IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SHENZHEN QIANFENYI INTELLIGENT TECHNOLOGY CO., LTD.,

Petitioner,

v.

WACOM CO. LTD.,

Patent Owner.

Patent No. 10,108,277
Issued: Oct. 23, 2018
Filed: Feb. 18, 2016

Inventors: Yasuo Oda et al.
Title: POINTER, POSITION DETECTION APPARATUS AND POSITION DETECTION METHOD

Inter Partes Review No. IPR2025-01596

PETITION FOR *INTER PARTES* REVIEW OF U.S. PAT. NO. 10,108,277

LISTING OF CHALLENGED CLAIMS

Limitation[1]	**Claim 1**
1pre]	A pen-shaped position indicator configured to capacitively couple with a sensor surface, the pen-shaped position indicator comprising:
1[a]	a pen-shaped body having a pen-tip portion;
1[b]	a first electrode arranged at a first position of the pen-tip portion;
1[c]	a second electrode arranged at a second position of the pen-tip portion different from the first position, the second position being off an axis of the pen-shaped position indicator;
1[d]	a signal production circuit configured to generate first and second signals that are distinguishable from each other; and
1[e]	conductive lines extending between the signal production circuit and the first and second electrodes, respectively,
1[f]	wherein the first and second signals generated by the signal production circuit, in operation, are transmitted to the first and second electrodes via the conductive lines;
1[g]	wherein the first and second electrodes are configured to form first and second capacitive relationships with the sensor surface, respectively, to generate detection signals in the sensor surface based on which angle information of the pen-shaped position indicator is obtainable.
Limitation	**Claim 2**
2[pre]	The pen-shaped position indicator according to claim 1,
2[a]	wherein the first and second electrodes are arranged at the first and second positions that are different along the axis of the pen-shaped position indicator.
Limitation	**Claim 3**
3[pre]	The pen-shaped position indicator according to claim 1,
3[a]	wherein the second electrode comprises plural electrode pieces arranged to surround the axis of the pen-shaped position indicator.

[1] Petitioner refers to claim limitations throughout this petition in the manner shown here (*e.g.*, 1[a] will always refer to "a pen-shaped body having a pen-tip portion" as recited in claim 1.

Limitation	Claim 4
4[pre]	The pen-shaped position indicator according to claim 1,
4[a]	wherein the first and second electrodes are arranged to surround the axis of the penshaped position indicator.
Limitation	**Claim 5**
5[pre]	The pen-shaped position indicator according to claim 1,
5[a]	wherein the angle information is a tilt angle of the pen-shaped position indicator relative to the sensor surface.
Limitation	**Claim 7**
7[pre]	The pen-shaped position indicator according to claim 1,
7[a]	wherein the first and second signals are different in type from each other.
Limitation	**Claim 8**
8[pre]	The pen-shaped position indicator according to claim 1,
8[a]	wherein the first and second signals are of the same type but have a time difference from each other.
Limitation	**Claim 9**
9[pre]	The pen-shaped position indicator according to claim 1, further comprising:
9[a]	a coil configured to receive an excitation signal; and
9[b]	a power generation circuit configured to generate a drive voltage based on the excitation signal;
9[c]	wherein the drive voltage is supplied to the signal production circuit to generate the first and second signals.
Limitation	**Claim 10**
10[pre]	A pen-shaped position indicator configured to capacitively couple with a sensor surface, the pen-shaped position indicator comprising:
10[a]	a pen-shaped body having a pen-tip portion;
10[b]	first and second electrodes arranged near the pen-tip portion to surround an axis of the pen-shaped position indicator; and
10[c]	a signal production circuit configured to generate first and second signals that are distinguishable from each other; and
10[d]	conductive lines extending between the signal production circuit and the first and second electrodes, respectively,
10[e]	wherein the first and second signals generated by the signal production circuit, in operation, are transmitted to the first and second electrodes via the conductive lines;

10[f]	wherein the first and second electrodes are configured to form first and second capacitive relationships with the sensor surface, respectively, to generate detection signals in the sensor surface based on which angle information of the pen-shaped position indicator is obtainable.
Limitation	**Claim 11**
11[pre]	The pen-shaped position indicator according to claim 10,
11[a]	wherein the pen-tip portion includes a conductive pen tip, to which the signal production circuit transmits a signal via a conductive line.
Limitation	**Claim 12**
12[pre]	The pen-shaped position indicator according to claim 10,
12[a]	wherein the angle information is a tilt angle of the pen-shaped position indicator relative to the sensor surface.
Limitation	**Claim 14**
14[pre]	A method of detecting angle information of a pen-shaped position indicator, the method comprising:
14[a]	forming a first capacitive relationship between a sensor surface and a first electrode, which is arranged at a first position of a pen-tip portion of the pen-shaped position indicator and is supplied with a first signal generated by a signal production circuit and transmitted via a first conductive line in the pen-shaped position indicator;
14[b]	forming a second capacitive relationship between the sensor surface and a second electrode, which is arranged at a second position of the pen-tip portion different from the first position and off an axis of the pen-shaped position indicator and is supplied with a second signal generated by the signal production circuit and transmitted via a second conductive line in the pen-shaped position indicator, wherein the second signal is distinguishable from the first signal; and
14[c]	detecting angular information of the pen-shaped position indicator based on the first and second capacitive relationships.
Limitation	**Claim 15**
15[pre]	The method according to claim 14,
15[a]	wherein the first and second electrodes are arranged at the first and second positions that are different along the axis of the pen-shaped position indicator.
Limitation	**Claim 16**
16[pre]	The method according to claim 14,

16[a]	wherein the second electrode comprises plural electrode pieces arranged to surround the axis of the pen-shaped position indicator.
Limitation	**Claim 17**
17[pre]	The method according to claim 14,
17[a]	wherein the first and second electrodes are arranged to surround the axis of the pen-shaped position indicator.
Limitation	**Claim 18**
18[pre]	The method according to claim 14,
18[a]	wherein the angle information is a tilt angle of the pen-shaped position indicator relative to the sensor surface.
Limitation	**Claim 20**
20[pre]	The method according to claim 14,
20[a]	wherein the first and second signals are different in type from each other.
Limitation	**Claim 21**
21[pre]	The method according to claim 14,
21[a]	wherein the first and second signals are of the same type but have a time difference from each other.
Limitation	**Claim 22**
22[pre]	A method of detecting angle information of a pen-shaped position indicator, the method comprising:
22[a]	forming first and second capacitive relationships between a sensor surface and first and second electrodes, respectively,
22[b]	wherein the first and second electrodes are arranged near a pen-tip portion of the pen-shaped position indicator to surround an axis of the pen-shaped indicator, and
22[c]	wherein the first and second electrodes are supplied with first and second signals generated by a signal production circuit via first and second lines, respectively, wherein the first and second signals are distinguishable from each other; and
22[d]	detecting angular information of the pen-shaped position indicator based on the first and second capacitive relationships.
Limitation	**Claim 23**
23[pre]	The method according to claim 22, comprising:
23[a]	forming a capacitive relationship between the sensor surface and the pen-tip portion including a conductive pen tip, to which a signal is supplied from the signal production circuit.
Limitation	**Claim 24**

24[pre]	The method according to claim 22,
24[a]	wherein the angle information is a tilt angle of the pen-shaped position indicator relative to the sensor surface.

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EXHIBITS

Exhibit	Reference
1001	U.S. Patent No. 10,108,277 ("'277 Patent")
1002	Prosecution History of U.S. Patent No. 10,108,277
1003	Curriculum Vitae of Dr. Ricardo Valerdi
1004	Intentionally omitted
1005	U.S. Patent No. 5,798,756 ("Yoshida")
1006	Japanese Patent Application Publication No. H10-11206 – Certified English Translation ("Ikeda")
1007	U.S. Patent No. 5,736,980 ("Iguchi")
1008	Declaration of Dr. Ricardo Valerdi
1009	Florence Ion, *From touch displays to the Surface: A brief history of touchscreen technology*, Ars Technica (April 4, 2013), https://arstechnica.com/gadgets/2013/04/from-touch-displays-to-the-surface-a-brief-history-of-touchscreen-technology/.
1010	Johnson, E.A., *Touch display—a novel input/output device for computers*, Electronics Letters, 1(8), 219-220 (1965).
1011	U.S. Patent No. 3,873,770 ("Ioannou").
1012	U.S. Patent No. 4,939,318 ("Watson").
1013	U.S. Patent No. 5,239,489 ("Russell").
1014	U.S. Patent No. 5,748,110 ("Sekizawa").
1015	*Wacom Intuos™ User's Manual for Windows®*, May 22, 2000, https://www.manualslib.com/manual/378139/Wacom-Intuos-For-Windows.html?page=39#manual.
1016	*Wacom Announces Intuos2 Graphics Tablet*, Macworld Staff, Macworld (Sept. 24, 2001), https://www.macworld.com/article/163005/intuos2.html.
1017	*Wacom Intuos® 2 User's Manual for Windows®*, Nov. 12, 2003, https://cdn-media.wacom.com/en-us/events/-/media/graveyard/wacomdotcom/files/store-manuals/legacy-models/intuos2-users-manual-win.pdf?rev=c8e4fadec98f4a5b9185d6e3f8c5e099&hash=D3EB3E89897883E6373E7EAD21CC9BF8.
1018	Ben Long, *Review: Wacom Cintiq 21UX Interactive Pen Display*, CreativePro Network (July 5, 2005), https://creativepro.com/review-wacom-cintiq-21ux-interactive-pen-display/.

Exhibit	Reference
1019	Bashir Hamid, *Review: Wacom's Cintiq 21UX Control Panel*, Post Magazine (Dec. 1, 2005), https://www.postmagazine.com/Publications/Post-Magazine/2005/December-1-2005/REVIEW-WACOMS-CINTIQ-21UX-CONTROL-PANEL.aspx.
1020	Feng Tian et al., *Tilt Menu: Using the 3D Orientation Information of Pen Devices to Extend the Selection Capability of Pen-Based User Interfaces*, Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (2008), https://zhang.ist.psu.edu/pdf/paper239.pdf.
1021	Robert Bridson, *SpikeNav: Using Stylus Tilt in Three Dimensional Navigation*, Proceedings of the 22nd Annual ACM Symposium on User Interface Software and Technology (UIST) (2009), https://www.cs.ubc.ca/~rbridson/docs/bridson-uist09-spikenav.pdf.
1022	Yizhong Xin and Xiangshi Ren, *A Study of Inherent Pen Input Modalities for Precision Parameter Manipulations During Trajectory Tasks*, 92 IEICE Transactions on Information & Systems 2454 (2009).

I. INTRODUCTION

Shenzhen Qianfenyi Intelligent Technology Co., Ltd. ("Petitioner") petitions for *inter partes* review ("IPR") of claims 1-5, 7-12, 14-18, and 20-24 ("Challenged Claims") of U.S. Patent No. 10,108,277 granted to Wacom Co. Ltd. ("Patent Owner"). Ex. 1001.

II. REQUIREMENTS FOR IPR

A. Standing

The '277 Patent is available for IPR. Petitioner is not barred or estopped from requesting IPR of the Challenged Claims.

B. Fee for IPR

The Director is authorized to charge the fee specified by 37 CFR § 42.15(a) to Deposit Account No. 506181.

C. Relief Requested

Petitioner requests IPR of the Challenged Claims on the grounds below:

Ground	Challenged Claims	Basis for Rejection
1	1-5, 7-12, 14-18, and 20-24	35 U.S.C. §103: Yoshida/Ikeda
2	1-5, 8-12, 14-18, and 21-24	35 U.S.C. §103: Yoshida/Iguchi

The '277 Patent claims the benefit of Foreign Application 2010-024858 (JP), filed on February 5, 2010. The prior art relied on is prior art under 35 U.S.C. §102 (PRE-AIA) based on that priority date. Accordingly, without conceding any priority claim by Patent Owner, Petitioner treats the priority date for the Challenged Claims as February 5, 2010.

Yoshida (issued August 25, 1998) (Ex. 1005), Ikeda (published April 24, 1998) (Ex. 1006), and Iguchi (issued April 7, 1998) (Ex. 1007) are prior art under 35 U.S.C. § 102 (PRE-AIA).

None of these references were cited during prosecution of the '277 Patent. *See* Ex. 1002.

D. Notice of Real Party in Interest (37 C.F.R. § 42.8(b)(1))

Petitioner Shenzhen Qianfenyi Intelligent Technology Co., Ltd. is the real-party-in-interest.

E. Notice of Related Matters (37 C.F.R. § 42.8(b)(2))

Petitioner is the defendant in a pending action filed by Patent Owner alleging infringement of the '277 Patent, among other patents. That action is Case No. 2:24-cv-702-JRG in the United States District Court for the Eastern District of Texas, Marshall Division. The complaint in that action was served on October 17, 2024. Dkt. 10. This petition is filed less than one year from the date of service. 35 U.S.C. § 315(b).

F. Other Grounds for Denial

Pursuant to the March 26, 2025 *Interim Processes of PTAB Workload Management Memorandum*, and the associated guidance issued by the USPTO, Petitioner does not address arguments relating to discretionary denial in this Petition.

III. BACKGROUND AND OVERVIEW OF THE ’277 PATENT

A. Background of the Prior Art

Styluses have been known and used for decades. For example, the “Palm Pilot” product launched in 1996 included a stylus to use with its handheld computing device. Ex. 1008, ¶ 97. The Background of the ’277 Patent explains that a “position detection apparatus, called a tablet, has been developed as one of pointing devices used for producing an image or illustration on a computer apparatus.” Ex. 1001, 1:21–25. Such a device “typically includes a position detector substantially in the form of a flat plate, and a pointer in the form of a pen to be operated by a user on the position detector.” *Id.* at 1:25–29.

The Background of the ’277 Patent further explains that tablets based on an “electrostatic coupling method” in which “a predetermined signal is transmitted from the pointer, which is placed on the sensor section, to the conductor group, and the position pointed to by the pointer is detected by specifying the reception position of the transmission signal by the position detector” were already known. *Id.* at 1:33–40. The ’277 Patent also acknowledges that conventional position detection apparatuses were already known in the art. *Id.* at 1:42–45.

B. Description of the ’277 Patent

The ’277 Patent, titled “Pointer, Position Detection Apparatus and Position Detection Method,” relates to systems for detecting the position of a pen-shaped pointer on a coordinate input surface and additional attributes such as pressure and tilt. Ex. 1001, at Abstract; 2:1–27; Ex. 1008, ¶ 27.

The pointer disclosed in the ’277 Patent includes multiple electrodes, such as a first electrode 20 and a second electrode 21, each connected to a signal production circuit and configured to transmit distinguishable signals (e.g., codes C1 and C2). Ex. 1001, 12:47–53, 13:1–18, Figs. 1–2. These signals are capacitively coupled to the sensor surface and then processed to identify position and additional characteristics of the pen’s interaction. Ex. 1001, 13:5–18; Ex. 1008, ¶ 28.

FIG. 1

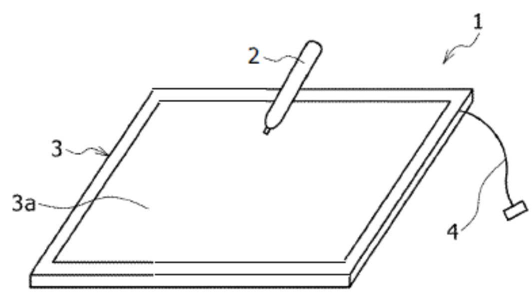

FIG. 1 of ’277 Patent (pointer and coordinate input system overview)

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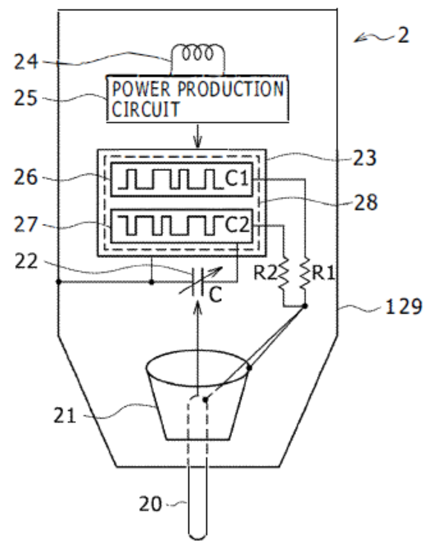


FIG. 2 of ’277 Patent (pointer structure including first and second electrodes)

The position detection apparatus includes correlation matching circuitry that compares received signals against the transmitted codes to identify correlation peaks. Ex. 1001, 13:15–35, Figs. 5–7. From these correlation values, the system determines pen position and other attributes. Ex. 1001, 13:36–14:27, 21:63–22:57; Ex. 1008, ¶¶ 29–30.

For example, time differences between received codes C1 and C2 can indicate pressure, while spatially distributed electrodes transmit distinguishable signals allowing detection of pen inclination based on variations in received signal intensities. Ex. 1001, 13:60–14:51, 21:63–23:4, Fig. 19; Ex. 1008, ¶ 31.

The ’277 Patent also describes alternative signaling techniques to separate electrode signals, including use of different modulation schemes such as phase shift keying (PSK) or frequency shift keying (FSK), as well as the use of integrated circuit components to generate and transmit modulated codes. Ex. 1001, 15:20–34, 21:1–12; Ex. 1008, ¶¶ 32–33.

C. Summary of the Prosecution History of the ’277 Patent

The patent application that issued as the ’277 Patent, U.S. Application No. 15/047,013, was filed on February 18, 2016 and claims priority to Japanese Application No. 2010-024858, filed February 5, 2010. Ex. 1001. The ’277 Patent issued on October 23, 2018 after four office actions and various amendments and arguments related to obviousness.

IV. PERSON HAVING ORDINARY SKILL IN THE ART (“POSITA”)

As of February 5, 2010, a POSITA relevant to the ’277 Patent would have at least a bachelor’s degree in computer engineering, electrical engineering, or similar, and at least two years of experience working with computing systems and their interaction/communication with other devices, or an advanced degree in computer engineering, electrical engineering, or the like. Ex. 1008, ¶ 41.

V. CLAIM CONSTRUCTION

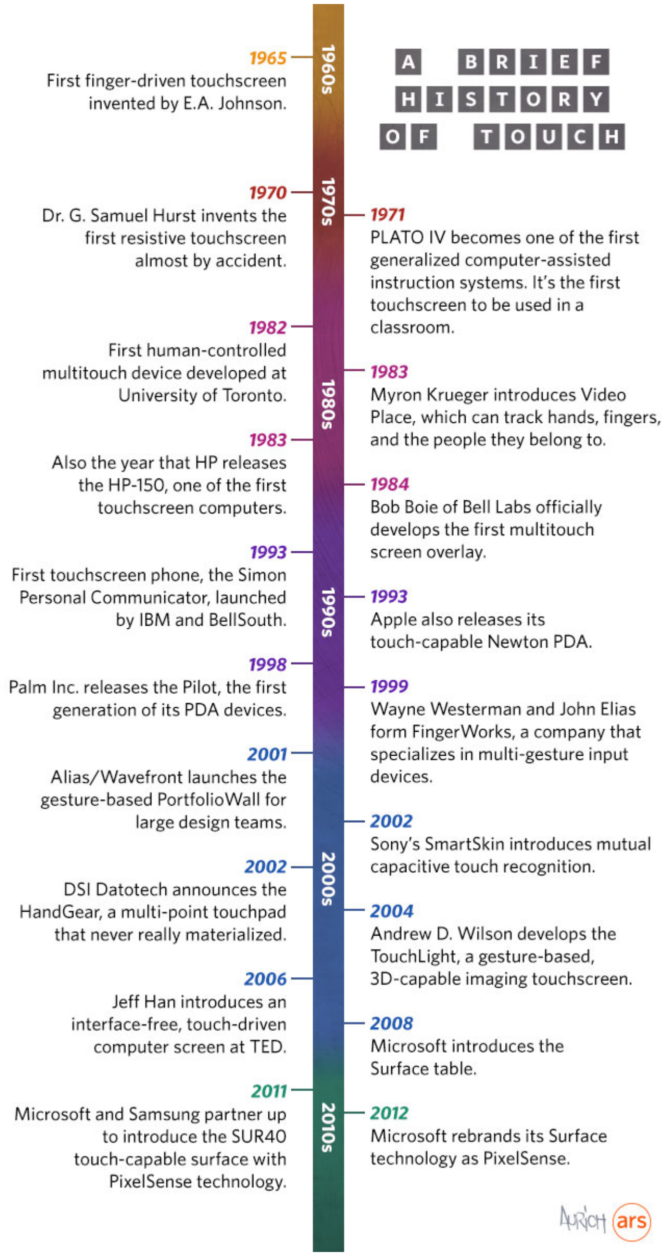
Petitioner submits that no formal claim constructions are necessary. Petitioner reserves the right to respond to any constructions offered by Patent Owner or adopted by the Board. Petitioner is not conceding that each Challenged Claim satisfies all statutory requirements, nor is Petitioner waiving any arguments concerning claim scope or grounds that can only be raised in district court.

VI. CHALLENGED CLAIMS ARE UNPATENTABLE

All Challenged Claims of the ’277 Patent are unpatentable; they merely recite limitations that were known in the art as of the priority date of the ’277 Patent.

A. Conventional Knowledge of a POSITA

As of the priority date of the ’277 Patent (February 5, 2010), a POSITA would be familiar with a wide variety of techniques and components for implementing a stylus for use with a touch-sensitive device, including capacitive and resistive technologies. Ex. 1008, ¶¶ 42, 77–79; Ex. 1009; Ex. 1010 (1965 “Touch Display” study); *see e.g.*, Exs. 1011–1014. Companies like HP, Palm, Apple, Sony, and Microsoft all made advances in touchscreen technology before the effective filing date of the ’277 Patent:



Ex. 1009 at 2; Ex. 1008, ¶ 97.

Moreover, as of February 2010, a POSITA would have been familiar with active styluses that have their own power source, and communicate richer information to a touchscreen device, such as switch data, pressure data, and orientation information. Ex. 1008, ¶¶ 78, 80–110; Ex. 1010 at 1-2. Beyond general stylus functionality, a POSITA would have also been familiar with numerous patents, commercial products, and academic publications that specifically addressed tilt and angle detection.

For example, U.S. Patent No. 3,873,770 to Ioannou ("Ioannou," Ex. 1011) issued March 25, 1975, decades before the '277 Patent. Ioannou discloses a stylus-based input system that detects tilt and compensates for tilt-induced position errors. Ex. 1011, Abstract; 8:15–67; 9:55–10:65. Ioannou confirms that stylus tilt detection and correction were known techniques long before the alleged invention of the '277 Patent. Ex. 1008, ¶¶ 80–83.

U.S. Patent No. 4,939,318 to Watson ("Watson," Ex. 1012) issued July 3, 1990, nearly two decades before the '277 Patent. Watson discloses a method of detecting pen tilt in an electromagnetic digitizer without altering the physical construction of the pen or tablet. Ex. 1012, Abstract; 3:29–33; 3:45–4:24. Watson teaches calculating tilt by interpolating voltage values from grid wires adjacent the zero-crossing point and determining a compensation factor proportional to pen tilt. *Id.*, 5:4–6:15. Watson confirms that tilt detection and correction were well-understood and widely implemented prior to the '277 Patent. Ex. 1008, ¶¶ 84–88.

U.S. Patent No. 5,239,489 to Russell ("Russell," Ex. 1013) issued August 24, 1993, several years before Yoshida, Ikeda, and Iguchi. Russell discloses a digitizer tablet that estimates both stylus position and angular orientation (tilt). Ex. 1013, Abstract; 3:30–46; 6:15–35; 9:20–45. Russell confirms that stylus tilt detection and correction techniques were established well before the mid-1990s. Ex. 1008, ¶¶ 89–93.

U.S. Patent No. 5,748,110 to Sekizawa ("Sekizawa," Ex. 1014 issued May 5, 1998, shortly before Yoshida, Ikeda, and Iguchi. Sekizawa discloses a coordinate detecting device and method for detecting tilt angles of a stylus pen with high accuracy by analyzing induced voltage distributions and correcting positional error through interpolation. Ex. 1014, Abstract; 3:35–4:16; 6:18–7:10; 9:27–11:11. Sekizawa confirms that tilt detection with high accuracy was well developed before the effective filing date of the '277 Patent. Ex. 1008, ¶¶ 94–95.

