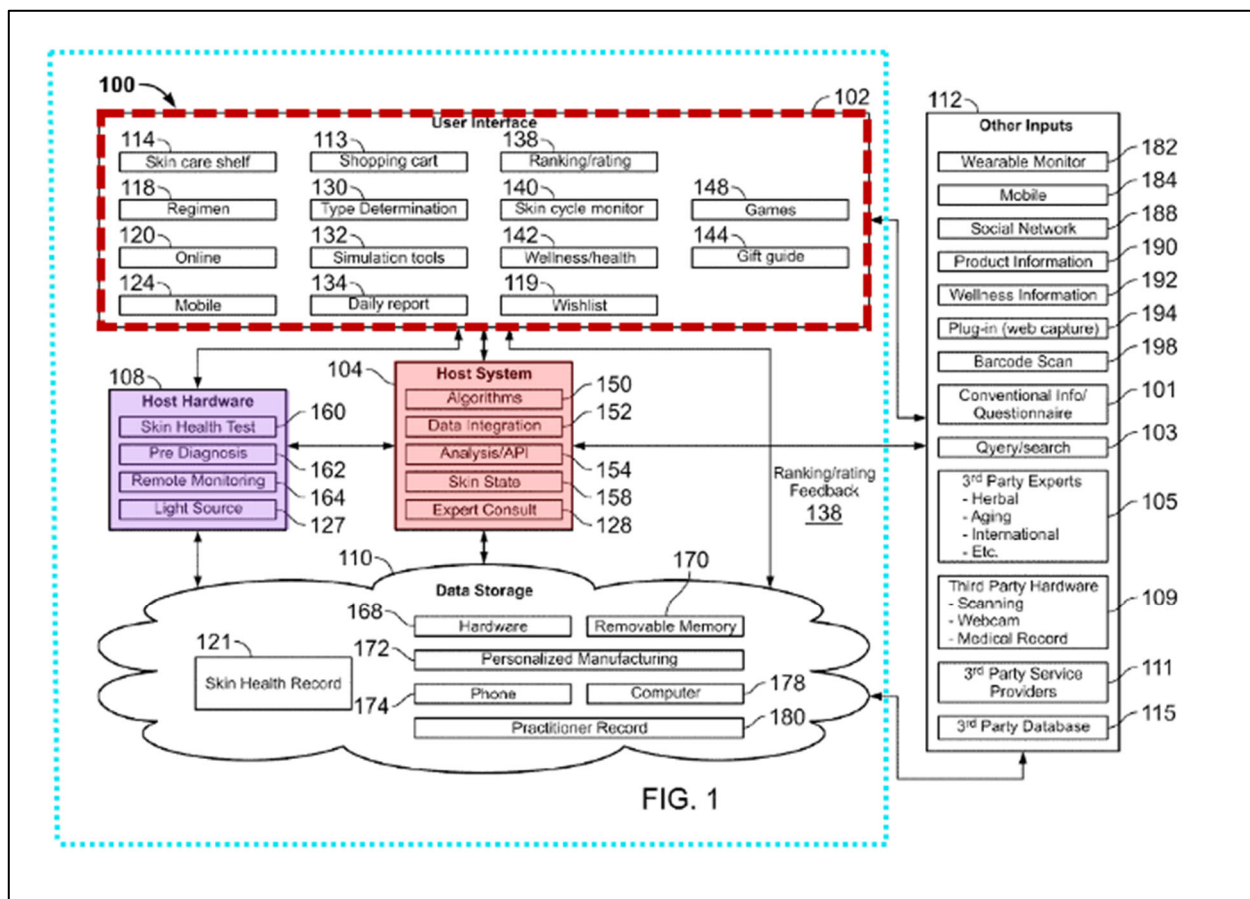
89. Bandic discloses “a system for health analysis, monitoring, and recommendation” that comprises “**host hardware 108**, such as an imaging device 108[,]. . . **a user interface 102** interfacing with the **host hardware 108**,” and “a **host system 104** for processing and analyzing captured information” Bandic, ¶ 0303 (describing Fig. 1 below) (color added).

90. Bandic teaches that the user interface 102 may integrate with the host device 108. For example, the **user interface 102** may be operable as an application running on a **device 108**, a computer, server, . . . a mobile platform 123, and the like.” Bandic, ¶ 0460 (describing **user interface 102** can run in any environment), ¶ 0461. Bandic further describes that “the **device 108** may integrate with **user interface 102**.” Bandic, ¶ 0384.

91. Bandic also suggests that the host system 104 encompasses the user interface 102 and the host device 108. For example, Bandic discloses that “the system 104 may be home based . . . [where] the device 108 may integrate with a user interface 102 . . . to perform analysis 154, skin state 158 record keeping, obtain referrals/analysis from a . . . algorithm 150.” Bandic, ¶ 0386. Bandic also describes that the **host system 104** “may comprise server architecture” but can be “technology agnostic.” Bandic, ¶ 0384.

92. Bandic also suggests that the data storage 110 may be integrated into the host system 104/user interface 102/host device 108. For example, Bandic states that “[d]ata may be stored in an internal device memory 168.” Bandic, ¶ 0312.

93. Thus, in my opinion, a POSITA would find it obvious that the **device 108**, **user interface 102**, and **host system 104** could all be in one electronic device because Bandic teaches that the user interface 102 may be integrated into the host device 108. Bandic also suggests that the host system 104 encompasses the user interface 102 and host device 108 in order to perform analysis (block 154) to determine skin state (158). Bandic also teaches that its data storage 110 may occur by storage via internal device memory 168. Bandic, ¶ 0312. Thus, a POSITA would also find it obvious that the single device that integrates the device 108, user interface 102, and host system 104 can also encompass data storage 110.



See Figure 1 (annotated above to show that the host hardware 108, system 104, user interface 102, and data storage 110 can all be integrated into one device).

94. For the claimed aspect about “processors and memory storing one or more programs for execution,” a POSITA would understand that the host system 104 (which could incorporate both the device 108, integrated user interface 102, and data storage 110) could be a computer, server, or mobile platform, which would necessarily include a processor and memory that would store programs for execution on the processor(s). As I described above, it would be obvious to a POSITA that Bandic’s host system 104 could incorporate both the device 108 and integrated user

interface 102, thus combining host system 104, host device 108 and user interface 102 into a single electronic device. Additionally, a POSITA would understand that this electronic device could be a computer, server, or mobile platform, which would necessarily include a processor and memory that would store programs for execution on the processor(s). *See* Bandic, ¶ 1686 (stating that in all embodiments, the “depicted elements and the functions thereof may be implemented on machines through computer executable media having a processor capable of executing program instructions stored thereon . . .”), ¶¶ 1687-89.

95. Additionally, I note that while Bandic generally uses the terms “in an embodiment” to refer to aspects of the system it describes, the discussion about Bandic here does not combine separate or distinct embodiments, and the citations refer to interchangeable variations in my opinion. For example, Bandic, ¶ 0388 recites “in an embodiment” in various sentences when describing an algorithm, analysis and skin state. *See* Bandic, ¶ 0388. Yet nothing in this paragraph or the surrounding discussion suggests that these are distinct embodiments. Bandic is clear that the variations it describes may be modified and combined. Bandic, ¶ 1691 (“the invention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the invention.”). Additionally, Bandic’s disclosures that I cite to do not appear to recite distinct embodiments. As some examples: paragraphs 0303–0304 describe the system as a whole and refer to Figure 1; paragraphs 0305–

0309 describe aspects and variations of the system's imaging device 108; paragraphs 0310-0324 describe aspects and variations of the system again, where, as one example, 0318 recites aspects of the imaging device and also recites aspects of the imaging device if it had tracking and targeting features, but does not isolate the imaging device 108 to certain features if it does have tracking and targeting features. In other words, unless Bandic is abundantly explicit that an embodiment is separate and distinct, a POSITA would understand to combine aspects of Bandic's disclosures with necessary modifications in my opinion.

c. 5[a1]: calibrating colors of a first digital image, wherein the first digital image depicts at least a portion of a face of the subject, and the first digital image includes a plurality of pixels;

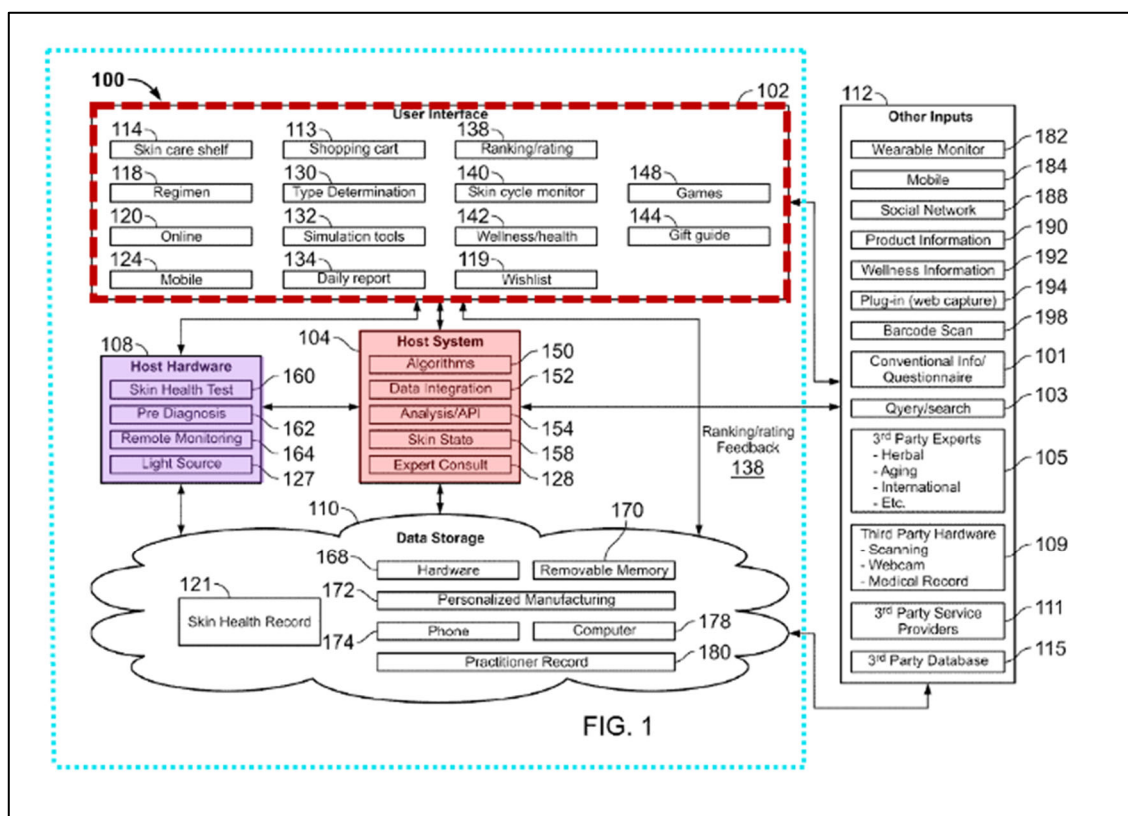
96. In my opinion, Bandic discloses or renders obvious this limitation. For the “*first digital image depict[ing] at least a portion of a face of the subject . . . includ[ing] a plurality of pixels,*” Bandic teaches that the host hardware 108 or third party hardware 109 (via a webcam) can capture an image, and that a digital image comprises pixels.

97. First, for example, the **host hardware 108** can be an “imaging device 108 to capture images of skin structures.” Bandic, ¶ 0304. The imaging system may be a variety of camera sources, such as a “camera embedded in a cell phone or iPhone,” as well as other types. Bandic, ¶ 0311. The camera may capture an “image

[of] any size area, such as a small portion of the skin, [or] **the full face . . .**” Bandic, ¶ 0311 (emphasis added).

98. Second, Bandic also describes that the captured image may be from a third party hardware 109, such as a webcam. Bandic states: “a sensor for detecting reflected or re-emitted light from the skin may be embodied in optics resident in a CCD camera, CMOS-based imaging system, digital camera, webcam, camera embedded in a communications device such as a cell phone or iPhone, PDA (Personal Digital Assistant), a watch or other wearable device for continuous monitoring of the skin as in a sports-type indication, a third party device, a scanner, and the like. The sensor may be adapted to absorb any wavelength of light, such as near IR or visible wavelengths. The sensor may be adapted to automatically filter out particular wavelengths. The sensor may be adapted to image any size area, such as a small portion of the skin, the full face” Bandic, ¶ 0311.

99. Bandic also describes that “[i]n general, color digital images are made up of pixels” and that discrete pixels can have red green blue (RGB) values. Bandic, ¶ 0602.



Bandic at Fig. 1 (annotated).

100. As to “calibrating colors of a first digital image,” like the ’595 patent, Bandic describes that its **host system 104** can calibrate a received image. Bandic describes that the **imaging device 108** can transmit the digital image to the **host system 104**, which can then analyze the image using an algorithm 150. Bandic, ¶¶ 0312, 0392, 0427, 0429.

101. This analysis (block 154) (e.g., via algorithm 150) may calibrate the acquired digital image via color offset correction. Specifically, Bandic describes that the “algorithm 150 may use RGB color analysis” to determine cosmetic parameters, Bandic, ¶ 0427, and “for determining a skin phototype of acquired digital image.”

Bandic, ¶ 0428. The color analysis includes “analyzing the color of skin images in a pixel by pixel manner.” Bandic, ¶ 0429. As part of this analysis, “colors obtained in a device dependent RGB color system are then converted into a device independent standard RGB color system (sRGB).” Bandic, ¶ 0429; *see also id.*, ¶¶ 0435, 0439, at Fig. 58 (describing color offset) and Fig. 59 (depicting pixel view of image of subject’s face). Bandic also teaches the use of other standard color spaces such as YIQ, YCbCr, L *a*b*, L *u*v* and HSUHSV,” stating that “[t]he enhancement of the current algorithm 150 may include at least one of these color systems and its/their correlation with presented sRGB analysis.” Bandic, ¶ 0430.

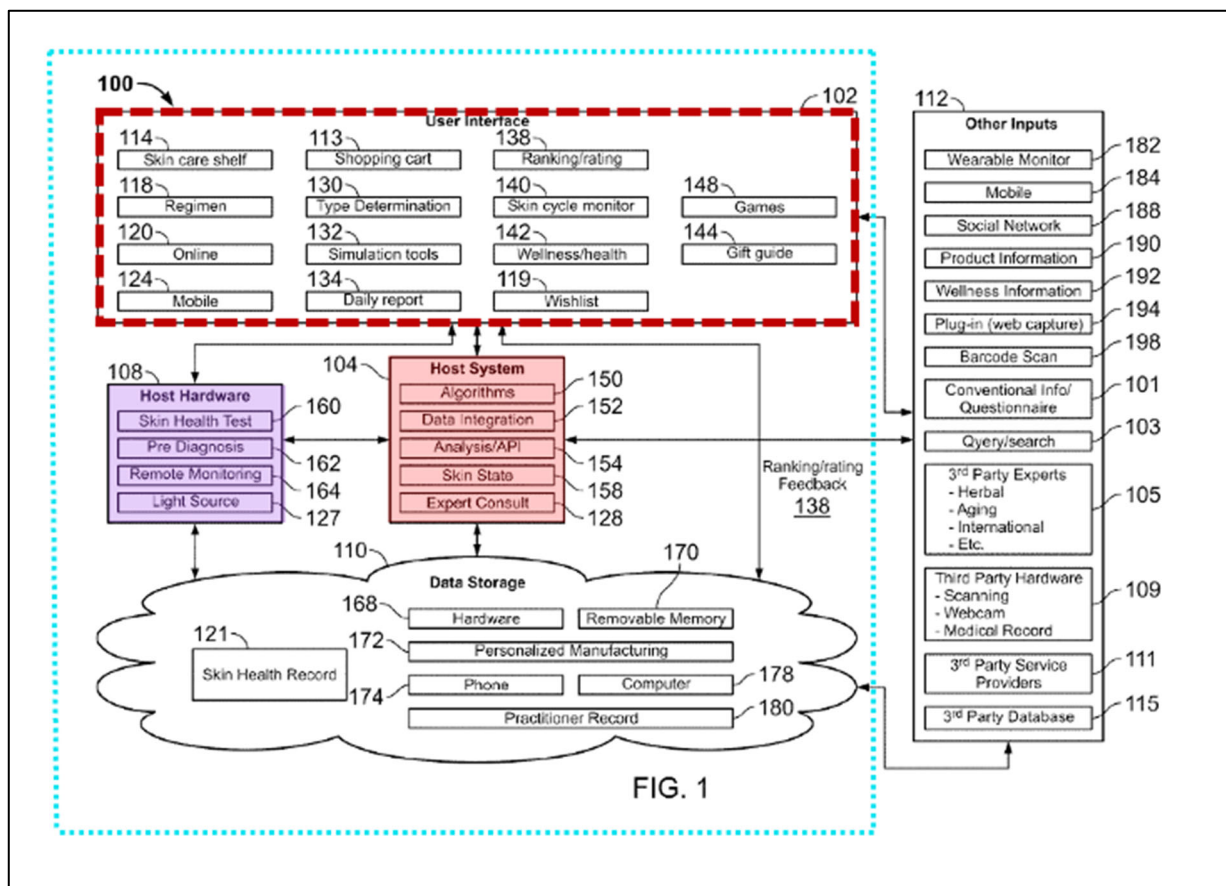
102. A POSITA would understand that color offset correction is equivalent to calibrating the colors of the first digital image because it takes device dependent colors and converts them into standard-space colors. For example, a colorimeter and calibration software can be used to compare the values that were actually sent to a display against the readings from the colorimeter calibration device. This establishes the current offsets in color display. Depending on the calibration software and type of monitor used, the software either creates a correction matrix for color values before being sent to the display or gives instructions for altering the display's brightness/contrast and RGB values through the display controls. This tunes the display to reproduce fairly accurately the in-gamut part of a desired color space. “Color Imaging Science” book (EX1009) was published in 2005 and offers

comprehensive description of the relevant state of the art at that time. Device calibration is described in detail in EX1009, Chapter 16 titled “Device calibration.” Sections 16.1, 16.1.1, 16.1.2, 16.1.3 (Colorimetric calibration) are especially relevant. Bandic describes that color offset can include calibration of the imaging device, such as a digital camera, to ensure that the acquired digital image’s color is offset correctly. *See* Bandic, ¶ 0439; *see also* Bandic, ¶ 1144 (describing meaning of “calibration”).

d. 5[a2]: displaying the first digital image;

