the insulating material out from the glasses, the terminal will establish electrical connection with the contact, activating the circuit and turning the speaker on.

[00234] In another embodiment of a switch based on mechanical force 1654, the mechanical force is the force that is used to insert 1718 a battery into the glasses. Once the battery is inserted, the speaker in the glasses will be activated. The speaker will remain on until the battery is removed, or until the power in the battery is drained.

[00235] The switch can also be activated by radiation 1654, or energies in a type of radiation, according to a number of embodiments of the invention. The radiation 1654 can be in the optical, or infrared or ultraviolet range. For example, the switch includes a photodiode or photo sensor in the glasses, and there is an opening above the photodiode. In one embodiment, the diode is activated by light getting to the diode through the opening. In another embodiment, the circuit is activated if the opening is covered to prevent light from getting to the diode.

[00236] The switch can be activated by magnetic forces 1656. For example, there can be a magnetic sensor or a Hall effect detector inside a temple proximate to a joint of a pair of glasses. FIG. 18 shows a section of a pair of glasses 1750 with such a detector 1754. The detector 1754 is electrically connected to a printed circuit board 1755. When the temple 1752 is in its extended position, as when the glasses 1750 are ready to be worn, the detector 1754 will be directly adjacent to a magnet 1756 inside a lens holder 1758 at the corresponding joint 1760. The magnet 1756 would activate the Hall effect detector 1754. In another embodiment, a magnetic switch is activated based on changing the inductance of a coil. For example, the switch includes a steel rod that can be positioned in or out of a coil. The switch's range of control is based on the position of the rod with respect to the coil.

[00237] The switch can be activated depending on electrical forces 1658. In one embodiment, the electrical force depends on capacitive effect. By changing the capacitance, the switch is turned on and off. For example, the capacitance is changed by placing one's finger over a metallic pad. In another example, by

changing the amount of overlap between two metallic sheets that are not in contact, the capacitance between the two metallic sheets will change. This then changes the range of control of the switch.

[00238] In another embodiment, the electrical force 1658 is based on resistive effect. For example, the switch is made up of a slide or a rotary potentiometer. By changing the amount of coupling, the amount of resistance is changed to reflect the range of control of the switch.

[00239] In one embodiment, the switch's activation can depend on temperature 1660. For example, the switch includes a temperature sensor. When the temperature reaches a certain point, the switch is activated.

[00240] In yet another embodiment, the switch is controlled by a remote controller. For example, the glasses include an infrared detector. The remote controller can generate infrared radiation. By aiming the controller at the detector, the infrared radiation can activate the infrared detector and the switch is activated. Or, if the user moves into the vicinity of a corresponding infrared transmitter, circuits in the glasses would be activated.

[00241] The switch can include one or more previously-described sensor or detector of different types of forces. For example, the switch can use two photo sensors. One sensor is exposed to light on the outside surface of the temple and the other is exposed to light on the inside surface of the temple, such as close to the ear. Based on their differential output, the switch is activated. As another example, there are two temperature sensors in the glasses. One is located close to a joint and the other is at the temple close to the ear. Again, the switching action depends on their differential outputs. In yet another embodiment, the glasses include more than one type of switch. There can be one type of switch, such as a mechanical switch, acting as an on/off switch, and another, such as a switch using electrical forces, as an incremental switch to change frequency.

[00242] As described, in a number of embodiments, the switch can provide different degrees or ranges of control. In one embodiment, there are two degrees of control, such as in an on/off switch. In another embodiment, there can be

multiple discrete degrees, steps or positions. For example, the switch is a roller with discrete notches to indicate different discrete positions. Or, there can be two mechanical switches, placed side-by-side. Pushing one switch will increment one step, and pushing the other will decrement one step.

[00243] In yet another embodiment, the change from one degree to the next is gradual and not noticeably discrete. This can be achieved with two (2) sensors arranged in quadrature. FIGs. 19A-19C show examples of different embodiments of such a switch based on two photodiodes or photo detectors.

[00244] FIG. 19A shows an embodiment 1800 with a wheel 1802 (roller) having clear strips, 1804, 1806 and 1808, alternating with black strips, 1810, 1812 and 1814, and two photodiodes, 1816 and 1818. Most of the wheel 1802 and the two diodes, after incorporated into the temple 1820, are covered by a piece of material 1822. The two diodes, 1816 and 1818, are exposed to ambient light through a clear window 1824. A part of the wheel 1802 is extended out of the temple 1820, allowing the wheel 1802 to be turned about its axis 1826. The wheel 1802 can have teeth for friction turning. As the wheel 1802 rotates about the axis 1826, based on the differential outputs from the diodes, the direction of movement of the wheel 1802—clockwise or counterclockwise—is determined. For example, if the wheel 1802 is rotated clockwise, the top diode 1816 senses light before the bottom 1818 senses light. On the other hand, if the wheel 1802 is rotated counterclockwise, the bottom diode 1818 senses light before the top 1816. Based on the signals from the two diodes, one would be able to tell if the wheel is being turned clockwise or counterclockwise. Clockwise can denote increase and counterclockwise can denote decrease. This embodiment can be used, for example, to change frequency. By turning the wheel 1802 clockwise, the frequency of the radio goes up. And, by turning the wheel 1802 counter-clockwise, the frequency goes down. Such a wheel 1802 is also applicable for other purposes, such as controlling the volume of a speaker.

[00245] FIG. 19B shows an embodiment 1850 with a wheel 1852 having black 1854 and reflecting 186356 strips, two photodiodes, 1858 and 1860, and a

LED 1862. Again, most of the wheel, the two diodes and the LED are covered by a sheet of material 1864. If a reflecting strip 1856, instead of a black strip 1854, goes over a diode, more light from the LED will be reflected back and received by the diode. If a black strip 1854 goes over a diode, output from the diode will be significantly reduced. Again, based on the signals from the diodes, the direction of rotation can be determined, which, in turn, can be used to indicate incrementing or decrementing outputs.

[00246] FIG. 19C shows an embodiment 1900 again using two photodiodes, 1902 and 1904, but without a wheel. The two diodes, 1902 and 1904, are exposed to ambient light unless they are covered. In this embodiment, whether the finger 1906 or another object is moving from the first diode 1902 to the second diode 1904, or from the second diode 1904 to the first diode 1902 can be determined based on the signals from the diodes. For example, the finger 1906 sliding in a forward direction would trigger a signal from the first diode 1902 before the second diode 1904. On the other hand, sliding the finger in a backward direction would trigger a signal from the second diode before the first diode. Thus, the outputs from the two diodes can show the direction of movement of the finger. One can then, for example, assign forward movement (from the first 1902 to the second 1904) as increment, and backward movement (from the second 1904 to the first 1902) as decrement.

[00247] A switch can be placed at different location on a pair of glasses. In one embodiment, the switch is positioned on one of the side surfaces of one of the temples, such as the side that is not facing the face of the user when the glasses are worn. In another embodiment, the switch is positioned on a top surface of one of the temples. In yet another embodiment, the switch is positioned at one of the joints or hinges of the glasses. For example, there is a mechanical switch at a joint. If the corresponding temple is extended, as in the position when the glasses are worn, the switch will be pressed, which can indicate that the switch has been activated.

[00248] In one embodiment, the user can be using a switch when the glasses are worn. Depending on the position and the type of switch, the user may not be able to see the switch when he is manipulating it. In one embodiment, the design of the switch takes into consideration perception. To illustrate, there are two mechanical switches on the glasses. The top surfaces of the two switches have different texture. One switch has a smooth surface and the other has a rough surface. Pushing the rough surface implies incrementing one step and pushing the smooth surface implies decrementing one step. This type of perception design is based on tactile effect. In another example, the heights of the two switches are different. The taller switch is for one effect and the shorter is for another. In yet another embodiment, the lateral position of the two switches has significance. For example, the two mechanical switches are on the top surface or edge of a temple. By pushing the switch closer to the lens holder, the volume of the speaker in the glasses goes up; and by pushing the switch further away from the lens holder, the volume of the speaker goes down. In another example, the two switches are under the two ends of a piece of materials, such as a rocker-lever, which can be plastic. Rocking the plastic piece forward is an increment motion, and rocking the plastic piece backwards is a decrement motion.

[00249] A number of embodiments have been described where information is available only for a relatively short duration of time. In one embodiment, the information is available for a longer duration of time. For example, after the short duration of time, the battery in the glasses is drained. In order to continue on running the electronics inside the glasses to get the information, the user can replace the battery in the glasses with a new battery. In this embodiment, the glasses are designed so that the battery is replaceable by the user. Or, in another embodiment, the battery is rechargeable through a connector at the glasses.

[00250] A number of embodiments have been described regarding the glasses with a speaker for providing information to the user. In one embodiment, the glasses also include one or more light emitting diodes. The LEDs can be for entertaining purposes. For example, the information provided to the user is music. If the audio signals received are beyond a certain threshold, one or more of the

LEDs will be activated. The activation of the one or more LEDs can then be synchronized to the sound of the speaker. In another example, a number of LEDs could be arranged as an array on the outside surface of one of the temples. The array could display graphics, pictures, or scrolling text. The array could also be located at other locations on the glasses, such as across the front surface or the top surface of the bridge or the lens-holders of the glasses.

[00251] In still yet another embodiment, the "being worn" sensor can be implemented as a switch. For example, the switch can utilize optical, magnetic or mechanical means. In one embodiment, the switch can be positioned at the temple of the eyewear, such as a forward end of the temple proximate to a corresponding lens holder. Different embodiments of such sensors is also described in U.S. Provisional Patent Application No. 60/583,169, filed June 26, 2004, entitled "ELECTRICAL COMPONENTS FOR USE WITH EYEWEAR, AND METHODS THEREFOR," which has been incorporated herein by reference, see, e.g., section entitled "EYEGLASSES WITH USER INPUT CAPABILITY."

[00252] In one embodiment, a pair of glasses has access to voice recognition software. The software can be embedded in (a) the glasses, (b) a base tethered to the glasses, (c) a portable device wired or wirelessly coupled to the glasses or to the base, or (d) a computing system wired or wirelessly coupled to the glasses. Or, the software or firmware can be in more than one of the above devices.

[00253] The operation of the electrical components can be on-demand. For example, the on/off switch can be voice activated. The glasses are trained to recognize specific recitation, such as specific sentences or phrases, and/or the user's voice. To illustrate, when the user says sentences like any of the following, the hearing enhancement capabilities would be automatically turned from the sleep mode to the active mode: What did you say? Louder. You said what?

[00254] There are different approaches to make a user selection, such as selection of a song. In one embodiment, the media assets/songs can be categorized in the asset player. The categorization can be based on the names of artists, albums and/or songs. The categorization can be hierarchical, with multiple

levels in the hierarchy. To illustrate, assume that there are three levels. The top level can be the name of a singer; the second level can be the time periods when the assets were produced, and the third level can be the names of the songs. The entries, such as the name of the singer, can be abbreviated. There can be a small display and a control knob to allow a user to scroll down entries in a level. By pushing the knob, the user selects an entry, which can lead the user to a lower level. There can be an entry for moving up a level also. In another embodiment, the display is a touch-screen display, allowing entries to be entered directly on the display. In yet another embodiment, entries can be selected based on voice recognition.

[00255] In another embodiment, information can be searched. The search can be based on one or more key words. As an example, the information is related to songs. A user can search by the name of the song, the name of the artists or music genre. Entry for the search term can be through voice recognition applications in the glasses. Based on the term verbalized by the user, a song will be selected. The glasses can ask the user if that is the song the user has selected. If the response is positive, the song will be played. If not, the glasses will ask the user to verbalize the term again. In another embodiment, entering the search terms is through the key pad of a portable device, wired or wirelessly, coupled to the glasses.

[00256] The various aspects, embodiments, implementations and features of the invention noted above can be combined in various ways or used separately. Those skilled in the art will understand from the description that the invention can be equally applied to or used in other various different settings with respect to various combinations, aspects, embodiments, implementations or features provided in the description herein.

[00257] Certain aspects of the invention can be implemented in software, hardware or a combination of hardware and software. Certain aspects of the invention can also be embodied as computer readable code on a computer readable medium. The computer readable medium is any data storage device that

can store data which can thereafter be read by a computer system. Examples of the computer readable medium include read-only memory, random-access memory, CD-ROMs, magnetic tape, optical data storage devices, and carrier waves. The computer readable medium can also be distributed over network-coupled computer systems so that the computer readable code is stored and executed in a distributed fashion.

[00258] The advantages of the invention are numerous. Different embodiments or implementations may yield one or more of the following advantages. One advantage of the invention is that electrical components can be provided integral with or attached to a temple arrangement, a temple adapter or a removable temple part for use with a pair of eyeglasses. Another advantage of the invention is that after-market changes to electrical capabilities of eyeglasses can be relatively easily achieved. Another advantage of the invention is that communication, computation, information capturing or sensing, and/or operational capabilities can be provided for eyeglasses without substantial interference to style or design choices of the glasses. Still another advantage of the invention is that wireless communications, radiation monitoring, fitness monitoring and/or health monitoring can be supported by the electrical components. Yet another advantage of the invention is the ability to provide hands-free wireless communications capability.

[00259] As noted above, this application incorporates by reference, each of the following: (i) U.S. Patent Application 10/822,218 (now U.S. Patent No. 10/822,218), filed April 12, 2004, and entitled "EYEGLASSES FOR WIRELESS COMMUNICATIONS;" (ii) U.S. Patent Application No. 10/964,011 (now U.S. Patent No. 7,192,136), filed October 12, 2004, and entitled "TETHERED ELECTRICAL COMPONENTS FOR EYEGLASSES;" (iii) U.S. Patent No. 7,116,976; (iv) U.S. Patent No. 7,500,746; (v) U.S. Patent Application No. 11/078,857, filed March 11, 2005, and entitled "RADIATION MONITORING SYSTEM;" (vi) U.S. Patent Application No. 11/183,283, filed July 15, 2005, and entitled "EVENT EYEGLASSES;" (vii) U.S. Patent No. 7,760,898; (viii) U.S. Patent

No. 7,500,747; (ix) U.S. Patent No. 7,380,936; (x) U.S. Patent No. 7,255,437; and (xi) U.S. Patent No. 7,806,525.

[00260] Numerous specific details are set forth in order to provide a thorough understanding of the present invention. However, it will become obvious to those skilled in the art that the invention may be practiced without these specific details. The description and representation herein are the common meanings used by those experienced or skilled in the art to most effectively convey the substance of their work to others skilled in the art. In other instances, well-known methods, procedures, components, and circuitry have not been described in detail to avoid unnecessarily obscuring aspects of the present invention.

[00261] In the foregoing description, reference to “one embodiment” or “an embodiment” means that a particular feature, structure, or characteristic described in connection with the embodiment can be included in at least one embodiment of the invention. The appearances of the phrase “in one embodiment” in various places in the specification are not necessarily all referring to the same embodiment, nor are separate or alternative embodiments mutually exclusive of other embodiments. Further, the order of blocks in process flowcharts or diagrams representing one or more embodiments of the invention do not inherently indicate any particular order nor imply any limitations in the invention.

[00262] Many features and advantages of the present invention are apparent from the written description. Since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation as illustrated and described. Hence, all suitable modifications and equivalents may be resorted to as falling within the scope of the invention.

What is claimed is:

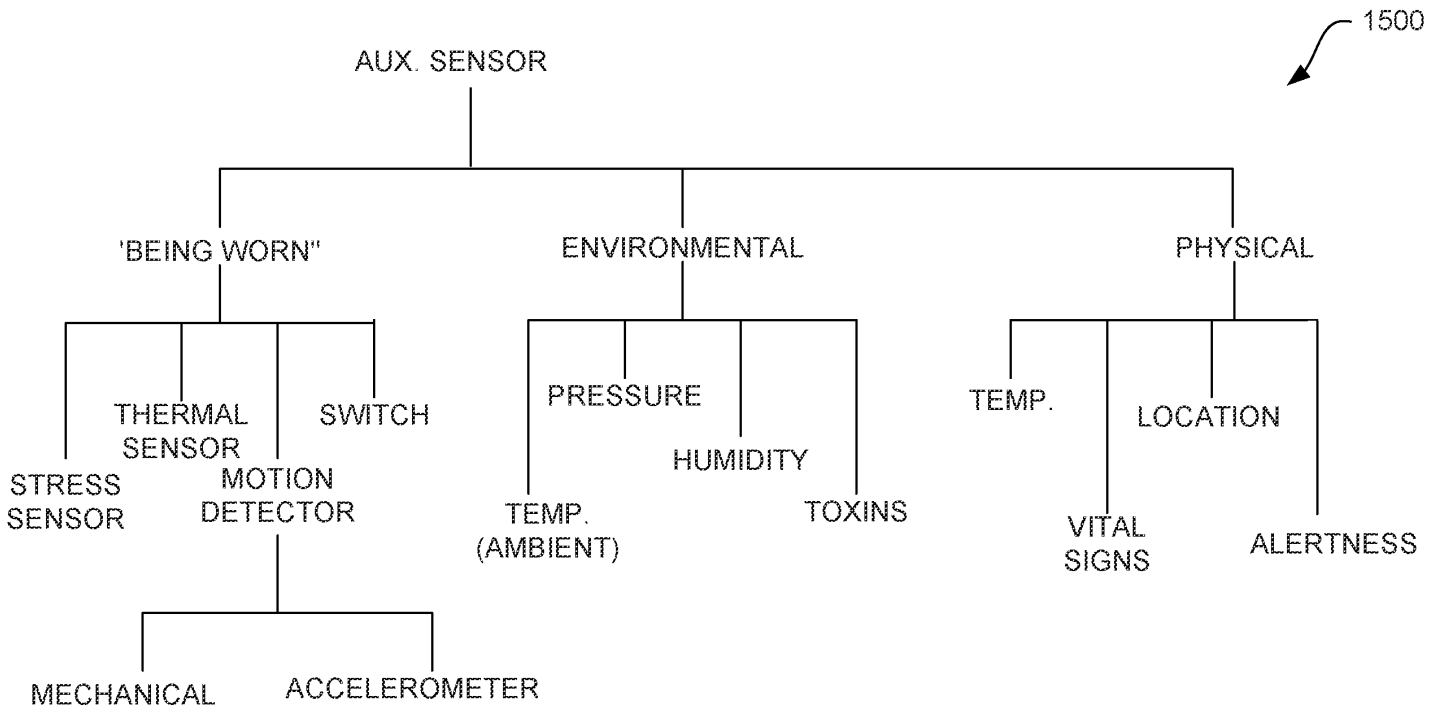


FIG. 14

NEW SHEET

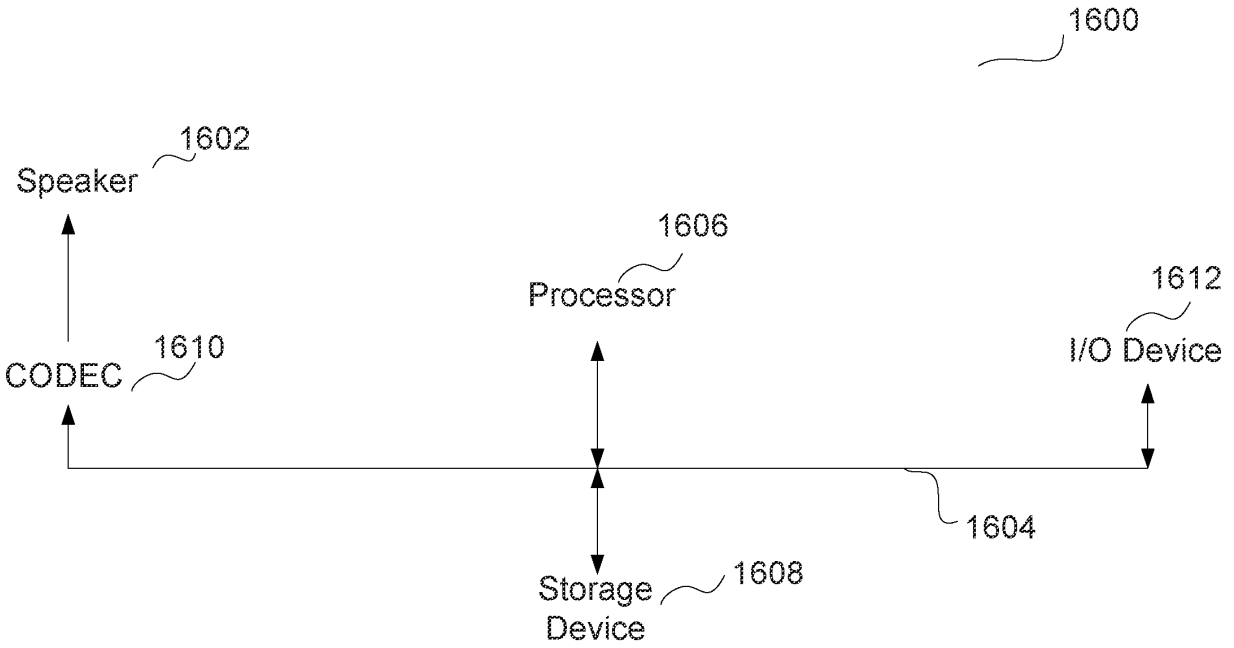
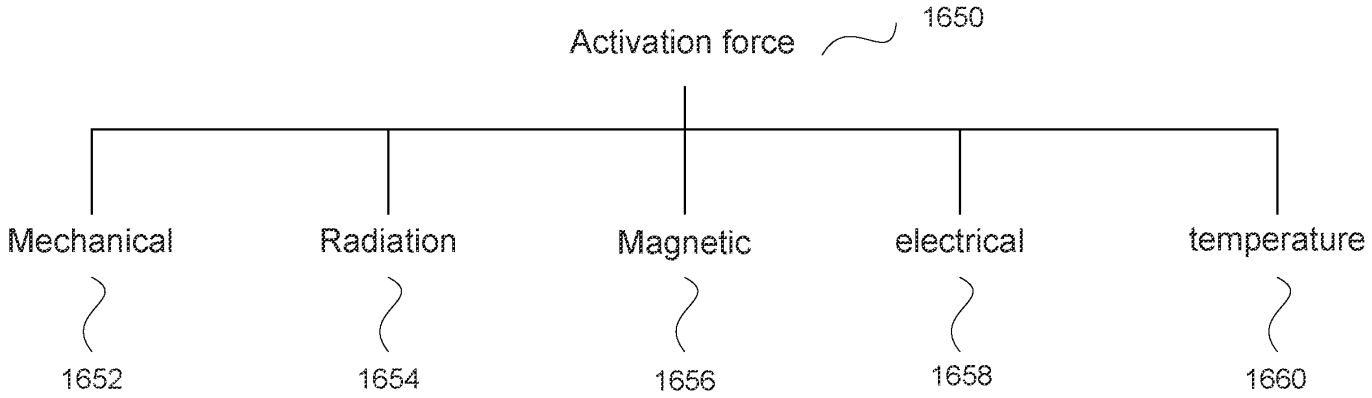


FIG. 15

NEW SHEET



NEW SHEET

FIG. 16

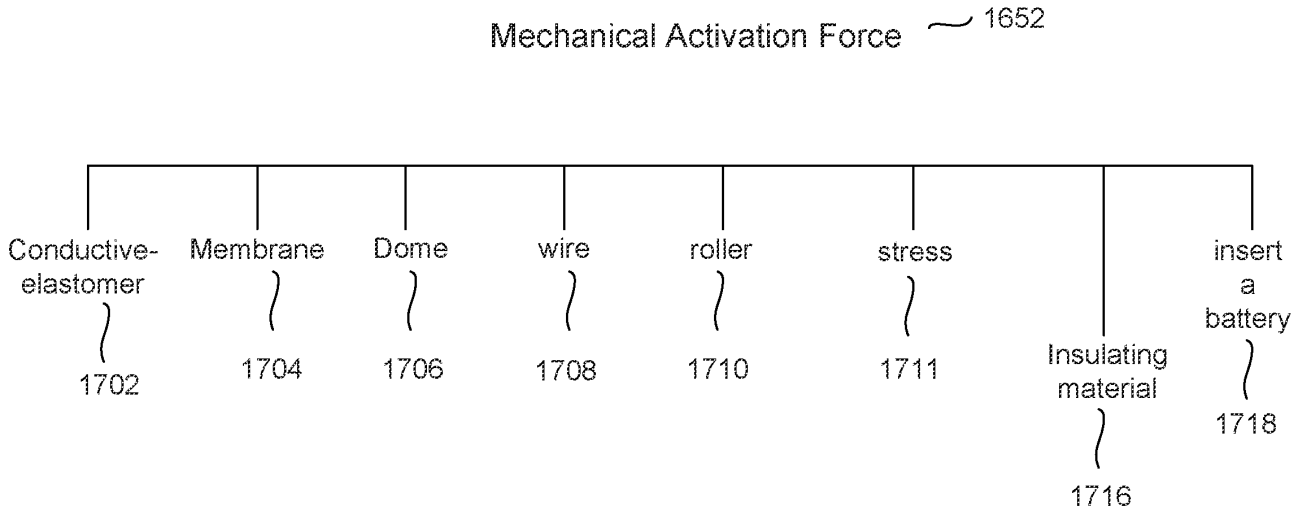


FIG. 17

NEW SHEET

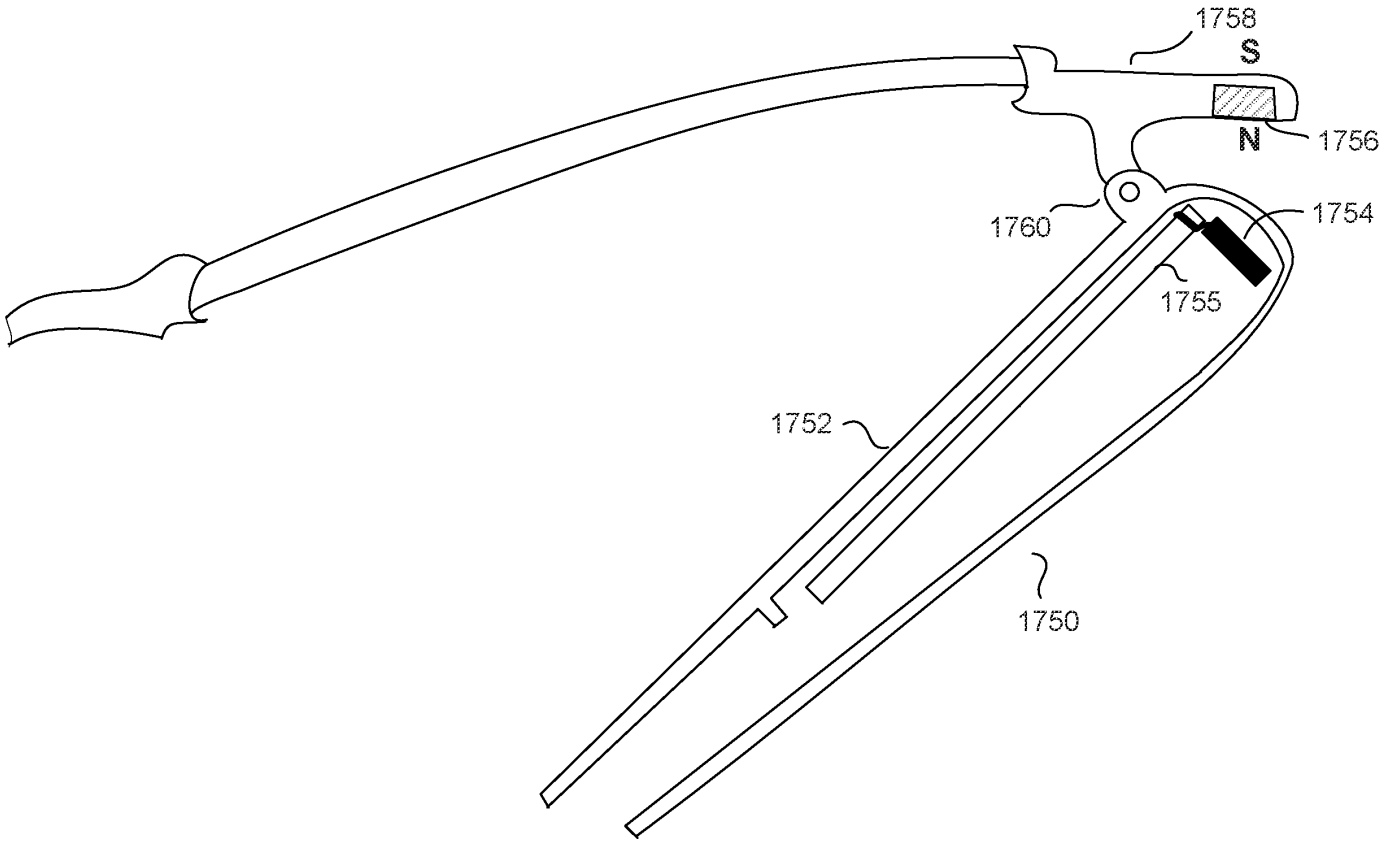


FIG. 18

NEW SHEET

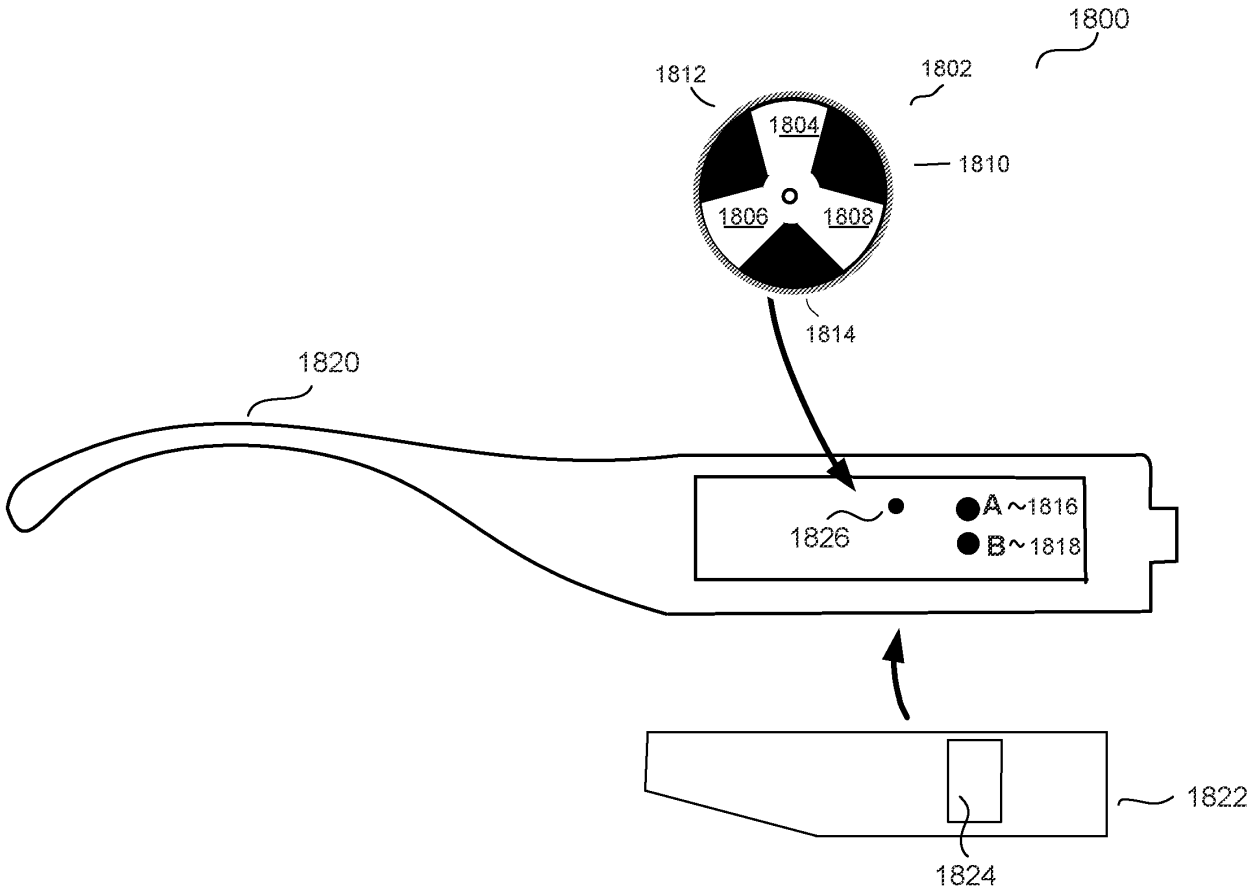


FIG. 19A

NEW SHEET

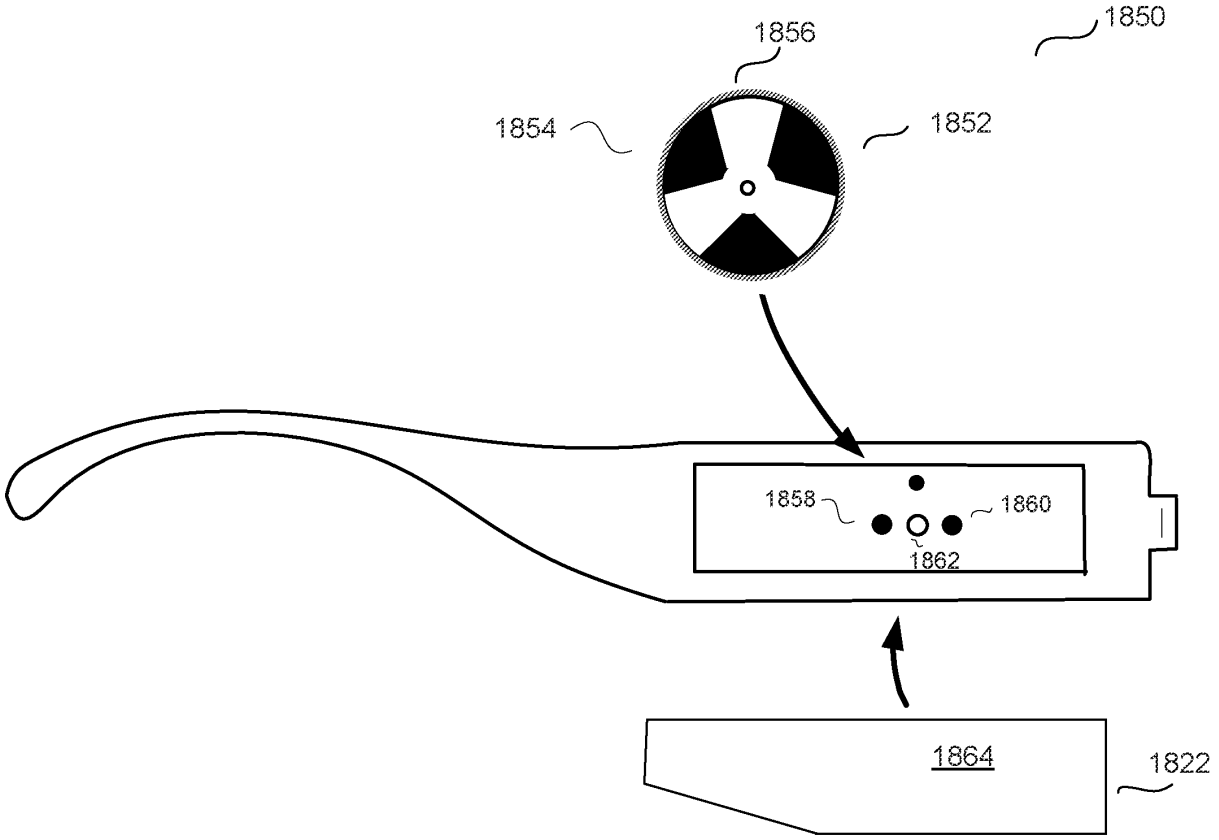


FIG. 19B

NEW SHEET

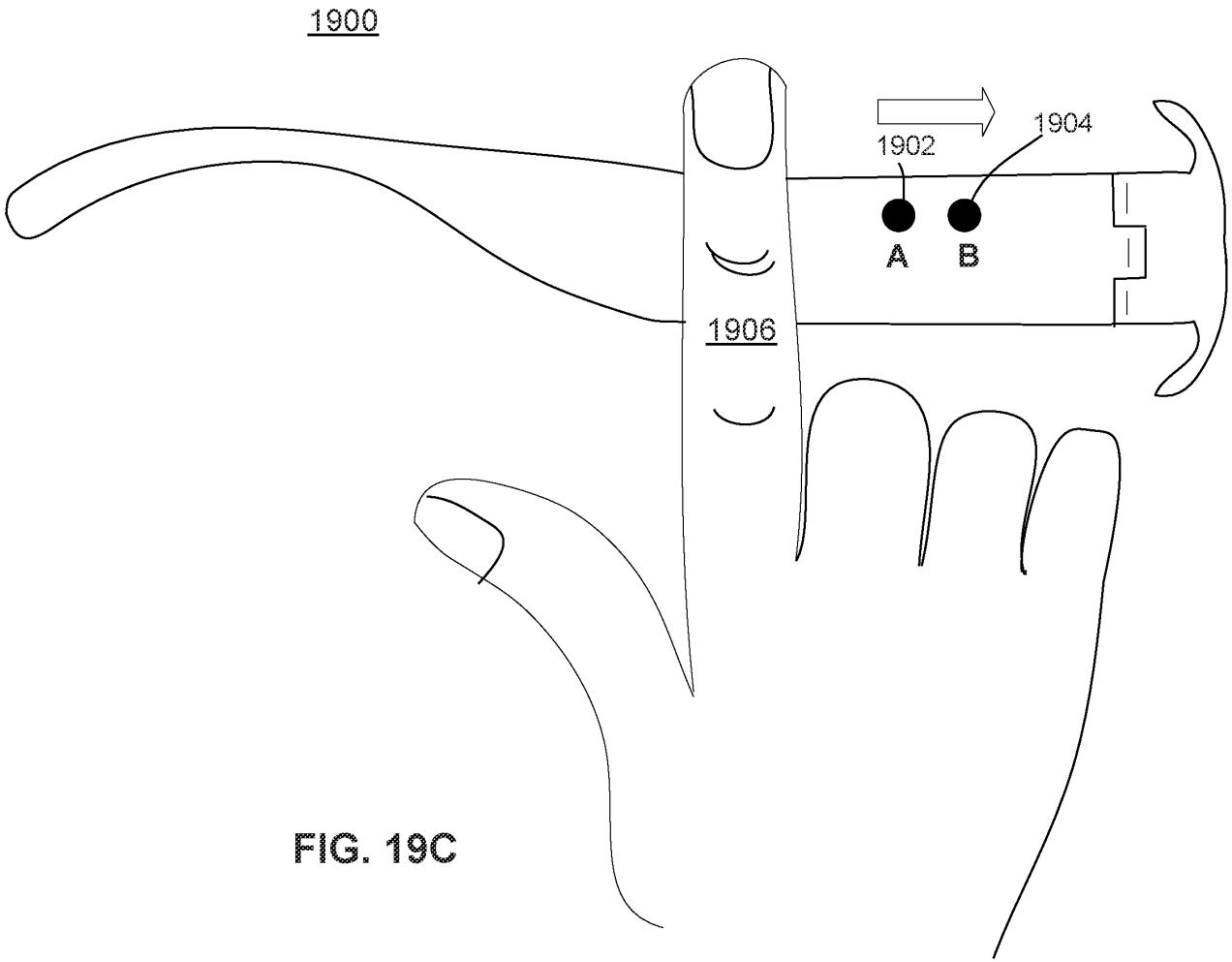


FIG. 19C

NEW SHEET

SYSTEM FOR CHARGING EMBEDDED BATTERY IN WIRELESS HEAD-WORN PERSONAL ELECTRONIC APPARATUS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of U.S. Patent Application No. 16/182,969, filed November 7, 2018, and entitled "EYEWEAR HOUSING FOR CHARGING EMBEDDED BATTERY IN EYEWEAR FRAME" which is incorporated herein by reference, which in turn is a continuation of U.S. Patent Application No. 16/127,957, now U.S. Patent No. 11,086,147, filed September 11, 2018, and entitled "EYEWEAR SUPPORTING ELECTRICAL COMPONENTS AND APPARATUS THEREFOR" which is incorporated herein by reference, which in turn is a continuation of U.S. Patent Application No. 14/715,501, now U.S. Patent No. 10,330,956, filed May 18, 2015, and entitled "EYEWEAR SUPPORTING ELECTRICAL COMPONENTS AND APPARATUS THEREFOR" which is incorporated herein by reference, which in turn is a continuation of U.S. Patent Application No. 13/367,346, filed February 6, 2012, now U.S. Patent No. 9,033,493, and entitled "EYEWEAR SUPPORTING ELECTRICAL COMPONENTS AND APPARATUS THEREFOR" which is incorporated herein by reference, which in turn is a continuation of U.S. Patent Application No. 12/462,286, filed July 31, 2009, now U.S. Patent No. 8,109,629, and entitled "EYEWEAR SUPPORTING ELECTRICAL COMPONENTS AND APPARATUS THEREFOR" which is incorporated herein by reference, which in turn is a continuation of U.S. Patent Application No. 11/580,222, filed October 11, 2006, now U.S. Patent No. 7,581,833, and entitled "EYEWEAR SUPPORTING AFTER-MARKET ELECTRICAL COMPONENTS" which is hereby incorporated herein by reference.

[0002] This application and U.S. Patent Application No. 11/580,222 references U.S. Patent Application No. 11/183,269, filed July 15, 2005, now U.S. Patent No. 7,922,321, and entitled "EYEGLASSES SUPPORTING AFTER MARKET ELECTRICAL COMPONENTS," which is hereby incorporated herein by reference,

which references U.S. Patent Application No. 10/964,011, filed October 12, 2004, now U.S. Patent No. 7,192,136, and entitled "TETHERED ELECTRICAL COMPONENTS FOR EYEGLASSES" which is hereby incorporated herein by reference, which in turn references each of: (i) U.S. Provisional Patent Application No. 60/509,631, filed October 9, 2003, and entitled "TETHERED ELECTRICAL COMPONENTS FOR EYEGLASSES," which is hereby incorporated herein by reference; (ii) U.S. Provisional Patent Application No. 60/527,565, filed December 8, 2003, and entitled "ADAPTABLE COMMUNICATION TECHNIQUES FOR ELECTRONIC DEVICES," which is hereby incorporated herein by reference; (iii) U.S. Provisional Patent Application No. 60/562,798, filed April 15, 2004, entitled "EYEWEAR WITH ULTRAVIOLET DETECTION SYSTEM," and which is hereby incorporated herein by reference; (iv) U.S. Provisional Patent Application No. 60/583,169, filed June 26, 2004, entitled "ELECTRICAL COMPONENTS FOR USE WITH EYEWEAR, AND METHODS THEREFOR," and which is hereby incorporated herein by reference; (v) U.S. Provisional Patent Application No. 60/592,045, filed July 28, 2004, entitled "EYEGLASSES WITH A CLOCK OR OTHER ELECTRICAL COMPONENT," and which is hereby incorporated herein by reference; and (vi) U.S. Provisional Patent Application No. 60/605,191, filed August 28, 2004, entitled "ELECTRICAL COMPONENTS FOR USE WITH EYEWEAR, AND METHODS THEREFOR," and which is hereby incorporated herein by reference.

[0003] This application and U.S. Patent Application No. 11/580,222 also claim priority to each of: (i) U.S. Provisional Patent Application No. 60/725,999, filed October 11, 2005, and entitled "EYEWEAR SUPPORTING AFTER-MARKET ELECTRICAL COMPONENTS," which is hereby incorporated herein by reference; (ii) U.S. Provisional Patent Application No. 60/725,896, filed October 11, 2005, and entitled "EYEGLASSES WITH ELECTRICAL COMPONENTS," which is hereby incorporated herein by reference; (iii) U.S. Provisional Patent Application No. 60/787,850, filed April 1, 2006, and entitled "EYEGLASSES WITH A HEART RATE MONITOR," which is hereby incorporated herein by reference; and (iv) U.S. Provisional Patent Application No. 60/846,150, filed September 20, 2006, and

entitled "EYEGLASSES WITH ACTIVITY MONITORING," which is hereby incorporated herein by reference.

[0004] This application, by way of U.S. Patent Application No. 16/182,969, is a continuation of U.S. Patent Application No. 16/049,120, filed July 30, 2018, and entitled "EYEWEAR SUPPORTING EMBEDDED ELECTRONIC COMPONENTS," which is hereby incorporated herein by reference, which in turn is a continuation of U.S. Patent Application No. 15/375,423, filed December 12, 2016, and entitled "EYEWEAR SUPPORTING EMBEDDED ELECTRONIC COMPONENTS," which is hereby incorporated herein by reference, which in turn is a continuation of U.S. Patent Application No. 14/557,409, filed December 1, 2014, and entitled "EYEWEAR SUPPORTING EMBEDDED ELECTRONIC COMPONENTS," now U.S. Patent No. 9,547,184, which is hereby incorporated herein by reference, which in turn is a continuation of U.S. Patent Application No. 13/955,336, filed July 31, 2013, and entitled "EYEWEAR SUPPORTING BONE CONDUCTING SPEAKER," now U.S. Patent No. 8,905,542, which is hereby incorporated herein by reference, which in turn is a continuation of U.S. Patent Application No 13/085,402, filed April 12, 2011, and entitled "EYEWEAR SUPPORTING AFTER-MARKET ELECTRICAL COMPONENTS," now U.S. Patent No. 8,500,271, which is hereby incorporated herein by reference, which in turn references U.S. Patent Application No. 11/183,269, filed July 15, 2005, and entitled "EYEWEAR SUPPORTING AFTER-MARKET ELECTRICAL COMPONENTS," now U.S. Patent No. 7,922,321, which is hereby incorporated herein by reference, which in turn references U.S. Patent Application No. 10/964,011, filed October 12, 2004, and entitled "TETHERED ELECTRICAL COMPONENTS FOR EYEGLASSES," now U.S. Patent No. 7,192,136, which in turn references each of: (i) U.S. Provisional Patent Application No. 60/509,631, filed October 9, 2003, and entitled "TETHERED ELECTRICAL COMPONENTS FOR EYEGLASSES," which is hereby incorporated herein by reference; (ii) U.S. Provisional Patent Application No. 60/527,565, filed December 8, 2003, and entitled "ADAPTABLE COMMUNICATION TECHNIQUES FOR ELECTRONIC DEVICES," which is hereby incorporated herein by reference; (iii) U.S. Provisional

Patent Application No. 60/562,798, filed April 15, 2004, entitled "EYEWEAR WITH ULTRAVIOLET DETECTION SYSTEM," which is hereby incorporated herein by reference; (iv) U.S. Provisional Patent Application No. 60/583,169, filed June 26, 2004, entitled "ELECTRICAL COMPONENTS FOR USE WITH EYEWEAR, AND METHODS THEREFOR," which is hereby incorporated herein by reference; and (v) U.S. Provisional Patent Application No. 60/592,045, filed July 28, 2004, entitled "EYEGLASSES WITH A CLOCK OR OTHER ELECTRICAL COMPONENT," which is hereby incorporated herein by reference; and (vi) U.S. Provisional Patent Application No. 60/605,191, filed August 28, 2004, entitled "ELECTRICAL COMPONENTS FOR USE WITH EYEWEAR, AND METHODS THEREFOR," which is hereby incorporated herein by reference.

[0005] This application, by way of U.S. Patent Application No. 11/183,269, also references each of: (i) U.S. Provisional Patent Application No. 60/592,045, filed July 28, 2004, entitled "EYEGLASSES WITH A CLOCK OR OTHER ELECTRICAL COMPONENT," which is hereby incorporated herein by reference; (ii) U.S. Provisional Patent Application No. 60/605,191, filed August 28, 2004, entitled "ELECTRICAL COMPONENTS FOR USE WITH EYEWEAR, AND METHODS THEREFOR," which is hereby incorporated herein by reference; (iii) U.S. Provisional Patent Application No. 60/618,107, filed October 12, 2004, and entitled "TETHERED ELECTRICAL COMPONENTS FOR EYEGLASSES," which is hereby incorporated herein by reference; (iv) U.S. Provisional Patent Application No. 60/620,238, filed October 18, 2004, entitled "EYEGLASSES WITH HEARING ENHANCED AND OTHER AUDIO SIGNAL-GENERATING CAPABILITIES," which is hereby incorporated herein by reference; (v) U.S. Provisional Patent Application No. 60/647,836, filed January 31, 2005, and entitled "EYEGLASSES WITH HEART RATE MONITOR," which is hereby incorporated herein by reference; and (vi) U.S. Provisional Patent Application No. 60/647,826, filed January 31, 2005, and entitled "EYEWEAR WITH ELECTRICAL COMPONENTS," which is hereby incorporated herein by reference.

[0006] This application, by way of U.S. Patent Application No. 16/182,969, is a continuation of U.S. Patent Application No. 15/409,723, filed January 19, 2017,

and entitled "EYEWEAR HOUSING FOR CHARGING EMBEDDED BATTERY IN EYEWEAR FRAME" which is hereby incorporated herein by reference, which in turn is a continuation of U.S. Patent Application No. 13/831,512, filed March 14, 2013, and entitled "EYEWEAR SUPPORTING AFTER-MARKET ELECTRICAL COMPONENTS" which is hereby incorporated herein by reference, which in turn is a continuation of U.S. Patent Application No. 12/806,312, filed August 10, 2010, and entitled "EYEWEAR WITH MULTI-PART TEMPLE FOR SUPPORTING ONE OR MORE ELECTRICAL COMPONENTS" (now U.S. Patent No. 8,465,151) which is hereby incorporated herein by reference, which in turn is a continuation-in-part of U.S. Patent Application No. 12/462,286, filed July 31, 2009, and entitled "EYEWEAR SUPPORTING ELECTRICAL COMPONENTS AND APPARATUS THEREFOR" (now U.S. Patent No. 8,109,629) which is hereby incorporated herein by reference, which in turn is a continuation of U.S. Patent Application No. 11/580,222, filed October 11, 2006, and entitled "EYEWEAR SUPPORTING AFTER-MARKET ELECTRICAL COMPONENTS" (now U.S. Patent No. 7,581,833) which is hereby incorporated herein by reference.

[0007] This application, by way of U.S. Patent Application No. 10/964,011, also references each of: (i) U.S. Provisional Patent Application No. 60/509,631, filed October 9, 2003, and entitled "TETHERED ELECTRICAL COMPONENTS FOR EYEGLASSES," which is hereby incorporated herein by reference; (ii) U.S. Provisional Patent Application No. 60/527,565, filed December 8, 2003, and entitled "ADAPTABLE COMMUNICATION TECHNIQUES FOR ELECTRONIC DEVICES," which is hereby incorporated herein by reference; (iii) U.S. Provisional Patent Application No. 60/562,798, filed April 15, 2004, entitled "EYEWEAR WITH ULTRAVIOLET DETECTION SYSTEM," and which is hereby incorporated herein by reference; (iv) U.S. Provisional Patent Application No. 60/583,169, filed June 26, 2004, entitled "ELECTRICAL COMPONENTS FOR USE WITH EYEWEAR, AND METHODS THEREFOR," and which is hereby incorporated herein by reference; (v) U.S. Provisional Patent Application No. 60/592,045, filed July 28, 2004, entitled "EYEGLASSES WITH A CLOCK OR OTHER ELECTRICAL COMPONENT," and which is hereby incorporated herein by reference; and (vi)

U.S. Provisional Patent Application No. 60/605,191, filed August 28, 2004, entitled "ELECTRICAL COMPONENTS FOR USE WITH EYEWEAR, AND METHODS THEREFOR," and which is hereby incorporated herein by reference.

[0008] This application via U.S. Patent Application No. 12/806,312 is also a continuation-in-part of U.S. Patent Application No. 12/317,043, filed December 18, 2008, and entitled "EYEGLASSES WITH MONITORING CAPABILITY," (now U.S. Patent No. 7,771,046) which is hereby incorporated herein by reference, which in turn is a continuation of U.S. Patent Application No. 12/214,435, filed June 19, 2008, and entitled "EYEGLASSES WITH USER MONITORING," (now U.S. Patent No. 7,481,531), which is hereby incorporated herein by reference, which in turn is a continuation of U.S. Patent Application No. 11/891,411, filed August 9, 2007, and entitled "EYEGLASSES WITH ACTIVITY MONITORING" (now U.S. Patent No. 7,401,918), which is hereby incorporated herein by reference, which in turn references U.S. Patent Application No. 11/183,276, filed July 15, 2005, and entitled "EYEGLASSES WITH ACTIVITY MONITORING" (now U.S. Patent No. 7,255,437), which is hereby incorporated herein by reference, which in turn references U.S. Patent Application No. 10/964,011, filed October 12, 2004, and entitled "TETHERED ELECTRICAL COMPONENTS FOR EYEGLASSES" (now U.S. Patent No. 7,192,136), which is hereby incorporated herein by reference.

[0009] This application via U.S. Patent Application No. 11/183,276 also references each of: (i) U.S. Provisional Patent Application No. 60/592,045, filed July 28, 2004, entitled "EYEGLASSES WITH A CLOCK OR OTHER ELECTRICAL COMPONENT," and which is hereby incorporated herein by reference; (ii) U.S. Provisional Patent Application No. 60/605,191, filed August 28, 2004, entitled "ELECTRICAL COMPONENTS FOR USE WITH EYEWEAR, AND METHODS THEREFOR," and which is hereby incorporated herein by reference; (iii) U.S. Provisional Patent Application No. 60/618,107, filed October 12, 2004, and entitled "TETHERED ELECTRICAL COMPONENTS FOR EYEGLASSES," which is hereby incorporated herein by reference; (iv) U.S. Provisional Patent Application No. 60/620,238, filed October 18, 2004, entitled "EYEGLASSES WITH HEARING ENHANCED AND OTHER AUDIO SIGNAL-GENERATING CAPABILITIES," and

which is hereby incorporated herein by reference; (v) U.S. Provisional Patent Application No. 60/647,836, filed January 31, 2005, and entitled "EYEGLASSES WITH HEART RATE MONITOR," which is hereby incorporated herein by reference; and (vi) U.S. Provisional Patent Application No. 60/647,826, filed January 31, 2005, and entitled "EYEWEAR WITH ELECTRICAL COMPONENTS," which is hereby incorporated herein by reference.

[0010] This application via U.S. Patent Application No. 12/806,312 also references U.S. Patent Application No. 10/822,218, filed April 12, 2004, and entitled "EYEGLASSESS FOR WIRELESS COMMUNCIATIONS," (now U.S. Patent No. 7,792,552, which is hereby incorporated herein by reference, which in turn references each of: (i) U.S. Provisional Patent Application No. 60/462,591, filed April 15, 2003, and entitled "EYEGLASSES FOR WIRELESS COMMUNICATION," which is hereby incorporated herein by reference; (ii) U.S. Provisional Patent Application No. 60/509,631, filed October 9, 2003, and entitled "TETHERED ELECTRICAL COMPONENTS FOR EYEGLASSES," which is hereby incorporated herein by reference; and (iii) U.S. Provisional Patent Application No. 60/527,565, filed December 8, 2003, and entitled "ADAPTABLE COMMUNICATION TECHNIQUES FOR ELECTRONIC DEVICES," which is hereby incorporated herein by reference.

[0011] In addition, this application is related to each of: (i) U.S. Patent Application 10/822,218, filed April 12, 2004, and entitled "EYEGLASSES FOR WIRELESS COMMUNICATIONS," which is hereby incorporated herein by reference; (ii) U.S. Patent Application No. 10/964,011, filed October 12, 2004, and entitled "TETHERED ELECTRICAL COMPONENTS FOR EYEGLASSES," which is hereby incorporated herein by reference; (iii) U.S. Patent Application No. 11/006,343, filed December 7, 2004, and entitled "ADAPTABLE COMMUNICATION TECHNIQUES FOR ELECTRONIC DEVICES," (now U.S. Patent No. 7,116,976) which is hereby incorporated herein by reference; (iv) U.S. Patent Application No. 11/078,855, filed March 11, 2005, and entitled "EYEWEAR WITH RADIATION DETECTION SYSTEM," (now U.S. Patent No. 7,500,746) which is hereby incorporated herein by reference; (v) U.S. Patent Application No.

11/078,857, filed March 11, 2005, and entitled "RADIATION MONITORING SYSTEM," which is hereby incorporated herein by reference; (vi) U.S. Patent Application No. 11/183,283, filed July 15, 2005, and entitled "EVENT EYEGLASSES," which is hereby incorporated herein by reference; (vii) U.S. Patent Application No. 11/183,262, filed July 15, 2005, and entitled "EYEGLASSES WITH HEARING ENHANCED AND OTHER AUDIO SIGNAL-GENERATING CAPABILITIES," (now U.S. Patent No. 7,760,898) which is hereby incorporated herein by reference; (viii) U.S. Patent Application No. 11/183,256, filed July 15, 2005, and entitled "EYEGLASSES WITH ELECTRICAL COMPONENTS," (now U.S. Patent No. 7,500,747) which is hereby incorporated herein by reference; (ix) U.S. Patent Application No. 11/183,263, filed July 15, 2005, and entitled "EYEGLASSES WITH A CLOCK OR OTHER ELECTRICAL COMPONENT," (now U.S. Patent No. 7,380,936) which is hereby incorporated herein by reference; (x) U.S. Patent Application No. 11/183,276, filed July 15, 2005, and entitled "EYEGLASSES WITH ACTIVITY MONITORING," now U.S. Patent No. 7,255,437) which is hereby incorporated herein by reference; and (xi) U.S. Patent Application No. 11/546,685, filed October 11, 2006, and entitled "EYEGLASSES HAVING A CAMERA", (now U.S. Patent No. 7,806,525) which is hereby incorporated herein by reference.

BACKGROUND OF THE INVENTION

[0012] Traditionally, eyeglasses have not contained or made any use of electrical components. In recent years, attempts to include electrical components within eyeglasses have had limited success. Even incorporating a small electrical component, such as a microphone, into an eyeglass frame may not be a simple task because, for example, of the necessary electrical connections with the electrical component. Clearly, larger scale electrical components would be more difficult to be provided in or attached to eyeglass frames. Many eyeglass frames tend to be very compact and lightweight and thus may not have a lot of space for electrical components. Moreover, since eyeglass frames are often fashionable items whose designs are important, there are substantial design tradeoffs involved with providing or attaching electrical components to eyeglass frames.

[0013] Even if electrical components are provided in an eyeglass frame, the ability to alter or change electrical components is problematic. Conventionally, once an eyeglass frame is manufactured, electrical components embedded in the eyeglass frame may not be removed, nor can addition electrical components be added into the eyeglass frame. Attachment of electrical components to eyeglass frames has not proven to be reliable, design friendly or commercially successful. Hence, there is a need for improved approaches to facilitate modifications or alterations to electrical components used with eyeglasses.

[0014] Typically, to participate in wireless communications, a user holds a mobile phone (e.g., wireless or a cellular phone) against his ear to hear an audio communication received in a wireless manner. The user usually also speaks towards a microphone embedded in the mobile phone to participate in the audio communication, again in a wireless manner. More recently, to facilitate hands-free operation of mobile phones, head-sets have been produced and utilized. Typically, a headset clips over or into an ear of the user to provide a speaker and a microphone in proximity to the ear and the mouth, respectively, of the user. Traditionally, the head-set was connected to the mobile phone by a cord (i.e., wire). In recent times, head-sets have been developed to operate in a wireless manner, without the need of a cord connected to the mobile phone. For example, one

popular type of wireless head-set uses Bluetooth wireless transmissions to communicate between the head-set and the corresponding mobile phone.

[0015] Mobile phones often support both voice calls and text messaging. When the user does not make use of a head-set, the user often holds the mobile phone against their ear when participating in a voice call. One problem this presents is that the user is not able to see the screen of the mobile phone. As a result, the user has difficultly interacting with the keypad or screen of the mobile phone when the mobile phone is held against the user's head. Alternatively, when the user of a mobile phone makes use of a head-set, the user can receive and participate in voice calls in a hands-free manner. Unfortunately, however, the user would need to view a screen of the mobile phone to participate in text messaging.

[0016] Accordingly, there is a need for improved wireless communication techniques for users of mobile communication devices.

SUMMARY

[0017] Generally speaking, the invention pertains to techniques for providing eyewear or other head-worn personal electronic apparatus with electrical components. The electrical components can provide electrical technology to eyewear (e.g., eyeglasses) or other head-worn personal electronic apparatus without having to substantially compromise aesthetic design principles of the eyewear. The electrical components can operate independently or together with other electrical components provided elsewhere. Apparatus can also be provided to present after-market electrical components.

[0018] The electrical components can support signal capturing, signal processing, signal transmission, signal display, signal storage and/or power provision. The signals can be, for example, analog or digital signals. The electrical components can, for example, be used to provide audio output and/or audio pick-up. The electrical components may include and/or control one or more sensors to monitor and/or signal the conditions of a user of the eyewear. The electrical components may also include and/or control one or more operation indicators to signal operational status of at least some other electrical components. In addition, the electrical components can be or pertain to a circuit board or module, which includes a plurality of electrical components.

[0019] The invention can be implemented in numerous ways, including a method, system, device, apparatus, and a computer readable medium. Several embodiments of the invention are discussed below.

[0020] Other aspects and advantages of the invention will become apparent from the following detailed description taken in conjunction with the accompanying drawings which illustrate, by way of example, the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] The invention will be readily understood by the following detailed description in conjunction with the accompanying drawings, wherein like reference numerals designate like structural elements, and in which:

[0022] FIG. 1 is a perspective view of a pair of glasses according to one embodiment of the invention.

[0023] FIG. 2 illustrates a diagram of a number of different embodiments of temple arrangements according to the invention.

[0024] FIG. 3A is a diagram of a temple arrangement according to one embodiment of the invention.

[0025] FIG. 3B is a diagram of a temple cover that at least partially covers a temple (e.g., temple and/or temple tip) according to one embodiment of the invention.

[0026] FIG. 3C is a diagram of a fit-over temple that at least partially fits over a temple (e.g., temple and/or temple tip) according to one embodiment of the invention.

[0027] FIG. 3D and 3E are diagrams of a temple arrangement according to another embodiment of the invention.

[0028] FIGs. 3F-3H are diagrams of exemplary multi-part temples according to different embodiments of the invention.

[0029] FIGs. 3I-3K are diagrams of exemplary rearward portions of multi-part temples according to several embodiments of the invention.

[0030] FIGs. 3L-3O are diagrams of exemplary forward portions of multi-part temples according to several embodiments of the invention.

[0031] FIG. 3P is a diagram of an eyewear products display apparatus according to one embodiment of the invention.

[0032] FIG. 4 shows examples of different electrical components according to the invention.

[0033] FIG. 5 is a chart that depicts examples of sensors suitable for use according to the invention.

[0034] FIG. 6 illustrates a diagram of a number of different embodiments of temple adapters according to the invention.

[0035] FIG. 7A is a diagram of a temple adapter according to one embodiment of the invention.

[0036] FIG. 7B is a diagram of a temple adapter according to another embodiment of the invention.

[0037] FIGs. 8A and 8B are diagrams of a temple adapter according to another embodiment of the invention.

[0038] FIG. 9A is a diagram of a temple adapter according to one embodiment of the invention.

[0039] FIGs. 9B and 9C are diagrams of a temple adapter according to another embodiment of the invention.

[0040] FIG. 9D is a diagram of a temple adapter according to still another embodiment of the invention.

[0041] FIGs. 10A-10C are diagrams of a temple having a bone conducting element according to still other embodiments of the invention.

[0042] FIG. 11A illustrates a pair of glasses according to one embodiment of the invention.

[0043] FIG. 11B illustrates a pair of glasses according to another embodiment of the invention.

[0044] FIGs. 12A-12E illustrate a side view of eyeglass frames having an extended temples according to several embodiment of the invention.

[0045] FIG. 13A illustrates a temple having multiple parts according to one embodiment of the invention.

[0046] FIG. 13B illustrates a portion of an eyeglass frame according to one embodiment of the invention.

[0047] FIG. 13C illustrates a portion of an eyeglass frame according to another embodiment of the invention.

[0048] FIG. 14 is a chart that depicts examples of auxiliary sensors that can be utilized with the eyewear.

[0049] FIG. 15 shows some electrical components of a player according to an embodiment of the invention.

[0050] FIG. 16 illustrates a number of forces activating a switch according to a number of embodiments of the invention.

[0051] FIG. 17 illustrates a number of mechanical forces activating a switch according to a number of embodiments of the invention.

[0052] FIG. 18 shows a Hall-effect detector at a joint of a pair of glasses according to an embodiment of the invention.

[0053] FIGs. 19A-19C illustrate different embodiments of a quadrature sensor according to the invention.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS OF THE INVENTION

[0054] The invention pertains to techniques for providing eyewear or other head-worn personal electronic apparatus with electrical components. The electrical components can provide electrical technology to eyewear (e.g., eyeglasses) or other head-worn personal electronic apparatus without having to substantially compromise aesthetic design principles of the eyewear. The electrical components can operate independently or together with other electrical components provided elsewhere. Apparatus can also be provided to present after-market electrical components.

[0055] One aspect of the invention relates to temple arrangements for use with eyeglasses. According to this aspect, a temple arrangement includes one or more electrical components. The one or more electrical components are attached to or at least partially embedded in the temple arrangement.

[0056] Another aspect of the invention relates to a temple adapter for use with eyeglasses. According to this aspect, a temple adapter includes one or more electrical components that are able to be mechanically (and optionally electrically) coupled to a temple (including a temple tip) of the eyeglasses.

[0057] Still another aspect of the invention relates to one or more swappable temple portions for a pair of glasses. In one aspect, a temple has a forward portion and a rearward portion which can removably couple to one another. In one embodiment, different rearward portions can be used with the same forward portion. In other words, the different rearward portions can be swapped with one another. In one implementation, the different rearward portions can offer different electrical components/functionalities to the pair of glasses. For example, the different rearward portions can provide different electrical components/functionalities such as: battery/power, wireless communication, radio, headset, GPS, pedometer, sun sensor, hearing enhancement, image/video capturing, etc. In another embodiment, different forward portions can be used with the same rearward portion.

[0058] The electrical components can support signal capturing, signal processing, signal transmission, signal display, signal storage and/or power provision. The signals can be, for example, analog or digital signals. The electrical components can, for example, be used to provide audio output and/or audio pick-up. The electrical components may include and/or control one or more sensors to monitor and/or signal the conditions of a user of the eyewear. The electrical components may also include and/or control one or more operation indicators to signal operational status of at least some other electrical components. In addition, the electrical components can be or pertain to a circuit board or module, which includes a plurality of electrical components.

[0059] Embodiments of different aspects of the invention are discussed below with reference to FIGs. 1 – 13C. However, those skilled in the art will readily appreciate that the detailed description given herein with respect to these figures is for explanatory purposes as the invention extends beyond these limited embodiments.

[0060] FIG. 1 is a perspective view of a pair of glasses 100 according to one embodiment of the invention. The glasses 100 include a frame and a pair of lenses 102. The frame has lens holders 104 that hold the lenses 102 in position. The frame also has a bridge 106. The glasses 100 further include a pair of temples (or arms) 108. The temples 108 are considered part of the frame. As shown in FIG. 1, each of the temples 108 is coupled to one of the lens holders 104 by a hinge 109. In one embodiment, the temples 108 can be removed from the frame (e.g., at the hinge 109).

[0061] In addition, temple arrangements 110 are attached to the temples 108. Here, one or both of the temples 108 can include a temple arrangement 110. A temple arrangement 110 can include one or more electrical components 112. In one embodiment, the temple arrangements 110 can be considered separate parts that can be attached to respective temples 108. Once attached, the temple arrangements 110 can be considered part of, or an extension to, the temples 108.

[0062] By having one or more electrical components 112 in one or more of the temple arrangements 110, electrical capabilities can be provided to the glasses 100 without burdensome impact to the design of other parts of the frames. Moreover, by providing electrical components in one or more of the temple arrangements 112, electrical capabilities can be added to eyeglasses in an after-market manner. Still further, by replacing temple arrangements, a user could alter the electrical capabilities of his eyeglasses.

[0063] In one embodiment, the glasses 100 do not have any other embedded electrical components, such as within the frame, except those in one or both of the temple arrangements 112. In another embodiment, the glasses 100 include one or more other electrical components embedded or attached to the frame of the glasses 100 and the components are electrically coupled to the one or more electrical components 112 in one or both of the temple arrangements 110.

[0064] In different embodiments, the glasses 100 can be, for example, a pair of sunglasses, fit-over glasses, prescription glasses, reading glasses, or safety glasses.

[0065] FIG. 2 illustrates a diagram of a number of different embodiments of temple arrangements 200 according to the invention. A temple arrangement 200 can be a temple tip, a temple fit-over, or a temple cover. In one embodiment, a temple tip is a structure that attaches to a rearward portion of a temple. In one embodiment, a temple tip can pertain to an enclosure that grabs onto a rearward portion of a temple. A temple tip is particularly common for wire frame eyeglass where the temple tip attaches to the rearward end of the temple and provides a surface suitable for positioning proximate to the user's ear. For example, FIG. 1 illustrates the temple arrangement 112 implemented as a temple tip.

[0066] In one embodiment, a temple tip is removable from its corresponding temple so that it can be replaced. The temple tip can be originally provided with the purchase of a pair of eyeglasses. Alternatively, the temple tip can be a replacement part that can be purchased separately and subsequently mounted onto a rearward portion of a temple of a pair of eyeglasses after removing any

original temple tip. In another embodiment, a temple tip is permanently held onto the corresponding temple, for example, by an adhesive (e.g., epoxy, glue, etc.).

[0067] In one embodiment, a temple fit-over fits over at least a portion of the rearward end of a temple. If the rearward end of the temple has a temple tip, at least a portion of the temple tip can be fitted over by the temple fit-over. In one embodiment, a temple cover slides over and at least partially covers a portion of the rearward end of a temple. If the rearward end of the temple has a temple tip, at least a portion of the temple tip can be covered by the temple cover.

[0068] A temple cover is typically made of a material that is more flexible than a temple fit-over. For example, a temple cover can be made of a fabric or other materials, such as a sock or sleeve; while a temple fit-over can be made of plastic.

[0069] A temple arrangement 200 can be made of the same or different materials than the temple or other parts of the frame of the pair of eyeglasses. To illustrate, a pair of glasses with a metal frame can have non-metallic temple tips. A temple arrangement 200 can be of a color that is the same as, or similar to, or different from, that of the temple.

[0070] A temple arrangement 200 can be held onto a temple by frictional force. For example, if the temple arrangement 200 is a temple fit-over, it can be held onto an existing temple or temple tip by frictional force. Here, the temple fit-over is often removable. In another embodiment, the temple arrangement 200 can be permanently held onto its corresponding temple or temple tip. For example, the temple arrangement can be permanently held onto the corresponding temple or temple tip, for example, by an adhesive (e.g., epoxy, glue, etc.).

[0071] Depending on applications, a temple arrangement can be of different shapes. The shape can depend on the type of glasses. For example, a temple arrangement for fit-over glasses can be bigger than a temple arrangement for prescription glasses. The shape of the temple arrangement can also depend on applications for the electronic component(s) that are fully or partially embedded in

the temple arrangement. Of course, aesthetic reasons can also influence shape (e.g., design, size, style) of a temple arrangement.

[0072] In one embodiment, the temple arrangement is a structure that has at least one electrical component attached thereto or at least partially embedded therein. In another embodiment, all of the electrical components to be provided with the temple arrangement are at least partially embedded in the temple arrangement.

[0073] FIG. 3A is a diagram of a portion 300 of a pair of eyeglasses according to one embodiment of the invention. The portion 300 includes a temple 302 that is associated with a pair of eyeglasses. Over the end of the temple 302 that is opposite the associated lens holder, a temple tip 304 is provided. The temple tip 304 can, for example, be held to the temple 302 by frictional forces and/or adhesive. The temple tip 304 includes at least one electrical component 306 that is at least partially embedded therein. A wide range of functionalities can be provided by the at least one electrical component 306. The temple tip 304 can be considered separate from or part of the temple 302. For example, when the temple tip 304 is not attached to the temple 302, the temple tip 304 is considered a separate part. As another example, when the temple tip 304 is attached to the temple 302, the temple tip 304 can be considered separate from or part of the temple 302.

[0074] The temple tip 304 can be manufactured and delivered to resellers or retailers and thereafter sold attached to eyeglasses. Alternatively, the temple tip 304 can be separately provided as an optional replacement temple tip for an original temple tip. Hence, after or during purchasing a pair of eyeglasses, upgrade of the eyeglasses can be had by replacing an existing temple tip with a replacement temple tip. The colors and shapes of the temple tip 304 can vary widely. In the after-manufacturing environment, the reseller or retailer can be provided with a range of different colors and shapes so that a user can receive a replacement temple tip that reasonably matches the color and shape of the temple or that provides an altered appearance as desired by the user.

[0075] A number of embodiments have been described regarding one or more electrical components at least partially embedded in a pair of glasses. In one embodiment, one or more electrical components are at least partially embedded in a temple tip of a pair of glasses. Temple tips are relatively common for wire or metal frames which have wire or metal temples. The pair of glasses has a first and a second lens holders for receiving lenses. Each of the lens holders has a first side and a second side. The pair of glasses has a bridge element that couples the first side of the first lens holder to the second side of the second lens holder. The pair of glasses also includes a first temple and a second temple. The first temple is pivotally secured to the second side of the first lens holder through a joint, while the second temple is pivotally secured to the first side of the second lens holder through another joint. A temple typically has two ends, a first end and a second end. The first end can be the end that is pivotally secured to a lens holder through a joint, and the second end can be the other end of the temple. It is not uncommon that a temple includes a main body and an enclosure that grabs onto the main body of the temple. The second end is typically where the enclosure grabs onto the main body. The enclosure can be made of a different material than the main body of the temple. In one embodiment, such an enclosure is a temple tip, and there is an electrical component, partially or fully, embedded in the temple tip. There can also be a connector at the temple tip. In another embodiment, the temple tip can include a female connector. In still another embodiment, as a temple tip grabs onto the main body of the temple, a connector at the temple tip (such as a female connector) can make electrical contact with another connector (such as a male connector) at the main body of the temple. Typically, particularly before a pair of glasses has been extensively worn, the temple tip can be removed and re-inserted back on to the main body of the temple without much difficulty. Such a temple tip can be an after-market component, with different temple tips having different electrical components to serve different functions.

[0076] Besides a temple tip such as illustrated in FIG. 3A, a temple tip can also be effectively modified by a fit-over temple or temple cover.

[0077] FIG. 3B is a diagram of a temple cover 320 that at least partially covers a temple (e.g., temple and/or temple tip) according to one embodiment of the invention. As an example, the temple cover 320 can be made of a fabric or other material, such as a sock or sleeve, that slides over and at least partially covers a temple or a temple tip. The temple cover 320 can include at least one electrical component 322 that is either attached thereto or at least partially embedded therein. The temple cover 320 can also include an opening 324 so as to receive a temple or a temple tip. In one embodiment, the temple cover 320 is placed over a substantial portion of a temple tip, and the opening 324 can extend to a far end 326 so as to receive all or a substantial part of the temple tip. The temple cover 320 can, for example, be held to a temple or a temple tip by frictional forces and/or adhesive.

[0078] FIG. 3C is a diagram of a fit-over temple 340 that at least partially fits over a temple (e.g., temple and/or temple tip) according to one embodiment of the invention. For example, the fit-over temple 340 can at least partially fit-over a temple tip. The fit-over temple 340 includes at least one electrical component 342 that is either attached thereto or at least partially embedded therein. The fit-over temple 340 can also include an opening 344 so as to receive a temple or a temple tip. The depth and/or width of the opening 344 within the fit-over temple 340 can vary depending on the extent to which it is being fit over a temple or a temple tip. The fit-over temple 340 can, for example, be held to a temple or temple tip by frictional forces and/or adhesive. As an example, the fit-over temple 340 can be plastic or other material. The colors and shapes of the fit-over temple 340 can have a lot of variations.

[0079] A wide range of functionalities can be provided by the at least one electrical component (e.g., electrical component 322 and 342). In the after-manufacturing environment, the reseller or retailer can be provided with a range of different colors and shapes so that a user can receive a replacement temple cover or fit-over temple that reasonably matches the color and shape of the temple or that provides an altered appearance as desired by the user.

[0080] FIG. 3D and 3E are diagrams of a temple arrangement 360 according to another embodiment of the invention. FIG. 3D is a side view of the temple arrangement 360, and FIG. 3E is a front view of the temple arrangement 360. In this embodiment, the temple arrangement 360 is a temple tip that can be attached to a temple (e.g., temple body) of a pair of eyeglasses. The temple arrangement 360 includes a speaker housing 362 allowing a speaker 364 to be at least partially embedded within the temple arrangement 360. An audio sound output by the speaker 364 is coupled to an ear plug 366 by way of the speaker housing 362 and a tube 368. Typically, the tube 368 is a flexible tube, such as a flexible plastic tube. A user of the eyeglasses having the temple arrangement 360 can place the ear plug 366 within her ear to facilitate coupling of the audio sound from the speaker 364 to the ear. The tube 368 can have a disconnection region 370 whereby at least a section of the tube 368 and the attached ear plug 366 can be removed from the temple arrangement 360, such as when audio output is not being listened to. The tube 368 and/or the speaker housing 362 can also be capable of rotating with respect to the temple arrangement 360 to facilitate ease of use. Still further, the temple arrangement 360 can include a connector 372, such as a male audio connector (e.g., 2.5 mm, stereo mini-phone connector). The connector 372 provides a means to electrically connect an external audio source to the speaker 364 within the temple arrangement 360. For example, at least one wire (not shown) that is internal to the temple arrangement 360 can be used to electrically connect the speaker 364 to the connector 372.

[0081] In one embodiment, an electrical component is a component of an electrical circuit or system, and the electrical circuit or system is for performing at least a desired, intended or predetermined function.

[0082] In one embodiment, a temple tip, fit-over temple or temple cover according to the invention can further include a connector or cable to facilitate electrical connection with the at least one electrical component that is either attached to a temple or a temple tip or at least partially embedded therein.

[0083] Still another aspect of the invention relates to one or more swappable temple portions for a pair of glasses. According to this aspect, a temple has a forward portion and a rearward portion which can removably couple to one another. In one embodiment, different rearward portions can be used with the same forward portion. In other words, the different rearward portions can be swapped with one another. In one implementation, the different rearward portions can offer different electrical components/functionalities to the pair of glasses. For example, the different rearward portions can provide different electrical components/functionalities such as: battery/power, wireless communication, radio, headset, GPS, pedometer, sun sensor, hearing enhancement, image/video capturing, etc. In another embodiment, different forward portions can be used with the same rearward portion.

[0084] In one embodiment, only one of the temples of an eyeglass frame has swappable part(s). In another embodiment, both of the temples of an eyeglass frame have swappable part(s). Regardless, viewed in one way, each of the swappable parts at a temple can be viewed as a removable peripheral device to the eyeglass frame.

[0085] In one embodiment, a temple is a multi-part temple. The multi-part temple includes at least a forward (or first) part and a rearward (or second) part. The forward part is typically integral with or coupled to an eyeglass frame (such as at the lens holder or hinge region of an eyeglass frame). The rearward part removably connects with the forward part. The removable connection allows the rearward part to be removed for any of a variety of reasons. For example, the rearward part can be removed to: (1) connect a different rearward part; (2) connect to a peripheral bus (e.g., for data download); or (3) charge a battery (e.g., located in forward or rearward part).

[0086] The removable connection between the forward and rearward parts of the multi-part temple physically attaches and secures the rearward part to the forward part by way of at least a mechanical connection. The mechanical

connection can be provided in a variety of ways, such as through use of one or more connectors, snaps, detents, bayonets, etc.

[0087] In addition, the removable connection between the forward and the rearward parts of the multi-part temple can provide (or facilitate) an electrical connection between the forward and rearward parts. In one embodiment, the forward part of the temple (or some other part of the eyeglass frame) includes one or more electrical components, and the rearward part includes one or more electrical components. In such case, the electrical connection serves to electrically connect one or more of the electrical components of the forward part (or other part of the eyeglass frame) with one or more of the electrical components of the rearward part. For example, the forward part of the temple can include one or more electronic components (e.g., integrated circuit) that are electrically connected to one or more electronic components in the rearward part.

[0088] However, in the event that all needed electrical components are within the rearward part of the multi-part temple, electrical connection between the forward part and the rearward part may not be needed. Accordingly, in some embodiments, no electrical components will be needed in the forward part; instead, all the needed electrical components will be provided in the rearward part.

[0089] Various embodiments of eyewear can utilize the multi-part temples to provided electrical components to eyeglass frames in a convenient and user-friendly manner. As one example, consider an eyeglass frame that supports a camera. The electrical components can include an image sensor, a memory, a microcontroller, and a battery. One or more of these electrical components can be in the forward part (or other part of the eyeglass frame) and the remaining one or more electrical components can be in the rearward part. For example, the image sensor and the microcontroller can be in the forward part and the battery and the memory can be in the rearward part. Additionally, if the camera makes use of a display (e.g., LCD), the display could be in either the forward part or the rearward part. The eyeglass frame might also include other electrical components for additional functionality. Examples of additional functionality include: global

positioning system, antenna, user interface (e.g., buttons, switches, etc), display, microphone, earphone, etc. In another example, all of the electrical components supporting the camera functionality can be provided in the rearward part of the multi-part temple.

[0090] In one embodiment, the electrical components provided in the forward part are able to be shared with different rearward parts. In other words, different rearward parts can be swapped. For example, a different rearward part can be connected to the forward part to provide the eyeglass frame with different functionality. Examples of some of the different functionality that can be provided in this matter include: radio receiver (e.g., satellite radio), media player, pedometer, wireless communication, sun monitor, hearing enhancement, global positioning, etc. In a first example, in the case of a radio receiver, the forward part can include a display, while the rearward part can include a tuner, a rechargeable battery, an amplifier, and earphones or earphone connectors. In a second example, in the case of a media player, the forward part can include a display, while the rearward part can include a media player module, a memory, a rechargeable battery, a switch and earphones or earphone connectors. In a third example, in the case of a pedometer, the forward part can include a display, while the rearward part can include an accelerometer, a rechargeable battery, a memory and a microcontroller. In a fourth example, in the case of a wireless communication device, the forward part can include a display, while the rearward part can include a battery, an antenna, a wireless module, earphones or earphone connectors, and a user interface. The user interface, for example, can include buttons, which, for example, can facilitate user input with respect to on/off, volume, and accept or decline call. In this case, information displayed can include battery status, device status, caller ID, etc. In these four examples, the forward part includes a display and thus the forward part can be used (i.e., shared) with any of the different rearward parts to thereby provide different functionality to the eyeglass frames. Hence, by swapping one of these different rearward parts, the same pair of eyeglasses can provide different functionality.

[0091] A multi-part temple can be manufactured and delivered to resellers or retailers and thereafter sold attached to eyeglasses. Alternatively, a rearward part can be separately provided as a separate part or as an optional rearward part that can be swapped with an original rearward part. Hence, after or during purchasing a pair of eyeglasses, alteration, upgrade or conversion of the eyeglasses can be had by swapping in another rearward part. The electrical components or functions supported by the rearward part can vary widely. The colors and shapes of the rearward parts also can vary widely. For example, in the retailing or after manufacturing environment, the reseller or retailer can be provided with a range of different colors and shapes so that a user can receive a rearward part that reasonably matches the color and shape of the multi-part temple or that provides an altered appearance as desired by the user.

[0092] FIG. 3F is a diagram of a multi-part temple 1300 according to one embodiment of the invention. The multi-part temple 1300 has a forward part 1302 and a rearward part 1304. The rearward part 1304 is removably connected to the forward part 1302 such that the rearward part 1304 is removable. Once removed, the same rearward part or a different rearward part can be later connected to the forward part 1302. Alternatively, a cable can be connected to the forward part 1302 when the rearward part 1304 is removed. The cable can facilitate data transfer, battery charging, etc, depending on the electrical components in the forward part 1302.

[0093] FIG. 3G is a diagram of a multi-part temple 1310 according to one embodiment of the invention. The multi-part temple 1310 can represent the multi-part temple 1300 shown in FIG. 1 in one embodiment. In FIG. 3G, a forward part 1312 and a rearward part 1314 are shown disconnected. The forward part 1312 has a mechanical element 1316 and the rearward part 1314 has a corresponding opening 1318. Once connected together, the mechanical element 1316 of the forward part 1312 is inserted into the opening 1318, thereby mechanically coupling the rearward part 1314 to the forward part 1312. Once mechanically coupled the rearward part 1314 is secured to the forward part 1312, but remains removable.

