

As demonstrated in the claim chart below, asserted claims 1, 2, 5, 8, 14, 15, 18, and 21 of U.S. Patent No. 7,277,277 (“’277 patent”) are invalid under 35 U.S.C. § 103 as obvious in view of U.S. Patent No. 5,798,756 to YOSHIDA (“YOSHIDA”) [MAXEYE_00001968 - MAXEYE_00002043] combined with the knowledge of a person of ordinary skill in the art (“POSITA”) and the secondary references identified in the claim chart below, namely, Japanese Patent No. JPH1011206A to IKEDA (“IKEDA”) [MAXEYE_00000987 - MAXEYE_00001009] and U.S. Patent No. 5,736,980 to IGUCHI (“IGUCHI”) [MAXEYE_00001908 - MAXEYE_00001967].

One of ordinary skill in the art, as of the effective filing date of the ’277 patent claims, would have known to combine the prior art elements disclosed by these references using known methods, and to use these elements according to their established functions in order to achieve a known and predictable result. Because these prior art references are within a common field of endeavor, and/or are directed to a related set of problems, it would have been obvious for one of ordinary skill in the art to look from one of the identified references to another in order to find any missing functionality.

As discussed below, a POSITA would have recognized that combining YOSHIDA (basic capacitive stylus), IKEDA (capacitive-based tilt detection), and IGUCHI (time-differentiated signals and phase-based angular detection) provides a well-known and predictable improvement in stylus-based input systems. Given the widespread use of capacitive styluses, a POSITA would have found it obvious to incorporate these elements to enhance detection accuracy, signal differentiation, and tilt compensation.

The chart below is based on Defendant’s current understanding of Plaintiff’s positions concerning the scope and construction of the claims of the asserted patents, and is not, and should in no way be seen as, adoption or admission of any particular claim scope or construction for any term or limitation. Defendant reserves the right to provide additional theories, disclosures, and analysis, particularly in light of the fact that discovery in this case has just begun. Plaintiff has not completed its document production regarding prior art, and portions of Plaintiff’s infringement contentions are vague, imprecise, and otherwise deficient.

Claim 1

1[pre] A pen-shaped position indicator configured to capacitively couple with a sensor surface, the pen-shaped position indicator comprising:

Disclosure

YOSHIDA discloses a pen-shaped electronic pen 21, which capacitively couples with a sensor surface. YOSHIDA, Figs. 1 and 2, 19:66-67, 20:1 (“the electric field generator 102 shown in FIG. 1 is incorporated in a pen-shaped electronic pen 21”). YOSHIDA also discloses that “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.” YOSHIDA, 14:62-67.

Fig. 1

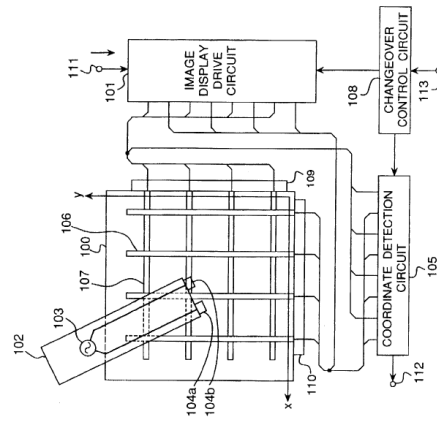
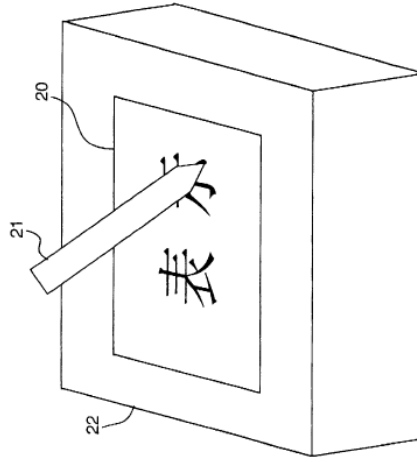


Fig. 2

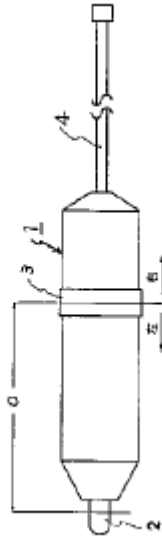


To the extent Plaintiff contends YOSHIDA does not expressly, implicitly, or inherently disclose capacitive coupling of a pen-shaped position indicator, one of ordinary skill in the art would, based on one’s knowledge and the disclosure of YOSHIDA, understand how to modify YOSHIDA to meet this limitation.

Alternatively, one of ordinary skill could modify YOSHIDA in view of IKEDA to meet this limitation, as shown below.

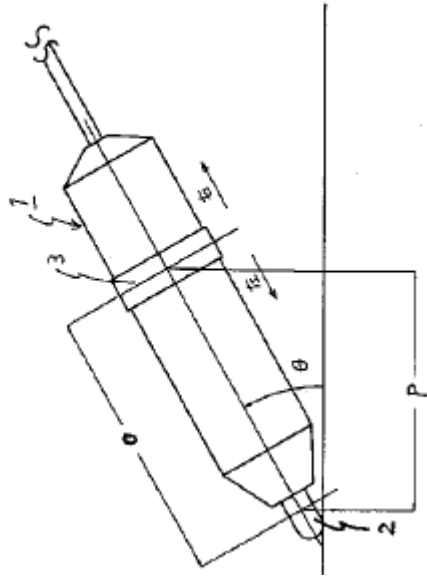
IKEDA discloses a coordinate detection pen that capacitively couples with a sensor surface. IKEDA, [0005], Figs. 1, 5. Specifically, IKEDA discloses a coordinate input device comprising a coordinate detection pen by capacitance coupling, with a detection unit for detecting a coordinate in a coordinate indicating unit of the pen and a detection unit for detecting an angle in a pen body unit of the pen: “[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. The device includes a detection unit for detecting coordinates at the coordinate indicating part of the coordinate detection pen and two detection electrode units: one for detecting coordinates and another for detecting angles at the pen body of the aforementioned coordinate detection pen, enabling the detection of the tilt angle of the aforementioned coordinate detection pen itself and the direction of the pen on the coordinate input device.” IKEDA, [0005], Figs. 1, 5).

【图1】



IKEDA Fig. 1

【图5】



IKEDA Fig. 5 discloses capacitive coupling through multiple detection electrodes. IKEDA, Fig. 5.

A POSITA would have recognized that capacitive coupling is a fundamental mechanism in coordinate input devices and that integrating multiple detection electrodes enhances precision in determining both position and angle. YOSHIDA discloses a capacitive stylus system, while IKEDA explicitly teaches a coordinate detection pen that capacitively couples with a sensor surface and includes dedicated detection units for positional and angular measurements. Given the widespread adoption of capacitive input technology, a POSITA would have understood that modifying YOSHIDA's stylus system in view of IKEDA would be a predictable and advantageous improvement, reinforcing tilt detection capabilities and enhancing overall input accuracy through the use of multiple capacitive detection electrodes

Alternatively, one of ordinary skill could modify YOSHIDA in view of IGUCHI to meet this limitation, as shown below.

IGUCHI discloses a capacitive pen system in which multiple electrodes interact with a sensor surface, forming capacitive relationships. Specifically, IGUCHI discloses that an electric field is generated from the stylus electrodes and capacitively coupled with the sensor surface to provide positional data. IGUCHI, Figs. 26a, 26b, 30:25-29 (“[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”).

FIG. 26a

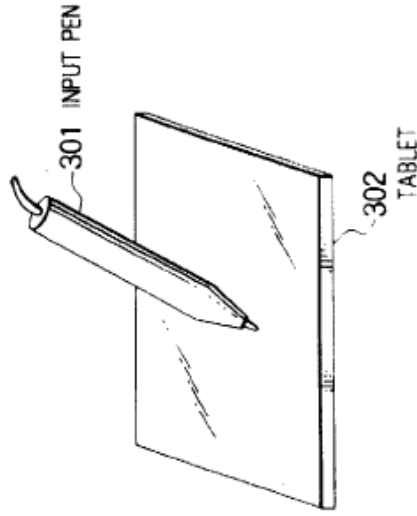
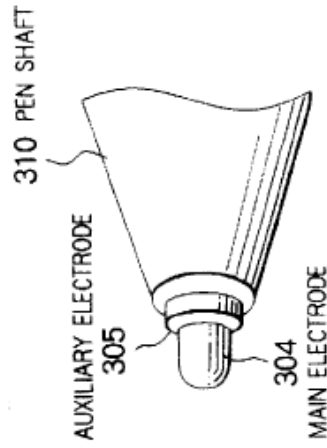


FIG. 26b



A POSITA would have recognized that capacitive stylus systems rely on multiple electrodes to facilitate accurate position detection and signal differentiation. YOSHIDA discloses a capacitive stylus that interacts with a sensor surface, while IGUCHI further reinforces this concept by demonstrating a system where multiple electrodes generate capacitive relationships to improve positional tracking. A POSITA would have found it obvious to incorporate IGUCHI’s structured electrode arrangement into YOSHIDA’s capacitive stylus system to enhance detection

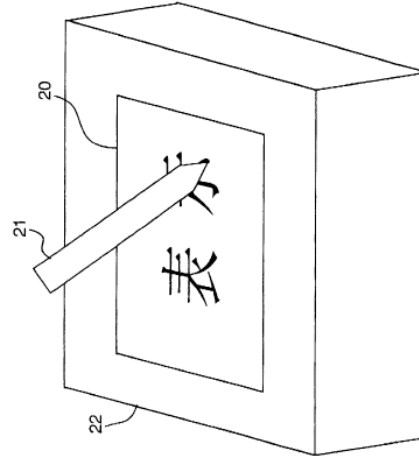
precision, as using multiple capacitive elements to refine position data was a well-known and predictable design choice in the field of coordinate input devices.

Alternatively, one of ordinary skill could modify YOSHIDA in view of IKEDA and IGUCHI to meet this limitation because capacitive stylus-based sensing was widely utilized in coordinate input devices, and a POSITA would have recognized that integrating capacitive stylus detection (YOSHIDA) with capacitive tilt measurement (IKEDA) and capacitive position differentiation (IGUCHI) would predictably enhance accuracy in stylus-based systems. A POSITA would have understood that combining these elements allows for improved capacitive coupling, refined positional tracking, and enhanced tilt detection, all of which are well-established in capacitive input technology.

YOSHIDA discloses a pen-shaped body with a pen-tip portion. YOSHIDA, Fig.2.

1|a| a pen-shaped body having a pen-tip portion;

Fig.2



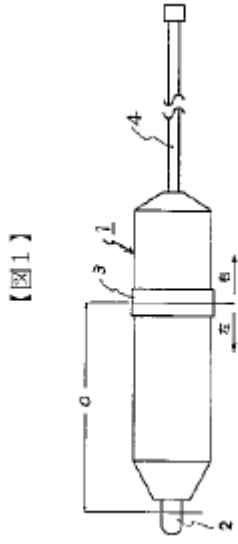
YOSHIDA's Fig. 2 illustrates a pen-shaped electronic pen 21 featuring a distinct pen-tip portion, which serves as the primary contact point for capacitive coupling.

This figure provides a side view of the pen, highlighting its elongated cylindrical body and the tapered tip designed for interaction with a sensor surface.

To the extent Plaintiff contends YOSHIDA does not expressly, implicitly, or inherently disclose a pen-shaped body with a pen-tip portion, one of ordinary skill in the art would, based on one's knowledge and the disclosure of YOSHIDA, understand how to modify YOSHIDA to meet this limitation.

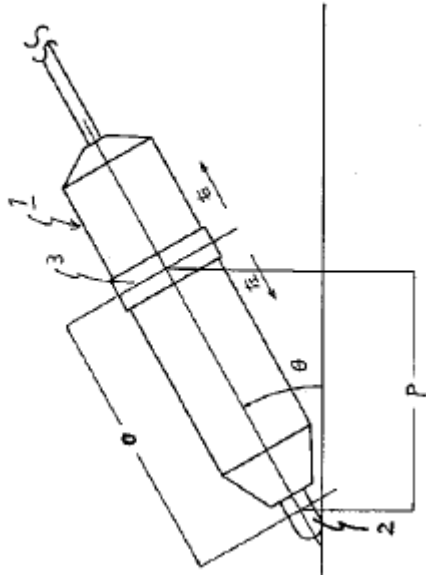
Alternatively, one of ordinary skill could modify YOSHIDA in view of IKEDA to meet this limitation, as shown below.

IKEDA discloses a coordinate detection pen with a pen tip portion ("detection unit 2"): "Fig. 1 is a configuration diagram of the coordinate detection pen of this invention, where 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, and a ring-shaped detection unit 3 for indicating the angle is positioned on the body of the coordinate detection pen." IKEDA, [0008], Figs. 1 (block diagram of the coordinate detection pen showing key components), 5 (shows coordinate detection pen with tilt detection).



IKEDA Fig. 1

【图5】



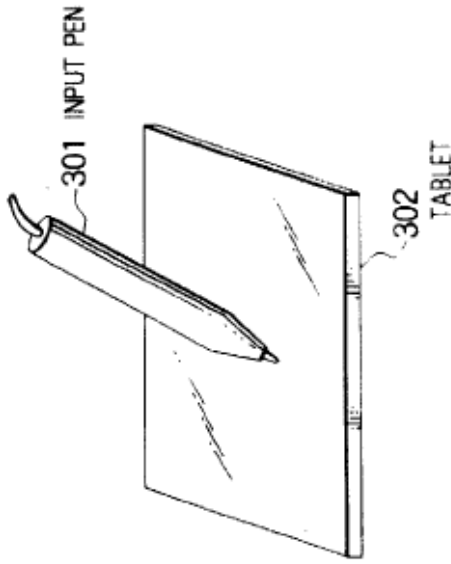
IKEDA Fig. 5

A POSITA would have recognized that capacitive input devices commonly utilize a pen-shaped body with a distinct pen-tip portion to facilitate precise interaction with a sensor surface. Given that YOSHIDA discloses a pen-shaped stylus with capacitive coupling and IKEDA explicitly discloses a coordinate detection pen with a defined pen-tip portion for input detection, a POSITA would have understood that incorporating IKEDA's pen structure into YOSHIDA's system represents a predictable and routine application of known design principles. The combination of YOSHIDA's capacitive stylus system with IKEDA's detailed pen structure would have been an obvious refinement to optimize capacitive signal detection and stylus positioning.

Alternatively, one of ordinary skill could modify YOSHIDA in view of IGUCHI to meet this limitation, as shown below.

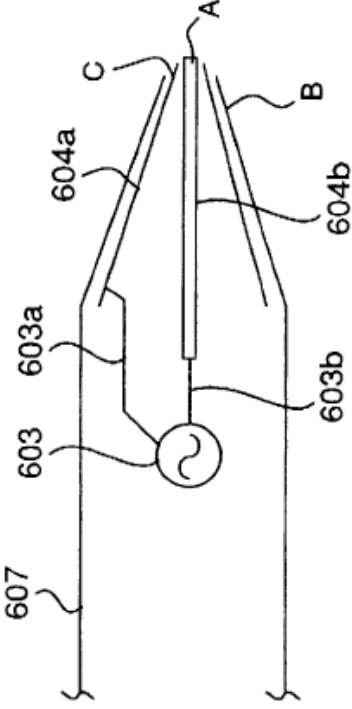
IGUCHI discloses a capacitive pen system that includes a pen-shaped structure with a main electrode at the tip. IGUCHI, Fig. 26a, 30:25-29.

FIG. 26a



A POSITA would have recognized that capacitive input devices commonly incorporate a pen-shaped structure to facilitate stable and accurate interaction with a sensor surface. IGUCHI discloses a capacitive pen system with a pen-shaped body and a main electrode positioned at the tip, reinforcing the conventional design principles for capacitive styluses. Given YOSHIDA's disclosure of a capacitive stylus and IGUCHI's explicit depiction of a pen-shaped input device with a tip electrode, a POSITA would have understood that modifying YOSHIDA's stylus system in view of IGUCHI would be a predictable optimization to improve capacitive signal transmission and precision in input detection.

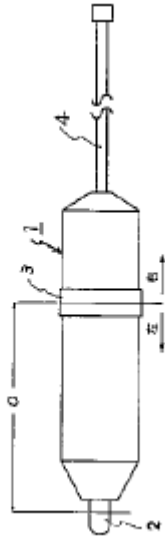
Alternatively, one of ordinary skill could modify YOSHIDA in view of IKEDA and IGUCHI to meet this limitation, because capacitive styluses with pen-shaped structures were a well-established design in coordinate input devices, and a POSITA would have recognized that incorporating elements from IKEDA and IGUCHI into

	<p>YOSHIDA's stylus system would be a predictable optimization. IKEDA's disclosure of a coordinate detection pen with a defined pen-tip portion and IGUCHI's depiction of a capacitive pen system with a main electrode at the tip confirm that a pen-shaped form factor was a standard configuration for stylus-based capacitive input. A POSITA would have understood that combining these references ensures a reliable, ergonomic, and effective design for capacitive interaction, making this integration an obvious and advantageous refinement.</p> <p>YOSHIDA discloses a rod-shaped inner electrode 604b at the pen-tip portion of the pen-shaped electric field generator 607. YOSHIDA, Fig. 6A.</p>
<p>1[b] a first electrode arranged at a first position of the pen-tip portion;</p>	<p style="text-align: center;">Fig. 6A</p>  <p>In Figure 6A of YOSHIDA, a rod-shaped inner electrode 604b is depicted at the pen-tip portion. This cross-sectional view shows the internal configuration of the pen tip, where the inner electrode is located along the central axis of the pen, facilitating capacitive coupling with the sensor surface.</p> <p>To the extent Plaintiff contends YOSHIDA does not expressly, implicitly, or inherently disclose a first electrode arranged at a first position of the pen-tip portion, one of ordinary skill in the art would, based on one's knowledge and the disclosure of YOSHIDA, understand how to modify YOSHIDA to meet this limitation.</p>

Alternatively, one of ordinary skill could modify YOSHIDA in view of IKEDA to meet this limitation, as shown below.

