

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MOTOROLA MOBILITY LLC and
GOOGLE LLC,
Petitioners,

v.

MULTIFOLD INT'L INC. PTE. LTD.,
Patent Owner.

Case No. IPR2025-00039
U.S. Patent No. 9,146,589

**DECLARATION OF JEFFREY J. RODRIGUEZ, PH.D. IN SUPPORT OF
PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 9,146,589**

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I, Jeffrey J. Rodriguez, declare the following:

I. INTRODUCTION

1. I have been retained on behalf of Petitioners, Motorola Mobility LLC and Google LLC as an independent expert consultant to provide my expert opinions regarding the validity of claims of U.S. Patent No. 9,146,589 (the “’589 patent”).

2. I am being compensated for my work in this matter at my usual consulting rate for the time I spend on this matter. Neither my engagement nor my compensation depends on the substance of my opinions or the outcome of this or any other proceeding. I have been informed that the alleged owner of the ’589 patent is Multifold Int’l Inc. Pte. Ltd. (“Patent Owner”). To the best of my knowledge, I have no financial interest in the Patent Owner or Petitioners.

3. I expect to be available for deposition and to testify at the evidentiary hearing in this inter partes review to the extent required.

4. This declaration contains a summary of my conclusions; an overview of my qualifications as an expert; an overview of the scope and terms of my engagement for this declaration; an overview of the materials I have considered in arriving at my conclusions; an overview of the terminology and legal principles that I applied in my analysis; an overview of the technical background of the subject matter; an overview of the ’589 patent; an analysis of the level of ordinary skill in

the art related to the Patent in Suit; an analysis of the asserted references; and a patentability analysis of the challenged claims.

5. This declaration is based on information currently available to me. I may continue my investigation and study, which may include a review of documents and information that may yet be produced, as well as deposition testimony from depositions for which transcripts are not yet available or that may yet be taken in this review. Therefore, I expressly reserve the right to expand or modify my opinions as my investigation and study continue, and to supplement my opinions in response to any additional information that becomes available to me, any matters raised by Petitioners or Patent Owner and/or other opinions provided by their expert(s), or in light of any relevant orders from the Patent Trial and Appeal Board or other authoritative body.

II. QUALIFICATIONS, PUBLICATIONS, AND PRIOR TESTIMONY

6. I am a professor at The University of Arizona in the Department of Electrical & Computer Engineering, where I hold or have held the following positions: (a) Associate Professor of Electrical & Computer Engineering, with tenure (1997–present), (b) Associate Professor of Biomedical Engineering, with tenure (2017–present), (c) Director of ECE Online Programs (2023–present), (d) Director of the Signal and Image Laboratory (1990–present), (e) Director of Image Analysis, Cancer Imaging Shared Services, Arizona Cancer Center (2009–2014), (f) Co-

Director of Connection One, a National Science Foundation industry/university cooperative research center for wired and wireless communication circuits and systems, (g) Director of Graduate Studies for the Department of Electrical & Computer Engineering (2000–2003, 2005–2016).

7. My formal education includes a Bachelor of Science degree in Electrical Engineering from the University of Texas at Austin in May 1984, a Master of Science degree in Electrical Engineering from the Massachusetts Institute of Technology in June 1986, and a Ph.D. Degree in Electrical Engineering from the University of Texas at Austin in May 1990.

8. I teach courses at both the graduate and undergraduate level through the Dept. of Electrical & Computer Engineering and the College of Optical Sciences. The courses I have taught include Digital Image Processing, Digital Image Analysis, Digital Signal Processing, Advanced Digital Signal Processing, Signals and Systems, and Circuit Analysis. I have been awarded the Outstanding Teaching Award by the IEEE and Eta Kappa Nu (IEEE-HKN), given by students at The University of Arizona to one outstanding professor each year.

9. My research activity focuses on systems for digital signal/image/video processing and analysis. My research activities include automated algorithms for detection/analysis/classification of objects using machine learning and conventional methods, efficient management of large image databases for training machine

learning systems, quality assessment of medical image display devices, and applications in medical image analysis, automobile tracking, driver distraction detection, animal species classification, and real-time video processing for motion analysis.

10. One project involved determining the modulation transfer function (MTF) of medical image display devices. The prior methods typically involved measuring the response to square waves, white noise, and/or line stimuli, but these methods can be tedious and sensitive to noise. We proposed two novel methods: (1) subtracting a shifted edge-spread function from the edge-spread function followed by Fourier analysis, and (2) applying a low-pass differentiator to the edge-spread function followed by Fourier analysis. Experimental performance analysis demonstrated that the new methods were less labor-intensive and reduced the high-frequency noise associated with prior methods.

11. Another project involved the design and development of a real-time image and video processing system for automated detection and behavioral analysis of zebrafish for use in ototoxicity assessment of drugs. The system we designed and built includes an array of Raspberry Pi microcomputer systems configured for parallel video capture of sixteen zebrafish populations. Each Raspberry Pi features a system on a chip, which includes a CPU, a video graphics processing unit (GPU), a disk storage system, and a memory system. Our zebrafish analysis system includes

hardware and software to automatically capture and transmit compressed MPEG video data to a local personal computer or to a high-performance computing cluster to decode the video and implement customized algorithms for detection of zebrafish pose and motion using multi-scale edge map analysis, resulting in automated assessment of zebrafish swimming behavior.

12. I am a Senior Member of the Institute of Electrical and Electronics Engineers (IEEE) and the IEEE Signal Processing Society. I served as Treasurer of the 2024 IEEE Southwest Symposium on Image Analysis and Interpretation (SSIAI), General Chair of SSIAI 2016, and General Chair of the 2007 IEEE International Conference on Image Processing (ICIP). In addition, I served on the IEEE Signal Processing Society Technical Committee on Image, Video, and Multidimensional Signal Processing (2005–2011) and served as Associate Editor of the *IEEE Transactions on Image Processing* (1996–2000). Over the years, I have served on numerous other professional committees, and I have served as a technical reviewer for numerous journals and professional conferences.

13. I am named as an inventor on a patent involving polar dynamic programming for automated image segmentation. I have authored or co-authored over 140 technical publications. Over the past 30 years, I have trained hundreds of students in signal/image/video processing, including directing the research of numerous graduate students, resulting in more than 50 graduate theses and

dissertations. I have served as an expert in patent cases since 2005, involving signal/image/video processing, data compression systems, video receivers, document cameras, cellular camera phones, signal/image/video transmission over wireless networks, etc.

14. My current curriculum vitae is attached as Exhibit 1006, which includes a detailed listing of my education, work experience, honors, awards, professional associations, publications, and a list of expert consulting activities during the past five years in which I have testified as an expert at deposition or trial.

III. MATERIALS CONSIDERED

15. In forming my opinions, I have relied on my own knowledge and experience, including my education, training, and work experience in the field of electrical & computer engineering, my research and teaching experience, my experience in working with others in this field, and my experience in the design, development, and operation of relevant systems. I have relied on the documents and materials recited herein as well as those identified in this declaration, including the '589 patent, the prosecution history of the '589 patent, the prior art references, and information discussed and any other references specifically identified in this declaration, including the materials identified in the chart below.

Exhibit	Description
Ex. 1001	U.S. Pat. No. 9,146,589 to Sirpal, et al.

Exhibit	Description
Ex. 1002	File History for U.S. Pat. No. 9,146,589 to Sirpal, et al.
Ex. 1004	U.S. Pub. 2012/0139815 A1 to Aono, et al.
Ex. 1005	U.S. Patent No. 8,928,552
Ex. 1006	Curriculum Vitae of Dr. Jeffrey J. Rodriguez
Ex. 1009	U.S. Patent No. 7,471,890 to Lee
Ex. 1010	U.S. Patent Application Publication No. 2011/0193806 A1 to Kim
Ex. 1011	U.S. Patent Application Publication No. 2002/0142810 to Kawasaki
Ex. 1012	U.S. Patent Publication No. 2010/0048190 to Park
Ex. 1013	U.S. Patent Application Publication No. 2010/0248788 to Yook
Ex. 1014	U.S. Patent Application Publication 2009/0190295 A1 to Chin
Ex. 1015	U.S. Patent Application Publication 2005/0078211 A1 to Whitehorn

16. To the best of my knowledge, I have listed all the materials I considered and reviewed. I may have inadvertently left some materials off the above list that I cited in my analysis below. Such materials, if any, should be included in the above list of materials I considered and reviewed. I reserve the right to supplement, amend, or modify the opinions set forth in this declaration or in any other declaration, report, witness statement, deposition, or in testimony.

IV. LEGAL PRINCIPLES

17. I am not an attorney and offer no legal opinions. For the purposes of this declaration, I have been informed about certain aspects of the law that are relevant to my analysis, as summarized below.

A. Interpretation of Claims

18. I have been advised that, for purposes of this *inter partes* review proceeding, the words of the claims should be given their ordinary and customary meaning according to a person of ordinary skill in the art in question at the time of the invention. I have further been advised that the prosecution history is relevant to determining the correct construction of claim terms and that extrinsic evidence also may be relevant to establish the meaning of terms to the extent it is consistent with the specification and prosecution history.

B. Anticipation

19. I have been advised that a patent claim is “anticipated” and therefore invalid when a single prior art document describes, or a prior art product includes, every element recited, either expressly or inherently, in the claim. I have further been advised that, to be considered anticipatory, a written prior art reference must be enabling and describe the invention of the claim sufficiently to have placed it in possession of a person of ordinary skill in the field of the invention.

20. I have further been advised that a prior art reference may anticipate a claim without disclosing an element of the claim if that missing element is necessarily present, or inherent, in the single anticipating reference as would be understood by one of ordinary skill in the art. I have been advised that inherency cannot be established by probabilities or possibilities; the mere fact that a certain thing may result from a given set of circumstances is not sufficient.

21. I have been advised that a patent claim is invalid if the claimed invention “was known or used by others in this country ... before the invention thereof by the [patent] applicant.” 35 U.S.C. § 102(a). I have been advised that, to be invalidating, knowledge or use must be accessible to the public. I have been advised that whether use or knowledge is “public” is a fact-intensive question, the answer to which depends on such factors as whether some or all of the prior use or knowledge was maintained in confidence or as a trade secret, the existence of non-disclosure agreements or other confidentiality obligations imposed on members of the public who observed the use, the number of people involved, and the extent to which the use of the product informs an observer about the features of the claimed invention.

22. I have been advised that a patent claim is invalid if the claimed invention was “patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent” (35 U.S.C. §

102(a)) or the claimed invention was described in “a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent” (35 U.S.C. § 102(e)). I have been advised that the date of “the invention . . . by the applicant” in both § 102(a) and § 102(e) refers to the conception date of the claimed invention by the patent applicant.

23. I have been advised that a reference does not qualify as prior art under § 102(a) or § 102(e) if (1) the inventor conceived of the invention prior to the effective date of the reference and showed reasonable diligence in reducing the invention to practice from a time just prior to the effective date of the reference or (2) the inventor reduced the invention to practice prior to the effective date of the reference. I have been advised that conception requires an inventor to form in his or her mind a definite and particular idea of a complete and operative invention, including every feature of the claim at issue. I have further been informed that there are two types of reduction to practice: actual reduction to practice (i.e., when all limitations of the claimed invention are embodied in a physical or tangible form that has been sufficiently tested to demonstrate it works for its intended purpose) and constructive reduction to practice (i.e., by the filing of a patent application).

24. I have been advised that a patent claim is invalid if the claimed “invention was patented or described in a printed publication in this or a foreign country . . . more than one year prior to the date of the application for patent in the

United States” (35 U.S.C. § 102(b)). I have been advised that, to qualify as prior art, a printed publication must be shown to be accessible to the public (i.e., disseminated or otherwise made available to the extent that persons interested and ordinarily skilled in the subject matter or art, exercising reasonable diligence, can locate it).

C. Obviousness

25. I have been advised that a patent claim is “obvious” and therefore invalid when the differences between the claimed 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 to which the subject matter pertains.

26. In making an obviousness determination, I have been advised that there are several factors to consider: (1) the scope and content of the prior art; (2) the level of ordinary skill in the art at the time the invention was made; (3) the differences between the claimed invention and the prior art, if any, and (4) objective considerations, if any exist, such as any commercial success, copying, prior failure by others, licenses, longstanding need, and unexpected results.

27. I have been advised that prior art used to show that a claimed invention is obvious must be “analogous art.” Prior art is analogous art to the claimed invention if (1) it is from the same field of endeavor as the claimed invention (even if it addresses a different problem) or (2) the reference is reasonably pertinent to the

problem faced by the inventor (even if it is not from the same field of endeavor as the claimed invention).

28. I have been advised that a patent claim composed of several elements is not proved obvious merely by demonstrating that each of its elements was independently known in the prior art, whether those references were set forth in a single reference or in a combination of references. Instead, it must have been obvious to arrange those elements in the same way as the elements in the claim.

29. I have been advised a single reference may be the basis for finding that a claim is obvious. When the obviousness determination relies on the combination of two or more references, however, the patent challenger must show that there is a reason, suggestion, or motivation that would lead one of ordinary skill in the art to combine prior art references.

30. I have been advised that there is no single way to define the line between true inventiveness on the one hand (which is patentable) and the application of common sense and ordinary skill to solve a problem on the other hand (which may not be patentable). For example, market forces or other design incentives may be what produced a change in the technology of the prior art, rather than true inventiveness. I have further been advised that explicit teachings or suggestions in the prior art to make the modification or combination of elements claimed in the patent may be evidence of obviousness. Further, an innovation may be obvious if it

applies a known technique that had been used to improve a similar device or method in a similar way. I have been advised that a claimed invention may be found to be obvious to try if the claimed innovation was one of a relatively small number of possible approaches to the problem with a reasonable expectation of success by those skilled in the art.

31. However, I also been advised that it is improper to engage in hindsight when trying to determine the obviousness of a patent claim. Many true inventions might seem obvious with the benefit of hindsight. I have been advised that the obviousness inquiry must be conducted from the standpoint of a person of ordinary skill in the field at the time the claimed invention was made. What is known today, and what is learned from the teachings and disclosures of the patent itself containing the claim under analysis, should not be considered. Nor should one use the patent claim as a guide to picking out elements of the prior art for combination.

32. I have been informed that various “secondary considerations” (sometimes referred to as objective indicia of non-obviousness) may support a determination of non-obviousness and that such secondary considerations must be considered as part of an obviousness analysis. I have been informed that secondary considerations of nonobviousness may include:

- commercial success of a product due to the merits of the claimed invention;

- a long felt need for the solution provided by the claimed invention;
- unsuccessful attempts by others to find the solution provided by the claimed invention;
- copying of the claimed invention by others;
- unexpected and superior results from the claimed invention; and
- acceptance by others of the claimed invention as shown by praise from others in the field or from the licensing of the claimed invention.

33. I have been advised that in order for such “secondary considerations” evidence to be relevant to the obviousness inquiry, there must be a relationship or “nexus” between the advantages and features of the claimed invention and the evidence of secondary considerations.

34. I have been advised that if a claim element is not obvious, then the claims that depend from it are not obvious.

V. THE '589 PATENT

A. Synopsis of the '589 patent

34. The '589 patent, titled “Image Capture During Device Rotation,” issued to Sanjiv Sirpal and Mohammed Selim on Sept. 29, 2015. The '589 patent derives from U.S. Patent Application No. 13/627,453 (“Application”), which was filed on Sept. 26, 2012, and from U.S. Provisional Patent Application No. 61/539,884 (“Provisional”), which was filed on Sept. 27, 2011. The '589 patent is directed to

methods and devices for changing the display mode of a multiple screen device for a first screen and a second screen when capturing the image. Ex. 1001, Abstract.

B. Prosecution History of the '589 patent

35. The application that ultimately issued as the '589 patent went through several rounds of rejections and amendments. U.S. Patent Publication No. 2010/2010/0060664 (“Kilpatrick II”) was the primary prior art cited in the rejections. Ex. 1002, p. 64-77, 184-194. The examiner repeatedly found that Kilpatrick II taught among other things a device with two screens and an image capture function, which receives a device orientation change (*e.g.*, a device rotation from landscape to portrait), and based on that rotation change, a portion on the display of both screens changed. Ex. 1002, p. 64-77, 184-194.

36. Ultimately, the applicant overcame these rejections by amending the independent claims to recite that the claimed device state was “physical” and to specify: “the physical device state at least including open, closed easel or modified easel, the display mode at least including portrait single, portrait dual, landscape single, landscape dual, portrait max or landscape max.” Ex. 1002, p. 53-60. In the accompanying remarks, the applicant referenced a telephone interview with the examiner in which it was “discussed that the changing of the displays in the claims was based on 3 items: i) a device state, 2) a display mode and 3) a device orientation. Ex. 1002, p. 58. “It was also discussed that Kilpatrick in Figs 39-40 changed what

was displayed based on orientation.” *Id.* The applicant argued that Kilpatrick did not teach or suggest: “presenting a first display for the image capture *function based on a physical device state, a display mode and a device orientation*, the physical device state at least including open, closed easel or modified easel, the display mode at least including portrait single, portrait dual, landscape single, landscape dual, portrait max or landscape max, and *based on the device orientation change, the device state and the display mode*, presenting a second display for the image capture function, wherein a portion on the first and second screen changes from the first display to the second display.” (emphasis in the original). *Id.* The examiner subsequently allowed the claims. Ex. 1002, p. 23-25.

C. Challenged Claims of the ’589 patent

37. My understanding is that Petitioner is requesting *inter partes* review of claims 1-6, and 11-14, and 16 (“Challenged Claims”) of the ’589 patent. These claims are recited below as follows, where I have added reference labels (P), (A), (B), etc. to individual portions of the claims for convenience:

Limitation	Claim Language
[1P]	A method, comprising:
[1A]	providing a device having at least first and second screens;
[1B]	receiving user interface input to execute an image capture function;

Limitation	Claim Language
[1C]	presenting a first display for the image capture function based on a physical device state, a display mode and a device orientation,
[1D]	the physical device state at least including open, closed easel or modified easel, the display mode at least including portrait single, portrait dual, landscape single, landscape dual, portrait max or landscape max;
[1E]	receiving a device orientation change, wherein the device orientation change is a rotation of the device; and
[1F]	based on the device orientation change, the device state and the display mode, presenting a second display for the image capture function, wherein a portion on the first and second screen changes from the first display to the second display.
[2]	The method of claim 1, wherein the image capture function is configured to capture an inward-facing image
[3]	The method of claim 2, wherein the device is in an open state.
[4]	The method of claim 3, wherein the first display is a portrait display.
[5]	The method of claim 4, wherein the second display is a landscape display.
[6]	The method of claim 5, wherein the portion that changes includes an image preview changing from a portrait orientation to a landscape orientation.
[11P]	A device, comprising:
[11A]	a first screen, the first screen including a first gesture capture region;
[11B]	a second screen, wherein the second screen faces in a substantially same direction as the first screen when the device is open, and wherein a lens is associated with the second screen;

Limitation	Claim Language
[11C]	a memory;
[11D]	a processor in communication with the memory, the first screen, and the second screen, the processor operable to:
[11E]	receive user interface input to execute a image capture function;
[11F]	determine an image capture function configuration, a device orientation, and a physical device state,
[11G]	wherein the image capture function configuration is for a self-portrait, the physical device state at least including open, closed easel or modified easel, the display mode at least including portrait single, portrait dual, landscape single, landscape dual, portrait max or landscape max
[11H]	based on the image capture function configuration, the device orientation, and the device state, enter a dual screen mode for the image capture function;
[11I]	present a first display for the image capture function;
[11J]	receive a device orientation change, wherein the device orientation change is a rotation of the device; and
[11K]	based on the device orientation change, the image capture function configuration and the device state, present a second display for the image capture function, wherein a portion on the first and second screen changes from the first display to the second display.
[12A]	The device of claim 11, wherein the device is in an open state,
[12B]	wherein the first display is in a landscape orientation, and
[12C]	wherein the image capture mode is a self-portrait mode.
[13]	The device of claim 11, wherein the second display is in a portrait orientation.

Limitation	Claim Language
[14]	The device of claim 13, wherein the portion that changes includes an image preview changing from a landscape orientation to a portrait orientation.
[16P]	A non-transitory computer readable medium having stored thereon computer-executable instructions, the computer executable instructions causing a processor of a device to execute a method for providing a user interface, the computer-executable instructions comprising:
[16A]	instructions to receive user interface input to execute a image capture function;
[16B]	instructions to determine an image capture function configuration, a device orientation, and a physical device state,
[16C]	wherein the device has at least first and second screens,
[16D]	wherein the device is in an open state,
[16E]	wherein, in the open state, the first and second screens face in substantially same directions,
[16F]	wherein the image capture function is configured to capture an inward-facing image,
[16G]	and wherein a lens is associated with the second screen;
[16H]	based on the image capture function configuration, the device orientation, and the physical device state, instructions to enter a dual screen mode for the image capture function,
[16I]	the physical device state at least including open, closed easel or modified easel, the display mode at least including portrait single, portrait dual, landscape single, landscape dual, portrait max or landscape max;
[16J]	instructions to present a first display for the image capture function;
[16K]	instructions to receive a device orientation change, wherein the device orientation change is a rotation of the device; and

Limitation	Claim Language
[16L]	based on the device orientation change, the image capture function configuration and the device state, instructions to present a second display for the image capture function, wherein a portion on the first and second screen changes from the first display to the second display.

VI. LEVEL OF ORDINARY SKILL IN THE ART

38. For my analysis, I have been asked to assume that the date of the claimed invention is the filing date of the Provisional, but my opinions would be the same if the date of the claimed invention is determined to be the date of the Application.

39. In my opinion, the field of art pertaining to the '589 patent includes image capture using a handheld computing device. In my opinion, a POSITA at the time of the claimed would have had a bachelor's degree in electrical engineering, computer engineering, computer science, or the equivalent plus at least two years of experience in image capture, image processing, image display, user interfaces, or a related field. Additional education could offset a lesser amount of experience and vice versa.

40. In determining the characteristics of a POSITA, I considered several factors, including the type of problems encountered in the art, the solutions to those problems, the rapidity with which innovations are made in the field, the

sophistication of the technology, and the education level of active workers in the field. I also placed myself back in the time frame of the claimed invention and considered the students and colleagues with whom I had worked at that time.

41. I am qualified as a person having at least this level of skill. Based on my education, training, and professional experience, I am familiar with the level and abilities of a POSITA. Indeed, I have participated in professional organizations and have taught, trained, and worked closely with many such persons over the course of my career, including prior to and around the time of the claimed invention.

42. I provide my analysis and opinions in this declaration from the perspective of a POSITA, as I have defined it above, during the relevant time frame stated above, where appropriate.