[0094] FIG. 3H is a diagram of a multi-part temple 1320 according to one embodiment of the invention. The multi-part temple 1320 can represent the multi-part temple 1300 shown in FIG. 1 in one embodiment. In FIG. 3H, a forward part 1322 and a rearward part 1324 are shown disconnected. The forward part 1322 has a connector 1326 and the rearward part 1324 has a corresponding connector 1328 embedded therein. Once connected together, the connector 1326 of the forward part 1322 is inserted into the corresponding connector 1328, thereby mechanically coupling the rearward part 1324 to the forward part 1322. Once mechanically coupled the rearward part 1324 is secured to the forward part 1322, but remains removable. Additionally, the connection of the connector 1326 and the corresponding connector 1328 can also provide an electrical connection. An electrical connection would serve to enable electrical components in the forward part 1322 (or other parts of an eyeglass frame) to electrically connect to electrical components in the rearward part 1324. For example, the electrical connection can provide electrical connections for one or more electrical wires. An example of one suitable type of connector is a USB connector which can provide mechanical and electrical connection.

[0095] As noted above, a rearward part of a multi-part temple can include one or more electrical components. FIG. 3I is a diagram of a rearward part 1330 of a multi-part temple according to one embodiment of the invention. The rearward part 1330 has a body 1332 with electrical circuitry 1334 internal to the body 1332. As one example, the electrical circuitry 1334 can pertain to data storage (e.g., memory). In such an example, the rearward part 1330 can be considered a memory stick or a memory card. As other examples, the electrical circuitry 1334 can pertain to a battery/power source, a sun sensor, a pedometer, a media player, a wireless module, etc.

[0096] FIG. 3J is a diagram of a rearward part 1340 of a multi-part temple according to another embodiment of the invention. The rearward part 1340 has a body 1342 with an ear bud 1344 and an ear bud arm 1346 extending therefrom. In addition, the body 1342 includes at least one conductor 1347 and electrical circuitry 1348 internal to the body 1342. The at least one conductor 1347 can

electrically connect the electrical circuitry 1348 with the ear bud 1344, where the at least one conductor 1347 extends through the ear bud arm 1346 to the ear bud 1344. Optionally, the body 1342 can further include an antenna 1349 internal to the body 1342. In the case where the electrical circuitry 1348 includes a wireless receiver (e.g., Bluetooth, XM, FM), the antenna 1349 can enhance reception. As an example, the electrical circuitry 1348, can be a wireless module for wireless communications or a receiver for XM or FM signals. Additionally or alternatively, the electrical circuitry 1348 can, for example, pertain to one or more of a data storage device, battery/power source, a sun sensor, a pedometer, a media player, etc.

[0097] FIG. 3K is a diagram of a rearward part 1350 of a multi-part temple according to another embodiment of the invention. The rearward part 1330 has a body 1352 with a printed circuit board 1354 internal to the body 1352. A display device 1356 (e.g., LCD) can be provided on the body 1352. In one example, the display device 1356 can be mounted to the circuit board 1354 and exposed through an opening in the body 1352 so as to be visible by a user of the eyeglasses using the multi-part temple. Optionally, at least a portion of the printed circuit board 1354 can conform to the shape of the body 1352. The ability to conform, even partially, allows the printed circuit board 1354 to yield greater surface area within a temple, which tends to be small and stylized. The integrated circuit board 1354 can have one or more electronic components (e.g., integrated circuits) mounted thereon.

[0098] FIGs. 3L – 3O are diagrams of representative forward parts for multi-part temples according to different embodiments of the invention. FIG. 3L is a diagram of an exemplary forward part 1360 having a mechanical element 1362 that includes one or more detents 1364. When a rearward part is connected to the forward part 1360, the mechanical element 1362 is inserted into an opening (e.g., opening 1318) and held securely in place by mechanical forces facilitated by the mechanical element 1362 and the detents 1364. This can be accomplished through different methods, such as with corresponding protruding portions in the

opening that can, for example, be aligned with the detents 1364. For example, the protruding portions can snap into place or biased by springs (e.g., spring–loaded).

[0099] FIG. 3M is a diagram of an exemplary forward part 1370 having a mechanical element 1372 that includes one or more protrusions 1374. When a rearward part is connected to the forward part 1370, the mechanical element 1372 is inserted into an opening (e.g., opening 1318) and held securely in place by mechanical forces facilitated by the mechanical element 1372 and the protrusions 1374. In one embodiment, the protrusions 1374 are spring-loaded to facilitate connection with the opening.

[00100] FIG. 3N is a diagram of an exemplary forward part 1380 having a mechanical element 1382 that includes one or more bayonet structures 1384. To connect a rearward part to the forward part 1380, the mechanical element 1382 is inserted into an opening (e.g., opening 1318) that has groves (in the direction substantially parallel to the axis of the mechanical element 1382) for receiving the bayonet structures 1384. The rearward part can be connected with the forward part 1380 when the groves within the opening of the rearward part are aligned with the bayonet structures 1384. Once the mechanical element 1382 is so inserted, the rearward part can be rotated with respect to the forward part 1380. The rotation causes the bayonet structures 1384 to no longer be aligned with the grooves. As a result, the rearward part is mechanically secured to the forward part 1380 (and thus the eyeglass frame) in a bayonet like manner.

[00101] In one embodiment, a connector is used to removably couple the rearward portion to the forward portion of a multi-part temple. For example, the connector can be standard connector. One example of a suitable connector is a Universal Serial Bus (USB) connector.

[00102] FIG. 3O is a diagram of an exemplary forward part 1390 having an electrical connector 1392. The connector 1392 facilitates mechanical and/or electrical connections between the forward part 1390 and a rearward part. When a rearward part is connected to the forward part 1390, the connector 1392 is inserted into an opening (e.g., opening 1328) and held securely in place by

mechanical forces. There can be additional mechanical connecting mechanisms to further secure the connection.

[00103] In one embodiment, the opening receiving the connector 1392 can include a corresponding (i.e., counterpart) connector. When the connector 1392 is connected with the corresponding connector within the opening, the rearward part is physically secured to the forward part 1390. For example, mechanical forces can hold the connector 1392 and the corresponding connector in a connected position. In addition, when the connector 1392 and the corresponding counterpart connector are coupled together, one or more electrical connections are facilitated. For example, each connector can be coupled to one or more electrical wires at the other connector so that wires from one part are able to be connected to corresponding wires on the other part. As a result, electrical component(s) in the rearward part are able to be electrically connected with electrical component(s) in the forward part 1390 (or elsewhere in the eyeglass frame). In one implementation, the connectors pertain to or resemble a Universal Serial Bus (USB) type connector.

[00104] In another embodiment, the opening receiving the connector 1392 does include a corresponding counterpart connector. In this embodiment, mechanical forces can hold the connector 1392 within the opening. Also, in this embodiment, electrical connections are not facilitated.

[00105] Although FIGs. 3G-3N pertain to connections having a male connector at the forward part and a female connector at the rearward part, it should be understood that alternatively the male connector can be at the rearward part and the female connector can be at the forward part.

[00106] Also, although FIGs. 3G-3N pertain to connections showing only one elongated portion (like a male connector) to be received by an opening (like a female connector), in other embodiments, there can be more than one elongated portion to be received by more than one opening. Also, the connections can be formed on the sides (i.e., outer surface), instead of by having elongated portions and openings positioned in the middle of (i.e., internal to) the forward and rearward parts. For example, there can be two prongs, one on the top surface and one on

the bottom surface of a forward part. Each prong can be received by a counterpart detent in a rearward part, such as the prong on the top surface of the forward part to be received by a detent on the top surface of the rearward part.

[00107] In a number of embodiments, the forward part of the multi-part temple is substantially smaller than the rearward part. For example, in FIG. 3F, the forward part 1302 is substantially smaller than the rearward part 1304. In one embodiment, a forward part is large enough to house a connection mechanism used to couple with a rearward part and not too much larger. In another embodiment, a forward part and a rearward part are about the same size. In still another embodiment, a forward part is larger than a rearward part.

[00108] In one embodiment, neither the forward part nor the rearward part of a multi-part temple contains any electrical components. In such case, the rearward part can still be removable from the forward part. Such an embodiment enables a user to swap one (which can be substantially all of the temple) or both the rearward portions of both temples, with another rearward portion(s), such as for aesthetic, configuration or design reasons.

[00109] In one implementation, a connector is used to removably couple the rearward portion to the forward portion of the multi-part temple. For example, the connector can be a Universal Serial Bus (USB) connector.

[00110] In one embodiment, a forward part can be part of or integral with a corresponding region of a lens holder. In such case, there need not be any hinges for coupling the temples to the lens holders.

[00111] As noted above, connectors can be use to removably attach a temple to an eyeglass frame (e.g., lens holder) or to removably attach different portion(s) of a temple. These connectors can be provided for one or both temples of the eyeglass frames. With such temples being easily removable by users without the need for any special skill or tools, the temple parts can be interchangeable and can be separately sold or leased.

[00112] Further, to display various eyewear products, such as in a retail environment, an eyewear products display apparatus (e.g., stand) can include corresponding connectors or connector structures so that (i) separate temples (ii) separate parts of temples and/or (iii) eyeglass frames without temples can be connected to the eyewear products display apparatus for display. For example, if the eyewear products (e.g., frames, temples, etc.) use connectors, then the eyewear products display apparatus can support those same connectors (e.g., USB connectors) or compatible structures. This eyewear products display apparatus opens up new ways to organize and present eyewear products at retail stores. It also allows users to separately select a base eyewear frame and temples to be used therewith. The temples and the frames can be displayed detached from one another, such that a user can separately select and try different temples with frames.

[00113] FIG. 3P is a diagram of an eyewear products display apparatus 1400 according to one embodiment of the invention. The apparatus 1400 has a first region 1404 of first type connectors (or compatible protrusions) integral with the apparatus 1400. A plurality of eyeglass frames having second type connectors can be attached and displayed on the apparatus 1400 by connecting one or two of the second type connector of the eyeglass frames to those of the first type connectors of the first region of the apparatus 1400.

[00114] The apparatus 1400 also can include a second region 1402 of second type connectors (or compatible openings) integral with the apparatus 1400. A plurality of removable temples (and/or removable temple parts) having first type connectors can be attached and displayed on the apparatus 1400 by connecting the first type connectors of the removable temples (and/or removable temple parts) to those of the second type connectors (or compatible openings) in the second region 1402 of the apparatus 1400.

[00115] In one embodiment, the first type connectors are male connectors and the second type connectors are corresponding female connectors which provide a secure mechanical connection. In one embodiment, the first type

connectors and/or the second type connectors provided integral with the apparatus 1400 are not electrical connectors but compatible structures (e.g., protrusions and openings) such that a secure mechanical connect can be had.

[00116] In one embodiment, the orientation of at least some of the connectors in the apparatus 1400 is substantially horizontal. In other words, for example, when a rearward part of a temple is inserted into such a connector in the apparatus 1400, the rearward part is substantially perpendicular to the surface of the apparatus 1400 as shown. In another embodiment, the orientation of at least some of the connectors in the apparatus 1400 is substantially facing upward or downward in a vertical manner. In other words, for example, when a rearward part of a temple is inserted into such a connector in the apparatus 1400, the rearward part is substantially parallel to the surface of the apparatus 1400 as shown. In yet another embodiment, the orientation is at an acute angle relative to the surface of the apparatus 1400 as shown. In other words, for example, when a rearward part of a temple is inserted into a connector in the apparatus 1400, the rearward part is at an acute angle relative to the surface of the apparatus 1440 as shown. The connectors in the apparatus 1400 can also be rotatable or movable, such as between different positions and/or angles.

[00117] Although FIG. 3P only depicts one side of the eyewear products display apparatus 1400, the apparatus can have other like sides. For example, the apparatus 1400 can be a one, two, three or four sided apparatus.

[00118] In still another embodiment, at least one connector of the apparatus 1400 is connected to at least one electrical component in the apparatus 1400. For example, when a selected temple part is connected to the connector, the at least one electrical component in the apparatus 1400 is electrically connected to an electrical component in the temple part, and together can perform an electrical operation.

[00119] In yet another embodiment, at least one connector of the apparatus 1400 is connected to another connector of the apparatus 1400. This allows electrical connection between the different eyewear parts connected to the

apparatus 1400. For example, when a selected temple part is connected to the connector and an eyeglass frame is connected to the other connector, an electrical component within the eyeglass frame is electrically connected to an electrical component in the temple part, and together can perform an electrical operation.

[00120] FIG. 4 shows examples of different electrical components according to the present invention. Different embodiments of temple arrangements, temple adapters or temple parts according to the invention can use one or more of these different electrical components.

[00121] In one embodiment, the electrical component is an electrical connector. The connector can be a male connector or a female connector. Examples of different types of connectors have previously been described in the related patent applications, which have been incorporated by reference.

[00122] In one embodiment, the embedded electrical component is an electrical switch, such as one or more of those previously described in the related patent applications, which have been incorporated by reference.

[00123] In one embodiment, one electrical component can be a power source. The power source can be a battery, a solar cell or other type of power source.

[00124] In one embodiment, one electrical component can include a circuit board. The circuit board can be a rigid or a flexible circuit board.

[00125] In one embodiment, one electrical component can be an indicator. The indicator can be audio, visual, or physical (e.g., vibration). For example, the indicator can signal an event or condition to a user of the glasses.

[00126] In one embodiment, one electrical component can be a display, such as an LCD display.

[00127] In one embodiment, one electrical component can be a speaker. The speaker can provide an audio output for the benefit of the wearer of the glasses. The speaker can directly transmit sound to a user, such as a speaker mounted on an exterior surface of an eyeglass frame, or partially or fully embedded in an

eyeglass frame, or a bone conducting type of speaker. Alternatively, the speaker can indirectly transmit sound to a user, such as through the use of a tube to deliver audio output proximate to a user's ear.

[00128] In one embodiment, one electrical component can be a controller. The controller can, for example, be a microprocessor.

[00129] In one embodiment, one electrical component can be a memory device. The memory device can be non-volatile memory, such as FLASH memory. The data stored in the memory device can be user data or data provided by other electrical components.

[00130] In one embodiment, one electrical component is a frequency receiver or a frequency transmitter. They can be in the radio frequency range.

[00131] In one embodiment, one electrical component can be a sensor. The sensor can be a temperature sensor. The temperature sensor can be used to sense the temperature of the wearer. In one embodiment, such a temperature sensor is in a temple tip. In measuring the temperature, the user can further press the temple tip towards his head to ensure better connection. One can also put the temple under one's tongue to measure body temperature.

[00132] In other different embodiments, one electrical component can be a motion detector, a speed sensor, a rate of ascent (or descent) detector, a pressure detector, or a detector for radiation, such as an ultraviolet (UV) detector.

[00133] In one embodiment, one electrical component is a radio frequency identification (RFID) tag. A RFID tag typically includes a memory chip and a radio antenna. The memory chip usually has a small storage capacity and thus does not include a large amount of information. A portion of such information can provide identifying information for the glasses. The memory chip may only have a few kilobytes, sufficient to encode information, such as a serial number, where and when the product (such as eyeglasses) was manufactured, and other relevant information.

[00134] The RFID tags can come in a number of configurations. For example, an active tag uses a battery-powered transponder to constantly emit signals which can carry information programmed into the memory chip. Active tags are more applicable to situations where readers are not close to the tags. A semi-passive tag likewise has a battery, but may not be activated until it receives a signal from a reader. They are more applicable to situations that do not need continuous connection and accessing. A passive tag has no battery; its antenna extracts power from a reader's radio wave signal to transmit the identifying information. Passive tags are typically relatively inexpensive, but may have to be within a few feet of a reader to extract power. The electrical component can be a passive RFID tag, or some other type of tag.

[00135] In one embodiment, one electrical component can be for locating the corresponding glasses. For example, the electrical component can produce a beeping tone when it receives a specific radio signal. A handheld device (such as a key chain accessory, can generate the specific radio signal (e.g., when a button is pushed). Through the beeping tone, one can locate the glasses.

[00136] As noted above, in one embodiment, the electrical component can be a sensor. More generally, a pair of glasses can include one or more sensors that can be used individually or in combination. FIG. 5 is a chart 500 that depicts examples of sensors suitable for use in or attached to the glasses.

[00137] In one embodiment, the sensor is a "being worn" sensor. The "being worn" sensor indicates whether the glasses are being worn by its user. The "being worn" operation can be performed using, for example, a thermal sensor, a motion detector, a stress sensor or a switch.

[00138] In one embodiment, a motion detector is used as a "being worn" sensor. A threshold can be set, such that if the amount of motion exceeds the threshold, the glasses are assumed to be worn. The motion detector can, for example, be achieved by a mechanical mechanism or an accelerometer.

[00139] In another embodiment, the "being worn" sensor includes two thermal sensors. One sensor can be at approximately the middle of a temple, such

as in a region that touches the head of the user wearing the glasses. The other sensor can be at one end of the temple, the end that is close to its hinge. If the temperature differential between the two sensors is beyond a certain preset value, the glasses would be assumed to be worn. The differential is presumed to be caused by a person wearing the pair of glasses.

[00140] In yet another embodiment, the "being worn" sensor includes a stress sensor at the hinge of the temple. The assumption is that when the eyewear is worn, the hinge is typically slightly stretched because typically, the width of the head of the user is slightly wider than the width between the temples when the two temples are in the extended positions. If the value of the stress sensor is beyond a certain preset value, the glasses would be assumed to be worn.

[00141] In a further embodiment, the "being worn" sensor can be a switch. For example, at the hinge between a temple and its corresponding lens holder, there is a switch. When that temple is in its extended position, i.e., fully extended outwards, the switch is turned on. The switch can be a pin-type switch. When the temple is fully extended outwards, the pin is pressed. When both temples are fully extended outwards, in one embodiment, the glasses would be assumed to be worn by the user.

[00142] In one embodiment, another type of sensor is an environmental sensor. The environmental sensor can sense environmental conditions, such as one or more of radiation (e.g., ultraviolet radiation or light), temperature (e.g., ambient temperature), pressure, humidity and toxins (e.g., chemicals, etc.).

[00143] In another embodiment, another type of sensor is a condition sensor. The condition sensor can sense the conditions of the user of the glasses. Examples of condition sensors include sensing one or more of distance traveled, location, speed, calories consumed, temperature and vital signs associated with the user of the glasses. The distance traveled could represent the horizontal distance traveled or the vertical distance (i.e., elevation) traveled. The speed can be the rate of movement along the horizontal distance traveled and/or the vertical

distance. In yet another embodiment, the condition sensor can indirectly sense emotional conditions of the user of the glasses.

[00144] The sensors can be provided in a redundant or fault-tolerant manner. For example, sensors can come in pairs in the glasses. When one malfunctions, the other one will take over its operation. In another embodiment, the sensor information can be processed in a differential manner to examine changes to the sensor information. The differential can be based on time. The sensors can be powered by a battery, solar energy, or kinetic energy. For reduced power consumption, the sensors can remain in a low-power state unless data is being acquired by the sensors. In yet another embodiment, two or more of the sensors can communicate with one another (wired or wirelessly) to exchange data or control information.

[00145] FIG. 6 illustrates a diagram of a number of different embodiments of temple adapters 600 according to the invention. The temple adapters 600 serve to adapt a temple (i.e., a temple body or temple tip) of a pair of eyeglasses to provide for at least one electrical component. In one embodiment, a temple adapter can clip onto a temple body or a temple tip. In another embodiment, a temple adapter can mount to a post provided on a temple body or a temple tip. In still another embodiment, a temple adapter can mount to a hole provided in a temple body or a temple tip. In yet another embodiment, a temple adapter can be bonded (or adhered) to a temple body or a temple tip.

[00146] The temple adapter is particularly well suited to adapt a pair of eyeglasses with communication components, such as a speaker and/or a microphone. As an example, a standard pair of eyeglasses can be transformed into an operational headset by attaching a temple adapter to a temple body or temple tip of the pair of eyeglasses, wherein the temple adapter includes at least one speaker and at least one microphone.

[00147] The temple adapter can be rigid or malleable. The benefit of being malleable is that the particular geometric arrangement/assembly of the temple adapter can be altered by its user for better user comfort or operation.

[00148] In one embodiment, the temple adapter is a structure that has at least one electrical component attached thereto or at least partially embedded therein. In another embodiment, all of the electrical components to be provided with the temple adapter are at least partially embedded in the temple adapter.

[00149] FIG. 7A is a diagram of a temple adapter 700 according to one embodiment of the invention. The temple adapter 700 attaches to a temple 702 (including any temple tip using a clip 704. The clip 704 can use force, such as an interference fit force or spring-induced force, to attach the temple adapter 700 to the temple 702. Besides the clip 704, the temple adapter 700 includes an angled arm 706 and an ear bud 708. The angled arm 706 can be malleable. When a pair of eyeglasses associated with the temple 702 is being worn by a user, the ear bud 708 can be placed in or near the user's ear canal. The ear bud 708 contains a speaker and receives electrical signals via a wire, such wire can be provided internal or external to the temple adapter 700 and can originate at the temple 702 or external to the temple 702.

[00150] FIG. 7B is a diagram of a temple adapter 720 according to another embodiment of the invention. The temple adapter 720 attaches to a temple 722 (including any temple tip) using a clip 724. The clip 724 can use force, such as an interference fit force or spring-induced force, to hold the temple adapter 720 to the temple 722. Besides the clip 724, the temple adapter 720 includes an angled arm 726, an ear bud 728, a microphone 730, an extension arm 732 and a cord 734. In this embodiment, the cord 734 includes a wire that connects to the speaker within the ear bud 728 and another wire that connects to the microphone 730. There can be one or more conductors inside a given wire. For example, a wire might have one conductor serving as a signal line and another conductor serving as ground. Such wires can be provided internal to the extension arm 732 and the angled arm 726. The arm 732 can serve to guide the cord 734 away from the user's ear or rearward. The angled arm 726 can be malleable. The placement or position of the microphone 730 can vary with implementation. As shown in FIG. 7B, the microphone 730 is directed forward to a user's front when a pair of eyeglasses associated with the temple 722 are being worn. Alternatively, the microphone 730

could be directed outward away from the user's head when the pair of eyeglasses are being worn. When a pair of eyeglasses associated with the temple 722 is being worn by a user, the ear bud 728 can be placed in or near the user's ear canal. The ear bud 728 contains a speaker and receives electrical signals via a wire of the cord 734. The cord 734 can have another end (not shown) with a connector for coupling with an audio output device (e.g., radio, MP3 player) or a communication device (e.g., mobile phone).

[00151] FIGs. 8A and 8B are diagrams of a temple adapter 800 according to another embodiment of the invention. FIG. 8A is a side view of the temple adapter 800, and FIG. 8B is a front view of the temple adapter 800. The temple adapter 800 has a support body 802 which has a support arm 803. An ear bud 804 is attached to an end of the support arm 803. A connector 806, such as a male audio connector, is attached to one end of the support body 802. A microphone 808 can be optionally provided and attached to the support body 802 or the support arm 803. Additionally, an elastic member 810 can be provided to facilitate attachment of the support body 802 to a temple 812 of a pair of eyeglasses. The temple 812 can have a tip region 814, which can be referred to as a temple tip. When the temple adapter 800 is attached to the tip region 814 of the temple 812, the tip region 814 is placed in or through an opening 816 in the elastic member 810, as shown, for example, in FIG. 8B. The temple adapter 800 is thereby held in place relative to the tip region 814. Additionally, although not shown, the support body 802 would carry a first internal wire from the connector 806 to the microphone 808, and the support body 802 and the support arm 803 would carry a second internal wire from the connector 806 to the ear bud 804.

[00152] FIG. 9A is a diagram of a temple adapter 900 according to another embodiment of the invention. In FIG. 9A, a side-view of the temple adapter 900 is depicted. The temple adapter 900 attaches to a temple 902 of a pair of eyeglasses. The temple 902 can have a tip region 904, which can be referred to as a temple tip. The temple adapter 900 has a support member 906. A first end 908 of the support member 906 couples to the temple 902 of a pair of eyeglasses. In one embodiment, the first end 908 serves to attach the temple adapter 900 to the

temple 902. For example, the first end 908 can provide a clip, clamp, post, or hole to provide or assist with the attachment. As another example, the first end 908 can alternatively or additionally use an adhesive, bonding or fastener (e.g., hook and loop system, such as Velcro) to provide or assist with the attachment. A second end 910 of the support member 906 provides an opening through which an arm 912 extends. One end of the arm 912 has an ear bud 914 attached thereto. The arm 912 can be angled and/or malleable. When a pair of eyeglasses associated with the temple 902 is being worn by a user, the ear bud 914 can be placed in or near the user's ear canal. The ear bud 914 contains a speaker and receives electrical signals via a wire, such wire can be provided internal or external to the temple adapter 900 and can originate at the temple 902 or external to the temple 902.

[00153] FIGs. 9B and 9C are diagrams of a temple adapter 920 according to still another embodiment of the invention. FIG. 9B is a side view of the temple adapter 920, and FIG. 9C is a front view of the temple adapter 920. The temple adapter 920 attaches to a temple 922 of a pair of eyeglasses. The temple 922 can have a tip region 924, which can be referred to as a temple tip. The temple adapter 920 has a support member 926. A first end 928 of the support member 926 couples to the temple 922 of a pair of eyeglasses. In one embodiment, the first end 928 serves to attach the temple adapter 920 to the temple 922. For example, the first end 928 can provide a clip, clamp, post, or hole to provide or assist with the attachment. As another example, the first end 928 can alternatively or additionally use an adhesive, bonding or fastener (e.g., hook and loop system, e.g., Velcro) to provide or assist with the attachment. The first end 928 also has a bracket 930 having a connector 932 at one end, and an elastic member 934 for coupling about the tip region 924. The connector 932, such as a male audio connector, is attached to one end of the bracket 930. A microphone 936 can be optionally provided and, for example, attached to the support body 926.

[00154] A second end 938 of the support member 926 provides an opening through which an arm 940 extends. One end of the arm 940 has an ear bud 942 attached thereto. The arm 940 can be angled and/or malleable. The arm 940 is

also re-positionable within the opening at the second end 938 so as to permit user adjustment. When a pair of eyeglasses associated with the temple 922 is being worn by a user, the ear bud 942 can be placed in or near the user's ear canal. The ear bud 942 contains a speaker and receives electrical signals via a wire, such wire can be provided internal or external to the temple adapter 920 and can originate at the temple 902 or external to the temple 902. In this embodiment, a wire 944 is shown as passing through the arm 940 to provide signals to the speaker within the ear bud 942. More particularly, in one embodiment, although not shown in FIGs. 9B and 9C, a first wire would connect the speaker within the ear bud 942 to the connector 932 (e.g., wire 944), and a second wire would connect the microphone 936 to the connector 932. Such wires can be internal or external, or partially internal and partially external, to the temple adapter 920.

[00155] FIG. 9D is a diagram of a temple adapter 960 according to still another embodiment of the invention. In FIG. 9D, a side-view of the temple adapter 960 is depicted. The temple adapter 960 attaches to a temple 962 of a pair of eyeglasses. The temple 962 can have a tip region 964, which can be referred to as a temple tip. The temple adapter 900 has a support member 966. A first end 968 of the support member 966 couples to the temple 962 of a pair of eyeglasses. In one embodiment, the first end 968 serves to attach the temple adapter 960 to the temple 962. For example, the first end 968 can provide a clip, clamp, post, or hole to provide or assist with the attachment. As another example, the first end 968 can alternatively or additionally use an adhesive, bonding or fastener (e.g., hook and loop system, e.g., Velcro) to provide or assist with the attachment. A second end 970 of the support member 906 provides an opening through which an arm 972 extends. One end of the arm 972 has an ear bud 974 attached thereto. The arm 972 can be angled and/or malleable. When a pair of eyeglasses associated with the temple 962 is being worn by a user, the ear bud 974 can be placed in or near the user's ear canal. The ear bud 974 contains a speaker and receives electrical signals via a wire, such wire can be provided internal or external to the temple adapter 960 and can originate at the temple 962 or external to the temple 962. Further, the temple adapter 960 can include a microphone 976. In this

embodiment, the microphone 976 is attached to the support member 966. In addition, an arm 978 is used to support an end of a cable 980 that is coupled to the arm 978. The cable 980 can include at least one wire for the microphone 976 and one wire for the speaker within the ear bud 974.

[00156] To the extent that any of the embodiments of the temple adapters discussed above use a microphone, a tube can be optionally attached to the microphone to facilitate voice pick-up of the user. One end of the tube can be placed over the microphone, and the other end of the tube is then positioned closer to the user's mouth than is the microphone. With a temple adapter on both temples, each providing a microphone and speaker to a pair of eyeglasses, only one temple adapter would typically make use of such a tube. Alternatively, the tube and the microphone could be replaced by a boom microphone.

[00157] FIG. 10A-10C are diagrams of a temple having a bone conducting element according to still other embodiments of the invention. The bone conducting elements can replace a traditional speaker to provide audio output to a user. Although not shown, electrical signals would be internally or externally supplied to the bone conducting element.

[00158] FIG. 10A illustrates a temple 1000 for a pair of eyeglasses. The temple 1000 includes a bone conducting element 1002 that can provide audio sound to a user by coupling vibrations to at least one bone of the user's face. The bone conducting element 1002 is held relative to the temple 1000 by an arm 1004. Hence, in this embodiment, the temple 1000, the arm 1004 and the bone conducting element 1002 can all be integrally formed.

[00159] FIG. 10B illustrates a temple 1020 for a pair of eyeglasses. The temple 1020 includes a bone conducting element 1022 that can provide audio sound to a user by coupling vibrations to at least one bone of the user's face. The bone conducting element 1022 is held relative to the temple 1020 by a support 1024 that removably attaches to the temple 1020.

[00160] FIG. 10C illustrates a temple 1040 for a pair of eyeglasses. The temple 1040 includes a bone conducting element 1042 that can provide audio

sound to a user by coupling vibrations to at least one bone of the user's head. In this embodiment, the bone conducting element 1042 is positioned in the vicinity of the user's ear, such as behind the user's ear. The placement of the bone conducting element 1042 in this embodiment can reduce impact to the design of the eyeglasses.

[00161] In one embodiment, the electrical components associated with a temple arrangement, a temple adapter or a removable temple part is for enhancing the hearing of the person wearing the corresponding pair of glasses. There can be at least a microphone and a speaker in a temple arrangement, a temple adapter or removable temple part. The microphone can be close to an ear of the user when the glasses are worn by the user, and can be a directional microphone. The microphones can be a microphone in a temple adapter, such as the microphone 730 in FIG. 7B, 808 in FIG. 8A, 936 in FIG. 9B, or 976 in FIG. 9D. The microphones can be in a temple arrangement. The microphone in a temple arrangement can be attached to a temple tip, a temple fit-over or a temple cover. The microphones can be positioned to be in front of the user's ears so that the microphones will not be affected by the shadowing effect of the ears. The speaker can be inserted into the ear, as in some of the speakers previously described.

[00162] In another embodiment, there are two sets of microphones and speakers, such as in two temple arrangements, temple adapters or removable temple part. In the vicinity of each ear, there is a temple arrangement, temple adapter or removable temple part with its corresponding microphone and speaker. The microphones again can be directional, one pointing generally outwards in a position close to the left ear, and one pointing generally outwards in a position close to the right ear. Alternatively, the microphones can point forward.

[00163] The microphone and the speaker close to an ear do not have to be in very close proximity to each other, as in many hearing aids existing nowadays. They can be spaced apart by, such as, one to several inches, with the microphone being directional and pointing to the front and to either the left or the right of the user, and with the speaker pointing toward or inserted into the corresponding ear

of the user. Such a distance apart can significantly reduce feedback effect of existing hearing aids. Another advantage of such a hearing enhancement device is that users may not need to be fitted into ears with ear molds. In any case, additional details on hearing enhancement are further described in the related applications that have been incorporated herein by reference, such as U.S. Provisional Patent Application No. 60/620,238, filed October 18, 2004, and entitled "EYEGLASSES WITH HEARING ENHANCED AND OTHER AUDIO SIGNAL-GENERATING CAPABILITIES."

[00164] The various embodiments of the invention noted above, whether temple arrangement, temple adapter or removable temple part, can have a cable or cord attached or attachable thereto. The cable or cord has one or more conductors. The cable or cord can serve to provide electrical signals to or receive electrical signals from the temple arrangement, the temple adapter or removable temple part. In one embodiment, one end of a cable or cord attaches to a temple arrangement, temple adapter or removable temple part (either permanently or via a connector) and the other end of the cable or cord attaches (either permanently or via a connector) to an electronic device. As an example, the electronic device can be an audio output device (e.g., audio player) or a communication device (e.g., mobile telephone). In a first example, the cable or cord could provide a male audio (stereo) connector at one end, and a pair of female audio connectors at the opposite end, each being for use with a different temple. In a second example, the cable or cord could provide a set of connectors, such as a male mini-phone connector (2.5 mm) and a male audio (stereo) connector, at one end, and one or a pair of female phone connectors at the opposite end.

[00165] In one embodiment, the cable or cord can also have a switch coupled thereto so as to permit a user to switch modes. For example, if the temple arrangement, temple adapter or removable temple part provides a speaker and microphone to a pair of eyeglasses, a switch on a cable or cord that connects the temple arrangement or temple adapter to an electronic device could provide different switch positions for different electronic devices or different functional modes of operation of a single electronic device. As an example, if the electronic

device is (or operates as) an audio player, a first switch position could be used. Alternatively, if the electronic device is (or operates as) a mobile telephone, a second switch position could be used. Additional discussion of suitable cables and cords is provided in the related applications that have been incorporated herein by reference.

[00166] Electrical components can form an electronic module. The electronic module can provide radiation monitoring, wireless communication, enhanced hearing, etc. A radiation monitoring system can be partially or fully contained in a temple arrangement, temple adapter or removable temple part associated with a temple of a pair of glasses. Typically, the temple arrangement or temple adapter can be removable from the temple. The removable temple part is obviously removable from a corresponding remaining temple part.

[00167] In another embodiment, an electronic component in a temple arrangement, temple adapter or removable temple part interacts with another electronic component in another part (e.g., frame) of the glasses or in a device tethered to the glasses. For example, a temple of a pair of glasses holds one portion of an electronic circuit. That portion can include generic parts, such as a battery, that are applicable to different applications. Another portion of the electronic circuit is in a temple arrangement, temple adapter or removable temple part. This portion can be application specific, such as an electronic clock without a battery, or a temperature sensor.

[00168] In yet another embodiment, the electrical components can provide audio player capabilities. In such an embodiment, the electrical components can include audio file storage, an audio player and a battery. The electrical components may or may not include wireless communication circuitry.

[00169] Further, in an alternative embodiment, the output of an operation indicator can be audio. The audio output can be from one or more speakers associated with the frame of the eyeglasses. Such audio output can signal the user using natural language, voice synthesis, pre-recorded messages, etc.

[00170] In another embodiment, the electrical components can include a memory module. The memory module provides non-volatile data storage. For example, the memory module can be a portable (or removable) memory device (e.g., memory card). The memory module can, for example, store sensor information (which can be over an extended period of time). Such memory module can be remotely interrogated using wireless communication circuitry, or can be accessed through a wired connection with a tethered device.

[00171] In one embodiment, the electrical connection(s) can alternatively be used to allow information stored in the electrical components to be accessed or queried by a device. For example, when the electrical components include a memory module, the memory module can be accessed to read data (e.g., status information) stored therein.

[00172] As previously noted, the electrical components associated with a temple arrangement, a temple adapter and/or removable temple part can pertain to radiation monitoring circuitry. In such case, the electrical components within the temple arrangement, temple adapter or removable temple part alone or together with eyeglass electrical components can implement a radiation monitoring system. The radiation being monitored can, for example, pertain to one or more of UV, infrared and gamma radiation. In one embodiment, sunlight is considered as a type of radiation. In any case, additional details on radiation monitoring are further described in the related applications that have been incorporated herein by reference.

[00173] Also, the electrical components can pertain to health or fitness monitoring circuitry. In such case, the electrical components within the temple arrangement, the temple adapter removable temple part alone or together with eyeglass electrical components can implement a health or fitness monitoring system. Additional details on health or fitness monitoring are further described in the related applications that have been incorporated herein by reference.

[00174] In yet another embodiment, an electronic component in a temple arrangement, a temple adapter or removable temple part of a frame of eyeglasses

interacts with an electronic component of an apparatus tethered to the eyeglasses to perform an operation. For example, a temple arrangement, a temple adapter removable temple part of a pair of eyeglasses holds one portion of an electronic system, and a tethered apparatus that tethers to the pair of eyeglasses includes another portion of the electronic system.

[00175] Still further, the invention can provide a new approach to marketing accessories, namely, electrical accessories, for eyewear. According to one method for providing temple arrangements, temple adapters and/or removable temple part for use with a pair of glasses, the method can initially provide a plurality of temple arrangements, temple adapters and/or removable temple part for a customer. This enables the customer to browse and select at least one temple arrangement, temple adapter or removable temple part. Each of the temple arrangements, temple adapters or removable temple part can have one or more electrical components at least partially embedded therein, with different temple arrangements, temple adapters or removable temple parts providing different electrical capabilities. Once a temple arrangement, temple adapter or removable temple part has been selected, the selected temple arrangement, temple adapter or removable temple part can be coupled to one of the corresponding temples of the eyewear (e.g., a pair of glasses). In the case where the selected temple arrangement is a temple tip, the selected temple tip is inserted onto (e.g., slid over) an end of the corresponding temple (after removing any previously installed temple tip if there was one). In the case where the selected temple adapter is to be coupled, the selected temple adapter can be attached to the corresponding temple. In the case where the selected removable temple part is to be coupled, the selected removable temple part can be attached to a remaining part (e.g., forward part) of the corresponding temple. Thereafter, the customer can make use of the eyewear with its associated electrical capabilities provided by the temple arrangement, temple adapters or removable temple part.

[00176] In one embodiment, once a temple arrangement, a temple adapter and/or removable temple part is provided to a customer, the customer can test the electrical capabilities of the pair of glasses. If the customer does not like the current

selected temple arrangement, temple adapter or removable temple part, the customer can repeat the process by selecting and testing another temple arrangement, temple adapter or removable temple part. Before providing the eyewear with the temple arrangement, temple adapter or removable temple part, the customer can be required to pay a purchase (or rental) price for at least the temple arrangement, temple adapter or removable temple part. Thereafter, the customer can be permitted to return and replace the temple arrangement, temple adapter or removable temple part with another temple arrangement, temple adapter or removable temple part. Such returns or replacements can be available only for a limited period of time following their purchase.

[00177] Yet still another aspect of the invention relates to eyewear having an extended endpiece so as to facilitate placement of one or more electrical components at the extended endpiece. In one embodiment, a conventional pair of glasses has two endpieces, one on its left and the other on its right side of the frame. For example, the left endpiece is the region of the frame approximately between the left hinge (or joint) and the left lens holder of the frame. Similarly, the right endpiece is the region of the frame approximately between the right hinge (or joint) and the right lens holder of the frame.

[00178] The one or more electrical components at an extended endpiece can operate independently or together with other electrical components provided elsewhere. For example, other electrical components can be provided in other regions of the frame for the eyewear. In another example, the other electrical components can be located in a bridge area of the frame for the eyewear. In such an example, given that the endpiece is extended, the one or more electrical components can be placed at the endpiece and thereby communicate with other electrical components in a front area (e.g., lens holder region or bridge region) or the other endpiece (which can also be extended) without having to communicate through a hinge or connector.

[00179] FIG. 11A illustrates a pair of glasses 1100 according to one embodiment of the invention. The pair of glasses 1100 includes a first lens holder

1102 and a second lens holder 1104. The lens holders 1102 and 1104 are capable of receiving lenses. The lenses can be prescription lenses or non-prescription lenses. The first lens holder 1102 has a first side and a second side. The second lens holder 1104 has a first side and a second side. The pair of glasses 1100 also has a bridge 1106 in between the first lens holder 1102 and the second lens holder 1104. The bridge 1106 is coupled to the second side of the first lens holder 1102 and the first side of the second lens holder 1104. The lens holders 1102 and 1104 and the bridge 1106 can be separate pieces or a single integral piece. The glasses 1100 can also be referred to as eyeglasses.

[00180] The pair of glasses 1100 also includes a first extended endpiece 1112 and a second extended endpiece 1113. In addition, the pair of glasses 1100 includes a pair of temples, namely, a first temple 1108 and a second temple 1110. The first extended endpiece 1112 connects to the first temple 1108 via a joint (or hinge) 1114. The second extended endpiece 1113 connects to the second temple 1110 via a joint (or hinge) 1115. In one embodiment, the extended endpieces 1112 and 1113 are larger as compared to conventional endpieces. As a result, the respective joints (or hinges) 1114 and 1115 are set back from the respective lens holders 1102 and 1104. For example, in one embodiment, the hinge 1115 is set back from the lens holder 1104 by about 1 to 5 centimeters. One advantage of utilizing enlarged (or extended) endpieces 1112 and 1113 as illustrated in FIG. 11A is that electrical components 1116 are able to be comfortably provided in the extended endpieces 1112 and 1113. Moreover, another advantage is that the electrical components 1116 within the extended endpiece 1113 can electrically couple to other electrical components provided within the forward portion or front area of the frame without having to electrically connect through a joint or hinge. As illustrated in FIG. 11A, the extended endpiece 1113 provides electrical components 1116 with at least a portion at an inner surface of the extended endpiece 1113. The electrical components 1116, in this example, include a display 1118 and a plurality of switches 1120 (e.g., buttons). As an example, the electrical components 1116 can, for example, implement an electrical system (e.g., pedometer system, UV monitoring system, or other physical condition monitoring

system, etc.). In the embodiment of the glasses 1100 illustrated in FIG. 11A, the electrical components 1116 are provided in the extended endpiece 1113.

[00181] FIG. 11B illustrates the pair of glasses 1100 according to another embodiment of the invention. More particularly, FIG. 11B illustrates the pair of glasses 1100 illustrated in FIG. 11A where the electrical components 1116 are provided as a module 1122 embedded internal to the extended endpiece 1113. The module 1122 includes a plurality of interconnected electrical components, including the display 1118 and the switches 1120. In addition, the glasses 1100 further include a separate electrical component 1124. As illustrated in FIG. 11B, the separate electrical component 1124 can be provided at the bridge 1106. Still further, a conductive element (e.g., a wire) that electrically connects the module 1122 with the separate electrical component 1124 can be provided internal to the eyeglass frame, such as internal to the lens holder of 1104. The nature of the separate electrical component 1124 can vary depending upon application. In the case in which the module 1122 pertains to a pedometer or health system, the separate electrical component 1124 can pertain to a sensor used to measure the heart rate of the user of the glasses 1100. For additional details on a sensor utilized in this context, see U.S. Provisional Patent Application No. 60/787,850, filed April 1, 2006, and entitled "EYEGLASSES WITH HEART RATE MONITOR," which is hereby incorporated herein by reference. Although not illustrated in FIG. 11B, the extended end piece 1113 can also include a cavity (or opening) and a cover or a door. The module 1122 can be inserted or removed from the cavity by way of the cover or door.

[00182] FIGs. 12A-12E illustrate a side view of eyeglass frames having an extended temples according to several embodiment of the invention. In FIG. 12A, a side view of an eyeglass frame 1200 includes a lens holder (or a region immediately proximate to a lens holder) 1202, an extended endpiece 1204 and a temple 1206. The extended endpiece 1204 includes one or more electrical components 1208 partially or completely internal to the extended endpiece 1204. In this embodiment, the manner by which the temple 1206 connects to the extended endpiece 1204 is not depicted. Hence, the temple 1206 can be integral

with the extended endpiece 1200, can be permanently coupled to the extended endpiece 1204, or can be removably or pivotally coupled to the extended endpiece 1204.

[00183] The side view of an eyeglass frame 1220 illustrated in FIG. 12B is similar to the eyeglass frame 1200 illustrated in FIG. 12A. However, in this embodiment, the temple 1206 is coupled to the extended endpiece 1204 by way of a joint (or hinge) 1210. FIG. 12C illustrates the eyeglass frame 1220 with the temple 1206 being substantially closed with respect to the eyeglass frame 1220. As noted in FIG. 12C, the temple 1206 can rotate (or pivot) with respect to the extended endpiece 1204 by way of the joint (or hinge) 1210. In this embodiment, the temple 1206 is able to be rotated (or pivoted) as in conventional eyewear such that (i) the temples can be closed or folded inwards towards the lens holders when not being worn, which can facilitate storage or (ii) the temples can be extended to an open position or extended outwards away from the lens holders, so that the eyeglasses can be worn. While retaining the traditional notion of the folding temples, the eyeglass frame 1220 causes the joint 1210 to be set back from the lens holder 1202 so that the endpiece is extended, which can facilitate including or storing one or more electoral components within the endpiece.

[00184] The side view of an eyeglass frame 1230 illustrated in FIG. 12D is similar to the eyeglass frame 1200 illustrated in FIG. 12A. However, in this embodiment, the temple 1206 is coupled to the extended endpiece 1204 by a linking temple piece 1232. The linking temple piece 1232 couples to the extended endpiece 1204 by way of a joint (or hinge) 1234. The joint 1234 allows the linking temple piece 1232 to rotate (or pivot) with respect to the extended endpiece 1204. In addition, the linking temple piece 1232 includes a connector 1236 that is capable of receiving a corresponding connector 1238 associated with the temple 1206. In this embodiment, the temple 1206 couples to the linking temple piece 1232 using the connectors 1236 and 1238 which provide physical connection (and optionally also electrical connection). The linking temple piece 1232 in turn can couple to the extended endpiece 1204 by way of the joint (or hinge) 1234. The temple 1206 is

thus easily removable from the linking temple piece 1232 of the eyeglass frame 1230.

[00185] The side view of an eyeglass frame 1240 illustrated in FIG. 12E is similar to the eyeglass frame 1200 illustrated in FIG. 12A. However, in this embodiment, the extended endpiece 1204 includes a first connector 1242, and the temple 1206 includes a corresponding connector 1244. Here, the temple 1206 can be removably connected to the extended endpiece 1204 by way of the connectors 1242 and 1244.

[00186] According to still another embodiment of the invention, temples for eyeglass frames can be not only removable but also piecewise replaceable. In other words, an entire temple can be removed and replaced with respect to an eyeglass frame. In another implementation, a portion of a temple can be removed and replaced with another portion. Allowing temples of eyeglass frames to be removed and replaced facilitates incorporating different electronic modules that are internal to, integral with, or at least partially embedded in the temples (or temple portions) to the changed. Also, the different temple portions can have different design appearances that allow the design of the eyeglasses, namely the temples, to be altered as desired by a user. In other words, the temples or temple portions can be swappable.

[00187] FIG. 13A illustrates a temple 1400 having multiple parts according to one embodiment of the invention. The temple 1400 includes a temple base 1402 that couples to a forward portion 1404 of an eyeglass frame. The forward portion 1404 can, for example, pertain to an endpiece or a portion in the vicinity of a hinge (or joint) of a temple. In addition, the temple 1400 includes a temple tip 1406 (or rearward portion). One end of the temple base 1402 can connect to the forward portion 1404 and the other end of the temple base can connect to the temple tip (or rearward portion) 1406. In one embodiment, the temple base 1402 and the temple tip 1406 of an eyeglass frame can be replaced (individually or in combination) with other temple bases and temple tips. For example, the temple base 1402 and/or the temple tip 1406 could be removed and replaced with another

temple base and/or temple tip having a different functional capability or a different ornamental appearance.

[00188] FIG. 13B illustrates a portion of an eyeglass frame 1420 according to one embodiment of the invention. The portion of the eyeglass frame 1420 is similar to a portion of the eyeglass frames 1200 illustrated in FIG. 12A. One difference is that the temple 1206 now explicitly illustrates a temple base 1422 and a temple tip 1424. The temple base 1422 and the temple tip 1424 can be removed and replaced (individually or in combination) with respect to the eyeglass frame, such as the extended endpiece 1204.

[00189] FIG. 13C illustrates a portion of an eyeglass frame 1340 according to another embodiment of the invention. The portion of the eyeglass frame 1440 is similar to a portion of the eyeglass frame 1200 illustrated in FIG. 12A. However, in FIG. 13C, the portion of the eyeglass frame 1440 includes a temple insert 1442. The temple insert 1442 can include one or more electrical components 1444 internal to, integral with, or at least partially embedded in the temple insert 1442. As illustrated in FIG. 13C, the temple insert 1442 can be provided between the extended endpiece 1204 and the temple 1206 or the rearward portion of the temple. Although not shown in FIG. 13C, the connection between the temple insert 1442 and the extended endpiece 1204 or the temple 1206 can be through use of a joint (or hinge) or by way of connectors as discussed above. In this embodiment, the temple insert 1442 can provide electrical components that can interact with the electrical components 1208 within the extended endpiece 1204 or elsewhere within the eyeglass frame. Hence, a user can optionally include the temple insert 1442 between the temple 1206 and the extended endpiece 1204 to provide additional functionality to the eyeglasses. In one embodiment, when the additional functionalities are not desired, the temple insert 1442 can be removed from the temple configuration, or the one or more electrical components 1444 can be removed from the temple insert 1442.

[00190] Another feature of the wireless eyeglasses that may be provided is one or more electrical connections on the frame of the wireless eyeglasses so as

to facilitate electrical connection with a battery charger. For example, when the power source for the wireless eyeglasses is a rechargeable battery, the ability to charge the battery without removing the battery from the frame (e.g., arm) of the wireless eyeglasses is advantageous. Hence, in one embodiment, the frame of the eyeglasses includes at least one connector or conductive element (e.g., terminal, pin, pad, trace, etc.) so that the electrical coupling between the rechargeable battery and the charger can be achieved. In this regard, the electrical connector or conductive element is provided on the frame of the eyeglasses and electrically connected to the battery. The placement of the electrical connector or conductive element on the frame serves to allow the wireless eyeglasses to be simply placed within a charger and consequently have the electrical connector or conductive element be in electrical contact with a counterpart or corresponding electrical connector or conductive element of the charger.

[00191] In one embodiment, the charger can be considered a docking station, upon which the wireless eyeglasses are docked so that the battery within the wireless eyeglasses is able to be charged. Hence, the frame of the wireless eyeglasses can likewise include an electrical connector or conductive element that facilitates electrical connection to the docking station when docked.

[00192] Power (e.g., external power source) can be coupled to the glasses through a connector. In one embodiment, the power source is embedded inside or inserted into the glasses. Different types of power sources are applicable. For example, the power source can be a battery, a fuel cell, a solar cell, or a re-chargeable battery. The rechargeable battery can be charged through a connector at the glasses.

[00193] In an earlier application, namely, U.S. Provisional Patent Application No. 60/509,631, filed October 9, 2003, and entitled "TETHERED ELECTRICAL COMPONENTS FOR EYEGLASSES," which has been incorporated herein by reference, there can be a base connected to the glasses through a cord. The cord can be just a piece of flexible conductor encapsulated by a flexible insulator. Typically, a cord includes a number of electrical wires or conductors. There can be one or more electrical components in the base, and there can also be one or more

electrical components in the cord. The different types of connectors previously described can be located in the base. In one embodiment, a power source is an electrical component in the base tethered to a pair of glasses. In another embodiment, the glasses are tethered to a base that has a connector. The connector is connected to and draws power from an external electronic device. In this embodiment, electrical components in the glasses draw power from the external electronic devices.

[00194] In yet another embodiment, the power sources are in a base or portable device connected to the glasses through a wire connection, and the power sources can be rechargeable.

[00195] An arm for a frame of a pair of eyeglasses according to one embodiment can further include additional eyeglass electrical components, such as a light source. The light source can, for example, be a Light Emitting Diode (LED). The light source can provide ornamental lighting to the frame or can serve as an indicator light.

[00196] As explained, in a number of embodiments, the glasses include a switch, which typically is at least partially embedded in the glasses.

[00197] Sensor processing can receive sensor information from a sensor. The sensor information is typically associated with the user of the eyeglasses. There can be different types of sensors. The sensors can be considered either eyeglass electrical components or tethered electrical components. For example, the sensor can be a temperature sensor configured to sense the temperature of the user. The sensor can be a humidity sensor configured to sense how much the user has been perspiring. The sensor can sense whether at least one of the user's eyes is open or not. The sensor can sense if the user is crying. The sensor can sense the direction the user is looking. In a general sense, the sensor information can, for example, pertain to physical and/or emotional conditions of the user.

[00198] In another embodiment, another type of sensor is a condition sensor. The condition sensor can sense the conditions of the user of the glasses. Examples of physical sensors include sensing one or more of distance traveled,

location, speed, calories consumed, temperature and vital signs associated with the user of the glasses. The distance traveled could represent the horizontal distance traveled or the vertical distance (i.e. elevation) traveled. The speed can be the rate of movement along the horizontal distance traveled and/or the vertical distance. In yet another embodiment, the condition sensor can sense the emotional conditions of the user of the glasses.

[00199] One advantage of cell phones is that you can make calls anywhere you can get a signal. However, one disadvantage is that you might be making a call in a noisy environment. In one embodiment, the glasses also include electrical components for noise cancellation. Such noise cancellation functionalities can be activated during a phone conversation.

[00200] In one approach, noise cancellation is achieved through a first and a second directional microphones. The first one points at the user's mouth, and the second one points away. For example, the first one can be at one of the hinges, whose directionality favors sound arriving from the user. There can also be a tube from the first microphone to or towards the mouth of the user, to guide the sound from the mouth to the microphone. The second microphone can be in the vicinity of the other hinge, whose directionality favors sound arriving in front of or outside of the user. Signals received from the second microphone are subtracted from signals received from the first microphone before the audio signals are further processed for transmission as the message from the user.

[00201] In yet another embodiment of power management, the amplification of the glasses on at least a range of frequencies depends on the ambient power level, or the noise level of the environment of the glasses. One approach to measure the noise level is to measure the average SPL at gaps of the audio signals. For example, a person asks the user the following question, "Have you left your heart in San Francisco?" Typically, there are gaps between every two words or between sentences or phrases. The glasses measure, for example, the root mean square ("rms") value of the power in each of the gaps, and can calculate another average among all of the rms values to determine the noise level. In one

embodiment, the glasses increase the amplification so as to ensure that the average power of the output audio signals by its speaker(s) is higher than the noise level by a certain degree. For example, the average SPL of the output audio signals from the glasses is 20 dB above the noise level.

[00202] In another embodiment, if the average power level of the environment or the ambient noise level is higher than a preset threshold value, signal amplification is reduced. This average power level can include all the audio signals received by, such as the microphone(s) of the glasses. The rationale is that if the environment is very noisy, it would be difficult for the user to hear the audio signals from the other person anyway. As a result, the glasses should not keep on amplifying the audio signals independent of the environment. To illustrate, if the average power level of the environment is more than 75 dB, hearing enhancement amplification is reduced, such as to 0 dB.

[00203] A number of embodiments have been described involving a speaker in an eyemask or a night cap. In one embodiment, the audio output from the speaker can serve to cancel the environmental sounds in the vicinity of the user. For example, if the user is on an airplane, the surrounding environmental sound has a relatively high level of white noise. This white noise can be detected by a pickup device and cancelled by noise cancellation circuitry provided within the eyemask or night cap. Namely, the audio output from the speaker serves to cancel the white noise of the user's environment. In another embodiment, the electrical component embedded or partially embedded is not a speaker, but can be a sensor, which can sense a physiological function of the user.

[00204] Electrical components within the temple arrangement or temple adapter alone or together with eyeglass electrical components can implement a radiation monitoring system. The radiation being monitored can, for example, pertain to one or more of UV, infrared and gamma radiation. In one embodiment, sunlight is considered as a type of radiation. In any case, additional details on radiation monitoring are further described in the related applications that have been incorporated herein by reference.

[00205] Eyewear can include one or more auxiliary sensors. One another type of auxiliary sensor is a physical sensor. The physical sensor can sense physical conditions of the user of the glasses. Examples of physical sensors include sensing one or more of location, temperature, alertness, and vital signs (e.g., heart rate, blood pressure, etc.) associated with the user of the glasses. Still other physical sensors can sense emotions of the user. For example, the physical sensor could sense whether the user is calm, excited, happy, sad, angry, etc. In one embodiment, the physical sensor can also more generally sense user activity level. As an example, the user activity level can be used to provide a lifestyle indication. For example, a lifestyle indication might show that the user was active today or, alternatively, lazy today. Such a lifestyle indication can be displayed as a text or graphic symbol to let the user or others aware of the activity level.

[00206] The activity monitoring system can also include one or more switches with the eyewear. The switches can, for example, facilitate user input or control with respect to the activity monitoring system. For example, the switches can provide one or more of on/off, reset, on, on (and reset), and calibration. The activity monitoring system can also provide a user with an indication of whether the system is currently on or off, such as by a graphical image on a display device or by a LED. The one or more switches can also be used to change operational settings, such as threshold levels, output type, user preferences, user physical characteristics (e.g., stride, weight), operational mode, or activation/deactivation of auxiliary sensors, if any.

[00207] The activity monitoring system can have a “being-worn” switch. In one embodiment, the “being-worn” switch enables the activity monitoring system to automatically determine when to monitor activity and when not to monitor activity. In particular, the activity can be monitored when an eyeglass frame having the activity monitoring system is “being-worn” and not when the eyeglass frame is not “being-worn.” The “being-worn” switch can be positioned in the temple portion with the other components of the activity monitoring system. In one embodiment, the activity monitoring system is provided, as a module as noted above, and which further includes a switch. The switch can, for example, be a “being worn” switch.

By having the switch integral with the module, the manufacture and assembly of the end-product having the activity monitoring system can be simplified. As examples, the "being-worn" switch can be an optical, magnetic or mechanical switching device.

[00208] The "being-worn" switch can make use of the situation that the temples are in an open position when the eyeglass frame is being worn, and in a closed position when not being worn. In one embodiment, the "being-worn" switch can be positioned at a temple proximate to a region that couples the temple to its corresponding lens holder. For example, the activity monitoring system (e.g., module) can be provided within the temple region near the end of the temple so that the "being worn" switch is adjacent the lens portion of the eyeglass frame.

[00209] The "being worn" switch can also be used by a user to signal the activity monitoring system to provide its output at an output device, such as a display device. For example, when the "being worn" switch is initially closed (i.e., being worn), the activity monitoring system can output its text or graphical output to the display device. Typically, the displayed output would be displayed only for a limited period of time (e.g., 10 seconds). Such an approach is typically more power efficient, yet permits the user to obtain the output information when desired. Alternatively, another switch (e.g., dedicated output switch) could be used to cause the output to be displayed for a limited period of time or while the switch is depressed.

[00210] In one embodiment, the eyewear (such as one including the activity monitoring system) can further include one or more auxiliary sensors. FIG. 14 is a chart 1500 that depicts examples of auxiliary sensors that can be utilized with the eyewear.

[00211] The chart 1500 indicates that one type of auxiliary sensor is a "being worn" sensor. The "being worn" sensor would indicate whether the glasses are being worn by its user. The "being worn" sensing mechanism can be performed using, for example, a thermal sensor, a motion detector, a stress sensor or a switch.

[00212] In one embodiment, a motion detector is used as a "being worn" sensor. A threshold can be set, such that if the amount of motion detected exceeds the threshold, the eyewear is assumed to be worn. The motion detector can, for example, be achieved by a mechanical means or an accelerometer.

[00213] In another embodiment, the "being worn" sensor includes one or more thermal sensors. In the case where two sensors are used, one sensor can be at approximately the middle of a temple, such as in a region that would receive heat from the head of the user wearing the glasses, and the other sensor can be positioned at the end of the same temple close to the hinge. If the temperature differential between the two sensors is beyond a certain preset value, the eyewear would be assumed to be worn.

[00214] In yet another embodiment, the "being worn" sensor includes a stress sensor at the hinge of the temple. The assumption is that when the eyewear is worn, the hinge is typically slightly stretched because typically the width of the head of the user can be slightly wider than the width between the temples when the two temples are in the extended positions. If the value of the stress sensor is beyond a certain preset value, the glasses would be assumed to be worn.

[00215] In still yet another embodiment, the "being worn" sensor can be implemented as a switch. For example, the switch can utilize optical, magnetic or mechanical means. In one embodiment, the switch can be positioned at the temple of the eyewear, such as a forward end of the temple proximate to a corresponding lens holder. Different embodiments of such sensors is also described in U.S. Provisional Patent Application No. 60/583,169, filed June 26, 2004, entitled "ELECTRICAL COMPONENTS FOR USE WITH EYEWEAR, AND METHODS THEREFOR," which has been incorporated herein by reference, see, e.g., section entitled "EYEGLASSES WITH USER INPUT CAPABILITY."

[00216] Another type of auxiliary sensor is an environmental sensor. The environmental sensor can sense environmental conditions, such as one or more of temperature (e.g., ambient temperature), pressure, humidity and toxins (e.g., chemicals, radiation, etc.).

[00217] Still another type of auxiliary sensor is a physical sensor. The physical sensor can sense physical conditions of the user of the glasses. Examples of physical sensors include sensing one or more of location, temperature, alertness, and vital signs (e.g., heart rate, blood pressure, etc.) associated with the user of the glasses. Still other physical sensors can sense emotions of the user. For example, the physical sensor could sense whether the user is calm, excited, happy, sad, angry, etc. In one embodiment, the physical sensor can also more generally sense user activity level. As an example, the user activity level can be used to provide a lifestyle indication. For example, a lifestyle indication might show that the user was active today or, alternatively, lazy today. Such a lifestyle indication can be displayed as a text or graphic symbol to let the user or others aware of the activity level.

[00218] In one embodiment, one particular type of physical sensor is a heart-beat sensor. The heart-beat sensor measures the heart beat of the wearer of the eyewear. One implementation for the heart-beat sensor utilizes an infrared emitter and an infrared detector as components. The infrared emitter can be an infrared LED and the infrared detector can be an infrared photodiode (or a non-infrared photodiode with a separate infrared filter). The components can be located at a temple of the eyewear, with both the emitter and the detector facing the user when the eyewear is worn. In operation, the infrared emitter shines infrared radiation towards the user, and the detector captures the infrared signals reflected back by the skin of the user. The magnitude of the reflected signals depends on the amount of blood flowing below the skin, which, in turn, depends on (i.e., fluctuates with) the heart beat. The rate of emission by the emitter and reception by the detector can be modulated (e.g., amplitude modulate) in a frequency range much higher than the heart beat, such as three Kilohertz. And the signals from the detector can be low-pass filtered before they are measured to identify the heart beat of the user. For example, the low-pass filter can have a cutoff frequency at about 1 Hertz (Hz).

[00219] It should be understood that the sensors might rely on more than one measured criteria. The one or more measured criteria might be used to determine

the sensor output. The determination of the sensor output can involve estimation or prediction.

[00220] The auxiliary sensors can be provided in a redundant or fault-tolerant manner. For example, sensors can be provided in pairs. When one sensor of a pair malfunctions, the other one can replace it. In another embodiment, any of the auxiliary sensor information can be processed in a differential manner to examine changes to the auxiliary sensor information. The auxiliary sensors can by powered by a battery, solar energy, or kinetic energy. For reduced power consumption, the auxiliary sensors can remain in a low-power state unless data is being acquired by the auxiliary sensors. In yet another embodiment, two or more of the auxiliary sensors can communicate with one another (wired or wirelessly) to exchange data or control information.

[00221] In general, the auxiliary sensors can be fully or partially embedded in the eyewear or a base tethered to the eyewear. Alternatively, one or more of the auxiliary sensors can be separate from the eyewear, or any base tethered thereto, and wirelessly communicate with the eyewear or base.

[00222] FIG. 15 shows some of the electrical components for a player 1600 in a glasses according to an embodiment of the invention. The player includes a speaker 1602, a data bus 1604 to facilitate data transfer among, for example, a processor 1606, a storage device 1608, and a coder/decoder (CODEC) 1610. The processor 1606, which can be a microprocessor or controller, controls the operation of the player 1600. The storage device 1608 stores the information, which can be different types of appropriately-formatted media data. In one example, the information is digitally encoded audio signals. The storage device 1608 can include a number of separate storage elements. For example, the device can be a flash memory device, or a minidisk device, and a cache, which can improve the access time and reduce power consumption of the storage device 1608. The storage device 1608 typically also includes a Read-Only Memory (ROM), which stores programs, utilities or processes to be executed in a non-volatile manner. The player 1600 can also include a RAM, such as for the cache.

[00223] Once a piece of information is selected to be played, the processor 1606 would supply the piece of information to the CODEC 1610, which decompresses the media data and produces analog output signals for the speaker 1602. In one embodiment, the bus 1604 is also coupled to an input/output device 1612, which would allow information to be downloaded from an instrument to the glasses.

[00224] There are different approaches to identify a piece of information to be played. In one embodiment, different pieces of information in the storage device 1608 can be categorized, and the categorization can be hierarchical, with multiple levels in the hierarchy. To illustrate, assume that there are three levels. The top level can be the name of the football team; the second level can be the names of the players on the team, and the third level can be scoring statistics or other attributes of the players. The entries, such as the name of the players, can be abbreviated. There can be a control knob or switch to allow the user to scroll down entries in a level. By pushing the knob, the user selects an entry, which can lead the user to the next level. There can be an entry for moving up a level also. In one embodiment, once an entry is selected, the identity of that entry will be announced. For example, a selected entry is about the statistics of Joe Smith. Once that entry is selected, the speaker will state, "Joe Smith statistics." If that is the one the user wants, the user can signal his preference by, for example, pushing a switch.

[00225] In another embodiment, the information can be searched. The search can be based on one or more key words. As an example, the information is related to songs. A user can search by the name of the song, the name of the artists or music genre. Entry for the search term can be through voice recognition applications in the glasses. Based on the term verbalized by the user, a song will be selected. The glasses can ask the user if that is the song the user has selected. If the response is positive, the song will be played. If not, the glasses will ask the user to verbalize the term again. In another embodiment, entering the search terms is through the key pad of a portable device, wired or wirelessly, coupled to

the glasses. Additional descriptions regarding having a portable device linked to a pair of glasses are further discussed below.

[00226] With the speaker relatively close to at least one ear of the user, the volume of the speaker does not have to be very high. In one embodiment, the volume of the speaker is limited, such as the maximum sound level is not more than 60 dB. If the glasses are powered by a battery, limiting the volume of the speaker would extend the lifetime of the battery. Such a limit can also reduce the chance of the speaker generating audio signals that might disturb people in the vicinity of the user. This, in turn, helps to provide information to the user in a relatively private manner.

[00227] In one embodiment, the glasses are powered by a battery. To extend its lifetime, the glasses include a timer. For example, if the glasses have a radio, after the radio is turned on for a preset amount of time, the timer will turn the radio off automatically. In another embodiment, the glasses include a speaker and the timer would turn the speaker off after the speaker has been turned on for a preset amount of time. The preset time can be determined by the timer.

[00228] In another embodiment, the glasses are powered by other types of sources, such as a solar cell or a fuel cell. Such other type of sources can be at one of temples of the glasses.

[00229] As explained, in a number of embodiments, the glasses include a switch, which typically is at least partially embedded in the glasses. For example, the switch can be used to turn the speaker on, or to tune the frequency of a radio. If the glasses have two speakers, such as one on each of the temples, there can be two switches, one on each temple to control the corresponding speaker. The two speakers can be for generating stereo audio signals for the user. There can also be one control switch for both speakers.

[00230] The switch in the glasses can have different attributes. It can be activated by different type of forces, including mechanical, radiation, magnetic, electrical, and temperature. The switch can also be activated remotely by a remote device. The switch can be based on one or more detectors. The switch can have

different degrees or ranges of control, such as binary, multiple discrete steps or incremental control. The switch can be placed at different position on the glasses, such as on the side or top surface of a temple or at a joint. The control can take perception into consideration, such as based on texture, height and lateral position of multiple switches.

[00231] FIG. 16 illustrates a number of forces 1650 activating the switch according to different embodiments of the invention. They can be based on, for example, mechanical 1652, radiation 1654, magnetic 1656, electrical 1658, and temperature 1660.

[00232] FIG. 17 illustrates a number of mechanical forces 1652 activating the switch according to different embodiments of the invention. The mechanical switch or sensor can be a conductive-elastomer switch 1702, a membrane switch 1704, a dome switch 1706, a relatively simple wire switch 1708, and a roller switch 1710, such as a switch including a wheel. Another type of mechanical force can be based on stress 1711, such as a switch based on piezoelectric force or a piezoelectric device.

[00233] In yet another embodiment, the mechanical switch is made so that the electrical circuitry in the glasses can be activated but not deactivated by the user. In other words, once activated, the switch is designed not to be deactivated by the user, and the circuit will remain on till the power source inside the glasses is depleted. One approach to implement such a switch is based on a piece of insulating material 1716 between a terminal of, for example, a battery and its contact with the circuit embedded in the glasses. When the battery is installed, at least one of its terminals is separated from its circuit contact. There can be a thin, flexible, insulating material, 1716, such as a ribbon, positioned between the terminal and the contact. Though the circuit is embedded in the glasses, the insulating material 1716 extends outwardly from inside the glasses through a hole, such as a small hole, in the side wall of, for example, a temple of the glasses. In one embodiment, the hole or slot is located above or below the terminal and the contact, or the hole is not directly inline with the terminal and the contact. By pulling

the insulating material out from the glasses, the terminal will establish electrical connection with the contact, activating the circuit and turning the speaker on.

[00234] In another embodiment of a switch based on mechanical force 1654, the mechanical force is the force that is used to insert 1718 a battery into the glasses. Once the battery is inserted, the speaker in the glasses will be activated. The speaker will remain on until the battery is removed, or until the power in the battery is drained.

[00235] The switch can also be activated by radiation 1654, or energies in a type of radiation, according to a number of embodiments of the invention. The radiation 1654 can be in the optical, or infrared or ultraviolet range. For example, the switch includes a photodiode or photo sensor in the glasses, and there is an opening above the photodiode. In one embodiment, the diode is activated by light getting to the diode through the opening. In another embodiment, the circuit is activated if the opening is covered to prevent light from getting to the diode.

[00236] The switch can be activated by magnetic forces 1656. For example, there can be a magnetic sensor or a Hall effect detector inside a temple proximate to a joint of a pair of glasses. FIG. 18 shows a section of a pair of glasses 1750 with such a detector 1754. The detector 1754 is electrically connected to a printed circuit board 1755. When the temple 1752 is in its extended position, as when the glasses 1750 are ready to be worn, the detector 1754 will be directly adjacent to a magnet 1756 inside a lens holder 1758 at the corresponding joint 1760. The magnet 1756 would activate the Hall effect detector 1754. In another embodiment, a magnetic switch is activated based on changing the inductance of a coil. For example, the switch includes a steel rod that can be positioned in or out of a coil. The switch's range of control is based on the position of the rod with respect to the coil.

[00237] The switch can be activated depending on electrical forces 1658. In one embodiment, the electrical force depends on capacitive effect. By changing the capacitance, the switch is turned on and off. For example, the capacitance is changed by placing one's finger over a metallic pad. In another example, by

changing the amount of overlap between two metallic sheets that are not in contact, the capacitance between the two metallic sheets will change. This then changes the range of control of the switch.

[00238] In another embodiment, the electrical force 1658 is based on resistive effect. For example, the switch is made up of a slide or a rotary potentiometer. By changing the amount of coupling, the amount of resistance is changed to reflect the range of control of the switch.

[00239] In one embodiment, the switch's activation can depend on temperature 1660. For example, the switch includes a temperature sensor. When the temperature reaches a certain point, the switch is activated.

[00240] In yet another embodiment, the switch is controlled by a remote controller. For example, the glasses include an infrared detector. The remote controller can generate infrared radiation. By aiming the controller at the detector, the infrared radiation can activate the infrared detector and the switch is activated. Or, if the user moves into the vicinity of a corresponding infrared transmitter, circuits in the glasses would be activated.

[00241] The switch can include one or more previously-described sensor or detector of different types of forces. For example, the switch can use two photo sensors. One sensor is exposed to light on the outside surface of the temple and the other is exposed to light on the inside surface of the temple, such as close to the ear. Based on their differential output, the switch is activated. As another example, there are two temperature sensors in the glasses. One is located close to a joint and the other is at the temple close to the ear. Again, the switching action depends on their differential outputs. In yet another embodiment, the glasses include more than one type of switch. There can be one type of switch, such as a mechanical switch, acting as an on/off switch, and another, such as a switch using electrical forces, as an incremental switch to change frequency.

[00242] As described, in a number of embodiments, the switch can provide different degrees or ranges of control. In one embodiment, there are two degrees of control, such as in an on/off switch. In another embodiment, there can be

multiple discrete degrees, steps or positions. For example, the switch is a roller with discrete notches to indicate different discrete positions. Or, there can be two mechanical switches, placed side-by-side. Pushing one switch will increment one step, and pushing the other will decrement one step.

[00243] In yet another embodiment, the change from one degree to the next is gradual and not noticeably discrete. This can be achieved with two (2) sensors arranged in quadrature. FIGs. 19A-19C show examples of different embodiments of such a switch based on two photodiodes or photo detectors.

[00244] FIG. 19A shows an embodiment 1800 with a wheel 1802 (roller) having clear strips, 1804, 1806 and 1808, alternating with black strips, 1810, 1812 and 1814, and two photodiodes, 1816 and 1818. Most of the wheel 1802 and the two diodes, after incorporated into the temple 1820, are covered by a piece of material 1822. The two diodes, 1816 and 1818, are exposed to ambient light through a clear window 1824. A part of the wheel 1802 is extended out of the temple 1820, allowing the wheel 1802 to be turned about its axis 1826. The wheel 1802 can have teeth for friction turning. As the wheel 1802 rotates about the axis 1826, based on the differential outputs from the diodes, the direction of movement of the wheel 1802—clockwise or counterclockwise—is determined. For example, if the wheel 1802 is rotated clockwise, the top diode 1816 senses light before the bottom 1818 senses light. On the other hand, if the wheel 1802 is rotated counterclockwise, the bottom diode 1818 senses light before the top 1816. Based on the signals from the two diodes, one would be able to tell if the wheel is being turned clockwise or counterclockwise. Clockwise can denote increase and counterclockwise can denote decrease. This embodiment can be used, for example, to change frequency. By turning the wheel 1802 clockwise, the frequency of the radio goes up. And, by turning the wheel 1802 counter-clockwise, the frequency goes down. Such a wheel 1802 is also applicable for other purposes, such as controlling the volume of a speaker.

[00245] FIG. 19B shows an embodiment 1850 with a wheel 1852 having black 1854 and reflecting 186356 strips, two photodiodes, 1858 and 1860, and a

LED 1862. Again, most of the wheel, the two diodes and the LED are covered by a sheet of material 1864. If a reflecting strip 1856, instead of a black strip 1854, goes over a diode, more light from the LED will be reflected back and received by the diode. If a black strip 1854 goes over a diode, output from the diode will be significantly reduced. Again, based on the signals from the diodes, the direction of rotation can be determined, which, in turn, can be used to indicate incrementing or decrementing outputs.

[00246] FIG. 19C shows an embodiment 1900 again using two photodiodes, 1902 and 1904, but without a wheel. The two diodes, 1902 and 1904, are exposed to ambient light unless they are covered. In this embodiment, whether the finger 1906 or another object is moving from the first diode 1902 to the second diode 1904, or from the second diode 1904 to the first diode 1902 can be determined based on the signals from the diodes. For example, the finger 1906 sliding in a forward direction would trigger a signal from the first diode 1902 before the second diode 1904. On the other hand, sliding the finger in a backward direction would trigger a signal from the second diode before the first diode. Thus, the outputs from the two diodes can show the direction of movement of the finger. One can then, for example, assign forward movement (from the first 1902 to the second 1904) as increment, and backward movement (from the second 1904 to the first 1902) as decrement.

[00247] A switch can be placed at different location on a pair of glasses. In one embodiment, the switch is positioned on one of the side surfaces of one of the temples, such as the side that is not facing the face of the user when the glasses are worn. In another embodiment, the switch is positioned on a top surface of one of the temples. In yet another embodiment, the switch is positioned at one of the joints or hinges of the glasses. For example, there is a mechanical switch at a joint. If the corresponding temple is extended, as in the position when the glasses are worn, the switch will be pressed, which can indicate that the switch has been activated.

[00248] In one embodiment, the user can be using a switch when the glasses are worn. Depending on the position and the type of switch, the user may not be able to see the switch when he is manipulating it. In one embodiment, the design of the switch takes into consideration perception. To illustrate, there are two mechanical switches on the glasses. The top surfaces of the two switches have different texture. One switch has a smooth surface and the other has a rough surface. Pushing the rough surface implies incrementing one step and pushing the smooth surface implies decrementing one step. This type of perception design is based on tactile effect. In another example, the heights of the two switches are different. The taller switch is for one effect and the shorter is for another. In yet another embodiment, the lateral position of the two switches has significance. For example, the two mechanical switches are on the top surface or edge of a temple. By pushing the switch closer to the lens holder, the volume of the speaker in the glasses goes up; and by pushing the switch further away from the lens holder, the volume of the speaker goes down. In another example, the two switches are under the two ends of a piece of materials, such as a rocker-lever, which can be plastic. Rocking the plastic piece forward is an increment motion, and rocking the plastic piece backwards is a decrement motion.

[00249] A number of embodiments have been described where information is available only for a relatively short duration of time. In one embodiment, the information is available for a longer duration of time. For example, after the short duration of time, the battery in the glasses is drained. In order to continue on running the electronics inside the glasses to get the information, the user can replace the battery in the glasses with a new battery. In this embodiment, the glasses are designed so that the battery is replaceable by the user. Or, in another embodiment, the battery is rechargeable through a connector at the glasses.

[00250] A number of embodiments have been described regarding the glasses with a speaker for providing information to the user. In one embodiment, the glasses also include one or more light emitting diodes. The LEDs can be for entertaining purposes. For example, the information provided to the user is music. If the audio signals received are beyond a certain threshold, one or more of the

LEDs will be activated. The activation of the one or more LEDs can then be synchronized to the sound of the speaker. In another example, a number of LEDs could be arranged as an array on the outside surface of one of the temples. The array could display graphics, pictures, or scrolling text. The array could also be located at other locations on the glasses, such as across the front surface or the top surface of the bridge or the lens-holders of the glasses.

[00251] In still yet another embodiment, the "being worn" sensor can be implemented as a switch. For example, the switch can utilize optical, magnetic or mechanical means. In one embodiment, the switch can be positioned at the temple of the eyewear, such as a forward end of the temple proximate to a corresponding lens holder. Different embodiments of such sensors is also described in U.S. Provisional Patent Application No. 60/583,169, filed June 26, 2004, entitled "ELECTRICAL COMPONENTS FOR USE WITH EYEWEAR, AND METHODS THEREFOR," which has been incorporated herein by reference, see, e.g., section entitled "EYEGLASSES WITH USER INPUT CAPABILITY."

[00252] In one embodiment, a pair of glasses has access to voice recognition software. The software can be embedded in (a) the glasses, (b) a base tethered to the glasses, (c) a portable device wired or wirelessly coupled to the glasses or to the base, or (d) a computing system wired or wirelessly coupled to the glasses. Or, the software or firmware can be in more than one of the above devices.

[00253] The operation of the electrical components can be on-demand. For example, the on/off switch can be voice activated. The glasses are trained to recognize specific recitation, such as specific sentences or phrases, and/or the user's voice. To illustrate, when the user says sentences like any of the following, the hearing enhancement capabilities would be automatically turned from the sleep mode to the active mode: What did you say? Louder. You said what?

[00254] There are different approaches to make a user selection, such as selection of a song. In one embodiment, the media assets/songs can be categorized in the asset player. The categorization can be based on the names of artists, albums and/or songs. The categorization can be hierarchical, with multiple

levels in the hierarchy. To illustrate, assume that there are three levels. The top level can be the name of a singer; the second level can be the time periods when the assets were produced, and the third level can be the names of the songs. The entries, such as the name of the singer, can be abbreviated. There can be a small display and a control knob to allow a user to scroll down entries in a level. By pushing the knob, the user selects an entry, which can lead the user to a lower level. There can be an entry for moving up a level also. In another embodiment, the display is a touch-screen display, allowing entries to be entered directly on the display. In yet another embodiment, entries can be selected based on voice recognition.

[00255] In another embodiment, information can be searched. The search can be based on one or more key words. As an example, the information is related to songs. A user can search by the name of the song, the name of the artists or music genre. Entry for the search term can be through voice recognition applications in the glasses. Based on the term verbalized by the user, a song will be selected. The glasses can ask the user if that is the song the user has selected. If the response is positive, the song will be played. If not, the glasses will ask the user to verbalize the term again. In another embodiment, entering the search terms is through the key pad of a portable device, wired or wirelessly, coupled to the glasses.

[00256] The various aspects, embodiments, implementations and features of the invention noted above can be combined in various ways or used separately. Those skilled in the art will understand from the description that the invention can be equally applied to or used in other various different settings with respect to various combinations, aspects, embodiments, implementations or features provided in the description herein.

[00257] Certain aspects of the invention can be implemented in software, hardware or a combination of hardware and software. Certain aspects of the invention can also be embodied as computer readable code on a computer readable medium. The computer readable medium is any data storage device that

can store data which can thereafter be read by a computer system. Examples of the computer readable medium include read-only memory, random-access memory, CD-ROMs, magnetic tape, optical data storage devices, and carrier waves. The computer readable medium can also be distributed over network-coupled computer systems so that the computer readable code is stored and executed in a distributed fashion.

[00258] The advantages of the invention are numerous. Different embodiments or implementations may yield one or more of the following advantages. One advantage of the invention is that electrical components can be provided integral with or attached to a temple arrangement, a temple adapter or a removable temple part for use with a pair of eyeglasses. Another advantage of the invention is that after-market changes to electrical capabilities of eyeglasses can be relatively easily achieved. Another advantage of the invention is that communication, computation, information capturing or sensing, and/or operational capabilities can be provided for eyeglasses without substantial interference to style or design choices of the glasses. Still another advantage of the invention is that wireless communications, radiation monitoring, fitness monitoring and/or health monitoring can be supported by the electrical components. Yet another advantage of the invention is the ability to provide hands-free wireless communications capability.

[00259] As noted above, this application incorporates by reference, each of the following: (i) U.S. Patent Application 10/822,218 (now U.S. Patent No. 10/822,218), filed April 12, 2004, and entitled "EYEGLASSES FOR WIRELESS COMMUNICATIONS;" (ii) U.S. Patent Application No. 10/964,011 (now U.S. Patent No. 7,192,136), filed October 12, 2004, and entitled "TETHERED ELECTRICAL COMPONENTS FOR EYEGLASSES;" (iii) U.S. Patent No. 7,116,976; (iv) U.S. Patent No. 7,500,746; (v) U.S. Patent Application No. 11/078,857, filed March 11, 2005, and entitled "RADIATION MONITORING SYSTEM;" (vi) U.S. Patent Application No. 11/183,283, filed July 15, 2005, and entitled "EVENT EYEGLASSES;" (vii) U.S. Patent No. 7,760,898; (viii) U.S. Patent

No. 7,500,747; (ix) U.S. Patent No. 7,380,936; (x) U.S. Patent No. 7,255,437; and (xi) U.S. Patent No. 7,806,525.

[00260] Numerous specific details are set forth in order to provide a thorough understanding of the present invention. However, it will become obvious to those skilled in the art that the invention may be practiced without these specific details. The description and representation herein are the common meanings used by those experienced or skilled in the art to most effectively convey the substance of their work to others skilled in the art. In other instances, well-known methods, procedures, components, and circuitry have not been described in detail to avoid unnecessarily obscuring aspects of the present invention.

[00261] In the foregoing description, reference to "one embodiment" or "an embodiment" means that a particular feature, structure, or characteristic described in connection with the embodiment can be included in at least one embodiment of the invention. The appearances of the phrase "in one embodiment" in various places in the specification are not necessarily all referring to the same embodiment, nor are separate or alternative embodiments mutually exclusive of other embodiments. Further, the order of blocks in process flowcharts or diagrams representing one or more embodiments of the invention do not inherently indicate any particular order nor imply any limitations in the invention.

[00262] Many features and advantages of the present invention are apparent from the written description. Since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation as illustrated and described. Hence, all suitable modifications and equivalents may be resorted to as falling within the scope of the invention.

What is claimed is:

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: HOWELL et al.

Attorney Docket No.: IPVCP003X1C4X1C1

Application No.: 18/375,893

Examiner: LEI, JIE

Filed: October 2, 2023

Group: 2872

Title: SYSTEM FOR CHARGING EMBEDDED BATTERY IN WIRELESS HEAD-WORN PERSONAL ELECTRONIC SERVICES

AMENDMENT A TRANSMITTAL

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Transmitted herewith is an Amendment in the above-identified application.

