

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Lee et al.
U.S. Patent No.: 11,222,448 Attorney Docket No. 57721-0004IP1
Issue Date: January 11, 2022
Appl. Serial No.: 17/027,426
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Title: METHOD AND APPARATUS FOR MEASURING
MEASUREMENTS OF TWO-DIMENSIONAL PATTERN
CORRESPONDING TO THREE-DIMENSIONAL VIRTUAL
CLOTHING

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**PETITION FOR *INTER PARTES* REVIEW OF UNITED STATES PATENT
NO. 11,222,448 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42**

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LIST OF EXHIBITS

LINGDI-1001	U.S. Patent No. 11,222,448
LINGDI-1002	U.S. Patent No. 11,222,448 File History
LINGDI-1003	Declaration of Dan Perreault
LINGDI-1004	U.S. Pat. App. Pub. No. 2014/0114620 (“Grinspun”)
LINGDI-1005	Graphicextras.com, <i>Photoshop CC : Smart guide align and spacing / distances</i> video (July 10, 2014), available at https://www.youtube.com/watch?v=dgok9GunPa0&t=227s (“Graphicextras”)
LINGDI-1006	Canvai, <i>Photoshop CC 2014 : Smarter Smart Guides</i> (July 9, 2014), available at https://tinytutorials.wordpress.com/2014/07/09/photoshop-cc-2014-smarter-smart-guides/ (“Canvai”)
LINGDI-1007	<i>Adobe Photoshop CC Help</i> (Sep. 29, 2014), available at https://help.adobe.com/archive/en/photoshop/cc/2014/photoshop_reference.pdf (“Adobe”)
LINGDI-1008	Marvelous Designer, <i>Marvelous Designer 6: Offset Pattern Outline</i> (August 23, 2016), available at https://www.youtube.com/watch?v=lqyrHYjAjUk (“Marvelous Designer-1”)
LINGDI-1009	Marvelous Designer, <i>Marvelous Designer 6: Align & Distribute</i> (August 23, 2016), available at https://www.youtube.com/watch?v=tuN6kOxvXdQ (“Marvelous Designer-2”)
LINGDI-1010	Declaration of Kathryn Talbot
LINGDI-1011	RESERVED
LINGDI-1012	RESERVED

LINGDI-1013	RESERVED
LINGDI-1014	RESERVED
LINGDI-1015	RESERVED
LINGDI-1016	USPTO First Inventor to File (FITF) Comprehensive Training presentation (available at https://www.uspto.gov/sites/default/files/aia_implementation/fitf_comprehensive_training_prior_art_under_aia.pdf)
LINGDI-1017	Complaint from <i>Clo Virtual Fashion Inc. v. Zhejiang Lingdi Digital Tech. Co. LTD. (D/B/A/ Linctex)</i> , Case No. 2:23-cv-00274-JRG-RSP (E.D. Tex. June 14, 2023)
LINGDI-1018	Waiver of Service from <i>Clo Virtual Fashion Inc. v. Zhejiang Lingdi Digital Tech. Co. LTD. (D/B/A/ Linctex)</i> , Case No. 2:23-cv-00274-JRG-RSP (E.D. Tex.) (Filed Sept. 1, 2023)
LINGDI-1019	Petitioner's <i>Sotera</i> stipulation

LISTING OF CHALLENGED CLAIMS

Claim 1	
[1.pre]	A method of taking a measurement of a two-dimensional (2D) pattern, comprising:
[1.1]	receiving a plurality of points in a space in which a 2D pattern of clothing is displayed;
[1.2]	determining attributes of areas in which the points are located,
[1.3]	wherein the attributes indicate at least whether the points are located in a same pattern piece of the clothing or different pattern pieces of the clothing;
[1.4]	determining a length of a line segment using the points based on the determined attributes of the areas, the determined length of the line segment changed to account for separation between the pattern pieces responsive to determining that the points are located in different pattern pieces; and
[1.5]	outputting the length of the line segment.
Claim 2	
[2]	The method of claim 1, wherein the determining of the attributes of the areas comprises: analyzing a data structure corresponding to each of the points to determine the attributes.

Claim 3	
[3]	The method of claim 2, wherein the data structure corresponding to each of the points includes, in a form of a link, information associated with at least one of a pattern piece in which each of the points is positioned, a line in a pattern piece on which each of the points is positioned, or a point on a line in a pattern piece.
Claim 4	
[4]	The method of claim 1, wherein the attributes of the areas comprises at least one of: a first attribute indicating that an area in which points are located corresponds to a same pattern piece of the 2D pattern; a second attribute indicating that an area of one of the points is located in a first pattern piece and an area of another of the points is located in a second pattern piece different from the first pattern piece; a third attribute indicating that an area in which a start point and an end point of the points are located corresponds to an outer arc of a same pattern piece of the 2D pattern; a fourth attribute indicating that an area including one of the start point and the end point of the points corresponds to a pattern piece of the 2D pattern, and an area including the other of the start point and the end point corresponds to a remaining area excluding the pattern piece of the 2D pattern; or a fifth attribute indicating that areas including the points outside the 2D pattern.
Claim 14	
[14.1]	The method of claim 1, wherein the 2D pattern is modeled with a mesh including a plurality of polygons,
[14.2]	wherein at least one point outside the 2D pattern is defined by a relative position of the at least one point with respect to the 2D pattern.

Claim 15	
[15.pre]	A non-transitory computer-readable storage medium storing instructions thereon, the instructions, when executed by a processor, cause the processor to:
[15.1]	receive a plurality of points in a space in which a 2D pattern of clothing is displayed;
[15.2]	determine attributes of areas in which the points are located, wherein the attributes indicate at least whether the points are located in a same pattern piece of the clothing or different pattern pieces of the clothing;
[15.3]	determine a length of a line segment using the points based on the determined attributes of the areas, the determined length of the line segment changed to account for separation between the pattern pieces responsive to determining that the points are located in different pattern pieces; and
[15.4]	output the length of the line segment.
Claim 16	
[16.pre]	An apparatus for taking a measurement of a two-dimensional (2D) pattern, comprising:
[16.1]	a user interface (UI) device configured to receive, from a user, a plurality of points in a space in which a 2D pattern of clothing is displayed;
[16.2]	a processor coupled to a memory to execute instructions on the memory the memory instructions causing the processor to: determine attributes of areas in which the points are located, wherein the attributes indicate at least whether the points are located in a same pattern piece of the clothing or different pattern pieces of the clothing, and

[16.3]	determine a length of a line segment using the points based on the determined attributes of the areas, the determined length of the line segment changed to account for separation between the pattern pieces responsive to determining that the points are located in different pattern pieces; and
[16.4]	an output device configured to output the length of the line segment.
Claim 17	
[17]	The apparatus of claim 16, wherein the instructions further cause the processor analyze a data structure corresponding to each of the points to determine the attributes.
Claim 18	
[18]	The apparatus of claim 16, wherein the attributes of the areas comprises at least one of: a first attribute indicating that an area in which points are located corresponds to a same pattern piece of the 2D pattern; a second attribute indicating that an area of one of the points is located in a first pattern piece and an area of another of the points is located in a second pattern piece different from the first pattern piece; a third attribute indicating that an area in which a start point and an end point of the points are located corresponds to an outer arc of a same pattern piece of the 2D pattern; a fourth attribute indicating that an area including one of the start point and the end point of the points corresponds to a pattern piece of the 2D pattern, and an area including the other of the start point and the end point corresponds to a remaining area excluding the pattern piece of the 2D pattern; or a fifth attribute indicating that areas including the points outside the 2D pattern.

I. INTRODUCTION

Zhejiang Lingdi Digital Technology Co., Ltd. (“Lingdi” or “Petitioner”) petitions for IPR of claims 1-4 and 14-18 (“Challenged Claims”) of U.S. Patent No. 11,222,448 (“the ’448 patent”). As explained in this petition, there exists a reasonable likelihood that Petitioner will prevail with respect to at least one of the Challenged Claims. The Challenged Claims are unpatentable based on teachings set forth in publications presented in this Petition. Petitioner respectfully submits that an IPR should be instituted, and that the Challenged Claims should be canceled as unpatentable.

II. REQUIREMENTS FOR IPR UNDER 37 C.F.R. § 42.104

A. Grounds for Standing Under 37 C.F.R. § 42.104(a)

Zhejiang Lingdi Digital Technology Co., Ltd. certifies that the ’448 patent is available for IPR. The present petition is being filed within one year of service of a complaint against Lingdi in *CLO Virtual Fashion Inc. v. Zhejiang Lingdi Digital Technology Co., Ltd. d/b/a Linctex*, 2-23-cv-00274 (EDTX). See LINGDI-1018 (waiver of service filed on September 1, 2023); LINGDI-1017 (complaint filed on June 14, 2023). Petitioner is not barred or estopped from requesting this review challenging the Challenged Claims on the below-identified grounds.

B. Challenge Under 37 C.F.R. § 42.104(b) and Relief Requested

Petitioner requests an IPR of the Challenged Claims on the grounds set forth

in the table shown below, and requests that each of the Challenged Claims be found unpatentable. An explanation of how these claims are unpatentable under the statutory grounds identified below is provided in the form of detailed description and claim charts that follow, indicating where each element can be found in the cited prior art, and the relevance of that prior art. Additional explanation and support for each ground of rejection is set forth in Exhibit LINGDI-1003, the Declaration of Dan Perrault (“Perrault Declaration”), referenced throughout this Petition. *See* LINGDI-1003, ¶¶24-27, 43.

Ground	Challenged Claims	Basis for Rejection
Ground 1	1-4 and 14-18	§103 – Grinspun (Exhibit 1004) in view of Graphicextras (Exhibit 1005)

III. THE CITED REFERENCES ARE PRIOR ART PUBLICATIONS

Grinspun (published Apr. 24, 2014) and Graphicextras (published July 10, 2014) qualify as prior art under post-AIA 35 U.S.C. §102(a)(1) as printed publications published prior to August 19, 2019 (the earliest possible priority date of the ’448 patent) (“Critical Date”).

Graphicextras qualifies as printed publication prior art as a video published to the popular video sharing website, YouTube. The USPTO guidelines state that “[a]n electronic publication, include an online database or Internet publication (e.g., discussion group, forum, *digital video*, or social media post), is considered to

be a ‘printed publication’ within the meaning of 35 U.S.C. 102(a)(1).” MPEP § 2128(II)(A). This is also consistent with the USPTO’s “First Inventor to File (FITF) Comprehensive Training” materials, which confirm that “a YouTube video...may also qualify as a printed publication under AIA.” LINGDI-1016, 15.

Federal courts have similarly held that such YouTube “videos meet the definition” of “a printed publication.” *HVLPO2, LLC v. Oxygen Frog, LLC*, 2018 U.S. Dist. LEXIS 245874, *1-2 (N.D. Fla., May 28, 2018). With respect to YouTube specifically, at least one federal court has found that

A familiar user would know that you don’t need to search for a particular channel to watch the videos uploaded on it. For example, if you want to watch a video of a cat skateboarding, you can search ‘cat skateboarding’; you don’t need to know that it might have been ‘CatLady83’ who uploaded the video you end up watching.

Id., *3. The ability to search for a video based on the title, specific subject matter, or other keywords “does not exceed the reasonable diligence” that the law expects of a hypothetical prior-art subject.” *Id.*, *3-4. Thus “someone interested and ordinarily skilled in the pertinent art, exercising reasonable diligence, would have been able to locate” the Graphicxtras reference as of its publication date on YouTube. *Id.*

Likewise, the Board has similarly concluded that such YouTube videos qualify as printed publication prior art as of the publication date identified on the

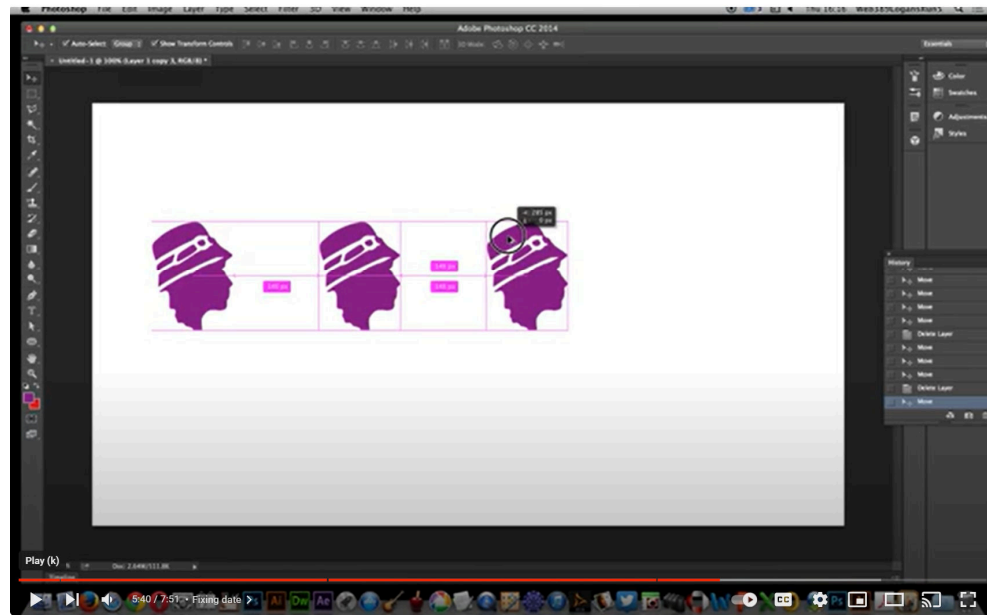
YouTube page for that video. For example, the PTAB has held that the publication date listed on YouTube for a particular video indicates the date when that video “was available to the public.” *Mission Integrated Tech. LLC, v. Joshua Clemente*, IPR2023-01285, Paper 16 at 19, 22-23 (PTAB Feb. 23, 2024); *see also K/S HIMPP v. Bragi GmbH*, IPR2023-00901, Paper 14 at 15 (PTAB Nov. 13, 2023); *Danxiao Inf. Tech. LTD v. Shenzhen Svakom Tech. Co. LTD*, PGR2022-00050, Paper 36 at 6-7 (PTAB Jan. 19, 2024).

Additionally, Graphicxtras qualifies as prior art as of the date listed on its YouTube page because YouTube videos are published by a “well-known, reputable compiler and publisher.” *Ericsson Inc. v. Intell. Ventures I LLC*, IPR2014-00527, Paper 41 at 10-11 (PTAB May 18, 2015); *see also VidStream LLC v. Twitter, Inc.*, 981 F.3d 1060, 1065-66 (Fed. Cir. 2020) (“When there is an established publisher there is a presumption of public accessibility as of the publication date.”).

Furthermore, in numerous cases, Google Custodians of Record have given sworn testimony that “[a]s explained on YouTube’s support website, the date listed under a video is the date it was published and, if the video was posted publicly, that is the date on which it became available to anyone for viewing.” *See, e.g., London Luxury LLC v. E&E Co., Ltd.*, PGR2021-00083, Ex. 1013; *see also Ex. 1014, 1* (“When you make a video public on YouTube, the date on the watch page

is based on Pacific Standard Time (PST). If you want a certain date to show beneath your video, upload your video on that date.”); Ex. 1015.

