

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION**

AR DESIGN INNOVATIONS LLC,

Plaintiff,

v.

BANG & OLUFSEN A/S,

Defendant.

Case No. 2:24-cv-1055

JURY TRIAL DEMANDED

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff AR Design Innovations LLC (“AR Design” or “Plaintiff”) files this complaint against Defendant Bang & Olufsen A/S (“Defendant” or “Bang & Olufsen”) alleging, based on its own knowledge as to itself and its own actions, and based on information and belief as to all other matters, as follows:

NATURE OF THE ACTION

1. This is a patent infringement action to stop Defendant’s infringement of the following United States Patent (the “Asserted Patent”) issued by the United States Patent and Trademark Office (“USPTO”), a copy of which is attached hereto as **Exhibit A**:

U.S. Patent No.	Title
7,277,572 (the “572 patent”)	Three-Dimensional Interior Design System

2. AR Design seeks injunctive relief and monetary damages.

PARTIES

3. AR Design Innovations LLC is a limited liability company organized under the laws of the State of Texas, with a place of business at 815 Brazes Street, Suite 500, Austin, Texas 78701-2509 (Travis County).

4. Based on information and belief, Bang & Olufsen is a corporation organized under the laws of Denmark, with its principal place of business located at Allé 1, DK-7600 Struer, Denmark.

5. Upon information and belief, Defendant owns, operates, advertises, and/or controls the website <https://www.bang-olufsen.com/> through which it advertises, sells, offers to sell, provides and/or educates customers about its products and services utilizing infringing systems. *See, e.g.*, Terms of Use, BANG & OLUFSEN, <https://www.bang-olufsen.com/en/us/legal/terms-of-use>; <https://www.whois.com/whois/bang-olufsen.com>.

6. Upon information and belief, Defendant is the registered owner, seller, and developer of the Bang & Olufsen AR Experience App. *See, e.g.*, **Figures 1–3** (below).