The fee has been calculated as shown below.

	Claims After Amendment		Highest Previously Paid For	Present Extra	Small Entity Rate Fee	Large Entity Rate Fee
Total Claims	59	MINUS	55	04	x 40 =	x 100 = 400
Independent Claims	5	MINUS	4	01	x 192 =	x 480 = 480
Multiple Dependent Claim Present and Fee Not Previously Paid					$	$
				Total	$0.00	$880.00

☐ Applicant(s) hereby petition for a _____- month extension(s) of time to respond to the aforementioned Office Action.

☒ Applicant(s) believe that no (additional) Extension of Time is required; however, if it is determined that such an extension is required, Applicant(s) hereby petition that such an extension be granted and authorize the Commissioner to charge the required fees for an Extension of Time under 37 CFR 1.136 to Deposit Account No. 50-3874 (Order No. IPVCP003X1C4X1C1).

☒ Any fees due are being paid electronically herewith.

☒ Please charge any additional fees required to facilitate filing the enclosed response, to Deposit Account No. 50-3874 (Order No. IPVCP003X1C4X1C1).

Respectfully submitted,

/C. Douglass Thomas/

C. Douglass Thomas
Reg. No. 32,947

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: HOWELL et al.	Attorney Docket No.: IPVCP003X1C4X1C1
Application No.: 18/375,893	Examiner: LEI, JIE
Filed: October 2, 2023	Group: 2872
Title: SYSTEM FOR CHARGING EMBEDDED BATTERY IN WIRELESS HEAD-WORN PERSONAL ELECTRONIC DEVICES	

AMENDMENT A

Mail Stop _____
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Further to the Office Action mailed December 14, 2023, please amend the above-identified as follows:

Amendments to the Claims are reflected in the listing of claims which begin on page 2 of this paper.

Amendments to the Drawings are denoted on page 20 of this paper.

Remarks/Arguments begin on page 21 of this paper.

AMENDMENTS TO THE CLAIMS:

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Withdrawn-Currently Amended) A system, comprising:

a head-worn personal electronic apparatus, including at least:

a head-worn structure configured to be worn by a user;

a ~~at least one~~ speaker at least partially contained within ~~internal to~~ the head-worn structure, the ~~at least one~~ speaker being configured to be worn proximate to an ear of the user when the head-worn structure is being worn by the user;

a touch sensitive surface at least partially contained within the head-worn structure and configured to sense a touch input associated with the user;

a rechargeable battery contained within the head-worn structure;

electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery, and the electronic circuitry being electrically connected to the touch sensitive surface;

wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and

at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and

a charging apparatus having at least a charging connector,

wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.

2. (Withdrawn) A system as recited in claim 1, wherein the sensed touch input by the touch sensitive surface operates to at least alter operation of the head-worn personal electronic apparatus.

3. (Withdrawn) A system as recited in claim 2, wherein head-worn personal electronic apparatus is configured to support voice calls to the user, and

wherein the at least one operation of the head-worn personal electronic apparatus being altered concerns at least accepting or declining a voice call to the user.

4. (Withdrawn-Currently Amended) A system as recited in claim 2, wherein head-worn personal electronic apparatus is configured to support audio output to the user via the speaker, and

wherein the at least one operation of the head-worn personal electronic apparatus being altered concerns control of the audio output being provided to the user.

5. (Withdrawn) A system as recited in claim 2, wherein the head-worn personal electronic apparatus is configured to distinguish at least a direction of the user input with respect to the touch sensitive surface.

6. (Withdrawn) A system as recited in claim 2, wherein the head-worn personal electronic apparatus is configured to detect at least a sliding of a finger action with respect to the touch sensitive surface.

7. (Withdrawn) A system as recited in claim 2, wherein the head-worn personal electronic apparatus is configured to facilitate determination at least whether the user input pertains to a forward sliding action or a backward sliding action with respect to the touch sensitive surface.

8. (Withdrawn-Currently Amended) A system as recited in claim 1, wherein the head-worn structure comprises:

a physical condition sensor at least partially contained within the head-worn structure and configured to acquire data pertaining to a physical condition of the user, the

physical condition sensor being provided at least partially contained within ~~internal to~~ the head-worn structure.

9. (Canceled).

10. (Withdrawn-Currently Amended) A system as recited in claim 1, wherein the head-worn personal electronic apparatus comprises:

at least one magnetic element at least partially contained within ~~internal to~~ the head-worn structure and configured to support a magnetic force that facilitates an electrical connection.

11. (Withdrawn-Currently Amended) A system as recited in claim 1, wherein the head-worn personal electronic apparatus comprises:

a microphone at least partially contained within ~~internal to~~ the head-worn structure,

wherein the head-worn personal electronic device is configured to receive a voice input via the microphone, determine or receive a determination of a requested operation from the voice input using voice recognition, and control an operation by the head-worn personable electronic device based on the requested operation.

12. (Withdrawn) A system as recited in claim 1, wherein the head-worn structure comprises:

a radiation sensor, operatively connected to the rechargeable battery, at least partially contained within the head-worn structure and configured to sense radiation.

13. (Withdrawn) A system as recited in claim 1, wherein the head-worn personal electronic apparatus comprises:

a sensor at least partially contained within the head-worn structure and configured to sense data indicative of whether the head-worn personal electronic apparatus is being worn by the user.

14. (Withdrawn) A system as recited in claim 13, wherein the sensor is electrically connected to the electronic circuitry, and wherein the electronic circuitry contained within the head-worn structure of the head-worn personal electronic apparatus is configured to at least alter operation of the head-worn personal electronic apparatus based at least in part on the sensed data from the sensor.

15. (Withdrawn-Currently Amended) A system as recited in claim 14, wherein head-worn personal electronic apparatus is configured to support audio output to the user via the speaker, and

wherein the operation of the head-worn personal electronic apparatus being altered concerns control of the audio output being provided to the user.

16. (Withdrawn) A system as recited in claim 14, wherein head-worn personal electronic apparatus is configured to support a low power operational mode, and

wherein the operation of the head-worn personal electronic apparatus being altered concerns operation of the head-worn personal electronic apparatus in the low power operational mode.

17. (Withdrawn-Currently Amended) A system as recited in claim 1, wherein the system ~~head-worn personal electronic apparatus~~ comprises:

a Hall effect detector ~~at least partially contained within the head-worn structure and~~ configured to capture data associated with a magnetic characteristic~~, the Hall effect detector being operatively connected to the electronic circuitry~~.

18. (Withdrawn) A system as recited in claim 1, wherein the head-worn personal electronic apparatus comprises:

a bone conducting element at least partially contained within the head-worn structure and configured to operate in accordance with acoustic characteristics, the bone conducting element being operatively connected to the electronic circuitry.

19. (Currently Amended) A system, comprising:

a head-worn personal electronic apparatus, including at least:

a head-worn structure configured to be worn by a user;

a ~~at least one~~ speaker at least partially contained within ~~internal to~~ the head-worn structure, the ~~at least one~~ speaker being configured to be worn proximate to an ear of the user when the head-worn structure is being worn by the user;

a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user;

a second microphone at least partially contained within the head-worn structure, the second microphone being positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus;

a rechargeable battery contained within the head-worn structure;

a sensor at least partially contained within the head-worn structure and configured to capture data;

electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least one or more of the first microphone, the second microphone, the rechargeable battery and the sensor, the electronic circuitry being configured to at least process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, the electronic circuitry being configured to process at least the data captured by the sensor, and the electronic circuitry being configured to determine whether the head-worn structure is being worn by a user based on at least the processed sensor data;

wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and

at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and

a charging apparatus having at least a charging connector,

wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.

20. (Currently Amended) A system as recited in claim 19, wherein the first microphone is positioned to be directed forward towards the user's front when the head-worn structure is being worn by the user, and the second microphone is positioned to be directed outward away from the user's head when the head-worn structure is being worn by the user ~~the electronic circuitry is configured to process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone~~.

21. (Original) A system as recited in claim 20, wherein the head-worn personal electronic apparatus comprises:

a touch sensitive surface at least partially contained within the head-worn structure and configured to sense a touch input associated with the user, wherein the sensed touch input operating to at least alter operation of the head-worn electronic personal audio apparatus.

22. (Currently Amended) A system as recited in claim 21, wherein head-worn electronic personal audio apparatus is configured to support audio output to the user via the speaker, and

wherein the at least one operation of the head-worn electronic personal audio apparatus being altered concerns control of the audio output being provided to the user.

23. (Currently Amended) A system as recited in claim 21, wherein the system ~~head-worn electronic personal audio apparatus~~ comprises:

a Hall effect detector ~~at least partially contained within the head-worn structure and~~ configured to capture data associated with a magnetic characteristic.

24. (Currently Amended) A system as recited in claim 19, wherein the sensor is positioned to be directed towards the user's head when the head-worn structure is being worn ~~the head-worn personal electronic apparatus comprises:~~

~~a sensor at least partially contained within the head-worn structure and configured to capture data,~~

~~wherein the electronic circuitry provided within the head-worn structure and electrically connected to the sensor, the electronic circuitry configured to process at least the data captured by the sensor~~.

25. (Currently Amended) A system as recited in claim 24, wherein the data captured by the sensor is dependent on thermal characteristics of the user's head when the head-worn structure is being worn ~~electronic circuitry is configured to determine whether the head-worn structure is being worn by a user based on at least the processed sensor data~~.

26. (Currently Amended) A system as recited in claim 19, wherein the head-worn personal electronic apparatus comprises:

wherein the head-worn personal electronic device is configured to receive a voice input via the first microphone, determine or receive a determination of a requested operation from the voice input using voice recognition, and control an operation by the head-worn personal electronic device based on the requested operation.

27. (Canceled).

28. (Canceled).

29. (Currently Amended) A system as recited in claim 19 [[28]], wherein the head-worn personal electronic apparatus is configured to at least alter operation of the head-

worn personal electronic apparatus based at least in part on the sensed data from the sensor.

30. (Currently Amended) A system as recited in claim 29, wherein head-worn personal electronic apparatus is configured to support audio output to the user via the speaker, and

wherein the operation of the head-worn personal electronic apparatus being altered concerns control of the audio output being provided to the user.

31. (Original) A system as recited in claim 19, wherein the head-worn personal electronic apparatus comprises:

a user input device supported by the head-worn structure, the user input device being configured to receive a user input, the user input device is based on at least capacitive effect, wherein the user input being received induces at least a capacitive change to produce at least an electrical response.

32. (Original) A system as recited in claim 31, wherein the user input device is configured to distinguish at least a direction of the user input with respect to the user input device.

33. (Original) A system as recited in claim 31, wherein the electronic circuitry is electrically connected to the user input device to receive user input data from the user input device, and wherein the head-worn personal electronic apparatus is configured to detect at least a sliding of a finger action with respect to the user input device using at least the electronic circuitry and the user input data.

34. (Original) A system as recited in claim 31, wherein the electronic circuitry is electrically connected to the user input device to receive user input data from the user input device, and wherein the head-worn personal electronic apparatus is configured to distinguish at least whether the user input pertains to a forward sliding action or a

backward sliding action with respect to the user input device using at least the electronic circuitry and the user input data.

35. (Canceled).

36. (Canceled).

37. (Canceled).

38. (Currently Amended) A system as recited in claim 19, wherein the system ~~head-worn electronic personal audio apparatus~~ comprises:

a Hall effect detector ~~at least partially in the head-worn structure and configured to capture data associated with a magnetic characteristic~~.

39. (Original) A system as recited in claim 19, wherein the head-worn personal electronic apparatus comprises:

a bone conducting element at least partially contained within the head-worn structure and configured to operate based on signals associated with sound, the bone conducting element being operatively connected to the electronic circuitry.

40. (Currently Amended) A system, comprising: ~~as recited in claim 19, wherein the head-worn personal electronic apparatus comprises:~~

a head-worn personal electronic apparatus, including at least:

a head-worn structure configured to be worn by a user;

a speaker at least partially contained within the head-worn structure, the speaker being configured to be worn proximate to an ear of the user when the head-worn structure is being worn by the user;

a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user;

a second microphone at least partially contained within the head-worn structure, the second microphone being positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus;

a rechargeable battery contained within the head-worn structure;

a “being worn” sensor at least partially contained within the head-worn structure and configured to detect data indicative of whether the head-worn structure of the head-worn personal electronic apparatus is being worn;

electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least one or more of the first microphone, the second microphone, the rechargeable battery and the “being worn” sensor, the electronic circuitry being configured to at least process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, the electronic circuitry being configured to process at least the detected data captured by the “being worn” sensor;

wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and

at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and

a charging apparatus having at least a charging connector,

wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus

~~radiation detector configured to capture radiation data,~~

~~wherein the electronic circuitry is electrically connected to the radiation detector, the electronic circuitry configured to process at least the radiation data captured by the radiation detector, and~~

~~wherein the electronic circuitry is configured to determine whether the head-worn personal electronic apparatus is being worn by a user based on at least the processed radiation data~~.

41. (Currently Amended) A system as recited in claim 40, wherein the detected data by the "being worn" sensor is dependent on a physical characteristic of the user ~~the radiation detector comprises a photodetector~~.

42. (Original) A system as recited in claim 19, wherein the conductive element is a conductive pad.

43. (Withdrawn-Currently Amended) A system, comprising:

a head-worn personal electronic apparatus, including at least:

a head-worn structure configured to be worn by a user;

a ~~at least one~~ speaker at least partially contained within ~~internal to~~ the head-worn structure, the ~~at least one~~ speaker being configured to be worn proximate to an ear of the user when the head-worn structure is being worn by the user;

a motion detector at least partially contained within the head-worn structure and configured to provide motion data pertaining to the head-worn personal electronic apparatus;

a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user;

a second microphone at least partially contained within the head-worn structure, the second microphone being positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus;

a touch sensitive surface at least partially contained within the head-worn structure and configured to sense a touch input associated with the user, wherein the sensed touch input operating to at least alter operation of the head-worn electronic personal audio apparatus.

a rechargeable battery contained within the head-worn structure;

electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery;

wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and

at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and

a charging apparatus having at least a charging connector,

wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.

44. (Withdrawn-Currently Amended) A system as recited in claim 43, wherein the head-worn personal electronic apparatus comprises:

wherein the electronic circuitry is configured to process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, and

wherein the head-worn personal electronic device is configured to receive a voice input via the first microphone, determine or receive a determination of a requested

operation from the voice input using voice recognition, and control an operation by the head-worn personal electronic device based on the requested operation.

45. (Withdrawn-Currently Amended) A system as recited in claim 44, wherein the head-worn personal electronic apparatus comprises:

at least one magnetic element at least partially contained within ~~internal to~~ the head-worn structure and configured to support a magnetic force that facilitates an electrical connection.

46. (Withdrawn) A system as recited in claim 44, wherein the head-worn personal electronic apparatus comprises:

a sensor at least partially contained within the head-worn structure and configured to sense data indicative of whether the head-worn personal electronic apparatus is being worn by the user,

wherein the head-worn personal electronic apparatus is configured to at least alter operation of the head-worn personal electronic apparatus based at least in part on the sensed data from the sensor.

47. (Withdrawn-Currently Amended) A system as recited in claim 46, wherein the head-worn personal electronic apparatus is configured to support audio output to the user via the speaker, and

wherein the operation of the head-worn personal electronic apparatus being altered concerns control of the audio output being provided to the user.

48. (Withdrawn-Currently Amended) A system as recited in claim 46, wherein the head-worn personal electronic apparatus is configured to support a low power operational mode, and

wherein the operation of the head-worn personal electronic apparatus being altered concerns operation of the head-worn personal electronic apparatus in the low power operational mode.

49. (Withdrawn-Currently Amended) A system, comprising:

a head-worn personal electronic apparatus, including at least:

a head-worn structure configured to be worn by a user;

a ~~at least one~~ speaker at least partially contained within ~~internal to~~ the head-worn structure, the ~~at least one~~ speaker being configured to be worn proximate to an ear of the user when the head-worn structure is being worn by the user;

a motion detector at least partially contained within the head-worn structure and configured to provide motion data pertaining to the head-worn personal electronic apparatus;

a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user;

a second microphone at least partially contained within the head-worn structure~~, the second microphone being positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus~~;

a rechargeable battery contained within the head-worn structure;

electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery;

wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery;

a radiation emitter at least partially contained within the head-worn structure and configured to at least direct radiation towards the user when at least the head-worn structure of the head-worn personal electronic apparatus is being worn;

a radiation detector at least partially contained within the head-worn structure and configured to detect at least a portion of the radiation from the radiation emitter that is reflected back from the user when at least the head-worn structure of the head-worn personal electronic apparatus is being worn; and

at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and

a charging apparatus having at least a charging connector,

wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.

50. (Withdrawn-Currently Amended) A system as recited in claim 49,

wherein the radiation detector is operatively connected to the electronic circuitry, and

wherein electronic circuitry within the head-worn structure is configured to facilitate determining whether the head-worn structure of the head-worn personal electronic apparatus is being worn by the user ~~based on at least the detected radiation, and~~

~~wherein the detected radiation is at least infrared radiation~~.

51. (Withdrawn-Currently Amended) A system as recited in claim 50, wherein the head-worn personal electronic apparatus comprises:

at least one magnetic element at least partially contained within ~~internal to~~ the head-worn structure and configured to support a magnetic force that facilitates an electrical connection.

52. (Withdrawn-Currently Amended) A system as recited in claim 50 [[51]], ~~wherein the head-worn personal electronic apparatus comprises:~~

wherein the second microphone is positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus,

wherein the electronic circuitry is configured to process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, and

wherein the head-worn personal electronic device is configured to receive a voice input via the first microphone, determine or receive a determination of a requested operation from the voice input using voice recognition, and control an operation by the head-worn personal electronic device based on the requested operation.

53. (Withdrawn-Currently Amended) A system as recited in claim 50 [[51]], wherein the head-worn personal electronic apparatus is configured to at least alter operation of the head-worn personal electronic apparatus based at least in part on the determination of whether the head-worn structure of the head-worn personal electronic apparatus is being worn by the user based on at least the motion data ~~detected radiation~~.

54. (Withdrawn-Currently Amended) A system as recited in claim 53, wherein head-worn personal electronic apparatus is configured to support audio output to the user via the speaker, and

wherein the operation of the head-worn personal electronic apparatus being altered concerns control of the audio output being provided to the user.

55. (Withdrawn) A system as recited in claim 53, wherein head-worn personal electronic apparatus is configured to support a low power operational mode, and

wherein the operation of the head-worn personal electronic apparatus being altered concerns operation of the head-worn personal electronic apparatus in the low power operational mode.

56. (New) A system as recited in claim 50, wherein the radiation detector is an infrared radiation detector, and wherein the radiation being detected by the radiation detector includes infrared radiation.

57. (New) A system as recited in claim 56, wherein the first microphone is positioned to be directed forward towards the user's front when the head-worn structure is being

worn by the user, and the second microphone is positioned to be directed outward away from the user's head when the head-worn structure is being worn by the user.

58. (New) A system as recited in claim 57, wherein the head-worn personal electronic apparatus is configured to at least alter operation of the head-worn personal electronic apparatus based at least in part on the determination of whether the head-worn structure of the head-worn personal electronic apparatus is being worn by the user.

59. (New) A system as recited in claim 58,

wherein the second microphone is positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus,

wherein the electronic circuitry is configured to process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, and

wherein the head-worn personal electronic device is configured to receive a voice input via the first microphone, determine or receive a determination of a requested operation from the voice input using voice recognition, and control an operation by the head-worn personal electronic device based on the requested operation.

60. (New) A system as recited in claim 59,

wherein the motion detector comprises an accelerometer, and

wherein the system comprises a Hall effect detector.

61. (New) A system as recited in claim 49, wherein the head-worn personal electronic apparatus comprises:

a force sensor at least partially contained within the head-worn structure and configured to sense a force input associated with the user, wherein the sensed force input operating to at least alter operation of the head-worn electronic personal audio apparatus.

62. (New) A system as recited in claim 61, wherein head-worn electronic personal audio apparatus is configured to support audio output to the user via the speaker, and

wherein the at least one operation of the head-worn electronic personal audio apparatus being altered concerns control of the audio output being provided to the user.

63. (New) A system as recited in claim 61, wherein head-worn personal electronic apparatus is configured to support voice calls to the user, and

wherein the at least one operation of the head-worn personal electronic apparatus being altered concerns at least accepting or declining a voice call to the user.

64. (New) A system as recited in claim 49, wherein the first microphone is positioned to be directed forward towards the user's front when the head-worn structure is being worn by the user, and the second microphone is positioned to be directed outward away from the user's head when the head-worn structure is being worn by the user.

65. (New) A system as recited in claim 40, wherein the head-worn structure comprises:

an accelerometer, operatively connected to the rechargeable battery, at least partially contained within the head-worn structure and configured to sense movement data.

AMENDMENTS TO THE DRAWINGS:

Please **AMEND** the application to **ADD** New Figures 14-19C to the application. These New Figures 14-19C are submitted as attached hereto.

REMARKS

In the Office Action, the Examiner restricted certain claims, objected to the drawings, rejected claims 19-42 under the first paragraph of 35 USC § 112, rejected claims 19-42 under the second paragraph of 35 USC § 112, and rejected claims 19, 20, 24-30 and 38-42 under 35 USC § 103(a). These objections and rejections are fully traversed below.

Claims 1, 4, 8, 10, 11, 15, 17, 19, 20, 22-26, 29, 30, 38, 40, 41, 43-45 and 47-54 have been amended to further clarify the subject matter regarded as the invention. Claims 9, 27, 28 and 35-37 have been canceled from the application without prejudice or disclaimer. New claims 56-65 have been added to the application. Claims 1-8, 10-26, 29-34 and 38-65 are pending.

A Substitute Specification is submitted herewith including additional content from incorporated by reference content from earlier patent application. New FIGs. 14-19C are also added to the application.

Reconsideration of the application is respectfully requested based on the following remarks.

RESTRICTION REQUIREMENTS

On pages 2-3 of the Office Action, the Examiner notes that claim 21 (of Species II) was not then allowable given a rejection under 35 USC § 112. However, since the rejections under 35 USC § 112 have been traversed below, and claim 21 is in condition for allowance and serves as a linking claim to Species I and III). As such, Applicant respectfully requests that the Restriction Requirement be reconsidered and withdrawn so that all pending claims are examined.

OBJECTION TO THE DRAWINGS

In the Office Action, the Examiner objected to the drawings for not showing features associated with claims 19, 21, 31 and 35. Applicant respectfully disagrees and submits that the drawings are sufficiently compliant with 37 CFR 1.83(a). However, to

expedite examination, Applicant has added New Figures 14-19C to the application. These added New Figures 14-19C are directly from drawings provided in prior applications that are incorporated by reference into the present application, see, e.g., U.S. Patent Application No. 11/183,276, FIG. 7; and U.S. Patent Application No. 11/283,283, FIGs. 3-7C. With respect to the Examiner's specific concerns, Applicant notes, for example, that regarding claims 21 and 31, Figures 16, 17 and/or 19C denote a touch sensitive surface as well as electrical/capacitive effect. For claim 35, Applicant notes, for example, that Figure 14 illustrates uses of various different sensors, one of which being a sensor that can utilize an infrared emitter and an infrared detector. Further, as to claim 19, Applicant notes, for example, that Figure 11A notes electrical components 1116 (which can pertain to microphones) and also paragraphs [00199] and [00200] are of note, for example. Accordingly, it is respectfully requested that the Examiner reconsider and withdraw the objection to the drawings.

REJECTION OF CLAIMS 19-24 UNDER 35 USC 112, FIRST PARAGRAPH

In the Office Action, the Examiner rejected claims 19-24 under the first paragraph of 35 USC 112 as failing to comply with the written description requirement. Applicant respectfully disagrees.

Specifically, on pages 4-6 of the Office Action, the Examiner alleges that claims 19, 21, 31 and 35 are not adequately described in the specification. Applicant respectfully disagrees and submits that these claims are adequately disclosed in the written description provided in the present specification and drawings. In this regard, as examples, Applicant notes that: (i) for claim 19, paragraphs [00199] and [00200] provide written support for "a second microphone" for use in noise cancelation in noisy environments; (ii) for claims 21 and/or 31, paragraphs [00237], [00238], [00246] and [00254] provide written support for "a touch sensitive surface" and/or "capacitive effect"; and (iii) for claim 35, paragraph [00218].

Accordingly, it is respectfully requested that the Examiner reconsider and withdraw the rejection of claims 19-24 under the first paragraph of 35 USC 112.

REJECTION OF CLAIMS 19-24 UNDER 35 USC 112, SECOND PARAGRAPH

In the Office Action, the Examiner rejected claims 19-24 under the second paragraph of 35 USC 112 as being indefinite. Applicant respectfully disagrees. This rejection is premised on the same basis as the above rejection under 35 USC 112, first paragraph, and is respectfully traversed for at least the one or more reasons noted above. Accordingly, it is respectfully requested that the Examiner withdraw the rejection of claims 19-24 under the second paragraph of 35 USC 112.

REJECTION OF CLAIMS 19-20, 24-30 AND 38-42 UNDER 35 USC 103

In the Office Action, the Examiner rejected claims 19-20, 24-30 and 38-42 under 35 USC 103 as being unpatentable over Spitzer (US Patent No. 6,349,001) in view of Kallman et al. (US Patent No. 5,835,185). Applicant respectfully disagrees.

Claim 19 pertains to a system having a head-worn personal electronic apparatus as well as a charging apparatus. The Office Action principally relies on Spitzer to reject claim 19. However, on pages 11-12 of the Office Action, the Examiner notes various deficiencies of Spitzer, such as at least a charging apparatus and at least one conductive element for a head-worn structure of the head-worn personal electronic apparatus.

Besides the admitted deficiencies, Spitzer has other deficiencies. Among other things, claim 19 recites that the head-worn structure includes:

> a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user;
>
> a second microphone at least partially contained within the head-worn structure, the second microphone being positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus….

As to Spitzer's use of microphone, on page 10 of the Office Action, the Examiner makes reference to column 8, lines 1-5 and Figure 1, #106 of Spitzer. Column 8, lines 6-8 of Spitzer makes general mention of using a plurality of microphones for implementing noise reduction techniques. However, to the contrary, claim 19 not only includes the first microphone but also a second microphone "positioned to pick up at least environmental

audio input associated with an environment around the head-worn personal electronic apparatus…." Spitzer simply notes that a plurality of microphones may be used to implement noise reduction techniques and that "it may be desirable to sense ambient sound". As such, Spitzer does not disclose first and second microphones differently positioned as denoted in claim 19. Kallman et al. also does not disclose first and second microphones recited in claim 19.

Claim 19 also recites limitations previously recited in claim 20, which further distinguish claim 19 from Spitzer in combination with Kallman. For instance, claim 19 specifies that "the electronic circuitry being configured to process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone." Spitzer and Kallman fail to teach or suggest any sort of electronic circuitry that is configured to process audio input and environmental audio input as recited in claim 19.

Moreover, claim 19 also recites that there is a rechargeable battery contained within the head-worn structure of the head-worn personal electronic apparatus, that "at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery", and that the rechargeable battery is able to be charged when placed in a charging apparatus. More particularly, claim 19, recites "wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus."

Spitzer discloses that its eyeglasses 100 include internal batteries 112. Spitzer, col. 4, lines 20-21. FIG. 1 of Spitzer also show the internal batteries 112 within the rear portion of temples of eyeglasses. Likewise, Spitzer also states concerning FIGs. 17A-C that "a battery 925 may also be installed in the eyeglasses which powers the interface circuits and all other devices in the eyewear. The battery may be located within the temple

behind the ear or remote from the eyeglass frame and in communication with the eyeglasses by wire." Spitzer, col. 9, lines 26-31. There is nothing in Spitzer that teaches or suggests that these internal batteries 112 could be recharged via an exposed conductor for electrically coupling to a charging system. Furthermore, even if Spitzer were to be combined with Kallman, there is nothing to teach or suggest that the battery 112 internal the eyeglass frame of Spitzer, such as shown in FIG. 1, would be capable of being recharged if placed within an eyewear case 110, a charging case, described in Kallman et al. Indeed, Spitzer places its microphone 106 at the bridge area of the eyeglass frame; it is not clear how it is that a conductive element could be or would be placed in the same area in order to operate with the charging case 110 of Kallman et al. which also requires its electrical connection to be at the bridge area.

Further still, claim 19 also recites "a sensor at least partially contained within the head-worn structure and configured to capture data" and "electronic circuitry contained within the head-worn structure ... the electronic circuitry being configured to process at least the data captured by the sensor, and the electronic circuitry being configured to determine whether the head-worn structure is being worn by a user based on at least the processed sensor data ...." Neither Spitzer nor Kallman teach or suggest such features. On page 15 of the Office Action, the Examiner commented on then pending claim 25 and referenced col. 11, lines 35-42 of Spitzer. There, however, Spitzer simply discloses use of magnetic sensors to determine head position, which can be used for head position tracking. Claim 19, to the contrary, is concerned with determining whether a head-worn structure is being worn, not tracking head position. Second, col. 11, lines 35-42 of Spitzer concern magnetic sensors in its module 1001 which is not only separate from Spitzer's eyeglass frame but also worn on the shoulders of the user. It is thus clear that nothing in Spitzer teaches or suggests any ability or desire to determine "whether the head-worn structure is being worn by a user based on at least the processed sensor data," as recited in claim 19.

Further still, there is no motivation to combine Spitzer and Kallman et al. The alleged justification to combine these references are non-specific and/or without justification, improperly driven by hindsight, and fail to offer a reasonable rationale as to why one skilled in the art would attempt such a combination.

Accordingly, it is submitted that claim 19 is patentably distinct from Spitzer in view of Kallman et al., even if these references were able to be combined. It is also submitted that claim 40 is patentably distinct from Spitzer in view of Kallman et al. for one or more similar reasons as claim 19.

Based on the foregoing, it is submitted that claims 19 and 40 are patentably distinct from Spitzer in view of Kallman et al. Additional limitations recited in the independent claims or the dependent claims need not be further discussed because the limitations discussed above are sufficient to distinguish the claimed invention from the cited art.

Accordingly, it is respectfully requested that the Examiner withdraw the rejection of claims under 35 U.S.C. § 103.

SUMMARY

It is submitted that both the rejections under 35 USC 112 have been traversed. In addition, it is submitted that the rejection under 35 USC 103 has been traversed. It is also submitted that the objections to the drawings have been likewise traversed. Therefore, it is submitted that all claims are in condition for allowance.

Reconsideration of the application and an early Notice of Allowance are earnestly solicited. If there are any issues remaining which the Examiner believes could be resolved through either a Supplemental Response or an Examiner's Amendment, the Examiner is respectfully requested to contact the undersigned representative at the telephone number listed below.

Respectfully submitted,

/C. Douglass Thomas/

C. Douglass Thomas
Reg. No. 32,947

(650) 903-9200, x103

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NOTICE OF ALLOWANCE AND FEE(S) DUE

34071 7590 02/22/2024

IPVENTURE, INC.
4010 Moorpark Avenue
Suite 211
San Jose, CA 95117

EXAMINER	
LEI, JIE	
ART UNIT	PAPER NUMBER
2872	

DATE MAILED: 02/22/2024

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/375,893	10/02/2023	Thomas A. Howell	IPVCP003X1C4X1C1	4776

TITLE OF INVENTION: SYSTEM FOR CHARGING EMBEDDED BATTERY IN WIRELESS HEAD-WORN PERSONAL ELECTRONIC APPARATUS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	05/22/2024

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 40% the amount of undiscounted fees, and micro entity fees are 20% the amount of undiscounted fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

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34071 7590 02/22/2024
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4010 Moorpark Avenue
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I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via the USPTO patent electronic filing system or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/375,893	10/02/2023	Thomas A. Howell	IPVCP003X1C4X1C1	4776

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APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	05/22/2024

EXAMINER	ART UNIT	CLASS-SUBCLASS
LEI, JIE	2872	351-158000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1_____
2_____
3_____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

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4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

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5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29
NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

❑ Applicant asserting small entity status. See 37 CFR 1.27
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❑ Applicant changing to regular undiscounted fee status.
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34071 7590 02/22/2024

IPVENTURE, INC.
4010 Moorpark Avenue
Suite 211
San Jose, CA 95117

EXAMINER	
LEI, JIE	

ART UNIT	PAPER NUMBER
2872	

DATE MAILED: 02/22/2024

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. The United States Patent and Trademark Office (USPTO) collects the information in this record under authority of 35 U.S.C. 2. The USPTO's system of records is used to manage all applicant and owner information including name, citizenship, residence, post office address, and other information with respect to inventors and their legal representatives pertaining to the applicant's/ owner's activities in connection with the invention for which a patent is sought or has been granted. The applicable Privacy Act System of Records Notice for the information collected in this form is COMMERCE/PAT-TM-7 Patent Application Files, available in the Federal Register at 78 FR 19243 (March 29, 2013).
https://www.govinfo.gov/content/pkg/FR-2013-03-29/pdf/2013-07341.pdf

Routine uses of the information in this record may include disclosure to:

1) law enforcement, in the event that the system of records indicates a violation or potential violation of law;
2) a federal, state, local, or international agency, in response to its request;
3) a contractor of the USPTO having need for the information in order to perform a contract;
4) the Department of Justice for determination of whether the Freedom of Information Act (FOIA) requires disclosure of the record;
5) a Member of Congress submitting a request involving an individual to whom the record pertains, when the individual has requested the Member's assistance with respect to the subject matter of the record;
6) a court, magistrate, or administrative tribunal, in the course of presenting evidence, including disclosures to opposing counsel in the course of settlement negotiations;
7) the Administrator, General Services Administration (GSA), or their designee, during an inspection of records conducted by GSA under authority of 44 U.S.C. 2904 and 2906, in accordance with the GSA regulations and any other relevant (i.e., GSA or Commerce) directive, where such disclosure shall not be used to make determinations about individuals;
8) another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c));
9) the Office of Personnel Management (OPM) for personnel research purposes; and
10) the Office of Management and Budget (OMB) for legislative coordination and clearance.

If you do not furnish the information requested on this form, the USPTO may not be able to process and/or examine your submission, which may result in termination of proceedings, abandonment of the application, and/or expiration of the patent.

Notice of Allowability	Application No. 18/375,893	Applicant(s) Howell et al.	
	Examiner JIE LEI	Art Unit 2872	AIA (FITF) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to filing of 2/13/2024.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are See Continuation Sheet . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☑ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/JIE LEI/
Primary Examiner, Art Unit 2872

Continuation of 3. The allowed claim(s) is/are: 1-8,10-26,29-34 and 38-65

REASONS FOR ALLOWANCE

1. The present application is being examined under the pre-AIA first to invent provisions. This office action is in response to the filing of 2/13/2024.

Election/Restrictions

2. Claims 1, 19, 40, 43 and 49 are allowable. The restriction requirement between the Inventions, as set forth in the Office action mailed on 11/14/2023, has been reconsidered in view of the allowability of claims to the elected invention pursuant to MPEP § 821.04(a). **The restriction requirement is hereby withdrawn as to any claim that requires all the limitations of an allowable claim.** Specifically, the restriction requirement of 11/14/2023 is withdrawn. Withdrawn claims directed to other Inventions are no longer withdrawn from consideration because the claim(s) requires all the limitations of an allowable claim.

In view of the above noted withdrawal of the restriction requirement, applicant is advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application.

Once a restriction requirement is withdrawn, the provisions of 35 U.S.C. 121 are no longer applicable. See In re Ziegler, 443 F.2d 1211, 1215, 170 USPQ 129, 131-32 (CCPA 1971). See also MPEP § 804.01.

Allowable Subject Matter

3. Claims 1-8, 10-26,29-34 and 38-65 are allowed.

4. The following is an examiner's statement of reasons for allowance: the prior art taken singularly or in combination fails to anticipate or fairly suggest the limitations of the independent claims, in such a manner that a rejection under 35 U.S.C. 102 or 103 would be proper.

In regard to independent claims 1, 19, 40, 43 and 49, the closest prior art are US 6349001 of Spitzer and US 5835185 of Kallman et al.

Regarding Claims 1, 19, 40, 43 and 49, Spitzer teaches a system, comprising: a head-worn personal electronic apparatus, including at least: a head-worn structure configured to be worn by a user; at least one speaker at least partially internal to the head-worn structure, the at least one speaker being configured to be worn proximate to an ear of the user when the head-worn structure is being worn by the user; a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user; a second microphone at least partially contained within the head-worn structure, the second microphone being positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus; a battery contained within the head-worn structure; electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least

the battery; wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the battery .

Kallman teaches an eyewear system, wherein, a rechargeable battery contained within the head-worn structure; at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and a charging apparatus having a charging connector, wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head- worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.

But none of them teaches that wherein a touch sensitive surface at least partially contained within the head-worn structure and configured to sense a touch input associated with the user; wherein a sensor at least partially contained within the head-worn structure and configured to capture data; the electronic circuitry being configured to process at least the data captured by the sensor, and the electronic circuitry being configured to determine whether the head-worn structure is being worn by a user based on at least the processed sensor data.

The prior art taken either singly or in combination fails to anticipate or fairly suggest a system further comprising:

wherein a touch sensitive surface at least partially contained within the head-worn structure and configured to sense a touch input associated with the user; wherein a sensor at least partially contained within the head-worn structure and configured to capture data; the electronic circuitry being configured to process at least the data captured by the sensor, and the electronic circuitry being configured to determine whether the head-worn structure is being worn by a user based on at least the processed sensor data,

as claimed; recited together in combination with the totality of particular features/limitations recited therein.

Claims 2-8 and 10-18 are also allowed due to their dependence on claim 1.

Claims 20-26, 29-34, 38-39 and 42 are also allowed due to their dependence on claim 19.

Claims 41 and 65 are also allowed due to their dependence on claim 40.

Claims 44-48 are also allowed due to their dependence on claim 43.

Claims 50-64 are also allowed due to their dependence on claim 49.

5. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

6. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Jie Lei whose telephone number is (571) 272 7231. The examiner can normally be reached on Mon.-Thurs. 8:00 am to 5:30 pm.

If attempts to reach the examiner by the telephone are unsuccessful, the examiner's supervisor, Thomas Pham can be reached on (571) 272 3689.The Fax number for the organization where this application is assigned is (571) 273 8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published application may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Services Representative or access to the automated information system, call 800-786-9199(In USA or Canada) or 571-272-1000.

/JIE LEI/
Primary Examiner, Art Unit 2872

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/375,893	Howell et al.
	Examiner	Art Unit
	JIE LEI	2872

CPC - Searched*		
Symbol	**Date**	**Examiner**
G02C 1/00, 11/10, 11/06, 5/001, 5/02, 5/14, 5/22, 5/143, 5/146, 2200/08	12/12/2023	JL
G02B 27/01, 27/017, 27/0176; G02J 7/0045	12/12/2023	JL
update search	02/19/2024	JL

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**
351	158, 41, 111, 121, 123, 124	12/12/2023	JL
359	13, 629-633	12/12/2023	JL
381	381, 327, 328, 370, 380	12/12/2023	JL
	update search	02/19/2024	JL

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

/JIE LEI/ Primary Examiner, Art Unit 2872	

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/375,893	Howell et al.
	Examiner	Art Unit
	JIE LEI	2872

Search Notes		
Search Notes	**Date**	**Examiner**
G02C 1/00, 11/10, 11/06, 5/001, 5/02, 5/14, 5/22, 5/143, 5/146, 2200/08 class and text search	12/12/2023	JL
G02B 27/01, 27/017, 27/0176; G02J 7/0045 class and text search	12/12/2023	JL
351/158, 41, 111, 121, 123, 124 class and text search	12/12/2023	JL
359/13, 629-633 class and text search	12/12/2023	JL
381/381, 327, 328, 370, 380 class and text search	12/12/2023	JL
Inventor name search	12/12/2023	JL
NPL and foreign search (google scholar, google patent, globaldossier and Dialog search)	12/12/2023	JL
PE2E text search	12/12/2023	JL
Similarity search	12/12/2023	JL
update search	02/19/2024	JL

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**
	USPGPUB, USPAT	12/12/2023	JL
	update search	02/19/2024	JL

/JIE LEI/ Primary Examiner, Art Unit 2872	

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/375,893	Howell et al.
	Examiner	**Art Unit**
	JIE LEI	2872

CPC						
Symbol					**Type**	**Version**
G02C	/	11	/	10	F	2013-01-01
G02C	/	5	/	143	I	2013-01-01
G02C	/	5	/	146	I	2013-01-01
H02J	/	7	/	0045	I	2013-01-01
G02C	/	11	/	06	I	2013-01-01
G02C	/	2200	/	08	A	2013-01-01

CPC Combination Sets								
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	59	
/JIE LEI/ Primary Examiner, Art Unit 2872	19 February 2024	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office — Part of Paper No.: 20240219

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/375,893	Howell et al.
	Examiner	**Art Unit**
	JIE LEI	2872

INTERNATIONAL CLASSIFICATION				
CLAIMED				
G02C	/	11	/	00
G02C	/	5	/	14
H02J	/	7	/	00
G02C	/	11	/	06

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**
351	158

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE (Assistant Examiner) (Date)	**Total Claims Allowed:** 59	
/JIE LEI/ Primary Examiner, Art Unit 2872 (Primary Examiner) 19 February 2024 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 1

U.S. Patent and Trademark Office Part of Paper No.: 20240219

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/375,893	Howell et al.
	Examiner	**Art Unit**
	JIE LEI	2872

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	9	10	18	19	-	28	-	37	41	46	49	55	59	64
2	2	10	11	19	20	26	29	32	38	42	47	51	56	37	65
3	3	11	12	20	21	27	30	33	39	43	48	52	57		
4	4	12	13	21	22	28	31	35	40	44	49	53	58		
5	5	13	14	22	23	29	32	36	41	45	50	54	59		
6	6	14	15	23	24	30	33	34	42	46	51	55	60		
7	7	15	16	24	25	31	34	38	43	50	52	56	61		
8	8	16	17	25	26	-	35	39	44	47	53	57	62		
-	9	17	18	-	27	-	36	40	45	48	54	58	63		

NONE (Assistant Examiner) (Date)	**Total Claims Allowed:** 59	
/JIE LEI/ Primary Examiner, Art Unit 2872 (Primary Examiner) (Date) 19 February 2024	O.G. Print Claim(s) 1	O.G. Print Figure 1

U.S. Patent and Trademark Office Part of Paper No.: 20240219

Bibliographic Data

Application No: 18/375,893

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No ☐ Met After Allowance

Verified and Acknowledged: /JIE LEI/ (Examiner's Signature) | (Initials)

Title: SYSTEM FOR CHARGING EMBEDDED BATTERY IN WIRELESS HEAD-WORN PERSONAL ELECTRONIC APPARATUS

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
10/02/2023	351	2872	IPVCP003X1C4X1C1
RULE			

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CONTINUING DATA

This application is a CON of 16182969 11/07/2018

16182969 is a CON of 16127957 09/11/2018 PAT 11086147

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11580222 has PRO of 60725896 10/11/2005

11580222 has PRO of 60725999 10/11/2005

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

10/17/2023

STATE OR COUNTRY

UNITED STATES

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FILING FEE RECEIVED

$4,620

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	4	"18375893"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:12 PM
L3	13	"20190187492"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:14 PM
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L7	31	(Artificial Intelligence) More like doc: US-11762224-B2 Text: (US-11086147-B2 OR	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA,	OR	ON	ON	2023/12/11 03:16 PM

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			EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L10	4	"83901364".fmid.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; JPO)	OR	ON	ON	2023/12/11 03:33 PM
L11	5	"16821810"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L12	17	"46304853".fmid.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; JPO)	OR	ON	ON	2023/12/11 03:33 PM
L13	45	(Artificial Intelligence)	(US-PGPUB; USPAT;	OR	ON	ON	2023/12/11

		Similar to: 16/182,969 with 0 CPC Selections and 0 Text Selections Text: (US-10330956-B2 OR US-11086147-B2 OR US-9690121-B2 OR US-20090296044-A1 OR US-20210364828-A1 OR US-9033493-B2 OR US-20170131575-A1 OR US-20190033623-A1 OR US-20210364827-A9 OR US-20190187492-A1 OR US-8109629-B2 OR US-20120133885-A1 OR US-20150253590-A1 OR US-20100309426-A1 OR US-20220260859-A1 OR US-8465151-B2 OR US-20130201440-A1 OR US-20170146829-A1 OR CN-113330355-A OR KR-20210110726-A OR EP-3914960-A1 OR WO-2020154047-A1 OR US-20200233238-A1 OR US-20190113774-A1 OR US-11156855-B2 OR EP-3455670-A1 OR WO-2017196294-A1 OR US-20220113562-A1 OR US-7581833-B2 OR US-20070046887-A1 OR CN-113454521-A OR US-8905542-B2 OR US-11204512-B2 OR KR-20210127221-A OR EP-3928149-A1 OR WO-2020172138-A1 OR US-20200271961-A1 OR CA-3103299-A1 OR US-20210191159-A1 OR DE-102020102281-A1 OR CH-718397-A2 OR KR-102077483-B1 OR TW-M583054-U OR KR-20070077875-A OR KR-100819659-B1 OR US-9720260-B2 OR US-20170255029-A1 OR WO-2014201213-	USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))				03:33 PM

		A1 OR KR-20220042606-A OR GB-834268-A).did.					
L14	44	(Artificial Intelligence) Similar to: 16/182,969 with 0 CPC Selections and 2 Text Selections Text: (US-9690121-B2 OR US-11204512-B2 OR US-20170131575-A1 OR US-8905542-B2 OR US-10330956-B2 OR US-11086147-B2 OR US-11536988-B2 OR US-20200012127-A1 OR US-20080151179-A1 OR US-7621634-B2 OR US-10444544-B2 OR US-20180252946-A1 OR US-20170255029-A1 OR US-7438410-B1 OR US-10345625-B2 OR EP-3341785-B1 OR US-9547184-B2 OR US-10061144-B2 OR US-20100309426-A1 OR JP-6475289-B2 OR US-9033493-B2 OR US-8500271-B2 OR EP-3377934-B1 OR US-20220011604-A1 OR US-20210364827-A9 OR US-20190187492-A1 OR WO-2009092054-A2 OR JP-2017194712-A OR US-20110139163-A1 OR US-20140207033-A1 OR US-7922321-B2 OR US-10031345-B2 OR AU-2016373687-B2 OR CA-3008656-A1 OR US-20170168316-A1 OR EP-3377934-A1 OR WO-2017105647-A1 OR AU-2016373687-A1 OR US-20220260859-A1 OR US-11243416-B2 OR JP-2017194711-A OR US-20190033623-A1 OR US-20200041813-A1 OR US-11199724-B2	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))	OR	ON	ON	2023/12/11 03:33 PM

		OR WO-2017106385-A3 OR KR-20210110726-A OR US-20210364828-A1 OR US-20220099996-A1 OR US-9482880-B1 OR WO-2017048484-A1).did.					
L15	48	(Artificial Intelligence) Similar to: 16/182,969 with 0 CPC Selections and 3 Text Selections Text: (US-9690121-B2 OR US-11204512-B2 OR US-8905542-B2 OR US-10330956-B2 OR US-20170131575-A1 OR US-11086147-B2 OR US-11536988-B2 OR US-20080151179-A1 OR US-8500271-B2 OR US-20200012127-A1 OR US-7438410-B1 OR US-7621634-B2 OR US-10345625-B2 OR US-9033493-B2 OR US-7922321-B2 OR US-9547184-B2 OR US-20100309426-A1 OR US-20210364827-A9 OR US-20190187492-A1 OR US-20220011604-A1 OR JP-6475289-B2 OR US-20210364828-A1 OR US-10061144-B2 OR US-10444544-B2 OR US-20180252946-A1 OR US-20170255029-A1 OR EP-3341785-B1 OR US-20190033623-A1 OR JP-2017194712-A OR JP-2017194711-A OR US-20220260859-A1 OR US-20090296044-A1 OR KR-20210110726-A OR EP-3377934-B1 OR US-11243416-B2 OR US-8465151-B2 OR US-20130201440-A1 OR US-8337013-B2 OR US-10168551-B2 OR JP-6571136-B2 OR US-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))	OR	ON	ON	2023/12/11 03:33 PM

		10670889-B1 OR US-20200241329-A1 OR US-20150253590-A1 OR US-20120133885-A1 OR US-7581833-B2 OR US-20170075141-A1 OR US-20160246075-A9 OR US-20140268008-A1 OR US-10031345-B2 OR AU-2016373687-B2).did.					
L16	45	(Artificial Intelligence) Similar to: 16/182,969 with 2 CPC Selections and 3 Text Selections Text: (US-9690121-B2 OR US-10330956-B2 OR US-20170131575-A1 OR US-11086147-B2 OR US-11204512-B2 OR US-20220260859-A1 OR US-7581833-B2 OR US-8905542-B2 OR US-20070046887-A1 OR US-9033493-B2 OR US-20220011604-A1 OR US-20100309426-A1 OR JP-6475289-B2 OR US-20210364827-A9 OR US-20190187492-A1 OR US-20210364828-A1 OR WO-0003287-A1 OR CA-2275057-C OR GB-2336692-A OR US-20190033623-A1 OR FR-2906900-A1 OR US-6176576-B1 OR JP-2017194712-A OR JP-2017194711-A OR CA-2275057-A1 OR GB-2343263-A OR US-20090296044-A1 OR US-4251302-A OR US-8465151-B2 OR CA-2045119-A1 OR US-10168551-B2 OR US-20130201440-A1 OR US-20200041813-A1 OR US-11199724-B2 OR JP-6571136-B2 OR US-20170075141-A1 OR US-20220099996-A1 OR US-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))	OR	ON	ON	2023/12/11 03:33 PM

		20120133885-A1 OR US-20150253590-A1 OR US-10222633-B2 OR WO-2021262097-A1 OR US-20170031181-A1 OR CN-114174900-A OR FR-2957157-A1 OR WO-2017106385-A3 OR US-5042933-A OR US-20170146829-A1 OR GB-2079972-A OR JP-S56501775-A OR US-20180074341-A1).did.					
L17	46	(Artificial Intelligence) Similar to: 16/182,969 with 2 CPC Selections and 3 Text Selections Text: (US-11204512-B2 OR US-9690121-B2 OR US-8905542-B2 OR US-10330956-B2 OR US-20170131575-A1 OR US-11086147-B2 OR US-11536988-B2 OR US-8500271-B2 OR US-20200012127-A1 OR US-9547184-B2 OR US-10061144-B2 OR AU-2016201503-B2 OR US-10114235-B2 OR US-9033493-B2 OR US-7922321-B2 OR US-20180231804-A1 OR US-10156739-B2 OR CN-106940484-B OR US-20210364827-A9 OR US-20190187492-A1 OR US-20210364828-A1 OR US-20100309426-A1 OR BR-112014016460-A8 OR BR-112014016460-A2 OR AU-2013207265-B2 OR US-11243416-B2 OR US-20190033623-A1 OR US-11487138-B2 OR US-20200218093-A1 OR US-20150378180-A1 OR US-10598960-B2 OR US-20090296044-A1 OR AU-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))	OR	ON	ON	2023/12/11 03:33 PM

		2013207265-A1 OR WO-2013103985-A2 OR EP-2800993-A2 OR US-20130215374-A1 OR KR-102276220-B1 OR WO-2013103985-A3 OR US-8465151-B2 OR US-20130201440-A1 OR KR-20220003143-A OR US-20150253590-A1 OR US-20120133885-A1 OR KR-102347056-B1 OR US-20170146829-A1 OR US-8109629-B2 OR US-20170090219-A1 OR US-20180335650-A1 OR WO-2014163794-A2 OR US-20140270316-A1).did.					
L18	47	(Artificial Intelligence) Similar to: 16/182,969 with 2 CPC Selections and 3 Text Selections Text: (US-9690121-B2 OR US-10330956-B2 OR US-11086147-B2 OR US-20170131575-A1 OR US-11204512-B2 OR US-20190187492-A1 OR US-20210364827-A9 OR US-20210364828-A1 OR US-9033493-B2 OR US-20190033623-A1 OR US-20090296044-A1 OR US-20120133885-A1 OR US-20150253590-A1 OR US-8905542-B2 OR US-8109629-B2 OR US-20100309426-A1 OR KR-20210110726-A OR US-20220260859-A1 OR US-20170255029-A1 OR EP-3914960-A1 OR WO-2020154047-A1 OR US-20200233238-A1 OR US-20130201440-A1 OR US-8465151-B2 OR US-20170146829-A1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))	OR	ON	ON	2023/12/11 03:33 PM

		OR US-11536988-B2 OR EP-3686654-A1 OR US-20210389605-A1 OR US-20080151179-A1 OR CN-111033361-A OR US-8500271-B2 OR US-20200012127-A1 OR JP-6475289-B2 OR US-7438410-B1 OR JP-WO2019059220-A1 OR JP-2017194711-A OR US-10423011-B2 OR EP-1707028-A1 OR WO-2005067343-A1 OR JP-6896086-B2 OR JP-2017194712-A OR CN-113330355-A OR US-10168551-B2 OR WO-2019059220-A1 OR US-20090060231-A1 OR CN-113078715-A OR KR-20210080253-A OR US-7621634-B2 OR JP-6571136-B2 OR US-10345625-B2).did.					
L19	20223	((("HOWELL") near3 ("Thomas")) OR (("CHAO") near3 ("David")) OR (("THOMAS") near3 ("C")) OR (("TONG") near3 ("Peter"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/12/11 03:33 PM
L20	42965	((("HOWELL") near3 ("Thomas")) OR (("CHAO") near3 ("David")) OR (("THOMAS") near3 ("C")) OR (("TONG") near3 ("Peter"))).INV.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L21	300	((("HOWELL") near3 ("Thomas")) OR (("CHAO") near3 ("David")) OR (("THOMAS") near3 ("C")) OR (("TONG") near3 ("Peter"))).INV. AND frame AND (arm	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV,	OR	ON	ON	2023/12/11 03:33 PM

		OR temple) AND sensor AND battery	MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L22	296	((("HOWELL") near3 ("Thomas")) OR (("CHAO") near3 ("David")) OR (("THOMAS") near3 ("C")) OR (("TONG") near3 ("Peter"))).INV. AND frame AND (arm OR temple) AND sensor AND batter$4 AND control$4 AND connect$4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L23	195	((("HOWELL") near3 ("Thomas")) OR (("CHAO") near3 ("David")) OR (("THOMAS") near3 ("C")) OR (("TONG") near3 ("Peter"))).INV. AND frame AND (arm OR temple) AND sensor AND batter$4 AND control$4 AND connect$4 AND charg$4 AND electric$4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L24	176	((("HOWELL") near3 ("Thomas")) OR (("CHAO") near3 ("David")) OR (("THOMAS") near3 ("C")) OR (("TONG") near3 ("Peter"))).INV. AND frame AND (arm OR temple) AND sensor AND batter$4 AND control$4 AND connect$4 AND charg$4 AND electric$4 AND wireless AND communicat$4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM

L25	50912	(eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND batter$4 AND control$4 AND connect$4 AND charg$4 AND electric$4 AND wireless AND communicat$4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L26	33912	(eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND wireless AND communicat$4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L27	31655	(eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND (wireless WITH communicat$4)	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L28	24323	(eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO,	OR	ON	ON	2023/12/11 03:33 PM

		(wireless WITH communicat$4) AND position AND open$4 AND clos$4	MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L29	20131	(eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND (wireless WITH communicat$4) AND position AND open$4 AND clos$4 AND circuit$4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L30	6749	(eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND (wireless WITH communicat$4) AND position AND open$4 AND clos$4 AND circuit$4 AND (within WITH frame)	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L31	2943	(eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND (wireless WITH communicat$4) AND position AND open$4 AND clos$4 AND circuit$4 AND (within WITH frame) AND hing$4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L32	2424	(eyewear OR spectale	(US-PGPUB; USPAT;	OR	ON	ON	2023/12/11

		OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND (wireless WITH communicat$4) AND position AND open$4 AND clos$4 AND circuit$4 AND (within WITH frame) AND hing$4 AND conduct$4	USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				03:33 PM
L33	2310	(eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND (wireless WITH communicat$4) AND position AND open$4 AND clos$4 AND circuit$4 AND (within WITH frame) AND hing$4 AND conduct$4 AND coupl$4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L34	1453	(eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND (wireless WITH communicat$4) AND position AND open$4 AND clos$4 AND circuit$4 AND (within WITH frame) AND hing$4 AND conduct$4 AND coupl$4 AND lens$4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L35	1439	(eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS,	OR	ON	ON	2023/12/11 03:33 PM

		AND connect$4 AND electric$4 AND (wireless WITH communicat$4) AND position AND open$4 AND clos$4 AND circuit$4 AND (within WITH frame) AND hing$4 AND conduct$4 AND coupl$4 AND lens$4 AND indicat$4	IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L36	1174	(eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND (wireless WITH communicat$4) AND position AND open$4 AND clos$4 AND circuit$4 AND (within WITH frame) AND hing$4 AND conduct$4 AND coupl$4 AND lens$4 AND indicat$4 AND embed$4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L37	999	(eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND (wireless WITH communicat$4) AND position AND open$4 AND clos$4 AND circuit$4 AND (within WITH frame) AND hing$4 AND conduct$4 AND coupl$4 AND lens$4 AND indicat$4 AND embed$4 AND antenna	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L38	23	(eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS,	OR	ON	ON	2023/12/11 03:33 PM

		AND connect$4 AND electric$4 AND (wireless WITH communicat$4) AND position AND open$4 AND clos$4 AND circuit$4 AND (within WITH frame) AND hing$4 AND conduct$4 AND coupl$4 AND lens$4 AND indicat$4 AND embed$4 AND antenna AND endpiece	IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L39	999	(eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND (wireless WITH communicat$4) AND position AND open$4 AND clos$4 AND circuit$4 AND (within WITH frame) AND hing$4 AND conduct$4 AND coupl$4 AND lens$4 AND indicat$4 AND embed$4 AND antenna AND side AND view	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L40	836	(eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND (wireless WITH communicat$4) AND position AND open$4 AND clos$4 AND circuit$4 AND (within WITH frame) AND hing$4 AND conduct$4 AND coupl$4 AND lens$4 AND indicat$4 AND embed$4 AND antenna AND side AND view AND audio AND microphone	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L41	544	(eyewear OR spectale	(US-PGPUB; USPAT;	OR	ON	ON	2023/12/11

		OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND (wireless WITH communicat$4) AND position AND open$4 AND clos$4 AND circuit$4 AND (within WITH frame) AND hing$4 AND conduct$4 AND coupl$4 AND lens$4 AND indicat$4 AND embed$4 AND antenna AND side AND view AND audio AND microphone AND diode AND output	USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				03:33 PM
L42	520	(eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND (wireless WITH communicat$4) AND position AND open$4 AND clos$4 AND circuit$4 AND (within WITH frame) AND hing$4 AND conduct$4 AND coupl$4 AND lens$4 AND indicat$4 AND embed$4 AND antenna AND side AND view AND audio AND microphone AND diode AND output AND front AND section	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L43	464	(eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND (wireless WITH communicat$4) AND	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO,	OR	ON	ON	2023/12/11 03:33 PM

		position AND open$4 AND clos$4 AND circuit$4 AND (within WITH frame) AND hing$4 AND conduct$4 AND coupl$4 AND lens$4 AND indicat$4 AND embed$4 AND antenna AND side AND view AND audio AND microphone AND diode AND output AND front AND section AND information AND place AND expos$4	RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L44	319	(eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND (wireless WITH communicat$4) AND position AND open$4 AND clos$4 AND circuit$4 AND (within WITH frame) AND hing$4 AND conduct$4 AND coupl$4 AND lens$4 AND indicat$4 AND embed$4 AND antenna AND side AND view AND audio AND microphone AND diode AND output AND front AND section AND information AND place AND expos$4 AND pin	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L45	317	(eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND (wireless WITH communicat$4) AND position AND open$4 AND clos$4 AND circuit$4 AND (within WITH frame) AND hing$4 AND conduct$4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM

		AND coupl$4 AND lens$4 AND indicat$4 AND embed$4 AND antenna AND side AND view AND audio AND microphone AND diode AND output AND front AND section AND information AND place AND expos$4 AND pin AND pad					
L46	0	(eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND (wireless WITH communicat$4) AND position AND open$4 AND clos$4 AND circuit$4 AND (within WITH frame) AND hing$4 AND conduct$4 AND coupl$4 AND lens$4 AND indicat$4 AND embed$4 AND antenna AND side AND view AND audio AND microphone AND diode AND output AND front AND section AND information AND place AND expos$4 AND pin AND pad AND endpiece	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L47	32	((("HOWELL") near3 ("Thomas")) OR (("CHAO") near3 ("David")) OR (("THOMAS") near3 ("C")) OR (("TONG") near3 ("Peter"))).INV. AND (eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND (wireless WITH	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM

		communicat$4) AND position AND open$4 AND clos$4 AND circuit$4 AND (within WITH frame) AND hing$4 AND conduct$4 AND coupl$4 AND lens$4 AND indicat$4 AND embed$4 AND antenna AND side AND view AND audio AND microphone AND diode AND output AND front AND section AND information AND place AND expos$4					
L48	3433	L1 AND ((G02B2027/0178 OR G02B27/017 OR G02B27/0172 OR G02B2027/014 OR G02B2027/0138 OR G02B27/0093 OR G02B2027/0187 OR G02B27/0176 OR G02B2027/0118 OR G02B27/0101 OR G02B2027/0134 OR G02B27/01 OR G02B2027/0174 OR G02B27/0179 OR G02B2027/012 OR G02B6/005 OR G02B2027/0141 OR G02B6/00 OR G02B6/0076 OR G02B27/0081 OR G02B2027/0132 OR G02B2027/0123 OR G02B6/0016 OR G02B2027/011 OR G02B2027/0156 OR G02B6/0023 OR G02B27/30 OR G02B2027/0125 OR G02B27/144 OR G02B6/0036 OR G02B6/34 OR G02B6/0038 OR G02B2027/0127 OR G02B7/285 OR G02B27/283 OR G02B3/0081 OR G02B27/1086 OR G02B5/3025 OR G02B7/28 OR G02B5/1857 OR	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM

		G02B6/0088 OR G02B5/1866 OR G02B6/0068 OR G02B27/0018 OR G02B6/0035 OR G02B7/008 OR G02B5/1871 OR G02B2027/0112 OR G02B2027/0114 OR G02B2027/0147 OR G02B2027/0159 OR G02B5/1823 OR G02B6/003 OR G02B6/29325 OR G02B2027/0154 OR G02B27/0149 OR G02B3/14 OR G02B6/0001 OR G02B6/006 OR G02B6/0028 OR G02B6/0018 OR G02B2027/015 OR G02B2027/0181 OR G02B27/022 OR G02B6/0065 OR G02B2027/0169 OR G02B27/028 OR G02B5/208 OR G02B6/002 OR G02B19/0061 OR G02B2027/013 OR G02B7/09 OR G02B27/02 OR G02B2027/0161 OR G02B26/10 OR G02B6/0031 OR G02B6/0053 OR G02B27/4272 OR G02B19/0042 OR G02B26/0833 OR G02B19/0052 OR G02B6/009 OR G02B2027/0152 OR G02B27/0103 OR G02B27/20 OR G02B13/001 OR G02B13/06 OR G02B2027/0163 OR G02B5/005 OR G02B26/001 OR G02B27/64 OR G02B5/30 OR G02B7/02 OR G02B7/021 OR G02B7/102 OR G02B27/646 OR G02B5/32 OR G02B6/001 OR					

		G02B6/0055 OR G02B13/0045 OR G02B27/0006 OR G02B6/0006 OR G02B13/14 OR G02B5/3016 OR G02B5/18 OR G02B5/20 OR G02B6/0011 OR G02B7/08 OR G02B2027/0107 OR G02B27/0972 OR G02B27/4205 OR G02B3/0056 OR G02B30/24 OR G02B6/0078 OR G02B6/0085 OR G02B2027/0116 OR G02B2027/0158 OR G02B2027/0185 OR G02B2027/0198 OR G02B27/0944 OR G02B27/0955 OR G02B7/12 OR G02B2027/0143 OR G02B2027/0167 OR G02B26/00 OR G02B27/0977 OR G02B30/00 OR G02B30/34 OR G02B5/201 OR G02B7/04 OR G02B9/62 OR G02B5/0263 OR G02B6/0051 OR G02B6/0075 OR G02B6/42 OR G02B13/00 OR G02B3/0006 OR G02B6/0045 OR G02B6/02085 OR G02B9/60 OR G02B13/004 OR G02B27/0189 OR G02B27/0905 OR G02B3/08 OR G02B30/27 OR G02B30/30 OR G02B13/0015 OR G02B15/14 OR G02B2027/0136 OR G02B25/004 OR G02B26/101 OR G02B6/2848 OR G02B9/34 OR G02B13/009 OR G02B15/142 OR G02B23/125 OR					

		G02B26/0875 OR G02B27/00 OR G02B27/0075 OR G02B27/14 OR G02B27/425 OR G02B3/0075 OR G02B30/36 OR G02B6/0008 OR G02B6/0015 OR G02B6/0025 OR G02B7/003 OR G02B7/182 OR G02B7/38 OR G02B19/0028 OR G02B2027/0196 OR G02B26/02 OR G02B26/105 OR G02B27/48 OR G02B5/205 OR G02B6/0033 OR G02B7/006 OR G02B7/025 OR G02B9/16 OR G02B13/18 OR G02B23/2484 OR G02B27/0961 OR G02B27/106 OR G02B27/146 OR G02B27/40 OR G02B27/4233 OR G02B27/4288 OR G02B3/0043 OR G02B3/10 OR G02B30/26 OR G02B30/33 OR G02B5/003 OR G02B5/0294 OR G02B5/23 OR G02B6/0083 OR G02B6/0086 OR G02B6/32 OR G02B9/10).cpc.)					
L49	1197	L1 AND ((G02C11/10 OR G02C7/101 OR G02C7/083 OR G02C11/06 OR G02C7/04 OR G02C7/06 OR G02C7/08 OR G02C7/02 OR G02C2202/20 OR G02C5/146 OR G02C2202/16 OR G02C2202/18 OR G02C2202/22 OR G02C5/14 OR G02C11/00 OR	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT;	OR	ON	ON	2023/12/11 03:33 PM

		G02C7/061 OR G02C7/102 OR G02C7/022 OR G02C5/16 OR G02C2202/12 OR G02C7/049 OR G02C7/066 OR G02C3/003 OR G02C2200/08 OR G02C5/143 OR G02C11/04 OR G02C7/16 OR G02C5/02 OR G02C7/086 OR G02C5/001 OR G02C9/00 OR G02C7/10 OR G02C7/088 OR G02C5/22 OR G02C7/041 OR G02C5/12 OR G02C2202/24 OR G02C9/02 OR G02C5/008 OR G02C5/10 OR G02C2202/10 OR G02C5/2209 OR G02C2200/02 OR G02C7/081 OR G02C7/104 OR G02C7/085 OR G02C1/00 OR G02C7/12 OR G02C9/04 OR G02C7/14 OR G02C1/10 OR G02C2200/26 OR G02C3/006 OR G02C5/006 OR G02C7/107).cpc.)	IBM_TDB)				
L50	1691	L4 AND ((G02B2027/0178 OR G02B27/017 OR G02B2027/014 OR G02B27/0172 OR G02B2027/0138 OR G02B27/0176 OR G02B27/0093 OR G02B2027/0187 OR G02B2027/0118 OR G02B27/0101 OR G02B2027/012 OR G02B6/0076 OR G02B6/005 OR G02B2027/0174 OR G02B6/00 OR G02B27/30 OR	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM

		G02B6/0016 OR G02B6/0036 OR G02B2027/0156 OR G02B2027/0125 OR G02B27/01 OR G02B6/0023 OR G02B6/0038 OR G02B27/283 OR G02B2027/011 OR G02B2027/0132 OR G02B2027/0134 OR G02B27/0081 OR G02B7/008 OR G02B27/0179 OR G02B27/1086 OR G02B5/1857 OR G02B5/1866 OR G02B2027/0114 OR G02B27/0018 OR G02B5/1823 OR G02B5/1871 OR G02B5/3025 OR G02B6/0035 OR G02B6/0088 OR G02B6/29325 OR G02B6/34 OR G02B6/0068 OR G02B6/003 OR G02B6/0001 OR G02B6/006 OR G02B6/0028 OR G02B6/0018 OR G02B27/022 OR G02B2027/0169 OR G02B2027/0141 OR G02B3/14 OR G02B6/002 OR G02B2027/0159 OR G02B27/028 OR G02B2027/0123 OR G02B2027/0154 OR G02B6/0053 OR G02B6/0065 OR G02B19/0061 OR G02B19/0042 OR G02B19/0052 OR G02B2027/0127 OR G02B27/144 OR G02B6/0031 OR G02B6/009 OR G02B27/0149 OR G02B5/208 OR G02B7/09 OR G02B27/02 OR G02B27/64 OR G02B2027/0147 OR G02B6/001 OR G02B26/001 OR					

		G02B26/10 OR G02B2027/013 OR G02B2027/0161 OR G02B6/0078 OR G02B6/0085 OR G02B2027/0167 OR G02B27/0006 OR G02B27/646 OR G02B6/0011 OR G02B7/021 OR G02B2027/0112 OR G02B2027/015 OR G02B5/005 OR G02B5/201 OR G02B6/0075 OR G02B2027/0158 OR G02B2027/0163 OR G02B5/0263 OR G02B5/30 OR G02B6/0045 OR G02B6/0051 OR G02B6/0055 OR G02B2027/0152 OR G02B27/20 OR G02B6/0006 OR G02B6/42 OR G02B7/102 OR G02B26/00 OR G02B7/02 OR G02B13/009 OR G02B26/0833 OR G02B27/14 OR G02B3/0075 OR G02B5/20 OR G02B6/0025 OR G02B7/08 OR G02B7/38 OR G02B2027/0136 OR G02B27/48 OR G02B5/205 OR G02B7/003 OR G02B7/025 OR G02B13/001 OR G02B15/142 OR G02B2027/0143 OR G02B27/00 OR G02B27/0103 OR G02B27/106 OR G02B27/146 OR G02B27/4272 OR G02B3/10 OR G02B30/34 OR G02B5/0294 OR G02B6/0015 OR G02B6/0083 OR G02B6/0086 OR G02B6/32 OR G02B7/12 OR					

		G02B13/0045 OR G02B26/0875 OR G02B3/08 OR G02B6/0021 OR G02B7/006 OR G02B7/182 OR G02B15/00 OR G02B17/08 OR G02B2003/0093 OR G02B2027/0116 OR G02B25/02 OR G02B26/06 OR G02B26/0841 OR G02B27/08 OR G02B27/0972 OR G02B3/0006 OR G02B30/36 OR G02B5/18 OR G02B7/023 OR G02B7/026 OR G02B7/028 OR G02B9/62 OR G02B13/06 OR G02B13/14 OR G02B2027/0107 OR G02B2027/0181 OR G02B2027/0185 OR G02B2027/0196 OR G02B21/0012 OR G02B26/02 OR G02B27/0012 OR G02B27/0075 OR G02B27/04 OR G02B27/0955 OR G02B3/005 OR G02B3/0087 OR G02B30/27 OR G02B30/30 OR G02B5/122 OR G02B5/3016 OR G02B7/1827).cpc.)					
L51	658	L4 AND ((G02C11/10 OR G02C11/06 OR G02C7/101 OR G02C5/16 OR G02C7/083 OR G02C3/003 OR G02C7/04 OR G02C5/146 OR G02C5/14 OR G02C5/143 OR G02C11/00 OR G02C7/06 OR G02C2200/08 OR G02C7/16 OR G02C5/001 OR G02C5/02 OR	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM

		G02C7/02 OR G02C5/12 OR G02C5/22 OR G02C9/00 OR G02C2200/02 OR G02C7/10 OR G02C7/086 OR G02C7/08 OR G02C1/00 OR G02C11/04 OR G02C5/008 OR G02C9/04 OR G02C5/10 OR G02C2202/10 OR G02C5/2209 OR G02C2200/26 OR G02C9/02 OR G02C1/10 OR G02C3/006 OR G02C5/2263 OR G02C7/104 OR G02C2200/28 OR G02C5/006 OR G02C5/2227 OR G02C7/041 OR G02C7/081).cpc.)					
L52	472	L6 AND ((G02B2027/0178 OR G02B27/017 OR G02B27/0172 OR G02B2027/014 OR G02B27/0176 OR G02B27/0093 OR G02B2027/0138 OR G02B6/0076 OR G02B2027/0118 OR G02B6/005 OR G02B27/0101 OR G02B6/0036 OR G02B6/0016 OR G02B2027/0174 OR G02B6/0038 OR G02B7/008 OR G02B2027/012 OR G02B27/0081 OR G02B2027/0114 OR G02B2027/0125 OR G02B27/0018 OR G02B27/1086 OR G02B27/283 OR G02B27/30 OR G02B5/1823 OR G02B5/1857 OR G02B5/1866 OR G02B5/1871 OR G02B5/3025 OR G02B6/0023 OR	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM

		G02B6/0035 OR G02B6/29325 OR G02B6/34 OR G02B2027/0156 OR G02B2027/0132 OR G02B2027/0187 OR G02B6/0068 OR G02B6/0018 OR G02B6/0028 OR G02B6/006 OR G02B6/003 OR G02B6/0088 OR G02B2027/011 OR G02B2027/0169 OR G02B27/0179 OR G02B27/022 OR G02B27/028 OR G02B6/002 OR G02B6/0065 OR G02B27/0149 OR G02B6/0053 OR G02B6/0078 OR G02B6/0085 OR G02B6/0031 OR G02B6/009 OR G02B2027/0159 OR G02B6/0011 OR G02B6/0075 OR G02B2027/0134 OR G02B5/30 OR G02B5/0263 OR G02B3/14 OR G02B2027/0112 OR G02B2027/0158 OR G02B26/00 OR G02B3/08 OR G02B2027/0161 OR G02B2027/0123 OR G02B2027/013 OR G02B2027/0143 OR G02B2027/0147 OR G02B2027/0116 OR G02B2027/0127 OR G02B2027/0167 OR G02B27/0103 OR G02B27/04 OR G02B27/40 OR G02B3/0006 OR G02B3/005 OR G02B5/18 OR G02B6/0051 OR G02B6/0055 OR G02B6/0083 OR G02B6/12009 OR G02B2027/0152 OR G02B2027/0154 OR G02B2027/0163 OR G02B2207/113 OR					

		G02B2207/115 OR G02B26/004 OR G02B27/0075 OR G02B27/01 OR G02B27/18 OR G02B27/281 OR G02B27/4272 OR G02B5/23 OR G02B5/3058 OR G02B6/0045 OR G02B6/0056 OR G02B6/12019 OR G02B6/42 OR G02B2003/0093 OR G02B2027/0141 OR G02B2027/015 OR G02B26/10 OR G02B27/02 OR G02B27/64 OR G02B3/0081 OR G02B3/10 OR G02B30/00 OR G02B30/34 OR G02B5/04 OR G02B5/1842 OR G02B5/28 OR G02B6/00 OR G02B6/001 OR G02B7/38).cpc.)					
L53	389	L6 AND ((G02C11/10 OR G02C11/06 OR G02C5/16 OR G02C3/003 OR G02C7/101 OR G02C5/143 OR G02C5/146 OR G02C7/083 OR G02C5/14 OR G02C2200/08 OR G02C7/16 OR G02C11/00 OR G02C5/001 OR G02C7/06 OR G02C5/22 OR G02C5/02 OR G02C7/02 OR G02C1/00 OR G02C5/12 OR G02C2200/02 OR G02C9/00 OR G02C5/2209 OR G02C5/008 OR G02C7/086 OR G02C11/04 OR G02C5/10 OR G02C7/10 OR G02C9/04 OR	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM

		G02C2200/26 OR G02C7/08 OR G02C2200/28 OR G02C5/006 OR G02C5/2227 OR G02C9/02 OR G02C7/104 OR G02C1/08 OR G02C1/10 OR G02C11/08 OR G02C2200/22 OR G02C5/2236 OR G02C5/2263 OR G02C5/2272 OR G02C7/081 OR G02C11/02 OR G02C5/2218).cpc.)					
L54	368	L13 AND ((G02B2027/0178 OR G02B27/017 OR G02B27/0172 OR G02B2027/014 OR G02B27/0176 OR G02B27/0093 OR G02B2027/0138 OR G02B2027/0118 OR G02B6/0076 OR G02B6/005 OR G02B6/0016 OR G02B6/0036 OR G02B6/0038 OR G02B7/008 OR G02B2027/012 OR G02B2027/0174 OR G02B27/0081 OR G02B2027/0114 OR G02B2027/0125 OR G02B27/0018 OR G02B27/1086 OR G02B27/283 OR G02B27/30 OR G02B5/1823 OR G02B5/1857 OR G02B5/1866 OR G02B5/1871 OR G02B5/3025 OR G02B6/0023 OR G02B6/0035 OR G02B6/29325 OR G02B6/34 OR G02B2027/0156 OR G02B2027/0132 OR G02B27/0101 OR G02B2027/0187 OR G02B2027/0169 OR G02B27/022 OR G02B27/028 OR	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM

		G02B2027/011 OR G02B27/0179 OR G02B6/0018 OR G02B6/0028 OR G02B6/003 OR G02B6/006 OR G02B6/0068 OR G02B6/0088 OR G02B6/0053 OR G02B6/0011 OR G02B6/002 OR G02B6/0065 OR G02B6/0031 OR G02B6/0075 OR G02B6/0078 OR G02B6/0085 OR G02B6/009 OR G02B5/30 OR G02B2027/0134 OR G02B5/0263 OR G02B3/14 OR G02B27/0149 OR G02B2027/0112 OR G02B26/00 OR G02B2027/0123 OR G02B2027/013 OR G02B2027/0143 OR G02B2027/0147 OR G02B2027/0159 OR G02B2027/0116 OR G02B2027/0127 OR G02B2027/0161 OR G02B27/0103 OR G02B27/40 OR G02B3/0006 OR G02B3/005 OR G02B5/18 OR G02B6/12009 OR G02B2027/0154 OR G02B2027/0163 OR G02B2207/113 OR G02B2207/115 OR G02B26/004 OR G02B27/0075 OR G02B27/4272 OR G02B5/23 OR G02B5/3058 OR G02B6/0045 OR G02B6/0056 OR G02B6/12019 OR G02B2003/0093 OR G02B2027/0141 OR G02B2027/015 OR G02B2027/0152 OR G02B2027/0167 OR G02B26/10 OR G02B27/01 OR G02B27/02 OR				

		G02B27/04 OR G02B3/0081 OR G02B3/10 OR G02B30/34 OR G02B5/04 OR G02B5/1842 OR G02B5/28 OR G02B6/00 OR G02B6/001).cpc.)					
L55	301	L13 AND ((G02C11/10 OR G02C11/06 OR G02C5/16 OR G02C5/143 OR G02C3/003 OR G02C5/14 OR G02C7/101 OR G02C5/146 OR G02C7/083 OR G02C2200/08 OR G02C5/001 OR G02C5/22 OR G02C7/02 OR G02C1/00 OR G02C5/02 OR G02C5/12 OR G02C9/00 OR G02C7/06 OR G02C7/16 OR G02C11/00 OR G02C5/008 OR G02C5/2209 OR G02C2200/02 OR G02C5/10 OR G02C7/10 OR G02C7/08 OR G02C7/086 OR G02C2200/26 OR G02C5/006 OR G02C9/02 OR G02C9/04 OR G02C1/10 OR G02C11/08 OR G02C5/2236 OR G02C5/2263 OR G02C5/2272 OR G02C7/081 OR G02C11/02 OR G02C2200/28 OR G02C5/2218 OR G02C5/2227).cpc.)	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L56	308	L17 AND ((G02B2027/0178 OR G02B27/017 OR G02B27/0172 OR G02B2027/014 OR G02B27/0093 OR G02B27/0176 OR	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS,	OR	ON	ON	2023/12/11 03:33 PM

		G02B2027/0118 OR G02B2027/0138 OR G02B6/0076 OR G02B6/0016 OR G02B6/0036 OR G02B6/005 OR G02B6/0038 OR G02B7/008 OR G02B2027/012 OR G02B2027/0174 OR G02B2027/0114 OR G02B2027/0125 OR G02B27/0018 OR G02B27/0081 OR G02B27/1086 OR G02B27/283 OR G02B27/30 OR G02B5/1823 OR G02B5/1857 OR G02B5/1866 OR G02B5/1871 OR G02B5/3025 OR G02B6/0023 OR G02B6/0035 OR G02B6/29325 OR G02B6/34 OR G02B2027/0132 OR G02B2027/0156 OR G02B27/0101 OR G02B2027/0169 OR G02B27/022 OR G02B27/028 OR G02B2027/0187 OR G02B2027/011 OR G02B27/0179 OR G02B6/0018 OR G02B6/0028 OR G02B6/003 OR G02B6/006 OR G02B6/0068 OR G02B6/0088 OR G02B6/0011 OR G02B6/0031 OR G02B6/0075 OR G02B6/0078 OR G02B6/0085 OR G02B6/009 OR G02B5/30 OR G02B6/0053 OR G02B2027/0134 OR G02B27/0149 OR G02B3/14 OR G02B6/002 OR G02B6/0065 OR G02B2027/0112 OR G02B26/00 OR G02B2027/013 OR G02B2027/0147 OR	IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				

		G02B2027/0123 OR G02B2027/0127 OR G02B2027/0161 OR G02B27/0103 OR G02B27/40 OR G02B3/0006 OR G02B5/18 OR G02B6/12009 OR G02B2027/0154 OR G02B2207/113 OR G02B2207/115 OR G02B27/0075 OR G02B5/23 OR G02B5/3058 OR G02B6/0045 OR G02B6/0056 OR G02B6/12019 OR G02B2027/0141 OR G02B2027/015 OR G02B2027/0152 OR G02B2027/0167 OR G02B26/10 OR G02B27/04 OR G02B30/34 OR G02B5/04 OR G02B5/1842 OR G02B5/28 OR G02B6/00).cpc.)					
L57	247	L17 AND ((G02C11/10 OR G02C11/06 OR G02C5/16 OR G02C3/003 OR G02C5/143 OR G02C5/146 OR G02C5/14 OR G02C2200/08 OR G02C7/101 OR G02C7/083 OR G02C5/001 OR G02C1/00 OR G02C7/06 OR G02C7/16 OR G02C11/00 OR G02C7/08 OR G02C7/086 OR G02C5/2209 OR G02C9/00 OR G02C1/10 OR G02C5/2236 OR G02C7/081 OR G02C11/02 OR G02C5/2218).cpc.)	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L58	124	L21 AND ((G02B27/017 OR G02B2027/0178 OR G02B27/0093 OR G02B2027/014 OR	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA,	OR	ON	ON	2023/12/11 03:33 PM

		G02B27/0172 OR G02B2027/0187 OR G02B2027/0118 OR G02B6/0018 OR G02B6/0028 OR G02B6/003 OR G02B6/006 OR G02B6/0068 OR G02B6/0076 OR G02B6/0088 OR G02B2027/0138 OR G02B6/0011 OR G02B6/0016 OR G02B6/0031 OR G02B6/0036 OR G02B6/0075 OR G02B6/0078 OR G02B6/0085 OR G02B6/009 OR G02B27/0176 OR G02B5/30 OR G02B6/0053 OR G02B27/0101 OR G02B6/002 OR G02B6/005 OR G02B6/0065 OR G02B2027/0112 OR G02B2027/0147 OR G02B2027/0127 OR G02B2027/0132 OR G02B27/0149 OR G02B5/18 OR G02B6/12009 OR G02B2027/011 OR G02B2027/0123 OR G02B2027/0134 OR G02B2207/113 OR G02B2207/115 OR G02B27/0075 OR G02B5/23 OR G02B5/3058 OR G02B6/0038 OR G02B6/0045 OR G02B6/0056 OR G02B6/12019 OR G02B7/008 OR G02B2027/012 OR G02B2027/0141 OR G02B2027/0167 OR G02B5/04 OR G02B5/1842 OR G02B5/28 OR G02B6/00).cpc.)	EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L59	47	L21 AND ((G02C11/10 OR G02C5/143 OR G02C5/001 OR G02C5/14 OR	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU,	OR	ON	ON	2023/12/11 03:33 PM