And here, expert testimony from Kathryn Talbot confirms that Graphicxtras qualified as a printed publication since 2014. For example, this testimony confirms that “Exhibit LINGDI-1005 is a true and correct copy, in MP4 format, of the video located at the URL <https://www.youtube.com/watch?v=dgok9GunPa0&t=227s>” (LINGDI-1010, ¶¶2, 15) and that this video was “accessible at the same URL on July 10, 2014.” LINGDI-1010, ¶¶2, 13-15, 20, 23, 26, 29-30. The YouTube page that hosts Graphicxtras confirms this July 10, 2014 publication date:



Photoshop CC : Smart guide align and spacing / distances



Graphicextras.com
15K subscribers

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16

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Clip



...

3,926 views Jul 10, 2014 [Photoshop 2021](#) [2020](#) [2019](#) [2018](#) [CS6 etc](#) [Tutorials](#) [How To](#)

Smart guides (view show smart guides) are now even better with the latest version of Photoshop (CC software when you hold down the Cmd / ctrl and alt keys for layers - such as displaying distance / spacing from the edge etc as well as distances from groups and distances from duplicated layers. Here is a quick guide to some of the features and using them with brush strokes on layers

Photoshop CC 2021 2020 2019 2018 2017 2015 2014
<https://www.graphicxtras.com/adobe-ph>

LINGDI-1010, Appendix B (annotated).

Additionally, the testimony here confirms that a person of ordinary skill and other interested members of the public would have been able to find Graphicextras through the exercise of reasonable diligence by performing keyword searches using YouTube’s search functionality. LINGD-1010, ¶¶24, 29; LINGDI-1003, ¶¶26, 51-60; *see also HVLPO2*, 2018 U.S. Dist. LEXIS 245874, *3-4. As Mr. Perrault testifies:

persons of ordinary skill in the art during the relevant time frame would have been well-aware of YouTube and would have turned to YouTube to find information on the latest developments in design and drawing software, including clothing design software...by, for example, performing keyword searches or viewing the channels of users that regularly publish videos related to design software. I conducted such YouTube searches myself when researching the latest design software developments during the relevant time frame.

LINGDI-1003, ¶26.

IV. SUMMARY OF THE ’448 PATENT

A. Brief Description

The ’448 patent describes a computer-aided design (CAD) software that can be used to, in the depicted example, draw fabric patterns which are also displayed as “virtual clothing.” LINGDI-1001, 1:55-60, 6:1-34, FIGS. 2A-B. Patent Owner provided such a CAD software—called Marvelous Designer—for many years

before the priority date of the '448 patent. LINGDI-1003, ¶28, ¶¶29-30 (citing to corroborating background examples at LINGDI-1008 and LINGDI-1009). The '448 patent describes examples of an incremental change to an onscreen interface of such CAD software. LINGDI-1001, 2:8-15, 8:1-64, 9:53-57, 12:5-14:15, 15:42-50 (“may output, on a screen of a display ..., a length of a line segment”). The face of the '448 patent indicates Patent Owner opted to forego citing to the Examiner any of its tutorial publications or other literature demonstrating the onscreen interface for its then-common CAD software. LINGDI-1001, cover; LINGDI-1003, ¶31.

In more detail, the '448 patent describes an example in which a “2D pattern” may include “pieces” corresponding to “body parts of the 3D avatar,” such as “arms (e.g., sleeves), torso (front and back), neck, and legs.” *Id.*, 5:62-6:14. The 2D pattern may also be “modeled with a mesh including a plurality of polygons,” e.g., “triangles, to simulate [a] 3D virtual clothing.” *Id.*, 6:15-34. Further, “[b]y draping a 2D virtual clothing pattern formed with a mesh over a 3D avatar, it is possible to embody 3D virtual clothing that looks natural based on the laws of physics.” *Id.* In the '448 patent, a “drape” or “draping” refers to “a process of putting 3D clothing on a 3D avatar by combining a 2D pattern or 2D pattern pieces by a computer program.” *Id.*, 5:62-6:14; LINGDI-1003, ¶32.

The '448 patent also describes techniques to perform measurements in

relation to 2D patterns. For example, “a length of two desired points” may be measured by “measuring a length on a two-dimensional (2D) pattern corresponding to three-dimensional (3D) virtual clothing or in a space in which the 2D pattern is displayed.” *Id.*, 1:55-60. Figure 1 depicts an example of a process for measuring a measurement of a two-dimensional (2D) pattern:

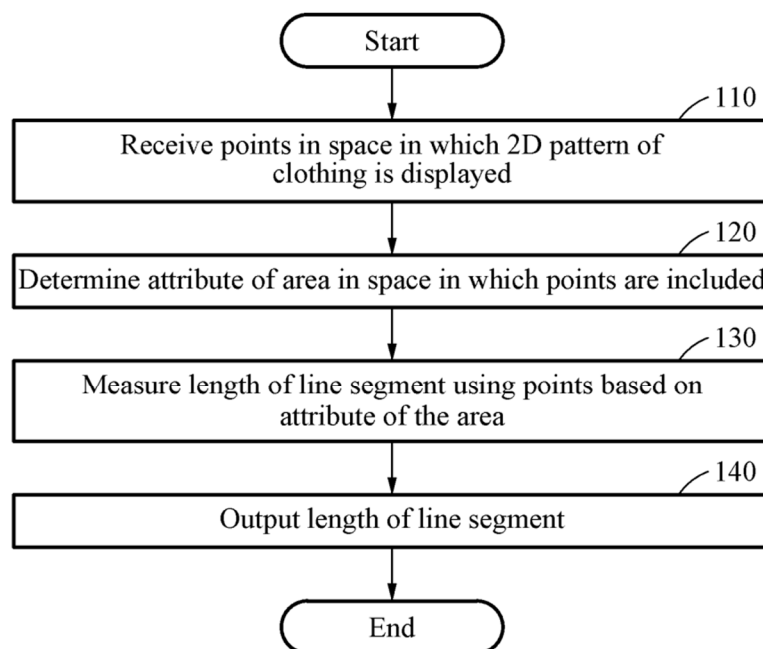


FIG. 1

LINGDI-1001, FIG. 1. In operation 110, “an apparatus for measuring a measurement of a 2D pattern” receives “a plurality of points in a space in which a 2D pattern of clothing is displayed.” LINGDI-1001, 5:62-6:14. This measurement is performed “through a screen of a user interface (UI).” *Id.*, 6:49-54; LINGDI-1003, ¶33.

In operation 120, the measuring apparatus “determine[s] [an] attribute of the area in which the points are included based on a data structure corresponding to each of the points.” LINGDI-1001, 6:49-54. Examples of “attributes” include a “first attribute indicating that an area in which points are included corresponds to a same pattern piece of the 2D pattern” and a “second attribute indicating that an area in which points are included corresponds to a first pattern piece and a second pattern piece that are different from each other in the 2D pattern.” *Id.*, 7:6-24. The “data structure” may include “link-type information associated with at least one of a pattern piece in which each of the points is positioned, a line in a pattern piece in which each of the points is positioned, or a point on a line of a pattern piece.” *Id.*, 6:55-7:5; LINGDI-1003, ¶34.

In operation 130, the measuring apparatus “measures a length of a line segment using the points based on the attribute of the area determined in operation 120.” LINGDI-1001, 8:1-3. As an example, “when the attribute of the area is determined to be the second attribute” (i.e., points included in different 2D patterns), the measurement involves measuring “a second length of a second line segment that connects a start point input in a first pattern piece and an end point input in a second pattern piece.” *Id.*, 8:11-27; LINGDI-1003, ¶35.

In operation 140, the measuring apparatus “outputs the length of the line segment measured in operation 130.” LINGDI-1001, 8:59-9:3. The output may

involve “output[ting], onto a screen of a display, a length of a line segment based on a plurality of points in a 2D pattern corresponding to draped simulated 3D clothing.” *Id.*; LINGDI-1003, ¶36.

B. Summary of the Prosecution History of the ‘448 Patent

The Application that led to the ’448 patent was filed on September 21, 2020. LINGDI-1002, 5-11. The Examiner issued a Non-final Office Action on April 9, 2021, which included obviousness rejections based on U.S. Pat. App. Pub. No. 2016/0314604 (“Oh”) and U.S. Pat. No. 6,208,352 (“Blackwell”). *Id.*, 288-97; LINGDI-1003, ¶37.

Applicant filed a Response on July 8, 2021, which amended the independent claims (claims 1, 15, 16) to include two additional limitations: (A) “wherein the attributes indicate at least whether the points are located in a same pattern piece of the clothing or different pattern pieces of the clothing” and (B) “[determining]/[determine] a length of a line segment using the points based on the determined attributes of the areas, the determining length of the line segment reduced to account for separation between the pattern pieces responsive to determining that the points are located in different pattern pieces...” *See* LINGDI-1002, 329-37. In the Response, Applicant characterized feature (B) as being “advantageous” because “exaggeration of a length of line connecting two points in a 2D pattern when the points are located in different pattern pieces that are

displayed as being separated may be prevented.” *Id.*, 325. Applicant also argued that feature (B) was not disclosed or suggested by the Oh and Blackwell references cited in the Non-Final Office Action. According to the Applicant, “Oh does not disclose taking measurement from a point in one pattern piece to another point in a different pattern piece.” *Id.*, 326. Further, Applicant stated “[n]or does Oh describe reducing the length of the line between the two points if the two points are placed on different pattern pieces that are displayed as being separated.” *Id.*; LINGDI-1003, ¶38.

The Examiner issued a Final Office Action on September 2, 2021. The Final Office Action included rejections of claims 1-20 under 35 U.S.C. § 112(a) in relation to feature (B) discussed above. Specifically, the Examiner found the pending claim language “reduced to account for separation” to lack support in the specification, noting that paragraph [0079] of the original specification merely provides that the connection line may change in its length or position as the user changes a position or size of the pattern piece or changes points selected from the pattern piece. *See* LINGDI-1002, 343; *see also id.*, 340-47; *see* LINGDI-1001, 10:58-11:6; LINGDI-1003, ¶39.

Applicant filed a Response on October 25, 2021, which included further amendments to the independent claims to substitute the term “reduced” with “changed.” LINGDI-1002, 359-66. The Response also addressed the §112(a)

rejection and additionally identified paragraph [0089] of the original specification as allegedly providing sufficient written description support. *Id.*, 367-68; LINGDI-1003, ¶40.

Subsequently, a Notice of Allowance was issued on November 9, 2021. LINGDI-1002, 371-78. The Notice included the following statement regarding allowability:

...the prior art does not clearly disclose all the claimed limitations. Matsushita et al. discloses determining the distance between two keypoints of a clothing item. However, the above prior art whether alone or in combination with the previously cited prior art does not clearly disclose all the limitations of claims 1-20.

Id., 376; LINGDI-1003, ¶41.

C. Level of Ordinary Skill in the Art

A person of ordinary skill in the art as of the Critical Date (“POSITA”) would have had a minimum of a bachelor’s degree in an engineering, computer science, graphic design, or a related field plus 2-3 years of work and/or research experience in the field of computer aided design (CAD) software. LINGDI-1003, ¶23. Graduate education could substitute for professional experience, or significant experience in the field could substitute for formal education. *Id.*

D. Claim Construction

All claim terms should be construed according to the *Phillips*

standard. *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005); 37 C.F.R.

§42.100. For the purposes here of comparing the Challenged Claims to the predictable combination articulated in Grounds, Petitioner submits that no claim terms need be construed. *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011); *Google Inc. v. Intellectual Ventures II LLC*, 701 Fed. Appx. 946, 956 (Fed. Cir. 2017) (“do not require construction” for purposes of “resolv[ing] the parties’ patentability arguments”); LINGDI-1003, ¶42.

V. DETAILED EXPLANATION OF IPR GROUNDS

This petition shows how the primary references above, alone or in combination with other references, disclose the limitations of the Challenged Claims, thereby rendering claims 1-4, and 14-18 unpatentable.

A. GROUND 1 – Claims 1-4 and 14-18 are rendered obvious by Grinspun in view of Graphicxtras

1. Grinspun

Similar to the ’448 patent, Grinspun describes CAD software enabling “interactive garment modeling and editing.” LINGDI-1004, [0010]-[0013], FIGS. 1-4 and 14-19, Abst. The CAD software provides an “interactive garment designing application that simultaneously and synchronously models a two-dimensional garment pattern and its corresponding three-dimensional draped representation.” *Id.*, [0003]. The CAD software is used for the “garment design process,” which traditionally involved “multiple iterations of drafting, synthesis,

and revision.” *Id.*, [0004]. Grinspun sought to address challenges relating to garment design and taught an improved CAD software that enables “interactive” garment modeling and edits (LINGDI-1004, [0009]) in an onscreen interface that “can simultaneously display two-dimensional [(2D)] flat patterns for constructing a garment and a three-dimensional [(3D)] draped representation of the garment” where the 2D flat patterns and the 3D draped representations can “maintain correspondence” in providing a “rendered draped form” (*id.*, [0010]). Grinspun’s system allowed “users to interactively edit [2D] flat patterns and instantaneously obtain feedback with the resulting [3D] draped representation, thereby enabling rapid prototyping of a garment and providing an understanding of the complex draped representation.” *Id.*, [0011]. The rendering of the 3D draped representation can be “automatically updated” in “real time” as the 2D flat panel pattern is edited. *Id.* Further, through such “bidirectional editing,” a user can “interactively mark, sculpt, refine, and/or revise a three-dimensional draped representation of a garment...” *Id.*, [0012]; *see id.*, [0034]-[0035]; LINGDI-1003, ¶¶44-45.

Figure 1 shows an example of a display screen 100 provided by the CAD system through an “interactive garment designing application”:

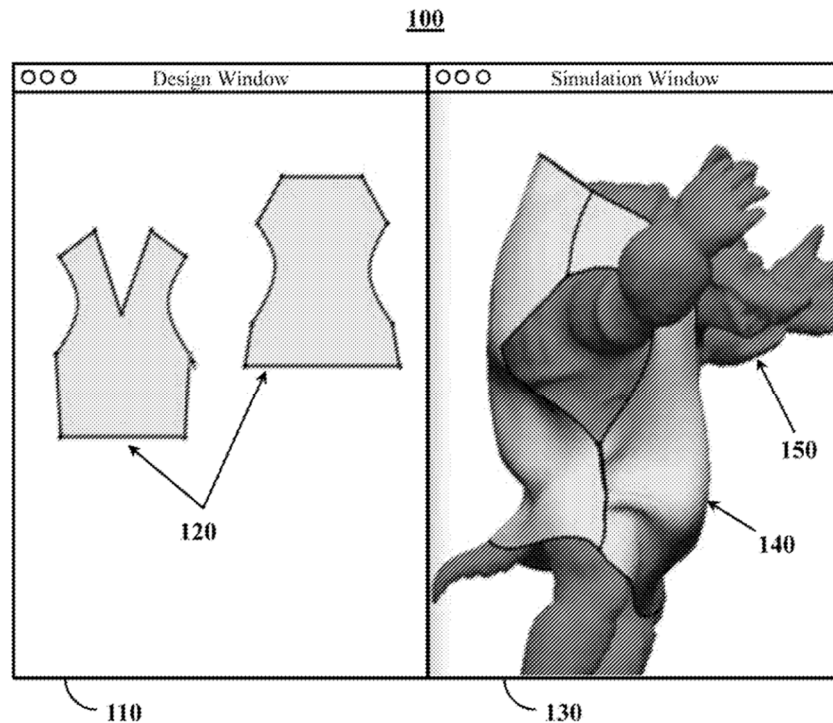


FIG. 1

LINGDI-1004, FIG. 1. As shown above, display screen 100 includes a “design window 110” and a “simulation window 130” that are “displayed side-by-side.” LINGDI-1004, [0036]-[0037]. Design window 110 includes “[2D] flat patterns 120 used to create a garment.” *Id.* Simulation window 130 includes a “[3D] simulation representation 140 resulting from the two-dimensional flat patterns draped over a body 150.” *Id.*; LINGDI-1003, ¶46.