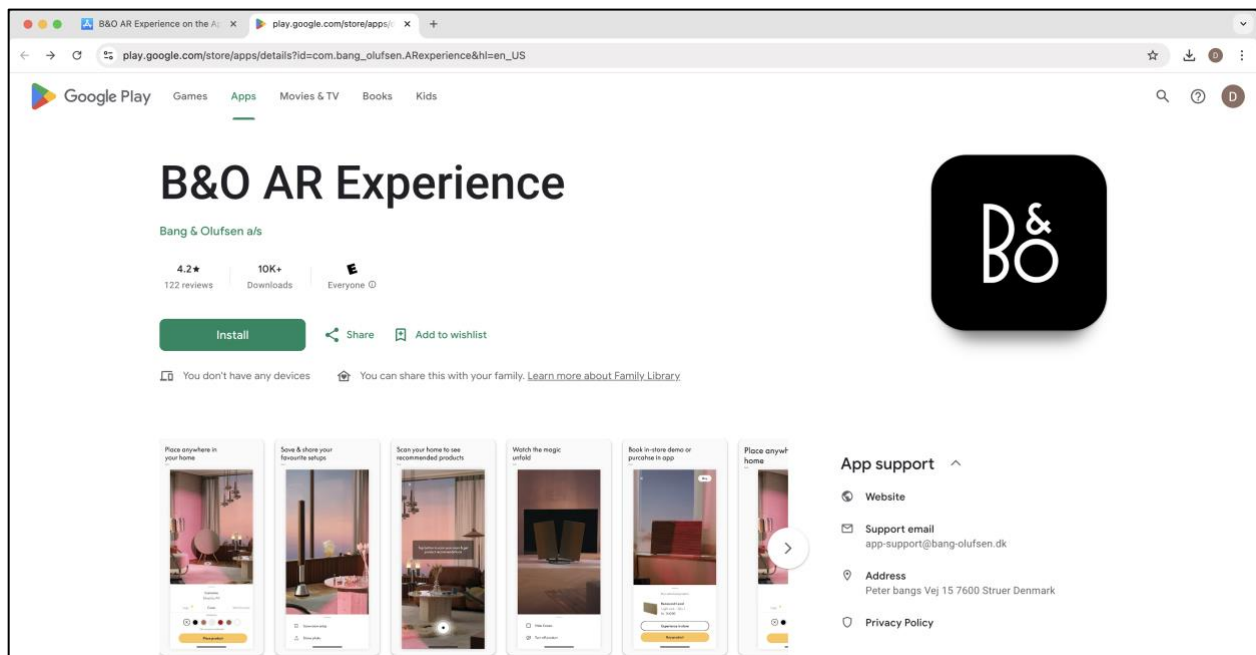


Figure 1

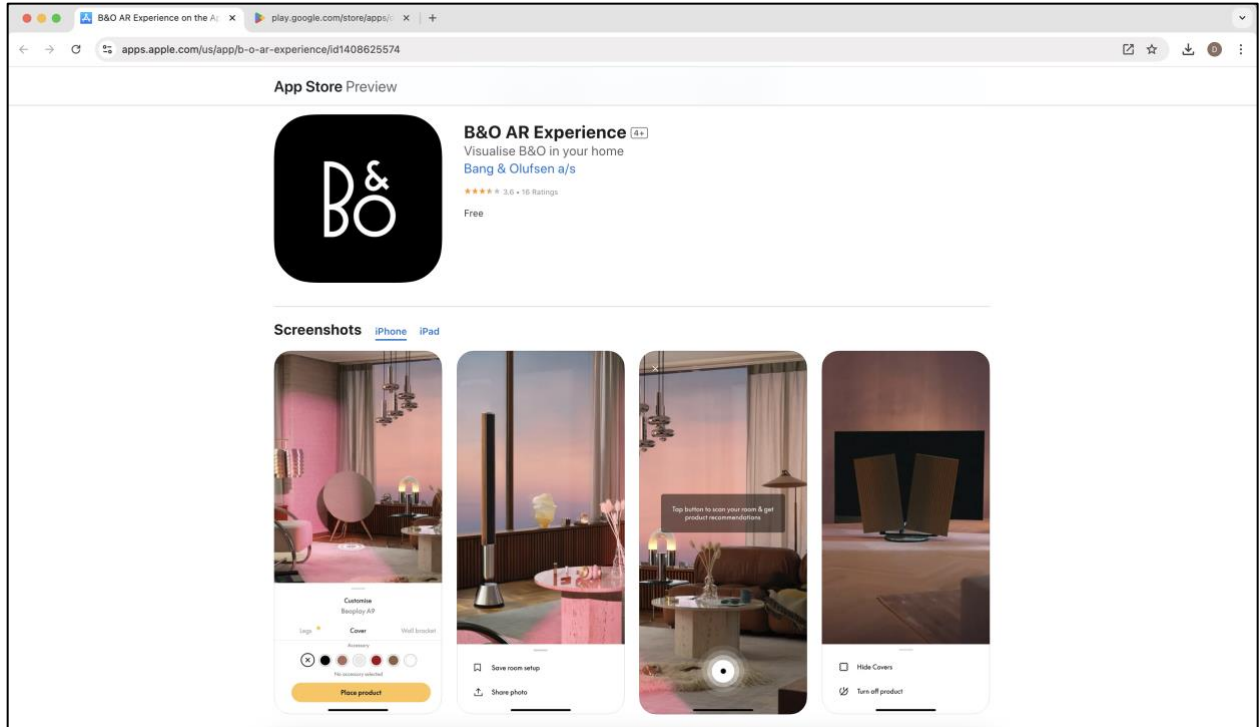


Figure 2

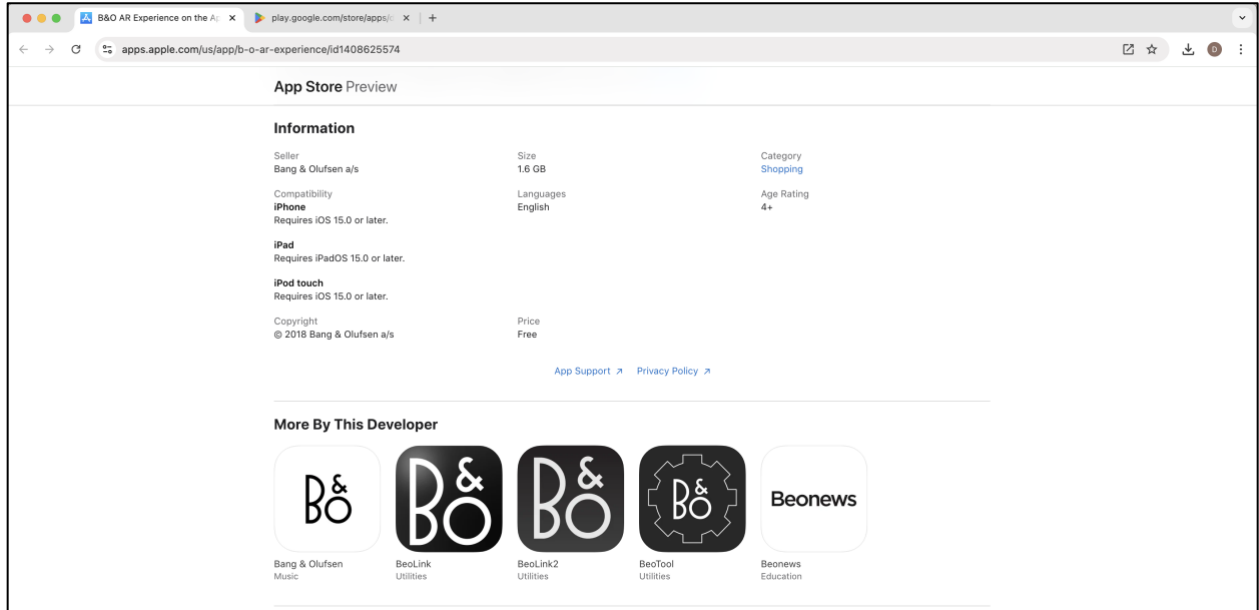


Figure 3

7. Upon information and belief, Defendant engages in making, using, selling, offering for sale, importing, or otherwise providing, directly or indirectly, in this State and District, products and services that infringe one or more claims of the Asserted Patent.

JURISDICTION AND VENUE

8. AR Design repeats and re-alleges the allegations in the Paragraphs above as though fully set forth in their entirety.

9. This is an action for infringement of a United States patent arising under 35 U.S.C. §§ 271, 281, and 284–285, among others. This Court has subject matter jurisdiction of the action under 28 U.S.C. §§ 1331 and 1338(a).

10. Defendant is subject to this Court’s specific and general personal jurisdiction due at least to its substantial business in this forum, including (i) at least a portion of the infringements alleged herein; or (ii) regularly doing or soliciting business, engaging in other persistent courses of conduct, or deriving substantial revenue from goods and services provided to individuals in this State and in this District.

11. Specifically, Defendant intends to do and does business in this State, directly or through intermediaries, and offers products or services, including those accused herein of infringement, to customers and potential customers located in this State, including in this District.

12. Defendant commits acts, and has committed acts, of infringement in this District, including, but not limited to, use of the Accused Products (identified below) and inducement of third parties to use them in an infringing manner.