Commercial products likewise included tilt functionality years before the '277 Patent. For example, the Wacom Intuos pen tablet, available in the late 1990s and early 2000s, advertised "the tablet recognizes when you tilt the pen or airbrush from vertical to inclined positions" and that the pen was "tilt sensitive," allowing natural brush and eraser strokes. Ex. 1015 at 39–40; Ex. 1008, ¶¶ 99–101. The Wacom Intuos2, released in 2001, was reported to "transmit tilt angle and direction information," and its user manual included a dedicated "TILT" tab for adjusting tilt sensitivity. Exs. 1016–1017; Ex. 1008, ¶¶ 102–103. Similarly, reviews of the Wacom Cintiq 21UX in 2005 explained that the Grip Pen supported "pen pressure and tilt sensitivity" and that tilt and pressure were adjustable in the control panel. Exs. 1018–1019; Ex. 1008, ¶¶ 105–106.

Academic publications likewise confirm that tilt was recognized as a core stylus input modality before the priority date of the '277 Patent. In 2008, researchers presented "Tilt Menu," which used the 3D orientation of a pen for command selection while drawing. Ex. 1020; Ex. 1008, ¶ 107. In 2009, the "SpikeNav" study demonstrated use of stylus tilt for three-dimensional navigation, treating tilt as a robust input channel. Ex. 1021 at 1–3; Ex. 1008, ¶ 108. That same year, an empirical study compared pressure, tilt, azimuth, and rolling as pen input modalities, using a Wacom Cintiq 21UX, and concluded that tilt achieved low error rates in precision tasks. Ex. 1022 at 2454–2461; Ex. 1008, ¶ 109.

Taken together, these patents, commercial devices, and academic studies confirm that tilt detection was well understood long before the February 5, 2010 priority date for the '277 Patent. Ex. 1008, ¶110. By the late 1990s and early 2000s, products like the Wacom Intuos, Intuos2, and Cintiq 21UX expressly advertised tilt detection as a feature, and academic research in 2008–2009 validated tilt as a reliable input modality. Exs. 1015–1022; Ex. 1008, ¶¶ 98–109. A POSITA would therefore have understood tilt detection as conventional, interchangeable technology and would have been motivated to combine the approaches of Yoshida with Ikeda (Ground 1) or Iguchi (Ground 2) with a reasonable expectation of success.

B. Summary of Prior Art

1. Yoshida (Ex. 1005)

Yoshida, titled "Position Indicating Apparatus," discloses a capacitive stylus system in which a pen-shaped position indicator interacts with a tablet surface through multiple, spatially separated electrodes. In one embodiment, the stylus includes a rod-shaped inner electrode 604b and a megaphone-shaped outer electrode 604a, arranged coaxially. Ex. 1005, Figs. 2, 6A, 19:66–20:3, 26:19–37; *see also id.*, Fig. 26. These electrodes are driven by signals of opposite phase, producing electric fields capacitively coupled with the sensor surface. *Id.* at 26:19–37; 27:13–25.

Fig.2

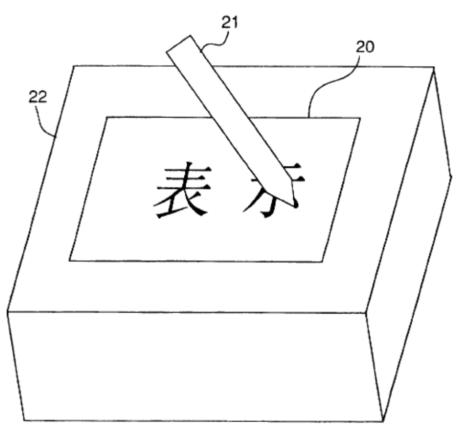


Fig.6A

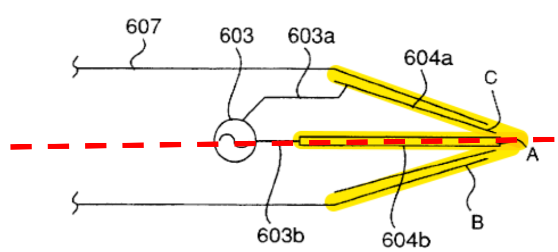
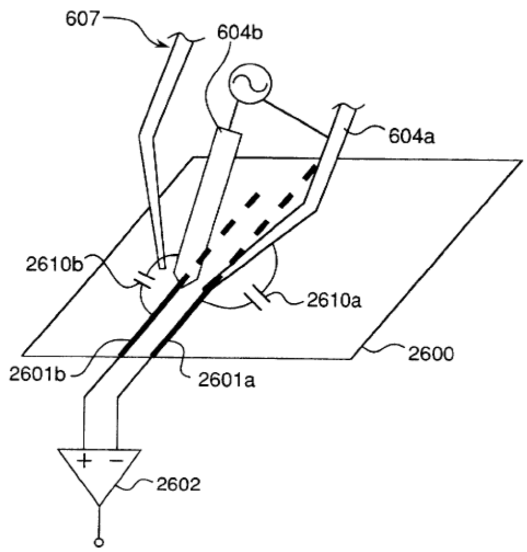


Fig.26



Yoshida further describes electrode arrangements at different axial positions, such as inner electrode 502 and outer electrode 510 in Figure 29 and electrodes DI in Figure 28, where variations in capacitive signals correspond to stylus tilt and rotation relative to the sensor surface. *Id.* at 28:3-25; 26:36-48.

Fig. 29

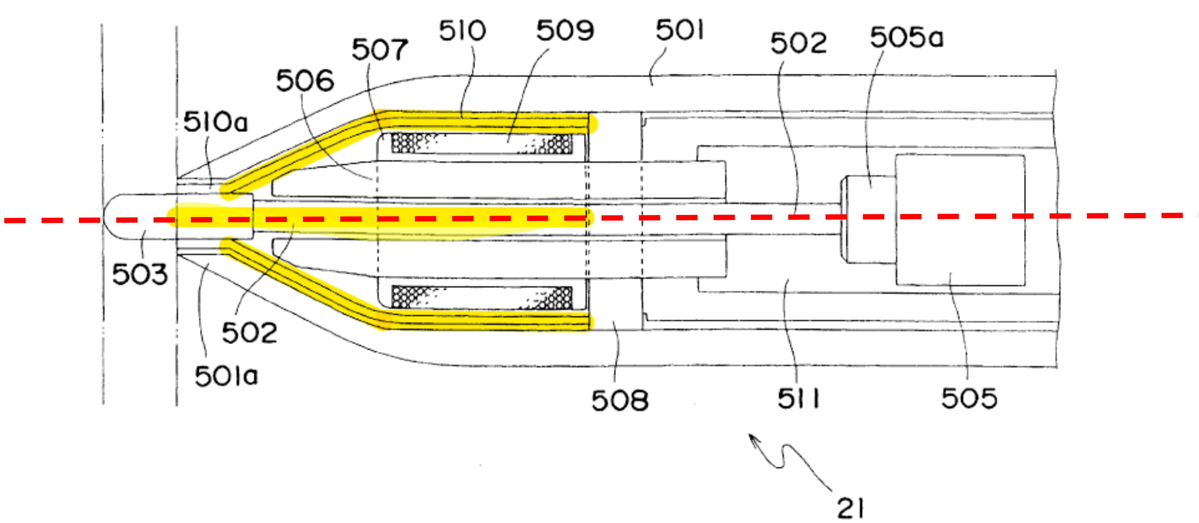
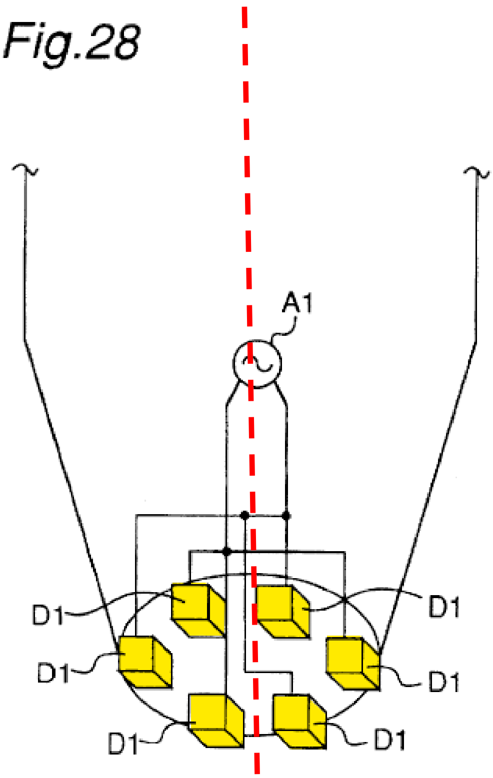


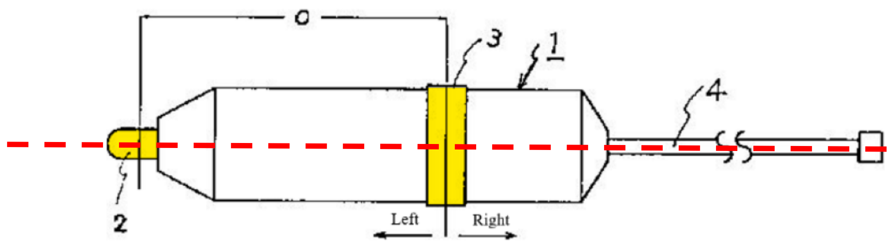
Fig.28



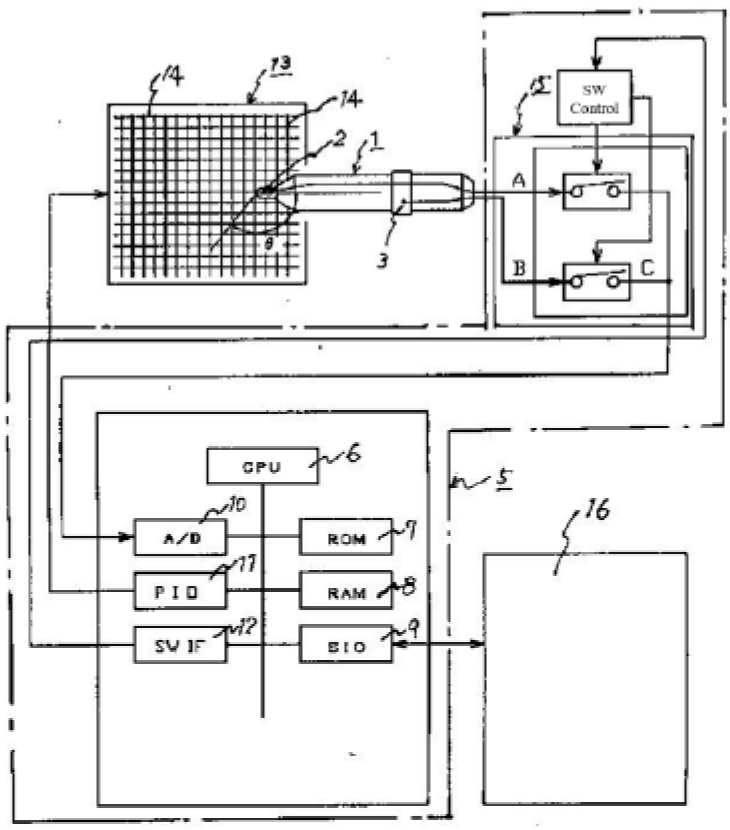
2. Ikeda (Ex. 1006)

Ikeda, titled "Coordinate Input Apparatus and Position Indicator," discloses a capacitive coordinate input system in which a pen-shaped position indicator includes multiple electrodes for detecting tilt and rotation. In one embodiment, a first electrode at the tip of the pen and a second electrode offset from the central axis allow angle detection based on differential capacitance with the sensor surface. *Id.*, ¶¶ [0001], [0005]–[0007]; Figs. 1, 3.

[Fig 1.]

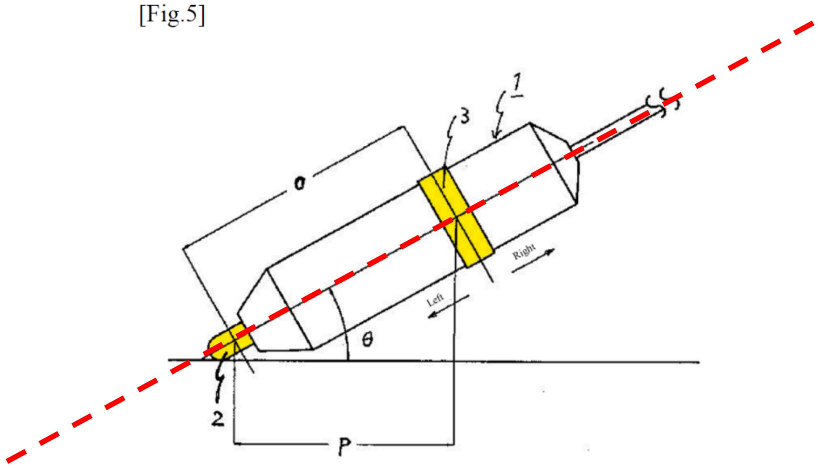


[Fig. 3]



The system switches between signals from the coordinate detection unit and the angle detection unit, digitizes both signals, and stores them for processing. Ex. 1006, ¶¶ [0009]–[0012]; Fig. 3. By comparing the positional data from both detection units, the device calculates the pen's tilt angle and controls whether coordinate input is permitted based on that angle. *Id.* ¶¶ [0013]–[0014]; *see also id.*, Fig. 5.

[Fig.5]



Ikeda further teaches that the system can derive tilt angle using the relation COS θ = O/P (where O is the reference dimension between electrodes and P is the measured angle dimension), allowing accurate angular detection without mechanical sensors. *Id.* ¶ [0013]; Fig. 6. Additionally, fixing the tip electrode while moving the body electrode enables joystick-like functionality. *Id.* ¶¶ [0015]-[0016].

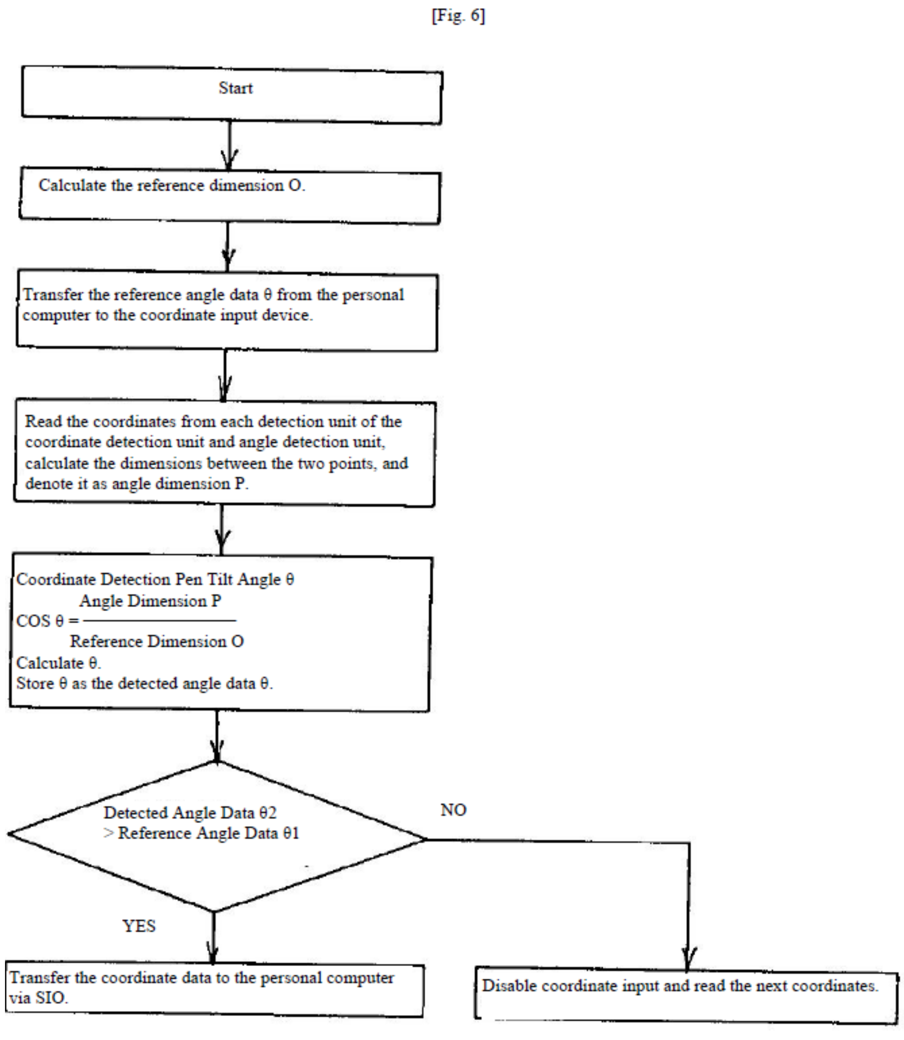


Fig. 6 of Ikeda (Detecting pen tilt)

3. Iguchi (Ex. 1007)

Iguchi, titled "Position Detecting System and Position Indicator," addresses accurate detection of pen tilt and rotation using capacitive methods without mechanical sensors. Iguchi discloses inner and outer electrodes near the pen tip, arranged coaxially, where changes in capacitive coupling with the tablet are analyzed to determine tilt direction and magnitude. Ex. 1007, Figs. 26a, 26b; 15:38-52. Tilt angle is detected by variations in signal strength received at sensor electrodes.

FIG. 26a

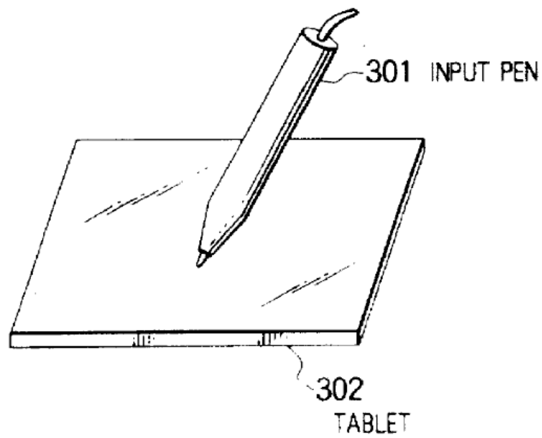
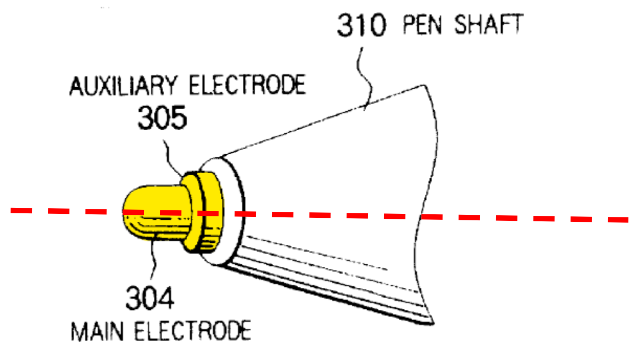


FIG. 26b



Iguchi also discloses circumferential electrode pairs for rotation detection, where relative amplitudes and phases of their signals indicate rotational orientation. *Id.*, Fig. 27c; 17:24-45. Further, Iguchi teaches signal modulation (timing, phase, or waveform) across electrodes so their capacitive couplings can be independently resolved at the tablet side, enabling both positional and angular detection. *Id.*, Figs. 29a, 29b; 18:14-36.

FIG. 27c

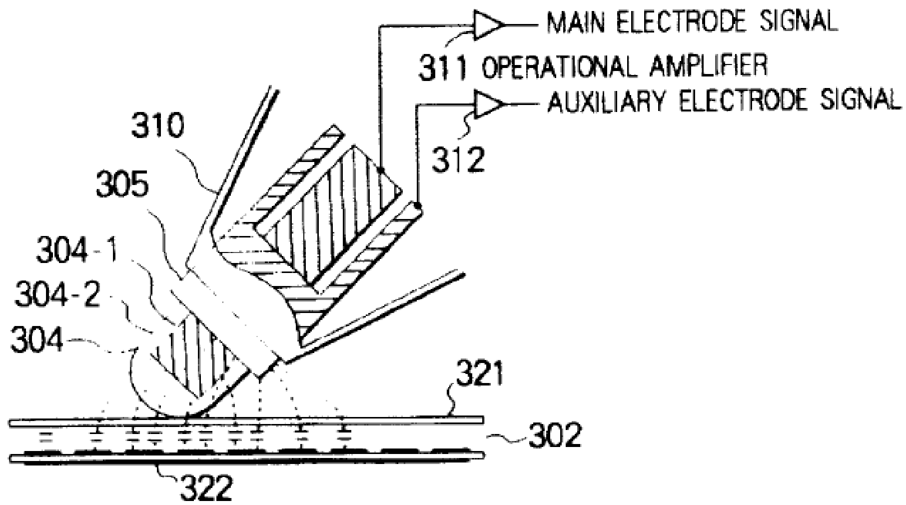
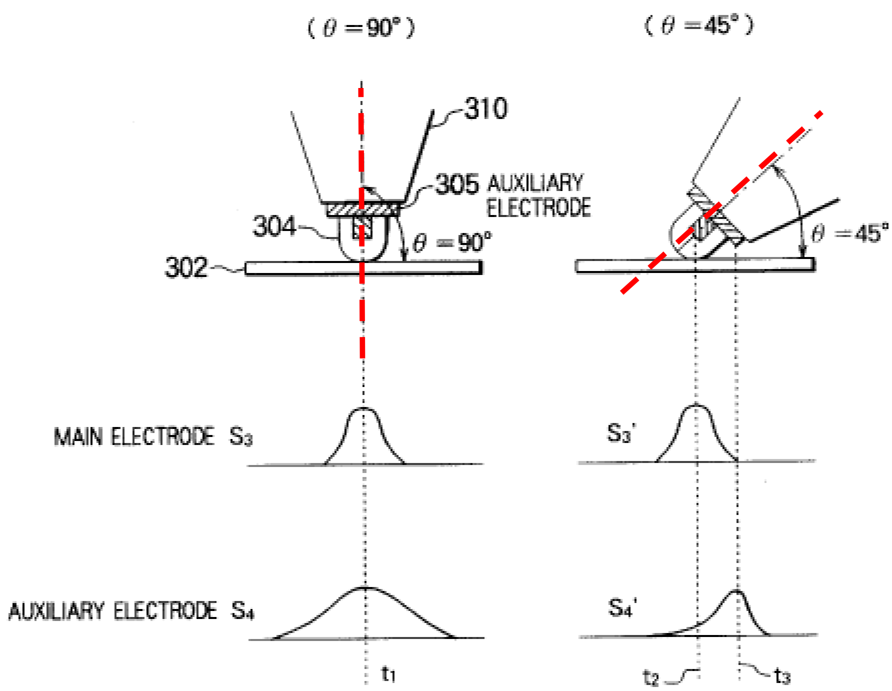


FIG. 29a

FIG. 29b



These techniques are integrated with conventional coordinate detection, providing both position and orientation data in real time for applications such as handwriting, drawing, and CAD. *Id.*, 15:38-52, 17:24-45, 18:14-36.

VII. GROUNDS OF UNPATENTABILITY

Under 37 C.F.R. §42.104(b)(4)-(5), the following sections (as confirmed in the Declaration of Ricardo Valerdi Ph.D., Ex. 1008) detail the grounds of unpatentability, the limitations of the Challenged Claims, and how these claims are obvious in view of the prior art.

A. Ground 1: Claims 1-5, 7-12, 14-18, and 20-24 are obvious over Yoshida in view of Ikeda and the knowledge of a POSITA.

These claims are obvious over Yoshida in view of Ikeda and the knowledge of a POSITA. *See* Ex. 1008, ¶ 121.

Yoshida and Ikeda are both directed to capacitive stylus input systems with multiple electrodes for position detection and angle information. *See* Ex. 1005, Abstract; Ex. 1006, Abstract. Both references address the detection and processing of multiple stylus signals to improve input accuracy. A POSITA would have been motivated to combine Yoshida's disclosure of stylus electrode structures and capacitive relationships with Ikeda's disclosure of capacitive detection circuits for stylus tilt and angular detection. A POSITA would have been motivated to combine these teachings because both Yoshida and Ikeda disclose forming multiple capacitive relationships between stylus electrodes and a sensor surface to extract detailed input information. Yoshida's multi-electrode structure provides strong positional data, while Ikeda's dual-electrode system enables accurate tilt detection. Combining these techniques would predictably yield a single stylus system capable of simultaneously detecting position and angular information with high precision, resulting in more accurate readings from the pen, and reducing errors due to uneven electric fields resulting in greater sensitivity and finer control of the pen. This advancement would meet growing commercial demand for more capable and responsive styluses in creative, technical, and professional markets. The combination would also avoid the need for additional mechanical tilt sensors, reducing manufacturing complexity while delivering superior performance. Ex. 1008, ¶¶ 112–113, 115–116, 118–120. The references are in the same field, dealing with capacitive stylus technology, and combining their teachings would be a logical step to achieve a system with enhanced functionality.

