**UNITED STATES DISTRICT COURT**
**SOUTHERN DISTRICT OF NEW YORK**

HOLOTOUCH, INC.,

Plaintiff,

CASE NO.

v.

MICROSOFT CORPORATION,

Defendant.
_____/

**COMPLAINT FOR PATENT INFRINGEMENT**

HoloTouch, Inc. ("HoloTouch") hereby sues Microsoft Corporation ("Microsoft") for patent infringement and alleges as follows:

**THE PARTIES**

1. HoloTouch is a corporation organized and existing under the laws of the State of Delaware with its principal place of business in Stamford, Connecticut.

2. Microsoft is a corporation organized and existing under the laws of the State of Washington with its principal place of business in Redmond, Washington.

**JURISDICTION AND VENUE**

3. This is an action for patent infringement arising under the patent laws of the United States, Title 35 of the United States Code.

4. This Court has federal question jurisdiction over this action under 28 U.S.C. §§ 1331 and 1338(a) because HoloTouch seeks relief under the Patent Act, 35 U.S.C. § 271 *et seq.*, including remedies for infringement of patents owned by HoloTouch.

5. Venue is proper in this district pursuant to 28 U.S.C. § 1400(b) because Microsoft has committed acts of infringement in this district and maintains a regular and established place

of business in this district.

## HOLOTOUCH'S PATENTED TECHNOLOGY

6. HoloTouch is the owner of United States Patent No. 6,377,238 B1 ("the '238 Patent"), entitled "Holographic Control Arrangement." Robert Douglas McPheters, the founder, CEO, and owner of HoloTouch, is the inventor of the '238 Patent. The application that matured into the '238 Patent was filed on June 6, 1995. The '238 Patent was duly and lawfully issued on April 23, 2002 by the United States Patent and Trademark Office and is now, and has been at all times since its date of issue, valid and enforceable. A copy of the '238 Patent is attached hereto as Exhibit 1.

7. The '238 Patent teaches a "means by which an operator may control one or more devices without touching a solid control object or surface while still interacting with familiar controls that are visually perceived, such as a keyboard." ('238 Patent, 2:7-12.)

8. The '238 Patent further teaches an "interface between an operator and a device to be controlled." (*Id.*, 2:15-27). The operator interface includes "an input interface that permits the operator to input data and commands into a device such as a computer without requiring physical contact. The input interface includes a holographic image of a physical input device — the operator activates the input interface without physically touching a solid control surface. The input interface is activated when the user passes a finger or pointer through the holographic image of a key or other input device." *Id.*

9. Claim 1 of the '238 Patent covers:

> A control arrangement for allowing an operator to control an electronic or electro-mechanical device of the type conventionally controlled by a tangible control mechanism having at least one customarily touch-activated tangible input object, physical contact with which produces a response by said device; said control arrangement allowing such control without the operator touching any solid object and comprising:

> an image generator for generating a holographic image of at least the one tangible input object of the tangible control mechanism for the device, with said generated holographic image for producing a response by said device corresponding to that produced conventionally by the one tangible input object of the tangible control mechanism; said image generator generating said holographic image of said one tangible input object such that it is larger than the one tangible input object of the tangible control mechanism;
>
> an actuation detector for determining selection by the operator of said holographic image of said one tangible input object; and
>
> a signal generator for receiving the determination of said actuation detector and providing an input signal to the device thereby to produce the response.

(*Id.*, 7:2-27.)

10. HoloTouch is also the owner of United States Patent No. 7,054,045 B2 ("the '045 Patent"), entitled "Holographic Human-Machine Interfaces." Robert Douglas McPheters, the founder, CEO, and owner of HoloTouch, is an inventor of the '045 Patent along with John Breitenbach and John F.W. Perry. The application that matured into the '045 Patent was filed on July 2, 2004. The '045 Patent was duly and lawfully issued on May 30, 2006 by the United States Patent and Trademark Office and is now, and has been at all times since its date of issue, valid and enforceable. A copy of the '045 Patent is attached hereto as Exhibit 2.