13. Upon information and belief based upon public knowledge, Defendant has committed and continues to commit acts of infringement in this District.

14. Venue is proper in this District pursuant to 28 U.S.C. § 1391 because, among other things, Defendant is not a resident of the United States, and thus may be sued in any judicial district, including this one, pursuant to 28 U.S.C. § 1391(c)(3). *See also In re HTC Corporation*, 889 F.3d 1349, 1357 (Fed. Cir. 2018) (“The Court’s recent decision in *TC Heartland* does not alter” the alien-venue rule.).

THE TECHNOLOGY

THE INVENTION

15. AR Design repeats and re-alleges the allegations in the Paragraphs above as though fully set forth in their entirety.

16. Cathryn MacInnes and Gerald Pearlstein are the inventors of the ’572 patent. A true and correct copy of the ’572 patent is attached as Exhibit A.

17. The ’572 patent resulted from the pioneering efforts of Ms. MacInnes and MR. Pearlstein (hereinafter “the Inventors”) in the area of interactive, three-dimensional (3D) interior design systems. These efforts resulted in the development of a method and apparatus for generating and rendering a photorealistic 3D perspective view of a 3D object (e.g., a piece of furniture, home audio and visual systems, speakers, etc.) that can be selectively positioned and manipulated within a 3D scene, such as a living room in a person’s house, in the early 2000s. At the time of these pioneering efforts, the most widely implemented technology used to try to address the need for a real-time, network-based interactive system for use in visualizing an item in a room prior to placing an order for that item was either limited by its capability of using only two-dimensional (2D) images of the item or, if it had such 3D capability, the 3D item could not be rendered for manipulation within a 3D representation of the room into which the item was to be placed.

18. Other systems at that time allowed users to import photographs of actual rooms into the program, and then place 3D objects into the room, which could be rotated to fit the scene. However, the room images for such systems were not associated with a 3D model of the room and lacked the capability of rendering objects placed onto floor plans in photographically derived scenes, and/or did not provide for the manipulation of 3D objects at the client computer.

19. The Inventors conceived of the inventions claimed in the '572 patent as a way to provide an improved 3D design and visualization system that includes an easy to use Graphical User Interface ("GUI"), which is capable of enabling a user to quickly and conveniently generate or import 3D scenes from a server, import and manipulate 3D objects (like furniture, home audio and visual systems, speakers, etc.) in the scenes in real-time, and render them in photorealistic detail on a client computer.

20. For example, the Inventors developed a method in a client-server computing environment for generating and rendering a photorealistic 3D perspective view of a 3D object selectively positioned within a 3D scene. The method includes operating a client application with a GUI and displaying a 3D scene with the GUI. It also includes configuring the 3D scene for being selectively displayed in a plurality of views; retrieving at least one 3D object (e.g., furniture, home audio and visual systems, speakers, etc.) from a server; importing the 3D object into the 3D scene to generate a composite; and manipulating the 3D object within the composite for placement and orientation. A 3D image of the composite may be rendered at the client and selectively reconfigured in real-time. Luminosity characteristics may be applied to the 3D image and a photorealistic 3D view of the composite image may be rendered with the client application, including the luminosity characteristics.

ADVANTAGE OVER THE PRIOR ART

21. The invention disclosed in the '572 patent provides many advantages over the prior art, and in particular improved systems for depicting a realistic 3D rendering of a space with architectural and design elements therein capable of real-time, user-friendly manipulation by a client. The system may be used by interior designers and architects (or by their clients) to easily design interior spaces with the help of an intuitive and easy to use custom interface. The resulting design may then be displayed on any number of suitable displays, such as phones, tablets, or computers, to improve customer visualization of proposed designs. *See Exhibit A* at 6:53-67.¹ One advantage of the patented invention is the easy-to-use GUI that is capable of enabling a user to quickly and conveniently generate or import 3D scenes, import and manipulate at the client computer 3D objects in the scenes in real-time, and which is capable of rendering them in photorealistic detail on the client computer. *See Exhibit A* at 4:18-25.

22. Another advantage of the patented invention is that it provides the ability to represent changes in both natural and artificial light, which may be precise enough to depict lighting and shadowing associated with a particular exposure during a particular season at a predetermined hour of the day at a particular geographic location worldwide. Advantageously, this ability enables the aesthetics of the conceptualized design to be accurately communicated prior to build-out of the actual room(s). *See Exhibit A* at 7:12-17.

23. Because of these significant advantages that can be achieved by the patented invention, the '572 patent presents significant commercial value for companies like Defendant. Indeed, use of the patented technology has become widespread among members of the public

¹ As used herein, a citation in the form such as "6:53-67" refers to column 6, lines 53-67 of the Asserted Patent.

interested in buying home audio and visual systems and/or home speaker products, including customers of Defendant. It has become quite popular and advantageous as part of the speaker buying process for a customer to first utilize the technology offered by Defendant and other home audio and visual systems and/or home speaker sellers, to import 3D objects (like furniture, home audio and visual systems, speakers, etc.) from the seller's server and render them in photorealistic detail, including with luminosity effects, within a room setting on the client computer.

TECHNOLOGICAL INNOVATION

24. The disclosures and claims of the '572 patent resolve technical problems related to computerized three-dimensional modeling systems, particularly problems related to the utilization of technology for rendering and manipulating in real-time 3D objects on a client computer with a user-selected or user-generated interior design scene, as well as editing of those objects to apply lighting and shadow effects called luminosity effects. As the '572 patent explains, one of the limitations of the prior art as regards such prior art modeling systems was that many of them generated images in 2D as opposed to 3D, which did not enable them to be shown in context of a background scene, *e.g.*, a particular room, and did not enable them to be manipulated, *e.g.*, for scaling, rotation and particular placement within the background scenes. Some prior art systems did include 3D models, which can be rotated and scaled to fit the scene. However, for example, the room images for such systems were not associated with a 3D model of the room and lacked the capability of rendering objects placed onto floor plans in photographically derived scenes, and/or did not provide for the manipulation of 3D objects at the client computer. *See Exhibit A* at 2:6-64, 3:12-29 and 3:58-4:17.

