

**UNITED STATES PATENT AND TRADEMARK OFFICE**

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**BEFORE THE PATENT TRIAL AND APPEAL BOARD**

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Canfield Scientific, Inc.  
Petitioner

v.

Melanoscan, LLC  
Patent Owner

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Case IPR: 2017-02125  
Patent No. 7,359,748

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**PETITION FOR INTER PARTES REVIEW**

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## EXHIBITS

Exhibit No.	Description
1001	U.S. Patent No. 7,359,748 (Drugge)
1002	File History for U.S. Patent No. 7,359,748
1003	Holger Voigt M.D. and Richarda Classen M.D., "Topodermatographic Image Analysis for Melanoma Screening and the Quantitative Assessment of Tumor Dimension Parameters of the Skin, " Cancer 1995 Fed; 75(4):981-988 ("Voigt")
1004	Jeffrey D. Hurly, Michelle H. Demers, Richard C. Wulpern, John R. Grindon, "Body Measurement System Using White Light Projected Patterns for Made-to-Measure Apparel," SPIE Vol. 3131, July 7, 1997, 212-223 ("Hurley")
1005	Heim A.M. Daanen and Jeroen van de Water, "Whole Body Scanners," Displays 19 (1998) 111-120. ("Daanen")
1006	PCT published application WO 98/28908 ("Crampton")
1007	PCT published application WO 99/56249 ("Dye")
1008	H.A.M. Daanen, <i>3-D Surface Anthropometry: accurate determination of body dimensions</i> , NATO Panel 8 RSG 24 Workshop on Emerging Technologies in Human Engineering and Testing & Evaluation, June 24-26, 1997
1009	Atkinson, Whittles Publishing, "Close Range Photogrammetry and Machine Vision" Ch. 11 "Medical photogrammetry," pp. 303-327 (1996)
1010	Curriculum Vitae of Dr. Jan-Peter Muller
1011	Deacon, Bhatia, and Jan-Peter Muller, "Evaluation of a CCD-based Facial Measurement System," Medical Informatics 16 pp. 213-228 (1991).
1012	Comer, R.P. <i>et al.</i> , Talking Digital, <i>Photogrammetric Engineering &amp; Remote Sensing</i> , 1139 (December 1998) ("Comer")
1013	Manual of Photogrammetry (4 <sup>th</sup> Ed. 1980), published by the American Society of Photogrammetry at p. 801-809.
1014	"USB powers up for market thrust," Office World News, September 1, 1998 ("Office World")
1015	"What's the big deal about USB," Info-Tech Advisor Newsletter, January 12, 1999 ("Info-Tech")
1016	Declaration of Dr. Jan-Peter Muller

## **I. Mandatory Notices and Fee Payment Authorization**

Canfield Scientific, Inc. is the real party-in-interest.

On June 9, 2017, a counterclaim was filed in the U.S. District Court for the District of New Jersey alleging that the petitioner infringes U.S. Patent No. 7,359,748 (the “‘748 patent”). *Canfield Scientific, Inc. v. Melanoscan LLC and Dr. Rhett Drugge*, Civil Action No. 2:16cv04636-JMV-JBC (D. N.J. 2016). The counterclaim was served on petitioner on June 9, 2017. Accordingly, this petition is timely and not subject to 35 USC § 315(b).

Lead and back-up counsel are identified in the signature block at the end of this petition. Service may be made upon such counsel by directing papers to the indicated addresses (including email).

Payment of the fees required under 37 CFR § 42.103(a) and 42.15(a) is submitted herewith. The Patent Office is authorized to charge payment of any additional required fees (and credit any overpayment) to Deposit Account No. 13-2855 under Order No. 32090/10004.

## **II. Requirements for Inter Partes Review**

### **A. Grounds for Standing**

The petitioner hereby certifies that the ‘748 patent is available for inter partes review, and that petitioner is neither barred nor estopped from requesting inter partes review of the patent. On August 1, 2016, petitioner filed an action for

unfair competition against patent owner seeking, inter alia, a declaration of non-infringement. On June 9, 2017, patent owner asserted a claim against petitioner for patent infringement. Petitioner properly counterclaimed for declaration that patent was invalid. *Southeastern Indus. Tire Co., Inc. v. Duraprene Corp.*, 70 F.R.D. 585, 586-87 (E.D. Pa. 1976). A counterclaim for declaratory judgment, filed in response to an action for patent infringement, does not bar inter partes review. *See* 35 U.S.C. §315(a)(3). Review here is proper. *Ariosa Diagnostics v. ISIS Innovation Ltd.*, Case IPR2012-00022, 2014 WL 4381564, \*6–\*11 (PTAB Sept. 2, 2014) (final written decision).

## **B. Identification of Challenge**

The petitioner requests inter partes review of claims 1-8, 11, 30, 32-34, 46, and 51 of the ‘748 Patent based on the following grounds.

Grounds	‘748 Patent Claims	Basis for Challenge
1	1-5, 8, 11, 30, 33-34, 46, and 51	Obvious under 35 USC § 103 over Voigt (Ex. 1003) and Hurley (Ex. 1004)
2	1-5, 8, 11, 30, 33-34, and 51	Obvious under 35 USC § 103 over Voigt (Ex. 1003) and Crampton (Ex. 1006)
3	1-8, 11, 30, 33-34, 46, and 51	Obvious under 35 USC § 103 over Hurley (Ex. 1004)
4	6 and 7	Obvious under 35 USC § 103 over Voigt (Ex. 1003), Hurley (Ex. 1004) and Daanen (Ex. 1005)
5	32 and 46	Obvious under 35 USC § 103 over Voigt (Ex. 1003), Crampton (Ex. 1006), and Dye (Ex. 1007)

The ‘748 patent issued April 15, 2008, from U.S. patent application No. 09/625,712 filed July 26, 2000 and does not claim any earlier date of priority. The patent has not expired. Each of the publications identified in the grounds above, except Dye (Ex. 1007), qualifies as prior art under 35 USC § 102(b) because each published more than one year before July 26, 2000. Dye published on November 9, 1999, and qualifies as prior art under 35 USC § 102(a).

### **III. Summary of the ‘748 Patent**

#### **A. ‘748 Patent**

The ‘748 patent describes a multi-camera enclosure for imaging a person or portion thereof, useful in screening for various medical and cosmetic conditions, as well as for analysis of body morphology by trainers, clothiers, and physicians. Ex. 1001, ‘748 patent at 5:63–8:12. The claims recite an enclosure defining a specified imaging position for placement of the person being imaged, a plurality of imaging devices, and a plurality of light sources. *Id.* at 21:63-22:25.

The ‘748 patent purports to improve prior art imaging devices by using multiple cameras within an enclosure capable of “photographing” the entire body. *See, e.g., id.* 4:11–5:13. The invention otherwise employs known techniques. *Id.* 1:7–12 (invention “involves the measurement and analysis of an optically depicted

image of a patient's [body] by *standard* color imaging, heat, electromagnetic or chemical imaging.") (emphasis added).

**B. Prosecution History**

Following the Patent Office's rejection of all initially filed claims over prior art (Ex. 1002, File History, 255-60), the applicant amended its claims, limiting them, *inter alia*, to devices using a *plurality* of imaging devices and light sources. The claims were then allowed. *Id.*, 264-82, 355.

**C. Reasonable Likelihood That At Least One Claim Is Unpatentable**

The references cited herein were never before the Patent Office. The claims of the '748 patent are obvious in light of these references.

**D. Level of Ordinary Skill in the Art**

A declaration of Dr. Jan-Peter Muller (Ex. 1016) is submitted in support of the Petition. Dr. Muller has a formal education in physics and astronomy, and his professional experience includes more than 30 years of experience in research and development, including many years in the fields of imaging and remote sensing. He is an expert in the fields of imaging, including medical imaging, remote sensing, optical and thermal infrared instrumentation, photogrammetry, automated image analysis and 3D modeling. Ex. 1016, Muller Decl. ¶¶ 3-13, 36.

The ‘748 patent relates to imaging a person or a portion thereof. *Id.* ¶¶ 39-40. The fields of imaging, scanning, and photogrammetry provide relevant prior art. *Id.* ¶ 13.

Dr. Muller is familiar with the level of skill of persons having ordinary skill in this art (“POSA”). *Id.* ¶¶ 34-35. A POSA would have had at least a university degree in physics, electrical engineering, photogrammetry, surveying, or optics and at least two years of post-degree experience in the field of imaging. *Id.* ¶ 35. For example, a POSA would understand the general principles for making measurements based upon images (i.e. photogrammetry), could acquire and analyze data gathered from digital cameras, and would be familiar with the literature discussing the use of photogrammetry and digital scanning in medicine as well as in other fields, such as the clothing, automotive, and entertainment industries. *Id.*

#### **E. Claim Construction**

The terms of an unexpired patent are to be accorded their broadest reasonable construction.<sup>1</sup>

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<sup>1</sup> Petitioner reserves its right to argue the constructions of these terms in the District Court proceeding under applicable standards.

**1. A device for identification of maladies that affect human tissue**

The preambles of independent claims 1 and 51 recite “a device for identification of maladies that affect human tissue.” These preambles merely state an intended use. The body of each claim recites a structurally complete device: an enclosure that includes a specified imaging position, a plurality of imaging devices or means, and a plurality of light sources or lighting means. The body nowhere references the use recited in the preamble. The preamble does not limit the scope of the challenged claims. *Catalina Mktg. Int’l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002).

**2. Imaging devices and imaging means**

Claim 1 recites “a plurality of imaging devices” and claim 51 recites “a plurality of imaging means.” Use of the term “means” creates a rebuttable presumption that § 112 ¶ 6 applies.

The specification discloses that the imaging devices are “devices capable of ‘photographing’ the body in a static position (motion or time-lapsed photography is also provided for).” Ex. 1001, 4:25-27. Such devices may “photograph” the body “through traditional photography means, and/or temperature, chemical or electromagnetic based means.” *Id.*, 4:28-30. The imaging devices “could comprise standard or digital cameras, or other devices capable of capturing light, temperature, chemical information, or other information of interest” or “any other



type of device capable of capturing the desired information from the subject.” *Id.*, 18:50-53, 19:25-28. A POSA would understand “imaging device” to be a device capable of capturing information useable for imaging a person, including all types of cameras such as film, black and white, color, digital, CCD, thermal infrared, multi-spectral, video, and chemical detection (*i.e.* fluorescence). Ex. 1016, Muller Decl. ¶¶ 45, 47. A POSA would understand the disclosed structure for the “imaging means” of claim 51 and its equivalents to have the same meaning. *Id.*

### **3. Centerline**

Claim 1 recites a specified imaging position that “defines a centerline.” The specification explains that the system is “sized such that the person [being imaged] could easily stand at the center 108 of the device 100 with sufficient comfort.” Ex. 1001, 18: 37-39. A POSA would understand the reference to centerline refers to a line dividing the imaged object through its center. Ex. 1016 ¶¶ 46, 87. A POSA would generally understand that to mean a line dividing the body along one of two planes, either the frontal plane of the person’s body dividing the person from side to side and or the sagittal plane dividing the person from front to back. *Id.*

### **4. Light sources and illuminating means**

Claim 1 recites “a plurality of light sources.” Claim 51 recites “illuminating means.” The specification discloses the use of fluorescent tubes as the preferred means, but states that “any type of illumination can be used.” Ex. 1001, 18:56-58.

A POSA would understand light sources to include any type of illumination used with imaging, such as LEDs, projectors, textured lighting, lasers, colored lights, theater or cinematic lights, Wood lights (ultraviolet), and fluorescent lights. Ex. 1016, Muller Decl. ¶ 47. A POSA would understand that the structure disclosed in the specification for the “illuminating means” would have the same meaning. *Id.*

## **5. The Wherein Clause**

Claims 1 and 51 recite “wherein each . . . [imaging means or imaging device] defines respective coordinates and said respective predetermined distance [relative to the specified imaging position], and defines a respective focal length and resolution information, allowing precise measurement of imaged features of the person or portion thereof [.]” Ex. 1001, 22:17-25, 25:41-48.

The ‘748 patent specification emphasizes that these “distances, in combination with focal length and resolution information, allows for precise measurement of the human features of interest.” *Id.*, 4: 42-46. The specification explains the purpose (*i.e.* “basis”) of the “panel-camera array” is “to accurately capture the physiological attributes desired from the subject patient.” *Id.* 4: 40-42. During prosecution, the applicant distinguished its invention over the prior art on the basis that the invention “allowed precise measurement of imaged features based on the coordinates and distance of each imaging device relative to the imaging position.” Ex. 1002, File History, 278.

The broadest possible construction of this clause, not inconsistent with these disclosures, is that the device precisely measures features of the person or portion thereof imaged by an imaging device using the predetermined distance between that imaging device and the specified imaging position, together with the imaging device's coordinates, its focal length, and its resolution. Ex. 1016 ¶¶ 48-50.

**6. First means for receiving and enclosing a person or portion thereof**

Claim 51 recites “first means for receiving and enclosing a person or portion thereof to image the person or portion thereof.” Ex. 1001, 25:22-23. For the recited function of receiving and enclosing a person, the ‘748 patent discloses interconnected panels that form a fully surrounding enclosed structure supported by a perimeter wall 103 that can be made of “plywood, particle board, or any other structural material capable of supporting the structure.” Ex. 1001, 18: 43-45, 60-63. A POSA would understand the broadest reasonable construction of the limitation to be “a structure that fully surrounds (*i.e.* encloses) a person and that is made of plywood, particle board, or any other structural material capable of supporting the structure and equivalents thereof known at the time of the filing of the application.” Ex. 1016 ¶¶ 52-53.

## **7. Second means for specifying an imaging position**

Claim 51 recites “second means located within the first means for specifying an imaging position for placing the person or portion thereof within the first means, wherein the second means defines a centerline.” Ex. 1001, 25:24-27

To “specify[ ] an imaging position,” the specification explains that the system (as shown in Figure 1) is “sized such that the person [being imaged] could easily stand at the center 108 of the device 100 with sufficient comfort.” *Id.*, 18: 37-39. Shield 107 “protects the imager array 102 and light sources 101 from contact with the subject.” *Id.* 18: 65-67 (shield of 1/8" plexiglass). The shield is in close proximity to the imaged person, physically confining the person to a specified location (the center of the enclosure) and compelling a particular orientation. Ex. 1001, Fig. 1; Ex. 1016 ¶¶ 54-56.

The compelled position and orientation of the person “defines a centerline” along their body from side to side or front to back. Accordingly, the structure disclosed in the ‘748 patent for the second means is “a shield positioned in such proximity to the person being imaged that the person is physically confined to the specified imaging position, or equivalent structures known at the time of the filing of the application that would similarly physically confine the person.” Ex.1016 ¶¶ 54-56.

Figure 1 of the ‘748 Patent depicts the center of the enclosure (“center 108.”) Ex. 1001, 19: 36-39. The patent links no structure to this geometric concept. Ex. 1016 ¶ 57.

#### **IV. Claims 1-8, 11, 30, 32-34, 46, and 51 Are Unpatentable**

All limitations of claims 1-8, 11, 30, 32-34, 46, and 51 were well-known in the prior art, and the claimed combinations are obvious. Ex. 1016 ¶¶ 58, 66-67, 100.

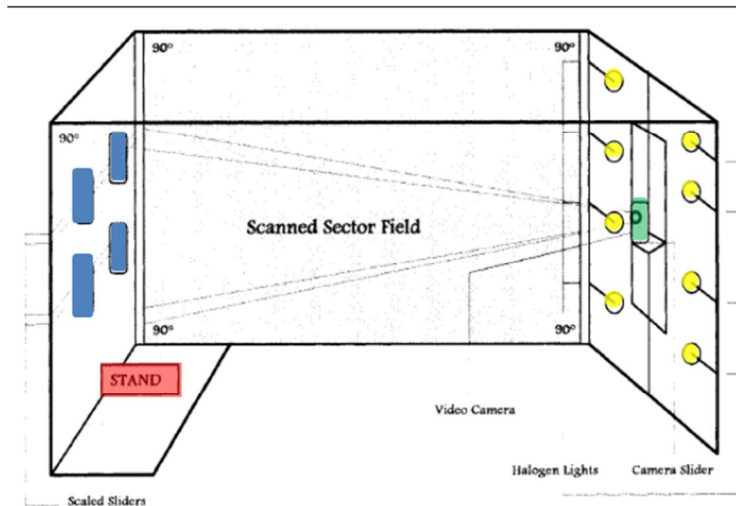
##### **A. Prior Art**

###### **1. Voigt**

Voigt identified a clinical need to evaluate changes in cutaneous (*i.e.* skin) lesions in connection with melanoma cancer screening and follow-up. Ex. 1003, Voigt, 981; Ex. 1016 ¶¶ 61-62, 101. Voigt described a technique it calls “topodermatography.” that uses images of a portion of the body (front and back of the torso) to make quantitative measurements of skin lesions over time. Ex. 1003 at 981, 983; Ex. 1016 ¶¶ 61-65, 115.

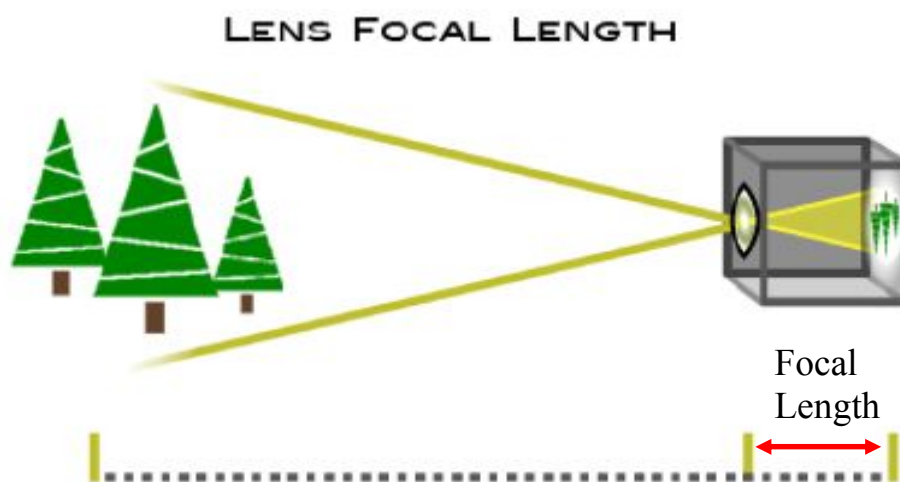
Voigt’s technique takes digital images of a patient in an enclosure. Ex. 1003 at 982; Ex. 1016 ¶¶ 61-65, 102. The enclosure specified an imaging position. Depicted in the annotated Voigt figure below, the patient’s standing position was fixed at the thoracic and iliac level (*i.e.* from the neck to the hips) by “symmetrically fitting the lateral extent of the trunk shape into horizontally

adjustable scaled sliders.” The patient stood on the stand (red) in front of the camera (green) between the brackets (blue). The patient’s position was recorded before imaging. Ex. 1003 at 982; Ex. 1016 ¶¶ 61-65, 88, 102.