11. The '045 Patent is in the field of holographic human-machine interfaces ("HMIs") between humans and electronic or electro-mechanical devices. ('045 Patent, 1:11-15.)

12. The invention disclosed in the '045 Patent solves certain problems in the field of HMIs. One such issue is that "holographic HMI systems may be characterized by the holographic HMI devices being relatively large and bulky, and they may consume relatively large amounts of power, making them impractical for some uses." (*Id.*, 1:39-41.) Additionally, "a problem may occur when the footprint of known holographic HMIs is not smaller than the physical dimensions of the conventional human-machine interfaces of the electronic or electro-

mechanical device(s) being controlled." (*Id.*, 1:63-67.)

13. The invention disclosed in the '045 Patent addresses these and other drawbacks of the state of the art, "and has the object to provide an apparatus for realizing the reduction of the power consumption, size and weight of conventional holographic HMIs." (*Id.*, 2:3-7.)

14. There are numerous preferred embodiments disclosed in the '045 Patent. The first preferred embodiment provides

> a means for reducing the size and weight of holographic HMIs by positioning detecting sensors behind the hologram in relation to the operator, so as to permit those sensors to "look through" the medium upon which the hologram is mounted. This arrangement offers a desirable alternative to positioning of wave source sensors alongside the hologram or on the same side of the hologram as the operator because required hardware can be more compact, reducing the size and weight of the holographic HMI.

(*Id.*, 4:10-19.)

15. Additionally, the second preferred embodiment provides

> a means for positioning the hologram(s) so that their reconstructed holographic images of keys or other customarily touch-activated tangible input devices appear below, above, or on either side of the screen employed to present input or output information to an operator, with respect to the electronic or electro mechanical device(s) being actuated or controlled.

(*Id.*, 5:39-46.)

16. Further, the fourth preferred embodiment provides

> a means for improving holographic HMIs employing transmission holograms by reducing their size and weight through compressing the distance between their reconstructing light sources and their holograms through recording them using a converging reference beam or by altering the direction of, or focusing or spreading, the light source employed in reconstructing their holographic images through the use of mirrors or lenses.

(*Id.*, 7:21-29.)

17. The fifth preferred embodiment provides

> an audible or visible response to the operator of a holographic HMI in the form of

> an electronic or other tone or a visual signal appearing on the information presentation device, such as a computer screen, to indicate the operator's selection of one or more holographic images of what would otherwise be keys or other customarily touch-activated tangible input devices of the electronic or electro mechanical device being actuated or controlled.

(*Id.*, 8:17-25.)

18. Claim 1 of the '045 Patent covers:

> An apparatus allowing an operator to control an electronic or electro-mechanical device of the type conventionally controlled by a tangible control mechanism having one or more customarily touch-activated tangible input objects, physical contact with which produces a response by the electronic or electro-mechanical device, said apparatus allowing such control without the operator physically touching any solid object and comprising:
>
> hologram means for generating a holographic image of a tangible input object of the tangible control mechanism for the electronic or electro-mechanical device;
>
> illumination means for illuminating said hologram means to produce the holographic image;
>
> actuation detection means for detecting selection by the operator of the holographic image, generated by said hologram means, of the tangible input object; and
>
> signal generation means for receiving the detection of said actuation detection means and providing an input signal to the electronic or electro-mechanical device thereby to produce the response,
>
> wherein said hologram means is affixed to at least one of a transparent material and a translucent material, and
>
> the actuation detection means comprises emission/detection means for producing and receiving electromagnetic radiation, said emission/detection means being positioned on a side of said hologram means opposite the operator and being positioned to transmit and receive electromagnetic radiation toward the holographic image and through said material to which said hologram means is affixed.

(*Id.*, 10:29-59.)