103. In my opinion, Bandic discloses or renders obvious this limitation.

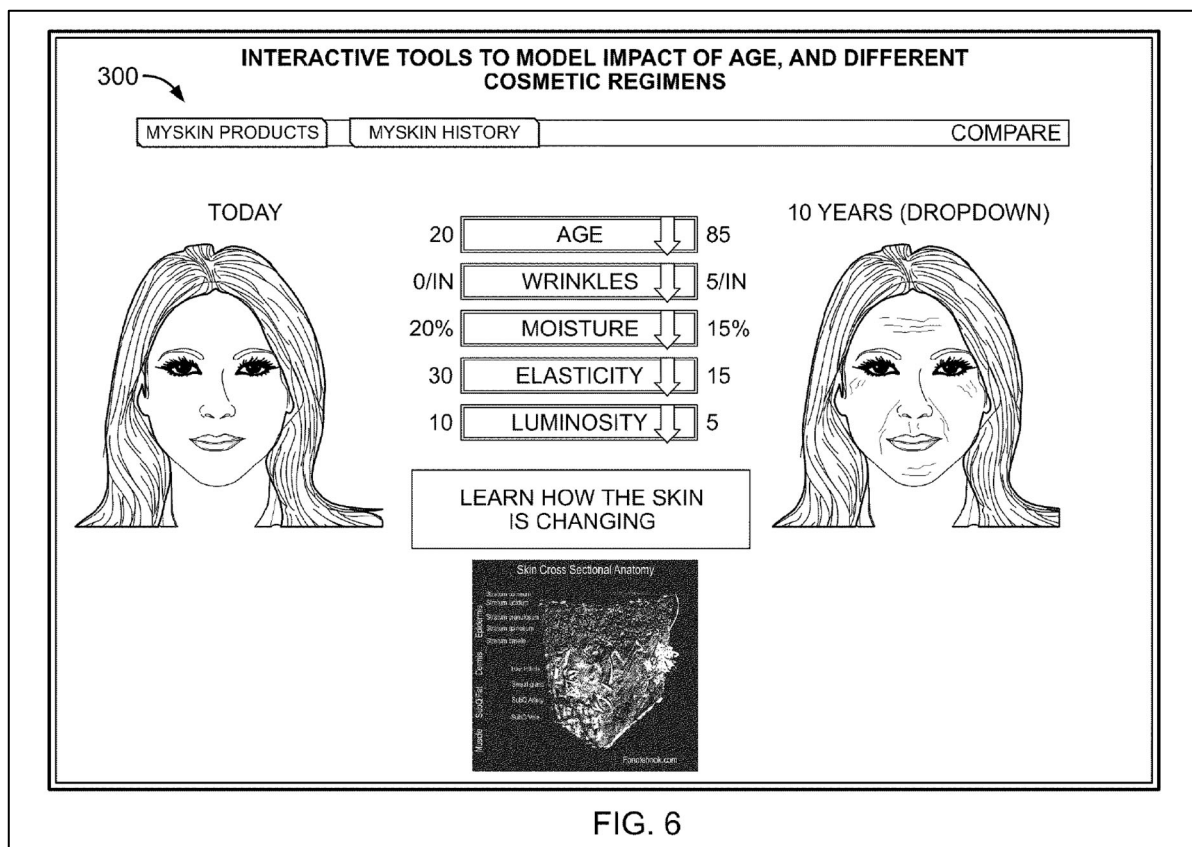
104. For the claimed aspect about “*displaying the first digital image*,” Bandic discloses that the “**device 108** may have a display for viewing the area to be imaged,” and that the “**user interface 102** to the **device 108** may display a real time view of the imaging.” Bandic, ¶ 0318. Bandic further discloses that its use of “digital imaging” implies “display of such images.” Bandic, ¶ 0530. Thus, in my opinion, a POSITA would find it obvious that a display could show a captured image.



Bandic at Fig. 1 (annotated).

105. Bandic also provides additional examples of the user interface displaying an image.

106. One example is Figure 6. There, Bandic states that “a user may use a user interface 102 to access the simulation tools 132. In the example, the image of an entire face may be used After selecting or capturing a starting image, a user may indicate the kind of simulation they would like to perform.” Bandic, ¶ 0423. Thus, Bandic’s Figure 7 teaches that the first digital image could be displayed on the user interface 102’s display.



Bandic at Fig. 6.

107. Another example is Bandic's Figure 7. Figure 7 is a recommendation page of the skin care system shown in Figure 1 that illustrates what is shown at the user interface 102, and this is shown on the left side of Figure 7. Bandic, ¶ 0114.

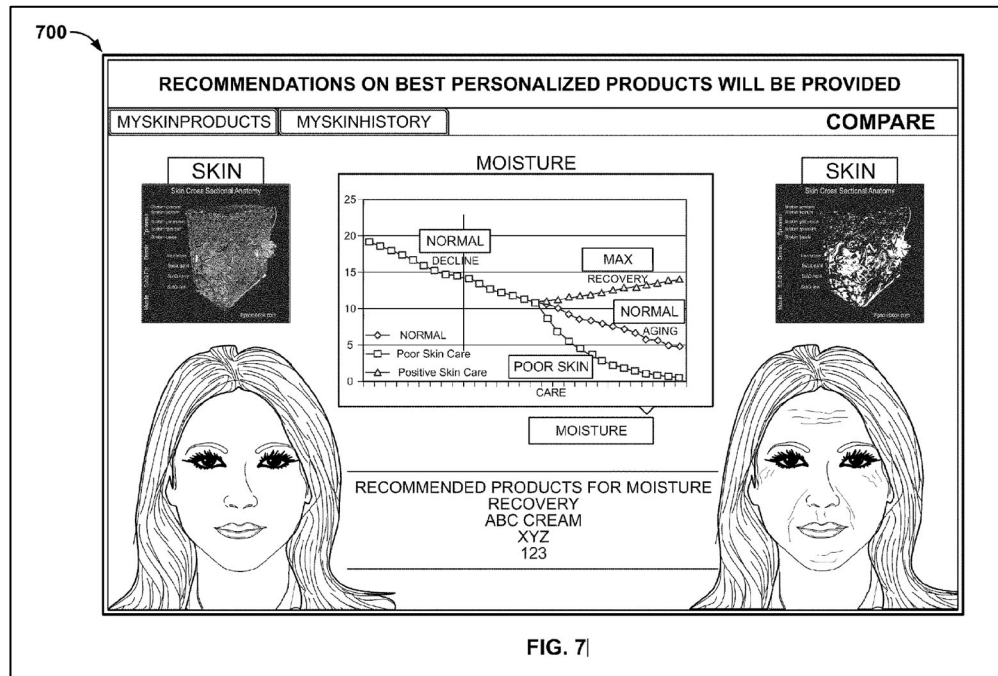


FIG. 7

Bandic at Fig. 7.

- e. **5[a3]:** dividing the display of the first digital image into two sides, wherein one side of the first digital image is displayed with no cosmetic product applied, and one side of the first digital image is displayed with a simulated application of a cosmetic product;

108. In my opinion, Bandic discloses or renders obvious this limitation.

109. Bandic describes that “a user may use a user interface 102 to access the simulation tools 132,” and the “algorithm 150 for determining a skin state 158 may enable prediction/simulation tools 132.” Bandic, ¶ 0423. Bandic further describes that, using “[t]he simulation tool 132 may return data on . . . product usage simulation” *Id.* It refers to FIG. 6, teaching that “a user may use a user interface 102 to access the simulation tools 132” and describes that the image can be divided to display a portion with product usage simulation applied: “In the example, the

image of an entire face may be used but it should be understood that simulation tools 132 may be used to generate simulations for any size area of concern.” *Id.* “For example, the output may also include a split image with the original face on one half and a new simulated output on the other half.” *Id.* A POSITA would find it obvious that product usage simulation could include cosmetic product simulation.

110. Additionally, because Bandic describes that algorithm 150 for determining a skin state 158 may be used to determine a cosmetic and because the cosmetic may be simulated on the user interface (Bandic, ¶ 0423), in my opinion, a POSITA would find it obvious that the simulation tool could simulate application of the cosmetic which was determined by the host system 104. *See infra*, 124-128 (claim 5[a5], describing the user interface 102 receiving data about a cosmetic).

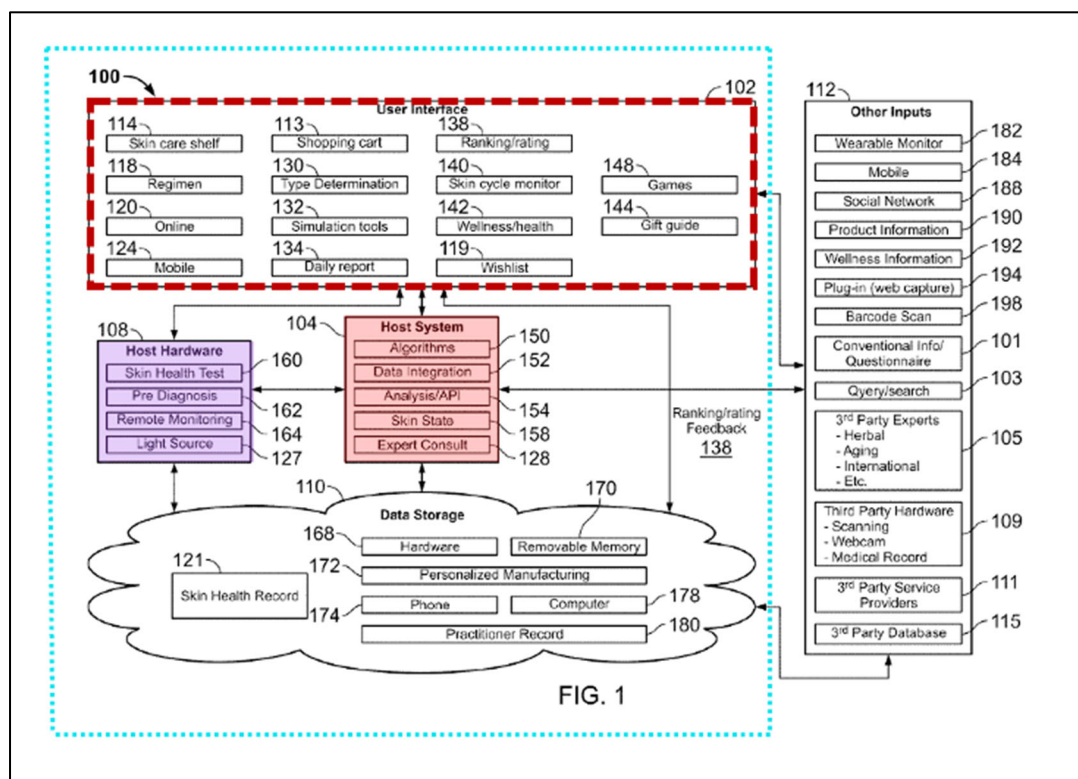
f. 5[a4]: transferring the first digital image; and

111. In my opinion, Bandic discloses or renders obvious this limitation.

112. For example, Bandic’s system (which incorporates the host hardware 108, user interface 102, host system 104 and data storage 110 into one electronic device), can transfer the first digital image (*e.g.*, externally) by receiving the image from a peripheral third-party device that captures the image. As one example, Bandic describes that a “mobile phone may have an attachment or an integrated feature that may enable a user to take an image of the skin and input/capture data and have it connect via the web, wirelessly or via cable, to the user interface 102 and enable

seamless connectivity and data transfer.” Bandic, ¶ 0503. By having a mobile phone transmit the image to the user interface 102, the system would receive (i.e., transfer) the digital image. Bandic also suggests that the captured image may be from third party hardware 109, such as a webcam. Bandic describes “a sensor for detecting reflected or re-emitted light from the skin may be embodied in a . . . webcam” (Bandic, ¶ 0311), and suggests using Figure 1 (other inputs block 112’s third party hardware 109’s webcam) that the webcam can transmit information to the user interface 102 or the host system 104. *See* Bandic at Fig. 1.

113. Thus a POSITA would understand that Bandic’s system could receive the digital image (e.g., thus, transferring the digital image).



Bandic at Fig. 1 (annotated).

114. As another example, Bandic's system (which incorporates the host hardware 108, user interface 102, host system 104, and data storage 110 into one electronic device), can transfer the first digital image (*e.g.*, internally) by transferring a captured image from the host hardware 108 (also called the **device 108**) to the **host system 104**. Bandic states that "device 108 may store captured images for analysis and/or transmittal to an analysis facility 154." Bandic, ¶ 0312. Bandic further discloses that the images "may be transmitted over a wireless network connection, a cellular connection, a wired connection," etc. *Id.*

115. Thus, a POSITA would find it obvious that Bandic teaches transferring the digital image.

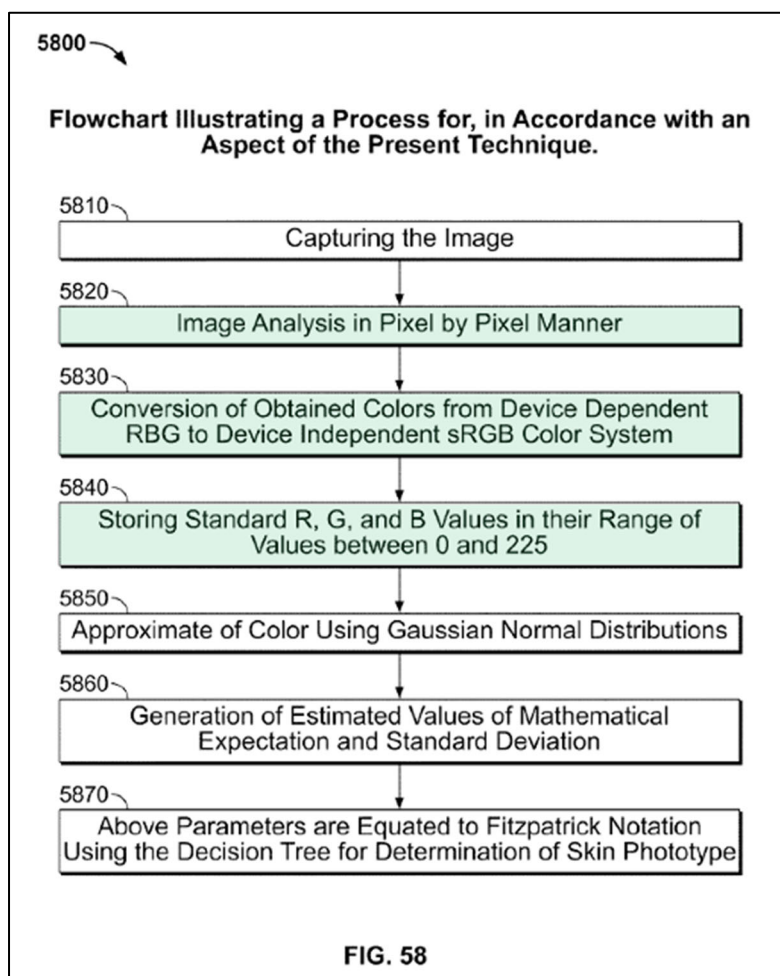
- g. 5[a5]: transferring information of a cosmetic product, wherein skin pixels in the plurality of pixels are identified, color space values are identified from the skin pixels, and the cosmetic product is identified at least based on the color space values.**

116. Bandic discloses or renders obvious this limitation in my opinion. For the claimed aspect about "*skin pixels in the plurality of pixels are identified, color space values are identified from the skin pixels,*" Bandic discloses that the algorithm 150 (which is in the **host system 104**) conducts an RGB color analysis. Bandic, ¶¶ 0427-0428. Specifically, the color analysis may include analyzing the colors of each pixel after converting them from device dependent colors to a device independent standard:

In an exemplary embodiment of the present invention, a method for determining skin characteristics and cosmetic features using **color analysis includes a step of analyzing the color of skin images in a pixel by pixel manner in a Red Green Blue (RGB) color system** for an acquired digital image. The colors obtained in a device dependent RGB color system are then converted into device independent standard RGB color system (sRGB) which will be used in subsequent color analysis. The step of analyzing the color of skin images in a pixel by pixel manner in a sRGB color system for an acquired digital image comprises analyzing a picture of a part of a person's skin by generating a table of most frequent colors appearing in the picture.

Bandic, ¶ 0429 (emphasis added). Bandic further describes that, as part of the color analysis, the pixels are converted into values for a color space (which Bandic describes can be multiple different color space types), such as a standard RGB (sRGB) color space values. Bandic, ¶¶ 0430. Bandic also states that “[t]he step of generating a sample of most frequent sRGB colors responsive to analyzing the color of skin images in the sRGB color system for the acquired digital image comprises preserving a plurality of sRGB color values.” Bandic, ¶ 0431.

117. Bandic illustrates this in Figure 58 (a process for determining a skin phototype). Bandic describes that for Figure 58, an image of a subject is analyzed in a pixel-by-pixel manner, the device dependent RGB colors are converted into standard (device independent) “sRGB” color values (i.e., calibrated), and those values are generated in a range between 0 and 255. Bandic, ¶ 0436, Fig. 58 (annotated in color).



118. Bandic further teaches that the color space values reflecting skin color are identified from skin pixels, stating that “In some embodiments, the skin type and/or color may be detected automatically if the user interface is interfaced with an imaging device 108. Bandic ¶ 0505. This is shown on Bandic’s Fig. 19 (below) where next to the “Skin Color” attribute is text “(automatically detected).”

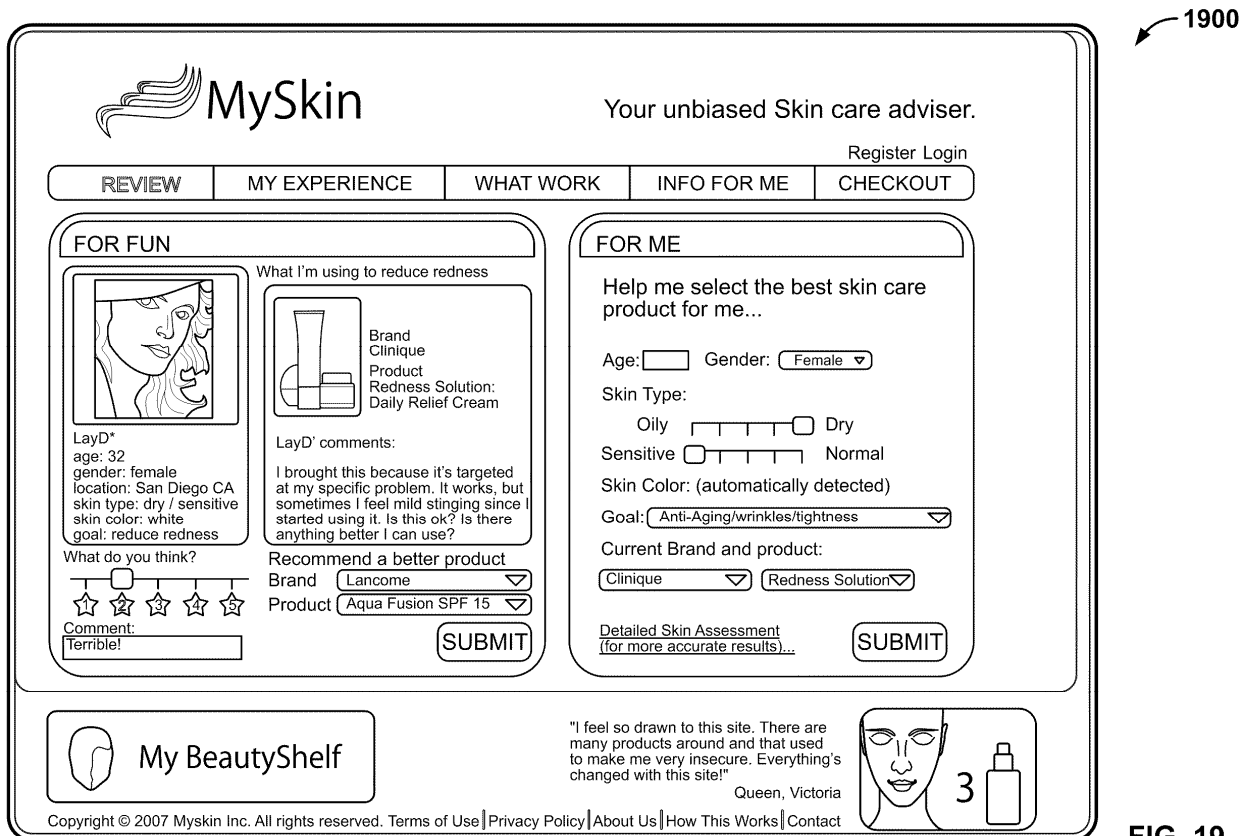


FIG. 19

119. For the claimed aspect about “*the cosmetic product is identified at least based on the color space values,*” Bandic discloses that the algorithm 150’s use of color analysis can determine skin phototype (i.e., standardized skin color) and suggests this can be used to determine parameters for cosmetics. Bandic states, “the skin phototype can be found in a very short period of time using a simple skin and cosmetic parameters classification routine,” teaching that machine learning (classification) can be used to determine a match between the skin phototype and cosmetic product to be recommended. Bandic, ¶ 0427. “The phototype of skin is determined according to corrected Fitzpatrick classification. The Fitzpatrick Skin Typing Test questionnaire (skin type scale) which ranges from very fair (skin type

I) to very dark (skin type VI) is often used to determine skin phototype.” Bandic ¶ 0427. Bandic further describes that, in general, the algorithm 150 may be used to determine skin state 158, such “mak[ing] a quantitative assessment of . . . cosmetic indications, such as . . . skin color” (Bandic, ¶ 0392) and that they may be used to “recommend and design personalized products based on skin health” (Bandic, ¶ 0388). *See also* Bandic, ¶ 0498 (“Given the current skin state 158, a new product or regimen 118 may be recommended.”). Bandic further describes that a POSITA would appreciate that its RGB color analysis “may be useful in recommendation of a cosmetic product.” *See* Bandic, ¶ 0456.