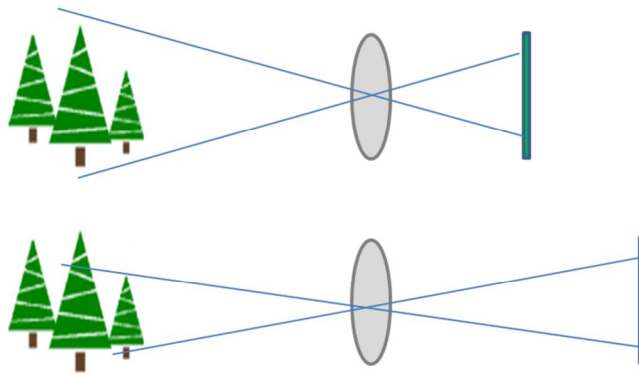


To illuminate the patient, Voigt’s enclosure included multiple light sources (yellow) spaced relative to one another in fixed positions. Ex. 1003 at 982 (“Illumination conditions were provided by halogen lights fixed laterally at the position framework”); Ex. 1016 ¶¶ 63, 103. These light sources were peripheral to a camera (green). The vertical position of the camera was adjustable, and its position was recorded before imaging. Ex. 1003 at 982; Ex. 1016 ¶ 65 (“the vertical height of the video camera was adjusted on a scaled-camera slider, and its framework position was recorded”). The camera’s distance from the imaging position was determined before imaging. Ex. 1016 ¶¶ 65, 131.

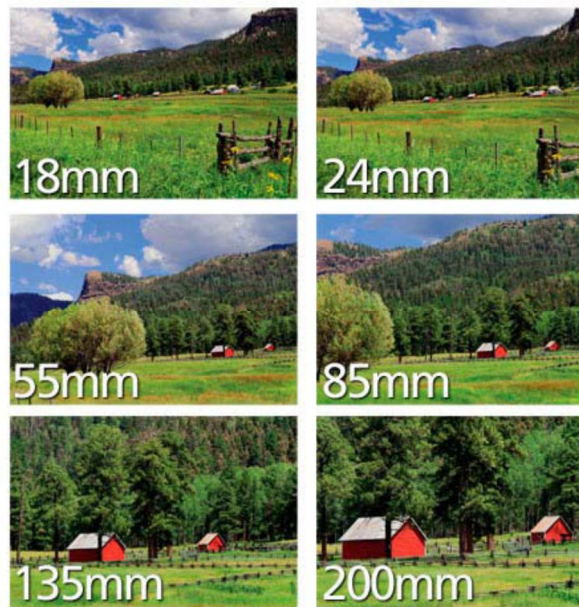
Voigt describes use of a Hitachi KP-Mlek black/white charge-coupled device camera. Ex. 1003, 982; Ex. 1016 ¶ 104. The Hitachi KP-Mlek would necessarily have had a lens that defined a focal length (*i.e.* the distance, usually represented in millimeters, from the point in the camera's lens where light converges from the subject to the image sensor.) Ex. 1016 ¶ 104. The concept of focal length, well known to a POSA, is illustrated in the following diagram (Ex. 1016 ¶¶ 43, 105-107):



Focal length determines how much of the photographed subject will appear in an image. Ex. 1016 ¶ 105. The greater the focal length, the less of a photographic scene is captured on the sensor (Ex. 1016 ¶¶ 105-107):



The following examples depict the same scene taken using lenses of different focal lengths (Ex. 1016 ¶ 106):



Charged couple devices, such as those used in Voigt, employ an integrated circuit etched onto a silicon surface forming light sensitive elements called pixels. Ex. 1016 ¶ 108. To capture the image, these light sensitive elements detect photons striking this surface. *Id.*



A POSA would have understood that the greater the focal length, the smaller the amount of the scene that is projected onto the CCD sensor. Ex. 1016 ¶ 109.

Comparing images taken using focal lengths of 85mm and 200mm, each pixel using 85mm will represent a greater actual area of the scene than each pixel captured at 200mm. Imagining each yellow square below to represent a single pixel, the entire red barn fits within a single pixel at 85mm, whereas only a portion falls within a single pixel at 200mm. *Id.*



POSA would have understood therefore that the real dimensions represented by a single pixel are a function of the camera's resolution (*i.e.* how fine or coarse is each pixel), the focal length of the camera (which determines the ratio between the size of the objects shown on the image with their actual size), and the distance between the camera and those objects. Ex. 1016 ¶¶ 60, 110.

Voigt describes capturing images at a specific resolution (*i.e.* 512 pixels horizontal and 768 pixels vertical). Ex. 1003, 983; Ex. 1016 ¶ 111. Voigt

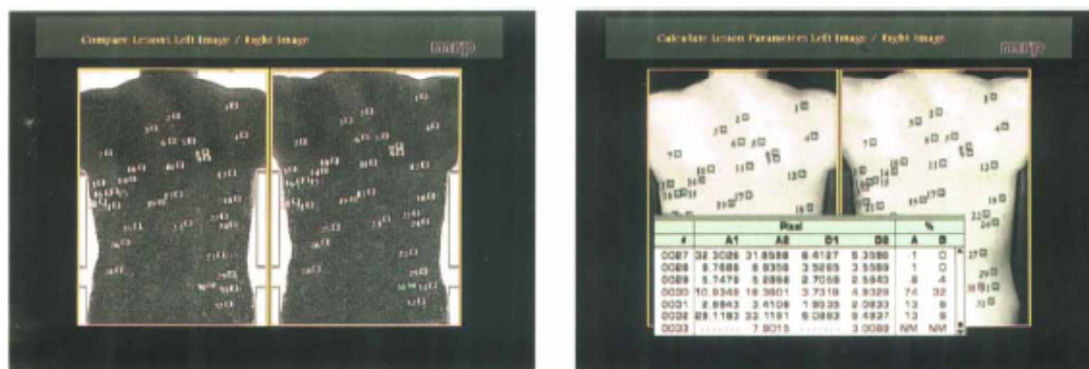
observes the images thus captured reflected a scale where each pixel equaled a 1mm area of the subject. A POSA would understand Voigt's measurement to reflect a calculation using the resolution of the camera (*i.e.* the physical size of the pixel in the sensor), the focal length of the camera lens (*i.e.* the ratio between the actual dimensions of the imaged object to that of the object when represented in the image) and the camera's distance from the subject's position. In Voigt, the camera captured a portion of the subject one foot eight inches wide, two feet six inches high (*i.e.* 512mm x 768mm). Ex. 1016 ¶¶ 60, 111.

From images, Voigt made "digitized measurements" of lesions. Voigt calculated the "area and the dimensions" from pixels representing those lesions—permitting size comparisons with earlier images. Ex. 1003, 983; Ex. 1016 ¶ 112.

Voigt demonstrates that those in the art in the mid-1990s knew an enclosure, having a camera and light sources positioned at predetermined distances and coordinates from a specified imaging position, could measure lesions using pixels whose scale was calculated from camera focal length, resolution, and distance from the imaging position. Ex. 1016 ¶ 113.

Voigt discloses digitized measurements using a high-speed processor with on-board coprocessor, a high-resolution video camera, image processing software, and a position framework. Ex. 1003, 982; Ex. 1016 ¶¶ 94, 206. The software was

installed on a personal computer. Resulting images were viewed on a monitor reproduced below. Ex. 1003, 983, Fig. 3; Ex. 1016 ¶ 94.



## 2. Daanen and Hurley

Daanen surveys eight then-available commercial products, each constituting an “optical 3D measuring system that produces a digital copy of the surface geometry of the human body.” Ex. 1005, Daanen, 111-120; Ex. 1016 ¶ 68. Daanen notes such devices were applicable to anthropometric research, the clothing industry (to create individually tailored clothing), the entertainment industry (to create special effects), computer animation, and medicine. Ex. 1005, 111; Ex. 1016 ¶ 68. The article describes a whole body scanner as consisting of:

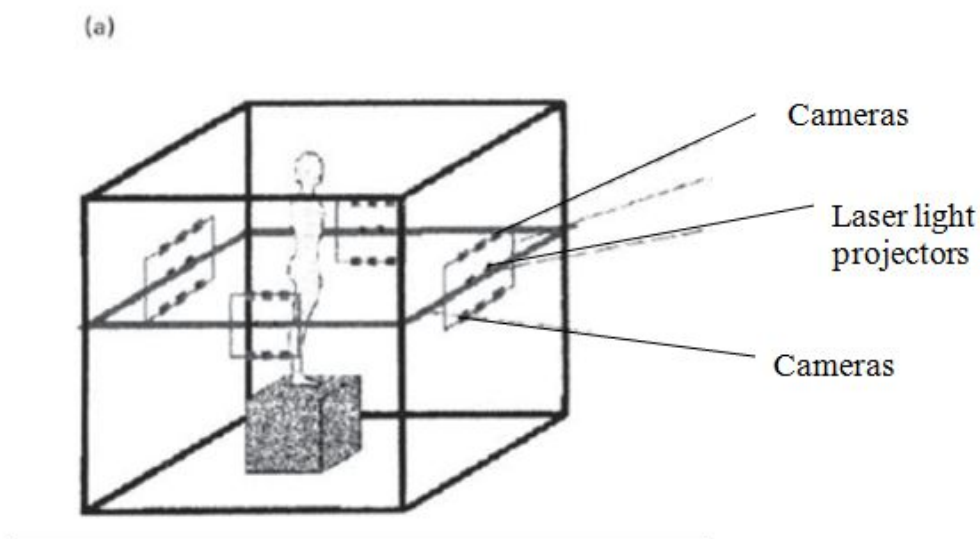
- One or more light sources
- Cameras that capture the image of the projected light on the body;
- Software to extract the depth structure of the body surface from the images, and
- A computer and screen to visualize the 3D surfaces.

Ex. 1005, 112; Ex. 1016 ¶ 95. Each described system contains multiple light sources and multiple cameras. Most also employ enclosures. Ex. 1016 ¶¶ 69-72, 86.

Daanen identifies several advantages of using multiple cameras and light sources. Daanen explains that “in order to cover the entire body, multiple scan heads [containing at least one light and camera] have to be used.” Ex. 1005, 119; Ex. 1016 ¶ 69. Compared to scanners having a moving camera, Daanen explains that use of multiple, steady-mounted cameras allows for no moving components “increase[ing] the life cycle of the scanning system and also increase[ing] the safety of the scanned subjects.” Ex. 1005, 119; Ex. 1016 ¶ 69. Describing one system, Daanen noted that its use of numerous cameras allowed for high resolution. Ex. 1005, 115 (“The Vitronic has the best resolution of the mentioned systems...[t]his relatively high resolution is mainly caused by the large number of cameras that is used.”); Ex. 1016 ¶ 69. These advantages, among others, provide a rationale for a POSA to add multiple cameras for full body imaging. Ex. 1016 ¶ 69.

The Vitronic system described in Daanen used either 16 or 24 CCD cameras. Exh. 1005, 115; Ex. 1016 ¶ 70. The cameras were arranged in four scanning heads, one on each wall of the enclosure. The person stands on a raised block in the center of the enclosure. Each of the four scanning heads includes two lasers to

illuminate the body. The cameras in each of the scanning heads are arranged in two, vertically spaced, horizontal rows of three cameras each, with the lasers in a row sandwiched between those rows. Ex. 1005, 115; Ex. 1016 ¶¶ 70, 89. An annotated representation of the Vitronic system from Daanen is shown below (Ex. 1005, 113, Fig. 4a):

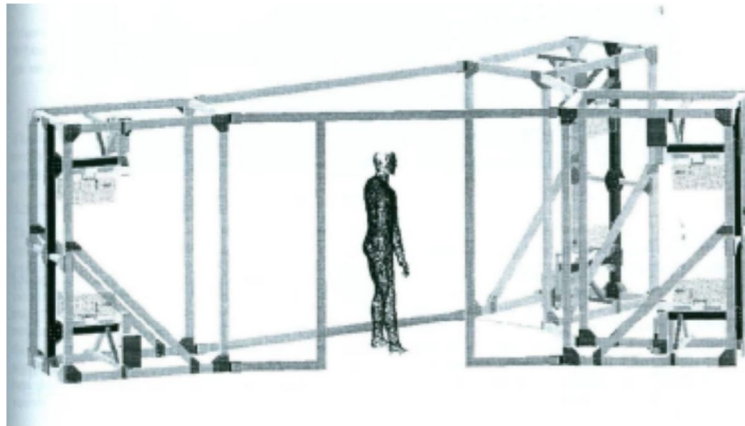


The Vitronic system provides a visual output, an example of which is shown below. Ex. 1005, Daanen, 113, Fig. 4a; Ex. 1016 ¶ 95.



Daanen further describes the TC<sup>2</sup> system. Ex. 1005, 114-15. More fully described in Hurley (Ex. 1004), the TC<sup>2</sup> system was used in the apparel industry. Ex. 1004, Hurley, 212-23; Ex. 1016 ¶ 72.

That system had six sensors, each consisting of a projector and a camera. The sensors were placed on a frame with three towers. The frame was designed “with an ‘erector set’ approach” built with a black anodized aluminum extrusion.” Ex. 1004, 213; Ex. 1016 ¶¶ 72, 76-77. The extrusion was covered with black theater cloth for light tightness and to reduce spurious reflection inside the system. *Id.* Each tower had two sensors, one spaced vertically above the other. Two towers faced the front of the body and one tower faced the back. The system is shown in the figure below from Hurley (Ex. 1004, 213).



Hurley discloses that each sensor contains a projector, a camera, and necessary controls for both. Ex. 1004, 214; Ex. 1016 ¶¶ 78, 207, 249. The whole system is controlled by a personal computer, and additional hardware and wiring

necessary to interface the computer to the sensor heads is contained in an enclosure attached to the sensor head. The software program serves as the graphical user interface, processes the acquired images, and displays graphical output. Ex. 1004, 214; Ex. 1016 ¶ 96. An example of the resulting images from Figure 5.1 of Ex. 1004 is reproduced below:

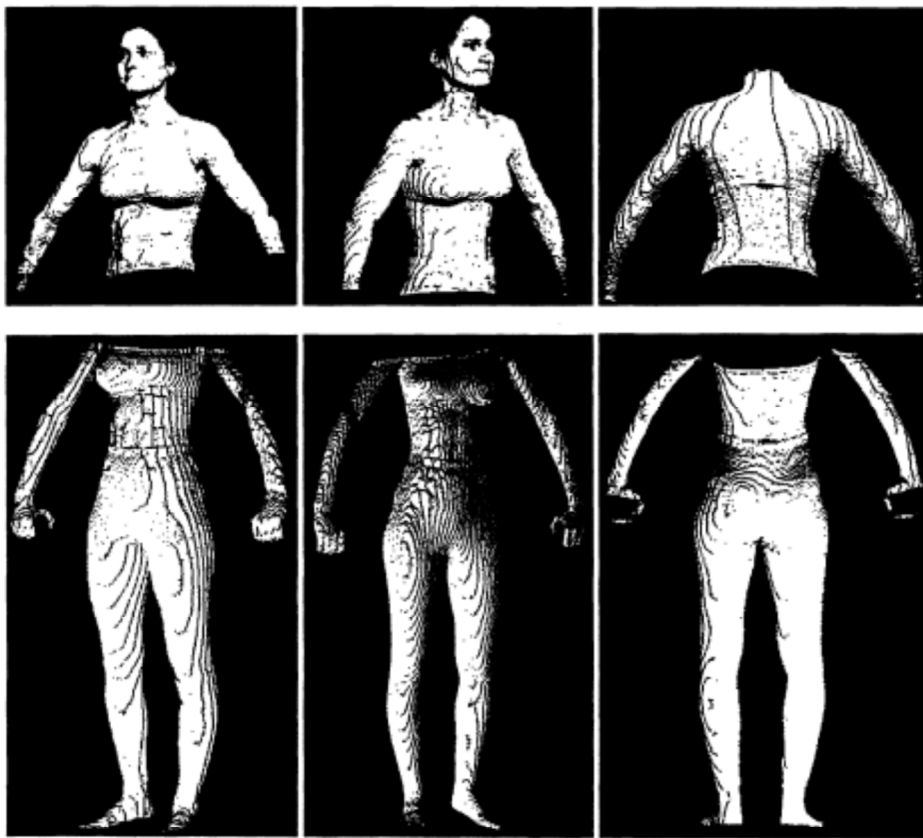


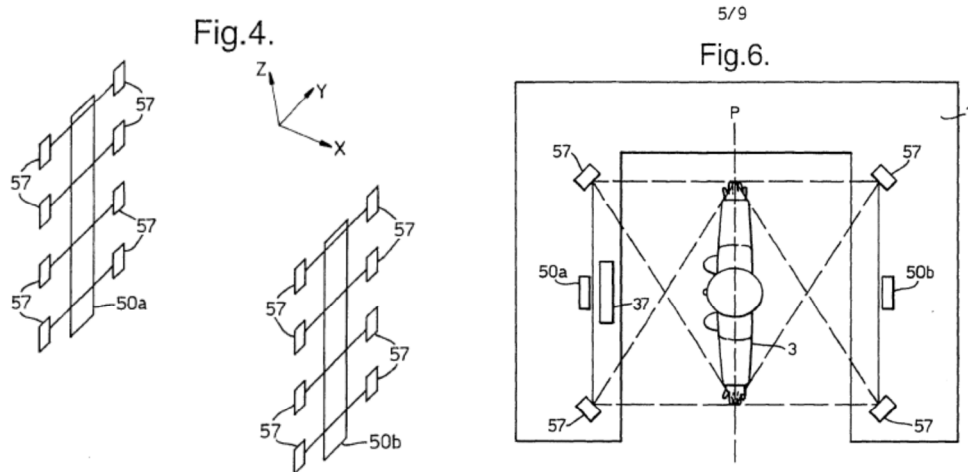
Figure 5.1 Six Individual Views of 3D Data Points

### 3. Crampton

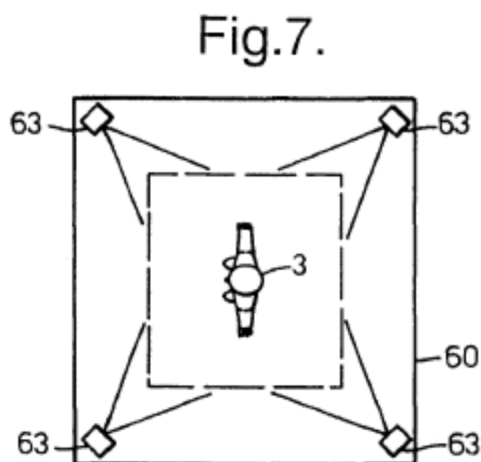
Crampton (Ex. 1006), published July 2, 1998, describes a variety of kiosk or booth designs with multiple camera and light configurations used for capturing a

3D image of the human body, specifically to create high-detail surface avatars of the person. Ex. 1016 ¶¶ 79, 86.