19. Further, claim 4 of the '045 Patent covers:

> An apparatus for allowing an operator to control a plurality of electronic or electro-mechanical devices of the type conventionally controlled by a separate tangible control mechanism having a plurality of customarily touch-activated tangible input objects, physical contact with which produces a response by at least one of the electronic or electro-mechanical devices, the apparatus allowing such control without the operator physically touching any solid object and comprising:
>
> a hologram unit adapted to generate a plurality of holographic images, each comprising the tangible input objects of the tangible control mechanism for a corresponding one of the plurality of the electronic or electro-mechanical devices;
>
> an illuminator adapted to illuminate said hologram unit to produce the plurality of holographic images;
>
> an actuation detector adapted to detect selection by the operator of each of the plurality of holographic images of the tangible input devices; and
>
> a signal generator adapted to receive the detection of said actuation detector and provide an input signal to the devices thereby producing the response,
>
> wherein said actuation detector and said signal generator are configured to independently produce a response by each electronic or electro-mechanical device upon detection of selection of each independent one of said holographic images, and
>
> the actuation detector comprises an emitter/detector that produces and receives electromagnetic radiation, said emitter/detector being positioned on a side of said hologram unit opposite the operator and being positioned to transmit and receive electromagnetic radiation toward the holographic images and through said hologram unit.

(*Id.*, 11:1-34.)

**HOLOTOUCH'S PRODUCTS AND SERVICES**

20. HoloTouch's engineering team works with original equipment manufacturers ("OEMs") to design and build prototypes of devices using HoloTouch's patented technologies.

21. To encourage adoption of HoloTouch's patented technologies, HoloTouch offers OEMs the use of demonstration units.

22. For OEMs interested in developing specific devices using patented HoloTouch technologies, HoloTouch offers short-term development licenses, predicated on the following

factors:

a. economics of the market(s) into which those products will be sold;

b. where touchless control products will be manufactured and sold;

c. the length of the proposed license; and

d. compensation to be paid for using HoloTouch patented technology, which might include a fixed royalty for a limited period of prototype development and/or continuing royalties calculated on the basis of a percentage of net sales of products making use of HoloTouch's patented technology.

23. For licensees of its technology, HoloTouch also offers design, engineering and manufacturing services.

**MICROSOFT'S INFRINGING "HOLOLENS"**

24. Microsoft's HoloLens is a holographic computer built into a wearable headset.

25. HoloLens lets users see, hear, and interact with holograms, as shown in the figure below.

*Figure 1* - HoloLens

26. The HoloLens headset uses high-definition semitransparent holographic lenses and spatial sound technology to create an immersive, interactive holographic experience.

27. Specifically, the headset features an inertial measurement unit; an ambient light sensor; one camera for measuring depth; and four "environment understanding cameras," all of which combine to process information about the user's environment and how users interact with it. *See* http://www.trustedreviews.com/opinion/hololens-release-date-news-and-price-2922378 (last visited Oct. 17, 2017).

28. HoloLens additionally includes a Holographic Processing Unit ("HPU"). The HPU understands gestures and maps the surrounding environment in real time. *Id.*

29. There are various ways in which users can interact with HoloLens. For example, a user's input may take the form of a "gaze." For "gaze" inputs, HoloLens recognizes what object or spatial location a user is looking to, and processes that as input. *See* Microsoft HoloLens Team, *HoloLens Interaction Model*, WINDOWS BLOGS (Jan. 21, 2016, 5:30 PM), *https://blogs.windows.com/buildingapps/2016/01/21/hololens-interaction-model/*.

30. HoloLens also understands "gesture" inputs. The most common type of "gesture" input is an "air-tap." For an "air-tap," HoloLens recognizes users' selections via hand gestures. *Id.*

31. HoloLens also allows voice input. That is, HoloLens has full access to the Windows 10 "speech engine" which allows for user voice commands. *Id.*

32. HoloLens also supports inputs via a physical Bluetooth keyboard.

33. As Microsoft explains: "while HoloLens supports many forms of input including Bluetooth keyboards, most applications cannot assume that all users will have a physical keyboard available. If [an] application requires text input, some form of on screen keyboard

should be provided." *See* https://developer.microsoft.com/en-us/windows/mixed-reality/keyboard_input_in_unity#hololens_system_keyboard_behavior_in_unity (last visited Oct. 18, 2017).