VII. CLAIM CONSTRUCTION

43. The '589 patent, including the claims at issue, use the terms “screen” and “display” as nouns.

44. The '589 patent expressly defines both “screen” and “display” (when used as a noun. “The term ‘screen,’ ‘touch screen,’ or ‘touchscreen’ refers to a physical structure that includes one or more hardware components that provide the device with the ability to render a user interface and/or receive user input.” Ex. 1001, 2:64-67. “The term ‘display’ refers to a portion of one or more screens used to display the output of a computer to a user.” Ex. 1001, 3:29-30. I have used these

meanings of the terms “screen” and “display” in my analysis, and in my opinion, a POSITA would have used these same meanings in light of the clear definitions provided in the specification.

45. For all other claim terms, I have assumed the meaning as understood by a POSITA at the time of the claimed invention, where appropriate, in light of the patent’s specification, claims, and file history.

VIII. TECHNOLOGY BACKGROUND

46. I rely on, and incorporate, the understandings below regarding such known concepts and technologies, to support my opinions regarding the knowledge of a POSITA at the time of the invention, where appropriate, and the motivations relating to the application of the prior art. The concepts, technologies, processes, and understandings discussed in this section would have been in the mind of a POSITA when contemplating the disclosures and/or suggestions in the prior art and when considering combining features from that prior art.

A. General Technology Background

47. As noted above in Section IV.A, the ’589 patent concerns a “dual multi-display handheld computing device.” Ex. 1001, 1:45-50. The device could capture an image, and could do so in different configurations, for instance, a self-portrait configuration or other configurations such as taking an image with the camera facing outward from the user. *See, e.g.*, Ex. 1001, 1:63-2:3. The device also could have

different physical configurations; for example, it could be open or closed in a folded configuration. *See, e.g.*, Ex. 1001, 1:53-1:62.

48. By September 2011, the earliest claimed priority date of the '589 patent, handheld devices such as cell phones and personal digital assistants had long been known in the art and were in widespread use in society. Many of these devices, like those that are the subject of the '589 patent, had more than one screen, could take images in different configurations, and / or had different physical states. Various prior art references describe these types of devices with some or all of these characteristics, most notably Aono, which is the focus of my declaration and discussed at length below. Other examples are discussed in this technology background section and elsewhere in this declaration.

49. U.S. Patent Application Publication No. 2009/0190295 to Chin is directed to a “portable information terminal” like a PDA “with two panels that are each hingably coupled with a connecting unit for moving the panels between first and second folded states.” Ex. 1014, [0003]. “When the positions of the first and second panels are in a state in which a digital camera can be used, it is judged in step **S150** whether the portable information terminal is set or otherwise being used in a self-photographing mode.” Ex. 1014, [0077]. Based on that determination, the device enters one of two image capture modes, which in turn changes what is

displayed on the two display units: each display unit displays images to perform a preview function, or not, depending on the mode. Ex. 1014, [0078]-[0079].

50. U.S. Patent Application Publication No. 2005/0078211 to Whitehorn is directed to a handheld device like a PDA with a camera. Ex. 1015, [0019]. The device includes top and bottom covers, each including a screen interface, which can rotate about two axes with respect to each other. Ex. 1015, [0020]-[0023]. Rotating the covers causes the device to enter into different modes, including different image capture modes, in which the device's screens display different information. Ex. 1015, [0026]-[0029].

51. U.S. Patent No. 7,471,890 to Lee teaches a mobile terminal that "includes a camera and first and second display units for displaying various information." Ex. 1009, 5:10-14, Figure 4.

52. U.S. Patent Application Publication No. 2011/0193806 A1 to Kim describes a "mobile terminal having multiple display units." Ex. 1010, [0008]. Kim discloses a "camera function." Ex. 1010, [0069]. Kim discloses outputting data to be shown on the device displays in different manners based on the orientation of the mobile terminal. Ex. 1010, [0031].

53. U.S. Patent App. Pub. No. 2002/0142810 to Kawasaki describes a foldable mobile communication terminal with two displays and a camera unit. Ex. 1011, [0034]. The mobile communication terminal judges whether the device is in a

folded or unfolded state. Ex. 1011, [0034]. The user of the device can be the subject of the image, or the subject of the image can be something else other than the user. Ex. 1011, [0009].

54. U.S. Patent Publication No. 2010/0048190 to Park describes “a mobile terminal equipped with first and second display modules provided on first and second surfaces.” Ex. 1012, Abstract. Park’s device includes a camera. Ex. 1012, [0037]. Park describes a “sensing unit **140**” that “determines a current state of the mobile terminal such as whether the mobile terminal 100 is opened or closed.” Ex. 1012, [0041]

B. Aono

55. Aono describes as background art the existence of “personal digital assistants having a large screen display or two-screen display panel have been commercially produced. With these personal digital assistants, using a large screen display or two-screen display panel enables a great number of information to be displayed at the same time, or enables information to be enlarged and displayed.” Ex. 1004, [0005]. Devices with a large screen display “includes a drawback, in that it is difficult to reduce the size of a device having such a large screen display panel, and accordingly portability is poor.” *Id.*, [0008].

56. Aono recognizes that two-screen personal digital assistants can be “folding” and thus highly portable. *Id.*, [0009]. Aono also notes a device with a two-screen display may have drawbacks including “the aspect ratio of one screen of

display panel differs from an aspect ratio at the time of adding two screens of display panels.” *Id.* [0009]. “[I]n the event of displaying a content having a fineness ratio optimized to the aspect ratio of a display panel of one screen using a display panel of two screens, this aspect ratio of two screens does not match the fineness ratio of the content.” *Id.* In addition, “in the event of displaying a content having a fineness ratio optimized to the aspect ratio obtained by adding the two screens on the display panel of one screen, the aspect ratio of this one screen does not match the fineness ratio of the content.” *Id.* Aono desires to provide a PDA type of device “which enables display or enlarged display of a great number of information using multiple screens, enables optimal display as to various contents while satisfying a user’s various applications and requests, realizes screen opening/closing by simple operations” in a small, thin, and simple configuration. *Id.*, [0013].

57. Aono “relates to a personal digital assistant having multiple screens, and a display control method and display control program of the personal digital assistant.” *Id.*, [0003]. In one embodiment, the personal digital assistant **1** “is configured so as to have three casings of a first casing **2**, a second casing **3**, and a third casing **4**” and each such casing “has a display panel of a predetermined aspect ratio on the first principal surface side, and has a texture panel on the second principal surface side.” *Id.* [0082]. The personal digital assistant **1** has a “three-screen folding-type configuration whereby the first casing **2** through third casing **4**

can be opened/closed by folding.” *Id.*, [0253]. The folding of the casings is illustrated in Figure 1:

FIG. 26

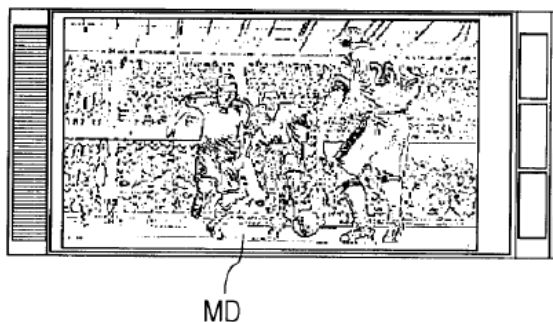
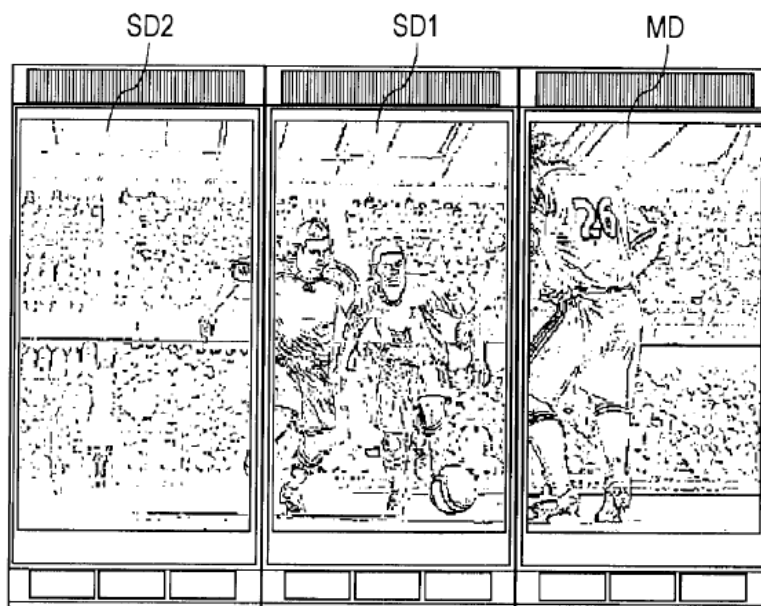


FIG. 27



Id., Fig. 1. The Aono device includes a digital camera. *Id.*, [0083].

58. Aono’s device includes sensors to detect the state of the personal digital assistant 1, including “a horizontal/vertical detection sensor, a direction detection

sensor, a position detection sensor, an acceleration detection sensor, a temperature detection sensor, a humidity detection sensor, an optical detection sensor, an infrared sensor, and further other various sensors.” *Id.*, [0270]. Based on determinations made by the sensors as to the state of the device, Aono discloses displaying images on a single display or enlarged across up to three displays. *Id.*, [0152]-[0154]. Aono illustrates this in Figures 26 and 27:

FIG. 26

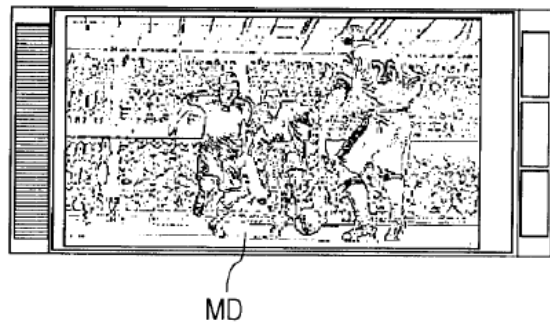
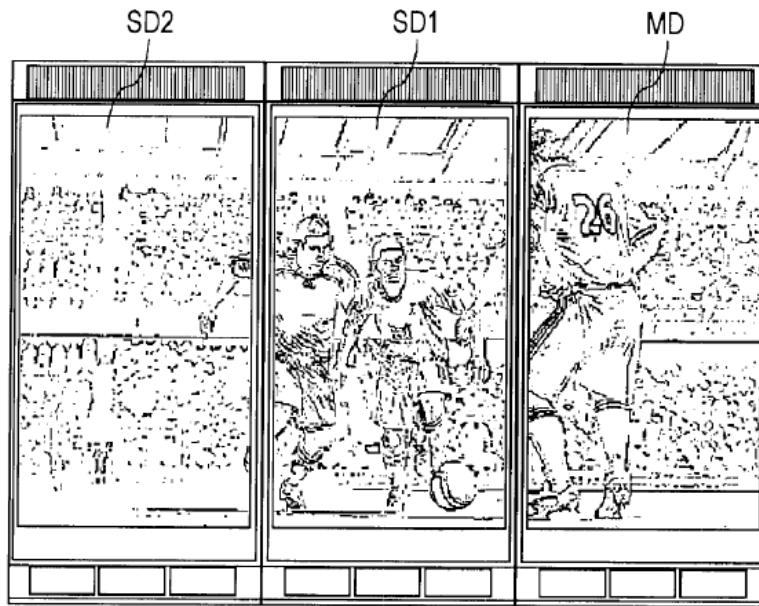


FIG. 27



Id., Figs. 26-27, [0152]-[0154].

IX. SUMMARY OF OPINIONS

59. Based on my knowledge and experience, the materials I have reviewed, I have formed the following opinions.

60. It is my opinion that all of the Challenged Claims would have been obvious in view of Aono to a POSITA.

X. GROUND 1: AONO RENDERS CLAIMS 1-6, 11-14, AND 16 OBVIOUS

61. In my opinion, based on the following analysis, all of the Challenged Claims of the '589 patent would have been obvious to a POSITA in view of Aono.

62. Aono is analogous art to the '589 patent. Both Aono and the '589 patent describe multi-display handheld computing devices. Ex. 1001, 1:45-48; *See*,

e.g., Ex. 1004, [0003]. Aono and the '589 patent both attempt to address the problem of how to present information in different image capture modes in a rotatable or foldable handheld electronic device. *See, e.g.*, Ex. 1001, Abstract; Ex. 1004, Abstract, [0013]-[0014].

63. Aono discloses, or at least suggests and would have rendered obvious to a POSITA, all the limitations of the Challenged Claims, as set forth below. For the reasons I discuss further below, the differences, if any, between what Aono discloses and the subject matter of the challenged claims are minor, at most. In my opinion, it would have been routine, simple, and obvious to a POSITA to modify the teachings of Aono, to the extent necessary, to yield the subject matter of the Challenged Claims.

A. Claim 1

1. Claim [1P]: A method, comprising:

64. If the preamble is limiting, Aono discloses this limitation. Aono illustrates an example method of controlling the disclosed device in Figures 60 and 61:

FIG. 60

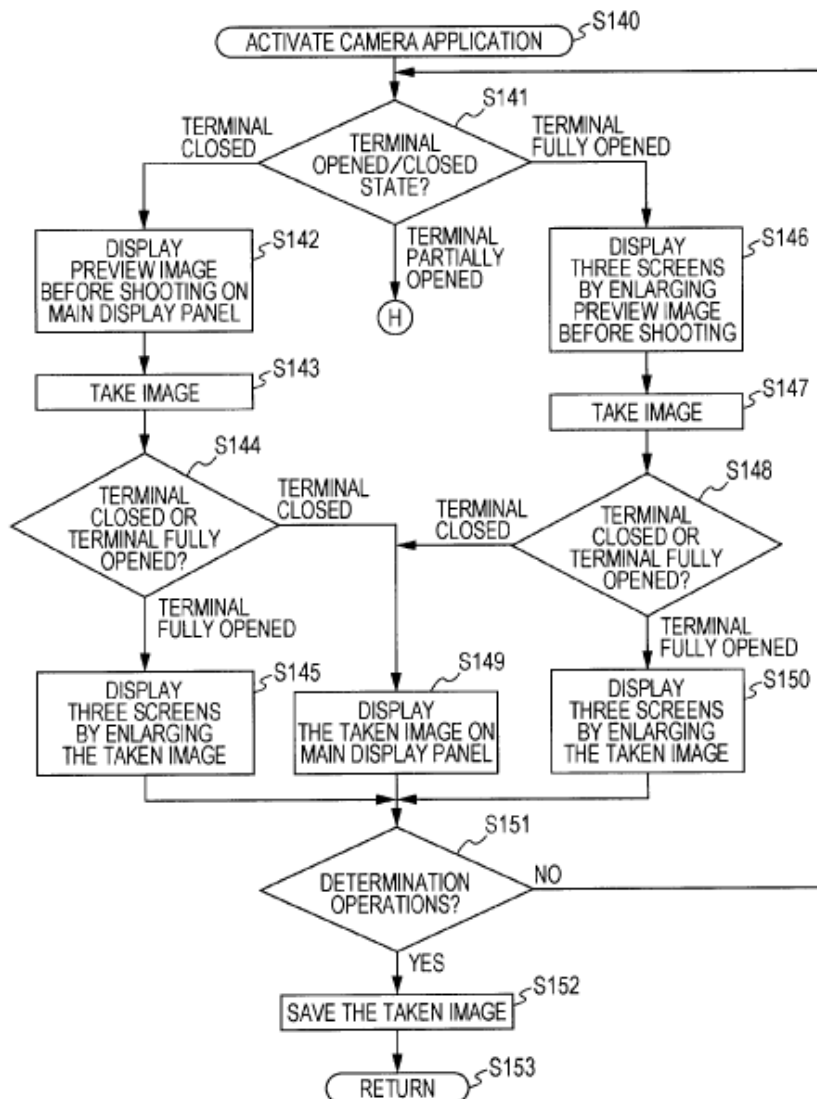
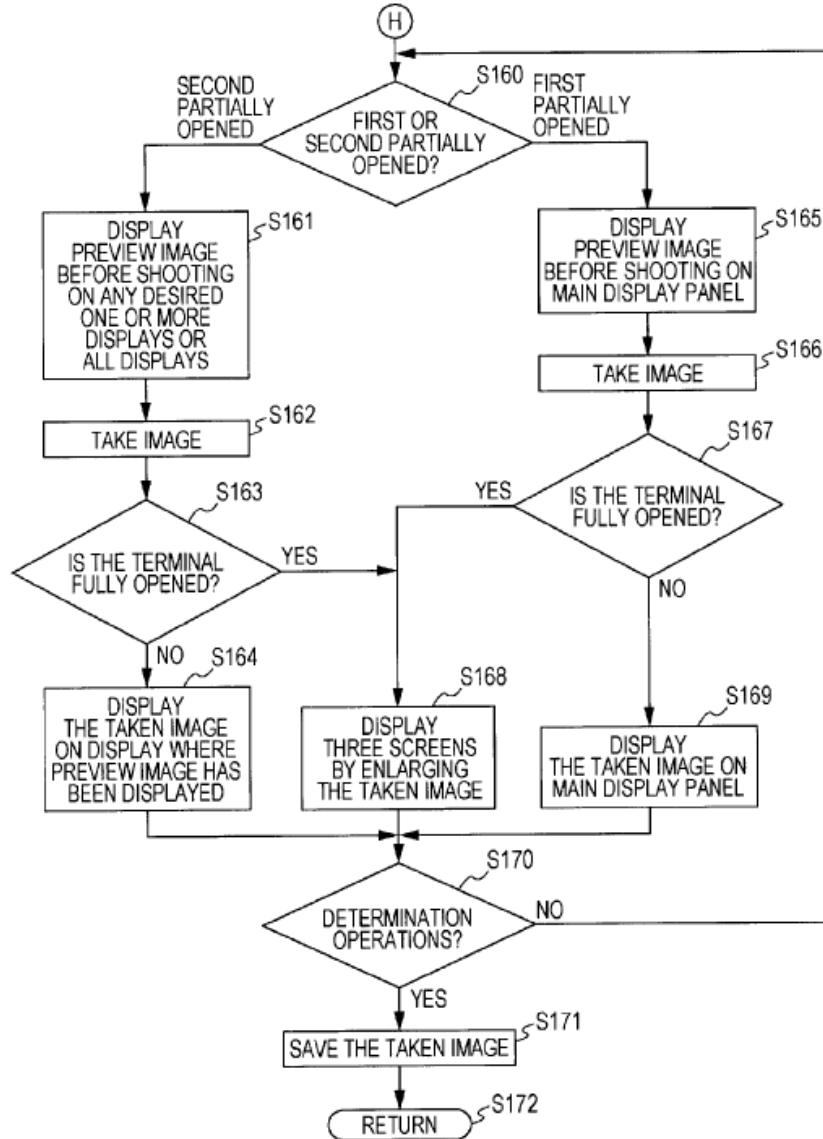


FIG. 61



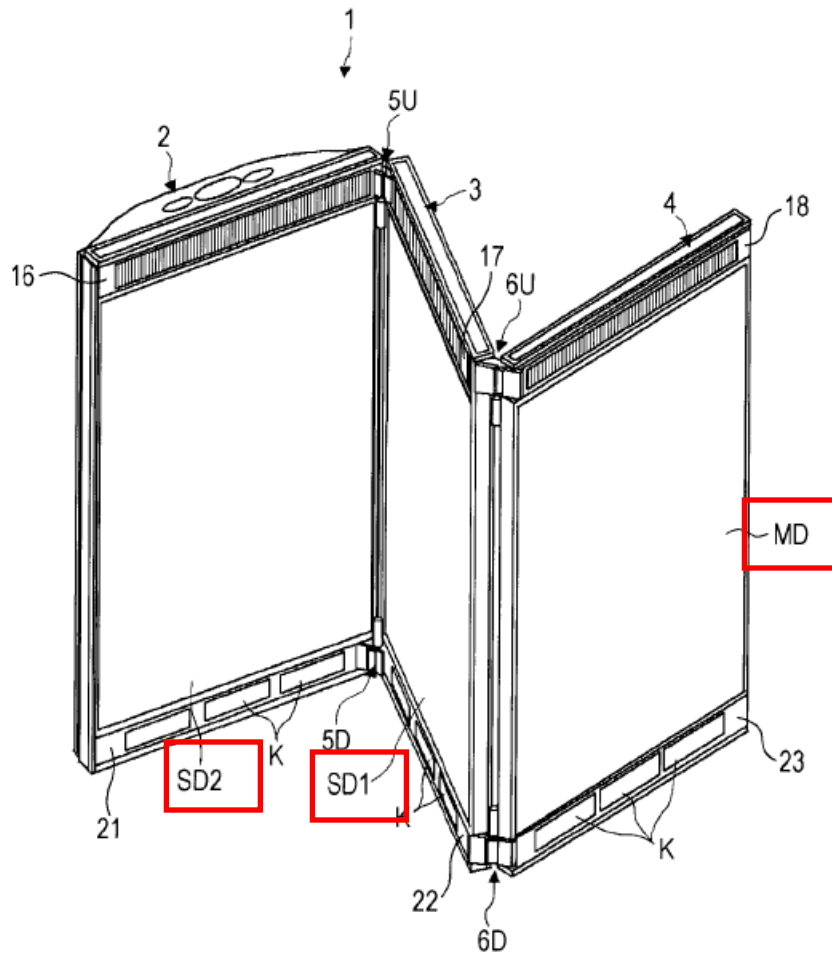
Ex. 1004, Figs. 60-61, [0385]-[0417]. The steps of the method disclosed in Aono are discussed further in the sections that follow as well.

2. Claim [1A]: providing a device having at least first and second screens;

65. Aono discloses this limitation.

66. Aono discloses “a personal digital assistant having multiple screens, and a display control method and display control program of the personal digital assistant.” Ex. 1004, [0003]. Aono discloses a first casing **2** that includes “a second sub display panel **SD2**,” second casing **3** that includes “a first sub display panel **SD1**,” and a third casing **4** that includes a main display panel **MD**.” Ex. 1004, [0082]-[0085]. Each of the display panels **SD1**, **SD2**, and **MD** are “made up of a flat display panel such as a liquid crystal display or organic Electro Luminescent (EL) or the like.” *Id.*, [0083]-[0085]. Aono illustrates this in Figure 1:

FIG. 1



Ex. 1004, Fig. 1, [0082]-[0085].