Crampton depicts two vertical columns of image sensors (57) at each corner of the booth or kiosk. Ex. 1006, 7-8, Figs. 4, 6; Ex. 1016 ¶¶ 80-82, 334.



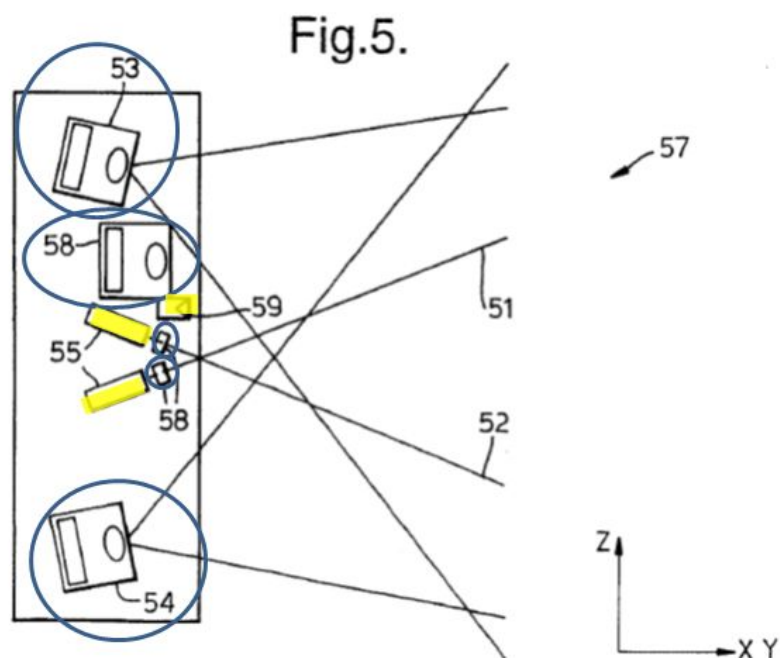
In one embodiment, cameras (63) surround the subject (3). Ex. 1006, 9-10, Fig. 7; Ex. 1016 ¶ 83.





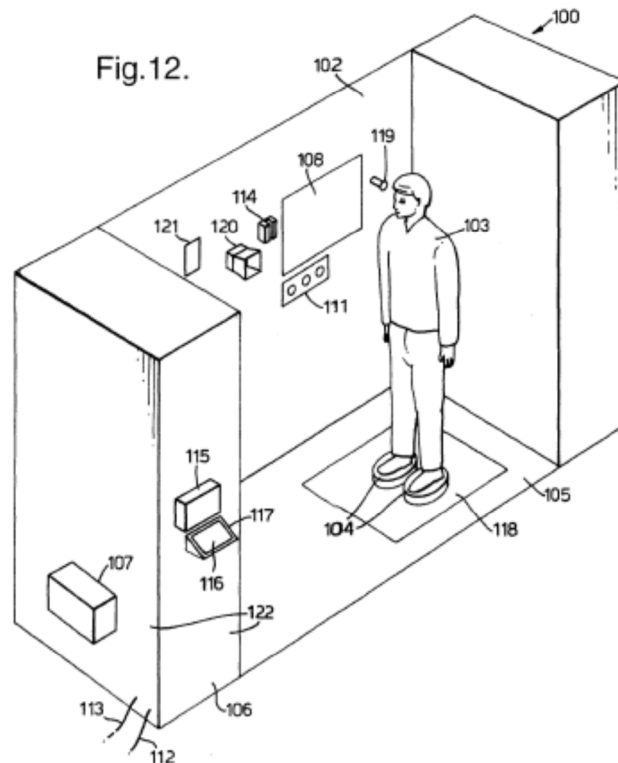
Crampton discloses that the number of cameras needed to capture the entire body will depend on the size of the kiosk. Ex. 1006, pp. 9-10; Ex. 1016 ¶ 84.

Each sensor may contain a variety of cameras, laser generators, color cameras, and flash lights. Ex. 1006, 7-8; Ex. 1016 ¶¶ 85, 335. In Figure 5 from Crampton reproduced below, cameras 53, 54, and 58 are circled in blue. Laser stripe generators (55) are highlighted in yellow, as are flash lights (59). Ex. 1006, 7-8; Ex. 1016 ¶¶ 85, 335.



Crampton discloses a variety of lighting arrangements. In addition to the sensors containing both cameras and light sources discussed above, Crampton also discloses an embodiment in which the camera lens (69) is surrounded by two different wavelengths of LEDs (70, 71). Ex. 1006, 10, Fig. 10; Ex. 1016 ¶ 85.

Crampton discloses further interior lighting (121) located within the kiosk, between columns of sensors. Ex. 1006, 13, Fig. 12; Ex. 1016 ¶ 82.



Crampton discloses sensing equipment connected to a means for programmable processing (a computer) that is, in turn, connected to a display monitor. Ex. 1006, 4-5; Ex. 1016 ¶ 97. An operator panel controls the system, with input means that may be a touch screen, a keyboard, or other user interface means. Ex. 1006, Abstr., pp. 4-5; Ex. 1016 ¶ 97. The display may be a computer monitor, LCD, or any form of pixel display technology. Ex. 1006, Abstr., p. 6; Ex. 1016 ¶ 97.

#### **4. USB and PDA**

Dye (Ex. 1007), published on November 4, 1999, describes a method for rendering and displaying 3D graphical data on a display device. Ex. 1016 ¶ 98. In describing the state of the art as of its April 23, 1999 filing date, Dye discloses that standard input/output devices for use in a computer system for building and manipulating three dimensional objects include a keyboard, mouse, floppy disk, hard drive, etc. Ex. 1007, 1, ll. 13-15; Ex. 1016 ¶ 98. Dye explains that images can be displayed on computers, television screens, personal digital assistants (PDAs) and other types of display systems for displaying 2D/3D graphics. Ex. 1007, 6, ll. 15-24; Ex. 1016 ¶ 98. Specifically, images can be conveyed to the display system through an I/O bus interface, including, for example, a Universal Serial Bus (USB). Exh. 1007, 7, ll. 21-23; Ex. 1016 ¶ 101.

Similarly, press coverage from 1998 makes clear that USB hubs were an increasingly popular option for connecting a large number of peripheral devices, such as digital cameras, to a computer. Ex. 1014, Office World; Ex. 1016 ¶ 99. Office World explains that USB connectors and hubs were growing in importance as operating systems were upgraded to support their use in connection with peripheral devices. USB hubs were known to allow users to connect up to 127 devices to a single computer and offered increased speed compared to other options. Ex. 1014; Ex. 1016 ¶ 99. These USB hubs prevented power drain when

using multiple devices. Ex. 1015, Info-Tech; Ex. 1016 ¶ 99. A POSA would have understood that USB hubs were a known technological option to connect multiple digital cameras to a computer at the time the application leading to the '748 patent was filed. Ex. 1016 ¶ 99.

**B. Application of the Prior Art to the Challenged Claims**

**1. Ground 1: Claims 1-5, 8, 11, 30, 32-34, 46, and 51 Are Obvious over Voigt and Hurley**

**(a) Independent Claim 1**

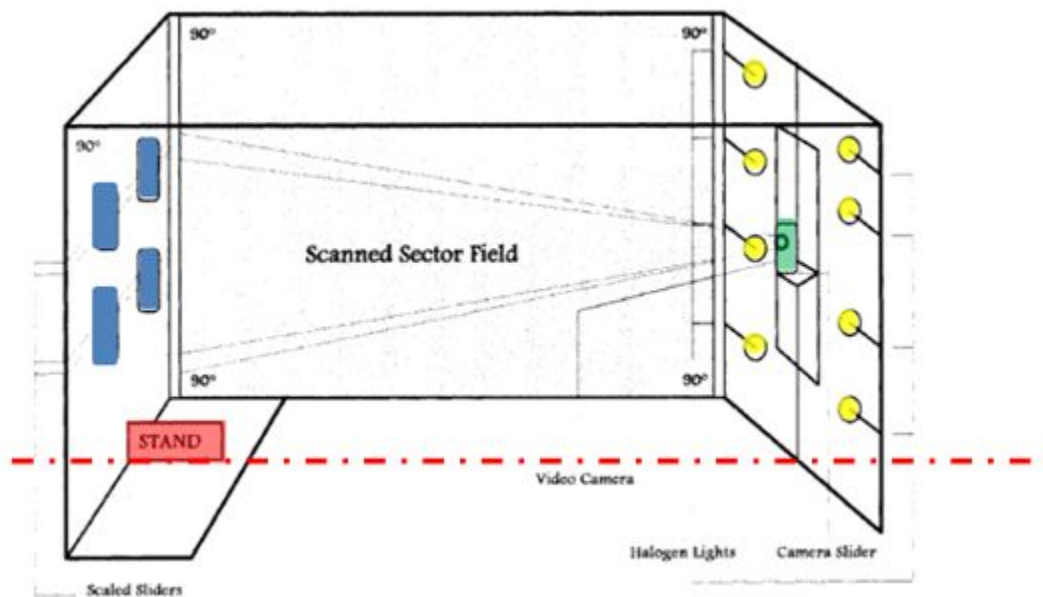
**(i) PREAMBLE: A device for the identification of maladies that effect human tissue comprising**

If the PTAB concludes the preamble is a limitation, then Voigt discloses a device “to identify and evaluate changes of cutaneous lesions in melanoma screenings.” Ex. 1003, Voigt, 981; Ex. 1016 ¶ 130. Use of the device allows for “digitized measurements of skin-surface image parameters.” Ex. 1003, 981. This constitutes a device for the identification of maladies that affect human tissue. Ex. 1016 ¶ 133.

**(ii) An enclosure configured to receive a person or portion thereof for imaging the person or portion thereof, wherein the enclosure defines a specified imaging position for placing the person or a portion thereof within the enclosure for imaging, and the specified imaging position defines a centerline**

The “position framework” in Figure 1 of Voigt shows an enclosure in which a person is imaged. Ex. 1003, Fig. 1; Ex. 1016 ¶ 131. In this position framework,

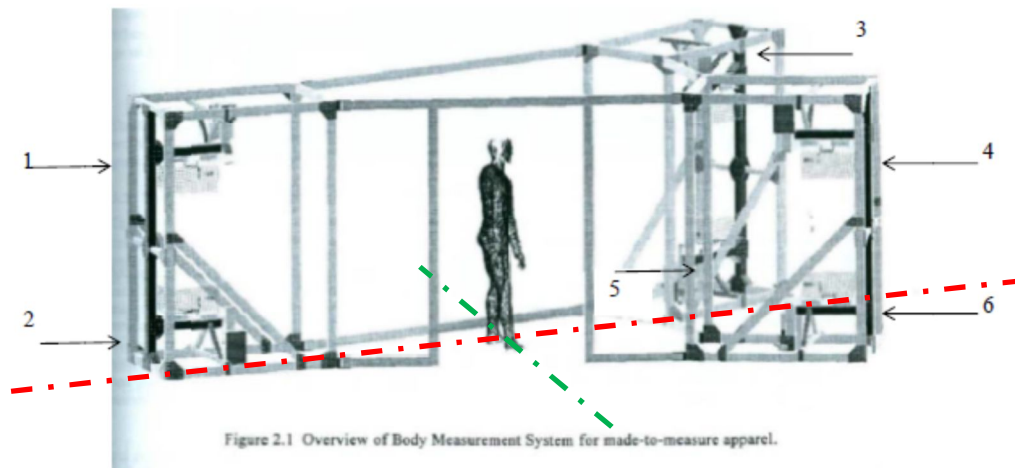
the “patient’s standing position was fixed at the thoracic and iliac level by symmetrically fitting the lateral extent of the trunk shape into horizontally adjustable scaled sliders of the position framework.” Ex. 1003, 982; Ex. 1016 ¶ 134. The stand where the person is located for imaging is highlighted in red below and the adjustable sliders are highlighted in blue. Ex. 1016 ¶ 131. The specified position so defined by the enclosure defines a centerline (dotted line) passing through the subject from front to back. Ex. 1016 ¶¶ 131, 170.



- (iii) **A plurality of imaging devices, wherein a plurality of the imaging devices are vertically spaced relative to each other, a plurality of the imaging devices are laterally spaced relative to each other, a plurality of the imaging devices are located on opposite sides of the centerline of the specified imaging position relative to each other and each imaging device is located a predetermined distance relative to the specified imaging position**

Voigt discloses an imaging device located at a predetermined distance relative to the specified imaging position. Ex. 1003, 982; Ex. 1016 ¶ 132. It does not disclose the use of multiple cameras, or cameras located on opposite sides of the subject. 1016The camera in Voigt captures one side of a person's torso. Ex. 1003, 983; Ex. 1016 ¶ 135.

Hurley discloses a device using six imaging devices, including at least a plurality that are spaced vertically, laterally, and opposite the centerline of the specified imaging position from one another. Ex. 1004, 212-13, Fig. 2.1; Ex. 1016 ¶ 144. Specifically, Hurley describes six sensor heads, each containing a camera and light source. These sensor heads are numbers one through six in the annotated reproduction of Figure 2.1 of Ex. 1004 below. Ex. 1016 ¶ 144.



Cameras 1 and 2 constitute a plurality of imaging devices that are vertically spaced relative to each other. Ex. 1016 ¶ 145. Cameras 3 and 4 constitute a plurality of imaging devices that are laterally spaced relative to each other. Cameras 2 and 6 constitute a plurality of imaging devices that are located on opposite sides of the centerline of the specified imaging position (defining the centerline as the frontal plane [green] of the body). Cameras 3 and 4 are also located on opposite sides of the centerline of the specified imaging position (defining the centerline as the sagittal plane [red] of the body). Ex. 1016 ¶ 145. Voigt in combination with Hurley discloses a plurality of imaging devices located in the positions recited in claim 1 of the ‘748 patent. Ex. 1016 ¶ 147.

Voigt acknowledges the usefulness of total body photography for melanoma screenings. Ex. 1003, 981, 983; Ex. 1016 ¶¶ 116, 133. The ‘748 patent recognizes that total body photo systems are used more widely than medicine—recognizing

the use of such systems by clothiers (*e.g.* Hurley), among others. Ex. 1001, 5:61-62, 6:54-66; Ex. 1016 ¶ 138. A POSA would have been motivated to modify Voigt to incorporate the multiple cameras of Hurley not only because of similarities between the two systems, but more importantly because of the obvious advantages of Hurley's multi-camera arrangement, including the ability to cover the entire body without repositioning, the increased resolution of the imaged subject available with multiple cameras, the ability to avoid the artificial shadowing or shading effects potentially encountered in single camera systems such as Voigt, the reduced time needed to scan a whole body, and avoidance of maintenance due to durability issues with a single moving camera as opposed to multiple fixed cameras capable of providing equivalent coverage. Ex. 1016 ¶¶ 73, 115-122, 134-143, 157.

A POSA would have been motivated to arrange the cameras vertically because that would permit the capture of the entire height of the subject, without sacrificing resolution, while further permitting accurate imaging of curved surfaces of both the upper and lower body without occlusion. Ex. 1016 ¶¶ 146, 179. A vertical arrangement of additional cameras makes efficient use of available space within the enclosure. Also, use of fixed upper and lower cameras would have simplified Voigt's design by eliminating any need for a vertically adjustable camera. Ex. 1016 ¶ 146.

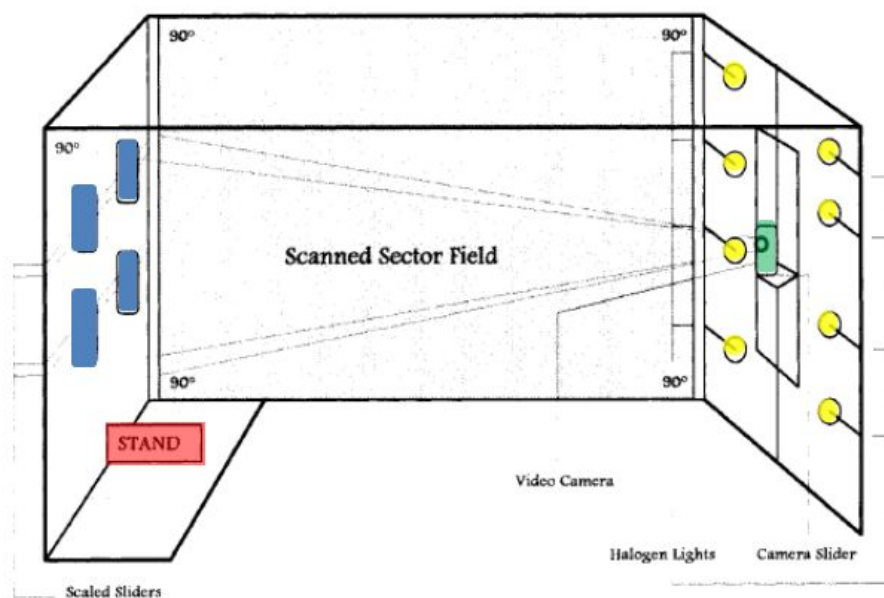


Locating cameras lateral to another would have been obvious to a POSA in order to capture greater detail of curved surfaces of the body—an advantage which Hurley acknowledges had motivated its design. Ex. 1016 ¶ 180.

The disclosures in Voigt and Hurley would have enabled a POSA to modify Voigt to provide multiple cameras behind, in front and to the sides of the person to be imaged. Ex. 1016 ¶¶ 123-129, 148.

- (iv) **A plurality of light sources spaced relative to each other and peripheral to the plurality of imaging devices that illuminate the person or portion thereof located at the specified imaging position and generate refraction and reflectance light therefrom**

Voigt discloses the use of a plurality of halogen light sources spaced relative to each other and peripheral to an imaging device. This plurality of light sources is identified in yellow below in the annotated representation of Figure 1 of Hurley (Ex. 1003). Ex. 1016 ¶¶ 149-150. Voigt explains that “total object illumination was given special attention to prevent any artificial shadowing.” Ex. 1003, 983; Ex. 1016 ¶ 149. A POSA would have appreciated that these light sources would produce both refraction and reflectance light from the skin of the subject. Ex. 1016 ¶¶ 250, 149.



Hurley similarly discloses use of a plurality of light sources spaced relative to each other and peripheral to the plurality of imaging devices to illuminate the person. Each of Hurley's six sensor heads consists of "a structured white light projector and an area sensing CCD camera." Ex. 1004, Hurley, at 212-213; Ex. 1016 ¶ 145.

A POSA that has chosen to incorporate the Hurley multi-camera format into the Voigt enclosure would understand that each of the additional cameras would also require lighting to avoid artificial shadowing. Ex. 1016, ¶ 149. It would have been obvious to a POSA to include light sources, similar to those disclosed for use in connection with the single Voigt camera, with each additional camera added. Ex. 1016 ¶¶ 149-152, 157-161. This would be an obvious design choice to avoid the artificial shadowing with which Voigt was concerned. Thus, it would have

been obvious to a POSA to locate multiple light sources around the enclosure, including light sources spaced relative to one another and peripheral to a plurality of imaging devices as recited in claim 1 of the '748 patent. Ex. 1016 ¶¶ 149-152.