34. HoloLens provides a holographic keyboard interface that allows application developers to build a touchscreen keyboard (the "TouchScreenKeyboard") into HoloLens-supported applications and, therefore, allows users the ability to interact with the holographic keyboard when using one or more HoloLens software applications. *Id.*

35. Microsoft describes the HoloLens holographic keyboard as follows: "On HoloLens, the TouchScreenKeyboard leverages the system's on-screen keyboard . . . . There are six different keyboard views available: Single-line textbox[,] Single-line textbox with title[,] Multi-line textbox[,] Multi-line textbox with title[,] Single-line password box[,] Single-line password box with title[.]" *Id.*

36. Microsoft also provides application developers the necessary source code that allows developers' third-party applications to utilize a holographic keyboard. *Id.* ("Declare the Keyboard . . . . Invoke the Keyboard").

37. The operation of the holographic keyboard on the HoloLens is shown on the figure below:


*Figure 2* - Operation of Holographic Keyboard on HoloLens

38. Publicly available YouTube videos show the operation of the HoloLens holographic keyboard. *See, e.g.,* Timo Aho, *Keyboard Input HoloLens Unity*, YOUTUBE (uploaded Apr. 29, 2017), https://www.youtube.com/watch?v=By3bwjA6FIM.

**PRE-SUIT NOTICE OF THE PATENTS**

39. In September 2006, HoloTouch wrote to Microsoft in an effort to forge a strategic partnership with Microsoft for the introduction of revolutionary holographic products to the marketplace. However, Microsoft failed to respond to HoloTouch's communication.

40. However, in October 2013, Microsoft filed a patent application citing HoloTouch's patents as prior art, evidence that Microsoft was aware of HoloTouch's patents at least as early as 2013.

41. In November 2015, and again in January 2016, HoloTouch wrote to Microsoft inquiring about Microsoft's interest in initiating a licensing discussion regarding the HoloTouch patents. Microsoft responded, indicating that Microsoft had reviewed the HoloTouch patents, but declined to entertain licensing discussions.

**COUNT I – INFRINGEMENT OF THE '238 PATENT**

*Direct Infringement Under § 271(a)*

42. HoloTouch repeats and realleges each and every allegation contained in paragraphs 1 through 41 above as though fully set forth herein.

43. Claim 1 of the '238 Patent covers:

> A control arrangement for allowing an operator to control an electronic or electro-mechanical device of the type conventionally controlled by a tangible control mechanism having at least one customarily touch-activated tangible input object, physical contact with which produces a response by said device; said control arrangement allowing such control without the operator touching any solid object and comprising:

an image generator for generating a holographic image of at least the one tangible input object of the tangible control mechanism for the device, with said generated holographic image for producing a response by said device corresponding to that produced conventionally by the one tangible input object of the tangible control mechanism; said image generator generating said holographic image of said one tangible input object such that it is larger than the one tangible input object of the tangible control mechanism;

an actuation detector for determining selection by the operator of said holographic image of said one tangible input object; and

a signal generator for receiving the determination of said actuation detector and providing an input signal to the device thereby to produce the response.

('238 Patent, 7:2-27.)