Grinspun’s CAD software also provides a user with “an interactive bidirectional editing feature that maintains correspondence between the flat patterns 120 shown in the two-dimensional view 110 and the three-dimensional draped representation 140 shown in the three-dimensional view 130.” LINGDI-

1004, [0038]. Thus, “in response to altering the two dimensional flat pattern,” the application “simultaneously and/or synchronously simulate[s] and update[s] the corresponding three-dimensional draped representation with the alterations as the flat pattern is being altered.” *Id.* Examples of alterations include “altering the shape or position of a pattern boundary.” *Id.*; LINGDI-1003, ¶47.

Grinspun also explains that the user can “generally create and/or edit patterns” in the design window 110. LINGDI-1004, [0042]-[0044]. For example, the user can “begin with a blank screen” and use mouse movements for “sketching and creation of the flat patterns” for purposes of organizing the 2D design space within the design window 110. *Id.*; *see also* LINGDI-1004, [0038] (“altering the shape or position”), [0049] (“free-flowing design experience”), [0057] (“alters the two-dimensional pattern configuration”); [0069] (“uses the pointer to drag two-dimensional pattern elements”), [0084] (“using click, drag, and/or release mouse manipulations”); LINGDI-1003, ¶48 (“[t]his organization and repositioning of the two-dimensions patterns within Grinspun’s design window 110 was a known and useful tool when creating/inserting new patterns between or adjacent to other patterns”).

Figure 2 shows one example of Grinspun’s “interactive bidirectional editing feature”:

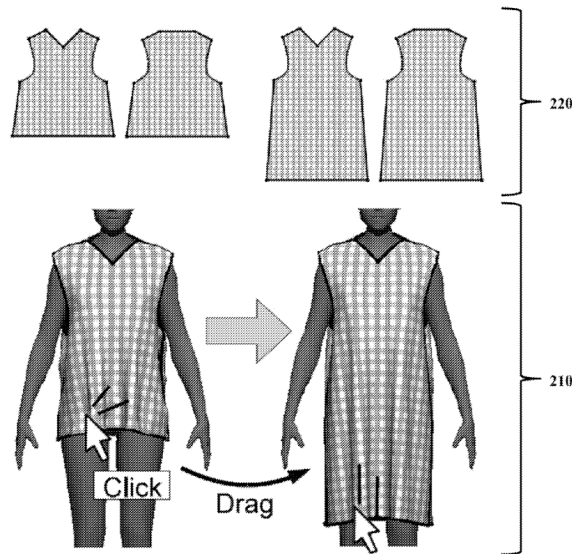


FIG. 2

LINGDI-1004, FIG. 2, [0039]. In this example, a user provides “user commands from a user input device (e.g., one or more mouse movements),” and the onscreen interface of the CAD software “update[s] the three-dimensional draped representation to reflect the alteration and can simultaneously update the corresponding two-dimensional flat patterns.” *Id.* As shown above, “the user selects the lower boundary of the three-dimensional draped representation and drags the mouse pointer in a downward direction to a new mouse position, thereby causing the application to lengthen the dress shown in the three-dimensional draped representation.” *Id.*, [0039]. Additionally, “as shown in area 220, the flat patterns of the garment are concurrently updated to reflect the alterations made to the three-dimensional draped representation.” *Id.*; LINGDI-1003, ¶49.

Figure 3 shows another example of Grinspun’s “interactive bidirectional

editing feature”:

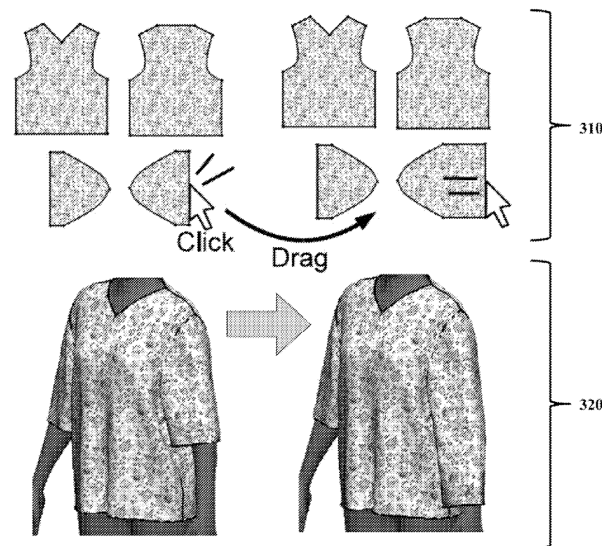


FIG. 3

LINGDI-1004, FIG. 3; [0040]. As shown above, “in area 310,” a user uses a mouse pointer to “select[] the right boundary line of a sleeve portion of a flat pattern and drags the mouse pointer in a lateral direction to a new mouse position,” which causes the application to “lengthen the sleeve of the garment.” *Id.*, [0040]. Additionally, “as shown in area 320, the sleeve of the draped representation is concurrently updated to reflect the alterations made to the flat pattern.” *Id.*; LINGDI-1003, ¶50.

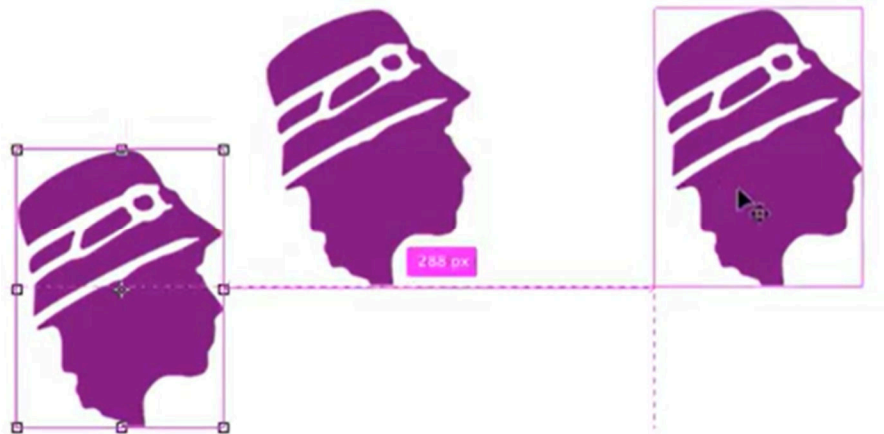
2. Graphicextras

Graphicextras is a video published by the well-established publisher YouTube showing conventional features of an onscreen interface for a prior art CAD software—the 2014 version of Adobe Photoshop CC, which was commonly used

in a variety of design fields for enhancing, editing, and manipulating 2D digital objects in the onscreen design interface. *See, e.g.*, LINGDI-1005, 0:00-0:20 (“new features in 2014 CC”), 2:59-3:27; LINGDI-1003, ¶51. Among these conventional features, Graphicextras shows useful functions of the “Smart Guide” feature, which advantageously provided a user with onscreen real-time measurement information for spacing of objects within a design interface. LINGDI-1005, 1:47-1:54 (“the distances between”); 2:59-3:27 (“which is really quite nice”); LINGDI-1003, ¶¶52-53(confirming what is depicted in Graphicextras with further corroboration from 2014 Photoshop CC publications at LINGDI-1006, 1-2 and LINGDI-1007, 14-16, 59-61).

For example, the “Smart Guide” feature provides a measurement guide function that allows a user to “actually see the distance” between the first object and the second object, which can occur onscreen even when the user selects a first object and “move[s] it around.” LINGDI-1005, 2:59-3:27; LINGDI-1003, ¶54(citing to further corroboration in LINGDI-1007, 14 to explain that the user can conveniently access “display[ed] reference measurement guides showing the distance between” displayed objects).

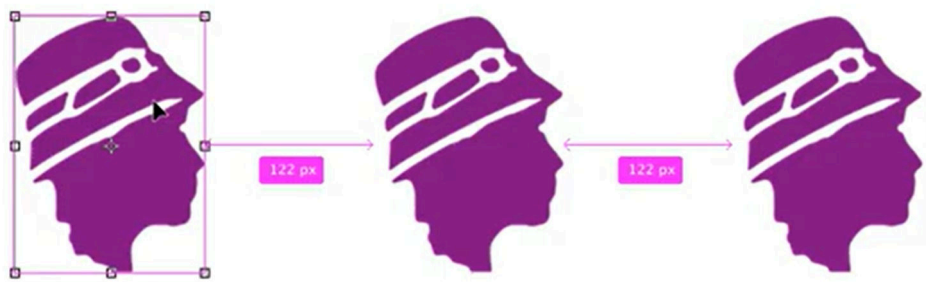
One example of this function is portrayed in Graphicextras:



LINGDI-1005, 2:59-3:27 (“which is really quite nice”). As shown above, a user performs a measurement between a reference 2D object (left, with border and corners identified) and a hovered 2D object (right, with only border identified).

LINGDI-1003, ¶55.

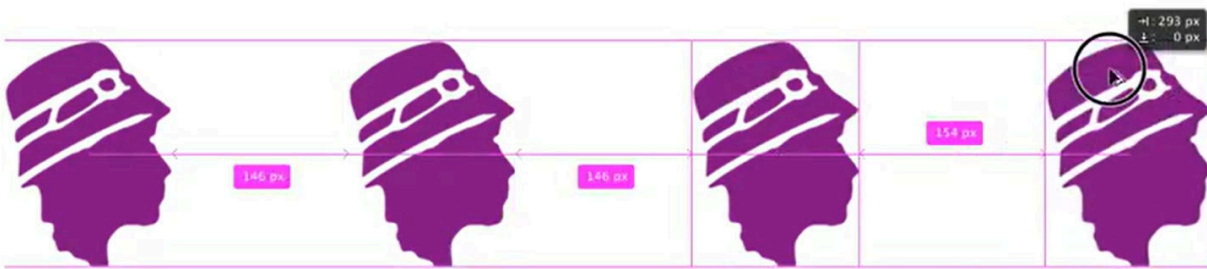
As another example, the “Smart Guide” feature also provides a “matched spacing” function to display spacing between individual objects. *See* LINGDI-1005, 1:37-2:56; LINGDI-1003, ¶56. This function is portrayed in Graphicextras (at 2:42). As shown in the excerpted image below, a user arranges three objects so that they are uniformly spaced apart.



LINGDI-1005, 2:44. In the image above, “a user arranges three objects so that they are spaced apart by a horizontal distance of “122 pix.” LINGDI-1003, ¶56.

Graphicextras further suggests a user can use the “measurement guide” and “matched spacing” functions of the “Smart Guide” feature to achieve real-time display of changes to the length measurement while moving/interacting with the 2D objects displayed within a design window. *See, e.g.*, LINGDI-1005, 5:47-6:00; *see also id.*, 2:54-3:39. Long before 2019, such features would have been readily recognized as advantageous for users organizing 2D objects (moving objects, opening sufficient space between objects for creation/insertion of new objects) in a design window of a CAD user interface. LINGDI-1003, ¶57.

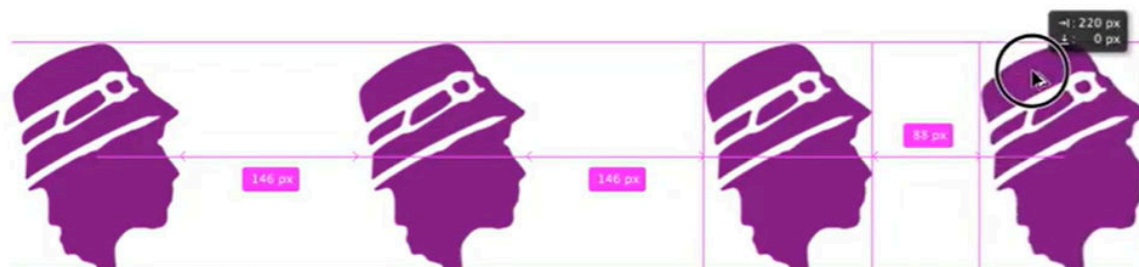
In more detail, Graphicextras demonstrates that, when one 2D object is moved relative to another 2D object within the 2D design window, the displayed length is changed in real time to account for the separation between those 2D objects. *Id.* (“this provides helpful and convenient onscreen distance information to the user while organizing multiple objects within the 2D space”). For example, at a first time point (selected at 5:47 by way of example here, which is a time point associated with the excerpted image below), a user demonstrates a first instance of the “measurement guide” function:



LINGDI-1005, 5:47. As shown above, a user selects a reference 2D object (left), and then moves the mouse cursor to hover over a second 2D object (right).

LINGDI-1003, ¶58. In this first instance, the relative x-coordinate of the second 2D object has a value of “293” (depicted in the dark gray box) and the “Smart Guide” feature shows a horizontal distance from the adjacent 2D object as a value of “154” (depicted in the pink box). LINGDI-1005, 5:47.

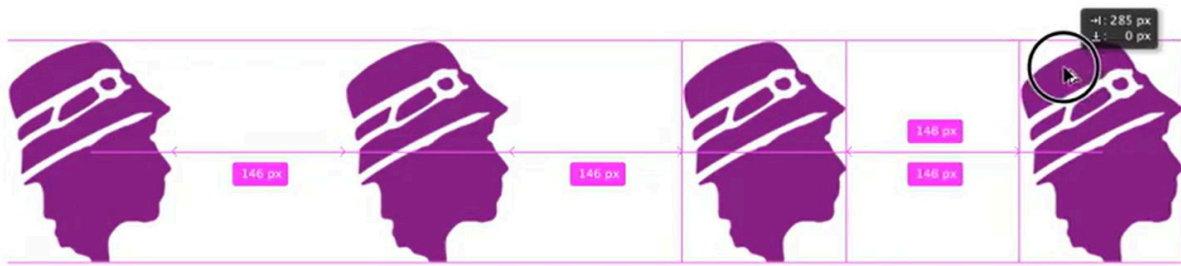
At a second time point (selected at 5:57 by way of example, which is within a time period between 5:47-6:00, and is a time point associated with the excerpted image below), a user adjusts the position of the second 2D object (right). The displayed length is updated using the “measurement guide” function:



LINGDI-10055:57; LINGDI-1003, ¶59. As shown above, a user uses a mouse

cursor to select the second 2D object and drag it to a new position with a relative x-coordinate of “220” (depicted in the dark gray box) and the “Smart Guide” feature changes the horizontal distance measurement (from the adjacent 2D object) to a new value of “88” (depicted in the pink box). LINGDI-1005, 5:57.

At a third time point (selected at 6:00 by way of example, which is a time point associated with the excerpted image below), the displayed length is further updated using the “measurement guide” function:



LINGDI-1005, 6:00; LINGDI-1003, ¶60. As shown above, a user places the second 2D object (right) at a final position. LINGDI-1005, 6:00. In this second instance, the relative x-coordinate of the second 2D object has a value of “285” (depicted in the dark gray box) and the “Smart Guide” feature changes the horizontal distance measurement (relative to the adjacent 2D object) to a new value of “146” (depicted in the pink box). LINGDI-1005, 6:00. All of this length information is displayed in the 2D design window and advantageously updated in real-time so that the user can benefit from this information and more rapidly organize/arrange the 2D objects within the 2D design window. LINGDI-1003,

¶60.