- (v) **Wherein each of said imaging devices generated an image of the illuminated person or portion thereof located at the specified imaging position, and defines respective coordinates and said respective predetermined distance relative to the specified imaging position, and defines a respective focal length and resolution information, allowing precise measurement of imaged features of the person or portion thereof located at the specified imaging position**

Voigt discloses that its device and methodology are used to “capture and process detailed surface information for instant metric determinations of shape changes in multiple skin lesions in defined time periods.” Ex. 1003 at 987. As described in more detail in Section IV.A.1 above, Voigt used the coordinates of the camera and the distance from the camera to the specified imaging position, the resolution of the camera, and its focal length to calculate the measured area and dimension of the measured skin lesions. Ex. 1003, at 983; Ex. 1016 ¶ 153. Voigt’s measurement method would have been apparent to a POSA, who would also have otherwise been familiar with such a methods. Ex. 1016 ¶¶ 44, 59-60, 105-113, 154-156; *see also* Ex. 1001, 1:7-12 (noting invention employed measurement methods “standard” for imaging). Thus, Voigt discloses each limitation of the

wherein clause to the extent performed by the claimed invention. Ex. 1016 ¶¶ 155-156.

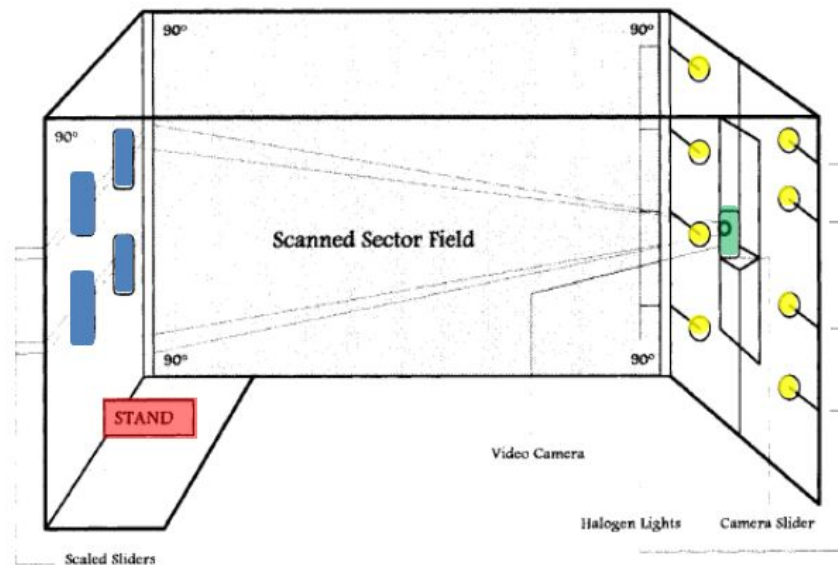
**(b) Independent Claim 51**

Claim 51 recites the same limitations as claim 1 but in means-plus-function format. The constructions of “imaging devices” and “lights sources” in Claim 1 are identical to the “imaging means” and “illuminating means” recited in Claim 51. Ex. 1016 ¶¶ 46, 47. There is also no substantive difference between the preamble and wherein clauses of claims 1 and 51. The analysis in Section IV.B.1(a) of the obviousness of Claim 1 in light of the Voigt/Hurley combination is identically applicable to these corresponding limitations in Claim 51. These limitations of Claim 51 would be equally obvious to a POSA based upon the Voigt/Hurley combination. Ex. 1016 ¶¶ 210-211, 214-238. The only limitations of Claim 51 that must be separately addressed herein are its “first” and “second” means.

**(i) First means for receiving and enclosing a person or portion thereof**

The “first means for receiving and enclosing a person” is “a structure that fully surrounds (*i.e.* encloses) a person made of plywood, particle board, or any other structural material capable of supporting the structure and equivalents thereof known at the time of the filing of the application.” Ex. 1016 ¶¶ 52-53. Voigt discloses a schematic of a “position framework” shown in Figure 1 of Ex. 1003. It is formed of a structural material capable of supporting the structure. The position

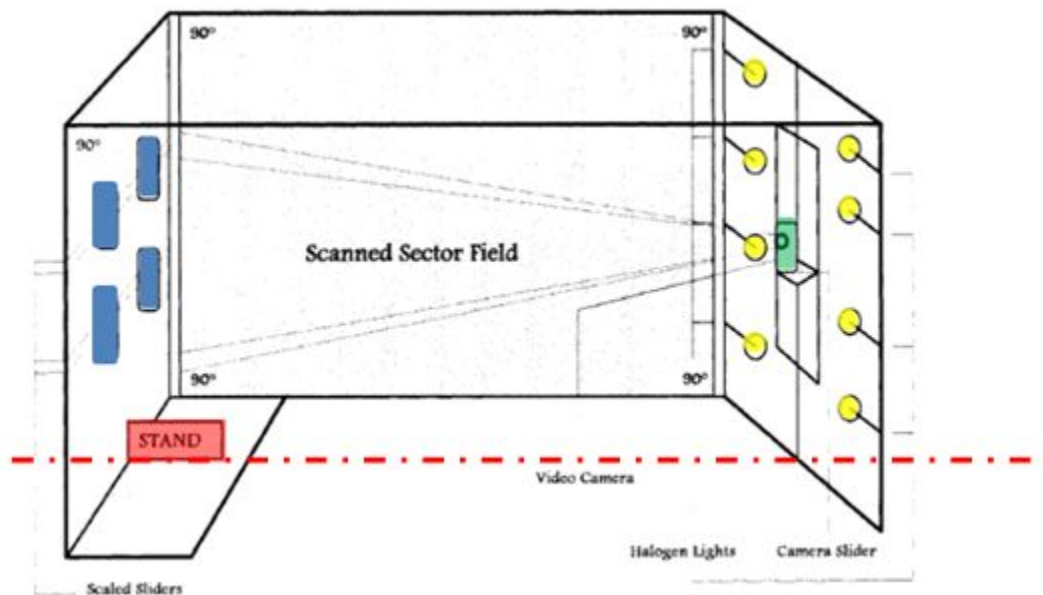
framework fully surrounds the person to be imaged. *Id.* Voigt discloses the first means limitation. Ex. 1016 ¶ 212.



**(ii) Second means located within the first means for placing the person or portion thereof within the first means wherein the second means defines a centerline**

The second means is a “shield positioned in such proximity to the person being imaged that the person is physically confined to the specified imaging position, or equivalent structures known at the time of the filing of the application that would similarly physically confine the person.” Ex. 1016 ¶¶ 54-56. While Voigt does not disclose shields, it discloses equivalent means. Ex. 1016 ¶ 213. The “patient’s standing position was fixed at the thoracic and iliac level by symmetrically fitting the lateral extent of the trunk shape into horizontally adjustable scaled sliders of the position framework.” Ex. 1003, at 982; Ex. 1016 ¶

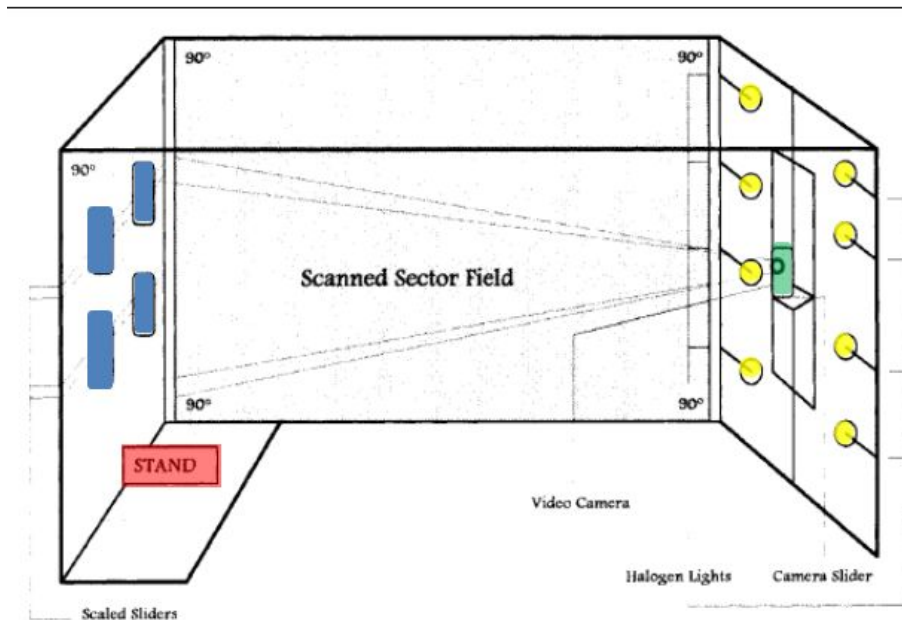
213. The stand where the person is located for imaging is highlighted in red below and the adjustable sliders are highlighted in blue. The stand and the sliders constitute portions of the first means that physically confine the person. The lateral sliders are placed symmetrically about the person being imaged, defining a centerline passing through the subject from front to back. A POSA would understand that Voigt discloses an equivalent to the shields (*i.e.* second means). Ex. 1016 ¶ 213. Claim 51 would thus have been obvious to a POSA based upon the disclosures of Voigt and Hurley. Ex. 1016 ¶¶ 210-238.



**(c) Claim 2 – A device according to claim 1 wherein the plurality of light sources is located amongst the plurality of imaging devices**

As discussed above in Section IV.B.1(a), each limitation of claim 1 is disclosed by Voigt in combination with Hurley. Voigt discloses a plurality of

halogen light sources (yellow) spaced relative to each other and peripheral to its single imaging device (green) to prevent artificial shadowing. Ex. 1016 ¶¶ 158-160.

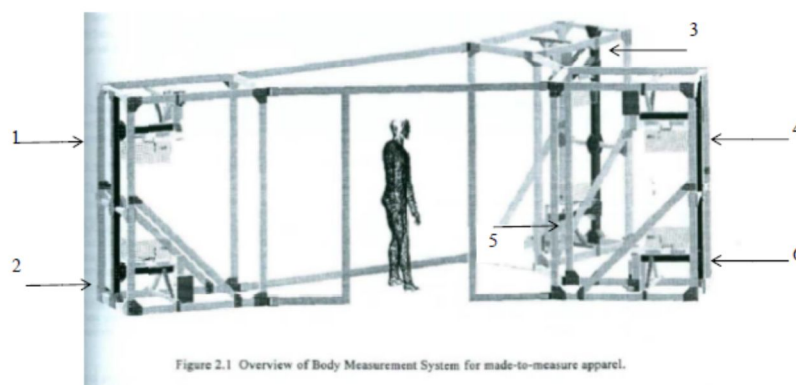


Replicating Voigt's illumination scheme with the additional cameras suggested by Hurley would result in a plurality of light sources located amongst a plurality of imaging devices. Ex. 1016 ¶ 159. Hurley's location of a light source on each of its multiple sensor heads points to the obviousness of such an arrangement. Ex. 1016 ¶ 160. This use of a plurality of light sources located amongst a plurality of cameras would have been an obvious design choice to a POSA to address Voigt's concerns with artificial shadowing. Ex. 1016 ¶¶ 73, 161. Voigt in combination with Hurley discloses the limitations of claim 2. Ex. 1016 ¶ 163.

**(d) Claim 3 – A device according to claim 2 wherein at least two light sources are located lateral to at least two imaging devices**

Both Voigt and Hurley disclose at least two light sources that are located lateral to at least two imaging devices. As noted above, it would have been obvious to a POSA to replicate Voigt's illumination scheme with respect to additional imaging devices. At least two light sources would then be located lateral to at least two imaging devices. Ex. 1016 ¶¶ 164-165.

Hurley discloses a device wherein at least two light sources are located lateral to at least two imaging devices. Ex. 1016 ¶ 166. In the annotated reproduction of Figure 2.1 of Ex. 1004, least the light source of sensor head 3 is lateral to the camera of sensor head 4 and the light source of sensor head 5 is lateral to the camera of sensor head six 6. Ex. 1016 ¶ 169.



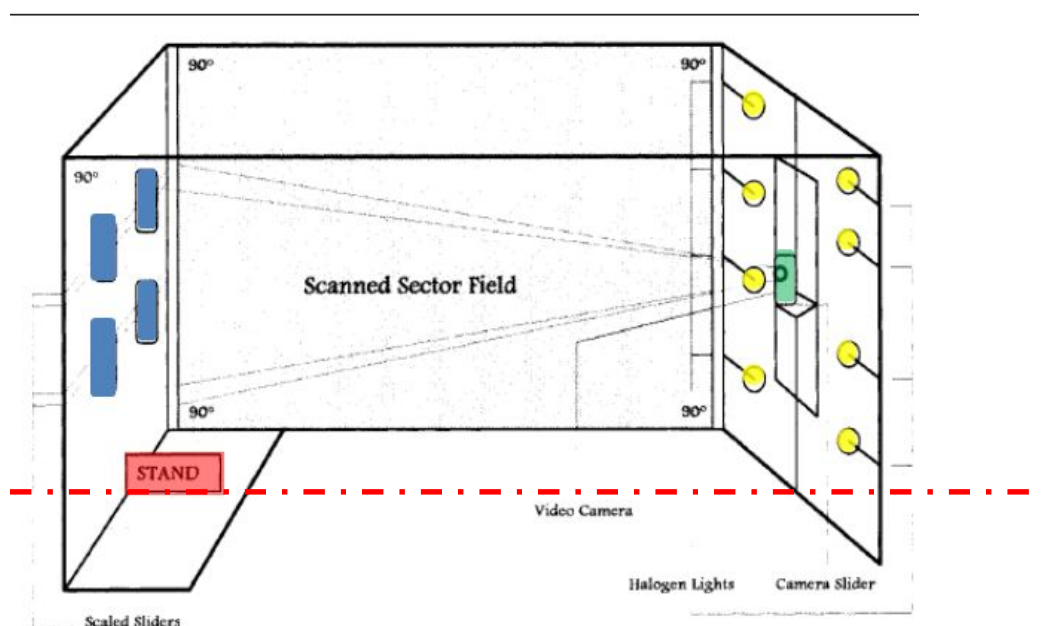
Placing light sources in locations that would avoid shadowing as noted in Voigt, such as including two light sources lateral to two cameras, would be an obvious design choice. Ex. 1016 ¶¶ 73, 167. Voigt in combination with Hurley



renders obvious a plurality of light sources located lateral to a plurality of imaging devices. Ex. 1016 ¶ 168.

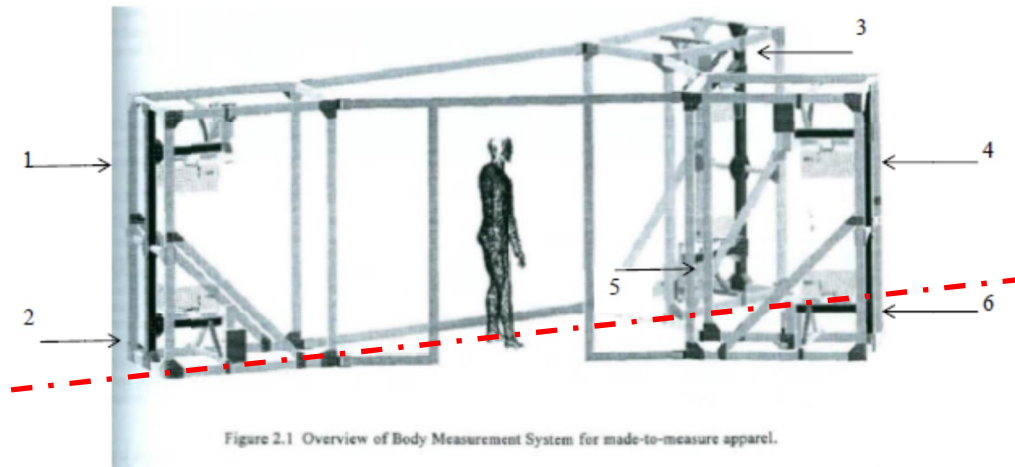
**(e) Claim 4 – A device according to claim 3 wherein at least two light sources are positioned symmetrically relative to the centerline of the specified imaging position**

Voigt discloses at least two light sources (in yellow) positioned symmetrically relative to the centerline of the specified imaging position (red dashed line). Ex. 1016 ¶ 170.



The obvious combination of multiple cameras (suggested by Hurley) with Voigt's enclosure, while maintaining Voigt's illumination scheme for each camera, would necessarily result in at least two light sources positioned symmetrically relative to the centerline. Ex. 1016 ¶ 171. Hurley's own illumination scheme is similar. As shown in the annotated reproduction of Figure 2.1 of Ex. 1004 below,

at least the light source located on sensor heads 3 and 4 are positioned symmetrically relative to the centerline of the specified imaging position. Ex. 1016 ¶ 172.



Locating light sources symmetrically, to provide consistent illumination for each respective camera so as to produce consistent images, would have been an obvious design choice. Ex. 1016 ¶¶ 73, 149-152, 173. Voigt in combination with Hurley, together with the knowledge of a POSA, would have rendered obvious the device recited in Claim 4. Ex. 1016 ¶¶ 169, 174.

**(f) Claim 5**

- (i) A device according to claim 1 wherein the plurality of imaging devices includes: a first imaging array spaced a predetermined distance relative to the specified imaging position to a side of the enclosure, wherein the first imaging array includes a plurality of first imaging devices vertically spaced relative to each other**

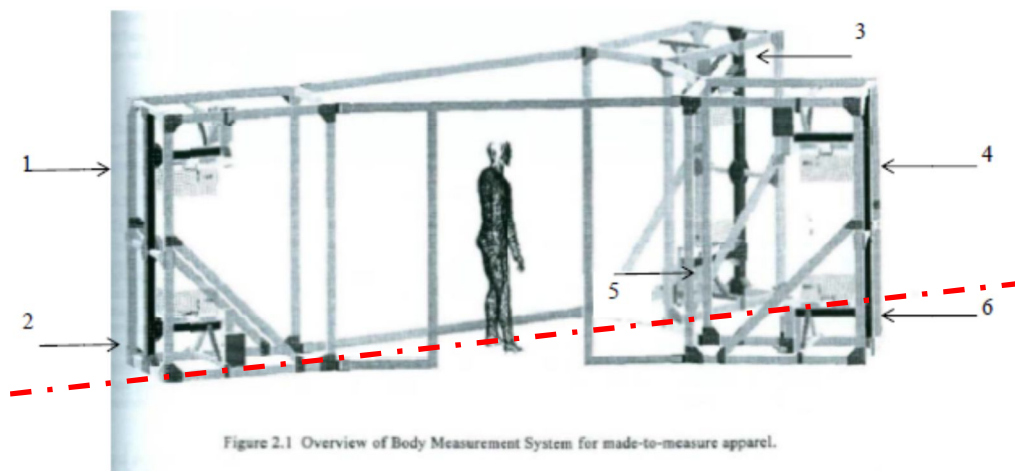
It would have been obvious to modify Voigt to incorporate Hurley's concept of multiple, vertically arranged cameras. Ex. 1016 ¶¶ 133-143, 146-152, 175. In the annotated figure below from Hurley, sensor heads (numbered 3 and 5) each containing a CCD camera, constitute such a first imaging array. Ex. 1004, 212; Ex. 1016 ¶¶ 176-178.

