

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

META PLATFORMS, INC.

Petitioner,

v.

IMMERSION CORPORATION

Patent Owner.

Case IPR2023-00942

U.S. Patent No. 8,469,806

EXHIBIT 2001

DECLARATION OF GREGORY ABOWD, D.Phil.

I, Gregory Abowd, declare as follows:

1. I have been retained by Folio Law Group PLLC, counsel for Patent Owner Immersion Corporation (“Immersion”) to assess the challenged claims of U.S. Patent No. 8,469,806 (“the ’806 patent”). I am being compensated for my time. My compensation is not dependent in any way upon any outcome of the Petition for *Inter Partes* Review of the ’806 patent (“the Petition”).

I. BACKGROUND AND QUALIFICATIONS

2. I have more than 30 years of experience in the field of computer science. In 1986, I received a Bachelor of Science (“B.S.”) with Honors in Mathematics from the University of Notre Dame. In 1987, I obtained a Master of Science (“M.Sc.”) from the University of Oxford in the United Kingdom in Computation. In 1991, I received a D. Phil. from the University of Oxford in Computation. At the University of Oxford, the term “Computation” referred to the field that is known in the United States as “Computer Science.”

3. I am employed by Northeastern University (“Northeastern”), where I am the Dean of the College of Engineering and Professor of Electrical and Computer Engineering.

4. I have extensive experience in Human–Computer Interaction (HCI), with specific expertise in the technologies of interaction, including including haptics and touch interfaces. My D.Phil. thesis was entitled *Formal Aspects of*

Human-Computer Interaction. I am co-author of one of the first textbooks in HCI, first published in 1994. I have won numerous Best Paper awards at a number of conferences related to user interfaces and wireless networks. I have also received several “test of time” awards for my publications, which is usually awarded to papers 10 years after publication and based on long-term impact. I am the most cited academic author in the world in the area of mobile and ubiquitous computing technologies.

5. My contributions to the fields of Human-Computer Interaction (“HCI”) and Ubiquitous Computing have been recognized through numerous awards. In 2008, I was named a Fellow of the Association for Computing Machinery. That same year, I was inducted into the ACM CHI Academy, the most prestigious honor for researchers in HCI. In 2023, I was awarded the Lifetime Research Achievement award by ACM SIGCHI, the leading academic professional society in HCI.

6. A detailed record of my professional qualifications, including a list of patents and academic and professional publications, is set forth in my curriculum attached as an appendix to this declaration.

II. BASES OF OPINIONS

7. In the course of performing my analysis and forming my opinions, I have reviewed the Petition and its Exhibits 1001–1011 including the materials listed below Exhibits:

- U.S. Patent No. 8,469,806 (“the ’806 Patent”) (Ex. 1001)
- IPR Petition IPR2023-00942
- Declaration of Dr. Jeremy Cooperstock (Ex. 1002)
- US Patent App. Pub. 2008/0024459 (“Poupyrev”) (Ex. 1003)
- US Patent App. Pub. 2008/0064499 (“Grant ’499”) (Ex. 1004)
- Prosecution History of the 806 Patent. (Ex. 1007)

III. APPLICABLE LEGAL STANDARDS

A. Ordinary Skill in the Art

8. My opinions in this declaration are based on the understandings of a person of ordinary skill in the art—sometimes referred to as an “ordinary artisan” or by the acronyms “POSITA” (person of ordinary skill in the art) or “PHOSITA” (person having ordinary skill in the art)—as of the time of the invention, which I understand to be the filing date (July 22, 2009) of the provisional application, to which the utility patent application of the ’806 Patent asserts priority. I understand that the person of ordinary skill in the art is a hypothetical person who is presumed to have known the art relevant to the challenged claims of the ’806 Patent at the time of the invention.

9. I understand that, in assessing the level of skill of a person of ordinary skill in the art, one should consider the type of problems encountered in the art, the prior solutions to those problems found in the prior art references, the rapidity with

which innovations are made, the sophistication of the technology, the level of education of active workers in the field, and my own experience working with those of skill in the art at the time of the invention.

10. I understand that the Petitioner and Patent Owner have proposed that the level of skill in the art at the time of the '806 patent is as follows:

A person of ordinary skill in the art would have possessed a bachelor's degree in electrical engineering or computer science (or an equivalent degree), and two years of practical or industry experience in the field of human computer interaction, including implementation of computer-based systems and software for providing haptic feedback effects to a user. A person could also have qualified as an ordinarily skilled artisan with more formal education and less practical or industry experience, or vice versa.