120. In this context, skin state provides a comprehensive description of the skin from image data, in which skin phototype or skin color are just some descriptors contributing to skin state: “principles of the invention, may be useful for analysis of skin characteristics, obtaining the biophysical properties of the skin and determining a skin state. The skin state may capture a combination of underlying skin structure with time-based variance. Some variation may be predictable but some may be based on a transient condition like infection, sunburn, hormonal imbalance, and the like. The algorithm may be able to measure aspects such as the structure, form, concentration, number, size, state, stage, and the like of melanocytes/melanin, hemoglobin, porphyrin, keratin, carotene, collagen, elastin, sebum, sebaceous gland activity, pores (sweat and sebaceous), wrinkles, moisture, elasticity, luminosity, all

forms of the aforementioned, such as derivatives, salts, complexes, and the like. The algorithm may be used to make a quantitative assessment of clinical, medical, non-medical, and cosmetic indications, such as moisture level, firmness, fine lines, wrinkle count and stage, pore size, percent of open pores, skin elasticity, skin tension lines, spots, skin color, psoriasis, allergies, red areas, general skin disorders and infections, or other skin related concerns for the user such as tumors, sunburns, rashes, scratches, pimples, acne, insect bites, itches, bleeding, injury, inflammation, photodamage, pigmentation, tone, tattoos, percent bum/bum classification, moles (naevi, nevus), aspects of skin lesions (structure, color, dimensions/asymmetry), melanoma, dermally observed disorders and cutaneous lesions, cellulite, boils, blistering diseases, management of congenital dermal syndromes, (sub)-cutaneous mycoses, melasma, vascular conditions, rosacea, spider veins, texture, skin ulcers, wound healing, post-operative tracking, melanocytic lesions, non-melanocytic lesions, basal cell carcinoma, seborrheic keratosis, sebum (oiliness), nail- and/or hair-related concerns, and the like.” Bandic ¶ 0554.

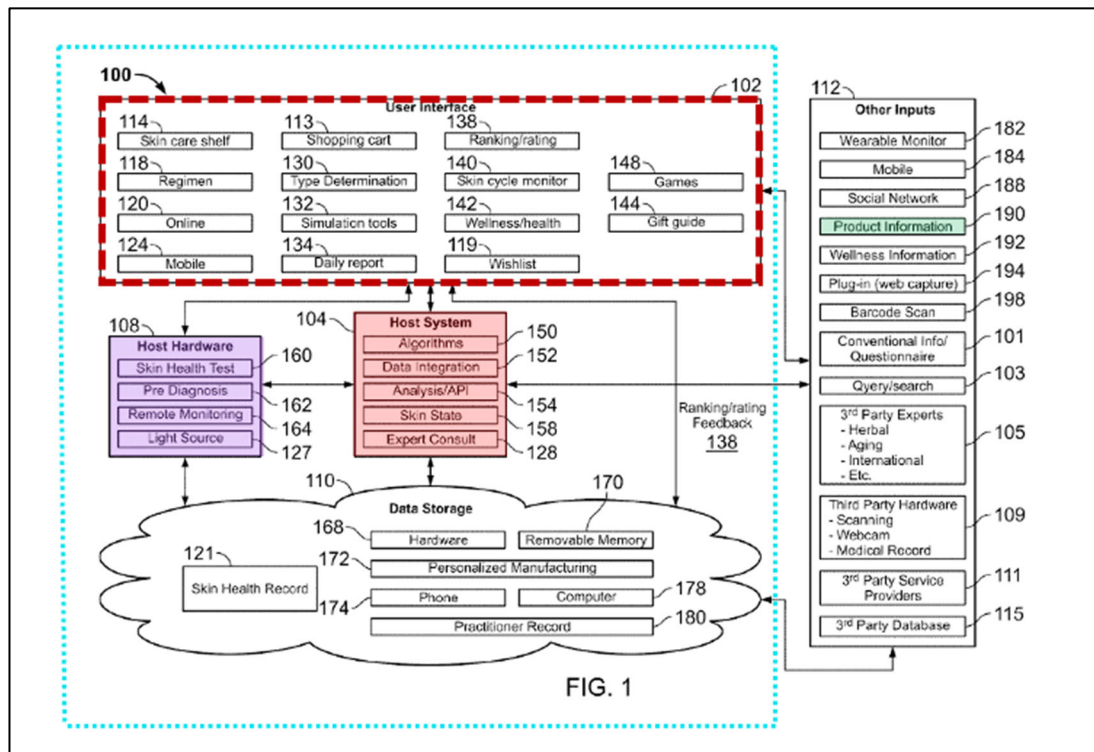
121. Bandic further describes that Fig. 19 (above) depicts a review page of the user interface of a skin care system, with the interface titled “Your unbiased skin care advisor” stating that identifying and recommending a skin product is the goal of this process. “The user interface may depict a portion of the user profile, such as the age, gender, location, skin type, skin color, skin goal, picture, and the like for the

user.” Bandic ¶ 0505. “The user interface may present tools to aid a user in selecting a product or regimen 118.” *Id.* Such an aid (product recommendation) is invoked and recommendation identified after clicking the SUBMIT button shown in Fig. 19 (above).

122. Given these broad disclosures, a POSITA would find it obvious that Bandic discloses that its algorithm 150’s use of color analysis can be used to identify a cosmetic product for a subject based on the color of the image skin pixels.

123. For the claimed aspect about “*transferring information of a cosmetic product*,” Bandic describes that the cosmetic product recommendation provided by the system on Fig. 1 may comprise **product information 190**, which may comprise “usage parameters, . . . color . . . and other such parameters that may be obtained and/or maintained to assist in the selection of the best product suited to the users’ individual preferences or conditions to obtain the best beauty or medical outcome for their skin.” Bandic, ¶ 0480. Bandic also teaches that this **product information 190** “may be an input 112 to the **system 104**.” Bandic, ¶ 0480; *see also id.*, ¶ 0303 (describing inputs into the host 104). Bandic also teaches that the analysis performed to determine skin state 158 or skin phototype, which is then used to determine a cosmetic product or regimen, relies on this product information. For example, Bandic states: “analysis 154 of images obtained from the device 108 . . . may also be used to determine a skin state 158. Based on the skin state 158, either derived

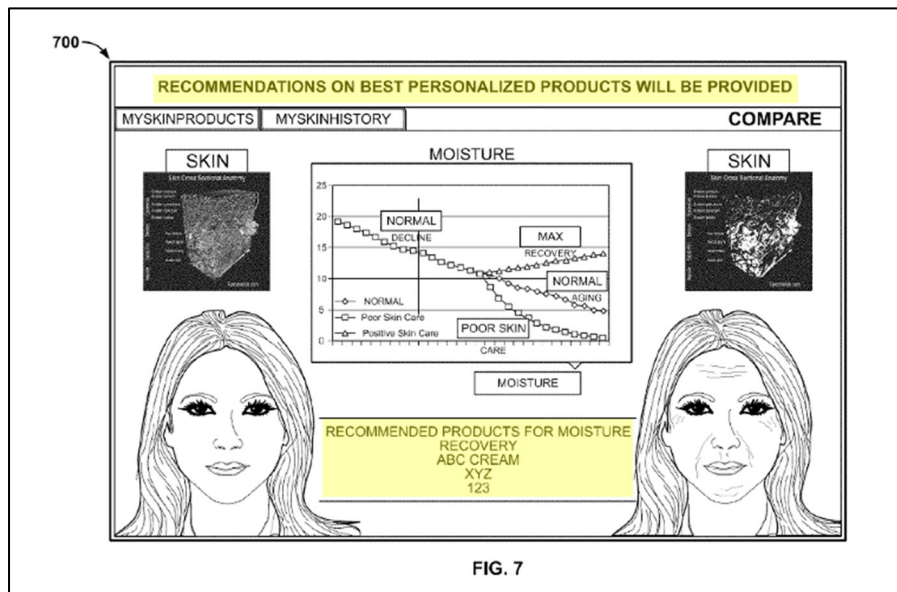
from user input, [or] analysis of images, . . . users may be able to determine products and regimens 118 that may work best for their skin state 158 by connecting to a database containing . . . product information 190 . . .” Bandic, ¶ 0498.



124. Bandic further discloses that the host system 104 and the user interface 102 can transmit (i.e., receive) the cosmetic product information from the product information 190 database in order to recommend the cosmetic product that was identified. Bandic is full of examples of where the recommended cosmetic is shown on a webpage or other visual shown in the user interface 102.

125. For example, Bandic describes Fig. 7, which a POSITA would understand could be shown on the display of the user interface 102, and which shows that the user interface can provide information about a specific “recommended

products,” such as “ABC CREAM.” Bandic at ¶¶ 0114 (“FIG. 7 depicts a recommendations page of a skin care system.”), 0488 (“The system may automatically recommend certain products based on the moisture level that may be effective given the moisture level, a skin state 158 . . .”), Fig. 7 (annotated below); Because the host system can determine skin state 158 and comprise product information, it would be obvious to a POSITA that the host 104 could send cosmetic product information to the user interface so that a user can see the recommended cosmetic product which is based off the determined skin state. Doing so is inherent to recommending a product based off conducting a color analysis.



126. Additionally, once the recommendation is available, information about the recommended beauty product is transferred to the user’s beauty shelf: “Referring to FIG. 22, a recommendation page of a user interface of a skin care system is depicted. Given the goal, various products or regimens 118 that may be effective in

meeting the goal may be shown on the recommendation page. The brand and product or regimen 118 may be shown along with a rating from the community of users, comments from users, the ability to indicate if the user believes the product may be better than the current product or regimen 118 in use, and the like. If the user believes the product or regimen 118 may be better than what they are currently using, the product or regimen 118 may be stored for future consideration on the beauty shelf 114.” Bandic, ¶ 0508, Bandic’s Fig. 22 (below).

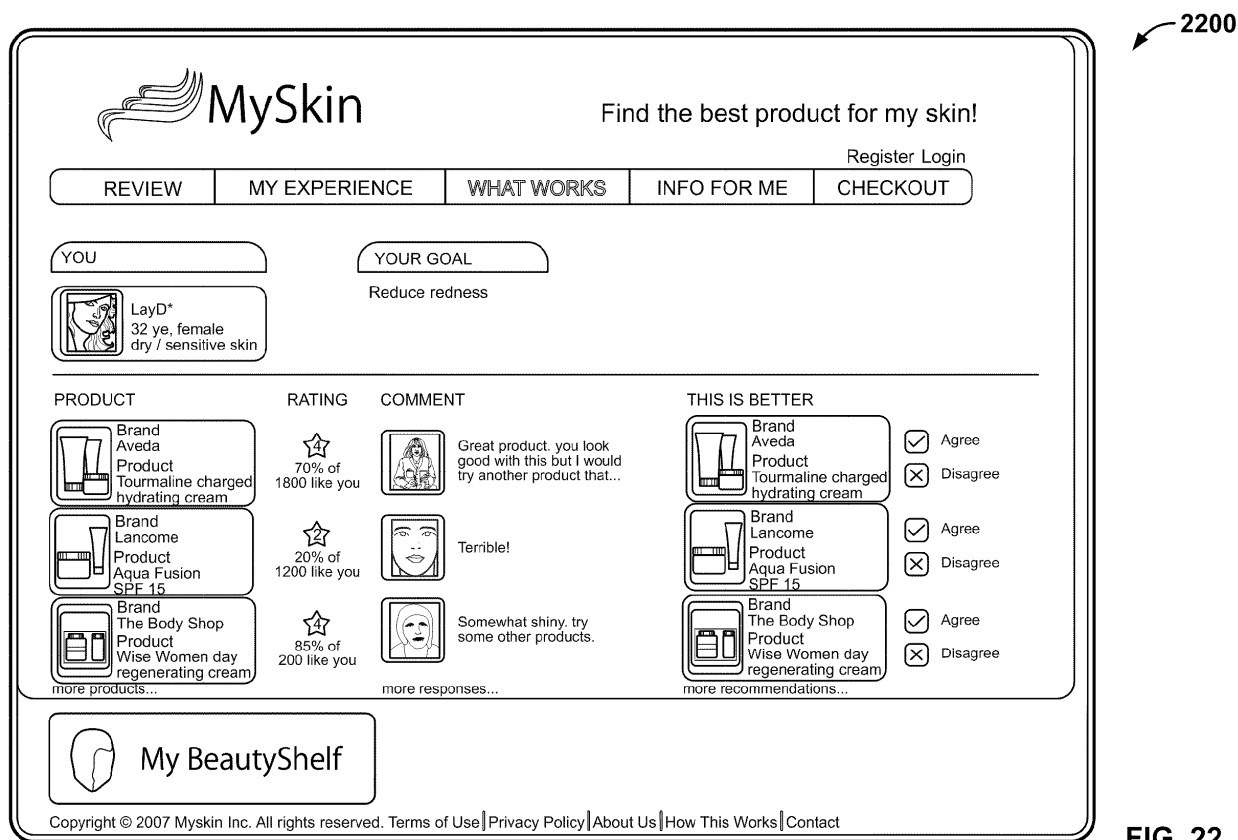
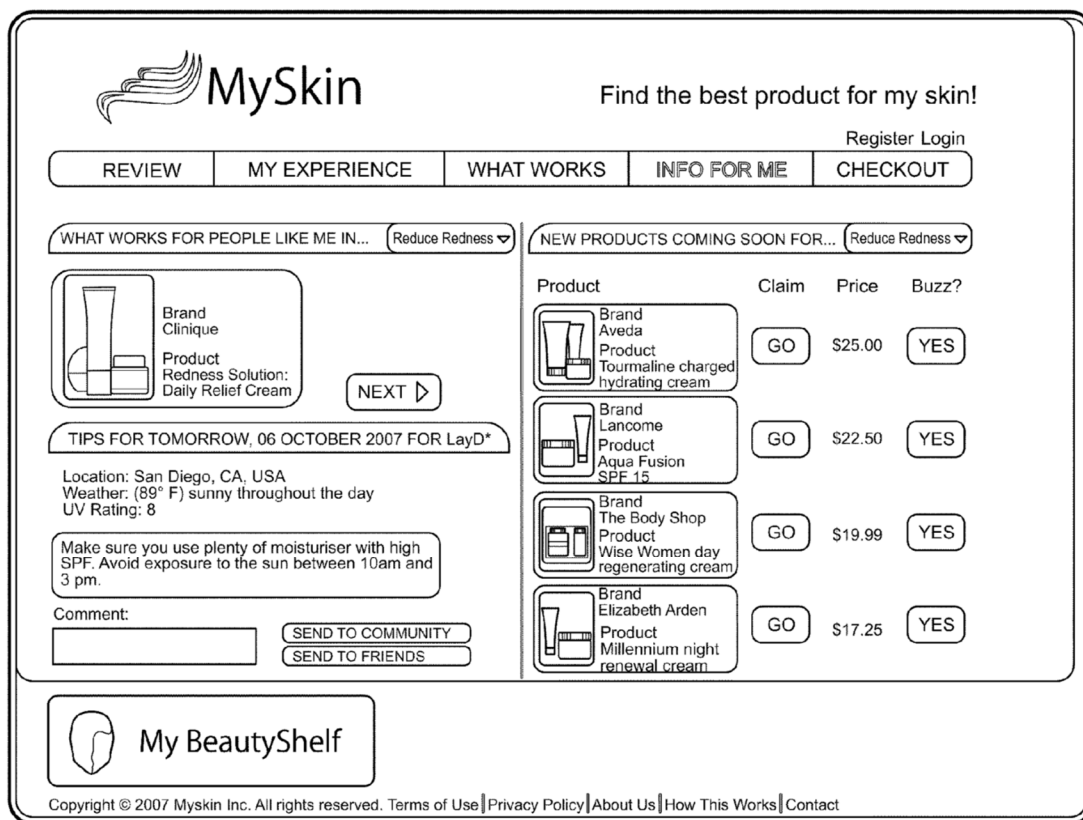


FIG. 22

127. Transferred information about the recommended product(s) may be diverse and rich, and is described as: “Referring to FIG. 23, an Info For Me page of a user interface of a skin care system is shown. A People Like Me algorithm 150

may be used to sort the community of users of the skin care system. Given the aspects of the user profile, the algorithm 150 may determine which other users are most similar along all criteria, along custom-selected criteria, along a combination of skin color and skin type, and the like. Once the algorithm 150 has determined a subset of the community of users who are most like the user, the user can view data for the community. For example, the user can find out which products work best for the subset generally, for a specific issue, for a specific time of day, for a specific season, and the like. The Info for Me page may also depict the weather for the location given in the user profile and a UV rating and any specific tips given the location/weather/environment. The Info for Me page may also alert the users of new products being launched. The user may sort the products according to effectiveness.” Bandic, ¶ 0509, Bandic’s Fig. 23 (below).