A POSA would have appreciated that a vertically spaced array of additional cameras around the subject permits an increase in the number of cameras, allowing imaging at higher resolutions. Ex. 1016 ¶¶ 69, 119, 134, 139-140. A POSA would also have appreciated a larger number of cameras can reduce image acquisition time. Ex. 1016 ¶¶ 118, 146, 179-180. A POSA would have been motivated to arrange the cameras in such arrays vertically because that would permit the capture of the entire height of the subject, without sacrificing resolution, while further permitting accurate imaging of curved surfaces of both the upper and lower body without occlusion. Ex. 1016 ¶¶ 139, 146, 179. Further, a vertical arrangement of additional cameras makes efficient use of available space within the enclosure.

The use of upper and lower cameras would have simplified Voigt's design by eliminating any need for a vertically adjustable camera. Ex. 1016 ¶¶ 139, 146, 179.

- (ii) **A second imaging array spaced a predetermined distance relative to the specified imaging position, and laterally spaced adjacent to the first imaging array, wherein the second imaging array includes a plurality of second imaging devices vertically spaced relative to each other**

Hurley suggests laterally spacing additional sensor arrays. The sensor heads 4 and 6 portrayed below, each containing a CCD camera, would constitute a second imaging array. Ex. 1016 ¶ 178.

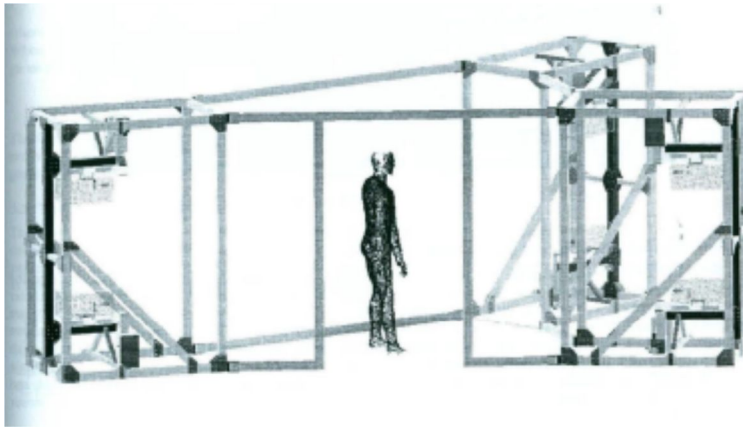


The same motivations that would have led a POSA to include additional cameras in Voigt's enclosure (Section IV.B.1(a)(iii)) would have lead a POSA to multiply the number of image arrays. Ex. 1016 ¶¶ 69, 118-119, 134, 139-140, 146,

179-180. Locating an additional array lateral to another would have been obvious to a POSA in order to capture greater detail of curved surfaces of the body—a motivation acknowledged by Hurley for doing so. Ex. 1016 ¶¶ 69, 118-119, 134, 139-140, 146, 179-180. These laterally spaced, vertical image arrays would have further been an obvious design choice for these reasons. Ex. 1016 ¶ 180. Thus, it would have been obvious to a POSA to adopt the camera positioning proposed by Hurley in the Voigt device to obtain these advantages. Voigt in combination with Hurley, along with the knowledge of a POSA, render obvious each limitation of claim 5. Ex. 1016 ¶¶ 179-180.

**(g) Claim 8 – A device according to claim 1 wherein said enclosure is further comprised of panels that enclose said person or portion thereof in a radius selected from at least one of: 360 degrees on the vertical axis and 360 degrees on the horizontal axis**

Voigt’s “positioning framework” is four rectangular frames joined at 90 degrees which enclose the person, having a 360 degree radius about a vertical axis (at least to the extent depicted in the elected embodiment depicted in Figure 1 of the ‘748 patent). Ex. 1016 ¶¶ 182, 186. Hurley’s Fig. 2.1 likewise shows fabric covered panels enclosing a person on all sides (*i.e.* radius of 360 degrees about a vertical axis). Ex. 1016 ¶¶ 183-184.



It further would have been an obvious design choice for a POSA providing (as Hurley notes) the advantage of reducing spurious reflection within the system. Ex. 1016 ¶ 185. The enclosure of claim 8 would have been obvious from the disclosures of Voigt and Hurley. Ex. 1016 ¶¶ 186-187.

**(h) Claim 11 – A device according to claim 8 wherein said panels are further comprised of at least one imaging means**

Voigt has a panel including at least one imaging means (green). *See* Section IV.A.1; Ex. 1016 ¶ 189. Hurley discloses panels encompassing three towers, each including two cameras. Ex. 1016 ¶ 190. Thus Voigt in combination with Hurley renders obvious claim 11. Ex. 1016 ¶¶ 191, 191.

**(i) Claim 30 – A device according to claim 1 further comprising a display device for displaying one or more images generated by the plurality of imaging devices**

Voigt discloses the use of a personal computer monitor to display its images. Ex. 1003, 982, Fig. 3; Ex. 1016 ¶ 193. Hurley's Figure 5.1 discloses displays of

image data generated by each of the six sensor heads using a personal computer and graphic display tools. Ex. 1004, 221; Ex. 1016 ¶ 194.

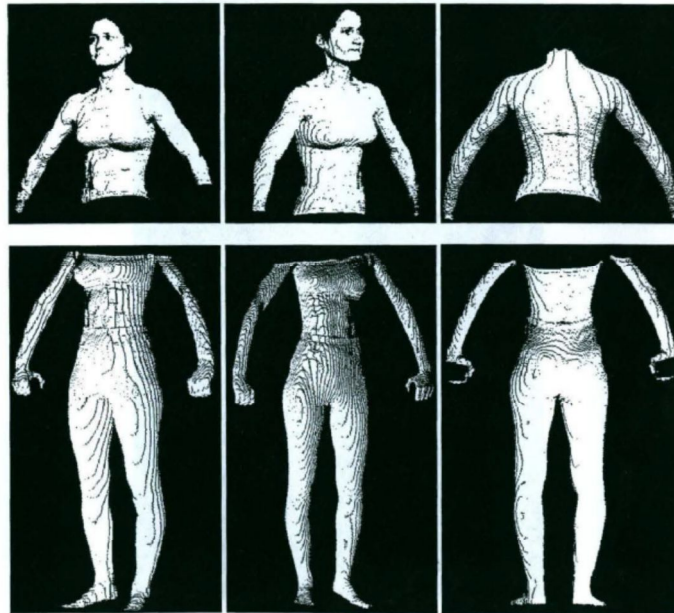


Figure 5.1 Six Individual Views of 3D Data Points

Claim 30 would have been obvious to a POSA in light of Voigt and Hurley. Ex. 1016 ¶ 195.

- (j) **Claim 33 – A device according to claim 30 wherein said display device further comprises a device capable of displaying said person or portion thereof in visually perceivable form**

Voigt and Hurley disclose the use of a computer to display the person or portion of a person in visually perceivable form. Ex. 1016 ¶¶ 197-198. Claim 33 would have been obvious. Ex. 1016 ¶¶ 196, 199.

**(k) Claim 34 – A device according to claim 1 wherein said device allows for viewing of said person or portion thereof in 360 degrees**

A POSA would have appreciated that the obvious modification of Voigt to incorporate the multiple cameras of Hurley in order to provide whole body imaging would allow viewing of the person in 360 degrees. 1016 The six views captured by Hurley shown in its Figure 5.1, above, illustrate this result. Ex. 1016 ¶¶ 200-203.

**(l) Claim 46 – A device according to claim 1 further comprising a viewing device that includes at least one of a USB hub, an interfacing cable, a computer processor or like processor, a monitor, and a control device**

These are obvious design choices to render such a device operable. Ex. 1016 ¶ 208. Voigt's device performs digitized measurements using a high-speed processor, an on-board coprocessor, a high-resolution video camera, and image processing software installed on a personal computer. Ex. 1016 ¶ 205. Images were viewed in a monitor display. Voigt discloses a camera connected to a computer, a monitor, and a control device. A POSA would have readily envisaged standard interfacing cables and USB ports or hubs. Ex. 1016 ¶ 205.

Hurley's sensor heads include "a custom designed projector, a commercial CCD camera, and the necessary controls for both." Ex. 1016 ¶ 207. "The whole system is controlled by a Pentium 133 personal computer" including graphic



display tools. Hurley discloses that “[a]dditional hardware and wiring necessary to interface the computer to the six sensor heads[.]” A POSA would understand the hardware and wiring necessary to interface the computer to the six sensors would encompass interfacing cables and USB ports or Hubs. Ex. 1016 ¶ 207. A POSA would have been familiar with the growing use and acceptance of USB ports and hubs. Ex. 1014, Office World, (“With USB, a person could hook up as many as 127 devices to the computer through a series of USB hubs.”); Ex. 1016 ¶ 208. Voigt in combination with Hurley and the knowledge of a POSA renders Claim 46 obvious. Ex. 1016 ¶ 205, 209.

## **2. Ground 2: Claims 1-4, 8, 11, 30, 32-34, and 51 Are Obvious over Voigt and Crampton**

As explained in Section IV.B.1, above, Voigt discloses every feature recited in claim 1 of the ‘748 patent, except multiple cameras. Crampton (Ex. 1006) discloses a kiosk to capture a 3D image of the human body using multiple cameras placed on each side of the body, so as to capture the whole body in a single pose. Ex. 1006, 9; Ex. 1016 ¶¶ 327-328. Thus, a POSA seeking to image the entire body in a single pose without repositioning would have a reason to incorporate multiple cameras, as taught by Crampton, in Voigt’s system. Ex. 1016 ¶¶ 327-328.

In addition, the ‘748 patent notes that the invention is intended to provide “body evaluation on several dimensions.” Ex. 1001, 6:58-63 (“consumer may be

curious about what ‘shape’ they are[.]”) The ‘748 patent describes uses including “body volume measurements.” Ex. 1001, 7:20-26. As also noted, the ‘748 patent observes its invention is useful for medical treatments, beauty treatments and clothing specification. Ex. 1001, 6:3-22, 32-53, 63-66.

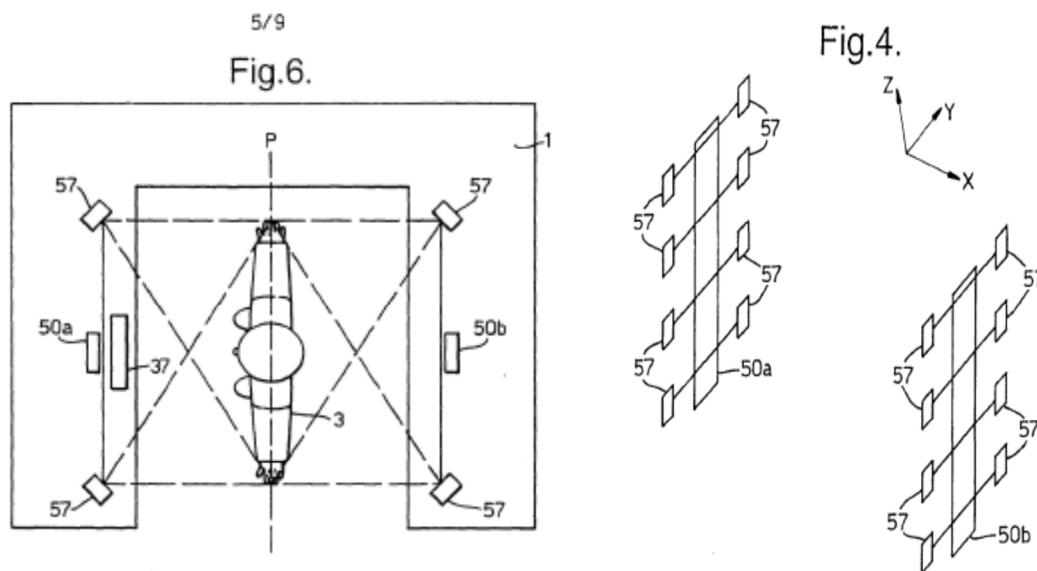
Crampton notes that whole body scanning systems, of which it is an example, capture the shape of the body. Ex. 1006, Crampton, 1; Ex. 1016 ¶ 328. Crampton also discloses its usefulness in calculating body volume measurements. Ex. 1006, 11; Ex. 1016 ¶ 328. Crampton also notes that applications of its system include “health and beauty treatment . . . clothing size specifications [and] medical treatments[.]” Ex. 1006, 14-15; Ex. 1016 ¶328.

A POSA would have looked to Crampton in connection with the design of a total body imaging system in light of its references to the same applications as the invention, and its disclosed advantages, such as quick image acquisition time, robust design, avoidance of the need for highly trained personnel, ability to image the body from various angles to avoid obscuring body surfaces and the higher resolution possible from multiple cameras. Ex. 1016 ¶ 328.

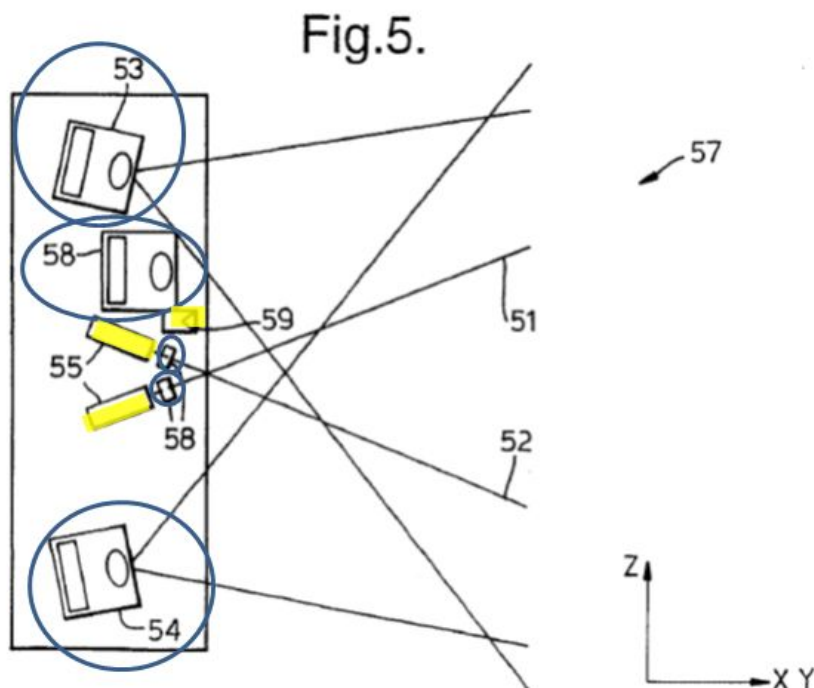
#### **(a) Independent Claims 1 and 51**

As explained in Section IV.B.1, Voigt discloses each limitation of claim 1 and 51 except for the use of a plurality of imaging devices located as specified in the claims.

Sensors (57), depicted in Crampton's Figure 4, surround the person as shown in Figure 6 reproduced below. Ex. 1006, Figs. 4, 6; Ex. 1016 ¶ 334.



Each sensor may have a variety of cameras, laser generators, color cameras, and flash lights mounted. Ex. 1006, 7-8; Ex. 1016 ¶ 335. One example of a sensor (57) is shown in Figure 5. Ex. 1005, Fig. 5; Ex. 1016 ¶ 335. Cameras 53, 54, and 58 (circled in blue), are arranged with laser generators (55) (in yellow) a flash (59) (also in yellow). Ex. 1016 ¶ 335.



**(b) Independent Claim 1**

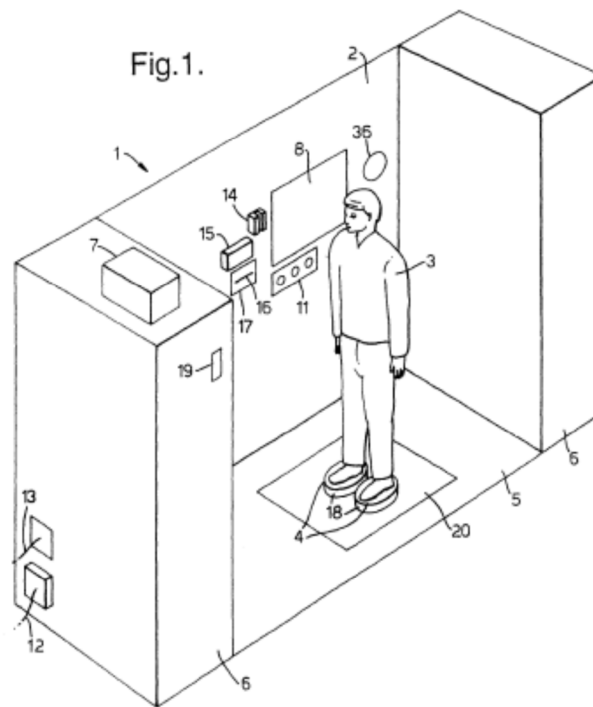
**(i) PREAMBLE**

If deemed a limitation, Voigt discloses this use. *See* Section IV.B.1(a)(i), *supra*.

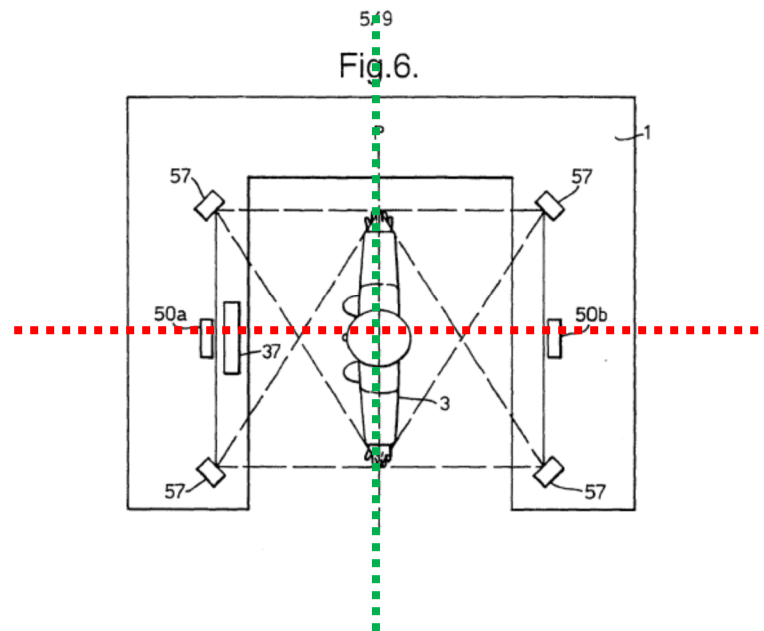
**(ii) [Element 1a]: An enclosure**

Voigt discloses this limitation. *See* Section IV.B.1(a)(ii), *supra*.

Like Hurley, Crampton also discloses an enclosure for imaging a person. Ex. 1006, 4-5; Ex. 1016 ¶ 332. Crampton discloses an enclosure (kiosk) containing a “a central area [2] for a person [3] to stand in” including “foot positioning guidance means [4]” “provided on the floor of the central area.” Ex. 1006, 4-5; Ex. 1016 ¶ 92, 332.