11. Consistent with this definition, I was at the time of invention, and am, a POSITA through my education, research experience and work experience. As of the date of the invention, I was familiar with the types of problems encountered in human computer interaction systems and the rapidity at which innovations are made.

B. Claim Construction

12. I understand that claims of the '806 Patent in this IPR are generally interpreted according to their ordinary and customary meaning taking into consideration the so-called "intrinsic evidence" of the patent consisting of (1) the

claim language; (2) the specification; and (3) the prosecution history.

13. I understand that claim terms may be explicitly defined in the patent specification or they may be implicitly defined through consistent usage in the specification. I also understand that the scope of claim terms may be limited by statements in the specification or prosecution history where the applicant clearly disavows or disclaims subject matter.

14. In this matter, I understand that the Patent Owner is proposing the following interpretation for “control gesture”:

a gesture made by a user that is a single and discrete control input having separate portions. The separate portions must be performed in specific order and/or with a specific timing to effectively achieve the control input associated with the ‘control gesture.’ Performance of the separate portions, on their own, will not result in the control input associated with the ‘control gesture’ as a whole (e.g., a ‘control gesture’ is not merely a combination of other gestures, each associated with its own control input).

C. Obviousness

15. Counsel has informed me, and I understand, that an issued patent claim is invalid as obvious if it can be shown that the differences between the patented subject matter and the prior art are such that the subject matter as a whole would have been obvious, at the time the invention was made, to a person having ordinary skill in the art. Relevant considerations include the level of ordinary skill in the art;

the scope and content of the prior art; differences between the prior art and the claims at issue; and the objective indicia, or secondary considerations, of nonobviousness.

16. In this regard, I am informed and I understand that the secondary considerations of nonobviousness could include factors such as commercial success, long felt but unresolved needs, the failure of others, skepticism by experts, praise by others, award and accolades, and copying.

17. Counsel has informed me, and I understand, that in order to evaluate the obviousness of any claim of the '806 Patent over a given prior art combination, I should analyze whether the prior art references, included collectively in the combination, disclose each and every element of the allegedly invalid claim as those references are read by the person of ordinary skill in the art at the time of the invention.

18. Counsel has informed me, and I understand, that even where all of the claim limitations are expressly disclosed in the prior art references, there must be some showing that a person of ordinary skill in the art would have been motivated to combine such prior art references, and explanation of how the combination would be achieved, and that there would have been a reasonable expectation of successfully achieving the claimed invention from such combination.

19. Counsel has informed me, and I understand, that absent some additional

reasoning, mere routine optimization for a person of ordinary skill in the art to arrive at the claimed invention through combination of prior art references is insufficient to support a conclusion of obviousness.

20. Counsel has informed me, and I understand, that to rely on a reference it must be analogous prior art. Counsel has informed me and I understand that a reference is considered analogous prior art: (1) if the reference is from the same field of endeavor as the claimed subject matter, or (2) if the reference “is reasonably pertinent to the particular problem with which the inventor is involved,” even though the reference is not within the field of the inventor’s endeavor.

21. Counsel has informed me, and I understand, in considering the obviousness of a claimed invention, one should not view the invention and the prior art with the benefit of hindsight. In an obviousness analysis, one must be aware of the distortion caused by hindsight bias and must be cautious of arguments reliant upon ex post reasoning. Counsel has instructed me and I understand that when considering obviousness, I should not consider what is known today or what was learned from the asserted patents. Instead, obviousness is assessed by the person of ordinary skill in the art at the time the invention was made.

22. In this regard, I am informed and I understand that the ’806 Patent may not be used as a guide to select and understand the prior art, because such an approach, at a minimum, discounts the value of combining various existing features

or principles in a new way so as to achieve a new result.

23. Counsel has informed me, and I understand, that obviousness cannot be predicated on what was unknown at the time of the invention, even if the inherency of a certain feature is later established. Counsel has also informed me, and I understand, that unknown properties of the prior art may not be relied upon to provide the rationale for modifying or combining the prior art to reach the claimed subject matter.

24. Counsel has informed me, and I understand, that a reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant of the '806 Patent.

IV. OVERVIEW OF THE 806 PATENT

25. The 806 patent deals with haptic feedback for systems that accept user inputs. “Haptics” in this context refers to simulation of touch and haptic feedback as a way of enhancing user experience of computing devices by providing tactile feedback to the users. This tactile feedback includes things like one or more vibrations, forces, and or motions applied to the user by actuators or objects containing actuators. EX1001, 6:3-17. As described in the background section of the 806 Patent, haptics and haptic feedback predate the inventions described in the

Patent and were part of the state of the art at the time of the invention.