25. Moreover, the disclosures and claims of the '572 patent recite inventive concepts that are not merely routine or conventional use of computerized 3D modeling systems and, more

particularly, to a software application configured to reside on a client computer that is capable of manipulating 3D object representations *in-situ* with a user-selected or user-generated interior design scene and rendering quality perspective images of the composite scene. Instead, the claims of the '572 patent are directed to a new and novel solution to specific problems related to improving a software application configured to reside on a client computer, which is capable of manipulated 3D object representations at the client computer with a user-selected or user-generated interior design scene, including selectively reconfiguring a given 3D object in real time and applying luminosity characteristics to the 3D image, thereby rendering quality perspective images of the composite scene.

26. The claims of the '572 patent does not preempt all the ways that a method in a client-server computing environment for generating and rendering a photorealistic 3D perspective view of a 3D object selectively positioned within a 3D scene may be used to improve computerized 3D modeling systems, nor does the '572 patent preempt any other well-known or prior art technology.

27. Accordingly, the claims in the '572 patent recite a combination of elements sufficient to ensure that the claims in substance and in practice amount to significantly more than a patent-ineligible abstract idea.

THE ACCUSED PRODUCTS

28. AR Design repeats and re-alleges the allegations in the Paragraphs above as though fully set forth in their entirety.

29. Based upon public information, Defendant owns, operates, advertises, and/or controls the website <https://www.bang-olufsen.com/>, through which it advertises, sells, offers to

sell, provides and/or educates customers about its products and services utilizing infringing systems.

30. Defendant makes, has made, uses, causes to be used, imports, provides, supplies, distributes, or offers one or more augmented reality (“AR”) products and tools, including but not limited to the Bang & Olufsen AR Experience App, a downloadable mobile application available for iOS and Android devices through Defendant’s website, including, for example, features allowing users to “[p]lace and move B&O products in your own living space,” and “see how they complement your decor,” as depicted below (hereinafter, “the Accused Products”). See **Figures 4–13** (below); see also **Exhibit B** (Evidence Of Use Regarding Infringement Of U.S. Patent No. 7,277,572).