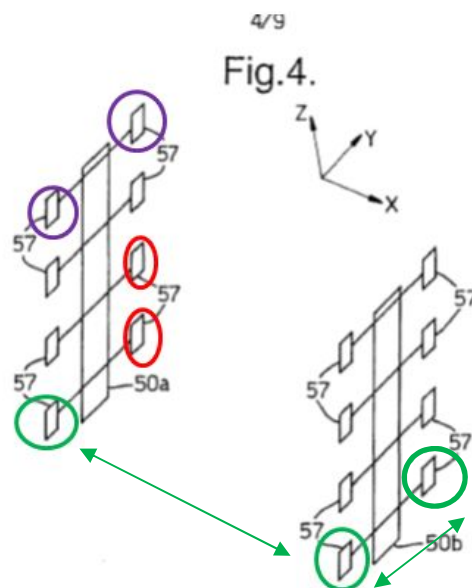
Centerlines are defined by the position of the person. Ex. 1016 ¶ 332.



For the reasons set forth in Section IV.B.1(a)(ii), *supra*, this limitation would have been obvious to a POSA in light of Voigt, in further view of Crampton. Ex. 1016 ¶¶ 331-333.

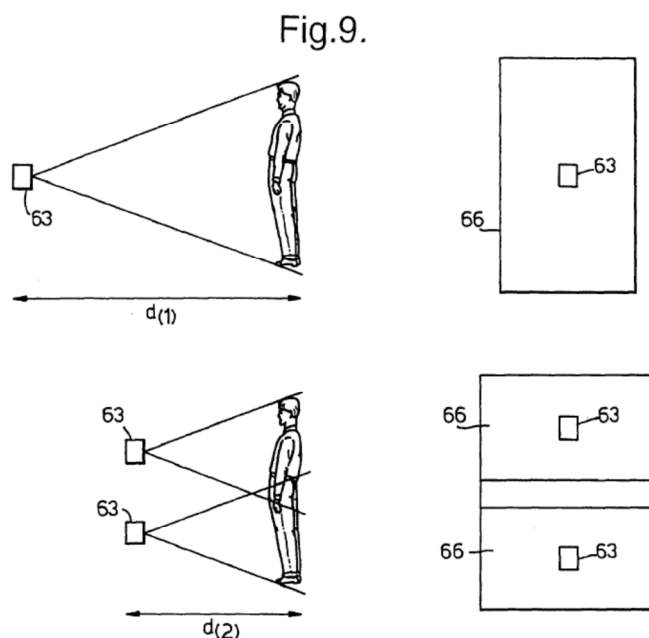
**(iii) [Element 1b]: Plurality of imaging devices**

Crampton discloses at least two vertically spaced imaging devices (circled in red), at least two imaging devices laterally spaced (circled in purple), and at least two imaging devices located on opposite sides of a centerline (various alternatives shown in green). Ex. 1016 ¶ 336.



Crampton notes the arrangement of cameras can be optimized to cover the maximum amount of the surface area of the person. Ex. 1006, 10, 14; Ex. 1016 ¶ 347. These may include color cameras (58). Ex. 1006, 7; Ex. 1016 ¶ 335.

Crampton observes that the addition of cameras (63), and particularly in a vertical arrangement, permits imaging at greater resolutions. Ex. 1006, 10, Fig. 9; Ex. 1016 ¶ 338. Crampton illustrates this greater resolution in Figure 9. Ex. 1016 ¶ 338.



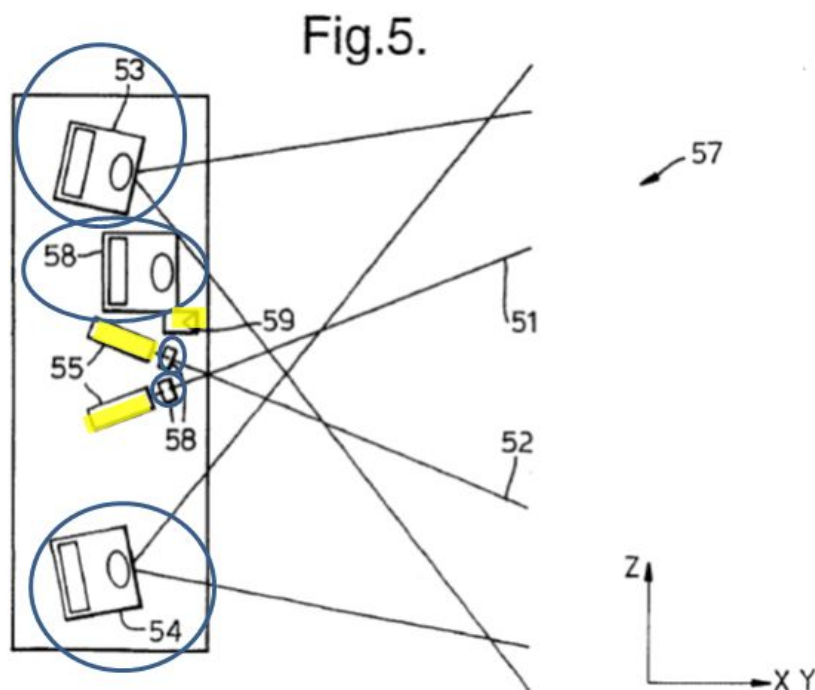
For the same reasons set forth in connection with Hurley, it would have been obvious to a POSA to modify the enclosure of Voigt to include additional cameras, as suggested by Crampton, having the vertical and lateral spacing of claim 1, in order to achieve the advantages of such total body, multi-camera systems. Ex. 1016 ¶¶ 339-341.

#### (iv) [Element 1c]: Plurality of light sources

For the same reasons set forth in Section B.1(a)(iv), *supra*, it would have been obvious to a POSA adding additional cameras to Voigt's enclosure to also

replicate the illumination scheme for those cameras disclosed in Voigt. The result would be a plurality of light sources having the spacing, locations and properties recited in this claim. Ex. 1016 ¶¶ 342, 344-355.

Like Hurley, Crampton teaches the use of such peripheral lighting in multi-camera enclosures. Ex. 1006, 14, Fig. 5; Ex. 1016 ¶ 343. Crampton discloses in Figure 5, a plurality of light sources located amongst the plurality of imaging devices on each single sensor. Ex. 1006, 8; Ex. 1016 ¶ 343. At least three light sources (55 and 59 highlighted in yellow) are located amongst the plurality of cameras (53, 54, and 58 circled in blue). These may illuminate with white light. Ex. 1006, 17, claim 8.





**(v) [Element 1d]: Wherein Clause**

Voigt discloses this method of measurement, and it would have been obvious to extend it to the duplicate imaging devices which Crampton would motivate a POSA to add to Voigt's enclosure. *See* Section IV.B.1(a)(v), *supra*. Claim 1 would have been obvious in light of Voigt in combination with Crampton. Ex. 1016 ¶¶ 326-349.

**(c) Independent Claim 51**

**(i) “First” and “second” means**

The only limitations of claim 51 not addressed in the analysis of claim 1 are its “first” and “second” means. Voigt discloses these further limitations. *See* Section IV.B.1(b), *supra*.

Additionally, if the Board concludes that the structure of the “second” means includes physical structures, such as floor markings, Crampton further discloses use of “foot positioning guidance means [4]” Ex. 1006, 4-5; Ex. 1016 ¶ 332. This claim would have been obvious over Voigt in combination with Crampton. Ex. 1016 ¶¶ 326-349.

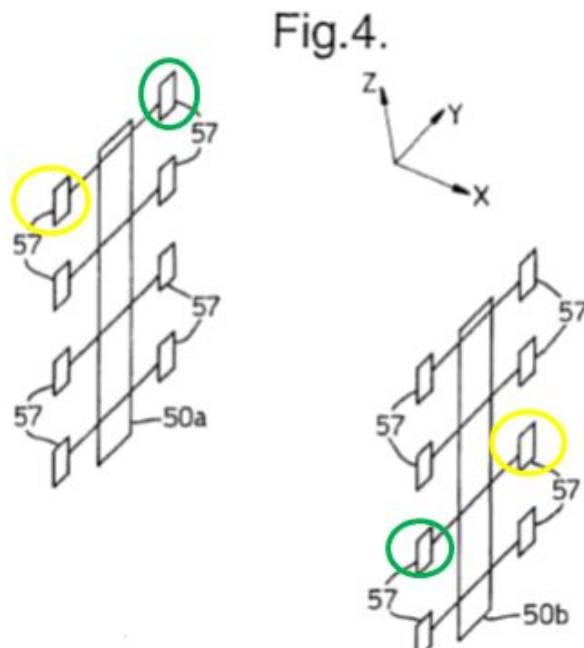
**(d) Claim 2 – Claim 1 with light sources amongst**

*See* discussion Section IV.B.1(c), *supra*. This claim would similarly have been obvious in light of Voigt in combination with Crampton. Ex. 1016 ¶¶ 335-355.

**(e) Claim 3 – Claim 2 with light sources lateral**

In the obvious modification of Voigt to incorporate multiple cameras, this claim would have been obvious for the reasons discussed in Section IV.B.1(d).

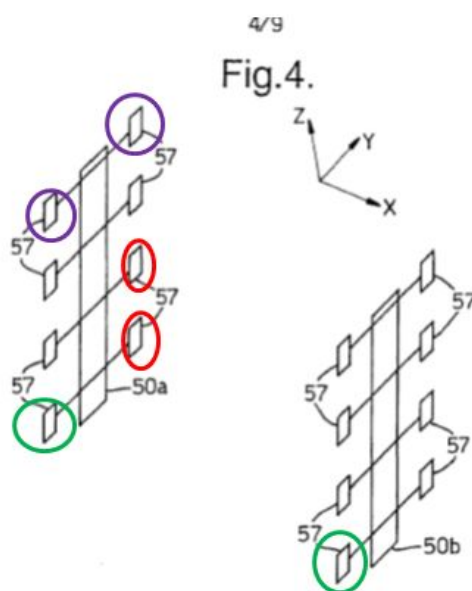
Moreover, Crampton discloses a multi-camera system employing such an arrangement. In Figure 4 reproduced below, sensors containing at least one light source (circled in yellow) are each located laterally to a sensor containing at least one camera (circled in green). Ex. 1006, 14, Fig. 4; Ex. 1016 ¶ 355. This would have been an obvious design choice to avoid the shadowing about which Voigt warned. Ex. 1016 ¶ 354.



**(f) Claim 4 – Claim 3 with two symmetric light sources**

In the obvious modification of Voigt to incorporate multiple cameras, this claim would have been obvious for the reasons discussed in Section IV.B.1(a)(iv).

For its part, Crampton's multiple camera arrangement included at least two light sources positioned symmetrically about the centerline of the specified imaging position.



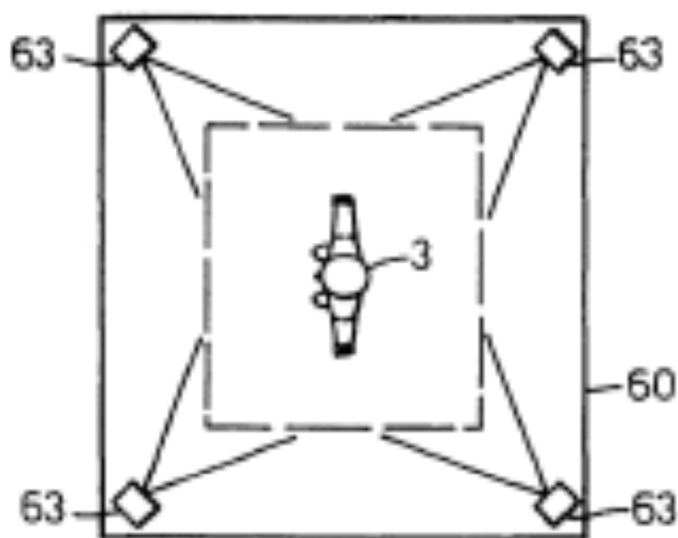
Crampton discloses two axes of sensor located on opposite sides of the centerline of the person being imaged and each sensor contains at least one camera and at least one light. This claim would have been obvious to a POSA. Ex. 1016 ¶¶ 351-359.

**(g) Claim 8 – Claim 1 wherein enclosure comprised of panels that enclose 360 degrees about vertical or horizontal axis**

In the obvious modification of Voigt to incorporate multiple cameras, this claim would have been obvious for the reasons discussed in Section IV.B.1(a)(ii); Section IV.B.1(g).

Crampton too discloses multiple embodiments that include an enclosure comprised of panels that enclose said person in a radius of 360 degrees on the vertical axis. Figure 7 shows a kiosk which entirely surrounds the subject. Ex. 1006, Fig. 7; Ex. 1016 ¶ 363. Fully enclosing the subject would have been an obvious design choice to ensure light tightness and privacy. Ex. 1016 ¶¶ 360-363.

Fig.7.



**(h) Claim 11 – Claim 8 wherein panels comprised of a imaging means**

In the obvious modification of Voigt to incorporate multiple cameras, this claim would have been obvious for the reasons discussed in Section IV.B.1(a)(ii); Section IV.B.1(h).

In addition, Crampton's Figure 7 shows the panels surrounding the person would include at least one imaging means, such as a camera. Ex. 1016 ¶ 363.

Claim 11 would have been obvious to a POSA. Ex. 1016 ¶ 364.

**(i) Claim 30 – Claim 1 with display**

In the obvious modification of Voigt to incorporate multiple cameras, this claim would have been obvious for the reasons discussed in Section IV.B.1(i).

**(j) Claim 33 – Claim 30 displaying person in visually perceivable form**

In the obvious modification of Voigt to incorporate multiple cameras, this claim would have been obvious for the reasons discussed in Section IV.B.1(j).

Crampton also discloses use of a display in a multi-camera enclosure for body imaging for displaying the generated images. Ex. 1006, 6 (can be a computer monitor, an LCD flatscreen, or other display technology); Ex. 1016 ¶¶ 367-369. It would have been obvious to employ such a display to view the imaging results. Ex. 1016 ¶¶ 365-370.

**(k) Claim 34 – Claim 1 wherein viewing allowed in 360 degrees**

In the obvious modification of Voigt to incorporate multiple cameras the device of this claim would have been obvious for the same reasons expressed in Section IV.B.1(k).

Additionally, Crampton teaches a variety of methodologies to fully capture and view the entire human body in 360 degrees. To capture the person in a single pose (*i.e.* without repositioning), Crampton discloses placing cameras on at least four sides of the person. The device of this claim would have been obvious. Ex. 1016 ¶¶ 371-375.

### **3. Ground 3: Obviousness of Claims 1-8, 11, 30, 33-34, and 46 over Hurley**

Hurley (Ex. 1004) discloses a body measurement system for making made-to-measure apparel. Ex. 1004, 212. It uses six sensors located on three separate towers, each tower containing an upper and lower sensor. Ex. 1004, 212; Ex. 1016 ¶¶ 239-240. Each sensor contains an area sensing CCD camera and a structured white light projector. Ex. 1004, 213; Ex. 1016, ¶¶ 239-240. These six sensors are located in stationary positions within a structure built with a black anodized aluminum extrusion that is then covered with non-reflective black theater cloth. Ex. 1004, 213-214; Ex. 1016 ¶ 240.

The applicant for the ‘748 Patent acknowledged his invention was applicable for the same uses as the Hurley system: “Below are some examples, but not limited to, in regards to the invention’s scope and intended applications[:] . . . will be valuable for the cosmetic surgeon, the physician, the physical trainer, the clothier, etc.” Ex. 1001, 5:61-62, 6:54-66 (emphasis added).

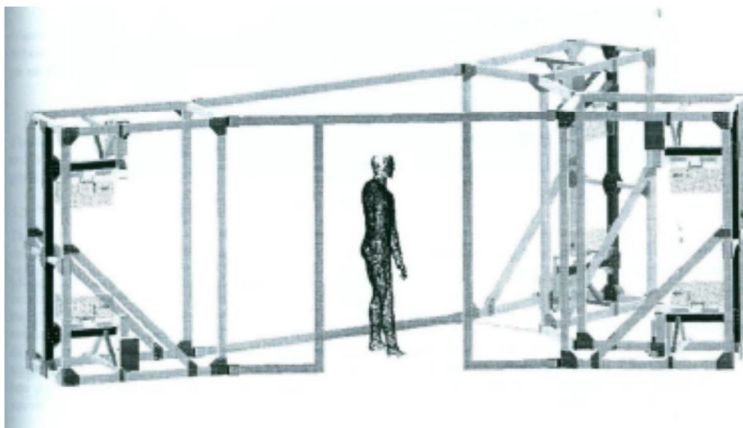
**(a) Independent Claim 1**

**(i) PREAMBLE**

The preamble is not a claim limitation.

**(ii) [Element 1a]: An enclosure**

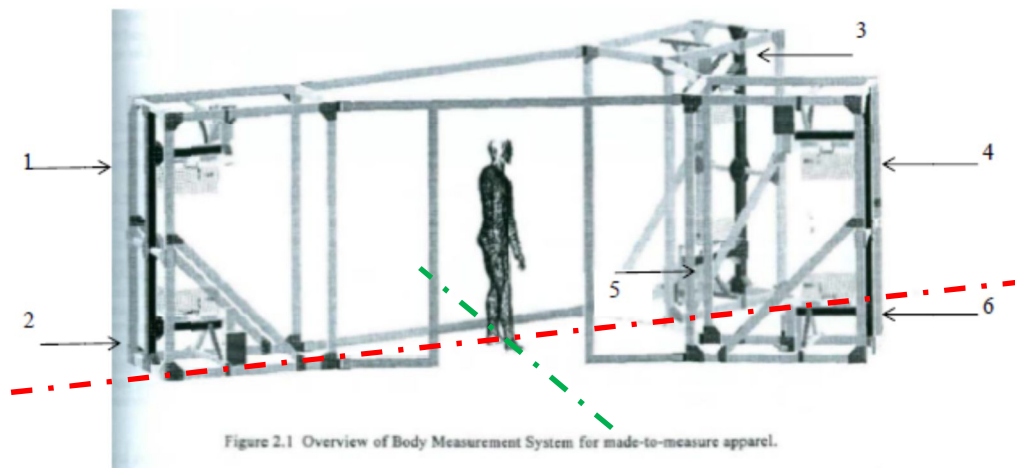
Hurley describes an enclosure having multiple cameras for imaging a person, built with “with an ‘erector set’ approach” from black anodized aluminum extrusion covered with non-reflective black theater cloth. Ex. 1004, 213-214; Ex. 1016 ¶ 244. The following figure shows the system (omitting the cloth). Ex. 1004, 213, Fig. 2.1.