44. Microsoft's HoloLens meets each element recited in claim 1 of the '238 Patent.

45. The figure below provides a high-level overview of the Microsoft HoloLens component parts:

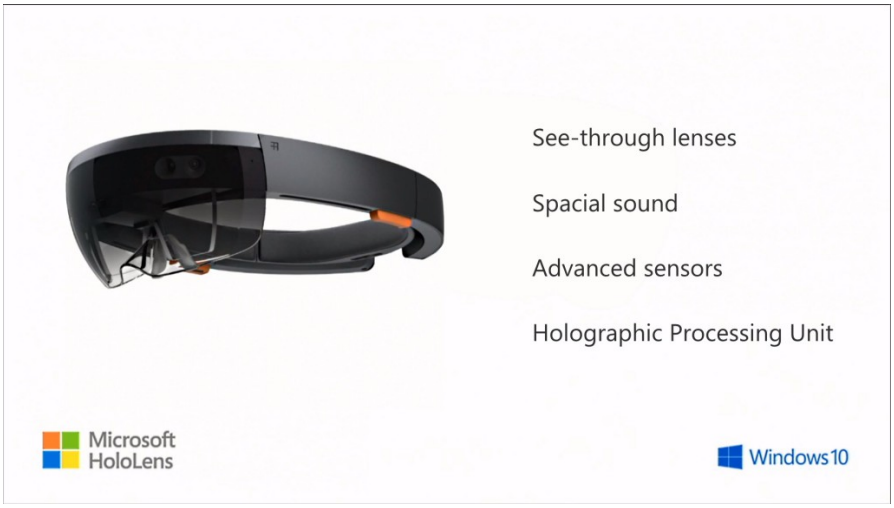


*Figure 3* - HoloLens Component Parts

46. Microsoft's HoloLens contains an image generator for generating a holographic image of at least one tangible input object of the tangible control mechanism for the device, with

said generated holographic image for producing a response by said device corresponding to that produced conventionally by the tangible input object of the tangible control mechanism; said image generator generating said holographic image of said tangible input object such that it is larger than the tangible input object of the tangible control mechanism.

47. Further, Microsoft's HoloLens includes an actuation detector for determining selection by the operator of a holographic image of a tangible input object.

48. Finally, Microsoft's HoloLens includes a signal generator for receiving the determination of the actuation detector and providing an input signal to the device to produce the desired user response.

49. Claim 2 of the '238 Patent recites:

> A control arrangement according to claim 1, wherein the tangible control mechanism conventionally controlling said electronic or electro-mechanical device has a plurality of customarily touch-activated tangible input objects, physical contact with each of which produces a response by said device; wherein said image generator generates a holographic image of each of the plurality of tangible input objects of the tangible control mechanism such that it is larger than the corresponding tangible input object of the tangible control mechanism; and wherein each holographic image of each tangible input object is for producing a response by said device corresponding to that produced by the corresponding tangible input object of the tangible control mechanism.

('238 Patent, 7:27-39.)

50. Microsoft's HoloLens meets each element recited in dependent claim 2 of the '238 Patent.

51. A tangible control mechanism such as a keyboard is used for controlling electronic or electro-mechanical devices such as a personal computer, and contains a plurality of customarily touch-activated tangible input objects in the form of individual input keys. Further, physical contact with each of the tangible input objects (*i.e.*, keys) produces a response by said device (*i.e.*, keyboard).

52. The Microsoft HoloLens image generator generates a holographic image of each of the keys found on a QWERTY keyboard (*i.e.*, the plurality of tangible input objects of the tangible control mechanism). The image generator provides users the ability to generate an image that is larger than the corresponding tangible input object (*i.e.*, key) of the tangible control mechanism (*i.e.*, keyboard).

53. In Microsoft's HoloLens, the holographic image of each key, when actuated by a user, produces a response that corresponds to that produced by a physical key, found in the tangible control mechanism.

54. Claim 3 of the '238 Patent recites:

> A control arrangement according to claim 2, wherein any one of said holographic images of said plurality of tangible input objects can be selected by the operator, and wherein said actuation detector determines which of said holographic images of said plurality of tangible input objects is so selected by the operator.

('238 Patent, 7:41-45.)

55. Microsoft's HoloLens meets each element recited in dependent claim 3 of the '238 Patent.

56. During operation, users of Microsoft's HoloLens can select any one of the various keys projected as part of the holographic keyboard image.

57. Moreover, Microsoft's HoloLens contains an actuation detector for determining a selection of a particular key in the holographic keyboard by the operator. In other words, Microsoft's HoloLens is capable of determining the selection of a particular key (*i.e.*, tangible input object) by a user or operator.