67. A “transparent touch sensor panel” is disposed on the entire surface of each of display panels **MD**, **SD1**, and **SD2**. *Id.*, [0285]. A “touch panel signal processing unit **119** measures the touch detection position, touch path, touch time interval, and so forth from the touch panels **121** and **122**, and transmits the measured data thereof to the control and computing unit **104** as touch detection data.” *Id.* Aono further discloses: “The control and computing unit **104** is made up of a CPU (Central

Processing Unit), controls each unit such as the transmission/reception circuit unit **103**, video signal processing unit **111**, audio signal processing unit **113**, GPS module **106**, noncontact communication module **107**, short-distance wireless communication module **108**, digital broadcasting reception module **109**, external memory interface unit **110**, camera unit **112**, various-sensor unit **116**, external input/output terminal unit **117**, key operating unit **118**, touch panel signal processing unit **119**, and so forth, and also performs various types of computation as appropriate. Also, the control and computing unit **104** executes the control program or various types of application programs stored in the memory unit **105**. Description will be made later regarding the flow of the operation control of this personal digital assistant **1** according to the control and computing unit **104** executing the control program or application program.” *Id.*, [0287].

68. Aono teaches that the display panels can display a user interface in several places in its disclosure. As just one example, “Also, the personal digital assistant **1** according to the present embodiment displays a screen for communication between users on the first sub display panel **SD1**, and ***displays a user interface screen for input operations*** for this communication between users on the main display panel **MD**.” *Id.*, [0189]; *see also id.*, [0192], [0241], [0425], [0426]. And, as explained in more detail below with respect to the other limitations of claim

1, each of the three display panels can display a user interface in the form of image and video.

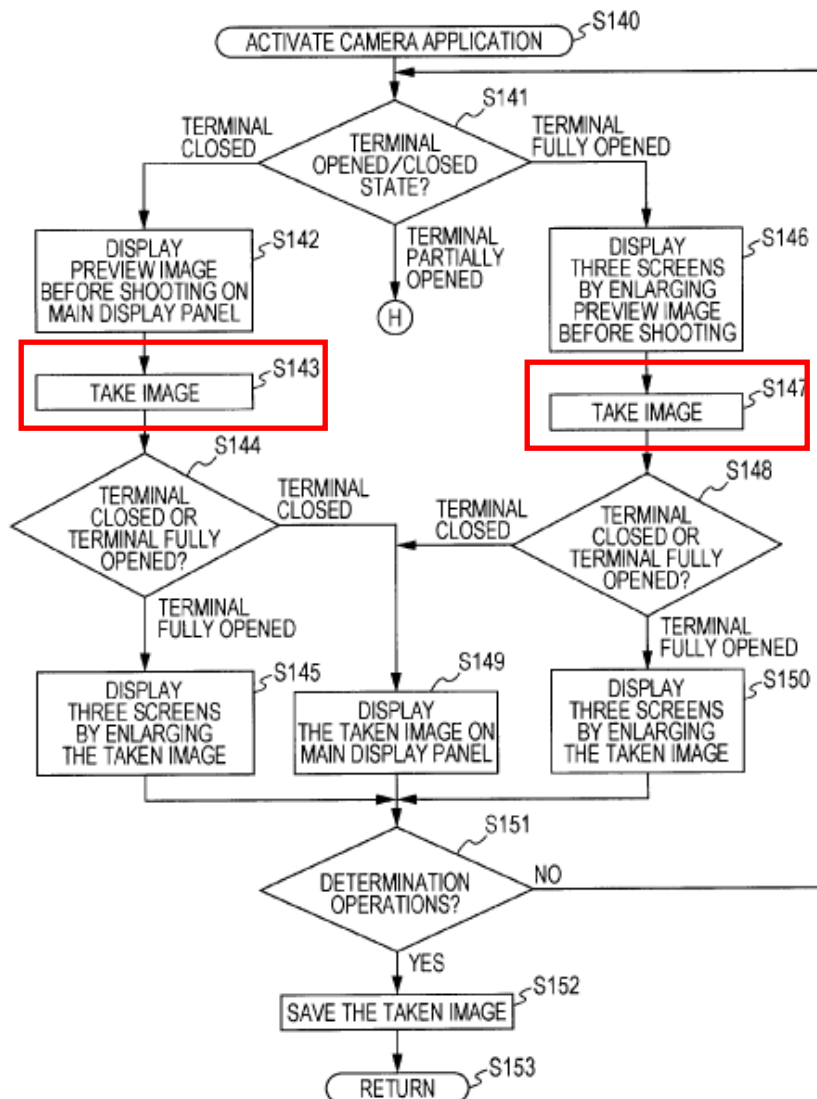
69. A POSITA would have understood that any of (**MD**, **SD1**, and **SD2**) could be the claimed “first and second screens”—because each are hardware components that provide the device with the ability to render a user interface and/or receive user input.

3. Claim [1B]: receiving user interface input to execute an image capture function;

70. Aono discloses this limitation.

71. Aono’s device includes a digital camera. Ex. 1004, [0083] (“Also, the first casing **2** also includes a shooting lens **7** for digital cameras, light **8** for emitting extra light for shooting, and a release button **7S** available for releasing at the time of camera shooting”). The digital camera is operable using buttons or touch screens on the device, as described in the discussion of the flowchart in Figure 60:

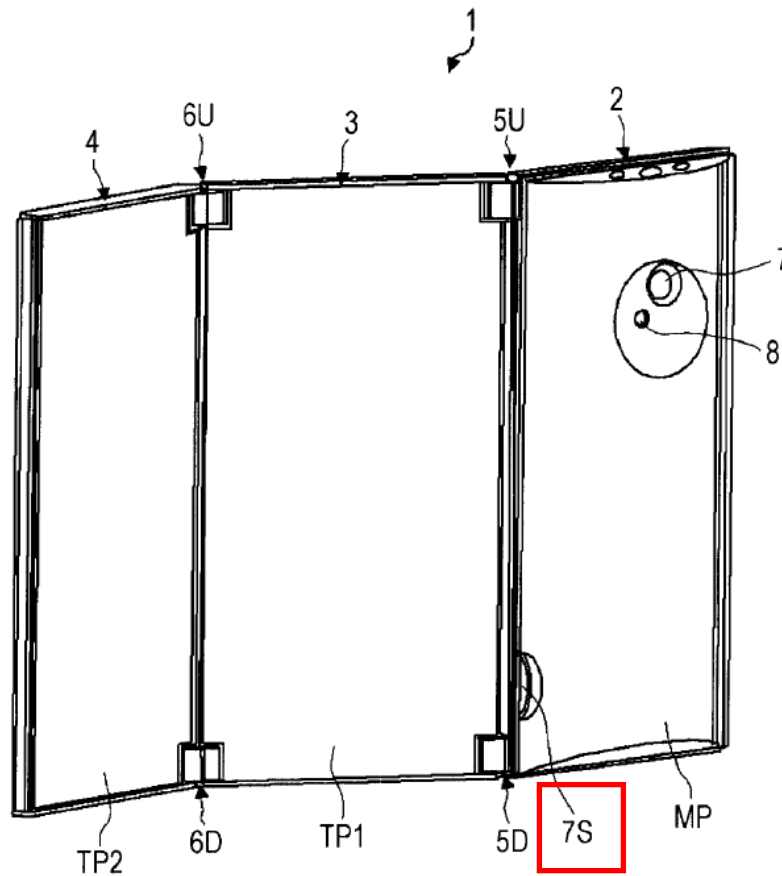
FIG. 60



Ex. 1004, Fig. 60, [0235] (“the personal digital assistant **1** according to the present embodiment is capable of taking an image” . . . and shooting an image may be accomplished “at the time of the release button **7S** being pressed by the user” or “at the time of taking one of the externally exposed pressing keys **K** . . . being pressed by the user” or “at the time of touching to the touch sensor panel . . .”), [0386] (“the

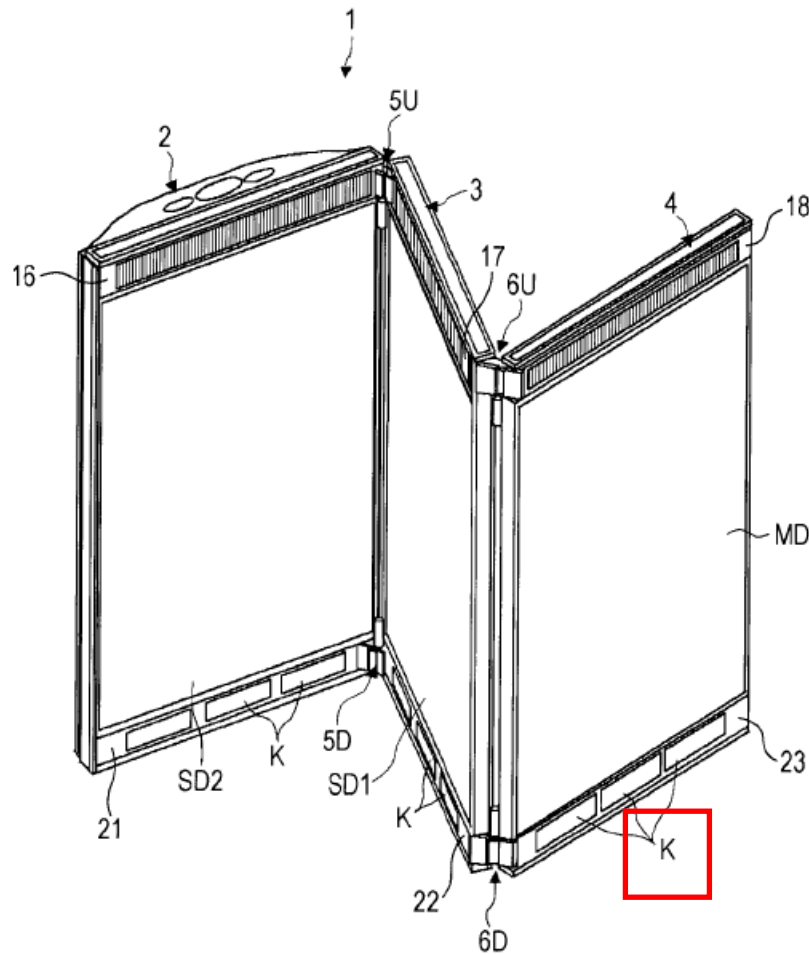
control and computing unit **104** activates a camera application program in step **S140.**"). Specific to step **S143**, "in the event that the release button **7S** has been pressed by the user ... the control and computing unit **104** executes shooting processing by the camera." *Id.*, [0390]. The button **7S** is illustrated in Figure 2:

FIG. 2



Id., Fig. 2. Aono also describes step **S147** as "in the event that one of the pressing keys **K** serving as the release button has been pressed by the user ... the control and computing unit **104** executes shooting processing by the camera." *Id.*, [0396]. These keys **K** are illustrated in Figure 1:

FIG. 1



Ex. 1004, Fig. 1. Below, I discuss in more detail how Aono’s device can take be configured in different open or closed physical states. The Aono device “is capable of taking an image even any state of the terminal closed state, first partially opened state, second partially opened state, and terminal fully opened state.” *Id.*, [0235].

72. A POSITA would accordingly understand that Aono teaches having an “image capture function” (*i.e.*, a digital camera that captures images) that is executed

when the device “receiv[es] user interface input” (*i.e.*, pressing a button or touchscreen to operate the digital camera).

4. Claim [1C]: presenting a first display for the image capture function based on a physical device state, a display mode and a device orientation,

73. Aono discloses, or at least suggests, this limitation, which would have been obvious to a POSITA in view of Aono.

74. *Presenting a first display for the image capture function.* Aono teaches presenting a first display for the image capture function of personal digital assistant 1.

75. Figures 60 and 61 illustrate a flowchart for steps for a device according to Aono capturing an image with a digital camera (*i.e.*, an image capture function):

FIG. 60

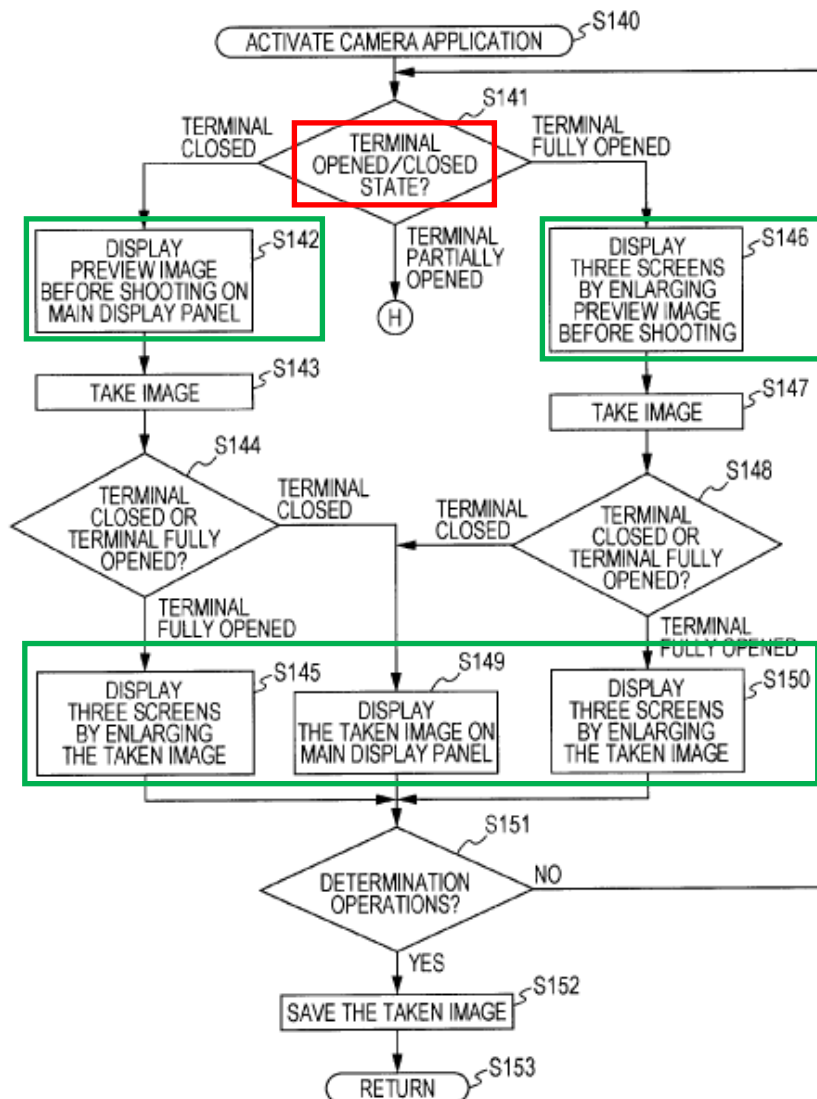
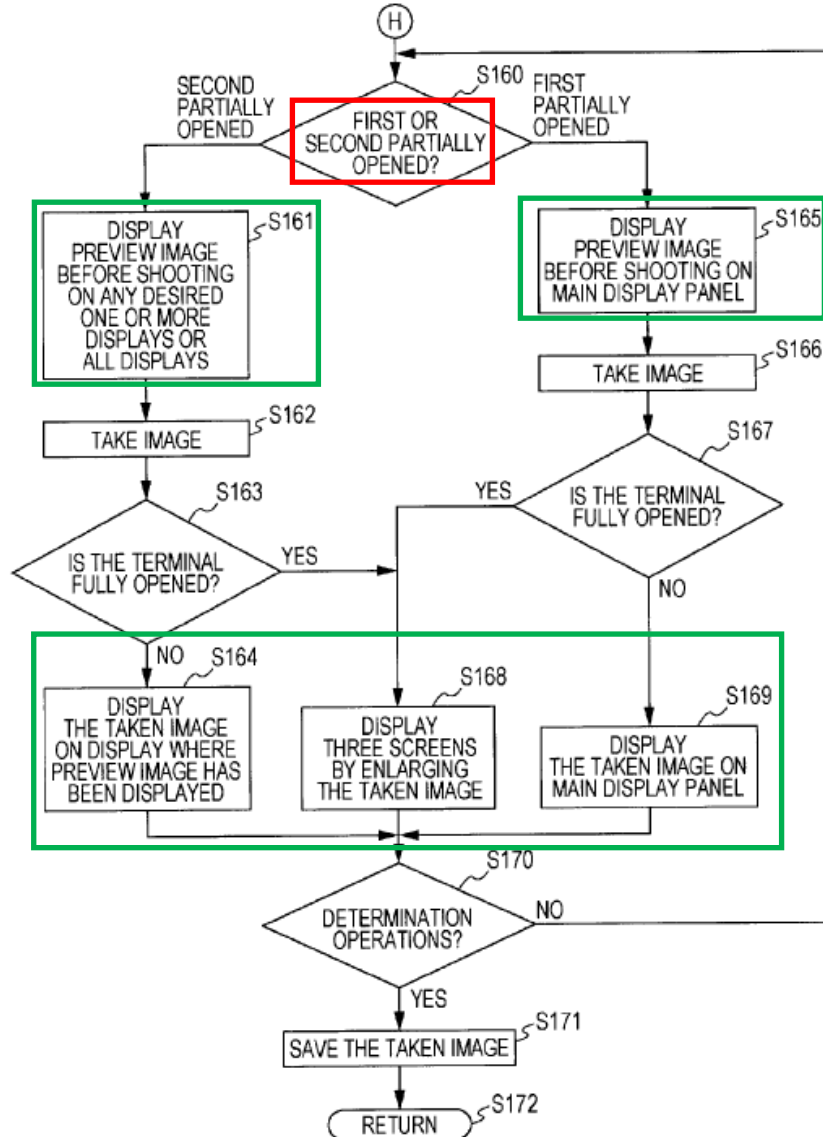


FIG. 61



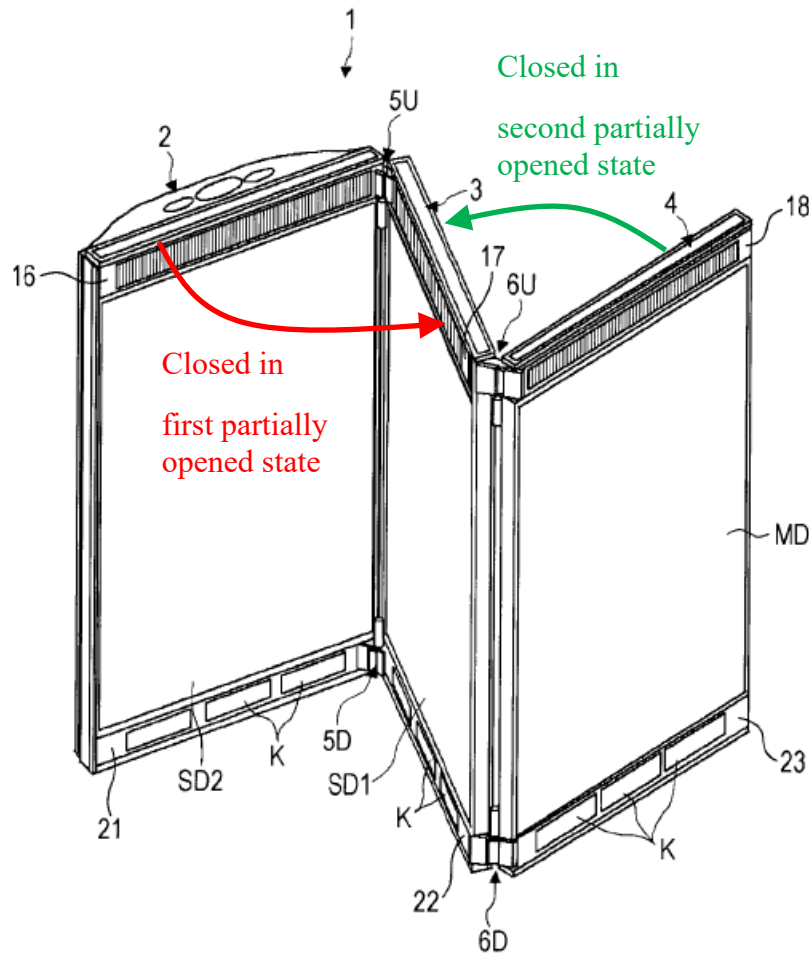
Ex. 1004, Figs. 60-61, [0385]-[0417]. The flowcharts of Figures 60 and 61 are examples of an image capture function according to Aono's teachings. In step **S140**, the method begins with activating a camera application. Ex. 1004, [0386]. Subsequently, the device presents different "display[s]" for the image capture function on display panels **MD**, **SD1**, and/or **SD2**. Ex. 1004, [0387]-[0417]; [0231]-

[0235]. The way this is done is discussed in more detail in connection with the steps below.

76. A POSITA would understand that the display depends on, and accordingly is based on, all three of the physical device state, display mode, and device orientation: (1) whether the device is open, closed, or partially open (“physical device state”), (2) whether the device is configured for the display to occupy one screen or more than one screen (“display mode”), *and* (3) whether the device is in a portrait or landscape orientation (“device orientation”). The reasons why are explained further below.

77. *Physical device state.* During an image capture function, the Aono device detects the physical device state: *e.g.*, opened, closed or partially opened (in a first or second partially opened device state). *Id.*, Figs. 60-61. A “first partially opened state” is “the state in which the first casing **2** and the second casing **3** are overlaid, and on the other hand, only the third casing **4** is opened.” *Id.*, [0234]. A “second partially opened state” is “the state in which the second casing **3** and the third casing **4** are overlaid, and on the other hand, only the first casing **2** is opened.” *Id.* Figure 1 is annotated below the illustrate a first (**red**) or second (**green**) partially opened device state and shows how the device opens and closes in those two states:

FIG. 1



78. The personal digital assistant **1** can be configured with sensors, specifically “terminal state detection sensors” such as an “opening/closing detection sensor,” to “detect the opened/closed State between the first casing **2** and the second casing **3**” and “between the second casing **3** and the third casing **4**.” Ex. 1004, [0143]-[0145]. “Upon the camera application program being activated, the control and computing unit **104** determines whether the state of the terminal is either the

terminal closed state or the terminal opened state, based on the detection output of the terminal state detection sensor as the processing in step **S141**.” *Id.*, [0387], [0403]-[0404].

79. The “physical device states” in Aono are consistent with the ’589 patent’s disclosure of “physical device states,” as explained further below as to limitation [1D]. *Infra* Section X.A.5.

80. Aono teaches that the display presented for the image capture function is based on the physical device state. With reference to Figures 60 and 61, Aono provides the following options depending on the device state:

81. “[I]n the event that determination is made in step **S141** that the state of the terminal is the terminal closed state, the control and computing unit **104** advances the processing to step **S142**. Upon proceeding to the processing in step **S142**, the control and computing unit **104** displays a preview image at the time of camera shooting on the main display panel **MD** in the terminal closed state.” *Id.*, [0388]-[0389].

82. “On the other hand, in the event that determination is made in step **S141** that the state of the terminal is the terminal fully opened state, the control and computing unit **104** advances the processing to step **S146**. Upon proceeding to the processing in step **S146**, the control and computing unit **104** enlarges and displays a

preview image at the time of camera shooting on the three screens at the time of the terminal fully opened state.” *Id.*, [0394]-[0395].

