PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

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PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing *(day/month/year)*	25 FEB 2020
Applicant's or agent's file reference B1348.70113WO00	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US 19/64839	06 December 2019 (06.12.2019)	07 December 2018 (07.12.2018)

International Patent Classification (IPC) or both national classification and IPC

IPC - G06K 9/00; A61B 5/117 (2020.01)

CPC - G06K 9/0002; G06K 9/00006; G06K 9/0012; G06K 9/00013; G06K 9/00107; A61B 5/1172; A61B 8/4483

Applicant
BUTTERFLY NETWORK, INC.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/US	Date of completion of this opinion	Authorized officer
Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-8300	07 February 2020	Lee Young PCT Help Desk Telephone No. 571-272-4300

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US 19/64839

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ the international application in the language in which it was filed.

   ☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(b)).

3. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:

   a. ☐ forming part of the international application as filed:

      ☐ in the form of an Annex C/ST.25 text file.

      ☐ on paper or in the form of an image file.

   b. ☐ furnished together with the international application under PCT Rule 13*ter*.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.

   c. ☐ furnished subsequent to the international filing date for the purposes of international search only:

      ☐ in the form of an Annex C/ST.25 text file (Rule 13*ter*.1(a)).

      ☐ on paper or in the form of an image file (Rule 13*ter*.1(b) and Administrative Instructions, Section 713).

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US 19/64839

Box No. V **Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-13, 17, 18, 21	YES
	Claims	14-16, 19, 20	NO
Inventive step (IS)	Claims	11, 21	YES
	Claims	1-10, 12-20	NO
Industrial applicability (IA)	Claims	1-21	YES
	Claims	none	NO

2. Citations and explanations:
Claims 14-16, 19, and 20 lack novelty under PCT Article 33(2) as being anticipated by US 2018/0129849 A1 to QUALCOMM INCORPORATED (hereinafter Qualcomm).

Referring to claim 14, Qualcomm teaches an ultrasound fingerprint apparatus (para [0011]: the fingerprint sensor system may include a high-bandwidth ultrasonic sensor system), comprising: a micromachined ultrasonic transducer (para [0086]: a capacitive micromachined ultrasonic transducer (CMUT) as part of an ultrasonic sensor system 500a) configured to emit ultrasound of at least two different frequencies and to detect a fingerprint based on detection of the emitted ultrasound of the at least two different frequencies (para [0083]: a fingerprint sensor system may include...a bimodal narrow-bandwidth ultrasonic sensor with a first frequency range including 1f Hz and a second frequency range including 2f Hz).

Referring to claim 15, Qualcomm teaches the ultrasound fingerprint apparatus of claim 14. Qualcomm further teaches an OLED display (para [0100]: an apparatus 900 that includes a fingerprint sensor system 105 and a portion of an organic light-emitting diode (OLED) display stack 910).

Referring to claim 16, Qualcomm teaches the ultrasound fingerprint apparatus of claim 14. Qualcomm further teaches a mobile electronic device (para [0058]: apparatus 100 may be a component of a mobile device).

Referring to claim 19, Qualcomm teaches a method of detecting a fingerprint (para [0011]: the fingerprint sensor system may include a high-bandwidth ultrasonic sensor system), the method comprising: emitting, from a micromachined ultrasonic transducer (para [0086]: a capacitive micromachined ultrasonic transducer (CMUT) as part of an ultrasonic sensor system 500a), ultrasound of a first frequency spectrum and receiving first ultrasound reflected from a finger (para [0056]: the transmitted ultrasonic signal may include a first frequency, which may be referred to herein as a fundamental frequency (e.g., "1f" Hertz (Hz)). As the transmitted ultrasonic signal propagates towards and into the finger, several reflected signals (e.g., reflected portions of the ultrasonic wave) may be generated due to components within the sensor (e.g., the platen and other layers), the epidermis (e.g., the outer layer of the skin), and the dermis layer); emitting, from the micromachined ultrasonic transducer (para [0045]: piezoelectric micromechanical ultrasonic transducer (PMUT) elements), ultrasound of a second frequency spectrum, different from the first frequency spectrum, and receiving second ultrasound reflected from the finger (para [0109]: control system may be configured to transmit a second ultrasonic wave using the fingerprint sensor system to allow cancellation of ultrasonic waves of the first frequency and the first phase with the ultrasonic waves of the first frequency and the second phase. For example, the second ultrasonic wave may include the first frequency and the second ultrasonic wave may have a second phase that is opposite from the first phase); and detecting the fingerprint based at least in part on the received first ultrasound and the received second ultrasound (para [0011]: the fingerprint sensor system may include a bimodal narrow bandwidth ultrasonic sensor with a first frequency range including 1f Hz and a second frequency range including 2f Hz, while diminishing some frequencies between 1f Hz and 2f Hz; para [0056]: As a result, by detecting reflected signals at a harmonic frequency from a target object at a time and/or depth corresponding with the dermis layer of a finger, the target object may be determined to be a live finger and higher resolution of imaged features in the target object may be attained whether combined or not combined with 1f image information).