58. Claim 4 of the '238 Patent recites: "A control arrangement as in claim 3, wherein said actuation detector comprises a look-up table for determining which of said holographic images of said plurality of tangible input objects is selected by the operator." ('238

Patent, 7:46-50.)

59. Microsoft's HoloLens meets each element recited in dependent claim 4 of the '238 Patent.

60. As part of its TouchScreenKeyboard function, Microsoft's HoloLens contains a lookup table for determining which of the plurality of input objects (*i.e.*, keys) is selected by the operator.

61. Claim 5 of the '238 Patent recites: "A control arrangement according to claim 4, wherein said signal generator receives the determination by said actuation detector and provides an input signal to the device that corresponds to the holographic image of the tangible input object selected by the operator." ('238 Patent, 7:51-55.)

62. Microsoft's HoloLens meets each element recited in dependent claim 5 of the '238 Patent.

63. Microsoft's HoloLens contains an actuation detector for determining a selection by the user (*i.e.*, operator) of the holographic image corresponding to the tangible input object (*i.e.*, a key).

64. After the HoloLens detector determines the corresponding key value, a HoloLens packet generator provides an input signal to the host device so as to produce the user-desired response.

65. Claim 6 of the '238 Patent recites:

> A control arrangement according to claim 1, wherein said image generator comprises:
>
> a mounting body;
>
> a hologram of the tangible control mechanism connected to said mounting body; and

> means for illuminating said hologram to produce a holographic image of said tangible control mechanism at a predetermined location spaced from said mounting body.

('238 Patent, 7:55-64.)

66. Microsoft's HoloLens meets each element recited in dependent claim 6 of the '238 Patent.

67. Microsoft's HoloLens is comprised of a mounting body, where the holographic processing unit and other components are housed.

68. Additionally, Microsoft's HoloLens, when in operation, is comprised of a hologram of the tangible control mechanism (here, the keyboard) connected to said mounting body (the HoloLens frame).

69. Finally, Microsoft's HoloLens contains means for illuminating said hologram to produce a holographic image of said tangible control mechanism (*i.e.*, the keyboard) at a predetermined location spaced from said mounting body.

70. Claim 7 of the '238 Patent recites: "A control arrangement according to claim 6, further comprising an image frame mounted to said mounting body and peripherally encompassing said holographic image." ('238 Patent, 7:65-67.)

71. Microsoft's HoloLens meets each element recited in dependent claim 7 of the '238 Patent.

72. HoloLens includes an image frame mounted to said mounting body and peripherally encompassing said holographic image.

73. Claim 10 of the '238 Patent recites: "A control arrangement according to claim 7, wherein said actuation detector comprises a three-dimensional active vision sensor." ('238 Patent, 8:8-10.)

74. Microsoft's HoloLens meets each element recited in dependent claim 10 of the '238 Patent.

75. Microsoft's HoloLens contains an image frame mounted to said mounting body and peripherally encompassing said holographic image.

76. In violation of 35 U.S.C. § 271(a), Microsoft directly infringes each of the aforementioned claims of the '238 Patent by making, using, selling, and offering to sell HoloLens devices in the United States without authorization from HoloTouch.

77. HoloTouch is damaged by Microsoft's infringement of the '238 Patent in an amount to be proven at trial, but no less than a reasonable royalty.

78. Microsoft's infringement of the '238 Patent has been willful, with full notice of and in conscious disregard of HoloTouch's rights in the patent.

**COUNT II – INFRINGEMENT OF THE '045 PATENT**

79. HoloTouch repeats and realleges each and every allegation contained in paragraphs 1 through 42 above as though fully set forth herein.