3. Combination of Grinspun with Graphicxtras

As discussed in §VI.A.1, Grinspun teaches CAD software with an onscreen interface allowing users to “interactively edit two-dimensional flat patterns and **instantaneously obtain feedback** with [a] resulting three-dimensional draped representation.” LINGDI-1004, [0010] (emphasis added). Grinspun also describes that its application “calculates and displays revisions or alterations to the three-dimensional draped representation and the flat patterns at an interactive rate to provide **real-time updates**.” *Id.*, [0043]. Grinspun also teaches that the onscreen interface can show multiple objects (patterns) spaced apart and organized/positioned by a user within the two-dimensional space (design window 110), yet the user does so without receiving onscreen measurement/spacing information. *Id.*, [0042]-[0044], [0049], [0057], [0069], [0084], FIGS. 1-4; LINGDI-1003, ¶61.

To the extent Grinspun does not expressly disclose displaying an onscreen measurement that changes to account for a separation distance between two objects within the two-dimensional space, such a feature was implemented in other conventional CAD software (such as Graphicxtras) to achieve known benefits, which are articulated in detail below. LINGDI-1003, ¶62. In doing so, the resulting combination would have improved Grinspun’s onscreen interface in a

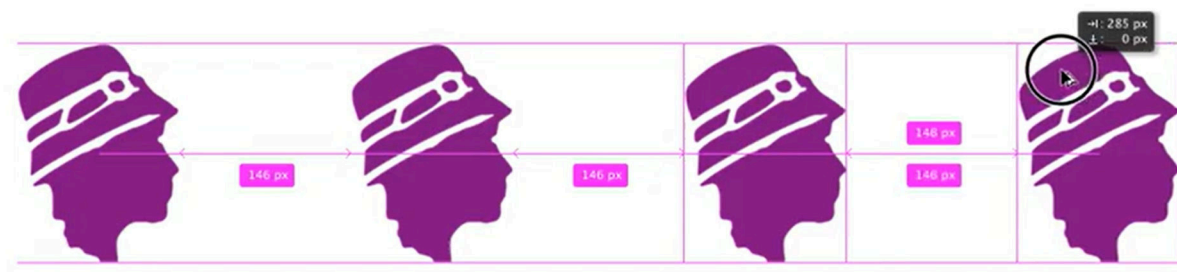
predictable manner that determines and displays a length measurement which is changed to account for a separation distance between pattern pieces within Grinspun's design window 110. LINGDI-1003, ¶67 (providing an example depiction of the resulting combination).

Multiple reasons would have prompted a POSITA to modify Grinspun's onscreen interface of the CAD software to include Graphicxtras' suggestions for improving such an onscreen interface. LINGDI-1003, ¶¶63-69.

First, a POSITA would have modified Grinspun's onscreen interface of the CAD software to include Graphicxtras' suggestion for a "measurement guide" so as to provide the user with real-time measurement information within Grinspun's design window 110 and thereby facilitate rapid organization/positioning of multiple garment pieces within the window 110. *See* LINGDI-1005, 2:29-4:03 ("which is really quite nice"); LINGDI-1003, ¶64. In the context of the Grinspun system, Grinspun explains that the user can create and organize multiple pattern pieces within the design window 110 using traditional mouse movements. *Id.*, [0042]-[0044] ("can begin with a blank screen" and use mouse movements for "sketching and creation of the flat patterns"), [0049] ("free-flowing design experience"), [0057] ("alters the two-dimensional pattern configuration"); [0069] ("uses the pointer to drag two-dimensional pattern elements"), [0084] ("using click, drag, and/or release mouse manipulations"); LINGDI-1003, ¶64 ("a known

and useful tool when creating/inserting new patterns between or adjacent to other patterns”). Here, Graphicextras’ suggested improvement would enhance this user interface by providing real-time measurement information that accounts for the spacing of those objects within this 2D space, which would have advantageously allowed a user to more precisely position 2D flat patterns relative to one another within the design window 110. LINGDI-1003, ¶64. This function would have also improved functionality described in Grinspun for “altering the [2D] flat pattern 120,” such as “altering the shape or position of a pattern boundary, etc.” LINGDI-1004, [0038]. Because Grinspun already teaches altering a “position” of a pattern 120, a POSITA would have recognized that incorporation of the “measurement” function within the Grinspun system would have allowed a user to achieve greater precision, e.g., by having the ability to view real-time measurements of relative spacing and rapidly select the user’s desired distances between the garment patterns 120 when performing alterations/positioning within the 2D design window 110. LINGDI-1003, ¶64. In sum, implementing this user interface feature (as suggested by Graphicextras) into Grinspun’s onscreen interface would have predictably improved the user’s initial organization of the multiple patterns within the design window 110 and any subsequent reorganization/repositioning (e.g., when creating/inserting new garment pieces between or adjacent to other garment pieces). LINGDI-1003, ¶64.

Second, a POSITA would have been motivated to include Graphicxtras' suggestion for a "match spacing" measurement information within Grinspun's design window 110 to improve the ease-of-use of the garment design processes described in Grinspun, especially where such a feature would have beneficially helped the user to quickly align the 2D objects with uniform spacing. As previously described, Graphicxtras suggests this feature that provides both alignment and measurement information confirming the equal measurements:



LINGDI-1005, 5:54-6:22 ("very quick and easy"). A POSITA would have recognized that, in the context of Grinspun, such a conventional feature would have been useful for garment designs that commonly involved the creation/arrangement of symmetric patterns and/or repeating design elements within the 2D design window. LINGDI-1003, ¶65.

Third, a POSITA would have been further motivated to combine the teachings of Grinspun and Graphicxtras because the combination would have involved using known user interface improvement (suggested in Graphicxtras) to

address a known problem within onscreen displays of garment design applications like that of Grinspun. The law is clear that such circumstances establish a motivation to combine prior art teachings. *Intel Corp. v. PACT XPP Schweiz AG*, 61 F.4th 1373, 1380 (Fed. Cir. 2023) (“[I]f there’s a known technique to address a known problem using prior art elements according to their established functions, then there is a motivation to combine.”). Here, Grinspun acknowledges that the user’s 2D design window may “begin with a blank screen” in which multiple pattern pieces are sketched/created, which can create spacing issues within the 2D design window when inserting/reorganizing the multiple pattern pieces. *See* LINGDI-1004, [0042]-[0044]. And, as explained above, the improved real-time display of measurements within the 2D design window (as suggested by Graphicxtras) represents a well-known technique for addressing the space-planning concerns when creating/reorganizing multiple objects within such a 2D design window of CAD software. LINGDI-1003, ¶66.

The evidence here provides several example visualizations of the predictable Grinspun-Graphicxtras system, which are based on an annotated version of Grinspun’s Figure 1 (modified to incorporate Graphicxtras’ suggestion for improved onscreen information). LINGDI-1003, ¶67. Such examples are used by the declarant to visualize one predictable result (an example) of this combination, not the only predictable result. One such example visualization is reproduced here:

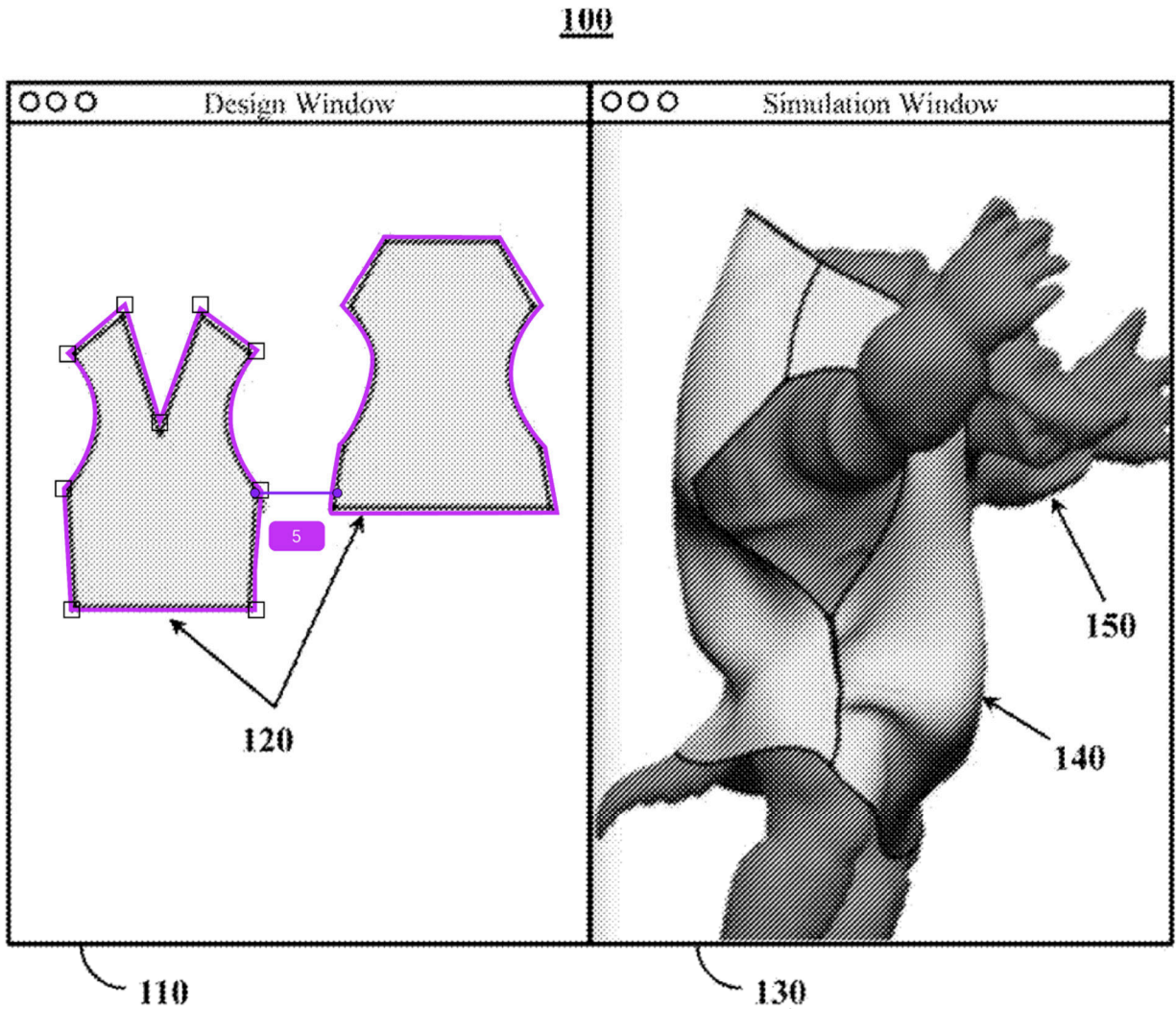


FIG. 1

LINGDI-1003, ¶67(annotating Grinspun's FIG. 1 based on Graphicextras' suggested improvement).

Finally, a POSITA would have had a reasonable expectation of success in incorporating Graphicextras' suggested improvement into Grinspun's onscreen interface of the CAD software as articulated above. LINGDI-1003, ¶68. Again, as

explained in §V.A.2, Graphicextras expressly suggested using various functions of the “Smart Guide” feature in an onscreen interface of CAD software to allow users to visualize information (e.g., length measurements indicative of spacing information) relating to arrangements/organization of 2D objects within a design window. A POSITA would have recognized that this suggested software functionality would have generally improved the user experience within Grinspun’s two-dimensional design space (design window 110), especially where such improved user experience/organization within the 2D space would have furthered Grinspun’s goal of “enabling rapid prototyping of a garment and providing an understanding of the complex draped representation.” LINGDI-1004, [0034]; [0042]-[0044] (“can begin with a blank screen” and use mouse movements for “sketching and creation of the flat patterns”), [0069], [0084]. Here, implementing such a software improvement to the onscreen interface would have required only routine knowledge—especially by the relatively late time frame leading up to August 2019. *Id.* Indeed, like Graphicextras, Grinspun teaches using “mouse movements” to “generally create and/or edit patterns and draped forms,” and further suggests that “any suitable user input device for performing a gesture can be used.” LINGDI-1004, [0042]-[0044], [0049], [0057], [0069], [0084]. Thus, based on Grinspun, a POSITA would have considered the specific input techniques for selecting and moving 2D flat patterns 120 within design window

110 (along with the real-time display of the length measurements) an ordinary implementation detail plainly demonstrated by Graphicxtras years before the '448 patent. LINGDI-1003, ¶68.

Further, a POSITA would have recognized that applying the suggestions of Graphicxtras to Grinspun's onscreen interface would have led to predictable results without significantly altering or hindering the functions performed by Grinspun's software. As discussed above, design window 110 of the display screen 100 would have continued to "provide the user with an interactive bidirectional editing feature that maintains correspondence between the flat patterns 120...and the three-dimensional draped representation 140." LINGDI-1004, [0038]. Further, the onscreen information (e.g., matched spacing, horizontal distance, vertical distance) would have been presented within a design window in a similar manner as suggested by Graphicxtras for facilitating improved organization within the two-dimensional design window. *See, e.g.*, LINGDI-1005, 5:47-6:00; LINGDI-1003, ¶69.

4. Application of Grinspun and Graphicxtras to Claims 1-4 and 14-18

(a) Claim 1

[1.pre] A method of taking a measurement of a two-dimensional (2D) pattern, comprising:

The recitation of purpose or intended use in the preamble ("of taking ...") is

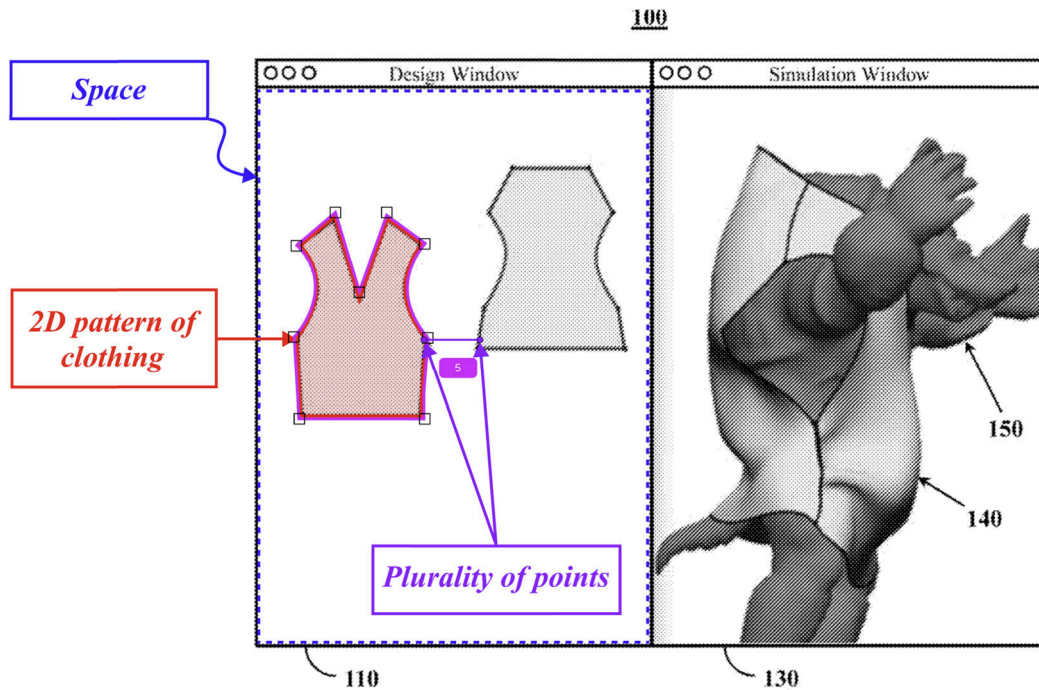
not a limitation under the law. *Arctic Cat Inc. v. GEP Power Prods.*, 919 F.3d 1320, 1328-1330 (Fed. Cir. 2019). Regardless, the Grinspun-Graphicxtras system provides the recited *method* because, as detailed above (*supra* §V.A.3), it would have provided a system with improved user interaction capabilities, e.g., by enabling presentation of onscreen measurement information associated with 2D patterns within Grinspun's design window 110. LINGDI-1004, [0036]-[0038], [0042]-[0044], FIG. 1; LINGDI-1005, 3:05-4:03; LINGDI-1003, ¶70; *see id.*, ¶71 (citing to corroborating publications confirming the demonstrated CAD software of Graphicxtras, for example, at LINGDI-1006, 1-2; LINGDI-1007, 14-16, 59-61).