Referring to claim 20, Qualcomm teaches the method of claim 19. Qualcomm further teaches wherein the first frequency spectrum and the second frequency spectrum exhibit different peak frequencies (para [0083]: a fingerprint sensor system may include...a bimodal narrow-bandwidth ultrasonic sensor with a first frequency range including 1f Hz and a second frequency range including 2f Hz).

Claims 1-3, 8-10 and 13 lack an inventive step under PCT Article 33(3) as being obvious over US 2017/0328866 A1 to INVENSENSE, INC. (hereinafter Invensense) in view of US 2017/0320091 A1 to KONINLKLIJKE PHILIPS N.V. (hereinafter Koninlklijke).

Referring to claim 1, Invensense teaches an ultrasound fingerprint apparatus (para [0034]: fingerprint sensing system including an array of ultrasonic transducers), comprising: a micromachined ultrasonic transducer (para [0032]: piezoelectric micromachined ultrasonic transducer (PMUT)) comprising: a substrate having a cavity (para [0038]: a substrate 140 to define a cavity 130; Figure 1: cavity 130, substrate 140); a membrane coupled to the substrate such that the cavity separates the membrane from at least a portion of the substrate (para [0038]: a PMUT device 100 having a center pinned membrane, according to some embodiments. PMUT device 100 includes an interior pinned membrane 120 positioned over a substrate 140 to define a cavity 130; Figure 1: cavity 130, substrate 140); and first and second electrodes (para [0039]: lower electrode 106 and upper electrode 108). Invensense does not teach the first and second electrodes on the substrate and opposite the membrane arranged so that at least part of the first electrode is arranged within the interior of at least a portion of the second electrode. (claim 1 continued)
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WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US 19/64839

Supplemental Box

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-- Box V --

(claim 1 continued) Koninlklijke teaches the first and second electrodes on the substrate and opposite the membrane arranged so that at least part of the first electrode is arranged within the interior of at least a portion of the second electrode (para [0039]: In the embodiment shown in FIG. 1 a second electrode S2 is embedded into the substrate 112 in a peripheral region 302 of the CMUT cell. A third electrode S3 of the CMUT device is embedded into the substrate 112...the membrane layer 114 is fixed relative to the top face of the substrate layer 112 and configured and dimensioned so as to define a spherical or cylindrical cavity 8 between the membrane layer 114 and the substrate layer 112. The second S2 and the third S3 electrodes may be arranged in laterally spaced relation within a common plane of the substrate 112. The second electrode S2 may be configured in a ring shape within the peripheral region 302 and the third electrode S3 me be circularly configured within the central region 303 forming a concentric circle with the ring shaped third electrode S3). It would have been obvious to one of ordinary skill in the art to include the inner and outer electrodes of Koninlklijke with the ultrasound fingerprint apparatus of Invensense to reduce the lower limit of the high impedance resistor which is beneficial when multiple CMUT devices in an array are driven by one signal (Koninlklijke, para [0052]: This configuration permits reducing the lower limit of the high impedance resistor used for the "sharing" CMUT devices compared to the AC-impedance value of a single CMUT device, since now a total AC impedance is determined by the AC impedances of each sharing device connected in parallel. This embodiment may be beneficially used in a high focused ultrasound (HIFU) application or ultrasound ablation therapy, wherein multiple CMUT devices in the array may be driven by one signal supplied by the driven circuit 45').

Referring to claim 2, Invensense in view of Koninlklijke teaches the ultrasound fingerprint apparatus of claim 1. Koninlklijke further teaches wherein the first and second electrodes are ring-shaped electrodes, and wherein the first electrode is arranged concentrically within the second electrode (para [0039]: The second S2 and the third S3 electrodes may be arranged in laterally spaced relation within a common plane of the substrate 112. The second electrode S2 may be configured in a ring shape within the peripheral region 302 and the third electrode S3 me be circularly configured within the central region 303 forming a concentric circle with the ring shaped third electrode S3).