		G02C11/06 OR G02C7/086 OR G02C7/08 OR G02C9/00 OR G02C11/00 OR G02C2200/08 OR G02C5/146).cpc.)	CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L60	175	L1 AND ((351/158 OR 351/41 OR 351/159.39 OR 351/159.03 OR 351/121 OR 351/159.01 OR 351/159.42 OR 351/246 OR 351/124 OR 351/210 OR 351/216 OR 351/111 OR 351/113 OR 351/159.41 OR 351/159.46 OR 351/116 OR 351/159.4 OR 351/159.44 OR 351/159.75 OR 351/222 OR 351/228 OR 351/114 OR 351/119 OR 351/131 OR 351/159.08 OR 351/159.6 OR 351/159.78 OR 351/204 OR 351/205 OR 351/233 OR 351/47 OR 351/110 OR 351/118 OR 351/125 OR 351/132 OR 351/133 OR 351/135 OR 351/136 OR 351/153 OR 351/156 OR 351/157 OR 351/159.02 OR 351/159.1 OR 351/159.31 OR 351/159.56 OR 351/159.62 OR 351/159.68 OR 351/159.71 OR 351/159.73 OR 351/159.74 OR 351/206 OR 351/209 OR 351/211 OR 351/219 OR 351/239 OR 351/51 OR 351/57 OR 351/74).ccls.)	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L61	56	L1 AND ((359/630 OR 359/13 OR 359/633 OR 359/838 OR 359/265	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY,	OR	ON	ON	2023/12/11 03:33 PM

		OR 359/267 OR 359/275 OR 359/631 OR 359/269 OR 359/273 OR 359/567 OR 359/632 OR 359/14 OR 359/197.1 OR 359/214.1 OR 359/223.1 OR 359/244 OR 359/245 OR 359/247 OR 359/256 OR 359/266 OR 359/291 OR 359/296 OR 359/358 OR 359/466 OR 359/554 OR 359/627 OR 359/844 OR 359/846 OR 359/851 OR 359/866 OR 359/871 OR 359/872 OR 359/886).ccls.)	CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L62	88	L4 AND ((351/158 OR 351/41 OR 351/111 OR 351/121 OR 351/124 OR 351/113 OR 351/114 OR 351/159.39 OR 351/159.78 OR 351/116 OR 351/119 OR 351/125 OR 351/132 OR 351/133 OR 351/156 OR 351/157 OR 351/159.01 OR 351/159.56 OR 351/159.75 OR 351/204 OR 351/205 OR 351/206 OR 351/210 OR 351/219 OR 351/246 OR 351/47 OR 351/51 OR 351/74).ccls.)	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L63	30	L4 AND ((359/630 OR 359/13 OR 359/838 OR 359/267 OR 359/633 OR 359/197.1 OR 359/223.1 OR 359/245 OR 359/247 OR 359/265 OR 359/273 OR 359/275 OR 359/291 OR 359/358 OR 359/554 OR 359/567 OR 359/627 OR 359/631 OR 359/632 OR 359/844 OR 359/846 OR 359/871 OR 359/872 OR 359/886).ccls.)	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L64	71	L6 AND ((351/158 OR 351/41 OR 351/111 OR	(US-PGPUB; USPAT; USOCR; FIT (AU, AP,	OR	ON	ON	2023/12/11 03:33 PM

		351/121 OR 351/113 OR 351/114 OR 351/124 OR 351/159.39 OR 351/116 OR 351/119 OR 351/125 OR 351/132 OR 351/133 OR 351/156 OR 351/157 OR 351/159.75 OR 351/159.78 OR 351/47 OR 351/74).ccls.)	AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L65	11	L6 AND ((359/630 OR 359/13 OR 359/358 OR 359/554 OR 359/567 OR 359/632 OR 359/886).ccls.)	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L66	4719	351/158,41,111.ccls.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L67	1918	351/121,123,124.ccls.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO,	OR	ON	ON	2023/12/11 03:33 PM

			RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L68	994	359/13.ccls.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L69	7622	359/629-633.ccls.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L70	3402	381/381,327,328.ccls.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L71	3460	381/370,380.ccls.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY,	OR	ON	ON	2023/12/11 03:33 PM

			CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L72	789	g02c1/00.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L73	16424	g02c11/10.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L74	2896	g02c11/06.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK,	OR	ON	ON	2023/12/11 03:33 PM

			TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L75	3099	g02c5/001.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L76	3949	g02c5/02.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L77	4712	g02c5/14.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L78	5034	g02c5/22.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU,	OR	ON	ON	2023/12/11 03:33 PM

			CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L79	4635	g02c5/143.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L80	4888	g02c5/146.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L81	5935	g02c2200/08.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA,	OR	ON	ON	2023/12/11 03:33 PM

			VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L82	34429	g02b27/01.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L83	68456	g02b27/017.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L84	26298	g02b27/0176.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:33 PM
L85	33028	h02j7/0045.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA,	OR	ON	ON	2023/12/11 03:33 PM

			EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L93	45	(Artificial Intelligence) Similar to: 16/182,969 with 0 CPC Selections and 0 Text Selections Text: (US-11086147-B2 OR US-10330956-B2 OR US-20210364828-A1 OR US-9033493-B2 OR US-20190033623-A1 OR US-20090296044-A1 OR US-9690121-B2 OR US-8109629-B2 OR US-20220260859-A1 OR US-20170131575-A1 OR US-20190187492-A1 OR US-20210364827-A9 OR US-20120133885-A1 OR US-20150253590-A1 OR US-20100309426-A1 OR US-8465151-B2 OR US-20130201440-A1 OR US-20170146829-A1 OR US-11204512-B2 OR CN-113330355-A OR KR-20210110726-A OR EP-3914960-A1 OR WO-2020154047-A1 OR US-20200233238-A1 OR US-20190113774-A1 OR US-11156855-B2 OR EP-3455670-A1 OR WO-2017196294-A1 OR US-11668958-B2 OR US-20220113562-A1 OR US-7581833-B2 OR US-8905542-B2 OR US-20070046887-A1 OR CN-113454521-A OR KR-20210127221-A OR EP-3928149-A1 OR	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))	OR	ON	ON	2023/12/11 03:33 PM

		WO-2020172138-A1 OR US-20200271961-A1 OR CA-3103299-A1 OR US-20210191159-A1 OR US-20230204985-A1 OR DE-102020102281-A1 OR KR-102077483-B1 OR CH-718397-A2 OR TW-M583054-U OR FR-3126050-A3 OR CH-718869-A2 OR AT-525342-B1 OR AU-2022201400-A1 OR CA-3149165-A1).did.					
L94	45	(Artificial Intelligence) Similar to: 16/182,969 with 0 CPC Selections and 6 Text Selections Text: (US-11204512-B2 OR US-11086147-B2 OR US-9690121-B2 OR US-8905542-B2 OR MX-PA99011222-A OR US-10330956-B2 OR US-20220260859-A1 OR US-10777048-B2 OR US-11536988-B2 OR US-20170131575-A1 OR US-10310296-B2 OR US-11721183-B2 OR US-20130329183-A1 OR EP-3377934-B1 OR US-8500271-B2 OR US-20170168316-A1 OR US-10031345-B2 OR AU-2016373687-A1 OR CA-3008656-A1 OR AU-2016373687-B2 OR WO-2017105647-A1 OR US-20080151179-A1 OR US-10345625-B2 OR KR-20150040032-A OR CN-218547168-U OR US-20230026477-A1 OR US-9547184-B2 OR US-20230054967-A1 OR US-11330165-B2 OR US-20190318589-A1 OR US-9033493-B2 OR KR-102240087-B1 OR US-10444544-B2 OR US-20180252946-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))	OR	ON	ON	2023/12/11 03:33 PM

		A1 OR US-20220011604-A1 OR US-20200012127-A1 OR US-7192136-B2 OR US-7621634-B2 OR US-7438410-B1 OR EP-3519892-B1 OR EP-3519892-A1 OR WO-2018064195-A1 OR US-20180091729-A1 OR US-11470936-B2 OR US-20210298440-A1 OR US-20050078274-A1 OR US-7922321-B2 OR US-10708488-B2 OR EP-3341785-B1 OR US-20220417418-A1).did.					
L95	44	(Artificial Intelligence) Similar to: 16/182,969 with 2 CPC Selections and 6 Text Selections Text: (US-11086147-B2 OR US-10330956-B2 OR US-9690121-B2 OR US-11204512-B2 OR US-20220260859-A1 OR US-8905542-B2 OR US-9033493-B2 OR US-20210364828-A1 OR US-20090296044-A1 OR US-20170131575-A1 OR US-20190033623-A1 OR US-20210364827-A9 OR US-20190187492-A1 OR US-8109629-B2 OR MX-PA99011222-A OR US-20120133885-A1 OR US-20150253590-A1 OR CN-111538173-B OR CN-111538173-A OR US-10777048-B2 OR US-20100309426-A1 OR WO-2022231768-A1 OR US-11536988-B2 OR US-8465151-B2 OR US-20170255029-A1 OR WO-2018058130-A1 OR EP-3515232-A1 OR US-20180090958-A1 OR KR-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))	OR	ON	ON	2023/12/11 03:33 PM

		20190054144-A OR EP-3539285-A1 OR US-20170146829-A1 OR CN-114545635-A OR KR-20210110726-A OR US-20130201440-A1 OR EP-3914960-A1 OR WO-2020154047-A1 OR US-20200233238-A1 OR KR-20210080253-A OR KR-20230003284-A OR WO-2021227975-A1 OR CA-3103299-A1 OR US-20210191159-A1 OR CN-113009715-A OR EP-4152079-A1 OR US-20230054967-A1 OR JP-2023524838-A OR CN-113467103-A OR JP-2022517538-A OR DE-102020102281-A1 OR US-20230060657-A1).did.					
L96	45	(Artificial Intelligence) Similar to: 16/182,969 with 5 CPC Selections and 6 Text Selections Text: (US-11086147-B2 OR US-9690121-B2 OR US-10330956-B2 OR US-20220260859-A1 OR US-20170131575-A1 OR US-9033493-B2 OR US-11204512-B2 OR US-20210364828-A1 OR US-20100309426-A1 OR US-20090296044-A1 OR US-8465151-B2 OR US-20190033623-A1 OR US-20210364827-A9 OR US-20190187492-A1 OR US-8109629-B2 OR US-20170146829-A1 OR US-20130201440-A1 OR US-20120133885-A1 OR US-20150253590-A1 OR US-20190113774-A1 OR US-11156855-B2 OR EP-3455670-A1 OR WO-2017196294-A1 OR US-11668958-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))	OR	ON	ON	2023/12/11 03:33 PM

		B2 OR US-20220113562-A1 OR CN-113454521-A OR KR-20210127221-A OR EP-3928149-A1 OR WO-2020172138-A1 OR US-20200271961-A1 OR US-8905542-B2 OR CN-113330355-A OR US-7581833-B2 OR US-20070046887-A1 OR KR-20210110726-A OR EP-3914960-A1 OR WO-2020154047-A1 OR US-20200233238-A1 OR KR-102077483-B1 OR TW-M583054-U OR CH-718397-A2 OR KR-102006414-B1 OR US-9720260-B2 OR KR-20200063030-A OR US-9081212-B1 OR US-20220390766-A1 OR WO-2014201213-A1 OR CH-718397-B1 OR US-20180011344-A1 OR US-20150286074-A1).did.					
L97	45	(Artificial Intelligence) Similar to: 16/182,969 with 7 CPC Selections and 6 Text Selections Text: (US-11086147-B2 OR US-10330956-B2 OR US-9690121-B2 OR US-9033493-B2 OR US-20210364828-A1 OR US-20220260859-A1 OR US-20090296044-A1 OR US-20170131575-A1 OR US-20190033623-A1 OR US-20190187492-A1 OR US-20210364827-A9 OR US-8109629-B2 OR US-20120133885-A1 OR US-20150253590-A1 OR US-20100309426-A1 OR US-8465151-B2 OR US-20170146829-A1 OR US-20130201440-A1 OR CN-113330355-A OR KR-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))	OR	ON	ON	2023/12/11 03:33 PM

		20210110726-A OR WO-2020154047-A1 OR EP-3914960-A1 OR US-20200233238-A1 OR US-11204512-B2 OR US-20190113774-A1 OR US-11156855-B2 OR EP-3455670-A1 OR WO-2017196294-A1 OR US-11668958-B2 OR US-20220113562-A1 OR CN-113454521-A OR CA-3103299-A1 OR US-20210191159-A1 OR KR-20210127221-A OR EP-3928149-A1 OR WO-2020172138-A1 OR US-20200271961-A1 OR DE-102020102281-A1 OR US-20230204985-A1 OR US-7581833-B2 OR US-20070046887-A1 OR US-8905542-B2 OR KR-102077483-B1 OR TW-M583054-U OR CH-718869-A2 OR AT-525342-B1 OR FR-3126050-A3 OR CH-718397-A2 OR AU-2022201400-A1 OR CA-3149165-A1).did.					
L794	336	(US-10042186-$ | US-10139966-$ | US-10152141-$ | US-10191279-$ | US-10215568-$ | US-10254856-$ | US-10310296-$ | US-10338400-$ | US-10341787-$ | US-10345625-$ | US-10359459-$ | US-10448867-$ | US-10466491-$ | US-10469916-$ | US-10481417-$ | US-10515623-$ | US-10534203-$ | US-10539459-$ | US-10613355-$ | US-10617342-$ | US-10624790-$ | US-10649220-$ | US-10663740-$ | US-10684478-$ | US-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:58 PM

		10684687-$ | US- 10722128-$ | US- 10739253-$ | US- 10761566-$ | US- 10777048-$ | US- 10802582-$ | US- 10824253-$ | US- 10853589-$ | US- 10908421-$ | US- 10964190-$ | US- 10993515-$ | US- 10997943-$ | US- 11003246-$ | US- 11042045-$ | US- 11061252-$ | US- 11064282-$ | US- 11069358-$ | US- 11086147-$ | US- 11103122-$ | US- 11204512-$ | US- 11243416-$ | US- 11300857-$ | US- 11340466-$ | US- 11487110-$ | US- 11495207-$ | US- 11513371-$ | US- 11558538-$ | US- 11604367-$ | US- 11630331-$ | US- 11644693-$ | US- 11669163-$ | US- 11709376-$ | US- 11733549-$ | US- 11737666-$ | US- 11762224-$ | US- 11796833-$ | US- 11829518-$ | US- 1255265-$ | US- 1917745-$ | US- 20020021407-$ | US- 20020081982-$ | US- 20020090103-$ | US- 20020098877-$ | US- 20020140899-$ | US- 20030022690-$ | US- 20030032449-$ | US- 20030226978-$ | US- 20040096078-$ | US- 20040114770-$ | US- 20050230596-$ | US- 20050248719-$ | US- 20050278446-$ | US- 20060034478-$ | US- 20070186330-$ | US- 20070248238-$ | US- 20070270663-$ | US- 20070271116-$ | US- 20080129953-$ | US-					

		20080144854-$ | US- 20090156128-$ | US- 20100045928-$ | US- 20100149073-$ | US- 20120105740-$ | US- 20120113235-$ | US- 20120176580-$ | US- 20130072828-$ | US- 20130143519-$ | US- 20140064536-$ | US- 20140176902-$ | US- 20140198293-$ | US- 20140259271-$ | US- 20150205135-$ | US- 20150206173-$ | US- 20150241964-$ | US- 20150293379-$ | US- 20150338677-$ | US- 20160019715-$ | US- 20160187651-$ | US- 20160239985-$ | US- 20170131575-$ | US- 20170255029-$ | US- 20200029140-$ | US- 20200124468-$ | US- 20210000347-$ | US- 20210259621-$ | US- 20210263319-$ | US- 20210379425-$ | US- 20220008763-$ | US- 20220034542-$ | US- 20220054092-$ | US- 20230033660-$ | US- 20230057654-$ | US- 2249572-$ | US- 2638532-$ | US- 2794085-$ | US- 2818511-$ | US- 2830132-$ | US- 2874230-$ | US- 2904670-$ | US- 3060308-$ | US- 3104290-$ | US- 3119903-$ | US- 3597054-$ | US- 3710115-$ | US- 3858001-$ | US- 3883701-$ | US- 4165487-$ | US- 4254451-$ | US- 4283127-$ | US- 4322585-$ | US- 4348664-$ | US- 4389217-$ | US- 4526473-$ | US- 4535244-$ | US- 4608492-$ | US- 46259103-$ | US-					

		4683587-$ | US- 4751691-$ | US- 4757714-$ | US- 4806011-$ | US- 4822160-$ | US- 4822161-$ | US- 4851686-$ | US- 4856086-$ | US- 4859047-$ | US- 4882769-$ | US- 4962469-$ | US- 4967268-$ | US- 4985632-$ | US- 5008548-$ | US- 5015086-$ | US- 5020150-$ | US- 5026151-$ | US- 5064410-$ | US- 5093576-$ | US- 50963103-$ | US- 5144344-$ | US- 5151600-$ | US- 5161250-$ | US- 5172256-$ | US- 5264877-$ | US- 52756503-$ | US- 5306917-$ | US- 5353378-$ | US- 5359444-$ | US- 5367345-$ | US- 5379464-$ | US- 5382986-$ | US- 5394005-$ | US- 5452026-$ | US- 5452480-$ | US- 5455637-$ | US- 5455640-$).DID.					
L795	365	(US-5457751-$ | US- 5463428-$ | US- 5475798-$ | US- 5500532-$ | US- 5510961-$ | US- 5513384-$ | US- 5519781-$ | US- 5533130-$ | US- 5581090-$ | US- 5585871-$ | US- 56279804-$ | US- 5634201-$ | US- 5671035-$ | US- 5686727-$ | US- 5694475-$ | US- 5715323-$ | US- 5777715-$ | US- 5819183-$ | US- 58316904-$ | US- 5835185-$ | US-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:58 PM

		5900720-$ | US- 5903395-$ | US- 59204504-$ | US- 5923398-$ | US- 5941837-$ | US- 5946071-$ | US- 5949516-$ | US- 5963294-$ | US- 5966746-$ | US- 5988812-$ | US- 5991085-$ | US- 5992996-$ | US- 6010216-$ | US- 6013919-$ | US- 6023372-$ | US- 6028627-$ | US- 6046455-$ | US- 60519104-$ | US- 6060321-$ | US- 6061580-$ | US- 6091832-$ | US- 6115177-$ | US- 6132681-$ | US- 6132881-$ | US- 6154552-$ | US- 6176576-$ | US- 61810704-$ | US- 6199550-$ | US- 62023804-$ | US- 6225897-$ | US- 6231181-$ | US- 6236969-$ | US- 6259367-$ | US- 6270466-$ | US- 6292213-$ | US- 6292685-$ | US- 6301050-$ | US- 6301367-$ | US- 6311155-$ | US- 6343858-$ | US- 6409335-$ | US- 6409338-$ | US- 6431705-$ | US- 6474816-$ | US- 64782605-$ | US- 64783605-$ | US- 6511175-$ | US- 6513532-$ | US- 6517203-$ | US- 6539336-$ | US- 6542081-$ | US- 6546101-$ | US- 6554444-$ | US- 6582075-$ | US- 6612695-$ | US- 6619799-$ | US- 6629076-$ | US- 6686843-$ | US-					

		6717737-$ | US- 6729726-$ | US- 6736759-$ | US- 6764194-$ | US- 6769767-$ | US- 6771423-$ | US- 6788309-$ | US- 6792401-$ | US- 6798391-$ | US- 6824265-$ | US- 6840908-$ | US- 6853303-$ | US- 6857741-$ | US- 6876947-$ | US- 6879930-$ | US- 6899585-$ | US- 6912386-$ | US- 6932090-$ | US- 6944474-$ | US- 6947219-$ | US- 6974226-$ | US- 7013009-$ | US- 7023594-$ | US- 7030902-$ | US- 7033025-$ | US- 7044615-$ | US- 7048370-$ | US- 7059717-$ | US- 7079876-$ | US- 7095455-$ | US- 7150526-$ | US- 7192136-$ | US- 7255437-$ | US- 72589605-$ | US- 72599905-$ | US- 7265358-$ | US- 7274292-$ | US- 7278734-$ | US- 7289767-$ | US- 7312699-$ | US- 7313246-$ | US- 7319780-$ | US- 7376238-$ | US- 7380936-$ | US- 7388962-$ | US- 7392880-$ | US- 7405801-$ | US- 7431450-$ | US- 7438409-$ | US- 7438410-$ | US- 7449622-$ | US- 7452067-$ | US- 7500746-$ | US- 7500747-$ | US- 7521623-$ | US- 7543934-$ | US- 7543938-$ | US- 7547101-$ | US-					

		7564981-$ | US- 7581833-$ | US- 7604348-$ | US- 7643895-$ | US- 7648236-$ | US- 7677723-$ | US- 7760898-$ | US- 7792552-$ | US- 7798638-$ | US- 7806525-$ | US- 78785006-$ | US- 7922321-$ | US- 8044879-$ | US- 8073984-$ | US- 8109629-$ | US- 8142015-$ | US- 8182084-$ | US- 8184067-$ | US- 8243973-$ | US- 8337013-$ | US- 8421851-$ | US- 84615006-$ | US- 8465151-$ | US- 8482488-$ | US- 8485661-$ | US- 8508851-$ | US- 8558759-$ | US- 8593795-$ | US- 8668334-$ | US- 8678581-$ | US- 8684900-$ | US- 8766747-$ | US- 8767306-$ | US- 8778022-$ | US- 8818466-$ | US- 8823740-$ | US- 8838708-$ | US- 8884845-$ | US- 8893010-$ | US- 8907867-$ | US- 8915588-$ | US- 8918197-$ | US- 8941560-$ | US- 8952869-$ | US- 8957835-$ | US- 9024843-$ | US- 9116545-$ | US- 9128522-$ | US- 9137309-$ | US- 9141194-$ | US- 9201512-$ | US- 9207515-$ | US- 9210991-$ | US- 9229233-$ | US- 9230501-$ | US- 9256071-$ | US- 9256253-$ | US- 9264803-$ | US-					

		9298007-$).DID.					
L796	338	(IP-0920081021-$ | IP-0920100720-$ | RF-1220040317-$ | DA-1419941122-$ | DA-1419960502-$ | IP-1520090310-$ | QR-1820030624-$ | QR-2320010515-$ | QR-3020040803-$ | AT-383428-$ | AU-2001261787-$ | AU-2002353793-$ | CA-2059597-$ | CA-2310114-$ | CA-2426681-$ | CA-2603077-$ | CA-3103521-$ | CH-037719-$ | CN-101815962-$ | CN-104160325-$ | CN-108014002-$ | CN-109565516-$ | CN-1279463-$ | CN-2054169-$ | CN-2066151-$ | CN-216145034-$ | CN-88203065-$ | DE-10103922-$ | DE-10123226-$ | DE-10205579-$ | DE-10222375-$ | DE-3818389-$ | DE-4338811-$ | DE-8529458-$ | EP-1830221-$ | EP-2439580-$ | EP-3258308-$ | EP-3264162-$ | EP-3299870-$ | EP-3740152-$ | ES-2530421-$ | ES-2637799-$ | FR-2530039-$ | FR-2697921-$ | FR-2706103-$ | FR-3028980-$ | FR-3051656-$ | GB-1467982-$ | GB-2291551-$ | GB-2369754-$ | GB-2393076-$ | GB-2495697-$ | GB-2561854-$ | IT-1298975-$ | IT-1397295-$ | JP-2000039595-$ | JP-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 03:58 PM

		2001183735-$ | JP-2002341059-$ | JP-2002515197-$ | JP-2003033328-$ | JP-2004513669-$ | JP-2005151292-$ | JP-2005167902-$ | JP-2005534269-$ | JP-2010231119-$ | JP-2012078588-$ | JP-2014049934-$ | JP-2017183827-$ | JP-2799002-$ | JP-3000621-$ | JP-3048964-$ | JP-3455182-$ | JP-3532537-$ | JP-3794986-$ | JP-3988632-$ | JP-4096376-$ | JP-4239317-$ | JP-4371268-$ | JP-4470301-$ | JP-4496354-$ | JP-4510993-$ | JP-4887907-$ | JP-5017989-$ | JP-5458080-$ | JP-6032940-$ | JP-6332880-$ | JP-7037818-$ | JP-7330920-$ | KR-100420024-$ | KR-101044199-$ | KR-101090667-$ | KR-101420560-$ | KR-101940638-$ | KR-20020044416-$ | KR-20180016552-$ | KR-20180084394-$ | NL-1021485-$ | PL-181650-$ | RU-2017124378-$ | TW-484711-$ | TW-572286-$ | WO-1996013136-$ | WO-1998035263-$ | WO-1999023524-$ | WO-2001006298-$ | WO-2002006881-$ | WO-2005036921-$ | WO-2005043224-$ | WO-2008076774-$ | WO-2010062479-$ | WO-2010141514-$ | WO-2010150260-$ | WO-2011137034-$ | WO-2013084240-$ | WO-2014149631-$ |					

		WO-2014201213-$ | WO-2016022499-$ | WO-2016044612-$ | WO-2017035384-$ | WO-2018089533-$ | WO-2019159141-$ | WO-2019178557-$).DID.					
L797	358	(US-5036311-$ | US-5050150-$ | US-5064410-$ | US-5093576-$ | US-50963103-$ | US-5148023-$ | US-5151600-$ | US-5161250-$ | US-5172256-$ | US-5264877-$ | US-52756503-$ | US-5306917-$ | US-5353378-$ | US-5359370-$ | US-5359444-$ | US-5367345-$ | US-5379464-$ | US-5382986-$ | US-5394005-$ | US-5452026-$ | US-5452480-$ | US-5455637-$ | US-5455640-$ | US-5457751-$ | US-5463428-$ | US-5500532-$ | US-5510961-$ | US-5513384-$ | US-5533130-$ | US-5581090-$ | US-5585871-$ | US-5589398-$ | US-5590417-$ | US-5608808-$ | US-56279804-$ | US-5634201-$ | US-5671035-$ | US-5686727-$ | US-5694475-$ | US-5715323-$ | US-5737436-$ | US-58316904-$ | US-5835185-$ | US-5900720-$ | US-5903395-$ | US-59204504-$ | US-5923398-$ | US-5941837-$ | US-5946071-$ | US-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 04:00 PM

		5949516-$ | US- 5963294-$ | US- 5966746-$ | US- 5980037-$ | US- 5988812-$ | US- 5991085-$ | US- 5992996-$ | US- 5995592-$ | US- 6010216-$ | US- 6013919-$ | US- 6028627-$ | US- 6046455-$ | US- 60519104-$ | US- 6060321-$ | US- 6061580-$ | US- 6091546-$ | US- 6091832-$ | US- 6115177-$ | US- 6132681-$ | US- 6132881-$ | US- 6154552-$ | US- 6176576-$ | US- 61810704-$ | US- 62023804-$ | US- 6225897-$ | US- 6231181-$ | US- 6236969-$ | US- 6243578-$ | US- 6259367-$ | US- 6270466-$ | US- 6292213-$ | US- 6292685-$ | US- 6301367-$ | US- 6307526-$ | US- 6343858-$ | US- 6409335-$ | US- 6409338-$ | US- 6426719-$ | US- 6431705-$ | US- 6474816-$ | US- 64782605-$ | US- 64783605-$ | US- 6478736-$ | US- 6506142-$ | US- 6511175-$ | US- 6513532-$ | US- 6517203-$ | US- 6539336-$ | US- 6542081-$ | US- 6546101-$ | US- 6554763-$ | US- 6582075-$ | US- 6619799-$ | US- 6629076-$ | US- 6736759-$ | US- 6764194-$ | US- 6788309-$ | US- 6792401-$ | US-					

		6824265-$ | US- 6857741-$ | US- 6879930-$ | US- 6912386-$ | US- 6932090-$ | US- 6947219-$ | US- 7013009-$ | US- 7023594-$ | US- 7030902-$ | US- 7031667-$ | US- 7033025-$ | US- 7059717-$ | US- 7079876-$ | US- 7192136-$ | US- 7255437-$ | US- 72589605-$ | US- 72599905-$ | US- 7274292-$ | US- 7278734-$ | US- 7289767-$ | US- 7312699-$ | US- 7319780-$ | US- 7376238-$ | US- 7405801-$ | US- 7429965-$ | US- 7431450-$ | US- 7438409-$ | US- 7438410-$ | US- 7452067-$ | US- 7500746-$ | US- 7527374-$ | US- 7543938-$ | US- 7547101-$ | US- 7581833-$ | US- 7604348-$ | US- 7648236-$ | US- 7740353-$ | US- 7792552-$ | US- 7798638-$ | US- 7806525-$ | US- 78785006-$ | US- 8109629-$ | US- 8142015-$ | US- 8243973-$ | US- 8384617-$ | US- 8421851-$ | US- 84615006-$ | US- 8485661-$ | US- 8508851-$ | US- 8558759-$ | US- 8593795-$ | US- 8668334-$ | US- 8678581-$ | US- 8766747-$ | US- 8767306-$ | US- 8770742-$ | US- 8823740-$ | US- 8838708-$ | US-					

		8884845-$ | US- 8892232-$ | US- 8907867-$ | US- 8915588-$ | US- 8934015-$ | US- 8941560-$ | US- 8952869-$ | US- 8957835-$ | US- 9024843-$ | US- 9033493-$ | US- 9116545-$ | US- 9122083-$ | US- 9124796-$ | US- 9128522-$ | US- 9137309-$ | US- 9141194-$ | US- 9201512-$ | US- 9207515-$ | US- 9210991-$ | US- 9229233-$ | US- 9230501-$ | US- 9256071-$ | US- 9264803-$ | US- 9274395-$ | US- 9298007-$ | US- 9299194-$ | US- 9360889-$ | US- 9400390-$ | US- 9401540-$ | US- 9405135-$).DID.					
L798	328	(US-20121030-$ | US- 20121220-$ | US- 10042186-$ | US- 10139966-$ | US- 10152141-$ | US- 10191279-$ | US- 10215568-$ | US- 10222617-$ | US- 10241351-$ | US- 10254856-$ | US- 10306036-$ | US- 10310296-$ | US- 10341787-$ | US- 10345625-$ | US- 10359459-$ | US- 10466491-$ | US- 10469916-$ | US- 10481417-$ | US- 10488668-$ | US- 10527490-$ | US- 10613355-$ | US- 10617342-$ | US- 10624790-$ | US- 10649220-$ | US- 10663740-$ | US- 10684478-$ | US- 10684687-$ | US-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 04:00 PM

		10722128-$ | US- 10739253-$ | US- 10777048-$ | US- 10824253-$ | US- 10853589-$ | US- 10863060-$ | US- 10876886-$ | US- 10908421-$ | US- 10993515-$ | US- 10997943-$ | US- 11003246-$ | US- 11061252-$ | US- 11064282-$ | US- 11086147-$ | US- 11103122-$ | US- 11243416-$ | US- 11300857-$ | US- 11487110-$ | US- 11495207-$ | US- 11513371-$ | US- 11558538-$ | US- 11604367-$ | US- 11630331-$ | US- 1255265-$ | US- 1917745-$ | US- 20010005230-$ | US- 20020017997-$ | US- 20020021407-$ | US- 20020081982-$ | US- 20020084990-$ | US- 20020089639-$ | US- 20020090103-$ | US- 20020098877-$ | US- 20020109600-$ | US- 20020140899-$ | US- 20030018274-$ | US- 20030022690-$ | US- 20030032449-$ | US- 20030062046-$ | US- 20030067585-$ | US- 20030068057-$ | US- 20030083591-$ | US- 20030226978-$ | US- 20040000733-$ | US- 20040063378-$ | US- 20040096078-$ | US- 20040100384-$ | US- 20040128737-$ | US- 20040150986-$ | US- 20040160573-$ | US- 20050067580-$ | US- 20050213026-$ | US- 20050230596-$ | US- 20050248717-$ | US- 20050248719-$ | US- 20050264752-$ | US- 20060001827-$ | US- 20060003803-$ | US-					

		20060023158-$ | US- 20060034478-$ | US- 20060107822-$ | US- 20060132382-$ | US- 20070030442-$ | US- 20070046887-$ | US- 20070098192-$ | US- 20070109491-$ | US- 20070186330-$ | US- 20070208531-$ | US- 20070270663-$ | US- 20070271065-$ | US- 20070271116-$ | US- 20070271387-$ | US- 20080062338-$ | US- 20080068559-$ | US- 20080144854-$ | US- 20080218684-$ | US- 20080282392-$ | US- 20090156128-$ | US- 20100309426-$ | US- 20110102734-$ | US- 20110187990-$ | US- 20120113235-$ | US- 20120176580-$ | US- 20130072828-$ | US- 20130143519-$ | US- 20130342981-$ | US- 20140064536-$ | US- 20140176902-$ | US- 20140198293-$ | US- 20140259271-$ | US- 20140313033-$ | US- 20150091781-$ | US- 20150185765-$ | US- 20150205135-$ | US- 20150293379-$ | US- 20160019715-$ | US- 20160187651-$ | US- 20160239985-$ | US- 20170146829-$ | US- 20170255029-$ | US- 20200029140-$ | US- 20210263319-$ | US- 20220260859-$ | US- 20220357599-$ | US- 2249572-$ | US- 2638532-$ | US- 2794085-$ | US- 2818511-$ | US- 2830132-$ | US- 2874230-$ | US- 2904670-$ | US- 3060308-$ | US- 3597054-$ | US- 3710115-$ | US- 3858001-$ | US- 3883701-$ | US-					

		4165487-$ | US-4254451-$ | US-4283127-$ | US-4322585-$ | US-4348664-$ | US-4389217-$ | US-4526473-$ | US-4535244-$ | US-4608492-$ | US-4683587-$ | US-4751691-$ | US-4757714-$ | US-4773095-$ | US-4806011-$ | US-4822160-$ | US-4822161-$ | US-4851686-$ | US-4856086-$ | US-4859047-$ | US-4882769-$ | US-4942629-$ | US-4962469-$ | US-4967268-$ | US-4985632-$ | US-5008548-$ | US-5015086-$ | US-5020150-$ | US-5026151-$).DID.					
L799	359	(LG-0220141104-$ | LG-0220220816-$ | IP-0920100720-$ | LG-1220150521-$ | DA-1419941122-$ | YU-1520050120-$ | QR-1820030624-$ | DP-2320110726-$ | MR-2620090827-$ | LG-2620140902-$ | LG-2820140703-$ | SR-2920060504-$ | QR-3020040803-$ | AU-2002255568-$ | AU-3150200-$ | CA-2252786-$ | CA-2307877-$ | CA-2576010-$ | CN-100416340-$ | CN-101770073-$ | CN-103033952-$ | CN-103217791-$ | CN-103584833-$ | CN-103646587-$ | CN-103905763-$ | CN-104090383-$ | CN-104616435-$ | CN-104796669-$ | CN-105262497-$ | CN-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; JPO)	OR	ON	ON	2023/12/11 04:00 PM

		106104364-$ | CN- 106687858-$ | CN- 107966821-$ | CN- 113196139-$ | DE- 10041085-$ | DE- 10063089-$ | DE- 10106650-$ | DE- 19921739-$ | DE- 2205325-$ | DE- 3623206-$ | DE- 4436528-$ | EP- 0724743-$ | EP- 1169663-$ | EP- 1196807-$ | EP- 1643401-$ | EP- 1874527-$ | EP- 2315066-$ | EP- 2963479-$ | EP- 2992382-$ | EP- 3128362-$ | EP- 3196643-$ | EP- 3308216-$ | EP- 3637419-$ | EP- 3686610-$ | EP- 3749172-$ | ES- 2387782-$ | ES- 2542804-$ | ES- 2612266-$ | FR- 2775894-$ | FR- 2848304-$ | FR- 2877737-$ | FR- 2907559-$ | FR- 2954090-$ | GB- 0414113-$ | GB- 0512038-$ | GB- 0704971-$ | GB- 0812753-$ | GB- 201103200-$ | GB- 2405049-$ | GB- 2513018-$ | GB- 2528867-$ | GB- 301672-$ | GB- 9721506-$ | JP- 2002023098-$ | JP- 2002282220-$ | JP- 2003169822-$ | JP- 2005124143-$ | JP- 2005276139-$ | JP- 2005352024-$ | JP- 2006071707-$ | JP- 2006071726-$ | JP- 2006071770-$ | JP- 2006145988-$ | JP- 2006267887-$ | JP- 2008067219-$ | JP- 2008124885-$ | JP- 2008310275-$ | JP- 2011138141-$ | JP-					

		2012058530-$ | JP- 2012159681-$ | JP- 2012249097-$ | JP- 2013255012-$ | JP- 2014049934-$ | JP- 2015132821-$ | JP- 2017183857-$ | JP- 2021189379-$ | JP- 3000621-$ | JP- 3111430-$ | JP- 3151770-$ | JP- 3245478-$ | JP- 3310325-$ | JP- 3632271-$ | JP- 4073533-$ | JP- 4367663-$ | JP- 4506795-$ | JP- 4727188-$ | JP- 4961914-$ | JP- 4961984-$ | JP- 5023663-$ | JP- 5092357-$ | JP- 5119636-$ | JP- 5228305-$ | JP- 5295714-$ | JP- 5360115-$ | JP- 5363555-$ | JP- 5748939-$ | JP- 5812666-$ | JP- 5891705-$ | JP- 6021582-$ | JP- 6499154-$ | KR- 100584344-$ | KR- 100609421-$ | KR- 100707294-$ | KR- 101231026-$ | KR- 101253348-$ | KR- 101290994-$ | KR- 101871660-$ | KR- 102422782-$ | KR- 20020067443-$ | KR- 20150084603-$ | KR- 20170112898-$ | KR- 20180009932-$ | KR- 20180037909-$ | KR- 20190100105-$ | KR- 20220140289-$ | RU- 2404531-$ | RU- 2593391-$ | RU- 2607640-$ | SE- 524821-$ | SG-193669-$ | WO-1997034182-$ | WO-2000079327-$ | WO-2000079329-$ | WO-2003083875-$ | WO-2003100503-$ | WO-2006001254-$ | WO-2006045843-$ |					

		WO-2006085308-$ | WO-2006085310-$ | WO-2006102368-$ | WO-2006128648-$ | WO-2007079633-$ | WO-2007110551-$ | WO-2008017051-$ | WO-2008096719-$ | WO-2008149172-$ | WO-2009012470-$ | WO-2009094646-$ | WO-2011100284-$ | WO-2011159205-$ | WO-2013013158-$ | WO-2013019893-$ | WO-2013052274-$ | WO-2013098376-$ | WO-2013101313-$ | WO-2014035622-$ | WO-2014160500-$ | WO-2015072633-$ | WO-2015110859-$ | WO-2015143018-$ | WO-2016090066-$ | WO-2017051079-$ | WO-2017058733-$ | WO-2017144934-$ | WO-2017145382-$ | WO-2017171157-$ | WO-2017222497-$).DID.					
L800	1656	794 795 796 797 798 799	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 04:00 PM
L801	91	800 AND 27	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO,	OR	ON	ON	2023/12/11 04:01 PM

			NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L802	75	800 AND 29	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 04:01 PM
L804	43	800 AND 40	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 04:01 PM
L806	12	800 AND 38	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 04:01 PM
L807	20536	66 67 68 69 70 71	(US-PGPUB; USPAT; USOCR; FIT (AU, AP,	OR	ON	ON	2023/12/11 04:17 PM

			AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L808	127	807 AND 27	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 04:17 PM
L809	79	807 AND 30	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 04:17 PM
L811	51	807 AND 40	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO,	OR	ON	ON	2023/12/11 04:18 PM

			RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L812	21	807 AND 44	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 04:18 PM
L813	12	807 AND 38	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 04:18 PM
L814	185512	72 73 74 75 76 77 78 79 80 81 82 83 84 85	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 04:42 PM
L815	2416	814 AND 27	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY,	OR	ON	ON	2023/12/11 04:42 PM

			CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L816	755	814 AND 30	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 04:43 PM
L817	382	814 AND 40	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 04:43 PM
L819	127	814 AND 44	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH,	OR	ON	ON	2023/12/11 04:43 PM

			TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L820	22	814 AND 38	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 04:43 PM
L825	45	(Artificial Intelligence) Similar to: 18/375,893 with 0 CPC Selections and 2 Text Selections Text: (US-11204512-B2 OR US-9761068-B2 OR US-20040086141-A1 OR US-11326941-B2 OR WO-2020060596-A1 OR US-20200088999-A1 OR CN-210136443-U OR US-20160349520-A1 OR KR-102400383-B1 OR US-11644361-B2 OR US-20220394371-A1 OR US-7677723-B2 OR WO-2021086537-A1 OR EP-4052478-A1 OR WO-2021086538-A1 OR US-10191289-B2 OR EP-3358861-A1 OR US-20180227679-A1 OR EP-3358812-A1 OR US-20180227684-A1 OR US-10674290-B2 OR EP-3358812-B1 OR US-20160100237-A1 OR BR-202014016356-U2 OR US-11762224-B2 OR CN-111936953-A OR US-10575579-B2 OR US-20220353624-A1 OR EP-3358861-B1 OR	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO))	OR	ON	ON	2023/12/11 04:54 PM

		CN-111936953-B OR US-6473630-B1 OR US-20100315329-A1 OR CN-115735179-A OR US-11630331-B2 OR WO-2021262318-A1 OR EP-4074067-A1 OR EP-3776144-B1 OR US-10359311-B2 OR US-20170090219-A1 OR US-20180335650-A1 OR NL-1027023-C2 OR WO-2023049877-A1 OR JP-2019537144-A OR US-9075249-B2 OR WO-2013109874-A1 OR US-20130188080-A1 OR AU-2013209578-A1 OR EP-2805201-A1 OR EP-2805201-B1 OR US-11668958-B2).did.					
L826	44	(Artificial Intelligence) Similar to: 18/375,893 with 3 CPC Selections and 2 Text Selections Text: (CN-113454521-A OR CN-113330355-A OR EP-3928149-A1 OR WO-2020172138-A1 OR KR-20210127221-A OR US-11762224-B2 OR WO-2020154047-A1 OR EP-3914960-A1 OR US-20200233238-A1 OR KR-20210110726-A OR US-9033493-B2 OR US-20210364828-A1 OR US-8109629-B2 OR US-20170131575-A1 OR US-20210364827-A9 OR US-20190187492-A1 OR US-10330956-B2 OR US-9690121-B2 OR US-20130201440-A1 OR US-20150253590-A1 OR US-20120133885-A1 OR US-11086147-B2 OR US-20090296044-A1 OR US-20170146829-A1 OR US-11733549-B2 OR US-8465151-B2	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO))	OR	ON	ON	2023/12/11 04:54 PM

		OR US-20150286074-A1 OR KR-20200135137-A OR CN-205691887-U OR US-11668958-B2 OR US-20220113562-A1 OR TW-M583054-U OR US-20230204985-A1 OR US-11156855-B2 OR US-9989771-B2 OR US-10288908-B2 OR US-20180011344-A1 OR KR-102006414-B1 OR WO-2017215953-A1 OR EP-3469418-A1 OR EP-3258308-A1 OR US-9720260-B2 OR US-11500227-B2 OR WO-2014201213-A1 OR WO-2023192316-A1 OR EP-4057051-A1 OR EP-3455670-A1 OR WO-2017196294-A1 OR CH-718397-A2 OR US-20220244576-A1).did.					
L827	44	(Artificial Intelligence) Similar to: 18/375,893 with 6 CPC Selections and 2 Text Selections Text: (US-11762224-B2 OR US-9033493-B2 OR US-20210364828-A1 OR US-10330956-B2 OR US-8109629-B2 OR US-20190187492-A1 OR US-20210364827-A9 OR US-20170131575-A1 OR US-11733549-B2 OR US-11086147-B2 OR US-9690121-B2 OR US-20130201440-A1 OR US-20120133885-A1 OR US-20150253590-A1 OR US-20090296044-A1 OR US-20170146829-A1 OR US-20100309426-A1 OR US-8465151-B2 OR CN-113330355-A OR US-20220260859-A1 OR US-11156855-B2 OR CN-113454521-A	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO))	OR	ON	ON	2023/12/11 04:54 PM

		OR EP-3914960-A1 OR WO-2020154047-A1 OR US-20200233238-A1 OR KR-20210110726-A OR US-11668958-B2 OR US-20220113562-A1 OR EP-3455670-A1 OR WO-2017196294-A1 OR US-20190113774-A1 OR WO-2023192316-A1 OR KR-102077483-B1 OR KR-20210127221-A OR EP-3928149-A1 OR WO-2020172138-A1 OR US-20200271961-A1 OR US-20230204985-A1 OR TW-M583054-U OR US-7581833-B2 OR KR-102006414-B1 OR FR-3126050-A3 OR AU-2022201400-A1 OR CA-3149165-A1 OR GB-2609686-A OR NL-2031025-A OR KR-20230000350-U OR CH-718869-A2 OR AT-525342-B1 OR AT-525342-A1).did.					
L828	44	(Artificial Intelligence) Similar to: 18/375,893 with 6 CPC Selections and 4 Text Selections Text: (US-11762224-B2 OR US-9033493-B2 OR US-20210364828-A1 OR US-10330956-B2 OR US-8109629-B2 OR US-20190187492-A1 OR US-20210364827-A9 OR US-20170131575-A1 OR US-11086147-B2 OR US-11733549-B2 OR US-9690121-B2 OR US-20090296044-A1 OR US-20130201440-A1 OR US-20120133885-A1 OR US-20150253590-A1 OR US-20170146829-A1 OR US-8465151-B2 OR CN-113330355-A	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO))	OR	ON	ON	2023/12/11 04:59 PM

		OR US-20220260859-A1 OR US-11156855-B2 OR CN-113454521-A OR EP-3914960-A1 OR WO-2020154047-A1 OR US-20200233238-A1 OR KR-20210110726-A OR US-11668958-B2 OR US-20220113562-A1 OR WO-2017196294-A1 OR EP-3455670-A1 OR US-20190113774-A1 OR WO-2023192316-A1 OR KR-20210127221-A OR KR-102077483-B1 OR EP-3928149-A1 OR WO-2020172138-A1 OR US-20230204985-A1 OR TW-M583054-U OR US-7581833-B2 OR KR-102006414-B1 OR FR-3126050-A3 OR AU-2022201400-A1 OR CA-3149165-A1 OR GB-2609686-A OR NL-2031025-A OR KR-20230000350-U OR CH-718869-A2 OR AT-525342-B1 OR CH-718397-A2 OR US-20210318558-A1 OR EP-4057051-A1).did.					
L829	579	"6349001"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 05:13 PM
L830	117	"5835185"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS,	OR	ON	ON	2023/12/11 05:13 PM

			IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L831	116	"6301050"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 05:13 PM
L832	84	"6678381"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 05:13 PM
L833	147	"5777715"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 05:13 PM

L834	74	"5819183"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 05:13 PM
L864	18	(16/182969 | 16/424018 | 16/429181 | 16/821810 | 17/395509 | 17/484080 | 17/737866 | 17/873104 | 17/942347 | 17/949029 | 17/964853).APP.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 05:25 PM
L865	12	(AT-20220034542-$ | EP-1027626-$ | EP-2290433-$ | KR-20020044416-$ | WO-200124576-$).DID.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 05:25 PM
L866	75	(US-9299194-$ | US-9360889-$ | US-9400390-$ | US-9401540-$ | US-9405135-$ | US-9423870-$ | US-9460732-$ | US-9482880-$ | US-9482882-$ | US-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO,	OR	ON	ON	2023/12/11 05:40 PM

		9482883-$ | US- 9494800-$ | US- 9501880-$ | US- 9508269-$ | US- 9538915-$ | US- 9575321-$ | US- 9594246-$ | US- 9632059-$ | US- 9635222-$ | US- 9651784-$ | US- 9651787-$ | US- 9684172-$ | US- 9684374-$ | US- 9726904-$ | US- 9746676-$ | US- 9746686-$ | US- 9753288-$ | US- 9766463-$ | US- 9766479-$ | US- 9798458-$ | US- 9800990-$ | US- 9810906-$ | US- 9829707-$ | US- 9836122-$ | US- 9841599-$ | US- 9851567-$ | US- 9874936-$ | US- 9880052-$ | US- 9910298-$ | US- 9922236-$ | US- 9939934-$ | US- 9952664-$ | US- 9965681-$).DID.	MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L867	74	(US-9423870-$ | US- 9451068-$ | US- 9482880-$ | US- 9482882-$ | US- 9482883-$ | US- 9494800-$ | US- 9494807-$ | US- 9532714-$ | US- 9575321-$ | US- 9594246-$ | US- 9619201-$ | US- 9628707-$ | US- 9632059-$ | US- 9635222-$ | US- 9649052-$ | US- 9651784-$ | US- 9651787-$ | US- 9684172-$ | US- 9684374-$ | US- 9720258-$ | US- 9720260-$ | US- 9726904-$ | US- 9740280-$ | US- 9746676-$ | US-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 05:40 PM

		9746686-$ | US-9753288-$ | US-9766463-$ | US-9766479-$ | US-9798458-$ | US-9800990-$ | US-9810906-$ | US-9811152-$ | US-9823494-$ | US-9829707-$ | US-9836122-$ | US-9841599-$ | US-9880052-$ | US-9910298-$ | US-9939934-$ | US-9952664-$ | US-9965681-$).DID.					
L868	127	(US-10042186-$ | US-10222617-$ | US-10345625-$ | US-10613355-$ | US-10624790-$ | US-10777048-$ | US-11061252-$ | US-11513371-$ | US-11536988-$ | US-20040160572-$ | US-20090097688-$ | US-20090296044-$ | US-20100177277-$ | US-20100265456-$ | US-20110080556-$ | US-20110102734-$ | US-20110109873-$ | US-20120002159-$ | US-20130010256-$ | US-20160109729-$ | US-20170068117-$ | US-20190126060-$ | US-3042548-$ | US-3683168-$ | US-3923384-$ | US-4447504-$ | US-4449799-$ | US-4618226-$ | US-4675259-$ | US-4756605-$ | US-4770954-$ | US-4883728-$ | US-4977899-$ | US-5007726-$ | US-5142406-$ | US-5455637-$ | US-5455638-$ | US-5835185-$ | US-5900720-$ | US-6099117-$ | US-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 05:40 PM

		6325507-$ | US-6476311-$ | US-64764696-$ | US-6552511-$ | US-7150526-$ | US-7339353-$ | US-7370963-$ | US-7461936-$ | US-8337013-$ | US-8465151-$ | US-8500271-$ | US-8770742-$ | US-8787970-$ | US-8801174-$ | US-8876285-$ | US-8905541-$ | US-8944590-$ | US-9192772-$ | US-9207515-$ | US-9274395-$ | US-9405135-$ | US-9470909-$ | US-9482880-$ | US-9619201-$ | US-9632059-$ | US-9720258-$ | US-9720260-$).DID.					
L869	69	(CA-2388872-$ | CN-1110465-$ | CN-212276134-$ | CN-217718312-$ | DE-69800345-$ | EP-2082281-$ | EP-3306380-$ | EP-3608705-$ | JP-2000162341-$ | JP-2000268883-$ | JP-2001183620-$ | JP-2002218669-$ | JP-2003017020-$ | JP-2020027271-$ | JP-6742059-$ | KR-100720019-$ | KR-101529551-$ | KR-20010078034-$ | KR-200250874-$ | KR-200262295-$ | WO-2001035159-$ | WO-2002054135-$ | WO-2009062381-$ | WO-2010010204-$ | WO-2019011925-$).DID.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 05:40 PM
L870	46	(US-9759932-$ | US-9763071-$ | US-9767160-$ | US-9782604-$ | US-9786171-$ | US-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA,	OR	ON	ON	2023/12/11 05:40 PM

		9804400-$ | US-9811752-$ | US-9814425-$ | US-9843743-$ | US-9864211-$ | US-9897811-$ | US-9897886-$ | US-9898039-$ | US-9901406-$ | US-9915545-$ | US-9915823-$ | US-9922236-$ | US-9946074-$ | US-9949700-$ | US-9958275-$ | US-9972216-$ | US-9976901-$ | US-9980054-$).DID.	EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L871	18	(US-0017635-$ | US-0063763-$ | US-0415338-$ | US-11721183-$ | US-11733549-$ | US-2725462-$ | US-20030063763-$ | US-20220415338-$ | US-20230017635-$).DID.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 05:40 PM
L872	11	(WO-2019013821-$ | WO-2019154509-$ | WO-2020244358-$ | WO-2022145647-$).DID.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 05:40 PM
L873	378	864 865 866 867 868 869 870 871 872	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS,	OR	ON	ON	2023/12/11 05:41 PM

			IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L874	41	873 AND 27	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 05:41 PM
L876	27	873 AND 40	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 05:42 PM
L877	15	873 AND 44	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 05:42 PM

L878	8	873 AND 38	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 05:42 PM
L879	27	873 AND 40	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 05:45 PM
L880	27	873 AND 40	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 05:46 PM
L881	27	873 AND 40	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO,	OR	ON	ON	2023/12/11 05:46 PM

			MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L882	15	873 AND 44	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 05:46 PM
L883	8	873 AND 38	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 05:46 PM
L884	27	873 AND 40	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/11 05:47 PM
L885	69	"2011106798"	(US-PGPUB; USPAT;	OR	ON	ON	2023/12/12

			USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				07:48 AM
L886	117	"20120075168"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/12 07:48 AM
L887	56	"20120194420"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/12 07:48 AM
L888	45	"20120194419"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO,	OR	ON	ON	2023/12/12 07:48 AM

			NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L889	30	"20120206322"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/12 07:48 AM
L890	22	"20040000733"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/12 08:06 AM
L891	24	"20050201585"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/12 08:06 AM
L892	90	"20060023158"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP,	OR	ON	ON	2023/12/12 08:06 AM

			AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L893	31	"20070030442"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/12 08:06 AM
L900	10	"20160085076"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/12 08:51 AM
L901	13	"20140268013"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO,	OR	ON	ON	2023/12/12 08:51 AM

			RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L902	17	"20140268008"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/12 08:51 AM
L903	202	"20130278631"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/12 08:51 AM
L904	19	"20110221657"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/12/12 08:51 AM
L913	1	"20240036361"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY,	OR	ON	ON	2024/02/19 03:25 PM

			CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L914	1	"89665263".fmid.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; JPO)	OR	ON	ON	2024/02/19 03:26 PM
L916	63009	(G02C11/10 OR G02C5/143 OR G02C5/146 OR G02C11/06 OR H02J7/0045 OR G02C2200/08).cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/19 03:32 PM
L923	887	916 AND 27	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO;	OR	ON	ON	2024/02/19 03:33 PM

			JPO; DERWENT; IBM_TDB)				
L924	636	916 AND 29	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/19 03:34 PM
L925	442	916 AND 30	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/19 03:34 PM
L926	242	916 AND 40	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/19 03:34 PM
L927	85	916 AND 42	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB,	OR	ON	ON	2024/02/19 03:34 PM

			HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L928	24	916 AND 38	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/19 03:34 PM
L929	32	(Artificial Intelligence) More like doc: US-20240036361-A1 Text: (US-9690121-B2 OR US-9033493-B2 OR US-20170146829-A1 OR US-20170131575-A1 OR US-20100309426-A1 OR US-20190187492-A1 OR US-20210364827-A9 OR US-8465151-B2 OR US-11762224-B2 OR US-20090296044-A1 OR US-20210364828-A1 OR US-8109629-B2 OR US-20230408850-A1 OR US-20130201440-A1 OR US-11733549-B2 OR US-20070046887-A1 OR US-10330956-B2 OR US-20120133885-A1 OR US-20150253590-A1 OR US-7581833-B2).did.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/19 03:47 PM
L930	32	(Artificial Intelligence) More like doc: US-20190187492-A1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY,	OR	ON	ON	2024/02/19 03:47 PM

		Text: (US-20090296044-A1 OR US-20120133885-A1 OR US-20210364827-A9 OR US-20100309426-A1 OR US-20210364828-A1 OR US-20170146829-A1 OR US-20170131575-A1 OR US-20150253590-A1 OR US-20130201440-A1 OR US-20190033623-A1 OR US-20220260859-A1 OR US-20070046887-A1 OR US-8109629-B2 OR US-8465151-B2 OR US-7581833-B2 OR US-11733549-B2 OR US-9033493-B2 OR US-9690121-B2 OR US-11086147-B2 OR US-10330956-B2).did.	CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L931	37	(Artificial Intelligence) More like doc: US-20200218094-A1 Text: (US-20220357599-A1 OR US-20230017635-A1 OR US-20220011603-A1 OR US-20230273464-A1 OR US-20200012127-A1 OR US-20050264752-A1 OR US-7500747-B2 OR US-7922321-B2 OR US-20230033660-A1 OR US-20230057654-A1 OR US-20110187990-A1 OR US-20230236444-A1 OR US-8500271-B2 OR US-8905542-B2 OR US-10310296-B2 OR US-11536988-B2 OR US-20130308089-A1 OR US-20180335650-A1 OR US-20170090219-A1 OR US-20150085245-A1).did.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/19 03:47 PM
L932	35	(Artificial Intelligence) More like doc: US-20220357599-A1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY,	OR	ON	ON	2024/02/19 03:47 PM

		Text: (US-20230017635-A1 OR US-20230273464-A1 OR US-20200218094-A1 OR US-20220011603-A1 OR US-7500747-B2 OR US-20230033660-A1 OR US-11644693-B2 OR US-20230057654-A1 OR US-20230236444-A1 OR US-11536988-B2 OR US-20190285913-A1 OR US-20120050668-A1 OR US-20190278110-A1 OR US-20220260859-A1 OR US-20140268008-A1 OR US-20160246075-A9 OR US-11513371-B2 OR US-11204512-B2 OR US-11733549-B2 OR US-8430507-B2).did.	CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L933	44	(Artificial Intelligence) Similar to: 18/375,893 with 0 CPC Selections and 0 Text Selections Text: (US-20210364828-A1 OR US-10330956-B2 OR US-20210364827-A9 OR US-20190187492-A1 OR US-11733549-B2 OR US-20170131575-A1 OR US-11086147-B2 OR US-9690121-B2 OR US-20090296044-A1 OR US-20130201440-A1 OR US-20120133885-A1 OR US-20150253590-A1 OR US-20100309426-A1 OR US-8465151-B2 OR CN-113330355-A OR US-20220260859-A1 OR CN-113454521-A OR US-11668958-B2 OR US-20220113562-A1 OR EP-3914960-A1 OR KR-20210110726-A OR WO-2017196294-A1 OR EP-3455670-A1 OR WO-2023192316-	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO))	OR	ON	ON	2024/02/19 04:12 PM

		A1 OR KR-20210127221-A OR EP-3928149-A1 OR WO-2020172138-A1 OR US-20200271961-A1 OR KR-102077483-B1 OR US-20230204985-A1 OR TW-M583054-U OR US-7581833-B2 OR KR-102006414-B1 OR CA-3149165-A1 OR GB-2609686-A OR NL-2031025-A OR KR-20230000350-U OR CH-718869-A2 OR AT-525342-B1 OR US-20210318558-A1 OR US-11604367-B2 OR CA-3103299-A1 OR US-20210191159-A1 OR DE-102020102281-A1 OR KR-20200135137-A OR JP-3237752-U OR CH-718397-B1 OR US-20180011344-A1 OR US-10288908-B2 OR US-20230040338-A1).did.					
L934	44	(Artificial Intelligence) Similar to: 18/375,893 with 0 CPC Selections and 5 Text Selections Text: (US-11204512-B2 OR US-9761068-B2 OR US-20040086141-A1 OR US-11326941-B2 OR WO-2020060596-A1 OR US-20200088999-A1 OR CN-210136443-U OR KR-102400383-B1 OR US-20160349520-A1 OR US-7677723-B2 OR US-20220394371-A1 OR US-11644361-B2 OR WO-2021086537-A1 OR US-10191289-B2 OR EP-4052478-A1 OR WO-2021086538-A1 OR US-20180227679-A1 OR US-20180227684-A1 OR EP-3358812-A1 OR	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO))	OR	ON	ON	2024/02/19 04:12 PM

		US-10674290-B2 OR US-10986451-B2 OR EP-3358812-B1 OR EP-3577911-A1 OR US-20160100237-A1 OR CN-111936953-A OR US-11762224-B2 OR US-10575579-B2 OR CN-111936953-B OR US-20220353624-A1 OR US-20140292636-A1 OR US-6473630-B1 OR US-11630331-B2 OR KR-20080031206-A OR CN-115735179-A OR EP-4074067-A1 OR WO-2021262318-A1 OR KR-20190027934-A OR EP-3776144-B1 OR US-20180335650-A1 OR US-20170090219-A1 OR US-10345625-B2 OR NL-1027023-C2 OR EP-3065027-B1 OR US-10359311-B2 OR WO-2023049877-A1 OR US-9075249-B2 OR EP-2805201-B1 OR WO-2013109874-A1 OR EP-2805201-A1 OR US-20130188080-A1).did.					
L935	44	(Artificial Intelligence) Similar to: 18/375,893 with 3 CPC Selections and 5 Text Selections Text: (CN-113454521-A OR CN-113330355-A OR US-20200271961-A1 OR EP-3928149-A1 OR WO-2020172138-A1 OR KR-20210127221-A OR EP-3914960-A1 OR WO-2020154047-A1 OR US-20200233238-A1 OR KR-20210110726-A OR US-11762224-B2 OR US-9033493-B2 OR US-20210364828-A1 OR US-8109629-B2 OR US-20170131575-A1 OR US-10330956-B2 OR US-20190187492-	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO))	OR	ON	ON	2024/02/19 04:12 PM

		A1 OR US-20210364827-A9 OR US-9690121-B2 OR US-20130201440-A1 OR US-11086147-B2 OR US-20090296044-A1 OR US-20150253590-A1 OR US-20120133885-A1 OR US-20170146829-A1 OR US-11733549-B2 OR US-20100309426-A1 OR US-8465151-B2 OR US-20150286074-A1 OR KR-20200135137-A OR CN-205691887-U OR TW-M583054-U OR US-20230204985-A1 OR US-9989771-B2 OR US-11668958-B2 OR US-20220113562-A1 OR US-10288908-B2 OR KR-102006414-B1 OR US-20180011344-A1 OR US-11156855-B2 OR EP-3469418-A1 OR WO-2017215953-A1 OR EP-3258308-A1 OR JP-2017147520-A OR US-11500227-B2 OR WO-2023192316-A1 OR EP-4057051-A1 OR EP-3455670-A1 OR WO-2017196294-A1 OR US-20220244576-A1).did.					
L936	44	(Artificial Intelligence) Similar to: 18/375,893 with 6 CPC Selections and 5 Text Selections Text: (US-11762224-B2 OR US-9033493-B2 OR US-20210364828-A1 OR US-10330956-B2 OR US-8109629-B2 OR US-20190187492-A1 OR US-20210364827-A9 OR US-20170131575-A1 OR US-11086147-B2 OR US-11733549-B2 OR US-9690121-B2 OR US-20090296044-A1 OR US-20130201440-	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO))	OR	ON	ON	2024/02/19 04:12 PM

		A1 OR US-20120133885-A1 OR US-20150253590-A1 OR US-20170146829-A1 OR US-20100309426-A1 OR US-8465151-B2 OR CN-113330355-A OR US-20220260859-A1 OR US-11156855-B2 OR CN-113454521-A OR WO-2020154047-A1 OR EP-3914960-A1 OR US-20200233238-A1 OR KR-20210110726-A OR US-11668958-B2 OR US-20220113562-A1 OR WO-2017196294-A1 OR EP-3455670-A1 OR US-20190113774-A1 OR WO-2023192316-A1 OR KR-20210127221-A OR KR-102077483-B1 OR EP-3928149-A1 OR WO-2020172138-A1 OR US-20200271961-A1 OR US-20230204985-A1 OR TW-M583054-U OR US-7581833-B2 OR KR-102006414-B1 OR FR-3126050-A3 OR AU-2022201400-A1 OR CA-3149165-A1 OR GB-2609686-A OR NL-2031025-A OR KR-20230000350-U OR CH-718869-A2 OR AT-525342-B1 OR AT-525342-A1).did.				
L937	303	"7792552"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT;	OR	ON	ON	2024/02/19 04:15 PM

			IBM_TDB)				
L938	2	"35514697".fmid.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; JPO)	OR	ON	ON	2024/02/19 04:16 PM
L941	12	"46332221".fmid.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; JPO)	OR	ON	ON	2024/02/19 04:17 PM
L943	194	"8593795"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/19 04:18 PM
L944	1	"49596677".fmid.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO,	OR	ON	ON	2024/02/19 04:18 PM

			RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; JPO)				
L946	29	"11630331"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/19 04:52 PM
L947	26	"11513371"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/19 04:53 PM
L948	57	"10345625"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/19 04:53 PM
L949	41	"10802582"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA,	OR	ON	ON	2024/02/19 04:53 PM

			EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L950	60	"10515623"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/19 04:53 PM
L951	10	"11762224"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; JPO)	OR	ON	ON	2024/02/19 04:53 PM
L952	37	(Artificial Intelligence) More like doc: US-6349001-B1 Text: (CA-2307877-C OR EP-1027627-A1 OR EP-1027627-A4 OR WO-9923524-A1 OR US-6091546-A OR JP-2001522063-A OR EP-1027627-B1 OR AU-2007205168-A1 OR CA-2636159-A1 OR AU-2007205168-B2 OR CA-2174510-A1 OR CA-2636159-C OR BR-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/19 04:55 PM

		PI0706349-A2 OR KR-20180037887-A OR US-20040108981-A1 OR CN-1529831-A OR CN-100365470-C OR TW-200409945-A OR CN-103033952-A OR CA-2377742-A1).did.					
L953	38	(Artificial Intelligence) More like doc: US-5835185-A Text: (US-5455638-A OR US-5455637-A OR US-5900720-A OR US-20080100792-A1 OR WO-2008057199-A2 OR CA-2667671-A1 OR US-20090201460-A1 OR WO-2008057200-A2 OR EP-2082281-A2 OR US-20080106694-A1 OR WO-2008057198-A2 OR WO-2008054654-A2 OR US-20080129953-A1 OR US-20210149216-A1 OR WO-2019011925-A1 OR EP-3652584-A1 OR EP-3608705-A1 OR TW-200837421-A OR CN-110892314-A OR WO-2008057200-A3).did.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/19 04:55 PM
L954	34	(Artificial Intelligence) More like doc: US-7792552-B2 Text: (US-20060003803-A1 OR US-9690121-B2 OR US-20080151179-A1 OR US-11204512-B2 OR US-11630331-B2 OR US-7621634-B2 OR US-20050078274-A1 OR US-20240036361-A1 OR US-7192136-B2 OR US-11644693-B2 OR US-7438410-B1 OR US-7631968-B1 OR US-20230017635-A1 OR US-20220357599-A1 OR US-10777048-B2 OR US-20070046887-A1 OR US-20200012127-A1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/19 04:55 PM

		OR US-11721183-B2 OR US-20190318589-A1 OR US-20230273464-A1).did.					
L955	33	(Artificial Intelligence) More like doc: US-8109629-B2 Text: (US-20090296044-A1 OR US-9033493-B2 OR US-11086147-B2 OR US-20210364828-A1 OR US-20230408850-A1 OR US-20220260859-A1 OR US-10330956-B2 OR US-20070046887-A1 OR US-11762224-B2 OR US-11733549-B2 OR US-20190033623-A1 OR US-20100309426-A1 OR US-20120133885-A1 OR US-7581833-B2 OR US-8465151-B2 OR US-20150253590-A1 OR US-20170146829-A1 OR US-20130201440-A1 OR US-20170131575-A1 OR US-20210364827-A9).did.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/19 04:55 PM
L956	29	(Artificial Intelligence) More like doc: US-8593795-B1 Text: (US-8971023-B2 OR US-20130250503-A1 OR EP-2831661-B1 OR TW-201346333-A OR US-9291823-B2 OR US-20160147086-A1 OR US-9766482-B2 OR KR-102308595-B1 OR WO-2013148980-A1 OR EP-2831661-A1 OR US-20130258270-A1 OR JP-2015521395-A OR US-9091852-B2 OR EP-2828704-B1 OR US-20130249776-A1 OR US-20140028968-A1 OR KR-20140053341-A OR US-10139625-B2 OR US-20160320618-A1 OR US-11135446-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/19 04:55 PM

		B2).did.					
L957	212	(US-0000347-$ | US-0004325-$ | US-0005069-$ | US-0008763-$ | US-0011603-$ | US-0017634-$ | US-0026146-$ | US-0033622-$ | US-0033660-$ | US-0036103-$ | US-0044416-$ | US-0045928-$ | US-0054092-$ | US-0057654-$ | US-0064746-$ | US-0089545-$ | US-0091200-$ | US-0098874-$ | US-0101411-$ | US-0104864-$ | US-0105445-$ | US-0114770-$ | US-0122208-$ | US-0136414-$ | US-0172691-$ | US-0178743-$ | US-0189548-$ | US-0211574-$ | US-0226838-$ | US-02511706-$ | US-0277123-$ | US-0283894-$ | US-0291667-$ | US-0292333-$ | US-0335792-$ | US-0338677-$ | US-0357599-$ | US-0369402-$ | US-0378493-$ | US-0379425-$ | US-0415388-$ | US-10515623-$ | US-10571715-$ | US-10802582-$ | US-10964190-$ | US-11069358-$ | US-11204512-$ | US-11243416-$ | US-11326941-$ | US-11513371-$ | US-11536988-$ | US-11630331-$ | US-11644361-$ | US-11644693-$ | US-20020136414-$ | US-20030064746-$ | US-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/19 05:23 PM

		20030091200-$ | US-20040005069-$ | US-20040104864-$ | US-20040114770-$ | US-20050036103-$ | US-20060291667-$ | US-20070189548-$ | US-20070211574-$ | US-20080089545-$ | US-20100045928-$ | US-20100105445-$ | US-20110292333-$ | US-20120101411-$ | US-20120283894-$ | US-20130172691-$ | US-20140226838-$ | US-20150277123-$ | US-20150338677-$ | US-20160098874-$ | US-20180122208-$ | US-20190004325-$ | US-20190033622-$ | US-20190369402-$ | US-20190378493-$ | US-20210000347-$ | US-20210026146-$ | US-20210379425-$ | US-20220008763-$ | US-20220011603-$ | US-20220054092-$ | US-20220178743-$ | US-20220335792-$ | US-20220357599-$ | US-20220415388-$ | US-20230017634-$ | US-20230033660-$ | US-20230057654-$ | US-3104290-$ | US-3119903-$ | US-5144344-$ | US-5475798-$ | US-5519781-$ | US-5777715-$ | US-5819183-$ | US-6301050-$ | US-6311155-$ | US-6346929-$ | US-6678381-$ | US-6717737-$ | US-6771423-$ | US-7801570-$ | US-8582789-$ | US-8849185-$).DID.					
L958	209	(IP-0920081021-$ | RF-1220040325-$ | DA-1419941122-$ | DA-1419970304-$ | IP-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU,	OR	ON	ON	2024/02/19 05:23 PM

		1520090310-$ | QR- 1820030624-$ | QR- 2320010515-$ | DA- 2420050929-$ | AT- 383428-$ | CA- 2059597-$ | CA- 2603077-$ | CA- 2667671-$ | CH- 037719-$ | CN- 101815962-$ | CN- 2054169-$ | CN- 2066151-$ | CN- 216145034-$ | CN- 88203065-$ | DE- 10103922-$ | DE- 10123226-$ | DE- 10222375-$ | EP- 1134491-$ | EP- 1196807-$ | EP- 1830221-$ | EP- 1908304-$ | EP- 2439580-$ | EP- 3258308-$ | EP- 3264162-$ | EP- 3299870-$ | EP- 3893043-$ | ES- 2530421-$ | FR- 2530039-$ | FR- 3028980-$ | GB- 1467982-$ | GB- 2291551-$ | GB- 2476064-$ | GB- 2495697-$ | GB- 2561854-$ | IT- 1298975-$ | IT- 1397295-$ | JP- 2000039595-$ | JP- 2002341059-$ | JP- 2005151292-$ | JP- 2010231119-$ | JP- 2012078588-$ | JP- 2014049934-$ | JP- 2017183827-$ | JP- 2019522391-$ | JP- 3000621-$ | JP- 3532537-$ | JP- 3794986-$ | JP- 3988632-$ | JP- 4470301-$ | JP- 4496354-$ | JP- 4887907-$ | JP- 5436678-$ | JP- 5458080-$ | JP- 6032940-$ | JP- 6332880-$ | JP- 7037818-$ | KR- 100420024-$ | KR- 101044199-$ | KR-	CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				

		101124852-$ | KR-101940638-$ | TW-484711-$ | TW-572286-$ | WO-1997012205-$ | WO-2002006881-$ | WO-2003069394-$ | WO-2003100368-$ | WO-2004012477-$ | WO-2004025554-$ | WO-2007070508-$ | WO-2010062479-$ | WO-2011137034-$ | WO-2016044612-$ | WO-2019178557-$ | WO-2020006275-$).DID.					
L959	341	(US-20080090679-$ | US-20080119207-$ | US-20080147488-$ | US-20080151179-$ | US-20080218684-$ | US-20080273165-$ | US-20080291277-$ | US-20090059159-$ | US-20090059381-$ | US-20090086159-$ | US-20090091838-$ | US-20090109395-$ | US-20090122161-$ | US-20090122414-$ | US-20090154293-$ | US-20090202096-$ | US-20090213323-$ | US-20090226022-$ | US-20090237355-$ | US-20090251660-$ | US-20090251661-$ | US-20090268032-$ | US-20100026970-$ | US-20100103249-$ | US-20100103516-$ | US-20100110368-$ | US-20100149073-$ | US-20100165287-$ | US-20100277563-$ | US-20100309426-$ | US-20110055027-$ | US-20110077548-$ | US-20110080289-$ | US-20110084900-$ | US-20110139163-$ | US-20110169932-$ | US-20110170723-$ | US-20110193963-$ | US-20110194029-$ | US-20110213664-$ | US-20110214082-$ |	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/19 05:23 PM

		US-20110221658-$ | US-20110248905-$ | US-20120188501-$ | US-20120194549-$ | US-20120194550-$ | US-20120224070-$ | US-20120262557-$ | US-20120281961-$ | US-20130131985-$ | US-20130141313-$ | US-20130150004-$ | US-20130169513-$ | US-20130201285-$ | US-20130249776-$ | US-20130342806-$ | US-20140063054-$ | US-20140152530-$ | US-20140164282-$ | US-20140184724-$ | US-20140253867-$ | US-20140270316-$ | US-20140291396-$ | US-20140347736-$ | US-20150177521-$ | US-20150187357-$ | US-20150219899-$ | US-20150234192-$ | US-20150261995-$ | US-20150323990-$ | US-20160004306-$ | US-20160103322-$ | US-20160210834-$ | US-20160248994-$ | US-20160259996-$ | US-20170053576-$ | US-20170099479-$ | US-20180130371-$ | US-20180131847-$ | US-20180336382-$ | US-20220163806-$ | US-20220299792-$ | US-2339173-$ | US-3192826-$ | US-3216308-$ | US-3229580-$ | US-3524710-$ | US-3610825-$ | US-3787109-$ | US-3885095-$ | US-3915548-$ | US-3923370-$ | US-3936605-$ | US-3940204-$ | US-4052073-$ | US-4082432-$ | US-4195915-$ | US-4218111-$ | US-4447128-$ | US-					

		4516157-$ | US- 4550984-$ | US- 4621283-$ | US- 4649434-$ | US- 4664475-$ | US- 4665385-$ | US- 4722601-$ | US- 4751691-$ | US- 4753514-$ | US- 4799765-$ | US- 4806001-$ | US- 4806011-$ | US- 4818048-$ | US- 4826287-$ | US- 4852988-$ | US- 4853306-$ | US- 4867551-$ | US- 4869575-$ | US- 4884137-$ | US- 4961626-$ | US- 4968117-$ | US- 4973132-$ | US- 4973139-$ | US- 4988183-$ | US- 5003300-$ | US- 5013134-$ | US- 5028119-$ | US- 5044709-$ | US- 5050962-$ | US- 5053755-$ | US- 5129716-$ | US- 5138470-$ | US- 5162828-$ | US- 5212471-$ | US- 5214425-$ | US- 5231379-$ | US- 5281957-$ | US- 5281960-$ | US- 5309169-$ | US- 5320538-$ | US- 5325386-$ | US- 5334991-$ | US- 5348477-$ | US- 5359669-$ | US- 5367345-$ | US- 5369415-$ | US- 5381267-$ | US- 5384654-$ | US- 5392158-$ | US- 5416876-$ | US- 5446507-$ | US- 5455591-$ | US- 5459612-$ | US- 5469185-$ | US- 5491510-$ | US- 5495576-$ | US- 5506728-$ | US- 5519410-$ | US-					

		5537253-$ | US-5539578-$ | US-5576887-$ | US-5579148-$ | US-5583590-$ | US-5585871-$ | US-5589846-$ | US-5596451-$ | US-5606743-$ | US-5610765-$ | US-5626410-$ | US-5629790-$ | US-5648789-$ | US-5653751-$ | US-5654827-$ | US-5654828-$ | US-5671037-$).DID.					
L960	340	(US-10042186-$ | US-10139966-$ | US-10152141-$ | US-10191279-$ | US-10215568-$ | US-10254856-$ | US-10310296-$ | US-10345625-$ | US-10359459-$ | US-10448867-$ | US-10466491-$ | US-10469916-$ | US-10481417-$ | US-10527491-$ | US-10613355-$ | US-10617342-$ | US-10624790-$ | US-10649220-$ | US-10663740-$ | US-10684478-$ | US-10684687-$ | US-10722128-$ | US-10739253-$ | US-10761566-$ | US-10777048-$ | US-10824253-$ | US-10853589-$ | US-10863060-$ | US-10908421-$ | US-10997943-$ | US-11003246-$ | US-11061252-$ | US-11064282-$ | US-11086147-$ | US-11103122-$ | US-11163156-$ | US-11219287-$ | US-11243416-$ | US-11300857-$ | US-11326941-$ | US-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/19 05:23 PM

		11487110-$ | US- 11495207-$ | US- 11513371-$ | US- 11536988-$ | US- 1255265-$ | US- 1917745-$ | US- 20020021407-$ | US- 20020057440-$ | US- 20020081982-$ | US- 20020090103-$ | US- 20020098877-$ | US- 20030022690-$ | US- 20030032449-$ | US- 20030226978-$ | US- 20040096078-$ | US- 20050230596-$ | US- 20050248719-$ | US- 20060034478-$ | US- 20070186330-$ | US- 20070270663-$ | US- 20070271116-$ | US- 20080144854-$ | US- 20090156128-$ | US- 20100296045-$ | US- 20120105740-$ | US- 20120113235-$ | US- 20120176580-$ | US- 20130072828-$ | US- 20130143519-$ | US- 20140064536-$ | US- 20140176902-$ | US- 20140198293-$ | US- 20140259271-$ | US- 20150205135-$ | US- 20150206173-$ | US- 20150293379-$ | US- 20160019715-$ | US- 20160187651-$ | US- 20160239985-$ | US- 20170131575-$ | US- 20170255029-$ | US- 20190278110-$ | US- 20200029140-$ | US- 20210263319-$ | US- 20210263343-$ | US- 20220260859-$ | US- 2249572-$ | US- 2638532-$ | US- 2794085-$ | US- 2818511-$ | US- 2830132-$ | US- 2874230-$ | US- 2904670-$ | US- 3060308-$ | US- 3597054-$ | US- 3710115-$ | US- 3858001-$ | US- 3883701-$ | US-					

		4165487-$ | US- 4254451-$ | US- 4283127-$ | US- 4322585-$ | US- 4348664-$ | US- 4389217-$ | US- 4526473-$ | US- 4535244-$ | US- 4608492-$ | US- 46259103-$ | US- 4683587-$ | US- 4751691-$ | US- 4757714-$ | US- 4806011-$ | US- 4822160-$ | US- 4822161-$ | US- 4851686-$ | US- 4856086-$ | US- 4859047-$ | US- 4882769-$ | US- 4962469-$ | US- 4967268-$ | US- 4985632-$ | US- 5008548-$ | US- 5015086-$ | US- 5020150-$ | US- 5026151-$ | US- 5064410-$ | US- 5093576-$ | US- 50963103-$ | US- 5151600-$ | US- 5161250-$ | US- 5172256-$ | US- 5264877-$ | US- 52756503-$ | US- 5306917-$ | US- 5353378-$ | US- 5359444-$ | US- 5367345-$ | US- 5379464-$ | US- 5382986-$ | US- 5394005-$ | US- 5452026-$ | US- 5452480-$ | US- 5455637-$ | US- 5455640-$ | US- 5457751-$ | US- 5463428-$ | US- 5500532-$ | US- 5510961-$ | US- 5513384-$ | US- 5533130-$ | US- 5581090-$ | US- 5585871-$ | US- 56279804-$ | US- 5634201-$ | US- 5671035-$ | US- 5686727-$ | US-					

		5694475-$ | US-5715323-$ | US-58316904-$ | US-5835185-$ | US-5900720-$ | US-5903395-$ | US-59204504-$ | US-5923398-$ | US-5946071-$ | US-5949516-$ | US-5963294-$ | US-5966746-$ | US-5988812-$ | US-5991085-$ | US-5992996-$ | US-6010216-$ | US-6013919-$ | US-6028627-$ | US-6046455-$ | US-60519104-$ | US-6060321-$ | US-6061580-$ | US-6091832-$ | US-6115177-$ | US-6132681-$ | US-6132881-$).DID.					
L961	329	(US-6154552-$ | US-6176576-$ | US-61810704-$ | US-6199550-$ | US-62023804-$ | US-6225897-$ | US-6231181-$ | US-6236969-$ | US-6259367-$ | US-6270466-$ | US-6292213-$ | US-6292685-$ | US-6301367-$ | US-6343858-$ | US-6409335-$ | US-6409338-$ | US-6431705-$ | US-6474816-$ | US-64782605-$ | US-64783605-$ | US-6511175-$ | US-6513532-$ | US-6517203-$ | US-6539336-$ | US-6542081-$ | US-6546101-$ | US-6554444-$ | US-6582075-$ | US-6619799-$ | US-6629076-$ | US-6686843-$ | US-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/19 05:24 PM

		6729726-$ | US- 6736759-$ | US- 6764194-$ | US- 6769767-$ | US- 6788309-$ | US- 6792401-$ | US- 6798391-$ | US- 6824265-$ | US- 6840908-$ | US- 6853303-$ | US- 6857741-$ | US- 6871951-$ | US- 6876947-$ | US- 6879930-$ | US- 6899585-$ | US- 6912386-$ | US- 6932090-$ | US- 6947219-$ | US- 6974226-$ | US- 7013009-$ | US- 7023594-$ | US- 7030902-$ | US- 7033025-$ | US- 7044615-$ | US- 7048370-$ | US- 7059717-$ | US- 7079876-$ | US- 7150526-$ | US- 7187960-$ | US- 7192136-$ | US- 7255437-$ | US- 72589605-$ | US- 72599905-$ | US- 7265358-$ | US- 7274292-$ | US- 7278734-$ | US- 7289767-$ | US- 7312699-$ | US- 7313246-$ | US- 7319780-$ | US- 7376238-$ | US- 7380936-$ | US- 7405801-$ | US- 7431450-$ | US- 7438409-$ | US- 7438410-$ | US- 7449622-$ | US- 7452067-$ | US- 7500746-$ | US- 7500747-$ | US- 7521623-$ | US- 7543934-$ | US- 7543938-$ | US- 7547101-$ | US- 7581833-$ | US- 7604348-$ | US- 7643895-$ | US- 7648236-$ | US-					

		7677723-$ | US- 7740353-$ | US- 7760898-$ | US- 7792552-$ | US- 7798638-$ | US- 7806525-$ | US- 78785006-$ | US- 7922321-$ | US- 8073984-$ | US- 8109629-$ | US- 8142015-$ | US- 8184067-$ | US- 8243973-$ | US- 8337013-$ | US- 8421851-$ | US- 84615006-$ | US- 8465151-$ | US- 8482488-$ | US- 8485661-$ | US- 8508851-$ | US- 8558759-$ | US- 8593795-$ | US- 8668334-$ | US- 8678581-$ | US- 8766747-$ | US- 8767306-$ | US- 8778022-$ | US- 8823740-$ | US- 8838708-$ | US- 8884845-$ | US- 8893010-$ | US- 8907867-$ | US- 8918197-$ | US- 8931896-$ | US- 8941560-$ | US- 8952869-$ | US- 8957835-$ | US- 9024843-$ | US- 9116545-$ | US- 9128522-$ | US- 9137309-$ | US- 9141194-$ | US- 9201512-$ | US- 9207515-$ | US- 9210991-$ | US- 9229233-$ | US- 9230501-$ | US- 9256071-$ | US- 9256253-$ | US- 9264803-$ | US- 9298007-$ | US- 9299194-$ | US- 9360889-$ | US- 9400390-$ | US- 9401540-$ | US- 9405135-$ | US- 9423870-$ | US- 9482880-$ | US-					