Specifically, a POSITA would have configured the Grinspun-Graphicxtras system to provide Grinspun's display screen 100 (which includes a design window 110 and a simulation window 130). LINGDI-1004, [0037]-[0038], [0042]-[0044], FIG. 1. Further, in the Grinspun-Graphicxtras system, the display screen 100 would have implemented Graphicxtras' suggested improvement so that the design window 110 would display an onscreen measurement that changes to account for a separation distance between two objects within the two-dimensional space. *Supra*, §V.A.3; LINGDI-1003, ¶71. Accordingly, a user would have received additional useful information, for example, a real-time measurement of a line segment appearing between garment patterns 120 in the design window 110. *Id.*; LINGDI-1005, 5:47-6:00; LINGDI-1003, ¶71 (citing to corroborating evidence at LINGDI-

1006, 1-2; LINGDI-1007, 14-16, 59-61).

[1.1] receiving a plurality of points in a space in which a 2D pattern of clothing is displayed;

As discussed above, the Grinspun-Graphicxtras system would have provided this ***receiving*** function. In the resulting system, Grinspun's display screen 100 (which includes a design window 110 and a simulation window 130) would have been modified as articulated above. LINGDI-1004, [0037]-[0038]. In one example of the resulting combination (depicted below), a user would have received a length measurement of a spacing line between two patterns 120 (including a ***2D pattern of clothing***) that are used to create a garment within design space (***space***) defined by Grinspun's design window 110. *Id.*, [0036]. In this example, and consistent with Graphicxtras's suggestion, upon the user providing an input command initiating the "measurement guide" function, the Grinspun-Graphicxtras system would have established two points (***plurality of points***, depicted below). LINGDI-1005, 0:15-0:19 ("ALT and CMD, or control on the PC"); LINGDI-1003, ¶72 (citing to further corroboration at LINGDI-1006, 2, which describes a "CMD + hover" command, and LINGDI-1007, 59-61). Each point is associated with a line segment representing a horizontal distance between the two 2D patterns 120 depicted in Grinspun's Figure 1 (below):

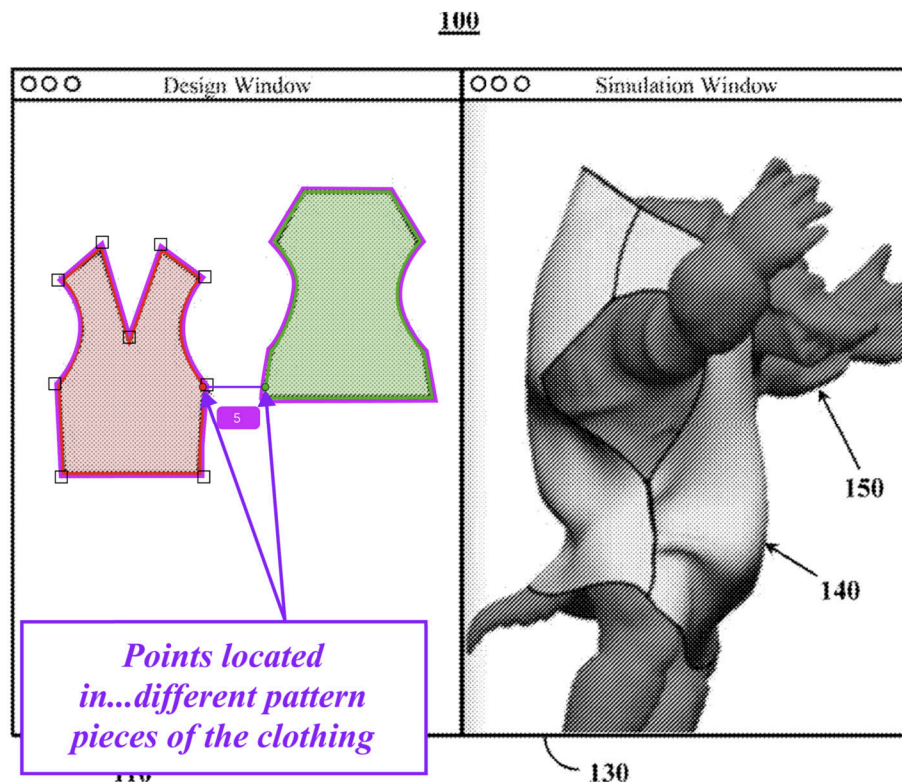


LINGDI-1003, ¶72 (annotating LINGDI-1004, FIG. 1 based upon Graphicxtras’ suggested improvement); see LINGDI-1005, 5:47-6:00.

[1.2] determining attributes of areas in which the points are located, wherein the attributes indicate at least whether the points are located in a same pattern piece of the clothing or different pattern pieces of the clothing;

As discussed in §V.A.3 and in Element [1.1], in one example of the Grinspun-Graphicxtras system, upon the user providing an initiating an input command for the “measurement guide” function, the Grinspun-Graphicxtras system would have determined that two points (***plurality of points***) associated with a line segment are each associated with distinct 2D patterns 120. LINGDI-1004, 1:06-1:12; LINGDI-1005, 0:15-0:19 (“ALT and CMD, or control on the PC”);

LINGDI-1003, ¶73 (citing to further corroboration at LINGDI-1006, 1-2, which describes a “CMD + hover” command, and LINGDI-1007, 14-16, 59-61). Thus, as shown below and as consistent with Graphicxtras’s suggestion, a POSITA would have recognized from Graphicxtras’ demonstration that the process of establishing points for distance measurement by the system would have involved *determining attributes of areas in which the points are located* in that the establishment of the two points represents *attributes* indicating that *the points are located in... different pattern pieces of the clothing*:



LINGDI-1003, ¶74 (annotating LINGDI-1004, FIG. 1 based upon Graphicxtras’ suggested improvement); see LINGDI-1005, 5:47-6:00.

[1.3] determining a length of a line segment using the points based on the determined attributes of the areas, the determined length of the line segment changed to account for separation between the pattern pieces responsive to determining that the points are located in different pattern pieces; and

As discussed for Element [1.2], in one example of the Grinspun-Graphicxtras system, upon a user providing an initiating an input command for the “measurement guide” function, the Grinspun-Graphicxtras system would have established a line segment to be indicative of a spacing distance between the points of the two patterns 120. LINGDI-1005, 5:47-6:00; *see id.*, 0:15-0:19 (“ALT and CMD, or control on the PC”); LINGDI-1003, ¶75(citing to corroborating exhibits that also confirms the “CMD + hover” command (LINGDI-1006, 1-2, and LINGDI-1007, 14-16, 59-61)). Further, the line segment is defined by the two points as depicted above in Element [1.2] (where one point is a starting point of the line and the other point is a terminating point of the line). LINGDI-1003, ¶75. Thus, the ***length*** of the line segment ***uses*** the points. *Id.*

In the example discussed above, each point is also associated with a distinct two-dimensional flat pattern 120, and thus, represents ***attributes*** indicating that ***the points are located in... different pattern pieces of the clothing***. LINGDI-1003, ¶76; *see* LINGDI-1005, 5:47-6:00. And, because the ***length*** of the line segment is used to represent spacing between the ***different pattern pieces of the clothing***, the ***length*** is ***determine[ed]*** is ***based on*** the points being located with the distinct two-

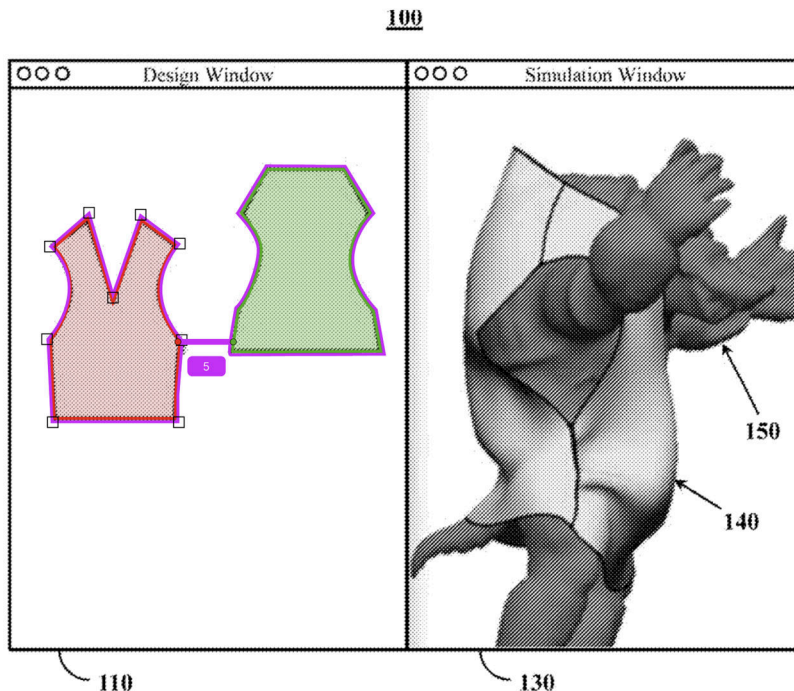
dimensional flat patterns 120 (*determined attributes of the areas*). *Id.*

The Grinspun-Graphicxtras system provides that the determined length of the line segment is *changed to account for separation between* distinct two-dimensional flat patterns 120.¹ LINGDI-1003, ¶77. Indeed, based on Grinspun’s teaching for digital garment design, a user would have “generally create[d] and/or edit[ed] patterns and draped forms using mouse movements” within the 2D design window 110. LINGDI-1004, [0042] (“any suitable user input device for performing a gesture can be used”), [0043] (“the application calculates and

¹ Notably, Element [1.3] recites that a determined length is “changed” to “account for separation between the pattern pieces,” but the claim language does not specify how to “account for” this separation. LINGDI-1001, 18:1-4. The specification of the ’448 patent mentions an “example” embodiment in which a length value is calculated based at least in part upon a length of a connection line 425 between two objects, which then “maybe be changed” as a user “deforms or changes a position or size of a pattern piece.” LINGDI-1001, 12:20-34; 10:58-11:6. As detailed above, Graphicxtras plainly suggested the known benefits of an onscreen length measurement that is changed in real time as a user changes a position of one object relative to another object. LINGDI-1005, 2:59-3:27 (“which is really quite nice”); LINGDI-1005, 5:54-6:22 (“very quick and easy”); LINGDI-1003, ¶77.

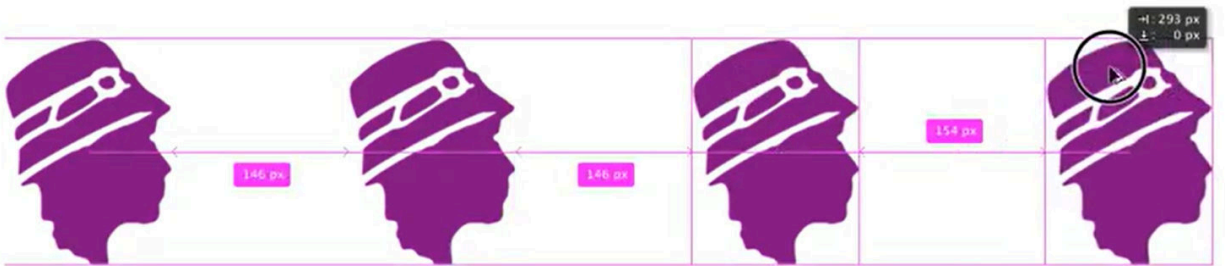
displays revisions or alterations to the three-dimensional draped representation and the flat patterns at an interactive rate to provide real-time updates”); LINGDI-1003, ¶77. And Graphicsxtras plainly suggests that a POSITA would have found it beneficial to visualize measurement guides, e.g., to confirm a desired positioning adjustment of 2D objects within the design window by comparing an initial measurement and a subsequent measurement before and after the repositioning. LINGDI-1005, 2:59-3:27 (“which is really quite nice”); LINGDI-1003, ¶77.

As discussed in §V.A.3, and consistent with Graphicxtras’s suggestion for real-time changes to the display length measurement, the user would have performed an initial measurement at a first time point (T_1) using a first instance of the “measurement guide” function:



LINGDI-1003, ¶78 (annotating LINGDI-1004, FIG. 1 based upon the suggested features of Graphicxtras); *see* LINGDI-1005, 5:47-6:00. As shown above, when the user initiates the first instance of the “measurement guide” function, the length value of the line segment based on the positioning of the two-dimensional flat patterns 120 is “5.”