2300

FIG. 23

128. Information about the recommended product(s) is transferred to user's MyBeauty Shelf as follows: "Referring to FIG. 24, an example of a beauty shelf 114 portion of a user interface of a skin care system is shown. Products or regimens 118 used by the user may be categorized by time of day use, specific effectiveness, cost, expiration, and the like. Each item may be clicked on to pop-up additional details about the product or regimen 118, such as effectiveness, ingredients, suggested use, expiration date, a link to purchase more, a link to blog about the product or regimen 118, a link to write a review or read reviews, a link to the manufacturer's site, a link to an in-store coupon, and the like." Bandic, ¶ 0509, Bandic's Fig. 24 (below).

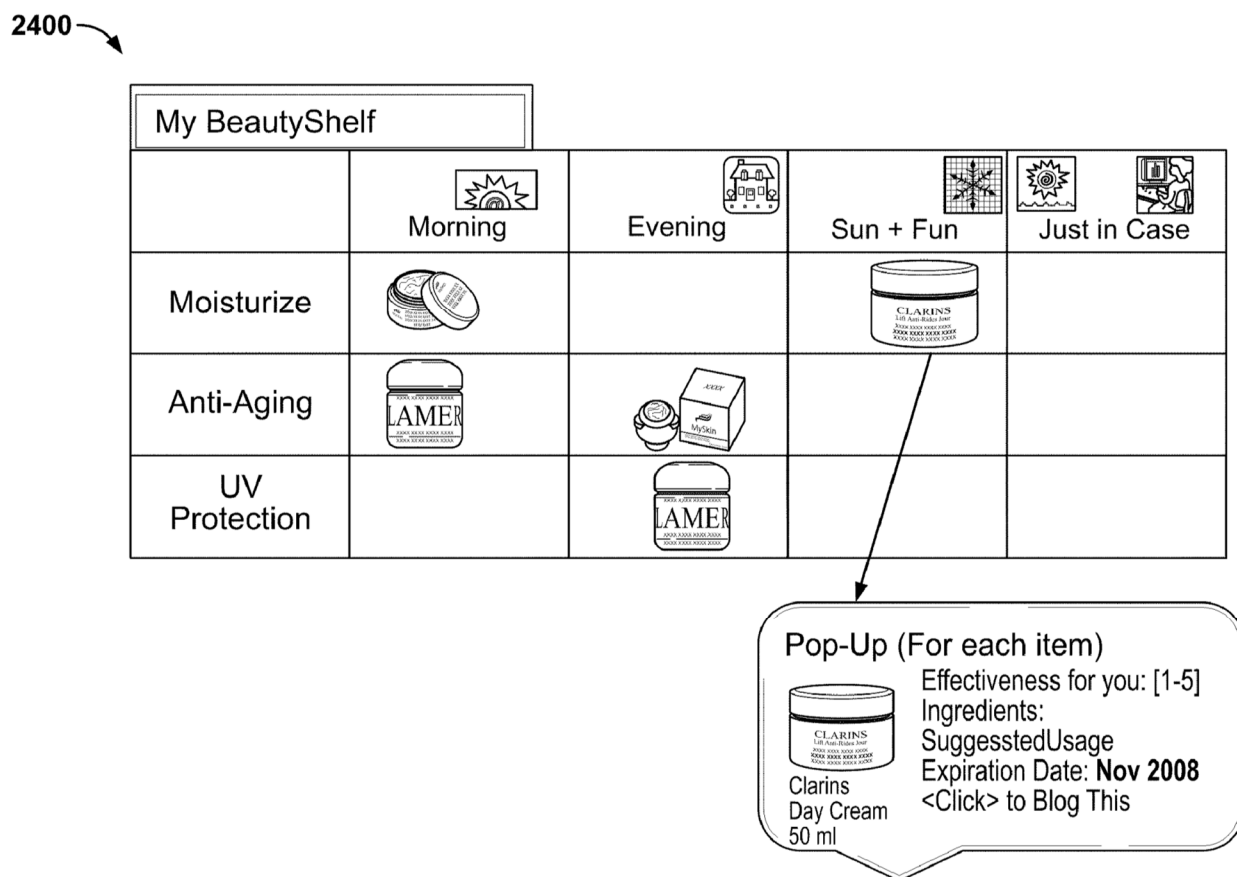


FIG. 24

Bandic's FIG. 25 depicts another example of a beauty shelf 114 portion of a user interface of a skin care system, showing the recommended product information

transferred from the recommendation system. Bandic's Fig. 25 (below).

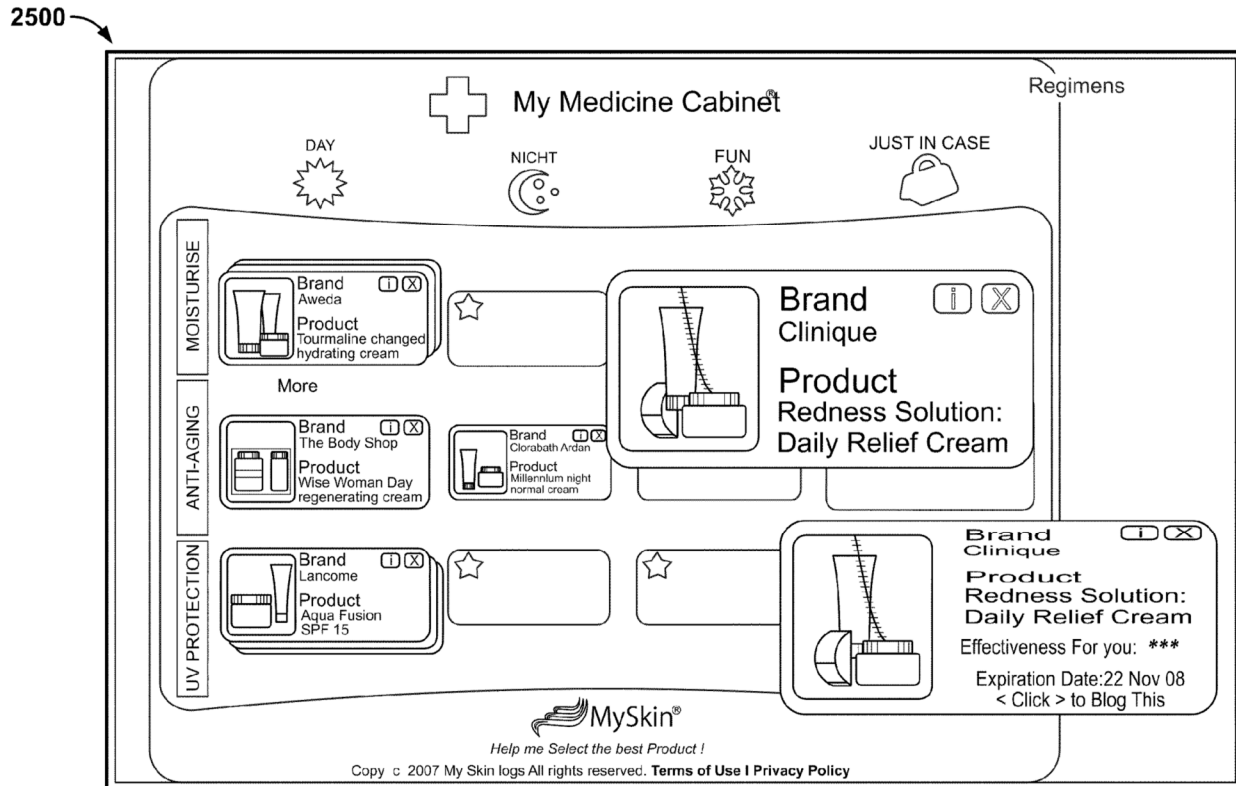


FIG. 25

129. Thus, Bandic discloses or renders obvious this transferring information of a cosmetic product because it discloses that a specific cosmetic product is identified (using the skin state/phototype) and information about such specific cosmetic product is then transmitted from the external input 112's product information 190 to the user interface 102 to be shown to the user.

3. Bandic discloses or renders obvious each element of Claim 6.

a. 6[pre]: An electronic device, comprising:

130. In my opinion, Bandic discloses or renders obvious this limitation. *See* limitation 5[a] above in this ground.

b. 6[a]: one or more processors; and

131. In my opinion, Bandic discloses or renders obvious this limitation. *See* limitation 5[a] above in this ground.

c. 6[b]: memory storing one or more programs for execution by the one or more processors, the one or more programs causing the electronic device to perform a method comprising:

132. In my opinion, Bandic discloses or renders obvious this limitation. *See* limitation 5[a] above in this ground.

d. 6[b1]: calibrating colors of a first digital image, wherein the first digital image depicts at least a portion of a face of the subject, and the first digital image includes a plurality of pixels;

133. In my opinion, Bandic discloses or renders obvious this limitation. *See* limitation 5[a1] above in this ground.

e. 6[b2]: transferring the first digital image;

134. In my opinion, Bandic discloses or renders obvious this limitation. *See* limitation 5[a4] above in this ground.

f. 6[b3]: displaying the first digital image;

135. In my opinion, Bandic discloses or renders obvious this limitation. *See* limitation 5[a2] above in this ground.

g. 6[b4]: dividing the display of the first digital image into two sides, wherein one side of the first digital image is displayed with no cosmetic product applied, and one side of the first digital image is displayed with a simulated application of a cosmetic product; and

136. In my opinion, Bandic discloses or renders obvious this limitation. *See* limitation 5[a3] above in this ground.

h. 6[b5]: transferring information of a cosmetic product, wherein skin pixels in the plurality of pixels are identified, color space values are identified from the skin pixels, and the cosmetic product is identified at least based on the color space values.

137. In my opinion, Bandic discloses or renders obvious this limitation. *See* limitation 5[a5] above in this ground.

4. Bandic discloses or renders obvious each element of Claim 11.

a. 11[pre]: A non-transitory computer readable storage medium storing one or more programs for execution by one or more processors of an electronic device, the one or more programs causing the electronic device to perform a method comprising:

138. In my opinion, Bandic discloses or renders obvious this limitation. *See* limitation 5[a] above in this ground. *See also, e.g.,* Bandic, ¶¶ 1686-88, 89 (“Thus, in one aspect, each method described above and combinations thereof may be

embodied in computer executable code that, when executing on one or more computing devices, performs the steps thereof.”).

- b. 11[a]: calibrating colors of a first digital image, wherein the first digital image depicts at least a portion of a face of the subject, and the first digital image includes a plurality of pixels;**

139. In my opinion, Bandic discloses or renders obvious this limitation. *See* limitation 5[a1] above in this ground.

- c. 11[b]: transferring the first digital image;**

140. In my opinion, Bandic discloses or renders obvious this limitation. *See* limitation 5[a4] above in this ground.

- d. 11[c]: displaying the first digital image;**

141. In my opinion, Bandic discloses or renders obvious this limitation. *See* limitation 5[a2] above in this ground.

- e. 11[d]: dividing the display of the first digital image into two sides, wherein one side of the first digital image is displayed with no cosmetic product applied, and one side of the first digital image is displayed with a simulated application of a cosmetic product; and**

142. In my opinion, Bandic discloses or renders obvious this limitation. *See* limitation 5[a3] above in this ground.

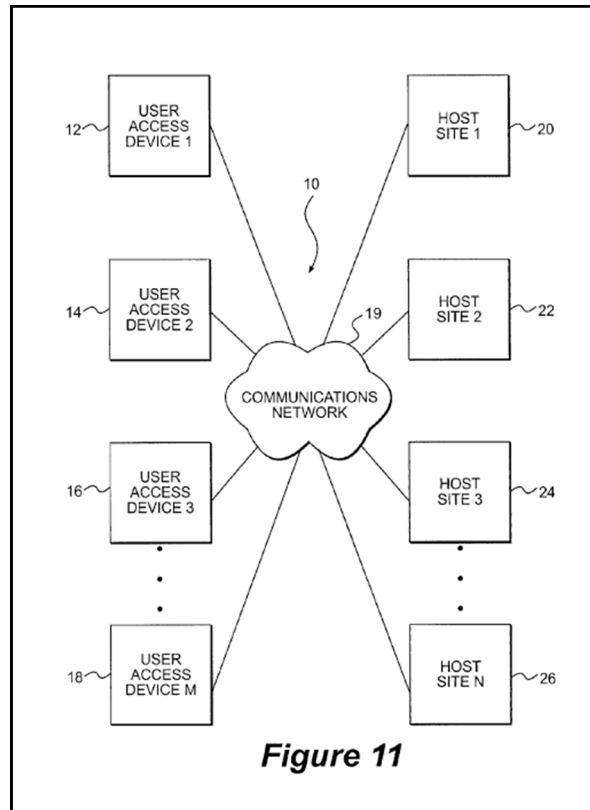
- f. 11[e]: transferring information of a cosmetic product, wherein skin pixels in the plurality of pixels are identified, color space values are identified from the skin pixels, and the cosmetic product is identified at least based on the color space values.**

143. In my opinion, Bandic discloses or renders obvious this limitation. *See* limitation 5[a5] above in this ground.

B. Ground 2: Rubinstenn103 in view of Bandic Renders Obvious Claims 5, 6, and 11 of the '595 Patent.

1. Summary of Rubinstenn103 and Combining its Embodiments

144. Rubinstenn103 discloses a “method and system for enabling simulated use of an aesthetic feature on a simulated facial image.” Rubinstenn103 at 4:15-17. Rubinstenn103 describes a system (see Fig. 11 below) where a user access device 12-18 such as “personal computers, internet access terminal, such as thin client devices, hand-held devices, such as palm pilots, or any other device with a computing module” can connect to a host site 20-26 through a communications network. Rubinstenn103 at 18:32-46. The host site device may be a server. Rubinstenn103 at 18:51-55. The communications network may be the Internet, a local area network, etc. Rubinstenn103 at 18:56-62; *see id.* at Fig. 11 below.



145. Rubinstenn103 generally discusses three methods.

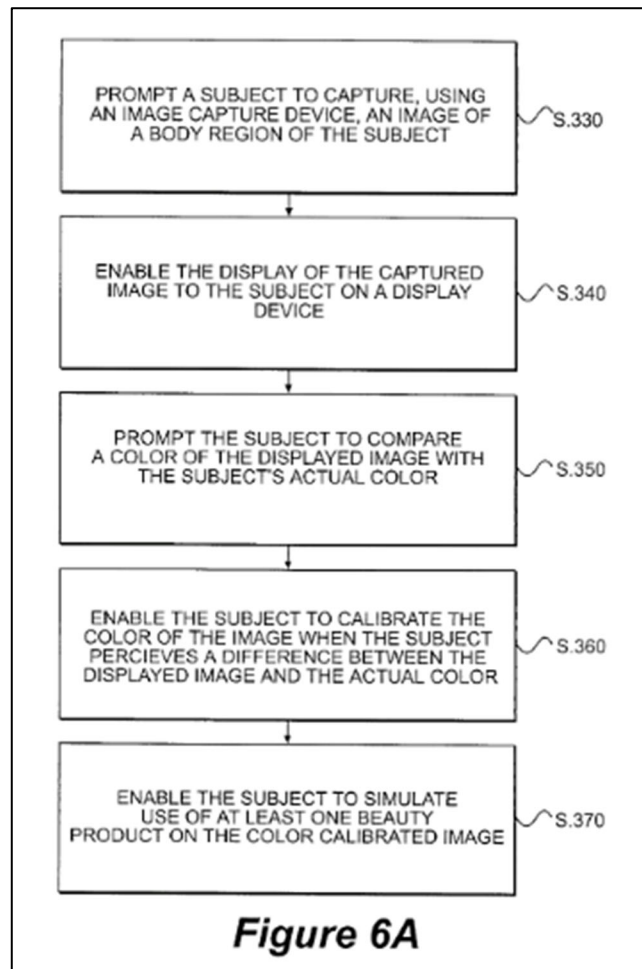
146. First, Rubinstenn103 discusses a way to calibrate the subject’s facial image. For example, Figure 6A “is a flow chart of an exemplary calibration method” (Rubinstenn103 at 11:17-18), and Figure 6B is “from the user’s perspective, a method like that of FIG. 6A” (Rubinstenn103 at 12:5-36). Thus, Figures 6A and 6B discuss an exemplary calibration method, and this is recited below:

[T]he method may involve prompting a subject to capture, using an image capture device, an image of a body region of the subject (S.330); enabling the display of the captured image to the subject on a display device (S.340); prompting the subject to compare a color of the displayed image with the subject's actual color (S.350); enabling the subject to calibrate the color of the image when the subject perceives a difference between the displayed image and

the actual color (S.360); and enabling the subject to simulate use of at least one beauty product on the color-calibrated image (S.370).

Rubinstenn103 at 11:17-28.

147. This is further demonstrated by Figure 6A (reproduced below).



148. Second, Rubinstenn103 also discloses a method where a first cosmetic product is offered based on the subject's response to a query, and a simulated application of that cosmetic can be applied to the subject's facial image. Rubinstenn103 at 8:66-9:7, 10:58-59. For example, this is shown in Figure 4A. Rubinstenn103 at 8:66-9:7. "FIG. 4B is a flow chart of the method of FIG. 4A, from

the subject's perspective." Rubinstenn103 at 10:58-59. Thus, Figures 4A and 4B recite the same method where a subject responds to a query and an identified cosmetic can be simulated on the subject's facial image.

149. Third, Rubinstenn103 also discloses a method in Figure 8 where a three-dimensional image may be created from the subject's facial image, the three-dimensional image may be analyzed, and a cosmetic may be simulated on that facial image. Rubinstenn103 at 12:45-49, 13:46-50, 13:57-14:3. Specifically, Rubinstenn103 describes that Figure 8 is "an exemplary method of enabling an analysis using a three-dimensional facial image." Rubinstenn103 at 12:45-46. Specifically, the method includes "facilitating construction of a three-dimensional facial image using at least one captured image of a subject's face (S.440)" (*id.* at 12:47-49) and "the method may also include facilitating a simulation of use of an aesthetic feature on the three-dimensional facial image and/or processing of the three-dimensional facial image to enable a beauty analysis (S.442). (*id.* at 13:46-50). The step of S.442 of analyzing the beauty product may include proposing a beauty product to a subject based on analyzing an external body condition obtained from the 3D image, which could be done by "image processing techniques." *See* Rubinstenn103 at 14:62-15:19 (below):

In one example, when the captured facial images used in the construction of the 3-D image contains an external condition, the facilitating of step S.442 may involve analyzing the external body condition via the three-

dimensional image. . . . In addition, the method may also include proposing a beauty product to the subject (e.g., transmitting a beauty product recommendation via any communication means disclosed herein), wherein the proposing may be based at least partially on the analyzing of the external body condition.

In another example, the facilitating of step S.442 may involve providing the subject with access to software configured to analyze an external body condition. For example, the software could use image processing techniques, such as those that may be capable of identifying the extent and severity of external body conditions. The software may be configured to propose a beauty product to the subject. Logic algorithms, such as those discussed previously, may identify an appropriate beauty product for use in addressing the external condition.

2. Motivation to Combine

a. Combining Rubinstenn103's Embodiments

150. A POSITA would be motivated to combine the three methods of Rubinstenn103 that I described above. These methods are not different and exclusive, and a POSITA would understand that they could be combined to achieve a functional product. I elaborate on this below.