26. In contrast, the 806 Patent describes techniques that improve upon the relatively simple and “limited” state of the art in haptic feedback to provide rich and complex haptic stimulations “to enhance the performance of complex control gestures by users, enhance the user experience, teach users to perform control gestures, and/or provide other enhancements over conventional real-world systems.” EX1001, 2:42-47; *id.*, 1:34-43. More advanced systems have control inputs that have become more complicated than the push-button or toggle switch found in those state-of-the-art systems, and involve complex control gestures where movements in multiple dimensions are analyzed to provide a single control input. EX1001, 1:58-65 (the control gesture is a gesture associated with a command input to the game, and includes an initial portion, a first intermediate portion and an ending portion); 2:13-15 (“the control gesture is a gesture associated with a command input to the game”).

27. The 806 Patent describes a control gesture as follows:

a ‘control gesture’ refers to a gesture made by a user that is a single and discrete control input having separate portions. The separate portions must be performed in specific order and/or with specific timing to effectively achieve the control input associated with the ‘control gesture’. Performance of the separate portions, on their own, will not result in the control input associated with the ‘control gesture’ as a whole (e.g., a ‘control gesture’ is not merely a

combination of other gestures, each associated with its own control input). EX1001, 5:7-16.

28. I note that this tracks the language that Patent Owner is proposing the Board use to interpret the term “control gesture.”

29. The 806 Patent describes providing haptic stimulation to the user in response to a user’s control gesture. *E.g. id.*, 25:58-60. The 806 Patent describes more complex and immersive haptic responses in order to provide more realistic feedback to users.

The haptic stimulation determined by the stimulation module is complex and rich beyond the haptic stimulation typically associated with control gestures. For example, in conventional systems, haptic stimulation associated with control gestures tends to include a single stimulation that is provided during and/or after a control gesture. This haptic stimulation provides confirmation of the control gesture. The haptic stimulation determined by the stimulation module 25, by contrast, tracks more closely with the performance of the control gesture to increase the immersive experience provided by the haptic stimulation. EX1001, 9:25-35.

30. My understanding is that the Petition challenges the patentability of claims 11, 12 and 15. Of these three claims, claim 11 is the independent claim and claims 12 and 15 depend from claim 11. Claim 11 is reproduced below:

A computer-implemented method of providing haptic stimulation to a user of a system, the method being implemented in the system

which includes a haptic device and one or more physical processors configured to execute computer program modules, the method comprising:

monitoring, on the one or more processors, performance of a control gesture by a user,

wherein the control gesture is a gesture associated with a command input to the system, and includes an initial portion, a first intermediate portion, and an ending portion;

determining, on the one or more processors, haptic stimulation associated with performance of the control gesture to be generated for the user,

wherein the haptic stimulation includes a first stimulation determined responsive

to performance of the initial portion of the control gesture, and a second stimulation that is different from the first stimulation and is determined responsive to performance of the first intermediate portion of the control gesture; and

generating, with the haptic device, the determined stimulation during performance of the control gesture.

31. I note that claim 11 includes receiving a control gesture from a user where the “control gesture is . . . associated with a command input to the system, and includes an initial portion, a first intermediate portion, and an ending portion

. . . .” EX1001, 25:52-60. This reflects the more complicated nature of control inputs beyond state of the art push buttons and sliders.

32. Claim 11 also describe a complex haptic response to the control input: “determining . . . haptic stimulation associated with the performance of the control gesture . . . wherein the haptic stimulation includes a first stimulation determined responsive to a first portion of the control gesture, and a second stimulation that is different from the first stimulation and is determined responsive to the performance of the intermediate portion of the control gesture” *Id.*, 25:61-67.

V. THE ASSERTED PRIOR ART

A. The Poupyrev Reference (Ex. 1003)

33. The Poupyrev Reference is a patent application publication from 2008 bearing serial number U.S. 208/0024459. This publication describes a system for determining when a user has taken an action that is consistent with a command input and proposes different techniques for distinguishing between a user’s intended command input and a casual, unintended touches of a pressure-sensitive touch screen. EX1003, ¶ 0068. According to the reference, Poupyrev describes “providing tactile notification when a user touches a user interface element on a touchscreen without executing functionality of the user interface element”; and “providing tactile feedback notification to a user when the functionality of the user interface is executed.” EX1003, ¶¶ 0005-0007.