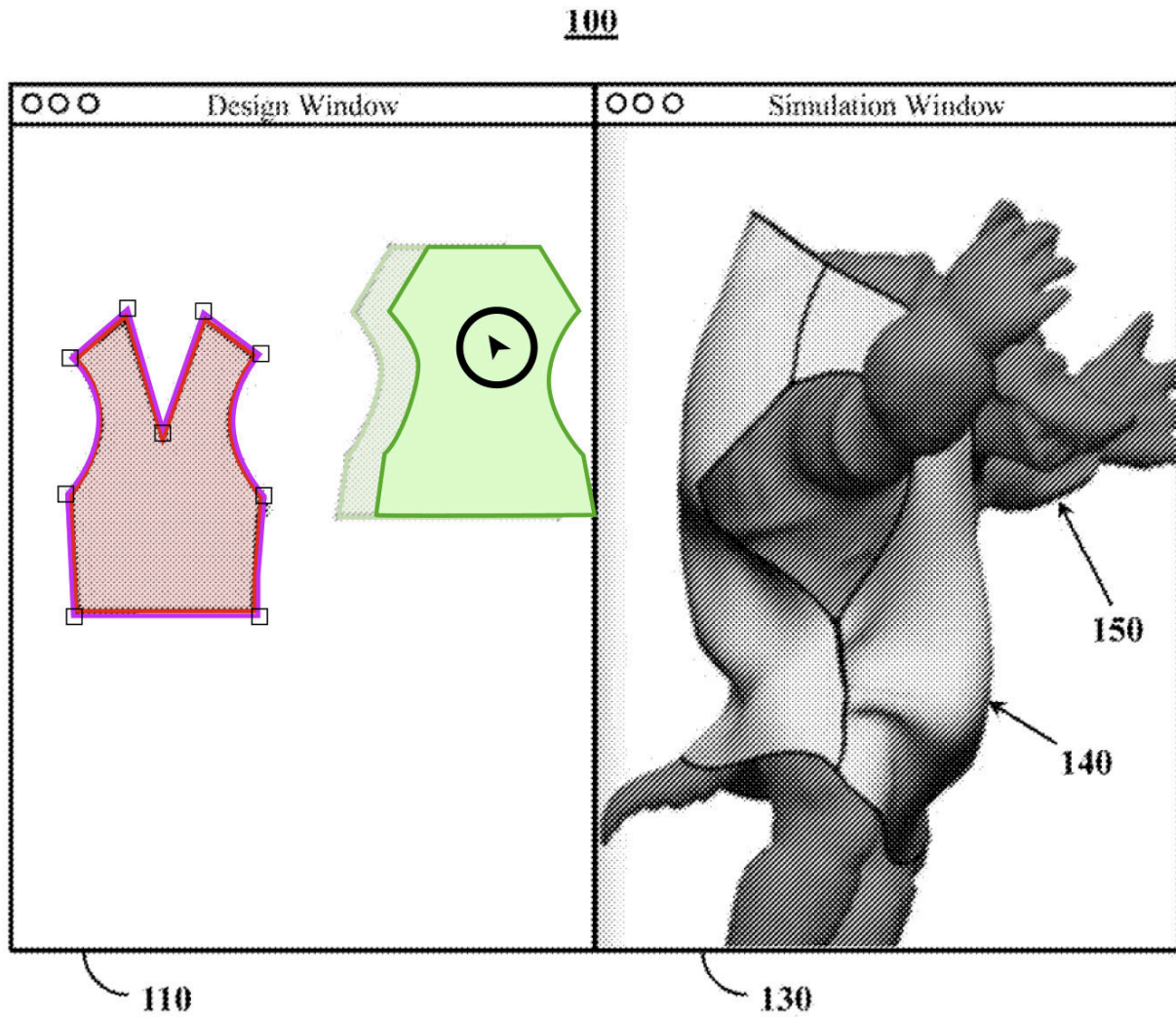
This is consistent with Graphicxtras’ suggestion for using the “measurement guide” function to measure a horizontal distance between two objects within the 2D design window. *See* LINGDI-1005, 5:47-6:00; *see also* LINGDI-1003, ¶79 (citing LINGDI-1006, 1-12; LINGDI-1007, 14-16, 59-61).



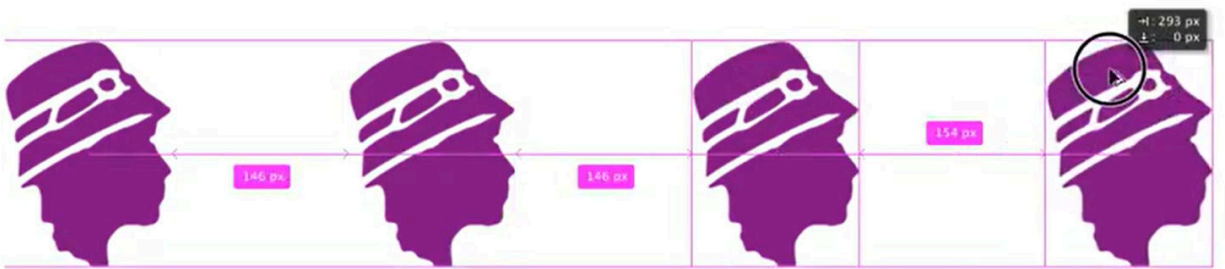
LINGDI-1005, 5:47; LINGDI-1003, ¶79.

After the first time point (T_1), a user would have performed a positioning adjustment (consistent with Graphicxtras’ suggestion), e.g., by dragging one two-dimensional flat pattern (green) and moving its position within the design window 100 relative to the position of the other two-dimensional flat pattern (red).

LINGDI-1003, ¶80; *see* LINGDI-1005, 5:47-6:00.

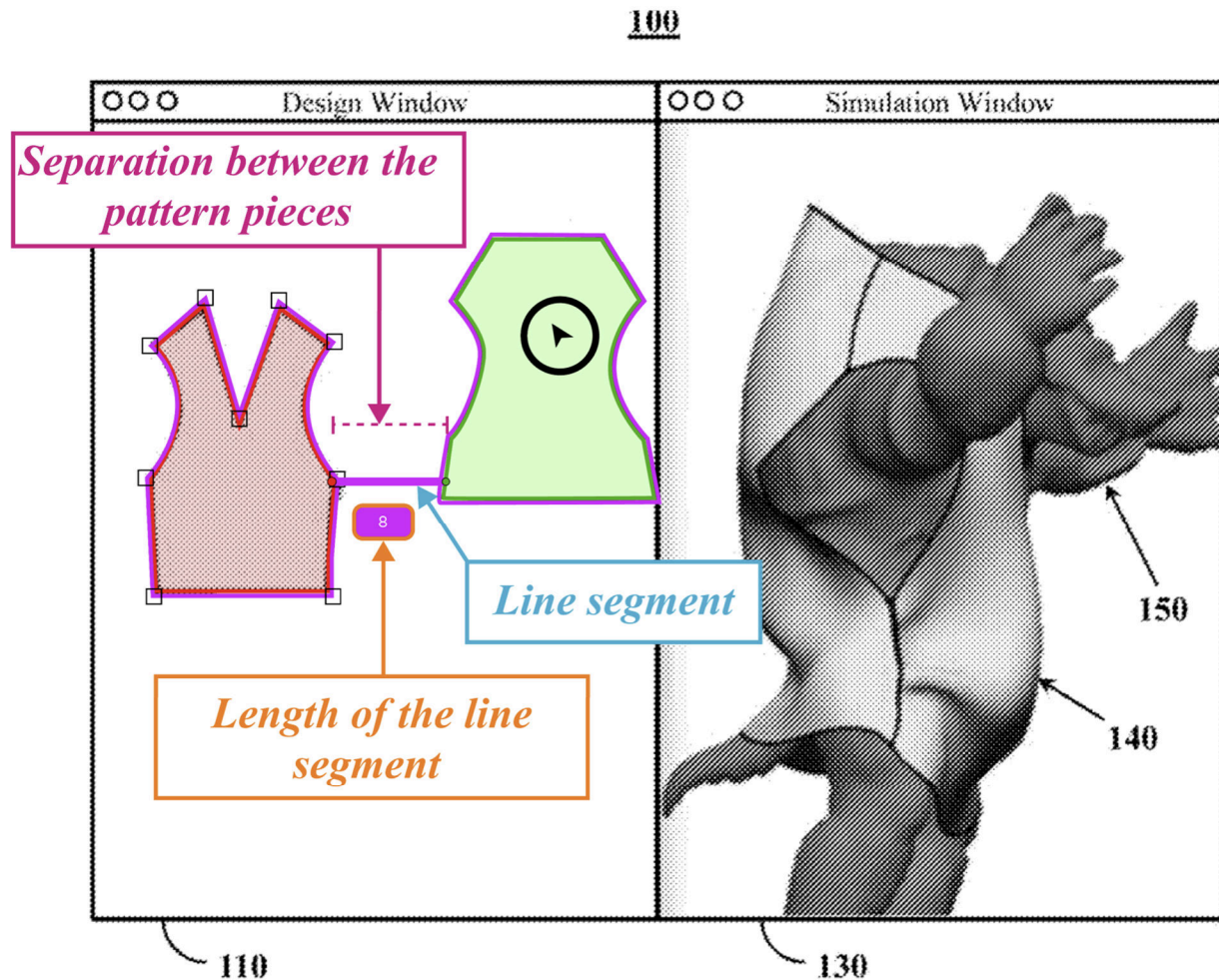


LINGDI-1003, ¶79 (annotating LINGDI-1004, FIG. 1 based upon Graphicxtras' suggested improvement); *see* LINGDI-1005, 5:47-6:00. As shown above, the user would have performed the positioning adjustment by selecting a 2D pattern (green) using a mouse cursor and dragging it to a new position (shaded as darker green) within the design window 100. This interaction technique is consistent with the suggested use/reorganization of the 2D objects in Graphicxtras:



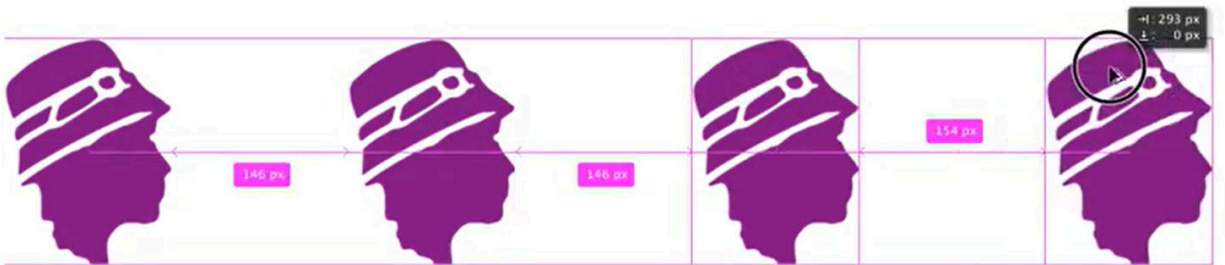
LINGDI-1005, 5:47; *see also* LINGDI-1003, ¶80 (citing LINGDI-1007, 14-16, 59-61). The example discussed above is also consistent with Grinspun, which teaches that its application allows a user to “modify a [2D] flat pattern,” using a variety of “mouse manipulations,” such as “using click, drag, and/or release mouse manipulations,” and in response, “perform various determinations (e.g., sensitivity analysis, tensor mesh manipulation, etc.) and display the resulting effects on the three-dimensional form, thereby providing instantaneous feedback during editing.” LINGDI-1004, [0084]; LINGDI-1003, ¶81.

In accordance with the Graphicxtras’ suggested improvement, after the user performs the positioning adjustment at the second time point (T_2) as depicted above, the distance measurement displayed onscreen is changed, e.g., based on the new position of the selected pattern piece:



LINGDI-1003, ¶82 (annotating LINGDI-1004, FIG. 1 based upon Graphicxtras’ suggested improvement); *see* LINGDI-1005, 5:47-6:00. In this depicted example, at the second time point (T_2), the length of the line segment represents the determined length that was *changed to account for the separation between* the two patterns 120 (after the positioning adjustment). LINGDI-1003, ¶82 (“changed to a value of ‘8’”). Again, this depicted example is consistent with the suggestion of Graphicxtras, which teaches that the “measurement guide” function should

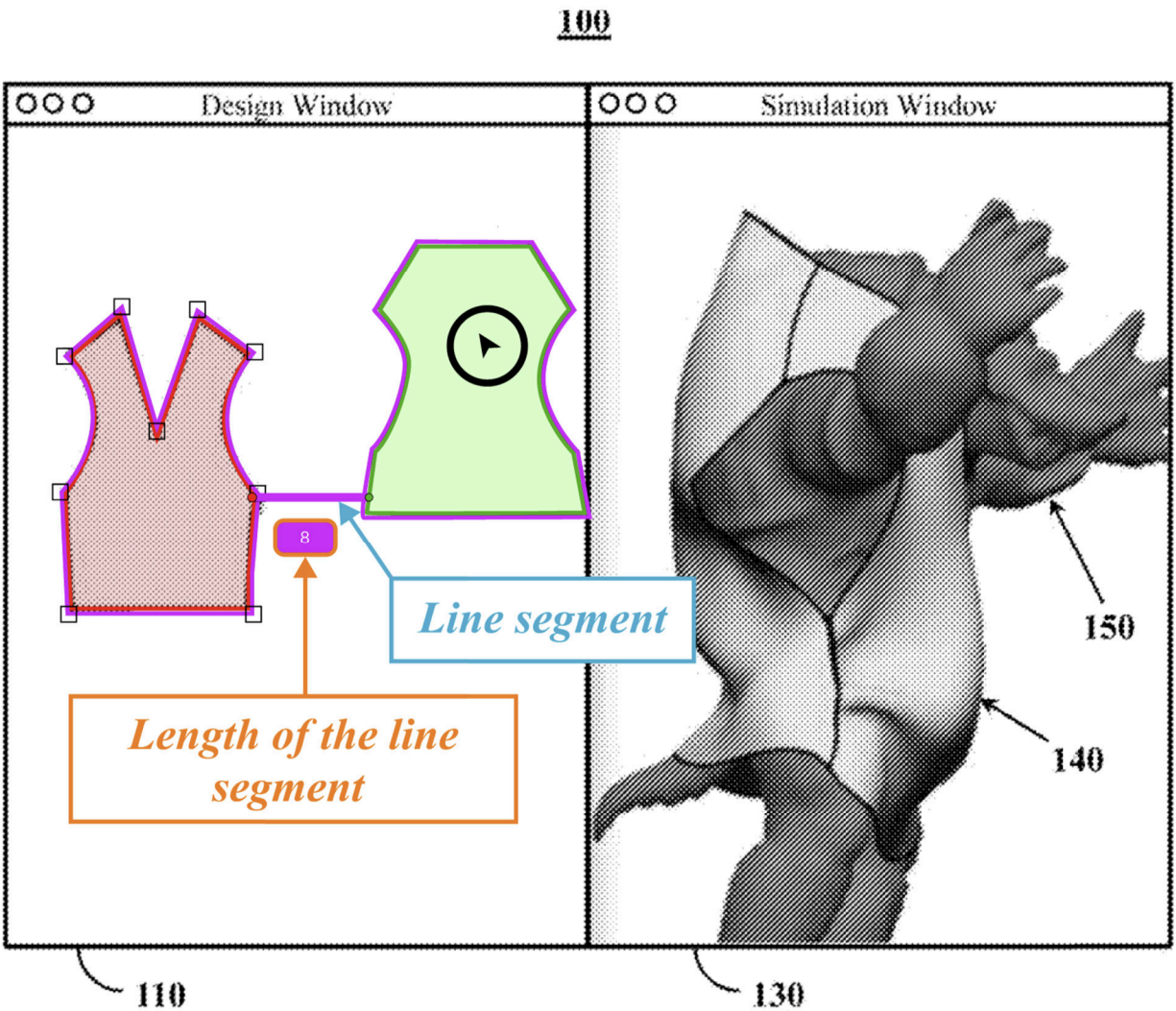
provide real-time changes to the length value of the line segment displayed onscreen based on the repositioning of one of the 2D objects within the design window:



LINGDI-1004, 5:57; *compare id.*, 5:47 (relative horizontal distance value of “154”) and 5:57 (relative horizontal distance value of “88”); LINGDI-1003, ¶82.

[1.4] outputting the length of the line segment.

As discussed for Element [1.3], the Grinspun-Graphicxtras system renders obvious usage scenarios in which the line segment used for distance measurement is ***changed to account for separation between*** distinct 2D flat patterns 120. And consistent with Graphicxtras’ suggested improvement, the Grinspun-Graphicxtras system ***outputs the length of the line segment*** by displaying onscreen the length measurement within design window 110:



LINGDI-1003, ¶83 (annotating LINGDI, FIG. 1 based upon Graphicextras' suggested improvement); see LINGDI-1005, 5:47-6:00.

(b) Claim 2

[2] The method of claim 1, wherein the determining of the attributes of the areas comprises: analyzing a data structure corresponding to each of the points to determine the attributes.