1. Claim 1

a. 1[pre]

Yoshida discloses a pen-shaped electronic pen 21 (a "pen-shaped position indicator") that capacitively couples with a sensor surface (display panel). Ex. 1005, Figs. 1 and 2, 19:66–20:1 ("the electric field generator 102 shown in FIG. 1 is incorporated in a pen-shaped electronic pen 21"); 14:62–67 ("a signal which is generated by an electric field generated from the electrodes of the coordinate pointing device at the electrodes of the panel coupled through an electrostatic capacitive coupling with the coordinate pointing device is detected"); *see also id.*, 22:28-39; 25:28-35; Fig. 2.

Fig.1

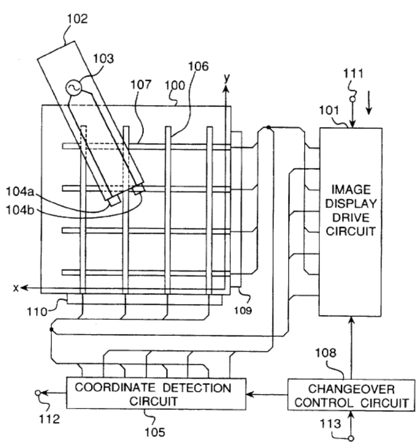
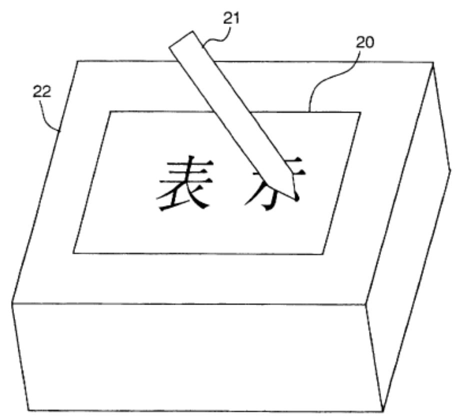
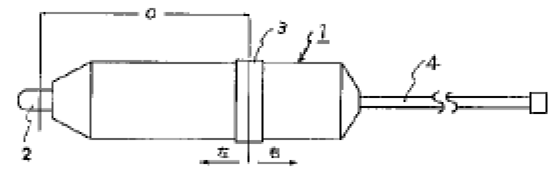


Fig.2

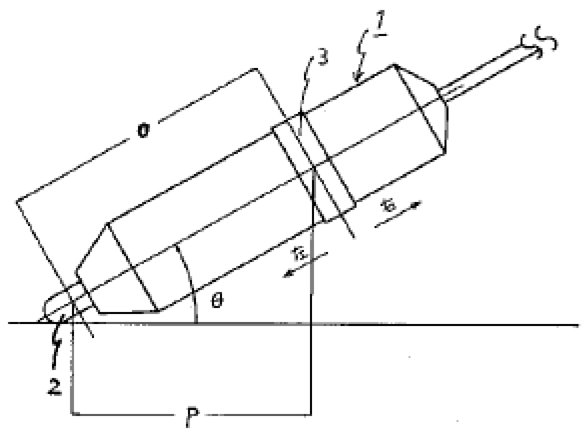


Ikeda also discloses a coordinate detection pen (a "pen shaped position indicator") that capacitively couples with a sensor surface. Ex. 1006, ¶ [0005] ("[a] coordinate input device comprising a tablet with multiple electrode lines in the X and Y axis directions and a coordinate detection pen utilizing capacitive coupling with the tablet's electrode lines."); *see also id.*, [0001] ("This invention relates to an apparatus for detecting electrode line signals on the board surface of a coordinate input device using capacitive coupling."), Figs. 1, 5.

【図1】



【図5】

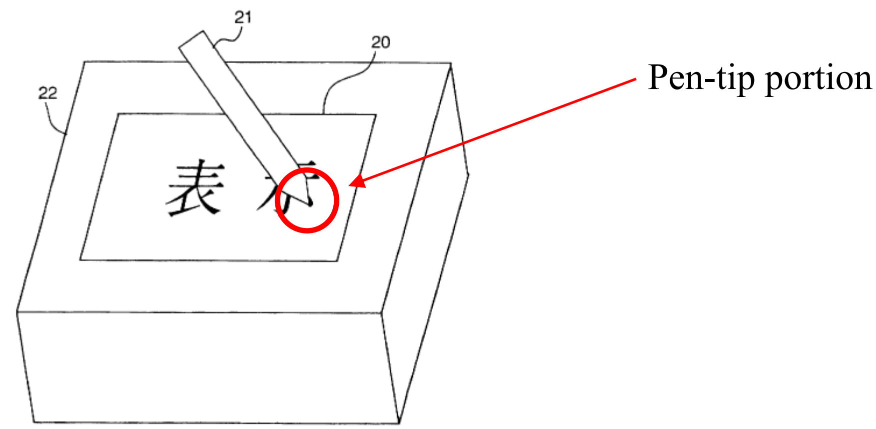


Yoshida and Ikeda each disclose 1[pre]. Ex. 1008, Appx. A, 1[pre].

b. 1[a]

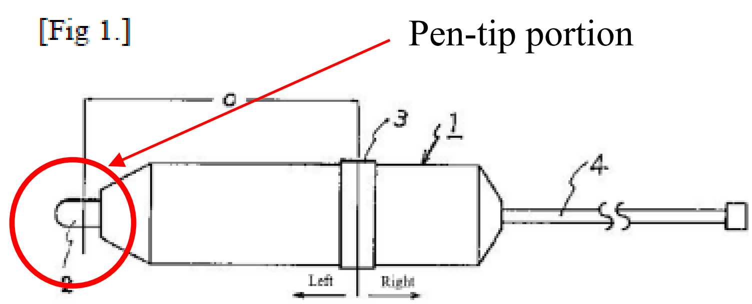
Yoshida discloses a pen-shaped electronic pen 21with a tapered pen-tip portion. Ex. 1005, Fig. 2:

Fig.2

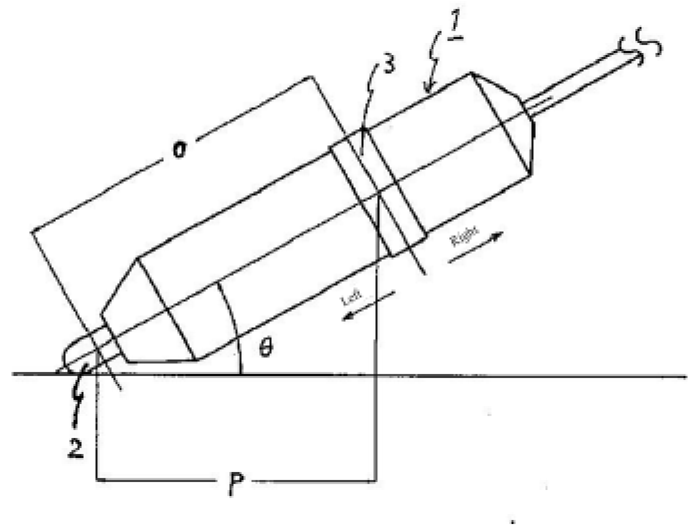


Ikeda discloses a coordinate detection pen with a pen-tip portion. Ex. 1006, ¶ [0008] ("an axis-shaped detection unit 2 is positioned at the tip of the coordinate detection pen 1 to read the coordinates of the indicated point"); Figs. 1, 5:

[Fig 1.]



[Fig.5]

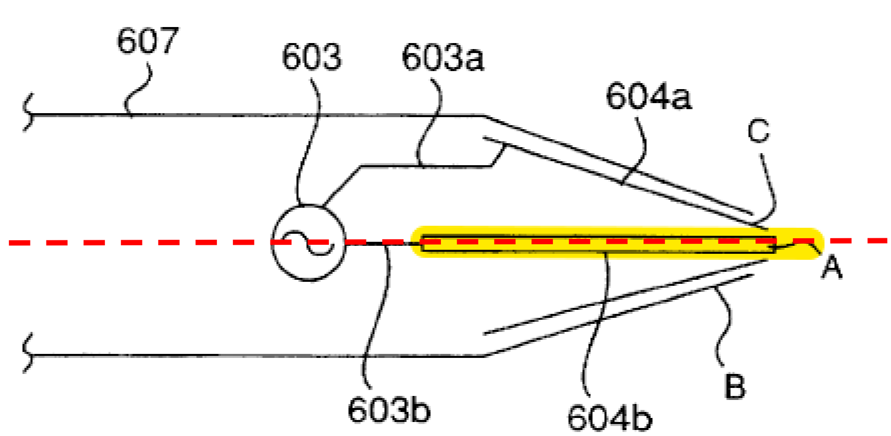


Yoshida and Ikeda each disclose 1[a]. Ex. 1008, Appx. A, 1[a].

c. 1[b]

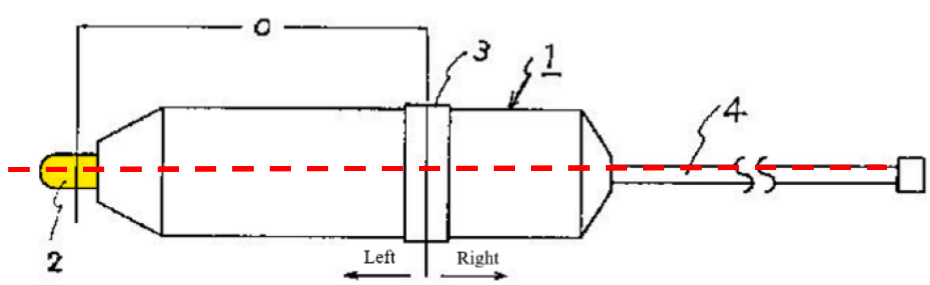
Yoshida discloses a first rod-shaped inner electrode 604b at the pen-tip portion of the pen-shaped electric field generator 607. Ex. 1005, Fig. 6A. In Figure 6A, the rod-shaped inner electrode 604b is shown along the central axis of the pen tip. Ex. 1008, Appx. A, 1[b].

Fig.6A

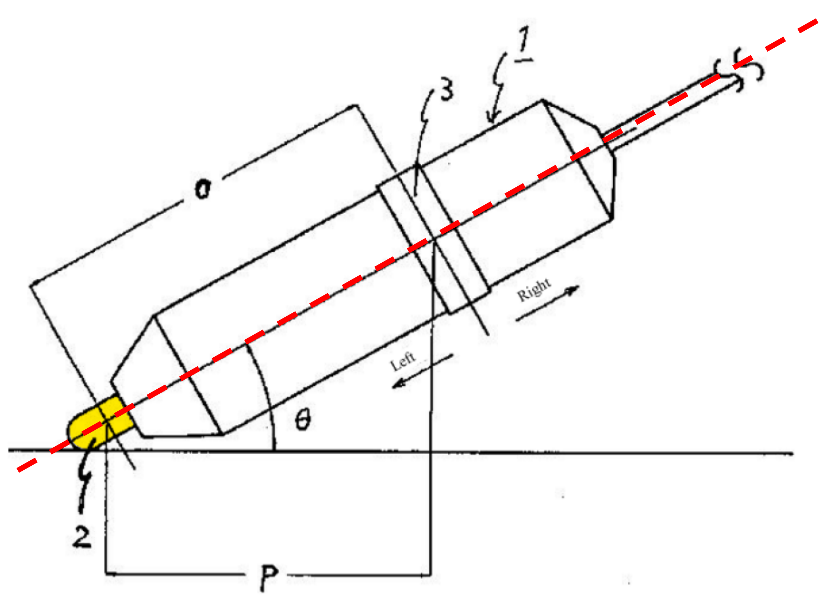


Ikeda discloses a first electrode at the tip of a coordinate detection pen. Ex. 1006, ¶ [0006] ("a coordinate detection electrode (first detection unit) is positioned at the tip of the coordinate detection pen"); Figs. 1, 5. A POSITA would understand that capacitive styluses routinely employ a first electrode at the tip to facilitate coordinate detection and signal tracking. Ex. 1008, Appx. A, 1[b].

[Fig 1.]



[Fig.5]

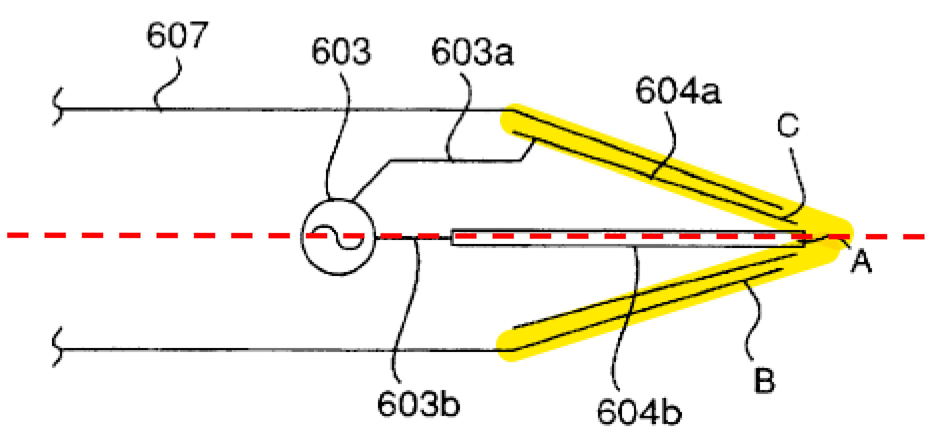


Yoshida and Ikeda each disclose 1[b]. Ex. 1008, Appx. A, 1[b].

d. 1[c]

Yoshida discloses a second electrode at a second position from the first electrode and off the axis of the pen-shaped position indicator. Ex. 1005, Fig. 6A; 25:8-57. A megaphone-shaped outer electrode 604a is arranged at the pen-tip portion of the electric field generator 607, positioned differently from the rod-shaped inner electrode 604b. *Id.* The outer electrode 604a surrounds the inner electrode asymmetrically, creating an off-axis arrangement that contributes to angle detection when interacting with the sensor surface. Ex. 1008, Appx. A, 1[c].

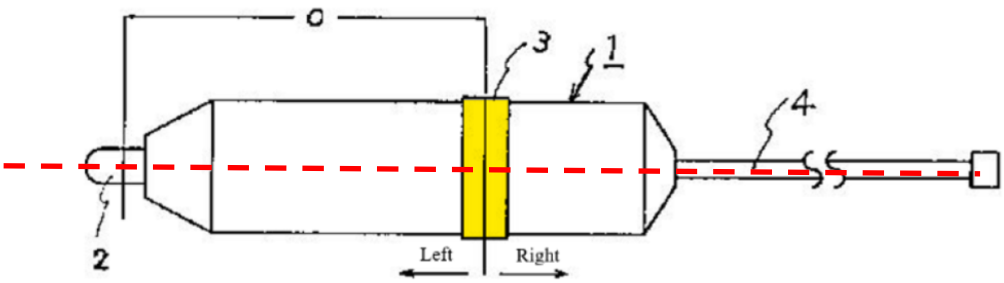
Fig.6A



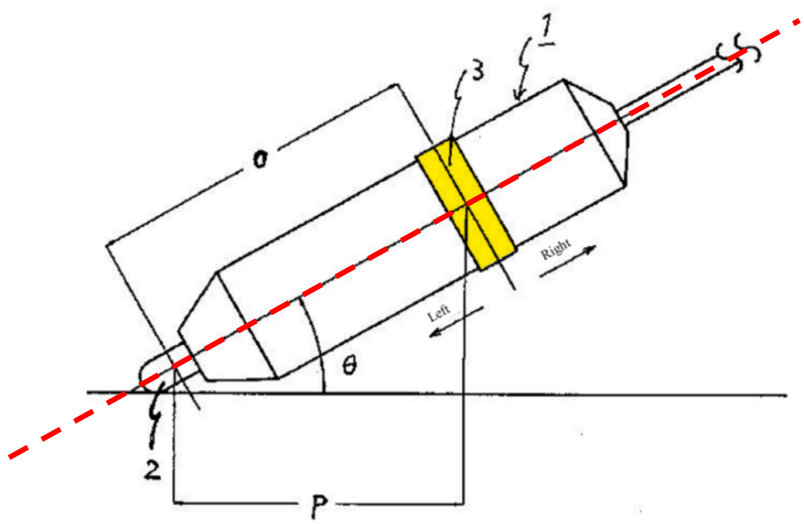
See also Figs. 26, 28 (disclosing non-coaxial structure), and 29.

Ikeda discloses a second electrode positioned at a second position of the pen-tip portion different from the first position. Ex. 1006, ¶ [0006] (“a ring-shaped coordinate detection electrode (second detection unit) for angle reading is placed on the body of the coordinate detection pen"); Figs. 1, 5.

[Fig 1.]



[Fig.5]



Ikeda's ring-shaped detection electrode, positioned separately from the tip electrode, inherently forms an off-axis capacitive field that enables tilt detection.

Ex. 1008, Appx. A, 1[c]. A POSITA would have understood that arranging a second electrode off-axis and at a different position along the pen body enhances capacitive sensing by producing measurable variations in capacitance as the stylus tilts. *Id.* A POSITA would have been motivated to combine Ikeda's disclosure of an off-axis ring-shaped detection electrode with Yoshida's stylus design for several reasons. The combination would yield predictable results by enabling more precise angle detection without resorting to additional complex or expensive mechanical sensors. The desire to improve performance by enabling the stylus to detect not only precise position but also tilt and other angular information was driven by the commercial demand for more advanced, feature-rich input devices, as evidenced by the widespread development of touchscreens and styluses in the prior art. This combination is a predictable application of known techniques to achieve enhanced functionality and improved angular detection accuracy without adding mechanical sensors. *Id.*

Yoshida, in view of Ikeda and the knowledge of a POSITA, discloses 1[c]. Ex. 1008, Appx. A, 1[c].

e. 1[d]

Yoshida discloses a signal production circuit that generates first and second signals that are distinguishable from each other. Ex. 1005, 26:12–26 ("as shown in FIG. 26, when electrodes 2601a and 2601b provided in an LCD panel 2600 are connected to a differential amplifier 2602. . .the outer electrode 604a and the inner electrode 604b are coupled most intensely with the electrodes 2601a and 2601b via capacitors 2610a and 2610b. In the above place, electric fields applied to the outer electrodes 604a and 604b are opposite in phase to each other"); Figs. 26, 27.

Fig.26

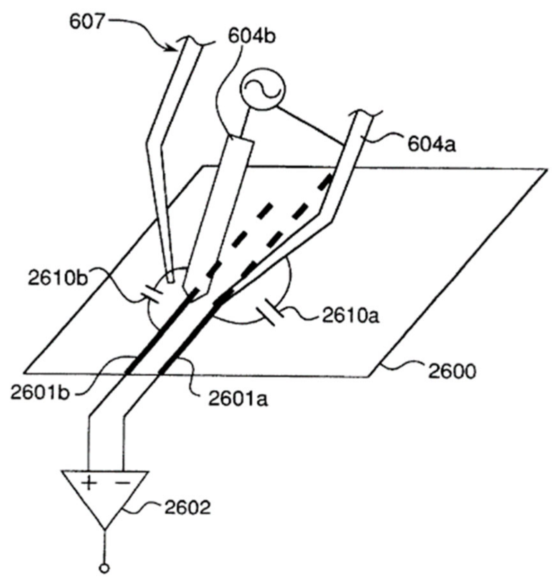
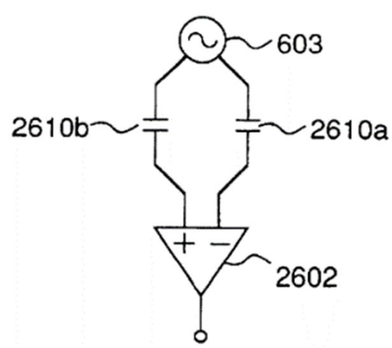


Fig.27



Yoshida further discloses an AC power source 603 of the electric field generator connected to the differential amplifier 2602 via capacitors 2610a and 2610b, applying opposite-phase signals to the inner and outer electrodes. *Id.*, 26:31–35; Fig. 27. These disclosures show that the signals applied to electrodes 604a and 604b are distinguishable. Ex. 1008, Appx. A, 1[d].

Ikeda discloses separate signals generated for coordinate and angular detection. Ex. 1006, ¶ [0008] ("coordinate detection is performed using the two detection units 2 and 3, and the coordinate data detected via electrostatic capacitance coupling with the tablet's electrodes. . .is applied to the main body 5 of the coordinate input device . . . ."); Fig. 3. Ikeda further explains that signals from the two detection units are processed for angle determination: "Using the coordinate data from the two detection units 2 and 3 stored in the regions of RAM 8, the dimensional control program converts the dimensions between the detection unit for coordinate detection and the detection unit for angle detection, storing the angle dimension P...." *Id.*, ¶ [0013]; Fig. 5.

A POSITA would understand that generating distinguishable signals for multiple electrodes is essential to capacitive stylus operation. Ex. 1008, Appx. A, 1[d]. Yoshida discloses such signals via opposite-phase outputs from a signal production circuit, and Ikeda reinforces the same principle by showing distinguishable signals for coordinate and angle detection. A POSITA would have been motivated to combine Ikeda's disclosure of a signal-separation approach with Yoshida's stylus circuitry because both references operate in the common field of capacitive stylus technology and address similar problems of improving signal processing. A POSITA would have recognized that combining these teachings would lead to predictable results by enabling a more robust system for distinguishing positional and angular information. The combination would also improve performance by enhancing the accuracy of both position and angle detection, meeting the commercial demand for more sophisticated input devices. *Id.*

Yoshida and Ikeda each disclose 1[d]. Ex. 1008, Appx. A, 1[d].

f. 1[e]

Yoshida discloses first and second conductive lines extending within the pen body and connected to the inner electrode 604b and outer electrode 604a, respectively. Ex. 1005, Figs. 26, 27, 26:31–35 ("the AC power source 603 included in the electric field generator 607 is connected to the differential amplifier 2602 via the capacitors 2610a and 2610b," showing each electrode coupled through separate conductive pathways.)

Fig.26

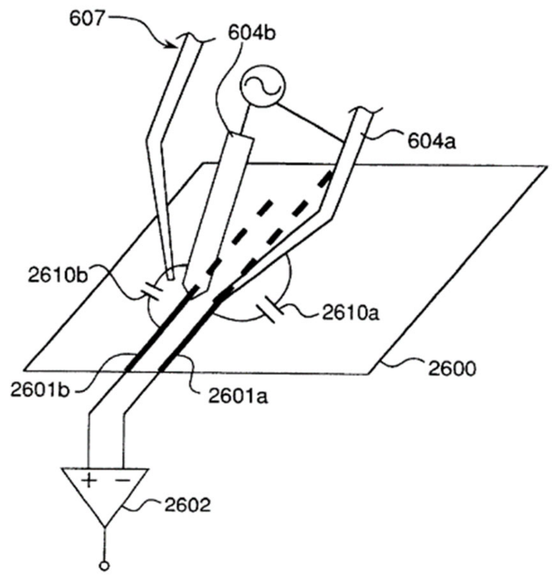
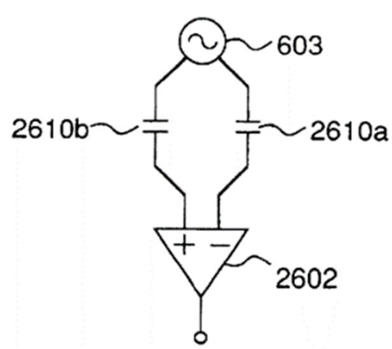
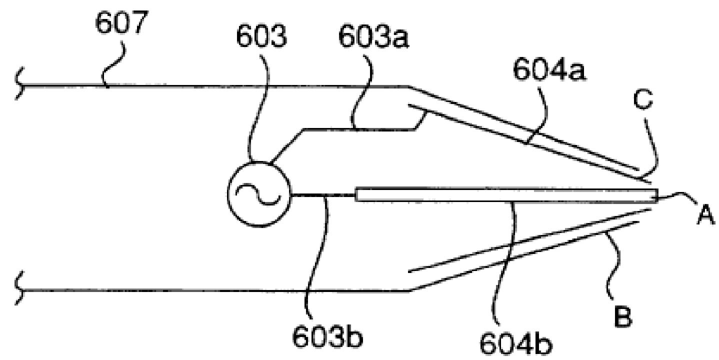


Fig.27



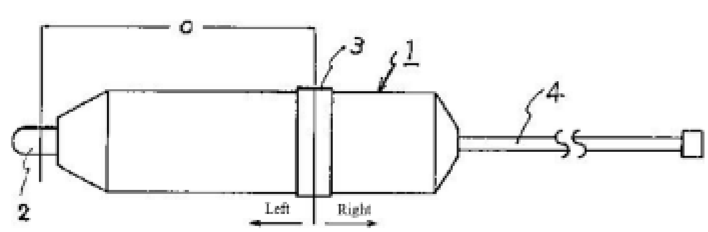
See also id., Fig. 6A (cross-sectional view illustrating the electrode structure and connections inside the pen); 24:66-25:14 ("As shown in FIG. 6A, the electric field generator 607 has a structure in which both the output terminals of the AC power source 603 are connected to the outer electrode 604a and the inner electrode 604b of the coaxial electrode.")