151. A POSITA would be motivated to combine cosmetic selection and simulation method of Figures 4A and 4B with the calibration method of Figs. 6A & 6B. For example, the simulation method (Figs.6A and 6B) recites at step (S.360) that it supports “enabling the subject to calibrate the color of the image when the subject perceives a different between the displayed image and the actual color (S.360).”

Rubinstenn103 at 11:24-27, 12:40-43 (similar). A POSITA would thus turn to the specific calibration method disclosed in Rubinstenn103 at Figures 6A and 6B, which recites the calibration in more detail. Practically, this makes sense. In order to correctly simulate a cosmetic on a subject's facial image, the facial image display must be calibrated to the correct color.

152. A POSITA also would be motivated to combine the methods of Figures 4A and 4B and Figs. 6A & 6B with Figure 8. Practically, to create a proper 3D image, the facial image(s) must be first calibrated. Additionally, Figure 6A and 6B's method allows for simulation of a beauty product on the subject's facial image (S.370/S.430), but it requires that a user first identify a cosmetic product. This could yield incorrect cosmetic product selection because subjects do not always select the right cosmetic product for their skin tone. *See also* EX1001 at 1:42-43 ("Furthermore, a cosmetic product that has been selected solely based on a visual perception of the user may not be a correct cosmetic product for the user."). Thus, a POSITA would be motivated to look to Figure 8's method—which describes a method where the facial image can construct a 3D image, and image analysis can occur to recommend a cosmetic product based on analyzing the 3D image for external body conditions—so that a subject's error would not be present in the cosmetic selection.

b. Rubinstenn103 would be combined with Bandic

153. A POSITA would have been motivated to combine Rubinstenn103 and Bandic because both concern analyzing a subject's skin and identifying a cosmetic to be recommended to the user.

154. They are different in the processes they use for identifying a cosmetic. Rubinstenn103 generally determines a first cosmetic off a query answered by the subject, but Bandic analyzes the skin pixels according to their color value.

155. In Rubinstenn103, if the cosmetic recommended as a result of analyzing the user's query responses is not acceptable to the user, Rubinstenn103 teaches that the "if the user indicates that the first product is unacceptable, the method may further include selecting an alternative first beauty product and enabling a display, on the display device, of a simulation of the alternative first beauty product applied on the representative facial image. The alternative first beauty product may be selected using any of the analytic techniques discussed above." Rubinstenn103 at 10:9-17. The analytic techniques described above are based on various user-query approaches. Rubinstenn103 at 9:15-10:8.

156. For recommending the second, alternative, complementary cosmetic product, Rubinstenn103 teaches that "Beauty product selection may be driven by the user or may occur automatically or semi-automatically, such as by selecting a

product complementary to some other information relating to the user and/or the user's activity. Rubinstenn103, 12:28-31.

157. These descriptions do not specifically include an approach that recommends a first cosmetic from the subject's first acquired image wherein the cosmetic product is identified at least based on the color space values. For example, Rubinstenn103 generally recites that a first cosmetic is selected based on a subject answering a question about what cosmetic they want to see. Rubinstenn103 at 9:1-5.

158. However, Rubinstenn103 suggests that even with this query, a cosmetic may not yet be recommended. Rubinstenn103 describes that a subject could express an interest in determining the best lipstick for her skin tone, in which case, Rubinstenn103 describes that "analytic techniques may be used to identify lip stick likely to be compatible with the subject." Rubinstenn103 at 9:48-52.

159. Rubinstenn103 later discloses that captured images can be analyzed to show an external body condition. *See* Rubinstenn103 at 15:3-13. As part of this analysis, which is used to propose a beauty product to a subject, analyzing the external body condition may be based on "image processing techniques." Rubinstenn103 at 15:13.

160. Rubinstenn103 does not explain the specifics of the image processing techniques that may be used to identify a cosmetic for the subject, and thus, a

POSITA would be motivated to turn to other references that describe in more detail how image processing can be used to analyze the user's first image to provide a cosmetic in a cosmetic category that the subject may be interested in. Given this, a POSITA would be motivated to turn to Bandic, which describes image processing techniques of skin images for recommending a cosmetic. Bandic is directed towards "Analytic Methods of Tissue Evaluation." Bandic at Title. Bandic also discloses "a method for determining skin characteristics and cosmetic features using color analysis [which] may include a step of analyzing color of skin images in a pixel by pixel manner in a Red Green Blue (RGB) color system for an acquired digital image." Bandic, ¶ 0075. Bandic also discloses a way to properly determine the actual color of a person's skin by "converting colors obtained in device dependent RGB color system into device independent standard RGB color system (sRGB)." Bandic, ¶ 0076.

161. Thus, a POSITA would have appreciated, that Rubinstenn103's determination of a first cosmetic could be performed by the device itself instead and would have been motivated to incorporate Bandic into Rubinstenn103 to employ the analytical processes that Rubinstenn103 references.

162. Additionally, a POSITA would be motivated to look to Bandic for its calibration purposes as well. I discuss this below.

163. As far as image calibration is concerned, Rubinstenn103 teaches to calibrate the image to match the appearance/color of the actual subject body part and on-screen display after the image capture. Rubinstenn 103's "FIG. 7 illustrates how a subject might compare the color of the displayed image 180 with the actual color of her hand by placing her hand adjacent to the display device 342. The prompting of step S.350 may encourage the Subject to make the comparison by providing the Subject with directions or instructions to do so. For example, when the skin color (e.g., tone) on the subject's hand differs from the actual skin color of the body region, the Subject may be prompted to make a more precise comparison (e.g., in FIG. 7, comparing the captured facial image with the Subjects actual facial skin color rather than the skin color of the subject's hand). Enabling the user to calibrate color may include enabling the display of a plurality of colors, enabling the Subject to select one of the displayed colors closest to the actual color of the Subject's body region, and enabling alteration of the displayed image to include the selected color. These actions may occur directly or indirectly. For example, the subject may be presented with a plurality of controls 40a, 40b, 40c, and 40d, each corresponding to a differing color, from which a particular color (e.g., 40c) may be selected (FIG. 7). The subject may be presented with a confirm button 240 to alter the displayed image to include the selected color, for example. As an alternative to exemplary displayed color controls 40c, 40c, 40c and 40d, a sliding continuum may be provided or the Subject

may be provided with some other control feature for making a positive color identification.” Rubinstenn103, 11:49-12:17.

164. As described in Rubinstenn103, the value of calibration is recognized by Rubinstenn, however it relies on user’s perception ability to determine color differences and as such would be considered subjective, irreproducible, and potentially imperfect by a POSITA. POSITA would therefore be motivated to combine Rubinstenn103 with Bandic who teaches objective calibration principles in Bandic ¶ 0439.

165. Rubinstenn103 primarily focuses on providing cosmetic product recommendation based on generating a simulated 3D image of the subject rather than on providing cosmetic product recommendation based on the acquired image of the subject. The former embodiment is described in notable detail. While Rubinstenn103 teaches an embodiment, in which the subjects image can also be acquired by a camera or similar capturing device, this embodiment seems secondary in Rubinstenn103. A POSITA would therefore be motivated to increase the importance of initial subject’s body part image capture and combine Rubinstenn103 with Bandic who devotes sufficient detail to this strategy.

166. Additionally, this calibration may be performed on Rubinstenn103’s user access device. As I described above, Rubinstenn103 explains that its user access device can analyze a captured image (and a 3D image)’s external body condition

using “image processing techniques” to propose a beauty product. *See* Rubinstenn103 15:3-3. Because the device (e.g., the user access device) could employ image processing analysis, it could easily perform the calibration disclosed in Bandic, which is converting device-dependent RGB values to device-independent sRGB values.

3. Rubinstenn103 in view of Bandic disclose or render obvious each element of claim 5.

a. 5[pre]: A method for analyzing a skin of a subject and identifying a cosmetic product for the subject, comprising:

167. Rubinstenn103 and Bandic disclose or render obvious this limitation in my opinion.

168. Rubinstenn103 teaches a calibration method (e.g., Fig. 6A) where a user’s facial image is calibrated. *Id.* at 11:17-27. Rubinstenn103 further teaches a method (e.g., Fig. 4A) where a first cosmetic product is offered based on the subject’s response to a query, including at least one query about subject’s skin and the simulated application of cosmetic can be applied to the subject’s simulated or actual facial image. *Id.* at 8:66-9:7. Rubinstenn103 also teaches a method (Fig. 8), in which three-dimensional image may be created from that simulated or actual facial image and a cosmetic may be simulated on the simulated or actual facial image (e.g., Fig. 8). *Id.* at 12:45-49, 13:46-50, 13:57-14:3. In view of these methods,

Rubinstenn103 teaches a method where a subject's facial image may be analyzed to determine a cosmetic product.

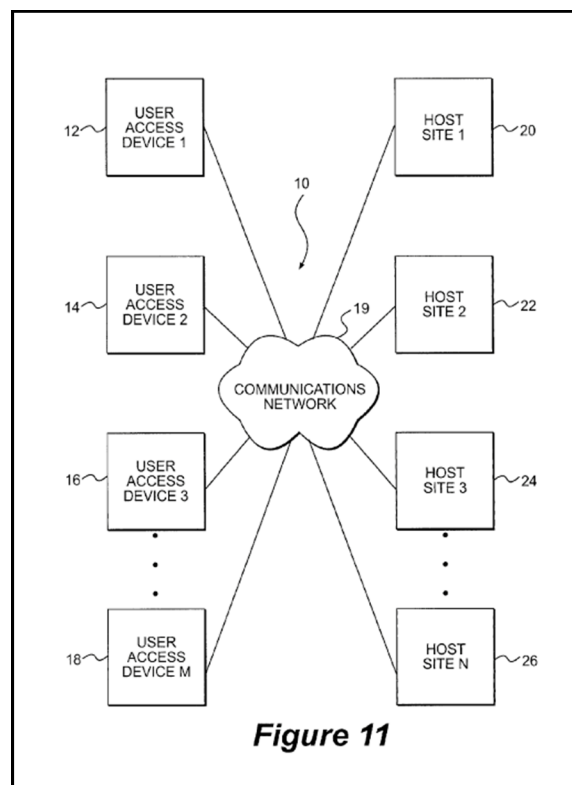
169. Rubinstenn103 in view of Bandic also discloses or renders this limitation obvious in my opinion. As I described above in the motivation to combine (*see supra* ¶¶ 157-161), Rubinstenn103 teaches analysis of an image to recommend a cosmetic, but does not describe it in detail. Accordingly, a POSITA would turn to Bandic, which does describe image analysis in detail for recommending a cosmetic product to a user. *See supra* ¶ 160.

170. Bandic discloses “a method for determining skin characteristics and cosmetic features using color analysis [that] may include a step of analyzing color of skin images in a pixel by pixel manner in a Red Green Blue (RGB) color system for an acquired digital image.” Bandic, ¶ 0075. Bandic also discloses that a purpose of the invention is to conduct “[r]eal-time analysis of digitally captured skin characteristics . . . [to perform] skin regimen recommendation” Bandic, ¶ 0053; *see also, e.g., id.*, ¶¶ 0006, 0057, 0067, Fig. 1 (system for recommending and having a product recommendation module). Bandic further discloses that its “[a]lgorithms 150 may be used to analyze 154 non-medical concerns, such as the effectiveness of a medical, non-medical, or cosmetic regimen 118” (Bandic, ¶ 0388) and describes that “product” may include any cosmetic product (Bandic, ¶ 0292). Thus, Bandic discloses a method for analyzing a subject's skin to determine a cosmetic using color

analysis. I also describe this above in Ground 1, limitation 5[pre]. *See supra*, ¶¶ 85-86.

b. 5[a]: at an electronic device with one or more processors and memory storing one or more programs for execution by the one or more processors:

171. Rubinstenn103 discloses or renders obvious this limitation in my opinion. Rubinstenn103 describes a system where user access devices are connected via a communications network to host sites, and the user access devices can transmit information to the host sites. Rubinstenn103 at 18:32-40. This is shown in Figure 11 reproduced below.



172. Rubinstenn103 describes that a user access device, by itself, may carry out the methods described through the specification. *See* Rubinstenn103 at 19:33-34 (“[T]he invention may be carried out in whole or in part within the environment of FIG. 12.” (describing the user access device in Fig. 12)). Rubinstenn teaches that “Although a focus of the disclosure may be on server-side methods, it is nevertheless to be understood that the invention includes corresponding client-side methods, software, articles of manufacture, and computer readable media, and that computer readable media can be used to store instructions for some or all of the methods described herein. Further, it is to be understood that disclosed structures define means for implementing the functionality described herein, and that the invention includes such means for performing the disclosed functions.” Rubinstenn103, 26:62-27:4.

173. Additionally, Rubinstenn103 describes that the “user access device may include a computing module 30, a display 32, a keyboard 34, a pointing device 36, such as a mouse, an image capture device 41 and a removable data storage device 42.” *Id.* at 19:17-20. The user access device’s “computing module 30 may include at least one CPU 50, at least one memory 52, and at least one storage device 54.” *Id.* at 19:35-38. Additionally, “one skilled in the art will appreciate that information may be stored on or read from various computer-readable media, such as secondary storage devices, like hard disks, floppy disks, and CD-ROM; a carrier

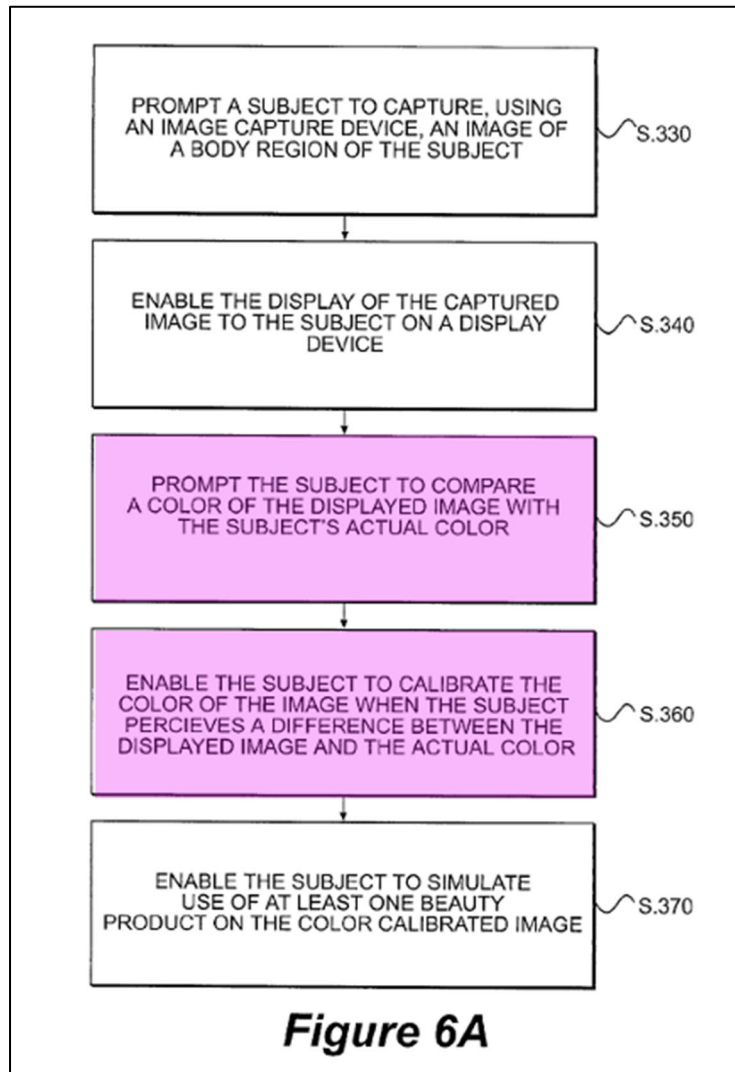
wave received from a network like the Internet; or other forms of ROM or RAM.”

Id. at 19:44-49.

174. Thus, in my opinion, a POSITA would find it obvious that Rubinstenn103’s user device is an electronic device with one or more processors and memory storing one or more programs for execution by the one or more processors.

c. 5[a1]: calibrating colors of a first digital image, wherein the first digital image depicts at least a portion of a face of the subject, and the first digital image includes a plurality of pixels;

175. In my opinion, Rubinstenn103 discloses or renders this limitation obvious. With respect to the limitation for “*calibrating colors of a first digital image*,” Rubinstenn103 discloses that, after an image is captured and displayed, the subject is prompted “to compare a color of the displayed image with the subject’s actual color (S.350); [and] enabling the subject to calibrate the color of the image when the subject perceives a difference between the displayed image and the actual color (S.360)” Rubinstenn103 at 11:24-27; *see also id.* at 11:29-32 (“As used herein, the term “color-calibrating” includes, but is not limited to, matching an actual color of the subject’s skin with, for example, a color of the subject’s skin that is displayed on a display device.”). This is reflected in steps S.350 and S.360 of Figure 6A (“a flow chart of an exemplary calibration method” (*id.* at 11:17), annotated below:



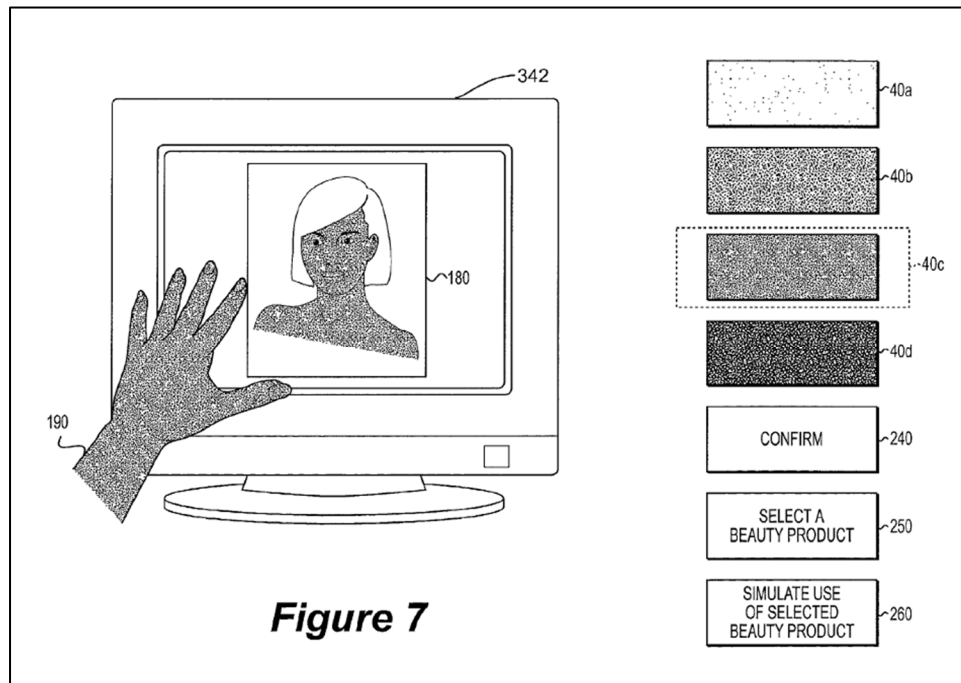
176. For example, Figure 7 “illustrates how a subject might compare the color of the displayed image 180 with the actual color of her hand 190 by placing her hand adjacent to the display device 342.” Rubinstenn103 at 11:58-61. The subject may select a displayed color closest to the actual color of their body or could use a sliding continuum of colors.