		9482882-$ | US-9482883-$ | US-9494800-$ | US-9529199-$ | US-9532714-$ | US-9575321-$ | US-9594246-$ | US-9632059-$ | US-9635222-$ | US-9651784-$ | US-9651787-$ | US-9684172-$ | US-9684374-$ | US-9726904-$ | US-9746686-$ | US-9753288-$ | US-9766463-$ | US-9766479-$ | US-9798458-$ | US-9800990-$ | US-9810906-$ | US-9811153-$ | US-9829707-$ | US-9836122-$ | US-9841599-$ | US-9851567-$ | US-9874936-$ | US-9880052-$ | US-9910298-$ | US-9939934-$ | US-9952664-$ | US-9965681-$).DID.					
L962	293	(IP-0920081021-$ | IP-0920100720-$ | RF-1220040317-$ | DA-1419941122-$ | DA-1419960502-$ | IP-1520090310-$ | QR-1820030624-$ | QR-2320010515-$ | QR-3020040803-$ | AT-383428-$ | AU-2001269883-$ | AU-2002243370-$ | CA-2059597-$ | CA-2307877-$ | CA-2310114-$ | CA-2667671-$ | CA-2852711-$ | CA-3018763-$ | CH-037719-$ | CN-102972037-$ | CN-104793338-$ | CN-106687858-$ | CN-107077173-$ | CN-2054169-$ | CN-205691887-$ | CN-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/19 05:24 PM

		2066151-$ | CN- 216145034-$ | CN- 88203065-$ | DE- 10103922-$ | DE- 10123226-$ | DE- 10205579-$ | DE- 10222375-$ | DE- 3818389-$ | DE- 4338811-$ | DE- 69810855-$ | DE- 8529458-$ | EP- 1196807-$ | EP- 1265524-$ | EP- 1547434-$ | EP- 1830221-$ | EP- 1908304-$ | EP- 2439580-$ | EP- 3258308-$ | EP- 3264162-$ | EP- 3299870-$ | EP- 3308216-$ | EP- 3867610-$ | ES- 2530421-$ | FR- 2530039-$ | FR- 2697921-$ | FR- 2706103-$ | FR- 3028980-$ | GB- 1467982-$ | GB- 2291551-$ | GB- 2369754-$ | GB- 2393076-$ | GB- 2495697-$ | GB- 2561854-$ | IT- 1298975-$ | IT- 1397295-$ | JP- 2000039595-$ | JP- 2001183735-$ | JP- 2002341059-$ | JP- 2003033328-$ | JP- 2005151292-$ | JP- 2010231119-$ | JP- 2012078588-$ | JP- 2014049934-$ | JP- 2017183827-$ | JP- 2799002-$ | JP- 3000621-$ | JP- 3048964-$ | JP- 3532537-$ | JP- 3794986-$ | JP- 3988632-$ | JP- 4096376-$ | JP- 4239317-$ | JP- 4470301-$ | JP- 4496354-$ | JP- 4510993-$ | JP- 4887907-$ | JP- 5458080-$ | JP- 6032940-$ | JP-					

		6332880-$ | JP-7037818-$ | KR-100420024-$ | KR-101940638-$ | NL-1021485-$ | PL-181650-$ | TW-200819817-$ | TW-484711-$ | TW-572286-$ | WO-1996013136-$ | WO-1997011574-$ | WO-1997022295-$ | WO-2005043224-$ | WO-2006118555-$ | WO-2007070508-$ | WO-2010062479-$ | WO-2013084240-$ | WO-2014149631-$ | WO-2017075405-$ | WO-2020006271-$).DID.					
L963	384	(US-5673139-$ | US-5682173-$ | US-5699194-$ | US-5717479-$ | US-5719588-$ | US-5744788-$ | US-5751493-$ | US-5808589-$ | US-5815197-$ | US-5815326-$ | US-5886822-$ | US-5943171-$ | US-5973845-$ | US-5991103-$ | US-6005720-$ | US-6023372-$ | US-6081304-$ | US-6091546-$ | US-6169789-$ | US-6204974-$ | US-6301050-$ | US-6349001-$ | US-6417969-$ | US-6442018-$ | US-6443097-$ | US-6523006-$ | US-6523753-$ | US-6582075-$ | US-6619799-$ | US-6629076-$ | US-6639706-$ | US-6724354-$ | US-6729726-$ | US-6736759-$ | US-6769767-$ | US-6784833-$ | US-6966647-$ | US-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/19 05:24 PM

		6975991-$ | US- 7008074-$ | US- 7013009-$ | US- 7079876-$ | US- 7095573-$ | US- 7126558-$ | US- 7158296-$ | US- 7199951-$ | US- 7248232-$ | US- 7255437-$ | US- 7321785-$ | US- 7380936-$ | US- 7410254-$ | US- 7488294-$ | US- 7500747-$ | US- 7505793-$ | US- 7536150-$ | US- 7581833-$ | US- 7631968-$ | US- 7648236-$ | US- 7760898-$ | US- 7773767-$ | US- 7791593-$ | US- 7810750-$ | US- 7824052-$ | US- 7855743-$ | US- 7873243-$ | US- 7885419-$ | US- 7922321-$ | US- 7987070-$ | US- 8109629-$ | US- 8128422-$ | US- 8160287-$ | US- 8188880-$ | US- 8189263-$ | US- 8203502-$ | US- 8223088-$ | US- 8294994-$ | US- 8316319-$ | US- 8340476-$ | US- 8376548-$ | US- 8386261-$ | US- 8405489-$ | US- 8411214-$ | US- 8417185-$ | US- 8438659-$ | US- 8467133-$ | US- 8471967-$ | US- 8472119-$ | US- 8472120-$ | US- 8477425-$ | US- 8482859-$ | US- 8488246-$ | US- 8503087-$ | US- 8508851-$ | US- 8531355-$ | US- 8554307-$ | US- 8576143-$ | US-					

		8582209-$ | US- 8588448-$ | US- 8593795-$ | US- 8605009-$ | US- 8640959-$ | US- 8641621-$ | US- 8659397-$ | US- 8666212-$ | US- 8690776-$ | US- 8699842-$ | US- 8743464-$ | US- 8744113-$ | US- 8749886-$ | US- 8760762-$ | US- 8760765-$ | US- 8767305-$ | US- 8767306-$ | US- 8773599-$ | US- 8778022-$ | US- 8786686-$ | US- 8798292-$ | US- 8817379-$ | US- 8823603-$ | US- 8823636-$ | US- 8823740-$ | US- 8830329-$ | US- 8848289-$ | US- 8867131-$ | US- 8867139-$ | US- 8873148-$ | US- 8878750-$ | US- 8885877-$ | US- 8890946-$ | US- 8911087-$ | US- 8929589-$ | US- 8941560-$ | US- 8956396-$ | US- 8964298-$ | US- 8966656-$ | US- 8976085-$ | US- 8988519-$ | US- 9001030-$ | US- 9013793-$ | US- 9069115-$ | US- 9087471-$ | US- 9091851-$ | US- 9097890-$ | US- 9097891-$ | US- 9116337-$ | US- 9116545-$ | US- 9128281-$ | US- 9129295-$ | US- 9129429-$ | US- 9134534-$ | US- 9151953-$ | US- 9153074-$ | US- 9182596-$ | US- 9194995-$ | US-					

		9217868-$ | US- 9223134-$ | US- 9229227-$ | US- 9239415-$ | US- 9256071-$ | US- 9277334-$ | US- 9285589-$ | US- 9285591-$ | US- 9285592-$ | US- 9286726-$ | US- 9329388-$ | US- 9341843-$ | US- 9366862-$ | US- 9366869-$ | US- 9377627-$ | US- 9389422-$ | US- 9395544-$ | US- 9405135-$ | US- 9429759-$ | US- 9436009-$ | US- 9438984-$ | US- 9459455-$ | US- 9470907-$ | US- 9482882-$ | US- 9482883-$ | US- 9488833-$ | US- 9519092-$ | US- 9544675-$ | US- 9578307-$ | US- 9586318-$ | US- 9592404-$ | US- 9606612-$ | US- 9606992-$ | US- 9629774-$ | US- 9635222-$ | US- 9665901-$ | US- 9675319-$ | US- 9677901-$ | US- 9720258-$ | US- 9720260-$ | US- 9726904-$ | US- 9729767-$ | US- 9759917-$).DID.					
L964	340	(US-10012505-$ | US- 10013138-$ | US- 10013889-$ | US- 10015577-$ | US- 10018530-$ | US- 10024667-$ | US- 10024678-$ | US- 10024679-$ | US- 10024680-$ | US- 10037708-$ | US- 10039445-$ | US- 10042186-$ | US- 10061352-$ | US- 10063958-$ | US-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO;	OR	ON	ON	2024/02/19 05:24 PM

		10067341-$ | US- 10073264-$ | US- 10089684-$ | US- 10095034-$ | US- 10095036-$ | US- 10095833-$ | US- 10129395-$ | US- 10133070-$ | US- 10133074-$ | US- 10146054-$ | US- 10162180-$ | US- 10172760-$ | US- 10178378-$ | US- 10180572-$ | US- 10188467-$ | US- 10192133-$ | US- 10192361-$ | US- 10219944-$ | US- 10222617-$ | US- 10248856-$ | US- 10261321-$ | US- 10275642-$ | US- 10278778-$ | US- 10288881-$ | US- 10302835-$ | US- 10306389-$ | US- 10310296-$ | US- 10314559-$ | US- 10338390-$ | US- 10338400-$ | US- 10339952-$ | US- 10341787-$ | US- 10345625-$ | US- 10348965-$ | US- 10360907-$ | US- 10423760-$ | US- 10424405-$ | US- 10432851-$ | US- 10437031-$ | US- 10453264-$ | US- 10466487-$ | US- 10481319-$ | US- 10481417-$ | US- 10490102-$ | US- 10506220-$ | US- 10507346-$ | US- 10520731-$ | US- 10520732-$ | US- 10521669-$ | US- 10539787-$ | US- 10545347-$ | US- 10547814-$ | US- 10551544-$ | US- 10561519-$ | US- 10624790-$ | US- 10634912-$ | US- 10634921-$ | US- 10646283-$ | US-	JPO; DERWENT; IBM_TDB)				

		10650594-$ | US- 10742965-$ | US- 10747301-$ | US- 10764571-$ | US- 10777048-$ | US- 10782527-$ | US- 10809528-$ | US- 10859834-$ | US- 10860100-$ | US- 10884246-$ | US- 10895679-$ | US- 10965931-$ | US- 10976575-$ | US- 11009711-$ | US- 11054648-$ | US- 11119353-$ | US- 11137609-$ | US- 11153472-$ | US- 11153555-$ | US- 11163161-$ | US- 11181974-$ | US- 11207150-$ | US- 11219287-$ | US- 11243434-$ | US- 11259879-$ | US- 11262587-$ | US- 11294427-$ | US- 11300857-$ | US- 11378802-$ | US- 11382699-$ | US- 11382700-$ | US- 11402668-$ | US- 11415802-$ | US- 11415812-$ | US- 11448816-$ | US- 11464578-$ | US- 11464581-$ | US- 11484365-$ | US- 11500143-$ | US- 11510750-$ | US- 11513371-$ | US- 11523092-$ | US- 11526003-$ | US- 11533961-$ | US- 11536988-$ | US- 20020049566-$ | US- 20020049775-$ | US- 20020058531-$ | US- 20030020950-$ | US- 20030068057-$ | US- 20030090439-$ | US- 20030090787-$ | US- 20030227542-$ | US- 20040096078-$ | US- 20040108981-$ | US- 20040156012-$ | US- 20040156114-$ | US- 20040160573-$ | US-					

		20040171432-$ | US-20040178970-$ | US-20040201695-$ | US-20040205256-$ | US-20040212776-$ | US-20040238732-$ | US-20050012683-$ | US-20050046953-$ | US-20050078274-$ | US-20050110943-$ | US-20050184866-$ | US-20050201585-$ | US-20050230596-$ | US-20050248719-$ | US-20050254135-$ | US-20060003803-$ | US-20060052146-$ | US-20060055786-$ | US-20060093178-$ | US-20060109350-$ | US-20060115130-$ | US-20060140422-$ | US-20060152618-$ | US-20060192306-$ | US-20060212430-$ | US-20060236120-$ | US-20060236121-$ | US-20060238550-$ | US-20060238877-$ | US-20070030442-$ | US-20070049351-$ | US-20070064097-$ | US-20070064888-$ | US-20070064894-$ | US-20070067885-$ | US-20070081646-$ | US-20070109491-$ | US-20070204014-$ | US-20080024391-$ | US-20080064326-$ | US-20080068559-$ | US-20080082363-$ | US-20080084362-$).DID.				
L965	2139	957 958 959 960 961 962 963 964	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO;	OR	ON	ON	2024/02/19 05:24 PM

			JPO; DERWENT; IBM_TDB)				
L966	129	965 AND 27	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/19 05:25 PM
L967	92	965 AND 30	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/19 05:25 PM
L968	72	965 AND 40	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/19 05:25 PM
L969	41	965 AND 44	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB,	OR	ON	ON	2024/02/19 05:26 PM

			HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L970	7	965 AND 38	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/19 05:26 PM
L971	45	"8849185"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/19 05:50 PM
L972	30	"8582789"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT;	OR	ON	ON	2024/02/19 05:50 PM

			IBM_TDB)				
L973	188	"8109629"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/19 05:50 PM
L976	560	"8964298"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/19 05:52 PM
L977	422	"8467133"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/19 05:52 PM

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N1	13385	((("HOWELL") near3 ("Thomas")) OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/12/11 03:33 PM

		(("CHAO") near3 ("David")) OR (("THOMAS") near3 ("C")) OR (("TONG") near3 ("Peter"))).INV.					
N2	210	((("HOWELL") near3 ("Thomas")) OR (("CHAO") near3 ("David")) OR (("THOMAS") near3 ("C")) OR (("TONG") near3 ("Peter"))).INV. AND frame AND (arm OR temple) AND sensor AND battery	(US-PGPUB; USPAT)	OR	ON	ON	2023/12/11 03:33 PM
N3	210	((("HOWELL") near3 ("Thomas")) OR (("CHAO") near3 ("David")) OR (("THOMAS") near3 ("C")) OR (("TONG") near3 ("Peter"))).INV. AND frame AND (arm OR temple) AND sensor AND batter$4 AND control$4 AND connect$4	(US-PGPUB; USPAT)	OR	ON	ON	2023/12/11 03:33 PM
N4	143	((("HOWELL") near3 ("Thomas")) OR (("CHAO") near3 ("David")) OR (("THOMAS") near3 ("C")) OR (("TONG") near3 ("Peter"))).INV. AND frame AND (arm OR temple) AND sensor AND batter$4 AND control$4 AND connect$4 AND charg$4 AND electric$4	(US-PGPUB; USPAT)	OR	ON	ON	2023/12/11 03:33 PM
N5	129	((("HOWELL") near3 ("Thomas")) OR (("CHAO") near3 ("David")) OR (("THOMAS") near3 ("C")) OR (("TONG") near3 ("Peter"))).INV. AND frame AND (arm OR temple) AND sensor AND batter$4 AND control$4 AND connect$4 AND charg$4 AND electric$4 AND wireless AND communicat$4	(US-PGPUB; USPAT)	OR	ON	ON	2023/12/11 03:33 PM
N6	32	((("HOWELL") near3	(US-PGPUB; USPAT)	OR	ON	ON	2023/12/11

		("Thomas")) OR (("CHAO") near3 ("David")) OR (("THOMAS") near3 ("C")) OR (("TONG") near3 ("Peter"))).INV. AND (eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND (wireless WITH communicat$4) AND position AND open$4 AND clos$4 AND circuit$4 AND (within WITH frame) AND hing$4 AND conduct$4 AND coupl$4 AND lens$4 AND indicat$4 AND embed$4 AND antenna AND side AND view AND audio AND microphone AND diode AND output AND front AND section AND information AND place AND expos$4					03:33 PM
N146	5484	((eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple)).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/12/11 03:44 PM
N147	687	((eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/12/11 03:44 PM
N148	140	((eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4)).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/12/11 03:44 PM
N149	51	((eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4)).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/12/11 04:19 PM

N150	28	((eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND connect$4 AND electric$4).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/12/11 04:19 PM
N164	21	((eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2024/02/19 03:24 PM
N165	11	((eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND wireless).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2024/02/19 03:24 PM
N166	10	((eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND wireless AND communicat$4).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2024/02/19 03:24 PM
N167	2	((eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND (wireless WITH communicat$4) AND position AND open$4 AND clos$4).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2024/02/19 03:45 PM
N168	2	((eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple)	(US-PGPUB; USPAT)	OR	ON	ON	2024/02/19 03:45 PM

		AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND (wireless WITH communicat$4) AND position AND open$4 AND clos$4 AND circuit$4).clm.					
N169	2	((eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND (wireless WITH communicat$4) AND position AND open$4 AND clos$4 AND circuit$4 AND (within WITH frame)).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2024/02/19 03:46 PM
N170	0	((eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND (wireless WITH communicat$4) AND position AND open$4 AND clos$4 AND circuit$4 AND (within WITH frame) AND hing$4 AND conduct$4).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2024/02/19 04:50 PM
N171	0	((eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND (wireless WITH communicat$4) AND position AND open$4 AND clos$4 AND circuit$4 AND (within WITH frame) AND	(US-PGPUB; USPAT)	OR	ON	ON	2024/02/19 04:51 PM

		hing$4 AND conduct$4 AND coupl$4).clm.					
N172	0	((eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND (wireless WITH communicat$4) AND position AND open$4 AND clos$4 AND circuit$4 AND (within WITH frame) AND hing$4 AND conduct$4 AND coupl$4 AND lens$4 AND indicat$4).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2024/02/19 04:51 PM
N173	0	((eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND (wireless WITH communicat$4) AND position AND open$4 AND clos$4 AND circuit$4 AND (within WITH frame) AND hing$4 AND conduct$4 AND coupl$4 AND lens$4 AND indicat$4 AND embed$4 AND antenna AND side AND view AND audio AND microphone).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2024/02/19 05:27 PM
N174	0	((eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND (wireless WITH communicat$4) AND position AND open$4 AND clos$4 AND circuit$4 AND (within	(US-PGPUB; USPAT)	OR	ON	ON	2024/02/19 05:27 PM

		WITH frame) AND hing$4 AND conduct$4 AND coupl$4 AND lens$4 AND indicat$4 AND embed$4 AND antenna AND side AND view AND audio AND microphone AND diode AND output AND front AND section).clm.					
N177	0	((eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND (wireless WITH communicat$4) AND position AND open$4 AND clos$4 AND circuit$4 AND (within WITH frame) AND hing$4 AND conduct$4 AND coupl$4 AND lens$4 AND indicat$4 AND embed$4 AND antenna AND side AND view AND audio AND microphone AND diode AND output AND front AND section AND information AND place AND expos$4).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2024/02/19 05:50 PM
N178	0	((eyewear OR spectale OR eyeglass$4 OR glass$4) AND frame AND (arm OR temple) AND sensor AND (batter$4 WITH charg$4) AND control$4 AND connect$4 AND electric$4 AND (wireless WITH communicat$4) AND position AND open$4 AND clos$4 AND circuit$4 AND (within WITH frame) AND hing$4 AND conduct$4 AND coupl$4 AND lens$4 AND indicat$4 AND embed$4 AND antenna AND side AND view AND audio AND	(US-PGPUB; USPAT)	OR	ON	ON	2024/02/19 05:50 PM

		microphone AND diode AND output AND front AND section AND information AND place AND expos$4 AND pin AND pad).clm.					

PE2E SEARCH - Search History (Similarity Search)

Ref #	Sort and Retrieval Information	Text Selections	CPC Selections
L825	Sort results by: Similarity to Application # 18/375,893 Retrieve results by: Application # 18/375,893	(Abstract) Techniques for providing eyewear or other head-worn personal electronic apparatus with electrical components are disclosed. The electrical components can provide electrical technology to eyewear or other head-worn personal electronic apparatus without having to substantially compromise aesthetic design principles. The electrical components can be partially or completely internal to eyewear or other head-worn personal electronic apparatus. The electrical components can operate independently or together with other electrical components provided elsewhere. Apparatus for presenting after-market electrical components are also disclosed. (Claims) 19. (Original) A system, comprising: a head-worn structure configured to be worn by a user; at least one speaker at least partially internal to the head-worn structure, the at least one speaker being configured to be worn proximate to an ear of the user when the head-worn structure is being worn by the user; a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user;	No selections

		a second microphone at least partially contained within the head-worn structure, the second microphone being positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus; a rechargeable battery contained within the head-worn structure; electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery; wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head- worn personal electronic apparatus is able to be recharged while the head-worn personal electronic	

		apparatus is placed in the charging apparatus. a charging apparatus having a charging connector,	
L826	Sort results by: Similarity to Application # 18/375,893 Retrieve results by: Application # 18/375,893	(Abstract) Techniques for providing eyewear or other head-worn personal electronic apparatus with electrical components are disclosed. The electrical components can provide electrical technology to eyewear or other head-worn personal electronic apparatus without having to substantially compromise aesthetic design principles. The electrical components can be partially or completely internal to eyewear or other head-worn personal electronic apparatus. The electrical components can operate independently or together with other electrical components provided elsewhere. Apparatus for presenting after-market electrical components are also disclosed. (Claims) 19. (Original) A system, comprising: a head-worn structure configured to be worn by a user; at least one speaker at least partially internal to the head-worn structure, the at least one speaker being configured to be worn proximate to an ear of the user when the head-worn structure is being worn by the user; a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user; a second microphone at least partially contained within the head-worn structure, the second microphone being	(G02C11/10) Electronic devices other than hearing aids (G02C5/146) Side-members having special front end (G02C2200/08) Modular frames, easily exchangeable frame parts and lenses

		positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus; a rechargeable battery contained within the head-worn structure; electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery; wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head- worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus. a charging apparatus having a charging connector,	

L827	Sort results by: Similarity to Application # 18/375,893 Retrieve results by: Application # 18/375,893	(Abstract) Techniques for providing eyewear or other head-worn personal electronic apparatus with electrical components are disclosed. The electrical components can provide electrical technology to eyewear or other head-worn personal electronic apparatus without having to substantially compromise aesthetic design principles. The electrical components can be partially or completely internal to eyewear or other head-worn personal electronic apparatus. The electrical components can operate independently or together with other electrical components provided elsewhere. Apparatus for presenting after-market electrical components are also disclosed. (Claims) 19. (Original) A system, comprising: a head-worn structure configured to be worn by a user; at least one speaker at least partially internal to the head-worn structure, the at least one speaker being configured to be worn proximate to an ear of the user when the head-worn structure is being worn by the user; a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user; a second microphone at least partially contained within the head-worn structure, the second microphone being positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus;	(G02C11/10) Electronic devices other than hearing aids (G02C5/146) Side-members having special front end (G02C2200/08) Modular frames, easily exchangeable frame parts and lenses (G02C5/143) Side-members having special ear pieces (G02C11/06) Hearing aids (H02J7/0045) Circuit arrangements for charging or depolarising batteries or for supplying loads from batteries characterised by the mechanical construction concerning the insertion or the connection of the batteries

		a rechargeable battery contained within the head-worn structure; electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery; wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head- worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus. a charging apparatus having a charging connector,	
L828	Sort results by: Similarity to Application # 18/375,893 Retrieve results by: Application # 18/375,893	(Abstract) Techniques for providing eyewear or other head-worn personal electronic apparatus with electrical components are disclosed.	(G02C11/10) Electronic devices other than hearing aids (G02C5/146) Side-members having special front end

		The electrical components can provide electrical technology to eyewear or other head-worn personal electronic apparatus without having to substantially compromise aesthetic design principles. The electrical components can be partially or completely internal to eyewear or other head-worn personal electronic apparatus. The electrical components can operate independently or together with other electrical components provided elsewhere. Apparatus for presenting after-market electrical components are also disclosed. (Claims) 19. (Original) A system, comprising: a head-worn structure configured to be worn by a user; at least one speaker at least partially internal to the head-worn structure, the at least one speaker being configured to be worn proximate to an ear of the user when the head-worn structure is being worn by the user; a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user; a second microphone at least partially contained within the head-worn structure, the second microphone being positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus; a rechargeable battery contained within the head-worn structure;	(G02C2200/08) Modular frames, easily exchangeable frame parts and lenses (G02C5/143) Side-members having special ear pieces (G02C11/06) Hearing aids (H02J7/0045) Circuit arrangements for charging or depolarising batteries or for supplying loads from batteries characterised by the mechanical construction concerning the insertion or the connection of the batteries

		electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery; wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head- worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus. a charging apparatus having a charging connector, (Claims) 31. (Original) A system as recited in claim 19, wherein the head-worn personal electronic apparatus comprises: a userinput device supported by the head-worn structure, the user input device being configured to receive a user	

		input, the user input device is based on at least capacitive effect, wherein the user input being received induces at least a capacitive change to produce at least an electrical response. (Claims) a touch sensitive surface at least partially contained within the head-worn structure and configured to sense a touch input associated with the user;	
L933	Sort results by: Similarity to Application # 18/375,893 Retrieve results by: Application # 18/375,893	No selections	No selections
L934	Sort results by: Similarity to Application # 18/375,893 Retrieve results by: Application # 18/375,893	(Abstract) Techniques for providing eyewear or other head-worn personal electronic apparatus with electrical components are disclosed. The electrical components can provide electrical technology to eyewear or other head-worn personal electronic apparatus without having to substantially compromise aesthetic design principles. The electrical components can be partially or completely internal to eyewear or other head-worn personal electronic apparatus. The electrical components can operate independently or together with other electrical components provided elsewhere. Apparatus for presenting after-market electrical components are also disclosed. (Claims) a head-worn personal electronic apparatus, including at least: a head-worn structure configured to be worn by a user; at least one speaker at least partially internal to the head-worn structure, the at least one speaker being configured	No selections

		to be worn proximate to an ear of the user when the head-worn structure is being worn by the user; a touch sensitive surface at least partially contained within the head-worn structure and configured to sense a touch input associated with the user; a rechargeable battery contained within the head-worn structure; electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery, and the electronic circuitry being electrically connected to the touch sensitive surface; wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and a charging apparatus having a charging connector, wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results from the at least one conductive element connecting with the charging connector, and thereby the	

		rechargeable battery of the head- worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus. 1. (Original) A system, comprising: (Claims) 19. (Original) A system, comprising: a head-worn structure configured to be worn by a user; at least one speaker at least partially internal to the head-worn structure, the at least one speaker being configured to be worn proximate to an ear of the user when the head-worn structure is being worn by the user; a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user; a second microphone at least partially contained within the head-worn structure, the second microphone being positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus; a rechargeable battery contained within the head-worn structure; electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery; wireless communication circuitry at least partially	

		contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head- worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus. a charging apparatus having a charging connector, (Claims) 43. (Original) A system, comprising: wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection	

		therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head- worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus. a charging apparatus having a charging connector, wherein the electronic circuitry is configured to process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, and wherein the head-worn personal electronic device is configured to receive a voice input via the first microphone, determine a requested operation from the voice input using voice recognition, and control an operation by the head-worn personal electronic device based on the requested operatio (Claims) 49. (New) A system, comprising: at least one speaker at least partially internal to the head-worn structure, the at least one speaker being configured to be worn proximate to an ear of the user when the head-worn structure is being worn by the user;	

		a motion detector at least partially contained within the head-worn structure and configured to provide motion data pertaining to the head-worn personal electronic apparatus; a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user; a second microphone at least partially contained within the head-worn structure, the second microphone being positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus; a rechargeable battery contained within the head-worn structure; electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery; wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; a radiation emitter at least partially contained within the head-worn structure and configured to at least direct radiation towards the user when at least the head-worn structure of the head-worn personal electronic apparatus is being worn; a radiation detector at least partially contained within the	

		head-worn structure and configured to detect radiation reflected back from the user when at least the head- worn structure of the head-worn personal electronic apparatus is being worn; and at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head- worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus. a charging apparatus having a charging connector,	
L935	Sort results by: Similarity to Application # 18/375,893 Retrieve results by: Application # 18/375,893	(Abstract) Techniques for providing eyewear or other head-worn personal electronic apparatus with electrical components are disclosed. The electrical components can provide electrical technology to eyewear or other head-worn personal electronic apparatus without having to substantially compromise aesthetic design principles. The electrical components can be partially or completely internal to eyewear or other head-worn personal electronic apparatus. The electrical components can operate	(G02C2200/08) Modular frames, easily exchangeable frame parts and lenses (G02C11/10) Electronic devices other than hearing aids (G02C5/146) Side-members having special front end

		independently or together with other electrical components provided elsewhere. Apparatus for presenting after-market electrical components are also disclosed. (Claims) a head-worn personal electronic apparatus, including at least: a head-worn structure configured to be worn by a user; at least one speaker at least partially internal to the head-worn structure, the at least one speaker being configured to be worn proximate to an ear of the user when the head-worn structure is being worn by the user; a touch sensitive surface at least partially contained within the head-worn structure and configured to sense a touch input associated with the user; a rechargeable battery contained within the head-worn structure; electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery, and the electronic circuitry being electrically connected to the touch sensitive surface; wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at	

		least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and a charging apparatus having a charging connector, wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head- worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus. 1. (Original) A system, comprising: (Claims) 19. (Original) A system, comprising: a head-worn structure configured to be worn by a user; at least one speaker at least partially internal to the head-worn structure, the at least one speaker being configured to be worn proximate to an ear of the user when the head-worn structure is being worn by the user; a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user; a second microphone at least partially contained within the head-worn structure, the second microphone being positioned to pick up at least	

		environmental audio input associated with an environment around the head-worn personal electronic apparatus; a rechargeable battery contained within the head-worn structure; electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery; wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head- worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus. a charging apparatus having a charging connector,	

		(Claims) 43. (Original) A system, comprising: wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head- worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus. a charging apparatus having a charging connector, wherein the electronic circuitry is configured to process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, and wherein the head-worn personal electronic device is configured to receive a voice input via the first microphone,	

		determine a requested operation from the voice input using voice recognition, and control an operation by the head-worn personal electronic device based on the requested operatio (Claims) 49. (New) A system, comprising: at least one speaker at least partially internal to the head-worn structure, the at least one speaker being configured to be worn proximate to an ear of the user when the head-worn structure is being worn by the user; a motion detector at least partially contained within the head-worn structure and configured to provide motion data pertaining to the head-worn personal electronic apparatus; a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user; a second microphone at least partially contained within the head-worn structure, the second microphone being positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus; a rechargeable battery contained within the head-worn structure; electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery; wireless communication	

		circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; a radiation emitter at least partially contained within the head-worn structure and configured to at least direct radiation towards the user when at least the head-worn structure of the head-worn personal electronic apparatus is being worn; a radiation detector at least partially contained within the head-worn structure and configured to detect radiation reflected back from the user when at least the head- worn structure of the head-worn personal electronic apparatus is being worn; and at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head- worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus. a charging apparatus having a charging connector,	

L936	Sort results by: Similarity to Application # 18/375,893 Retrieve results by: Application # 18/375,893	(Abstract) Techniques for providing eyewear or other head-worn personal electronic apparatus with electrical components are disclosed. The electrical components can provide electrical technology to eyewear or other head-worn personal electronic apparatus without having to substantially compromise aesthetic design principles. The electrical components can be partially or completely internal to eyewear or other head-worn personal electronic apparatus. The electrical components can operate independently or together with other electrical components provided elsewhere. Apparatus for presenting after-market electrical components are also disclosed. (Claims) a head-worn personal electronic apparatus, including at least: a head-worn structure configured to be worn by a user; at least one speaker at least partially internal to the head-worn structure, the at least one speaker being configured to be worn proximate to an ear of the user when the head-worn structure is being worn by the user; a touch sensitive surface at least partially contained within the head-worn structure and configured to sense a touch input associated with the user; a rechargeable battery contained within the head-worn structure; electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery, and the	(G02C2200/08) Modular frames, easily exchangeable frame parts and lenses (G02C11/10) Electronic devices other than hearing aids (G02C5/146) Side-members having special front end (G02C5/143) Side-members having special ear pieces (G02C11/06) Hearing aids (H02J7/0045) Circuit arrangements for charging or depolarising batteries or for supplying loads from batteries characterised by the mechanical construction concerning the insertion or the connection of the batteries

		electronic circuitry being electrically connected to the touch sensitive surface; wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and a charging apparatus having a charging connector, wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head- worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus. 1. (Original) A system, comprising: (Claims) 19. (Original) A system, comprising: a head-worn structure configured to be worn by a user; at least one speaker at least partially internal to the head-worn structure, the at least	

		one speaker being configured to be worn proximate to an ear of the user when the head-worn structure is being worn by the user; a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user; a second microphone at least partially contained within the head-worn structure, the second microphone being positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus; a rechargeable battery contained within the head-worn structure; electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery; wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and wherein on placement of the	

		head-worn personal electronic apparatus in the charging apparatus, electrical connection results from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head- worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus. a charging apparatus having a charging connector, (Claims) 43. (Original) A system, comprising: wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head- worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.	

		a charging apparatus having a charging connector, wherein the electronic circuitry is configured to process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, and wherein the head-worn personal electronic device is configured to receive a voice input via the first microphone, determine a requested operation from the voice input using voice recognition, and control an operation by the head-worn personal electronic device based on the requested operatio (Claims) 49. (New) A system, comprising: at least one speaker at least partially internal to the head-worn structure, the at least one speaker being configured to be worn proximate to an ear of the user when the head-worn structure is being worn by the user; a motion detector at least partially contained within the head-worn structure and configured to provide motion data pertaining to the head-worn personal electronic apparatus; a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user; a second microphone at least partially contained within the head-worn structure, the second microphone being positioned to pick up at least	

		environmental audio input associated with an environment around the head-worn personal electronic apparatus; a rechargeable battery contained within the head-worn structure; electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery; wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; a radiation emitter at least partially contained within the head-worn structure and configured to at least direct radiation towards the user when at least the head-worn structure of the head-worn personal electronic apparatus is being worn; a radiation detector at least partially contained within the head-worn structure and configured to detect radiation reflected back from the user when at least the head- worn structure of the head-worn personal electronic apparatus is being worn; and at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and	

		wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head- worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus. a charging apparatus having a charging connector,	

Web Search History

date, time	web site	search string
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2/19/2024 10:01:08 AM	Google Patents	Search Term 1 (electrode) (electrochromic) (group) (general formula) (layer) Before Priority Date: priority:20160513
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date, time	web site	search string
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2/19/2024 10:01:22 AM	Google Scholar	(compound) (electrochromic) (optical density) (electrochromic element) (wavelength region)
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2/19/2024 10:01:43 AM	Google Scholar	electrode capacitor layer complex metal

date, time	web site	search string
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2/19/2024 10:01:55 AM	Google Scholar	metal rare earth color film electrode changing
2/19/2024 10:01:55 AM	Google Patents	Search Term 1 metal Search Term 2 rare earth Search Term 3 color Search Term 4 film electrode Search Term 5 changing Before Priority Date: priority:20200702
2/19/2024 10:02:54 AM	Google Scholar	(electrochromic) (electrolyte) (layer) (storage capacity) (charge storage)
2/19/2024 10:02:54 AM	Google Patents	Search Term 1 (electrochromic) (electrolyte) (layer) (storage capacity) (charge storage) Before Priority Date: priority:20201027
2/19/2024 10:02:56 AM	Google Scholar	electrochromic electrolyte layer storage capacity charge storage

date, time	web site	search string
2/19/2024 10:02:56 AM	Google Patents	Search Term 1 electrochromic Search Term 2 electrolyte Search Term 3 layer Search Term 4 storage capacity Search Term 5 charge storage Before Priority Date: priority:20201027
2/19/2024 10:03:05 AM	Google Scholar	(electrochromic) (layer) (electrochromic film) (substrate) (panel)
2/19/2024 10:03:05 AM	Google Patents	Search Term 1 (electrochromic) (layer) (electrochromic film) (substrate) (panel) Before Priority Date: priority:20160415
2/19/2024 10:03:07 AM	Google Scholar	electrochromic layer electrochromic film substrate panel
2/19/2024 10:03:07 AM	Google Patents	Search Term 1 electrochromic Search Term 2 layer Search Term 3 electrochromic film Search Term 4 substrate Search Term 5 panel Before Priority Date: priority:20160415
2/19/2024 10:03:12 AM	Google Scholar	(transmittance state) (electro) (icon) (assembly) (icons)
2/19/2024 10:03:12 AM	Google Patents	Search Term 1 (transmittance state) (electro) (icon) (assembly) (icons) Before Priority Date: priority:20190107
2/19/2024 10:03:14 AM	Google Scholar	transmittance state electro icon assembly icons

date, time	web site	search string
2/19/2024 10:03:14 AM	Google Patents	Search Term 1 transmittance state Search Term 2 electro Search Term 3 icon Search Term 4 assembly Search Term 5 icons Before Priority Date: priority:20190107
2/19/2024 10:03:20 AM	Google Scholar	(electro) (optic) (window) (window assembly) (dust cover)
2/19/2024 10:03:20 AM	Google Patents	Search Term 1 (electro) (optic) (window) (window assembly) (dust cover) Before Priority Date: priority:20181021
2/19/2024 10:03:21 AM	Google Scholar	electro optic window window assembly dust cover
2/19/2024 10:03:21 AM	Google Patents	Search Term 1 electro Search Term 2 optic Search Term 3 window Search Term 4 window assembly Search Term 5 dust cover Before Priority Date: priority:20181021
2/19/2024 10:06:32 AM	Google Scholar	(electrochromic) (layer) (inorganic) (inorganic electrochromic) (substrate)
2/19/2024 10:06:32 AM	Google Patents	Search Term 1 (electrochromic) (layer) (inorganic) (inorganic electrochromic) (substrate) Before Priority Date: priority:19890713
2/19/2024 10:06:33 AM	Google Scholar	electrochromic layer inorganic inorganic electrochromic substrate

date, time	web site	search string
2/19/2024 10:06:33 AM	Google Patents	Search Term 1 electrochromic Search Term 2 layer Search Term 3 inorganic Search Term 4 inorganic electrochromic Search Term 5 substrate Before Priority Date: priority:19890713
2/19/2024 10:06:40 AM	Google Scholar	(layer) (electrochromic) (inorganic) (inorganic electrochromic) (amorphous)
2/19/2024 10:06:40 AM	Google Patents	Search Term 1 (layer) (electrochromic) (inorganic) (inorganic electrochromic) (amorphous) Before Priority Date: priority:19890713
2/19/2024 10:06:41 AM	Google Scholar	layer electrochromic inorganic inorganic electrochromic amorphous
2/19/2024 10:06:41 AM	Google Patents	Search Term 1 layer Search Term 2 electrochromic Search Term 3 inorganic Search Term 4 inorganic electrochromic Search Term 5 amorphous Before Priority Date: priority:19890713
2/19/2024 10:14:17 AM	Google Scholar	(group) (organic compound) (electrochromic) (formula) (electrochromic element)
2/19/2024 10:14:17 AM	Google Patents	Search Term 1 (group) (organic compound) (electrochromic) (formula) (electrochromic element) Before Priority Date: priority:20220330

date, time	web site	search string
2/19/2024 10:14:19 AM	Google Scholar	group organic compound electrochromic formula electrochromic element
2/19/2024 10:14:19 AM	Google Patents	Search Term 1 group Search Term 2 organic compound Search Term 3 electrochromic Search Term 4 formula Search Term 5 electrochromic element Before Priority Date: priority:20220330
2/19/2024 10:14:25 AM	Google Scholar	(electrochromic) (electrodes) (resistance) (light modulating) (electrode)
2/19/2024 10:14:25 AM	Google Patents	Search Term 1 (electrochromic) (electrodes) (resistance) (light modulating) (electrode) Before Priority Date: priority:20210216
2/19/2024 10:14:26 AM	Google Scholar	electrochromic electrodes resistance light modulating electrode
2/19/2024 10:14:26 AM	Google Patents	Search Term 1 electrochromic Search Term 2 electrodes Search Term 3 resistance Search Term 4 light modulating Search Term 5 electrode Before Priority Date: priority:20210216
2/19/2024 10:14:35 AM	Google Scholar	(electrochromic) (optical density) (voltage) (electrochromic device) (electrochromic element)

date, time	web site	search string
2/19/2024 10:14:35 AM	Google Patents	Search Term 1 (electrochromic) (optical density) (voltage) (electrochromic device) (electrochromic element) Before Priority Date: priority:20180727
2/19/2024 10:14:38 AM	Google Scholar	electrochromic optical density voltage electrochromic device electrochromic element
2/19/2024 10:14:38 AM	Google Patents	Search Term 1 electrochromic Search Term 2 optical density Search Term 3 voltage Search Term 4 electrochromic device Search Term 5 electrochromic element Before Priority Date: priority:20180727
2/19/2024 10:14:45 AM	Google Scholar	(electrode) (terminal) (electrochromic) (electrochromic device) (voltage)
2/19/2024 10:14:45 AM	Google Patents	Search Term 1 (electrode) (terminal) (electrochromic) (electrochromic device) (voltage) Before Priority Date: priority:20161117
2/19/2024 10:14:46 AM	Google Scholar	electrode terminal electrochromic electrochromic device voltage
2/19/2024 10:14:46 AM	Google Patents	Search Term 1 electrode Search Term 2 terminal Search Term 3 electrochromic Search Term 4 electrochromic device Search Term 5 voltage Before Priority Date: priority:20161117

date, time	web site	search string
2/19/2024 3:18:54 PM	Google Images	smart glasses
2/19/2024 3:18:54 PM	Google	smart glasses
2/19/2024 3:19:15 PM	Google Images	Smart glasses with display
2/19/2024 3:19:15 PM	Google	Smart glasses with display
2/19/2024 3:19:34 PM	Google Images	Smart glasses with camera
2/19/2024 3:19:34 PM	Google	Smart glasses with camera
2/19/2024 3:20:05 PM	Google Images	vr glasses
2/19/2024 3:20:05 PM	Google	vr glasses
2/19/2024 3:20:43 PM	Google Images	Best VR headset for movies
2/19/2024 3:20:43 PM	Google	Best VR headset for movies
2/19/2024 3:21:10 PM	Google Images	vr headset
2/19/2024 3:21:10 PM	Google	vr headset
2/19/2024 3:21:35 PM	Google Images	Best VR headset
2/19/2024 3:21:35 PM	Google	Best VR headset
2/19/2024 3:21:50 PM	Google Images	VR headset Oculus
2/19/2024 3:21:50 PM	Google	VR headset Oculus
2/19/2024 3:28:06 PM	Google	20240036361
2/19/2024 3:30:03 PM	Google Scholar	(temple) (electrical components) (eyewear) (eyeglasses) (electrical)
2/19/2024 3:30:03 PM	Google Patents	Search Term 1 (temple) (electrical components) (eyewear) (eyeglasses) (electrical) Before Priority Date: priority:20030415

date, time	web site	search string
2/19/2024 3:30:04 PM	Google Scholar	temple electrical components eyewear eyeglasses electrical
2/19/2024 3:30:04 PM	Google Patents	Search Term 1 temple Search Term 2 electrical components Search Term 3 eyewear Search Term 4 eyeglasses Search Term 5 electrical Before Priority Date: priority:20030415
2/19/2024 3:30:38 PM	Google Scholar	(radiation) (eyewear) (temple) (frame) (output)
2/19/2024 3:30:38 PM	Google Patents	Search Term 1 (radiation) (eyewear) (temple) (frame) (output) Before Priority Date: priority:20040415
2/19/2024 3:30:39 PM	Google Scholar	radiation eyewear temple frame output
2/19/2024 3:30:39 PM	Google Patents	Search Term 1 radiation Search Term 2 eyewear Search Term 3 temple Search Term 4 frame Search Term 5 output Before Priority Date: priority:20040415
2/19/2024 3:30:46 PM	Google Scholar	(microphone) (glasses) (frame) (microphones) (miniature)
2/19/2024 3:30:46 PM	Google Patents	Search Term 1 (microphone) (glasses) (frame) (microphones) (miniature) Before Priority Date: priority:20180625

date, time	web site	search string
2/19/2024 3:30:48 PM	Google Scholar	microphone glasses frame microphones miniature
2/19/2024 3:30:48 PM	Google Patents	Search Term 1 microphone Search Term 2 glasses Search Term 3 frame Search Term 4 microphones Search Term 5 miniature Before Priority Date: priority:20180625
2/19/2024 3:30:54 PM	Google Scholar	(switch) (command) (shutter glasses) (user) (therapy)
2/19/2024 3:30:54 PM	Google Patents	Search Term 1 (switch) (command) (shutter glasses) (user) (therapy) Before Priority Date: priority:20110915
2/19/2024 3:30:56 PM	Google Scholar	switch command shutter glasses user therapy
2/19/2024 3:30:56 PM	Google Patents	Search Term 1 switch Search Term 2 command Search Term 3 shutter glasses Search Term 4 user Search Term 5 therapy Before Priority Date: priority:20110915
2/19/2024 3:31:04 PM	Google Scholar	(eyewear) (user) (recited) (eyewear frame) (software code)
2/19/2024 3:31:04 PM	Google Patents	Search Term 1 (eyewear) (user) (recited) (eyewear frame) (software code) Before Priority Date: priority:20180412

date, time	web site	search string
2/19/2024 3:31:05 PM	Google Scholar	eyewear user recited eyewear frame software code
2/19/2024 3:31:05 PM	Google Patents	Search Term 1 eyewear Search Term 2 user Search Term 3 recited Search Term 4 eyewear frame Search Term 5 software code Before Priority Date: priority:20180412
2/19/2024 3:31:14 PM	Google Scholar	(eyewear) (image source) (reflective surface) (concave reflective) (frame)
2/19/2024 3:31:14 PM	Google Patents	Search Term 1 (eyewear) (image source) (reflective surface) (concave reflective) (frame) Before Priority Date: priority:20130315
2/19/2024 3:31:15 PM	Google Scholar	eyewear image source reflective surface concave reflective frame
2/19/2024 3:31:15 PM	Google Patents	Search Term 1 eyewear Search Term 2 image source Search Term 3 reflective surface Search Term 4 concave reflective Search Term 5 frame Before Priority Date: priority:20130315
2/19/2024 3:31:39 PM	Google Scholar	(eyewear) (recited) (temple) (frame) (user)
2/19/2024 3:31:39 PM	Google Patents	Search Term 1 (eyewear) (recited) (temple) (frame) (user) Before Priority Date: priority:20031009

date, time	web site	search string
2/19/2024 3:31:40 PM	Google Scholar	eyewear recited temple frame user
2/19/2024 3:31:40 PM	Google Patents	Search Term 1 eyewear Search Term 2 recited Search Term 3 temple Search Term 4 frame Search Term 5 user Before Priority Date: priority:20031009
2/19/2024 3:40:37 PM	Google Images	ar glasses
2/19/2024 3:40:37 PM	Google	ar glasses
2/19/2024 3:40:50 PM	Google Images	Nreal AR glasses
2/19/2024 3:40:50 PM	Google	Nreal AR glasses
2/19/2024 3:41:01 PM	Google Images	Best AR glasses
2/19/2024 3:41:01 PM	Google	Best AR glasses
2/19/2024 3:41:09 PM	Google Images	AR glasses for gaming
2/19/2024 3:41:09 PM	Google	AR glasses for gaming
2/19/2024 3:41:24 PM	Google Images	AR headset
2/19/2024 3:41:24 PM	Google	AR headset
2/19/2024 3:41:36 PM	Google Images	Best ar headset
2/19/2024 3:41:36 PM	Google	Best ar headset
2/19/2024 3:42:08 PM	Google Images	AR headset Apple
2/19/2024 3:42:08 PM	Google	AR headset Apple

date, time	web site	search string
2/19/2024 3:42:17 PM	Google Images	Ar headset app
2/19/2024 3:42:17 PM	Google	Ar headset app
2/19/2024 3:42:37 PM	Google Images	electronic smart glasses
2/19/2024 3:42:37 PM	Google	electronic smart glasses
2/19/2024 3:43:47 PM	Google Scholar	(user) (eyewear apparatus) (message) (electrical components) (speaker)
2/19/2024 3:43:47 PM	Google Patents	Search Term 1 (user) (eyewear apparatus) (message) (electrical components) (speaker) Before Priority Date: priority:20031009
2/19/2024 3:43:49 PM	Google Scholar	user eyewear apparatus message electrical components speaker
2/19/2024 3:43:49 PM	Google Patents	Search Term 1 user Search Term 2 eyewear apparatus Search Term 3 message Search Term 4 electrical components Search Term 5 speaker Before Priority Date: priority:20031009
2/19/2024 3:43:58 PM	Google Scholar	(eyewear apparatus) (recited) (eyewear) (glasses) (user)
2/19/2024 3:43:58 PM	Google Patents	Search Term 1 (eyewear apparatus) (recited) (eyewear) (glasses) (user) Before Priority Date: priority:20031009
2/19/2024 3:44:00 PM	Google Scholar	eyewear apparatus recited eyewear glasses user

date, time	web site	search string
2/19/2024 3:44:00 PM	Google Patents	Search Term 1 eyewear apparatus Search Term 2 recited Search Term 3 eyewear Search Term 4 glasses Search Term 5 user Before Priority Date: priority:20031009
2/19/2024 3:44:08 PM	Google Scholar	(user) (temple) (head) (worn) (recited)
2/19/2024 3:44:08 PM	Google Patents	Search Term 1 (user) (temple) (head) (worn) (recited) Before Priority Date: priority:20040728
2/19/2024 3:44:10 PM	Google Scholar	user temple head worn recited
2/19/2024 3:44:10 PM	Google Patents	Search Term 1 user Search Term 2 temple Search Term 3 head Search Term 4 worn Search Term 5 recited Before Priority Date: priority:20040728
2/19/2024 3:44:17 PM	Google Scholar	(temple) (endpiece) (connector) (another) (front section)
2/19/2024 3:44:17 PM	Google Patents	Search Term 1 (temple) (endpiece) (connector) (another) (front section) Before Priority Date: priority:20051011
2/19/2024 3:44:18 PM	Google Scholar	temple endpiece connector another front section

date, time	web site	search string
2/19/2024 3:44:18 PM	Google Patents	Search Term 1 temple Search Term 2 endpiece Search Term 3 connector Search Term 4 another Search Term 5 front section Before Priority Date: priority:20051011
2/19/2024 3:44:26 PM	Google Scholar	(glasses) (head) (electronic apparatus) (wireless electronic) (user)
2/19/2024 3:44:26 PM	Google Patents	Search Term 1 (glasses) (head) (electronic apparatus) (wireless electronic) (user) Before Priority Date: priority:20040728
2/19/2024 3:44:28 PM	Google Scholar	glasses head electronic apparatus wireless electronic user
2/19/2024 3:44:28 PM	Google Patents	Search Term 1 glasses Search Term 2 head Search Term 3 electronic apparatus Search Term 4 wireless electronic Search Term 5 user Before Priority Date: priority:20040728
2/19/2024 3:44:37 PM	Google Scholar	(user) (temple) (eyewear device) (sensor) (eyewear)
2/19/2024 3:44:37 PM	Google Patents	Search Term 1 (user) (temple) (eyewear device) (sensor) (eyewear) Before Priority Date: priority:20181212
2/19/2024 3:44:39 PM	Google Scholar	user temple eyewear device sensor eyewear

date, time	web site	search string
2/19/2024 3:44:39 PM	Google Patents	Search Term 1 user Search Term 2 temple Search Term 3 eyewear device Search Term 4 sensor Search Term 5 eyewear Before Priority Date: priority:20181212
2/19/2024 4:08:39 PM	Google Scholar	(eyewear) (temple) (front section) (recited) (extended)
2/19/2024 4:08:40 PM	Google Scholar	eyewear temple front section recited extended
2/19/2024 4:08:40 PM	Google Patents	Search Term 1 eyewear Search Term 2 temple Search Term 3 front section Search Term 4 recited Search Term 5 extended Before Priority Date: priority:20031009
2/19/2024 4:08:49 PM	Google Scholar	(temple) (electrical components) (connector) (eyewear) (eyeglasses)
2/19/2024 4:08:49 PM	Google Patents	Search Term 1 (temple) (electrical components) (connector) (eyewear) (eyeglasses) Before Priority Date: priority:20030415
2/19/2024 4:08:51 PM	Google Scholar	temple electrical components connector eyewear eyeglasses

date, time	web site	search string
2/19/2024 4:08:51 PM	Google Patents	Search Term 1 temple Search Term 2 electrical components Search Term 3 connector Search Term 4 eyewear Search Term 5 eyeglasses Before Priority Date: priority:20030415
2/19/2024 4:09:00 PM	Google Scholar	(eyewear) (recited) (temple) (embedded) (electrically connected)
2/19/2024 4:09:00 PM	Google Patents	Search Term 1 (eyewear) (recited) (temple) (embedded) (electrically connected) Before Priority Date: priority:20031009
2/19/2024 4:09:01 PM	Google Scholar	eyewear recited temple embedded electrically connected
2/19/2024 4:09:01 PM	Google Patents	Search Term 1 eyewear Search Term 2 recited Search Term 3 temple Search Term 4 embedded Search Term 5 electrically connected Before Priority Date: priority:20031009
2/19/2024 4:09:08 PM	Google Scholar	(temple) (glasses) (pair) (connector) (electrical components)
2/19/2024 4:09:08 PM	Google Patents	Search Term 1 (temple) (glasses) (pair) (connector) (electrical components) Before Priority Date: priority:20031009

date, time	web site	search string
2/19/2024 4:09:09 PM	Google Scholar	temple glasses pair connector electrical components
2/19/2024 4:09:09 PM	Google Patents	Search Term 1 temple Search Term 2 glasses Search Term 3 pair Search Term 4 connector Search Term 5 electrical components Before Priority Date: priority:20031009
2/19/2024 4:09:22 PM	Google Scholar	(user) (eyewear system) (electrical) (electrical components) (cord)
2/19/2024 4:09:23 PM	Google Scholar	user eyewear system electrical electrical components cord
2/19/2024 4:09:23 PM	Google Patents	Search Term 1 user Search Term 2 eyewear system Search Term 3 electrical Search Term 4 electrical components Search Term 5 cord Before Priority Date: priority:20031009
2/19/2024 4:09:32 PM	Google Scholar	(cord) (electrical) (eyeglass) (tethered) (eyeglasses)
2/19/2024 4:09:32 PM	Google Patents	Search Term 1 (cord) (electrical) (eyeglass) (tethered) (eyeglasses) Before Priority Date: priority:20030415
2/19/2024 4:09:34 PM	Google Scholar	cord electrical eyeglass tethered eyeglasses

date, time	web site	search string
2/19/2024 4:09:34 PM	Google Patents	Search Term 1 cord Search Term 2 electrical Search Term 3 eyeglass Search Term 4 tethered Search Term 5 eyeglasses Before Priority Date: priority:20030415
2/19/2024 4:09:40 PM	Google Scholar	(temple) (electrical components) (eyewear) (glasses) (rearward)
2/19/2024 4:09:40 PM	Google Patents	Search Term 1 (temple) (electrical components) (eyewear) (glasses) (rearward) Before Priority Date: priority:20051011
2/19/2024 4:09:42 PM	Google Scholar	temple electrical components eyewear glasses rearward
2/19/2024 4:09:42 PM	Google Patents	Search Term 1 temple Search Term 2 electrical components Search Term 3 eyewear Search Term 4 glasses Search Term 5 rearward Before Priority Date: priority:20051011
2/19/2024 4:09:49 PM	Google Scholar	(eyeglasses) (sensor) (wireless communication) (recited) (communication circuitry)
2/19/2024 4:09:49 PM	Google Patents	Search Term 1 (eyeglasses) (sensor) (wireless communication) (recited) (communication circuitry) Before Priority Date: priority:20030415

date, time	web site	search string
2/19/2024 4:09:51 PM	Google Scholar	eyeglasses sensor wireless communication recited communication circuitry
2/19/2024 4:09:51 PM	Google Patents	Search Term 1 eyeglasses Search Term 2 sensor Search Term 3 wireless communication Search Term 4 recited Search Term 5 communication circuitry Before Priority Date: priority:20030415
2/19/2024 4:19:59 PM	Google Images	Electronic smart glasses reviews
2/19/2024 4:19:59 PM	Google	Electronic smart glasses reviews
2/19/2024 4:20:13 PM	Google Images	Best electronic smart glasses
2/19/2024 4:20:13 PM	Google	Best electronic smart glasses
2/19/2024 4:20:23 PM	Google Images	Electronic smart glasses app
2/19/2024 4:20:23 PM	Google	Electronic smart glasses app
2/19/2024 4:48:10 PM	Google Scholar	(eyeglass frame) (eyeglasses) (hole) (coupling) (nose)
2/19/2024 4:48:10 PM	Google Patents	Search Term 1 (eyeglass frame) (eyeglasses) (hole) (coupling) (nose) Before Priority Date: priority:20060302
2/19/2024 4:48:11 PM	Google Scholar	eyeglass frame eyeglasses hole coupling nose

date, time	web site	search string
2/19/2024 4:48:11 PM	Google Patents	Search Term 1 eyeglass frame Search Term 2 eyeglasses Search Term 3 hole Search Term 4 coupling Search Term 5 nose Before Priority Date: priority:20060302
2/19/2024 4:48:17 PM	Google Scholar	(eyeglass frame) (eyeglasses) (coupling) (eyeglass) (nose)
2/19/2024 4:48:17 PM	Google Patents	Search Term 1 (eyeglass frame) (eyeglasses) (coupling) (eyeglass) (nose) Before Priority Date: priority:20060221
2/19/2024 4:48:19 PM	Google Scholar	eyeglass frame eyeglasses coupling eyeglass nose
2/19/2024 4:48:19 PM	Google Patents	Search Term 1 eyeglass frame Search Term 2 eyeglasses Search Term 3 coupling Search Term 4 eyeglass Search Term 5 nose Before Priority Date: priority:20060221
2/19/2024 4:48:25 PM	Google Scholar	(head) (worn) (temple) (user) (personal electronic)
2/19/2024 4:48:25 PM	Google Patents	Search Term 1 (head) (worn) (temple) (user) (personal electronic) Before Priority Date: priority:20051011
2/19/2024 4:48:27 PM	Google Scholar	head worn temple user personal electronic

date, time	web site	search string
2/19/2024 4:48:27 PM	Google Patents	Search Term 1 head Search Term 2 worn Search Term 3 temple Search Term 4 user Search Term 5 personal electronic Before Priority Date: priority:20051011
2/19/2024 4:48:33 PM	Google Scholar	(video recording) (frame) (video) (recording device) (spectacles)
2/19/2024 4:48:33 PM	Google Patents	Search Term 1 (video recording) (frame) (video) (recording device) (spectacles) Before Priority Date: priority:20091209
2/19/2024 4:48:35 PM	Google Scholar	video recording frame video recording device spectacles
2/19/2024 4:48:35 PM	Google Patents	Search Term 1 video recording Search Term 2 frame Search Term 3 video Search Term 4 recording device Search Term 5 spectacles Before Priority Date: priority:20091209
2/19/2024 4:49:26 PM	Google Scholar	(battery) (eyewear) (lens) (frame) (batteries)
2/19/2024 4:49:26 PM	Google Patents	Search Term 1 (battery) (eyewear) (lens) (frame) (batteries) Before Priority Date: priority:19930910
2/19/2024 4:49:27 PM	Google Scholar	battery eyewear lens frame batteries

date, time	web site	search string
2/19/2024 4:49:27 PM	Google Patents	Search Term 1 battery Search Term 2 eyewear Search Term 3 lens Search Term 4 frame Search Term 5 batteries Before Priority Date: priority:19930910
2/19/2024 4:49:35 PM	Google Scholar	(light) (eye) (pupil) (optical fibers) (array)
2/19/2024 4:49:35 PM	Google Patents	Search Term 1 (light) (eye) (pupil) (optical fibers) (array) Before Priority Date: priority:19950615
2/19/2024 4:49:37 PM	Google Scholar	light eye pupil optical fibers array
2/19/2024 4:49:37 PM	Google Patents	Search Term 1 light Search Term 2 eye Search Term 3 pupil Search Term 4 optical fibers Search Term 5 array Before Priority Date: priority:19950615
2/19/2024 4:49:44 PM	Google Scholar	(electro) (lens) (active) (optical lens) (controller)
2/19/2024 4:49:44 PM	Google Patents	Search Term 1 (electro) (lens) (active) (optical lens) (controller) Before Priority Date: priority:20000623
2/19/2024 4:49:45 PM	Google Scholar	electro lens active optical lens controller

date, time	web site	search string
2/19/2024 4:49:45 PM	Google Patents	Search Term 1 electro Search Term 2 lens Search Term 3 active Search Term 4 optical lens Search Term 5 controller Before Priority Date: priority:20000623
2/19/2024 4:49:52 PM	Google Scholar	(eyeglass) (bracket) (spectacles) (spectacle) (combined)
2/19/2024 4:49:52 PM	Google Patents	Search Term 1 (eyeglass) (bracket) (spectacles) (spectacle) (combined) Before Priority Date: priority:18850623
2/19/2024 4:49:53 PM	Google Scholar	eyeglass bracket spectacles spectacle combined
2/19/2024 4:49:53 PM	Google Patents	Search Term 1 eyeglass Search Term 2 bracket Search Term 3 spectacles Search Term 4 spectacle Search Term 5 combined Before Priority Date: priority:18850623
2/19/2024 4:50:19 PM	Google Scholar	(transistor) (light emitting) (display device) (electrode) (signal line)
2/19/2024 4:50:19 PM	Google Patents	Search Term 1 (transistor) (light emitting) (display device) (electrode) (signal line) Before Priority Date: priority:20031028
2/19/2024 4:50:20 PM	Google Scholar	transistor light emitting display device electrode signal line

date, time	web site	search string
2/19/2024 4:50:20 PM	Google Patents	Search Term 1 transistor Search Term 2 light emitting Search Term 3 display device Search Term 4 electrode Search Term 5 signal line Before Priority Date: priority:20031028
2/19/2024 5:21:37 PM	Google Scholar	(sunglasses) (frames) (band) (lenses) (user)
2/19/2024 5:21:37 PM	Google Patents	Search Term 1 (sunglasses) (frames) (band) (lenses) (user) Before Priority Date: priority:20031028
2/19/2024 5:21:39 PM	Google Scholar	sunglasses frames band lenses user
2/19/2024 5:21:39 PM	Google Patents	Search Term 1 sunglasses Search Term 2 frames Search Term 3 band Search Term 4 lenses Search Term 5 user Before Priority Date: priority:20031028
2/19/2024 5:21:45 PM	Google Scholar	(liquid) (crystal) (computerized) (implement) (control system)
2/19/2024 5:21:45 PM	Google Patents	Search Term 1 (liquid) (crystal) (computerized) (implement) (control system) Before Priority Date: priority:20031103
2/19/2024 5:21:46 PM	Google Scholar	liquid crystal computerized implement control system

date, time	web site	search string
2/19/2024 5:21:46 PM	Google Patents	Search Term 1 liquid Search Term 2 crystal Search Term 3 computerized Search Term 4 implement Search Term 5 control system Before Priority Date: priority:20031103
2/19/2024 5:21:55 PM	Google Scholar	(conduction speaker) (bone conduction) (bone) (head) (glasses)
2/19/2024 5:21:55 PM	Google Patents	Search Term 1 (conduction speaker) (bone conduction) (bone) (head) (glasses) Before Priority Date: priority:20031118
2/19/2024 5:21:57 PM	Google Scholar	conduction speaker bone conduction bone head glasses
2/19/2024 5:21:57 PM	Google Patents	Search Term 1 conduction speaker Search Term 2 bone conduction Search Term 3 bone Search Term 4 head Search Term 5 glasses Before Priority Date: priority:20031118
2/19/2024 5:22:04 PM	Google Scholar	(sound) (speaker) (display device) (observer) (video display)
2/19/2024 5:22:04 PM	Google Patents	Search Term 1 (sound) (speaker) (display device) (observer) (video display) Before Priority Date: priority:20031205

date, time	web site	search string
2/19/2024 5:22:05 PM	Google Scholar	sound speaker display device observer video display
2/19/2024 5:22:05 PM	Google Patents	Search Term 1 sound Search Term 2 speaker Search Term 3 display device Search Term 4 observer Search Term 5 video display Before Priority Date: priority:20031205
2/19/2024 5:22:12 PM	Google Scholar	(signal) (carrier wave) (frequency) (sound) (audible sound)
2/19/2024 5:22:12 PM	Google Patents	Search Term 1 (signal) (carrier wave) (frequency) (sound) (audible sound) Before Priority Date: priority:20031218
2/19/2024 5:22:13 PM	Google Scholar	signal carrier wave frequency sound audible sound
2/19/2024 5:22:13 PM	Google Patents	Search Term 1 signal Search Term 2 carrier wave Search Term 3 frequency Search Term 4 sound Search Term 5 audible sound Before Priority Date: priority:20031218
2/19/2024 5:22:21 PM	Google Scholar	(microphone) (eyeglass) (telephone) (arm) (speaker)
2/19/2024 5:22:21 PM	Google Patents	Search Term 1 (microphone) (eyeglass) (telephone) (arm) (speaker) Before Priority Date: priority:20031223

date, time	web site	search string
2/19/2024 5:22:22 PM	Google Scholar	microphone eyeglass telephone arm speaker
2/19/2024 5:22:22 PM	Google Patents	Search Term 1 microphone Search Term 2 eyeglass Search Term 3 telephone Search Term 4 arm Search Term 5 speaker Before Priority Date: priority:20031223
2/19/2024 5:22:29 PM	Google Scholar	(temple) (wireless communication) (glasses) (lens frame) (adjustable handle)
2/19/2024 5:22:29 PM	Google Patents	Search Term 1 (temple) (wireless communication) (glasses) (lens frame) (adjustable handle) Before Priority Date: priority:20040116
2/19/2024 5:22:30 PM	Google Scholar	temple wireless communication glasses lens frame adjustable handle
2/19/2024 5:22:30 PM	Google Patents	Search Term 1 temple Search Term 2 wireless communication Search Term 3 glasses Search Term 4 lens frame Search Term 5 adjustable handle Before Priority Date: priority:20040116
2/19/2024 5:22:37 PM	Google Scholar	(subscriber) (computer) (expert) (technical) (home)
2/19/2024 5:22:37 PM	Google Patents	Search Term 1 (subscriber) (computer) (expert) (technical) (home) Before Priority Date: priority:20040527

date, time	web site	search string
2/19/2024 5:22:38 PM	Google Scholar	subscriber computer expert technical home
2/19/2024 5:22:38 PM	Google Patents	Search Term 1 subscriber Search Term 2 computer Search Term 3 expert Search Term 4 technical Search Term 5 home Before Priority Date: priority:20040527
2/19/2024 5:29:02 PM	Google Scholar	(head mounted) (focus) (mounted display) (image) (unit)
2/19/2024 5:29:03 PM	Google Scholar	head mounted focus mounted display image unit
2/19/2024 5:29:03 PM	Google Patents	Search Term 1 head mounted Search Term 2 focus Search Term 3 mounted display Search Term 4 image Search Term 5 unit Before Priority Date: priority:20040602
2/19/2024 5:29:09 PM	Google Scholar	(camera) (calibration) (image) (index) (instrument)
2/19/2024 5:29:09 PM	Google Patents	Search Term 1 (camera) (calibration) (image) (index) (instrument) Before Priority Date: priority:20040618
2/19/2024 5:29:11 PM	Google Scholar	camera calibration image index instrument

date, time	web site	search string
2/19/2024 5:29:11 PM	Google Patents	Search Term 1 camera Search Term 2 calibration Search Term 3 image Search Term 4 index Search Term 5 instrument Before Priority Date: priority:20040618
2/19/2024 5:29:17 PM	Google Scholar	(items) (proximity threshold) (master controller) (tagged) (item)
2/19/2024 5:29:17 PM	Google Patents	Search Term 1 (items) (proximity threshold) (master controller) (tagged) (item) Before Priority Date: priority:20040625
2/19/2024 5:29:19 PM	Google Scholar	items proximity threshold master controller tagged item
2/19/2024 5:29:19 PM	Google Patents	Search Term 1 items Search Term 2 proximity threshold Search Term 3 master controller Search Term 4 tagged Search Term 5 item Before Priority Date: priority:20040625
2/19/2024 5:29:27 PM	Google Scholar	(eyewear) (temple) (recited) (glasses) (rfid tag)
2/19/2024 5:29:27 PM	Google Patents	Search Term 1 (eyewear) (temple) (recited) (glasses) (rfid tag) Before Priority Date: priority:20040728
2/19/2024 5:29:28 PM	Google Scholar	eyewear temple recited glasses rfid tag

date, time	web site	search string
2/19/2024 5:29:28 PM	Google Patents	Search Term 1 eyewear Search Term 2 temple Search Term 3 recited Search Term 4 glasses Search Term 5 rfid tag Before Priority Date: priority:20040728
2/19/2024 5:29:35 PM	Google Scholar	(audio) (eyeglasses) (recited) (frame assembly) (mass storage)
2/19/2024 5:29:37 PM	Google Scholar	audio eyeglasses recited frame assembly mass storage
2/19/2024 5:29:37 PM	Google Patents	Search Term 1 audio Search Term 2 eyeglasses Search Term 3 recited Search Term 4 frame assembly Search Term 5 mass storage Before Priority Date: priority:20040811
2/19/2024 5:29:50 PM	Google Scholar	(glasses) (user) (wearable device) (connector) (microphone)
2/19/2024 5:29:50 PM	Google Patents	Search Term 1 (glasses) (user) (wearable device) (connector) (microphone) Before Priority Date: priority:20041012
2/19/2024 5:29:51 PM	Google Scholar	glasses user wearable device connector microphone

date, time	web site	search string
2/19/2024 5:29:51 PM	Google Patents	Search Term 1 glasses Search Term 2 user Search Term 3 wearable device Search Term 4 connector Search Term 5 microphone Before Priority Date: priority:20041012
2/19/2024 5:29:58 PM	Google Scholar	(biometric) (equipment) (scanner) (operator) (authorization signal)
2/19/2024 5:29:58 PM	Google Patents	Search Term 1 (biometric) (equipment) (scanner) (operator) (authorization signal) Before Priority Date: priority:20050331
2/19/2024 5:30:00 PM	Google Scholar	biometric equipment scanner operator authorization signal
2/19/2024 5:30:00 PM	Google Patents	Search Term 1 biometric Search Term 2 equipment Search Term 3 scanner Search Term 4 operator Search Term 5 authorization signal Before Priority Date: priority:20050331
2/19/2024 5:30:07 PM	Google Scholar	(liquid crystal) (crystal panel) (pixel) (polarized light) (polarizer)
2/19/2024 5:30:07 PM	Google Patents	Search Term 1 (liquid crystal) (crystal panel) (pixel) (polarized light) (polarizer) Before Priority Date: priority:20050711

date, time	web site	search string
2/19/2024 5:30:08 PM	Google Scholar	liquid crystal crystal panel pixel polarized light polarizer
2/19/2024 5:30:08 PM	Google Patents	Search Term 1 liquid crystal Search Term 2 crystal panel Search Term 3 pixel Search Term 4 polarized light Search Term 5 polarizer Before Priority Date: priority:20050711
2/19/2024 5:47:30 PM	Google Scholar	(light) (illumination system) (adjustment device) (eyewear) (intensity)
2/19/2024 5:47:30 PM	Google Patents	Search Term 1 (light) (illumination system) (adjustment device) (eyewear) (intensity) Before Priority Date: priority:20050715
2/19/2024 5:47:32 PM	Google Scholar	light illumination system adjustment device eyewear intensity
2/19/2024 5:47:32 PM	Google Patents	Search Term 1 light Search Term 2 illumination system Search Term 3 adjustment device Search Term 4 eyewear Search Term 5 intensity Before Priority Date: priority:20050715
2/19/2024 5:47:38 PM	Google Scholar	(battery) (light source) (node) (electrical communication) (low)

date, time	web site	search string
2/19/2024 5:47:38 PM	Google Patents	Search Term 1 (battery) (light source) (node) (electrical communication) (low) Before Priority Date: priority:20051011
2/19/2024 5:47:39 PM	Google Scholar	battery light source node electrical communication low
2/19/2024 5:47:39 PM	Google Patents	Search Term 1 battery Search Term 2 light source Search Term 3 node Search Term 4 electrical communication Search Term 5 low Before Priority Date: priority:20051011
2/19/2024 5:47:45 PM	Google Scholar	(eyeglasses) (wire) (dep) (electronic) (temple)
2/19/2024 5:47:45 PM	Google Patents	Search Term 1 (eyeglasses) (wire) (dep) (electronic) (temple) Before Priority Date: priority:20051213
2/19/2024 5:47:47 PM	Google Scholar	eyeglasses wire dep electronic temple
2/19/2024 5:47:47 PM	Google Patents	Search Term 1 eyeglasses Search Term 2 wire Search Term 3 dep Search Term 4 electronic Search Term 5 temple Before Priority Date: priority:20051213

date, time	web site	search string
2/19/2024 5:47:55 PM	Google Patents	Search Term 1 (eyeglasses) (wire) (dep) (electronic) (temple) Before Priority Date: priority:20061213
2/19/2024 5:47:56 PM	Google Patents	Search Term 1 eyeglasses Search Term 2 wire Search Term 3 dep Search Term 4 electronic Search Term 5 temple Before Priority Date: priority:20061213
2/19/2024 5:48:03 PM	Google Scholar	(recited) (user) (binocular viewer) (binocular) (viewer)
2/19/2024 5:48:03 PM	Google Patents	Search Term 1 (recited) (user) (binocular viewer) (binocular) (viewer) Before Priority Date: priority:20060227
2/19/2024 5:48:05 PM	Google Scholar	recited user binocular viewer binocular viewer
2/19/2024 5:48:05 PM	Google Patents	Search Term 1 recited Search Term 2 user Search Term 3 binocular viewer Search Term 4 binocular Search Term 5 viewer Before Priority Date: priority:20060227
2/19/2024 5:48:16 PM	Google Scholar	(patient) (processor) (sensor) (data) (coupled)

date, time	web site	search string
2/19/2024 5:48:16 PM	Google Patents	Search Term 1 (patient) (processor) (sensor) (data) (coupled) Before Priority Date: priority:20060516
2/19/2024 5:48:18 PM	Google Scholar	patient processor sensor data coupled
2/19/2024 5:48:18 PM	Google Patents	Search Term 1 patient Search Term 2 processor Search Term 3 sensor Search Term 4 data Search Term 5 coupled Before Priority Date: priority:20060516
2/19/2024 5:48:25 PM	Google Scholar	(user) (activity) (calibration) (type) (data)
2/19/2024 5:48:25 PM	Google Patents	Search Term 1 (user) (activity) (calibration) (type) (data) Before Priority Date: priority:20060522
2/19/2024 5:48:27 PM	Google Scholar	user activity calibration type data
2/19/2024 5:48:27 PM	Google Patents	Search Term 1 user Search Term 2 activity Search Term 3 calibration Search Term 4 type Search Term 5 data Before Priority Date: priority:20060522
2/19/2024 5:48:34 PM	Google Scholar	(workout) (data) (user) (screen) (recited)

date, time	web site	search string
2/19/2024 5:48:34 PM	Google Patents	Search Term 1 (workout) (data) (user) (screen) (recited) Before Priority Date: priority:20060522
2/19/2024 5:48:36 PM	Google Scholar	workout data user screen recited
2/19/2024 5:48:36 PM	Google Patents	Search Term 1 workout Search Term 2 data Search Term 3 user Search Term 4 screen Search Term 5 recited Before Priority Date: priority:20060522
2/19/2024 5:48:43 PM	Google Scholar	(media player) (computer) (portable media) (physiologic data) (user)
2/19/2024 5:48:43 PM	Google Patents	Search Term 1 (media player) (computer) (portable media) (physiologic data) (user) Before Priority Date: priority:20060522
2/19/2024 5:48:44 PM	Google Scholar	media player computer portable media physiologic data user
2/19/2024 5:48:44 PM	Google Patents	Search Term 1 media player Search Term 2 computer Search Term 3 portable media Search Term 4 physiologic data Search Term 5 user Before Priority Date: priority:20060522
2/19/2024 5:53:17 PM	Google Patents	Search Term 1 (~patent/US8073984B2)

date, time	web site	search string
2/19/2024 5:53:18 PM	Google Patents	Search Term 1 ~patent/US8073984B2
2/19/2024 5:53:23 PM	Google Scholar	(accessory device) (accessory) (portable electronic) (capabilities) (electronic device)
2/19/2024 5:53:23 PM	Google Patents	Search Term 1 (accessory device) (accessory) (portable electronic) (capabilities) (electronic device) Before Priority Date: priority:20060522
2/19/2024 5:53:25 PM	Google Scholar	accessory device accessory portable electronic capabilities electronic device
2/19/2024 5:53:25 PM	Google Patents	Search Term 1 accessory device Search Term 2 accessory Search Term 3 portable electronic Search Term 4 capabilities Search Term 5 electronic device Before Priority Date: priority:20060522
2/19/2024 5:53:34 PM	Google Scholar	(physiologic data) (host computer) (media player) (user) (portable device)
2/19/2024 5:53:34 PM	Google Patents	Search Term 1 (physiologic data) (host computer) (media player) (user) (portable device) Before Priority Date: priority:20060522
2/19/2024 5:53:36 PM	Google Scholar	physiologic data host computer media player user portable device

date, time	web site	search string
2/19/2024 5:53:36 PM	Google Patents	Search Term 1 physiologic data Search Term 2 host computer Search Term 3 media player Search Term 4 user Search Term 5 portable device Before Priority Date: priority:20060522
2/19/2024 5:53:44 PM	Google Scholar	(speaker) (ear) (display device) (temple) (video display)
2/19/2024 5:53:44 PM	Google Patents	Search Term 1 (speaker) (ear) (display device) (temple) (video display) Before Priority Date: priority:20060526
2/19/2024 5:53:46 PM	Google Scholar	speaker ear display device temple video display
2/19/2024 5:53:46 PM	Google Patents	Search Term 1 speaker Search Term 2 ear Search Term 3 display device Search Term 4 temple Search Term 5 video display Before Priority Date: priority:20060526
2/19/2024 5:53:51 PM	Google Scholar	(frame) (pair) (electronic device) (slot) (lens)
2/19/2024 5:53:51 PM	Google Patents	Search Term 1 (frame) (pair) (electronic device) (slot) (lens) Before Priority Date: priority:20060712
2/19/2024 5:53:53 PM	Google Scholar	frame pair electronic device slot lens

date, time	web site	search string
2/19/2024 5:53:53 PM	Google Patents	Search Term 1 frame Search Term 2 pair Search Term 3 electronic device Search Term 4 slot Search Term 5 lens Before Priority Date: priority:20060712
2/19/2024 5:54:02 PM	Google Scholar	(flicker) (rate) (display) (display area) (vision training)
2/19/2024 5:54:04 PM	Google Scholar	flicker rate display display area vision training
2/19/2024 5:54:04 PM	Google Patents	Search Term 1 flicker Search Term 2 rate Search Term 3 display Search Term 4 display area Search Term 5 vision training Before Priority Date: priority:20060831
2/19/2024 5:54:12 PM	Google Scholar	(optical device) (tab) (electrode) (lens) (insulator layer)
2/19/2024 5:54:12 PM	Google Patents	Search Term 1 (optical device) (tab) (electrode) (lens) (insulator layer) Before Priority Date: priority:20060911
2/19/2024 5:54:13 PM	Google Scholar	optical device tab electrode lens insulator layer

date, time	web site	search string
2/19/2024 5:54:13 PM	Google Patents	Search Term 1 optical device Search Term 2 tab Search Term 3 electrode Search Term 4 lens Search Term 5 insulator layer Before Priority Date: priority:20060911
2/19/2024 5:54:20 PM	Google Scholar	(hands) (user) (frame) (free commands) (image)
2/19/2024 5:54:20 PM	Google Patents	Search Term 1 (hands) (user) (frame) (free commands) (image) Before Priority Date: priority:20060918
2/19/2024 5:54:21 PM	Google Scholar	hands user frame free commands image
2/19/2024 5:54:21 PM	Google Patents	Search Term 1 hands Search Term 2 user Search Term 3 frame Search Term 4 free commands Search Term 5 image Before Priority Date: priority:20060918
2/19/2024 5:55:18 PM	Google Scholar	(pedometer) (glasses) (pair) (activity) (recited)
2/19/2024 5:55:18 PM	Google Patents	Search Term 1 (pedometer) (glasses) (pair) (activity) (recited) Before Priority Date: priority:20060920
2/19/2024 5:55:20 PM	Google Scholar	pedometer glasses pair activity recited

date, time	web site	search string
2/19/2024 5:55:20 PM	Google Patents	Search Term 1 pedometer Search Term 2 glasses Search Term 3 pair Search Term 4 activity Search Term 5 recited Before Priority Date: priority:20060920
2/19/2024 5:55:27 PM	Google Scholar	(imaging) (information) (unit) (image) (control)
2/19/2024 5:55:27 PM	Google Patents	Search Term 1 (imaging) (information) (unit) (image) (control) Before Priority Date: priority:20060927
2/19/2024 5:55:31 PM	Google Patents	Search Term 1 (imaging) Search Term 2 (information) Search Term 3 (unit) Search Term 4 (image) Search Term 5 (control) Before Priority Date: priority:20060927
2/19/2024 5:55:32 PM	Google Scholar	imaging information unit image control

date, time	web site	search string
2/19/2024 5:55:32 PM	Google Patents	Search Term 1 imaging Search Term 2 information Search Term 3 unit Search Term 4 image Search Term 5 control Before Priority Date: priority:20060927
2/19/2024 5:55:43 PM	Google Scholar	(temple) (frame) (lens) (utep) (electrical)
2/19/2024 5:55:43 PM	Google Patents	Search Term 1 (temple) (frame) (lens) (utep) (electrical) Before Priority Date: priority:20061027
2/19/2024 5:55:44 PM	Google Scholar	temple frame lens utep electrical
2/19/2024 5:55:44 PM	Google Patents	Search Term 1 temple Search Term 2 frame Search Term 3 lens Search Term 4 utep Search Term 5 electrical Before Priority Date: priority:20061027