83. “Upon proceeding to the processing in step **S160**, the control and computing unit 104 determines whether this terminal partially opened state is either the first partially opened state or the second partially opened state. In the event that determination is made in step **S160** that the state of the terminal is the first partially opened state, the control and computing unit **104** enlarges and displays a preview image at the time of the camera shooting on the main display panel **MD** as the processing in step **S165**.” *Id.*, [0405]-[0406].

84. “On the other hand, in the event that determination is made in step S160 that the state of the terminal is the second partially opened state, the control and computing unit 104 displays a preview image at the time of the camera shooting on one or more display panel or all of the display panels which the user desires of the three display panels, as the processing in step S161.” *Id.*, [0410].

85. *Display Mode*. A POSITA would understand that Aono teaches having different display modes because images associated with the image capture function can be displayed on a single screen, on more than one screen, or enlarged across one or more screens, each of which is a different “display mode.”

86. A POSITA would have understood each of these represent different display modes because they represent a different mode or technique for visually

representing data. The “display modes” in Aono are consistent with the ’589 patent’s disclosure of “display modes,” which includes different display of an image or images on or enlarged across one or more screens. *Infra* Section X.A.5.

87. The annotated Figures 60 and 61, above, identify those steps (in **green**) that determine which display mode the device is in before a photo is taken. For example, in Step **S142**, the device “displays a preview image at the time of camera shooting *on the main display panel MD*” (*id.*, [0389]), in Step **S146**, the device “enlarges and displays a preview image at the time of camera shooting *on the three screens* at the time of the terminal fully opened state” (*id.*, [0395]), in Step **S161**, the device “displays a preview image at the time of the camera shooting *on one or more display panel* or all of the display panels” (*id.*, [0410]), and in Step **S165**, the device “enlarges and displays a preview image at the time of the camera shooting *on the main display panel MD*” (*id.*, [0405]). Figures 60 and 61 also identify the display mode the device is in after a photo is taken. *See id.* [0392]. Based on these disclosures, a POSITA would have understood that the display for the image capture function in Aono would be based on the display mode, that is, the display panel or panel(s) operable to show the preview image in the image capture mode, and how the panel(s) display the image (whether in an enlarged format or not),

88. The “display mode” may be affected by, and in some circumstances depend entirely upon, the physical device state, but in other circumstances a given

physical device state can have multiple display modes. For example, when in the “second partially opened state,” different display modes are possible: “in the event that determination is made in step **S160** that the state of the terminal is the second partially opened state, the control and computing unit **104** displays a preview image at the time of the camera shooting on one or more display panel or all of the display panels which the user desires of the three display panels.” Ex. 1004, [0410]. That is, in the physical device state of “second partially opened state,” the display mode could be (i) displaying a preview image on panel **MD**, (ii) displaying a preview image on panel **SD1**, (iii), displaying a preview images on panel **SD2**, (iv) displaying a preview image on each of panels **MD** and **SD1**, and so on for all the different permutations of the three display panels.

89. *Device Orientation.* Aono also discloses that the personal digital assistant **1** can be configured to have, and detect changes in, device orientation. The personal digital assistant **1** includes sensors that detect the device orientation and changes to device orientation including “a horizontal/vertical detection sensor, a direction detection sensor, a position detection sensor, an acceleration detection sensor . . . and further other various sensors.” Ex. 1004, [0143].

90. The ’589 patent defines “display orientation” as “the way in which a rectangular display is oriented by a user for viewing.” Ex. 1001, 3:42-43.

91. “The two most common types of display orientation are portrait and landscape.” *Id.*, 3:43-45. “Landscape” is where “the display is oriented such that the width of the display is greater than the height of the display.” *Id.*, 3:45-52. “Portrait” is where “the display is oriented such that the width of the display is less than the height of the display.” *Id.*, 3:52-57.

92. The definitions provided in the ’589 patent for “portrait” and “landscape” orientations are consistent with how those terms are typically used, that is, a POSITA generally would have understood a “landscape” orientation to be one where the width is greater than the height, and “portrait” to be one where the height is greater than the width.

93. Where, as in Claim limitation [1C], the ’589 patent refers to a “device orientation,” a POSITA would have understood that the same definitions and concepts would apply to determining the orientation (“portrait” or “landscape”) of a “device” as to a “display,” consistent with the ordinary meaning of those terms and how they are used elsewhere in the ’589 patent.

94. Aono further teaches that the display mode will be different depending on whether the personal digital assistant 1 is in a landscape or portrait orientation. There are several examples of this and relevant teachings in Aono.

95. Figures 26 and 27 illustrates a display mode that displays images according to the opened or closed state of the terminal based on what the terminal

state detection sensor detects (the physical device state). *Id.*, [0149]. Aono teaches that what is displayed *also* is based on the device orientation.

96. Figures 26 and 27 display an image (*e.g.*, a video) across one and three screens, respectively, with the device in a landscape orientation according to the meaning discussed above (*i.e.*, the width of the display is greater than the height of the display), with an aspect ratio of 16:9:

FIG. 26

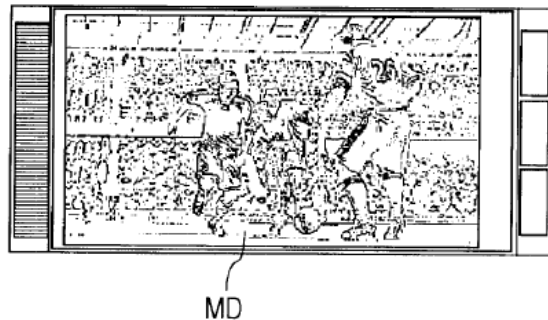
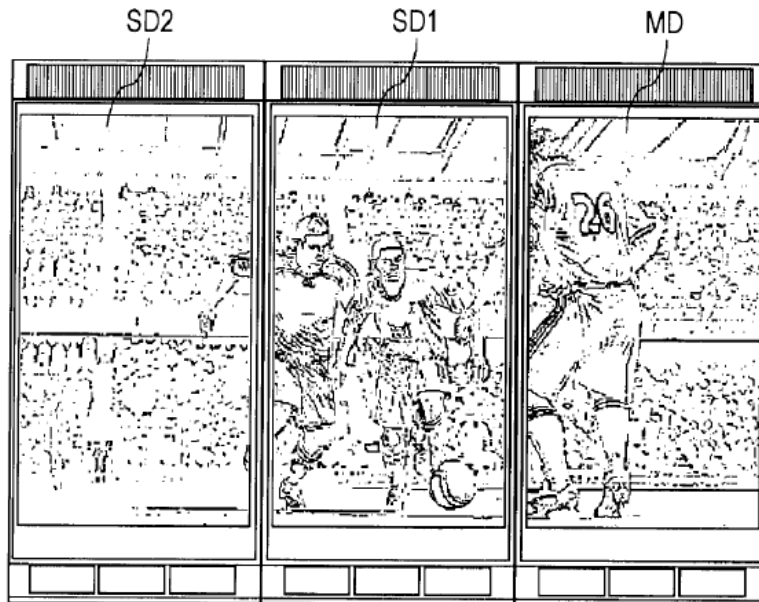


FIG. 27



Id., Fig. 26, [0151]-[0153]. Aono then notes that the display changes if the device is in portrait orientation: “It goes without saying that an example is also the same as with the above wherein in the terminal closed state, a portrait video corresponding to an aspect ratio of 9:16 is displayed with the long direction of the main display panel MD as perpendicular, and in the terminal opened state, a portrait enlarged video corresponding to an aspect ratio of generally 9:16 is displayed by arraying the three screens in the vertically longitudinal direction as viewed from the user.” *Id.*, [0153]. Aono gives another example of how the display changes based on the device orientation: “the personal digital assistant 1 according to the present embodiment may perform operation control such as *switching to enlarged display of the three screens from the one screen only at the time of transition of the horizontal/vertical*

state of this terminal based on detection output of, for example, a horizontal/vertical detection sensor, direction detection sensor, acceleration sensor, or the like.” *Id.*, [0154].

97. Aono explicitly describes how the display changes based on a 90 degree rotation of the device. This is described with reference to Figure 50, which “illustrates a schematic internal configuration example in the event that the personal digital assistant 1 according to the present embodiment is, for example, a cellular phone terminal.” Ex. 1004, [0272]. Aono describes the structure and operation of various components of Figure 50. Of particular relevance here, Figure 50 includes a “storage medium stores the display control program for controlling display of the personal digital assistant according to the present embodiment.” *Id.*, [0278].

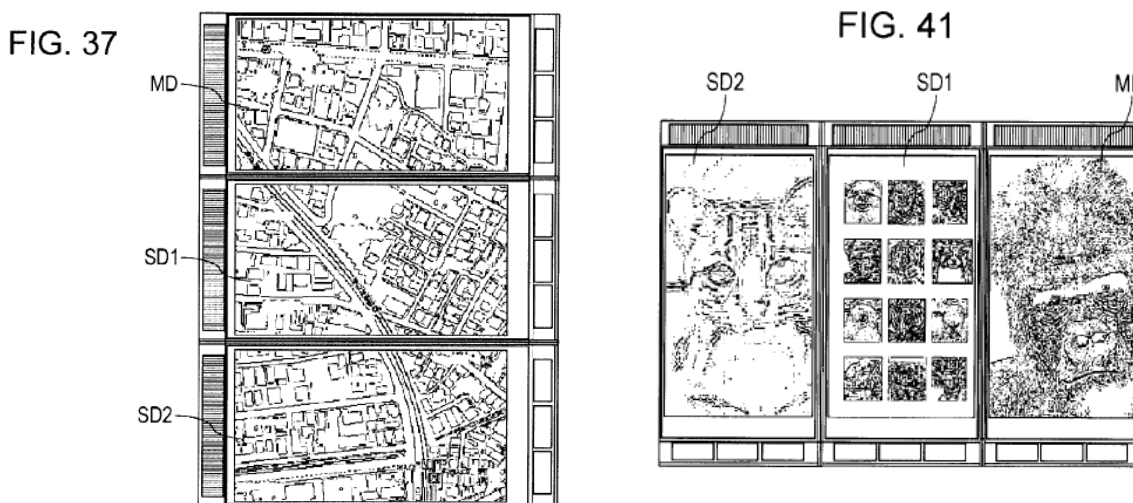
98. From the following description, a POSITA would understand that the display changes based rotating the device 90 degree, that is, a change in device orientation. Accordingly, the display depends on the device orientation: “Also, when the terminal state detection sensor *detects that this terminal is in the terminal opened state, and also detects that the horizontal and vertical directions of this terminal are directions where an aspect ratio obtained by adding all the display panels in the terminal opened state generally matches the above predetermined aspect ratio*, the display control program stored in the storage medium according to the present embodiment causes the control and computing unit 104 to execute

processing for dividing the video of the predetermined aspect ratio according to the number of the displays of the casings, *enlarging each of the divided videos in accordance with the display size of one display panel, and also adapting the placement relationship of each divided and enlarged video to the video of the predetermined aspect ratio before division to distribute each divided and enlarged video to the display of each casing in the terminal opened state for display.* Also, when the terminal state detection sensor detects that this terminal is in the terminal opened state, and also *detects that the horizontal and vertical directions of this terminal are directions where an aspect ratio obtained by adding all the display panels in the terminal opened state and the predetermined aspect ratio are rotated generally 90 degrees*, the display control program stored in the storage medium according to the present embodiment causes the control and computing unit 104 to execute processing for *displaying the video of the predetermined aspect ratio on any one display panel, and displaying related information of the video of the predetermined aspect ratio on the other display panels.*” *Id.*, [0278].

99. A POSITA would understand that the foregoing description from [0278] would apply to the image capture functionalities of Aono described with reference to the “ninth operation control example” and Figures 60-61. The disclosures above describe the display of video. Likewise, the “preview image” in the image capture operation of the device is displayed “as preview video data,” (*Id.*,

[0281]). So, a POSITA would know that the rotation of the Aono device when the camera functionality is activated would change the display on Aono's screens.

100. Aono illustrates display modes that display images with the device in a portrait orientation, e.g., Figures 37 (showing an image stretched across three screens) and 41 (showing two separate images and an image list on the three screens):



Id., Figs. 37 and 4127, [0203], [0208], [0225]-[0227].

101. When considering the disclosures of Aono, a POSITA would have understood that any of the disclosures related to the personal digital assistant 1 of Aono could be considered. Aono describes various “operation control examples” of the *same* device, the “personal digital assistant 1 according to *the present embodiment*.” Ex. 1004, [0148]. Aono teaches that the personal digital assistant 1 “is configured so as to perform various types of terminal operation control which will be described later based on the detection results by the terminal state detection

sensors.” *Id.* The disclosures cited above with respect to this claim limitation all describe aspects of the “operation control” of this device. A POSITA would have understood all these disclosures to be part of, and describing, one embodiment. And a POSITA would have looked to all these disclosures to understand how that device worked.

102. Although I do not read Aono’s disclosures discussed as to this claim element to be referring to different embodiments, or to require combining different embodiments, even if that were the case, a POSITA would have found it obvious to combine different disclosures of Aono in the manner I described above. At a high level, a POSITA would have understood from Aono’s disclosures that the display units **MD**, **SD1**, and **SD2** could display images, including when in the camera mode for taking photographs or videos. A POSITA also would have understood from the disclosures above that a device according to Aono could take different physical states (closed, open, or partially open), have different orientations (i.e., could be rotated), and had different display modes (different screens displaying or not displaying content, and content displayed on a single screen or more than one screen), all of which could change while the camera was in use. Aono also teaches, in various parts of its specification, that the display presented for an image capture mode could depend on any of these three criteria. It would be obvious to a POSITA, then, that the image capture mode would take all three of these factors into account

to properly display preview images when using Aono's image capture function. Indeed, this would be the most logical option; otherwise, the "preview images" and other aspects of Aono's user interface could fail to display properly to a user.

103. With respect to the "device orientation" disclosures in particular, even if these disclosures are not specifically referenced in Aono when talking about using the camera, a POSITA would have understood that those disclosures still would be relevant to the camera modes of operation. A device such as Aono's portable digital assistant **1** could be turned to be in different orientations, and second, that Aono at least suggests that the display on the screen or screens would be based on and change depending on the device orientation in the various modes of operation of Aono, including image capture modes.

104. Figures 26 and 27 and the "first operation control mode," Aono expressly disclose that the display of an image or video on a screen or screens will change depending upon whether the device is in portrait or landscape mode, as discussed above. Ex. 1004, [0149]-[0154].

105. A POSITA would have understood that the same would be true for the camera shooting modes of Aono's portable digital assistant **1** (*e.g.*, as described with respect to the "ninth operation control example" shown in Figures 60 and 61), or at least that would have been the most obvious way to implement the camera shooting modes, as noted above.

106. Aono's camera shooting modes discuss the display of preview images (which are preview video data). Ex. 1004, [0281] ("The still image data or moving image data at the time of shooting by this camera unit 112 is transmitted to the video signal processing unit 111 as preview video data. Thus, a preview image is displayed on the display panel at the time of this camera shooting."), [0385]-[0415]. A POSITA would have understood that these preview images or videos would change display upon a device orientation change, just like other images or videos as discussed with respect to Figures 26 and 27.

5. Claim [1D]: the physical device state at least including open, closed, easel¹ or modified easel, the display mode at least including portrait single, portrait dual, landscape single, landscape dual, portrait max or landscape max;

107. Aono discloses, or at least suggests, this limitation, and a POSITA would have found this limitation obvious in view of Aono's disclosures.

¹ Though Claim [1D] purports to recite a "closed easel" physical device state, this appears to be a clerical error (missing comma between "closed" and "easel"). It seems more likely that the applicant instead meant to claim separate "closed" and "easel" physical device states. Aono identifies does not reference a "closed easel" physical device state but repeatedly refers to separate "closed" and "easel" physical device states. *See* Ex. 1001, Figs. 3A, 3B, 9:25-53, 10:35-39, 13:9-50, 14:11-13,

108. *Physical device state.* The '589 patent describes various physical device states. These include open, closed, easel, and modified easel. These are illustrated in Figure 3A. Ex. 1001, Fig. 3A, 13:21-24 (“In state **304**, the device is in a *closed state* with the device **100** generally oriented in the portrait direction with the primary screen **104** and the secondary screen **108** back-to-back in different planes”), 13:50-53 (“Upon entering the *easel state* **312**, the primary screen **104** and the secondary screen **108** are separated from one another such that, for example, the device **100** can sit in an easel-like configuration on a surface.”), 13:60-61 (“State **320** is the *open state* where the primary screen **104** and the secondary screen **108** are generally on the same plane.”).

109. Aono also teaches each of the three device states. Examples are below:

110. In the “terminal opened state,” illustrated in Aono Figure 5, “the three screens are arrayed generally in parallel generally in the same lateral direction, and a generally flat screen can be realized by these three screens.” Ex. 1004, Fig. 5. A POSITA would have understood that this “terminal opened state” is the same as the '589 “open” device state, because the screens are in the same plane, consistent with how the '589 describes an “open” state. The screens also are visible in this state.

23:5-8, 23:16-20, 23:62-37, 24:4-8, 24:36-38, 24:42-51, 33:7-11, 33:26-28, 33:38-40, 34:47-52.

111. Aono also discloses a “first” and “second” “partially opened state. These too can be an “open state” as in limitation [1D], depending on how the states are configured. I discuss and illustrate these states in some detail below with regards to claims 2 and 3, in particular, how the “second partially opened state” can be configured so that display units SD1 and SD2 are positioned exactly the same way as in the “terminal opened state”: visible to the user and on the same plane. *See* Sections X.B and X.C

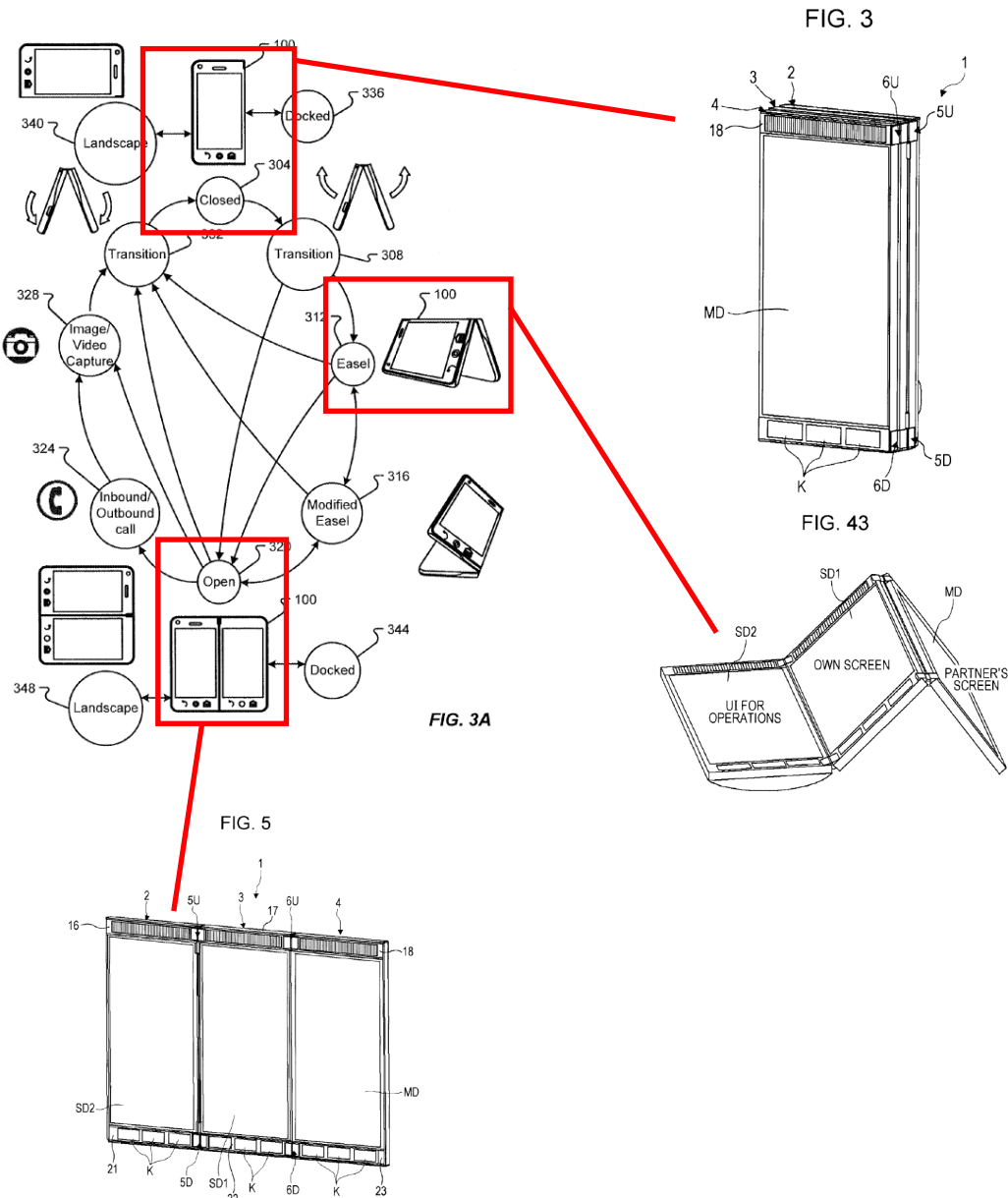
112. In the “terminal closed state,” “as illustrated in FIG. 3, from an angle (generally 0 degree) where both display panel surfaces are generally parallel by both display panel surfaces of the first casing 2 and second casing 3 fully facing each other.” *Id.*, Fig. 3, [0099], [0102]. A POSITA would have understood that this “terminal closed state” is the same as the ’589 “closed” device state, because two of the screens (specifically, **MD** and **SD1**) are back-to-back in different planes.

113. Aono also teaches the “easel” state disclosed in the ’589 patent. Aono teaches a “first partially opened state” is “the state in which the first casing 2 and the second casing 3 are overlaid, and on the other hand, only the third casing 4 is opened.” *Id.*, [0234]. A “second partially opened state” is “the state in which the second casing 3 and the third casing 4 are overlaid, and on the other hand, only the first casing 2 is opened.” *Id.* A POSITA would have understood that both of these can be in an “easel” configuration because the two screens are separated from one

another such that, for example, the personal digital assistant **1** can sit in an easel-like configuration on a surface. Figure 43 of Aono is another example of how Aono's device can be configured as the "easel" physical device state from the '589 patent. *Compare* Ex. 1001, Fig. 3A *with* Ex. 1004, Fig. 43.

114. Aono's "second partially opened state" also discloses a "modified easel" in the sense that one of the screens can be used as a stand and is faced down on the surface of an object (such as a table) (*see* Ex. 1001, Fig. IJ, 9:54-57). In the "second partially opened state," "the second casing **3** and the third casing **4** are overlaid, and on the other hand, only the first casing **2** is opened." Ex. 1004, [0234]. "[T]he second casing **3** and the third casing **4** are overlaid by the first texture panel **TP1** and the second texture panel **TP2** generally fully facing to each other, the main display panel **MD** is also available as a shooting angle variable monitor." *Id.* So, in this configuration, the screen **MD** would be facing outward and, when the device is placed on an object, the screen **MD** would be used as a stand, faced down.