34. The Poupyrev reference is concerned with distinguishing between touches that are intended by the user to actuate or execute a GUI element, e.g., pressing a button on a touch screen, and other touches not intending to execute a GUI element. Poupyrev determines which type of touch has occurred based on “a) the current state of GUI object and b) the pressure value applied to the GUI object . . . For example, if the GUI object is a graphical button, the GUI controller 112 can calculate if there was enough pressure applied on the graphical button on the screen to change the state of the button from ‘free’ to ‘pressed’ or ‘non-actuated’ to ‘actuated’.” EX1003, ¶ 0068.

35. Poupyrev describes providing multiple pressure thresholds including both an “activation” threshold and a greater pressure “confirmation” threshold to distinguish between when a user is intending to actuate or activate a GUI control, and when the touch is casual and not intended to actuate or activate the control, such as dragging a finger across a touch screen to “avoid accidental activation of the GUI objects.” EX1003, ¶120. Poupyrev only considers the user to intend to provide a command input when the user presses the GUI hard enough to reach this confirmation threshold. If the pressure does not reach the confirmation threshold, the system does not consider the user’s action to be a command input. EX1003, ¶ 81.

36. Fig. 11 of the Poupyrev reference illustrates these various pressure

thresholds and charts the pressure a user is exerting on the surface of the touch screen in two curves. Curve (a) represents a slow increase of pressure on the GUI object whereas Curve (b) is rapid increase. Points 1 and 2 on Curve (a) do not result in a command input or activation, but rather a command input is only recognized when the pressure reaches the confirmation pressure threshold at Point 3, at which point a tactile feedback is presented to the user to confirm the activation. EX1003, ¶0119. Other tactile feedbacks are associated with Points 1 and 2, but those points are not command inputs as the pressure on the device has not reached the “confirmation” threshold, and in fact if the user ceases pressing on the GUI object, no command input occurs for those two points.

37. Poupyrev separately recognized that when a user applies pressure quickly, having tactile feedback occurring at Points 1 and 2 would be “distracting or hamper the user interaction” and therefore the system only presents tactile feedback when the confirmation pressure threshold is exceeded, and a command input is signaled. EX1003, ¶121. This makes sense in that if the pressure is allowed to increase rapidly to the confirmation threshold, it is likely that the user intended the action.

B. The Grant Reference (Ex. 1004)

38. The Grant reference is another published application from 2008 with serial number US 2008/0064499. Grant describes adding haptic stimulation to

casino games being played on touch-sensitive screens. “While conventional casino gaming machines may provide feedback to a user in the form of visual displays on a screen, or with sounds, conventional casino gaming machines do not provide haptic feedback to a user. Such feedback may provide a more immersive or enjoyable experience, and may encourage the user to play a haptically-enabled game machine instead of a conventional machine.” EX1004, ¶4.

39. In Grant, user inputs from a touch sensitive screen are received, the system determines the type of interaction between the input contact and the image shown on the touch-sensitive device, and then provides a haptic feedback in response. EX1004, ¶5. “[A] user contacts a touchscreen at a location associated with a displayed playing card, the touchscreen senses the contact.” *Id.*, ¶¶35, 51. After that, Grant describes that, “the computer 310 compares the location of the contact with the location of an image of the playing card displayed on the display 340.” *Id.*, ¶¶37, 53. “[T]he system may determine that the user has touched an image . . . has slid a finger across an image, tapped the image or flipped over the image.” *Id.* “[T]he system 300 outputs a haptic effect based at least in part on the interaction.” EX1004, ¶¶38, 54.

VI. CLAIM CONSTRUCTION

40. I have not provided any specific opinions regarding the construction of any terms in the 806 Patent at this stage.

41. Unless I specify otherwise, I will use the construction for “control gesture” proposed by Patent Owner. That proposal is reproduced above in ¶ 14.

VII. POUPYREV DOES NOT TEACH A SINGLE CONTROL GESTURE WITH AN INITIAL PORTION, A FIRST INTERMEDIATE PORTION, AND AN ENDING PORTION

42. I have reviewed the Petition and Declaration of Dr. Jeremy Cooperstock (Ex. 1002). My understanding is that Petitioner and Dr. Cooperstock are mapping the claimed “control gesture” to Poupyrev’s “selecting” a GUI object by placing a finger on the surface of a touch screen, and “actuating” the GUI object by increasing pressure on the touch screen until the confirmation threshold is reached. Pet., 18-19.