Fig.6A

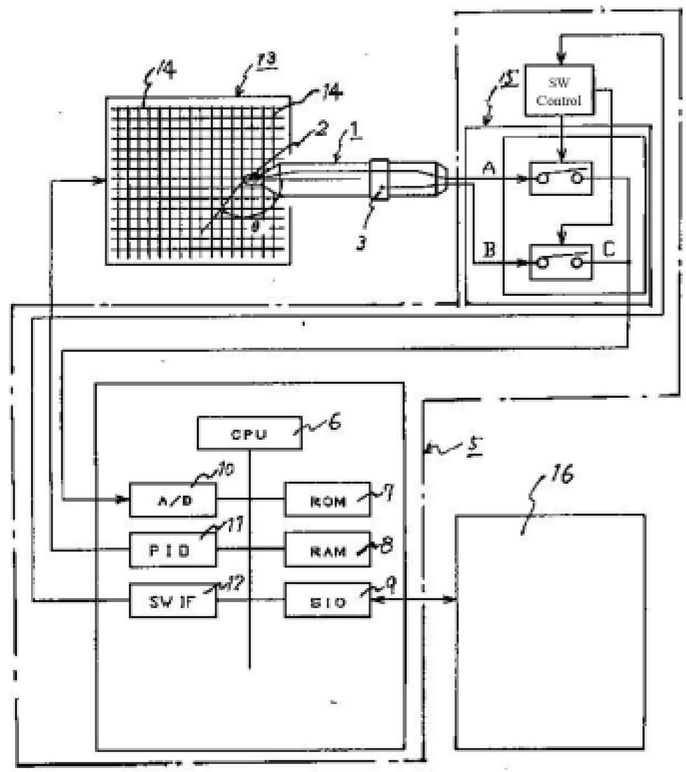


Ikeda discloses that the tip detection unit 2 and body detection unit 3 are connected by conductive lines to processing circuitry. Ex. 1006, ¶ [0008] ("an axis-shaped detection unit 2 is positioned at the tip. . .and a ring-shaped detection unit 3 for indicating the angle is positioned on the body of the coordinate detection pen"), with Figure 1 depicting the physical connection, and Figure 3 showing the signal flow from both electrodes to the CPU 6, ROM 7, and RAM 8. *Id.*, ¶ [0009], Fig. 3.

[Fig 1.]



[Fig. 3]



A POSITA would have understood that conductive lines are necessary to route signals from electrodes within the pen to the signal production circuit. Ex. 1008, Appx. A, 1[e]. Both Yoshida and Ikeda explicitly show such conductive connections, and combining these teachings would have been a routine application of known stylus design principles. *Id.* A POSITA would have been motivated to combine Yoshida and Ikeda's disclosures because both references are addressing identical challenges: routing signals between electrodes and signal-generation circuitry. This was a fundamental design requirement in any active stylus system. Combining their teachings would predictably result in a practical and reliable electrical connection scheme, improving manufacturing efficiency and ensuring accurate transmission of distinct signals. A POSITA would have recognized the benefit of leveraging Ikeda's clearly illustrated wiring techniques alongside Yoshida's electrode layout to build a higher-performance, market-ready device. *Id.*

Yoshida and Ikeda each disclose 1[e]. Ex. 1008, Appx. A, 1[e].

g. 1[f]

Yoshida discloses that the inner electrode 604b and outer electrode 604a of the electric field generator 607 capacitively couple with electrodes 2601a and 2601b of the LCD panel 2600. Ex. 1005, Fig. 26, 27:5–7 ("the outer electrode 604a and the inner electrode 604b are coupled most intensely with the electrodes 2601a and 2601b via capacitors 2610a and 2610b"). Yoshida further explains that, by detecting potential differences across panel electrodes, the coordinates (x, y) of the pen electrodes can be specified. *Id.* at 27:17–25; Figs. 26 and 27.

Fig.26

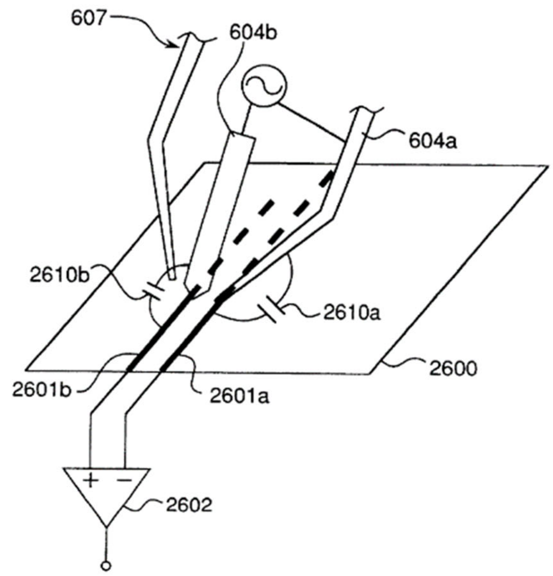
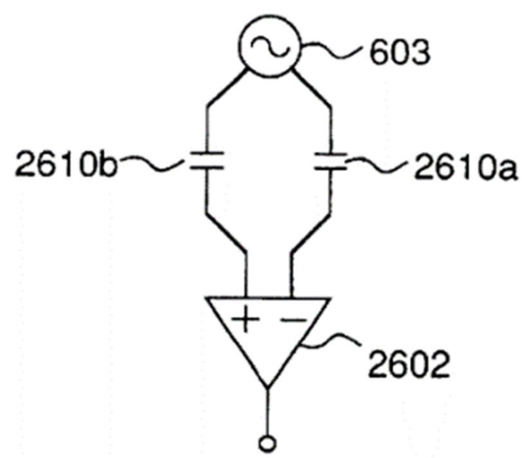
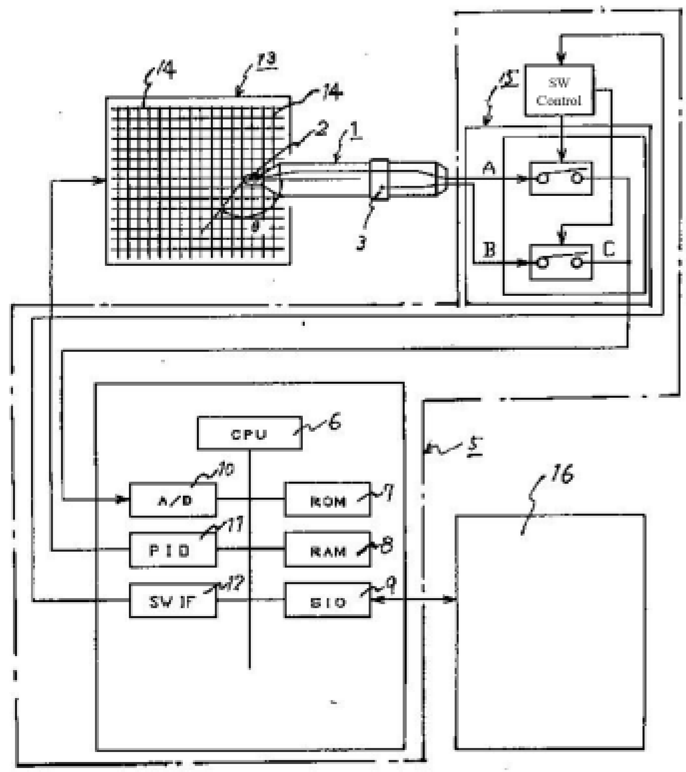


Fig.27



Ikeda discloses that its coordinate detection pen uses capacitive coupling between detection units and the tablet surface: "[c]oordinate detection is performed using the two detection units 2 and 3, and the coordinate data detected via electrostatic capacitance coupling with the tablet's electrodes. . .is applied to the main body 5." Ex. 1006, ¶ [0008], Fig. 3. The block diagram further shows the transmission of capacitive detection signals from the electrodes through cable 4 to the CPU 6, ROM 7, and RAM 8. *Id.*, ¶ [0009], Fig. 3.

[Fig. 3]



A POSITA would understand that capacitive coupling between stylus electrodes and tablet electrodes was a well-known mechanism for transmitting distinct detection signals. Ex. 1008, Appx. A, 1[f]. Yoshida expressly discloses such coupling, and Ikeda reinforces it by showing capacitive data paths from multiple electrodes to the processing circuitry. *Id.* Both references, therefore, disclose that the first and second signals are configured to capacitively couple with the sensor surface. *Id.*

A POSITA would have been motivated to combine Yoshida's and Ikeda's teachings regarding capacitive coupling because both references disclose highly compatible techniques within the same field. Capacitive coupling was a well-established method for transmitting stylus position and angle data, and combining these designs would predictably enhance performance by allowing the system to simultaneously process coordinate and angular information. There was a recognized market need for more advanced pen inputs in professional applications like CAD and digital illustration, driving manufacturers to adopt such improvements. Thus, merging Yoshida's robust electrode configuration with Ikeda's tilt-sensing methodology would be an expected and commercially sensible step. Ex. 1008, ¶¶ 112–113, 115, 118.

Yoshida and Ikeda each disclose 1[f]. Ex. 1008, Appx. A, 1[f].

h. 1[g]

Yoshida discloses that the inner electrode 604b and the outer electrode 604a form capacitive relationships with electrodes 2601a and 2601b of the LCD panel. Ex. 1005, Fig. 26, 27; 27:13–25 ("by performing two times similar detection operations from the segment electrode side and from the common electrode side so as to detect and decide the coordinates. . .the coordinates (x, y) of the position in which the electrodes 604a and 604b of the electric field generator 607 are located can be specified"). These disclosures show that each electrode of the stylus forms a capacitive relationship with the sensor surface. Ex. 1008, Appx. A, 1[g].

Fig.26

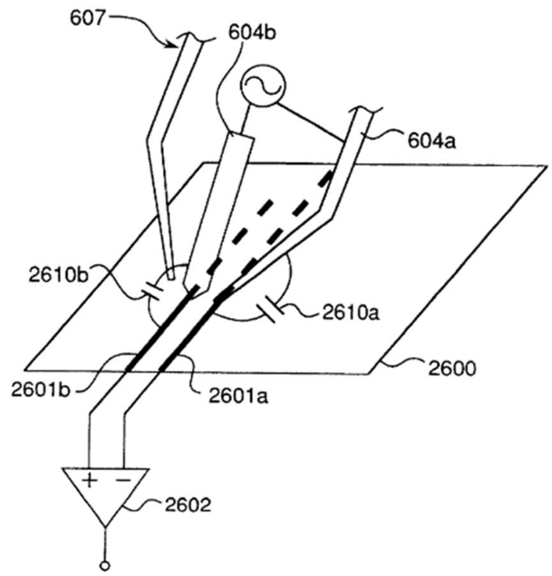
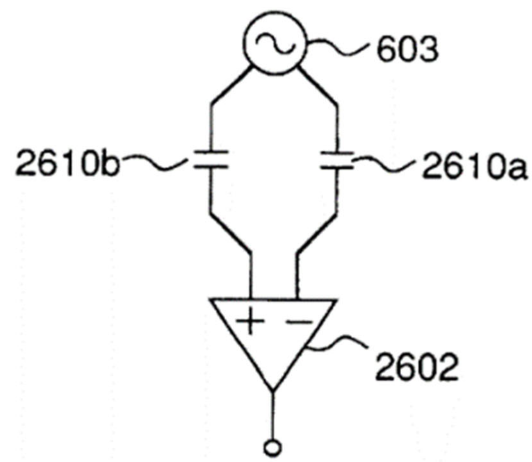
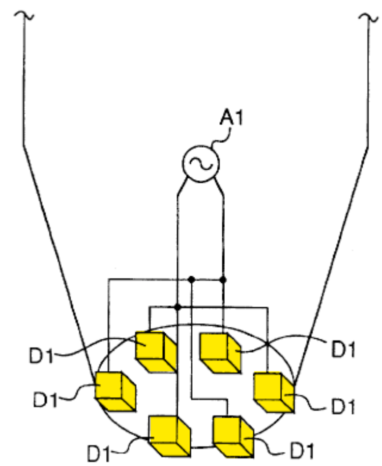


Fig.27



Yoshida further discloses using a plurality of electrodes (D1) to generate "a rotational electric field" that produces "an effect that, even though the pen which serves as the electric field generator rolls, the electrostatic capacity between the electrodes of the pen and the electrodes of the panel do not change." *Id.* 26:36-48; 8:66-9:11; 57:1-20; Fig. 28.

Fig.28



Yoshida describes a device that drives an AC electric field from the pen tip and senses it with the existing X/Y electrodes of an LCD panel, which are time-multiplexed into a differential amplifier. Ex. 1008, Appx. A, 1[g]. This architecture lets the same LCD electrode matrix serve double duty for display and pen input. *Id.* In such capacitive-coupling schemes, the mutual capacitances between the pen electrode(s) and the panel electrode grid are what carry the positional signal. *Id.* Those capacitances are sensitive not only to x–y position and distance, but also to pen posture (inclination and roll), because posture changes the spatial distribution of the electric field and the effective gaps to different panel electrodes. *Id.* That is why the design must either compensate for pen angle or deliberately render the measurement invariant to certain angle components (e.g., roll) to keep the reported coordinates accurate and stable. *Id.* YOSHIDA illustrates that by arranging electrodes to generate a rotationally symmetric field, certain angular components (such as roll) can be designed out of the measurement, thereby improving stability. *Id.* A POSITA would recognize that these disclosures collectively confirm that YOSHIDA teaches the use of electrode-to-panel capacitive relationships for extracting not just coordinate data but also angular information. *Id.*

Ikeda discloses that multiple electrodes on a stylus form separate capacitive relationships with the tablet. Ex. 1006, ¶ [0006] ("a coordinate detection electrode (first detection unit) is positioned at the tip of the coordinate detection pen, and a ring-shaped coordinate detection electrode (second detection unit) for angle reading is placed on the body of the coordinate detection pen"); ¶ [0013] ("using the coordinate data from the two detection units 2 and 3. . .the dimensional control program converts the dimensions. . .storing the angle dimension P"), ¶ [0015], Fig. 5; *see also* Abstract ("[Problem to be Solved]: In a coordinate input device using capacitive coupling, the presence of only one electrode for coordinate detection prevents input control based on the angle of use of the coordinate detection pen against the board surface...[Means for Solving the Problem]: An electrode for coordinate detection is arranged at the tip of the coordinate detection pen and the body of the pen. The pen body is equipped with an electrode designed to detect a ring-shaped angle."); Claim 1 ("two detection electrode units: one for detecting coordinates and another for detecting angles…enabling the detection of the tilt angle of the aforementioned coordinate detection pen itself").

A POSITA would have understood that capacitive stylus systems create multiple capacitive relationships when more than one electrode interacts with the sensor surface. Ex. 1008, Appx. A, 1[g]. Yoshida shows these relationships for electrodes 604a and 604b, while Ikeda reinforces the concept by teaching that separate electrodes (at the tip and along the pen body) form distinct capacitive couplings that enable both coordinate and angle detection. A POSITA would have been motivated to combine Yoshida's disclosure of first and second capacitive relationships with the sensor surface with Ikeda's disclosure of first and second capacitive relationships with the sensor surface, including to detect angle information of the pen-shaped position indicator, because doing so would predictably yield a stylus capable of both accurate coordinate tracking and precise angle measurement. Ex. 1008, ¶¶ 112–113, 118–119; Ex. 1008, Appx. A, 1[g].

Yoshida, in view of Ikeda and the knowledge of a POSITA, discloses 1[g]. Ex. 1008, Appx. A, 1[g].

2. Claim 2

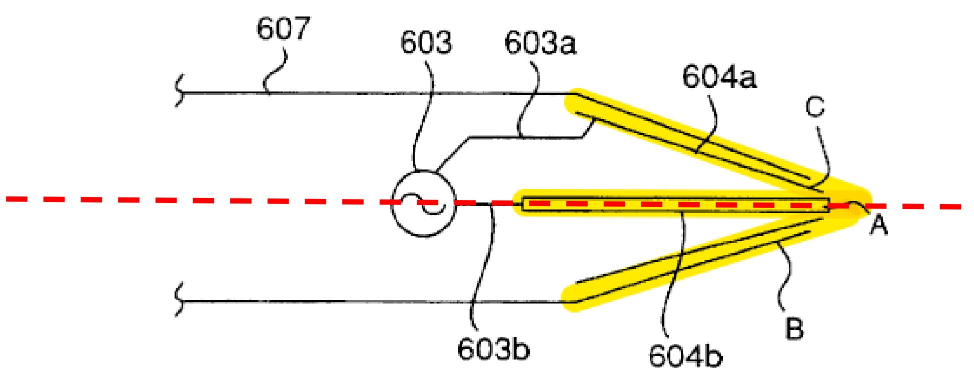
a. 2[pre]

See Claim 1.

b. 2[a]

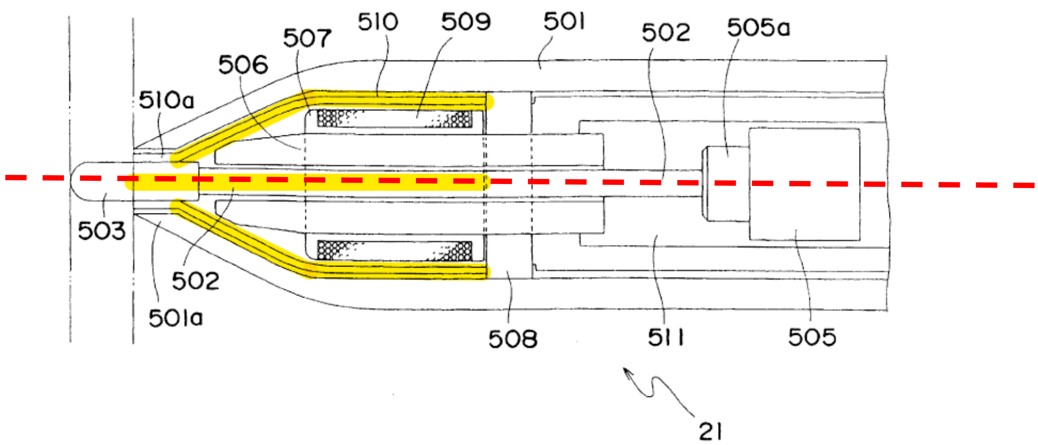
Yoshida discloses that the second electrode is at a position different from the first electrode and off the axis of the pen-shaped position indicator. Ex. 1005, Fig. 6A (showing a megaphone-shaped outer electrode 604a positioned differently from the rod-shaped inner electrode 604b and arranged off-axis within the pen-tip portion).

Fig.6A



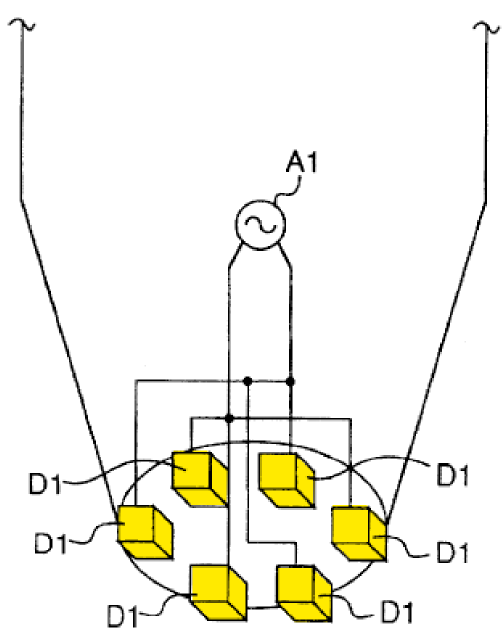
Yoshida further discloses that inner electrode 502 and outer electrode 510 are positioned at different locations along the longitudinal axis of the pen, confirming electrode separation in the axial direction. *Id.*, Fig. 29.

Fig. 29



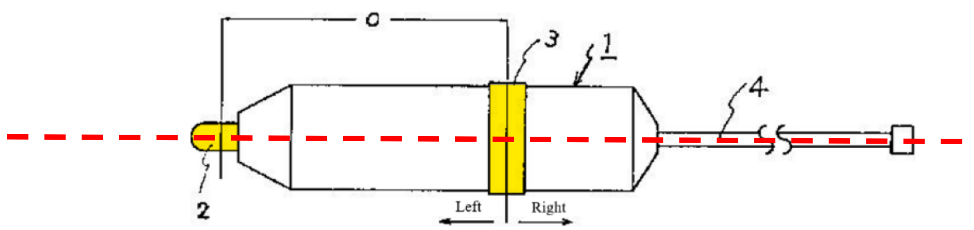
See also Fig. 28 (disclosing "plurality of electrodes D1 are mounted on a circumference of the tip end portion of the pen").

Fig.28

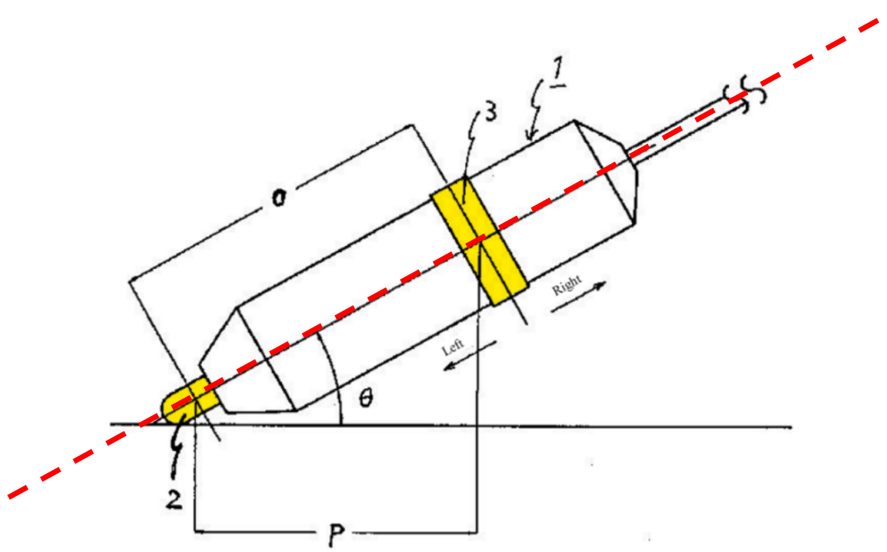


Ikeda discloses that its first electrode is positioned at the tip of the coordinate detection pen and its second electrode (ring-shaped) is positioned on the pen body, establishing that the electrodes are at different positions along the longitudinal axis. Ex. 1006, ¶ [0006], Figs. 1, 5.

[Fig 1.]



[Fig.5]



A POSITA would understand that employing electrodes at different axial positions and off-axis relative to one another was a known and predictable configuration to improve capacitive coupling and enable tilt detection. Ex. 1008, Appx. A, 2[a]. Combining Ikeda's disclosure of a tip electrode with a longitudinally separated body electrode into Yoshida's capacitive stylus system would have been a routine design choice yielding enhanced positional and angular detection accuracy. *Id.*

Yoshida and Ikeda, in view of the knowledge of a POSITA, both disclose 2[a]. *Id.*

A POSITA would have been motivated to combine Yoshida's and Ikeda's electrode placement strategies because positioning electrodes at different axial locations and off-axis from each other was a predictable and common approach to improve angle and tilt detection. This configuration creates measurable differences in capacitance as the stylus tilts, providing more accurate angular readings. Combining Yoshida's detailed stylus body design with Ikeda's explicit teaching of separated tip and body electrodes would enhance performance and meet the market's demand for precise and feature-rich input devices without adding complexity or cost. Ex. 1008, ¶¶ 112–113, 118–119.