Enabling the user to calibrate color may include enabling the display of a plurality of colors, enabling the Subject to select one of the displayed colors closest to the actual color of the Subject's body region, and enabling alteration of the

displayed image to include the selected color. These actions may occur directly or indirectly. For example, the subject may be presented with a plurality of controls 40a, 40b, 40c, and 40d, each corresponding to a differing color, from which a particular color (e.g., 40c) may be selected (FIG. 7). The subject may be presented with a confirm button 240 to alter the displayed image to include the selected color, for example. As an alternative to exemplary displayed color controls 40c, 40c, 40c and 40d, a sliding continuum may be provided or the Subject may be provided with some other control feature for making a positive color identification.

Rubinstenn103 at 12:3-17.

177. Figure 7 reproduced below illustrates this calibration technique.



178. This method, however, could yield incorrect calibration because a user incorrectly perceives their skin color. Thus, as described above, a POSITA would be motivated to look for a device that calibrates the image itself objectively. (See

supra ¶¶ 162-163, motivation to combine). Bandic, which already describes image processing techniques that would be performed on Rubinstenn103's user access device, also discloses a calibration method of converting device dependent RGB values for pixels into device independent standards sRGB values. (*See supra* ¶¶ 164-165, motivation to combine). Bandic, ¶ 0439. Rubinstenn103's user access device could implement Bandic's calibration technique. (*See supra* ¶ 166, motivation to combine).

179. For the requirement that “the first digital image depicts at least a portion of a face of the subject and the first digital image includes a plurality of pixels,” as can be seen above in Figure 7, the captured image may display the subject's face. *See* Rubinstenn103 at 11:46-47 (“FIG. 7 shows an example of a captured image 180 being displayed on a display device 342.”). A POSITA would further understand that a plurality of pixels is necessary to communicate a face or portion of a face image information in a digital image representation, a single pixel is not further divisible from the image analysis point of view. EX1010 at 27 and Fig. 2.3.

d. 5[a2]: displaying the first digital image;

180. In my opinion, Rubinstenn103 discloses or renders this limitation obvious. Rubinstenn103 recites that after the image of the subject is captured, its method comprises “enabling the display of the captured image to the subject on the display device (S.340).” Rubinstenn103 at 11:21-22. This is further demonstrated by

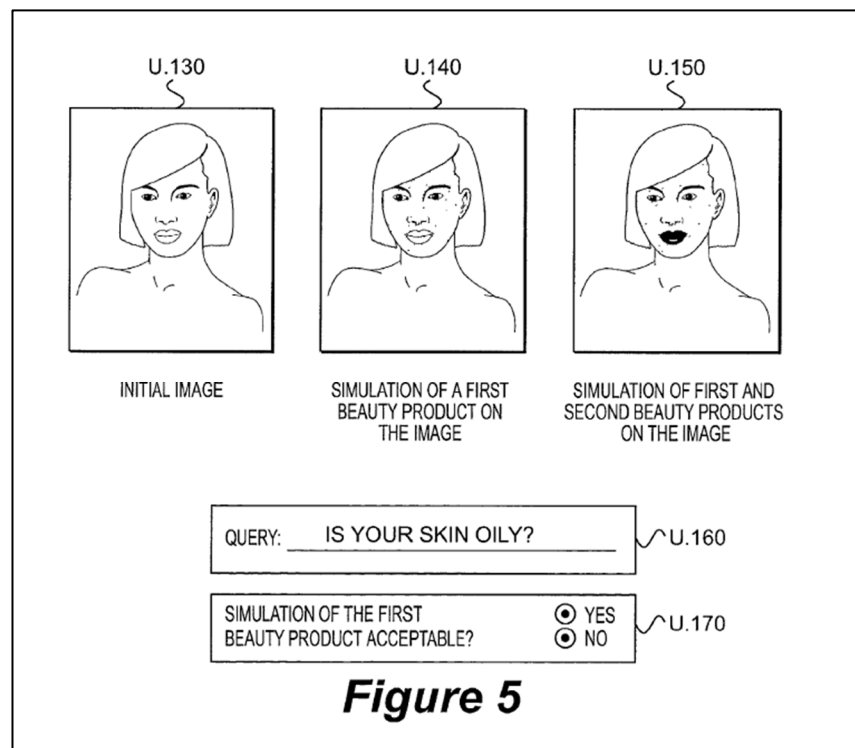
Figure 7 (given above) showing “an example of a captured image 180 being displayed on a display device 342.” Rubinstenn103 at 11:46-47. The user access device can include that display 32. *Id.* at 19:17-18.

- e. **5[a3]: dividing the display of the first digital image into two sides, wherein one side of the first digital image is displayed with no cosmetic product applied, and one side of the first digital image is displayed with a simulated application of a cosmetic product;**

181. In my opinion, Rubinstenn103 discloses or renders this limitation obvious. Specifically, Rubinstenn103 describes a method (shown in Fig. 4A) where, based on a question answered by the subject, a beauty product may be offered to a subject, and if the user wants to virtually try it, that beauty product is simulated on a representative facial image. Rubinstenn103 at 9:2-7 (“such a method may involve causing at least one query to be presented to a subject (S.120); selecting a first beauty product based on the subject's response to the query (S.130); enabling a display, on a display device, of a simulation of the first beauty product applied on a representative facial image (S.140)’”).

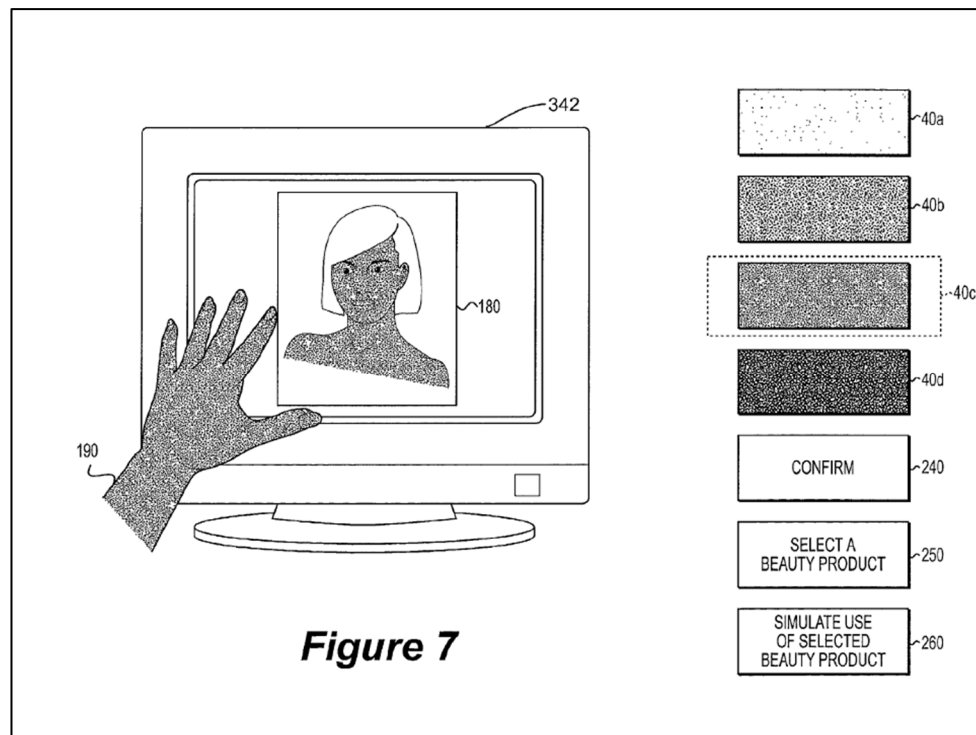
182. Rubinstenn103 does not explicitly state that the display is divided, where one side displays the first digital image with no cosmetic applied and the other side is displayed with a simulated application, but a POSITA would find this obvious from the disclosure.

183. For example, the method of Figure 4A describes that “[i]n the method illustrated in FIG. 4A, the simulation of the first beauty product applied on the representative facial image (e.g., U.140 in FIG. 5) may be replaced on the display device by a new image U.150. Alternatively, as shown in the example of FIG. 5, images U.140 and U.150 may be simultaneously displayed.” *Id.* at 10:40-45. Figure 5 shows a user interface in which 3 face images are displayed side by side: (i) full face without applying a beauty product, (ii) the same face image after applying the first recommended beauty product, and (iii) the same face image after applying the second recommended beauty product. *See* Fig. 5 reproduced below.



184. As another example, Figure 7, which shows the user interface for the calibration method (e.g., the method of FIG. 6A) (*id.* at 3:44-46), teaches that images

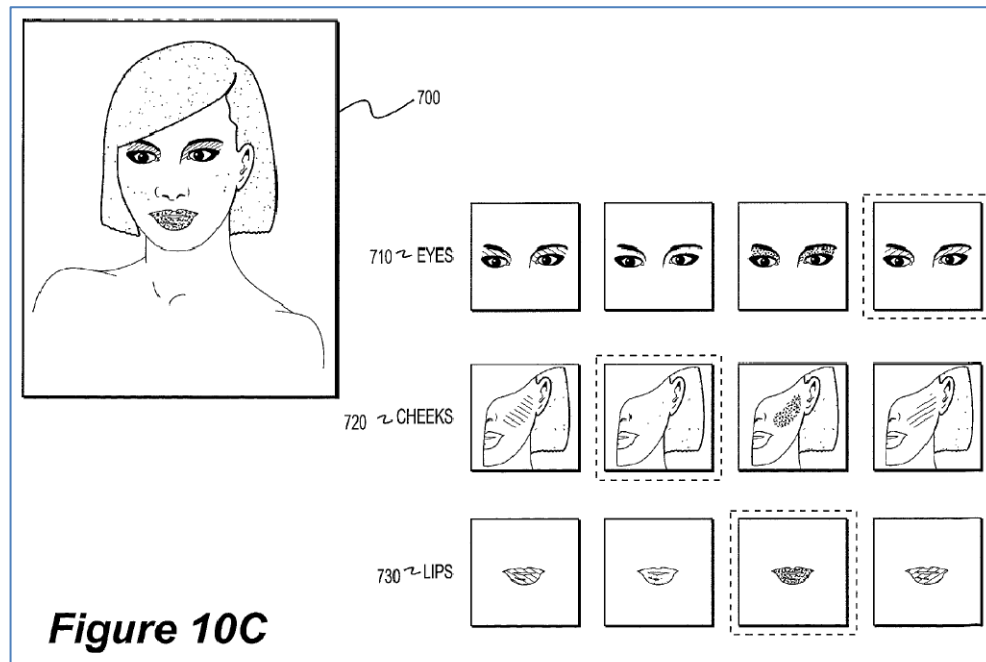
with full-face display without and with application of the beauty product can be displayed in rapid succession and in exact mutual image-to-image registration using the toggle button 260 on user interface. *See id.* at Fig. 7 (reproduced below); *see also id.* at 12:21-34.



185. As another example, Rubinstenn103 also teaches of method (in Figure 8) that allows for simulation of an aesthetic feature on a three-dimensional facial image, which uses the captured image of the subject to make a three-dimensional facial image. *Id.* at 12:45-49, 13:46-50. When describing that method, Rubinstenn103 teaches dividing the display in separate regions to show a facial image without and with regionally specific simulated application of a beauty product. (*Id.* at 14:6-18). While this does not teach to divide display into two sides, it teaches

two or more separate regions with an obvious option for such regions to be two face sides (left/right) or any other desired partitioning of the face image. Additionally, a POSITA would understand that the exemplary method of enabling an analysis of Fig. 8 could be combined with the calibration method of 6A because an image would need to be calibrated in order for the simulation to show the correct colors to show the correct cosmetics.

186. Finally, Fig. 10A teaches how to divide a face using templates and display simulated facial image of one or more facial portions with a beauty product simulation (S.550, S.560, S.570). *Id.* at 16:20-37, Figs. 10A, 10B, and 10C. It would be obvious to a POSITA for one of such templates to divide the face in left/right halves. Additionally, Fig. 10C (see below) directly suggests to select a half-face template to be displayed with a specific beauty product simulation applied. *Id.* at 16:45-51.



187. Given these examples, a POSITA would find it obvious that Rubinstenn103 teaches displaying image-dividing versions constructed from pairwise dividing or partial overlapping of these already displayed images and displaying a divided image with a beauty product simulation. A POSITA would be motivated to do so because dividing a single image instead of displaying just one would be useful for a device with a small screen, and Rubinstenn103 describes that the user access devices may be small “hand-held devices, such as palm pilots” Rubinstenn103 at 18:42-45.

f. 5[a4]: transferring the first digital image; and

188. In my opinion, Rubinstenn103 discloses or renders this limitation obvious. Transferring occurs when the device receives an image from a peripheral image capturing device. Transferring also occurs internally to the device or module

where the first digital image is transferred from the data storage to the image analysis processing module.

189. First, Rubinstenn103 describes that the user access device (e.g., Fig. 12) may include “an image capturing device.” Rubinstenn103 at 19:19-20. Figure 12, block 41 illustrates that this may be a peripheral device.

190. As shown in Fig. 12, a single device (personal computer) with peripheral devices (webcam, display) carries out the methods described through the specification (see also Figs. 9A, 9B). A personal computer used in this setting transfers image data from the webcam to the processor, display, storage as well as transmits information about the selected beauty product (e.g., from storage/memory to processor to display).

191. In order for the user access device to process the image, it is necessary for the image to be transferred from the image capturing device to the CPU or storage of the user access device. Thus, transferring occurs when the device receives an image from a peripheral image capturing device.

192. Transferring also occurs internally in the device, where the first digital image is transferred from internal storage to a module that is used to analyze the image and thus also transferred to the CPU.

193. For example, Rubinstenn103 teaches that cosmetic product recommendation is based on personal information, e.g., obtained by querying the

user. “Personal information”, “subject specific information”, “user specific information”, “user profile”, “personal characteristics”, “personal attributes”, “profile information”, and like terms (collectively referred to in this section as ‘personal information’) may broadly encompass any information about the Subject or user. Such information may, for example, fall within categories such as ... an image, such as a picture ...” Rubinstenn103 25:57-63, 26:8-10.

194. Rubinstenn103 also teaches that “the method shown in FIG. 4A may include selecting a first beauty product based on the Subject’s response to the query (S.130). A first beauty product may be automatically selected by analyzing the Subject's response using any analytic technique. Such analytic techniques may include, but are not limited to, statistical analysis, modeling, textual analysis, collaborative filtering, artificial intelligence and any other technique that may correlate selection of a first beauty product to a subject's response.” Rubinstenn103 9:30-38. Any use of such beauty-selection analytic techniques that recommends a beauty product based on personal information (or user profile) that includes images then requires the first digital image to be transferred for subsequent use in the analytic technique.

195. For example, one of the techniques described by Rubinstenn103 is that image processing may be used. Rubinstenn103 at 15:10-19. Any use of image

processing that recommends a beauty product would require the first image to be transferred to the image processing software module.

196. Rubinstenn103 also teaches that product recommendation can be accomplished by artificial intelligence (AI) engines: “Selecting the second beauty product may include identifying the second beauty product by using artificial intelligence engine such as discussed earlier.” Rubinstenn103 10:34-36. Any use of AI engines that recommends a beauty product based on personal information (or user profile) that includes images then requires the first digital image to be transferred to the AI engine. “Artificial intelligence techniques are disclosed in concurrently filed applications incorporated herein by reference.” Rubinstenn103 9:45-47.

- g. 5[a5]: transferring information of a cosmetic product, wherein skin pixels in the plurality of pixels are identified, color space values are identified from the skin pixels, and the cosmetic product is identified at least based on the color space values.**

197. In my opinion, Rubinstenn103 in view of Bandic discloses or renders this limitation obvious.

198. For the limitation about “*skin pixels in the plurality of pixels are identified, color space values are identified from the skin pixels, and the cosmetic product is identified at least based on the color space values,*” Rubinstenn103 in view of Bandic renders this obvious in my opinion.

199. Rubinstenn103 describes that one of its methods (e.g., of Fig. 4A) is for “recommending at least one complementary beauty product.” Rubinstenn103 at 8:66-67. Rubinstenn103 does not describe that a cosmetic is identified based on the color space values, but Rubinstenn103 does describe a method where a query is presented to the subject and a first cosmetic product is offered to the subject based on the subject’s response. Rubinstenn103 at 9:1-5. Rubinstenn103 also describes that the query may not indicate a specific type of product but may be a category of products. Rubinstenn103 at 9:48-52 (“[T]he first selected product may be selected from a type of the subject’s choosing. For example, if the subject expresses interest in lip stick, analytic techniques may be used to identify lip stick likely to be compatible with the subject.”).

200. Rubinstenn103 also describes that the analysis of the external body condition (the method of Figure 8) may include software, such as image processing techniques to analyze the body condition. Rubinstenn103 at 15:10-19 (it “may involve providing the Subject with access to Software configured to analyze an external body condition. For example, the software could use image processing techniques, such as those that may be capable of identifying the extent and severity of external body conditions. The software may be configured to propose a beauty product to the subject.”). Thus, Rubinstenn103 teaches that image processing may be used to analyze the facial image to recommend a cosmetic.

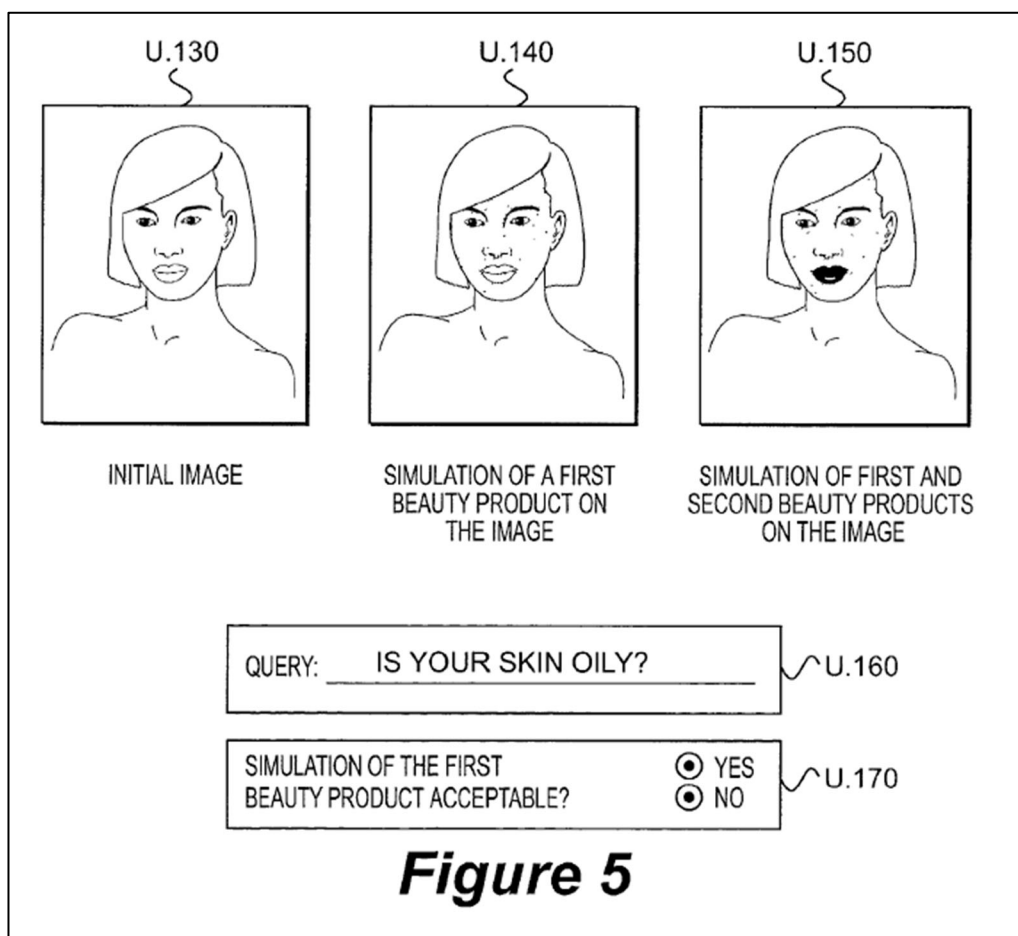
201. Rubinstenn103 does not describe in detail the image processing that would be used, and thus, would turn to another reference that performs image processing techniques for skin. As I described above, a POSITA would accordingly turn to Bandic, which does describe image processing techniques. *See supra* ¶¶ 154-161 (motivation to combine), also *see supra* ¶¶ 116-129 (Ground 1 (Bandic), 5[a5] analysis).