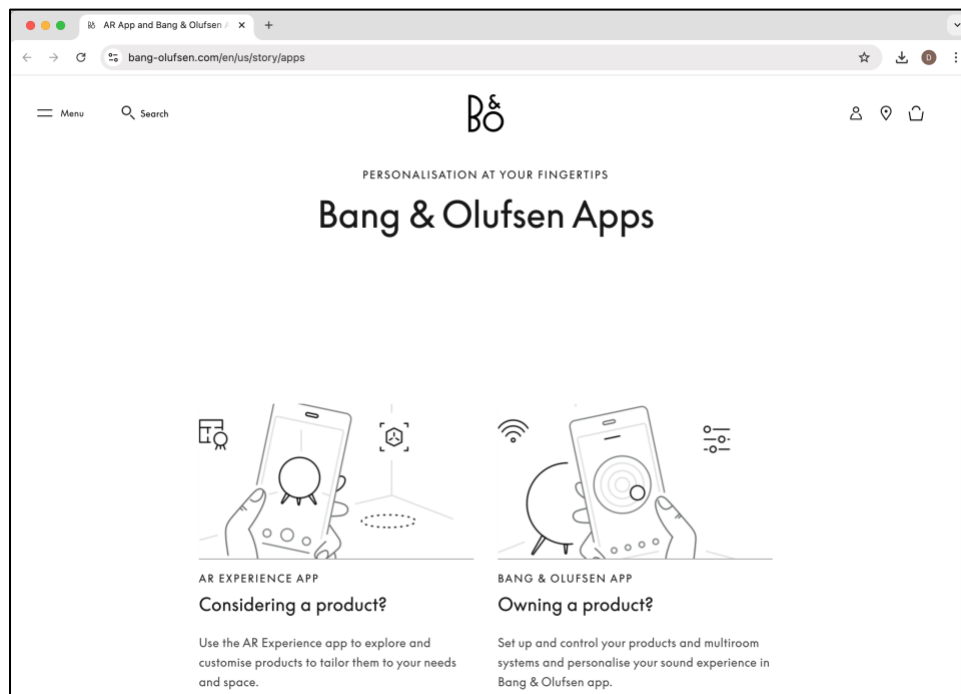


Figure 4

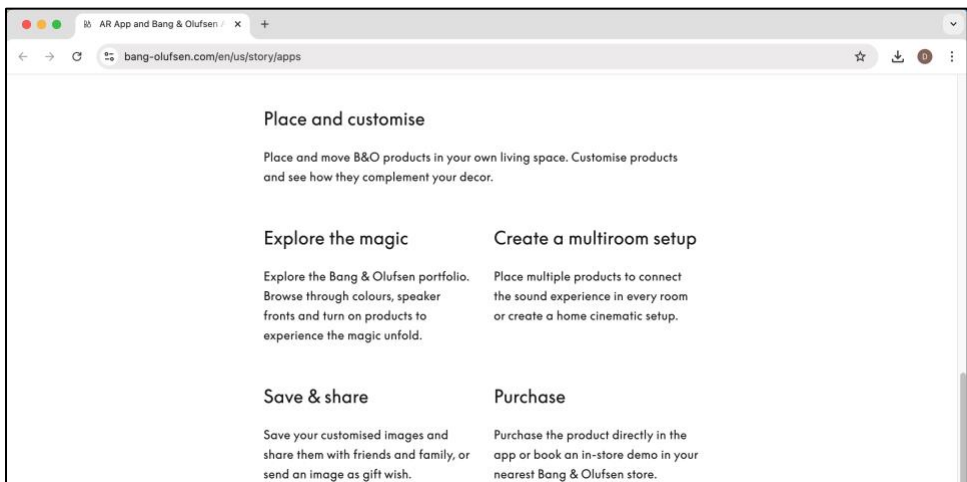


Figure 5

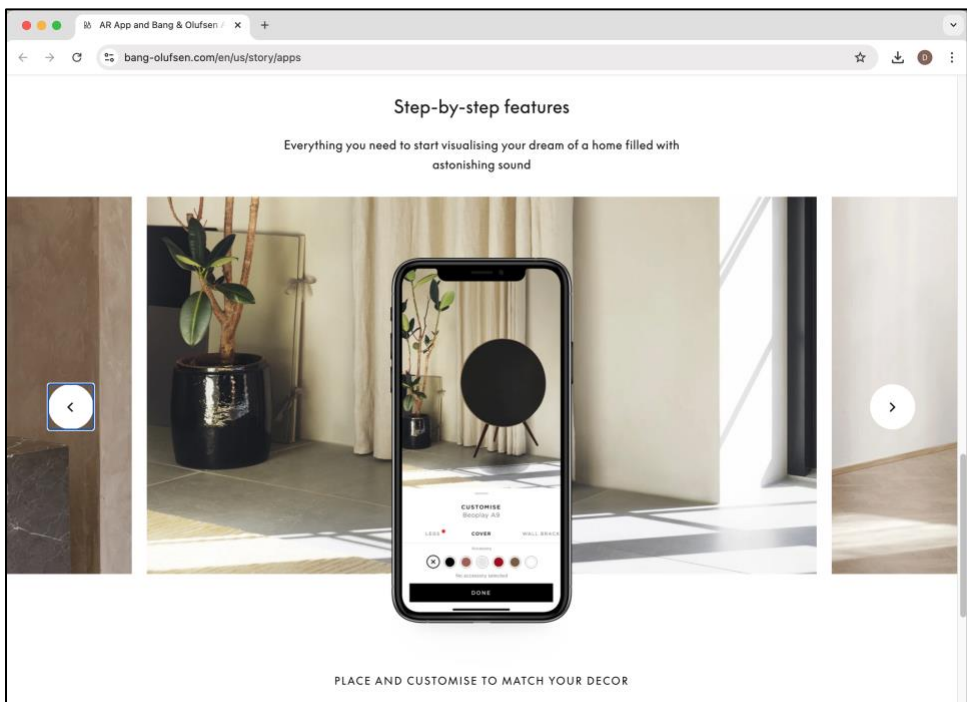


Figure 6

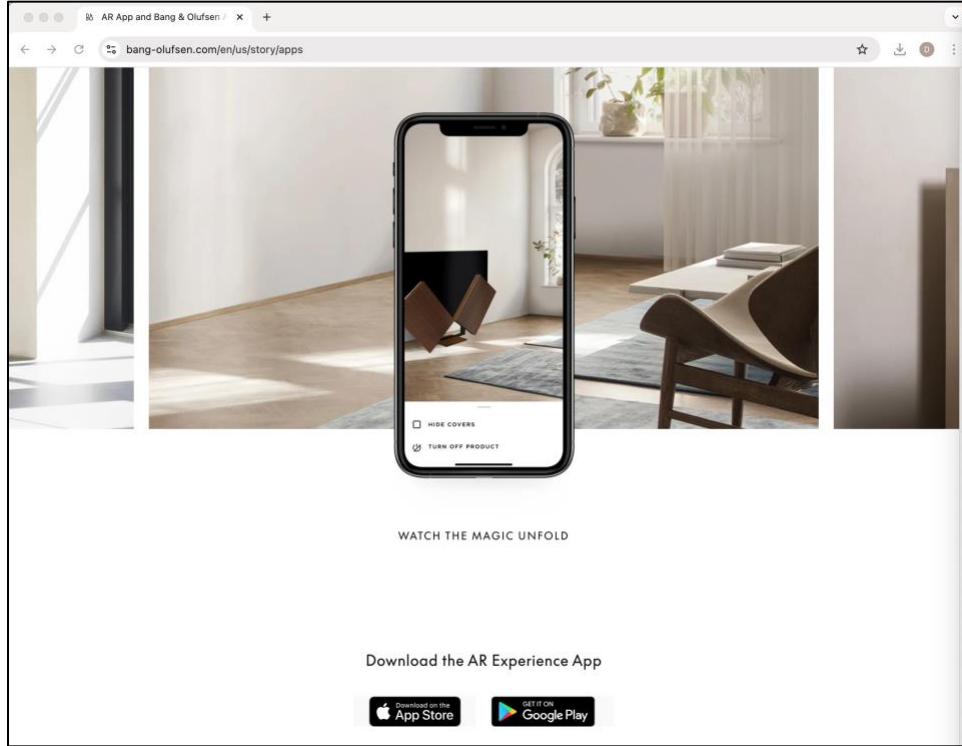


Figure 7

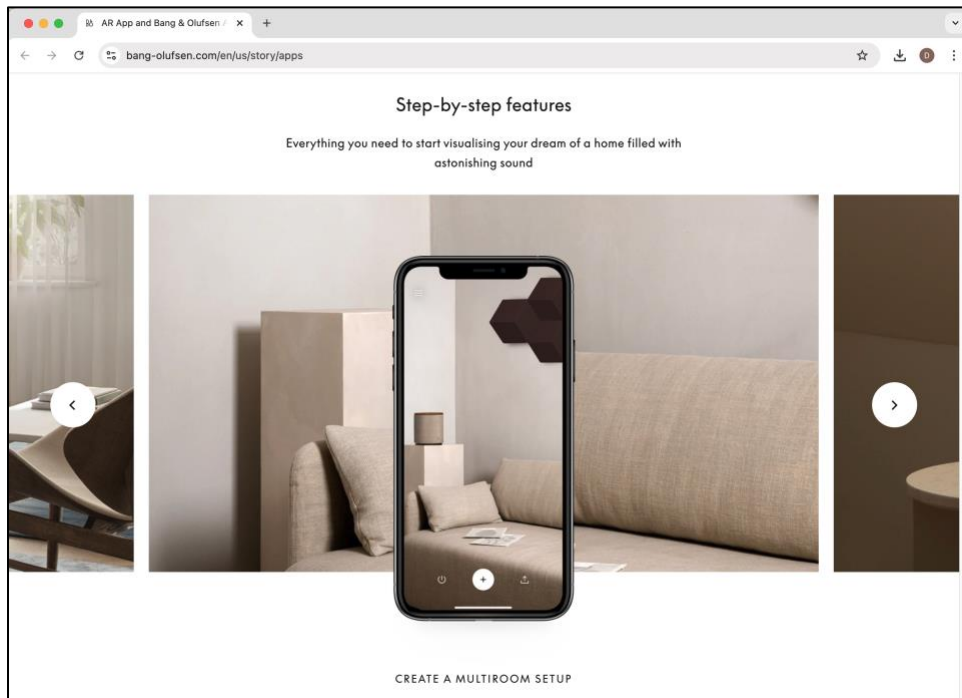


Figure 8

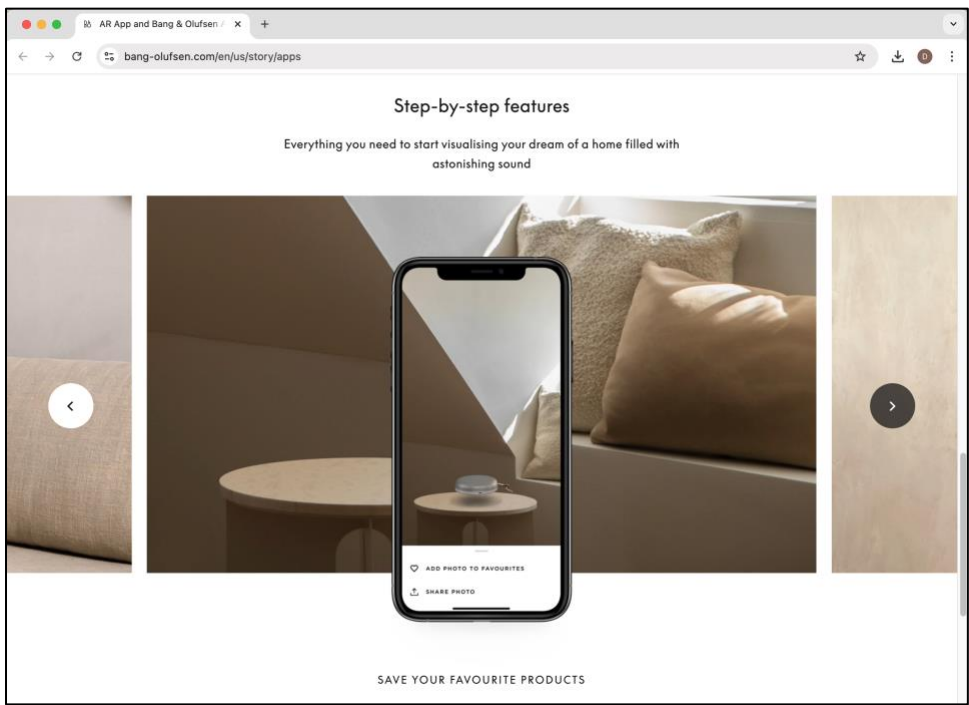


Figure 9

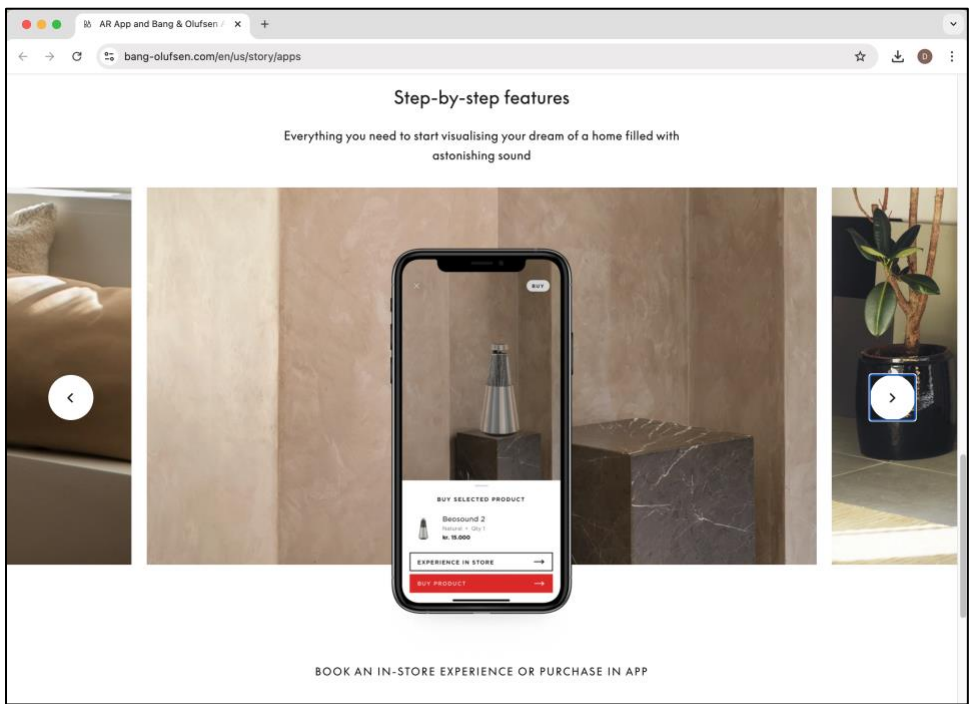


Figure 10

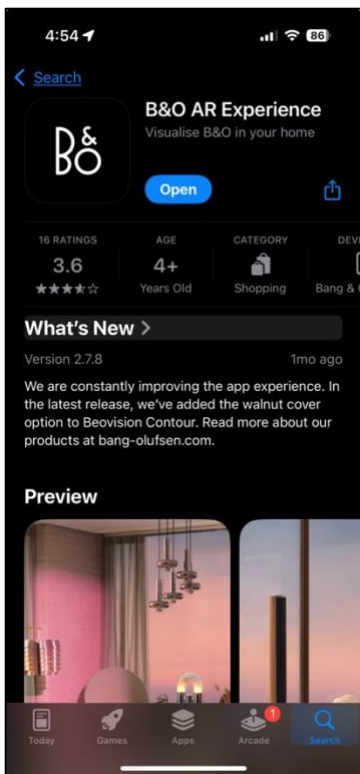


Figure 11



Figure 12

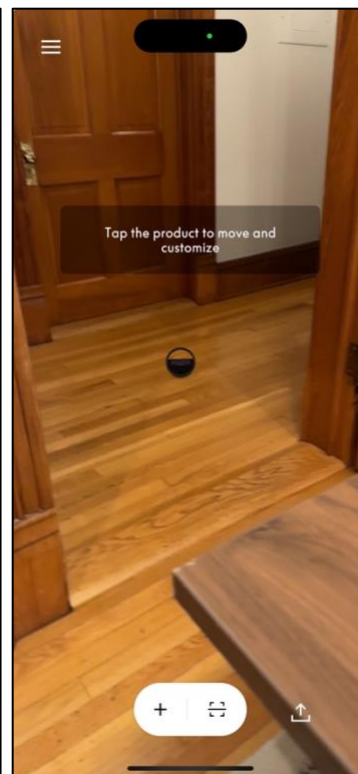


Figure 13

31. Based upon public information and belief, the Accused Products are downloadable to a user's phone, tablet, or computer including but not limited to, phones, tablets, which users may access through phones, tablets, or computers, including but not limited to the phones, tablets, or computers used by the Defendant's employees, agents, and customers. *See id.*; *see also* Bang & Olufsen Apps, BANG-OLUFSEN.COM, <https://www.bang-olufsen.com/en/us/story/apps>.

COUNT I: DIRECT INFRINGEMENT OF U.S. PATENT NO. 7,277,572

32. AR Design repeats and re-alleges the allegations in the Paragraphs above as though fully set forth in their entirety.

33. The United States Patent and Trademark Office duly issued the '572 patent on October 2, 2007, after full and fair examination of application 10/683,825 which was filed on