115. The physical device states are illustrated in annotated Figure 3A from '589 patent and Figures 3, 5, and 43 from Aono, below.



116. A POSITA at least would have understood from Aono's disclosures and found it obvious that the Aono device could have been configured in the open, closed, easel, or modified easel device states. Beyond the discloses cited above, more generally, Aono teaches that the disclosed personal digital assistant 1 embodiment is just exemplary. Aono's disclosures are not limited to the physical configurations of the device expressly described and shown with that embodiment. "It goes without

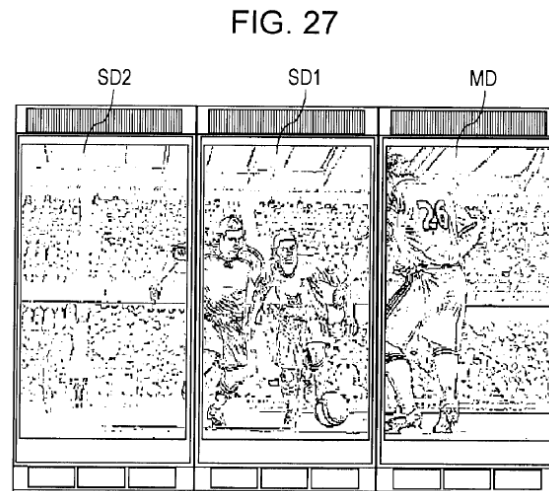
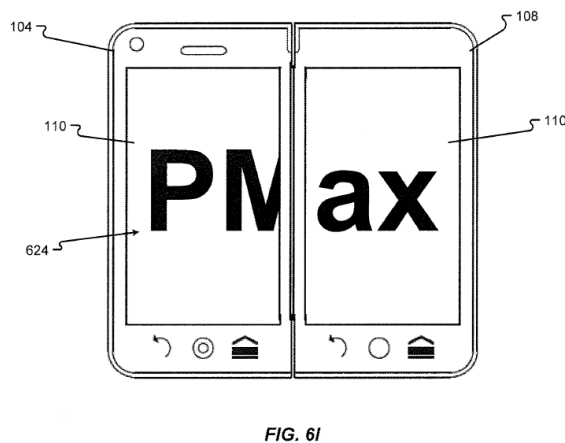
saying that the content described in the present embodiment is consistently an example, the number of display panels is not restricted to three surfaces, *how to fold and unfold a casing and a display panel is not restricted to folding and unfolding of a later-described folding screen type*, and *further the shapes and number of components making up the personal digital assistant are also not restricted.*” Ex. 1004, [0080].

117. From these express teachings, a POSITA would have been motivated to construct a device that would fold/unfold and be configured physically in different ways, including in “open,” “closed,” “easel,” and “modified easel” type configurations. Moreover, a POSITA would have reasonably expected success in making such modifications (if necessary) to the personal digital assistant 1 embodiment, particularly considering Aono’s teachings of how the device can be constructed.

118. *Display mode.* Aono discloses, or at least suggests and would have made obvious to a POSITA, each of the six “display modes” recited in this limitation of claim 1.

(a) The first is “portrait max” mode, which the ’589 patent illustrates in Figure 6I. In this mode, “the device **100** may be configured to present a single continuous image across both touch sensitive displays **110**, **114** in a portrait configuration.” Ex. 1001, Fig. 6I, 24:60-65. Aono likewise teaches a “portrait max”

display mode in Figure 27 because each screen is in a portrait orientation and the image displayed is presented as a continuous image across all screens. *Compare* Ex. 1001, Fig. 6I *with* Ex. 1004, Fig. 27:



(b) The '589 patent also teaches the “landscape max” display mode, illustrated in Figure 6J, as one where “the device **100** may be configured to present a single continuous image across both touch sensitive displays **110**, **114** in a landscape configuration referred.” Ex. 1001, Fig. 6J, 25:9-14. Aono likewise teaches a “landscape max” display mode in Figure 37 because each screen is in a portrait orientation and the image displayed is presented as a continuous image across all screens. *Compare* Ex. 1001, Fig. 6J *with* Ex. 1004, Fig. 37:

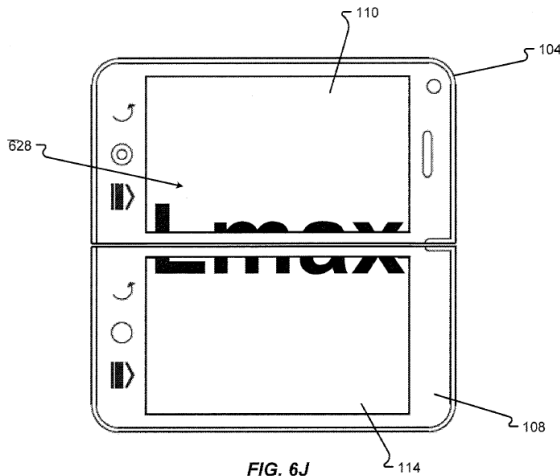
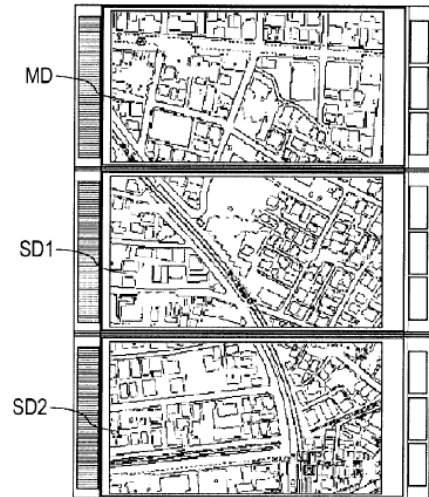


FIG. 37



(c) Aono also discloses both “portrait single” and “landscape single” display modes. Aono discloses displaying an image on just a single screen. For example, as described with respect to Figures 60 and 61, a preview image is shown on just the “main display panel” in the “terminal closed” and “first partially opened” states. Ex. 1004, Figs. 60 and 61, [0389], [0405]. As another example, an image is shown on just a single screen in Figures 26, 35, and 39 of Aono. Ex. 1004. And, as described above with respect to limitation [1C], *supra* Section X.A.4, the Aono device can be oriented in both portrait and landscape modes, and accordingly, the Aono device is capable of both “portrait single” and “landscape single” display modes. Aono’s disclosures are consistent with the ’589 patent’s disclosures of “portrait single” and “landscape single” displays.

(d) The ’589 patent teaches “dual” display modes, *e.g.*, “Dual-Portrait” (PD) and “Dual-Landscape” (LD). Ex. 1001, Figs. 6C, 6F, 23:32-37, 24:20-24. Aono likewise discloses “dual” display modes where images are displayed on

two (or more) of the display units, but in contrast to the “max” display modes, one image is not stretched across two or more screens. Examples in Aono include Figures 28-33 and 41-42. Ex. 1004; A POSITA further would have understood from Aono’s disclosure that the “camera shooting mode” as described in the “ninth operation control” would, in the case of at least the “second partially opened” state, display a preview image on one or more of the display panels in a “dual” configuration as desired by the user. And, as described above with respect to limitation [1C], *supra* Section X.A.4, the Aono device can be oriented in both portrait and landscape modes, and accordingly, the Aono device is capable of both “portrait dual” and “landscape dual” display modes.

6. Claim [1E]: receiving a device orientation change, wherein the device orientation change is a rotation of the device; and

119. Aono discloses this limitation.

120. Aono teaches that the personal digital assistant **1** can be configured to have, and detect changes in, device orientation. The personal digital assistant **1** includes sensors such as “a horizontal/vertical detection sensor, a direction detection sensor, a position detection sensor, an acceleration detection sensor . . . and further other various sensors.” Ex. 1004, [0143]. Aono further teaches the change in device orientation being the result of “rotation of the device,” *i.e.* transition of the terminal horizontal/vertical state. *See id.*, [0153]-[0154]. And, as noted above, paragraph

[0278] of Aono describes at length the detection of a 90 degree rotation of the device and its corresponding effect on the displays.

121. A POSITA would have understood that such sensors would detect the rotations and other device manipulations typically used to change between portrait and landscape orientations.

7. **Claim [1F]: based on the device orientation change, the device state and the display mode, presenting a second display for the image capture function, wherein a portion on the first and second screen changes from the first display to the second display.**

122. Aono discloses this limitation.

123. As discussed above with respect to limitations [1C] and [1F], the personal digital assistant 1 includes sensors such as “a horizontal/vertical detection sensor, a direction detection sensor, a position detection sensor, an acceleration detection sensor . . . and further other various sensors.” Ex. 1004, [0143]. In addition, “the personal digital assistant 1 according to the present embodiment may perform operation control such as switching to enlarged display of the three screens from the one screen *only at the time of transition of the horizontal/vertical state* of this terminal based on detection output of, for example, a horizontal/vertical detection sensor, direction detection sensor, acceleration sensor, or the like.” *Id.*, [0154]. From the example discussed at length above in paragraphs [0278] and [0281] (*supra* Section X.A.4), a POSITA would understand that the first and second screens would

change what they display when the device is rotated 90 degrees, and when the camera is being used, that change would be a change of the preview image.

124. In addition to the device orientation change, the personal digital assistant 1 otherwise determines the images to display according to the flowcharts in Figures 60 and 61, which consider the physical device state, display mode, and device orientation:

FIG. 60

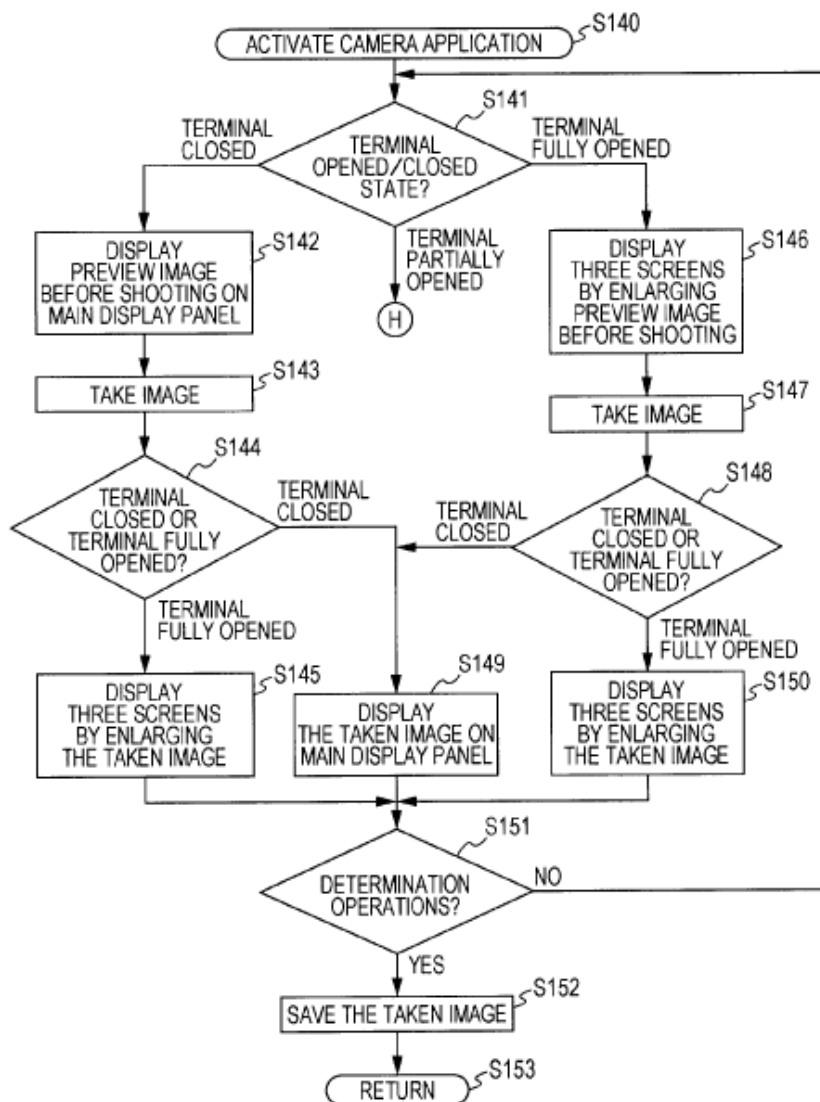
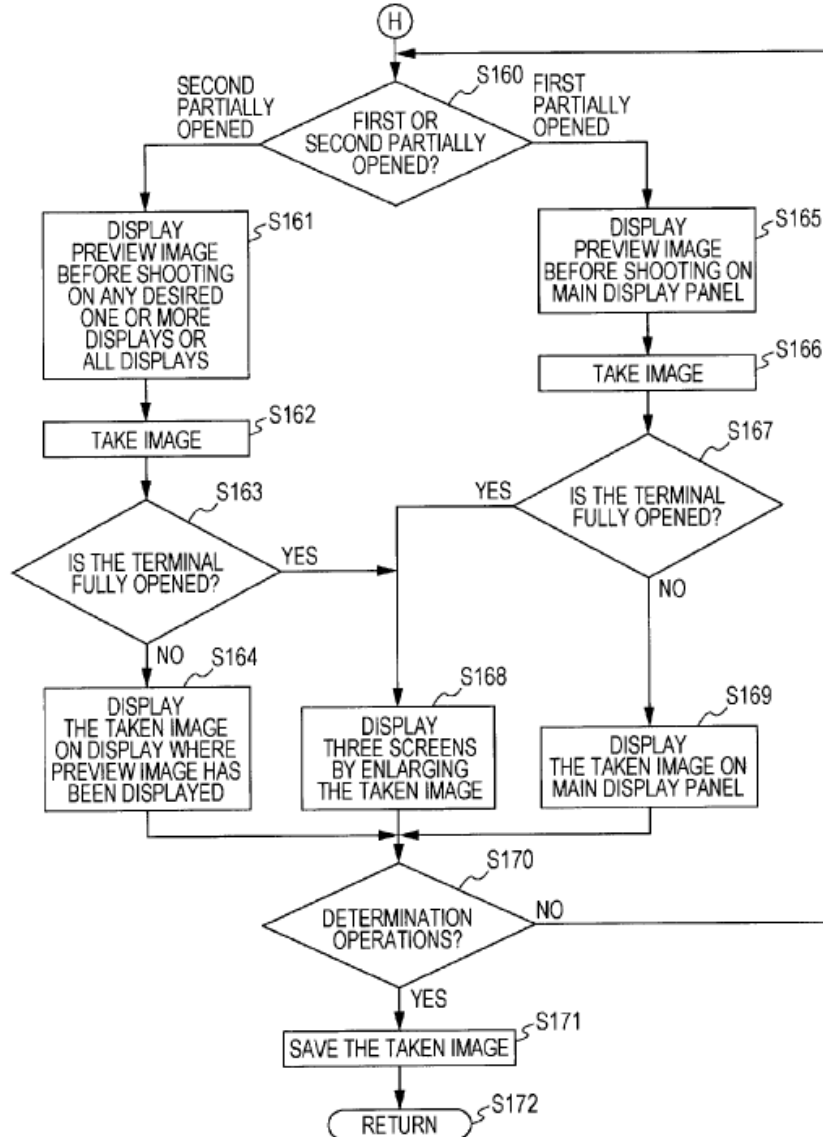


FIG. 61



Id., Figs. 60 and 61; *see also* limitation [1C] *supra*. Aono also teaches a portion of the first and second screen changing from the first display to the second display when, in response to an orientation change, the displayed images changes from appearing on one screen to being enlarged across three screens, as illustrated in, *e.g.*, Figures 26 and 27:

FIG. 26

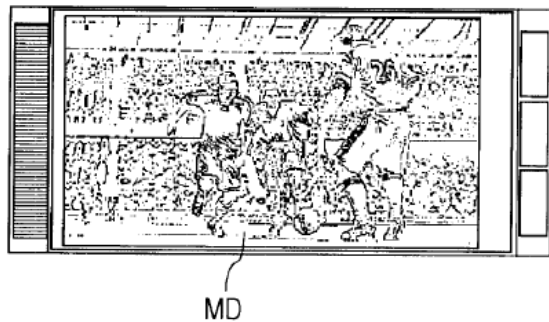
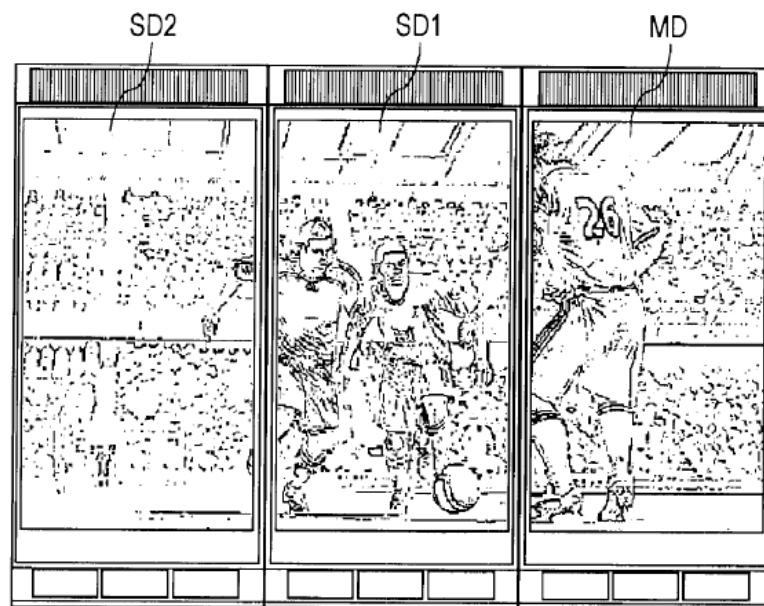


FIG. 27



Id., Figs. 26-27, [0152]-[0154].

125. A POSITA would have understood, the Aono personal digital assistant 1 has been rotated (a “device orientation change”) between Figures 26 and 27, in addition to undergoing a physical device state change (*i.e.*, unfolding certain portions of the device).

B. Claim 2

1. Claim [2]: The method of claim 1, wherein the image capture function is configured to capture an inward-facing image

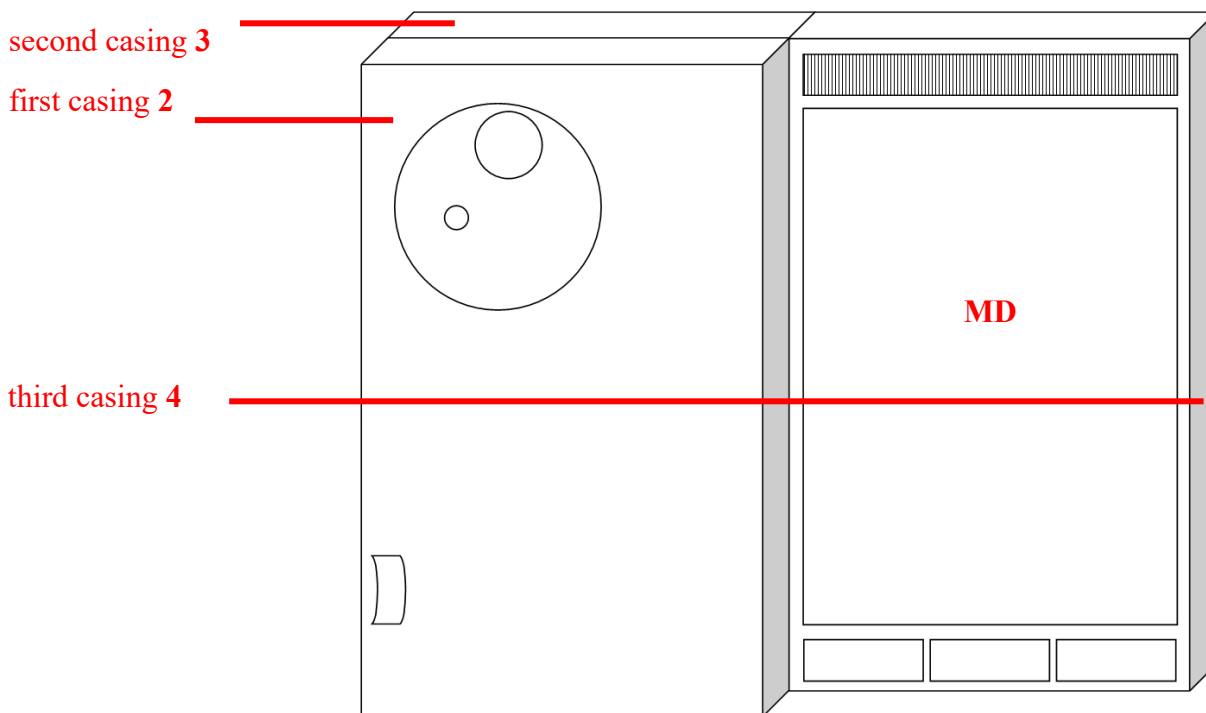
126. Aono discloses the additional limitations of claim 2 and thus at least renders obvious claim 2.

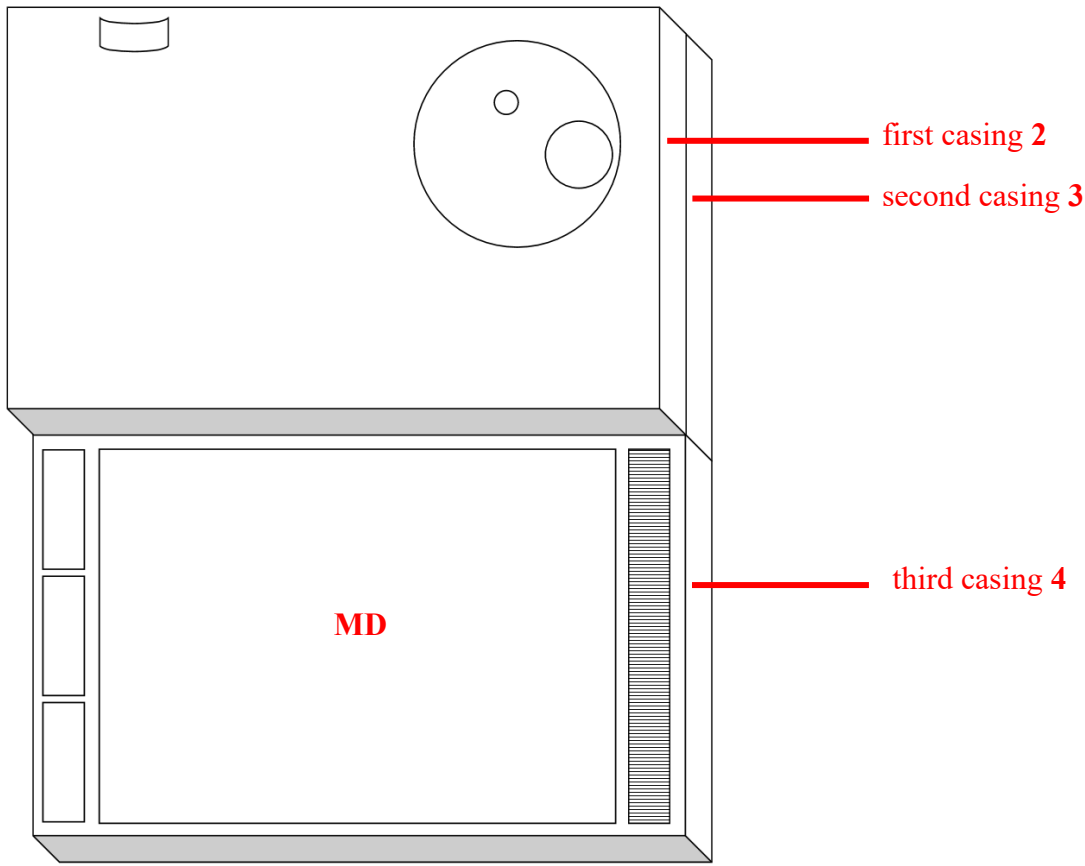
127. Aono teaches configuring the personal digital assistant **1** to shoot self-portraits with the camera. Ex. 1004, [0233] (“Particularly, with the camera shooting mode such as this ninth operation control example, in the event that the shooting angle is set to the above generally 180 degrees, it is possible to take the user himself/herself of this terminal by the shooting lens **7**, i.e., to *shoot a self-portrait*.”)