3. Claim 3

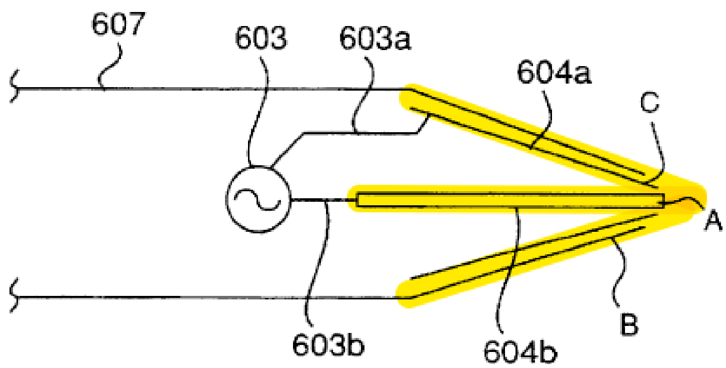
a. 3[pre]

See Claim 1.

b. 3[a]

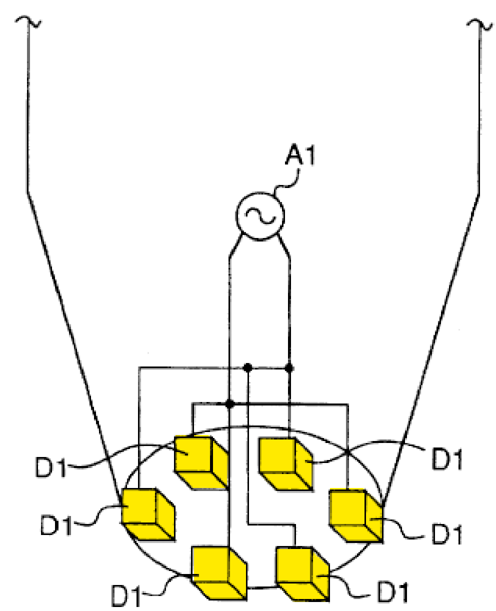
Yoshida discloses an outer electrode (604a) that surrounds a rod-shaped inner electrode (604b) at the pen tip of the electric field generator. Ex. 1005, Fig. 6A, 24:58–25:5; 8:66-9:11. Figure 6A shows the outer electrode extending circumferentially around the pen axis.

Fig.6A



Yoshida further discloses a second electrode comprising plural electrode pieces arranged to surround the axis of the pen-shaped indicator. *Id.* 26:36-48 ("*plurality of electrodes D1* are mounted on a circumference of the tip end portion of the pen").

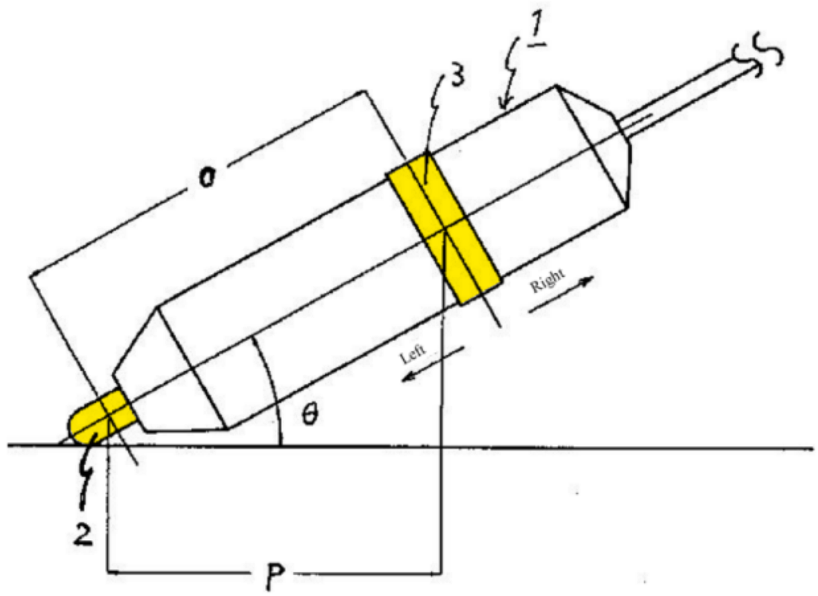
Fig.28



See also id. 57:1-20 ("the first ['cylinder shaped'] electrode of the coordinate pointing device is *arranged as separated apart at approximately regular intervals around the circumference* of the second electrode.") This cylinder-shaped electrode must comprise plural electrode pieces if the electrode "is arranged as separated apart at [] regular intervals around the circumference of the" pen axis. Ex. 1008, Appx. A, 3[a].

Ikeda discloses a ring-shaped detection electrode 3 positioned on the pen body for angle detection, surrounding the axis of the pen shaft. Ex. 1006, ¶ [0006], Figs. 1, 5. A POSITA would have understood that such circumferential electrodes, whether shown in Yoshida or Ikeda, could be implemented using plural electrode pieces arranged about the pen axis to improve sensitivity, enable independent signal control, or provide differential signals. Ex. 1008, Appx. A, 3[a].

[Fig.5]



A POSITA would have been motivated to integrate Ikeda's disclosure of a displaced circumferential ring electrode with Yoshida's surrounding outer electrode 604a, recognizing that segmenting the electrode into plural pieces was a routine and predictable design choice to enhance angular detection accuracy in capacitive stylus systems, as explicitly shown, for example, in Figure 28 of Yoshida. *Id.*

Yoshida, in view of Ikeda and the knowledge of a POSITA, discloses 3[a]. Ex. 1008, Appx. A, 3[a].

4. Claim 4

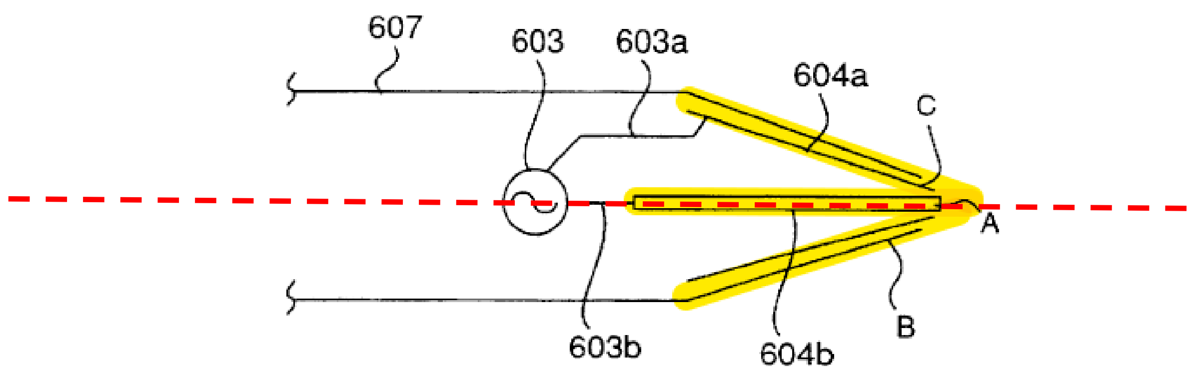
a. 4[pre]

See Claim 1.

b. 4[a]

Yoshida discloses a pen-shaped electric field generator in which an inner electrode 604b is surrounded by a megaphone-shaped outer electrode 604a at the pen tip. Ex. 1005, Fig. 6A, 24:58–25:5. Figure 6A shows a concentric arrangement that places the electrodes symmetrically around the axis of the pen.

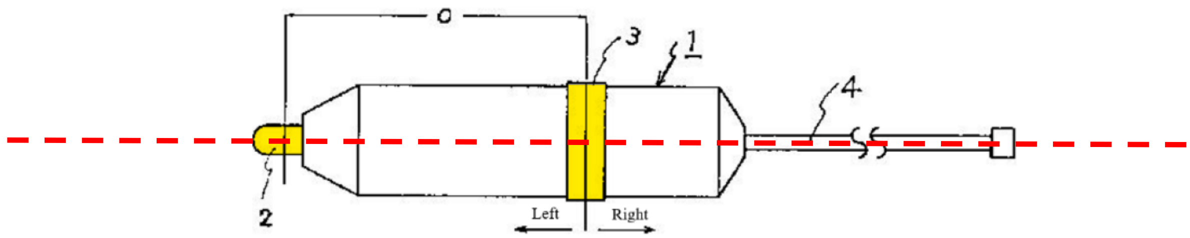
Fig.6A



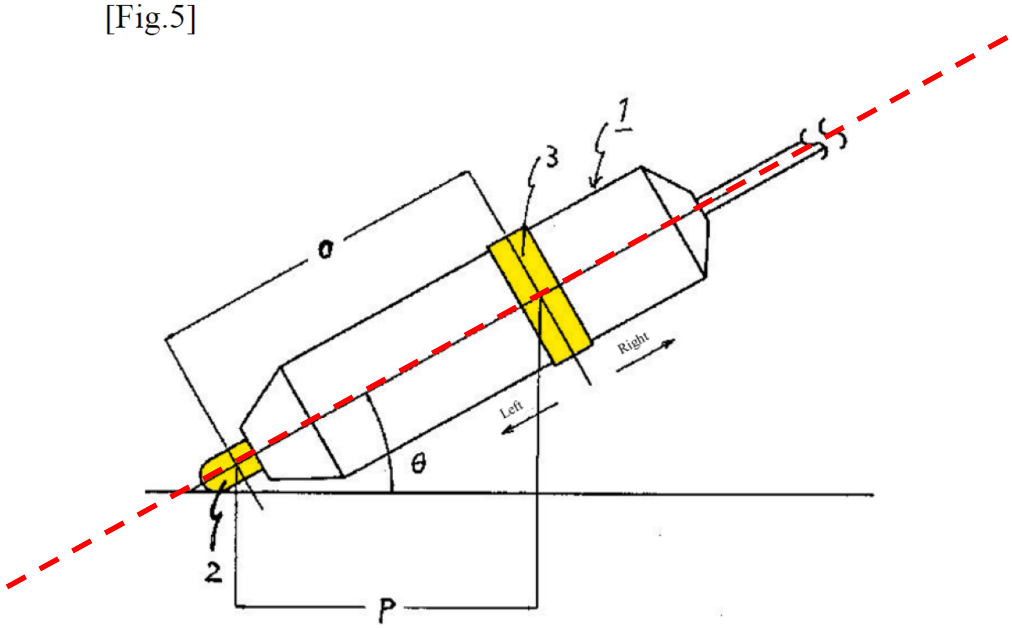
See also Fig. 28; 26:36-48 ("In the electrode structure, a plurality of electrodes D1 are mounted on a circumference of the tip end portion of the pen."). A POSITA would have understood these configurations as surrounding the axis to ensure uniform field distribution and to generate angle-dependent variations in capacitive signals. Ex. 1008, Appx. A, 4[a].

Ikeda discloses a coordinate detection pen with multiple detection units aligned along the pen axis, including a ring-shaped electrode 3 for angle detection that surrounds the pen shaft (the axis of the pen-shaped position indicator). Ex. 1006, ¶ [0006], Figs. 1, 5.

[Fig 1.]



[Fig.5]



A POSITA would have recognized this concentric structure as confirming that arranging electrodes to surround the pen axis was a conventional design to facilitate tilt detection based on capacitive coupling. Ex. 1008, Appx. A, 4[a]. A POSITA would have been motivated to combine these teachings because arranging electrodes symmetrically around the pen axis was a known way to ensure uniform field distribution and consistent tilt measurements. Yoshida's design provides a foundational coaxial arrangement, while Ikeda's ring electrode confirms its utility for detecting angular changes. Combining these references would predictably improve performance by reducing error due to uneven electric fields, meeting both technical and commercial requirements for high-precision styluses. Ex. 1008, ¶¶ 112–113, 115, 118–119.

Yoshida, in view of Ikeda and the knowledge of a POSITA, discloses 4[a]. Ex. 1008, Appx. A, 4[a].

5. Claim 5

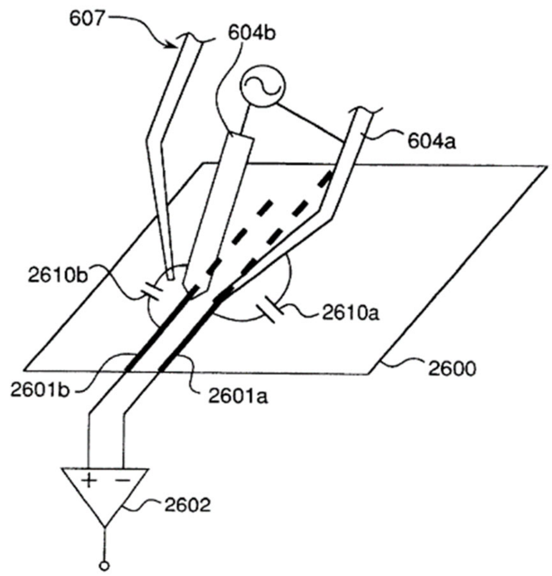
a. 5[pre]

See Claim 1.

b. 5[a]

Yoshida discloses a capacitive stylus system in which multiple electrodes interact with a sensor surface to generate detection signals. Ex. 1005, Fig. 26, 27:13–25. The relative strengths of these detection signals vary depending on the inclination of the pen-shaped position indicator.

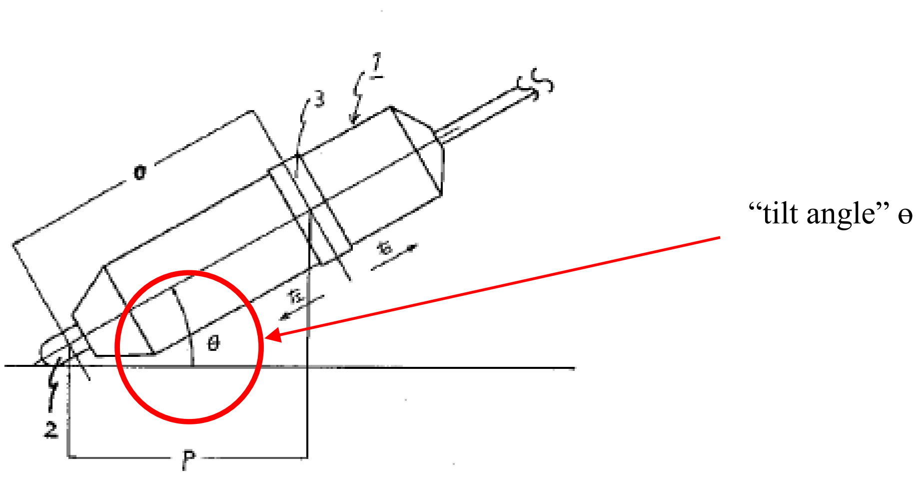
Fig.26



A POSITA would have understood that such variations correspond to the tilt angle of the pen relative to the sensor surface, because tilting alters the spatial relationship between each electrode and the panel, thereby changing the detected capacitances. Ex. 1008, Appx. A, 5[a]; *see also* Fig. 28; 26:36-48 ("In the electrode structure, a plurality of electrodes D1 are mounted on a circumference of the tip end portion of the pen, and the electrodes D1 are connected to an AC power source A1 so that a rotational electric field is generated on the circumference.").

Ikeda discloses a coordinate detection pen that measures inclination relative to the sensor surface: "By detecting each coordinate using the detection unit 2 for coordinate detection and the detection unit 3 for angle detection of the coordinate detection pen 1, control over the angle of the coordinate detection pen 1 can be achieved." Ex. 1006, ¶¶ [0015], [0014]; Fig. 5; *see also* ¶ [0001] ("By analyzing the positional dimensions between the two coordinate detection units and the dimensions of the coordinates read by each detection unit, it is possible to detect the pen's tilt."). Ikeda's system includes a tip electrode and a ring-shaped body electrode, positioned to allow capacitive measurements at different points, which enables determination of the tilt angle.

【図5】



A POSITA would have recognized that integrating Ikeda's explicit tilt detection into Yoshida's stylus design was a routine and predictable way to determine tilt angle, improving angular resolution without requiring additional mechanical sensors. Ex. 1008, Appx. A, 5[a].

Yoshida, in view of Ikeda and the knowledge of a POSITA, discloses 5[a]. Ex. 1008, Appx. A, 5[a]; *see also* §VII(A)(1)(h) (discussing limitation 1[g], which underlies tilt detection).

6. Claim 7

a. 7[pre]

See Claim 1.

b. 7[a]

Ikeda discloses a coordinate detection electrode (unit 2) and a ring-shaped angle detection electrode (unit 3), each producing coordinate data stored and processed separately. Ex. 1006, ¶¶ [0006], [0013], Figs. 3, 5.

A POSITA would have understood that these outputs differ in type because they originate from physically distinct electrodes and are processed through separate detection channels designed for different purposes. Ex. 1008, Appx. A, 7[a]. A POSITA would have been motivated to combine Ikeda's explicit disclosure of signal separation with Yoshida's time-differentiated signals, recognizing this as a predictable and routine way to improve angular and positional tracking in capacitive stylus systems. *Id.*

Yoshida, in view of Ikeda and the knowledge of a POSITA, discloses 7[a]. Ex. 1008, Appx. A, 7[a].

7. Claim 8

a. 8[pre]

See Claim 1.

b. 8[a]

Yoshida discloses a capacitive pen system where an AC power source 603 applies alternating current signals of the same waveform type to the inner electrode

604b and outer electrode 604a, but with opposite phase. Ex. 1005, Fig. 6A, 24:58–25:5; 26:23-26. Yoshida further explains that the electrodes generate distinct detection signals in the sensor surface during operation. Ex. 1005, Figs. 26–27, 27:13–25. A POSITA would understand that a phase offset between two AC signals of the same type necessarily produces a corresponding time difference in the signals. Ex. 1008, Appx. A, 8[a].

Yoshida discloses 8[a]. *Id.*

8. Claim 9

a. 9[pre]

See Claim 1.

b. 9[a]

Yoshida discloses a stylus coil driven by an oscillator circuit. Specifically, Yoshida explains that "the electric circuit further includes a serial resonance circuit comprised of an inductance L1 and a capacitor C3," where "the inductance L1 is implemented by the coil 509." Ex. 1005, 20:60–65. Yoshida further teaches that "when the switch SW1 is closed. . .the oscillator circuit oscillates to supply signals which are opposite in phase to the serial resonance circuit comprised of the inductance L1 and the capacitor C3. . . .[t]hen the voltage is transmitted to the inner electrode 502 [generated first signal] and the outer electrode 510 [generated second signal]." *Id.*, 21:10–25, Figs. 29–30. A POSITA would have understood that coil

509 (inductance L1) is configured to receive the oscillator's excitation signal. Ex. 1008, Appx. A, 9[a].

Fig. 29

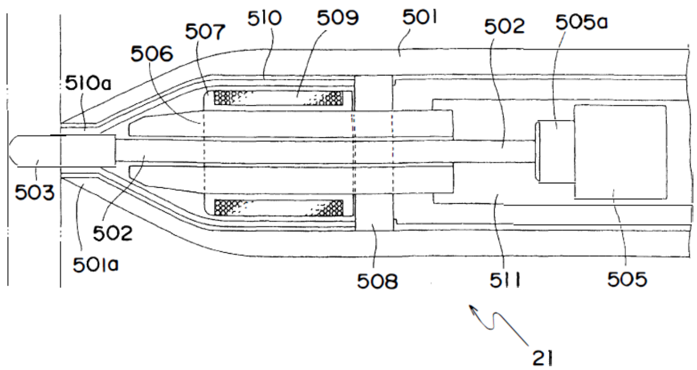
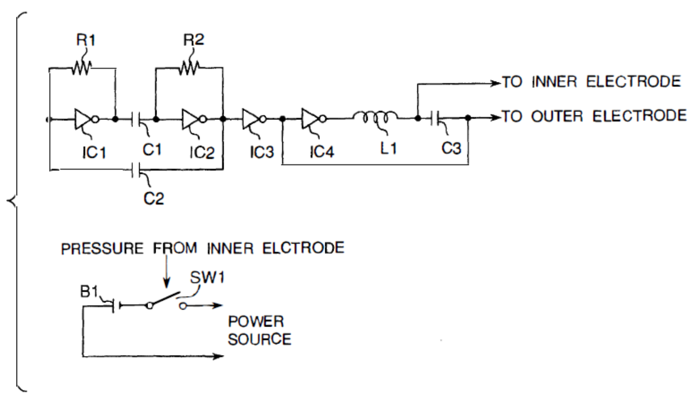
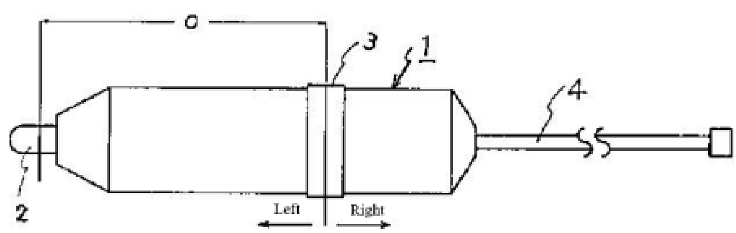


Fig.30

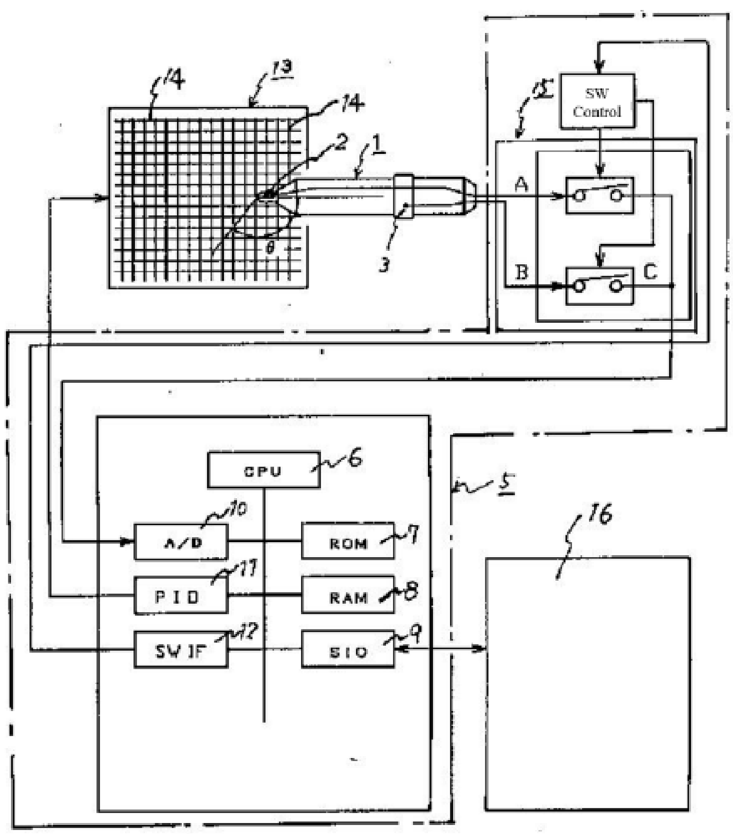


Ikeda discloses a coordinate detection pen in which detection units receive excitation signals supplied from the coordinate input device. The pen includes a tip-based detection unit 2 and a ring-shaped detection unit 3, connected through a cable 4 to the main body 5 of the coordinate input device. These units are selectively connected to the A/D converter 10 through a switching switch 15, enabling them to receive driving signals from the tablet's electrode lines via capacitive coupling. Ex. 1006, ¶¶ [0008]–[0010], Figs. 1, 3. A POSITA would have understood this as functioning analogously to a stylus coil configured to receive an excitation signal. Ex. 1008, Appx. A, 9[a].

[Fig 1.]



[Fig. 3]



Yoshida and Ikeda, in view of the knowledge of a POSITA, both disclose 9[a]. Ex. 1008, Appx. A, 9[a].

c. 9[b]

Yoshida discloses a power generation circuit configured to generate a drive voltage based on an excitation signal. Yoshida explains that "the oscillator circuit oscillates to supply signals. . .to the serial resonance circuit comprised of the inductance L1 and the capacitor C3." Ex. 1005, 21:10–14. This serial resonance circuit, implemented by coil 509 (inductance L1) and capacitor C3, is driven by the oscillator's excitation signal and converts that signal into a voltage waveform suitable for electrode operation. The developed voltage is then transmitted "to the inner electrode 502 and the outer electrode 510." *Id.*, 21:22–25; Figs. 29, 30.

Fig. 29

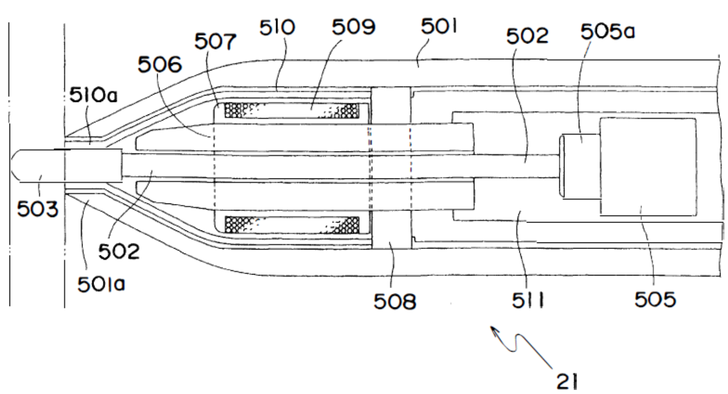
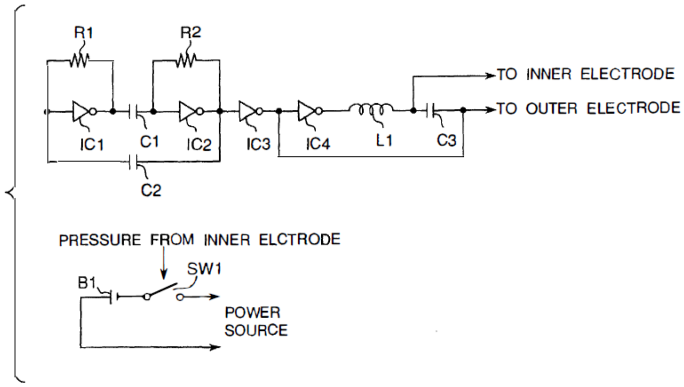


Fig.30



A POSITA would have understood that the inductance L1 (coil 509) and capacitor C3 form a tuned circuit that transforms the oscillator's excitation signal into the appropriate drive voltage for the stylus's inner and outer electrodes, thus performing the function of a "power generation circuit" as claimed. Ex. 1008, Appx. A, 9[b].