Web Search History

date, time	web site	search string
12/12/2023 7:45:20 AM	Google Scholar	(eyeglass) (interface system) (camera) (audio) (integrated circuits)
12/12/2023 7:45:20 AM	Google Patents	**Search Term 1** (eyeglass) (interface system) (camera) (audio) (integrated circuits) **Before** Priority Date: priority:19971030
12/12/2023 7:45:22 AM	Google Scholar	eyeglass interface system camera audio integrated circuits
12/12/2023 7:45:22 AM	Google Patents	**Search Term 1** eyeglass **Search Term 2** interface system **Search Term 3** camera **Search Term 4** audio **Search Term 5** integrated circuits **Before** Priority Date: priority:19971030
12/12/2023 7:45:51 AM	Google Scholar	(prism) (telescopes) (relating) (block) (systems suitable)
12/12/2023 7:45:51 AM	Google Patents	**Search Term 1** (prism) (telescopes) (relating) (block) (systems suitable) **Before** Priority Date: priority:19280124
12/12/2023 7:45:53 AM	Google Scholar	prism telescopes relating block systems suitable

date, time	web site	search string
12/12/2023 7:45:53 AM	Google Patents	**Search Term 1** prism **Search Term 2** telescopes **Search Term 3** relating **Search Term 4** block **Search Term 5** systems suitable **Before** Priority Date: priority:19280124
12/12/2023 7:46:01 AM	Google Scholar	(viewfinder) (mirror) (block means) (intermediate block) (light rays)
12/12/2023 7:46:01 AM	Google Patents	**Search Term 1** (viewfinder) (mirror) (block means) (intermediate block) (light rays) **Before** Priority Date: priority:19601102
12/12/2023 7:46:02 AM	Google Scholar	viewfinder mirror block means intermediate block light rays
12/12/2023 7:46:02 AM	Google Patents	**Search Term 1** viewfinder **Search Term 2** mirror **Search Term 3** block means **Search Term 4** intermediate block **Search Term 5** light rays **Before** Priority Date: priority:19601102
12/12/2023 7:46:11 AM	Google Scholar	(aircraft) (landing) (mirror) (spherical) (pilot)
12/12/2023 7:46:11 AM	Google Patents	**Search Term 1** (aircraft) (landing) (mirror) (spherical) (pilot) **Before** Priority Date: priority:19611005
12/12/2023 7:46:12 AM	Google Scholar	aircraft landing mirror spherical pilot

date, time	web site	search string
12/12/2023 7:46:12 AM	Google Patents	**Search Term 1** aircraft **Search Term 2** landing **Search Term 3** mirror **Search Term 4** spherical **Search Term 5** pilot **Before** Priority Date: priority:19611005
12/12/2023 7:46:18 AM	Google Scholar	(viewer) (vehicle) (windshield) (housing) (vehicles)
12/12/2023 7:46:18 AM	Google Patents	**Search Term 1** (viewer) (vehicle) (windshield) (housing) (vehicles) **Before** Priority Date: priority:19640210
12/12/2023 7:46:19 AM	Google Scholar	viewer vehicle windshield housing vehicles
12/12/2023 7:46:19 AM	Google Patents	**Search Term 1** viewer **Search Term 2** vehicle **Search Term 3** windshield **Search Term 4** housing **Search Term 5** vehicles **Before** Priority Date: priority:19640210
12/12/2023 7:46:29 AM	Google Scholar	(reticle) (target) (sight) (mirror) (semi)
12/12/2023 7:46:29 AM	Google Patents	**Search Term 1** (reticle) (target) (sight) (mirror) (semi) **Before** Priority Date: priority:19650412
12/12/2023 7:46:30 AM	Google Scholar	reticle target sight mirror semi

date, time	web site	search string
12/12/2023 7:46:30 AM	Google Patents	**Search Term 1** reticle **Search Term 2** target **Search Term 3** sight **Search Term 4** mirror **Search Term 5** semi **Before** Priority Date: priority:19650412
12/12/2023 7:46:36 AM	Google Scholar	(housing) (camera head) (mirror) (elevation) (turret)
12/12/2023 7:46:36 AM	Google Patents	**Search Term 1** (housing) (camera head) (mirror) (elevation) (turret) **Before** Priority Date: priority:19690604
12/12/2023 7:46:38 AM	Google Scholar	housing camera head mirror elevation turret
12/12/2023 7:46:38 AM	Google Patents	**Search Term 1** housing **Search Term 2** camera head **Search Term 3** mirror **Search Term 4** elevation **Search Term 5** turret **Before** Priority Date: priority:19690604
12/12/2023 8:03:59 AM	Google Patents	**Search Term 1** (~patent/DE2205325A1)
12/12/2023 8:04:01 AM	Google Patents	**Search Term 1** ~patent/DE2205325A1
12/12/2023 8:04:12 AM	Google Scholar	(visor) (focal point) (light emitting) (emitting means) (helmet)

date, time	web site	search string
12/12/2023 8:04:12 AM	Google Patents	**Search Term 1** (visor) (focal point) (light emitting) (emitting means) (helmet) **Before** Priority Date: priority:19720628
12/12/2023 8:04:13 AM	Google Scholar	visor focal point light emitting emitting means helmet
12/12/2023 8:04:13 AM	Google Patents	**Search Term 1** visor **Search Term 2** focal point **Search Term 3** light emitting **Search Term 4** emitting means **Search Term 5** helmet **Before** Priority Date: priority:19720628
12/12/2023 8:04:20 AM	Google Scholar	(light) (image) (lens) (source) (focal plane)
12/12/2023 8:04:20 AM	Google Patents	**Search Term 1** (light) (image) (lens) (source) (focal plane) **Before** Priority Date: priority:19730430
12/12/2023 8:04:21 AM	Google Scholar	light image lens source focal plane
12/12/2023 8:04:21 AM	Google Patents	**Search Term 1** light **Search Term 2** image **Search Term 3** lens **Search Term 4** source **Search Term 5** focal plane **Before** Priority Date: priority:19730430
12/12/2023 8:04:28 AM	Google Scholar	(holographic lens) (lens) (holographic) (axial) (tilted)

date, time	web site	search string
12/12/2023 8:04:28 AM	Google Patents	**Search Term 1** (holographic lens) (lens) (holographic) (axial) (tilted) **Before** Priority Date: priority:19750123
12/12/2023 8:04:30 AM	Google Scholar	holographic lens lens holographic axial tilted
12/12/2023 8:04:30 AM	Google Patents	**Search Term 1** holographic lens **Search Term 2** lens **Search Term 3** holographic **Search Term 4** axial **Search Term 5** tilted **Before** Priority Date: priority:19750123
12/12/2023 8:04:47 AM	Google Scholar	(documentation) (information) (documentation data) (data) (real information)
12/12/2023 8:04:48 AM	Google Scholar	documentation information documentation data data real information
12/12/2023 8:04:48 AM	Google Patents	**Search Term 1** documentation **Search Term 2** information **Search Term 3** documentation data **Search Term 4** data **Search Term 5** real information **Before** Priority Date: priority:19990325
12/12/2023 8:04:57 AM	Google Scholar	(data) (operating) (acquisition means) (designed) (observation)
12/12/2023 8:04:57 AM	Google Patents	**Search Term 1** (data) (operating) (acquisition means) (designed) (observation) **Before** Priority Date: priority:19990302

date, time	web site	search string
12/12/2023 8:04:58 AM	Google Scholar	data operating acquisition means designed observation
12/12/2023 8:04:58 AM	Google Patents	**Search Term 1** data **Search Term 2** operating **Search Term 3** acquisition means **Search Term 4** designed **Search Term 5** observation **Before** Priority Date: priority:19990302
12/12/2023 8:05:07 AM	Google Scholar	(arm) (phone) (user) (image) (phone body)
12/12/2023 8:05:07 AM	Google Patents	**Search Term 1** (arm) (phone) (user) (image) (phone body) **Before** Priority Date: priority:20001110
12/12/2023 8:05:09 AM	Google Scholar	arm phone user image phone body
12/12/2023 8:05:09 AM	Google Patents	**Search Term 1** arm **Search Term 2** phone **Search Term 3** user **Search Term 4** image **Search Term 5** phone body **Before** Priority Date: priority:20001110
12/12/2023 8:05:16 AM	Google Scholar	(language) (learning) (virtual world) (studying) (education)
12/12/2023 8:05:16 AM	Google Patents	**Search Term 1** (language) (learning) (virtual world) (studying) (education) **Before** Priority Date: priority:20020511

date, time	web site	search string
12/12/2023 8:05:17 AM	Google Scholar	language learning virtual world studying education
12/12/2023 8:05:17 AM	Google Patents	**Search Term 1** language **Search Term 2** learning **Search Term 3** virtual world **Search Term 4** studying **Search Term 5** education **Before** Priority Date: priority:20020511
12/12/2023 8:13:39 AM	Google Scholar	(image capture) (remote device) (image data) (images) (user)
12/12/2023 8:13:41 AM	Google Scholar	image capture remote device image data images user
12/12/2023 8:13:41 AM	Google Patents	**Search Term 1** image capture **Search Term 2** remote device **Search Term 3** image data **Search Term 4** images **Search Term 5** user **Before** Priority Date: priority:20010727
12/12/2023 8:13:51 AM	Google Scholar	(multidimensional) (video) (receptors) (video data) (audio)
12/12/2023 8:13:51 AM	Google Patents	**Search Term 1** (multidimensional) (video) (receptors) (video data) (audio) **Before** Priority Date: priority:19980127
12/12/2023 8:13:53 AM	Google Scholar	multidimensional video receptors video data audio

date, time	web site	search string
12/12/2023 8:13:53 AM	Google Patents	**Search Term 1** multidimensional **Search Term 2** video **Search Term 3** receptors **Search Term 4** video data **Search Term 5** audio **Before** Priority Date: priority:19980127
12/12/2023 8:13:59 AM	Google Scholar	(reader) (keyboard) (indicia) (monitor) (light)
12/12/2023 8:13:59 AM	Google Patents	**Search Term 1** (reader) (keyboard) (indicia) (monitor) (light) **Before** Priority Date: priority:19981110
12/12/2023 8:14:01 AM	Google Scholar	reader keyboard indicia monitor light
12/12/2023 8:14:01 AM	Google Patents	**Search Term 1** reader **Search Term 2** keyboard **Search Term 3** indicia **Search Term 4** monitor **Search Term 5** light **Before** Priority Date: priority:19981110
12/12/2023 8:14:08 AM	Google Scholar	(wearer) (eyewear) (speaker) (microphone) (unit)
12/12/2023 8:14:08 AM	Google Patents	**Search Term 1** (wearer) (eyewear) (speaker) (microphone) (unit) **Before** Priority Date: priority:20011006
12/12/2023 8:14:09 AM	Google Scholar	wearer eyewear speaker microphone unit

date, time	web site	search string
12/12/2023 8:14:09 AM	Google Patents	**Search Term 1** wearer **Search Term 2** eyewear **Search Term 3** speaker **Search Term 4** microphone **Search Term 5** unit **Before** Priority Date: priority:20011006
12/12/2023 8:14:16 AM	Google Scholar	(support) (display) (support member) (user) (ear)
12/12/2023 8:14:16 AM	Google Patents	**Search Term 1** (support) (display) (support member) (user) (ear) **Before** Priority Date: priority:20010907
12/12/2023 8:14:17 AM	Google Scholar	support display support member user ear
12/12/2023 8:14:17 AM	Google Patents	**Search Term 1** support **Search Term 2** display **Search Term 3** support member **Search Term 4** user **Search Term 5** ear **Before** Priority Date: priority:20010907
12/12/2023 8:14:33 AM	Google Scholar	(values) (speaker) (listener) (location) (speech)
12/12/2023 8:14:33 AM	Google Patents	**Search Term 1** (values) (speaker) (listener) (location) (speech) **Before** Priority Date: priority:20001127
12/12/2023 8:14:34 AM	Google Scholar	values speaker listener location speech

date, time	web site	search string
12/12/2023 8:14:34 AM	Google Patents	**Search Term 1** values **Search Term 2** speaker **Search Term 3** listener **Search Term 4** location **Search Term 5** speech **Before** Priority Date: priority:20001127
12/12/2023 8:49:24 AM	Google Scholar	(audio) (video) (wearer) (pick) (mounting means)
12/12/2023 8:49:25 AM	Google Scholar	audio video wearer pick mounting means
12/12/2023 8:49:25 AM	Google Patents	**Search Term 1** audio **Search Term 2** video **Search Term 3** wearer **Search Term 4** pick **Search Term 5** mounting means **Before** Priority Date: priority:20020403
12/12/2023 8:49:31 AM	Google Scholar	(eyewear according) (eyewear) (front frame) (sidepiece) (display)
12/12/2023 8:49:31 AM	Google Patents	**Search Term 1** (eyewear according) (eyewear) (front frame) (sidepiece) (display) **Before** Priority Date: priority:20020524
12/12/2023 8:49:32 AM	Google Scholar	eyewear according eyewear front frame sidepiece display

date, time	web site	search string
12/12/2023 8:49:32 AM	Google Patents	**Search Term 1** eyewear according **Search Term 2** eyewear **Search Term 3** front frame **Search Term 4** sidepiece **Search Term 5** display **Before** Priority Date: priority:20020524
12/12/2023 8:49:38 AM	Google Scholar	(tracking) (augmented reality) (frame acquisition) (video) (computer)
12/12/2023 8:49:38 AM	Google Patents	**Search Term 1** (tracking) (augmented reality) (frame acquisition) (video) (computer) **Before** Priority Date: priority:20011220
12/12/2023 8:49:39 AM	Google Scholar	tracking augmented reality frame acquisition video computer
12/12/2023 8:49:39 AM	Google Patents	**Search Term 1** tracking **Search Term 2** augmented reality **Search Term 3** frame acquisition **Search Term 4** video **Search Term 5** computer **Before** Priority Date: priority:20011220
12/12/2023 8:49:46 AM	Google Scholar	(speaker) (eyewear) (wearer) (earstem)
12/12/2023 8:49:46 AM	Google Patents	**Search Term 1** (speaker) (eyewear) (wearer) (earstem) **Assignee(s)** [microphone] **Before** Priority Date: priority:20011006

date, time	web site	search string
12/12/2023 8:49:54 AM	Google Scholar	(speaker) (eyewear) (microphone) (wearer) (earstem)
12/12/2023 8:49:54 AM	Google Patents	**Search Term 1** (speaker) **Search Term 2** (eyewear) **Search Term 3** (microphone) **Search Term 4** (wearer) **Search Term 5** (earstem) **Before** Priority Date: priority:20011006
12/12/2023 8:49:55 AM	Google Scholar	speaker eyewear microphone wearer earstem
12/12/2023 8:49:55 AM	Google Patents	**Search Term 1** speaker **Search Term 2** eyewear **Search Term 3** microphone **Search Term 4** wearer **Search Term 5** earstem **Before** Priority Date: priority:20011006
12/12/2023 8:50:10 AM	Google Scholar	(information) (user) (telescope) (electronic) (visual)
12/12/2023 8:50:10 AM	Google Patents	**Search Term 1** (information) (user) (telescope) (electronic) (visual) **Before** Priority Date: priority:20021210
12/12/2023 8:50:11 AM	Google Scholar	information user telescope electronic visual

date, time	web site	search string
12/12/2023 8:50:11 AM	Google Patents	**Search Term 1** information **Search Term 2** user **Search Term 3** telescope **Search Term 4** electronic **Search Term 5** visual **Before** Priority Date: priority:20021210
12/12/2023 8:50:19 AM	Google Scholar	(audio interface) (wearer) (signal) (audio) (support)
12/12/2023 8:50:19 AM	Google Patents	**Search Term 1** (audio interface) (wearer) (signal) (audio) (support) **Before** Priority Date: priority:20020726
12/12/2023 8:50:21 AM	Google Scholar	audio interface wearer signal audio support
12/12/2023 8:50:21 AM	Google Patents	**Search Term 1** audio interface **Search Term 2** wearer **Search Term 3** signal **Search Term 4** audio **Search Term 5** support **Before** Priority Date: priority:20020726
12/12/2023 8:50:27 AM	Google Scholar	(mounting) (user) (chassis) (virtual) (images)
12/12/2023 8:50:27 AM	Google Patents	**Search Term 1** (mounting) (user) (chassis) (virtual) (images) **Before** Priority Date: priority:20030103
12/12/2023 8:50:29 AM	Google Scholar	mounting user chassis virtual images

date, time	web site	search string
12/12/2023 8:50:29 AM	Google Patents	**Search Term 1** mounting **Search Term 2** user **Search Term 3** chassis **Search Term 4** virtual **Search Term 5** images **Before** Priority Date: priority:20030103
12/12/2023 9:29:11 AM	Google Scholar	(support) (wearer) (eyeglass) (frame) (audio)
12/12/2023 9:29:11 AM	Google Patents	**Search Term 1** (support) (wearer) (eyeglass) (frame) (audio) **Before** Priority Date: priority:20000602
12/12/2023 9:29:13 AM	Google Scholar	support wearer eyeglass frame audio
12/12/2023 9:29:13 AM	Google Patents	**Search Term 1** support **Search Term 2** wearer **Search Term 3** eyeglass **Search Term 4** frame **Search Term 5** audio **Before** Priority Date: priority:20000602
12/12/2023 9:29:21 AM	Google Scholar	(golfer) (image) (training aid) (golf training) (light)
12/12/2023 9:29:21 AM	Google Patents	**Search Term 1** (golfer) (image) (training aid) (golf training) (light) **Before** Priority Date: priority:20010327
12/12/2023 9:29:22 AM	Google Scholar	golfer image training aid golf training light

date, time	web site	search string
12/12/2023 9:29:22 AM	Google Patents	**Search Term 1** golfer **Search Term 2** image **Search Term 3** training aid **Search Term 4** golf training **Search Term 5** light **Before** Priority Date: priority:20010327
12/12/2023 9:29:28 AM	Google Scholar	(user) (virtual image) (spectacles) (display) (mounting)
12/12/2023 9:29:28 AM	Google Patents	**Search Term 1** (user) (virtual image) (spectacles) (display) (mounting) **Before** Priority Date: priority:20021210
12/12/2023 9:29:30 AM	Google Scholar	user virtual image spectacles display mounting
12/12/2023 9:29:30 AM	Google Patents	**Search Term 1** user **Search Term 2** virtual image **Search Term 3** spectacles **Search Term 4** display **Search Term 5** mounting **Before** Priority Date: priority:20021210
12/12/2023 9:29:37 AM	Google Scholar	(location) (audiovisual) (processor) (communication) (user)
12/12/2023 9:29:37 AM	Google Patents	**Search Term 1** (location) (audiovisual) (processor) (communication) (user) **Before** Priority Date: priority:20021127
12/12/2023 9:29:38 AM	Google Scholar	location audiovisual processor communication user

date, time	web site	search string
12/12/2023 9:29:38 AM	Google Patents	**Search Term 1** location **Search Term 2** audiovisual **Search Term 3** processor **Search Term 4** communication **Search Term 5** user **Before** Priority Date: priority:20021127
12/12/2023 9:29:50 AM	Google Scholar	(viewing system) (binocular viewing) (optical) (assembly) (optical pipe)
12/12/2023 9:29:50 AM	Google Patents	**Search Term 1** (viewing system) (binocular viewing) (optical) (assembly) (optical pipe) **Before** Priority Date: priority:20030425
12/12/2023 9:29:51 AM	Google Scholar	viewing system binocular viewing optical assembly optical pipe
12/12/2023 9:29:51 AM	Google Patents	**Search Term 1** viewing system **Search Term 2** binocular viewing **Search Term 3** optical **Search Term 4** assembly **Search Term 5** optical pipe **Before** Priority Date: priority:20030425
12/12/2023 9:29:58 AM	Google Scholar	(user) (arrangement according) (vehicle) (head) (information)
12/12/2023 9:29:58 AM	Google Patents	**Search Term 1** (user) (arrangement according) (vehicle) (head) (information) **Before** Priority Date: priority:20030829

date, time	web site	search string
12/12/2023 9:29:59 AM	Google Scholar	user arrangement according vehicle head information
12/12/2023 9:29:59 AM	Google Patents	**Search Term 1** user **Search Term 2** arrangement according **Search Term 3** vehicle **Search Term 4** head **Search Term 5** information **Before** Priority Date: priority:20030829
12/12/2023 9:30:29 AM	Google Scholar	(cord) (eyeglass) (tethered) (electrical) (recited)
12/12/2023 9:30:29 AM	Google Patents	**Search Term 1** (cord) (eyeglass) (tethered) (electrical) (recited) **Before** Priority Date: priority:20030415
12/12/2023 9:30:31 AM	Google Scholar	cord eyeglass tethered electrical recited
12/12/2023 9:30:31 AM	Google Patents	**Search Term 1** cord **Search Term 2** eyeglass **Search Term 3** tethered **Search Term 4** electrical **Search Term 5** recited **Before** Priority Date: priority:20030415
12/12/2023 9:30:39 AM	Google Scholar	(video) (audio) (stream) (camera) (participant)
12/12/2023 9:30:39 AM	Google Patents	**Search Term 1** (video) (audio) (stream) (camera) (participant) **Before** Priority Date: priority:20030724

date, time	web site	search string
12/12/2023 9:30:40 AM	Google Scholar	video audio stream camera participant
12/12/2023 9:30:40 AM	Google Patents	**Search Term 1** video **Search Term 2** audio **Search Term 3** stream **Search Term 4** camera **Search Term 5** participant **Before** Priority Date: priority:20030724
12/12/2023 9:45:23 AM	Google Scholar	(eyeglasses) (wireless) (arms) (wireless communication) (frame)
12/12/2023 9:45:23 AM	Google Patents	**Search Term 1** (eyeglasses) (wireless) (arms) (wireless communication) (frame) **Before** Priority Date: priority:20030415
12/12/2023 9:45:25 AM	Google Scholar	eyeglasses wireless arms wireless communication frame
12/12/2023 9:45:25 AM	Google Patents	**Search Term 1** eyeglasses **Search Term 2** wireless **Search Term 3** arms **Search Term 4** wireless communication **Search Term 5** frame **Before** Priority Date: priority:20030415
12/12/2023 9:45:31 AM	Google Scholar	(head mounted) (mounted display) (signals) (unit) (display device)

date, time	web site	search string
12/12/2023 9:45:31 AM	Google Patents	**Search Term 1** (head mounted) (mounted display) (signals) (unit) (display device) **Before** Priority Date: priority:20040909
12/12/2023 9:45:33 AM	Google Scholar	head mounted mounted display signals unit display device
12/12/2023 9:45:33 AM	Google Patents	**Search Term 1** head mounted **Search Term 2** mounted display **Search Term 3** signals **Search Term 4** unit **Search Term 5** display device **Before** Priority Date: priority:20040909
12/12/2023 9:45:40 AM	Google Scholar	(coupled) (microphone) (speaker) (eyeglasses) (frame)
12/12/2023 9:45:40 AM	Google Patents	**Search Term 1** (coupled) (microphone) (speaker) (eyeglasses) (frame) **Before** Priority Date: priority:20010621
12/12/2023 9:45:41 AM	Google Scholar	coupled microphone speaker eyeglasses frame
12/12/2023 9:45:41 AM	Google Patents	**Search Term 1** coupled **Search Term 2** microphone **Search Term 3** speaker **Search Term 4** eyeglasses **Search Term 5** frame **Before** Priority Date: priority:20010621
12/12/2023 9:45:47 AM	Google Scholar	(camera) (cable) (wiring harness) (communication system) (power)

date, time	web site	search string
12/12/2023 9:45:47 AM	Google Patents	**Search Term 1** (camera) (cable) (wiring harness) (communication system) (power) **Before** Priority Date: priority:20040309
12/12/2023 9:45:49 AM	Google Scholar	camera cable wiring harness communication system power
12/12/2023 9:45:49 AM	Google Patents	**Search Term 1** camera **Search Term 2** cable **Search Term 3** wiring harness **Search Term 4** communication system **Search Term 5** power **Before** Priority Date: priority:20040309
12/12/2023 9:45:57 AM	Google Scholar	(display) (information) (user) (gaze) (control)
12/12/2023 9:45:57 AM	Google Patents	**Search Term 1** (display) (information) (user) (gaze) (control) **Before** Priority Date: priority:20041001
12/12/2023 9:45:59 AM	Google Scholar	display information user gaze control
12/12/2023 9:45:59 AM	Google Patents	**Search Term 1** display **Search Term 2** information **Search Term 3** user **Search Term 4** gaze **Search Term 5** control **Before** Priority Date: priority:20041001
12/12/2023 9:46:07 AM	Google Scholar	(eye) (audio circuitry) (ear) (arm) (compartment)

date, time	web site	search string
12/12/2023 9:46:07 AM	Google Patents	**Search Term 1** (eye) (audio circuitry) (ear) (arm) (compartment) **Before** Priority Date: priority:20041013
12/12/2023 9:46:09 AM	Google Scholar	eye audio circuitry ear arm compartment
12/12/2023 9:46:09 AM	Google Patents	**Search Term 1** eye **Search Term 2** audio circuitry **Search Term 3** ear **Search Term 4** arm **Search Term 5** compartment **Before** Priority Date: priority:20041013
12/12/2023 9:46:15 AM	Google Scholar	(module) (user) (visualisation) (eye) (images)
12/12/2023 9:46:15 AM	Google Patents	**Search Term 1** (module) (user) (visualisation) (eye) (images) **Before** Priority Date: priority:20041029
12/12/2023 9:46:17 AM	Google Scholar	module user visualisation eye images
12/12/2023 9:46:17 AM	Google Patents	**Search Term 1** module **Search Term 2** user **Search Term 3** visualisation **Search Term 4** eye **Search Term 5** images **Before** Priority Date: priority:20041029
12/12/2023 9:46:23 AM	Google Scholar	(user) (data) (biometric authentication) (eyewear) (biometric)

date, time	web site	search string
12/12/2023 9:46:23 AM	Google Patents	**Search Term 1** (user) (data) (biometric authentication) (eyewear) (biometric) **Before** Priority Date: priority:20041129
12/12/2023 9:46:24 AM	Google Scholar	user data biometric authentication eyewear biometric
12/12/2023 9:46:24 AM	Google Patents	**Search Term 1** user **Search Term 2** data **Search Term 3** biometric authentication **Search Term 4** eyewear **Search Term 5** biometric **Before** Priority Date: priority:20041129
12/12/2023 9:46:30 AM	Google Scholar	(user) (signals) (accelerometer) (nose) (input)
12/12/2023 9:46:30 AM	Google Patents	**Search Term 1** (user) (signals) (accelerometer) (nose) (input) **Before** Priority Date: priority:20041229
12/12/2023 9:46:31 AM	Google Scholar	user signals accelerometer nose input
12/12/2023 9:46:31 AM	Google Patents	**Search Term 1** user **Search Term 2** signals **Search Term 3** accelerometer **Search Term 4** nose **Search Term 5** input **Before** Priority Date: priority:20041229
12/12/2023 9:46:38 AM	Google Scholar	(image) (distance) (optical element) (display) (subject)

date, time	web site	search string
12/12/2023 9:46:38 AM	Google Patents	**Search Term 1** (image) (distance) (optical element) (display) (subject) **Before** Priority Date: priority:20040206
12/12/2023 9:46:40 AM	Google Scholar	image distance optical element display subject
12/12/2023 9:46:40 AM	Google Patents	**Search Term 1** image **Search Term 2** distance **Search Term 3** optical element **Search Term 4** display **Search Term 5** subject **Before** Priority Date: priority:20040206
12/12/2023 9:46:48 AM	Google Scholar	(optical device) (substrate) (light waves) (reflecting surfaces) (optical)
12/12/2023 9:46:48 AM	Google Patents	**Search Term 1** (optical device) (substrate) (light waves) (reflecting surfaces) (optical) **Before** Priority Date: priority:20050210
12/12/2023 9:46:49 AM	Google Scholar	optical device substrate light waves reflecting surfaces optical
12/12/2023 9:46:49 AM	Google Patents	**Search Term 1** optical device **Search Term 2** substrate **Search Term 3** light waves **Search Term 4** reflecting surfaces **Search Term 5** optical **Before** Priority Date: priority:20050210

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US	11183269			07/15/2005	US 60647826 US 60527565 US 60583169 US 11183269 US 60509631 US 10964011 US 60562798 US 60620238 US 60618107 US 60605191 US 60592045 US 60647836	US 20050264752 A1 US 7922321 B2	12/01/2005 04/12/2011
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US	11183256			07/15/2005	US 60647826 US 60527565 US 60583169 US 60509631 US 10964011 US 60562798 US 60620238 US 60618107 US 60605191 US 11183256 US 60592045 US 60647836	US 20060023158 A1 US 7500747 B2	02/02/2006 03/10/2009
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US	11580222			10/11/2006	US 60583169 US 60725896 US 11183256 US 60787850 US 60846150 US 10964011 US 60725999 US 60527565 US 60509631 US 60562798 US 60620238 US 11580222 US 60618107 US 60605191 US 60592045 US 60647836	US 20070046887 A1 US 7581833 B2	03/01/2007 09/01/2009
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US	11650626			01/06/2007	US 11650626 US 60583169 US 60787850 US 60846150 US 10964011 US 11183256 US 60647826 US 60527565 US 60509631 US 60763854 US 60562798 US 60620238 US 60618107 US 60605191 US 60592045 US 60647836	US 20070109491 A1 US 7677723 B2	05/17/2007 03/16/2010
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US	12214435			06/19/2008	US 60583169 US 11183276 US 10964011 US 11891411 US 60647826 US 60527565 US 60509631 US 60562798 US 60620238 US 60618107 US 12214435 US 60605191 US 60592045 US 60647836	US 20080278678 A1 US 7481531 B2	11/13/2008 01/27/2009

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US	12462286			07/31/2009	US 60583169 US 60725896 US 11183269 US 60757850 US 60846150 US 10964011 US 60725999 US 60647826 US 60527565 US 60509631 US 60562798 US 60620238 US 11580222 US 60618107 US 60605191 US 12462286 US 60592045 US 60647836	US 20090296044 A1 US 8109629 B2	12/03/2009 02/07/2012
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US	12806312			08/10/2010	US 60583169 US 60725896 US 60787850 US 10522218 US 11891411 US 60647826 US 60527565 US 12214435 US 60605191 US 12462286 US 60592045 US 60647836 US 11183269 US 11183276 US 60846150 US 10964011 US 12806312 US 60725999 US 12317043 US 60509631 US 60562798 US 60620238 US 11580222 US 60618107 US 60462591	US 20100309426 A1 US 8465151 B2	12/09/2010 06/18/2013
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US	13955336			07/31/2013	US 60583169 US 11078855 US 11183269 US 11183276 US 10964011 US 13955336 US 10822218 US 13086402 US 11183256 US 60647826 US 11006343 US 60527565 US 60509831 US 11183283 US 60562798 US 11183262 US 60620238 US 60818107 US 60805191 US 11078857 US 11183263 US 60592045 US 60647836	US 20130308089 A1 US 8905542 B2	11/21/2013 12/09/2014
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US	14272632			05/08/2014	US 11452115 US 60689686 US 11006343 US 60527565 US 12798995 US 14272632	US 20140242956 A1 US 9204268 B2	08/28/2014 12/01/2015
US	14286976			05/23/2014	US 12987018 US 11497851 US 13580483 US 11006343 US 60527565 US 13363360 US 14286976 US 12074961	US 20140256293 A1 US 11019199 B2	09/11/2014 05/25/2021
US	14313989			06/24/2014	US 14313989 US 60583169 US 12322377 US 11078855 US 10964011 US 10822218 US 60647826 US 11006343 US 60562798 US 60620238 US 60618107 US 60606191 US 11078857 US 60592045 US 60647836	US 20140361185 A1 US 9488520 B2	12/11/2014 11/08/2016
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HK	14112801			12/22/2014	US 13831455	HK 1199316 A1	06/26/2015

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US	14715501			05/18/2015	US 14715501 US 60583169 US 60726896 US 11078855 US 60787850 US 13367346 US 10822218 US 60647826 US 60527565 US 60605191 US 12462286 US 60592045 US 60647836 US 11183269 US 11183276 US 11546685 US 60546150 US 10964011 US 60726999 US 11183256 US 11006343 US 60509631 US 11183283 US 60562798 US 11183262 US 60620238 US 11580222 US 60618107 US 11078857 US 11183263	US 20150253590 A1 US 10330956 B2	09/10/2015 06/25/2019
US	14922344			10/26/2015	US 14922344 US 11006343 US 60527565 US 14272632 US 11452115 US 60689686 US 12798995	US 20160044474 A1 US 9736664 B2	02/11/2016 08/15/2017
US	15343472			11/04/2016	US 14313983 US 60583169 US 12322377 US 11078855 US 10964011 US 10822218 US 60647826 US 15343472 US 11006343 US 60562798 US 60620238 US 60618107 US 60605191 US 11078857 US 60592045 US 60647836	US 20170074721 A1 US 10060790 B2	03/16/2017 08/28/2018

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US	15396428			12/31/2016	US 60583169 US 60725596 US 11078855 US 60787850 US 10822218 US 11891411 US 15396428 US 60847826 US 60527565 US 12214435 US 60605191 US 13831512 US 12462286 US 60592045 US 60647836 US 11183269 US 11183276 US 11546685 US 60846150 US 10964011 US 12806312 US 60725999 US 11183256 US 12317043 US 11006343 US 60509631 US 11183283 US 60562798 US 11183262 US 60620238 US 11580222 US 60618107 US 60462591 US 11078857 US 11183263	US 20170146829 A1	05/25/2017

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US	15409723			01/19/2017	US 60583169 US 60725896 US 11078855 US 60757850 US 10822218 US 11891411 US 60647826 US 15409723 US 60527565 US 12214435 US 60605191 US 13831512 US 12462286 US 60592045 US 60647836 US 11183269 US 11183276 US 11546885 US 60646150 US 10964011 US 12806312 US 60725999 US 11183256 US 12317043 US 11006343 US 60509631 US 11183283 US 60562798 US 11183262 US 60620238 US 11580222 US 60618107 US 60462591 US 11078857 US 11183263	US 20170131575 A1	05/11/2017
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US	16102859			08/14/2018	US 14313989 US 60583169 US 12322377 US 11078855 US 16102859 US 60647826 US 15343472 US 60562798 US 60620238 US 60618107 US 60605191 US 60592045 US 60647836	US 20180348050 A1 US 10359311 B2	12/06/2018 07/23/2019
US	16127957			09/11/2018	US 14715501 US 60583169 US 60725596 US 11183269 US 60787850 US 60846150 US 10964011 US 13367346 US 60725999 US 16127957 US 60647826 US 60527565 US 60509631 US 60562798 US 60620238 US 11580222 US 60618107 US 60605191 US 12462286 US 60592045 US 60647836	US 20190033823 A1 US 11086147 B2	01/31/2019 08/10/2021

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US	16182969	1)Howell, Thomas A., 2)Chao, David ,3)Thomas, C. Douglass,4)Tong, Peter P.	EYEWEAR HOUSING FOR CHARGING EMBEDDED BATTERY IN EYEWEAR FRAME	11/07/2018	US 14715501 US 60583169 US 60726896 US 60787850 US 13367346 US 10822218 US 13085402 US 11891411 US 60647826 US 15409723 US 60527565 US 15375423 US 12214436 US 60805191 US 13831512 US 12462286 US 60592045 US 60647836 US 16182969 US 11183269 US 11183276 US 60846150 US 10964011 US 13958336 US 12806312 US 16049120 US 60725999 US 16127967 US 12317043 US 14557409 US 60509631 US 60562798 US 60620238 US 11580222 US 60618107 US 60462591	US 20190187492 A1 US 20210364827 A9	06/20/2019 11/25/2021
US	16424018			05/28/2019	US 60583169 US 60726896 US 11546695 US 60787850 US 60846150 US 10964011 US 12803732 US 60725999 US 11183256 US 60647826 US 60527565 US 16424018 US 60509631 US 60562798 US 60620238 US 60618107 US 13291020 US 60805191 US 13831419 US 60592045 US 60647836	US 20190278110 A1 US 11630331 B2	09/12/2019 04/18/2023

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US	16445452			06/19/2019	US 12987018 US 11497651 US 13593483 US 11006343 US 60527565 US 13363360 US 14286976 US 12074961 US 16445452	US 20190306304 A1 US 11792316 B2	10/03/2019 10/17/2023
US	16446710			06/20/2019	US 12987018 US 11497651 US 13593483 US 11006343 US 60527565 US 13363360 US 14286976 US 12074961 US 16446710	US 20190306305 A1 US 11711459 B2	10/03/2019 07/25/2023
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US	16703805			12/04/2019	US 14313989 US 60583169 US 12322377 US 11078855 US 16102859 US 16426351 US 16703805 US 60647826 US 15343472 US 60562798 US 60620238 US 60618107 US 60605191 US 60592045 US 60647836	US 20200109986 A1 US 11326941 B2	04/09/2020 05/10/2022
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US	17484080			09/24/2021	US 17484080 US 60583169 US 11183269 US 10964011 US 13955336 US 13085402 US 16049120 US 14557409 US 60647826 US 60527565 US 60509631 US 15375423 US 60562798 US 60620238 US 60618107 US 16574254 US 60605191 US 60592045 US 60647836	US 20220011603 A1	01/13/2022
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US	17873104			07/25/2022	US 17484080 US 11183269 US 13956336 US 13086402 US 16049120 US 14557409 US 60647826 US 15376423 US 17873104 US 60620238 US 60618107 US 16574254 US 60605191 US 60592045 US 60647836	US 20220357599 A1 US 11644693 B2	11/10/2022 05/09/2023
US	17942347			09/12/2022	US 60725896 US 11546685 US 60787850 US 60846150 US 17942347 US 12503732 US 60725999 US 11183256 US 60647826 US 16429181 US 60620238 US 60618107 US 13831445 US 60647836	US 20230057654 A1	02/23/2023
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US	17964853			10/12/2022	US 60583169 US 60725896 US 11546685 US 60787850 US 60846150 US 10964011 US 12803732 US 60725999 US 17964853 US 11183256 US 60647826 US 60527565 US 60509631 US 16429181 US 60562798 US 60620238 US 60618107 US 13831445 US 60606191 US 60592045 US 60647836	US 20230033660 A1	02/02/2023
US	18129660			03/31/2023	US 60583169 US 60725896 US 11546685 US 60787850 US 60846150 US 10964011 US 12803732 US 60725999 US 11183256 US 60647826 US 18129660 US 60527565 US 16424018 US 60509631 US 60562798 US 60620238 US 60618107 US 13291020 US 60606191 US 13831419 US 60592045 US 60647836	US 20230236444 A1 US 11803089 B2	07/27/2023 10/31/2023
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UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ISSUE FEE TRANSMITTAL FORM

APPLICATION #	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET #
18375893	10/02/2023	Thomas Howell	IPVCP003X1C4X1C1

Title of Invention

SYSTEM FOR CHARGING EMBEDDED BATTERY IN WIRELESS HEAD-WORN PERSONAL ELECTRONIC APPARATUS

Application Information

APPLICATION TYPE	Nonprovisional Application under 35 USC 111(a)	DATE DUE	05/22/2024
CONFIRMATION #	4776	ISSUE FEE DUE	$ 1200
EXAMINER	JIE LEI	PUBLICATION DUE	$ 0
GROUP ART UNIT	2872	TOTAL FEES DUE	$1200
CLASS - SUBCLASS	351/158000	PREV. PAID FEE	$ 0
ENTITY STATUS	Regular Undiscounted		

1. CHANGE OF CORRESPONDENCE ADDRESS AND/OR INDICATION OF FEE ADDRESS (37 CFR 1.33 & 1.363)

Correspondence Address

CURRENT ADDRESS

Maintenance Fee Address

CURRENT ADDRESS

☐ Change of correspondence address requested,system generated AIA/122-PC form attached

☐ Fee address indication requested, system generatedSB/47-PC form attached

2. ENTITY STATUS

Change in Entity Status

NEW STATUS

3. THE FOLLOWING FEES ARE SUBMITTED

☑ Issue Fee

☑ Publication Fee

4. FEE AUTHORIZATION

☐ I authorize USPTO to apply my previously paid issue fee to the current fees due

☐ The Director is herby authorized to apply my previously paid issue fee to the current fee due and to charge deficient fees to Deposit Account Number:

☑ If in addition to the payment of the issue fee amount submitted with this form, there are any discrepencies in any amount(s) due, the Director is authorized to charge any deficiency, or credit any overpayment, to Deposit Account Number: 503874

5. FIRM AND/OR ATTORNEY NAMES TO BE PRINTED

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6. ASSIGNEE NAME(S) AND RESIDENCE DATA TO BE PRINTED

NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been

filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a susbstitute for filing an assignment.

IngenioSpec, LLC	San Jose, CA UNITED STATES	Corporation

Signature

I certify, in accordance with 37 CFR 1.4(d)(4) that I am an attorney or agent registered to practice before the Patent and Trademark Office who has filed and has been granted power of attorney in this application. I also certify that this Fee(s) Transmittal form is being transmitted to the USPTO via Patent Center on the date indicated below.

Signature	Name	Registration #	Date
/Peter Tong/	Peter Tong	35757	02/23/2024

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/375,893	**02/23/2024 06:34:40 PM Z ET**	**IPVCP003X1C4X1C1**

Title of Invention

SYSTEM FOR CHARGING EMBEDDED BATTERY IN WIRELESS HEAD-WORN PERSONAL ELECTRONIC APPARATUS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	4776	FILED BY	Peter Tong
PATENT CENTER #	64427080	FILING DATE	10/02/2023
CUSTOMER #	34071	FIRST NAMED INVENTOR	Thomas A. Howell
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 1

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
web85b.pdf	3	Issue Fee Payment (PTO-85B)	58 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
web85b.pdf	6995C0DB5655D74AC1074D9225575C013A2D37BABD7E598E3 2EA224D2A2178F007CED66D6551F50C39874EBD0669FBE1E3 409BBE5D45BD4BC9B3C3726C468917

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/375,893	**02/23/2024 06:34:40 PM Z ET**	**IPVCP003X1C4X1C1**

Title of Invention

SYSTEM FOR CHARGING EMBEDDED BATTERY IN WIRELESS HEAD-WORN PERSONAL ELECTRONIC APPARATUS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	4776	FILED BY	Peter Tong
PATENT CENTER #	64427080	AUTHORIZED BY	-
CUSTOMER #	34071	FILING DATE	10/02/2023
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Thomas A. Howell

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 9649	**E20242MI36526145**	**Peter Tong**

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
1501	UTILITY ISSUE FEE	1200.00	1	1200.00
			TOTAL AMOUNT:	**$1,200.00**

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New Applications Under 35 U.S.C. 111

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National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage

submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/375,893	**02/23/2024 09:50:32 PM Z ET**	**IPVCP003X1C4X1C1**

Title of Invention

SYSTEM FOR CHARGING EMBEDDED BATTERY IN WIRELESS HEAD-WORN PERSONAL ELECTRONIC APPARATUS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	4776	FILED BY	Angela Nijim
PATENT CENTER #	64435232	FILING DATE	10/02/2023
CUSTOMER #	34071	FIRST NAMED INVENTOR	Thomas A. Howell
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Peter Tong

Documents

TOTAL DOCUMENTS: 2

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
IPVCP003X1C4X1C1_Amd_312_AsFiled_2-24-APP.TEXT.docx	19	Application body structured text document	34 KB
IPVCP003X1C4X1C1_Amd_312_AsFiled_2-24.pdf	19	Auxiliary PDF of Application	87 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
IPVCP003X1C4X1C1_Amd_312_AsFiled_2-24-APP.TEXT.docx	427204DC9212DFE597E81549D1B176DF10900D46AF431E2032651EF1C209CE11AD81924F1824E55017B2BF2A1A988D72E5ADB8E62B6DB6184388E512DFD3B020

IPVCP003X1C4X1C1_Amd_312_AsFiled_2-24.pdf

7C9394C3D14E62420CD04E83EC458B6FF624EBB4C74356880916D4A8E23107FFCDE46AE846F5B59E3E3086B8EFCCD02F2069A79C17E9E857BA25BBEC33A0CDA0

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AMENDMENTS TO THE CLAIMS:

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Previously Presented) A system, comprising:

a head-worn personal electronic apparatus, including at least:

a head-worn structure configured to be worn by a user;

a speaker at least partially contained within the head-worn structure, the speaker being configured to be worn proximate to an ear of the user when the head-worn structure is being worn by the user;

a touch sensitive surface at least partially contained within the head-worn structure and configured to sense a touch input associated with the user;

a rechargeable battery contained within the head-worn structure;

electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery, and the electronic circuitry being electrically connected to the touch sensitive surface;

wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and

at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and

a charging apparatus having at least a charging connector,

wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.

2. (Previously Presented) A system as recited in claim 1, wherein the sensed touch input by the touch sensitive surface operates to at least alter operation of the head-worn personal electronic apparatus.

3. (Previously Presented) A system as recited in claim 2, wherein the head-worn personal electronic apparatus is configured to support voice calls to the user, and

wherein the at least one operation of the head-worn personal electronic apparatus being altered concerns at least accepting or declining a voice call to the user.

4. (Currently Amended) A system as recited in claim 2, wherein the head-worn personal electronic apparatus is configured to support audio output to the user via the speaker, and

wherein the at least one operation of the head-worn personal electronic apparatus being altered concerns control of the audio output being provided to the user.

5. (Previously Presented) A system as recited in claim 2, wherein the head-worn personal electronic apparatus is configured to distinguish at least a direction of the user input with respect to the touch sensitive surface.

6. (Previously Presented) A system as recited in claim 2, wherein the head-worn personal electronic apparatus is configured to detect at least a sliding of a finger action with respect to the touch sensitive surface.

7. (Previously Presented) A system as recited in claim 2, wherein the head-worn personal electronic apparatus is configured to facilitate determination at least whether the user input pertains to a forward sliding action or a backward sliding action with respect to the touch sensitive surface.

8. (Previously Presented) A system as recited in claim 1, wherein the head-worn structure comprises:

a physical condition sensor at least partially contained within the head-worn structure and configured to acquire data pertaining to a physical condition of the user, the

physical condition sensor being provided at least partially contained within the head-worn structure.

9. (Canceled).

10. (Previously Presented) A system as recited in claim 1, wherein the head-worn personal electronic apparatus comprises:

at least one magnetic element at least partially contained within the head-worn structure and configured to support a magnetic force that facilitates an electrical connection.

11. (Currently Amended) A system as recited in claim 1, wherein the head-worn personal electronic apparatus comprises:

a microphone at least partially contained within the head-worn structure,

wherein the head-worn personal electronic apparatus ~~device~~ is configured to receive a voice input via the microphone, determine or receive a determination of a requested operation from the voice input using voice recognition, and control an operation by the head-worn personable electronic apparatus ~~device~~ based on the requested operation.

12. (Previously Presented) A system as recited in claim 1, wherein the head-worn structure comprises:

a radiation sensor, operatively connected to the rechargeable battery, at least partially contained within the head-worn structure and configured to sense radiation.

13. (Previously Presented) A system as recited in claim 1, wherein the head-worn personal electronic apparatus comprises:

a sensor at least partially contained within the head-worn structure and configured to sense data indicative of whether the head-worn personal electronic apparatus is being worn by the user.

14. (Previously Presented) A system as recited in claim 13, wherein the sensor is electrically connected to the electronic circuitry, and wherein the electronic circuitry contained within the head-worn structure of the head-worn personal electronic apparatus is configured to at least alter operation of the head-worn personal electronic apparatus based at least in part on the sensed data from the sensor.

15. (Currently Amended) A system as recited in claim 14, wherein the head-worn personal electronic apparatus is configured to support audio output to the user via the speaker, and

wherein the operation of the head-worn personal electronic apparatus being altered concerns control of the audio output being provided to the user.

16. (Currently Amended) A system as recited in claim 14, wherein the head-worn personal electronic apparatus is configured to support a low power operational mode, and

wherein the operation of the head-worn personal electronic apparatus being altered concerns operation of the head-worn personal electronic apparatus in the low power operational mode.

17. (Previously Presented) A system as recited in claim 1, wherein the system comprises:

a Hall effect detector configured to capture data associated with a magnetic characteristic.

18. (Previously Presented) A system as recited in claim 1, wherein the head-worn personal electronic apparatus comprises:

a bone conducting element at least partially contained within the head-worn structure and configured to operate in accordance with acoustic characteristics, the bone conducting element being operatively connected to the electronic circuitry.

19. (Previously Presented) A system, comprising:

a head-worn personal electronic apparatus, including at least:

a head-worn structure configured to be worn by a user;

a speaker at least partially contained within the head-worn structure, the speaker being configured to be worn proximate to an ear of the user when the head-worn structure is being worn by the user;

a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user;

a second microphone at least partially contained within the head-worn structure, the second microphone being positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus;

a rechargeable battery contained within the head-worn structure;

a sensor at least partially contained within the head-worn structure and configured to capture data;

electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least one or more of the first microphone, the second microphone, the rechargeable battery and the sensor, the electronic circuitry being configured to at least process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, the electronic circuitry being configured to process at least the data captured by the sensor, and the electronic circuitry being configured to determine whether the head-worn structure is being worn by a user based on at least the processed sensor data;

wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and

at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and

a charging apparatus having at least a charging connector,

wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.

20. (Previously Presented) A system as recited in claim 19, wherein the first microphone is positioned to be directed forward towards the user's front when the head-worn structure is being worn by the user, and the second microphone is positioned to be directed outward away from the user's head when the head-worn structure is being worn by the user.

21. (Original) A system as recited in claim 20, wherein the head-worn personal electronic apparatus comprises:

a touch sensitive surface at least partially contained within the head-worn structure and configured to sense a touch input associated with the user, wherein the sensed touch input operating to at least alter operation of the head-worn electronic personal audio apparatus.

22. (Currently Amended) A system as recited in claim 21, wherein the head-worn electronic personal audio apparatus is configured to support audio output to the user via the speaker, and

wherein the at least one operation of the head-worn electronic personal audio apparatus being altered concerns control of the audio output being provided to the user.

23. (Previously Presented) A system as recited in claim 21, wherein the system comprises:

a Hall effect detector configured to capture data associated with a magnetic characteristic.

24. (Previously Presented) A system as recited in claim 19, wherein the sensor is positioned to be directed towards the user's head when the head-worn structure is being worn.

25. (Previously Presented) A system as recited in claim 24, wherein the data captured by the sensor is dependent on thermal characteristics of the user's head when the head-worn structure is being worn.

26. (Currently Amended) A system as recited in claim 19, wherein the head-worn personal electronic apparatus ~~comprises: wherein the head-worn personal electronic device~~ is configured to receive a voice input via the first microphone, determine or receive a determination of a requested operation from the voice input using voice recognition, and control an operation by the head-worn personal electronic apparatus ~~device~~ based on the requested operation.

27. (Canceled).

28. (Canceled).

29. (Previously Presented) A system as recited in claim 19, wherein the head-worn personal electronic apparatus is configured to at least alter operation of the head-worn personal electronic apparatus based at least in part on the sensed data from the sensor.

30. (Currently Amended) A system as recited in claim 29, wherein the head-worn personal electronic apparatus is configured to support audio output to the user via the speaker, and

wherein the operation of the head-worn personal electronic apparatus being altered concerns control of the audio output being provided to the user.

31. (Original) A system as recited in claim 19, wherein the head-worn personal electronic apparatus comprises:

a user input device supported by the head-worn structure, the user input device being configured to receive a user input, the user input device is based on at least capacitive effect, wherein the user input being received induces at least a capacitive change to produce at least an electrical response.

32. (Original) A system as recited in claim 31, wherein the user input device is configured to distinguish at least a direction of the user input with respect to the user input device.

33. (Original) A system as recited in claim 31, wherein the electronic circuitry is electrically connected to the user input device to receive user input data from the user input device, and wherein the head-worn personal electronic apparatus is configured to detect at least a sliding of a finger action with respect to the user input device using at least the electronic circuitry and the user input data.

34. (Original) A system as recited in claim 31, wherein the electronic circuitry is electrically connected to the user input device to receive user input data from the user input device, and wherein the head-worn personal electronic apparatus is configured to distinguish at least whether the user input pertains to a forward sliding action or a backward sliding action with respect to the user input device using at least the electronic circuitry and the user input data.

35. (Canceled).

36. (Canceled).

37. (Canceled).

38. (Previously Presented) A system as recited in claim 19, wherein the system comprises:

a Hall effect detector.

39. (Original) A system as recited in claim 19, wherein the head-worn personal electronic apparatus comprises:

a bone conducting element at least partially contained within the head-worn structure and configured to operate based on signals associated with sound, the bone conducting element being operatively connected to the electronic circuitry.

40. (Previously Presented) A system, comprising:

a head-worn personal electronic apparatus, including at least:

a head-worn structure configured to be worn by a user;

a speaker at least partially contained within the head-worn structure, the speaker being configured to be worn proximate to an ear of the user when the head-worn structure is being worn by the user;

a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user;

a second microphone at least partially contained within the head-worn structure, the second microphone being positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus;

a rechargeable battery contained within the head-worn structure;

a "being worn" sensor at least partially contained within the head-worn structure and configured to detect data indicative of whether the head-worn structure of the head-worn personal electronic apparatus is being worn;

electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least one or more of the first microphone, the second microphone, the rechargeable battery and the "being worn" sensor, the electronic circuitry being configured to at least process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, the electronic circuitry being configured to process at least the detected data captured by the "being worn" sensor;

wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and

at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and

a charging apparatus having at least a charging connector,

wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.

41. (Previously Presented) A system as recited in claim 40, wherein the detected data by the "being worn" sensor is dependent on a physical characteristic of the user.

42. (Original) A system as recited in claim 19, wherein the conductive element is a conductive pad.

43. (Currently Amended) A system, comprising:

a head-worn personal electronic apparatus, including at least:

a head-worn structure configured to be worn by a user;

a speaker at least partially contained within the head-worn structure, the speaker being configured to be worn proximate to an ear of the user when the head-worn structure is being worn by the user;

a motion detector at least partially contained within the head-worn structure and configured to provide motion data pertaining to the head-worn personal electronic apparatus;

a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user;

a second microphone at least partially contained within the head-worn structure, the second microphone being positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus;

a touch sensitive surface at least partially contained within the head-worn structure and configured to sense a touch input associated with the user, wherein the sensed touch input operating to at least alter operation of the head-worn electronic personal audio apparatus; [[.]]

a rechargeable battery contained within the head-worn structure;

electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery;

wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and

at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and

a charging apparatus having at least a charging connector,

wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.

44. (Currently Amended) A system as recited in claim 43, wherein the head-worn personal electronic apparatus comprises:

wherein the electronic circuitry is configured to process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, and

wherein the head-worn personal electronic apparatus ~~device~~ is configured to receive a voice input via the first microphone, determine or receive a determination of a requested operation from the voice input using voice recognition, and control an operation by the head-worn personal electronic apparatus ~~device~~ based on the requested operation.

45. (Previously Presented) A system as recited in claim 44, wherein the head-worn personal electronic apparatus comprises:

at least one magnetic element at least partially contained within the head-worn structure and configured to support a magnetic force that facilitates an electrical connection.

46. (Previously Presented) A system as recited in claim 44, wherein the head-worn personal electronic apparatus comprises:

a sensor at least partially contained within the head-worn structure and configured to sense data indicative of whether the head-worn personal electronic apparatus is being worn by the user,

wherein the head-worn personal electronic apparatus is configured to at least alter operation of the head-worn personal electronic apparatus based at least in part on the sensed data from the sensor.

47. (Previously Presented) A system as recited in claim 46, wherein the head-worn personal electronic apparatus is configured to support audio output to the user via the speaker, and

wherein the operation of the head-worn personal electronic apparatus being altered concerns control of the audio output being provided to the user.

48. (Previously Presented) A system as recited in claim 46, wherein the head-worn personal electronic apparatus is configured to support a low power operational mode, and

wherein the operation of the head-worn personal electronic apparatus being altered concerns operation of the head-worn personal electronic apparatus in the low power operational mode.

49. (Previously Presented) A system, comprising:

a head-worn personal electronic apparatus, including at least:

a head-worn structure configured to be worn by a user;

a speaker at least partially contained within the head-worn structure, the speaker being configured to be worn proximate to an ear of the user when the head-worn structure is being worn by the user;

a motion detector at least partially contained within the head-worn structure and configured to provide motion data pertaining to the head-worn personal electronic apparatus;

a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user;

a second microphone at least partially contained within the head-worn structure;

a rechargeable battery contained within the head-worn structure;

electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery;

wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery;

a radiation emitter at least partially contained within the head-worn structure and configured to at least direct radiation towards the user when at least the head-worn structure of the head-worn personal electronic apparatus is being worn;

a radiation detector at least partially contained within the head-worn structure and configured to detect at least a portion of the radiation from the radiation emitter that

is reflected back from the user when at least the head-worn structure of the head-worn personal electronic apparatus is being worn; and

at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and

a charging apparatus having at least a charging connector,

wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.

50. (Previously Presented) A system as recited in claim 49,

wherein the radiation detector is operatively connected to the electronic circuitry, and

wherein electronic circuitry within the head-worn structure is configured to facilitate determining whether the head-worn structure of the head-worn personal electronic apparatus is being worn by the user.

51. (Previously Presented) A system as recited in claim 50, wherein the head-worn personal electronic apparatus comprises:

at least one magnetic element at least partially contained within the head-worn structure and configured to support a magnetic force that facilitates an electrical connection.

52. (Currently Amended) A system as recited in claim 50,

wherein the second microphone is positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus,

wherein the electronic circuitry is configured to process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, and

wherein the head-worn personal electronic apparatus ~~device~~ is configured to receive a voice input via the first microphone, determine or receive a determination of a requested operation from the voice input using voice recognition, and control an operation by the head-worn personal electronic apparatus ~~device~~ based on the requested operation.

53. (Previously Presented) A system as recited in claim 50, wherein the head-worn personal electronic apparatus is configured to at least alter operation of the head-worn personal electronic apparatus based at least in part on the determination of whether the head-worn structure of the head-worn personal electronic apparatus is being worn by the user based on at least the motion data.

54. (Currently Amended) A system as recited in claim 53, wherein the head-worn personal electronic apparatus is configured to support audio output to the user via the speaker, and

wherein the operation of the head-worn personal electronic apparatus being altered concerns control of the audio output being provided to the user.

55. (Currently Amended) A system as recited in claim 53, wherein the head-worn personal electronic apparatus is configured to support a low power operational mode, and

wherein the operation of the head-worn personal electronic apparatus being altered concerns operation of the head-worn personal electronic apparatus in the low power operational mode.

56. (Previously Presented) A system as recited in claim 50, wherein the radiation detector is an infrared radiation detector, and wherein the radiation being detected by the radiation detector includes infrared radiation.

57. (Previously Presented) A system as recited in claim 56, wherein the first microphone is positioned to be directed forward towards the user's front when the head-

worn structure is being worn by the user, and the second microphone is positioned to be directed outward away from the user's head when the head-worn structure is being worn by the user.

58. (Previously Presented) A system as recited in claim 57, wherein the head-worn personal electronic apparatus is configured to at least alter operation of the head-worn personal electronic apparatus based at least in part on the determination of whether the head-worn structure of the head-worn personal electronic apparatus is being worn by the user.

59. (Currently Amended) A system as recited in claim 58,

wherein the second microphone is positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus,

wherein the electronic circuitry is configured to process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, and

wherein the head-worn personal electronic apparatus ~~device~~ is configured to receive a voice input via the first microphone, determine or receive a determination of a requested operation from the voice input using voice recognition, and control an operation by the head-worn personal electronic apparatus ~~device~~ based on the requested operation.

60. (Previously Presented) A system as recited in claim 59,

wherein the motion detector comprises an accelerometer, and

wherein the system comprises a Hall effect detector.

61. (Previously Presented) A system as recited in claim 49, wherein the head-worn personal electronic apparatus comprises:

a force sensor at least partially contained within the head-worn structure and configured to sense a force input associated with the user, wherein the sensed force input operating to at least alter operation of the head-worn electronic personal audio apparatus.

62. (Currently Amended) A system as recited in claim 61, wherein the head-worn electronic personal audio apparatus is configured to support audio output to the user via the speaker, and

wherein the at least one operation of the head-worn electronic personal audio apparatus being altered concerns control of the audio output being provided to the user.

63. (Currently Amended) A system as recited in claim 61, wherein the head-worn personal electronic apparatus is configured to support voice calls to the user, and

wherein the at least one operation of the head-worn personal electronic apparatus being altered concerns at least accepting or declining a voice call to the user.

64. (Previously Presented) A system as recited in claim 49, wherein the first microphone is positioned to be directed forward towards the user's front when the head-worn structure is being worn by the user, and the second microphone is positioned to be directed outward away from the user's head when the head-worn structure is being worn by the user.

65. (Previously Presented) A system as recited in claim 40, wherein the head-worn structure comprises:

an accelerometer, operatively connected to the rechargeable battery, at least partially contained within the head-worn structure and configured to sense movement data.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: HOWELL et al.	Attorney Docket No.: IPVCP003X1C4X1C1
Application No.: 18/375,893	Examiner: LEI, JIE
Filed: October 2, 2023	Group: 2872
Title: SYSTEM FOR CHARGING EMBEDDED BATTERY IN WIRELESS HEAD-WORN PERSONAL ELECTRONIC DEVICES	

AMENDMENT UNDER 37 CFR 1.312

Mail Stop _____
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Further to the Notice of Allowance mailed February 22, 2024, please amend the above-identified as follows:

Amendments to the Claims are reflected in the listing of claims which begin on page 2 of this paper.

Remarks/Arguments begin on page 19 of this paper.

REMARKS

Further to the Notice of Allowance, claims 3, 4, 11, 15, 16, 22, 26, 30, 43, 44, 52, 54, 55, 59, 62 and 63 have been amended to correct minor informalities. Claims 1-8, 10-26, 29-34 and 38-65 remain pending. Entry of this Amendment is respectfully requested.

Respectfully submitted,

/C. Douglass Thomas/

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Reg. No. 32,947

(650) 903-9200, x103

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: HOWELL et al.	Attorney Docket No.: IPVCP003X1C4X1C1
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AMENDMENT UNDER 37 CFR 1.312 [Revised]

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Dear Sir:

Further to the Notice of Allowance mailed February 22, 2024, please amend the above-identified as follows:

Amendments to the Claims are reflected in the listing of claims which begin on page 2 of this paper.

Remarks/Arguments begin on page 19 of this paper.

AMENDMENTS TO THE CLAIMS:

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Previously Presented) A system, comprising:

a head-worn personal electronic apparatus, including at least:

a head-worn structure configured to be worn by a user;

a speaker at least partially contained within the head-worn structure, the speaker being configured to be worn proximate to an ear of the user when the head-worn structure is being worn by the user;

a touch sensitive surface at least partially contained within the head-worn structure and configured to sense a touch input associated with the user;

a rechargeable battery contained within the head-worn structure;

electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery, and the electronic circuitry being electrically connected to the touch sensitive surface;

wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and

at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and

a charging apparatus having at least a charging connector,

wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.

2. (Previously Presented) A system as recited in claim 1, wherein the sensed touch input by the touch sensitive surface operates to at least alter operation of the head-worn personal electronic apparatus.

3. (Previously Presented) A system as recited in claim 2, wherein the head-worn personal electronic apparatus is configured to support voice calls to the user, and

wherein the at least one operation of the head-worn personal electronic apparatus being altered concerns at least accepting or declining a voice call to the user.

4. (Currently Amended) A system as recited in claim 2, wherein the head-worn personal electronic apparatus is configured to support audio output to the user via the speaker, and

wherein the at least one operation of the head-worn personal electronic apparatus being altered concerns control of the audio output being provided to the user.

5. (Previously Presented) A system as recited in claim 2, wherein the head-worn personal electronic apparatus is configured to distinguish at least a direction of the user input with respect to the touch sensitive surface.

6. (Previously Presented) A system as recited in claim 2, wherein the head-worn personal electronic apparatus is configured to detect at least a sliding of a finger action with respect to the touch sensitive surface.

7. (Previously Presented) A system as recited in claim 2, wherein the head-worn personal electronic apparatus is configured to facilitate determination at least whether the user input pertains to a forward sliding action or a backward sliding action with respect to the touch sensitive surface.

8. (Previously Presented) A system as recited in claim 1, wherein the head-worn structure comprises:

a physical condition sensor at least partially contained within the head-worn structure and configured to acquire data pertaining to a physical condition of the user, the

physical condition sensor being provided at least partially contained within the head-worn structure.

9. (Canceled).

10. (Previously Presented) A system as recited in claim 1, wherein the head-worn personal electronic apparatus comprises:

at least one magnetic element at least partially contained within the head-worn structure and configured to support a magnetic force that facilitates an electrical connection.

11. (Currently Amended) A system as recited in claim 1, wherein the head-worn personal electronic apparatus comprises:

a microphone at least partially contained within the head-worn structure,

wherein the head-worn personal electronic apparatus ~~device~~ is configured to receive a voice input via the microphone, determine or receive a determination of a requested operation from the voice input using voice recognition, and control an operation by the head-worn personable electronic apparatus ~~device~~ based on the requested operation.

12. (Previously Presented) A system as recited in claim 1, wherein the head-worn structure comprises:

a radiation sensor, operatively connected to the rechargeable battery, at least partially contained within the head-worn structure and configured to sense radiation.

13. (Previously Presented) A system as recited in claim 1, wherein the head-worn personal electronic apparatus comprises:

a sensor at least partially contained within the head-worn structure and configured to sense data indicative of whether the head-worn personal electronic apparatus is being worn by the user.

14. (Previously Presented) A system as recited in claim 13, wherein the sensor is electrically connected to the electronic circuitry, and wherein the electronic circuitry contained within the head-worn structure of the head-worn personal electronic apparatus is configured to at least alter operation of the head-worn personal electronic apparatus based at least in part on the sensed data from the sensor.

15. (Currently Amended) A system as recited in claim 14, wherein the head-worn personal electronic apparatus is configured to support audio output to the user via the speaker, and

wherein the operation of the head-worn personal electronic apparatus being altered concerns control of the audio output being provided to the user.

16. (Currently Amended) A system as recited in claim 14, wherein the head-worn personal electronic apparatus is configured to support a low power operational mode, and

wherein the operation of the head-worn personal electronic apparatus being altered concerns operation of the head-worn personal electronic apparatus in the low power operational mode.

17. (Previously Presented) A system as recited in claim 1, wherein the system comprises:

a Hall effect detector configured to capture data associated with a magnetic characteristic.

18. (Previously Presented) A system as recited in claim 1, wherein the head-worn personal electronic apparatus comprises:

a bone conducting element at least partially contained within the head-worn structure and configured to operate in accordance with acoustic characteristics, the bone conducting element being operatively connected to the electronic circuitry.

19. (Currently Amended) A system, comprising:

a head-worn personal electronic apparatus, including at least:

a head-worn structure configured to be worn by a user;

a speaker at least partially contained within the head-worn structure, the speaker being configured to be at or adjacent ~~worn proximate~~ to an ear of the user when the head-worn structure is being worn by the user;

a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user;

a second microphone at least partially contained within the head-worn structure, the second microphone being positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus;

a rechargeable battery contained within the head-worn structure;

a sensor at least partially contained within the head-worn structure and configured to capture data;

electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least one or more of the first microphone, the second microphone, the rechargeable battery and the sensor, the electronic circuitry being configured to at least process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, the electronic circuitry being configured to process at least the data captured by the sensor, and the electronic circuitry being configured to determine whether the head-worn structure is being worn by a user based on at least the processed sensor data;

wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and

at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and

a charging apparatus having at least a charging connector,

wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.

20. (Previously Presented) A system as recited in claim 19, wherein the first microphone is positioned to be directed forward towards the user's front when the head-worn structure is being worn by the user, and the second microphone is positioned to be directed outward away from the user's head when the head-worn structure is being worn by the user.

21. (Original) A system as recited in claim 20, wherein the head-worn personal electronic apparatus comprises:

a touch sensitive surface at least partially contained within the head-worn structure and configured to sense a touch input associated with the user, wherein the sensed touch input operating to at least alter operation of the head-worn electronic personal audio apparatus.

22. (Currently Amended) A system as recited in claim 21, wherein the head-worn electronic personal audio apparatus is configured to support audio output to the user via the speaker, and

wherein the at least one operation of the head-worn electronic personal audio apparatus being altered concerns control of the audio output being provided to the user.

23. (Previously Presented) A system as recited in claim 21, wherein the system comprises:

a Hall effect detector configured to capture data associated with a magnetic characteristic.

24. (Previously Presented) A system as recited in claim 19, wherein the sensor is positioned to be directed towards the user's head when the head-worn structure is being worn.

25. (Previously Presented) A system as recited in claim 24, wherein the data captured by the sensor is dependent on thermal characteristics of the user's head when the head-worn structure is being worn.

26. (Currently Amended) A system as recited in claim 19, wherein the head-worn personal electronic apparatus ~~comprises: wherein the head-worn personal electronic device~~ is configured to receive a voice input via the first microphone, determine or receive a determination of a requested operation from the voice input using voice recognition, and control an operation by the head-worn personal electronic apparatus ~~device~~ based on the requested operation.

27. (Canceled).

28. (Canceled).

29. (Previously Presented) A system as recited in claim 19, wherein the head-worn personal electronic apparatus is configured to at least alter operation of the head-worn personal electronic apparatus based at least in part on the sensed data from the sensor.

30. (Currently Amended) A system as recited in claim 29, wherein the head-worn personal electronic apparatus is configured to support audio output to the user via the speaker, and

wherein the operation of the head-worn personal electronic apparatus being altered concerns control of the audio output being provided to the user.

31. (Original) A system as recited in claim 19, wherein the head-worn personal electronic apparatus comprises:

a user input device supported by the head-worn structure, the user input device being configured to receive a user input, the user input device is based on at least capacitive effect, wherein the user input being received induces at least a capacitive change to produce at least an electrical response.

32. (Original) A system as recited in claim 31, wherein the user input device is configured to distinguish at least a direction of the user input with respect to the user input device.

33. (Original) A system as recited in claim 31, wherein the electronic circuitry is electrically connected to the user input device to receive user input data from the user input device, and wherein the head-worn personal electronic apparatus is configured to detect at least a sliding of a finger action with respect to the user input device using at least the electronic circuitry and the user input data.

34. (Original) A system as recited in claim 31, wherein the electronic circuitry is electrically connected to the user input device to receive user input data from the user input device, and wherein the head-worn personal electronic apparatus is configured to distinguish at least whether the user input pertains to a forward sliding action or a backward sliding action with respect to the user input device using at least the electronic circuitry and the user input data.

35. (Canceled).

36. (Canceled).

37. (Canceled).

38. (Previously Presented) A system as recited in claim 19, wherein the system comprises:

a Hall effect detector.

39. (Original) A system as recited in claim 19, wherein the head-worn personal electronic apparatus comprises:

a bone conducting element at least partially contained within the head-worn structure and configured to operate based on signals associated with sound, the bone conducting element being operatively connected to the electronic circuitry.

40. (Previously Presented) A system, comprising:

a head-worn personal electronic apparatus, including at least:

a head-worn structure configured to be worn by a user;

a speaker at least partially contained within the head-worn structure, the speaker being configured to be worn proximate to an ear of the user when the head-worn structure is being worn by the user;

a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user;

a second microphone at least partially contained within the head-worn structure, the second microphone being positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus;

a rechargeable battery contained within the head-worn structure;

a "being worn" sensor at least partially contained within the head-worn structure and configured to detect data indicative of whether the head-worn structure of the head-worn personal electronic apparatus is being worn;

electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least one or more of the first microphone, the second microphone, the rechargeable battery and the "being worn" sensor, the electronic circuitry being configured to at least process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, the electronic circuitry being configured to process at least the detected data captured by the "being worn" sensor;

wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and

at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and

a charging apparatus having at least a charging connector,

wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.

41. (Previously Presented) A system as recited in claim 40, wherein the detected data by the "being worn" sensor is dependent on a physical characteristic of the user.

42. (Original) A system as recited in claim 19, wherein the conductive element is a conductive pad.

43. (Currently Amended) A system, comprising:

a head-worn personal electronic apparatus, including at least:

a head-worn structure configured to be worn by a user;

a speaker at least partially contained within the head-worn structure, the speaker being configured to be at or adjacent ~~worn proximate~~ to an ear of the user when the head-worn structure is being worn by the user;

a motion detector at least partially contained within the head-worn structure and configured to provide motion data pertaining to the head-worn personal electronic apparatus;

a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user;

a second microphone at least partially contained within the head-worn structure, the second microphone being positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus;

a touch sensitive surface at least partially contained within the head-worn structure and configured to sense a touch input associated with the user, wherein the sensed touch input operating to at least alter operation of the head-worn electronic personal audio apparatus; [[.]]

a rechargeable battery contained within the head-worn structure;

electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery;

wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery; and

at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and

a charging apparatus having at least a charging connector,

wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.

44. (Currently Amended) A system as recited in claim 43, wherein the head-worn personal electronic apparatus comprises:

wherein the electronic circuitry is configured to process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, and

wherein the head-worn personal electronic apparatus ~~device~~ is configured to receive a voice input via the first microphone, determine or receive a determination of a requested operation from the voice input using voice recognition, and control an operation by the head-worn personal electronic apparatus ~~device~~ based on the requested operation.

45. (Previously Presented) A system as recited in claim 44, wherein the head-worn personal electronic apparatus comprises:

at least one magnetic element at least partially contained within the head-worn structure and configured to support a magnetic force that facilitates an electrical connection.

46. (Previously Presented) A system as recited in claim 44, wherein the head-worn personal electronic apparatus comprises:

a sensor at least partially contained within the head-worn structure and configured to sense data indicative of whether the head-worn personal electronic apparatus is being worn by the user,

wherein the head-worn personal electronic apparatus is configured to at least alter operation of the head-worn personal electronic apparatus based at least in part on the sensed data from the sensor.

47. (Previously Presented) A system as recited in claim 46, wherein the head-worn personal electronic apparatus is configured to support audio output to the user via the speaker, and

wherein the operation of the head-worn personal electronic apparatus being altered concerns control of the audio output being provided to the user.

48. (Previously Presented) A system as recited in claim 46, wherein the head-worn personal electronic apparatus is configured to support a low power operational mode, and

wherein the operation of the head-worn personal electronic apparatus being altered concerns operation of the head-worn personal electronic apparatus in the low power operational mode.

49. (Currently Amended) A system, comprising:

a head-worn personal electronic apparatus, including at least:

a head-worn structure configured to be worn by a user;

a speaker at least partially contained within the head-worn structure, the speaker being configured to be at or adjacent ~~worn proximate~~ to an ear of the user when the head-worn structure is being worn by the user;

a motion detector at least partially contained within the head-worn structure and configured to provide motion data pertaining to the head-worn personal electronic apparatus;

a first microphone at least partially contained within the head-worn structure, the first microphone being positioned to pick up at least audio input from at least the user;

a second microphone at least partially contained within the head-worn structure;

a rechargeable battery contained within the head-worn structure;

electronic circuitry contained within the head-worn structure, the electronic circuitry being electrically connected to at least the rechargeable battery;

wireless communication circuitry at least partially contained within the head-worn structure, the wireless communication circuitry being electrically connected to at least the rechargeable battery;

a radiation emitter at least partially contained within the head-worn structure and configured to at least direct radiation towards the user when at least the head-worn structure of the head-worn personal electronic apparatus is being worn;

a radiation detector at least partially contained within the head-worn structure and configured to detect at least a portion of the radiation from the radiation emitter that

is reflected back from the user when at least the head-worn structure of the head-worn personal electronic apparatus is being worn; and

at least one conductive element at least partially included within the head-worn structure, the at least one conductive element being at least partially exposed to enable interconnection therewith, the at least one conductive element being electrically connected to at least the rechargeable battery; and

a charging apparatus having at least a charging connector,

wherein on placement of the head-worn personal electronic apparatus in the charging apparatus, electrical connection results at least from the at least one conductive element connecting with the charging connector, and thereby the rechargeable battery of the head-worn personal electronic apparatus is able to be recharged while the head-worn personal electronic apparatus is placed in the charging apparatus.

50. (Previously Presented) A system as recited in claim 49,

wherein the radiation detector is operatively connected to the electronic circuitry, and

wherein electronic circuitry within the head-worn structure is configured to facilitate determining whether the head-worn structure of the head-worn personal electronic apparatus is being worn by the user.

51. (Previously Presented) A system as recited in claim 50, wherein the head-worn personal electronic apparatus comprises:

at least one magnetic element at least partially contained within the head-worn structure and configured to support a magnetic force that facilitates an electrical connection.

52. (Currently Amended) A system as recited in claim 50,

wherein the second microphone is positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus,

wherein the electronic circuitry is configured to process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, and

wherein the head-worn personal electronic apparatus ~~device~~ is configured to receive a voice input via the first microphone, determine or receive a determination of a requested operation from the voice input using voice recognition, and control an operation by the head-worn personal electronic apparatus ~~device~~ based on the requested operation.

53. (Previously Presented) A system as recited in claim 50, wherein the head-worn personal electronic apparatus is configured to at least alter operation of the head-worn personal electronic apparatus based at least in part on the determination of whether the head-worn structure of the head-worn personal electronic apparatus is being worn by the user based on at least the motion data.

54. (Currently Amended) A system as recited in claim 53, wherein the head-worn personal electronic apparatus is configured to support audio output to the user via the speaker, and

wherein the operation of the head-worn personal electronic apparatus being altered concerns control of the audio output being provided to the user.

55. (Currently Amended) A system as recited in claim 53, wherein the head-worn personal electronic apparatus is configured to support a low power operational mode, and

wherein the operation of the head-worn personal electronic apparatus being altered concerns operation of the head-worn personal electronic apparatus in the low power operational mode.

56. (Previously Presented) A system as recited in claim 50, wherein the radiation detector is an infrared radiation detector, and wherein the radiation being detected by the radiation detector includes infrared radiation.

57. (Previously Presented) A system as recited in claim 56, wherein the first microphone is positioned to be directed forward towards the user's front when the head-

worn structure is being worn by the user, and the second microphone is positioned to be directed outward away from the user's head when the head-worn structure is being worn by the user.

58. (Previously Presented) A system as recited in claim 57, wherein the head-worn personal electronic apparatus is configured to at least alter operation of the head-worn personal electronic apparatus based at least in part on the determination of whether the head-worn structure of the head-worn personal electronic apparatus is being worn by the user.

59. (Currently Amended) A system as recited in claim 58,

wherein the second microphone is positioned to pick up at least environmental audio input associated with an environment around the head-worn personal electronic apparatus,

wherein the electronic circuitry is configured to process the audio input from at least the user via the first microphone to remove at least a portion of the environmental audio input associated with the environment picked up via the second microphone, and

wherein the head-worn personal electronic apparatus ~~device~~ is configured to receive a voice input via the first microphone, determine or receive a determination of a requested operation from the voice input using voice recognition, and control an operation by the head-worn personal electronic apparatus ~~device~~ based on the requested operation.

60. (Previously Presented) A system as recited in claim 59,

wherein the motion detector comprises an accelerometer, and

wherein the system comprises a Hall effect detector.

61. (Previously Presented) A system as recited in claim 49, wherein the head-worn personal electronic apparatus comprises:

a force sensor at least partially contained within the head-worn structure and configured to sense a force input associated with the user, wherein the sensed force input operating to at least alter operation of the head-worn electronic personal audio apparatus.

62. (Currently Amended) A system as recited in claim 61, wherein the head-worn electronic personal audio apparatus is configured to support audio output to the user via the speaker, and

wherein the at least one operation of the head-worn electronic personal audio apparatus being altered concerns control of the audio output being provided to the user.

63. (Currently Amended) A system as recited in claim 61, wherein the head-worn personal electronic apparatus is configured to support voice calls to the user, and

wherein the at least one operation of the head-worn personal electronic apparatus being altered concerns at least accepting or declining a voice call to the user.

64. (Previously Presented) A system as recited in claim 49, wherein the first microphone is positioned to be directed forward towards the user's front when the head-worn structure is being worn by the user, and the second microphone is positioned to be directed outward away from the user's head when the head-worn structure is being worn by the user.

65. (Previously Presented) A system as recited in claim 40, wherein the head-worn structure comprises:

an accelerometer, operatively connected to the rechargeable battery, at least partially contained within the head-worn structure and configured to sense movement data.

REMARKS

Further to the Notice of Allowance, claims 3, 4, 11, 15, 16, 19, 22, 26, 30, 43, 44, 49, 52, 54, 55, 59, 62 and 63 have been amended to correct minor informalities. Claims 1-8, 10-26, 29-34 and 38-65 remain pending. Entry of this Amendment is respectfully requested.

Respectfully submitted,

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/375,893	**02/27/2024 09:52:35 PM Z ET**	**IPVCP003X1C4X1C1**

Title of Invention

SYSTEM FOR CHARGING EMBEDDED BATTERY IN WIRELESS HEAD-WORN PERSONAL ELECTRONIC APPARATUS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	4776	FILED BY	Angela Nijim
PATENT CENTER #	64472390	FILING DATE	10/02/2023
CUSTOMER #	34071	FIRST NAMED INVENTOR	Thomas A. Howell
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Peter Tong

Documents

TOTAL DOCUMENTS: 2

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
IPVCP003X1C4X1C1_Amd_312_Revised_AsFiled_2-27-24-APP.TEXT.docx	19	Application body structured text document	34 KB
Warning: The automatic document description has been replaced.			
IPVCP003X1C4X1C1_Amd_312_Revised_AsFiled_2-27-24.pdf	19	Auxiliary PDF of Application	88 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)

IPVCP003X1C4X1C1_Amd_312_Revised_AsFiled_2-27-24-APP.TEXT.docx	4663E7F183C89AD7F958800F001301D6ECE738842B49A94D39268D149450E4B545B91EF934C87F8F929323FD9333E11DBEF4F71C805D18E2BDF705CFC0435E96
IPVCP003X1C4X1C1_Amd_312_Revised_AsFiled_2-27-24.pdf	13F25B5BBF634DE0D9300D418798AEA1D8692B30B99158BF17E6938285D063C10D9AAEBF6BC9FFAD09596510C30028A1EF3AD2318028823D949B4963EEA4AC41

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/375,893	**03/29/2024 04:10:03 PM Z ET**	**IPVCP003X1C4X1C1**

Title of Invention

SYSTEM FOR CHARGING EMBEDDED BATTERY IN WIRELESS HEAD-WORN PERSONAL ELECTRONIC APPARATUS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	4776	FILED BY	Peter Tong
PATENT CENTER #	64898672	AUTHORIZED BY	-
CUSTOMER #	34071	FILING DATE	10/02/2023
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Thomas A. Howell

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
DA / 503874	**E20243SG14105404**	**Peter Tong**

PRE-AUTHORIZED ACCOUNT	PRE-AUTHORIZED CATEGORY
503874	**37 CFR 1.21 (Miscellaneous fees and charges)**

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
1464	PETITIONS REQUIRING THE PETITION FEE SET FORTH IN 37 CFR 1.17(H) (GROUP III)	140.00	1	140.00
1801	REQUEST FOR CONTINUED EXAMINATION (RCE) - 1ST REQUEST (SEE 37 CFR 1.114)	1360.00	1	1360.00
			TOTAL AMOUNT:	**$1,500.00**

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES
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PETITION TO WITHDRAW AN APPLICATION FROM ISSUE AFTER PAYMENT OF THE ISSUE FEE UNDER 37 CFR 1.313(c)(2)

APPLICATION #	ATTORNEY DOCKET #	FILING DATE
18375893	IPVCP003X1C4X1C1	10/02/2023

Title of Invention

SYSTEM FOR CHARGING EMBEDDED BATTERY IN WIRELESS HEAD-WORN PERSONAL ELECTRONIC APPARATUS

Application Information

CONFIRMATION #	**4776**	FILING DATE	**10/02/2023**
ART UNIT	**2872**	FIRST NAMED INVENTOR	**Thomas Howell**
EXAMINER	**JIE LEI**		

An application may be withdrawn from issue for further action upon petition by the applicant. To request that the Office withdraw an application from issue, applicant must file a petition under this section including the fee set forth in § 1.17(h) and a showing of good and sufficient reasons why withdrawal of the application from issue is necessary.

APPLICANT HEREBY PETITIONS TO WITHDRAW THIS APPLICATION FROM ISSUE UNDER 37 CFR 1.313(c).

A grantable petition requires the following items:

(1) Petition fee; and
(2) One of the following reasons: A grantable petition requires the following items: (a) Unpatentability of one or more claims, which must be accompanied by an unequivocal statement that one or more claims are unpatentable, an amendment to such claim or claims, and an explanation as to how the amendment causes such claim or claims to be patentable;
(b) Consideration of a request for continued examination in compliance with § 1.114 (for a utility or plant application only); or
(c) Express abandonment of the application. Such express abandonment may be in favor of a continuing application, but not a CPA under 37 CFR 1.53(d).

Reason for withdrawal

Consideration of a request for continued examination (Quick Path Information Disclosure Statement) - RCE request, submission, and fee are attached

Applicant claims the following entity status

Regular Undiscounted

Signature

I certify, in accordance with 37 CFR 1.4(d)(4) that I am:
An attorney or agent registered to practice before the Patent and Trademark Office who has been given power of attorney in this application

Signature	Name	Registration #
/Peter Tong/	Peter Tong	35757

Doc Code: QPIDS.REQ
Document Description: QuickPath Information Disclosure Statement

PTO/SB/09 (11-23)

CERTIFICATION AND REQUEST FOR CONSIDERATION OF AN INFORMATION DISCLOSURE STATEMENT FILED AFTER PAYMENT OF THE ISSUE FEE UNDER THE QPIDS PROGRAM

Non-Provisional Application Number: 18375893	Filing Date: October 2, 2023
First Named Inventor: Thomas A. Howell	Title of Invention: SYSTEM FOR CHARGING EMBEDDED BATTERY IN WIRELESS HEAD-WORN PERSONAL ELEC

THE UNDERSIGNED HEREBY CERTIFIES AND REQUESTS THE FOLLOWING FOR THE ABOVE-IDENTIFIED APPLICATION.

1. Consideration is requested of the information disclosure statement (IDS) submitted herewith, which is being filed after payment of the issue fee.
2. Check the box next to the appropriate selection:

   ☐ Each item of information contained in the IDS was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the IDS. See 37 CFR 1.97(e)(1).

   OR

   ☑ No item of information contained in the IDS was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the IDS was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the IDS. See 37 CFR 1.97(e)(2).