Referring to claim 3, Invensense in view of Koninlklijke teaches the ultrasound fingerprint apparatus of claim 1. Koninlklijke further teaches wherein the second electrode comprises at least one interior region and wherein the first electrode is arranged within the interior region of the second electrode (para [0039]: second S2 and the third S3 electrodes may be arranged in laterally spaced relation within a common plane of the substrate 112. The second electrode S2 may be configured in a ring shape within the peripheral region 302 and the third electrode S3 me be circularly configured within the central region 303 forming a concentric circle with the ring shaped third electrode S3).

Referring to claim 8, Invensense in view of Koninlklijke teaches the ultrasound fingerprint apparatus of claim 1 Invensense further teaches wherein the ultrasound fingerprint apparatus is an ultrasound-on-a-chip apparatus (para [0097]: an example transmit path architecture 1500 of a two-dimensional array of ultrasonic transducers...The 50 MHz frequency can be generated by an on-chip RC oscillator).

Referring to claim 9, Invensense in view of Koninlklijke teaches the ultrasound fingerprint apparatus of claim 1. Invensense further teaches an array of the micromachined ultrasonic transducers integrated with integrated circuitry (para [0035], [0088]: Examples of PMUT devices and arrays of PMUT devices are described in accordance with FIGS. 1-13 above; para [0097] on-chip RC oscillator).

Referring to claim 10, Invensense in view of Koninlklijke teaches the ultrasound fingerprint apparatus of claim 9. Invensense further teaches wherein the micromachined ultrasonic transducers are capacitive micromachined ultrasonic transducers (CMUTs) (para [0088]: fingerprint sensor 1430 can include ultrasonic transducers (e.g., PMUTs or capacitive micromachined ultrasonic transducers (CMUTs)) able to generate and detect pressure waves).

Referring to claim 13, Invensense in vies of Koninlklijke teaches the ultrasound fingerprint apparatus of claim 1 Invensense further teaches wherein the membrane comprises silicon (para [0040]: membrane 120 also includes a mechanical support layer 112 (e.g., stiffening layer) to mechanically stiffen the layers. In various embodiments, mechanical support layer 112 may include at least one of, and without limitation, silicon, silicon oxide, silicon nitride).

Claim 17 lacks an inventive step under PCT Article 33(3) as being obvious over US 2017/0328866 A1 to INVENSENSE, INC. (hereinafter Invensense) in view of Qualcomm.

Referring to claim 17, Invensense teaches a mobile electronic device with fingerprint detection (para [0027]: fingerprint sensing system and/or mobile electronic device), comprising: a housing (para [0080]: a device 1410 includes a fingerprint sensor 1430; Figure 14A: device 1410); an ultrasound-on-a-chip device (para [0097]: an example transmit path architecture 1500 of a two-dimensional array of ultrasonic transducers, according to some embodiments...The 50 MHz frequency can be generated by an on-chip RC oscillator) disposed within the housing (para [0027]: fingerprint sensing system and/or mobile electronic device); and a display coupled to the housing (para [0080]: fingerprint sensor 1430 is disposed beneath a touch-screen display device 1415 of device 1410), wherein the ultrasound-on-a-chip device is disposed between the housing and the display (para [0080]: fingerprint sensor 1430 is disposed beneath a touch-screen display device 1415 of device 1410; para [0085]: sensing device 1430 includes an array 1450 of ultrasonic transducers (e.g., PMUT devices)). Invensense does not teach that the ultrasound device is configured to emit through the display ultrasound of a first frequency spectrum and ultrasound of a second frequency spectrum, different from the first frequency spectrum. Qualcomm teaches that the ultrasound device is configured to emit through the display ultrasound of a first frequency spectrum and ultrasound of a second frequency spectrum, different from the first frequency spectrum (para [0083]: the 1f frequency may be within a range between about 5 MHz and about 20 MHz such as 10 MHz and the 2f frequency may be within a range between about 10 MHz and 40 MHz such as 20 MHz; para [0090]: For example, a finger or other target object may be placed on the display and may be detected in some implementations using ultrasonic sensing, capacitive sensing or force sensing. However, in alternative examples, block 805 may involve detecting a touch in an area of a device other than a display such as a sidewall or backside of a device enclosure). It would have been obvious to one of ordinary skill in the art to include the first and second ultrasound frequencies of Qualcomm with the mobile electronic device of Invensense to generate image information based on the reflected portion of the first ultrasonic wave at the second frequency (Qualcomm, para [0014]: generate image information based, at least in part, on the reflected portion of the first ultrasonic wave at the second frequency). -- see next page

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US 19/64839

Supplemental Box

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-- Previous Supplemental Box --

Claims 4-7 lack an inventive step under PCT Article 33(3) as being obvious over Invensense in view of Koninlklijke and in further view of Qualcomm.