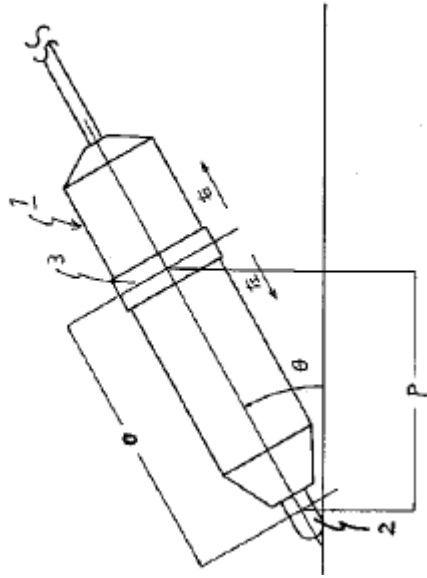
IKEDA discloses a first electrode on a coordinate detection pen tip: “[A] coordinate detection electrode (first detection unit) is positioned at the tip of the coordinate detection pen, and a ring-shaped coordinate detection electrode (second detection unit) for angle reading is placed on the body of the coordinate detection pen.” IKEDA, [0006], Figs. 1, 5.

【 图 1 】



IKEDA Fig. 1

【图5】



IKEDA Fig. 5

A POSITA would have understood that capacitive styluses commonly employ a first electrode at the tip to facilitate signal detection and coordinate tracking. YOSHIDA discloses a capacitive stylus system, and IKEDA reinforces this design by explicitly describing a coordinate detection electrode positioned at the pen tip for enhanced input accuracy. A POSITA would have found it obvious to integrate IKEDA's electrode configuration into YOSHIDA's stylus to optimize capacitive coupling and improve signal differentiation, as arranging detection electrodes at the tip was a known and predictable design choice in capacitive input devices.

Alternatively, one of ordinary skill could modify YOSHIDA in view of IGUCHI to meet this limitation, as shown below.

IGUCHI discloses a main electrode 304 at the end tip of the pen shaft, which is positioned to interact capacitively with the sensor surface. IGUCHI, Fig. 26a, Fig. 26b, 30:25-29 ("the 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.”).

FIG. 26a

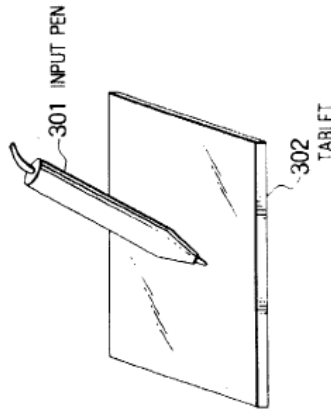
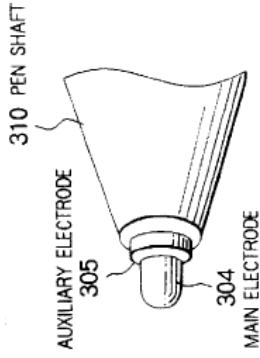


FIG. 26b



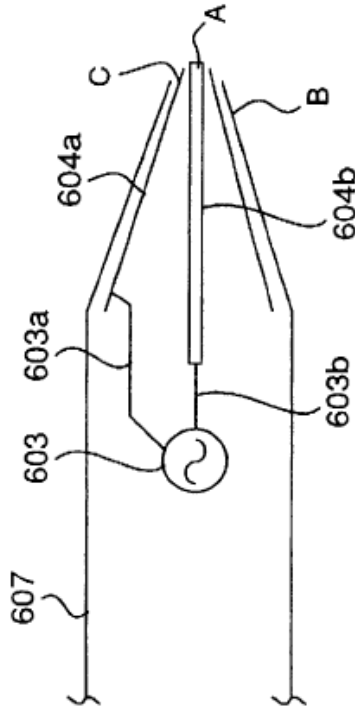
A POSITA would have recognized that positioning a main electrode at the tip of a capacitive stylus enhances signal transmission and interaction with the sensor surface, ensuring accurate coordinate detection. IGUCHI explicitly discloses a main electrode 304 arranged at the end tip of the pen shaft, reinforcing that this configuration was a well-known design principle in capacitive input technology. Integrating IGUCHI’s electrode placement into YOSHIDA’s stylus would have been an obvious design choice to improve capacitive coupling efficiency and facilitate precise input detection, as capacitive stylus systems commonly employ such electrode positioning to optimize performance.

Alternatively, one of ordinary skill could modify YOSHIDA in view of IKEDA and IGUCHI to meet this limitation by combining YOSHIDA’s disclosure of a first electrode at the pen tip (Fig. 6A), IKEDA’s explicit teaching of a coordinate detection electrode at the tip for capacitive coupling (Page 2, Figs. 1, 5), and IGUCHI’s disclosure of a main electrode at the end tip of the pen shaft interacting capacitively with the sensor surface (Fig. 26a, Fig. 26b, 30:25-29). A POSITA would have recognized that capacitive input systems routinely incorporate a first electrode

at the pen tip for optimal interaction with the sensor surface, making this combination a predictable improvement.

YOSHIDA discloses a megaphone-shaped outer electrode 604a positioned differently from the first electrode and off-axis. YOSHIDA, Fig.6A.

Fig.6A



Referring to Fig.6A of YOSHIDA, a megaphone-shaped outer electrode 604a is also arranged at the pen-tip portion of the pen-shaped electric field generator 607, and the second position of the outer electrode 604a is different from the first position of the inner electrode 604b.

Fig. 6A also shows that the position of the outer electrode 604a is off an axis of the pen-shaped position indicator. This arrangement is evident in this cross-sectional depiction, where the outer electrode surrounds the inner electrode asymmetrically, contributing to the detection of tilt or angle when interacting with the sensor surface.

To the extent Plaintiff contends YOSHIDA does not expressly, implicitly, or inherently disclose a second electrode at a second position off-axis, one of ordinary

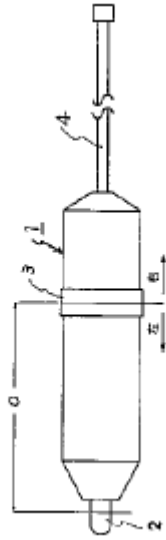
1|c| a second electrode arranged at a second position of the pen-tip portion different from the first position, the second position being off an axis of the pen-shaped position indicator;

skill in the art would, based on one's knowledge and the disclosure of YOSHIDA, understand how to modify YOSHIDA to meet this limitation.

Alternatively, one of ordinary skill could modify YOSHIDA in view of IKEDA to meet this limitation, as shown below.

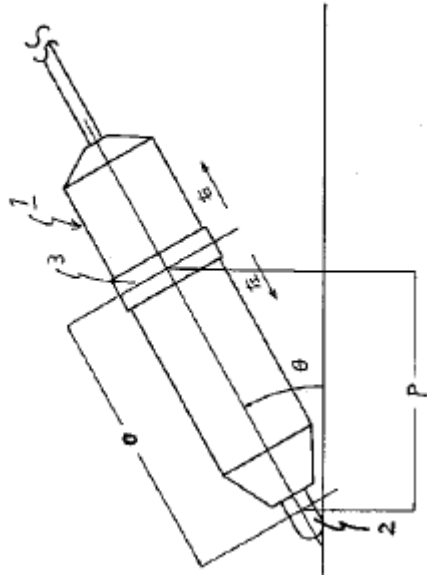
IKEDA discloses a ring-shaped coordinate detection electrode for angle reading positioned differently from the first electrode: "[A] ring-shaped coordinate detection electrode (second detection unit) for angle reading is placed on the body of the coordinate detection pen." IKEDA, [0006], Figs. 1, 5.

【 图 1 】



IKEDA Fig. 1

【图5】



IKEDA Fig. 5

IKEDA discloses a ring-shaped detection electrode positioned away from the tip electrode, which forms a capacitive relationship at a different position along the stylus body. IKEDA, Fig. 5, [0006]. This configuration inherently creates an off-axis capacitive field, which a POSITA would recognize as enabling tilt detection.

A POSITA would have understood that positioning a second electrode at a different location along the stylus body, as disclosed in IKEDA, enhances capacitive sensing by enabling angle detection through variations in capacitive coupling. The ring-shaped detection electrode in IKEDA, positioned away from the tip electrode, inherently forms an off-axis capacitive field that allows for improved tilt measurement. Modifying YOSHIDA's stylus to incorporate a second electrode in an off-axis configuration, as shown in IKEDA, would have been an obvious and predictable design choice to refine stylus-based capacitive input systems, as capacitive electrode placement is a well-known method for improving spatial and angular tracking accuracy.

Alternatively, one of ordinary skill could modify YOSHIDA in view of IGUCHI to meet this limitation, as shown below.

IGUCHI discloses an auxiliary electrode 305 arranged around the main electrode 304, forming an off-axis capacitive interaction with the sensor surface. IGUCHI, Figs. 26a, 26b, 30:25-29.

FIG. 26a

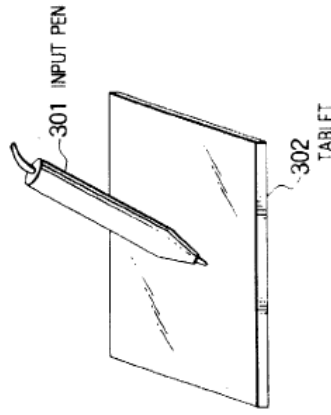
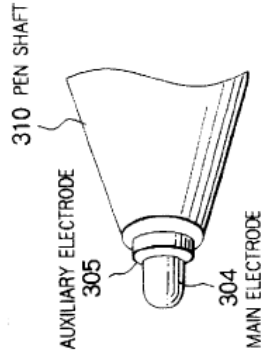


FIG. 26b

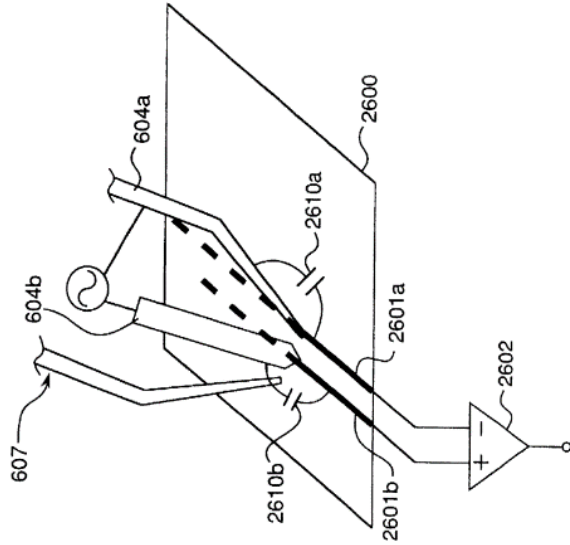


A POSITA would have recognized that positioning an auxiliary electrode around the main electrode, as disclosed in IGUCHI, creates an off-axis capacitive interaction that enhances signal differentiation and enables more precise tilt detection. The arrangement of the auxiliary electrode 305 in IGUCHI demonstrates a well-known approach to improving capacitive input accuracy by detecting changes in electrostatic coupling caused by stylus inclination. Modifying YOSHIDA's stylus to incorporate a second electrode positioned off-axis, as shown in IGUCHI, would have been an obvious design choice for optimizing capacitive sensing capabilities, particularly in applications requiring enhanced angular detection.

Alternatively, one of ordinary skill could modify YOSHIDA in view of IKEDA and IGUCHI to meet this limitation because capacitive input devices frequently

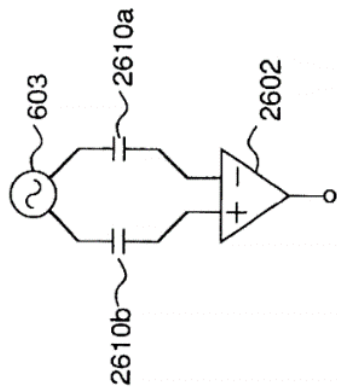
	<p>incorporate multiple electrodes positioned at different locations to improve signal differentiation and tilt detection. YOSHIDA discloses a megaphone-shaped outer electrode positioned off-axis, IKEDA reinforces this design by teaching a ring-shaped detection electrode arranged along the stylus body to enhance angle measurement, and IGUCHI further supports the concept by disclosing an auxiliary electrode surrounding the main electrode, forming an off-axis capacitive interaction. A POSITA would have understood that combining these elements optimizes capacitive stylus operation by improving angular sensitivity and position tracking, making the integration of these references a logical and predictable refinement in capacitive input technology.</p>
<p>1[d] a signal production circuit configured to generate first and second signals that are distinguishable from each other; and</p>	<p>YOSHIDA discloses a signal production circuit that generates first and second signals that are distinguishable from each other. Specifically, YOSHIDA discloses “in a manner as shown in FIG.26, when electrodes 2601a and 2601b provided in an LCD panel 2600 are connected to a differential amplifier 2602 . . .” (YOSHIDA, 26:12-16) and “as shown in FIG, 26, 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.” YOSHIDA, 26:19-26, Fig. 26. Thus, the first and second signals generated using electrodes 604a and 604b are distinguishable from each other.</p>

Fig.26



YOSHIDA further discloses in Figure 27 that the AC power source 603 of the electric field generator connects to the differential amplifier 2602 via capacitors 2610a and 2610b, demonstrating how distinguishable signals are applied to the electrodes in a stylus system. YOSHIDA, Fig. 27, 26:31-35. Specifically, YOSHIDA also discloses “[a]n electric equivalent circuit corresponding to the arrangement of FIG. 26 is shown in FIG. 27” and “[a]s shown in FIG.27, 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”. YOSHIDA, Fig. 27, 26:31-35. These signals interact with the sensor surface in operation, ensuring they are transmitted through conductive pathways and maintaining distinct phase relationships.

Fig.27



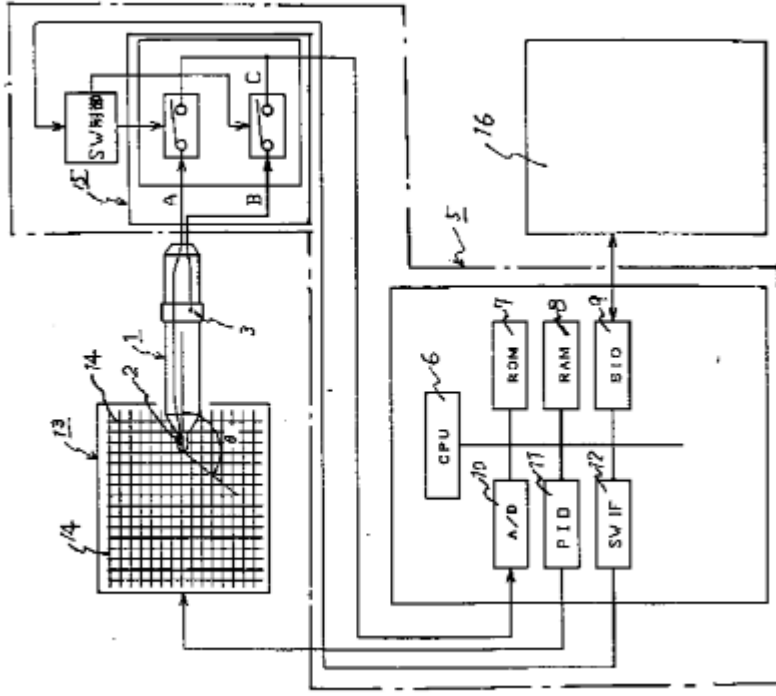
YOSHIDA's Figure 27 presents a schematic diagram of the electronic pen's circuitry, including an AC power source 603 (a signal production circuit) connected to electrodes 604a and 604b as depicted in Fig. 26. The output of the AC power source 603 applied to the outer electrodes 604a and the inner electrode 604b are opposite in phase to each other. The phase of the first signal to the inner electrode 604b is inverted with respect to the phase of the second signal to the outer electrode 604a. The diagram indicates that the power source generates distinguishable signals applied to the electrodes, with annotations suggesting opposite phases or differing frequencies to facilitate signal differentiation. Additionally, YOSHIDA Figure 27 expands on the signal transmission process, illustrating how the signals interact with the sensor surface during operation.

To the extent Plaintiff contends YOSHIDA does not expressly, implicitly, or inherently disclose a signal production circuit generating distinguishable first and second signals, one of ordinary skill in the art would, based on one's knowledge and the disclosure of YOSHIDA, understand how to modify YOSHIDA to meet this limitation.

Alternatively, if further clarification is required regarding signal differentiation beyond phase inversion, one of ordinary skill could modify YOSHIDA in view of IKEDA to meet this limitation, as shown below.

IKEDA describes two detection units for coordinate and angle determination, indicating that its system produces separate signals for positional tracking and angular displacement. IKEDA, Fig. 3, [0008] (“[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 of the coordinate input device . . .”). Additionally, the electrical block diagram (Fig. 3) illustrates how signals are processed: “The main body 5 of the coordinate input device includes a CPU 6 for performing coordinate control, a ROM 7 storing the program for coordinate control, a RAM 8 for storing the detected coordinate data and the reference dimensions O corresponding to the two detection units 2 and 3 of the coordinate detection pen 1” IKEDA, [0009], Fig. 3 (electrical block diagram).

【图3】



IKEDA Fig. 3

IKEDA further discloses that signals from the detection units are used 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 where the coordinate detection pen 1 is located in RAM 8 of the coordinate input device." IKEDA, [0013], Fig. 5.