80. Claim 1 of the '045 Patent recites:

> An apparatus allowing an operator to control an electronic or electro-mechanical device of the type conventionally controlled by a tangible control mechanism having one or more customarily touch-activated tangible input objects, physical contact with which produces a response by the electronic or electro-mechanical device, said apparatus allowing such control without the operator physically touching any solid object and comprising:
>
> hologram means for generating a holographic image of a tangible input object of the tangible control mechanism for the electronic or electro-mechanical device;
>
> illumination means for illuminating said hologram means to produce the holographic image;

> actuation detection means for detecting selection by the operator of the holographic image, generated by said hologram means, of the tangible input object; and
>
> signal generation means for receiving the detection of said actuation detection means and providing an input signal to the electronic or electro-mechanical device thereby to produce the response,
>
> wherein said hologram means is affixed to at least one of a transparent material and a translucent material, and
>
> the actuation detection means comprises emission/detection means for producing and receiving electromagnetic radiation, said emission/detection means being positioned on a side of said hologram means opposite the operator and being positioned to transmit and receive electromagnetic radiation toward the holographic image and through said material to which said hologram means is affixed.

('045 Patent, 10:30-60.)

81. Microsoft's HoloLens is an apparatus which allows an operator to control an electronic or electro-mechanical device (*i.e.*, a PC or other type of computing device) of the type conventionally controlled by a tangible control mechanism (*i.e.*, a keyboard) having one or more customarily touch-activated tangible input objects, physical contact with which produces a response by the electronic or electro-mechanical device.

82. HoloLens allows users to control an electronic or electro-mechanical device without the operator physically touching any solid object.

83. As shown above, HoloLens comprises hologram means for generating a holographic image of a tangible input object of the tangible control mechanism for the electronic or electro-mechanical device.

84. Additionally, HoloLens is comprised of illumination means for illuminating said hologram means to produce the holographic image and actuation detection means for detecting selection by the operator of the holographic image, generated by said hologram means, of the

tangible input object.

85. Further, HoloLens is comprised of signal generation means for receiving the detection of said actuation detection means and providing an input signal to the electronic or electro-mechanical device thereby to produce the response.

86. Finally, HoloLens' hologram means are affixed to at least one of a transparent material and a translucent material, and the actuation detection means comprises emission/detection means for producing and receiving electromagnetic radiation, said emission/detection means being positioned on a side of said hologram means opposite the operator and being positioned to transmit and receive electromagnetic radiation toward the holographic image and through said material to which said hologram means is affixed.

87. Claim 2 of the '045 Patent recites: "An apparatus according to claim 1, wherein said at least one of said transparent material and said translucent material is selected from glass, acrylic, and plastic." ('045 Patent, 10:60-62.)

88. Microsoft's HoloLens meets each element recited in dependent claim 2 of the '045 Patent.

89. HoloLens' transparent material and translucent material is selected from glass, acrylic, and plastic, as shown in Figure 2, above.

90. Claim 4 of the '045 Patent recites:

> An apparatus for allowing an operator to control a plurality of electronic or electro-mechanical devices of the type conventionally controlled by a separate tangible control mechanism having a plurality of customarily touch-activated tangible input objects, physical contact with which produces a response by at least one of the electronic or electro-mechanical devices, the apparatus allowing such control without the operator physically touching any solid object and comprising:
>
> a hologram unit adapted to generate a plurality of holographic images, each comprising the tangible input objects of the tangible control mechanism for a corresponding one of the plurality of the electronic or electro-mechanical devices;

> an illuminator adapted to illuminate said hologram unit to produce the plurality of holographic images;
>
> an actuation detector adapted to detect selection by the operator of each of the plurality of holographic images of the tangible input devices; and
>
> a signal generator adapted to receive the detection of said actuation detector and provide an input signal to the devices thereby producing the response,
>
> wherein said actuation detector and said signal generator are configured to independently produce a response by each electronic or electro-mechanical device upon detection of selection of each independent one of said holographic images, and
>
> the actuation detector comprises an emitter/detector that produces and receives electromagnetic radiation, said emitter/detector being positioned on a side of said hologram unit opposite the operator and being positioned to transmit and receive electromagnetic radiation toward the holographic images and through said hologram unit.