   OR

   ☐ See attached certification statement in compliance with 37 CFR 1.97(e).
3. Please charge the IDS fee set forth in 37 CFR 1.17(p) to Deposit Account No. 503874.
4. A Petition to Withdraw from Issue After Payment of the Issue Fee (37 CFR 1.313(c)(2)), including the petition fee set forth in 37 CFR 1.17(h), is submitted herewith as a **Web-based ePetition**.
   WARNING: Do not submit the petition as a follow-on paper via the USPTO patent electronic filing system. Submit the petition as a Web-based ePetition by signing on to the USPTO patent electronic filing system as a registered user, selecting "Petitions" in the top menu or by using the display cards, and then selecting the appropriate Petition to Withdraw from Issue after Payment of the Issue Fee (for automatic processing and immediate grant, if all petitions requirements are met). Failure to use a Web-based ePetition will result in automatic entry of the RCE.
5. A request for continued examination (RCE) under 37 CFR 1.114 and the RCE fee under 37 CFR 1.17(e) are submitted herewith.
6. The RCE will be treated as a "conditional" RCE. In the event the examiner determines that any item of information contained in the IDS necessitates the reopening of prosecution in the application, the undersigned understands that (i) the RCE will be processed and treated as an RCE under 37 CFR 1.114 and therefore (ii) the IDS fee under 37 CFR 1.17(p) will be returned in accordance with 37 CFR 1.97(b)(4). In the event that no item of information in the IDS necessitates reopening prosecution, the undersigned understands that the RCE will not be processed and the RCE fee under 37 CFR 1.17(e) will be returned.
7. This certification and request is being filed as a **Web-based ePetition** and is not accompanied by an amendment to the application. Inclusion of an amendment will result in automatic entry of the RCE.

Signature /C. Douglass Thomas/	Date March 29, 2024
Name (Print/Typed) C. Douglass Thomas	Practitioner Registration Number (If applicable) 32947

Note: *Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required in accordance with 37 CFR 1.33 and 11.18. Please see 37 CFR 1.4(d) for the form of the signature. If necessary, submit multiple forms for more than one signature, see below.**

☑ *Total of 1 forms are submitted.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

Routine uses of the information in this record may include disclosure to:

1) law enforcement, in the event that the system of records indicates a violation or potential violation of law;

2) a federal, state, local, or international agency, in response to its request;

3) a contractor of the USPTO having need for the information in order to perform a contract;

4) the Department of Justice for determination of whether the Freedom of Information Act (FOIA) requires disclosure of the record;

5) a Member of Congress submitting a request involving an individual to whom the record pertains, when the individual has requested the Member's assistance with respect to the subject matter of the record;

6) a court, magistrate, or administrative tribunal, in the course of presenting evidence, including disclosures to opposing counsel in the course of settlement negotiations;

7) the Administrator, General Services Administration (GSA), or their designee, during an inspection of records conducted by GSA under authority of 44 U.S.C. 2904 and 2906, in accordance with the GSA regulations and any other relevant (i.e., GSA or Commerce) directive, where such disclosure shall not be used to make determinations about individuals;

8) another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c));

9) the Office of Personnel Management (OPM) for personnel research purposes; and

10) the Office of Management and Budget (OMB) for legislative coordination and clearance.

If you do not furnish the information requested on this form, the USPTO may not be able to process and/or examine your submission, which may result in termination of proceedings, abandonment of the application, and/or expiration of the patent.

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/375,893	**03/29/2024 04:10:03 PM Z ET**	**IPVCP003X1C4X1C1**

Title of Invention

SYSTEM FOR CHARGING EMBEDDED BATTERY IN WIRELESS HEAD-WORN PERSONAL ELECTRONIC APPARATUS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	4776	FILED BY	Peter Tong
PATENT CENTER #	64898672	FILING DATE	10/02/2023
CUSTOMER #	34071	FIRST NAMED INVENTOR	Thomas A. Howell
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 5

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
petition-request.pdf	2	ePetition Request Form	29 KB
IPVCP003X1C4X1C1_QPIDS_3-24.pdf	2	Quick Path Information Disclosure Statement	201 KB
IPVCP003X1C4X1C1_RCE_AsFiled_3-24.pdf	3	Request for Continued Examination (RCE)	84 KB
Warning: This is not a USPTO supplied RCE fillable form. Data in the form cannot be automatically loaded to other USPTO systems.			
IPVCP003X1C4X1C1_IDSTransAfterIssueFee_3-24.pdf	2	Letter specifying the conditions for filing under 37 CFR 1.97	21 KB
IPVCP003X1C4X1C1_1449_3-24.pdf	3	Information Disclosure Statement (IDS) Form (SB08)	41 KB

Warning: This is not a USPTO supplied IDS fillable form. Data in the form cannot be automatically loaded to other USPTO systems.

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
petition-request.pdf	B2E07DE61F9DA00537365F1B0D75DC2C84785141EA4D733E8 CCECF94A1A92160D9E54F60C9609DC1D9BCB3DD294190FB3 93DCE98817B9301A22DB31C3544F3D1
IPVCP003X1C4X1C1_QPIDS_ 3-24.pdf	440F12592595AC0E3DD74A75BC8F0FADE09468A30A1978E67 C86C9D604764C3DEA9D75A0FB99FE4CC956689915FDEE38E 57D4804CC865CB3FD1E256567E08033
IPVCP003X1C4X1C1_RCE_As Filed_3-24.pdf	78214220A99C2891A97F85362EBAC04FD0D50D79905E5FF53 D09D8FF67F868888AC5AF8641BDF14E747A1C7DDF1E4E379 5070D7B17C650625CA2B04D20BE16C7
IPVCP003X1C4X1C1_IDSTran sAfterIssueFee_3-24.pdf	83BEDF6336D5A62A426F2F596F1A7F50DE65B958537770B1B 9832380D366FF452C6C149309ED27D87CB1040594EB4DC35E 7E10A6188A7EA9B0B0A7B06AC8A3D5
IPVCP003X1C4X1C1_1449_3- 24.pdf	56331D8F545121F565EB8F7E5531410E64C139A436E19E971A 65D57CC48D91C7245811C089A3C16167283FA265E8110E89C 8426374884B2C6E3D9AA3057EFBD1

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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GRANT LETTER

APPLICATION #	DECISION DATE	DECISION ON PETITION #	ATTORNEY DOCKET NUMBER
18/375,893	03/29/2024		IPVCP003X1C4X1C1

Title of Invention

SYSTEM FOR CHARGING EMBEDDED BATTERY IN WIRELESS HEAD-WORN PERSONAL ELECTRONIC APPARATUS

In re Application of Thomas Howell

This is an electronic decision on the petition under , filed March 29, 2024 to withdraw the above-identified application from issue after payment of the issue fee.

The request is **GRANTED.**

Petitioner is advised that the issue fee paid in this application cannot be refunded. If, however, this application is again allowed, petitioner may request that it be applied towards the issue fee required by the new Notice of Allowance.

The application is being referred to Technology Center AU for

Telephone inquired concerning this decision should be directed to the Patent Electronic Business Center (EBC) at 866-217-9197.

Office of Petitions

Form 1449 (Modified) **Information Disclosure Statement By Applicant** (Use Several Sheets if Necessary)	Atty. Docket No.	IPVCP003X1C4X1C1
	Application No.:	18/375,893
	Applicant	HOWELL et al.
	Filing Date	October 2, 2023
	Group	2872
		Page 1 of 3

U.S. Patent Documents

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-class	Filing Date
	1.	2003/0030597 A1	Feb-03	Geist			
	2.	2005/0281440 A1	Dec-05	Pemer			
	3.	2006/0203183 A1	Sep-06	Jannard et al.			
	4.	2007/0182812 A1	Aug-07	Ritchey			
	5.	2008/0024594 A1	Jan-08	Ritchey			
	6.	2020/0363835 A1	Nov-20	Blum et al.			
	7.	4,852,988	Aug-89	Velez et al.			
	8.	4,882,598	Nov-89	Wulf			
	9.	4,975,584	Dec-90	Benjamin et al.			
	10.	5,184,156	Feb-93	Black et al.			
	11.	5,495,576	Feb-96	Ritchey			
	12.	5,583,795	Dec-96	Smyth			
	13.	5,841,507	Nov-98	Barnes			
	14.	5,966,680	Oct-99	Butnaru			
	15.	6,099,124	Aug-00	Hidaji			
	16.	6,163,281	Dec-00	Torch			
	17.	6,244,703 B1	Jun-01	Resnikoff et al.			
	18.	6,433,760 B1	Aug-02	Vaissie et al.			
	19.	6,491,391 B1	Dec-02	Blum et al.			
	20.	6,563,532 B1	May-03	Strub et al.			
	21.	6,771,294 B1	Aug-04	Pulli et al			
	22.	6,847,336 B1	Jan-05	Lemelson et al.			
	23.	6,943,754 B2	Sep-05	Aughey et al.			
	24.	6,977,776 B2	Dec-05	Volkenandt et al.			
	25.	7,148,489 B2	Dec-06	Yagi			
	26.	7,150,526 B2	Dec-06	Jannard et al.			
	27.	7,278,734 B2	Oct-07	Jannard et al			

Examiner	Date Considered

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

	28.	7,347,551 B2	Mar-08	Fergason et al.				
	29.	7,488,294 B2	Feb-09	Torch				
	30.	7,651,220 B1	Jan-10	Pattikonda				
	31.	8,408,699 B2	Apr-13	Blum et al.				
	32.	8,931,896 B2	Jan-15	Blum et al.				

Foreign Documents

							Translation	
Init.		Document No.	Date	Country	Class	Subclass	Yes	No
		CA 2,233,047C	Mar-98	Canada				
		CA 2,316,473 A1	Jul-00	Canada				
		CA 2,362,895 A1	Dec-02	Canada				
		CA 2,388,766 A1	Dec-03	Canada				
		CA 2,435,873C	Mar-04	Canada				
		EP 0441791B1	Aug-91	Europe				
		H02-102521 U	Aug-90	Japan			X	
		H02-159272 A	Jun-90	Japan			X	
		JP 6275987	Feb-18	Japan			X	
		JP 63-153218	Oct-88	Japan			X	
		WO 01/84095 A1	Nov-01	WIPO				
		WO 02/086599 A1	Oct-02	WIPO				
		WO 03/062906 A1	July-03	WIPO				
		WO 04/001373 A2	Dec-03	WIPO				
		WO 05/036110 A1	Apr-05	WIPO				

Other Documents (Including Author, Title, Date, Pertinent Pages, etc.)

	A	US Provisional Appl. No. 60/460154 filed April 3, 2003, to Jannard.
	B	Respondent's Disclosure of Invalidity Contentions with Exhibits A1-A13, Exhibits B1-B5, and Exhibits C1-C6, International Trade Commission Investigation No. 337-TA-1383, filed February 29, 2024, pp. 1-1516.
	C	Höllerer, T. and Feiner, S., "Mobile augmented reality." *Telegeoinformatics: Location-based computing and services* 21 (2004), pp. 1-39.
	D	Mann, Steve and S. Mann. *Intelligent image processing.* IEEE, 2002, 121 pgs. [Part 1 of 3]
	E	Mann, Steve and S. Mann. *Intelligent image processing.* IEEE, 2002, 130 pgs. [Part 2 of 3]

Examiner	Date Considered

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Form 1449 (Modified) **Information Disclosure Statement By Applicant** (Use Several Sheets if Necessary)	Atty. Docket No.	IPVCP003X1C4X1C1
	Application No.:	18/375,893
	Applicant	HOWELL et al.
	Filing Date	October 2, 2023
	Group	2872
		Page 3 of 3

	F	Mann, Steve and S. Mann. *Intelligent image processing.* IEEE, 2002, 110 pgs. [Part 3 of 3]
	G	Mann, S., & Fung, J. "VideoOrbits on Eye Tap devices for deliberately diminished reality or altering the visual perception of rigid planar patches of a real world scene." *EYE*, 3, pp. 1-8.
	H	Milgram, Paul, and Fumio Kishino. "A taxonomy of mixed reality visual displays." *IEICE TRANSACTIONS on Information and Systems* 77.12 (1994), pp. 1-15.
	I	DeVaul et al. MIThril Project Overview. https://www.media.mit.edu/wearables/mithril/overview.html, downloaded March 2, 2022, pp. 1-5.
	J	Rolland, Jannick P., and Hong Hua. "Head-mounted display systems." *Encyclopedia of optical engineering* 2 (2005), pp. 1-14.
	K	Rolland, Jannick P., et al. "High-resolution inset head-mounted display." *Applied optics* 37.19 (1998), pp. 1-11.
	L	Yoshida, Akitoshi, Jannick P. Rolland, and John H. Reif. "Design and Applications of a High Resolution Insert Head Mounted Display." (1994), pp. 1-13.
	M	Nortel 922, Mobile Phone Museum… pp. 1-3.

Examiner	Date Considered

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: HOWELL et al.	Attorney Docket No.: IPVCP003X1C4X1C1
Application No.: 18/375,893	Examiner: LEI, JIE
Filed: October 2, 2023	Group: 2872
Title: SYSTEM FOR CHARGING EMBEDDED BATTERY IN WIRELESS HEAD-WORN PERSONAL ELECTRONIC SERVICES	

INFORMATION DISCLOSURE STATEMENT AFTER ISSUE FEE PAYMENT UNDER 37 CFR §§1.56 AND 1.97

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

The issue fee in the above-identified patent application was paid on February 23, 2024. The references listed in the attached PTO Form 1449 became known after payment of the issue fee. Although this Information Disclosure Statement is being filed after payment of the Issue Fee, it is in accordance with the QPIDS Program and a conditional Request for Continued Examination is being filed herewith, if needed.

Under their duty of disclosure, Applicants hereby submit copies of the cited references. Applicants respectfully request that the Examiner consider these references and make these references of official record in this application.

Applicants would also like to inform the Patent Office of a potentially related case, as follows:

> United States International Trade Commission Investigation No. 337-TA-1383, filed on December 20, 2023 pertaining to US Patent Nos.8,770,742; 10,310,296; 11,762,224; 11,803,069.

Additionally, for your reference, the following items (though not specifically listed on the enclosed Form 1449) were denoted within the document listed at item B on the enclosed Form 1449:

> Nu Vision 60 GX Wireless Glasses; ELSA Revelator; Sun UV, Personal UV Monitor; SafeSun, Personal UV Meter, Optix Tech, Inc.; UV Index Solarmeter, Solartech, Inc.; Saitek Sunwatch II; Oakley Thump products, including at least Thump, Thump 1.5, Thump 2.0. (Item B, on pages 7 and/or 21)

This Information Disclosure Statement is not to be construed as a representation that a search has been made, that additional information material to the examination of this application does not exist, or that these references indeed constitute prior art.

In accordance with the QPIDS program, Applicants authorize the Commissioner to charge the required fee under 37 CFR § 1.17(p) to Deposit Account 50-3874 (Order No. IPVCP003X1C4X1C1).

Respectfully submitted,

/Peter P. Tong/

Peter P. Tong
Registration No. 35,757

4010 Moorpark Avenue
Suite 211
San Jose, CA 95117

⑲日本国特許庁（JP）　⑪実用新案出願公開

⑫公開実用新案公報（U）　平2－102521

⑤1Int.Cl.⁵	識別記号	庁内整理番号	④3公開　平成2年(1990)8月15日
G 02 C 11/00		7029－2H	
G 08 B 21/00	A	7605－5C	

審査請求　未請求　請求項の数 1　（全2頁）

⑤4考案の名称　音声警報装置付き眼鏡

⑵1実　願　平1－10109
⑵2出　願　平1(1989)1月30日

⑦2考 案 者　岡　本　　隆　博　大阪府大阪市天王寺区玉造元町2－32－1303
⑦1出 願 人　みえーる株式会社　大阪府大阪市北区曽根崎2丁目7－5
⑦4代 理 人　弁理士　樋口　豊治　外1名

⑤7実用新案登録請求の範囲

一対のレンズおよび上記レンズを保持しつつ顔面に係止されるフレームを備えた眼鏡において、

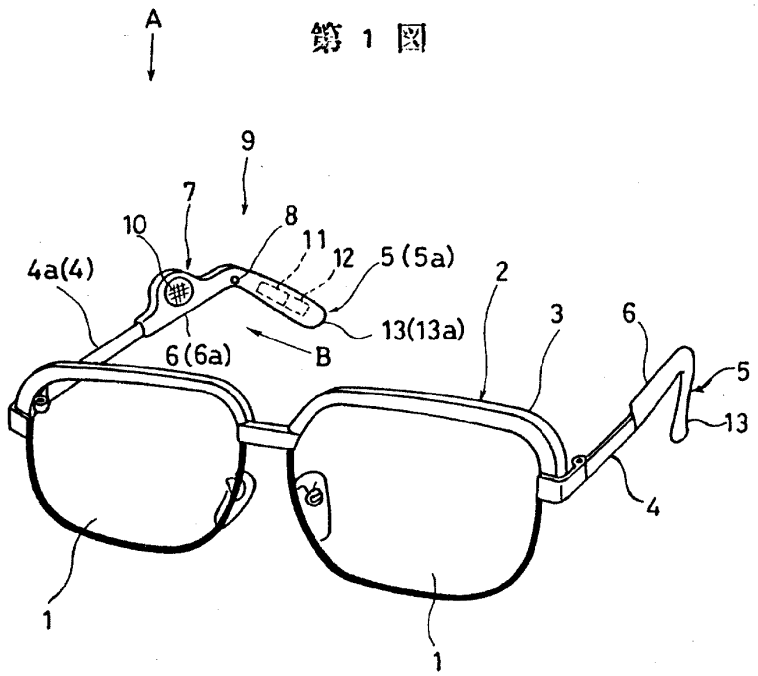
上記フレームに、スピーカ、制御回路および超小型電池等からなる音声発生装置を設ける一方、上記フレームの内側部に、眼鏡を外した時に外光を感知して上記音声発生装置に始動信号を出力する光センサーを設けたことを特徴とする、音声警報装置付き眼鏡。

図面の簡単な説明

第1図は本願考案にかかる眼鏡の実施例の全体斜視図、第2図は第1図に示す眼鏡を装着した場合の側面図、第3図は第1図における矢印A方向から見た場合のつる部の拡大図、第4図は第1図における矢印B方向から見た場合のつる部の拡大図である。

1……レンズ、2……フレーム、7……音声発生装置、8……光センサー、10……スピーカ、11……制御回路、12……超小型電池。

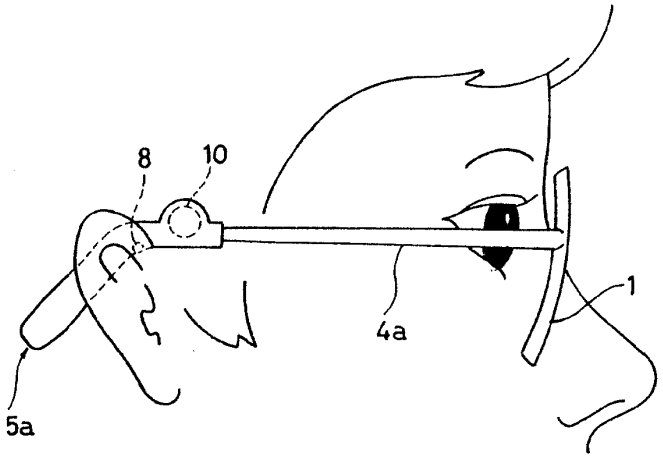
第1図



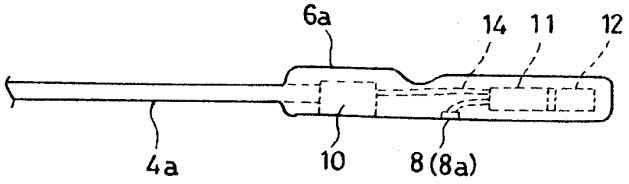
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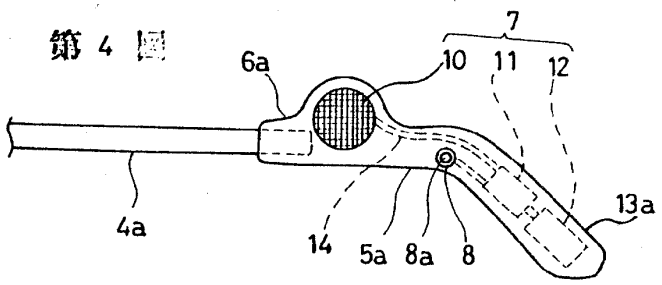
第２図



第３図



第４図



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⑲日本国特許庁（JP）　⑪実用新案出願公開

⑫公開実用新案公報（U）　平2－102521

⑤Int.Cl.⁵	識別記号	庁内整理番号	㊸公開　平成2年(1990)8月15日
G 02 C 11/00		7029－2H	
G 08 B 21/00	A	7605－5C	

審査請求　未請求　請求項の数 1　（全　頁）

㊹考案の名称　音声警報装置付き眼鏡

㉑実　願　平1－10109

㉒出　願　平1(1989)1月30日

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明　細　書

1．考案の名称

音声警報装置付き眼鏡

2．実用新案登録請求の範囲

(1)　一対のレンズおよび上記レンズを保持しつつ顔面に係止されるフレームを備えた眼鏡において、

上記フレームに、スピーカ、制御回路および超小型電池等からなる音声発生装置を設ける一方、上記フレームの内側部に、眼鏡を外した時に外光を感知して上記音声発生装置に始動信号を出力する光センサーを設けたことを特徴とする、音声警報装置付き眼鏡。

3．考案の詳細な説明

【産業上の利用分野】

本願考案は、音声警報装置付き眼鏡に関し、詳しくは、眼鏡を外したときに、上記眼鏡の置き忘れ等を防止する音声警報を発生する音声警報装置付き眼鏡に関する。

【従来の技術および考案が解決しようとする課題】

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眼鏡には、近視用眼鏡、遠視用眼鏡、乱視用眼鏡等種々のものがあるが、多くの人々は、日常生活において眼鏡を身体の一部のようにして使用している場合が多い。

しかし、眼鏡は本来、視覚の弱点を補うために利用されるものであり、とくに、近視等の度数が低い場合には、小さな文字を読む場合以外の日常生活では眼鏡を必要とせず、かえって、眼鏡が目障りとなることもある。

このため、眼鏡を利用している人は、必要に応じて無意識のうちに上記眼鏡を着脱していることが多い。

ところが、外した眼鏡をいったん手から離すと、眼鏡の存在を忘れてしまい、その場所に眼鏡を置き忘れることが非常に多い。とくに、外した眼鏡は、通常一方の手で保持することが多いため、眼鏡を外した状態で手を用いる作業をする必要が生じた場合等に置き忘れやすくなる。

上記問題を解決するために、フレームの左右つる部の先端に細い鎖を連結してループ状にするこ

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とにより、眼鏡を外したときには、眼鏡が上記鎖によって、使用者の首に係止されるようにしたものが用いられている。しかし、上記鎖付きの眼鏡は、眼鏡を使用している時に上記鎖が目障りとなり、また、上記鎖が長いため邪魔になって眼鏡の使用者の行動が制限される場合があり、さらに、デザイン上の問題も発生するため、一部の人によって利用されているに過ぎない。

また、就寝するときには眼鏡を外すが、外した眼鏡を眼鏡ケース等の所定場所へ収納しないまま枕元へ放置して、就寝時あるいは起床時に気が付かないで破損させてしまったり、起床時に眼鏡の置き場所を忘れてしまうことがよくある。

本願考案は、上述の事情のもとで考え出されたものであって、上記の問題を解決し、眼鏡を外した場合に音声警報を発生させることにより、置き忘れを防止するとともに、所定場所に収納するための注意を喚起することのできる眼鏡を提供することをその課題とする。

【課題を解決するための手段】

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本願考案では、上述の課題を解決するために、次の技術的手段を講じている。

すなわち、本願考案は、一対のレンズおよび上記レンズを保持しつつ顔面に係止されるフレームを備えた眼鏡において、上記フレームに、スピーカ、制御回路および超小型電池等からなる音声発生装置を設ける一方、上記フレームの内側部に、眼鏡を外した時に外光を感知して上記音声発生装置に始動信号を出力する光センサーを設けたことを特徴とする。

【考案の作用および効果】

本願考案は、眼鏡のフレームに、スピーカ、制御回路および超小型電池からなる音声発生装置を設ける一方、上記フレームの内側に、上記音声発生装置に始動信号を出力する光センサーを設けたものである。

上記光センサーは眼鏡のフレームの内側に設けられるため、眼鏡を装着している時には、上記センサーの受光部が顔面あるいは側頭部によって外光から遮蔽され、始動信号を出力しない。しかし、

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眼鏡を外すと、上記センサーに外光が入射し、上記音声発生回路に始動信号を出力して、スピーカから音声警報を発生させる。眼鏡の使用者は、この音声警報によって、注意を喚起されるとともに眼鏡を外したことを認識させられ、眼鏡を置き忘れることを防止することができる。

また、上記センサーは、所定の眼鏡ケース等に眼鏡を収納すると、上記センサーの受光部が眼鏡ケースによって外光から遮蔽されるために、始動信号を音声発生装置に出力することはなく、警告信号を停止させることができる。このため、眼鏡の使用者に、眼鏡を外したときに、所定の眼鏡ケースに収納する注意を喚起することにより、眼鏡を不用意に放置して傷つけたり破損したりすることを防止することができることはもちろん、眼鏡を使用しないときに、眼鏡を眼鏡ケースに収納するという習慣付けを行うこともできる。

一方、本願考案にかかる音声発生装置は、スピーカ、制御回路および超小型電池等からなり、上記光センサーから出力された始動信号によって、

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眼鏡使用者の注意を喚起することのできる警告音声を発生することができるように構成される。上記制御回路によって、単一の音声からなる警告音声はもちろんのこと、電子音によるメロディーを発生させることも可能であり、眼鏡の使用者に不快感を与えることなく注意を喚起することが可能となる。

また、近年の電子技術の発達によって、上記音声発生装置として非常に小さなものが開発され、眼鏡のフレームに組み込み、あるいは装着することに対しての技術的問題はほとんどない。さらに、フレームの一部あるいは全体を太陽電池の受光部として利用することにより、さらに使い勝手のよい警報装置付き眼鏡を提供することもできる。

【実施例の説明】

以下、本願の実施例を第1図ないし第4図に基づいて具体的に説明する。

第1図は本願考案に係る実施例の全体斜視図である。図に示すように、近視等の通常の視力矯正用に用いられる眼鏡は、一対のレンズ1，1と、

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上記レンズ１，１を両眼に対向させて保持するためのフレーム２とから大略構成される。上記フレーム２は、上記レンズ１，１をその前部３に保持する一方、上記前部３の両側に、使用者の両耳に係止されることにより、眼鏡を顔面に装着するための一対のつる部４，４が折り畳み可能に枢着される。また、本実施例においては、メタル製のつる部４，４が採用されるとともに、その先端部には樹脂等で形成され、眼鏡使用者の側頭部と耳の上部との間に当接係止されるいわゆる先セル部５，５が設けられている。上記先セル部５，５は、先端が下方に屈曲した略へ字状をしており、基部６，６において上記つる部４，４の先端部に接合されている。

本実施例においては、音声発生装置７と光センサー８とからなる音声警報装置９は、上記一方のつる部４ａの先端に接合される先セル部５ａに設けられている。

音声発生装置７は、第３図および第４図に示すように、スピーカ１０、制御回路１１および超小

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型電池１２から構成され、上記スピーカ１１は、上記先セル部５ａの基部６ａを上方に膨出させることにより、音声発生面を内方に向けて埋設される一方、上記制御回路１１および超小型電池１２は先セル部５ａの先端の屈曲部１３に装置全体を埋め込むようにして設けられている。

また、光センサー８は、上記先セル部５ａの屈曲点近傍内側に受光部８ａを眼鏡の内方に向けて埋設されている。これにより、上記眼鏡を装着したときには、第２図に示すように、上記光センサー８の受光部８ａが使用者の側頭部に確実に当接して遮蔽され、外光が上記受光部８ａに入射することを防止することができる。そして、上記樹脂製先セル部５ａの内部において上記スピーカ１０、制御回路１１、超小型電池１２および光センサー８がリード線１４によって接続され、音声警報装置９が構成されている。

上記光センサー８は、その受光部８ａに外光が入射すると、抵抗が減少しあるいは微小電流を発生すること等により、上記制御回路１１に始動信

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号を発生させる。一方、上記制御回路１１は上記光センサー８によって出力された始動信号によって作動し、所定時間音声警報を上記スピーカ１０から発生させる。また、超小型電池１２は上記制御回路１１およびスピーカ１０を駆動させるためのものであり、簡単に交換できあるいは充電することができるものが好ましい。

上記構成の警報装置付き眼鏡は、眼鏡が使用者の顔面に装着されている時には、第２図に示すように、上記センサー８の受光部８ａが顔面あるいは側頭部によって外光から遮蔽され、始動信号を出力しない。しかし、眼鏡を外すと、上記光センサー８の受光部８ａに外光が入射し、上記音声発生装置７に始動信号を出力して、スピーカ１０から音声警報を発生させる。眼鏡の使用者は、この音声警報によって、注意を喚起されるとともに眼鏡を外したことを認識させられ、眼鏡を置き忘れることを防止することができる。

また、上記センサー８は、所定の眼鏡ケース等に眼鏡を収納すると、上記センサー８の受光部８

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aが眼鏡ケース等によって外光から遮蔽されるため、始動信号を音声発生装置に出力することはなく、警告信号を停止させることができる。このため、眼鏡の使用者に、眼鏡を外したときに、所定の眼鏡ケースに収納する注意を喚起することにより、眼鏡を不用意に放置して傷つけたり破損したりすることを防止することができることはもちろん、眼鏡を使用しないときに、眼鏡を眼鏡ケースに収納するという習慣付けを行うこともできる。

さらに、本実施例の音声発生装置7は、上記光センサー8から出力された始動信号によって、眼鏡使用者の注意を喚起することのできる警告音声を発生することができるように構成されるのであるが、上記制御回路11によって、単一の音声からなる警告音声はもちろんのこと、上記制御回路11内に音声記憶回路を設けることにより電子音によるメロディーを発生させることも可能であり、眼鏡の使用者に不快感を与えることなく注意を喚起することが可能となる。

上述のように、本願考案によって、眼鏡を外し

たときに音声警報を発生させることにより、置き忘れを防止するとともに、所定場所に収納するための注意を喚起することのできる眼鏡を提供することができる。

本願考案の範囲は上述の実施例に限定されることはない。実施例においては、つる部4の先端に接合される先セル部5に本願考案にかかる音声警報装置9を設けたが、フレーム2の他の部分に設けることも可能である。また、実施例は通常の視力矯正用眼鏡に本願考案を適用した例であるが、サングラスあるいは防塵眼鏡等に本願考案を適用することもできる。さらに、フレーム2の一部あるいは全体を太陽電池の受光部として利用することも可能である。

4．図面の簡単な説明

第1図は本願考案にかかる眼鏡の実施例の全体斜視図、第2図は第1図に示す眼鏡を装着した場合の側面図、第3図は第1図における矢印A方向から見た場合のつる部の拡大図、第4図は第1図における矢印B方向から見た場合のつる部の拡大

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図である。

1…レンズ、2…フレーム、7…音声発生装置、8…光センサー、10…スピーカ、11…制御回路、12…超小型電池。

出願人　みえーる株式会社

代理人　弁理士　樋口　豊治

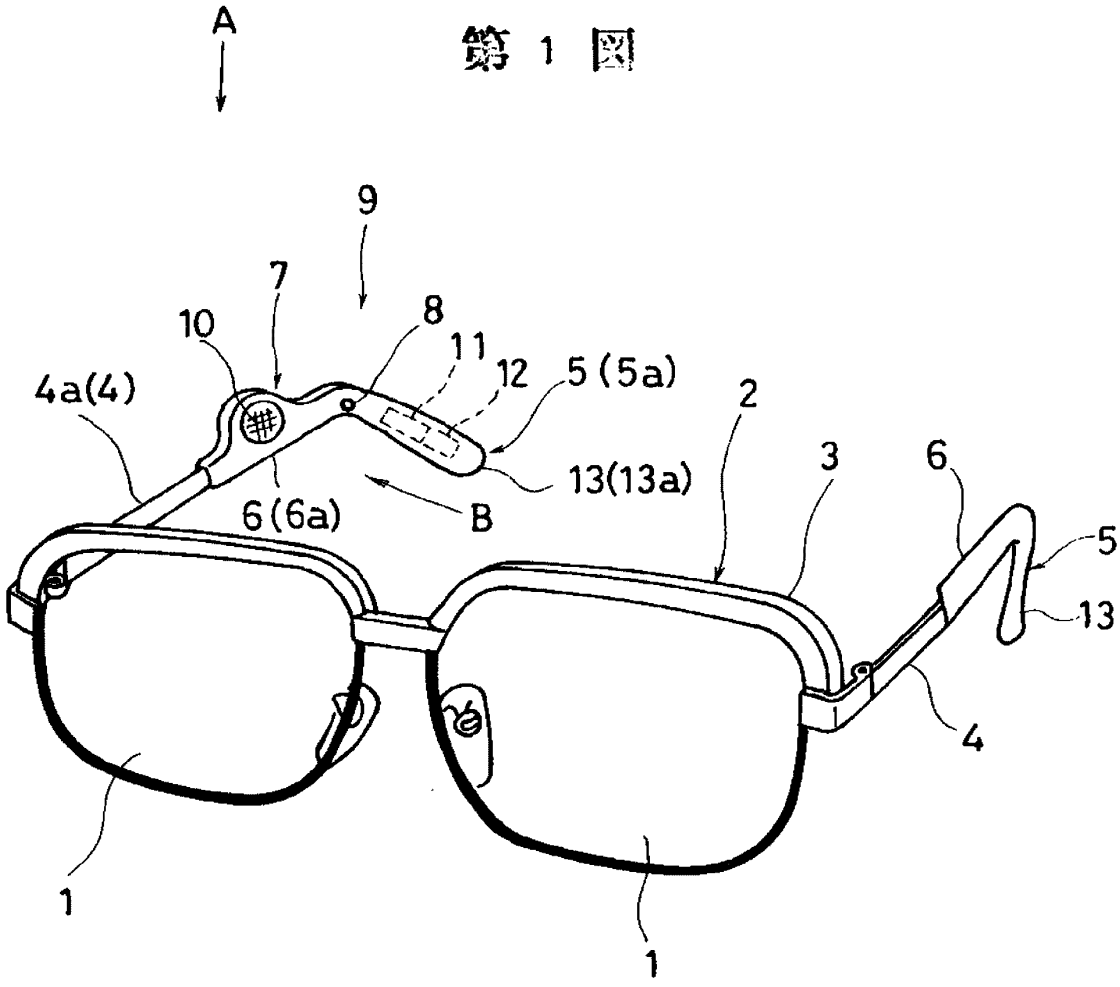
同　　弁理士　吉田　　稔

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[redacted] [redacted]

第 1 図



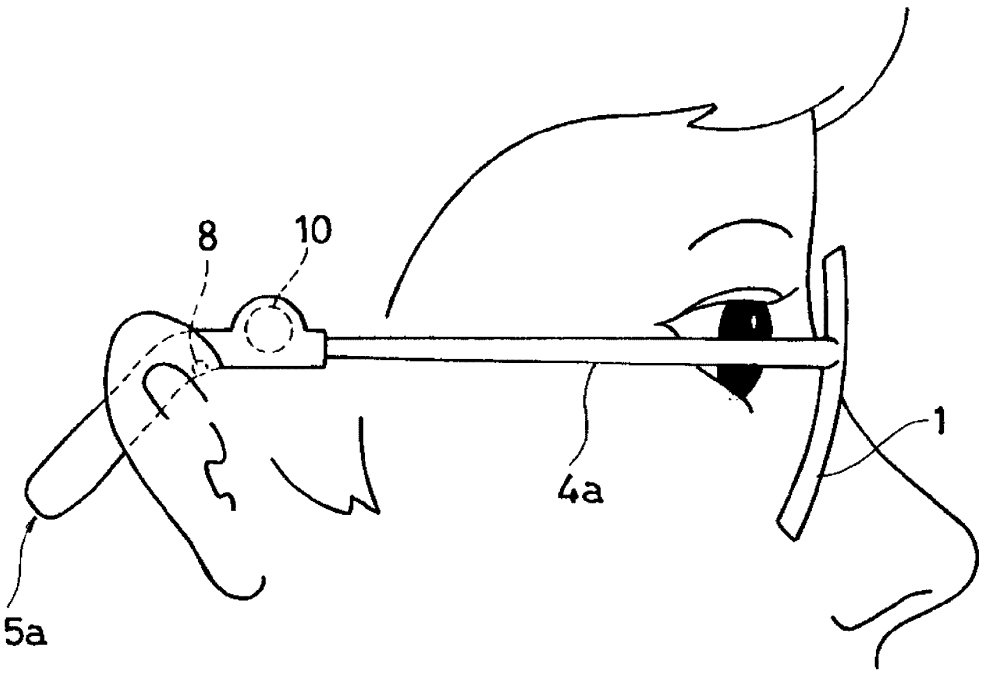
246

実開2-102521

代 理 人 弁理士 [redacted]

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第 2 図



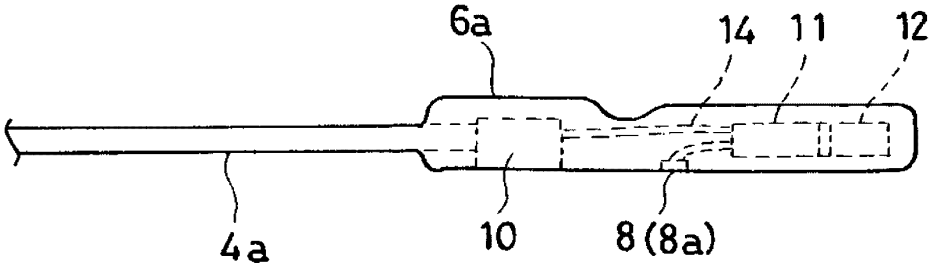
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実開2-102521

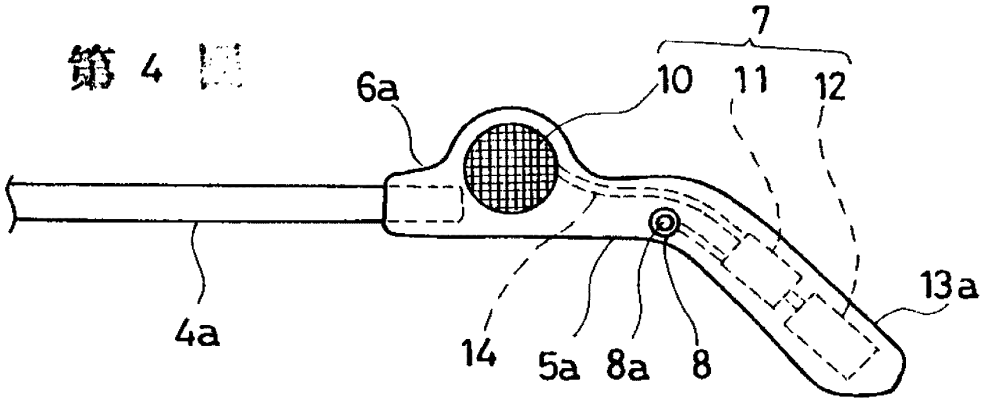
代理人 弁理士 樺口貴治

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第 3 図



第 4 図



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実開2-10252

代 理 人 弁理士 [illegible]

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MACHINE TRANSLATION

Scope of Utility Model Registration Claims

Glasses equipped with a pair of lenses and a frame that holds the lenses and is fastened to the face, and the frame is equipped with an audio generator consisting of a speaker, a control circuit, and a micro battery, etc., while a light sensor is provided on the inside of the frame that detects outside light and outputs a start signal to the audio generator when the glasses are removed. On the other hand, the inside of the frame is equipped with a light sensor that detects ambient light and outputs a start signal to the sound generator when the glasses are removed.

Brief Description of Drawings

The first figure is an overall view of an example of the eyeglasses of this application, the second figure is a side view of the eyeglasses shown in the first figure when worn, the third figure is an enlarged view of the vine when viewed from the direction of arrow A in the first figure, and the fourth figure is an enlarged view of the vine when viewed from the direction of arrow B in the first figure.

1..... lens, 2..... frame, 7..... sound generator, 8..... light sensor, 10..... speaker, 11..... control circuitry, 12..... micro batteries.

specifications
1. name of the device
Glasses with voice alarm system

2. scope of claims for utility model registration
(l) Glasses with a pair of lenses and a frame that holds the lenses and is fastened to the face, wherein the frame is equipped with an audio generator consisting of a speaker, a control circuit, and an ultra-compact battery, and wherein the inside of the frame is equipped with a light sensor that detects exterior light when the glasses are removed and outputs a start signal to the audio generator. On the other hand, the glasses with an audio alarm device are characterized in that an optical sensor is provided on the inside of the above frame that detects ambient light and outputs a start signal to the above audio generator when the glasses are removed.

3. detailed description of the idea

[Industrial Applications]
This invention relates to eyeglasses with an audio alarm device, and in detail, to eyeglasses with an audio alarm device that generates an audio alarm when the eyeglasses are removed to prevent misplacing, etc., the eyeglasses.

[Problem to be solved by the conventional techniques and devices].
There are various types of eyeglasses, including glasses for nearsightedness, farsightedness, and astigmatism, but most people use eyeglasses as if they were a part of their body in daily life.

However, eyeglasses are originally used to compensate for weaknesses in vision, and especially in cases of nearsightedness or low power, eyeglasses are not needed in daily life except for reading small letters, and in fact, eyeglasses can be an eyesore.

For this reason, people who use eyeglasses often unconsciously put on and take off the above glasses as needed.

However, once the glasses are removed from the hand, it is very common for the wearer to forget that the glasses are there and to leave them where they are. In particular, since the removed eyeglasses are usually held in one hand, it is easy to misplace the eyeglasses when it is necessary to use one's hand to perform a task while the eyeglasses are removed.

In order to solve the above problem, thin chains are connected to the tips of the left and right vines of the frames to form a loop so that the glasses are fastened around the user's neck by the above chains when the glasses are removed. However, glasses with the above chain are only used by some people because the above chain becomes an eyesore when the glasses are being used, the above chain is long and sometimes gets in the way and restricts the activities of the user of the glasses, and it also causes a design problem.

In addition, people take off their eyeglasses when they go to bed, but often leave them by their bedside without storing them in their eyeglass case or other designated place, damaging them without being noticed when they go to bed or wake up, or forgetting where to put them when they wake up.

This invention was conceived under the circumstances described above, and its task is to solve the above problem and provide a pair of eyeglasses that can prevent misplacing and alert the user to store them in a designated place by generating an audible alarm when the eyeglasses are removed.

[Issue.]

In order to solve the above-mentioned problems, the following technical measures are taken in this application.

The invention is characterized in that the glasses are equipped with a pair of lenses and a frame that holds the lenses and is fastened to the face, and that the frame is provided with an audio generator consisting of a speaker, a control circuit, and a micro battery, while the inside of the frame is provided with a light sensor that detects outside light when the glasses are removed and outputs a start signal to the above audio generator. On the other hand, a light sensor is provided on the inside of the above frame that detects ambient light and outputs a start signal to the above sound generating device when the glasses are removed.

[The river of ideas and effects].
In this application, a sound generator consisting of a speaker, a control circuit, and a micro battery is installed in the frame of eyeglasses, and an optical sensor that outputs a start signal to the above sound generator is installed inside the above frame. Since the above light sensor is installed inside the frame of the glasses, when the glasses are worn, the light receiving part of the above sensor is shielded from the outside light by the face or the side of the head, and does not output a start signal. However, when the glasses are removed, external light enters the above sensor, which outputs a start signal to the above audio generator circuit and

generates an audio alarm from the speaker. The user of the glasses is alerted by this audible alarm and reminded that he/she has removed the glasses, thereby preventing the user from forgetting to put them back on.

The above sensor does not output a start signal to the sound generator and the warning signal can be stopped because the light receiving part of the above sensor is shielded from outside light by the eyeglass case when the eyeglasses are stored in the prescribed eyeglass case or the like. Therefore, by alerting the user of eyeglasses to store the eyeglasses in the specified eyeglass case when they are removed, it is possible to prevent the user from damaging or damaging the eyeglasses by leaving them unattended, as well as to make it a habit to store the eyeglasses in the eyeglass jrce when they are not in use. It is also possible to make it a habit to store eyeglasses in the eyeglass case when not in use.

On the other hand, the sound generating device of the present application is composed of a speaker, a control circuit, and a micro battery, etc., and is capable of generating a warning sound that can alert the spectacle wearer by means of a start signal output from the optical sensor mentioned above. The above control circuit can generate not only a warning sound consisting of a single voice, but also an electronic melody to alert the spectacle wearer without causing discomfort.

In addition, recent developments in electronic technology have led to the development of very small sound-generating devices mentioned above, which pose few technical problems for incorporating or attaching them to the frames of eyeglasses. Furthermore, by using part or the entire frame as a light receiving part of a solar cell, it is possible to provide glasses with an alarm device that is even easier to use.

［Example Description.］
The following is a concrete explanation of the example of this application based on Figures l through 4.

The first figure is an overall view of an example of the present application. As shown in the figure, eyeglasses used for normal vision correction, such as myopia, are roughly composed of a pair of lenses 1,1 and a frame 2 for holding the above lenses 1,l facing both eyes. The above frame 2 holds the above lenses 1,1 in its front 3, while a pair of vines 4,4 are foldably pivoted on both sides of the front 3 for attaching the glasses to the face by being engaged to the user's two ears. In this example, metal vines 4,4 are employed, and the tips of the metal vines 4,4 are provided with so-called "tip cell portions 5,5" made of resin or the like, which are tangentially moored between the side of the head and the upper part of the ear of the spectacle wearer. The tip cell portion 5, 5 has an abbreviated H-shape with the tip bent downward, and is joined to the tips of the above-mentioned vines 4, 4 at the base 6, 6.

In this example, an audio alarm device 9 consisting of an audio generator 7 and an optical sensor 8 is installed in the tip cell section 5a, which is joined to the tip of one of the above-mentioned vines 4a.

As shown in Figures 3 and 4, the sound generating device 1 consists of a speaker 10, a control circuit 11, and an ultra-small battery 12. The above speaker l1 is buried with the sound generating surface facing inward by expanding the base 6a of the above tip cell part 5a upward, while the above control circuit 11 and ultra-small battery 12 are installed in a bent

portion 13 at the tip of the tip cell portion 5a, so that the entire device is embedded in the bent portion 13.

The light sensor 8 is buried in the inner side near the bending point of the above-mentioned tip cell portion 5a, with the light-receiving portion 8a facing inward of the eyeglasses. As a result, when the above glasses are worn, the light-receiving portion 8a of the above light sensor 8 securely contacts the user's temporal head and shields it, preventing outside light from entering the above light-receiving portion 8a, as shown in the second figure. The above speaker 10, control circuit 1l, micro battery 12, and light sensor 8 are connected by lead wires 14 inside the above plastic tip cell portion 5a to form the voice alarm device 9.

When external light enters the light receiving part 8a, the above light sensor 8 generates a start signal to the above control circuit 11 by decreasing resistance or generating a small current, etc. On the other hand, the above control circuit 11 is activated by the start signal output by the above light sensor 8 and generates an audible alarm from the above beeper 10 at a predetermined time. On the other hand, the above control circuit 11 is activated by the start signal output by the above light sensor 8 and generates an audible alarm from the above beeper 10 at a predetermined time. The micro battery l2 is used to drive the above control circuit 11 and speaker 10, and should be easily replaceable or rechargeable.

As shown in Figure 2, when the glasses are worn on the face of the user, the light receiving part 8a of the sensor 8 is shielded from outside light by the face or the side of the head, and does not output a start signal. However, when the glasses are removed, the light receiving part 8a of the above optical sensor 8 is illuminated by outside light and outputs a start signal to the above sound generator 7 to generate an audio alarm from the l0 speaker. The user of the glasses is alerted by this audio alarm and made aware that he/she has removed the glasses, thereby preventing the user from forgetting to put the glasses on.

When the eyeglasses are stored in the prescribed eyeglass case, etc., the sensor 8 above does not output the start signal to the sound generator and the warning signal can be stopped because the light receiving part 8a of the sensor 8 above is shielded from the outside light by the eyeglass case, etc. Therefore, by reminding eyeglass users to store their eyeglasses in the specified eyeglass case when they remove them, it is possible to prevent them from damaging or damaging their eyeglasses by leaving them unattended and also to make it a habit to store their eyeglasses in the eyeglass case when they are not using them. It is also possible to make it a habit to store eyeglasses in the eyeglass case when they are not in use.

Furthermore, the sound generator 7 in this example is configured to generate a warning sound that can alert the spectacle wearer by means of the start signal output from the optical sensor 8 above, and the control circuit 11 above can generate a warning sound consisting of a single sound or even an electronic sound melody by setting up a sound storage field in the control circuit 11 above. The control circuit 11 can generate not only a warning sound consisting of a single sound, but also an electronic sound melody by setting up a sound storage circuit in the control circuit 11, which can alert the spectacle wearer without causing discomfort.

As described above, the present invention can provide eyeglasses that can prevent misplacing and alert the user to store the eyeglasses in a designated place by generating an audible alarm when the eyeglasses are removed.

The scope of this application is not limited to the above examples. In the example, the voice alarm device 9 of the present application is installed in the tip cell portion 5 joined to the tip of the vine portion 4, but it can also be installed in other portions of the frame 2. The example shows the application of the present invention to ordinary eyeglasses for vision correction, but the invention can also be applied to sunglasses or dust-proof eyeglasses. Furthermore, it is also possible to use part or the entire frame 2 as the light-receiving part of a solar cell.

4. brief description of the drawing

The first figure is an overall view of an example of the eyeglasses of this application, the second figure is a side view of the eyeglasses shown in the first figure when worn, the third figure is an enlarged view of the vine when viewed from the direction of arrow A in the first figure, and the fourth figure is an enlarged view of the vine when viewed from the direction of arrow B in the first figure.

1..... lens, 2..... frame, 7..... sound generator , 8..... light sensor, 10..... speaker, 11..... control circuitry, 12..... micro batteries.

⑲日本国特許庁（JP）　⑪実用新案出願公開

⑫公開実用新案公報（U）　昭63－153218

⑤1Int.Cl.⁴		識別記号	庁内整理番号	⑬公開　昭和63年(1988)10月7日
G 02 C	7/10		A－7029－2H	
A 42 B	3/00		6704－3B	
G 02 F	1/13		A－7610－2H	
	1/17	101	C－7204－2H	審査請求　有　（全9頁）

⑤4考案の名称　調光レンズ付き眼鏡またはヘルメット等の構造

⑳実　願　昭61－188115
㉒出　願　昭61(1986)12月6日
優先権主張　㉜昭61(1986)7月4日㉝日本(JP)㉛実願　昭61－103330
㉜昭61(1986)10月4日㉝日本(JP)㉛実願　昭61－152899

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⑤7実用新案登録請求の範囲

(1) 電極基板を有し、外部電圧の印加により色又は光透過度が変化するようになる素子をレンズ部又はバイザー部に使用した自動二輪車用ヘルメットまたはサングラス等に於いて、素子の制御回路、外光を検出する光センサ、電源電池及び電源スイッチ等の全ての電子回路を眼鏡又はヘルメット等の本体に収容したことを特徴とする調光レンズ付き眼鏡またはヘルメット等の構造。

(2) 前記電子回路が、外部電圧の印加により色又は光透過度が変化するようになる素子を、特定の光量範囲または任意の光量範囲に切換又は可変する光感度切換機構を具備してなることを特徴とする実用新案登録請求の範囲第1項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

(3) 前記外部電圧の印加により色又は光透過度が変化するようになる素子が、ゲストホスト型の液晶セルであることを特徴とする実用新案登録請求の範囲第1項及び第2項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

(4) 前記外部電圧の印加により色又は光透過度が変化するようになる素子が、ツイストネマテイツク型の液晶セルであることを特徴とする実用新案登録請求の範囲第1項及び第2項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

(5) 前記光感度切換機構がマイクロコンピュータによる自動制御機構に成ることを特徴とする実用新案登録請求の範囲第1項乃至第4項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

(6) 前記光感度切換機構が信号増幅度を切り換え又は可変して、液晶素子を特定の光量範囲または任意の光量範囲に調整する構造になることを特徴とする実用新案登録請求の範囲第1項乃至第4項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

(7) 前記光感度切換機構が出力インピーダンスを切り換え又は可変して、液晶素子又はECセルを特定の光量範囲または任意の光量範囲に調整する構造になることを特徴とする実用新案登録請求の範囲第1項乃至第4項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

(8) 前記光感度切換機構が光センサの光入射窓に、光透過度の異なるフイルタを配置し、該フイルタを切り換え又は可変して、液晶素子又はECセルを特定の光量範囲または任意の光量範囲に調整する構造になることを特徴とする実用新案登録請求の範囲第1項乃至第4項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

(9) 前記液晶素子が、円柱状又は球面状の曲率半径を有する2枚の合成樹脂透明板の間に収容された構造になることを特徴とする実用新案登録請求の範囲第1項乃至第8項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

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(10) 前記調光レンズに加えてヘルメット又は眼鏡等の一部に、距離センサによつて前方障害物との距離を検出し、特定の距離以下または任意の検出距離に切換又は可変する検出距離切換機構を介して該ヘルメット又は眼鏡等に設けたブザーを鈴鳴する障害物警告装置を具備して成ることを特徴とする実用新案登録請求の範囲第１項乃至第８項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

(11) 前記距離センサが赤外線距離センサであることを特徴とする実用新案登録請求の範囲第10項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

(12) 前記距離センサが超音波距離センサであることを特徴とする実用新案登録請求の範囲第10項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

(13) 前記電子回路がフレキシブルプリント基板に構成されていることを特徴とする実用新案登録請求の範囲第１項乃至第12項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

(14) 前記電源電池を除く電子回路がメガネフレームのブリッジ部に配置されていることを特徴とする実用新案登録請求の範囲第１項乃至第８項記載の調光レンズ付き眼鏡等の構造。

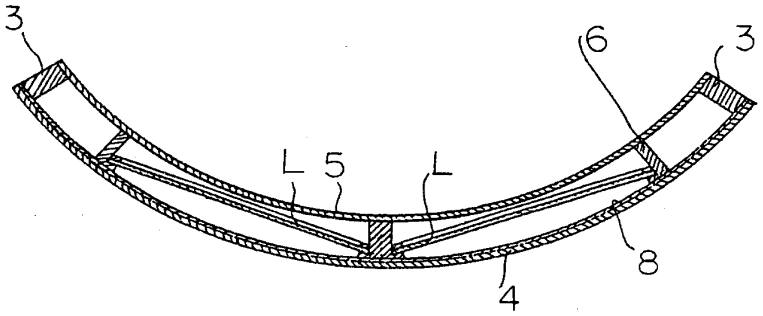
(15) 前記電子回路の電源電池がメガネフレームの智部分に配置されていることを特徴とする実用新案登録請求の範囲第１項乃至第８項記載の調光レンズ付き眼鏡等の構造。

図面の簡単な説明

第１図は本考案の一実施例を示す調光レンズ付きヘルメットの斜視図、第２図は第１図におけるⅡ－Ⅱ線断面図、第３図は液晶セルの構造と制御構造を示す説明図、第４図は第１図におけるⅣ－Ⅳ線断面図、第５図及び第６図はそれぞれ障害物警告機構の実施例を示すブロック線図、第７図は本考案の他の実施例を示すサングラスの斜視図、第８図は同電子回路収容部の拡大図、第９図は電源電池収容部の拡大図、第１０図は本考案の制御回路の基本的な実施例を示す回路図、第１１図乃至第１６図はそれぞれ光感度の切換機構の実施例を示す回路図、第１７図はCdSセルの光量－抵抗値特性の例を示すグラフ、第１８図は入力抵抗に光センサを使用した場合のCdSセルの抵抗値－出力電圧特性の例を示すグラフ、第１９図は直交ニコル間にツイストネマテイツク液晶セルを配置した場合の印加電圧－光透過度特性の例を示すグラフ、第２０図は外部光量－光透過度特性の例を示すグラフ、第２１図は帰還抵抗に光センサを使用した場合のCdSセルの抵抗値－出力電圧特性の例を示すグラフ、第２２図は平行ニコル間にツイストネマテイツク液晶セルを配置した場合の印加電圧－光透過度特性の例を示すグラフ、第２３図は出力抵抗と液晶セルの等価回路、第２４図は低域通過回路の周波数－電圧特性の例を示すグラフである。

１…ヘルメット本体、２…バイザー、４，５…合成樹脂透明板、１４…光センサ、１６，６５…光感度切換スイッチ、２０…障害物検出機構、２１…検出距離設定摘み、２２…投光素子、２３…受光素子、６１…眼鏡本体、６２…眼鏡フレーム、６４…光センサ、Ｌ…レンズ。

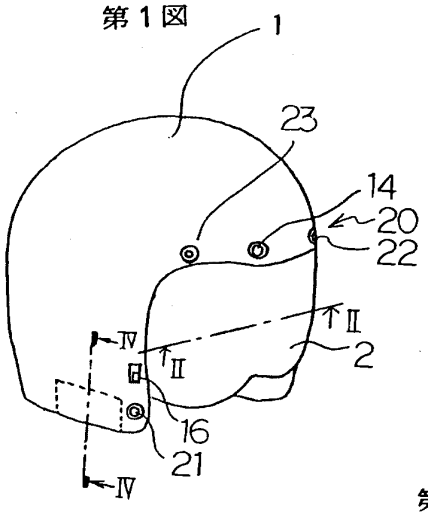
第２図



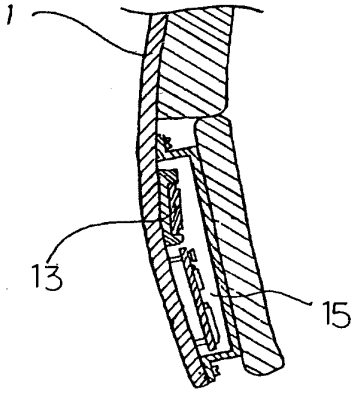
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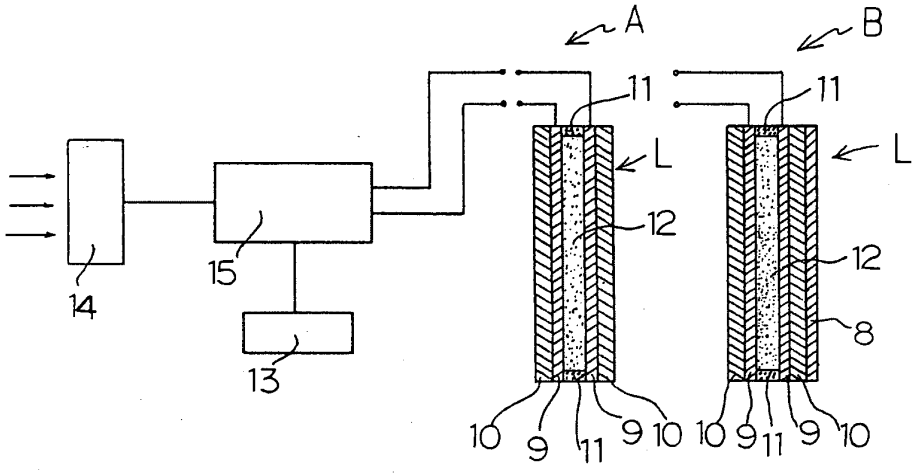
第１図



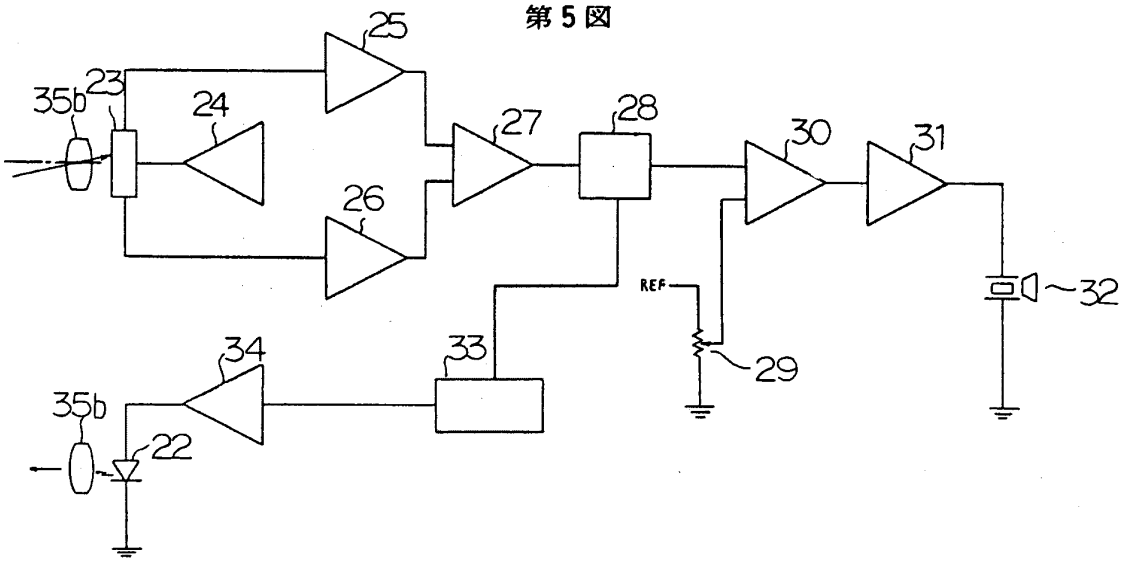
第４図



第３図

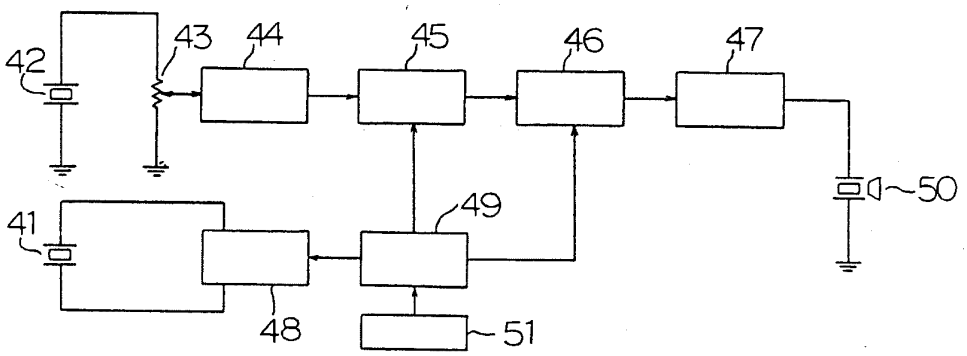


第５図

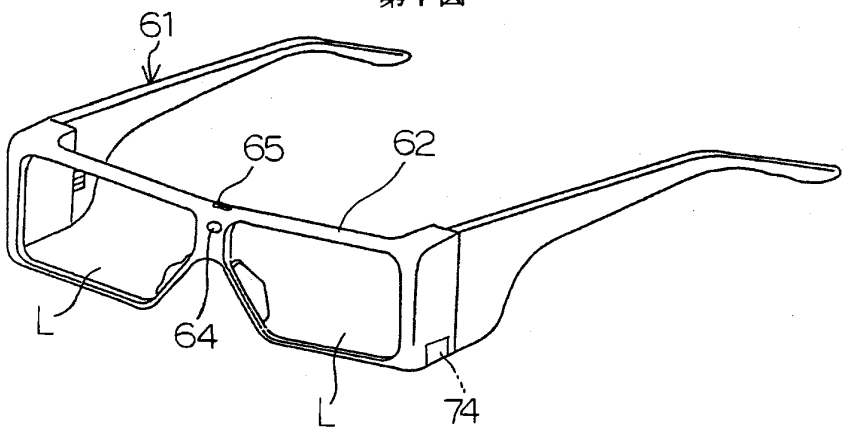


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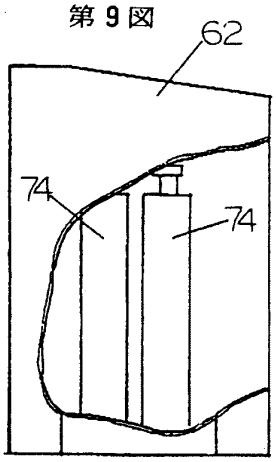
第６図



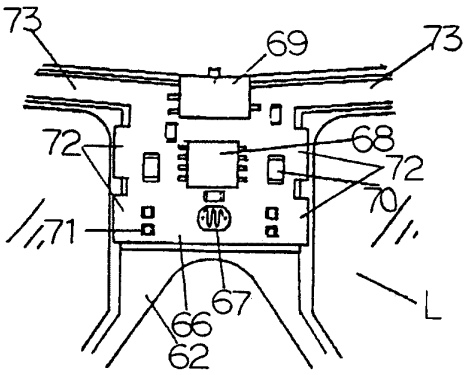
第７図



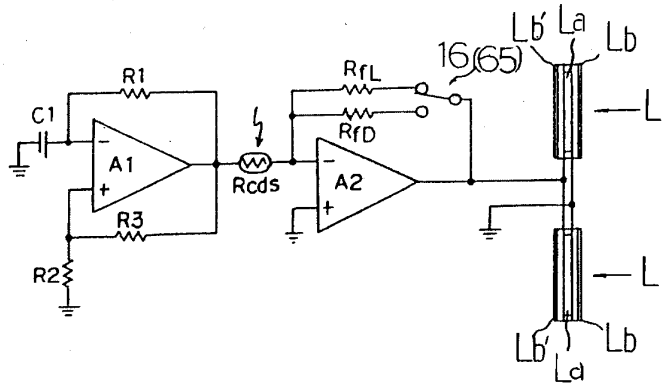
第９図



第８図



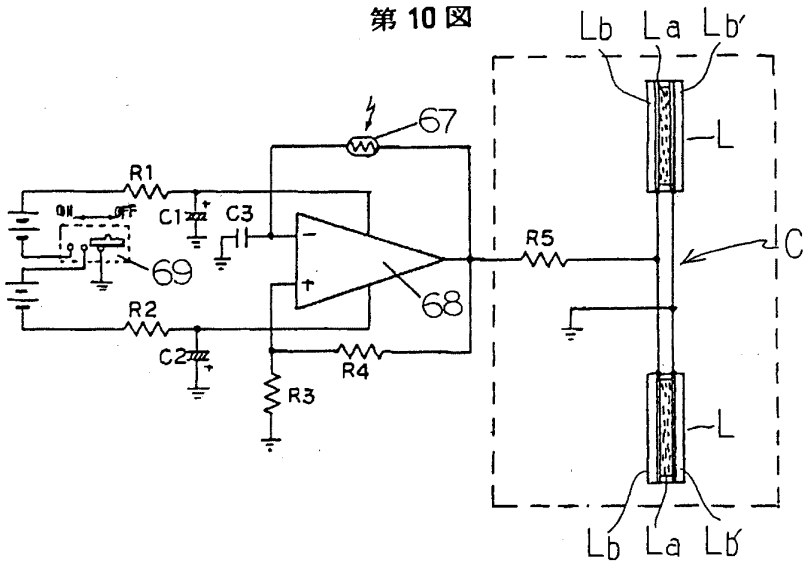
第１１図



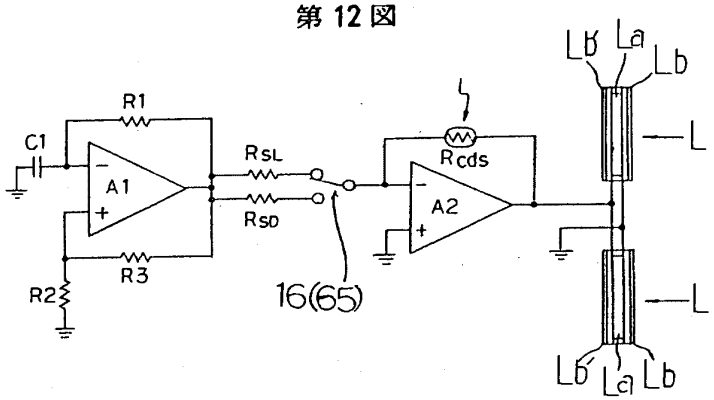
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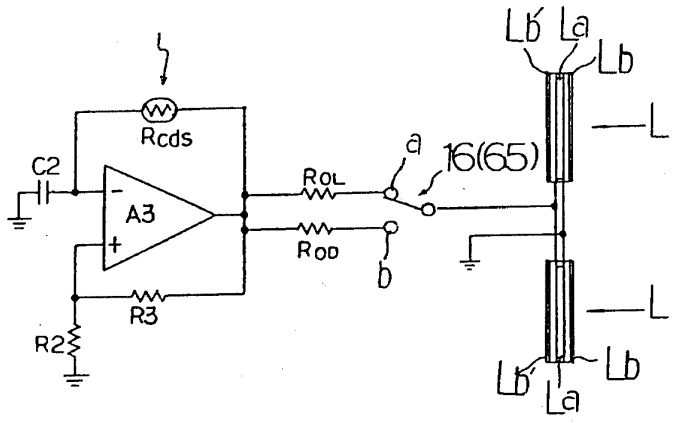
第 10 図



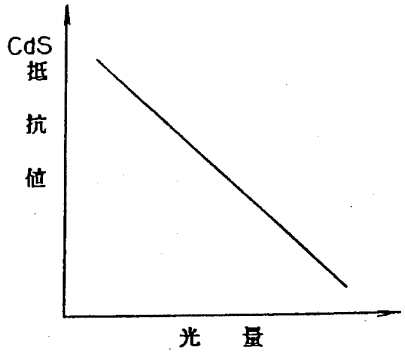
第 12 図



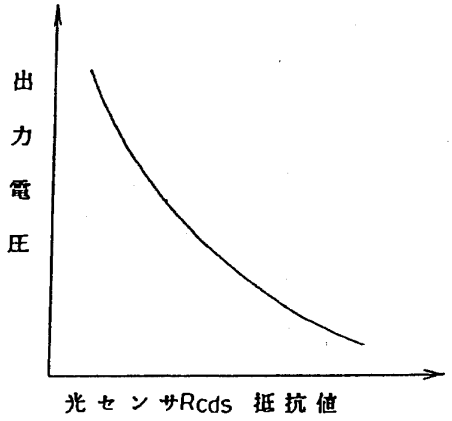
第 13 図



第 17 図



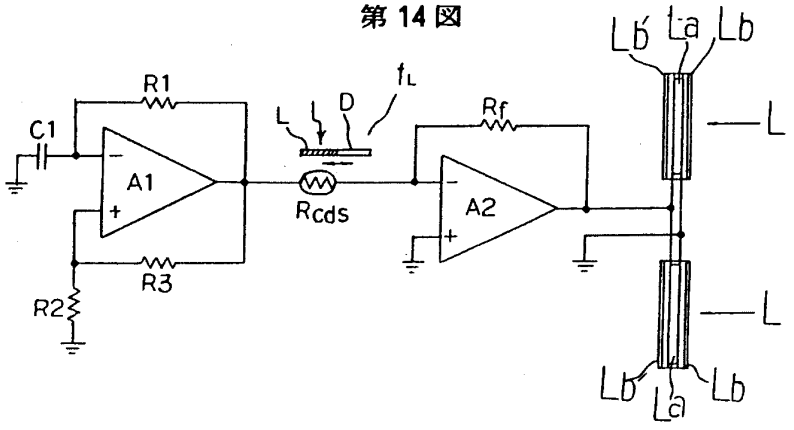
第 18 図



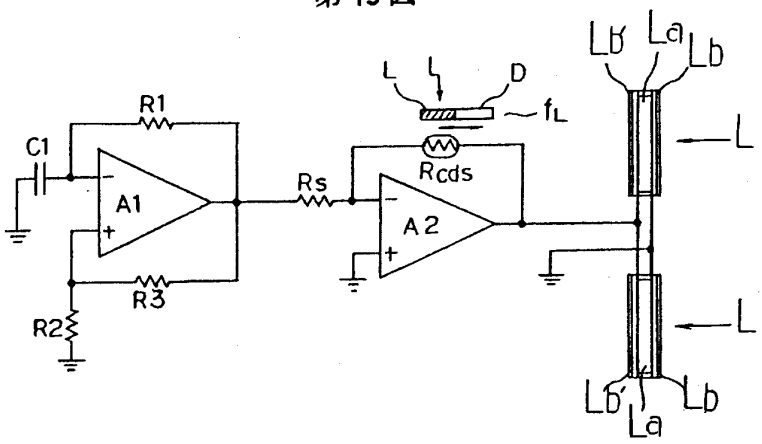
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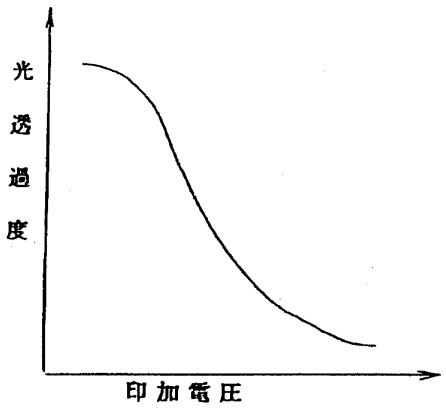
第 14 図



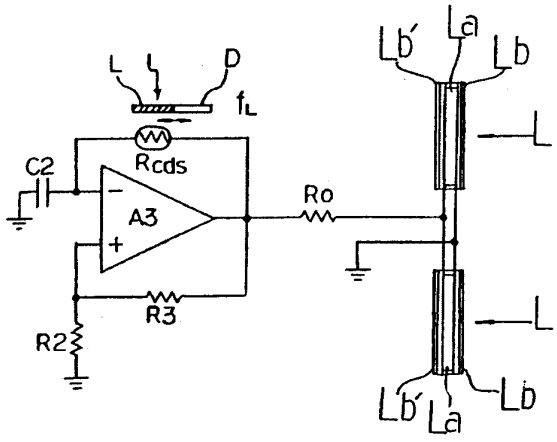
第 15 図



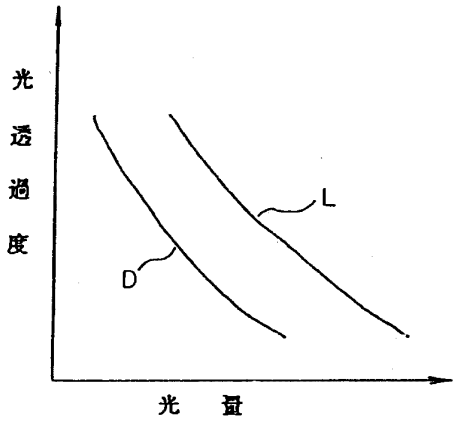
第 19 図



第 16 図



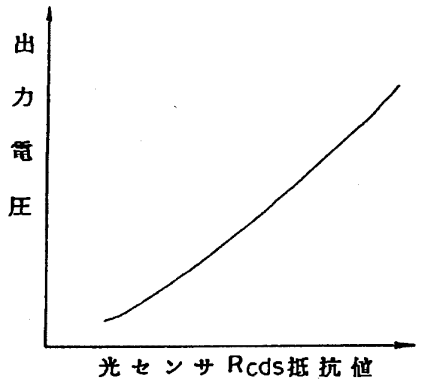
第 20 図



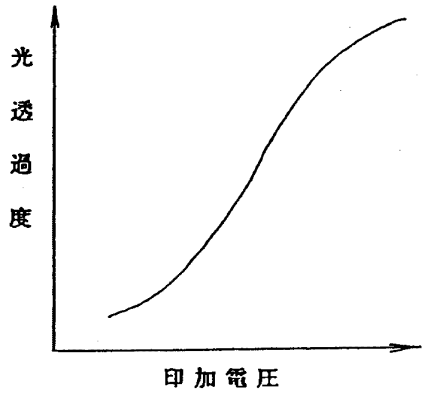
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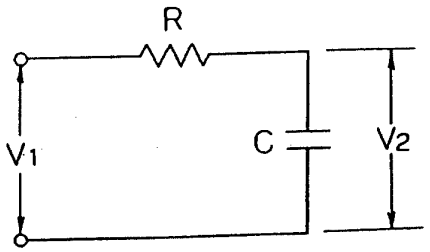
第 21 図



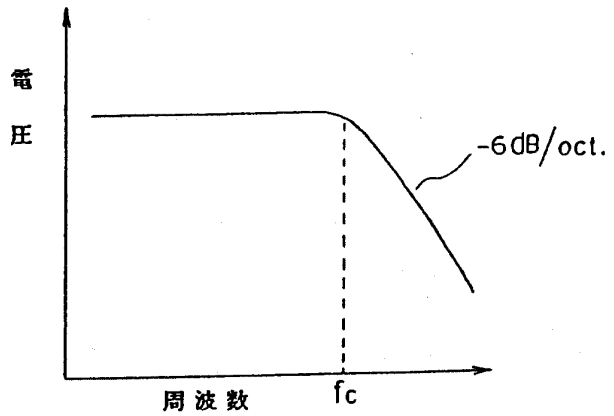
第 22 図



第 23 図



第 24 図



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補正　昭61.12.19

考案の名称を次のように補正する。

㊹考案の名称　　調光レンズ付き眼鏡またはヘルメット等の構造

実用新案登録請求の範囲、図面の簡単な説明を次のように補正する。

㊼実用新案登録請求の範囲

(1) 電極基板を有し、外部電圧の印加により色又は光透過度が変化するようになる素子や液晶分子の配向状態が変化して屈折率を変更する液晶レンズをレンズ部又はバイザー部に使用した自動二輪車用ヘルメットまたはサングラス等に於いて、素子の制御回路、外光を検出する光センサ、電源電池及び電源スイッチ等の全ての電子回路を眼鏡又はヘルメット等の本体に収容したことを特徴とする調光レンズ付き眼鏡またはヘルメット等の構造。

(2) 前記電子回路が、外部電圧の印加により色又は光透過度が変化するようになる素子を、特定の光量範囲または任意の光量範囲に切換又は可変する光感度切換機構を具備してなることを特徴とする実用新案登録請求の範囲第１項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

(3) 前記外部電圧の印加により色又は光透過度が変化するようになる素子が、ゲストホスト型の液晶セルであることを特徴とする実用新案登録請求の範囲第１項及び第２項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

(4) 前記外部電圧の印加により色又は光透過度が変化するようになる素子が、ツイストネマテイツク型の液晶セルであることを特徴とする実用新案登録請求の範囲第１項及び第２項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

(5) 前記光感度切換機構がマイクロコンピュータによる自動制御機構に成ることを特徴とする実用新案登録請求の範囲第１項乃至第４項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

(6) 前記光感度切換機構が信号増幅度を切り換え又は可変して、液晶素子を特定の光量範囲または任意の光量範囲に調整する構造になることを特徴とする実用新案登録請求の範囲第１項乃至第４項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

(7) 前記光感度切換機構が出力インピーダンスを切り換え又は可変して、液晶素子を特定の光量範囲または任意の光量範囲に調整する構造になることを特徴とする実用新案登録請求の範囲第１項乃至第４項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

(8) 前記光感度切換機構が光センサの光入射窓に、光透過度の異なるフイルタを配置し、該フイルタを切り換え又は可変して、液晶素子を特定の光量範囲または任意の光量範囲に調整する構造になることを特徴とする実用新案登録請求の範囲第１項乃至第４項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

(9) 前記液晶素子が、円柱状又は球面状の曲率半径を有する２枚の合成樹脂透明板の間に収容された構造になることを特徴とする実用新案登録請求の範囲第１項乃至第８項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

(10) 前記調光レンズに加えてヘルメット又は眼鏡等の一部に、距離センサによつて前方障害物との距離を検出し、特定の距離以下または任意の検出距離に切換又は可変する検出距離切換機構を介して該ヘルメット又は眼鏡等に設けたブザーを鈴鳴する障害物警告装置を具備して成ることを特徴とする実用新案登録請求の範囲第１項乃至第８項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

(11) 前記距離センサが赤外線距離センサであることを特徴とする実用新案登録請求の範囲第10項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

(12) 前記距離センサが超音波距離センサであることを特徴とする実用新案登録請求の範囲第10項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

(13) 前記電子回路がフレキシブルプリント基板に構成されていることを特徴とする実用新案登録請求の範囲第１項乃至第12項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

(14) 前記電源電池を除く電子回路がメガネフレームのブリッジ部に配置されていることを特徴と

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する実用新案登録請求の範囲第１項乃至第８項記載の調光レンズ付き眼鏡等の構造。

(15) 前記電子回路の電源電池がメガネフレームの智部分に配置されていることを特徴とする実用新案登録請求の範囲第１項乃至第８項記載の調光レンズ付き眼鏡等の構造。

図面の簡単な説明

第１図は本考案の一実施例を示す調光レンズ付きヘルメットの斜視図、第２図は第１図におけるⅡ－Ⅱ線断面図、第３図は液晶セルの構造と制御構造を示す説明図、第４図は第１図におけるⅣ－Ⅳ線断面図、第５図及び第６図はそれぞれ障害物警告機構の実施例を示すブロック線図、第７図は本考案の他の実施例を示すサングラスの斜視図、第８図は同電子回路収容部の拡大図、第９図は電源電池収容部の拡大図、第１０図は本考案の制御回路の基本的な実施例を示す回路図、第１１図乃至第１６図はそれぞれ光感度の切換機構の実施例を示す回路図、第１７図はCdSセルの光量－抵抗値特性の例を示すグラフ、第１８図は入力抵抗に光センサを使用した場合のCdSセルの抵抗値－出力電圧特性の例を示すグラフ、第１９図は直交ニコル間にツイストネマテイツク液晶セルを配置した場合の印加電圧－光透過度特性の例を示すグラフ、第２０図は外部光量－光透過度特性の例を示すグラフ、第２１図は帰還抵抗に光センサを使用した場合のCdSセルの抵抗値－出力電圧特性の例を示すグラフ、第２２図は平行ニコル間にツイストネマテイツク液晶セルを配置した場合の印加電圧－光透過度特性の例を示すグラフ、第２３図は出力抵抗と液晶セルの等価回路、第２４図は低域通過回路の周波数－電圧特性の例を示すグラフである。

１…ヘルメット本体、２…バイザー、４，５…合成樹脂透明板、１４…光センサ、１６，６５…光感度切換スイッチ、２０…障害物検出機構、２１…検出距離設定摘み、２２…投光素子、２３…受光素子、６１…眼鏡本体、６２…眼鏡フレーム、６４…光センサ、Ｌ…レンズ。

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⑲日本国特許庁（JP）　⑪実用新案出願公開

⑫公開実用新案公報（U）　昭63－153218

⑤1Int.Cl.⁴		識別記号	庁内整理番号	④3公開　昭和63年(1988)10月7日
G 02 C	7/10		A－7029－2H	
A 42 B	3/00		6704－3B	
G 02 F	1/13		A－7610－2H	
	1/17	101	C－7204－2H	審査請求　有　（全　頁）

⑤4考案の名称　調光レンズ付き眼鏡またはヘルメット等の構造

②1実　願　昭61－188115

②2出　願　昭61(1986)12月6日

優先権主張　③2昭61(1986)7月4日③3日本(JP)③1実願　昭61－103330

③2昭61(1986)10月4日③3日本(JP)③1実願　昭61－152899

⑦2考案者　藤原　辰美　秋田県仙北郡太田町中里字二十町129番地の2

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⑦4代理人　弁理士　畠山　隆

明　細　書

１．考案の名称

調光レンズ付き眼鏡またはヘルメット等の構造

２．実用新案登録請求の範囲

（１）電極基板を有し、外部電圧の印加により色又は光透過度が変化するようになる素子をレンズ部又はバイザー部に使用した自動二輪車用ヘルメットまたはサングラス等に於いて、素子の制御回路、外光を検出する光センサ、電源電池及び電源スイッチ等の全ての電子回路を眼鏡又はヘルメット等の本体に収容したことを特徴とする調光レンズ付き眼鏡またはヘルメット等の構造。

（２）前記電子回路が、外部電圧の印加により色又は光透過度が変化するようになる素子を、特定の光量範囲または任意の光量範囲に切換又は可変する光感度切換機構を具備してなることを特徴とする実用新案登録請求の範囲第１項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

（３）前記外部電圧の印加により色又は光透過度が変化するようになる素子が、ゲストホスト型の

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液晶セルであることを特徴とする実用新案登録請求の範囲第１項及び第２項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

（４）前記外部電圧の印加により色又は光透過度が変化するようになる素子が、ツイストネマティック型の液晶セルであることを特徴とする実用新案登録請求の範囲第１項及び第２項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