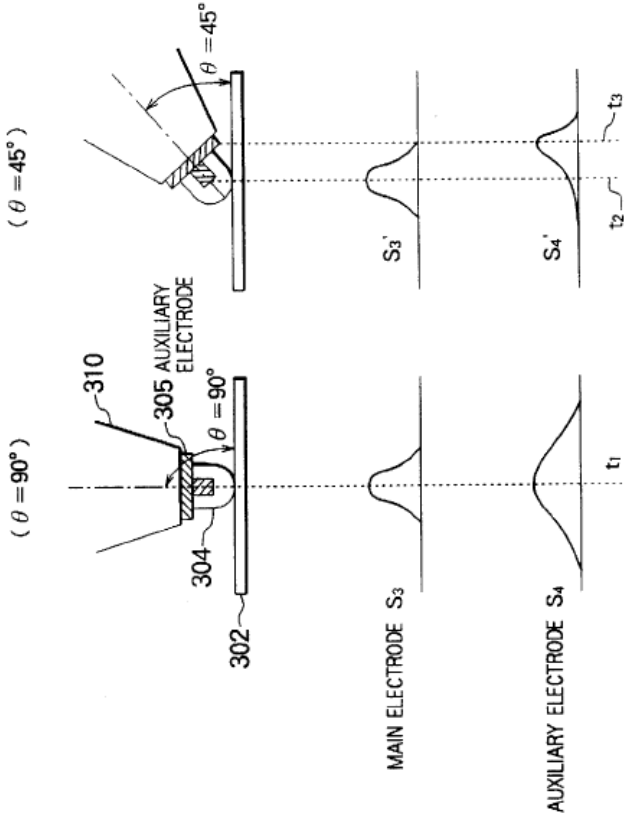
A POSITA would recognize that incorporating IKEDA's detection system into YOSHIDA's stylus configuration would enhance signal processing for both coordinate and angular tracking, further confirming distinguishable signals.

While YOSHIDA discloses an AC power source generating distinguishable signals through differential capacitive coupling, IKEDA further describes multiple detection units that generate separate signals for coordinate and angle determination (*see* 1 [g] *infra*). A POSITA would have been motivated to incorporate IKEDA's signal separation methods into YOSHIDA's stylus system to improve detection accuracy, particularly in distinguishing coordinate position from angular movement.

Alternatively, one of ordinary skill could modify YOSHIDA in view of IGUCHI to meet this limitation, as shown below.

IGUCHI discloses capacitive signal differentiation, where time-differentiated signals from capacitive electrodes encode positional information. IGUCHI, Fig. 29b.

FIG. 29a **FIG. 29b**

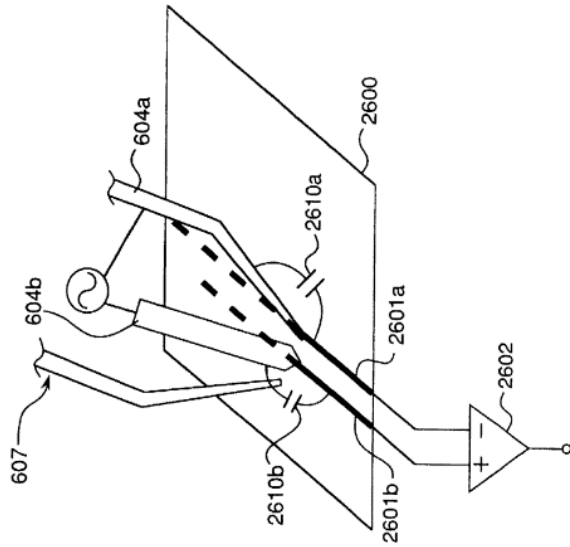


IGUCHI further discloses: “The main electrode 304 covered with resin is arranged at an end tip of the pen shaft 310. The auxiliary electrode 305 is arranged around this main electrode 304.” IGUCHI, 30:25-29. IGUCHI also discloses: “Since the auxiliary electrode is located in a position separated from 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.” IGUCHI, 15:6-12. This confirms that IGUCHI describes a system in which signals from different electrodes are separately detected, supporting the generation of distinguishable signals.

A POSITA would have recognized that capacitive input systems inherently generate and differentiate signals based on electrode positioning and coupling dynamics.

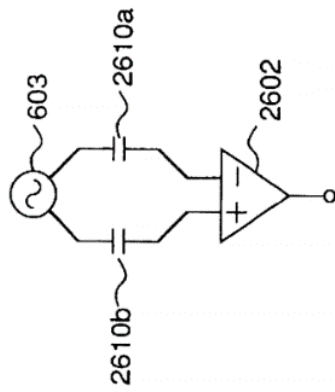
	<p>IGUCHI explicitly discloses time-differentiated capacitive signals that encode positional information, demonstrating a method for distinguishing signals based on temporal variations. IGUCHI, Fig. 29b. By modifying YOSHIDA's signal production circuit to incorporate IGUCHI's time-differentiation techniques, a POSITA would have found it obvious to enhance signal distinguishability for improved stylus input detection. Given that both references address capacitive input devices and signal processing, integrating IGUCHI's time-dependent capacitive variations into YOSHIDA's stylus system would have been a predictable design choice to refine signal resolution and tracking accuracy.</p> <p>Alternatively, one of ordinary skill could modify YOSHIDA in view of IKEDA and IGUCHI to meet this limitation because capacitive input devices frequently employ signal differentiation techniques to improve accuracy in coordinate tracking and angular detection. YOSHIDA discloses a signal production circuit generating distinguishable signals through differential capacitive coupling, IKEDA reinforces this by explicitly describing a system where separate detection units generate independent signals for positional and angular tracking, and IGUCHI further demonstrates capacitive signal differentiation using time-based variations. A POSITA would have recognized that combining these elements enhances the precision of capacitive stylus operation by ensuring that distinct signals are generated and processed for accurate input detection, making the integration of these references an expected and logical design choice.</p>
<p>1 e conductive lines extending between the signal production circuit and the first and second electrodes, respectively,</p>	<p>YOSHIDA discloses conductive lines transmitting signals between AC power source 603 and electrodes 604a, 604b. YOSHIDA, Figs. 26, 27. The signal of the AC power source 603 (the "signal production circuit") is applied to the outer electrodes 604a and the inner electrode 604b (the "first and second electrodes") through conductive lines.</p>

Fig.26



YOSHIDA's Figure 26 illustrates the internal circuit of the pen, where conductive lines extend between the AC power source 603 and the first and second electrodes (604a, 604b). These conductive lines serve as the transmission medium for signals from the power source to the electrodes, ensuring proper operation of the capacitive coupling mechanism. See also Fig. 27:

Fig.27



To the extent Plaintiff contends YOSHIDA does not expressly, implicitly, or inherently disclose conductive lines extending between a signal production circuit and electrodes, one of ordinary skill in the art would, based on one's knowledge and the disclosure of YOSHIDA, understand how to modify YOSHIDA to meet this limitation.

Alternatively, one of ordinary skill could modify YOSHIDA in view of IKEDA to meet this limitation, as shown below.

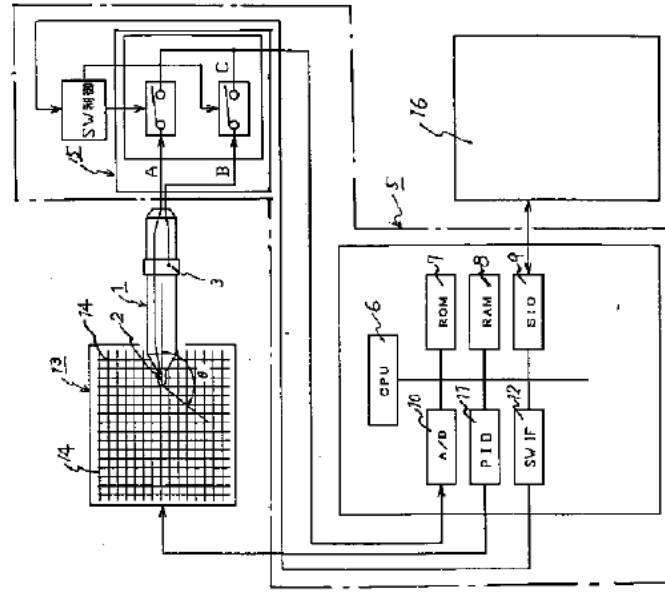
IKEDA discloses capacitive stylus systems where conductive pathways connect signal production circuits to electrodes. Specifically, IKEDA discloses: “[C]oordinate detection is performed using the two detection units 2 and 3, and the coordinate data detected via electrostatic capacitance coupling with the tablet's electrodes . . . is applied to the main body 5 of the coordinate input device through a cable 4 connected to the coordinate detection pen 1.” IKEDA, [0008], Fig. 3.

Further, IKEDA discloses, “The main body 5 of the coordinate input device includes a CPU 6 for performing coordinate control, a ROM 7 storing the program for coordinate control, a RAM 8 for storing the detected coordinate data and the reference dimensions 0 corresponding to the two detection units 2 and 3 of the

coordinate detection pen 1” IKEDA, [0009], Fig. 3. This confirms that IKEDA discloses a signal transmission structure using conductive connections from a detection unit to an external system.

Additionally, IKEDA Figure 3 discloses an electrical block diagram showing the signal paths and interconnections of the stylus system, reinforcing that conductive pathways are used to transfer signals from the detection pen to processing electronics. IKEDA, Fig. 3.

【 图 3 】



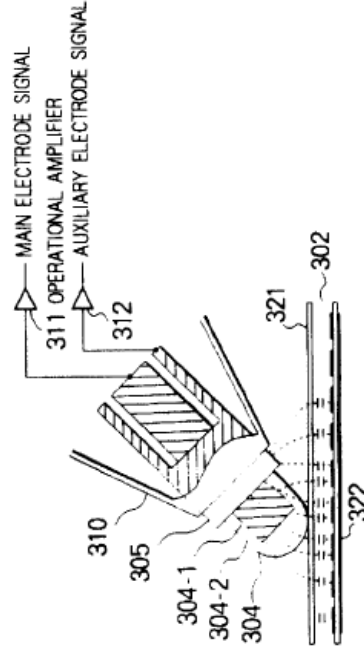
A POSITA would have understood that capacitive stylus systems commonly include conductive pathways to transmit signals between a signal production circuit and detection electrodes. IKEDA explicitly describes a structure where capacitive signals

detected at the stylus tip are transmitted via conductive lines to a processing unit, confirming that such configurations were well known in the field. By incorporating IKEDA's explicit disclosure of conductive connections into YOSHIDA's stylus system, a POSITA would have found it obvious to enhance signal integrity and processing efficiency. Given that both references address capacitive input devices and their signal transmission mechanisms, integrating IKEDA's structured conductive pathways into YOSHIDA's system would have been a predictable and straightforward design choice to improve the reliability and accuracy of signal propagation in capacitive stylus-based input devices.

Alternatively, one of ordinary skill could modify YOSHIDA in view of IGUCHI to meet this limitation, as shown below.

IGUCHI discloses conductive connections between the main and auxiliary electrodes and associated circuits. Specifically, IGUCHI discloses: "Since 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." IGUCHI, 15:6-12. Further, IGUCHI's Figure 27c shows the arrangement of electrodes and connections, supporting that the capacitive signals are transmitted through conductive pathways. IGUCHI, 31:5-11, Fig. 27c.

FIG. 27c



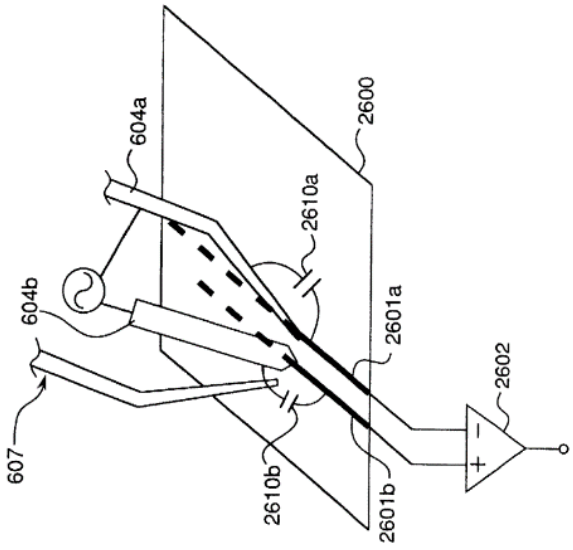
Additionally, IGUCHI discloses: "[T]he main electrode 304 covered with resin is arranged at an end tip of the pen shaft 310" and "[t]he auxiliary electrode 305 is

	<p>arranged around this main electrode 304.” IGUCHI, 30:25-29. This demonstrates the structured connectivity within IGUCHI’s capacitive stylus system.</p> <p>A POSITA would have recognized that capacitive stylus systems inherently require conductive pathways to transmit signals between multiple electrodes and a processing circuit. IGUCHI explicitly discloses a structured configuration where the main and auxiliary electrodes are positioned separately and interact with the sensor surface through capacitive coupling, confirming the presence of distinct signal transmission paths. IGUCHI further describes how capacitive signals are detected independently at different electrode locations, demonstrating that conductive connections are necessary for accurate position and inclination tracking. Incorporating IGUCHI’s disclosure of structured conductive pathways into YOSHIDA’s stylus system would have been a predictable and straightforward modification, as capacitive input devices commonly employ multiple electrodes connected through conductive lines to facilitate signal transmission. A POSITA would have understood that integrating IGUCHI’s signal transmission structure into YOSHIDA’s system would enhance the accuracy of capacitive detection by ensuring reliable signal propagation between the electrodes and the processing circuitry.</p> <p>Alternatively, one of ordinary skill could modify YOSHIDA in view of IKEDA and IGUCHI to meet this limitation because YOSHIDA discloses conductive pathways within a capacitive stylus system, IKEDA reinforces this by explicitly describing capacitive coupling with a detection unit that transmits coordinate and angle data via a conductive connection, and IGUCHI confirms capacitive transmission through separated electrodes interacting with a tablet surface. The integration of these references reflects well-known engineering principles for capacitive styluses and would have been an obvious design choice for a POSITA. A POSITA would have found it obvious to integrate these references to form a well-known capacitive stylus system where conductive lines reliably transmit signals from a signal production circuit to capacitive electrodes, ensuring accurate positional and angular detection.</p>
<p>11f) wherein the first and second signals generated by the signal production circuit, in</p>	<p>YOSHIDA discloses capacitive coupling between electrodes 604a, 604b and the LCD panel electrodes 2601a, 2601b. YOSHIDA, Fig.26, 27:5-7. The outer</p>

operation, are transmitted to the first and second electrodes via the conductive lines;

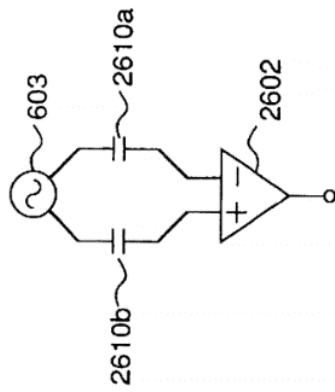
electrodes 604a and the inner electrode 604b are coupled with the electrodes 2601a and 2601b of the LCD panel 2600 via capacitors 2610a and 2610b.

Fig.26



See also Fig. 27:

Fig.27



YOSHIDA also discloses “[i]n the experiment shown in FIG. 7, a potential difference across a pair of adjoining segment electrodes 202 was detected . . . a y-coordinate value of the electrodes 604a and 604b of the electric field generator 607 can be obtained . . .” YOSHIDA, 27:5-16. YOSHIDA also discloses “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 of the bottom portion of each double-humped output obtained, the coordinates of the bottom portion correspond to the coordinates of the position in which the electrodes 604a and 604b are located. Therefore 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”. YOSHIDA, 27:17-25. YOSHIDA further discloses that the electrodes 202 of LCD panel 200 can detect the coordinates (x, y) of the position in which the electrodes 604a and 604b are located.

To the extent Plaintiff contends YOSHIDA does not expressly, implicitly, or inherently disclose that the first and second signals are transmitted via conductive lines to the first and second electrodes, one of ordinary skill in the art would, based on one’s knowledge and the disclosure of YOSHIDA, understand how to modify YOSHIDA to meet this limitation.

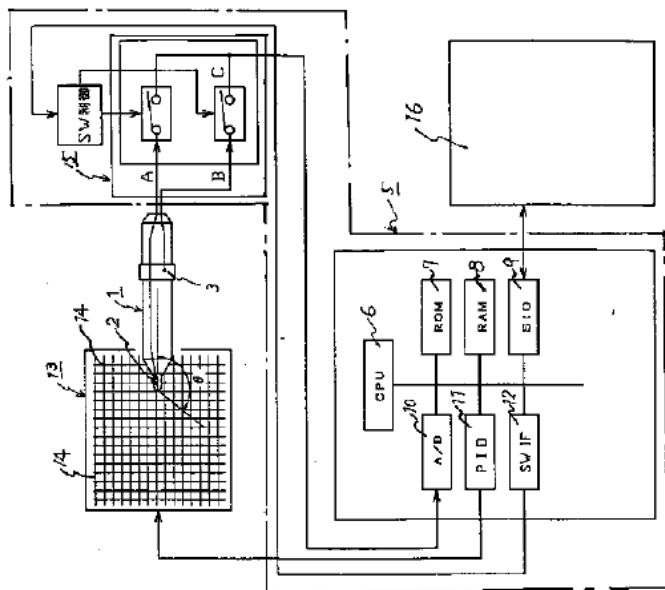
Alternatively, one of ordinary skill could modify YOSHIDA in view of IKEDA to meet this limitation, as shown below.

IKEDA describes a coordinate detection pen where signals are transmitted to multiple detection electrodes via circuit pathways. Specifically, IKEDA discloses: “[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 of the coordinate input device through a cable 4 connected to the coordinate detection pen 1.” IKEDA, [0008], Fig. 3.

Further, IKEDA describes a structure where coordinate detection is performed by multiple detection units, connected to circuit pathways that process and transmit signals: “The main body 5 of the coordinate input device includes a CPU 6 for performing coordinate control, a ROM 7 storing the program for coordinate control, a RAM 8 for storing the detected coordinate data and the reference dimensions O corresponding to the two detection units 2 and 3 of the coordinate detection pen 1” IKEDA, [0009], Fig. 3. This indicates an organized system of conductive pathways that allow for the transmission of capacitive detection signals.

Additionally, IKEDA Figure 3 presents an electrical block diagram detailing the connections of signal paths between the capacitive detection units and signal processing circuits, reinforcing that conductive pathways transmit signals between the signal production circuit and detection electrodes. IKEDA, Fig. 3.