October 10, 2003. See **Exhibit A**, at A-1. A Certificate of Correction was issued on May 18, 2010. See *id.* at A-51.

34. The claims of the '572 patent are not directed to an abstract idea. For example, claim 1 of the '572 patent recites a specific and multi-step method to generate and render a photorealistic 3D perspective view of a 3D object selectively positioned within a 3D scene. The method enables a user to connect to a server, interact with a graphical user interface (“GUI”), and retrieve and manipulate a 3D image – including applying different luminosity characterizations – that result in a photorealistic 3D view of the composite image, including any luminosity characteristics. Taken as a whole, the claimed inventions of the '572 patent are not limited to well-understood, routine, or conventional activity. Rather, the claimed inventions include inventive components that improve upon the experience of furnishing an interior space.

35. The written description of the '572 patent describes in technical detail each of the limitations of the claims, allowing a skilled artisan to understand the scope of the claims and how the non-conventional and non-generic combination of claim limitations is patently distinct from and improved upon what may have been considered conventional or generic in the art at the time of the invention.

36. AR Design owns all substantial rights, interest, and title in and to the '572 patent, including the sole and exclusive right to prosecute this action and enforce said patent against infringers, and to collect damages for all relevant times.

37. Plaintiff or its predecessors-in-interest have satisfied all statutory obligations required to collect pre-filing damages for the full period allowed by law for infringement of the '572 patent.

38. Defendant has infringed the '572 patent by making, having made, using, importing, providing, supplying, distributing, selling, or offering the Accused Products to customers.

39. The Accused Products include mobile applications with augmented reality (AR) tools that perform a method in a client-server computing environment for generating and rendering a photorealistic 3D perspective view of a 3D object selectively positioned within a 3D scene.

40. The Accused Products perform and supply a method in a client-server computing environment for generating and rendering a photorealistic 3D perspective view of a 3D object selectively positioned within a 3D scene.

41. Defendant has directly infringed, either literally or under the doctrine of equivalents, at least claim 1 of the '572 patent as shown in the attached Evidence of Use Chart which is incorporated herewith in its entirety. *See* **Exhibit B**.