128. A POSITA would have understood that such a “self-portrait” shooting configuration is a configuration to capture an “inward-facing image.” In a “self-portrait” the camera faces inward toward the user, not outward from the user. The ’589 patent’s disclosure is of accord: Ex. 1001, 36:6-8, Fig. 20 (“While in the dual screen orientation, the image capture function **1100** presents an inward facing image **2004** and may be in a self-portrait mode.”).

129. In the “self-portrait” example of Aono, the device is configured to take a “self-portrait” (inward-facing image) in the “first partially opened state”: where display panels SD1 and SD2 are facing each other, and display panel MD is opened and available as a “shooting angle variable monitor.” Ex. 1004, [0233]-[0234], [405]. The following images, based on Aono’s textual disclosure of how the “first

partially opened state” operates, illustrate a self-portrait shooting configuration in the “first partially opened state”:

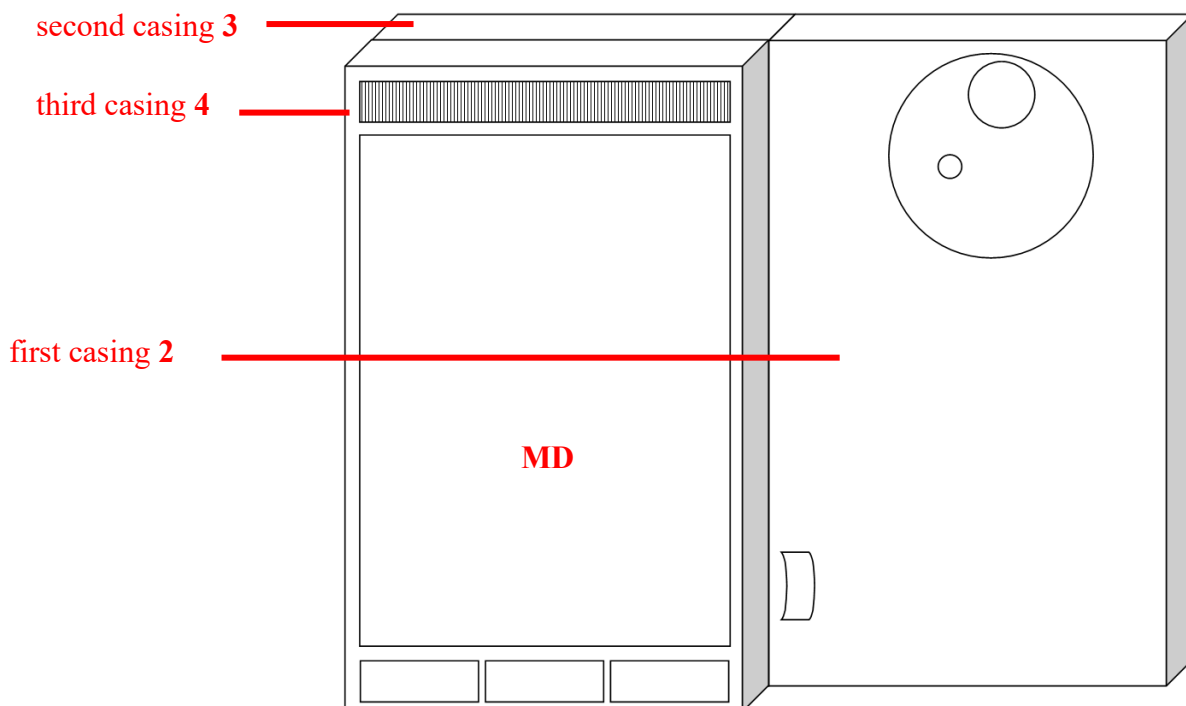


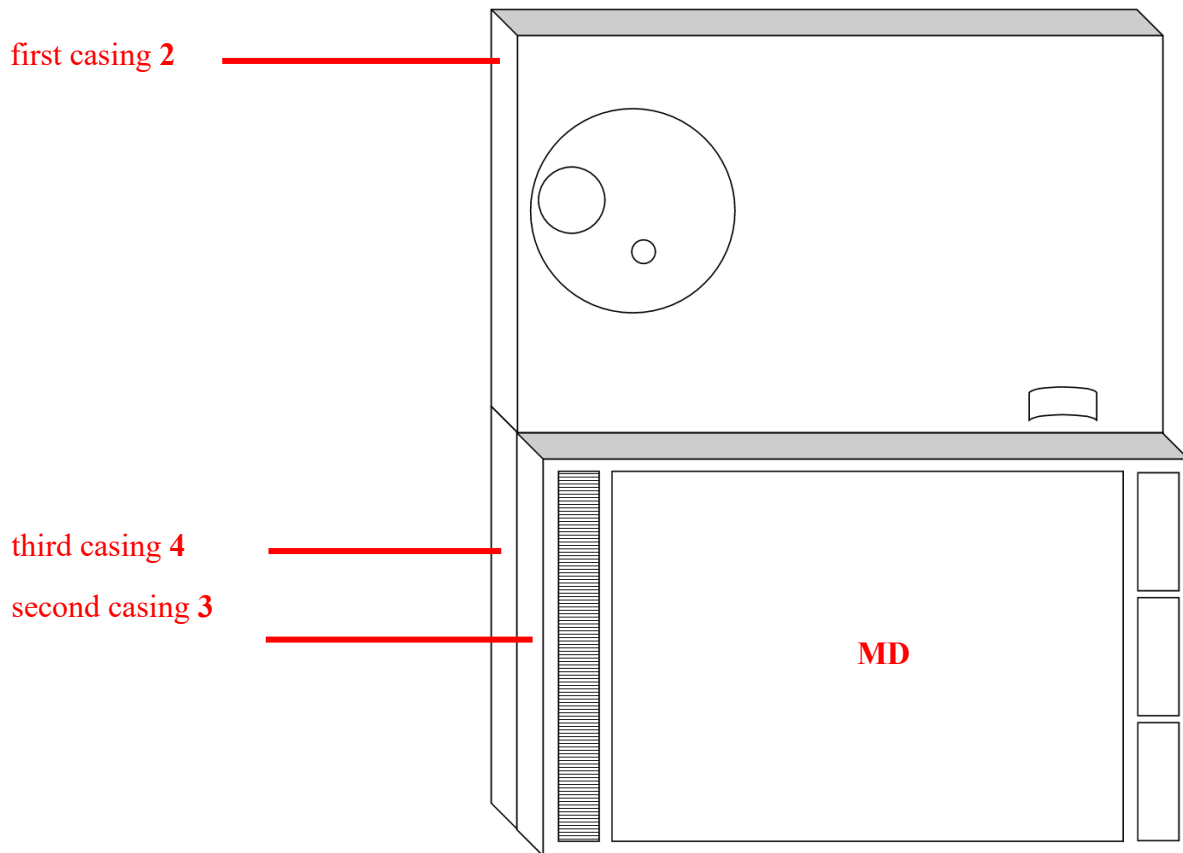


130. Aono’s image capture function also would be configured to capture an inward-facing image in the “second partially opened state.” In this state, “the second casing **3** and the third casing **4** are overlaid, and on the other hand, only the first casing **2** is opened.” Ex. 1004, [0234]. “At the time of the second partially opened state, a preview image may be displayed ... on the main display panel **MD**...” *Id.* An image can be captured in any of these configurations. Ex. 1004, [0235], [0410]. The connecting portions **5U** and **5D** connecting the casings **2** and **3** have an angular range from 0 to 180 degrees, such that at 180 degrees, “both display panel surfaces of the first casing **2** and second casing **3** are generally lined up sideways.” Ex. 1004, [0099]. Accordingly, in the “second partially opened state” with the angle between

casings **2** and **3** set to 180 degrees, the camera shooting lens **7** and the main display **MD** are facing the same direction, such that the user can shoot a self-portrait.

131. The following images, based on Aono's textual description of the "second partially opened state," illustrate a self-portrait shooting configuration in the "second partially opened state." In this configuration, the displays **SD1** and **SD2** are facing outward from the user and towards the page, with both displays **SD1** and **SD2** outwardly visible (i.e., not folded). As can be seen, the camera and display **MD** face the same direction, and would be configured to take a self-portrait when facing the user:





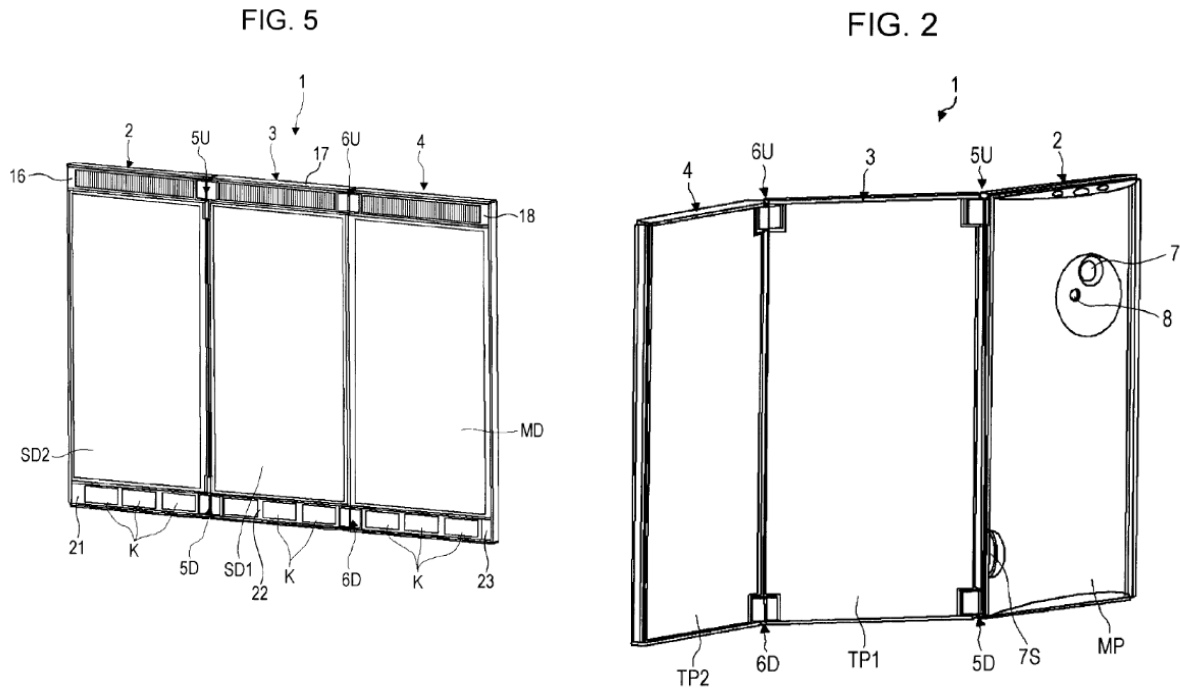
C. Claim 3

1. Claim [3]: The method of claim 2, wherein the device is in an open state.

132. Aono discloses, or at least suggests, the additional limitations of claim 3 and thus a POSITA at least would have found claim 3 obvious.

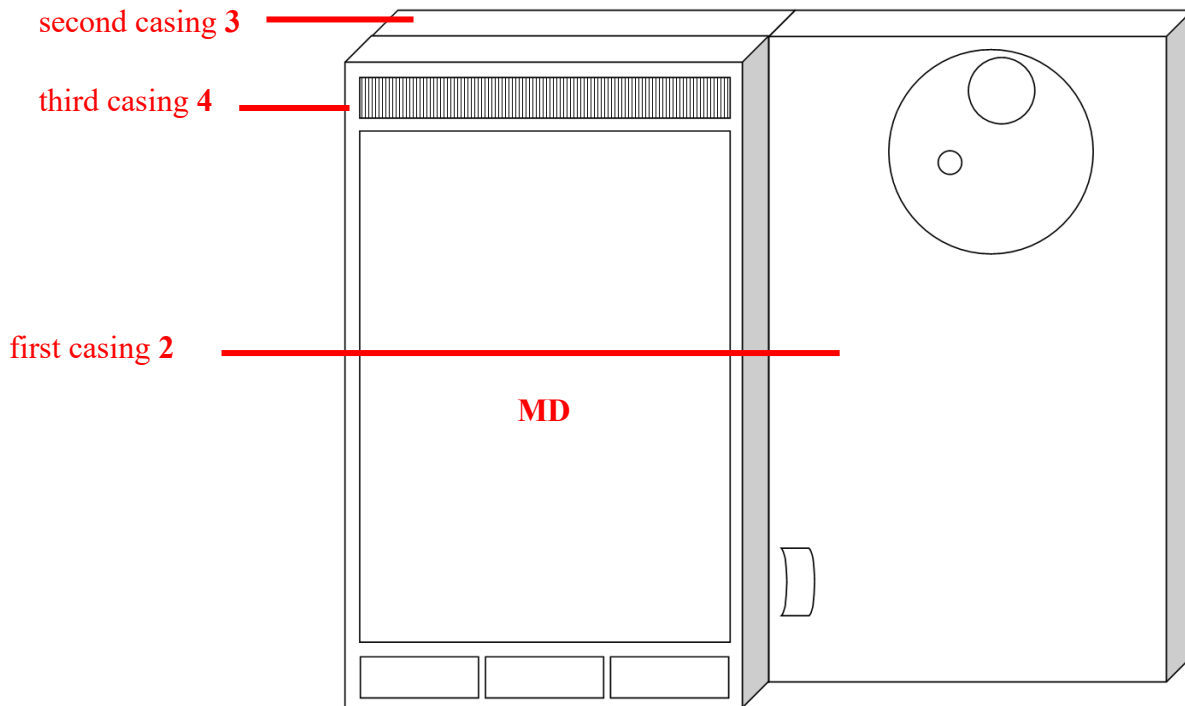
133. As discussed above in relation to limitation [1D], the personal digital assistant 1 disclosed by Aono can be configured to be in an “open” physical device state. *Supra* Section X.A.5. This can happen in several ways. For one, Aono illustrates the personal digital assistant 1 in an “open state” in Figures 2 and 5, which

also show the camera that could capture the inward-facing image required by Claim 2:



Ex. 1004, Figs. 2, 5.

134. Aono further also describes the personal digital assistant 1 in an “open state” by teaching the device can be configured in a “second partially opened state” as described in connection with Claim 2, with screens SD1 and SD2 in an “open state.” *Supra* Section X.B.1. The following images illustrate a self-portrait shooting configuration in the “second partially opened state” as described in Aono:



135. This illustrates an “open” state because the second casing **3** (containing **SD1**) and the first casing **2** (containing **SD2**) (again, with both **SD1** and **SD2** facing the page, but outwardly visible) are in the same plane (and visible to the user), consistent with the ’589 patent’s description of “open state.” Ex. 1001, 13:60-61 (“State **320** is the open state where the primary screen **104** and the secondary screen **108** are generally on the same plane.”).

D. Claim 4

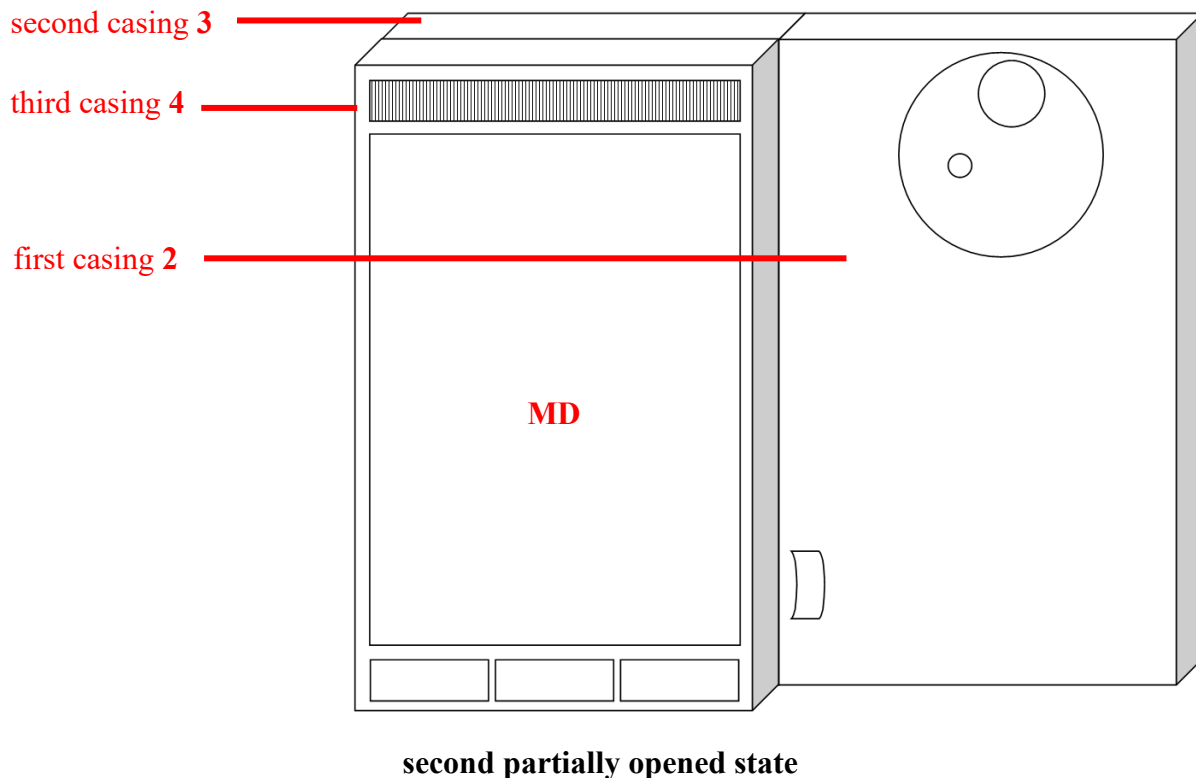
1. Claim [4]: The method of claim 3, wherein the first display is a portrait display.

136. Aono discloses, or at least suggests, the additional limitations of claim 4 and thus at least renders would have rendered claim 4 obvious to a POSITA.

137. As discussed at length above with respect to limitation [1C] (*supra* Section X.A.4), the Aono device can transition between “horizontal/vertical state[s],” (Ex. 1004, [0154]), has various “sensors” (*id.*, [0143]) configured to determine the orientation of the device, and changes the display of images depending upon, among other things, the orientation of the device and its displays horizontally or vertically (*i.e.*, in landscape or portrait mode). *See, e.g., id.*, [0153-0154], *see also id.*, [0184] and [0222].

138. Aono also shows many different examples of the device in different physical configurations displaying images in both portrait and landscape displays. Ex. 1004, Figures 26-43.

139. A POSITA would have understood from Aono’s disclosures, or at least it would be suggested to a POSITA, that the Aono device can display an image in a portrait display (or a landscape display) in any of the Aono device configurations, including the “second partially opened state.” For example, in the “second partially opened state” as described in connection with Claim 2, *supra* Section X.B.1, and illustrated once again below, the first display (which could be the image displayed on any of **MD**, **SD1**, or **SD2**) can be in a portrait orientation:



The a “second partially opened state” as described and illustrated disclose a first display as a portrait display because the screens are oriented such that the height of the display is greater than its width. As noted, this matches the ’589 patent’s description of “portrait” orientation. *See* Ex. 1001, 3:52-57.

E. Claim 5

1. Claim [5]: The method of claim 4, wherein the second display is a landscape display.

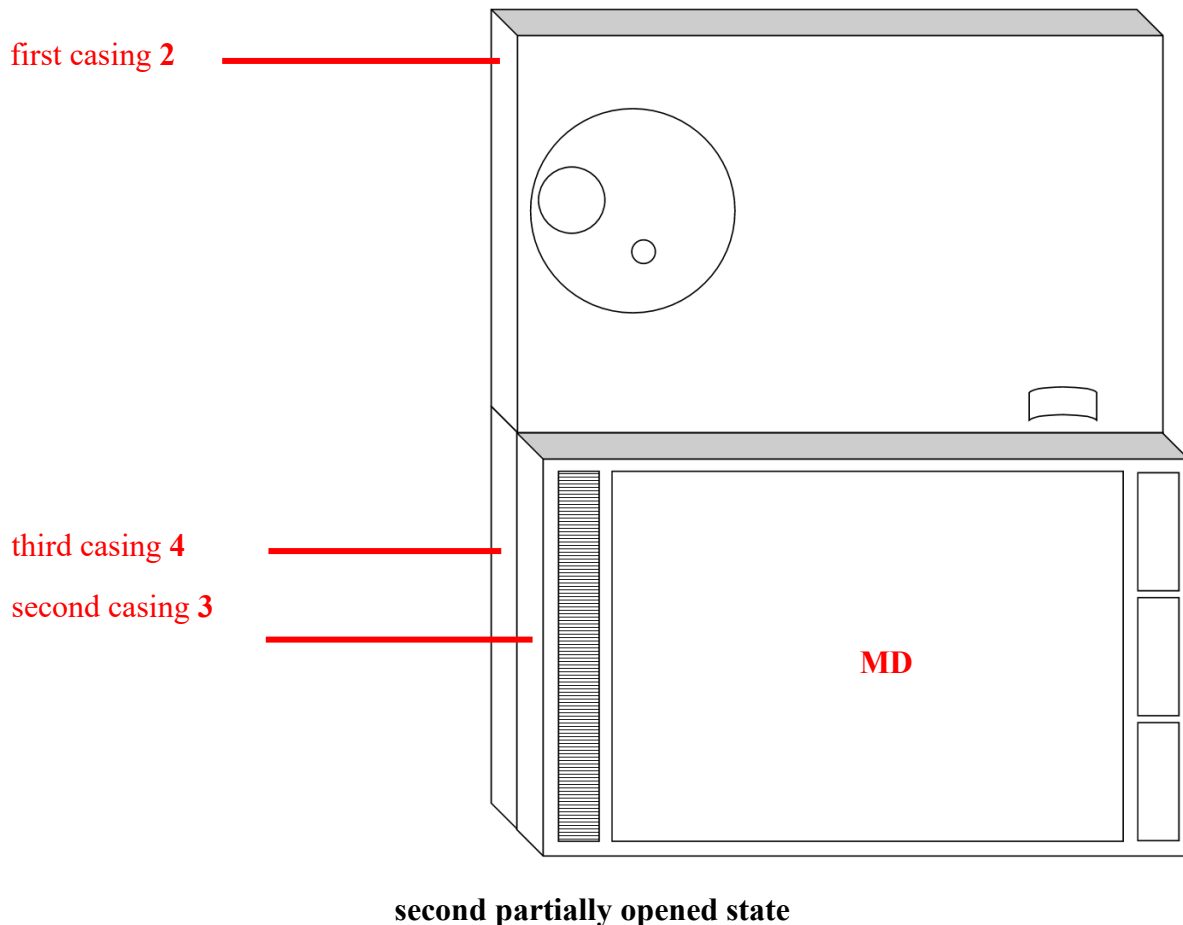
140. Aono discloses the additional limitations of claim 5 and thus at least would have rendered claim 5 obvious to a POSITA.