【 図 3 】



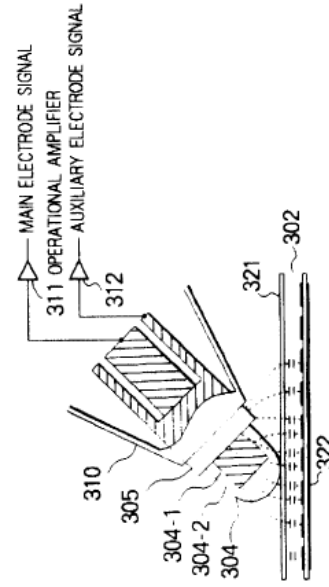
A POSITA would have understood that capacitive input devices commonly employ structured signal transmission pathways to ensure accurate detection and processing of positional and angular data. IKEDA explicitly discloses a coordinate detection pen where signals are transmitted to multiple detection electrodes via circuit pathways, reinforcing the necessity of conductive lines between a signal production circuit and detection electrodes. Given YOSHIDA's disclosure of capacitive coupling between electrodes and the sensor surface, integrating IKEDA's structured signal transmission design would have been a predictable and routine modification. A POSITA would recognize that applying IKEDA's transmission structure to YOSHIDA's system would improve signal accuracy and enable better detection of capacitive interactions at multiple electrode points. The combination of YOSHIDA's

capacitive system with IKEDA's circuit pathways would have been an obvious design choice to enhance the reliability and efficiency of stylus-based input technology.

Alternatively, one of ordinary skill could modify YOSHIDA in view of IGUCHI to meet this limitation, as shown below.

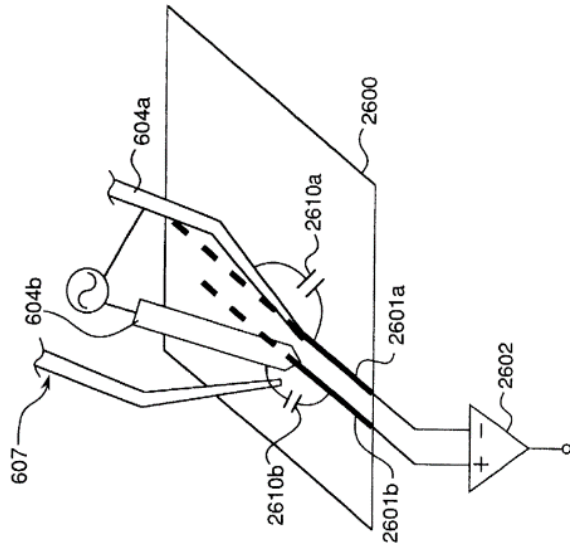
IGUCHI discloses time-differentiated signals traveling through capacitive pathways, demonstrating that signal transmission via conductive lines is an inherent feature. Specifically, IGUCHI states: "[A] time difference is caused between timing t2 of a peak of an output signal S3' provided by the main electrode and timing t3 of a peak of an output signal S4' provided by the auxiliary electrode." IGUCHI, Fig. 29b, 31:37-41. Further, IGUCHI discloses that capacitive signals are detected by electrodes positioned at different locations, confirming the presence of transmission paths: "Since 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." IGUCHI, 15:6-9. Additionally, IGUCHI Figure 27c provides a schematic representation of capacitive signal transmission paths, demonstrating how signals generated at different electrode locations travel through conductive pathways before interacting with the sensor surface. IGUCHI, Fig. 27c, 31:5-11.

FIG. 27c



	<p>A POSITA would recognize that capacitive stylus systems inherently require structured signal transmission to ensure accurate detection of positional and angular displacement. IGUCHI discloses that capacitive signals are detected by electrodes positioned at different locations and transmitted through conductive pathways, demonstrating that signal differentiation and transmission via conductive lines are essential components of capacitive stylus operation. Given YOSHIDA's disclosure of capacitive signal generation and transmission, a POSITA would have found it obvious to incorporate IGUCHI's structured signal transmission methods to enhance the detection of time-differentiated capacitive signals. By integrating IGUCHI's time-differentiated capacitive signal transmission into YOSHIDA's capacitive stylus framework, a POSITA would recognize the predictable advantage of improved tilt detection and signal resolution, making this combination an expected and beneficial modification.</p> <p>Alternatively, one of ordinary skill could modify YOSHIDA in view of IKEDA and IGUCHI to meet this limitation because: (1) YOSHIDA discloses a capacitive stylus system where signals are transmitted through conductive pathways to first and second electrodes; (2) IKEDA reinforces this by explicitly describing a coordinate detection pen where signals are sent via circuit pathways to multiple capacitive detection units for processing; and (3) IGUCHI confirms capacitive signal differentiation and transmission, demonstrating that signals travel through separate pathways and are distinguishable based on time offsets, further validating that transmission via conductive lines is inherent in such capacitive systems. A POSITA would have found it obvious to integrate these references to form a capacitive stylus system where multiple detection units, connected via conductive pathways, reliably transmit signals from a signal production circuit to capacitive electrodes.</p>
<p>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.</p>	<p>YOSHIDA discloses a capacitive stylus system where multiple electrodes 604a, 604b interact with a sensor surface to generate detection signals. Specifically, YOSHIDA explains that an electric field is generated from the stylus electrodes and capacitively coupled with the sensor surface to provide positional data. YOSHIDA, Fig. 26, 27:13-25.</p>

Fig.26



To the extent Plaintiff contends YOSHIDA does not expressly, implicitly, or inherently disclose that the first and second electrodes form first and second capacitive relationships with the sensor surface to generate detection signals for angle detection, one of ordinary skill in the art would, based on one's knowledge and the disclosure of YOSHIDA, understand how to modify YOSHIDA to meet this limitation.

Alternatively, one of ordinary skill could modify YOSHIDA in view of IKEDA to meet this limitation, as shown below.

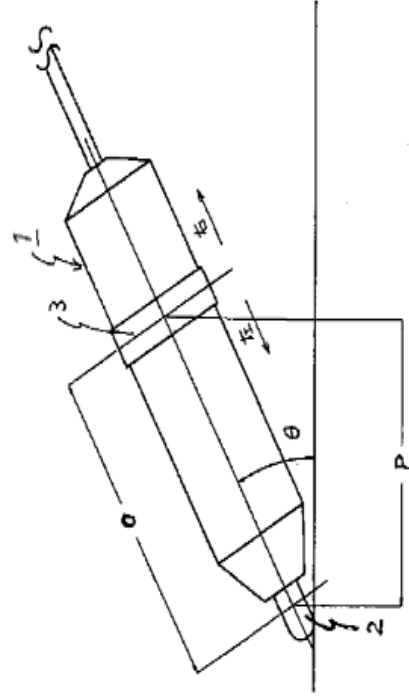
IKEDA discloses a capacitive stylus that detects tilt angle using multiple electrodes positioned along the stylus body. Specifically, IKEDA states: "A coordinate detection electrode (first detection unit) is positioned at the tip of the coordinate detection pen, and a ring-shaped coordinate detection electrode (second detection

unit) for angle reading is placed on the body of the coordinate detection pen.” IKEDA, [0006], Fig. 5 (illustrating angle detection using capacitive coupling).

Additionally, IKEDA discloses how these electrodes form capacitive relationships that allow tilt detection: “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 where the coordinate detection pen 1 is located in RAM 8 of the coordinate input device.” IKEDA, [0013], Fig. 5.

Further, IKEDA confirms that capacitive stylus systems inherently generate multiple capacitive relationships for tilt detection: “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.” IKEDA, [0015], Fig. 5.

【圖5】



IKEDA Fig. 5

Figure 5 of IKEDA discloses how the first detection unit is positioned at the pen tip, and the second detection unit is ring-shaped and positioned along the pen body, allowing the system to measure tilt by analyzing changes in capacitive coupling at different locations along the pen axis.

A POSITA would have recognized that capacitive stylus systems inherently generate multiple capacitive relationships between electrodes and the sensor surface due to the positioning of different conductive elements in the pen body. IKEDA explicitly teaches that these capacitive relationships can be used to determine the inclination of a pen. A POSITA would have been motivated to integrate IKEDA's explicit tilt detection technique with YOSHIDA's capacitive stylus system to enhance its ability to track angular displacement in addition to basic coordinate position.

Alternatively, one of ordinary skill could modify YOSHIDA in view of IGUCHI to meet this limitation, as shown below.

IGUCHI discloses an apparatus for inputting coordinates. As shown in FIG. 26a and FIG. 26b, "[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". IGUCHI, 30:25-29, FIG. 26a & 26b.

FIG. 26a

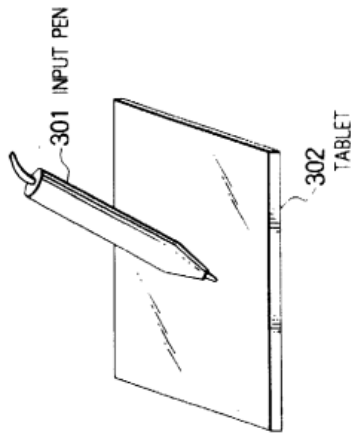
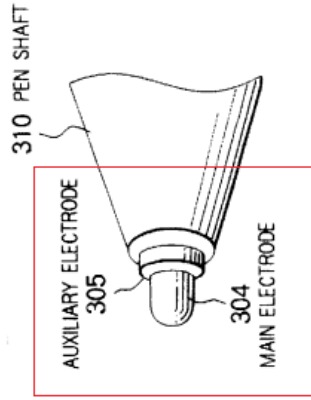
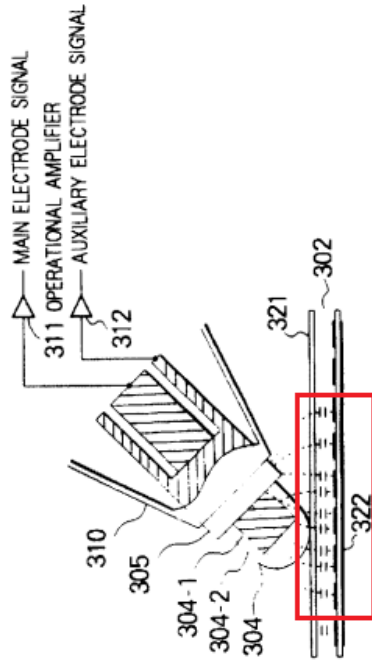


FIG. 26b



IGUCHI also discloses how capacitive signals interact to determine pen inclination: “No shape of the electrostatic capacity is formed with right and left symmetry with respect to the main electrode. This is because no peak of the electrostatic capacity provided by the main electrode 304 is in conformity with a peak of the electrostatic capacity provided by the auxiliary electrode 305 by inclining the pen shaft.”

FIG. 27c

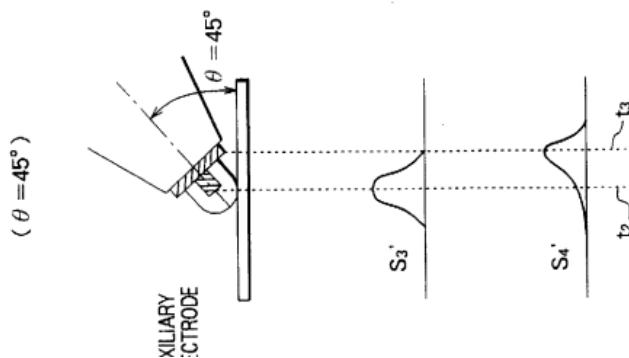


IGUCHI's Figure 27c presents an analysis of how capacitive relationships between multiple electrodes on a pen allow for angle detection. The capacitive signals generated by the electrodes interact with the sensor surface, producing detection signals that reveal tilt and angular movement of the pen. As shown in Figure 27c, variations in detected capacitance between electrodes allow for the calculation of angular displacement, supporting the claim that the generated detection signals provide angle information.

IGUCHI also discloses "[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". IGUCHI, 15: 6-12. A POSITA would have understood or found obvious that the "inclination data of the pen shaft" is corresponding to the "angle information of the pen-shaped position indicator" in 1[g], and the "the difference between timing signals caused by a difference between these coordinates" is corresponding to the "detection signals in the sensor surface" in 1[g]. See *also* IGUCHI 31:26-44. The limitation "to generate detection signals in the sensor surface based on which angle information of the pen-shaped position indicator is obtainable" in 1[g] has been disclosed by IGUCHI.

IGUCHI further supports the detectability of angular displacement by describing how time-differentiated signals from capacitive electrodes encode tilt information. IGUCHI, Fig. 29b, 31:47-50. Specifically, IGUCHI discloses “a time difference is caused between timing t_2 of a peak of an output signal S_3' provided by the main electrode and timing t_3 of a peak of an output signal S_4' provided by the auxiliary electrode.” IGUCHI, IGUCHI, 31:37-41, Fig. 29b.

FIG. 29b



In Figure 29b of IGUCHI, the output signals S_3' and S_4' from the main and auxiliary electrodes are plotted over time. 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. The figure presents a waveform diagram illustrating the time difference between output

signals S3' and S4'. The figure visually demonstrates how these signals shift over time, supporting the argument that signals from different electrodes have a detectable phase difference. This timing offset allows for accurate angular detection of the pen's tilt relative to the sensor surface.

A POSITA would have recognized that capacitive stylus systems inherently generate multiple capacitive relationships between electrodes and the sensor surface, leading to signal variations that can be used for angle detection. IGUCHI discloses that the main and auxiliary electrodes form distinct capacitive relationships with the sensor surface, and their interactions can be used to determine the pen's inclination. Given YOSHIDA's disclosure of capacitive signals from multiple electrodes, a POSITA would have found it obvious to incorporate IGUCHI's approach to capacitive signal differentiation for tilt measurement. The combination of YOSHIDA's capacitive stylus system with IGUCHI's time-differentiated signal processing would have been a predictable enhancement, allowing for precise detection of angular displacement based on variations in capacitive interactions.

Alternatively, one of ordinary skill could modify YOSHIDA in view of IKEDA and IGUCHI to meet this limitation because: (1) YOSHIDA discloses a multi-electrode capacitive stylus system where signals are detected at different locations along the pen; (2) IKEDA explicitly describes a system where a second capacitive electrode enables tilt detection by forming a capacitive relationship distinct from the first electrode; and (3) IGUCHI demonstrates that capacitive signal differentiation over time allows for precise angular measurement by analyzing variations in detected capacitance between electrodes. A POSITA would have found it obvious to integrate these references, as capacitive stylus systems commonly employ multiple electrodes and time-differentiated signals to enhance detection accuracy for tilt and angular movement.

Claim 2

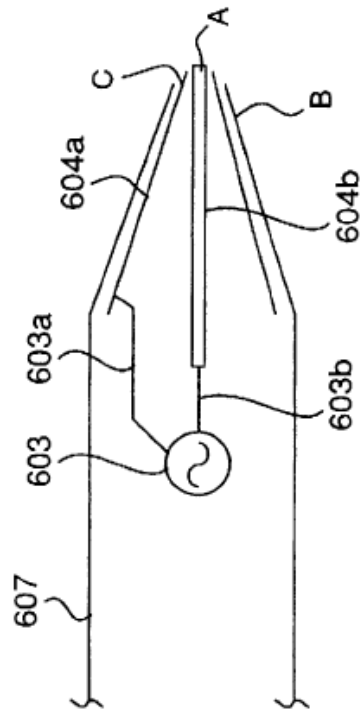
The pen-shaped position indicator according to claim 1, wherein the first and second electrodes are arranged at the first and second positions that are different along the axis of the pen-shaped position indicator.

Disclosure

See *supra* regarding Claim 1.

YOSHIDA discloses a megaphone-shaped outer electrode 604a positioned differently from the first electrode and off-axis. YOSHIDA, Fig.6A.

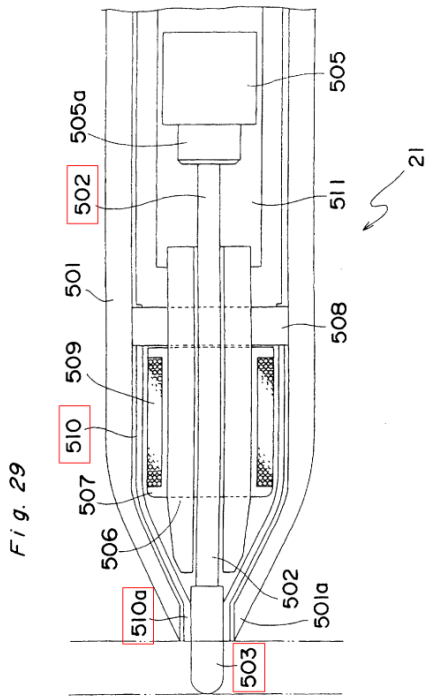
Fig.6A



Referring to Fig.6A of YOSHIDA, a megaphone-shaped outer electrode 604a is also arranged at the pen-tip portion of the pen-shaped electric field generator 607, and the second position of the outer electrode 604a is different from the first position of the inner electrode 604b.

Fig. 6A also shows that the position of the outer electrode 604a is off an axis of the pen-shaped position indicator. This arrangement is evident in this cross-sectional depiction, where the outer electrode surrounds the inner electrode asymmetrically, contributing to the detection of tilt or angle when interacting with the sensor surface.

YOSHIDA also discloses rod-shaped inner electrode 502 and outer electrode 510 are arranged at the first and second positions that are different along the axis of the pen 21. YOSHIDA, Fig.29.



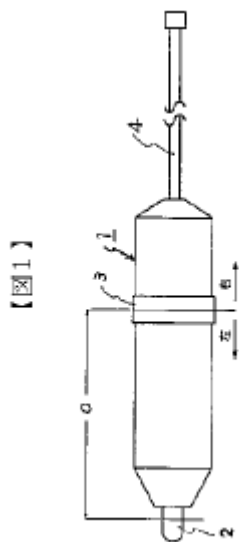
YOSHIDA's Figure 29 provides a detailed view of the pen's internal structure, showing inner electrode 502 and outer electrode 510 positioned at different locations along the pen's longitudinal axis. This longitudinal section highlights the spatial separation between the electrodes, which is crucial for detecting different capacitive interactions along the pen's length.