202. As to “*transferring information of a cosmetic product*,” Rubinstenn103 describes that the host site 130 may include a storage device 136 that may include “a server side beauty products database 150.” Rubinstenn103 at 55:60. Rubinstenn103 also further describes that, “[o]nce a subject is presented with one or more acceptable products, the Subject may be provided with purchasing information. Such purchasing information may include, but is not limited to, pricing information, at least one location of a store selling the product, a link to a website selling the product, and/or information enabling a product purchase.” Rubinstenn103 at 10:52-57.

203. It would be obvious to a POSITA that when a cosmetic product is selected, its information (such as a name or link to website selling it) could be transferred (e.g., from the host site’s server site product database to the user access device) at the request of the user access device. Additionally, a POSITA would recognize that the cosmetic product could be selected based off image analysis (such

as that conducted by Bandic). Rubinstenn103 is further clear that the method of Figure 8 (which was described above) “may involve providing the Subject with access to Software configured to analyze an external body condition. For example, the software could use image processing techniques, such as those that may be capable of identifying the extent and severity of external body conditions. The software may be configured to propose a beauty product to the subject.” Rubinstenn103 at 15:10-19.

204. Additionally, Rubinstenn103 also discloses that the identified cosmetic product would be transferred when the user access device transmits the cosmetic product information to the display. Specifically, anytime something is displayed, the user access device must necessarily transmit that information to the integrated or peripheral display. EX1011, ¶¶ 0013, 0016, 0017, 0021. Rubinstenn103’s Figure 5 shows a cosmetic product is simulated on the subject’s facial image. Rubinstenn103 at Fig. 5, 9:58-60. The cosmetic product information is the cosmetic (e.g., foundation) applied to the image, and this information is necessarily transferred from the user access device to the peripheral or integrated display. *See* Rubinstenn103 at Fig. 12 (display at 32), 19:17-18.



4. Rubinstenn103 in view of Bandic disclose or renders obvious each element of Claim 6.

a. 6[pre]: An electronic device, comprising:

205. In my opinion, Rubinstenn103 discloses or renders this limitation obvious. *See* limitation 5[a] above in this ground.

b. 6[a]: one or more processors; and

206. In my opinion, Rubinstenn103 discloses or renders this limitation obvious. *See* limitation 5[a] above in this ground.

- c. **6[b]: memory storing one or more programs for execution by the one or more processors, the one or more programs causing the electronic device to perform a method comprising:**

207. In my opinion, Rubinstenn103 discloses or renders this limitation obvious. *See* limitation 5[a] above in this ground.

- d. **6[b1]: calibrating colors of a first digital image, wherein the first digital image depicts at least a portion of a face of the subject, and the first digital image includes a plurality of pixels;**

208. In my opinion, Rubinstenn103 in view of Bandic discloses or renders this limitation obvious. *See* limitation 5[a1] above in this ground.

- e. **6[b2]: transferring the first digital image;**

209. In my opinion, Rubinstenn103 discloses or renders this limitation obvious. *See* limitation 5[a4] above in this ground.

- f. **6[b3]: displaying the first digital image;**

210. In my opinion, Rubinstenn103 discloses or renders this limitation obvious. *See* limitation 5[a2] above in this ground.

- g. **6[b4]: dividing the display of the first digital image into two sides, wherein one side of the first digital image is displayed with no cosmetic product applied, and one side of the first digital image is displayed with a simulated application of a cosmetic product; and**

211. In my opinion, Rubinstenn103 discloses or renders this limitation obvious. *See* limitation 5[a3] above in this ground.

- h. 6[b5]: transferring information of a cosmetic product, wherein skin pixels in the plurality of pixels are identified, color space values are identified from the skin pixels, and the cosmetic product is identified at least based on the color space values.**

212. In my opinion, Rubinstenn103 in view of Bandic discloses or renders this limitation obvious. *See* limitation 5[a5] above in this ground.

5. Rubinstenn103 + Bandic disclose or renders obvious each element of Claim 11.

- a. 11[pre]: A non-transitory computer readable storage medium storing one or more programs for execution by one or more processors of an electronic device, the one or more programs causing the electronic device to perform a method comprising:**

213. In my opinion, Rubinstenn103 in view of Bandic discloses or renders this limitation obvious. *See* limitation 5[a] in this ground. *See also, e.g.,* Bandic, ¶¶ 1686-88, 89 (“Thus, in one aspect, each method described above and combinations thereof may be embodied in computer executable code that, when executing on one or more computing devices, performs the steps thereof.”).

- b. 11[a]: calibrating colors of a first digital image, wherein the first digital image depicts at least a portion of a face of the subject, and the first digital image includes a plurality of pixels;**

214. In my opinion, Rubinstenn103 in view of Bandic discloses or renders this limitation obvious. *See* limitation 5[a1].

c. 11[b]: transferring the first digital image;

215. In my opinion, Rubinstenn103 discloses or renders this limitation obvious. *See* limitation 5[a4] above in this ground.

d. 11[c]: displaying the first digital image;

216. In my opinion, Rubinstenn103 discloses or renders this limitation obvious. *See* limitation 5[a2] above in this ground.

e. 11[d]: dividing the display of the first digital image into two sides, wherein one side of the first digital image is displayed with no cosmetic product applied, and one side of the first digital image is displayed with a simulated application of a cosmetic product; and

217. In my opinion, Rubinstenn103 discloses or renders this limitation obvious. *See* limitation 5[a3] above in this ground.

f. 11[e]: transferring information of a cosmetic product, wherein skin pixels in the plurality of pixels are identified, color space values are identified from the skin pixels, and the cosmetic product is identified at least based on the color space values.

218. In my opinion, Rubinstenn103 in view of Bandic discloses or renders this limitation obvious. *See* limitation 5[a5] above in this ground.

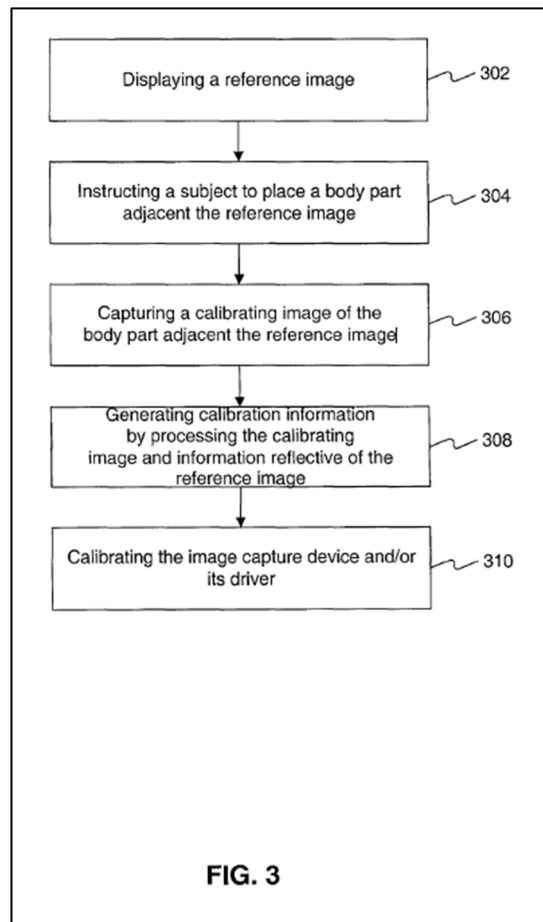
C. Ground 3: Rubinstenn103 in view of Rubinstenn300 and Bandic Renders Obvious Claims 1, 2, 3, and 4 of the '595 Patent.

1. Rubinstenn300

219. Rubinstenn300 is directed to “methods and systems . . . for calibrating image capturing for use in beauty analysis.” Rubinstenn300 at Abstract.

Rubinstenn103 also incorporates Rubinstenn300 by reference. Rubinstenn103 at 20:36-37, 20:49-50.

220. One of the calibration methods that Rubinstenn300 discloses includes “displaying an image on a calibrated display device” (302), “instructing a subject to place a body part adjacent the reference image” (304), “capturing a calibrating image of the body part adjacent the reference image using an image capture device” (36), and “calibrating information by processing the calibrating image and information reflective of the reference image.” Rubinstenn300, ¶¶ 0064, 0072, 0074, 0076. This is shown in Figure 3 reproduced below:



2. Motivation to Combine

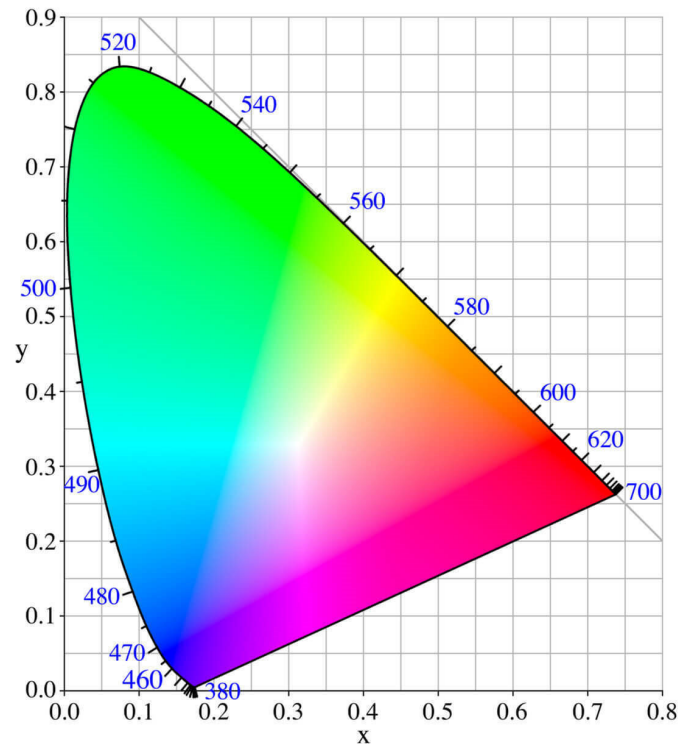
221. As I described above, a POSITA would be motivated to combine Rubinstenn103 with Bandic. *See supra* ¶¶ 156-166. Additionally, in my opinion, a POSITA would be motivated to combine Rubinstenn103 with Rubinstenn300. Rubinstenn103 describes a calibration method (e.g., FIG. 6A) in the context of a beauty analysis, which generally relies on the user to verify whether a color displayed on the screen is accurately reflected on the display (e.g., Rubinstenn103 at 11:17-12:34), but a POSITA would recognize that user error could cause the calibration method to be wrong. A POSITA would find such an approach inaccurate, irreproducible, depending on subjective ability of a user to properly perceive color differences, and – overall – insufficient (*see also supra* ¶ 146)). Thus, a POSITA would turn to a calibration method where an electronic device calibrates the image without potential user error.

222. Rubinstenn300 describes a calibration method where an electronic device calibrates the image without potential user error like that of Rubinstenn103, as I describe below.

223. Rubinstenn300 describes several calibration methods built on solid color-science foundations where the calibration outcome provides a match between the color representation of the captured image and that of one or more established color standards – called “reference image” of known colors: “calibration image may

be compared to at least one known color of the reference image. For example, the filtered image 602c shown in FIG. 6c may be compared to at least one color of the reference image 402, 404, shown in FIGS. 4a and 4b, respectively. Rubinstenn300 ¶¶ 0078, 0070. A POSITA would understand that the reference image of known colors can advantageously be an image of one of the established color-space standards, e.g., sRGB, CIE, CIEUVW, YCbCr, CMYK, or others. Images of such color space standards are readily available and location in the image is associated with known colors. The image below is an example of a reference (or standardized) space established in 1931 by the Commission Internationale de l'Eclairage (CIE) with the goal to find the closest approximation of what we see and translate it into numerical representations – the CIE/93/XYZ standard. In the CIE/93/XYZ model, Y is the luminance, Z is quasi-equal to blue (of CIE RGB), and X is a mix of the three CIE RGB curves chosen to be nonnegative. Setting Y as luminance has the useful result that for any given Y value, the XZ plane will contain all possible chromaticities at that luminance. The derived CIE XYZ color space encompasses all color sensations that are perceptible to a typical human. A standardized color space includes a range of colors optimized for a wide set of displays. These types of spaces are often built for computer monitors, television displays, or projectors, details of colorimetry and descriptions of color space

standards can be found in the following references. *See generally* EX1012 at 25-78, 101-134, 159-206; EX1013 at 540-542.



224. Color space reference color standard images (see example below) are available as matrices of selected colors from the entire gamut – with regions of the same known color – and these are often used for image capture calibration as described in some embodiments of Rubinstenn300.



225. When turning attention to Rubinstenn300, Rubinstenn300 generally describes calibration methods where the user takes an image of their body part adjacent to a reference image to calibrate the image to conduct a beauty analysis. Rubinstenn300, ¶¶ 0002, 0064. Rubinstenn300 teaches “displaying an image on a calibrated display device” (302), “instructing a subject to place a body part adjacent the reference image” (304), “capturing a calibrating image of the body part adjacent the reference image using an image capture device” (36), and “calibrating information by processing the calibrating image and information reflective of the reference image.” Rubinstenn300, ¶ 0064, 0072, 0074, 0076. The reference image “may include a color bar of multiple colors and/or a swatch of multiple colors.” Rubinstenn300, ¶ 0070.

226. A POSITA would be able to choose from a number of disclosed calibration methods in Rubinstenn300, allowing selection of a calibration method suited for specific image capturing environments. For example, Rubinstenn300 teaches how to calibrate a captured image if a calibrated computer display is available (Rubinstenn300 ¶ 0065), if a special lighting device with known properties is used (Rubinstenn300 ¶ 0067), when displaying a reference color standard image on a calibrated display (Rubinstenn300 ¶ 0068), when capturing the body part in the first image and the reference image in the second image under the same lighting conditions (Rubinstenn300 ¶¶ 0077-78), when positioning a physical reference color

standard image next to the body part and capture them simultaneously (Rubinstenn300 ¶ 0072), etc. Rubinstenn300, ¶¶ 0064-81.

227. Additionally, Rubinstenn103 incorporates Rubinstenn300 by reference. Specifically, Rubinstenn103 recites that “[t]he following concurrently filed U.S. patent applications are also incorporated herein by reference: . . . Calibrating Image Capturing, Ser. No. 10/024,334.” Rubinstenn103 at 20:36-37, 20:49-50. The Application No. of Rubinstenn300 (U.S. Pat. Pub. No. 2003/006300) is 10/024,334, it shares the same inventor (Gilles Rubinstenn), was filed on the same date as Rubinstenn103, and contains the same title as described in Rubinstenn103. For all of these reasons, a POSITA would view Rubinstenn300 as part of Rubinstenn103’s disclosure, and thus a POSITA would moreover be motivated to turn to Rubinstenn300’s disclosure for calibration.

228. Thus, in my opinion, a POSITA would be motivated to combine Rubinstenn103 with Rubinstenn300.

3. Rubinstenn103 in view of Rubinstenn300 and Bandic disclose or render obvious each element of Claim 1.

a. 1[pre]: A method for analyzing a skin of a subject and identifying a cosmetic product for the subject, comprising:

229. Rubinstenn103 in view of Bandic discloses or renders obvious this limitation in my opinion, as described above in Ground 2, limitation 5[pre].

- b. 1[a]: at an electronic device with one or more processors and memory storing one or more programs for execution by the one or more processors:**

230. In my opinion, Rubinstenn103 discloses or renders obvious this limitation, as described above in Ground 2, limitation 5[a].

- c. 1[a1]: calibrating colors of a first digital image, wherein the first digital image depicts at least a portion of a face of the subject, and the first digital image includes a plurality of pixels, and wherein calibrating colors of the first digital image is based on a second digital image of one or more color standards;**

231. In my opinion, Rubinstenn103 in view of Bandic and Rubinstenn300 disclose or render obvious this limitation.

232. As described above in Ground 2, Rubinstenn103 in view of Bandic discloses “*calibrating colors of a first digital image, wherein the first digital image depicts at least a portion of a face of the subject, and the first digital image includes a plurality of pixels,*” the limitation of 5[a1]. *See supra* ¶¶ 175-179 (Ground 2, 5[a1]); *see also supra* ¶¶ 96-102 (Ground 1, 5[a1]). Rubinstenn103 describes that a first image may be calibrated by comparing it to the subject’s actual color and this would be motivated with Bandic, which describes that the electronic device can calibrate by converting device-dependent color values to device-independent color values.

233. With respect to the requirement that “*calibrating colors of the first digital image is based on a second digital image of one or more color standards,*” Rubinstenn103 in view of Rubinstenn300 renders this obvious in my opinion.

234. As I described above, Rubinstenn103 describes a calibration method which generally relies on the user to verify whether a color displayed on the screen is accurately reflected on the display (e.g., Rubinstenn103 at 11:17-12:34), but a POSITA would recognize that user error could cause the calibration method to be wrong. *See supra* ¶¶ 178, 221. A POSITA would understand this limitation of Rubinstenn103 and seek the teaching of Rubinstenn300 to overcome this limitation because Rubinstenn300 describes a method where the device performs the calibration. *See supra* ¶ 223-228.

235. Rubinstenn300 describes a calibration method where calibrating colors of the first digital image is based on a second digital image of one or more color standards in ¶¶ 77-78 stating: “Generating calibration information may also include comparing at least one color of the body part in the calibrating image [(i.e., the first image)] to at least one known color of the reference image [(i.e., the second image)]. For example, when the reference image comprises a monotonic range of Skin tones or skin colors, as illustrated in FIGS. 4a and 4b, the calibrating image may be filtered or otherwise processed for determining a predominate color prior to the comparison. For example, FIG. 6a depicts an image of an arm captured as a calibration image. At

least a portion of the captured image 602, graphically shown in an enlarged view in FIG. 6b, may be processed using a digital filter or other processing technique, for example, to remove moles, freckles, age spots, hair, and other irregularities from the image, thereby determining a predominate color or tone 602c, shown in FIG. 6c.” Rubinstenn300 ¶ 77. “After determining the predominate color or tone, the filtered calibration image may be compared to at least one known color of the reference image. For example, the filtered image 602c shown in FIG. 6c may be compared to at least one color of the reference image 402, 404, shown in FIGS. 4a and 4b, respectively. Based on the comparison, a color of the reference image that is most similar to a color of the calibration image 602c may be stored as calibration information in a data base provided at a location local or remote from the subject. Since the colors on the color bar are known quantities, a single image of the color bar and the skin will enable precise calibration of the image capture device.” Rubinstenn300 ¶ 78.