Hurley discloses that the location of the imaged person is specified. Hurley describes first placing a calibration object “approximately where the subject will be standing.” Ex. 1004, 221; Ex. 1016 ¶¶ 90, 245. Using this calibration object, the distance between each camera and position that will be occupied by the subject is confirmed. Ex. 1004, 221 (“By scanning a calibration object of known size and orientation, we are able to calculate the orientation of each sensor head with

respect to the object. . . . [not only to ensure] correct coverage but to make sure the subject is within the depth of focus of each of the sensor heads”); Ex. 1016 ¶ 245.

Annotated Figure 2.1, shows the person’s centerline along at least two planes: a frontal plane dividing the person from side to side (green), and a sagittal plane dividing the person from front to back (red). Ex. 1004, 212-213; Ex. 1016 ¶ 246.



**(iii) [Element 1b]: Plurality of imaging devices**

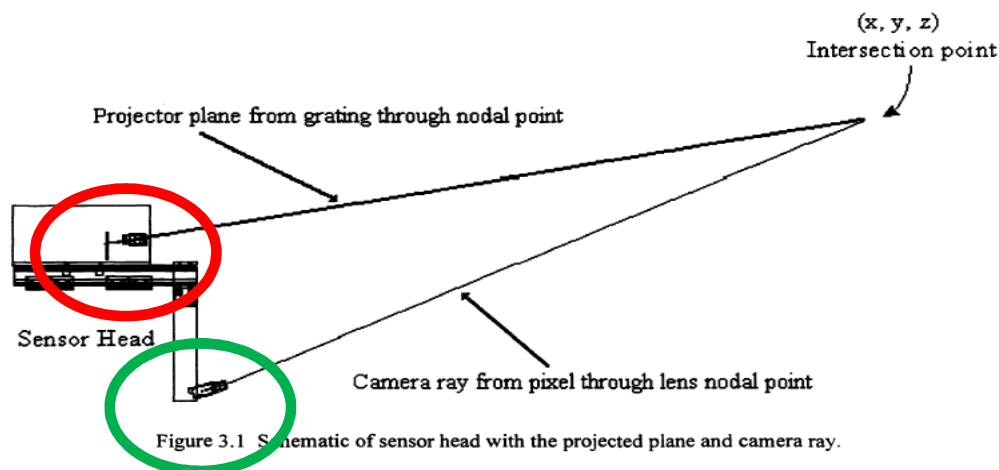
The system has six imaging sensors (1-6 in figure above) located in stationary positions. Ex. 1004, 213-214; Ex. 1016 ¶ 247. A plurality of these sensors are spaced both laterally and vertically to one another (*e.g.* sensors 1 and 2 vertically spaced, and 3 and 4 laterally). Sensors 5 and 6 are spaced laterally, on opposite sides of a centerline. Ex. 1016 ¶ 247.



The distance between each camera and imaging position is determined in advance of imaging by the calibration process. Ex. 1004, 221 (a calibration object is positioned “approximately where the subject will be standing.”); Ex. 1016 ¶ 248.

**(iv) [Element 1c]: Plurality of light sources**

Hurley uses a plurality of light sources spaced relative to each other and peripheral to the imaging devices. Ex. 1004 at 212-13; Ex. 1016 ¶ 249. These light sources project structured white light that illuminates the person at the specified imaging position. Refraction and reflectance light is generated from the subject. The light projector (red) is peripheral to the imaging device (green), as depicted in the annotated diagram from Hurley. Ex. 1016 ¶ 249.



**(v) [Element 1d]: Wherein Clause**

The cameras generate an image (shown below) of the illuminated person. Ex. 1004, 221, Fig. 5.1; Ex. 1016 ¶ 250.

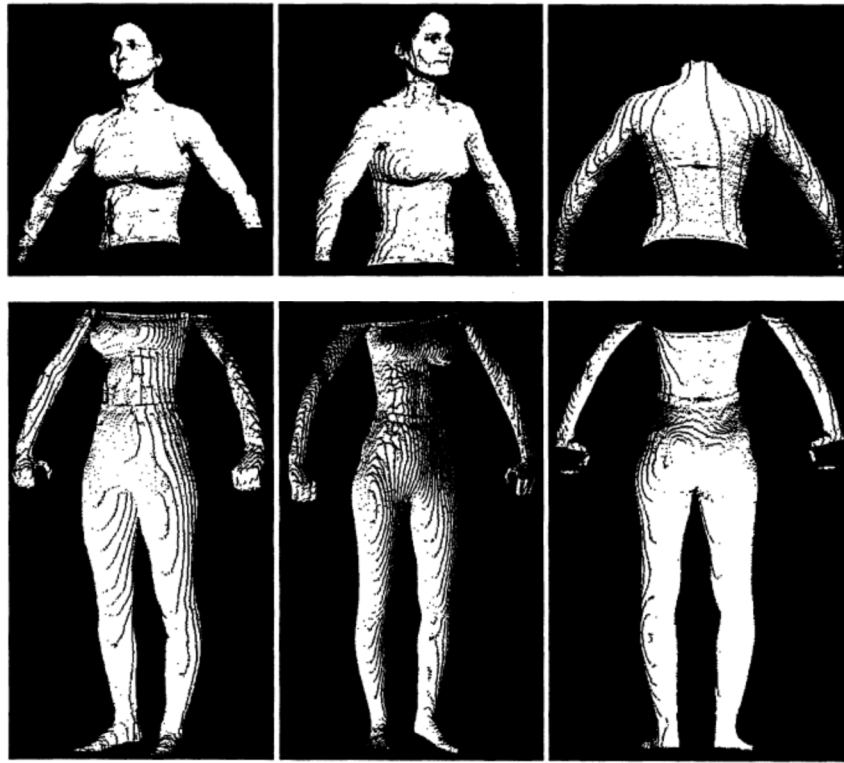


Figure 5.1 Six Individual Views of 3D Data Points

Hurley determines respective coordinates of each camera relative to the position of the subject. Ex. 1004, 221; Ex. 1016 ¶ 251. Hurley uses a commercial CCD camera having a lens. Ex. 1004, 214-215; Ex. 1016 ¶ 252. The CCD has a sensor array of a set number of pixel elements (*i.e.* resolution). Ex. 1004, 214-215 (referencing “a pixel location on the CCD array”); Ex. 1016 ¶ 222. Each camera would have a particular focal length. Ex. 1004, 214-215 (referencing “nodal point of the camera lens”); Ex. 1016 ¶ 222.

While Hurley does not explicitly describe the use of distance from the imaging position, focal length and resolution to calculate precise measurements, of

imaged features, the ‘748 Patent acknowledged its claimed calculations were “standard” techniques for the “measurement and analysis of optically depicted images of a patient’s surfaces[.]” Ex. 1001, 1:7-12; Ex. 1016 ¶ 253. The applicant considered these techniques so obvious, that he provided no further articulation outside of the claims. Ex. 1016 ¶ 254.

Photogrammetry has long used the well-known relationship between distance of the camera from the subject, and the focal length and resolution of the camera, to measure features depicted in the image. Ex. 1016 ¶ 254. The scale of the image relative to the object imaged is known to be determined by the ratios of the focal length of the camera to the distance to the object imaged. Ex. 1012, Comer, at 1139 (“The lens of an airborne digital camera forms an image of the ground on its focal plane at a certain scale. That *camera scale* is the ratio of focal length of the lens and the collection height above ground level (AGL),  $\text{camera scale} = (\text{focal length})/(\text{height AGL})$ .”); Ex. 1016 ¶ 254. When using a CCD array—such as disclosed in Hurley—the scale is calculated with the addition of the image array size (*i.e.* resolution) by means of the following formula:  $\text{scale} = (\text{array element size}) (\text{height AGL})/(\text{focal length})$ . Comer explains, “In general, GSD [*i.e.* scale] is simply the linear dimension of a single pixel’s footprint on the ground.” Ex. 1016 ¶ 254.

Hurley describes a “non-contact *measurement* system (BMS)” for use in making “made-to-*measure* apparel.” Ex. 1004, 212 (emphasis added); Ex. 1016 ¶ 255. Hurley notes mass producing such custom apparel requires a method of “accurately obtaining human body measurements[.]” Ex. 1016 ¶ 255.

Hurley seeks accurate surface measurements of three-dimensional, curved surfaces. Ex. 1016 ¶ 256. The calculations required for such measurements are complex. Hurley notes at the conclusion of his article that work was progressing to extract measurements from the three dimensional data sets acquired using his multiple camera system. Ex. 1016 ¶ 256.

However, not all body dimensions implicate such complex geometries. Ex. 1016 ¶ 257. The length of a subject’s arm (*i.e.* sleeve) or leg (*i.e.* inseam) are generally linear dimensions for which the algorithm described in Claim 1 would suffice. Ex. 1016 ¶ 257.

Hurley’s invitation to extract measurements from the body data sets would motivate a POSA to use the simpler algorithm described in claim 1 for at least those dimensions suitable to that method. Ex. 1016 ¶ 258. The applicant had specifically acknowledged that his invention relied upon “standard” techniques for these types of measurements. Ex. 1001, 6:54-66 (invention “for total body evaluation on several dimensions” produced measurements “valuable for the

cosmetic surgeon, the physician, the physical trainer, **the clothier, etc.**”) (emphasis added).

The device of claim 1 would have been obvious to a POSA based upon his knowledge and the disclosures in Hurley. Ex. 1016 ¶ 259.

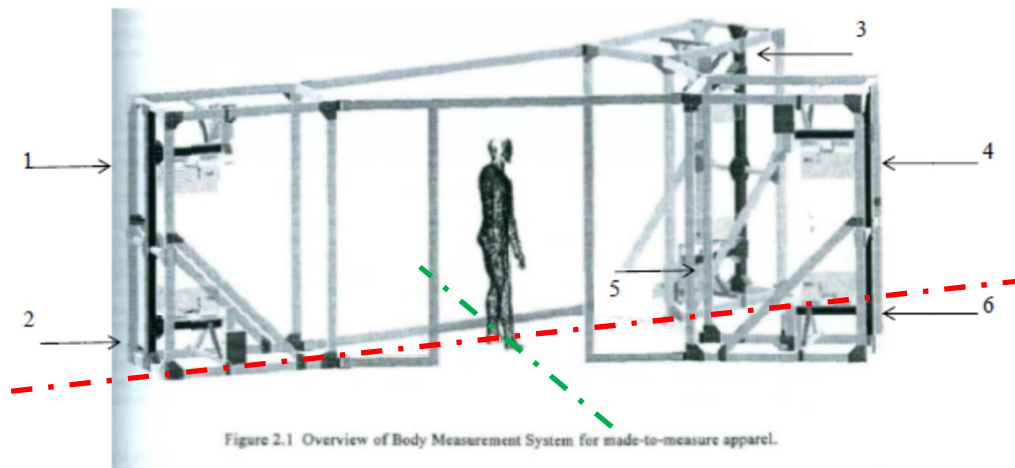
**(b) Claim 2 – Claim 1 with light sources amongst**

Hurley discloses six sensor heads that consisting of “a structured light projector and an area sensing CCD camera.” Ex. 1004, 213; Ex. 1016 ¶ 260.

Sensor heads are distributed about the enclosure at six different locations. Because cameras and structured white light projectors are located on each respective sensor head, Hurley discloses a plurality of light sources located amongst the plurality of imaging devices. Ex. 1016 ¶ 260.

**(c) Claim 3 – Claim 2 with light sources lateral**

The annotated Figure 2.1 of Hurley shows at least the light source on sensor head 3 is lateral to the camera on sensor head 4, and the light source at head 5 is lateral to the camera at head six 6. Ex. 1004, 212-13; Ex. 1016 ¶ 261.



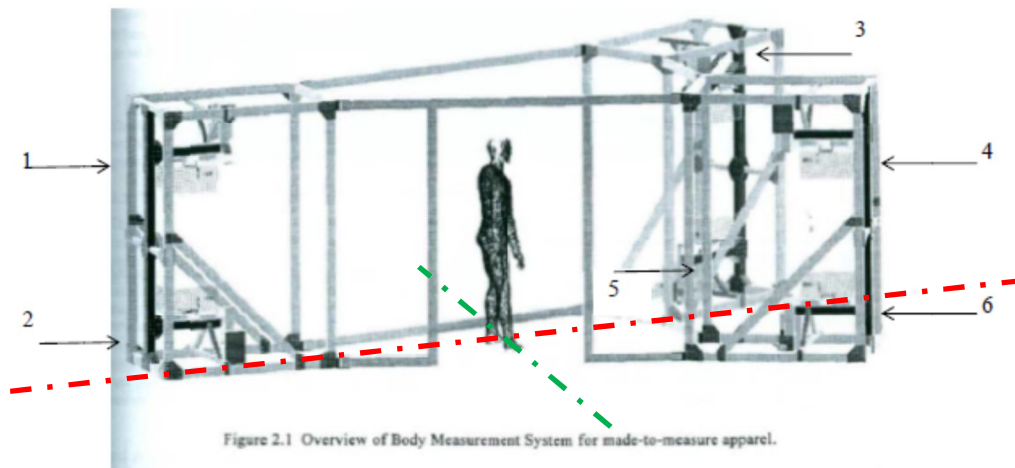
**(d) Claim 4 – Claim 3 with two symmetric light sources**

In the annotated Figure, light sources located on sensor heads 3 and 4 are positioned symmetrically relative to the centerline (red) of the specified imaging position. Ex. 1004, 212-213; Ex. 1016 ¶¶ 262-263.

**(e) Claim 5 – Claim 1 with plurality of spaced imaging arrays**

**(i) [Element 5a]: first array to a side of the enclosure**

Hurley discloses six sensor heads, with upper and lower heads on each tower. Ex. 1004, 212; Ex. 1016 ¶¶ 265-266. Numbered one through six in annotated Figure 2.1, each head contains a CCD camera. Ex. 1016 ¶¶ 265-266.



The sensor heads numbers 3 and 5, would constitute a first imaging array spaced a predetermined distance relative to the specified imaging position to a side of the enclosure. That array includes a plurality of vertically spaced imaging devices. Ex. 1016 ¶ 266.

**(ii) [Element 5b]: second array laterally adjacent to first and opposite centerline**

Sensor heads (numbered 4 and 6) would constitute a second imaging array spaced a predetermined distance relative to the specified imaging position, and laterally spaced adjacent to the first imaging array. Ex. 1016 ¶ 287. Cameras 4 and 6 are vertically spaced relative to each other. *Id.*<sup>2</sup> Claim 5 would have been obvious to a POSA at the time of the application. Ex. 1016 ¶ 289.

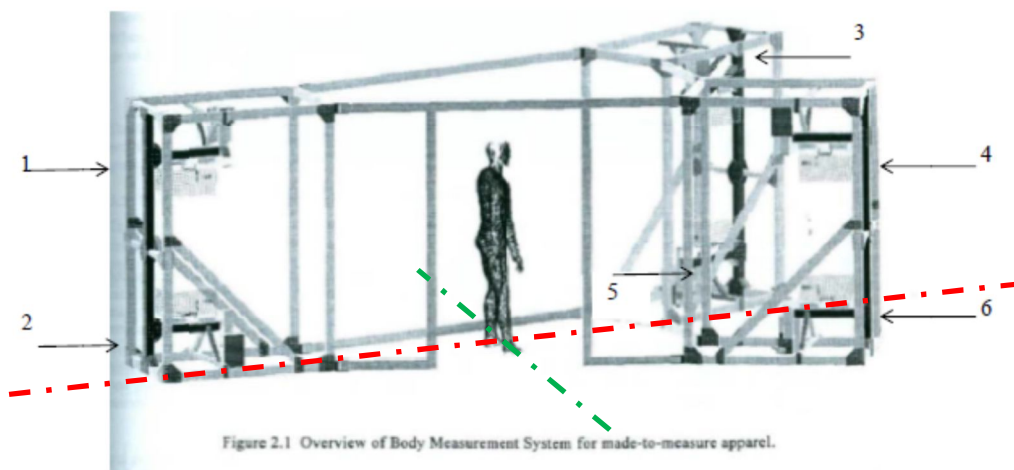
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<sup>2</sup> Alternatively, sensor heads 1 and 2 would constitute such a second imaging array laterally spaced adjacent to the first imaging array. Ex 1016 ¶ 288.

**(f) Claim 6<sup>3</sup> – third and fourth arrays**

**(i) [Element 6a]: third array lateral to first on side opposite second**

In the annotated Figure, sensor heads 1 and 2 would constitute a third imaging array spaced a predetermined distance relative to the specified imaging position. This array is laterally spaced relative to the first array (sensors 3 and 5), and is on the side of the first array opposite the second array (sensors 4 and 6). Ex. 1016 ¶ 271.



**(ii) [Element 6b]: fourth array lateral to second on side opposite first**

Hurley does not describe a fourth sensor array. It would have been obvious to a POSA to add a fourth array to Hurley, in order to obtain the coverage

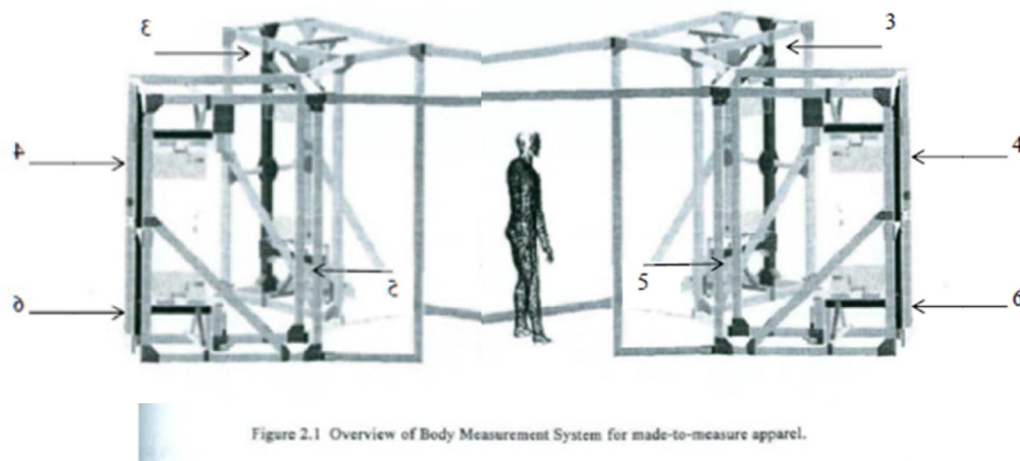
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<sup>3</sup> Claim 6 recites that it depends from Claim 1. However, it appears to depend from Claim 5. For purposes of this petition, Petitioner has addressed Claim 6 as if it depends from Claim 5.



advantages disclosed in Hurley for a plurality of laterally spaced arrays. Ex. 1016 ¶ 272.

Hurley noted that its design economized on the number of sensor arrays. Ex. 1004, 212-213; Ex. 1016 ¶ 273. Hurley discloses that greater detail may be acquired using sensor arrays spaced laterally at an angle to the subject. Ex. 1004, 212-213 (“With this [60 degree] separation angle, there is overlap between the viewing areas of the [front] towers where detail is needed[.]”); Ex. 1016 ¶ 273. Such a modification is illustrated (somewhat crudely) in the following modified figure:



A POSA would have been motivated by the teachings in Hurley to add a further laterally spaced sensor array if greater detail was desired. Ex. 1016 ¶ 274. Claim 6 was obvious. Ex. 1016 ¶ 275.