('045 Patent, 11:1-34.)

91. Microsoft's HoloLens meets each element recited in independent claim 4 of the '045 Patent.

92. HoloLens is an apparatus for allowing an operator to control a plurality of electronic or electro-mechanical devices of the type conventionally controlled by a separate tangible control mechanism having a plurality of customarily touch-activated tangible input objects, physical contact with which produces a response by at least one of the electronic or electro-mechanical devices, the apparatus allowing such control without the operator physically touching any solid object.

93. HoloLens is comprised of a hologram unit adapted to generate a plurality of holographic images, each comprising the tangible input objects of the tangible control mechanism for a corresponding one of the plurality of the electronic or electro-mechanical

devices.

94. Additionally, HoloLens is comprised of illumination means for illuminating said hologram means to produce the plurality of holographic images and an actuation detector adapted to detect selection by the operator of each of the plurality of holographic images of the tangible input devices.

95. Further, HoloLens includes a signal generator adapted to receive the detection of said actuation detector and provide an input signal to the devices thereby producing the response wherein the actuation detector and the signal generator are configured to independently produce a response by each electronic or electro-mechanical device upon detection of selection of each independent one of said holographic images.

96. Finally, HoloLens' actuation detector comprises an emitter/detector that produces and receives electromagnetic radiation, said emitter/detector being positioned on a side of said hologram unit opposite the operator and being positioned to transmit and receive electromagnetic radiation toward the holographic images and through said hologram unit.

97. Claim 11 of the '045 Patent recites: "An apparatus as in claim 1, wherein said signal generation means also generates at least one of an audible signal and a visible signal to indicate to the operator that the actuation detection means has detected selection of the holographic image by the operator." ('045 Patent, 12:29-33.)

98. Microsoft's HoloLens meets each element recited in dependent claim 11 of the '045 Patent.

99. Microsoft's HoloLens generates at least one of an audible signal and a visible signal to indicate to the operator that the actuation detection means has detected selection of the holographic image of the input device (*e.g.*, a keyboard) by the operator.

100. Claim 17 of the ’045 Patent recites: “An apparatus as in claim 4 or 5, wherein said signal generator also generates at least one of an audible signal and a visible signal to indicate to the operator that the actuation detector has detected selection of the holographic image by the operator.” (’045 Patent, 12:56-60.)

101. Microsoft’s HoloLens meets each element recited in dependent claim 17 of the ’045 Patent.

102. HoloLens generates at least one of an audible signal and a visible signal to indicate to the operator that the actuation detector has detected selection of the holographic image (*e.g.*, of a key in a holographic touchscreen keyboard) by the operator.

103. In violation of 35 U.S.C. § 271(a), Microsoft directly infringes each of the aforementioned claims of the ’045 Patent by making, using, selling, and offering to sell HoloLens devices in the United States without authorization from HoloTouch.

104. HoloTouch is damaged by Microsoft’s infringement of the ’045 Patent in an amount to be proven at trial, but no less than a reasonable royalty.

105. Microsoft’s infringement of the ’045 Patent has been willful, with full notice of and in conscious disregard of HoloTouch’s rights in the patent.

**WHEREFORE**, HoloTouch prays:

a. That the Court find Microsoft liable for infringement of the ’238 and ’045 Patents, either literally or under the doctrine of equivalents;

b. That the Court award HoloTouch damages due to Microsoft’s infringement of the ’238 and ’045 Patents, and enter judgment three (3) times such amount pursuant to 35 U.S.C. § 284;

c. That the Court find this case exceptional within the meaning of 35 U.S.C. § 285

and award HoloTouch its reasonable attorneys' fees and expenses;

d. That the Court award HoloTouch its taxable costs and disbursements;

e. That the Court award HoloTouch pre-judgment and post-judgment interest; and

f. For such other and further relief as the Court deems just and proper.

**JURY DEMAND**

HoloTouch demands trial by jury on all issues so triable.

Dated: November 9, 2017

Respectfully submitted,

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