42. The method performed and supplied by the Accused Products includes the steps of communicably accessing a server with a client; operating with the client, a client application configured for scene editing and rendering, including a GUI; displaying a 3D scene with the GUI; configuring the 3D scene for being selectively displayed in a plurality of views; retrieving at least one 3D object from the server; importing the 3D object into the 3D scene to generate a composite; manipulating the 3D object within the composite for placement and orientation; rendering a 3D image of the composite at the client; selectively reconfiguring the 3D image in real time; applying luminosity characteristics to the 3D image; and rendering, with the client application, a photorealistic 3D view of the composite image, including the luminosity characteristics. Defendant's infringement in this regard is ongoing. *See* **Ex. B**.

43. Plaintiff has been damaged as a result of the infringing conduct by Defendant alleged above. Defendant is liable to Plaintiff in an amount that compensates it for such

infringements, which by law cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

44. Since at least the time of receiving this Complaint, Defendant has also indirectly infringed the '572 patent by inducing others to directly infringe the '572 patent. Defendant has induced end-users, including Defendant's customers, to directly infringe, either literally or under the doctrine of equivalents, the '572 patent by downloading and using the Accused Products. Defendant took active steps, directly or through contractual relationships with others, with the specific intent to cause them to use the Accused Products in a manner that infringes one or more claims of the '572 patent, including, for example, claim 1 of the '572 patent. Such steps by Defendant included, among other things, advising or directing personnel, contractors, or end-users to make or use the Accused Products in an infringing manner; advertising and promoting the use of the Accused Products in an infringing manner; or distributing instructions that guide users to use the Accused Products in an infringing manner. Defendant is performing these steps, which constitutes induced infringement with the knowledge of the '572 patent and with the knowledge that the induced acts constitute infringement. Defendant is aware that the normal and customary use of the Accused Products by others would infringe the '572 patent. Defendant's inducement is ongoing.

45. Defendant has also indirectly infringed by contributing to the infringement of the '572 patent. Defendant has contributed to the direct infringement of the '572 patent by its personnel, contractors, and customers. The Accused Products have special features that are specially designed to be used in an infringing way and that have no substantial uses other than ones that infringe one or more claims of the '572 patent, including, for example, claim 1 of the '572 patent. The special features include, for example, the method recited in claim 1, including

all the intermediary steps, that allow the claimed method to generate and render a photorealistic 3D perspective view of a 3D object selectively positioned within a 3D scene. The special features constitute a material part of the invention of one or more of the claims of the '572 patent and are not staple articles of commerce suitable for substantial non-infringing use. Defendant's contributory infringement is ongoing.

46. Defendant has had knowledge of the '572 patent at least as of the date when it was notified of the filing of this action.

47. Furthermore, on information and belief, Defendant has a policy or practice of not reviewing the patents of others (including instructing its employees to not review the patents of others), and thus has been willfully blind of Plaintiff's patent rights.

48. Defendant's actions are at least objectively reckless as to the risk of infringing a valid patent and this objective risk was either known or should have been known by Defendant.

49. Defendant's direct and indirect infringement of the '572 patent is, has been, and continues to be willful, intentional, deliberate, or in conscious disregard of Plaintiff's rights under the patent.

50. Plaintiff has been damaged as a result of the infringing conduct by Defendant alleged above. Thus, Defendant is liable to AR Design in an amount that compensates it for such infringements, which by law cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

51. AR Design has suffered irreparable harm, through its loss of market share and goodwill, for which there is no adequate remedy at law. AR Design has and will continue to suffer this harm by virtue of each Defendant's infringement of the '572 patent. Defendant's actions have interfered with and will interfere with AR Design's ability to license technology. The balance of

hardships favors AR Design's ability to commercialize its own ideas and technology. The public interest in allowing AR Design to enforce its right to exclude outweighs other public interests, which supports injunctive relief in this case.

JURY DEMAND

52. Plaintiff hereby requests a trial by jury on all issues so triable by right.

PRAYER FOR RELIEF

53. WHEREFORE, AR Design Innovations LLC requests that the Court find in its favor and against Defendant, and that the Court grant AR Design the following relief:

54. Judgment that one or more claims of the Asserted Patent has been infringed, either literally or under the doctrine of equivalents, by Defendant or all others acting in concert therewith;

55. A permanent injunction enjoining Defendant and its officers, directors, agents, servants, affiliates, employees, divisions, branches, subsidiaries, parents, and all others acting in concert therewith from infringement of the '572 patent; or, in the alternative, an award of a reasonable ongoing royalty for future infringement of the Asserted Patent by such entities;

56. Judgment that Defendant accounts for and pays to AR Design all damages to and costs incurred by AR Design because of Defendant's infringing activities and other conduct complained of herein;

57. Judgment that Defendant's infringing activities be found willful, and that the Court award treble damages for the period of such willful infringement pursuant to 35 U.S.C. § 284;

58. Pre-judgment and post-judgment interest on the damages caused by Defendant's infringing activities and other conduct complained of herein;

59. That this Court declare this an exceptional case and award AR Design its reasonable attorneys' fees and costs in accordance with 35 U.S.C. § 285; and

60. All other and further relief as the Court may deem just and proper under the circumstances.

Dated: December 18, 2024

Respectfully submitted,

By: /s/ C. Matthew Rozier

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Attorneys for Plaintiff AR DESIGN INNOVATIONS LLC

*Admitted to the Eastern District of Texas

List Of Exhibits

- A. U.S. Patent No. 7,277,572
- B. Evidence of Use Regarding Infringement of U.S. Patent No. 7,277,572