**(g) Claim 7 – A device according to claim 6 wherein**

**(i) the plurality of light sources is symmetrical about the centerline**

Each sensor head includes a light source. Ex. 1004, 212-13; Ex. 1016 ¶277.

Hurley discloses plurality of light sources symmetrical about a centerline. Ex. 1004, Fig. 2.1 (note such arrangements of sensors 3 and 4 and 5 and 6 in illustrative Fig. 2.1 above); Ex. 1016 ¶ 277. Moreover, the obvious modification to replicate the angled front towers behind the subject would place light sources symmetrical about a centerline representing either the sagittal or the frontal planes. Ex. 1016 ¶ 277.

**(ii) and includes a first light source located lateral to the first imaging array, a second light source located between the first and second imaging array, a third light source located between the third and fourth imaging arrays and symmetrical about the centerline to the second light source, and a fourth light source located opposite the first light source and lateral to the fourth imaging array**

In the obvious four tower modification to Hurley, its peripheral light sources would necessarily be lateral to their respective imaging arrays and located between adjacent imaging arrays. Ex. 1016 ¶ 278. Light sources peripheral to a third imaging array located behind the subject, would necessarily be located in an area between the third and fourth arrays. They would be symmetrical about at least the sagittal centerline discussed above (*i.e.* a centerline that passes side-to-side to side

through the subject) to the opposite light source located between the first (sensors 3 and 5) and second (sensors 4 and 6) imaging arrays. Ex. 1016 ¶ 278.

If not inherent in Hurley, positioning light sources in this manner to illuminate the subject from opposite sides, and to do so symmetrically, would have been an obvious design choice for a POSA because it ensures consistent illumination. Ex. 1016 ¶ 279. Claim 7 would have been obvious. Ex. 1016 ¶ 280.

**(h) Claim 8 -- Claim 1 wherein enclosure comprised of panels that enclose 360 degrees about vertical or horizontal axis**

Hurley's enclosure is designed "with an 'erector set' approach" built with a black anodized aluminum extrusion that is covered with black theater cloth for light tightness and to reduce spurious reflection inside the system. Ex. 1004, 213; Ex. 1016 ¶ 281. The fabric covered panels thus formed enclosed a person on all sides (*i.e.* 360 degrees about a vertical axis). Ex. 1016 ¶ 282. Claim 8 would have been obvious. Ex. 1016 ¶ 283.

**(i) Claim 11 -- Claim 8 wherein panels comprised of a imaging means**

Hurley describes an enclosure that includes three towers, "each tower consisting of an upper and lower sensor," with two towers located in front of the person and one tower behind. Ex. 1004 at 212; Ex. 1016 ¶ 285. The panels encompassing any of the towers thus include two imaging means. Ex. 1016 ¶ 285. Claim 11 would have been obvious. Ex. 1016 ¶¶ 285-286.

**(j) Claim 30 – Claim 1 with display**

Hurley refers to the use of graphic *display* tools, performing the function of “displaying graphical output.” Ex. 1004, 214; Ex. 1016 ¶ 288. A POSA would understand Hurley discloses a display device for displaying the images such as those shown in Fig. 5.1 (below). Ex. 1016 ¶¶ 287-288. Claim 30 would have been obvious to a POSA. Ex. 1016 ¶ 289.

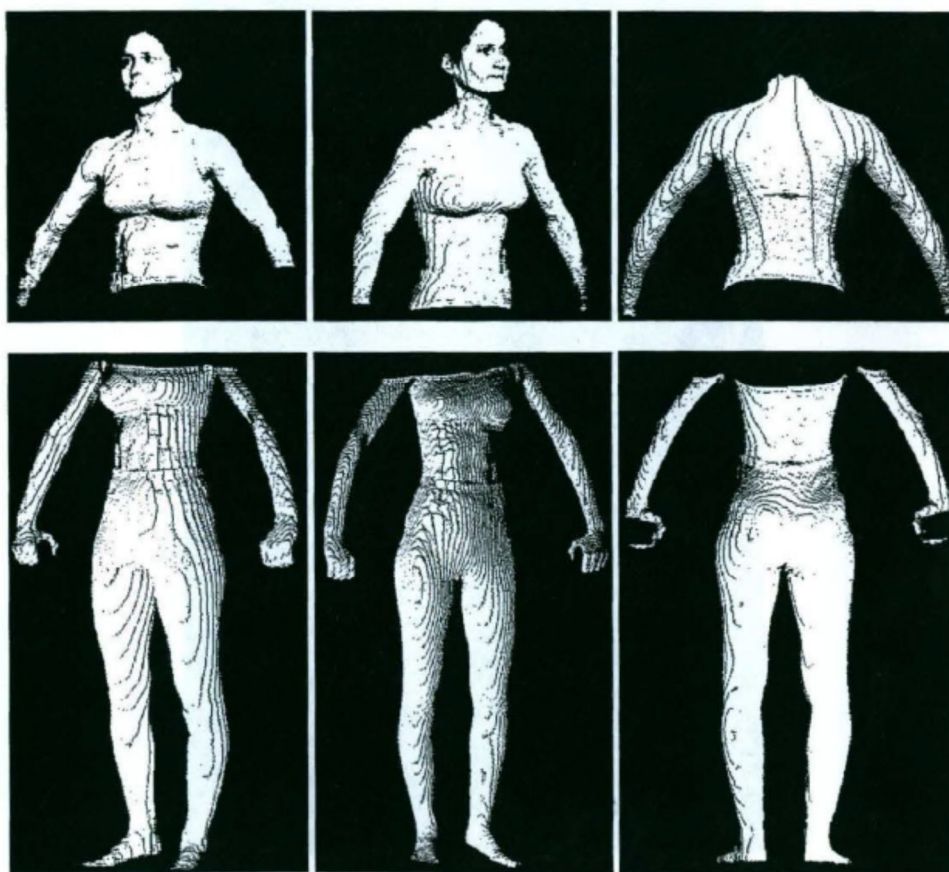


Figure 5.1 Six Individual Views of 3D Data Points

**(k) Claim 33 – Claim 30 displaying person in visually perceivable form**

As discussed above, Hurley discloses a device capable of displaying a portion of a person in visually perceptible form. Claim 33 would have been obvious to a POSA in light of Hurley. Ex. 1016 ¶¶ 290-292.

**(l) Claim 34 – Claim 1 wherein viewing allowed in 360 degrees**

Hurley discloses a system having six cameras allowing views of the entire body (*i.e.* 360 degrees), rendering Claim 34 obvious. Ex. 1016 ¶¶ 293-294.

**(m) Claim 46 – Claim 1 with at least one of a USB hub, an interfacing cable, a computer processor or like, a monitor, and a control device**

Hurley discloses “a custom designed projector, a commercial CCD camera, and **the necessary controls for both.**” Ex. 1004, 214 (emphasis added); Ex. 1016 ¶¶ 96, 296. “The whole [Hurley] system is controlled by a Pentium 133 personal computer.” Hurley discloses use of a monitor (*i.e.* display). Ex. 1016 ¶¶ 96, 296.

Hurley discloses “[a]dditional hardware and wiring necessary to interface the computer to the six sensor heads[.]” Ex. 1004, 214; Ex. 1016 ¶ 297. A POSA would understand that it would be an obvious design choice to use interfacing cables and USB ports or Hubs to interconnect its components. Claim 46 would have been obvious in light of Hurley. Ex. 1016 ¶¶ 93, 99, 208, 297.

**4. Ground 4: Obviousness of Claims 6 and 7 over Voigt, Hurley and Daanen**

Voigt in combination with Hurley discloses all limitations of this claim except for the particular placement of multiple sensor arrays. *See* Section IV.B.1(a), *supra*. The remaining elements of this claim would have been obvious in light of Daanen. Ex. 1016 ¶¶ 300-301, 312, 322.

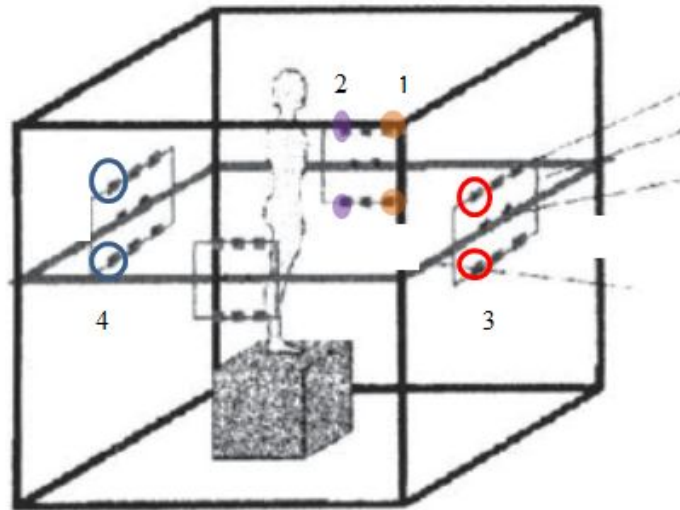
**(a) Claim 6 – third and fourth arrays**

**(i) [Element 6a]: third array lateral to first on side opposite second**

Daanen (Ex. 1005) describes the Vitronic system having a first array of vertically spaced image device located to a side of the enclosure (orange and marked number 1 below) (Ex. 1004 at 113; Ex. 1016 ¶¶ 299, 303, 320).<sup>4</sup> Daanen discloses a third imaging array (circled in red and numbered 3) laterally to the first in the opposite direction from the second array (purple and marked 2; Ex. 1016 ¶¶ 305, 307).

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<sup>4</sup> Here, the centerline is assumed to divide person from side to side. Same analysis applies with respect to image arrays front and back if the centerline is assumed to run from front to back.



**(ii) [Element 6b]: fourth array lateral to second on side opposite to first**

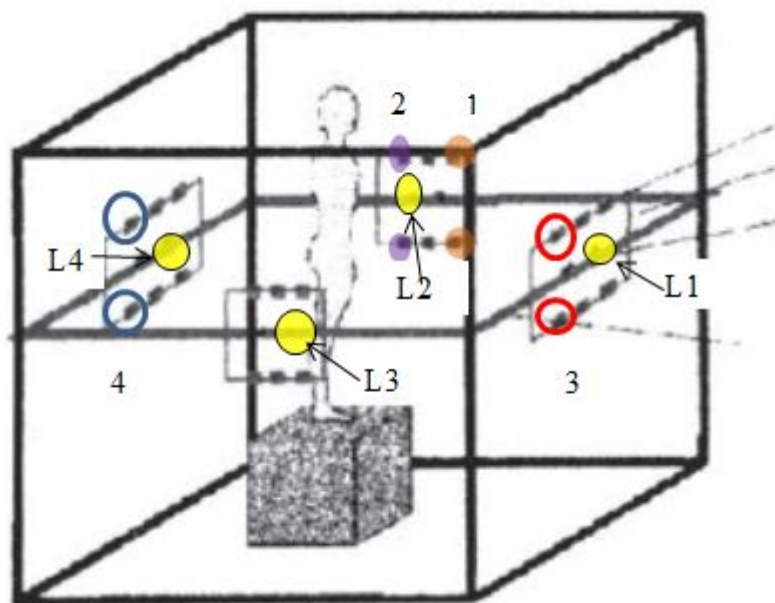
Daanen discloses a fourth imaging array (circled in blue and numbered 4) lateral to the second in the direction opposite direction to the first. A POSA seeking to image the entire body in a single pose would have to adopt the camera configuration of the disclosed Vitronic system in Voigt's enclosure. This arrangement of arrays would have been an obvious design choice to achieve total body coverage. Ex. 1016 ¶¶ 300-312.

In view of the disclosures of Voigt and Daanen, and the knowledge of a POSA, the device recited in Claim 6 would have been obvious as of July 26, 2000. Ex. 1016 ¶¶ 300-312.

**(b) Claim 7 – Claim 6 with**

**(i) [Element 7a]: plurality of light sources  
symmetrical about centerline**

Daanen discloses pairs of light sources (L1 and L4, L2 and L4, in yellow below) symmetrically located about a centerline (either frontal or sagittal). Ex. 1003 at 113; Ex. 1016 ¶¶ 314, 320-321, 323. Voigt in combination with Hurley discloses all limitations of this claim except for the particular placement of multiple sensor arrays. *See* Section IV.B.1(a), *supra*. The remaining elements of this claim would have been obvious in light of Daanen.





- (ii) **[Element 7b]: first light lateral to first array, second light between first and second array, third light between third and fourth arrays and symmetrical to second, and fourth light opposite first and lateral to fourth array**

This feature is nothing more than interspersing light sources in the area between image arrays. In the obvious four array modification to Voigt, its peripheral light sources would necessarily be lateral to their respective imaging arrays and located between adjacent imaging arrays. Daanen's description of the Vitronic's system illustrates this obvious placement. There, a first light source is lateral to the first array (L1), a second light source is between the first and second arrays (L2), a third light source is located between the third and fourth arrays and symmetrical about the centerline to the second light source (L3) and a fourth light source is opposite the first light source and lateral to the fourth array (L4). Ex. 1016 ¶ 314.

Light sources so positioned to illuminate the subject, and to do so symmetrically, would have been an obvious design choice for a POSA because it ensures consistent illumination. Ex. 1016 ¶¶ 73, 86, 313-317. Claim 7 would have been obvious. Ex. 1016 ¶ 317.

**5. Ground 5: Claims 32 and 46 Are Obvious over Voigt in view of Crampton and Dye**

**(a) Claim 32 – A device according to claim 30 wherein said display device further comprises a PDA (personal digital assistance)**

Crampton discloses that its multi-camera system may employ any form of pixel display technology. Ex. 1006, 6. Crampton also notes that its image output may be communicated to a user in a portable, computer readable format. Ex. 1006, 5.

Dye discloses an invention that includes video display monitors to view two- and three-dimensional images. The identified displays included not only LCD screens, flat panels, computer monitors, but also personal digital assistant devices (PDAs). Ex. 1016 ¶ 382. Voigt discloses a display, as does Crampton. Ex. 1016 ¶¶ 385-386. The use of such a PDA as a display device in connection with the combination of Voigt and Crampton would merely constitute a simple substitution of one type of known display device (a PDA) for another type of known display device (a computer monitor). Ex. 1016 ¶¶ 383, 387-388. Such a substitution of a prior art technology for its established function would have been obvious to a POSA. Ex. 1016 ¶¶ 93, 381, 383, 389.

**(b) Claim 46 – Claim 1 with at least one of a USB hub, an interfacing cable, a computer processor or like, a monitor, and a control device**

Voigt discloses that its device performs digitized measurements using a plug-in set of a high-speed processor with an on-board coprocessor, and a high-resolution video camera source, a specifically designed image processing software installed on a personal computer that allows a user to select settings and view images on a monitor display. Ex. 1016 ¶ 391. Thus, Voigt discloses the use of a camera that is connected in some way to a computer containing a computer processor, a monitor, and some method for a user to control the device. Ex. 1016 ¶ 391.

Crampton discloses sensing equipment connected to computing means that is connected to an operator input means (a touch screen surface, a keyboard, or a panel with buttons), wherein the computer performs a variety of image processing algorithms. Ex. 1016 ¶ 392. Thus, a POSA would understand that Crampton discloses a device comprising a viewing device that includes at least one of a computer processor, some type of interfacing cable connecting the sensing means to the computing means, a monitor, and a control device. Ex. 1016 ¶ 392.

Dye discloses a graphics system that includes a personal computer containing a processor, a display screen or monitor connected through an interface cable to the computer, and an input device such as a keyboard or a mouse. Ex.

1007 at 8-9; Ex. 1016 ¶ 393. Dye further discloses that USB (Universal Serial Bus) ports are a preferred method for connecting the computer to one or more video devices and to the display device for displaying two- and three-dimensional graphics. Ex. 1007 at 7, ll. 19-24; 28-31; Fig. 2B; Ex. 1016 ¶ 393. A POSA would understand that use of this technology was incorporated by Crampton and Voigt or could be substituted into those systems to perform its established function. Ex. 1016 ¶ 393, 396-397.

Even if Dye had not specifically disclosed the use of each of a computer processor, a monitor, a control device, an interfacing cable, and a USB hub for viewing images, it would have been obvious to a POSA to use such known technology to view images from a device for imaging a human body. Ex. 1016 ¶ 394.

In view of the disclosures of Voigt, Crampton, Dye, and the knowledge of a POSA, the device recited in Claim 46 would have been obvious as of July 26, 2000. Ex. 1016 ¶¶ 93, 395.

## V. Conclusion

For the foregoing reasons, the Petitioner respectfully requests that this Petition be granted, and that the Board cancel claims 1-8, 11, 30, 32-34, 46, and 51 of the '748 patent.

Respectfully submitted,

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/ s / Julianne M. Hartzell

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Julianne M. Hartzell (Reg. No. 44,748)  
[jhartzell@marshallip.com](mailto:jhartzell@marshallip.com)  
Lead Counsel for Petitioner

Sandip H. Patel (Reg. No. 43,848)  
[spatel@marshallip.com](mailto:spatel@marshallip.com)  
Back-up Counsel for Petitioner

Thomas L. Duston (*pro hac vice* request  
to be filed)  
[tduston@marshallip.com](mailto:tduston@marshallip.com)  
Back-up Counsel for Petitioner

**Customer No. 04743**

MARSHALL, GERSTEIN & BORUN LLP  
6300 Willis Tower  
233 South Wacker Drive  
Chicago, Illinois 60606-6357  
Telephone: (312) 474-6300  
[Docket@marshallip.com](mailto:Docket@marshallip.com)

**WORD COUNT CERTIFICATE OF COMPLIANCE**

The hereby certify that the foregoing, Petition for Inter Partes Review of U.S. Patent No. 7,359,748, contains 13,290 words as measured by the word processing software used to prepare the document, in compliance with 37 CFR § 42.24(d)

/ s /Julianne M. Hartzell /

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Julianne M. Hartzell (Reg. No. 44,748)

Counsel for Petitioner

MARSHALL, GERSTEIN & BORUN LLP

### **CERTIFICATE OF SERVICE**

The undersigned hereby certifies that, pursuant to 37 CFR §§ 42.6(e) and 42.105(a), copies of this petition (including its exhibits) and the other papers transmitting and accompanying this petition to the Patent Office are being deposited on September 21, 2017, with the United States Postal Service utilizing its “Priority Mail Express™” service under Mailing Label No. EL450757859US in an envelope addressed to the attention of:

MCCARTER & ENGLISH LLP  
CITYPLACE I, 185 ASYLUM STREET  
HARTFORD, CT 06103,

which is the correspondence address of record (37 CFR § 1.33(c)) indicated in the Patent Office’s public PAIR system for U.S. Patent No. 7,359,748 B1.

/ Julianne M. Hartzell /

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Julianne M. Hartzell (Reg. No. 44,748)  
Counsel for Petitioner  
MARSHALL, GERSTEIN & BORUN LLP