141. As discussed at length above with respect to limitation [1C] (*supra* Section X.A.4), the Aono device can transition between “horizontal/vertical

state[s],” (Ex. 1004, [0154]), has various “sensors” (Ex. 1004, [0143]) configured to determine the orientation of the device, and changes the display of images depending upon, among other things, the orientation of the device and its displays horizontally or vertically (i.e., in landscape or portrait mode) (*See, e.g.*, Ex. 1004, [0153-0154], *see also* [0184] and [0222]). Aono also shows several examples of the device in different physical configurations displaying images in both portrait and landscape displays. Ex. 1004, Figures 26-43.

142. A POSITA would have understood from Aono’s disclosures, or at least it would be suggested to a POSITA, that the Aono device can display an image in a portrait display (or a landscape display) in any of the Aono device configurations, including the “second partially opened state.”

143. For example, in the “second partially opened state” as described in connection with Claim 2, *supra* Section X.B.1, and illustrated below, the first display (which could be the image displayed on any of **MD**, **SD1**, or **SD2**) can be in a landscape orientation after the device is rotated 90 degrees from the portrait orientation (as described, for example, above as to claim 4):



The a “second partially opened state” as described and illustrated discloses a second display as a landscape display because the screens are oriented such that the width of the display is greater than its height. As noted, this matches the ’589 patent’s description of “landscape” orientation. *See* Ex. 1001, 3:52-57.

F. Claim 6

1. **Claim [6]: The method of claim 5, wherein the portion that changes includes an image preview changing from a portrait orientation to a landscape orientation.**

144. Aono discloses the additional limitations of claim 5 and thus anticipates claim 5.

145. As discussed in relation to Claim 1, limitations [1C], [1E], and [1F], Aono teaches transitioning from displaying an image in a portrait orientation across one screen in a closed device state to displaying an image in a landscape orientation across three screens in an open device state. *Supra* Sections, X.A.4, X.A.6, and X.A.7; *see also* Ex. 1004, [0153]-[0154] (“It goes without saying that an example is also the same as with the above wherein in the terminal closed state, a portrait video corresponding to an aspect ratio of 9:16 is displayed with the long direction of the main display panel **MD** as perpendicular, and in the terminal opened state, a portrait enlarged video corresponding to an aspect ratio of generally 9:16 is displayed by arraying the three screens in the vertically longitudinal direction as viewed from the user.”).

146. Moreover, Aono discloses that in the “camera shooting mode,” as described with respect to the “ninth operation control” and Figures 60 and 61, the device will display preview images (preview video data). Ex. 1004, [0281], [0385]-[0415].

147. A POSITA would have understood that the portion of the display that changes will include an “image preview.”

G. Claim 11

1. Claim [11P]: A device, comprising:

148. If the preamble is limiting, Aono discloses this limitation. Aono discloses a “device,” “a personal digital assistant having multiple screens, and a

display control method and display control program of the personal digital assistant.”

Ex. 1004, ¶ [0003].

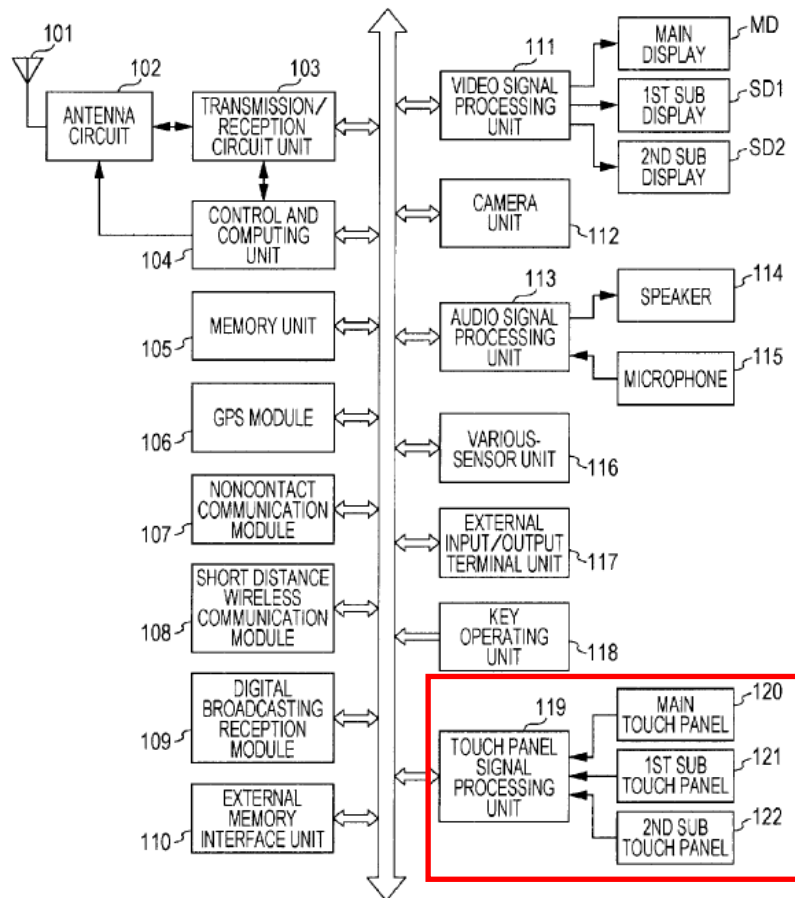
2. Claim [11A]: a first screen, the first screen including a first gesture capture region;

149. Aono discloses this limitation. *See supra* Section X.A.2 (limitation [1A]).

150. Aono discloses configuring a device with display panel **SD1** as the first screen. Ex. 1004, [0285]. A “first sub touch panel **121** is a transparent touch sensor panel disposed on the entire surface of the above first sub display panel **SD1**, and a second sub touch panel **122** is a transparent touch sensor panel disposed on the entire surface of the above second sub display panel **SD2**.”*Id.* A “touch panel signal processing unit **119** measures the touch detection position, touch path, touch time interval, and so forth from the touch panels **121** and **122**, and transmits the measured data thereof to the control and computing unit 104 as touch detection data.” *Id.*

151. Aono’s device is configured to make calculations, execute control programs, and / or execute applications in response to data processed by the touch panel signal processing unit **119**. *Id.*, [0287]. Aono illustrates this in Figure 50:

FIG. 50



Ex. 1004, Fig. 50, [0285]-[0287].

152. A POSITA would have understood that a display that includes the ability to capture user in input, such as display panel **SD1** of Aono, contains a “gesture capture region.” Aono’s **SD1** includes touch panels that can capture user input

153. Aono’s disclosure is consistent with the ’589 patent’s description. The ’589 patent explains that a “gesture” is “a user action that expresses an intended idea,

action, meaning, result, and/or outcome.” Ex. 1001, 3:63-64. Further, the “touch sensitive screens” comprise “liquid crystal display devices ... capable of providing visual output to a user, and a capacitive input matrix over those *regions of the touch sensitive screens* ... that are *capable of receiving input from the user*.” *Id.*, 10:67-11:11; *see also* 3:6-9 (“the screen can enable the user to interact with the device by touching areas ... and provides information to a user through a display”). As an example, “the personal digital assistant 1 according to the present embodiment is capable of taking an image” ... and shooting an image may be accomplished. . . “at the time of touching to the touch sensor panel” Ex. 1004, [0235].

3. Claim [11B]: a second screen, wherein the second screen faces in a substantially same direction as the first screen when the device is open, and wherein a lens is associated with the second screen;

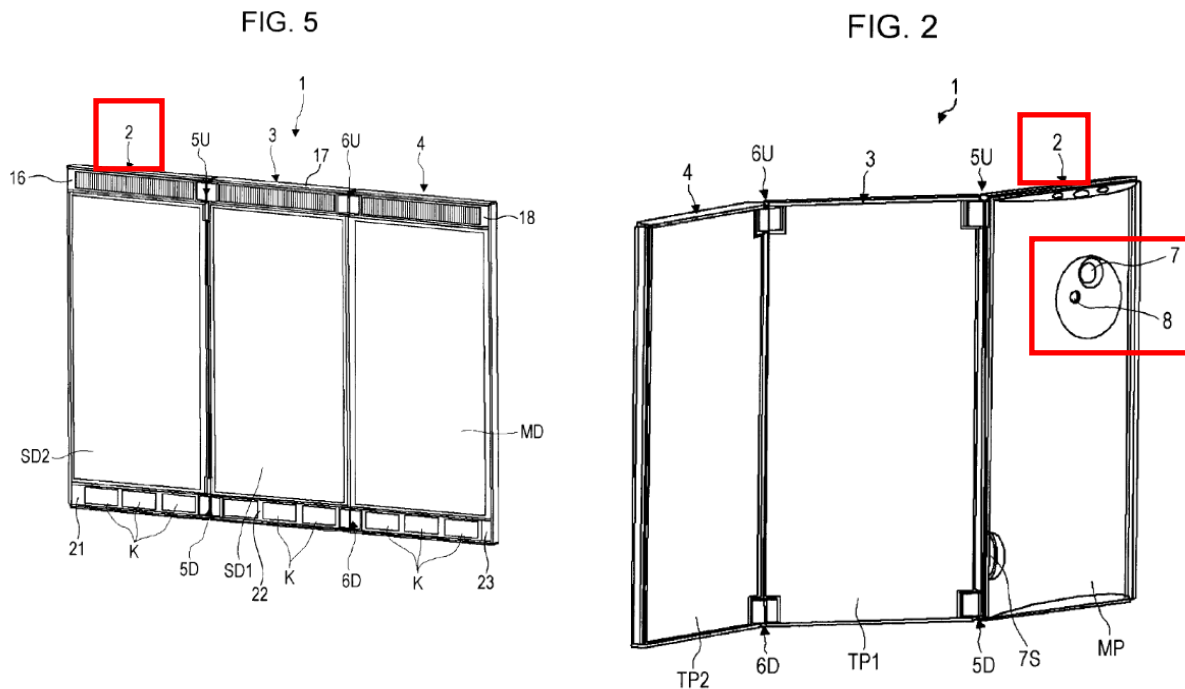
154. Aono discloses this limitation. *See supra* Section X.A.2 (limitation [1A]).

155. For example, Figure 5 (shown below) illustrates an example of the device in an “open” physical device state. Each of the screens are facing “in a substantially same direction.”

156. As another example, two of the screens (**SD1** and **SD2**) can face in the same direction in the “second partially *opened* state” of the Aono device. As discussed above with respect to claims 1 and 2, in these states the angle between two of the casings can be set to 180 degrees. *Supra* Sections X.A, X.B. Configured this

way, the device is “open,” because two of the screens, **SD1** and **SD2**, are in the same plane, and both screens are visible to the user. That is, both **SD1** and **SD2** are “open” in the same way that two screens are “open” in the ’589 patent.

157. A camera lens **7** is associated with screen **SD2**, because both the camera and display panel **SD2** reside on the same first casing **2**. This is illustrated by comparing Figures 5 and 2:



158. A POSITA also would have understood that the lens **7** is associated with each of the screens **MD**, **SD1**, and **SD2** because each of the three screens can display images, video, and preview images or video captured by the lens. *E.g.*, Ex. 1004, [0385]-[0415]. These disclosures of Aono are similar to the disclosure of a lens associated with a screen in the ’589 patent. Ex. 1001, 34:40-52 (“An example

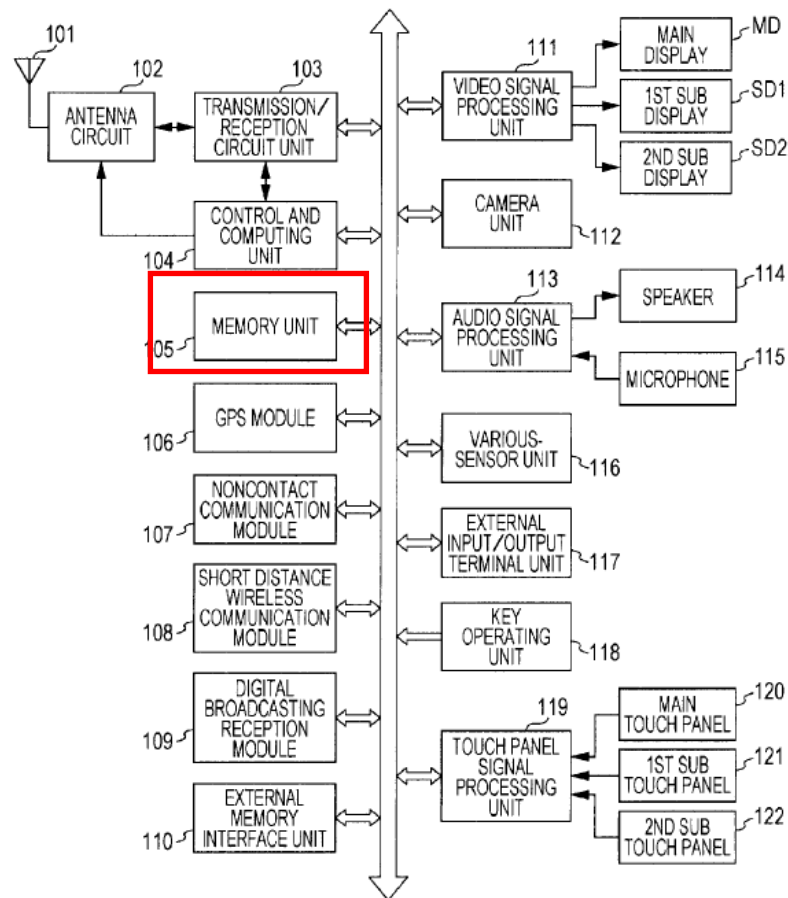
of a self-portrait configuration **1800** is as shown in FIG. 18. The device **100** configuration **1800** may provide a preview screen **1804**. To limit the amount of hardware provided with the device **100**, there may be a single lens or other hardware used to capture the image, as shown in FIGS. 1A-1.J. As shown in FIG. 11, the lens **1136** is associated with the first screen **110**. Thus, to accomplish a self-portrait, the first screen **110** must face the user. This device orientation is in contrast to what is shown in FIGS. 14A through 16B where the lens faces away from the user to attain an outward facing image. Further, the device **100** may be in the closed state in landscape orientation Such that the lens associated with the screen is pointing towards the user.”).

4. Claim [11C]: a memory;

159. Aono discloses this limitation. Aono’s device includes a “memory unit **105** [that] is configured of built-in memory provided to the inner portion of this terminal, and detachable card-shaped memory which stores so-called SIM (Subscriber Identity Module) information and so forth. The built-in memory **105** is made up of ROM (Read Only Memory) and RAM (Random Access Memory). The ROM stores an OS (Operating System), the control program for the control and computing unit **104** controlling each unit, various types of initialization values, dictionary data, various types of audio data, the various types of application programs including the display control program according to the present

embodiment, and so forth. This ROM includes rewritable ROM such as NAND-type flash memory or EEPROM (Electrically Erasable Programmable Read-Only Memory), and can store e-mail data, the data of a phone book or mail address book, the data of a still image or moving image content, or otherwise, various types of user setting values, and so forth. The RAM stores successively stores data serving as a work area and a buffer area at the time of the control and computing unit **104** performing various types of data processing.” Ex. 1004, [0286], Figure 50:

FIG. 50



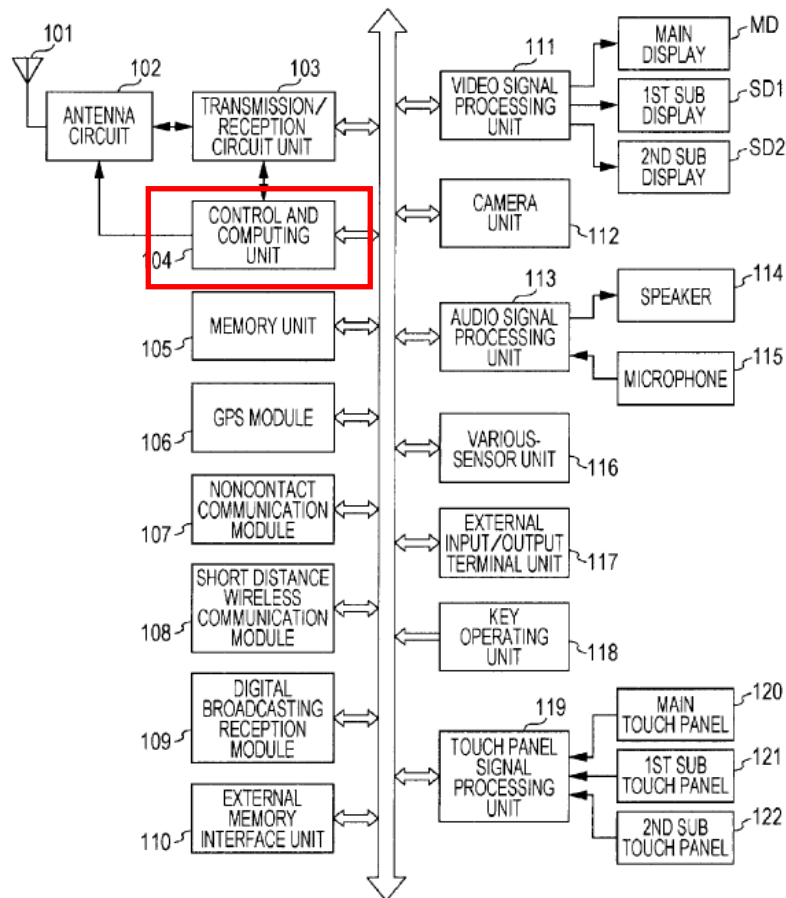
A POSITA would have understood a “memory unit” to be a “memory.” Indeed, of ROM (Read Only Memory) and RAM (Random Access Memory) were commonly known types of memories, as their name implies.

5. Claim [11D]: a processor in communication with the memory, the first screen, and the second screen, the processor operable to:

160. Aono discloses this limitation.

161. Aono’s device includes a “control and computing unit **104** [] made up of a CPU (Central Processing Unit), [which] controls each unit such as the transmission/reception circuit unit **103**, video signal processing unit **111**, audio signal processing unit **113**, GPS module **106**, noncontact communication module **107**, short-distance wireless communication module **108**, digital broadcasting reception module **109**, external memory interface unit **110**, camera unit **112**, various-sensor unit **116**, external input/output terminal unit **117**, key operating unit **118**, touch panel signal processing unit **119**, and so forth, and also performs various types of computation as appropriate. Also, the control and computing unit **104** executes the control program or various types of application programs stored in the memory unit **105**.” Ex. 1004, [0287], Fig. 50:

FIG. 50



162. A POSITA would have understood that the “CPU (Central Processing Unit)” in “control and computing unit **104**” is a “processor,” as its name implies, because it executes programs. A POSITA would have further understood that because the “control and computing unit **104**” “executes the control program or various types of application programs stored in the memory unit **105**,” it of course is in communication with the “memory.” Memory is where instructions for programs are stored. The “control and computing unit **104**,” and thus the “CPU,” also is in

communication with the first and second screens, as it “controls” both the “video signal processing unit **111**” and the “touch panel signal processing unit **119**,” both of which transmit and receive data from the three screens **MD**, **SD1**, and **SD2**. Ex. 1004, [0281], [0285]. For instance, “a video signal for displaying a video on the above three screens” “may be generated at the control and computing unit **104**.” Ex. 1004, [0275].

163. Additionally, Aono specifies that the control and computing unit **104** controls all the steps of “ninth operation control” for the camera shooting mode. Ex. 1004, [0385]-[0415].

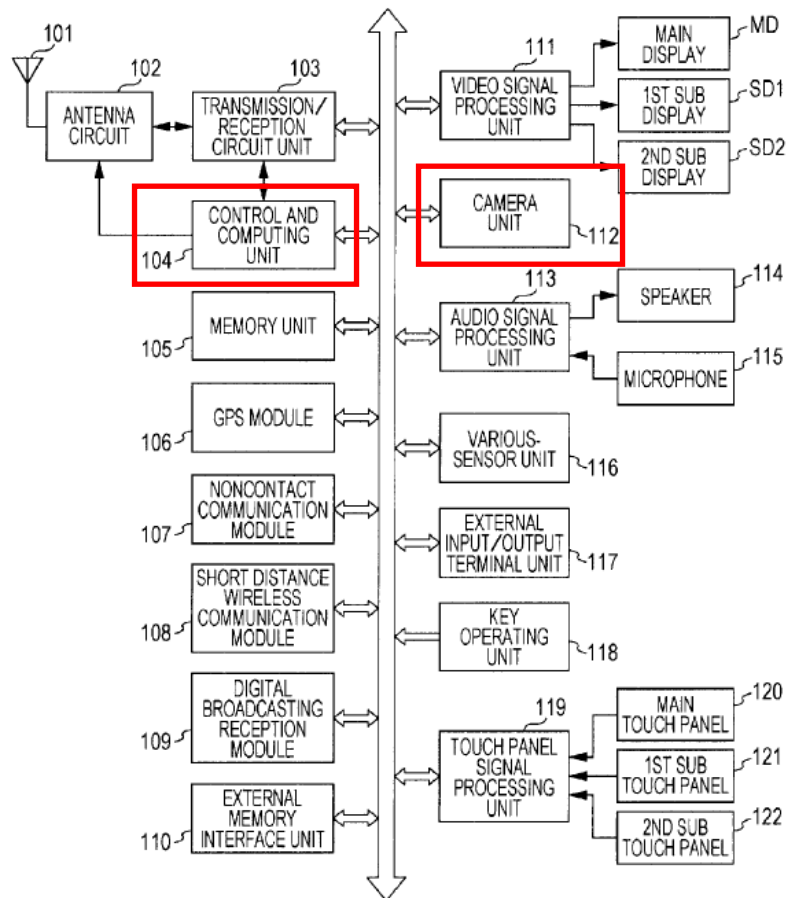
164. A POSITA would have understood that the processor is operable to execute the functions set forth in the following limitations, which make reference to the “ninth operation control” example.