The Grinspun-Graphicextras system renders this claim obvious. LINGDI-

1003, ¶84. As discussed for Element [1.1], upon the user providing an input command initiating the “measurement guide” function, the Grinspun-Graphicxtras system would have established two points which are defined at the periphery of the area of each of the two patterns (*plurality of points*). LINGDI-1005, 0:15-0:19 (“ALT and CMD, or control on the PC”); LINGDI-1003, ¶84 (citing LINGDI-1006, 1-2, which describes a “CMD + hover” command, and LINGDI-1007, 14-16, 59-61).

Further, as discussed for Element [1.2], a POSITA would have recognized that the process of establishing points for distance measurement by the system would have involved *determining attributes of areas in which the points are located* in that the establishment of the two points represents *attributes* indicating that *the points are located in... different pattern pieces of the clothing*. LINGDI-1003, ¶85.

100

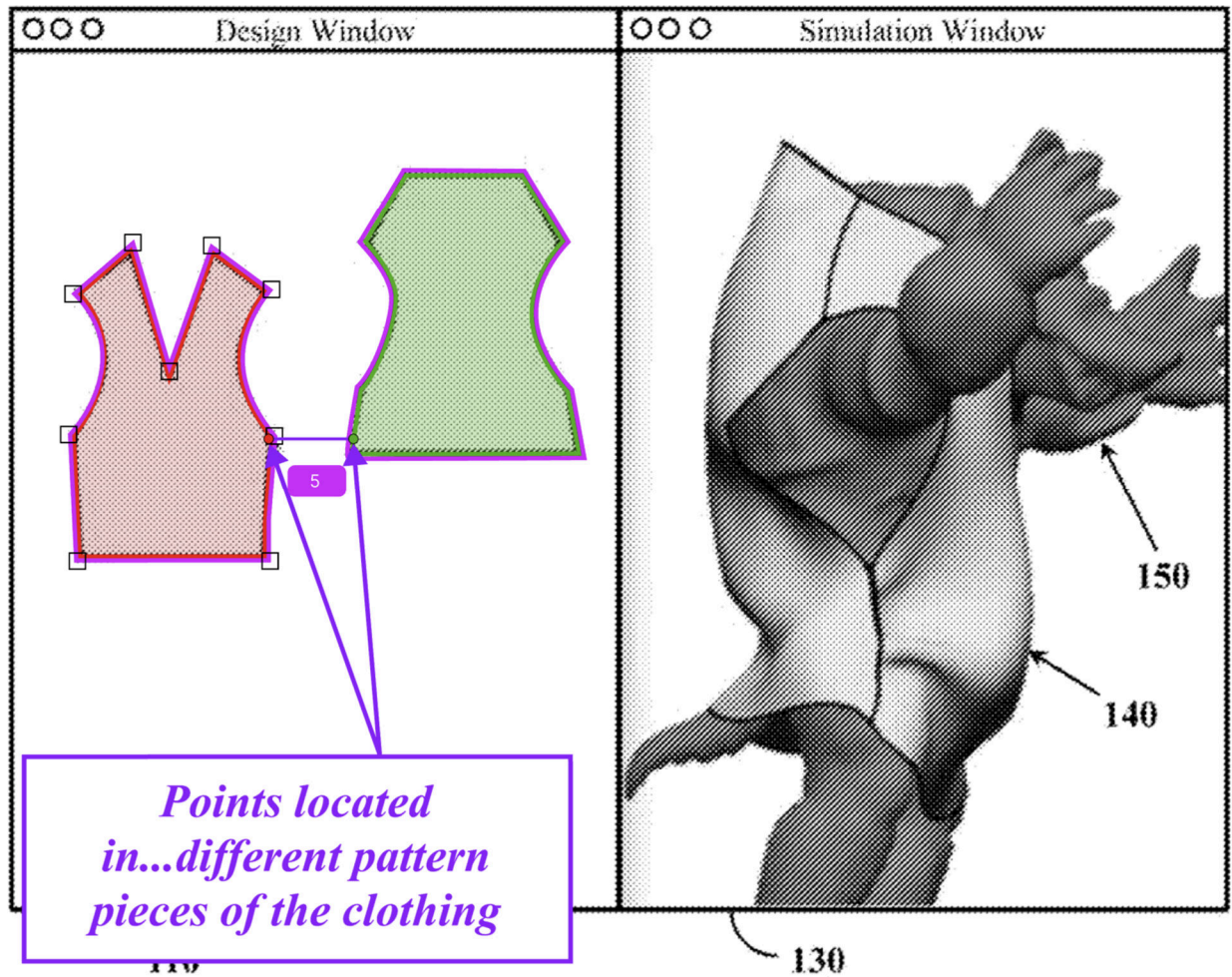
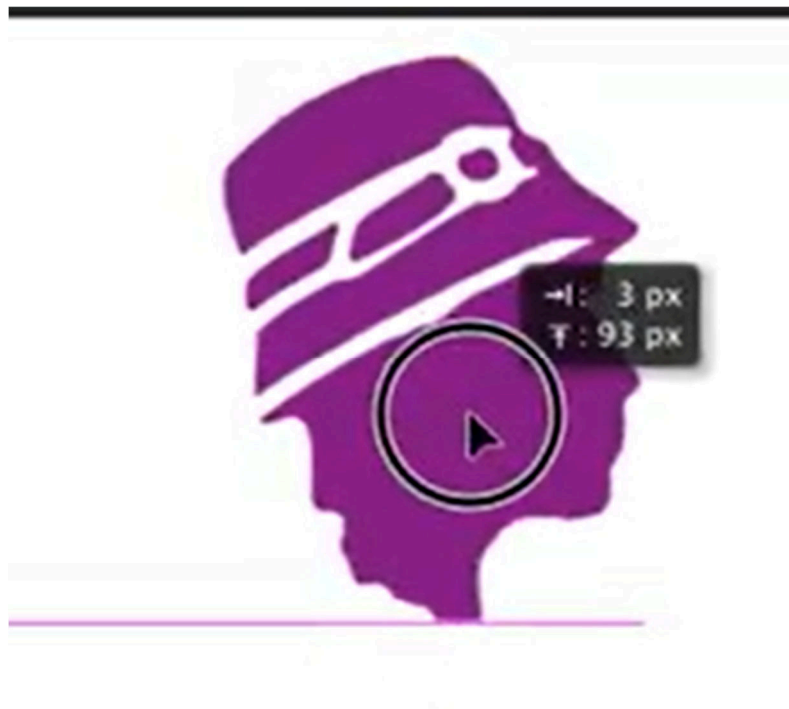


FIG. 1

LINGDI-1003, ¶85 (annotating LINGDI, FIG. 1 based upon Graphicextras' suggested improvement); see LINGDI-1005, 5:47-6:00.

As shown above and consistent with Graphicextras's suggestion of points at the periphery of the inserted 2D object, the Grinspun-Graphicextras system also would have established the points (as discussed above) by analyzing coordinates/area associated with each point within the 2D object. LINGDI-1003,

¶85. Indeed, Graphicextras depicts visualizing a set of current coordinates associated with the selected/repositioned 2D object as a user adjusts the location of the 2D object within the design window, and such a suggestion (coordinate data of the 2D object being tracked) would have been implemented in the Grinspun-Graphicextras system:



See, e.g., LINGDI-1005, 3:37; LINGDI-1003, ¶86. A POSITA would have also understood that the Grinspun-Graphicextras system is configured to analyze coordinates of the points because, when the “measurement guide” function is engaged, these coordinates are used to identify attributes of a line segment (e.g., starting coordinate, terminating coordinate) used for measurement. LINGDI-1005, 5:47-6:00; LINGDI-1003, ¶86 (citing corroborating evidence at LINGDI-1007, 14-

16, 59-61). This prior art disclosure aligns with examples of “data structure corresponding to each of the points data structure” described in the ’448 patent specification, such as “a link, information associated with at least one of a pattern piece in which each of the points is positioned, a line in a pattern piece on which each of the points is positioned, or a point on a line in a pattern piece.” LINGDI-1001, 2:20-25; LINGDI-1003, ¶87.

Thus, a POSITA would have understood that analysis of the coordinates associated with the two points (of the Grinspun-Graphicxtras system as depicted in Elements [1.1] and [1.2]) would have provided the step of *analyzing a data structure corresponding to each of the points to determine the attributes* recited in claim 2. LINGDI-1003, ¶87.

(c) Claim 3

[3] The method of claim 2, wherein the data structure corresponding to each of the points includes, in a form of a link, information associated with at least one of a pattern piece in which each of the points is positioned, a line in a pattern piece on which each of the points is positioned, or a point on a line in a pattern piece.

This claim further limits the *data structure* recited in claim 1 to one element among a list of enumerated options, including *information associated with at least one of: (1) a pattern piece in which each of the points is positioned, (2) a line in a pattern piece on which each of the points is positioned, or (3) a point on a line in a pattern piece.* Through use of “*or*,” the claim language confirms that the list of

elements recited in claim 4 should be interpreted disjunctively. LINGDI-1003, ¶¶88-89.

As discussed for Claim 2, a POSITA would have understood and/or found obvious that establishing the points (as discussed for Element [1.1]) involves analyzing coordinates associated with each point within the design window 110. LINGDI-1003, ¶90; *see* LINGDI-1005, 3:37. A POSITA would have also understood that the Grinspun-Graphicextras system is configured to analyze coordinates of the points because, when the “measurement guide” function is activated, these coordinates are used to identify attributes of a line segment (e.g., starting coordinate, terminating coordinate) used for measurement. LINGDI-1005, 5:47-6:00; LINGDI-1003, ¶90 (citing to corroborating evidence at LINGDI-1007, 14-16, 59-61). Thus, this process of analyzing coordinates of the points in relation to the “measurement guide” function by the Grinspun-Graphicextras system would have provided an analysis of a *data structure* that is at least *information associated with at least one of a pattern piece in which each of the points is positioned* (e.g., coordinate identifying a point on a boundary of a 2D flat pattern 120), *a line in a pattern piece on which each of the points is positioned* (e.g., a line segment used for measurement when a user engages the “measurement guide” function), or *a point on a line in a pattern piece* (e.g., a starting point on a boundary of a reference object when a user engages the “measurement guide”

function). LINGDI-1003, ¶90; *see also* LINGDI-1001, 2:20-25.

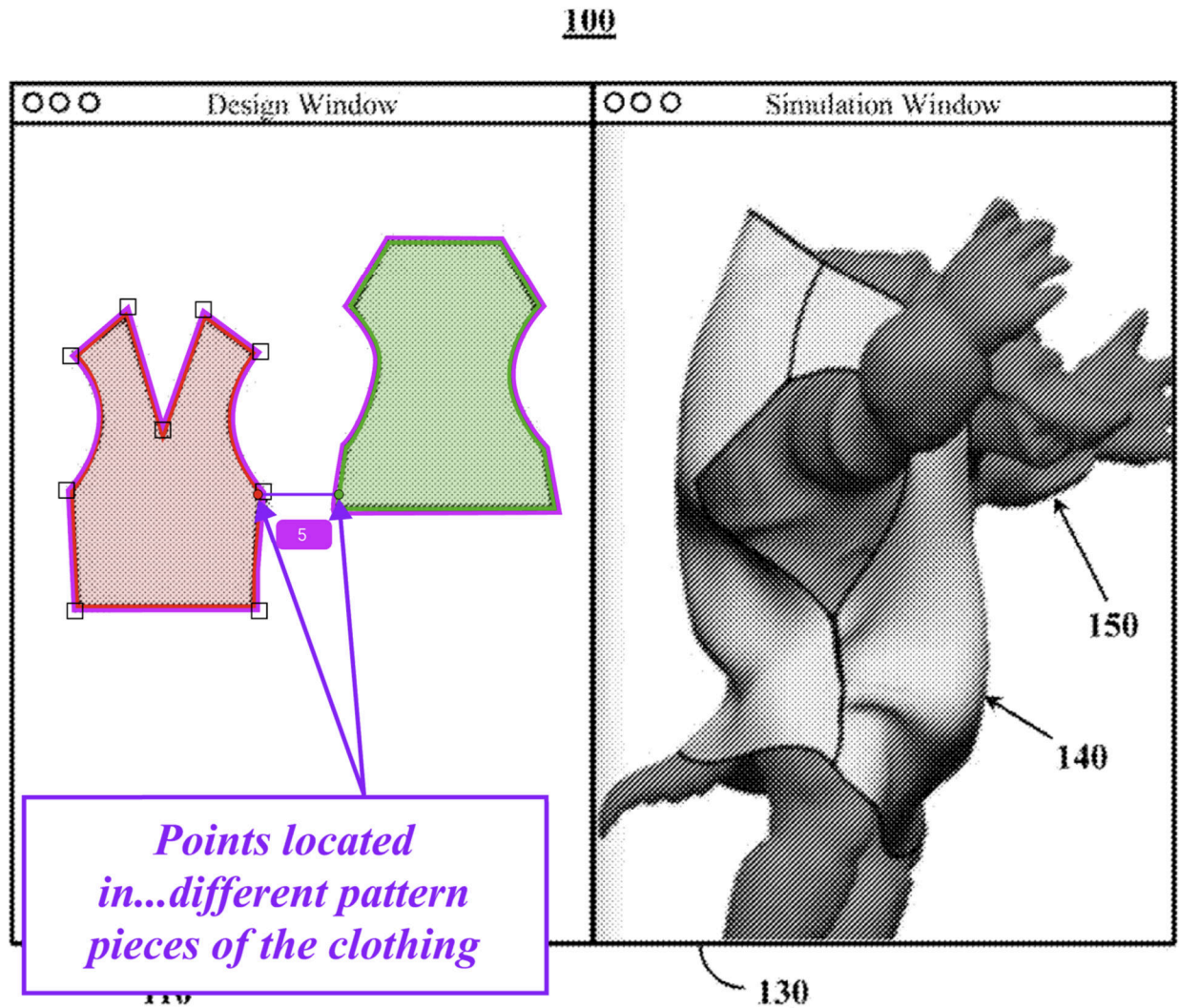
(d) Claim 4

[4] The method of claim 1, wherein the attributes of the areas comprises at least one of: a first attribute indicating that an area in which points are located corresponds to a same pattern piece of the 2D pattern; a second attribute indicating that an area of one of the points is located in a first pattern piece and an area of another of the points is located in a second pattern piece different from the first pattern piece; a third attribute indicating that an area in which a start point and an end point of the points are located corresponds to an outer arc of a same pattern piece of the 2D pattern; a fourth attribute indicating that an area including one of the start point and the end point of the points corresponds to a pattern piece of the 2D pattern, and an area including the other of the start point and the end point corresponds to a remaining area excluding the pattern piece of the 2D pattern; or a fifth attribute indicating that areas including the points outside the 2D pattern.

Claim 4 further limits the *attributes* recited in claim 1 to one of five enumerated *attribute* options recited in the claim. Through use of “*or*,” the claim language confirms that the five enumerated *attribute* elements recited in claim 4 should be interpreted disjunctively. LINGDI-1003, ¶91.

As discussed for Element [1.2], the Grinspun-Graphicextras system would have provided at least the *second attribute* option through the above-described example visualization in which a measurement is provided between a first point (*one of the points*) on the boundary of a first object (*first pattern piece*) and a second point (*another of the points*) on the boundary of a second object (*second pattern piece*). *Supra* Analysis of Elements [1.2]-[1.3]. And consistent with Graphicextras’

suggestion that the points are located at the border of each inserted 2D object, the evidence here confirms that each of the points are associated with *different* 2D patterns 120:



LINGDI-1003, ¶92 (annotating LINGDI-1004, FIG. 1 based on Graphicextras' suggested improvement); see LINGDI-1005, 5:47-6:00.