43. In my opinion these are two separate command inputs. The Poupyrev reference describes the “selecting” action as a separate action that has its own haptic and visual responses. EX1003, ¶¶68-69, , 82. If a user selects a GUI object, then does not reach the confirmation pressure threshold, the system does not register a command input at all. The user has the option instead to deselect the GUI object, select a different GUI object, and potentially actuate that different GUI object. Thus, “selecting” a GUI object is a separate command input, different and apart from “actuating” which involves pressing the surface of the touch screen device to reach the confirmation threshold.

44. With respect to “actuating” a GUI object, Poupyrev describes two

different scenarios illustrated in Fig. 11. EX1003 ¶¶ 119-122. Curve (a) shows a scenario where the pressure is increased passed several pressure thresholds before reaching a “confirmation” threshold where Poupyrev’s system considers the user action a command input to the system. However, as explained above, this “actuating” action is a separate command input as compared with “selecting” and combining the two does not meet the “control gesture” language of claim 11. Poupyrev also describes a scenario where the pressure is increased to the confirmation threshold very quickly, and in these cases, Poupyrev omits the other pressure thresholds. As Poupyrev explains: “if the user pressed GUI objects very quickly, the multiple feedbacks may be presented, distracting and hamper [sic] the user interaction.” EX1003, ¶ 121. In this case, the system only uses a single haptic response at the confirmation threshold.

45. According to the 806 Patent and Patent Owner’s proposal, a “control gesture is not merely a combination of other gestures, each associated with its own control input.” EX1001, 5:14-16. Rather, it must be “a single and discrete control input having separate portions.” EX2005. As I explained above, the combination of user input actions such as “selecting” and “actuating” comprise two separate and distinct control inputs. As such, in my opinion, these actions identified in the Petition are not the “command gesture” required by claim 11, and by dependence, claims 12 and 15.

VIII. GRANT DOES NOT TEACH A CONTROL GESTURE

46. I have reviewed the Petition and Dr. Cooperstock's declaration regarding the teachings of the Grant Reference. I understand that they have identified the following actions together as meeting the "control gesture" language of the claims of the 806 Patent: "(1) the user makes contact with a portion of the screen corresponding to a playing card in order to select a card . . . (2) the user initiates a sliding motion to drag the selected card on the screen . . . (3) the user continues dragging the card until it reaches the edge of the screen to discard the selected card" Pet. at pp. 47, 49.

47. In my opinion, this identification of a control gesture for Grant is not that different from what Petitioner has identified for Poupyrev in that both identifications involve an action that constitutes "selecting" and another action that causes the system to perform a function, such as "discarding" a card in Grant. As I explain further below, both of these actions are separate and distinct control inputs and the combination is not a "single and discrete control input."

48. The Petition combines at least two separate actions to identify a "control gesture" of claim 11, "selecting" and "dragging". However, these are two separate command inputs and not a single "control gesture" as that term is used in the 806 Patent. In Grant, the "selecting" action is a separate command input by itself, and may be a precursor to multiple other actions. For example, a card can be

“selected” so that it may be discarded, or it may be “selected” so that it can be moved to another place in the set of cards that appear on the surface of the touch screen. Pet., 50 (“Petitioner notes that selection and dragging of a virtual playing card can be used to perform another function other than discarding the card, such as rearranging the cards in a user’s hand.”); EX1004, ¶¶ 63. It is clear from the disclosure in Grant where there are multiple possible actions that can occur after a card is selected, that selection in itself is a command input separate and apart from the dragging action for the purpose of discarding or rearranging.

49. Given the teaching in the 806 Patent and the proposed construction that “a ‘control gesture’ is not merely a combination of other gestures, each associated with its own control input” it is my opinion that the combination of actions such as selecting, dragging and discarding identified in the Petition do not meet the control gesture claim language as that term is described in the 806 Patent or in the Patent Owner’s proposed construction.

50. Furthermore, Petitioner’s identification of a control gesture requires an artificial combination of actions. According to the claims of the 806 Patent, a control gesture must have “an initial portion, a first intermediate portion and an ending portion.” EX1001 at 25:54-57. The Petition identifies dragging the card with a finger as an intermediate portion, and further dragging the card off the edge of the screen as an ending portion. Pet., 47. However, in my opinion these are the

same action, not two separate portions. Performing a single dragging action is one portion, not an intermediate and an ending portion. In fact, the identified ending portion is merely a continuation of the dragging that is identified as an intermediate portion.

I declare under penalty of perjury that the foregoing is true and correct. I acknowledge that willful false statements and the like are punishable by fine and/or imprisonment, that all statements made of my own knowledge are true, and that all statements made on information and belief are believed to be true.

Executed September 8, 2023, in Boston, Massachusetts.

By: 
Gregory Abowd