Ikeda discloses that the coordinate input device includes circuitry for processing signals from the pen's detection units and for generating the voltages that drive those units in coordination with the tablet's scanning system. The coordinate detection pen 1 communicates with the main body 5 of the coordinate input device via cable 4, through which excitation signals and detection signals are exchanged. Ex. 1006, ¶ [0008], Fig. 3. Within the main body 5, a CPU 6, ROM 7, and RAM 8 operate with dedicated driving circuitry to control the amplitude, phase, and timing of the excitation signals, thereby generating the voltages that drive the detection electrodes. *Id.*, ¶ [0009]; Fig. 3.

A POSITA would have understood that this driving circuitry performs the role of a "power generation circuit" because it takes an excitation signal and outputs a drive voltage tailored for the coordinate detection electrode (unit 2) and the angle detection electrode (unit 3), enabling synchronized operation with the tablet's coordinate detection system.

Yoshida and Ikeda each disclose 9[b]. Ex. 1008, Appx. A, 9[b].

d. 9[c]

Yoshida discloses that the drive voltage is supplied to a signal production circuit to generate first and second signals. Figure 6A shows AC power source 603 within the electric field generator 607, producing an alternating current voltage (100 Vp-p at 100 kHz) that is applied to inner electrode 604b and outer electrode 604a arranged coaxially. Ex. 1005, 24:58–25:5. This AC power source functions as the signal production circuit, producing two distinct electrode drive signals. *Id.* at 26:12–35, Figs. 6A, 26, 27.

Yoshida further explains that the stylus can operate in coordination with external driving signals from the LCD panel, with Figure 26 illustrating operation in response to alternating signals from the sensor surface to determine positional information. *Id.* at 26:12–26, Fig. 26. A POSITA would have understood that integrating the coil (*see* 9[a]) and power generation circuit (*see* 9[b]) with Yoshida's AC power source would enable the signal production circuit to generate first and second signals, as already described in connection with limitations 1[d]–1[e]. *See* §§VII(A)(1)(e)–(f). Ex. 1008, Appx. A, 9[c].

Ikeda likewise discloses a coordinate detection pen operating with a main body unit that includes processing circuitry and memory. Ex. 1006, Figs. 1, 3; ¶¶ [0005]–[0009]. The pen connects via cable 4, which transmits detection signals and provides operating power to the pen's electrodes. A POSITA would have understood that such drive power, when routed to a signal production circuit within the pen, would enable the generation of first and second signals for capacitive detection. *Id.*, ¶ [0008].

Yoshida and Ikeda each disclose 9[c]. Ex. 1008, Appx. A, 9[c].

9. Claim 10

a. 10[pre]

See 1[pre]; Ex. 1008, Appx. A, 10[pre].

b. 10[a]

See 1[a]; Ex. 1008, Appx. A, 10[a].

c. 10[b]

See 1[b] (first electrode) – 1[c] (second electrode), 4[a] (to surround an axis of the pen-shaped position indicator); Ex. 1008, Appx. A, 10[b].

d. 10[c]

See 1[d]; Ex. 1008, Appx. A, 10[c].

e. 10[d]

See 1[e]; Ex. 1008, Appx. A, 10[d].

f. 10[e]

See 1[f]; Ex. 1008, Appx. A, 10[e].

g. 10[f]

See 1[g]; Ex. 1008, Appx. A, 10[f].

10. Claim 11

a. 11[pre]

See Claim 10.

b. 11[a]

Yoshida discloses a pen-shaped stylus in which the electric field generator includes an inner rod-shaped electrode 604b located at the pen tip. Ex. 1005 at 24:58–25:5; Fig. 6A. This electrode is driven by one terminal of the AC power source 603, and a POSITA would understand this connection to be implemented via a conductive path. *Id;* Ex. 1008, Appx. A, 11[a]. The inner electrode is the active signal-emitting component at the tip of the pen, and a POSITA would recognize this as a conductive structure for emitting the electric field. Ex. 1008, Appx. A, 11[a].

Ikeda discloses a pen with a tip portion that includes detection electrodes receiving drive signals from a signal circuit. Ex. 1006, ¶ [0006]; Fig. 1. These electrodes are positioned near the pen tip, and a POSITA would understand them to be conductive and connected via internal conductive lines. Ex. 1008, Appx. A, 11[a].

A POSITA would have been motivated to combine these teachings because Yoshida and Ikeda each teach aspects of stylus tip design in capacitive systems. Yoshida's inner rod-shaped electrode and Ikeda's tip-based detection unit both operate to transmit signals at the point of user interaction with the tablet surface. Combining these would predictably improve tip sensitivity and ensure accurate signal transmission. Both references address the same design challenge of providing a reliable conductive path to the tip electrode, and a POSITA would have recognized that leveraging the best features of each system would result in a stylus with superior accuracy and responsiveness. Ex. 1008, ¶¶ 112–113, 118–119; Ex. 1008, Appx. A, 11[a].

Yoshida and Ikeda, in view of the knowledge of a POSITA, each disclose 11[a]. Ex. 1008, Appx. A, 11[a].

11. Claim 12

a. 12[pre]

See Claim 10.

b. 12[a]

See Claim 5.

12. Claim 14

a. 14[pre]

See 1[g]; Ex. 1008, Appx. A, 14[pre].

b. 14[a]

Yoshida and Ikeda both disclose forming a first capacitive relationship between a sensor surface and a first electrode (*see* 1[g]) arranged at a first position at the pen tip portion (*see* 1[b]) that is supplied with a signal generated by a signal production circuit and transmitted via a conductive path in the pen (*see* 1[d] (signal production circuit configured to generate first signal), 1[e] (conductive lines extending between the signal production circuit and the first electrode), and 1[f] (the first signal generated by the signal production circuit is transmitted to the first electrode via the conductive line)). *See also* Ex. 1008, Appx. A, 14[a].

c. 14[b]

Yoshida and Ikeda both disclose forming a second capacitive relationship between a sensor surface and a second electrode (*see* 1[g]) arranged at a second position of the pen-tip portion different from the first position and off an axis of the pen (*see* 1[c]) that is supplied with a signal generated by a signal production circuit and transmitted via a conductive path in the pen wherein the second signal is distinguishable from the first signal (*see* 1[d] (signal production circuit configured to generate second signal), 1[e] (conductive lines extending between the signal production circuit and the second electrode), 1[f] (the second signal generated by the signal production circuit is transmitted to the second electrode via the conductive line), and 1[d] (the first and second signals are distinguishable from each other). *See also* Ex. 1008, Appx. A, 14[b].

d. 14[c]

Yoshida, in view of Ikeda and the knowledge of a POSITA, discloses limitation 14[c]. *See* 1[g] (demonstrating that the first and second electrodes are configured to form first and second capacitive relationships with the sensor surface to generate detection signals based on which angle information is obtainable); Ex. 1008, Appx. A, 14[c].

13. Claim 15

a. 15[pre]

See Claim 14.

b. 15[a]

See Claim 2; Ex. 1008, Appx. A, 15[a].

14. Claim 16

a. 16[pre]

See Claim 14.

b. 16[a]

See Claim 3; Ex. 1008, Appx. A, 16[a].

15. Claim 17

a. 17[pre]

See Claim 14.

b. 17[a]

See Claim 4; Ex. 1008, Appx. A, 17[a].

16. Claim 18

a. 18[pre]

See Claim 14.

b. 18[a]

See Claim 5; Ex. 1008, Appx. A, 18[a].

17. Claim 20

a. 20[pre]

See Claim 14.

b. 20[a]

See Claim 7; Ex. 1008, Appx. A, 20[a].

18. Claim 21

a. 21[pre]

See Claim 14.

b. 21[a]

See Claim 8; Ex. 1008, Appx. A, 21[a].

19. Claim 22

a. 22[pre]

See Claim 14[pre]; Ex. 1008, Appx. A, 22[pre].

b. 22[a]

See 1[g] (forming first and second capacitive relationships), 14[a] (forming a first capacitive relationship), 14[b] (forming a second capacitive relationship); Ex. 1008, Appx. A, 22[a].

c. **22[b]**

See 1[b] (first electrode arranged at a first position of the pen-tip portion), 1[c] (second electrode arranged at a second position of the pen-tip portion), and 4[a] (wherein the first and second electrodes are arranged to surround the axis of the penshaped position indicator); Ex. 1008, Appx. A, 22[b].

d. **22[c]**

See 1[f] (first and second signals generated by signal production circuit are transmitted to the first and second electrodes via the conductive lines) and 1[d] (the first and second signals are distinguishable from each other); Ex. 1008, Appx. A, 22[c].

e. **22[d]**

See 14(c); Ex. 1008, Appx. A, 22[d].

20. Claim 23

a. **23[pre]**

See Claim 22.

b. **23[a]**

See Claim 11[a]; Ex. 1008, Appx. A, 23[a].

21. Claim 24

a. **24[pre]**

See Claim 22.

b. **24[a]**

See Claim 5; Ex. 1008, Appx. A, 24[a].

B. <u>Ground 2</u>: Claims 1-5, 8-12, 14-18, and 21-24 are obvious over Yoshida in view of Iguchi and the knowledge of a POSITA.

Yoshida discloses elements of these claims for at least the reasons discussed above in §VII(A). To the extent one or more limitations of these claims are not disclosed in Yoshida, the below analysis further illustrates that these limitations are disclosed in Iguchi and how the claims are obvious over Yoshida in view of Iguchi and the knowledge of a POSITA. Ex. 1008, ¶ 122.

Yoshida and Iguchi are both directed to capacitive stylus input systems with multiple electrodes for position detection and angle information. *See* Ex. 1005, Abstract; Ex. 1007, Abstract. Both references address the detection and processing of stylus signals to improve input accuracy. The references are also directed to the same field of technology, as reflected by Iguchi's incorporation of capacitive electrode arrangements at the pen tip and surrounding axis to detect tilt and rotation. Ex. 1007, Figs. 26a–26b, 27c, 29a–29b, 15:38–52, 17:24–45, 18:14–36. The applications that issued as Yoshida and Iguchi were both filed in 1995 and were both assigned to Sharp Kabushiki Kaisha in Osaka, Japan.

A POSITA would have been motivated to combine Yoshida's disclosure of stylus electrode structures and capacitive relationships with Iguchi's disclosure of capacitive detection circuits for tilt and angular detection to achieve more robust stylus tracking. Ex. 1008, ¶¶ 114–116. Such a combination would have been a predictable application of known techniques for improving stylus angle detection without resorting to mechanical sensors or more complicated technology. *Id.* The references are in the same field and even shared a common consumer electronics company assignee, which provides further motivation for a POSITA to combine them to achieve improved performance and address commercial demand for more sophisticated input devices.

A POSITA would have been motivated to combine Yoshida and Iguchi because they result in improved performance through improved stylus tracking accuracy, improved sensor surface detection accuracy, enhanced capacitive signal distinguishability resulting in higher tilt detection accuracy, less electrical noise interference and more reliable signal propagation resulting in higher sensitivity of pen movements, and wireless pen movements resulting in higher degrees of freedom to interact with a sensor surface.

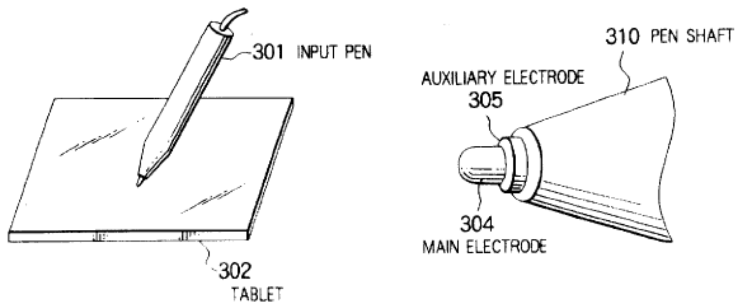
1. Claim 1

a. 1[pre]

Yoshida discloses this limitation. §VII(A)(1)(a).

Iguchi discloses a capacitive pen system in which multiple electrodes interact with a sensor surface to form capacitive relationships. Specifically, Iguchi explains that "the main electrode 304 covered with resin is arranged at an end tip of the pen shaft 310" and "the auxiliary electrode 305 is arranged around this main electrode 304," and that these electrodes capacitively couple with the tablet to generate positional data. Ex. 1007, Figs. 26a, 26b, 30:25–29.

FIG. 26a FIG. 26b



A POSITA would have recognized that capacitive stylus systems inherently require multiple electrodes to facilitate accurate position detection and signal differentiation. Ex. 1008, Appx. A, 1[pre]. Incorporating Iguchi's structured electrode arrangement into Yoshida's system would have been an obvious and predictable design choice to improve stylus tracking accuracy. *Id.*

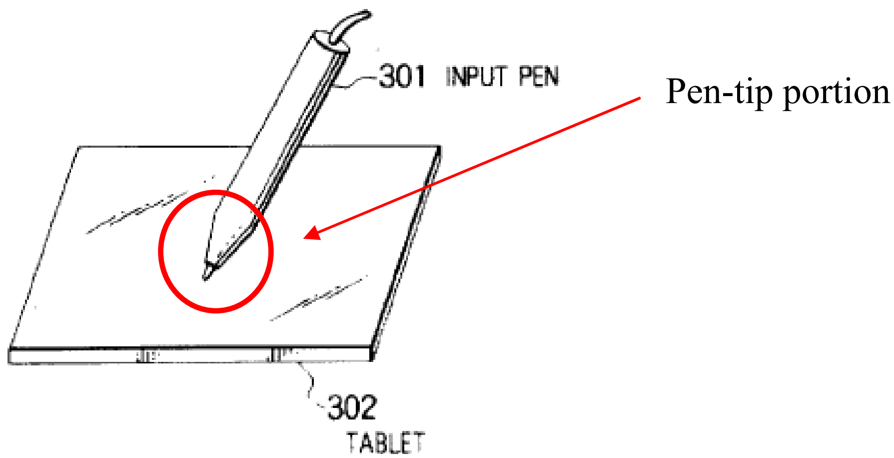
Yoshida and Iguchi each disclose 1[pre]. Ex. 1008, Appx. A, 1[pre].

b. 1[a]

Yoshida discloses this limitation. §VII(A)(1)(b).

Iguchi discloses a pen-shaped capacitive input device with a main electrode at the tip. Specifically, Iguchi explains that "the main electrode 304 covered with resin is arranged at an end tip of the pen shaft 310," confirming that the device includes a pen-shaped structure with a tip electrode. Ex. 1007, Fig. 26a, 30:25–29.

FIG. 26a



Yoshida and Iguchi each disclose 1[a]. Ex. 1008, Appx. A, 1[a].

c. 1[b]

Yoshida discloses this limitation. §VII(A)(1)(c).

Iguchi discloses a first electrode (main electrode 304) arranged at the end tip of the pen shaft (a first position of the pen-tip portion) to interact capacitively with the sensor surface, with an auxiliary electrode 305 positioned around the main electrode 304. Ex. 1007, Figs. 26a, 26b, 30:25–29.

FIG. 26a

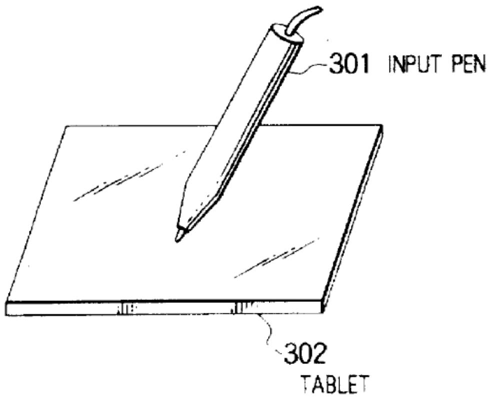
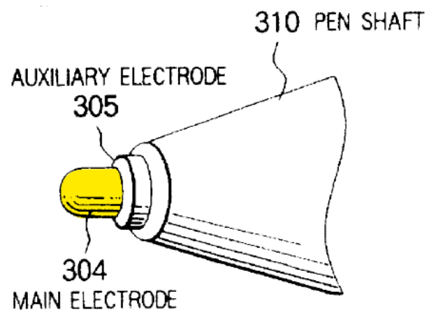


FIG. 26b



A POSITA would have recognized that this electrode placement enhances capacitive coupling with the sensor surface to improve detection accuracy. Ex. 1008, Appx. A, 1[b].

Yoshida and Iguchi each disclose 1[b]. Ex. 1008, Appx. A, 1[b].

d. 1[c]

Yoshida discloses this limitation. §VII(A)(1)(d).

Iguchi discloses a second electrode (auxiliary electrode 305) arranged around the main electrode 304 at a second position of the pen-tip portion, forming an off-axis capacitive interaction with the sensor surface. Ex. 1007, Figs. 26a, 26b, 30:25–29. The second position is off an axis of the pen-shaped position indicator. *Id.*

FIG. 26a

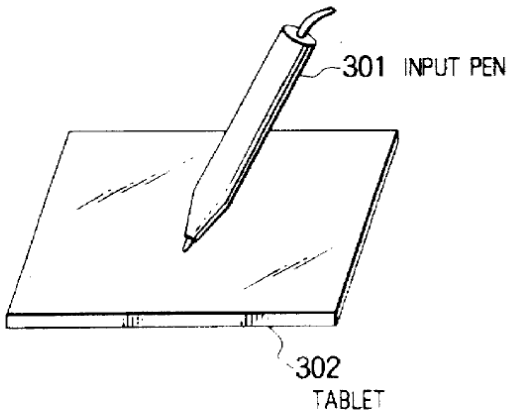
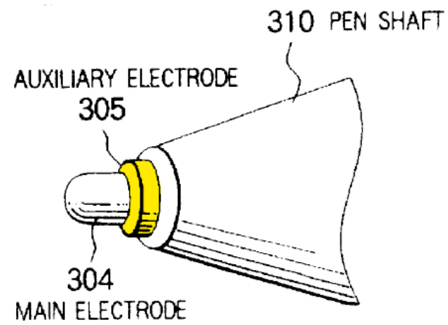


FIG. 26b



A POSITA would have recognized that positioning an auxiliary electrode surrounding the main electrode creates an off-axis capacitive interaction that improves signal differentiation and enables more precise tilt detection. Ex. 1008, Appx. A, 1[c].

Yoshida and Iguchi both disclose 1[c]. Ex. 1008, Appx. A, 1[c].

e. 1[d]

Yoshida discloses this limitation. §VII(A)(1)(e).

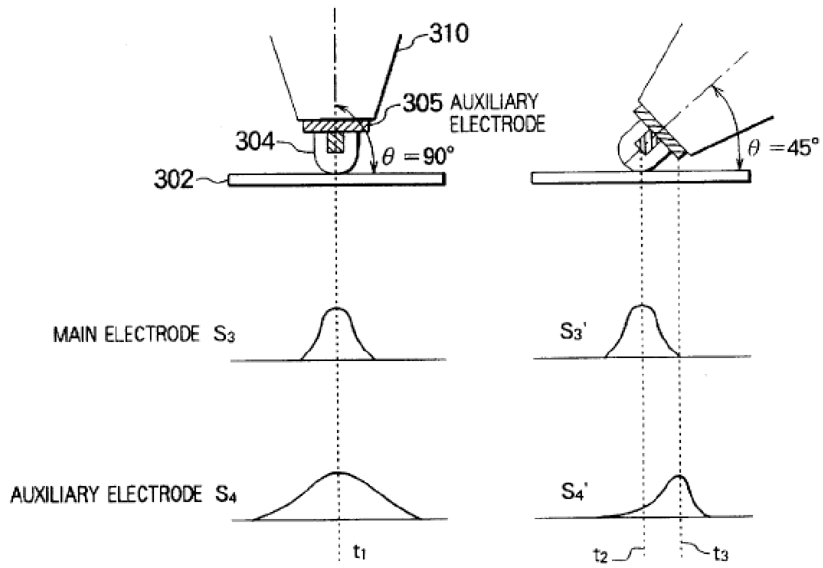
Iguchi discloses capacitive signal differentiation, where time-differentiated signals from capacitive electrodes encode positional information. Ex. 1007, Fig. 29b. Iguchi explains that "[t]he main electrode 304 covered with resin is arranged at an end tip of the pen shaft 310. The auxiliary electrode 305 is arranged around this main electrode 304." *Id.* at 30:25–29.

FIG. 29a

(θ =90°)

FIG. 29b

(θ =45°)



Iguchi further states that "[s]ince the auxiliary electrode is located in a position separated from the main electrode, coordinates of the main and auxiliary electrodes with respect to a tablet plate are separately detected when the pen shaft is inclined" and that "[i]nclination data of the pen shaft can be taken out by a difference between timing signals caused by a difference between these coordinates." *Id.* at 15:6–12. These disclosures confirm that Iguchi describes a system in which signals from different electrodes are separately detected and distinguished. Ex. 1008, Appx. A, 1[d].

A POSITA would have recognized that capacitive input systems inherently generate and differentiate signals based on electrode positioning and coupling dynamics. Ex. 1008, Appx. A, 1[d]. Iguchi's disclosure of time-differentiated capacitive signals demonstrates a method for distinguishing signals based on temporal variations. Incorporating Iguchi's time-differentiation techniques into Yoshida's stylus system would have been an obvious and predictable way to enhance signal distinguishability. *Id.*

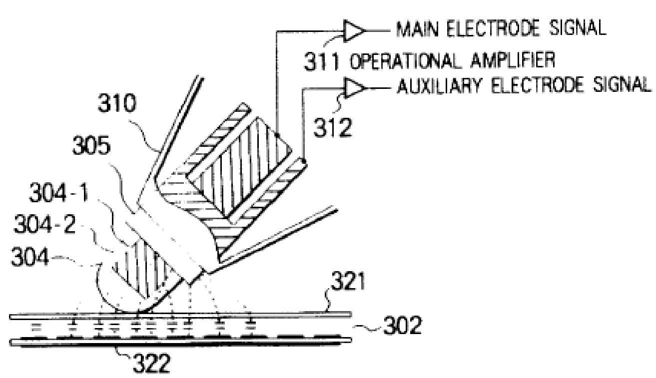
Yoshida and Iguchi both disclose 1[d]. Ex. 1008, Appx. A, 1[d].

f. 1[e]

Yoshida discloses this limitation. §VII(A)(1)(f).

Iguchi discloses conductive connections between the main and auxiliary electrodes and associated circuits. Specifically, Iguchi explains that "[s]ince the auxiliary electrode is located in a position separated from the main electrode, coordinates of the main and auxiliary electrodes with respect to a tablet plate are separately detected when the pen shaft is inclined." Ex. 1007, 15:6–12. Iguchi further shows the electrode arrangement and connections in Fig. 27c, noting the conductive pathways for transmitting capacitive signals. *Id.* at 31:5–11, Fig. 27c.

FIG. 27c



In addition, Iguchi discloses that "[t]he main electrode 304 covered with resin is arranged at an end tip of the pen shaft 310" and "[t]he auxiliary electrode 305 is arranged around this main electrode 304." *Id.* at 30:25–29. These disclosures confirm structured connectivity within Iguchi's capacitive stylus system. Ex. 1008, Appx. A, 1[e].