6. Claim [11E]: receive user interface input to execute a image capture function;

165. Aono discloses this limitation for the same reasons discussed above with respect to the limitation in Claim 1, limitation [1B]. *Supra* Section X.B.1.

166. Aono further discloses that the “processor” (part of “control and computing unit **104**”) can control the camera unit **112** as illustrated in Figure 50:

FIG. 50



Ex. 1004, Fig. 50, [0287], [0385]-[0415].

7. Claim [11F]: determine an image capture function configuration, a device orientation, and a physical device state,

167. Aono discloses, or at least suggests, this limitation for the same reasons discussed above with respect to the limitations in Claim 1, limitations [1C] (determining device orientation and physical device state) and 2 (determining an

image capture function configuration, *e.g.*, if the device is configured to be used to capture self-portraits or not). *Supra* Sections X.A.4, X.B.1.

168. Aono discloses that the “image capture function configuration” could be a self-portrait configuration or other configurations. As noted with respect to claim 2, Aono discloses a self-portrait configuration. Ex. 1004, [0233].

169. The device also can enter an image capture function configuration to take an outward-facing image. The shooting angle in the “first partially opened configuration” can be set to not just 180 degrees (allowing the user to shoot a self-portrait) but also to different angles such as 0 degrees or 90 degrees. *Id.* These allow a user to take an outward-facing image. Aono teaches that “the user can perform shooting by various shooting angles as ease.” Ex. 1004, [0233]. Indeed, as a POSITA would have understood, a digital camera device (including one that is part of a PDA) would take an outward-facing image in the usual and most common use of the camera (that is, a user would take a picture of something in front of his or herself).

170. The device also could have a configuration to take an outward-facing image in other device states. In the “terminal closed” state, for example, as shown in Figure 3, the only visible display (**MD**) and the lens **7** face in opposite directions, so the device is configured to take an outward-facing image. Ex. 1004, Fig. 3, [0389]-[0390].

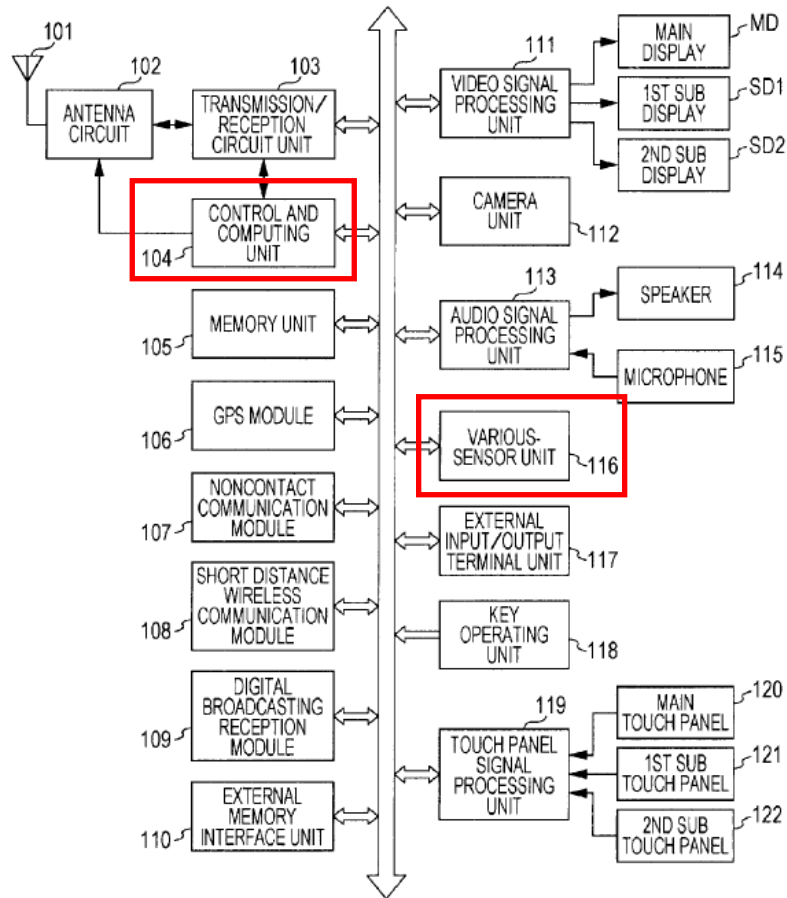
171. In the “terminal fully opened” state, the three displays **MD**, **SD1**, and **SD2** likewise all face in an opposite direction from the lens **7**, so the device is configured to take an outward-facing image. Ex. 1004, Fig. 5, [0395]-[0396].

172. In the “second partially opened” configuration, the device can take an outward-facing image, with the user looking through **SD1** or **SD2**. A POSITA would have understood that in such a configuration, both **SD1** and **SD2** are exposed to the user and facing the opposite direction as the lens **7**.

173. The determination of the image capture function configuration may, in some cases, be based on the physical device state in Aono. This arrangement still would be understood by a POSITA to meet the language of this claim; indeed, this is consistent with the teachings of the ’589 patent itself: “The device **100** can determine an image capture function **1100** configuration based on the devices state and display mode, in step **1312**.” Ex. 1001, 33:15-17.

174. Aono further discloses that the “processor” (part of “control and computing unit **104**”) is operable to interact with the camera unit **112** (as discussed immediately above) and the various-sensor unit **116**. The various-sensor unit **116** “is configured of various detection sensors such as the above terminal state detection sensor and so forth for detecting the state of the personal digital assistant 1” and “[d]etection signals from the various-sensor unit 116 are sent to the control and computing unit 104.” *Id.*, [0284], [0287], Fig. 50:

FIG. 50



8. **Claim [11G]: wherein the image capture function configuration is for a self-portrait, the physical device state at least including open, closed easel or modified easel, the display mode at least including portrait single, portrait dual, landscape single, landscape dual, portrait max or landscape max²**

175. Aono discloses, or at least suggests, this limitation for the same reasons discussed above with respect to the limitation in Claim 1, limitations [1C], [1D], and [2]. *Supra* Sections X.A.4.

176. Aono further discloses that the “processor” is the CPU (Central Processing Unit)” (part of “control and computing unit **104**”) as described in Claim [11D] *supra* Section X.A.5; *see also* Ex. 1004, [0287], Fig. 50.

9. **Claim [11H]: based on the image capture function configuration, the device orientation, and the device state, enter a dual screen mode for the image capture function;**

177. Aono discloses, or at least suggests, this limitation for the same reasons discussed above with respect to the limitation in claim 1, limitation [1F]. *Supra* Section X.A.7.

178. As explained above with respect to claim 2, the Aono device is configured to take a “self-portrait” when in the “second partially opened state.” *Supra* Section X.B.1; Ex. 1004, [0234], [0235], [0410]. As explained above with

² The term “display mode” has no antecedents. For purposes of this Petition, Petitioners interpret “display mode” the same as the term is used in claim 1.

respect to claim 1, limitation [1D], Aono's device is capable of a "dual screen mode" when in the "second partially opened state," as the device "displays a preview image on *one or more display panel[s]* ... which the user desires." *Supra* X.A.5; Ex. 1004, [0234], [0410].

179. Aono further discloses that the "processor" is the "CPU (Central Processing Unit)" (part of "control and computing unit **104**") as described in Claim [11D] *supra* Section X.G.5; *see* Ex. 1004, [0287], Fig. 50.

10. Claim [11I]: present a first display for the image capture function;

180. Aono this limitation for the same reasons discussed above with respect to the limitation in Claim 1, limitation [1C]. *Supra* Section X.A.4.

181. Aono further discloses that the "processor" is the "CPU (Central Processing Unit)" (part of "control and computing unit **104**") as described in Claim [11D] *supra* Section X.G.5; *see* Ex. 1004, [0287], Fig. 50.

11. Claim [11J]: receive a device orientation change, wherein the device orientation change is a rotation of the device; and

182. Aono discloses this limitation for the same reasons discussed above with respect to the limitation in Claim 1, limitation [1E]. *Supra* Section X.A.6.

183. Aono further discloses that the "processor" is the "CPU (Central Processing Unit)" (part of "control and computing unit **104**") as described in Claim [11D] *supra* Section X.G.5; *see* Ex. 1004, [0287], Fig. 50.

12. Claim [11K]: based on the device orientation change, the image capture function configuration and the device state, present a second display for the image capture function, wherein a portion on the first and second screen changes from the first display to the second display.

184. Aono discloses this limitation for the same reasons discussed above with respect to the limitation in Claim 1, limitation [1F]. *Supra* Section X.A.7.

185. Aono further discloses that the “processor” is the “CPU (Central Processing Unit)” (part of “control and computing unit **104**”) as described in Claim [11D] *supra* Section X.G.5; *see* Ex. 1004, [0287], Fig. 50.

H. Claim 12

186. Aono discloses, or at least suggests, the additional limitations of claim 12 and thus at least renders obvious Claim 12.

1. Claim [12A]: The device of claim 11, wherein the device is in an open state,

187. Aono discloses, or at least suggests, this limitation.

188. The limitations of claim 12A include those of Claim 3 (*i.e.*, device is in an open state). Aono discloses the limitations of Claim 3 and thus also discloses those limitations of Claim 12A. *Supra* Section X.C.1.

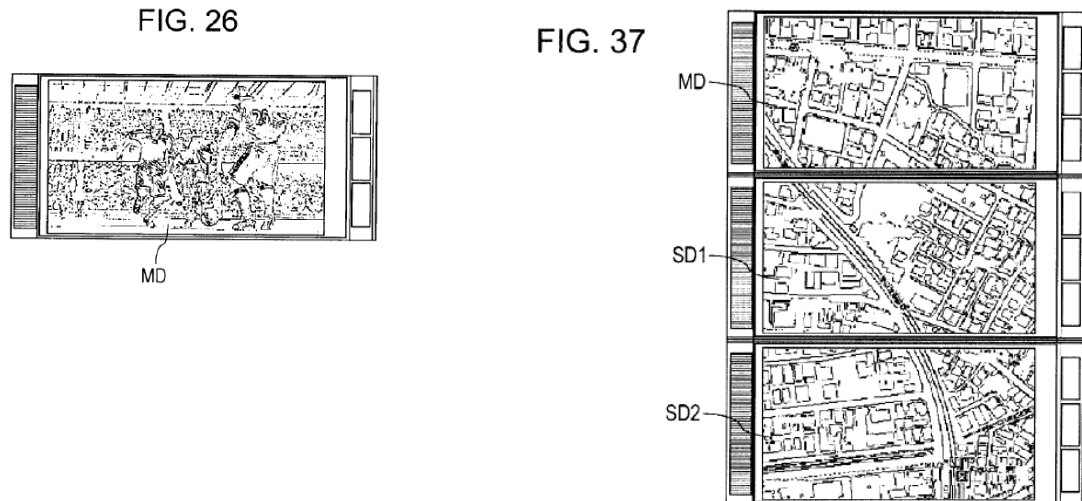
189. Furthermore, as discussed above with respect to claims 2 and 11, the Aono device can be configured to take a self-portrait in a “first partially *opened*” or “second partially *opened*” state. In at least the “second partially opened” state, with the angle between casings 2 and 3 set to 180 degrees, screens **SD1** and **SD2** are in

the same plane and thus the device is “open” in the same way as described in the ’589 patent. *Supra* Sections X.B, X.G.

2. Claim [12B]: wherein the first display is in a landscape orientation, and

190. Aono discloses this limitation.

191. Aono discloses the first display of the device in a landscape orientation, which Aono illustrates and describes in various places in its disclosure, including for example in Figures 26 and 37:



Ex. 1004, Figs. 26 and 37.

192. A POSITA would have understood that the device and displays of Aono can be in landscape or portrait orientation in any of the device states and configurations, including the “first partially opened state” and “second partially opened state.” *Supra* Section X.A.4.

3. Claim [12C]: wherein the image capture mode is a self-portrait mode.

193. Aono discloses, or at least suggests, this limitation.

194. The limitations of claim 12C are similar to those of Claim 2 (*i.e.*, taking an inward-facing image which, as a POSITA would understand and as taught in the '589 patent, could be a self-portrait). Aono discloses the limitations of Claim 2 because Aono teaches configuring a device to capture inward-facing images, and thus also discloses those limitations of Claim 12C. *Supra* Section X.B.1.

I. Claim 13

1. Claim [13]: The device of claim 11, wherein the second display is in a portrait orientation.

195. Aono discloses, or at least suggests, the additional limitations of claim 13 and thus at least renders obvious Claim 13.

196. A POSITA would have understood that the device and displays of Aono can be in landscape or portrait orientation in any of the device states and configurations, including the “second partially opened state.” *Supra* Sections X.A.4, X.D.1.

J. Claim 14

Claim [14]: The device of claim 13, wherein the portion that changes includes an image preview changing from a landscape orientation to a portrait orientation.

197. Aono discloses, or at least suggests, the additional limitations of claim 14 and thus would have rendered Claim 14 obvious to a POSITA.

198. As I explained in detail with respect to Claim 1, particularly limitations [1C], [1E], and [1F], Aono teaches transitioning from displaying an image in a landscape orientation across one screen in a closed device state to displaying an image in a portrait orientation on screens in an open device state. Ex. 1004, [0153]-[0154] (describing an example where “a landscape video corresponding to an aspect ratio of 16:9 is displayed with the long direction of the main display panel MD as level, and in the terminal opened state, a landscape enlarged video corresponding to an aspect ratio of generally 16:9 is displayed by arraying the three screens in the horizontally lateral direction as viewed from the user.”). Aono illustrates this in Figures 26 and 27:

FIG. 26

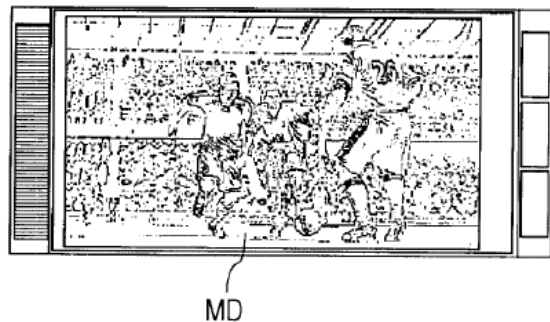
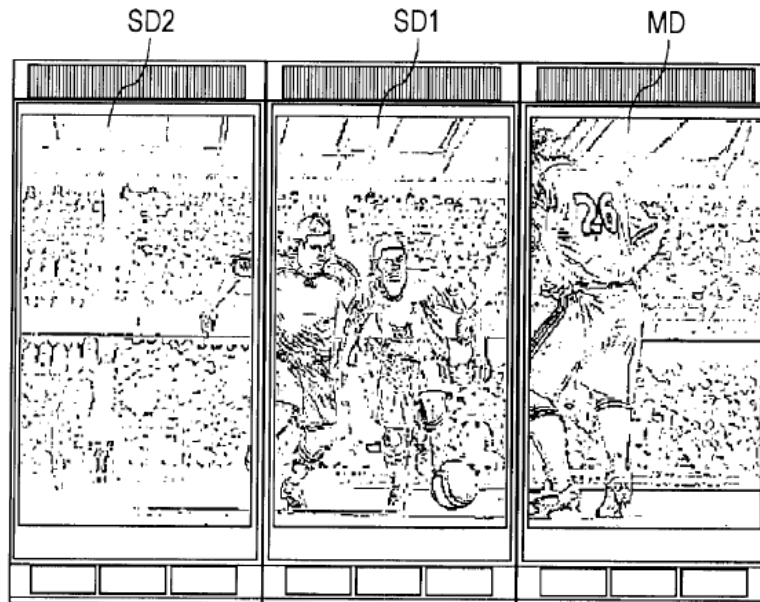


FIG. 27



Id., Figs. 26-27, [0152]-[0154].

199. A POSITA would have understood that the device and displays of Aono can be in landscape or portrait orientation in any of the device states and configurations, including the “second partially opened state.” A POSITA would further have understood that the image preview would change from a portrait to a landscape orientation in any of these states upon, e.g., a rotation of the device. *Supra* Section X.A.4.

200. Aono discloses that in the “camera shooting mode,” as described with respect to the “ninth operation control” and Figures 60 and 61, the device will display preview images (preview video data). Ex. 1004, [0281], [0385]-[0415]. A POSITA

would have understood that the portion of the display that changes will include an “image preview.”

K. Claim 16

- 1. Claim [16P]: A non-transitory computer readable medium having stored thereon computer-executable instructions, the computer executable instructions causing a processor of a device to execute a method for providing a user interface, the computer-executable instructions comprising:**

201. If the preamble is limiting, Aono discloses this limitation.

202. As explained above with respect to claim limitation [11C], Aono discloses a “memory unit **105**.” *Supra* Section X.G.4.

203. A POSITA would have understood that this “memory unit” is a computer readable medium that can store “computer-executable instructions.”

204. As Aono teaches, the “ROM stores an OS (Operating System), the control program for the control and computing unit **104** controlling each unit ... the various types of application programs including the display control program according to the present embodiment, and so forth.” Ex. 1004, [0286].

205. A POSITA would have understood that the computer-executable instructions stored in a memory and executed by a processor may cause the processor to execute a method for providing a user interface. As explained with respect to claim limitation [11D], the “CPU (Central Processing Unit)” (part of “control and computing unit **104**”) is the “processor.” *Supra* Section X.G.5. “[T]he control and

computing unit **104** executes the control program or various types of application programs stored in the memory unit **105.**” Ex. 1004, [0287].

206. A POSITA would have understood that the “computer executable instructions” comprise the instructions listed in the steps that follow.

207. Moreover, the “control program” and “application programs” are executed by the control and computing unit to control the operations of Aono’s device. *Supra* Section X.G.5. Aono also specifies that the control and computing unit **104** controls and executes the steps of all the steps of “ninth operation control” for the camera shooting mode. Ex. 1004, [0385]-[0415].

2. Claim [16A]: instructions to receive user interface input to execute a image capture function;

208. Aono discloses this limitation for the same reasons discussed above with respect to the limitations in Claim 1, limitation [1B] and claim 11, limitation [11F]. *Supra* Sections X.A.3 and X.G.7.

3. Claim [16B]: instructions to determine an image capture function configuration, a device orientation, and a physical device state,

209. Aono discloses, or at least suggests and would have rendered obvious to a POSITA, this limitation for the same reasons discussed above with respect to Claim 1, limitation [1C], Claim 2, and Claim 11, limitation [11F]. *Supra* Sections X.A.4, X.B.1, and X.G.7.

4. Claim [16C]: wherein the device has at least first and second screens,

210. Aono discloses this limitation for the same reasons discussed above with respect to the limitations in Claim 1, limitation [1A] and claim 11, limitations [11B] and [11C]. *Supra* Sections X.A.2, X.G.3, and X.G.4.

5. Claim [16D]: wherein the device is in an open state,

211. Aono discloses this limitation for the same reasons discussed above with respect to the limitations in Claim 1, limitation [1D], Claim 2, Claim 3, and Claim 11, limitation [11B]. *Supra* Section X.A.5, X.B.1, X.C.1, and X.G.3.

6. Claim [16E]: wherein, in the open state, the first and second screens face in substantially same directions,

212. Aono discloses this limitation for the same reasons discussed above with respect to the limitations in Claim 11, limitation [11B]. *Supra* Section X.G.3

7. Claim [16F]: wherein the image capture function is configured to capture an inward-facing image,

213. Aono discloses, or at least suggests and would have rendered obvious to a POSITA, this limitation for the same reasons discussed above with respect to the limitations in Claim 2 and Claim 11, limitations [11F] and [11G], that is, the image capture function is configured to capture a “self-portrait,” or inward-facing, image. *Supra* Sections X.B.1 and X.G.8.

8. Claim [16G]: and wherein a lens is associated with the second screen;

214. Aono discloses this limitation for the same reasons discussed above with respect to the limitation in Claim 11, limitation [11B]. *Supra* Section X.G.3.

9. Claim [16H]: based on the image capture function configuration, the device orientation, and the physical device state, instructions to enter a dual screen mode for the image capture function,

215. Aono discloses, or at least suggests and would have rendered obvious to a POSITA, this limitation for the same reasons discussed above with respect to the limitations in Claim 1, limitations [1C] and [1D] and claim 11, limitation [11H]. *Supra* Sections X.A.4, X.A.5, and X.G.9.

10. Claim [16I]: the physical device state at least including open, closed easel or modified easel, the display mode at least including portrait single, portrait dual, landscape single, landscape dual, portrait max or landscape max;

216. Aono discloses, or at least suggests and would have rendered obvious to a POSITA, this limitation for the same reasons discussed above with respect to the limitations in Claim 1, limitation [1D] and claim 11, limitation [11F]. *Supra* Sections X.A.5 and X.G.7.

11. Claim [16J]: instructions to present a first display for the image capture function;

217. Aono discloses this limitation for the same reasons discussed above with respect to the limitations in Claim 1, limitation [1C] and claim 11, limitation [11I]. *Supra* Sections X.A.4 and X.G.10.

12. Claim [16K]: instructions to receive a device orientation change, wherein the device orientation change is a rotation of the device; and

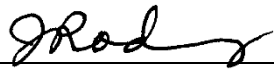
218. Aono discloses, or at least suggests and would have rendered obvious to a POSITA, this limitation for the same reasons discussed above with respect to the limitations in Claim 1, limitation [1E] and claim 11, limitation [11J]. *Supra* Sections X.A.6 and X.G.11.

13. Claim [16L]: based on the device orientation change, the image capture function configuration and the device state, instructions to present a second display for the image capture function, wherein a portion on the first and second screen changes from the first display to the second display.

219. Aono discloses, or at least suggests and would have rendered obvious to a POSITA, this limitation for the same reasons discussed above with respect to the limitations in Claim 1, limitation [1F] and claim 11, limitation [11K]. *Supra* Sections X.A.7 and X.G.12.

XI. OATH

220. I hereby declare that all of the foregoing statements are true or I believe them to be true to the best of my knowledge, information, and belief. I understand that willful false statements and the like are punishable by fine or imprisonment, or both in accordance with 18 U.S.C. 1001.



Jeffrey J. Rodriguez

Oct. 17, 2024

Date