(e) Claim 14

[14.1] The method of claim 1, wherein the 2D pattern is modeled with a mesh including a plurality of polygons,

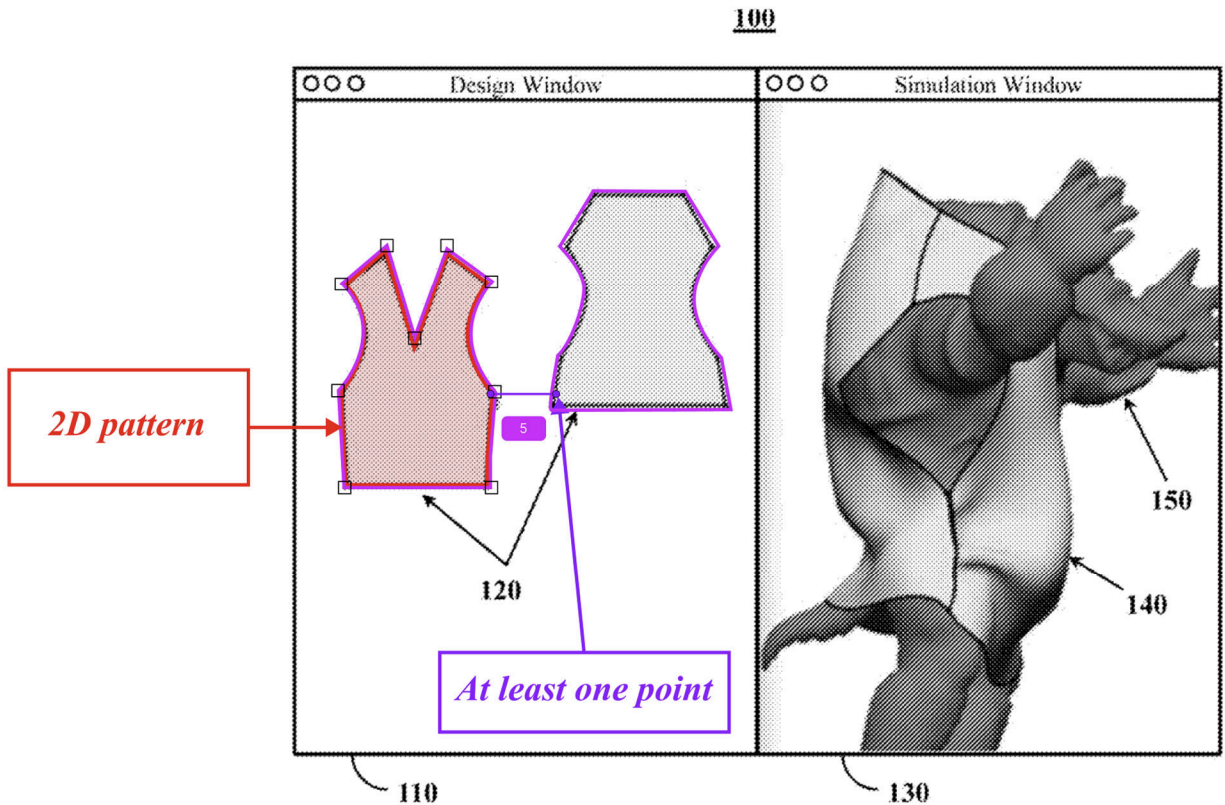
The Grinspun-Graphicxtras system provides this element based on Grinspun's repeated teaching that a 2D flat pattern 120 (***2D pattern***) is "concurrently updated" with 3D simulated representation 140. LINGDI-1004, [0039]; *see also id.*, [0036]-[0038], [0042]. The 3D simulated representation 140 is "shown in the three-dimensional view 130" and is "simultaneously and/or synchronously" updated based on alterations to 2D flat pattern 120 (e.g., "altering the shape or position of a pattern boundary"). *Id.*, [0038]. Because 3D simulated representation 140 is generated "in response to receiving user commands from a user input device" relating to 2D flat pattern 120, a POSITA would have understood that each 2D flat pattern 120 is uniquely tied (or otherwise linked) to a corresponding 3D simulated representation 140. LINGDI-1004, [0040]; LINGDI-1003, ¶93. This understanding is consistent with Grinspun's disclosure that "[a]s the three dimensional draped representation is updated in response to the alteration in real time, the application shows the modifications to the two-dimensional flat patterns in real time." LINGDI-1004, [0039].

Further, based on Grinspun, the Grinspun-Graphicxtras system would have generated 3D simulated representation 140 using polygon-based mesh structures such that the 2D flat patterns 120 are ***modeled with a mesh including a plurality of***

polygons. LINGDI-1003, ¶94; *see* LINGDI-1004, [0067]. For example, the application can “include [a] selection of one or more cloth models[,]” including use of “**triangle meshes** with multiple models that treat bending and stretching models separately.” LINGDI-1004, [0067] (emphasis added). Grinspun also provides various teachings more specifically focused on using several types of meshing techniques to generate 3D simulated representations for the 2D flat patterns. *See, e.g.*, LINGDI-1004, [0069], [0071]-[0074], [0080]-[0084]; LINGDI-1003, ¶95.

[14.2] wherein at least one point outside the 2D pattern is defined by a relative position of the at least one point with respect to the 2D pattern.

As discussed for Element [1.2], in one example of the Grinspun-Graphicxtras system where a user activates the “measurement guide” function during the garment design process, the system would have determined that two points associated with a line segment are each associated with distinct 2D patterns 120. LINGDI-1004, [0036], [0038]; *see* LINGDI-1005, 5:47-6:00; LINGDI-1003, ¶96. In this example (and consistent with Graphicxtras’ suggested improvement), a point associated with a boundary of a second 2D pattern (***at least one point***) has a coordinate that is ***outside*** the boundary (***relative position***) of the reference 2D pattern (***the 2D pattern***):



LINGDI-1003, ¶96 (annotating LINGDI-1004, FIG. 1 based upon Graphicxtras’ suggested improvement); see LINGDI-1005, 5:47-6:00.

(f) Claim 15

[15.pre] A non-transitory computer-readable storage medium storing instructions thereon, the instructions, when executed by a processor, cause the processor to:

To the extent the preamble is treated as a limitation, the Grinspun-Graphicxtras system renders it obvious based on implementation details described in Grinspun. *Supra* Element [1.pre]; see also LINGDI-1004, [0091]-[0095]. Indeed, Grinspun expressly states that “any suitable computer readable media can

be used for storing instructions for performing the processes described herein, can be used as a content distribution that stores content and a payload, etc.,” e.g., “computer readable media [that] can be transitory or non-transitory.” LINGDI-1004, [0094]; LINGDI-1003, ¶97.

[15.1] receive a plurality of points in a space in which a 2D pattern of clothing is displayed;

Supra Element [1.1]; LINGDI-1003, ¶98.

[15.2] determine attributes of areas in which the points are located, wherein the attributes indicate at least whether the points are located in a same pattern piece of the clothing or different pattern pieces of the clothing;

Supra Element [1.2] LINGDI-1003, ¶99.

[15.3] determine a length of a line segment using the points based on the determined attributes of the areas, the determined length of the line segment changed to account for separation between the pattern pieces responsive to determining that the points are located in different pattern pieces; and

Supra Element [1.3]; LINGDI-1003, ¶100.

[15.4] output the length of the line segment.

Supra Element [1.4]; LINGDI-1003, ¶101.

(g) Claim 16

[16.pre] An apparatus for taking a measurement of a two-dimensional (2D) pattern, comprising:

To the extent the preamble is treated as a limitation, the Grinspun-Graphicxtras system provides the recited apparatus based on implementation

details described in Grinspun. *Supra* Element [1.pre]; *see also* LINGDI-1004, [0096]-[0101]. For example, based on Grinspun, the garment design application of the Grinspun-Graphicxtras system may be provided on a “user computer 1801” (*apparatus*) which “include[s] processor 1902, display 1904, input device 1906, and memory 1908...” LINGDI-1004, [0096]. Further, “the application may include client-side software, hardware, or both.” *Id.*, [0100]. In other examples, the application is “implemented on any suitable platform (e.g., a personal computer (‘PC’), a main frame computer, a dumb terminal, a data display, a two-way pager, a wireless terminal, a portable telephone, a portable computer, a palmtop computer, an H/PC, an automobile PC, a laptop computer, a cellular phone, a personal digital assistant (‘PDA’), a combined cellular phone and PDA, etc.)...” *Id.*, [0101]; LINGDI-1003, ¶102.

[16.1] a user interface (UI) device configured to receive, from a user, a plurality of points in a space in which a 2D pattern of clothing is displayed;

As explained above in Section V.A.3 and Element [1.1], the Grinspun-Graphicxtras system included a computing device with a graphical user interface (*user interface (UI device)*) configured to provide within Grinspun’s design window 110 the suggested improvement of Graphicxtras. *Supra* Element [1.1]; LINGDI-1003, ¶103. For example, based on Grinspun, the onscreen interface of the Grinspun-Graphicxtras system would have been provided on a “user computer

1801,” which “include[s] processor 1902, **display 1904**, input device 1906, and memory 1908...” LINGDI-1004, [0096] (emphasis added). As another example, access to the garment design application may be provided through “distribution to user computer 1802” using a “a graphical user interface (‘GUI’), which allows a user to interact with the application resident at, for example, server 1810.” LINGDI-1004, [0099].

[16.2] a processor coupled to a memory to execute instructions on the memory the memory instructions causing the processor to: determine attributes of areas in which the points are located, wherein the attributes indicate at least whether the points are located in a same pattern piece of the clothing or different pattern pieces of the clothing, and

As explained above in Section V.A.3 and Elements [1.2]-[1.4], the Grinspun-Graphicxtras system included a computing device with a processor (*processor*) coupled to associated storage (*memory*) to perform instructions (*instructions on the memory*) corresponding to processing functions previously discussed in Elements [1.2], [1.3], and [1.4]. *Supra* §V.A.3, Elements [1.2]-[1.4]; LINGDI-1003, ¶104. For example, in Grinspun, a garment design application may be provided on a “user computer 1801,” which “include[s] processor 1902, display 1904, input device 1906, and **memory 1908**...” LINGDI-1004, [0096]. The memory 1908 “contains a storage device for storing a computer program for controlling processor 1902.” *Id.* Additionally, “processor 1902 uses the computer

program to present on display 1904 the application and the data received through communications link 1804 and commands and values transmitted by a user of user computer 1802.” *Id.*, [0097]; LINGDI-1003, ¶105.

[16.3] determine a length of a line segment using the points based on the determined attributes of the areas, the determined length of the line segment changed to account for separation between the pattern pieces responsive to determining that the points are located in different pattern pieces; and

Supra Element [1.3]; LINGDI-1003, ¶106.

[16.4] an output device configured to output the length of the line segment.

Supra Element [1.4]; LINGDI-1003, ¶107.

(h) Claim 17

[17] The apparatus of claim 16, wherein the instructions further cause the processor analyze a data structure corresponding to each of the points to determine the attributes.

Supra Elements [2] and [16.2]; LINGDI-1003, ¶108.

(i) Claim 18

[18] The apparatus of claim 16, wherein the attributes of the areas comprises at least one of: a first attribute indicating that an area in which points are located corresponds to a same pattern piece of the 2D pattern; a second attribute indicating that an area of one of the points is located in a first pattern piece and an area of another of the points is located in a second pattern piece different from the first pattern piece; a third attribute indicating that an area in which a start point and an end point of the points are located corresponds to an outer arc of a same pattern piece of the 2D pattern; a fourth attribute indicating that an area including one of the start point and the end point of the points corresponds to a pattern piece of the 2D

pattern, and an area including the other of the start point and the end point corresponds to a remaining area excluding the pattern piece of the 2D pattern; or a fifth attribute indicating that areas including the points outside the 2D pattern.

Supra Element [4]; LINGDI-1003, ¶109.

VI. DISCRETIONARY DENIAL IS NOT WARRANTED

In *Apple Inc. v. Fintiv, Inc.*, the Board enumerated six factors that it will assess in determining whether to exercise discretion to deny institution under §314(a) based on co-pending litigation. IPR2020-00019, Paper 11 at 2-3 (PTAB “precedential” Mar. 20, 2020). The USPTO issued updated discretionary denial guidance in view of the *Fintiv* factors and confirmed that “the PTAB will not discretionarily deny institution in view of parallel district court litigation where a petitioner presents a stipulation not to pursue in a parallel proceeding the same grounds or any grounds that could have reasonably been raised before the PTAB.” See June 21, 2022 Memorandum to Members of the PTAB, 3 (available at https://www.uspto.gov/sites/default/files/documents/interim_proc_discretionary_denials_aia_parallel_district_court_litigation_memo_20220621.pdf). Here, Petitioner has eliminated any risk of duplicated effort by voluntarily presenting a *Sotera* stipulation to Patent Owner. LINGDI-1019; *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 (PTAB Dec. 1, 2020). For at least this

reason, and considering the compelling merits of the above-detailed Grounds, discretionarily denial is unwarranted and would be unjust.

VII. PAYMENT OF FEES – 37 C.F.R. § 42.103

Petitioner authorizes the Patent and Trademark Office to charge any fees to Deposit Account No. 06-1050.

VIII. CONCLUSION

The cited prior art references identified in this Petition contain pertinent technological teachings (both cited and uncited), either explicitly or inherently disclosed, which were not previously considered in the manner presented herein, or relied upon on the record during original examination of the '448 patent. In sum, these references provide new, non-cumulative technological teachings which indicate a reasonable likelihood of success as to Petitioner's assertion that the Challenged Claims of the '448 patent are not patentable pursuant to the grounds presented in this Petition. Accordingly, Petitioner respectfully requests institution of an IPR for those claims of the '448 patent for each of the grounds presented herein.

IX. MANDATORY NOTICES UNDER 37 C.F.R § 42.8(a)(1)

A. Real Party-In-Interest Under 37 C.F.R. § 42.8(b)(1)

Zhejiang Lingdi Digital Technology Co., Ltd. is the petitioner and the real party-in-interest.

B. Related Matters Under 37 C.F.R. § 42.8(b)(2)

Petitioner is not aware of any disclaimers, reexamination certificates or petitions for inter partes review for the '448 patent. The '448 patent is the subject of civil action: *CLO Virtual Fashion Inc. v. Zhejiang Lingdi Digital Technology Co., Ltd. d/b/a Linctex*, 2-23-cv-00274 (EDTX), filed June 14, 2023.

C. Lead And Back-Up Counsel Under 37 C.F.R. § 42.8(b)(3)

Petitioner provides the following designation of counsel.

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D. Service Information

Please address all correspondence and service to the address listed above.

Petitioner consents to electronic service by email at IPR57721-0004IP1@fr.com.

Respectfully submitted,

Dated: May 30, 2024

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CERTIFICATION UNDER 37 CFR § 42.24

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Petition for *Inter Partes* Review totals 10,321 words, which is less than the 14,000 allowed under 37 CFR § 42.24.

Dated: May 30, 2024

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CERTIFICATE OF SERVICE

Pursuant to 37 CFR §§ 42.6(e)(4)(i) *et seq.* and 42.105(b), the undersigned certifies that on May 30, 2024, a complete and entire copy of this Petition for *Inter Partes* Review and all supporting exhibits were provided via Federal Express, to the Patent Owner by serving the correspondence address of record as follows:

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