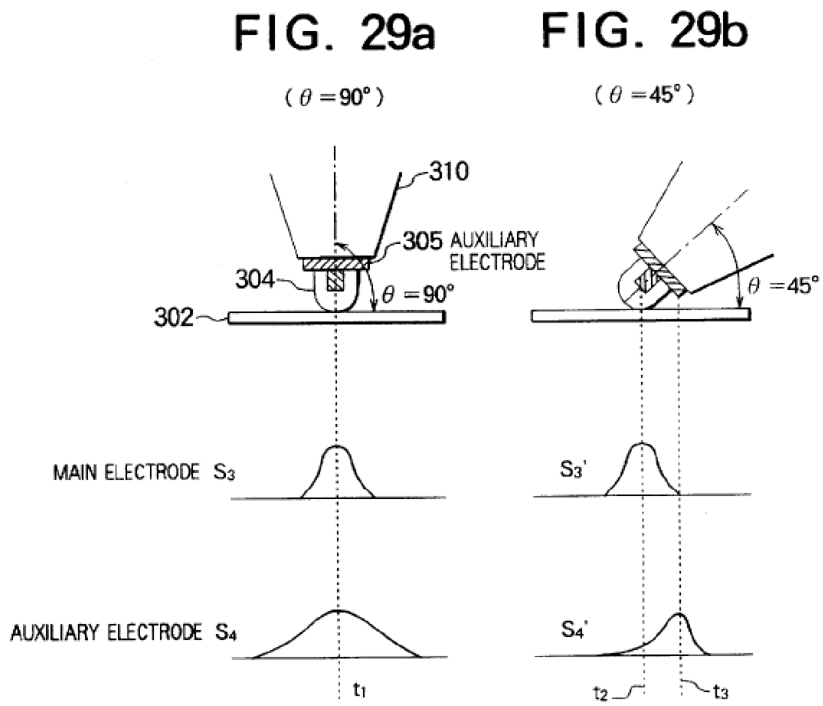
A POSITA would have recognized that capacitive stylus systems inherently require conductive pathways to transmit signals between multiple electrodes and a processing circuit. *Id*. Iguchi expressly discloses a system where electrodes are positioned separately, generate distinct signals, and are connected through conductive lines, demonstrating the presence of necessary transmission paths. *Id.* Incorporating Iguchi's disclosure of such structured conductive connections into Yoshida's stylus system would have been a straightforward and predictable modification to ensure reliable signal propagation and accurate detection. *Id.*

Yoshida and Iguchi both disclose 1[e]. Ex. 1008, Appx. A, 1[e].

g. 1[f]

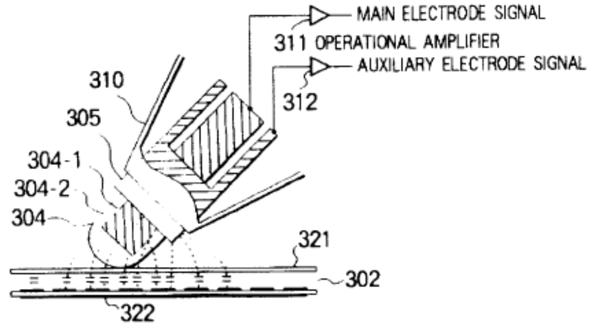
Yoshida discloses this limitation. *See* §VII(A)(1)(g).

Iguchi discloses time-differentiated signals transmitted through conductive pathways. Iguchi explains that "a time difference is caused between timing t2 of a peak of an output signal S3' provided by the main electrode and timing t3 of a peak of an output signal S4' provided by the auxiliary electrode." Ex. 1007, 31:37–41, Fig. 29b.



Iguchi further teaches that "[s]ince the auxiliary electrode is located in a position separated from the main electrode, coordinates of the main and auxiliary electrodes with respect to a tablet plate are separately detected when the pen shaft is inclined." *Id.* at 15:6–9. These disclosures confirm that capacitive signals generated at distinct electrode locations are separately detected and transmitted along conductive lines. Iguchi's Fig. 27c schematically illustrates such transmission paths. *Id.* at 31:5–11, Fig. 27c.

FIG. 27c



A POSITA would have recognized that capacitive stylus systems inherently require structured signal transmission to ensure accurate detection of position and angular displacement. Ex. 1008, Appx. A, 1[f]. Iguchi expressly discloses signal differentiation based on time-differentiated capacitive outputs traveling along conductive lines, confirming that such transmission is essential for tilt and angular detection. *Id.*

Yoshida and Iguchi each disclose 1[f]. Ex. 1008, Appx. A, 1[f].

h. 1[g]

Yoshida discloses this limitation. §VII(A)(1)(h).

Iguchi discloses generating detection signals in the sensor surface from which angle information is obtainable. Iguchi explains that "[t]he main electrode 304 covered with resin is arranged at an end tip of the pen shaft 310" and "[t]he auxiliary electrode 305 is arranged around this main electrode 304." Ex. 1007, 30:25–29, Figs. 26a–26b.

FIG. 26a

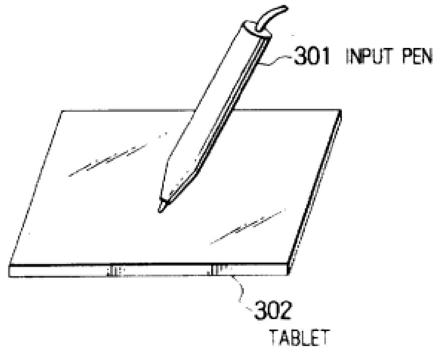
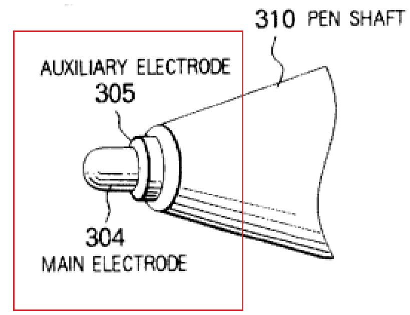
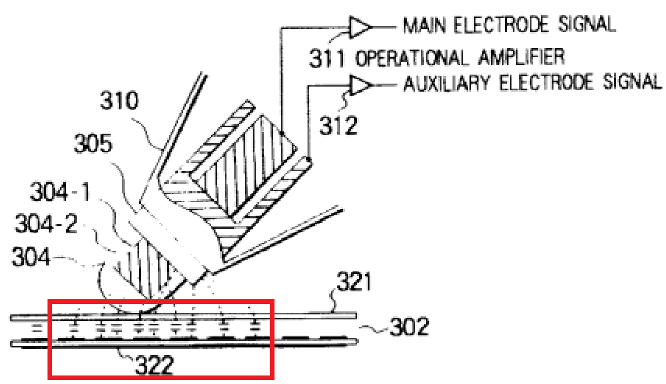


FIG. 26b



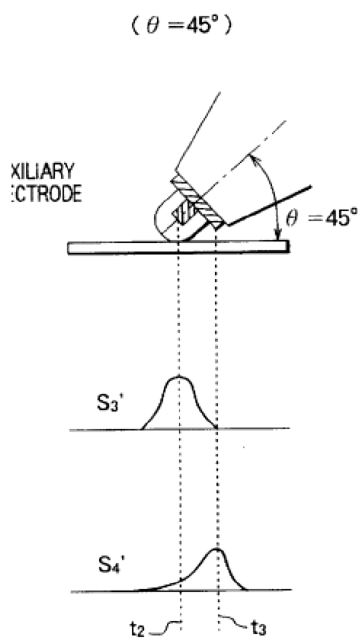
Because the auxiliary electrode is offset from the main electrode, "coordinates of the main and auxiliary electrodes with respect to a tablet plate are separately detected when the pen shaft is inclined," and "inclination data of the pen shaft can be taken out by a difference between timing signals caused by a difference between these coordinates." *Id.* at 15:6–12. Figure 27c illustrates how the asymmetric capacitive relationships between the electrodes and the sensor surface yield detection signals corresponding to stylus inclination. *Id.* at 31:5–11, Fig. 27c.

FIG. 27c



Iguchi further discloses that "a time difference is caused between timing t2 of a peak of an output signal S3' provided by the main electrode and timing t3 of a peak of an output signal S4' provided by the auxiliary electrode." *Id.* at 31:37–41, Fig. 29b. These time-differentiated capacitive outputs confirm that angular displacement is encoded in the detection signals. *Id.* at 31:26–44.

FIG. 29b



A POSITA would have recognized that these separate capacitive relationships and their timing differences inherently generate angle information of the pen. Ex. 1008, Appx. A, 1[g].

Yoshida, in view of Iguchi and the knowledge of a POSITA, discloses 1[g]. Ex. 1008, Appx. A, 1[g].

A POSITA would have been motivated to combine these teachings because Yoshida and Iguchi both operate in the same technical field of capacitive stylus input systems, addressing the identical problem of detecting stylus position and angular information. Combining Iguchi's offset electrode arrangement with Yoshida's signal processing architecture would have been a predictable improvement, as each reference teaches complementary features designed to enhance angular detection accuracy. The combination would have improved performance by providing more reliable tilt measurements without relying on mechanical sensors, reducing device complexity and cost. Additionally, there was a significant commercial demand for advanced digital pens to support emerging markets such as graphic design tablets and smartphones. This demand, combined with clear market trends toward thinner, more accurate styluses, would have incentivized a POSITA to integrate Iguchi's advanced angular detection methods into Yoshida's proven capacitive framework to meet user expectations for precision and functionality. Ex. 1008, ¶¶ 114–116.

2. Claim 2

a. 2[pre]

See Claim 1.

b. 2[a]

Yoshida discloses this limitation. §VII(A)(2)(b).

Iguchi discloses a pen-shaped input device in which the main electrode 304 is positioned at the center of the pen tip and the auxiliary electrode 305 is arranged around the main electrode but spaced along the shaft of the pen. Ex. 1007, Figs. 26a, 26b, 30:25–29 ("The main electrode 304 covered with resin is arranged at an end tip of the pen shaft 310. The auxiliary electrode 305 is arranged around this main electrode 304.").

FIG. 26a

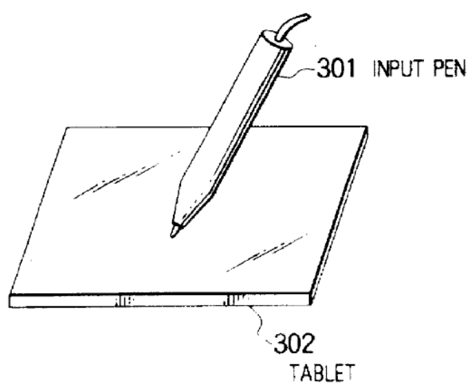
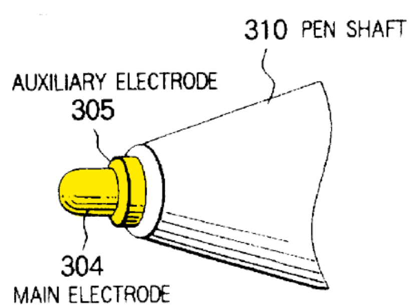
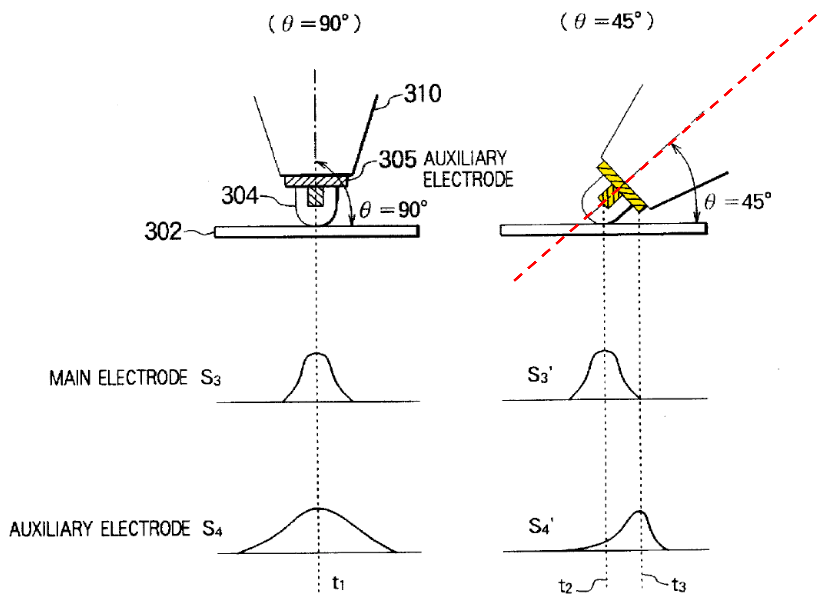


FIG. 26b



Iguchi's longitudinal cross-sectional illustrations further show that the auxiliary electrode is axially separated from the main electrode along the pen body. *See also id.*, Figs. 29a and 29b.

FIG. 29a FIG. 29b



A POSITA would have understood that positioning electrodes at different locations along the pen's axis enables detection of multiple capacitive relationships with the sensor surface, where differences in signal strength or timing can be used to determine angular displacement or positional accuracy. Yoshida provides the foundational capacitive precise detection framework, while Iguchi offers a refined electrode configuration to measure tilt based on spatial separation. Ex. 1008, Appx. A, 2[a].

Yoshida and Iguchi each disclose 2[a]. Ex. 1008, Appx. A, 2[a].

3. Claim 3

a. 3[pre]

See Claim 1.

b. 3[a]

Yoshida discloses this limitation. §VII(A)(3)(b).

Iguchi discloses a pen-shaped input device with a main electrode 304 positioned at the center axis of the pen tip and an auxiliary electrode 305 arranged around the main electrode to form a capacitive relationship with the sensor surface. Ex. 1007, Figs. 26a, 26b, 30:25–29 ("The main electrode 304 covered with resin is arranged at an end tip of the pen shaft 310. The auxiliary electrode 305 is arranged around this main electrode 304.").

FIG. 26a

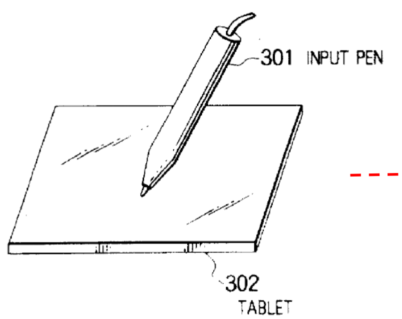
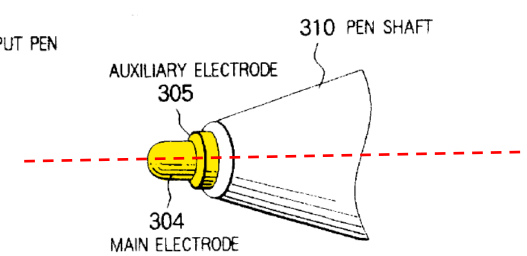


FIG. 26b



This radial configuration positions the auxiliary electrode to surround the axis of the pen. *Id.*

Iguchi also teaches that inclination data can be extracted from differences in coordinate signals received from the respective electrodes, indicating that the auxiliary electrode comprises multiple pieces or segments that can register spatial variation. *Id.* at 15:6–12 ("[i]nclination data of the pen shaft can be taken out by a difference between timing signals caused by a difference between these coordinates.”). A POSITA would have understood that implementing the auxiliary electrode as plural electrode pieces distributed around the pen axis facilitates signal differentiation based on orientation, a well-known approach to detecting tilt or angular displacement in capacitive systems. Ex. 1008, Appx. A, 3[a]. Incorporating Iguchi’s segmented auxiliary electrode configuration into Yoshida’s outer electrode design would have been a predictable and advantageous modification, particularly where Yoshida already explicitly discloses using plural electrode pieces arranged to surround the axis of the pen, as explained with respect to Fig. 28 above. *Id.*

Yoshida and Iguchi, in view of the knowledge of a POSITA, both disclose 3[a]. Ex. 1008, Appx. A, 3[a].

4. Claim 4

a. 4[pre]

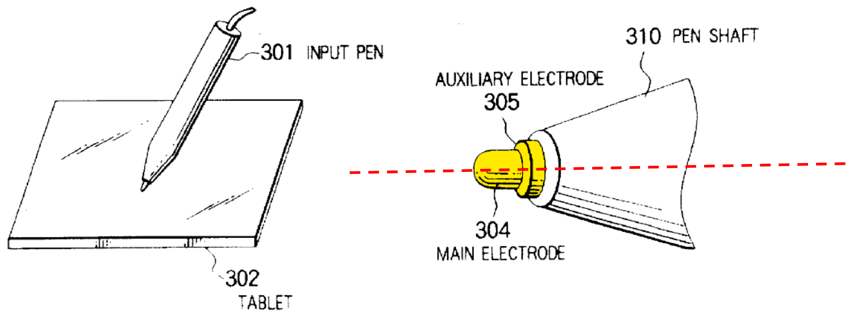
See Claim 1.

b. 4[a]

Yoshida discloses this limitation. §VII(A)(4)(b).

Iguchi discloses a concentric configuration in which main electrode 304 is placed at the pen center and auxiliary electrode 305 is positioned around it, forming a radial structure. Ex. 1007, Figs. 26a, 26b, 30:25–29 (“The main electrode 304 covered with resin is arranged at an end tip of the pen shaft 310. The auxiliary electrode 305 is arranged around this main electrode 304.”). This layout results in both electrodes being arranged to surround the pen axis, supporting angle detection through capacitive differences. *Id.*

FIG. 26a FIG. 26b



A POSITA would have recognized that combining this concentric arrangement into the structure shown in Yoshida provides the benefits disclosed in Iguchi, including enhanced angular resolution and consistent field detection, and would have implemented it as a predictable design refinement. Ex. 1008, Appx. A, 4[a].

Yoshida and Iguchi both disclose 4[a]. Ex. 1008, Appx. A, 4[a].

5. Claim 5

a. 5[pre]

See Claim 1.

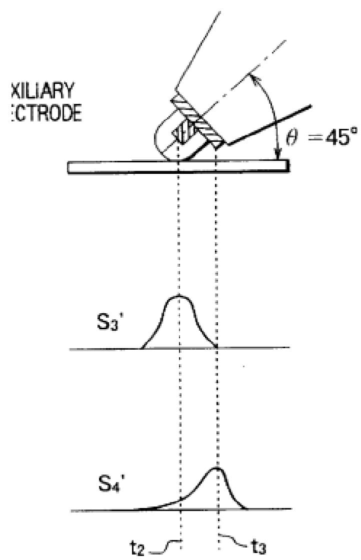
b. 5[a]

Yoshida discloses this limitation. §VII(A)(5)(b).

Iguchi discloses tilt detection by describing how capacitive signal variations can be used to measure angular displacement over time. Ex. 1007, Fig. 29b, 31:37–41. Specifically, Iguchi states: "[A] time difference is caused between timing t2 of a peak of an output signal S3' provided by the main electrode and timing t3 of a peak of an output signal S4' provided by the auxiliary electrode." *Id.*, 31:37–41, Fig. 29b.

FIG. 29b

(θ =45°)



A POSITA would have understood that such timing differences arise when the pen is tilted, as changes in the relative distances between the electrodes and the sensor surface alter the capacitive coupling and the resulting signal profiles. Ex. 1008, Appx. A, 5[a]. Iguchi's explicit teaching that these timing differences can be measured to determine angular displacement provides a direct basis for detecting a tilt angle. Incorporating Iguchi's time-differentiated signal approach into Yoshida's capacitive stylus framework would have been a predictable and straightforward enhancement, using well-known capacitive signal processing techniques to achieve accurate tilt detection without mechanical sensors. *Id.*

Thus, Yoshida in view of Iguchi discloses 5[a]. Ex. 1008, Appx. A, 5[a].

6. Claim 8

a. 8[pre]

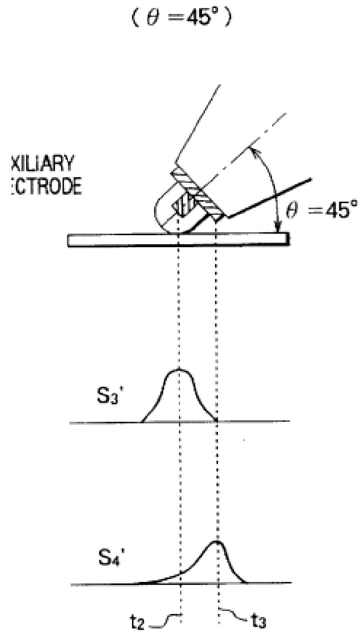
See Claim 1.

b. 8[a]

Yoshida discloses this limitation. §VII(A)(7)(b).

Iguchi discloses a capacitive pen system where the signals from the first and second electrodes are of the same type but have a measurable time difference. Ex. 1007, 31:37–41, Fig. 29b ("a time difference is caused between timing t2 of a peak of an output signal S3' provided by the main electrode and timing t3 of a peak of an output signal S4' provided by the auxiliary electrode").

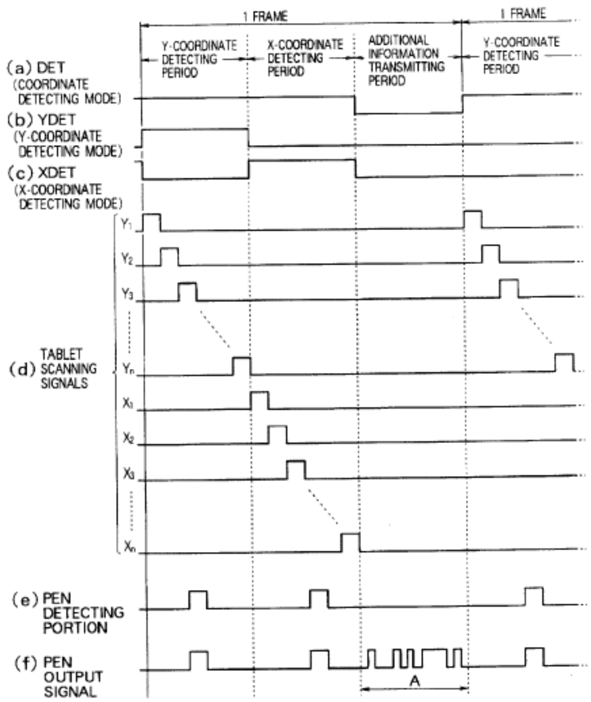
FIG. 29b



In Figure 29b of Iguchi, the output signals S3' and S4' from the main and auxiliary electrodes are plotted over time. *Id.*, Fig. 29b. The graph demonstrates that while both signals are of the same type (e.g., voltage signals), there is a measurable time difference between them, which is utilized to determine the pen's tilt or angle. *Id.* The figure visually demonstrates how these signals shift over time, supporting that signals from different electrodes have a detectable phase difference. *Id.*; Ex. 1008, Appx. A, 8[a]. This timing offset allows for accurate angular detection of the pen's tilt relative to the sensor surface. *Id.*; Ex. 1008, Appx. A, 8[a]

Additionally, Iguchi describes a systematic operation cycle where the capacitive pen interacts with a grid of electrodes in an X–Y coordinate system. Specifically, Iguchi discloses: "[o]ne cycle of a systematic operation of the coordinate inputting apparatus is shown as one frame in FIG. 31 and is constructed by three periods composed of a Y-coordinate detecting period, an X-coordinate detecting period and an additional information transmitting period"; "the electrodes Y1 to Ym at Y-coordinates are sequentially turned on in the Y-coordinate detecting period, and the electrodes Xl to Xn at X-coordinates are sequentially turned on in the X-coordinate detecting period"; "a detecting portion of the detecting pen outputs a signal when an electrode closest to a pen tip is turned on"; and "it is possible to discriminate a position of the pen tip on the tablet by timing of the signal from the detecting pen." Ex. 1007, 32:64–67, 33:1, 33:8–16, Fig. 31.

FIG. 31



A POSITA would have recognized that the signals from the two sets of electrodes X1–Xn and Y1–Ym both use electrostatic coupling and are of the same type but have a time difference from each other. Ex. 1007, 13:6–12, 31:26–44; Ex. 1008, Appx. A, 8[a]. Iguchi explicitly discloses that a time difference exists between signals detected from different electrodes positioned at separate locations along the stylus body. *Id.*, 31:37–41, Fig. 29b. Given Yoshida's disclosure of a capacitive stylus system generating multiple signals from its electrodes, a POSITA would have found it obvious to incorporate Iguchi's timing-based signal differentiation into Yoshida's system to refine detection accuracy. *See* Ex. 1008, Appx. A, 8[a]. Time-differentiated capacitive signals were a well-known feature in stylus-based input devices, and using this method in conjunction with Yoshida's capacitive framework would have been a predictable and advantageous modification for improving signal processing and distinguishing angular displacement. *Id.* Integrating Iguchi's signal timing variation approach into Yoshida's stylus system represents an expected design refinement that aligns with established principles in capacitive input technology. *Id.*

Yoshida and Iguchi both disclose 8[a]. Ex. 1008, Appx. A, 8[a].

7. Claim 9

a. 9[pre]

See Claim 1.

b. 9[a]

Yoshida discloses this limitation. §VII(A)(8)(b).

Iguchi discloses a coordinate inputting apparatus in which the main electrode 304 and auxiliary electrode 305 of the detecting pen receive drive signals from the tablet through capacitive coupling. The control circuit 401, common driving circuit 402, and segment driving circuit 403 sequentially drive the common electrodes Y1–Ym and segment electrodes X1–Xn during Y-coordinate and X-coordinate detecting periods, with the detecting pen outputting a signal when an electrode closest to the pen tip is energized. Ex. 1007, 32:64–33:16, Figs. 26a, 26b, 29a, 29b, 30, 31.