To the extent Plaintiff contends YOSHIDA does not expressly, implicitly, or inherently disclose that the first and second electrodes are positioned at different locations along the axis of the pen-shaped position indicator, one of ordinary skill in the art would, based on one's knowledge and the disclosure of YOSHIDA, understand how to modify YOSHIDA to meet this limitation.

Alternatively, one of ordinary skill could modify YOSHIDA in view of IKEDA to meet this limitation, as shown below.

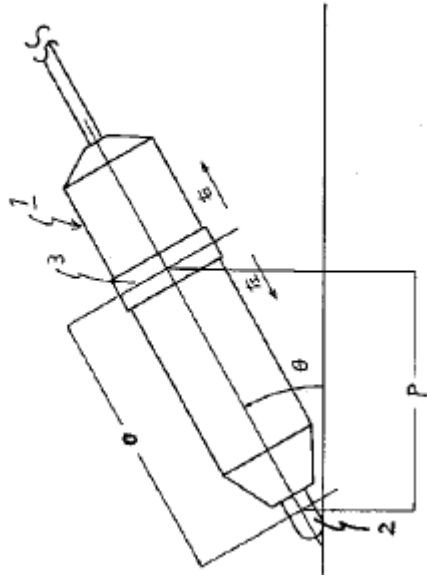
IKEDA discloses that the first electrode (on the pen tip) and the second electrode (on the pen body) are at different positions along the axis of the coordinate

detection pen: "In this invention, the operator can control coordinate detection without considering the angle of the coordinate detection pen. To achieve this, 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." IKEDA, [0006], Figs. 1, 5.



IKEDA Fig. 1

【图5】



IKEDA Fig. 5

Figures 1 and 5 of IKEDA disclose a coordinate detection pen with multiple detection electrodes positioned at different locations along the stylus axis, confirming a design where electrodes are spaced along the longitudinal direction of the pen body.

A POSITA would have found it obvious to integrate IKEDA's disclosure of longitudinally separated electrodes with YOSHIDA's capacitive stylus system because multi-electrode capacitive input devices commonly employ this configuration for enhanced position detection and angular tracking.

Claim 5

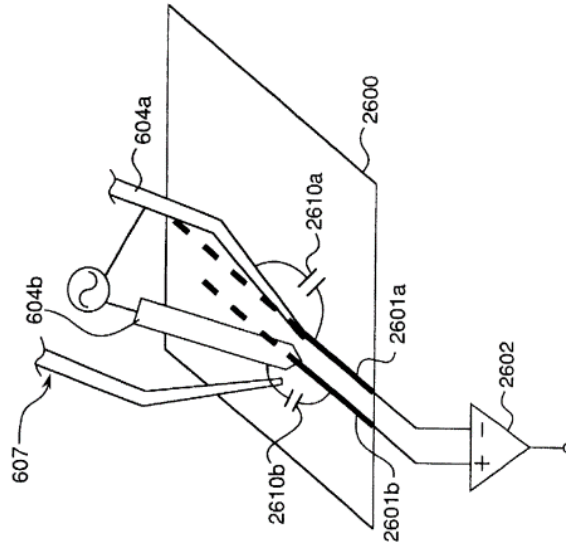
The pen-shaped position indicator according to claim 1, wherein the angle information is a tilt angle of the pen-shaped position indicator relative to the sensor surface.

Disclosure

See *supra* regarding Claim 1.

YOSHIDA discloses a capacitive stylus system where multiple electrodes interact with a sensor surface to generate detection signals. YOSHIDA, Fig. 26, 27:13-25.

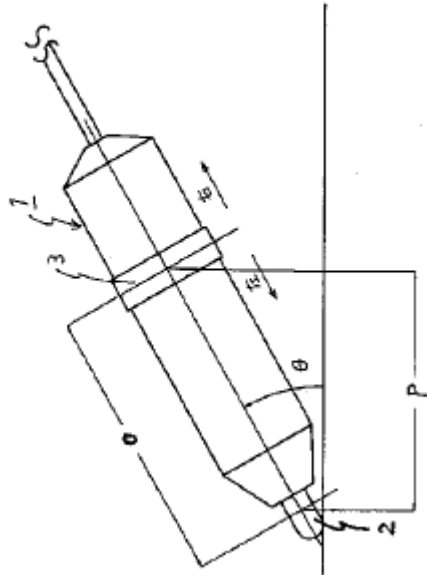
Fig.26



One of ordinary skill could modify YOSHIDA in view of IKEDA to meet this limitation, as shown below.

IKEDA discloses a coordinate detection pen that measures the inclination angle 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.” IKEDA, [0015], Fig. 5 (shows pen angle detection).

【图5】



IKEDA Fig. 5

IKEDA's system includes a first detection unit at the pen tip and a second, ring-shaped detection unit on the pen body, allowing capacitive measurements at different positions to determine the pen's tilt angle relative to the surface.

A POSITA would have recognized that capacitive stylus systems commonly rely on signal variations to detect angular displacement, as demonstrated by IGUCHI's explicit disclosure of time-differentiated capacitive signals. IGUCHI illustrates how a measurable time difference between signals from the main and auxiliary electrodes can be used to determine stylus tilt, reinforcing that signal differentiation is a predictable and well-understood method for tracking angular movement. Given that YOSHIDA already discloses a capacitive stylus system, a POSITA would have found it obvious to incorporate IGUCHI's signal timing differentiation to improve tilt accuracy. The integration of IGUCHI's capacitive timing-based approach into YOSHIDA's system would have been an expected design choice to enhance stylus input precision, as using time-based capacitive variations to determine angle

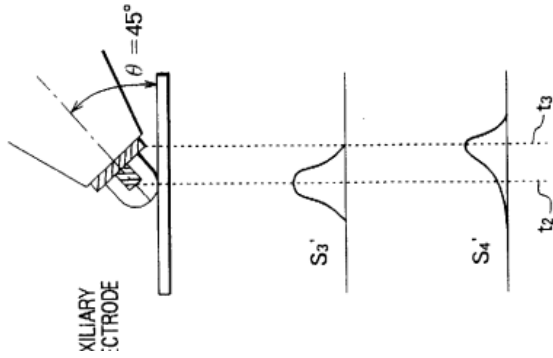
information was a well-known and established principle in capacitive sensing technology.

Alternatively, one of ordinary skill could modify YOSHIDA in view of IGUCHI to meet this limitation, as shown below.

IGUCHI discloses tilt detection by describing how capacitive signal variations can be used to measure angular displacement over time. IGUCHI, 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.” IGUCHI, 31:37-41, Fig. 29b.

FIG. 29b

($\theta = 45^\circ$)

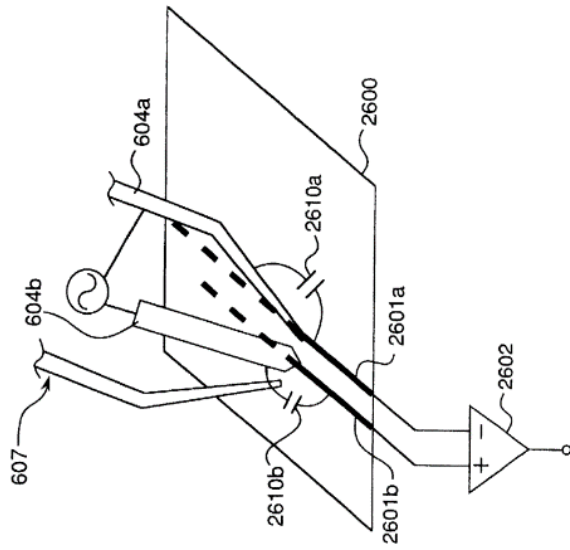


A POSITA would have recognized that capacitive stylus systems inherently produce variations in signal timing due to changes in electrode positioning and tilt, making IGUCHI's time-differentiated signal detection method a natural and predictable enhancement to YOSHIDA's capacitive stylus system. IGUCHI explicitly discloses that a measurable time difference between signals from the main and auxiliary electrodes allows for accurate detection of angular displacement. Given that YOSHIDA already provides a capacitive stylus framework, a POSITA would have found it obvious to incorporate IGUCHI's signal differentiation approach to enhance tilt detection precision. Modifying YOSHIDA's system in view of IGUCHI would have been a straightforward application of known capacitive signal processing techniques, reinforcing that

	<p>detecting tilt through capacitive signal variations was a well-established and expected design choice in the field.</p> <p>Alternatively, one of ordinary skill could modify YOSHIDA in view of IKEDA and IGUCHI to meet this limitation by combining YOSHIDA's capacitive stylus foundation, IKEDA's explicit tilt detection method using multiple electrodes, and IGUCHI's capacitive signal timing differentiation, reinforcing that capacitive tilt measurement was well understood by a POSITA. A POSITA would have been motivated to combine YOSHIDA's capacitive stylus system with IKEDA's explicit tilt detection method, as both use capacitive coupling to measure positional changes. Given the known problem of accurately detecting pen tilt in digitizing tablets, integrating IGUCHI's time-differentiated capacitive signal method would have been a logical improvement.</p>
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<p>Claim 8 The pen-shaped position indicator according to claim 1, wherein the first and second signals are of the same type but have a time difference from each other.</p>	<p>Disclosure <i>See supra</i> regarding Claim 1.</p> <p>YOSHIDA discloses a capacitive pen system where multiple electrodes interact with a sensor surface to generate distinct signals. YOSHIDA, Fig. 26, 27:13-25. The AC power source in YOSHIDA supplies different phase signals to separate electrodes, aligning with IGUCHI's disclosure of phase-differentiated capacitive signals.</p>
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Fig.26

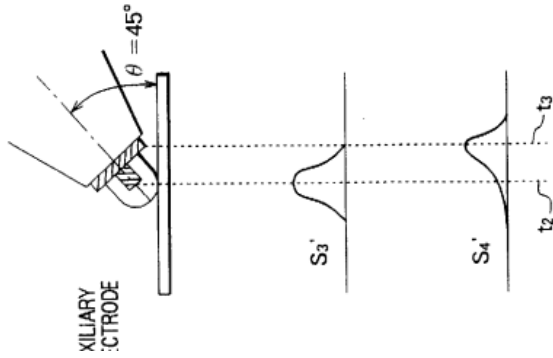


One of ordinary skill could modify YOSHIDA in view of IGUCHI to meet this limitation, as shown below.

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. Specifically, IGUCHI discloses “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.” IGUCHI, 31:37-41, Fig. 29b.

FIG. 29b

($\theta = 45^\circ$)

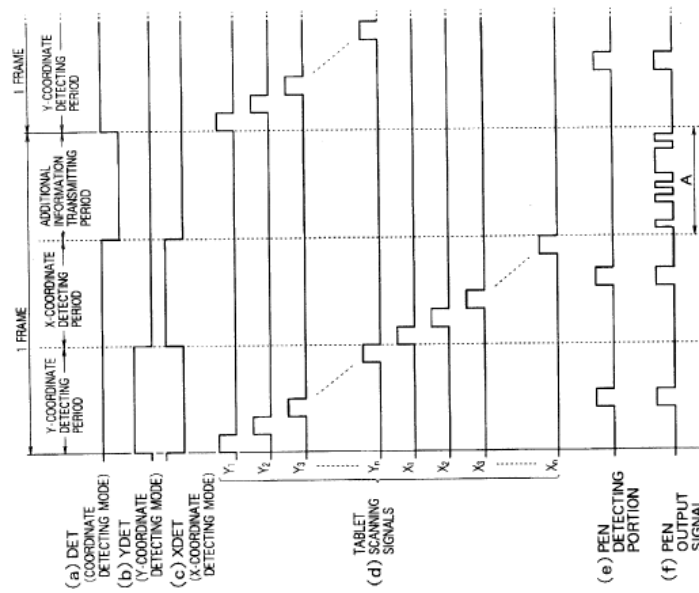


In Figure 29b of IGUCHI, the output signals $S_{3'}$ and $S_{4'}$ from the main and auxiliary electrodes are plotted over time. The graph demonstrates that while both signals are of the same type (e.g., voltage signals), there is a measurable time difference between them, which is utilized to determine the pen's tilt or angle. The figure presents a waveform diagram illustrating the time difference between output signals $S_{3'}$ and $S_{4'}$. The figure visually demonstrates how these signals shift over time, supporting the argument that signals from different electrodes have a detectable phase difference. This timing offset allows for accurate angular detection of the pen's tilt relative to the sensor surface.

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 also discloses that: “[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 X1 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.” IGUCHI, 32:64-67, 33:1, 33:8-16, Fig. 31.

FIG. 31



A POSITA would also have recognized or found obvious 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. IGUCHI, 13:6-12, 31:26-44. IGUCHI explicitly discloses that a time difference exists between signals detected from different electrodes positioned at separate locations along the stylus body. IGUCHI, Fig. 29b, 31:37-41. 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. 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. 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.

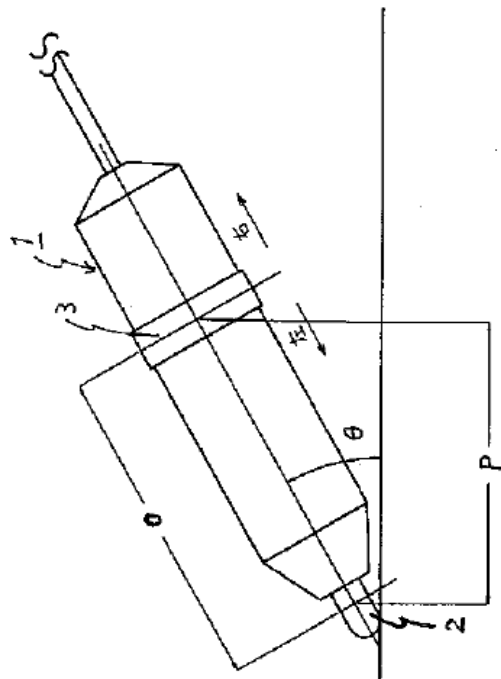
Alternatively, one of ordinary skill could modify YOSHIDA in view of IKEDA to meet this limitation, as shown below.

IKEDA discloses the concept of multiple capacitive detection units transmitting independent signals that vary based on position and tilt: "The 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 through a cable 4 connected to the coordinate detection pen 1." IKEDA, [0008], Fig. 3. This disclosure reinforces that capacitive signal processing inherently involves timing differences. The signals from these detection units also inherently vary due to differences in their capacitive coupling relationships with the sensor surface.

IKEDA further confirms that these signals are processed separately to determine position and tilt: "The main body 5 of the coordinate input device includes a CPU 6 for performing coordinate control, a ROM 7 storing the program for coordinate control, a RAM 8 for storing the detected coordinate data and the reference

the dimensions between the detection unit for coordinate detection and the detection unit for angle detection, storing the angle dimension P where the coordinate detection pen 1 is located in RAM 8 of the coordinate input device.” IKEDA, [0013], Fig. 5.

【图5】



IKEDA, Fig. 5.

Given the teachings of IKEDA on capacitive tilt detection, a POSITA would recognize that the signals from different capacitive detection points in a stylus system could inherently have time shifts due to variations in capacitive coupling as the pen moves.

A POSITA would have understood that capacitive stylus systems inherently produce time-differentiated signals due to differences in electrode placement and coupling strength across the stylus body. IKEDA explicitly discloses a stylus

system with multiple capacitive detection electrodes that generate distinct signals for coordinate and angle detection. IKEDA, Fig. 3. Given YOSHIDA's disclosure of a capacitive stylus generating multiple signals from its electrodes, a POSITA would have found it obvious to integrate IKEDA's capacitive detection structure into YOSHIDA's system to refine signal separation and enhance input accuracy. The use of multiple detection units in IKEDA inherently results in distinct signal timing variations, reinforcing that capacitive styluses naturally produce time-differentiated signals during operation. Modifying YOSHIDA's system in view of IKEDA to incorporate multiple capacitive electrodes and generate time-differentiated signals would have been an expected and predictable enhancement, following well-known design practices in capacitive input technology.

Alternatively, one of ordinary skill could modify YOSHIDA in view of IKEDA and IGUCHI to meet this limitation because YOSHIDA's capacitive input system, IKEDA's multiple detection electrodes, and IGUCHI's explicit timing-based capacitive signals demonstrate that time-differentiated signals are an inherent feature of capacitive stylus operation. A POSITA would recognize that capacitive stylus systems inherently produce phase and timing variations due to capacitive coupling dynamics. Given IGUCHI's explicit disclosure of a time offset between signals, a POSITA would have found it obvious to incorporate IGUCHI's timing-based differentiation into YOSHIDA's stylus framework to enhance angular accuracy. Furthermore, IKEDA confirms that multiple capacitive detection units generate distinct signals based on position and angle, reinforcing that capacitive stylus systems naturally produce time-differentiated signals without requiring additional hardware modifications.

Thus, the combination of YOSHIDA, IGUCHI, and IKEDA renders Claim 8 obvious, as the prior art collectively teaches a capacitive stylus system in which multiple electrodes generate signals of the same type but with a measurable time difference to enable tilt detection.

Claim 14

14[pre] A method of detecting angle information of a pen-shaped position indicator, the method comprising:

Disclosure

YOSHIDA discloses a pen-shaped electronic pen 21, which interacts with a sensor surface through electrostatic capacitive coupling. YOSHIDA, Figs. 1 and 2, 19:66-67, 20:1 (“the electric field generator 102 shown in FIG. 1 is incorporated in a pen-shaped electronic pen 21”). YOSHIDA also discloses that “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.” YOSHIDA, 14:62-67.