236. A POSITA would certainly understand that while Rubinstenn300 discloses use of a reference image with “colors on the color bar [that] are known quantities (Rubinstenn300 ¶ 78), the second image may equally well result from an image capture of an image of a color space standard, with the following image serving as an example (for which color values in one of the color space standards

are known as numerical values by definition). It would be obvious to a POSITA to use a color space standard in a physical form.



E.g., EX1014 at 1 (provides link to the above high resolution color calibration image).

237. Rubinstenn300 also generally describes a calibration method where the user takes an image of their body part adjacent to a reference image, followed by a simple image processing approach separating the body part region of the captured image as the first image and the reference image region as the second image. It would be obvious that the calibration of the first image could be based on the second image that contains color space standards. Specifically, Rubinstenn300 teaches that “Alternatively, if a color bar or Skin replica bar is provided to the Subject in physical form, the image capture device might capture an image of the color bar on or near the skin within the same image.” Rubinstenn300, ¶ 78. Rubinstenn300 teaches that the reference image “may include a color bar of multiple colors and/or a swatch of multiple colors.” Rubinstenn300, ¶ 70. Further, the “method may include generating

calibration information by processing the calibrating image and the information reflective of the reference image.” *Id.*, ¶ 76. Thus, a POSITA would understand that a “second digital image” could capture the color standard (e.g., the known color bar) shown on the reference display image without a user’s face or body part being present in that image, and a “first digital image” could contain the user’s face. Same as above, a POSITA would understand that the second image may be that of a color space standard (*see supra* ¶ 236). It would be obvious to a POSITA to use a color space standard in a physical form.

238. Overall, Rubinstenn300’s method shows that a second digital image (called a reference image) contains a color standard. This may be displayed adjacent to the subject’s body part, and an image is captured of the body part and the display showing the reference image. The color of the captured image is calibrated according to the reference image.

239. Thus, in my opinion, a POSITA would find that Rubinstenn103 in view of Rubinstenn300 renders this limitation obvious.

d. 1[a2]: transferring the first digital image, but prior to transferring the first digital image, transferring the second digital image of one or more color standards;

240. In my opinion, Rubinstenn103 in view of Rubinstenn300 discloses or renders obvious this limitation.

241. With respect to the requirement about “*transferring the first digital image*,” Rubinstenn103 discloses or renders obvious this requirement in my opinion. *See supra* ¶ 188 (Ground 2, 5[a4]). There, I explained that transferring occurs when the first digital image (e.g., the image capturing the subject’s face) must be transferred from the image capturing device to the user access device. I also explained that it occurs when the first digital image is transferred from the storage to the software performing the image analysis.

242. With respect to the requirement that “*but prior to transferring the first digital image, transferring the second digital image of one or more color standards*,” Rubinstenn300 teaches that the second image of color standards could be transmitted from the webcam to the electronic device before the first digital image of the individual’s face is transmitted. *See* Rubinstenn300, ¶ 0080 (“‘Calibrating’ may include enabling an adjustment on a subsequent captured image based upon the calibration information. For example, a color, tone, or skin replica/pattern of a subsequent captured image may be adjusted to resemble a color, tone, or skin replica/pattern that is stored as calibration information.”). This second digital image must necessarily contain a color standard because a known color standard must be captured in order to conduct the calibration. *See* Rubinstenn300, ¶ 0070 (“The reference image may include a color bar of multiple colors . . .”). As also discussed in detail above (*see supra* ¶¶ 223, 235-238), Rubinstenn300 describes a calibration

method where calibrating colors of the first digital image is based on a second digital image of one or more color standards (Rubinstenn300 ¶¶ 0077-0078) stating: “Generating calibration information may also include comparing at least one color of the body part in the calibrating image” (i.e., the first image) “to at least one known color of the reference image” (i.e., the second image).” Thus, a POSITA would understand that in order to correctly calibrate the first image, the second image would need to be sent first to derive calibration information and because otherwise the first digital image cannot be correctly adjusted (calibrated).

- e. **1[a3]: using the second digital image of one or more color standards to correlate one or more colors of one or more color standards and one or more colors of the skin pixels, wherein at least one color space value is identified in accordance with a correlation between the one or more colors of one or more color standards and the one or more colors of the skin pixels; and**

243. Rubinstenn103 in view of Rubinstenn300 discloses or renders obvious this limitation in my opinion.

244. For the requirements about “*using the second digital image of one or more color standards to correlate one or more colors of one or more color standards and one or more colors of the skin pixels,*” Rubinstenn300 describes that its calibration method may also include correlating color standards to the colors of the body part. Specifically, Rubinstenn300 teaches that “[g]enerating calibration information may also include **comparing at least one color of the body part in the**

calibrating image to at least one known color of the reference image” where the skin image may be used to determine a predominate color of the skin and “[a]fter determining the predominate color or tone, the filtered calibration image may be compared to at least one known color of the reference image.” *Id.*, ¶¶ 0077-0078 (emphasis added).

245. As I also described above (*see supra* ¶¶ 232-239, this ground, (1[a1]) discussion), it would be obvious that a second digital image could capture the reference image, and thus, a POSITA would find it obvious that Rubinstenn³⁰⁰ teaches that the first digital image (comprising the facial image) could be compared to the second digital image of reference image (e.g., the color standards) to correlate the colors between the skin image and the reference color image to determine the actual color of the skin.

246. As I described above in limitation 1[a1], any digital image would contain a plurality of pixels, and a POSITA would understand that any digital image that comprises someone’s face would contain “skin pixels” which are pixels representing the skin of the facial image. *See supra* ¶¶ 232, 175-179, 96-102, 53, 56, 57, 116.

247. For the requirements about “*wherein at least one color space value is identified in accordance with a correlation between the one or more colors of one or more color standards and the one or more colors of the skin pixels,*”

Rubinstenn300 does not explicitly state that a color space value is identified in accordance with the correlation, but a POSITA would find it obvious in my opinion.

248. Rubinstenn300 teaches several calibration approaches that inherently require the reference image color values to be represented in one or more color space standards (*see supra* ¶ 223). Rubinstenn300 teaches how to calibrate a captured image if a calibrated computer display is available (Rubinstenn300 ¶ 0065) – properly displaying images on a calibrated display requires the image data to be sent to the display in a compatible color-space standard representation – any images sent to be displayed are thus inherently in such a specific color space standard representation. Similarly, Rubinstenn300 teaches that when displaying a reference image on a calibrated display (Rubinstenn300 ¶ 0068), the reference image is necessarily provided in a compatible and specific color space representation that is compatible with the displaying capabilities of the calibrated display device. Similarly, when capturing the body part in the first image and the physical reference image in the second image under the same lighting conditions (Rubinstenn300 ¶¶ 0077-78) or when positioning a physical reference color standard image next to the body part and capturing them simultaneously (Rubinstenn300 ¶ 0072), the physical reference image information about colors in each location must be presented in one or more color space standards for the color to be represented uniquely and allow their use for calibration. Rubinstenn300, ¶¶ 0064-81. Furthermore, Rubinstenn300

teaches that its calibration techniques (of which the correlation is a part of) “are employed by, for example, Hewlett Packard and Lexmark printer drivers which account for a transfer from a RGB display mode to a CMYK print mode.” *Id.*, ¶ 0066.

249. As described in the previous paragraph, a POSITA would understand that pixels (such as the skin pixels) are represented by values associated with one or more specific color standards, and these values can thus be translated from one color-space standard to another using formulas for such translation between different color standards sets, such as between RGB and CMYK.

250. Accordingly, a POSITA would find it obvious that to properly correlate a color of a color standard to the color of the skin pixel, a device would need to identify the color of each pixel as a set of (vector of) numeral values within a certain and specified color standard.

- f. **1[a4]: transferring information of a cosmetic product, wherein skin pixels in the plurality of pixels are identified, color space values are identified from the skin pixels, and the cosmetic product is identified at least based on the color space values.**

251. In my opinion, while Rubinstenn103 alone does not explicitly teach this limitation, Bandic discloses or renders this limitation obvious. A POSITA when analyzing Rubinstenn103 in view of Bandic would find this limitation is obvious, as discussed above in Ground 2, limitation 5[a5] (*see supra* ¶¶ 197-204).

4. Rubinstenn103 discloses or renders obvious Claims 2-3.

- a. 2: The method of claim 1, wherein transferring the first digital image is one of sending or receiving the digital image.**

252. In my opinion, Rubinstenn103 discloses or renders obvious this claim. For “*sending*,” Ground 2, limitation 5[a4] describes that it occurs when the first digital image is transferred from the storage to the software performing the image analysis. *See supra* ¶¶ 188-196 (Ground 2, 5[a4]).

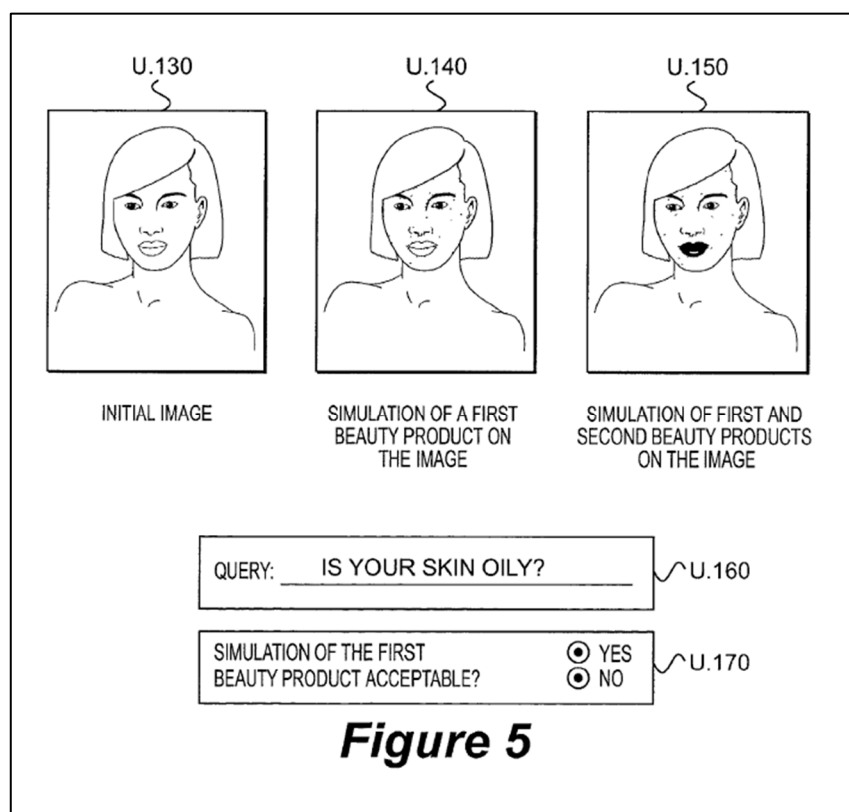
253. For “*receiving*,” Rubinstenn103 describes that it occurs when the device receives an image from a peripheral image capturing device. *See supra* ¶¶ 188-196 (Ground 2, 5[a4]).

- b. 3: The method of claim 1, including: transferring a modified image, wherein the modified image is prepared based on the first digital image, and at least a portion of the modified image shows a simulated effect of application of the cosmetic product.**

254. In my opinion, Rubinstenn103 discloses or renders obvious this claim. Rubinstenn103 discloses modifying the image to show a simulated effect of a cosmetic product and further describes that transferring that modified image may occur when the user device transmits the modified image to a display.

255. Specifically, as to “*modified image is prepared based on the first digital image, and at least a portion of the modified image shows a simulated effect of application of the cosmetic product*,” as described above in Ground 2, limitation 5[a3], Rubinstenn103 teaches that “[i]n the method illustrated in FIG. 4A, the

simulation of the first beauty product applied on the representative facial image (e.g., U.140 in FIG. 5) may be replaced on the display device by a new image U.150. Alternatively, as shown in the example of FIG. 5, images U.140 and U.150 may be simultaneously displayed.” Rubinstenn103 at 10:40-45. Figure 5 shows a user interface in which 3 face images are displayed side by side: (i) full face without applying a beauty product, (ii) the same face image after applying the first recommended beauty product, and (iii) the same face image after applying the second recommended beauty product. *See Fig. 5.*



256. Thus, Rubinstenn103 teaches that a modified image, such as image U.140 in Fig. 5, shows a simulated effect of application of the cosmetic product, and

that the simulation is “of the first beauty product applied on the representative facial image (e.g., U.140 in FIG. 5).” Rubinstenn103 at 10:40-45.

257. For “*transferring a modified image*,” Rubinstenn103 describes that user access device’s computing module could be coupled to a display 21. *Id.* at 19:17-20. Further, this modified image could be displayed on a display (*see* Fig. 5 above), and Rubinstenn103 defines that “displaying” may encompass “transmission.” (*Id.* at 23:16-21 (“Forms of the word ‘displaying’ and like terms may also include indirect acts such as providing content for transmission over a network to a display device, regardless of whether the display device is in the custody or control of the sender. Any entity in a chain of delivering information for display performs an act of ‘displaying’, as the term is used herein.”)). Thus, a POSITA would understand that the modified image could be transmitted to a display.

5. Rubinstenn103 in view of Bandic and Rubinstenn300 discloses or renders obvious Claim 4.

a. 4: The method of claims 1, wherein the first digital image further depicts one or more color standards.

258. In my opinion, Rubinstenn103 in view of Bandic and Rubinstenn300 discloses or renders obvious this claim. As I described above in ¶¶ 235-236 (limitation 1[a1]), the first digital image may be a photo taken of a subject’s body part adjacent to the reference image, and the reference image contains a color standard, such as a color bar in RGB. *See supra* ¶¶ 237-238 (Ground 3 (1[a1]));

Rubinstenn300, ¶¶ 0078, 0070. Thus, the first digital image depicts one or more color standards in my opinion. As discussed earlier, any image pixel colors to be shown properly on a digital display would need to adhere to a display-compatible color standard, such as the RGB, sRGB, Adobe RGB, or other color standard.

D. Ground 4: Rubinstenn103 in view of Bandic and Rubinstenn300 renders obvious claims 9 and 13 10 and 15, 7 and 12, and 8 and 14.

259. Dependent claims 7, 8, 9 and 10 stem from independent claim 6 and claims 12, 13, 14 and 15 stem from independent claim 11.

- 1. 9: The electronic device of claim 6, wherein the method includes: transferring a modified image, wherein the modified image is prepared based on the first digital image, and at least a portion of the modified image shows a simulated effect of application of the cosmetic product.**

260. In my opinion, Rubinstenn103 discloses or renders this claim obvious. See claim 3 discussion above in Ground 3 (*see supra* ¶¶ 254-257). There, I discussed that Rubinstenn103 discloses modifying the image to show a simulated effect of a cosmetic product, and further describes that transferring that modified image may occur when the user device transmits the modified image to a display.

2. **13: The computer readable storage medium of claim 11, wherein the method includes: transferring a modified image, wherein the modified image is prepared based on the first digital image, and at least a portion of the modified image shows a simulated effect of application of the cosmetic product.**

261. In my opinion, Rubinstenn103 discloses or renders this claim obvious. See claims 3 and 9 discussion above in Ground 3 (*see supra* ¶¶ 254-257) and Ground 4 (*see supra* ¶ 260).

3. **10: The electronic device of claim 6, wherein the first digital image further depicts one or more color standards.**

262. In my opinion, Rubinstenn103 in view of Bandic and Rubinstenn300 discloses or renders this claim obvious. See claim 4 discussion above in Ground 3 (*see supra* ¶¶ 258). Rubinstenn103 discloses that the user device may display the digital image and it depicts one or more color standards so that the user may select the right color button to calibrate the image (first image represented in one color standard and displayed on that-color-standard compatible computer monitor).

4. **15: The computer readable storage medium of claim 11, wherein the first digital image further depicts one or more color standards.**

263. In my opinion, Rubinstenn103 discloses or renders this claim obvious. See claims 4 and 10 discussion above – Ground 3 (*see supra* ¶ 258) and Ground 4 (*see supra* ¶ 262).

- 5. 7: The method of claim 6, wherein calibrating colors of a first digital image is based on a second digital image of one or more color standards.**

264. In my opinion, Rubinstenn103 in view of Bandic and Rubinstenn300 disclose or render this claim obvious. As described above in ground 3, limitation 1[a1] (*see supra* ¶¶ 233-238), a method is taught, which could be implemented by the user access device, where a facial image of the subject is calibrated based on an earlier image of a reference image, which displayed a color standard, such as a color bar.

- 6. 12: The computer readable storage medium of claim 11, wherein calibrating colors of the first digital image is based on a second digital image of one or more color standards.**

265. In my opinion, Rubinstenn103 in view of Bandic and Rubinstenn300 disclose or render this claim obvious. *See* claim 7 and ground 3 limitation 1[a1] discussion above (*see supra* ¶¶ 264, 233-238).

- 7. 8: The electronic device of claim 7, wherein the method includes, prior to transferring the first digital image, transferring the second digital image of one or more color standards.**

266. In my opinion, Rubinstenn103 in view of Rubinstenn300 discloses or renders this claim obvious. As described above in ground 3, limitation 1[a2] (*see supra* ¶¶ 264, 240-242), Rubinstenn103 and Rubinstenn300 describe a user access device, which could receive images from a webcam. While Rubinstenn103 does not explicitly describe transmitting a second digital image of one or more color standards

before the first digital image, Rubinstenn300 teaches that the second image of color standards could be transmitted from the webcam to the electronic device before the first digital image of the individual's face is transmitted. *See* Rubinstenn300, ¶ 0080. This is because the information used to calibrate (e.g., the information from the second digital image) must be known by the system so that the first digital image of the person's face could be calibrated. This second digital image must necessarily contain a color standard because image data must be captured in a known color standard in order to conduct the calibration. *See* Rubinstenn300, ¶ 0070.

- 8. 14: The computer readable storage medium of claim 11, wherein the method includes, prior to transferring the first digital image, transferring the second digital image of one or more color standards.**

267. In my opinion, Rubinstenn103 in view of Rubinstenn300 disclose or render this claim obvious. *See* claim 8 and ground 3, limitation 1[a2] discussion above (*see supra* ¶¶ 266, 240-242).

VI. CONCLUSION

268. Based on the foregoing analysis, it is my opinion that all claims of the '595 patent are obvious in view of the prior art references discussed above.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; that these statements were made with knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001; and further that such willful false statements may jeopardize the validity of the application or any patent issued thereon. I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Executed on 5/11/2025 in Coralville IA.



Milan Sonka, Ph.D.