Referring to claim 4, Invensense in view of Koninlklijke teaches the ultrasound fingerprint apparatus of claim 1. Neither Invensense nor Koninlklijke teach integrated circuitry disposed in the substrate and configured to provide a first drive signal of a first frequency to the first electrode and a second drive signal of a second frequency to the second electrode. Qualcomm teaches integrated circuitry disposed in the substrate and configured to provide a first drive signal of a first frequency to the first electrode and a second drive signal of a second frequency to the second electrode (para [0087]: The substrate 760 may have TFT or silicon-based circuitry for driving and sensing the PMUT 700 a and for generating a visual display... frequencies... may span both 1f and 2f). It would have been obvious to one of ordinary skill in the art to include the first and second frequencies of Qualcomm with the ultrasound fingerprint apparatus of Invensense in view of Koninlklijke to generate image information based on the reflected portion of the first ultrasonic wave at the second frequency (see Qualcomm, para [0014]: control system may be configured to generate image information based, at least in part, on the reflected portion of the first ultrasonic wave at the second frequency).

Referring to claim 5, Invensense in view of Koninlklijke and in further view of Qualcomm teach the ultrasound fingerprint apparatus of claim 4. Qualcomm further teaches wherein the first drive signal is of a higher frequency than the second drive signal (para [0083]: the 1f frequency may be within a range between about 5 MHz and about 20 MHz such as 10 MHz and the 2f frequency may be within a range between about 10 MHz and 40 MHz such as 20 MHz).

Referring to claim 6, Invensense in view of Koninlklijke and in further view of Qualcomm teach the ultrasound fingerprint apparatus of claim 5. Qualcomm further teaches wherein the first drive signal is of a frequency between 10 MHz and 40 MHz (para [0083]: the 2f frequency may be within a range between about 10 MHz and 40 MHz such as 20 MHz) and wherein the second drive signal is of a frequency between 1 MHz and 10 MHz (para [0083]: the 1f frequency may be within a range between about 5 MHz and about 20 MHz such as 10 MHz).

Referring to claim 7, Invensense in view of Koninlklijke and in further view of Qualcomm teaches the ultrasound fingerprint apparatus of claim 4. Invensense further teaches wherein the integrated circuitry is disposed in the substrate (para [0062]: an integrated fingerprint sensor formed by wafer bonding a substrate 1340 CMOS logic wafer) beneath the micromachined ultrasonic transducer cavity (para [0062]: a MEMS wafer defining PMUT devices having a common edge support 1302 and separate interior support 1304; Figure 13: CMOS, MEMS).

Claim 12 lacks an inventive step under PCT Article 33(3) as being obvious over Invensense in view of Koninlklijke and in further view of US 2016/0009544 A1 to BUTTERFLY NETWORK INC. (hereinafter Butterfly).

Referring to claim 12, Invensense in view of Schneider teaches the ultrasound fingerprint apparatus of claim 1. Neither Invensense nor Schneider teach wherein the cavity has a width of between 5 microns and 500 microns. Butterfly teaches herein the cavity has a width of between 5 microns and 500 microns (para [0106]: the cavities 306 may have widths W...between approximately 20 microns and approximately 100 microns). It would have been obvious to one of ordinary skill in the art to include the cavity width of Butterfly with the ultrasound fingerprint sensing of Invensense in view of Koninlklijke to operate at a target frequency (Butterfly, para [0106]: The ratio may be selected to provide desired operation of the transducer membrane, for example operation at a target frequency).

Claims 18 lack an inventive step under PCT Article 33(3) as being obvious over Invensense in view of Qualcomm and in further view of Koninlklijke