Fig. 1

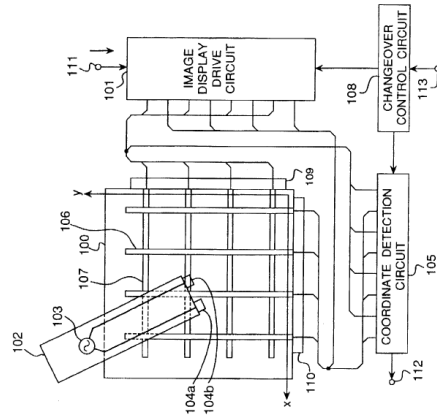
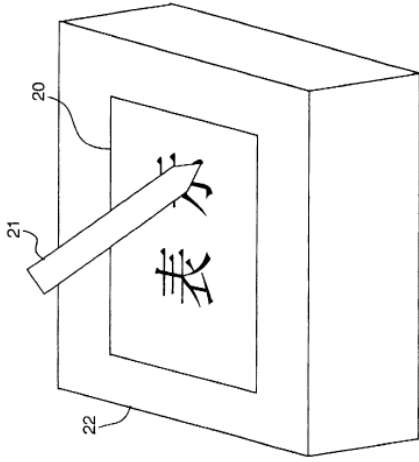


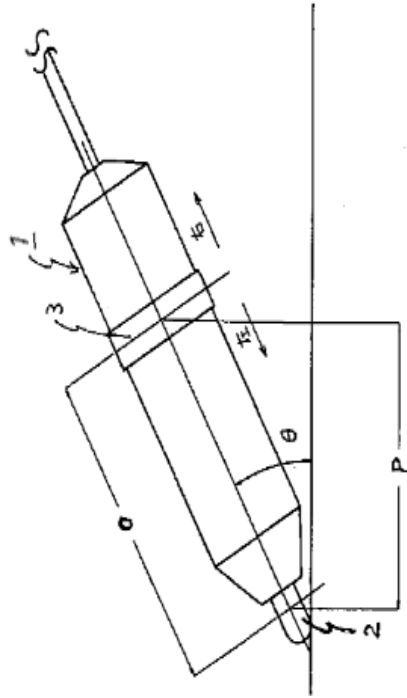
Fig.2



YOSHIDA further describes detecting angular information by analyzing capacitive interactions between the stylus electrodes and the sensor surface. YOSHIDA, Fig. 26. Specifically, capacitive variations corresponding to different pen orientations enable the system to determine tilt angles.

coordinate detection electrode (second detection unit) for angle reading is placed on the body of the coordinate detection pen.” IKEDA, [0006], Fig. 5.

【图5】



IKEDA, Fig. 5

A POSITA would recognize that IKEDA’s direct implementation of capacitive angle detection aligns with the fundamental principles of YOSHIDA’s system, confirming that detecting tilt angles through capacitive interactions was well known in the field.

Given the overlap in disclosures, a POSITA would have found it obvious to apply IKEDA’s capacitive tilt detection techniques to further refine YOSHIDA’s system, particularly in enhancing sensitivity to angular changes. As YOSHIDA already provides a capacitive stylus capable of detecting position, incorporating IKEDA’s tilt detection electrode would have been a routine and predictable modification, well within the expected design choices for capacitive styluses.

	<p>was well understood that detecting pen tilt using capacitive sensing could be improved by analyzing changes in capacitive signals over time, making IGUCHI's method a predictable and advantageous modification to YOSHIDA's stylus system.</p> <p>Alternatively, one of ordinary skill could modify YOSHIDA in view of IKEDA and IGUCHI to meet this limitation because a POSITA would have found it obvious to modify YOSHIDA's capacitive stylus system by incorporating IKEDA's explicit angular detection system and IGUCHI's capacitive signal differentiation method to improve tilt measurement. IKEDA discloses a coordinate detection pen that detects inclination through multiple electrodes, providing a structured approach for measuring angular displacement. IGUCHI further confirms that capacitive signals can be differentiated over time to extract tilt information, reinforcing that detecting angular displacement via capacitive coupling was a well-known principle. A POSITA would have understood that combining these techniques into YOSHIDA's capacitive input system would provide a predictable improvement in stylus-based input devices, enhancing angular resolution and accuracy by leveraging well-established capacitive detection methods.</p>
<p>14 a forming a first capacitive relationship between a sensor surface and 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;</p>	<p>YOSHIDA discloses capacitive coupling between a first electrode and a sensor surface. YOSHIDA, Fig. 26.</p>

Fig.26

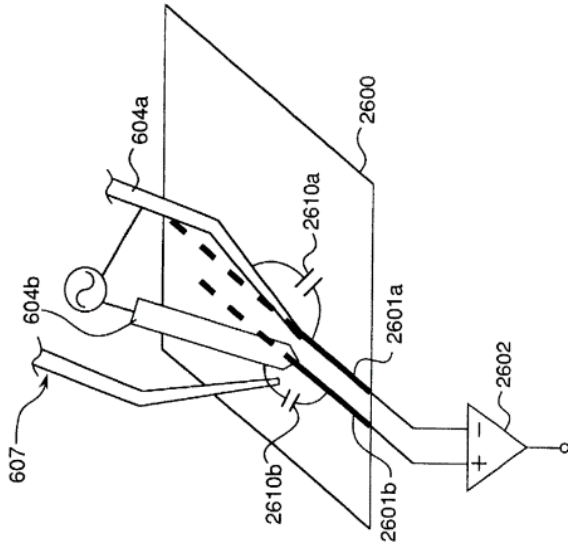


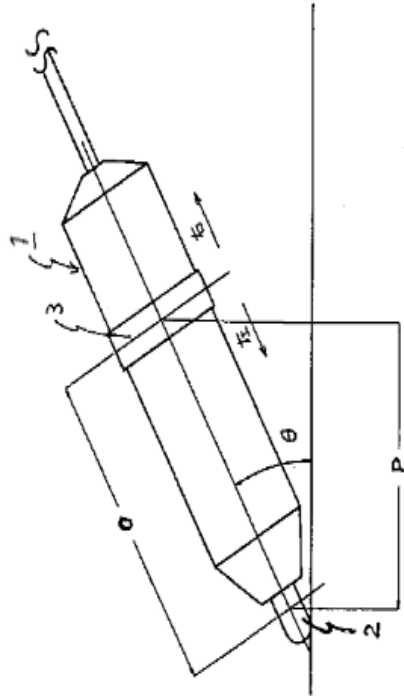
Figure 26 of YOSHIDA illustrates the capacitive interaction between the pen's first electrode 604b and the LCD panel electrode 2601b (at the sensor surface), demonstrating the fundamental capacitive relationship necessary for signal transmission. YOSHIDA's Figure 27 presents a schematic diagram of the electronic pen's circuitry, including an AC power source 603 (a signal production circuit) connected to electrodes 604a and 604b as depicted in Fig. 26.

To the extent Plaintiff contends YOSHIDA does not expressly, implicitly, or inherently disclose forming a first capacitive relationship, one of ordinary skill in the art would, based on one's knowledge and the disclosure of YOSHIDA, understand how to modify YOSHIDA to meet this limitation.

Alternatively, one of ordinary skill could modify YOSHIDA in view of IKEDA to meet this limitation, as shown below.

IKEDA discloses forming a first capacitive relationship between a sensor surface and a first electrode, which is positioned at the pen tip and supplied with a signal from a signal production circuit via a conductive line: “[A]n axis-shaped detection unit 2 is positioned at the tip of the coordinate detection pen 1 to read the coordinates of the indicated point, and a ring-shaped detection unit 3 for indicating the angle is positioned on the body of the coordinate detection pen.” IKEDA, [0008], Fig. 5.

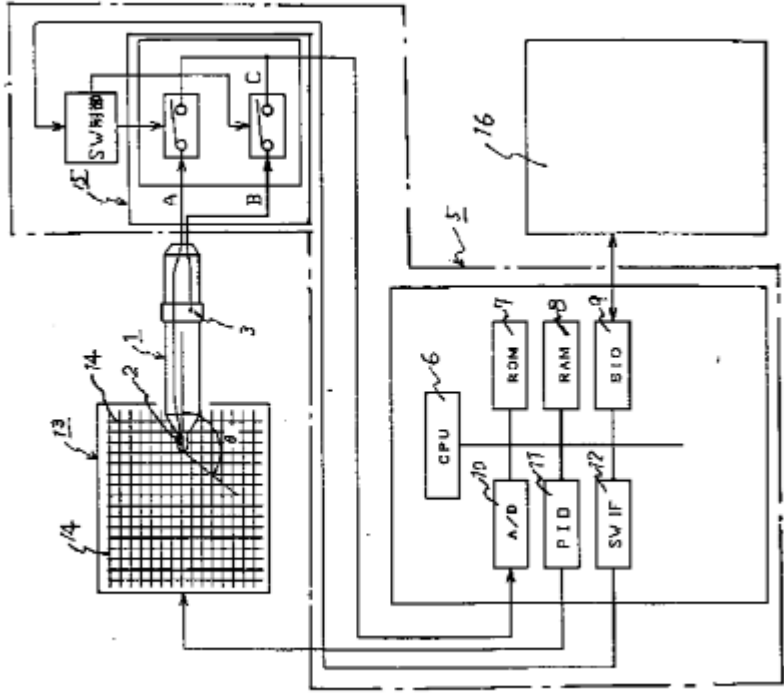
【图5】



IKEDA, Fig. 5

Additionally, IKEDA discloses that the first electrode is part of a capacitive system that transmits signals via a conductive pathway: “The 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 through a cable 4 connected to the coordinate detection pen 1.” IKEDA, [0008], Fig. 3.

【图3】



IKEDA, Fig. 3.

Further, IKEDA discloses how the signal is transmitted and processed in the main body via a signal production circuit: "The main body 5 of the coordinate input device includes a CPU 6 for performing coordinate control, a ROM 7 storing the program for coordinate control, a RAM 8 for storing the detected coordinate data

and the reference dimensions O corresponding to the two detection units 2 and 3 of the coordinate detection pen 1” IKEDA, [0009], Fig. 3

Finally, IKEDA discloses how the signals are transmitted via conductive lines from the detection pen to the processing circuit: “The selection control of the switching switch 15 is set so that the detection unit 2 for coordinate detection of the coordinate detection pen 1 is selected (connecting A-C through the switching switch 15). The electrode lines 14, 14, 14, . . . in the X and Y axis directions of the tablet 13 are driven by applying PIO 11 pulses, and the coordinate signal is sent to the connected A/D converter 10 through electrostatic capacitance coupling between each electrode line 14, 14, 14, . . . and the detection unit 2 for coordinate detection.” IKEDA, [0011], Fig. 3.

A POSITA would have recognized that placing the first electrode at the tip improves capacitive signal detection, ensuring accurate touch response and alignment with the sensor surface. Given that YOSHIDA already teaches capacitive interaction at the pen tip, incorporating IKEDA’s explicit teaching reinforces that this placement was a routine design consideration for stylus-based systems.

Alternatively, one of ordinary skill could modify YOSHIDA in view of IGUCHI to meet this limitation, as shown below.

IGUCHI discloses capacitive electrodes forming a capacitive relationship for stylus-based input detection. IGUCHI, Fig. 26a, Fig. 26b, 30:25-29 (“[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”).

FIG. 26a

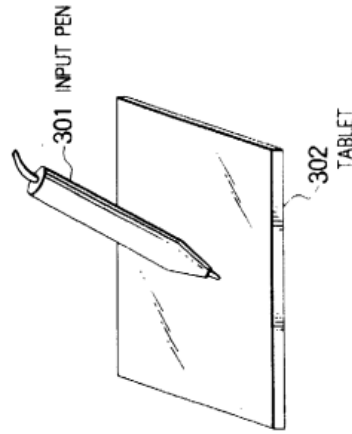
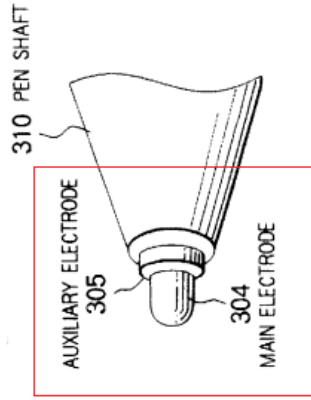
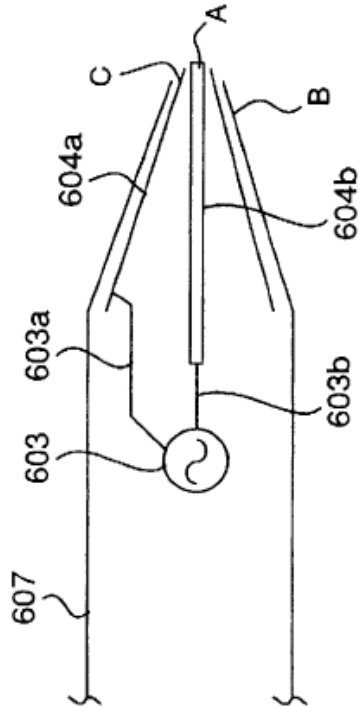


FIG. 26b



A POSITA would have recognized that capacitive input devices commonly employ multiple electrodes positioned at the tip of a stylus to establish a stable capacitive relationship with the sensor surface. IGUCHI explicitly discloses a capacitive stylus system in which a main electrode is arranged at the end tip of the pen shaft to interact with the sensor surface, confirming that this configuration was a well-known design principle. IGUCHI, Fig. 26a, Fig. 26b, 30:25-29. Given that YOSHIDA already discloses a capacitive stylus with a tip electrode, incorporating IGUCHI's structured electrode arrangement into YOSHIDA's system would have been an obvious and predictable modification to improve capacitive signal stability and input accuracy.

Alternatively, one of ordinary skill could modify YOSHIDA in view of IKEDA and IGUCHI to meet this limitation a POSITA would have found it obvious to modify YOSHIDA's capacitive stylus system by integrating IKEDA's explicit teaching of a structured electrode arrangement for coordinate tracking with IGUCHI's capacitive input system for detecting positional variations. IKEDA discloses a first electrode at the pen tip that capacitively interacts with a sensor surface, reinforcing the standard use of tip electrodes for accurate capacitive detection. IGUCHI further confirms that a main electrode at the tip facilitates

	<p>stable capacitive coupling for input accuracy. Given that capacitive stylus systems inherently rely on structured electrode placement to optimize detection precision, a POSITA would have found it obvious to combine YOSHIDA's stylus with the spatial electrode configurations of IKEDA and IGUCHI to enhance capacitive signal detection and coordinate tracking.</p>
<p>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</p>	<p>YOSHIDA discloses a multi-electrode stylus system with capacitive coupling. YOSHIDA, Fig. 6A. Specifically, Figure 6A of YOSHIDA illustrates an inner electrode (604b) and an outer megaphone-shaped electrode (604a), which is positioned at a different location from the inner electrode and extends outward, demonstrating an off-axis configuration.</p> <p>Fig. 6A</p>  <p>Figure 26 of YOSHIDA illustrates the capacitive interaction between the pen's first electrode 604a and the LCD panel electrode 2601a (at the sensor surface), demonstrating the fundamental capacitive relationship necessary for signal transmission. YOSHIDA's Figure 27 presents a schematic diagram of the electronic pen's circuitry, including an AC power source 603 (a signal production circuit) connected to electrodes 604a and 604b as depicted in Fig. 26.</p>

YOSHIDA explains that these electrodes create capacitive relationships with the sensor surface and that signals applied to them are phase-differentiated and thus distinguishable from each other: “Electric fields applied to the outer electrodes 604a and 604b are opposite in phase to each other.” YOSHIDA, 26:23-26.

To the extent Plaintiff contends YOSHIDA does not expressly, implicitly, or inherently disclose forming a second capacitive relationship, one of ordinary skill in the art would, based on one’s knowledge and the disclosure of YOSHIDA, understand how to modify YOSHIDA to meet this limitation.

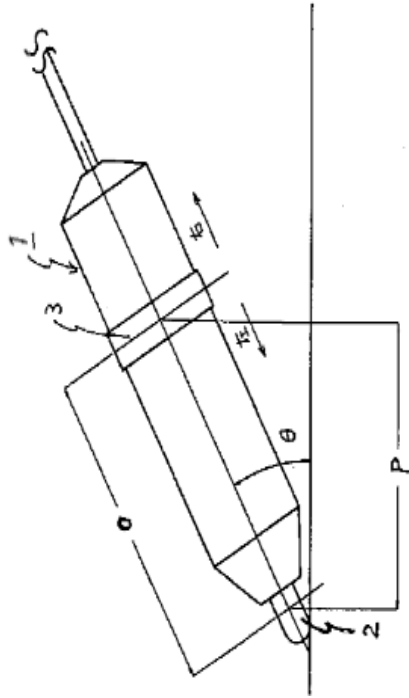
Alternatively, one of ordinary skill could modify YOSHIDA in view of IKEDA to meet this limitation, as shown below.

IKEDA reinforces the disclosure in YOSHIDA by confirming that an off-axis second electrode can be used for capacitive interaction and angle detection.

Figure 5 of IKEDA illustrates a ring-shaped second electrode positioned on the pen body, which is different from the first electrode located at the pen tip.

IKEDA states: “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.” IKEDA, [0006], Fig. 5.

【图5】



IKEDA, Fig. 5.

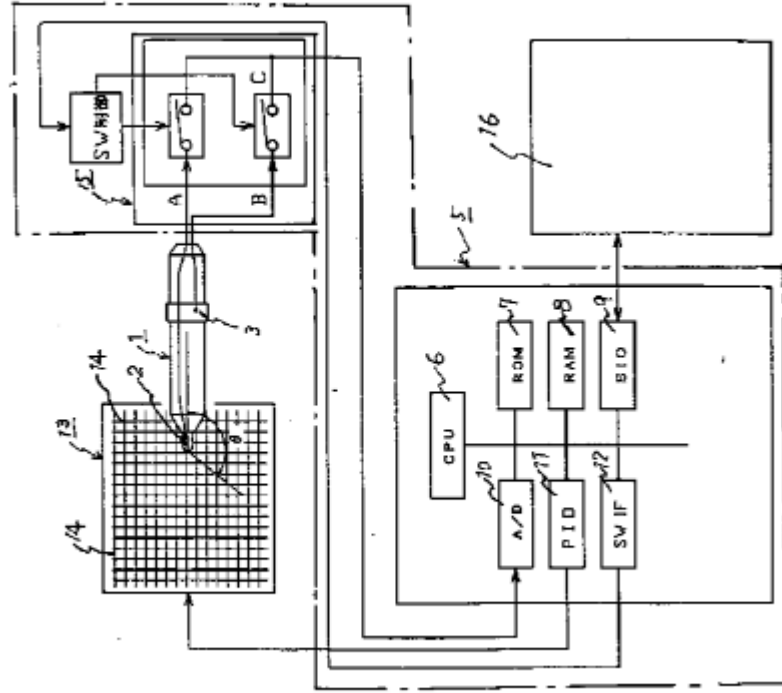
This further supports 14[b] by reinforcing that multiple electrodes positioned at different locations along the pen's body can generate distinct capacitive signals.