FIG. 26a

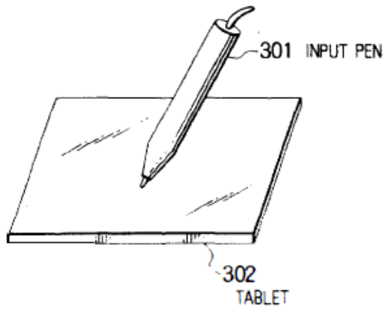


FIG. 26b

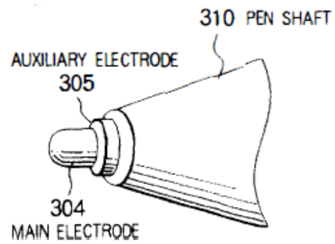


FIG. 29a

(θ = 90°)

FIG. 29b

(θ = 45°)

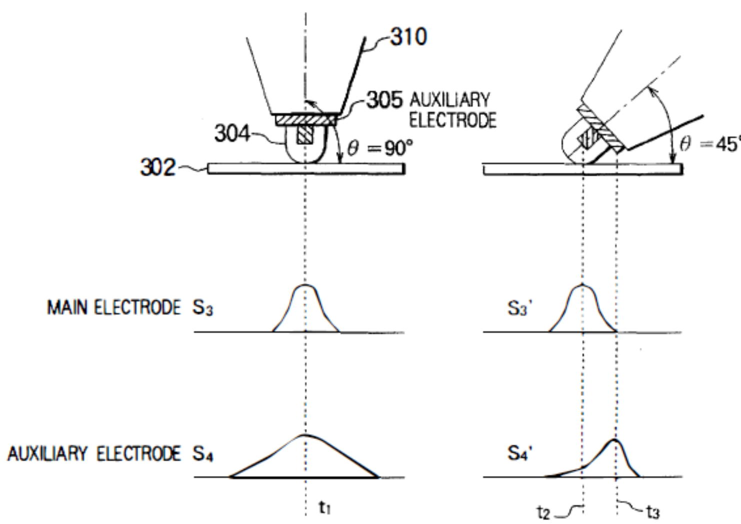


FIG. 30

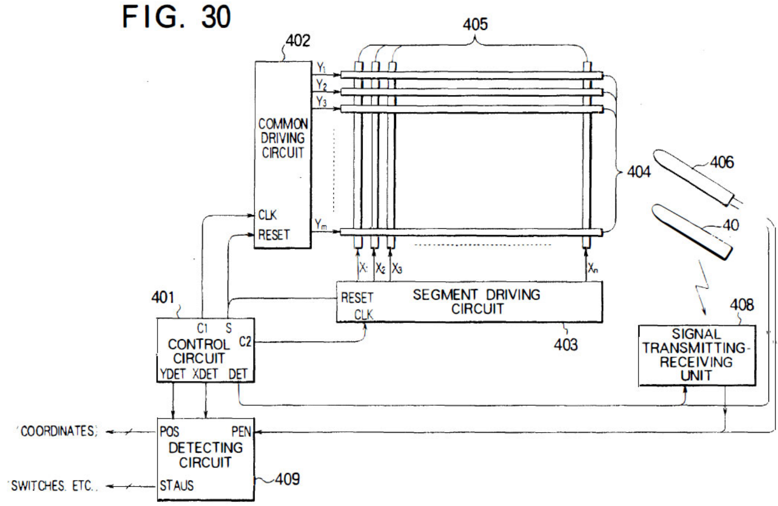
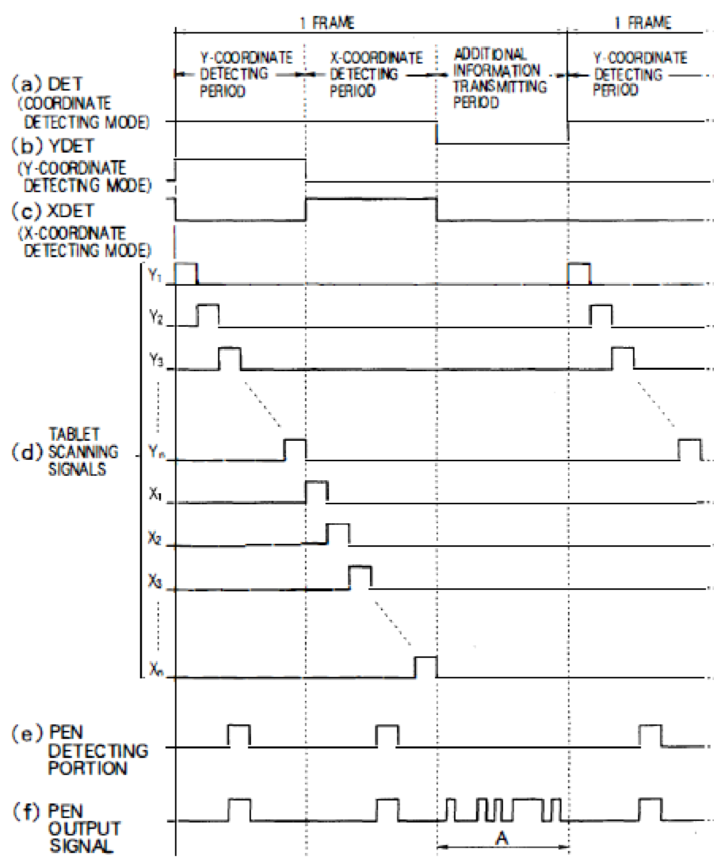

405
402
Y1
Y2
Y3
COMMON DRIVING CIRCUIT
CLK
RESET
Ym
404
406
40
X1 X2 X3
Xn
401
RESET
CLK
SEGMENT DRIVING CIRCUIT
408
C1 S
CONTROL CIRCUIT
C2
YDET XDET DET
403
SIGNAL TRANSMITTING-RECEIVING UNIT
COORDINATES
POS
PEN
DETECTING CIRCUIT
SWITCHES, ETC.
STAUS
409

FIG. 31


1 FRAME
1 FRAME
Y-COORDINATE DETECTING PERIOD
X-COORDINATE DETECTING PERIOD
ADDITIONAL INFORMATION TRANSMITTING PERIOD
Y-COORDINATE DETECTING PERIOD
(a) DET (COORDINATE DETECTING MODE)
(b) YDET (Y-COORDINATE DETECTING MODE)
(c) XDET (X-COORDINATE DETECTING MODE)
Y1
Y2
Y3
(d) TABLET SCANNING SIGNALS
Yn
X1
X2
X3
Xn
(e) PEN DETECTING PORTION
(f) PEN OUTPUT SIGNAL
A

Iguchi further explains that these drive signals are used to generate output signals from the pen's electrodes (e.g., signals S3' and S4'), which are then processed to determine position and angle information. Ex. 1007, 31:26–44; 33:8–16.

A POSITA would have understood from these disclosures that the pen's electrodes, functioning as detection elements, are configured to receive excitation signals from the tablet in a manner analogous to a stylus coil being driven by an oscillator, enabling capacitive detection. Ex. 1008, Appx. A, 9[a].

Yoshida and Iguchi each disclose 9[a]. Ex. 1008, Appx. A, 9[a].

c. 9[b]

Yoshida discloses this limitation. §VII(A)(8)(c).

Iguchi discloses that the coordinate inputting apparatus supplies controlled drive voltages to the pen's electrodes through capacitive coupling. The control circuit 401 outputs driving signals (YDET, XDET, and DET) to the common driving circuit 402 and segment driving circuit 403, which convert these control signals into corresponding voltage waveforms and sequentially energize the common electrodes Y1–Ym and segment electrodes X1–Xn during the coordinate detecting periods. Ex. 1007, 32:64–33:16, Figs. 30, 31.

FIG. 30

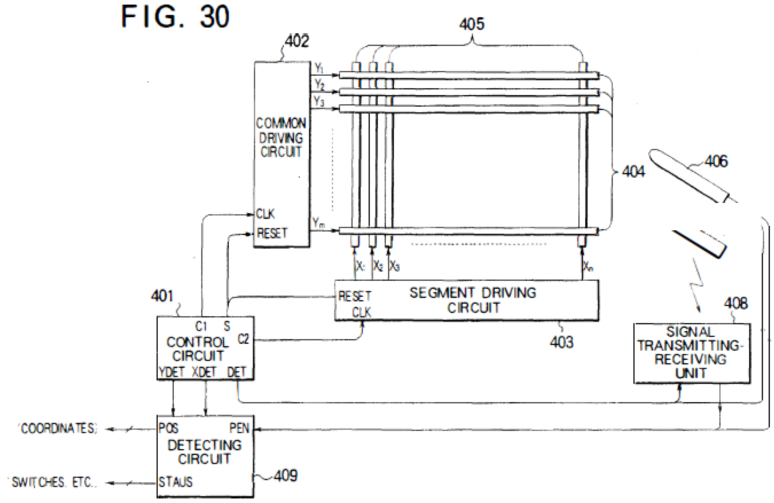
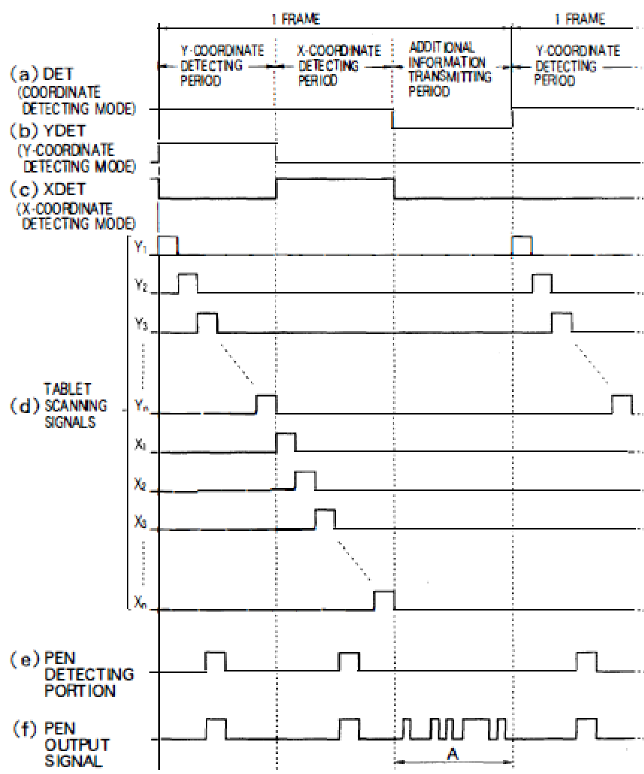


FIG. 31



These driving circuits perform the function of a power generation circuit by transforming the excitation/control signals from the control circuit 401 into the actual drive voltages applied to the tablet electrodes, which in turn capacitively couple into the pen's electrodes. *Id.*

Iguchi further explains that when the electrode closest to the pen tip is energized, the detecting pen outputs a corresponding signal, which is then processed to determine the pen's position and angle. *Id.*, 31:26–44; 33:8–16. A POSITA would have understood that the driving circuitry thus generates the necessary drive voltage from incoming excitation/control signals, enabling the main electrode 304 and auxiliary electrode 305 to function effectively in the capacitive detection system. Ex. 1008, Appx. A, 9[b].

Yoshida and Iguchi each disclose 9[b]. Ex. 1008, Appx. A, 9[b].

d. 9[c]

Yoshida discloses this limitation. §VII(A)(8)(d).

Iguchi discloses a capacitive coordinate inputting apparatus in which the main electrode 304 and auxiliary electrode 305 of the detecting pen receive drive signals from the tablet through capacitive coupling. Ex. 1007, Figs. 26a, 27c, 29b; 31:5–44.

FIG. 26a

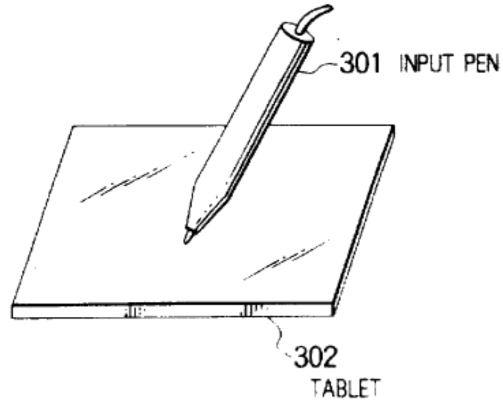


FIG. 27c

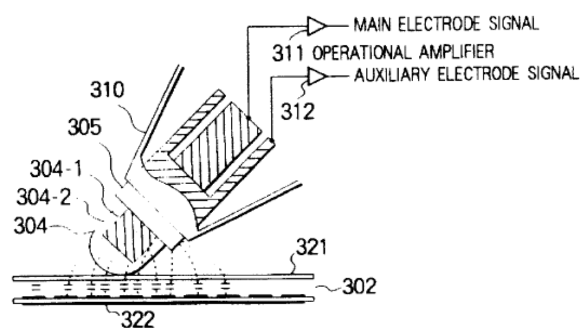
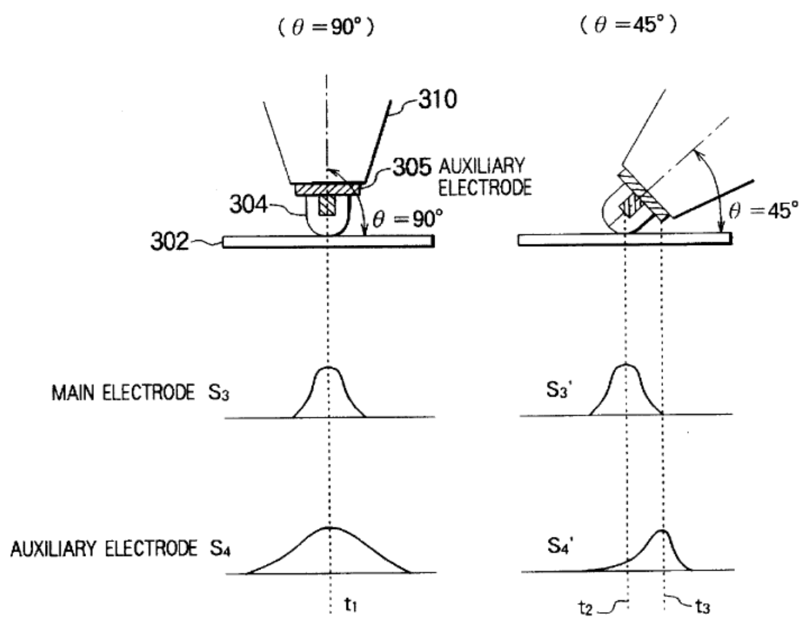


FIG. 29a

FIG. 29b



A POSITA would have understood that Iguchi's stylus could be powered using an inductively coupled coil and a power generation circuit, in place of or in addition to any wired or direct capacitive powering arrangement. Ex. 1008, Appx. A, 9[c]. In such a configuration, the drive voltage from the power generation circuit would feed the pen's signal production circuit, which would then output the first and second signals to the electrodes for capacitive detection, consistent with the structure in supra 1[d]–1[e]. *Id.* This represents a predictable adaptation of Iguchi's stylus using well-established wireless powering techniques in the art to eliminate the need for batteries or direct wiring. *Id.* Wireless powering was widely known in the art for similar input devices and provided practical benefits, such as reduced weight and simplified maintenance. *Id.*

Yoshida and Iguchi, in view of the knowledge of a POSITA, both disclose this limitation. Ex. 1008, Appx. A, 9[c].

8. Claim 10

a. 10[pre]

See 1[pre].

b. 10[a]

See 1[a]; Ex. 1008, Appx. A, 10[a].

c. 10[b]

See 1[b] (first electrode), 1[c] (second electrode), and 4[a] (to surround an axis of the pen-shaped position indicator); Ex. 1008, Appx. A, 10[b].

d. 10[c]

See 1[d]; Ex. 1008, Appx. A, 10[c].

e. 10[d]

See 1[e]; Ex. 1008, Appx. A, 10[d].

f. 10[e]

See 1[f]; Ex. 1008, Appx. A, 10[e].

g. 10[f]

See 1[g]; Ex. 1008, Appx. A, 10[f].

9. Claim 11

a. 11[pre]

See Claim 10.

b. 11[a]

Yoshida discloses this limitation. §VII(A)(10)(b).

Iguchi discloses a conductive main electrode 304 located at the end of the pen shaft 310 and coupled to a signal line 306, which supplies timing signals. The signal originates from the circuit and travels via the line to the conductive tip element. Ex. 1007, Figs. 26a, 29b, 30:25–29.

FIG. 26a

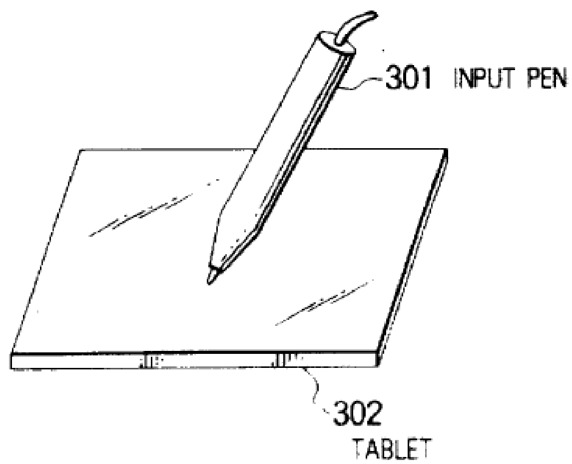
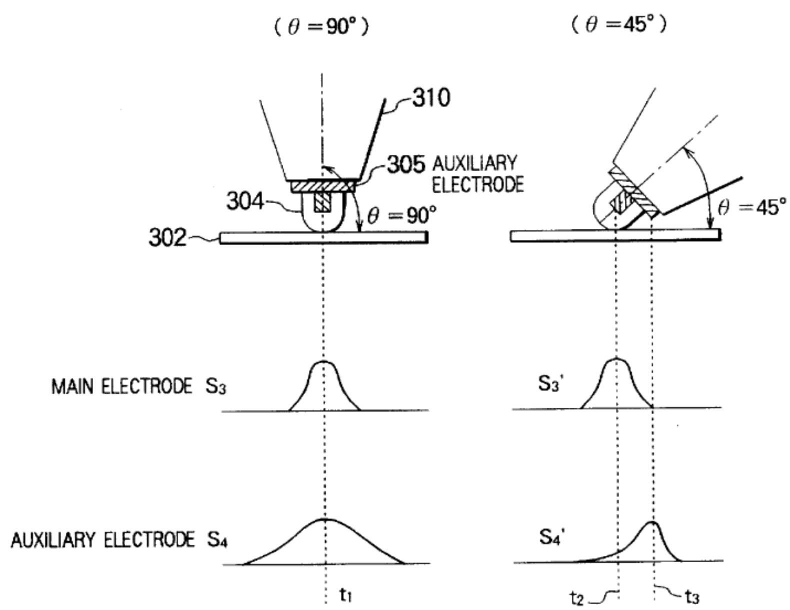


FIG. 29a FIG. 29b



A POSITA would have understood that this configuration satisfies the requirement of providing a conductive electrode at the pen tip connected to the signal generation circuitry via a line, enabling transmission of excitation signals. Ex. 1008, Appx. A, 11[a].

Yoshida and Iguchi each disclose 11[a]. Ex. 1008, Appx. A, 11[a].

10. Claim 12

a. 12[pre]

See Claim 10.

b. 12[a]

See Claim 5; Ex. 1008, Appx. A, 12[a].

11. Claim 14

a. 14[pre]

See 1[g]; Ex. 1008, Appx. A, 14[pre].

b. 14[a]

Yoshida and Iguchi both disclose forming a first capacitive relationship between a sensor surface and a first electrode (*see* 1[g]) arranged at a first position at the pen tip portion (*see* 1[b]) that is supplied with a signal generated by a signal production circuit and transmitted via a conductive path in the pen (*see* 1[d] (signal production circuit configured to generate first signal), 1[e] (conductive lines extending between the signal production circuit and the first electrode), and 1[f] (the first signal generated by the signal production circuit is transmitted to the first electrode via the conductive line)). *See also* Ex. 1008, Appx. A, 14[a].

c. 14[b]

Yoshida and Iguchi both disclose forming a second capacitive relationship between a sensor surface and a second electrode (*see* 1[g]) arranged at a second position of the pen-tip portion different from the first position and off an axis of the pen (*see* 1[c]) that is supplied with a signal generated by a signal production circuit and transmitted via a conductive path in the pen wherein the second signal is distinguishable from the first signal (*see* 1[d] (signal production circuit configured to generate second signal), 1[e] (conductive lines extending between the signal production circuit and the second electrode), 1[f] (the second signal generated by the signal production circuit is transmitted to the second electrode via the conductive line), and 1[d] (the first and second signals are distinguishable from each other). *See also* Ex. 1008, Appx. A, 14[b].

d. 14[c]

Yoshida, in view of Iguchi and the knowledge of a POSITA, discloses limitation 14[c]. *See* 1[g] (demonstrating that the first and second electrodes are configured to form first and second capacitive relationships with the sensor surface to generate detection signals based on which angle information is obtainable); Ex. 1008, Appx. A, 14[c].

12. Claim 15

a. 15[pre]

See Claim 14.

b. 15[a]

See Claim 2; Ex. 1008, Appx. A, 15[a].

13. Claim 16

a. 16[pre]

See Claim 14.

b. 16[a]

See Claim 3; Ex. 1008, Appx. A, 16[a].

14. Claim 17

a. 17[pre]

See Claim 14.

b. 17[a]

See Claim 4; Ex. 1008, Appx. A, 17[a].

15. Claim 18

a. 18[pre]

See Claim 14.

b. 18[a]

See Claim 5; Ex. 1008, Appx. A, 18[a].

16. Claim 21

a. 21[pre]

See Claim 14.

b. 21[a]

See Claim 8; Ex. 1008, Appx. A, 21[a].

17. Claim 22

a. 22[pre]

See Claim 14[pre]; Ex. 1008, Appx. A, 22[pre].

b. 22[a]

See 1[g] (forming first and second capacitive relationships), 14[a] (forming a first capacitive relationship), 14[b] (forming a second capacitive relationship); Ex. 1008, Appx. A, 22[a].

c. 22[b]

See 1[b] (first electrode arranged at a first position of the pen-tip portion), 1[c] (second electrode arranged at a second position of the pen-tip portion), and 4[a] (wherein the first and second electrodes are arranged to surround the axis of the penshaped position indicator); Ex. 1008, Appx. A, 22[b].

d. 22[c]

See 1[f] (first and second signals generated by signal production circuit are transmitted to the first and second electrodes via the conductive lines) and 1[d] (the first and second signals are distinguishable from each other); Ex. 1008, Appx. A, 22[c].

e. 22[d]

See 14(c); Ex. 1008, Appx. A, 22[d].

18. Claim 23

a. 23[pre]

See Claim 22.

b. 23[a]

See Claim 11[a]; Ex. 1008, Appx. A, 23[a].

19. Claim 24

a. 24[pre]

See Claim 22.

b. 24[a]

See Claim 5; Ex. 1008, Appx. A, 24[a].

VIII. CONCLUSION

The prior art references cited above are exemplary in nature and do not convey every way in which the references teach and disclose the claim limitations at issue. The cited references and this Petition show, however, that it is at least likely that the Challenged Claims of the '277 Patent are invalid as obvious over the cited references. Accordingly, Petitioner respectfully requests institution of *Inter Partes* review for the Challenged Claims for each presented ground.

IX. Notice of Lead and Backup Counsel and Service Information (37 C.F.R. § 42.8(b)(3))

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Powers of Attorney accompany this Petition pursuant to 37 C.F.R. §42.10(b). Please address all correspondence to lead and back-up counsel at the addresses above. Petitioner also consents to electronic service by email at the email addresses listed above.

X. Proof of Service and Service Information (37 C.F.R. §§42.6(e) and 42.105(a))

Attached is proof of service of this Petition on the Patent Owner through counsel of record listed on Patent Center at the U.S. Patent Office for the ’277 Patent.

Dated: September 30, 2025

Respectfully submitted,

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CERTIFICATION OF WORD COUNT UNDER 37 C.F.R. §42.24(d)

Under the provisions of 37 C.F.R. §42.24(d), the undersigned hereby certifies that the word count for the foregoing Petition for *Inter Partes* Review of U.S. Patent No. 10,108,277 totals 13,390 words, excluding the parts exempted by 37 C.F.R. §42.24(a). Accordingly, this Petition is under the word count limit of 14,000 words. This word count was made by using the built-in word count function tool in the Microsoft Word software Version 2502 used to prepare the document.

Dated: September 30, 2025

Respectfully submitted,

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<u>CERTIFICATE OF SERVICE</u>

Pursuant to 37 CFR §§ 42.6(e)(4)(i) *et seq*. and 42.105(b), the undersigned certifies that on September 30, 2025, a complete and entire copy of this Petition for *Inter Partes* Review and all supporting exhibits were provided by FedEx service, cost prepaid, to the Patent Owner by serving the correspondence address of record on USPTO Patent Center.

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A courtesy copy of the materials was provided to litigation counsel in the related proceeding.

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