Referring to claim 18, Invensense in view of Qualcomm teaches the mobile electronic device of claim 17. Invensense further teaches wherein the ultrasound-on-a-chip device (para [0097]: an example transmit path architecture 1500 of a two-dimensional array of ultrasonic transducers, according to some embodiments...The 50 MHz frequency can be generated by an on-chip RC oscillator) comprises:
a micromachined ultrasonic transducer (para [0032]:piezoelectric micromachined ultrasonic transducer (PMUT)) comprising:
a substrate having a cavity (para [0038]: a substrate 140 to define a cavity 130; Figure 1: cavity 130, substrate 140); a membrane coupled to the substrate such that the cavity separates the membrane from at least a portion of the substrate (para [0038]: a PMUT device 100 having a center pinned membrane, according to some embodiments. PMUT device 100 includes an interior pinned membrane 120 positioned over a substrate 140 to define a cavity 130; Figure 1: cavity 130, substrate 140); and first and second electrodes (para [0039]: lower electrode 106 and upper electrode 108). Invensense does not teach wherein providing a first electrical signal to the first electrode causes the transducer to produce the ultrasound of the first frequency spectrum, and wherein providing a second electrical signal to the second electrode causes the transducer to produce the ultrasound of the second frequency spectrum; or the first and second electrodes on the substrate and opposite the membrane arranged so that at least part of the first electrode is arranged within the interior of at least a portion of the second electrode. Qualcomm teaches wherein providing a first electrical signal to the first electrode causes the transducer to produce the ultrasound of the first frequency spectrum (para [0011]: the fingerprint sensor system may include a bimodal narrow bandwidth ultrasonic sensor with a first frequency range including 1f Hz and a second frequency range including 2f Hz, while diminishing some frequencies between 1f Hz and 2f Hz), and wherein providing a second electrical signal to the second electrode causes the transducer to produce the ultrasound of the second frequency spectrum (para [0011]: the fingerprint sensor system may include a bimodal narrow bandwidth ultrasonic sensor with a first frequency range including 1f Hz and a second frequency range including 2f Hz, while diminishing some frequencies between 1f Hz and 2f Hz). It would have been obvious to one of ordinary skill in the art to include the first and second ultrasound frequencies of Qualcomm with the mobile electronic device of Invensense to generate image information based on the reflected portion of the first ultrasonic wave at the second frequency (Qualcomm, para [0014]: generate image information based, at least in part, on the reflected portion of the first ultrasonic wave at the second frequency). Neither Invensense nor Qualcomm teach first and second electrodes on the substrate and opposite the membrane arranged so that at least part of the first electrode is arranged within the interior of at least a portion of the second electrode (claim 18 continued) -- see next page

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US 19/64839

Supplemental Box

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-- Previous Supplemental Box --

(claim 18 continued) Koninlklijke teaches the first and second electrodes on the substrate and opposite the membrane arranged so that at least part of the first electrode is arranged within the interior of at least a portion of the second electrode (para [0039]: In the embodiment shown in FIG. 1 a second electrode S2 is embedded into the substrate 112 in a peripheral region 302 of the CMUT cell. A third electrode S3 of the CMUT device is embedded into the substrate 112...the membrane layer 114 is fixed relative to the top face of the substrate layer 112 and configured and dimensioned so as to define a spherical or cylindrical cavity 8 between the membrane layer 114 and the substrate layer 112. The second S2 and the third S3 electrodes may be arranged in laterally spaced relation within a common plane of the substrate 112. The second electrode S2 may be configured in a ring shape within the peripheral region 302 and the third electrode S3 me be circularly configured within the central region 303 forming a concentric circle with the ring shaped third electrode S3). It would have been obvious to one of ordinary skill in the art to include the inner and outer electrodes of Koninlklijke with the ultrasound fingerprint apparatus of Invensense to reduce the lower limit of the high impedance resistor which is beneficial when multiple CMUT devices in an array are driven by one signal (Koninlklijke, para [0052]: This configuration permits reducing the lower limit of the high impedance resistor used for the "sharing" CMUT devices compared to the AC-impedance value of a single CMUT device, since now a total AC impedance is determined by the AC impedances of each sharing device connected in parallel. This embodiment may be beneficially used in a high focused ultrasound (HIFU) application or ultrasound ablation therapy, wherein multiple CMUT devices in the array may be driven by one signal supplied by the driven circuit 45').

Claims 11 and 21 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest the subject matter claimed.

The prior art for claim 11 is exemplified by Invensense and Koninlklijke.

Referring to claim 11, Invensense in view of Koninlklijke teaches the ultrasound fingerprint apparatus of claim 10. Neither Invensense nor Koninlklijke teach wherein the array of CMUTs is configured to focus an ultrasound beam within one-half of an inch of an upper surface of the array of CMUTs.
Therefore the prior art of record does not teach or fairly suggest the subject matter claimed. Accordingly since the prior art of record does not disclose all of the elements of claim 11, claim 11 meets the criteria set out in PCT Article 33(2)-(3).

The prior art for claim 21 is exemplified by Qualcomm:

Referring to claim 21, Qualcomm teaches the method of claim 19. Qualcomm does not teach wherein the ultrasound of the first frequency spectrum and the ultrasound of the second frequency spectrum probe different depths of the finger.
Therefore the prior art of record does not teach or fairly suggest the subject matter claimed. Accordingly since the prior art of record does not disclose all of the elements of claim 21, claim 21 meets the criteria set out in PCT Article 33(2)-(3).

Claims 1-21 have industrial applicability as defined by PCT Article 33(4) because the subject matter can be made or used in industry.