Additionally, IKEDA confirms that the second electrode is part of a signal transmission structure, connected via a conductive line to a signal production circuit: "The main body 5 of the coordinate input device includes a CPU 6 for performing coordinate control, a ROM 7 storing the program for coordinate control, a RAM 8 for storing the detected coordinate data and the reference dimensions 0 corresponding to the two detection units 2 and 3 of the coordinate detection pen 1" IKEDA, [0009], Fig. 3.

Further, IKEDA describes how the signals from the first and second electrodes are distinguishable and processed separately: "The selection control of the switching switch 15 is set so that the detection unit 2 for coordinate detection of the coordinate detection pen 1 is selected (connecting A-C through the switching switch 15). The electrode lines 14, 14, 14, . . . in the X and Y axis directions of the

tablet 13 are driven by applying PIO 11 pulses, and the coordinate signal is sent to the connected A/D converter 10 through electrostatic capacitance coupling between each electrode line 14, 14, 14, ... and the detection unit 2 for coordinate detection.” IKEDA, [0011], Fig. 3.

【図3】



IKEDA, Fig. 3.

A POSITA would recognize that multiple capacitive electrodes positioned at different locations allow for enhanced detection accuracy given that YOSHIDA already provides a system where multiple electrodes receive distinct signals and IKEDA explicitly teaches an off-axis second electrode to improve capacitive tracking.

Alternatively, one of ordinary skill could modify YOSHIDA in view of IGUCHI to meet this limitation, as shown below.

IGUCHI discloses that a secondary electrode is positioned at a different location from the main electrode and contributes to capacitive interactions: “[T]he auxiliary electrode 305 is arranged around this main electrode 304.” IGUCHI, Fig. 26a, Fig. 26b, 30:25-29.

FIG. 26a

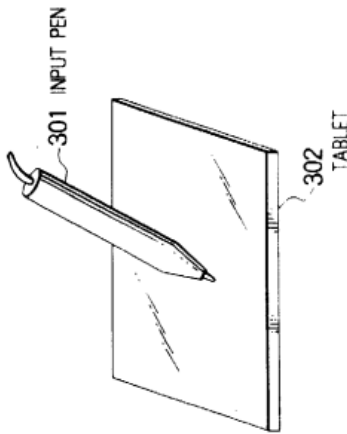
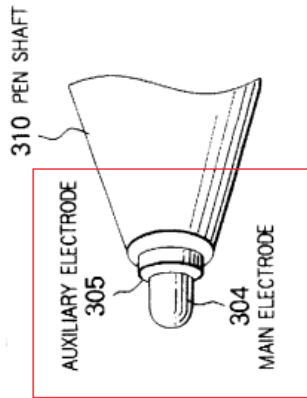


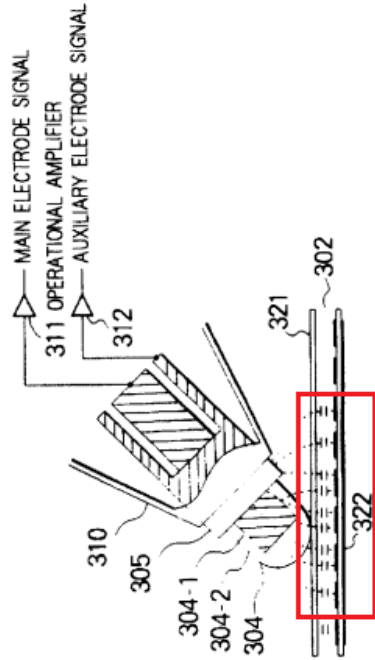
FIG. 26b



Furthermore, IGUCHI explicitly discloses that the secondary electrode contributes to detecting inclination by measuring capacitive differences: “[N]o shape of the electrostatic capacity is formed with right and left symmetry with respect to the main electrode. This is because no peak of the electrostatic capacity provided by the main electrode 304 is in conformity with a peak of the

electrostatic capacity provided by the auxiliary electrode 305 by inclining the pen shaft.” IGUCHI, 31:5-11, Fig. 27c.

FIG. 27c

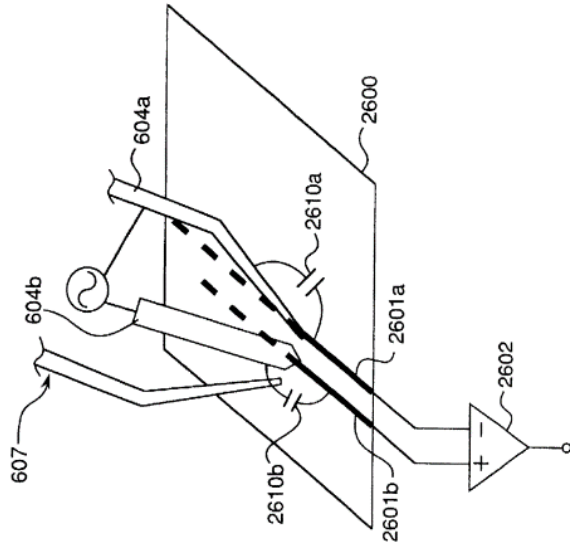


A POSITA would have recognized that capacitive input devices often use multiple electrodes arranged at different positions to improve signal detection and enable angular measurement. IGUCHI explicitly discloses an auxiliary electrode positioned around the main electrode, which forms an off-axis capacitive relationship with the sensor surface. IGUCHI, Fig. 26a, Fig. 26b, 30:25-29. Additionally, IGUCHI confirms that variations in capacitive coupling between the main and auxiliary electrodes enable accurate detection of inclination angles. IGUCHI, 31:5-11, Fig. 27c. Given that YOSHIDA already discloses multiple capacitive electrodes, incorporating IGUCHI’s off-axis electrode configuration into YOSHIDA’s stylus would have been an obvious improvement to enhance angular detection accuracy through well-known capacitive sensing techniques.

Alternatively, one of ordinary skill could modify YOSHIDA in view of IKEDA and IGUCHI to meet this limitation because a POSITA would have found it obvious to modify YOSHIDA’s capacitive stylus system by integrating IKEDA’s explicit disclosure of a secondary off-axis electrode for tilt detection with IGUCHI’s confirmation that capacitive variations between multiple electrodes enable accurate angular measurements. IKEDA describes a ring-shaped

	<p>coordinate detection electrode positioned on the stylus body to establish an additional capacitive relationship with the sensor surface, reinforcing that multiple detection points enhance angular tracking. IGUCHI further demonstrates that capacitive differences between spatially separated electrodes provide precise inclination data, confirming the effectiveness of this approach. Given that capacitive stylus-based input systems inherently rely on multi-electrode configurations to refine position and angle detection, a POSITA would have found it predictable and advantageous to integrate the teachings of YOSHIDA, IKEDA, and IGUCHI to enhance tilt measurement capabilities.</p> <p>YOSHIDA discloses a capacitive stylus system with multiple electrodes that interact with a sensor surface to determine positional information. YOSHIDA, Fig. 26, 14:62-67; <i>see also</i> Claim 1 [b] and 1 [c] and Claim 14[b] <i>supra</i> regarding the arrangement of multiple electrodes for capacitive coupling. Specifically, Figure 26 of YOSHIDA illustrates how capacitive coupling between electrodes 604a, 604b and a sensor surface generates detection signals, which allow the system to determine the pen's location.</p>
<p>14 c detecting angular information of the pen-shaped position indicator based on the first and second capacitive relationships.</p>	

Fig.26



YOSHIDA explains that the interaction between these capacitive elements and the sensor surface allows for precise input detection: “[A] signal which is generated by an electric field 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.” YOSHIDA, 14:62-67.

To the extent Plaintiff contends YOSHIDA does not expressly, implicitly, or inherently disclose detecting angular information based on capacitive relationships, one of ordinary skill in the art would, based on one’s knowledge and the disclosure of YOSHIDA, understand how to modify YOSHIDA to meet this limitation.

Alternatively, one of ordinary skill could modify YOSHIDA in view of IKEDA to meet this limitation, as shown below.

IKEDA discloses detecting angular information of the pen-shaped position indicator based on first and second capacitive relationships: “[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.” IKEDA, [0006], Fig. 5.

Additionally, IKEDA describes how the system uses these two capacitive relationships to calculate angular information: “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 where the coordinate detection pen 1 is located in RAM 8 of the coordinate input device.” IKEDA, [0013], Fig. 5.

Further, IKEDA confirms that the device detects the inclination angle using these capacitive relationships: “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” IKEDA, [0015], Fig. 5.

【图5】

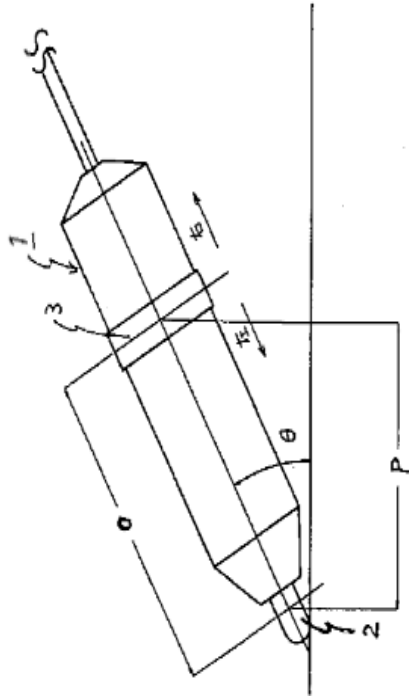


Figure 5 of IKEDA illustrates a ring-shaped coordinate detection electrode positioned along the pen body, forming a second capacitive interaction. This confirms that capacitive stylus systems inherently generate multiple capacitive relationships that allow for tilt detection.

A POSITA would have recognized that capacitive stylus systems inherently generate capacitive relationships between multiple electrodes and the sensor surface, making angular detection a natural consequence of capacitive signal variations. YOSHIDA discloses a capacitive stylus with multiple electrodes, while IKEDA explicitly describes an additional off-axis electrode that facilitates angular measurement by detecting capacitive differences caused by stylus inclination. IKEDA, Page 5, Fig. 5. Given that detecting angular displacement using capacitive relationships was a well-known principle in stylus-based input devices, a POSITA would have understood that incorporating IKEDA's explicit tilt detection method into YOSHIDA's capacitive stylus system would be a predictable and effective way to refine angular tracking accuracy.

Alternatively, one of ordinary skill could modify YOSHIDA in view of IGUCHI to meet this limitation, as shown below.

IGUCHI discloses a system where capacitive signals from multiple electrodes exhibit a measurable time difference, which is used to determine tilt: “[A] time difference is caused between timing t_2 of a peak of an output signal S_3 ’ provided by the main electrode and timing t_3 of a peak of an output signal S_4 ’ provided by the auxiliary electrode.” IGUCHI, 31:37-41, Fig. 29b.

FIG. 29b

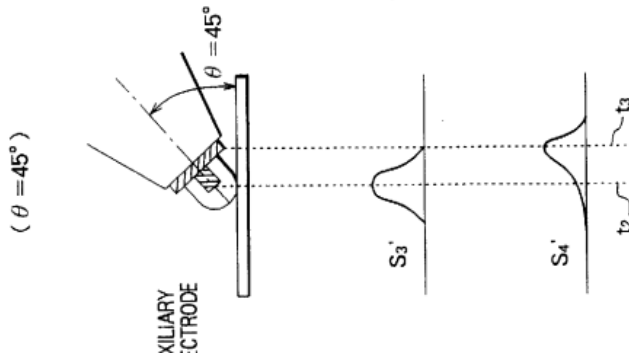


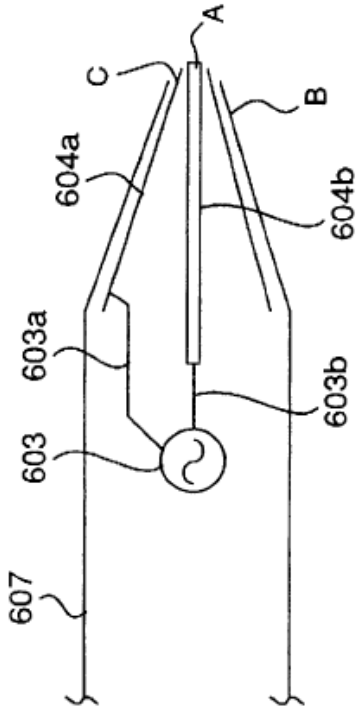
Figure 29b of IGUCHI illustrates phase-shifted capacitive signals, demonstrating how capacitive variations provide real-time tilt measurement. This disclosure

directly supports the angular detection requirement of 14[c] by showing how a capacitive stylus system processes signal differentiation to determine inclination.

IGUCHI further confirms that tilt detection is derived from capacitive differences: “Since 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.” IGUCHI, 15:6-9.

A POSITA would have found it obvious to modify YOSHIDA’s capacitive stylus system by incorporating IGUCHI’s capacitive signal timing differentiation technique to enhance angular detection. IGUCHI explicitly discloses that capacitive signals from multiple electrodes exhibit a measurable time difference, which is used to determine tilt: “[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.” IGUCHI, IGUCHI, 31:37-41, Fig. 29b. Given that capacitive signal variations inherently contain angular displacement information, a POSITA would have recognized that integrating IGUCHI’s timing-based capacitive differentiation into YOSHIDA’s capacitive stylus system would improve tilt measurement precision in a routine and predictable manner.

Alternatively, one of ordinary skill could modify YOSHIDA in view of IKEDA and IGUCHI to meet this limitation, as a POSITA would recognize that capacitive stylus systems inherently form multiple capacitive relationships with a sensor surface, generating detection signals that vary based on angular displacement. YOSHIDA provides the foundation for multi-electrode capacitive sensing, IKEDA discloses an off-axis second capacitive electrode for tilt detection, and IGUCHI demonstrates capacitive signal differentiation over time to measure angular displacement. Given that capacitive input devices commonly rely on multiple electrodes and time-differentiated signals to improve position and angle detection, a POSITA would have found it obvious to integrate

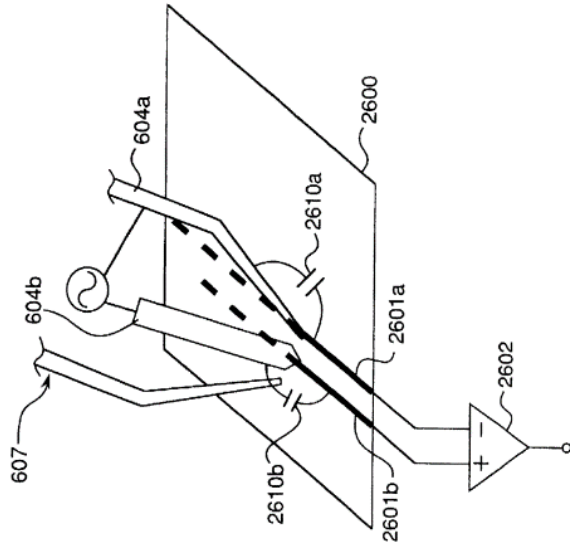
	<p>IGUCHI's signal differentiation techniques into YOSHIDA and IKEDA's capacitive stylus systems to enhance tilt tracking accuracy.</p>
<p>Claim 15 The method according to claim 14, wherein the first and second electrodes are arranged at the first and second positions that are different along the axis of the pen-shaped position indicator.</p>	<p>Disclosure See <i>supra</i> regarding Claim 14; see also Claim 2.</p> <p>YOSHIDA discloses a megaphone-shaped outer electrode 604a positioned differently from the first electrode and off-axis. YOSHIDA, Fig.6A.</p>
	<p>Fig.6A</p>  <p>Referring to Fig.6A of YOSHIDA, a megaphone-shaped outer electrode 604a is also arranged at the pen-tip portion of the pen-shaped electric field generator 607, and the second position of the outer electrode 604a is different from the first position of the inner electrode 604b.</p> <p>Fig. 6A also shows that the position of the outer electrode 604a is off an axis of the pen-shaped position indicator. This arrangement is evident in this cross-sectional depiction, where the outer electrode surrounds the inner electrode</p>

asymmetrically, contributing to the detection of tilt or angle when interacting with the sensor surface.

Fig. 6a discloses a multi-electrode stylus system with capacitive coupling. Specifically, Figure 6A of YOSHIDA illustrates an inner electrode 604b and an outer megaphone-shaped electrode 604a, which is positioned at a different location from the inner electrode and extends outward, demonstrating an off-axis configuration.

Figure 26 of YOSHIDA illustrates the capacitive interaction between the pen's first electrode 604a and the LCD panel electrode 2601a (at the sensor surface), demonstrating the fundamental capacitive relationship necessary for signal transmission. YOSHIDA's Figure 27 presents a schematic diagram of the electronic pen's circuitry, including an AC power source 603 (a signal production circuit) connected to electrodes 604a and 604b as depicted in Fig. 26.

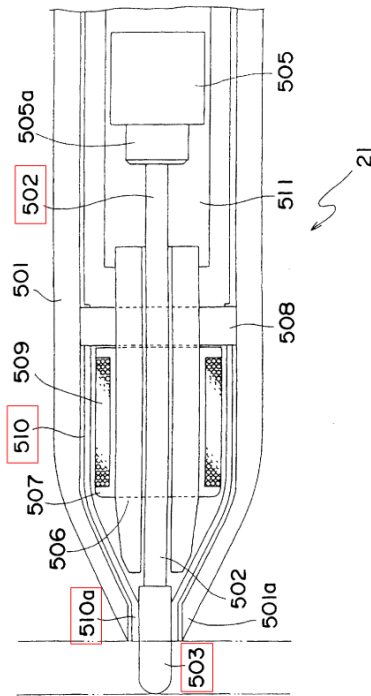
Fig.26



YOSHIDA explains that these electrodes create capacitive relationships with the sensor surface and that signals applied to them are phase-differentiated and thus distinguishable from each other: "Electric fields applied to the outer electrodes 604a and 604b are opposite in phase to each other." YOSHIDA, 26:23-26.

YOSHIDA also discloses electrodes 502 and 510 at different positions along the axis. YOSHIDA, Fig.29.

Fig. 29



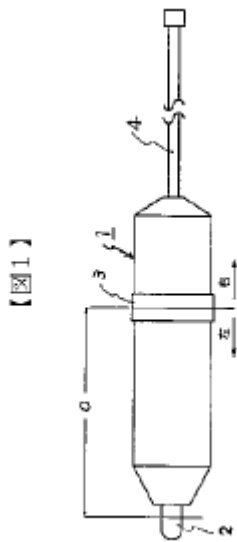
YOSHIDA's Figure 29 provides a longitudinal section of the pen, detailing the placement of inner electrode 502 and outer electrode 510 at distinct positions along the pen's axis. This configuration is designed to capture varying capacitive interactions along the length of the pen. The figure confirms that electrodes are placed at separate positions along the pen's longitudinal axis, allowing for varied capacitive interactions.

Capacitive stylus technology was well known at the time, and a POSITA would have recognized that placing electrodes at different positions along the pen's axis allows for more accurate signal differentiation and tilt detection. A POSITA would have understood that capacitive input systems commonly use multiple electrodes positioned at various locations along the pen axis to improve spatial resolution and enhance detection accuracy.

To the extent Plaintiff contends YOSHIDA does not expressly, implicitly, or inherently disclose that the first and second electrodes are arranged at first and second positions that are different along the axis of the pen-shaped position indicator, one of ordinary skill in the art would, based on one's knowledge and the disclosure of YOSHIDA, understand how to modify YOSHIDA to meet this limitation.

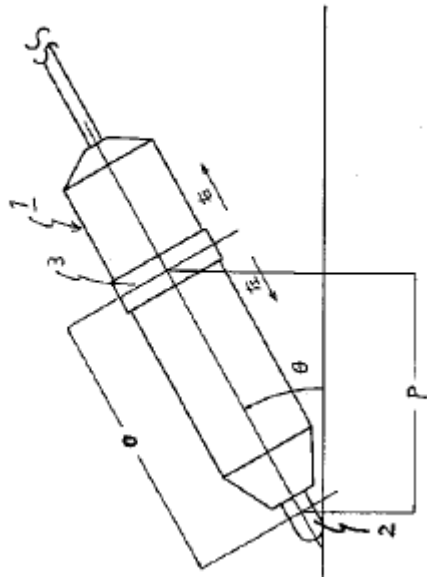
Alternatively, one of ordinary skill could modify YOSHIDA in view of IKEDA to meet this limitation, as shown below.

IKEDA discloses that the first electrode (on the pen tip) and the second electrode (on the pen body) are positioned at different locations along the pen's axis: "[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." IKEDA, [0006], Figs. 1, 5 (shows electrode positioning).



IKEDA Fig. 1: Illustrates electrode positioning along different axial locations of the pen.

【图5】



IKEDA Fig. 5: Depicts detection of pen inclination and tilt angle, reinforcing that the electrodes are arranged along the axis of the pen.

Further, IKEDA discloses that coordinate detection is performed using these two spatially separated detection units: “Fig. 1 is a configuration diagram of the coordinate detection pen of this invention, where 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, and a ring-shaped detection unit 3 for indicating the angle is positioned on the body of the coordinate detection pen.” IKEDA, [0008], Fig. 5.

Additionally, IKEDA discloses how the system processes signals separately from the two detection units, confirming their distinct locations: “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 where the coordinate detection pen 1 is located in RAM 8 of the coordinate input device.” IKEDA, [0013], Fig. 5.

A POSITA would have recognized that placing capacitive electrodes at different positions along the pen axis was a well-known technique for improving detection fidelity. Given that YOSHIDA already provides a system where electrodes are positioned at separate locations along the pen, incorporating IKEDA's explicit teaching of spatially separated electrodes would have been a routine design choice to enhance detection capabilities.

Claim 18

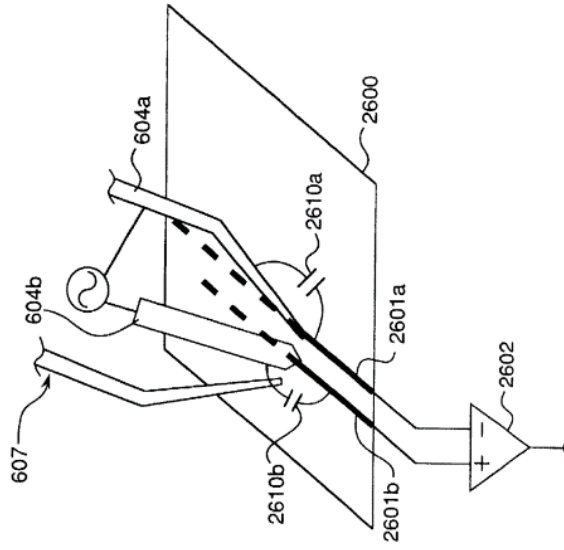
The method according to claim 14, wherein the angle information is a tilt angle of the pen-shaped position indicator relative to the sensor surface.

Disclosure

See *supra* regarding Claim 14.

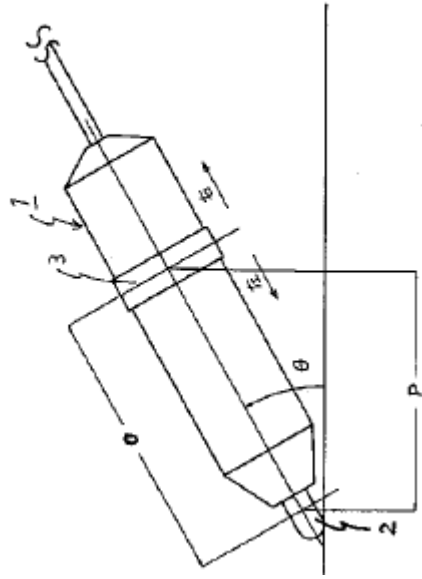
YOSHIDA discloses a capacitive stylus system where multiple electrodes interact with a sensor surface to generate detection signals. YOSHIDA, Fig. 26, 27:13-25.

Fig.26



IKEDA discloses detecting the tilt angle of the pen-shaped position indicator relative to the sensor surface: “[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.” IKEDA, [0006], Fig. 5 (illustrating tilt angle detection).

【图5】



IKEDA Fig. 5 - Illustrates pen inclination detection, showing the tilt angle measurement process.

Additionally, IKEDA discloses how these two capacitive relationships allow for tilt measurement: “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 where the coordinate detection pen 1 is located in RAM 8 of the coordinate input device.” IKEDA, [0013], Fig. 5.

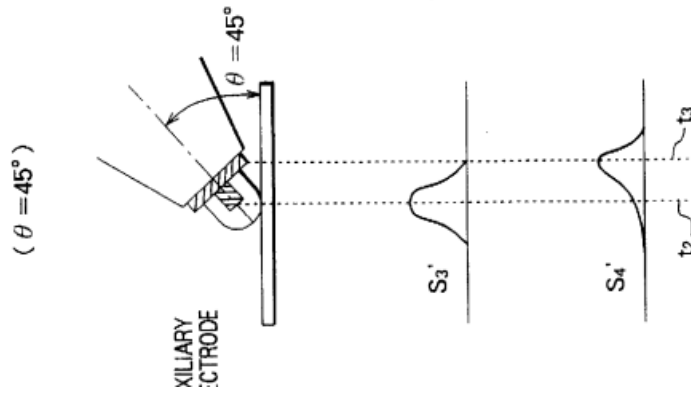
Further, IKEDA discloses that the system detects the inclination (tilt) angle relative to the sensor surface: 'By detecting each coordinate using the detection unit 2 for coordinate detection and the detection unit 3 for angle detection of the coordinate detection pen 1, control over the angle of the coordinate detection pen 1 can be achieved' IKEDA, [0015], Fig. 5.

One of ordinary skill could modify YOSHIDA in view of IKEDA to meet this limitation, because IKEDA explicitly discloses a coordinate detection pen that measures the inclination angle relative to the sensor surface. IKEDA's system includes a first detection unit at the pen tip and a second, ring-shaped detection unit on the pen body, allowing capacitive measurements at different positions to determine the pen's tilt angle relative to the surface. A POSITA would have recognized that incorporating IKEDA's explicit tilt detection technique into YOSHIDA's capacitive stylus system would enhance its ability to detect angular displacement and improve tilt accuracy.

Alternatively, one of ordinary skill could modify YOSHIDA in view of IGUCHI to meet this limitation, as shown below.

IGUCHI discloses determining tilt angle from capacitive relationships and signal timing differences. IGUCHI, Fig.29b, 31:37-50 (explaining "an arbitrary angle of the input pen with respect to the tablet can be set to an inclination angle in a standard state in accordance with differences in habit when the detecting pen is individually used" where "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



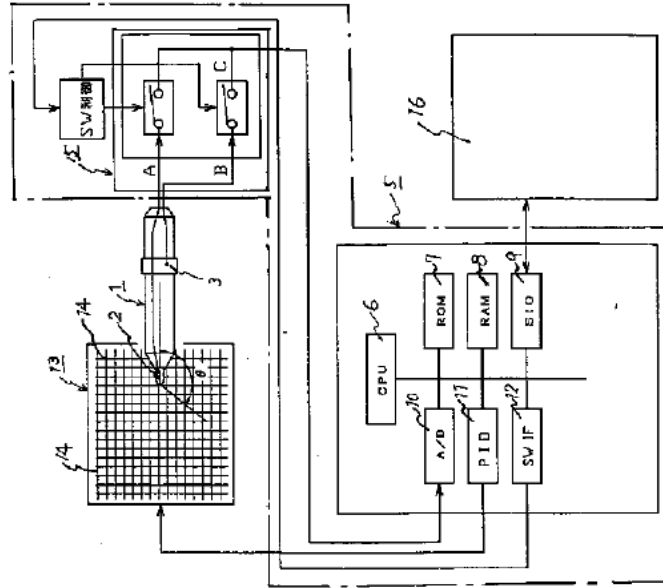
IGUCHI's Figure 29b, as previously described, illustrates the method of determining the pen's tilt angle by analyzing the time differences between signals from the main and auxiliary electrodes. The graphical representation in the figure correlates these time differences with specific tilt angles. The figure illustrates how a stylus's angle is derived from capacitive relationships, demonstrating real-world tilt calculations.

	<p>A POSITA would have recognized that capacitive stylus systems inherently generate signal variations that can be used to determine angular displacement. Given IGUCHI's explicit disclosure of time-differentiated capacitive signals for tilt detection, a POSITA would have been motivated to integrate IGUCHI's timing-based differentiation into YOSHIDA's system to improve stylus angle accuracy.</p> <p>Alternatively, one of ordinary skill could modify YOSHIDA in view of IKEDA and IGUCHI to meet this limitation. The combination of YOSHIDA's capacitive input system, IKEDA's explicit multiple electrode tilt detection, and IGUCHI's timing-based capacitive signals confirms that measuring tilt angle is an inherent feature of capacitive stylus-based sensing. A POSITA would recognize that YOSHIDA's capacitive stylus framework naturally benefits from both IKEDA's spatially separated electrodes for detecting inclination and IGUCHI's time-differentiated signals for enhanced angular resolution. The integration of these references follows well-established engineering principles in the field of capacitive input technology, making the claimed invention an obvious extension of known capacitive stylus methods.</p>
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<p>Claim 21 The method according to claim 14, wherein the first and second signals are of the same type but have a time difference from each other.</p>	<p>Disclosure <i>See supra</i> regarding Claim 14; <i>see also</i> Claim 8.</p> <p>YOSHIDA discloses a capacitive stylus system where multiple electrodes interact with a sensor surface to generate distinct signals. Specifically, YOSHIDA discloses how electrodes 604a and 604b interact with capacitive elements on a sensor panel to generate detection signals: “[A]signal which is generated by an electric field 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.” YOSHIDA, 14:62-67.</p> <p>One of ordinary skill could modify YOSHIDA in view of IKEDA to meet this limitation, because IKEDA discloses a coordinate detection pen that utilizes multiple capacitive detection units to measure angular displacement and positional</p>
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changes. Specifically, IKEDA states: “[A] coordinate detection electrode (first deflection 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.” IKEDA, [0006], Fig. 3.

【図3】



IKEDA, Fig. 3.

Additionally, IKEDA discloses that these two capacitive detection units work together to determine tilt and positional changes: “The 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, as described

later, is applied to the main body 5 of the coordinate input device through a cable 4 connected to the coordinate detection pen 1.” IKEDA, [0008], Fig. 3.

Further, IKEDA discloses how these signals are processed to measure angular displacement: “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 where the coordinate detection pen 1 is located in RAM 8 of the coordinate input device.” IKEDA, [0013], Fig. 3.

IKEDA’s multiple detection electrodes generate independent signals that vary based on position and tilt, reinforcing that capacitive stylus systems naturally produce time-differentiated signals. A POSITA would recognize that integrating IKEDA’s multiple detection electrode system into YOSHIDA’s capacitive stylus framework would naturally lead to variations in signal timing, making time-differentiated signals an inherent feature of the combined system.

Alternatively, one of ordinary skill could modify YOSHIDA in view of IGUCHI to meet this limitation, as shown below.

IGUCHI discloses signals from different electrodes having a timing difference. IGUCHI, Fig.29b, 31:37-50 (explaining “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. 29a

($\theta = 90^\circ$)

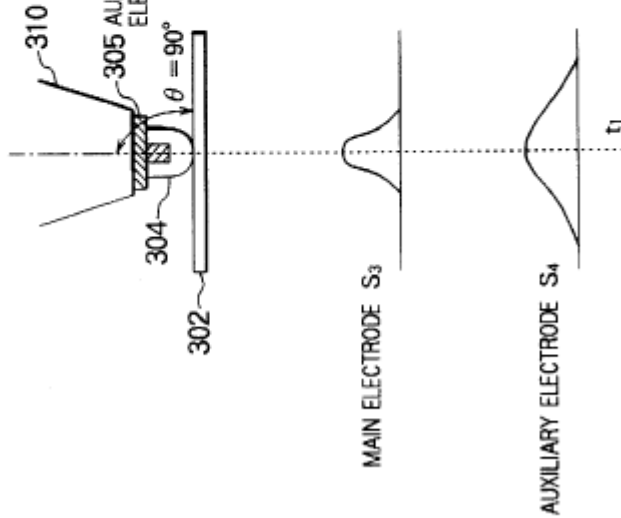
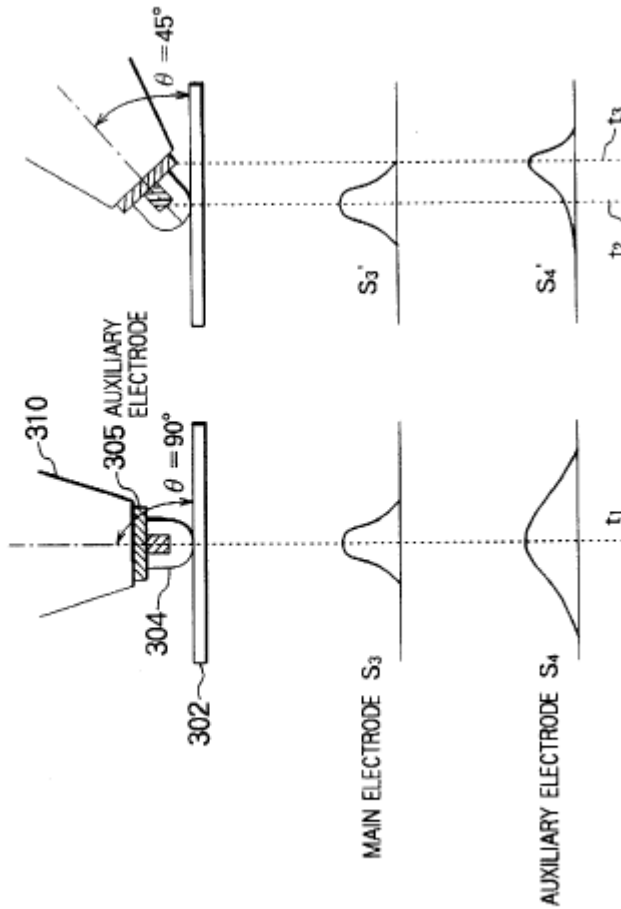


FIG. 29b

($\theta = 45^\circ$)



IGUCHI Figure 29b illustrates this concept through a waveform diagram, where the signals $S_{3'}$ and $S_{4'}$ are shown to have distinct peaks that occur at different times. This timing offset enables the determination of angular information based on phase shifts in the detected signals, a principle used in capacitive sensing. The timing difference between the signals from the electrodes in IGUCHI (Fig. 29a, 304, 305) corresponds to the claimed feature in Claim 21 of the '277 patent, thereby rendering this limitation obvious in light of prior art.

Further, IGUCHI discloses that capacitive signals are detected by electrodes positioned at different locations, confirming the presence of transmission paths: “Since 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.” IGUCHI, 15:6-9.

A POSITA would recognize that capacitive stylus systems inherently generate multiple signals that vary in phase and timing due to capacitive coupling dynamics. Given IGUCHI’s explicit disclosure of a time offset between signals, a POSITA would have found it obvious to incorporate IGUCHI’s timing-based differentiation into YOSHIDA’s capacitive stylus framework to improve angular accuracy.