（５）前記光感度切換機構がマイクロコンピュータによる自動制御機構に成ることを特徴とする実用新案登録請求の範囲第１項乃至第４項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

（６）前記光感度切換機構が信号増幅度を切り換え又は可変して、液晶素子を特定の光量範囲または任意の光量範囲に調整する構造になることを特徴とする実用新案登録請求の範囲第１項乃至第４項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

（７）前記光感度切換機構が出力インピーダンスを切り換え又は可変して、液晶素子又はＥＣセル

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を特定の光量範囲または任意の光量範囲に調整する構造になることを特徴とする実用新案登録請求の範囲第１項乃至第４項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

（８）前記光感度切換機構が光センサの光入射窓に、光透過度の異なるフィルタを配置し、該フィルタを切り換え又は可変して、液晶素子又はＥＣセルを特定の光量範囲または任意の光量範囲に調整する構造になることを特徴とする実用新案登録請求の範囲第１項乃至第４項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

（９）前記液晶素子が、円柱状又は球面状の曲率半径を有する２枚の合成樹脂透明板の間に収容された構造になることを特徴とする実用新案登録請求の範囲第１項乃至第８項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

（１０）前記調光レンズに加えてヘルメット又は眼鏡等の一部に、距離センサによって前方障害物との距離を検出し、特定の距離以下または任意の検出距離に切換又は可変する検出距離切換機構を

介して該ヘルメット又は眼鏡等に設けたブザーを鈴鳴する障害物警告装置を具備して成ることを特徴とする実用新案登録請求の範囲第１項乃至第８項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

（１１）前記距離センサが赤外線距離センサであることを特徴とする実用新案登録請求の範囲第１０項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

（１２）前記距離センサが超音波距離センサであることを特徴とする実用新案登録請求の範囲第１０項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

（１３）前記電子回路がフレキシブルプリント基板に構成されていることを特徴とする実用新案登録請求の範囲第１項乃至第１２項記載の調光レンズ付き眼鏡またはヘルメット等の構造。

（１４）前記電源電池を除く電子回路がメガネフレームのブリッジ部に配置されていることを特徴とする実用新案登録請求の範囲第１項乃至第８項

記載の調光レンズ付き眼鏡等の構造。

（１５）前記電子回路の電源電池がメガネフレームの智部分に配置されていることを特徴とする実用新案登録請求の範囲第１項乃至第８項記載の調光レンズ付き眼鏡等の構造。

３．考案の詳細な説明

〔産業上の利用分野〕

本考案は自動二輪車又は軽二輪車或は乗用車，軽飛行機等各種移動体乗用時に着用する自動二輪車用ヘルメット、または一般時に着用するサングラス等の改良に係る調光レンズ付き眼鏡またはヘルメット等の構造に関するものである。

〔従来の技術〕

自動二輪車乗用時のヘルメット着用義務化に基づき種々の頭部防護用ヘルメットが使用されており、視野を確保するための開口部にサンバイザー兼用のウインドバイザーを設けたものも多用されているが、該サンバイザーを設けたヘルメットは、太陽光の強弱によって視度が異なり、殊にトンネルの出入りが多い道路での走行はトンネルに進入

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したときの視度が急に低下し、盲目状態になる欠点を有しており、これを解消するために色又は光透過度を異にする複数枚のサンバイザーを用意し、外光の状況に応じて交換使用するものが用いられていた。

これは一般時に使用するサングラスでも同様であり、外光の強弱によって眼鏡を掛け換える必要があった。

〔考案が解決しようとする問題点〕

従って、上記ヘルメットを着用している場合、トンネルへの出入りが多い道路では、トンネルへの進入時とトンネルからの進出時にその都度停止してサンバイザーの交換を行わなければならず、高速道路使用時等では道路上で停止することができないため使用不能であった。

殊にサングラス等の眼鏡の場合は、レンズ部に使用する液晶やＥＣ材を電気的に制御するための電子回路を眼鏡フレームの限られた場所に具備しなければならず、配置的に困難を極め具体化されない問題を有していた。

本考案は上記問題に鑑みて成されたもので、ヘルメットに設けたサンバイザー又はサングラス等の眼鏡のレンズの透光量を外部の照度に応じて切換調節又は自動調節する調光レンズ付き眼鏡またはヘルメット等の構造を提供すると共に、前方障害物を検知して警告信号を発する障害物警告機能を付加した調光レンズ付き眼鏡またはヘルメット等の構造を提供することを目的とするものである。加えてレンズ部に使用する液晶やＥＣ材を電気的に制御するための電子回路を眼鏡フレームの限られた場所に配置する技術を提供することを目的とするものである。

〔問題点を解決するための手段〕

本考案の調光レンズ付き眼鏡またはヘルメット等の構造は、電極基板を有し、外部電圧の印加により色又は光透過度が変化するようになる素子をレンズ部又はバイザー部に使用した自動二輪車用ヘルメットまたはサングラス等に於いて、素子の制御回路、外光を検出する光センサ、電源電池及び電源スイッチ等の全ての電子回路を眼鏡又はヘ

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ルメット等の本体に収容したことを要旨とするものである。

また上記電子回路が、外部電圧の印加により色又は光透過度が変化するようになる素子を、特定の光量範囲または任意の光量範囲に切換又は可変する光感度切換機構を具備せしめ外光の強弱に対応して使用する構造にした。

上記外部電圧の印加により色又は光透過度が変化するようになる液晶素子が、ゲストホスト型の液晶セル又はツイストネマティック型の液晶セルによって構成することができる。

また、光感度切換機構はマイクロコンピュータによって液晶素子に印加する外部電圧を自動制御する自動制御構造にすることができると共に、光感度切換機構を出力インピーダンスを切り換え又は可変するか、又は、光センサの光入射窓に、光透過度の異なるフィルタを配置し、該フィルタを切り換え又は可変する構成にし、液晶素子又はECセルを特定の光量範囲または任意の光量範囲に調整するようにしている。

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更に前記液晶素子又はＥＣセルを、円柱状又は球面状の曲率半径を有する２枚の合成樹脂透明板の間に収容することによってレンズに直接加わる外圧を解消している。

本考案の調光レンズ付き眼鏡またはヘルメット等の構造は、前記調光レンズに加えてヘルメット又は眼鏡等の一部に、距離センサによって前方障害物との距離を検出し、特定の距離以下または任意の検出距離に切換又は可変する検出距離切換機構を介して該ヘルメット又は眼鏡等に設けたブザーを鈴鳴する障害物警告装置を具備せしめたものであり、眼鏡に実施する場合はブザーに代えて直接着用者の皮膚を刺激する振動体を設けることもできる。

また、上記距離センサは赤外線距離センサ又は超音波距離センサで構成することができる。

加えて本考案の調光レンズ付き眼鏡またはヘルメット等の構造は、電子回路をフレキシブルプリント基板によって構成し、電源電池を除く電子回路をメガネフレームのブリッジ部に配置すると共

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に、電源電池をメガネフレームの智部分に配置することによって目的を達成することができるものである。

〔 作 用 〕

上記構成の調光レンズ付き眼鏡またはヘルメット等の構造は、光感度切換機構により調光バイザーまたはレンズの液晶セルに印加する電圧を切り換えて、光透過度を変更する調光作用によって昼間と夜間の使用、トンネル内外での使用等、外部光の強弱差がある場所で適正な透過光量を得ることができるため、バイザー又は眼鏡を交換する必要がない。

又、上記平板状の液晶セルを円柱状又は球面状の曲面を有する二枚の合成樹脂透明板の間隙に収容する構造にしたことにより該液晶セルを外部衝撃から保護し、衝撃に対する充分な強度を確保することができるものである。

更に、障害物検出機構が距離センサによってヘルメット前方の障害物を検出し、予めセットし又は調節した距離以下の場合にブザーを鈴鳴するよ

うになるため、車間距離警告器の作用をなす。

加えて、殊に眼鏡に構成したものでは、従来の眼鏡と殆ど外観を変更することなく実施できる制御回路部の小型化が図れるため、眼鏡の意匠性を損なうことなく実施できるものである。

〔実　施　例〕

以下、本考案の調光レンズ付き眼鏡またはヘルメット等の構造の実施例を図面に従って説明する。

第１図乃至第６図は自動二輪車用ヘルメットの一実施例を示すもので、第１図乃至第３図はその外観を示すものである。

符号１は使用者の頭部を覆うようになるヘルメット本体であり、前面に視野を確保するためのバイザー２を構成して成る。該バイザー２は第２図に示すようにスペーサ３を介して離間した円柱状又は球面状の曲率半径を有するプラスチック樹脂等の二枚の合成樹脂透明板４，５間に液晶セル収納枠６を介して平板状の液晶セルＬａ，ＬａからなるレンズＬ，Ｌを位置せしめたものであり、該液晶セルＬａがツイストネマチィック型の場合は合

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成樹脂透明板４の裏面に偏光フィルム８を貼着して成る。該液晶セルＬａは第４図に示すようにそれぞれ絶縁スペーサ１１を介して透明電極膜９を内面に形成したガラス板１０，１０を対置し、両透明電極膜９，９の微小間隙に液晶１２を充填した構造になるゲストホスト型Ａのものや、上記構成に偏光フィルム８を並設したツイストネマチック型Ｂによって構成して成る。該液晶セルＬａは、ヘルメット本体１内に装備した電池等の電源部１３によって駆動し、該ヘルメット本体１の額部前面に固設したＣｄＳ素子等の光センサ１４からの信号を入力して出力電圧を調整する制御手段１５からの出力電圧を両透明電極膜９，９に印加して成るもので、ヘルメット本体１に設けた光感度切換スイッチ１６によって光感度を切換可能とし、後述する制御回路によってレンズＬ，Ｌに対する印加電圧を制御する構造になる。

また符号２１はヘルメット本体１に構成した障害物検出機構２０の検出距離設定摘みであり、該障害物検出機構２０は第５図にブロック線図で示

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すようにヘルメット本体１の額部に固設したＬＥＤからなる投光素子２２とＰＳＤからなる受光素子２３を含む制御回路によって構成されている。該制御駆動回路は、受光レンズ２４を介して受光する受光素子２３のバイアス回路２４と２個のパルス電流変換アンプ２５，２６からの出力差によって駆動する差動アンプ２７の出力をサンプル・ホールド回路２８に入力し、該サンプル・ホールド回路２８の出力と前記検出距離設定摘み２１によって設定値を変更するようになる可変抵抗器２９を後段の比較器３０によって比較し、該比較出力によってブザー駆動回路３１を介してヘルメット本体１の内部に設けたブザー３２を鈴鳴駆動する。また上記サンプル・ホールド回路２８はタイミングジェネレータ３３と同期するようになり、該出力によってＬＥＤ駆動回路３４はＬＥＤからなる前記投光素子２２に通電し、投光レンズ３５を介してヘルメットの前方に位置する障害物に向かって赤外線を照射すると共に、該赤外線の反射光が受光素子２３に入力するようになる。

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次に第６図は超音波センサを使用した障害物検出機構２０のブロック線図を示すものであり、ヘルメット本体１の額部には前記実施例の投光素子２２と受光素子２３に代わって送波センサ４１と受波センサ４２を固設して成る。符号４３は受波センサ４２の感度調整ボリューム，４４は受波信号整形回路，４５は距離パルス発生回路，４６は距離係数回路であり、タイミングジェネレータ４９との比較によりブザー駆動回路４７を介してブザー５０を鈴鳴駆動する。また、上記タイミングジェネレータ４９はデジタルスイッチ回路によって構成される距離設定スイッチ５１からの入力値によって前記距離パルス発生回路５２及び送波センサ駆動回路４８に駆動信号を送達するようになり、該送波センサ駆動回路４８によって送波センサ４１から所定周波数の距離測定用高周波を発振する構造になる。

次に第７図乃至第９図はは本考案をサングラスに実施したものを示すものである。

眼鏡本体６１は眼鏡フレーム６２と、レンズＬ，

Ｌと眼鏡フレーム６２に形成した光センサ窓６４及び光感度切換スイッチ６５により構成されている。後述する電子回路及び電源電池は眼鏡フレーム６２の一部に内蔵されている。またレンズＬ，Ｌには液晶セルを使用しており、それぞれ電気的に透過光量を制御する構造になる。

第８図に示すように上記電子回路は、眼鏡フレーム６２のブリッジ部に構成されており、フレキシブルプリント基板６６上にＣｄＳセル６７，アナログＩＣ６８，電源スイッチ６９，チップコンデンサ７０，及びチップ抵抗７１を実装した後述の制御電子回路である。

上記制御電子回路は、従来技術であるチップマウンターマシンやリフローソルダーマシン等を使用して実装することにより、小型微細加工ができるため、上記眼鏡フレーム６２のブリッジ部に収容可能な高密度実装が可能である。

更にフレキシブルプリント基板６６は、フィルム状の基板であるため、凹凸のある場所や変形した場所でもその形状に沿って電気回路を形成する

ことができるものである。

該制御電子回路とレンズＬ，Ｌの液晶セルとの接続は、導電性の接着剤等を介して符号７２で示す接続部で行われている。またフレキシブルプリント基板６６から延びた電源配線部７３は眼鏡フレーム６２のブリッジ部から智の部分まで配線され、第９図に示す電源電池７４の電極部に至っている。

以下に前記第一実施例に示した自動二輪車用ヘルメットの調光バイザーと第二実施例に示したサングラスのレンズＬ，Ｌに印加する電圧の制御回路を第１０図乃至第１６図について説明する。

第１０図の制御回路は本考案の基本的な実施例を示すものである。

本回路はアナログＩＣ６８にオペアンプを使用した実施例を示すもので、該アナログＩＣ６８，コンデンサＣ３，ＣｄＳセル６７，抵抗Ｒ３，Ｒ４でマルチバイブレータ回路を構成している。ＣｄＳセル６７は光を受けると抵抗値が低下する特性を持っているため、本回路では光量が多いと

きマルチバイブレータの発振周波数が高くなり、光量が少ないときには発振周波数が低くなる動作をする。こうして得られた信号を抵抗器Ｒ５を介してレンズＬ，Ｌの液晶セルＬａに印加する。

然るに液晶セルＬａは電気的特性上、容量性負荷Ｃを形成するため、第２３図の等価回路に示すようにＲ５とＣＬによってローパスフィルタを構成するようになる。従って液晶セルＬａの両端間の電圧Ｖ２は、高周波時には低電圧と成り、逆に低周波時には高電圧と成る。即ち光量が多いときには液晶セルＬａに印加する電圧が低く、レンズＬの光透過度を抑制し、光量が少ないときには液晶セルＬａに印加する電圧が高く、レンズＬの光透過度を高めるようになり、サングラスとしての外光に応じた遮光作用を発揮する。

次に光感度切換機構を装備した制御回路について説明する。第１１図乃至第１６図までの回路図において電源の接続は省略してある。電源の接続は使用する素子により適宜接続されるものであり、回路図は必要最小限を例示したものである。

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第１１図及び第１２図は増幅度を切り換えて光感度を切り換える実施例の回路図を示すもので、Ａ１，Ｃ１，Ｒ１～Ｒ３でマルチバイブレータ回路を構成し、増幅器Ａ２にＡＣ信号を供給する。マルチバイブレータ回路の発振周波数はＣ１，Ｒ１によって決定され、該発振周波数ｆは次式（イ）により求めることができる。

$$f = \frac{1}{2 \cdot C1 \cdot R1} \quad (Hz) \quad \cdots (イ)$$

このマルチバイブレータ回路で使用するＡ１には、オペアンプＩＣやコンパレータＩＣ等が使用でき、またディスクリート部品を組合せた回路であってもよい。

第１１図において前記マルチバイブレータ回路で得られた信号は、光センサＲcds を介して増幅器Ａ２に供給される。該増幅器Ａ２には、帰還抵抗ＲflとＲfdが組み合わされており、これらを切り換えるためのスイッチ１６（６５）がある。

増幅器Ａ２の増幅度Ｇは次式（ロ）によって求められるため、スイッチ１６（６５）を切り換える

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ことにより増幅度Ｇを変更することが可能と成る。

$$\text{増幅度 } G = -\frac{\text{Rfl または Rfd}}{\text{Rcds}} \quad \cdots (ロ)$$

増幅器Ａ２で増幅された信号はレンズＬ，Ｌに供給される。該レンズＬ，Ｌは液晶セルＬａを偏光板Ｌｂ，Ｌｂ’で挟んだ構造と成っており、液晶セルＬａにはツイストネマティック型液晶セルを使用し、偏光板ＬｂとＬｂ’は、偏光軸を直交させた直交ニコルの状態にする。このように、ツイストネマティック型液晶セルを直交ニコルにした偏光板の間に配置すると、第１９図に示すように高電圧の信号を印加すると光透過度が低下し、逆に低電圧の信号を印加すると、光透過度を上げる作用をさせることができる。

また、本実施例では光センサRcds にＣｄＳセルを使用しており、ＣｄＳセルの光に対する特性は第１７図に示すように、光量が多い場合には抵抗値が小さく、光量が少ないときは抵抗値が大きくなるという特性を示す。

従って（ロ）式でわかるように、該光センサ

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Ｒcds が光を受けると抵抗値が小さくなり、増幅器Ａ２の増幅度が増し、レンズＬ，Ｌに高電圧の信号が印加され、該レンズＬ，Ｌの光透過度が下がる。また該光センサＲcds の受光量が少ない場合は抵抗値が大きくなり、増幅器Ａ２の増幅度が低下し、レンズＬ，Ｌには低電圧の信号が印加されることになり、該レンズＬ，Ｌの光透過度が増す。このような動作をする回路に、ＲflとＲfdという帰還抵抗を設け、これらを切り換えることにより光感度を切り換えることができる。

ＲflとＲfdの抵抗値の関係をＲfl＜Ｒfdとし、日中の外部光量の多いときにはＲfl側を使用し、夜間（もしくは外部光量の少ないとき）はＲfd側を使用する。即ち光量が多いときには、光センサＲcds は低抵抗の範囲で作動するため、帰還抵抗Ｒflの抵抗値はＲcds の変化分に合った低抵抗値にし、また光量が少ないときには、光センサＲは高抵抗の範囲で作動するため、Ｒfdを高抵抗の値にすれば、光センサＲcds の抵抗値と増幅器Ａ２の出力電圧の特性は第１８図に示したようになる。

従って、光量とレンズの光透過度特性は第２０図に示したようになる。第２０図においてＤの特性曲線はＲfdを接続した場合、Ｌの特性曲線はＲflを接続した場合の特性例を示したものである。ＲflとＲfdの切換は切換スイッチ１６(６５)により行うことができる。

本実施例では帰還抵抗を２個としてあるが、用途に応じて２個以上としてもよく、この場合は切換スイッチ１６(６５)の接点数を帰還抵抗の個数に合った段数のものを使用すればよい。この切換スイッチ１６(６５)にはトグルスイッチやロータリースイッチ又はスライドスイッチなどを使用することができるもので、回路を切り換え得るものであれば足りる。

また、光感度を段階的ではなく無段階に可変するときには、ＲflやＲfdの代わりに可変抵抗器を帰還抵抗として使用すればよく、この場合切換スイッチ１６(６５)は不要となり、任意の光量範囲に設定できることになる。

第９図は、増幅器Ａ２の帰還抵抗に光センサ

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Ｒcds を使用し、入力抵抗Ｒsl，Ｒsdを切り換えることにより、光量に対する増幅器Ａ２の出力電圧を変え光感度を変えることができるようにした実施例の回路図を示したものである。

本実施例では、レンズＬ，Ｌに偏光軸を平行ニコルにした偏光板Ｌｂ，Ｌｂ’を用い、その間に液晶セルＬａ（ツイストネマティック液晶セル）を配置した実施例を示したものである。また、本実施例ではレンズＬ，Ｌにツイストネマティック液晶の他に、誘電異方性が正の液晶と染料分子の長軸方向に光を吸収する染料を混合したゲストホスト液晶を使用した液晶セルを用いることでもよい。ゲストホスト液晶を使用した液晶セルの場合、偏光板Ｌｂ，Ｌｂ’は全く使用しないかまたは、Ｌｂ，Ｌｂ’の偏光板どちらか一方を使用することでもよい。

レンズＬ，Ｌの印加電圧と光透過度特性を第２２図に示す。本実施例のように入力抵抗にＲsd及びＲslを使用した場合、増幅器Ａ２の増幅度Ｇは次式（ハ）により求めることができ、光センサ

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Ｒcds の光量に対する特性は第１７図に示した通りであり、光センサＲcds と増幅器Ａ２の出力電圧の特性は第２１図に示すようになる。

$$\text{増幅度 } G = -\frac{Rcds}{Rsd} \quad \text{又は} \quad G = -\frac{Rcds}{Rsl} \cdots (ハ)$$

従って、入力抵抗ＲsdとＲslをスイッチ１６（６５）で切り換えることにより、光量に対する増幅器Ａ２の出力電圧が変わり光感度を変えることができる。このときの光量とレンズの光透過度特性を第２０図に示す。第２０図においてＤの特性曲線は入力抵抗にＲsdを接続した場合、Ｌの特性曲線はＲslを接続した場合の特性例を示したものである。

本実施例では入力抵抗を２個としてあるが、用途に応じて２個以上としてもよく、この場合は切換スイッチ１６（６５）の接点数は、入力抵抗の個数に合った段数のものを使用すればよい。この切換スイッチ１６（６５）にはトグルスイッチやロータリースイッチ又はスライドスイッチなどを使用することができるもので、回路を切り換え得るも

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のであれば足りる。

また、光感度を段階的ではなく無段階に可変するときには、RslやRsdの代わりに可変抵抗器を入力抵抗として使用すればよい。この場合、切換スイッチ16(65)は不要となり、任意の光量範囲に光感度を設定できる。

第13図は出力インピーダンスを変えて光感度を切り換える一実施例の回路図を示したもので、A3, C2, R2, R3及びRcds でマルチバイブレータ回路を構成している。このマルチバイブレータ回路の発振周波数fは次式(ニ)によって求めることができる。

$$f = \frac{1}{2 \cdot C2 \cdot Rcds} \quad (Hz) \quad \cdots (ニ)$$

従って、光センサRcds の抵抗値は第17図に示したように光量によって変化するため、発振周波数fは光センサRcds の抵抗値の変化とともに、変化する。

液晶セルは電気的特性において容量性を示すため、第13図に示すような回路構成をした場合

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RolまたはRodを接続することにより、低域通過回路を構成することになる。従って、液晶セルの容量値をCとすると第２３図に示すような等価回路と成り、液晶セルに印加される電圧Ｖ２は次式（ホ）により求めることができる。第２３図においてＶ１はマルチバイブレータ回路の出力電圧、Ｖ２は液晶セルに印加される電圧、ＲはRol又はRodを示し、ＣはレンズＬ，Ｌの液晶セルの合成容量値を示す。

$$V2 = \frac{V1}{1 + j\omega CR} \qquad \cdots (ホ)$$

ただし、$\omega = 2\pi f$

（ホ）式で示されるように、Ｖ２は周波数が高い場合は低電圧に、また周波数が低い場合は高電圧と成り、その周波数特性は第２４図に示すように遮断周波数ｆｃ以上になると－６dB/オクターブの特性を示すことになる。この遮断周波数ｆｃは次式（へ）で求めることができる。

$$fc = \frac{1}{2\pi CR} \quad (Hz) \qquad \cdots (へ)$$

従って、（へ）式に示されるＲをRolやRodに

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変えることにより遮断周波数ｆｃを変えることができ、光量に対する感度を切り換えることが可能と成る。

本実施例に示すレンズＬ，Ｌには、偏光板Ｌｂ，Ｌｂ’を平行ニコルにしたツイストネマティック型の液晶セルや、偏光板Ｌｂ，Ｌｂ’のどちらか一方を使用するか又は偏光板を全く使用しないゲストホスト液晶を使用した液晶セルを用いることができる。このとき光量とレンズの光透過度特性は第２０図に示したようになる。第２０図においてＤの特性曲線はＲｏｄを接続した場合、Ｌの特性曲線はＲｏｌを接続した場合の特性例を示したものである。

また、本実施例では出力インピーダンスをＲｏｌとＲｏｄの２個としてあるが、用途に応じて２個以上としてもよく、この場合は切換スイッチ１６(６５)の接点数は、出力インピーダンスの数に合った段数のものを使用すればよい。この切換スイッチ１６(６５)にはトグルスイッチやロータリースイッチ又はスライドスイッチなどを使用するこ

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とができるもので、回路を切り換え得るものであれば足りる。

また、光感度を段階的ではなく無段階に可変するときには、RodやRolの代わりに可変抵抗器を出力インピーダンスとして使用すればよく、この場合は切換スイッチ16(65)は不要となり、任意の光量範囲に光感度を設定できることになる。

第14図乃至第16図は、光センサ受光窓に光透過度の異なるフィルタを配置し、該フィルタを切り換えることにより光感度を切り換える実施例の回路図を示したものである。フィルタf1は、光透過度の低い側Lと光透過度の高い側Dとがあり、これを切り換える。即ち、外部光量の多いときにはL側に設定し、外部光量をこのフィルタで低下させた状態で光センサRcds に当てる。また、外部光量の少ないときにはD側に設定する。フィルタのL側とD側の光透過度の差を、例えば昼夜の光量の差に設定すれば、フィルタを昼間は光量を低下させるL側にし、夜間は光量の低下しないD側に設定することにより光量差のある昼夜どち

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らでも同様の調光作用をさせることができる。

第１４図乃至第１６図の光透過度の異なるフィルタは２種類以上としてもよく、その場合は、光感度をフィルタの数だけ設定することができるようになる。また、光透過度が連続的に変化しているフィルタを使用すれば、段階的ではなく無段階に光感度を設定できることになる。更に、フィルタｆ１の形状は矩形板状のものや円盤状のものが考えられ、これらを摺動させたり回転させたりすることで光感度を切り換える（または可変にする）ことが可能となる。

第１４図の実施例のレンズＬ，Ｌには、ツイストネマティック液晶セルＬａを、偏光軸を平行ニコルにした偏光板Ｌｂ，Ｌｂ’で挟んだものや、誘電異方性が正の液晶と染料分子の長軸方向に光を吸収する染料を混合したゲストホスト液晶を使用した液晶セルＬａ等が使用できる。ゲストホスト液晶を使用した液晶セルの場合は偏光板Ｌｂ，Ｌｂ’を全く使用しないかまたは、Ｌｂ，Ｌｂ’の偏光板どちらか一方を使用することでもよい。

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尚、以上述べた実施例ではレンズＬ，Ｌにネマティック液晶セルを用いた場合について説明したが、該レンズＬ，Ｌにはコレステリック液晶やスメティック液晶、強誘電液晶等を用いた液晶セルを使用することでもよい。

〔考案の効果〕

以上述べたように本考案に係る調光レンズ付き眼鏡またはヘルメット等の構造は、光透過度を変更する調光作用によって昼間と夜間の使用、トンネル内外での使用等、外部光の強弱差がある場所で適正な透過光量を得ることができるため、バイザー又は眼鏡を交換する必要がないばかりでなく、障害物検出機構が距離センサによってヘルメット前方の障害物を検出し、予めセットし又は調節した距離以下の場合にブザーを鈴鳴するようになるため、車間距離警告器の作用をなすものである。

又、上記平板状の液晶セルを円柱状又は球面状の曲面を有する二枚の合成樹脂透明板の間隙に収容しているため、レンズを外部衝撃から保護し、衝撃に対する充分な強度を有するヘルメットを構

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成することができると共に、殊に眼鏡に構成したものでは、従来の眼鏡と殆ど外観を変更することなく実施できるため、眼鏡の意匠性を損なうことなく実施できる等の特徴を有するものであり、本考案実施後の実用的効果は極めて大きい。

4．図面の簡単な説明

第1図は本考案の一実施例を示す調光レンズ付きヘルメットの斜視図、第2図は第1図におけるII－II線断面図、第3図は液晶セルの構造と制御構造を示す説明図、第4図は第1図におけるIV－IV線断面図、第5図及び第6図はそれぞれ障害物警告機構の実施例を示すブロック線図、第7図は本考案の他の実施例を示すサングラスの斜視図、第8図は同電子回路収容部の拡大図、第9図は電源電池収容部の拡大図、第10図は本考案の制御回路の基本的な実施例を示す回路図、第11図乃至第16図はそれぞれ光感度の切換機構の実施例を示す回路図、第17図はCdSセルの光量－抵抗値特性の例を示すグラフ、第18図は入力抵抗に光センサを使用した場合のCdSセルの抵抗値

－出力電圧特性の例を示すグラフ、第１９図は直交ニコル間にツイストネマティック液晶セルを配置した場合の印加電圧－光透過度特性の例を示すグラフ、第２０図は外部光量－光透過度特性の例を示すグラフ、第２１図は帰還抵抗に光センサを使用した場合のＣｄＳセルの抵抗値－出力電圧特性の例を示すグラフ、第２２図は平行ニコル間にツイストネマティック液晶セルを配置した場合の印加電圧－光透過度特性の例を示すグラフ、第２３図は出力抵抗と液晶セルの等価回路、第２４図は低域通過回路の周波数－電圧特性の例を示すグラフである。

１…ヘルメット本体　　２…バイザー

４，５…合成樹脂透明板　１４…光センサ

１６，６５…光感度切換スイッチ

２０…障害物検出機構　２１…検出距離設定摘み

２２…投光素子　　２３…受光素子

６１…眼鏡本体　　６２…眼鏡フレーム

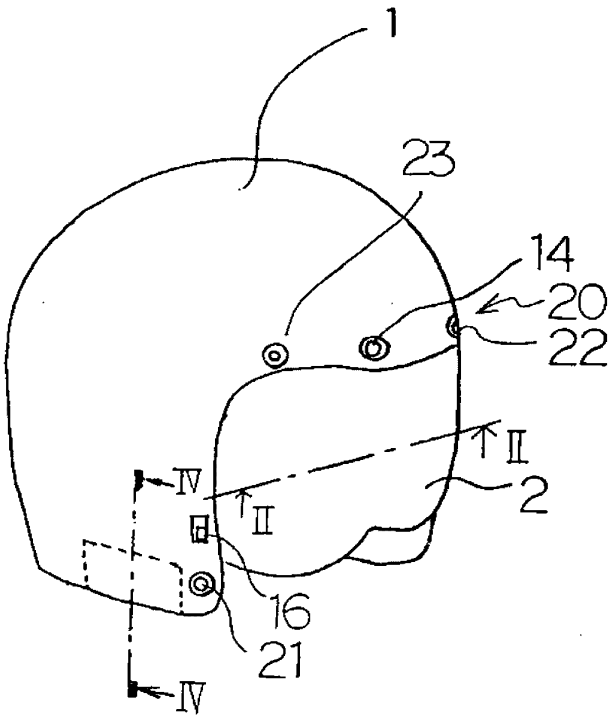
６４…光センサ　　Ｌ…レンズ

代理人　弁理士　畠　山　隆

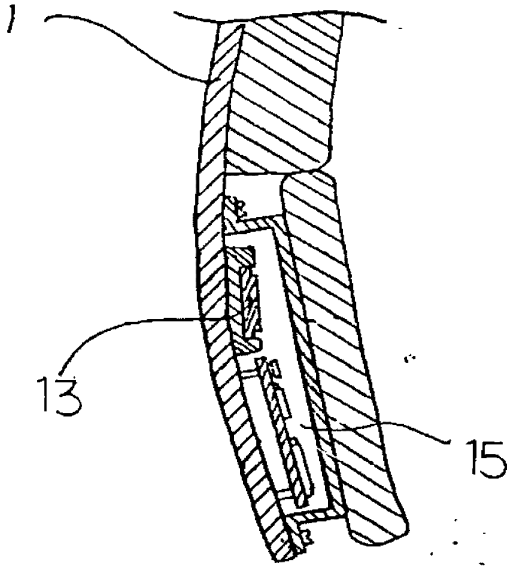
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第１図



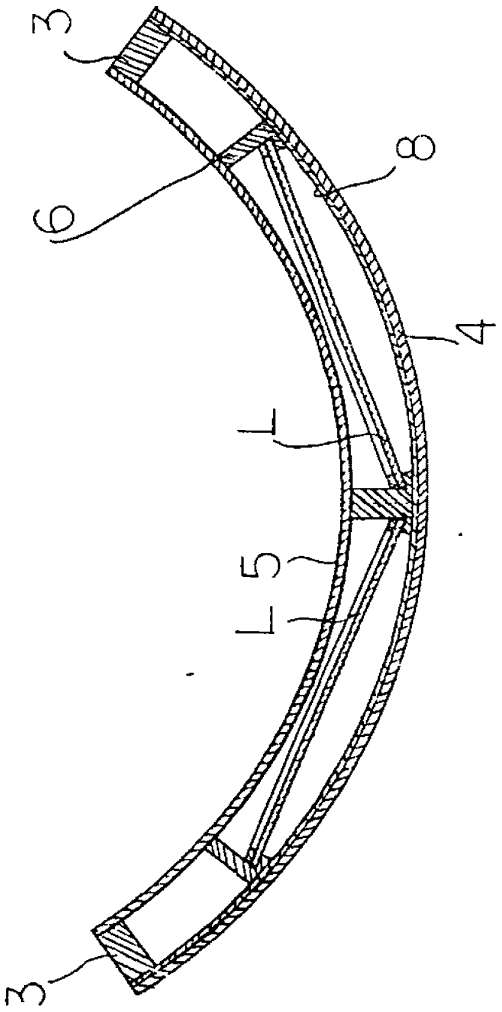
第４図



代理人 212
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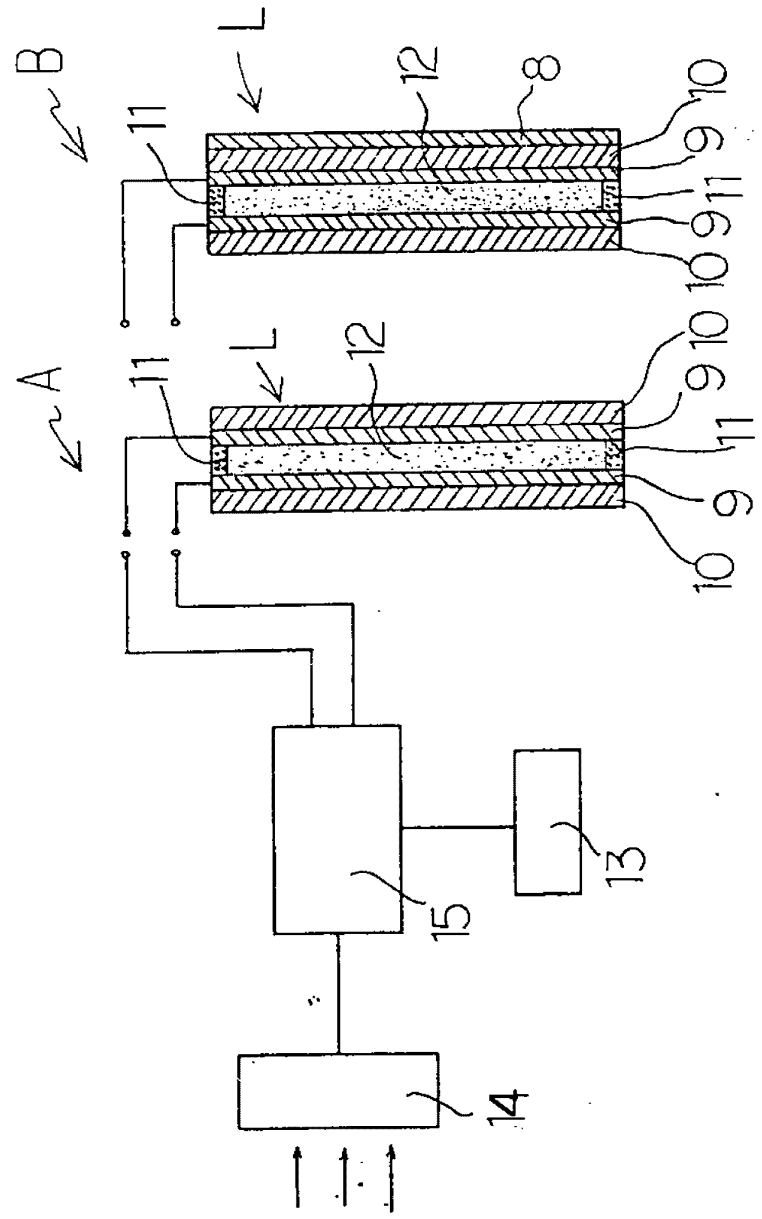
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第2図

代理人 21
弁理士 畠 山

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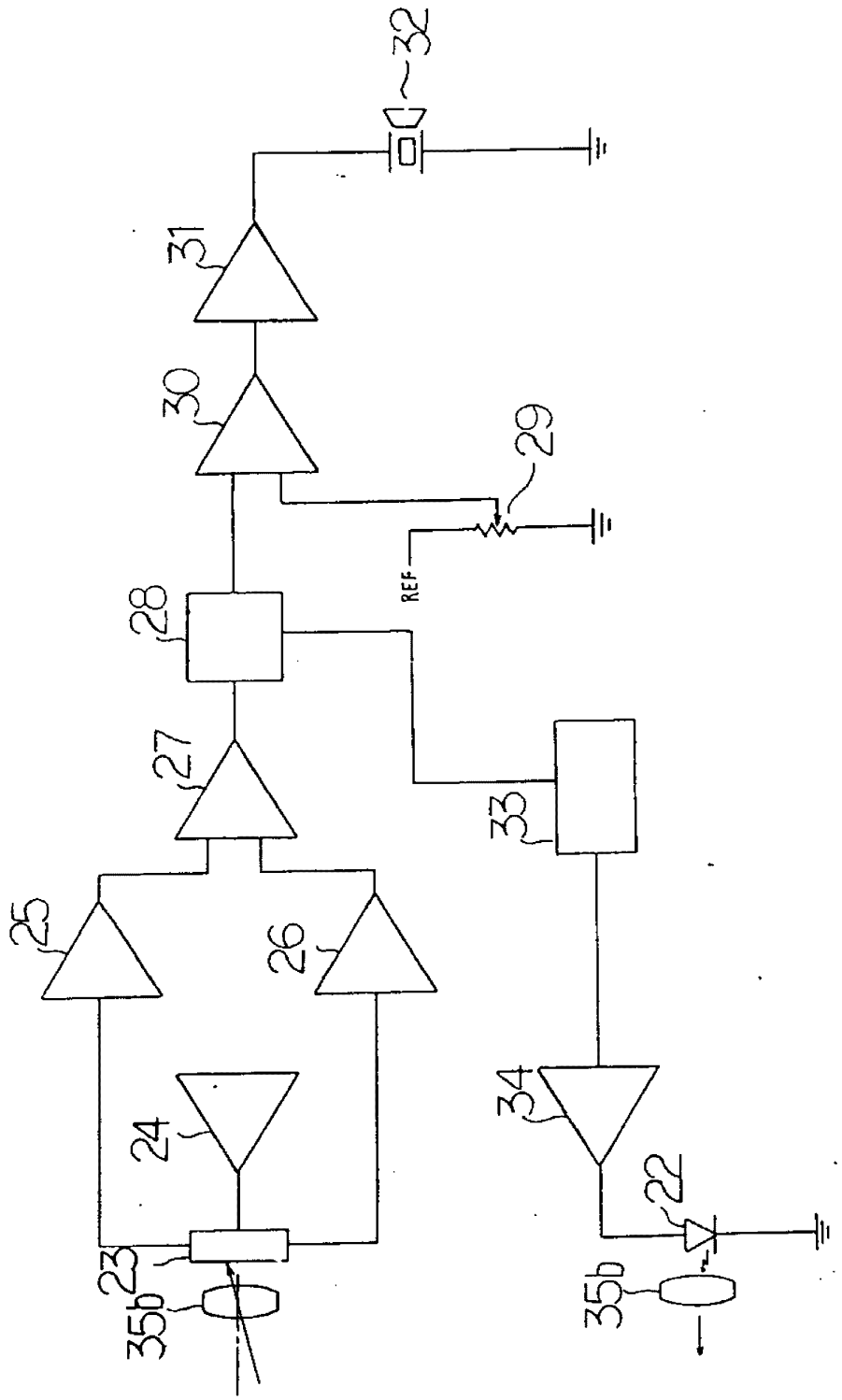
第3図

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弁理士 畠 山

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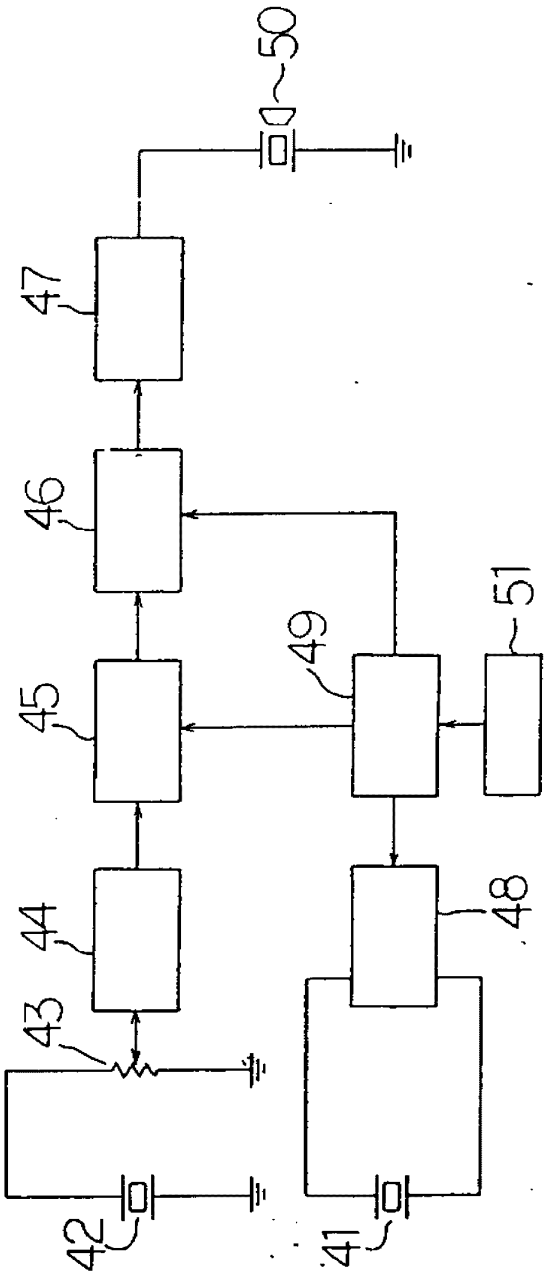
第5図



21

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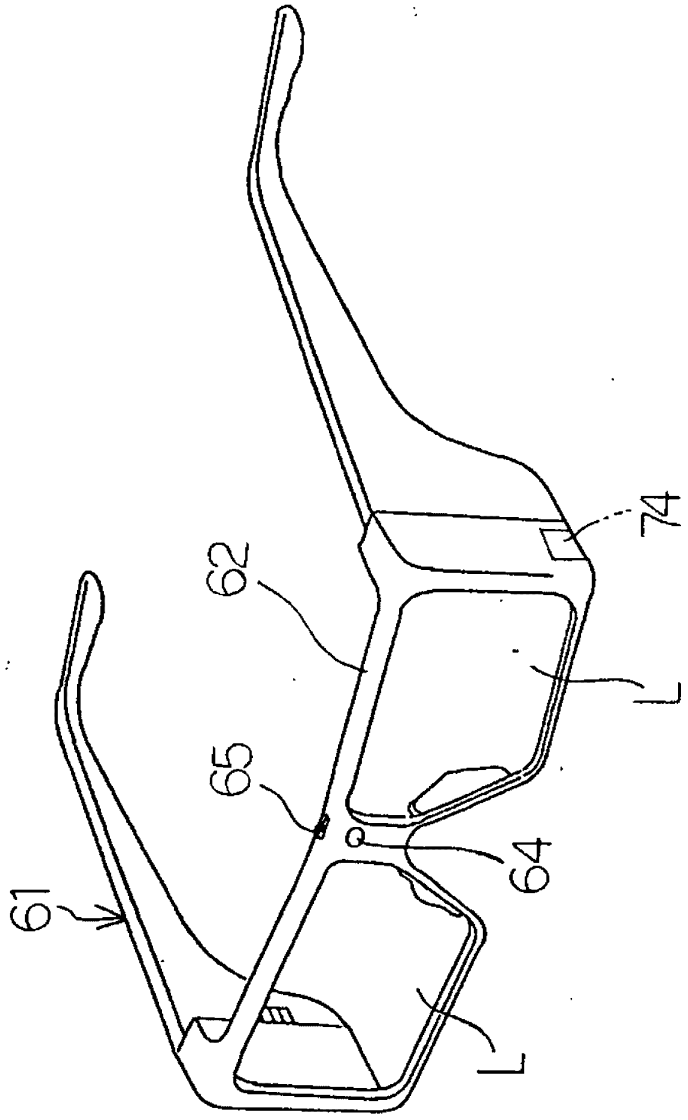


第6図

代理人 弁理士 畠山 隆 216

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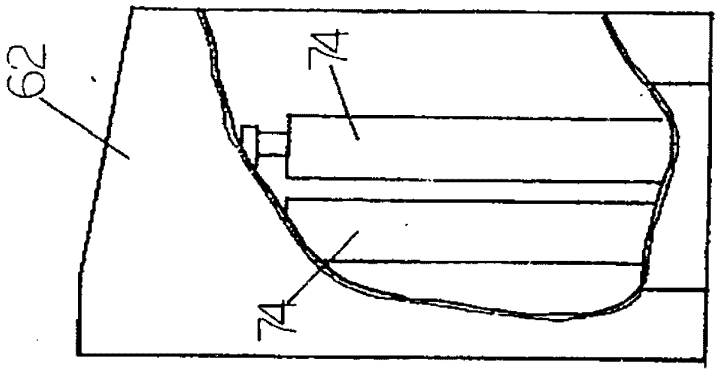
第７図



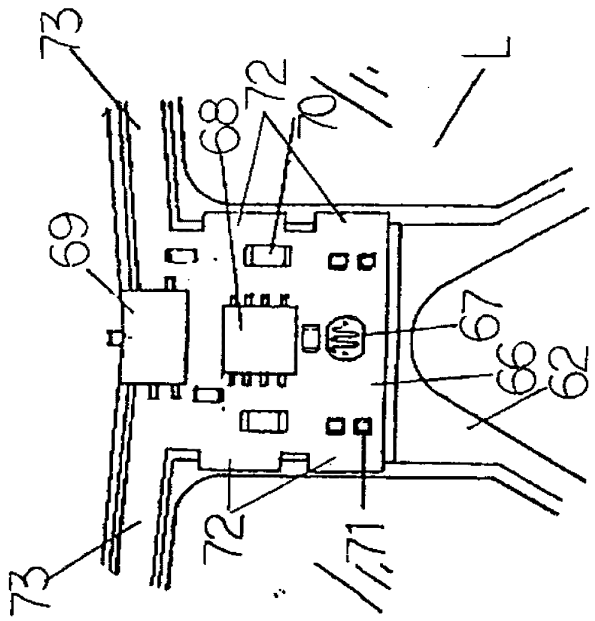
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弁理士 畠 山 隆

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第9図



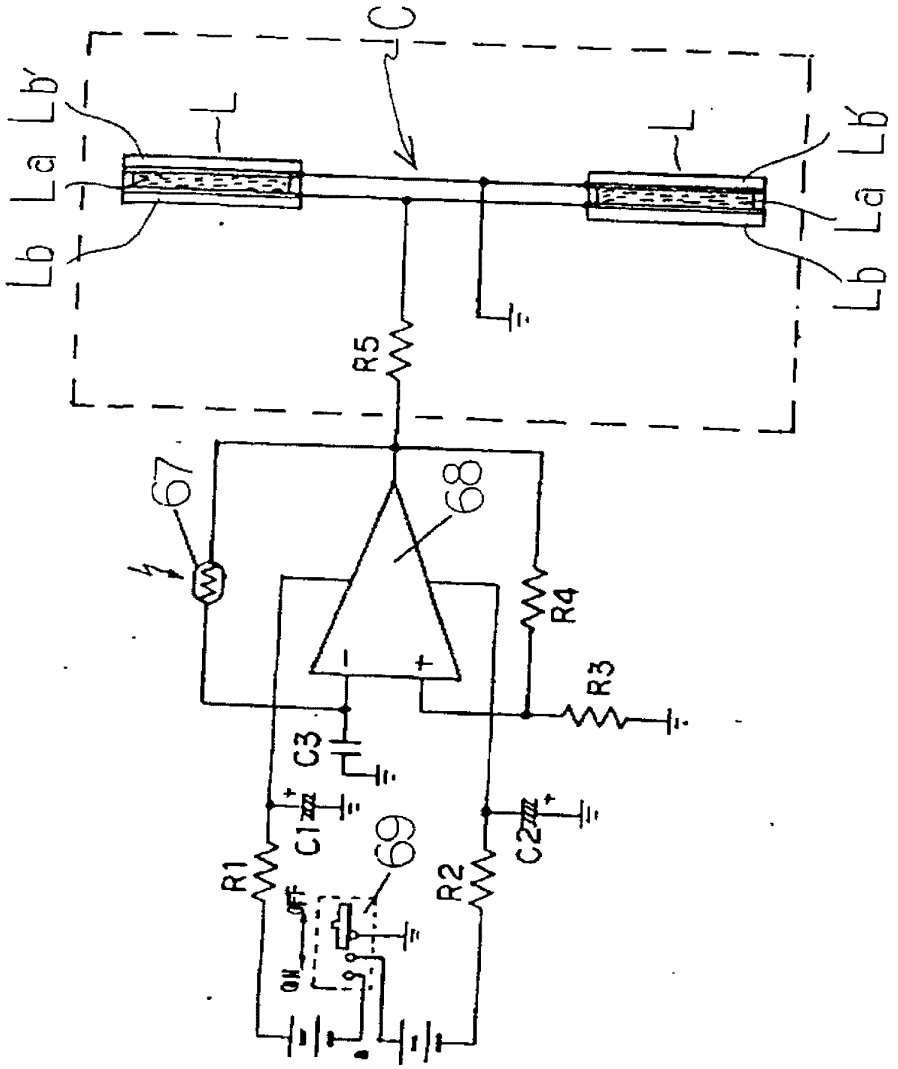
第8図



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第10図



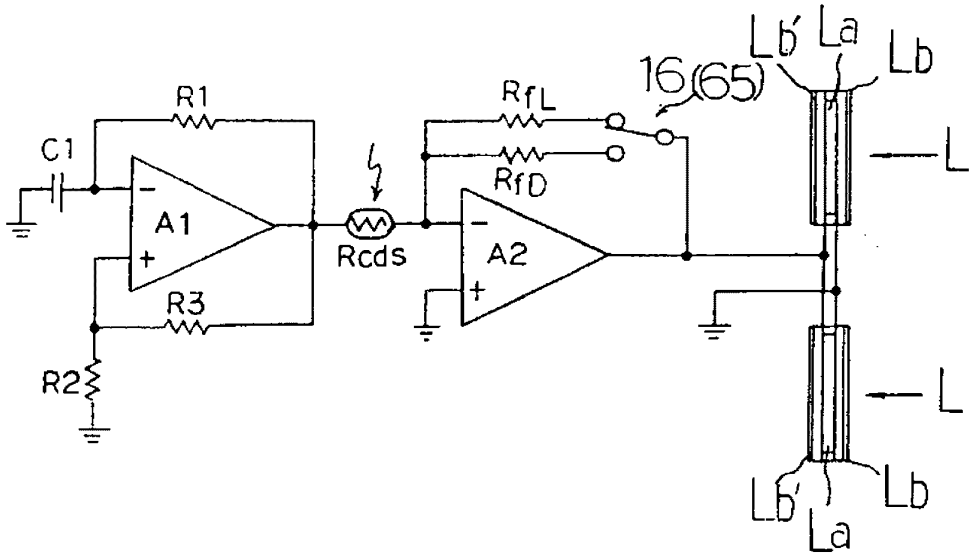
実開63-153218

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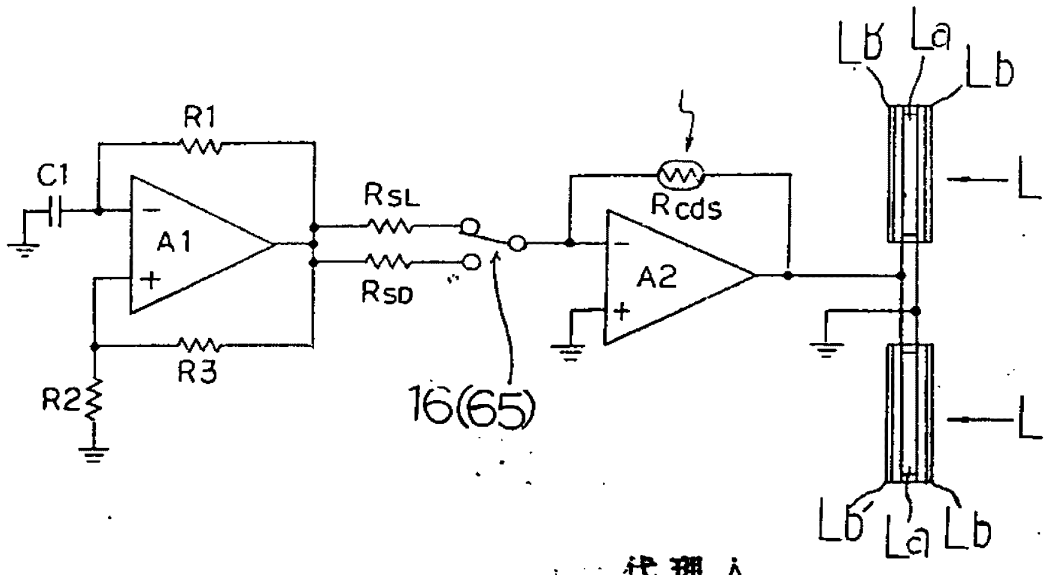
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第11図



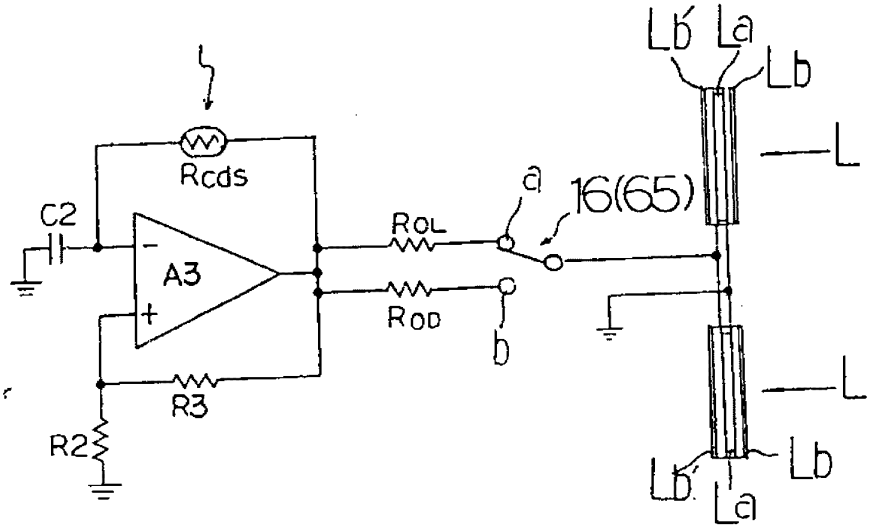
第12図



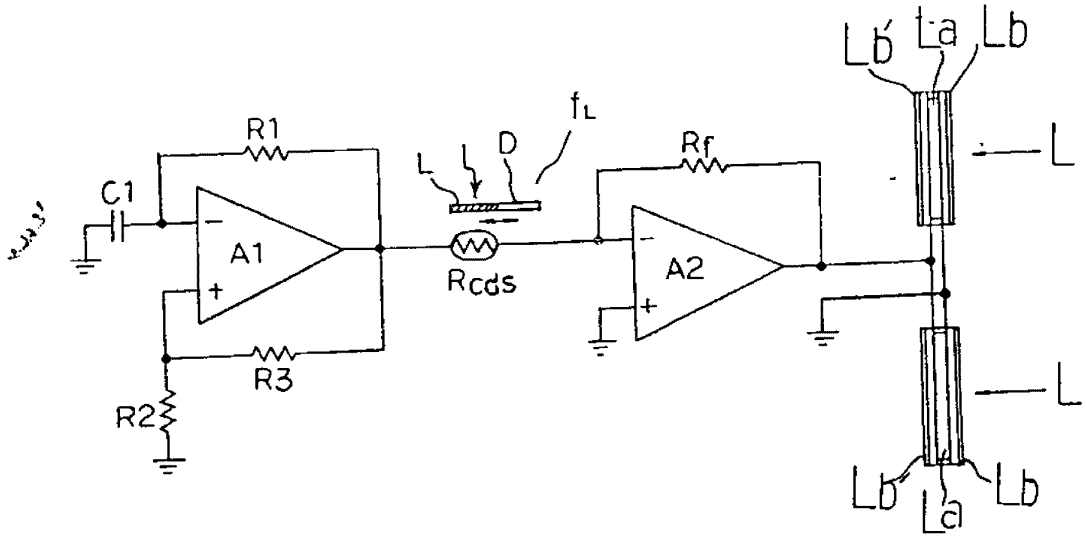
代理人
220 弁理士 畠山 隆

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第13図



第14図

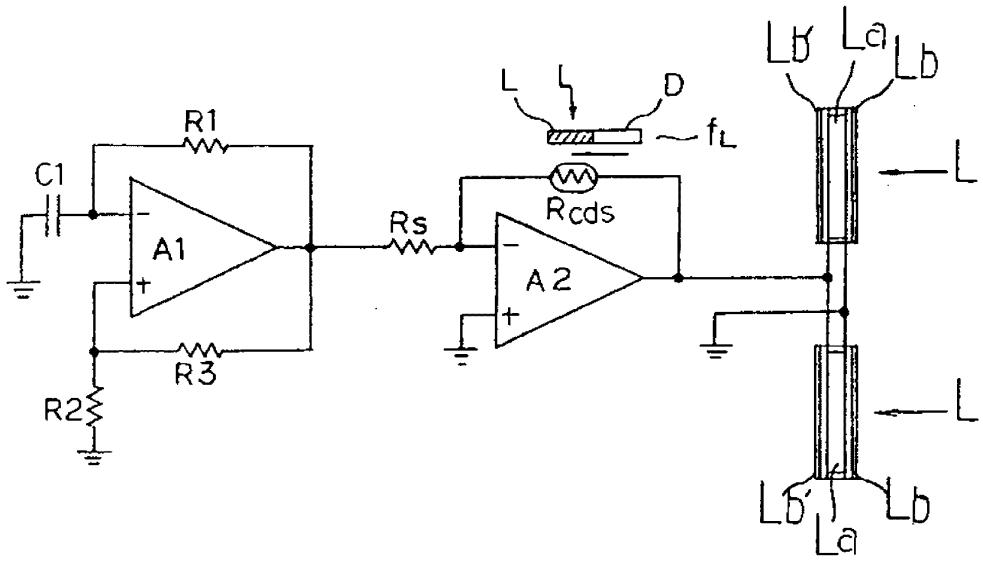


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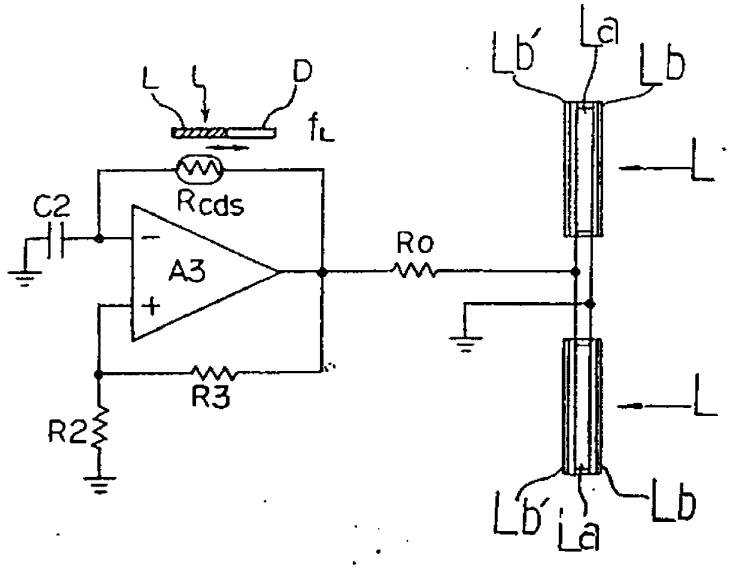
221 代理人 弁理士 畠山 隆

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第15図

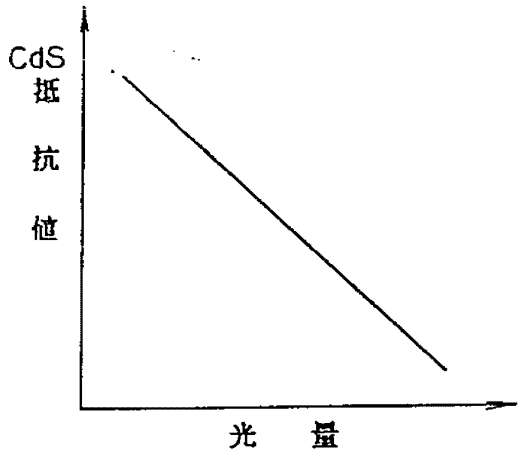


第16図

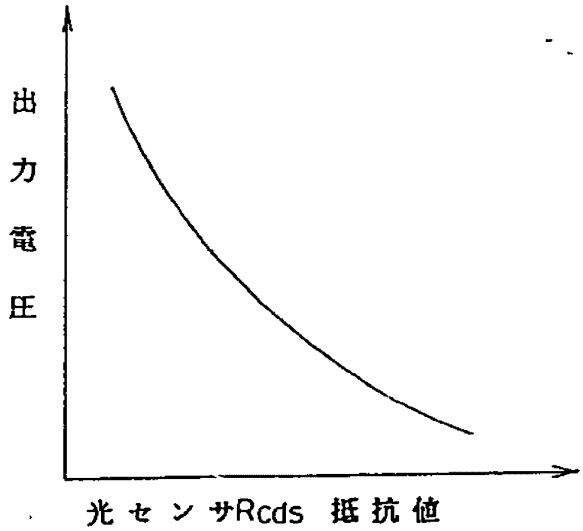


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第17図

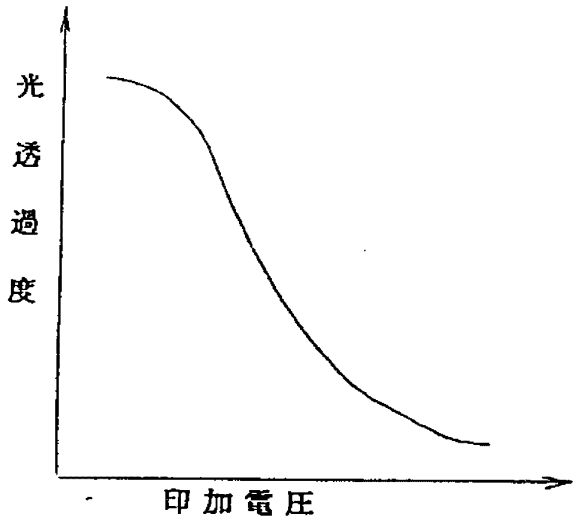


第18図

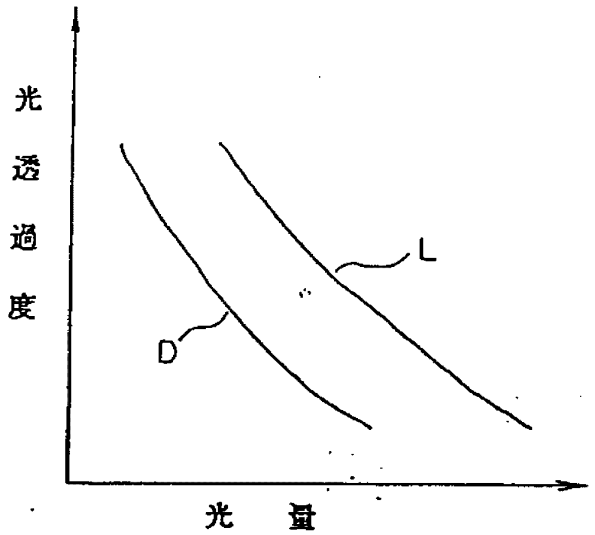
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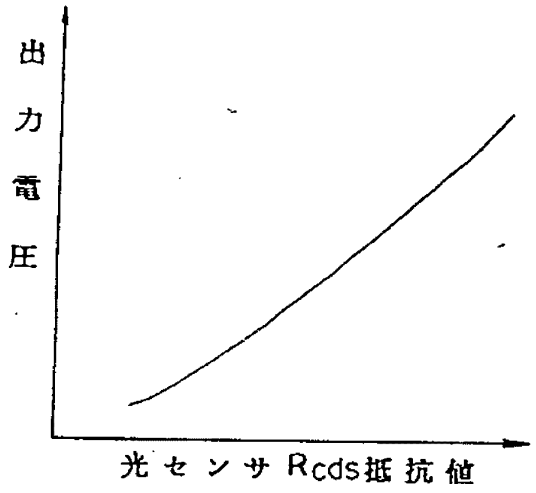
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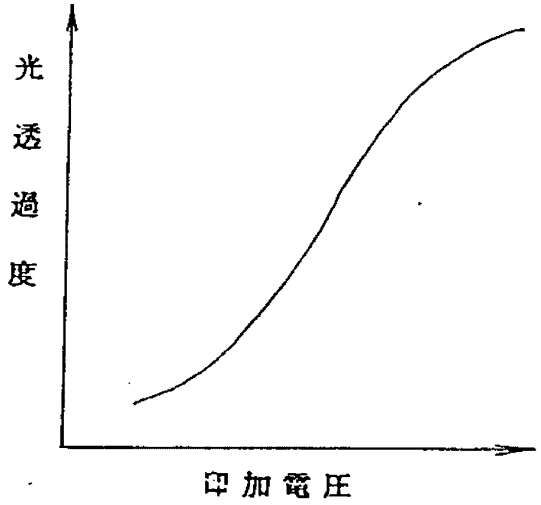
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第21図

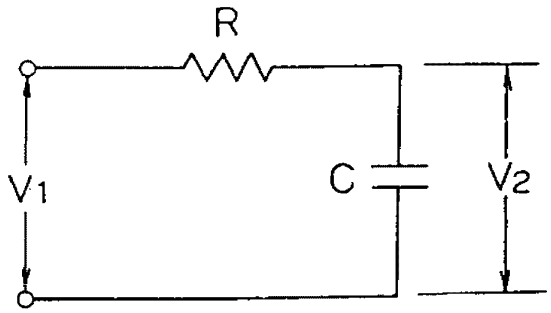


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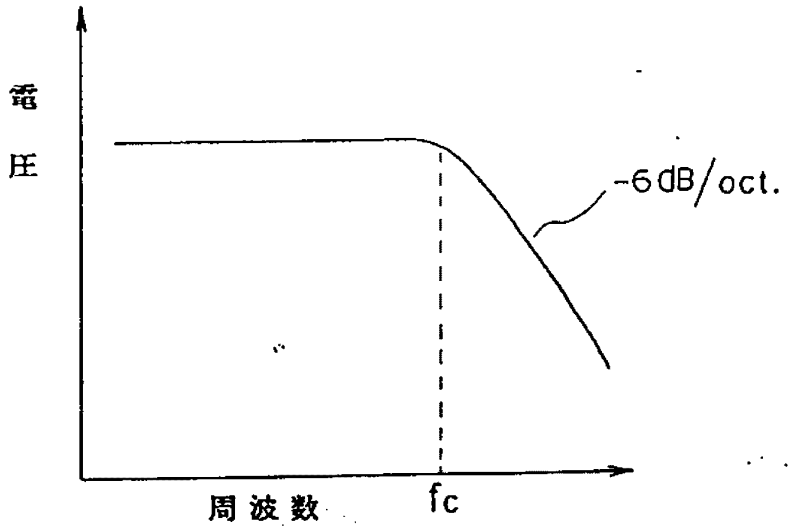
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第23図



第24図

実開 63-15321

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1383_PRIOR_ART_000436

MACHINE TRANSLATION

Name of the device Structure of glasses or helmets, etc. with dimming lenses

priority claim
July 4, 1986 Japan (JP) Jissho 61-103330
October 4, 1986 Japan (JP) Jitsugyo 61-152899

Scope of Utility Model Registration Claims
(1) In helmets or sunglasses, etc. for motorcycles that have an electrode substrate and use an element in the lens section or visor section that causes the color or light transmittance to change by the application of an external voltage, all electronic circuits, including the control circuit of the element, a light sensor that detects external light, a power battery and a power switch, are contained in the body of the glasses or The structure of glasses or helmets, etc. with light-dimming lenses, characterized in that all electronic circuits such as control circuits of elements, light sensors to detect external light, power batteries and power switches are housed in the body of the helmet, etc.
(2) The structure of eyeglasses or helmets, etc. with light-dimming lenses as described in paragraph 1 of the utility model registration claims, characterized in that the electronic circuit is equipped with a light sensitivity switching mechanism that switches or varies the element that causes the color or light transmittance to change upon application of an external voltage to a specific light intensity range or any light intensity range.
(3) The structure of eyeglasses or helmets, etc. with a light-tuning lens as described in paragraphs 1 and 2 of the Utility Model Registration claims, characterized in that the element that causes the color or light transmittance to change upon application of an external voltage is a guest-host type liquid crystal cell.
(4) The structure of eyeglasses or helmets, etc. with a light-tuning lens as described in paragraphs 1 and 2 of the Utility Model Registration claims, characterized in that the element that causes the color or light transmittance to change by the application of an external voltage is a twisted nematic liquid crystal cell.
(5) The structure of eyeglasses or helmets, etc. with light-dimming lenses as described in paragraphs 1 to 4 of the Utility Model Registration Claims, characterized in that the light sensitivity switching mechanism comprises an automatic control mechanism by a microcomputer.
(6) A structure for eyeglasses or helmets, etc. with a light control lens as described in paragraphs 1 to 4 of the Utility Model Registration claims, characterized in that the light sensitivity switching mechanism switches or varies the signal amplification level to adjust the liquid crystal element to a specific light intensity range or any light intensity range.
(7) A structure for eyeglasses or helmets, etc. with light-dimming lenses as described in paragraphs 1 to 4 of the utility model registration claims, characterized in that the light sensitivity switching mechanism switches or varies the output impedance to adjust the liquid crystal element or EC cell to a specific light intensity range or any light intensity range.
(8) The light sensitivity switching mechanism is characterized by a structure in which a filter with a different light transmittance is placed in the light input window of the light sensor, and the filter is switched or varied to adjust the liquid crystal element or EC cell to a specific light intensity range or any light intensity range, as described in paragraphs 1 to 4 of the utility model registration claims. Structure of eyeglasses or helmets, etc. with lenses.
(9) The structure of glasses or helmets, etc. with a light-dimming lens as described in paragraphs 1 to 8 of the Utility Model Registration claims, characterized in that the liquid crystal element is housed between two synthetic resin transparent plates having a columnar or spherical radius of curvature.

(10) In addition to said light-dimming lens, a part of the helmet or glasses is equipped with an obstacle warning device that detects a distance from a forward obstacle by a distance sensor and sounds a buzzer installed in said helmet or glasses via a detection distance switching mechanism that switches or changes the distance to a specific distance or less or to any detection distance. The structure of eyeglasses or helmets, etc. with light-dimming lenses as described in paragraphs 1 to 8 of the scope of claims for utility model registration, characterized in that
(11) The structure of eyeglasses or helmets, etc. with dimming lenses as described in paragraph 10 of the Utility Model Registration claims, characterized in that the distance sensor is an infrared distance sensor.
(12) The structure of eyeglasses or helmets, etc. with dimming lenses as described in paragraph 10 of the Utility Model Registration claims, characterized in that the distance sensor is an ultrasonic distance sensor.
(13) A structure for eyeglasses or helmets, etc. with a dimming lens as described in paragraphs 1 to 12 of the Utility Model Registration claims, characterized in that the electronic circuit is configured on a flexible blintz board.
(14) The structure of eyeglasses, etc. with dimming lenses as described in paragraphs 1 to 8 of the Utility Model Registration Claims, characterized in that the electronic circuit excluding the power supply battery is located in the bridge portion of the eyeglass frame.
(15) The structure of eyeglasses, etc. with light-dimming lenses as described in paragraphs 1 to 8 of the Utility Model Registration Claims, characterized in that the power supply battery for the electronic circuit is located in the wisdom portion of the eyeglass frame.

Brief Description of Drawings
Figure 1 shows a diagram of a helmet with a dimming lens, Figure 2 shows a cross-sectional view of the II-II line in Figure 1, Figure 3 shows the structure and control structure of a liquid crystal cell, Figure 4 shows a cross-sectional view of the IV-IV line in Figure 1, and Figure 5 and Figure 6 show block diagrams of an obstacle warning mechanism respectively Figures 7, 8, 9, 10, 11, 16, and 17 show the circuit diagram of a basic example of the control circuit of this idea, and the circuit diagram of the light sensitivity switching mechanism, respectively. The 17th figure shows an example of light intensity vs. resistance characteristics of a CdS cell, the 18th figure shows an example of resistance vs. output voltage characteristics of a CdS cell when an optical sensor is used as input resistance, the 19th figure shows an example of applied voltage vs. light transmittance characteristics when a twisted nematic liquid crystal cell is placed between orthogonal niches, and the 20th figure shows an example of external light intensity vs. light transmittance characteristics when a twisted nematic liquid crystal cell is placed between orthogonal niches. -Figure 21 shows an example of resistance value vs. output voltage characteristics of a CdS cell when an optical sensor is used as a feedback resistor; Figure 22 shows an example of applied voltage vs. optical transmittance characteristics when a twisted nematic liquid crystal cell is placed between parallel niches; Figure 23 shows the equivalent circuit of an output resistor and a liquid crystal Figure 24 is a graph showing an example of frequency-voltage characteristics of a low-pass circuit.

1...Helmet body, 2...Visor, 4, 5...Transparent synthetic resin plate, 14...Light sensor, 16, 65...Light sensitivity changeover switch, 20...Obstacle detection mechanism, 21. Obstacle detection mechanism, 21...Detection distance setting pick, 22...Light emitter, 23...Light receiver, 61...Glasses body, 62...Glasses frame, 64...Light sensor, L...lens.

Correction Dec. 19, 1961
The name of the device is amended as follows
Name of the device Structure of glasses or helmets, etc. with dimming lenses

The scope of claims and brief description of the drawings are amended as follows

Scope of Utility Model Registration Claims
(1) In helmets or sunglasses, etc. for motorcycles that have an electrode substrate and use an element that changes color or light transmittance by the application of an external voltage or a liquid crystal lens that changes its refractive index by changing the orientation state of liquid crystal molecules as a lens part or visor part, a control circuit for the element, an optical sensor that detects external light, The structure of glasses or helmets, etc. with light-dimming lenses, characterized in that all electronic circuits, such as power supply batteries and power switches, are housed in the body of the glasses or helmets, etc.
(2) A structure for eyeglasses or helmets, etc. with light-dimming lenses as described in paragraph 1 of the claims for utility model registration, characterized in that the electronic circuit is equipped with a light sensitivity switching mechanism that switches or varies the element that causes the color or light transmittance to change upon application of an external voltage to a specific light intensity range or any light intensity range.
(3) The structure of eyeglasses or helmets, etc. with a light-tuning lens as described in paragraphs 1 and 2 of the Utility Model Registration claims, characterized in that the element that causes the color or light transmittance to change upon application of an external voltage is a guest-host type liquid crystal cell.
(4) The structure of eyeglasses or helmets, etc. with a light-tuning lens as described in paragraphs 1 and 2 of the Utility Model Registration claims, characterized in that the element that causes the color or light transmittance to change by the application of an external voltage is a twisted nematic liquid crystal cell.
(5) The structure of eyeglasses or helmets, etc. with light-dimming lenses as described in paragraphs 1 to 4 of the Utility Model Registration Claims, characterized in that the light sensitivity switching mechanism comprises an automatic control mechanism by a microcomputer.
(6) A structure for eyeglasses or helmets, etc. with a light control lens as described in paragraphs 1 to 4 of the Utility Model Registration claims, characterized in that the light sensitivity switching mechanism switches or varies the signal amplification level to adjust the liquid crystal element to a specific light intensity range or any light intensity range.
(7) A structure for eyeglasses or helmets, etc. with light-dimming lenses as described in paragraphs 1 to 4 of the Utility Model Registration claims, characterized in that the light sensitivity switching mechanism switches or varies the output impedance to adjust the liquid crystal element to a specific light intensity range or any light intensity range.
(8) Glasses with a light control lens as described in paragraphs 1 to 4 of the Utility Model Registration Claims, characterized in that the light sensitivity switching mechanism comprises a structure in which a filter with a different light transmission level is placed in the light input window of the light sensor, and the filter is switched or varied to adjust the liquid crystal element to a specific light intensity range or any light intensity range. or structure of a helmet, etc. as described in paragraphs 1 to 4 of the utility model registration claims.
(9) The structure of glasses or helmets, etc. with a light-dimming lens as described in paragraphs 1 to 8 of the Utility Model Registration claims, characterized in that the liquid crystal element is housed between two synthetic resin transparent plates having a columnar or spherical radius of curvature.

(10) In addition to said light-dimming lens, a part of the helmet or glasses is equipped with an obstacle warning device that detects a distance from a forward obstacle by a distance sensor and sounds a buzzer installed in said helmet or glasses via a detection distance switching mechanism that switches or changes the distance to a specific distance or less or to any detection distance. The structure of eyeglasses or helmets, etc. with light-dimming lenses as described in paragraphs 1 to 8 of the scope of claims for utility model registration, characterized in that
(11) The structure of eyeglasses or helmets, etc. with dimming lenses as described in paragraph 10 of the Utility Model Registration claims, characterized in that the distance sensor is an infrared distance sensor.
(12) The structure of eyeglasses or helmets, etc. with dimming lenses as described in paragraph 10 of the Utility Model Registration claims, characterized in that the distance sensor is an ultrasonic distance sensor.
(13) A structure for eyeglasses or helmets, etc. with a dimming lens as described in paragraphs 1 to 12 of the Utility Model Registration claims, characterized in that the electronic circuit is configured on a flexible blintz board.
(14) The structure of eyeglasses, etc. with dimming lenses as described in paragraphs 1 to 8 of the Utility Model Registration Claims, characterized in that the electronic circuit excluding the power supply battery is located in the bridge portion of the eyeglass frame.
(l5) The structure of eyeglasses, etc. with dimming lenses as claimed in paragraphs 1 to 8 of the Utility Model Registration, characterized in that the power supply battery for the electronic circuit is located in the wisdom portion of the eyeglass frame.

Brief Description of Drawings
Figure 1 shows a diagram of a helmet with a dimming lens, Figure 2 shows a cross-sectional view of the II-II line in Figure 1, Figure 3 shows the structure and control structure of the liquid crystal cell, Figure 4 shows a cross-sectional view of the IV-IV line in Figure 1, Figure 5 and Figure 6 show examples of the obstacle warning mechanism, respectively. Fig. 4 shows the IV-IV cross section of Fig. 1; Fig. 5 and 6 show an example of the obstacle warning mechanism; Fig. 7 is a diagram of the sunglasses showing another example of this idea; Fig. 8 is an enlarged view of the electronic circuit housing; Fig. 9 is an enlarged view of the power battery housing; Fig. 10 is a circuit diagram showing a basic example of the control circuit of this idea; Fig. 11 to 16 show an example of the light sensitivity switching mechanism, respectively; Fig. 17 and 18 are circuit diagrams showing an example of the light sensitivity switching mechanism. The 17th figure is a graph showing an example of light intensity vs. resistance characteristics of a CdS cell, the 18th figure is a graph showing an example of resistance vs. output voltage characteristics of a CdS cell when an optical sensor is used as input resistance, the 19th figure is a graph showing an example of applied voltage vs. light transmission characteristics when a twisted nematic liquid crystal cell is placed between orthogonal niches Figure 20 shows an example of external light level - light transmittance characteristics; Figure 21 shows an example of resistance value - output voltage characteristics of a CdS cell when an optical sensor is used as a feedback resistor; and Figure 22 shows an example of applied voltage - light transmittance characteristics when a twisted nematic liquid crystal cell is placed between parallel niches, Figure 23 is an equivalent circuit of output resistance and liquid crystal cell, and Figure 24 is a graph showing an example of frequency-voltage characteristics of a low-pass circuit.

1...Helmet body, 2...Visor, 4, 5...Transparent synthetic resin plate, 1 4...Light sensor, 16, 65...Light sensitivity switching switch, 20...Obstacle detection mechanism, 21. Obstacle detection mechanism, 21...Detection distance setting knob, 22...Light emitter, 23...Light

receiver, 61...Eyeglass body, 62...Eyeglass frame, 64...Light sensor, L...Lens, 63...Light sensor, 64...Light sensor, 63...Light sensor, 64...Light sensor, 63...Light sensor, 64...Light sensor, 63...Light sensor sensor, L...lens.

specification
1. Name of the device
Structure of glasses or helmets, etc. with light-dimming lenses
2. Scope of claims for utility model registration
(1) In helmets or sunglasses, etc. for motorcycles that have an electrode substrate and use an element in the lens section or visor section that causes the color or light transmittance to change by the application of an external voltage, all electronic circuits, including the control circuit of the element, a light sensor that detects external light, a power battery and a power switch, are contained in the body of the glasses or The structure of glasses or helmets, etc. with light-dimming lenses, characterized in that all electronic circuits such as control circuits of elements, light sensors to detect external light, power batteries and power switches are housed in the body of the helmet, etc.
(2) The structure of eyeglasses or helmets, etc. with light-dimming lenses as described in paragraph 1 of the utility model registration claims, characterized in that the electronic circuit is equipped with a light sensitivity switching mechanism that switches or varies the element that causes the color or light transmittance to change upon application of an external voltage to a specific light intensity range or any light intensity range.
(3) The structure of eyeglasses or helmets, etc. with a light-tuning lens as described in paragraphs 1 and 2 of the Utility Model Registration claims, characterized in that the element that causes the color or light transmittance to change upon application of an external voltage is a guest-host type liquid crystal cell.
(4) The structure of eyeglasses or helmets, etc. with a light-tuning lens as described in paragraphs 1 and 2 of the Utility Model Registration claims, characterized in that the element that causes the color or light transmittance to change by the application of an external voltage is a twisted nematic liquid crystal cell.
(5) The structure of eyeglasses or helmets, etc. with light-dimming lenses as described in paragraphs 1 to 4 of the Utility Model Registration Claims, characterized in that the light sensitivity switching mechanism comprises an automatic control mechanism by a microcomputer.
(6) A structure for eyeglasses or helmets, etc. with a light control lens as described in paragraphs 1 to 4 of the Utility Model Registration claims, characterized in that the light sensitivity switching mechanism switches or varies the signal amplification level to adjust the liquid crystal element to a specific light intensity range or any light intensity range.
(7) A structure for eyeglasses or helmets, etc. with light-dimming lenses as described in paragraphs 1 to 4 of the utility model registration claims, characterized in that the light sensitivity switching mechanism switches or varies the output impedance to adjust the liquid crystal element or EC cell to a specific light intensity range or any light intensity range.
(8) The light sensitivity switching mechanism is characterized by a structure in which a filter with a different light transmittance is placed in the light input window of the light sensor, and the filter is switched or varied to adjust the liquid crystal element or EC cell to a specific light intensity range or any light intensity range, as described in paragraphs 1 to 4 of the utility model registration claims. Structure of eyeglasses or helmets, etc. with lenses.
(9) The structure of glasses or helmets, etc. with a light-dimming lens as described in paragraphs 1 to 8 of the Utility Model Registration claims, characterized in that the liquid crystal element is housed between two synthetic resin transparent plates having a columnar or spherical radius of curvature.
(10) In addition to said light-dimming lens, a part of the helmet or glasses is equipped with an obstacle warning device that detects a distance from a forward obstacle by a distance sensor and sounds a buzzer installed in said helmet or glasses via a detection distance switching mechanism that switches or changes the distance to a specific distance or less or to any

detection distance. The structure of eyeglasses or helmets, etc. with light-dimming lenses as described in paragraphs 1 to 8 of the scope of claims for utility model registration, characterized in that
(11) The structure of eyeglasses or helmets, etc. with dimming lenses as described in paragraph 10 of the Utility Model Registration claims, characterized in that the distance sensor is an infrared distance sensor.
(12) The structure of eyeglasses or helmets, etc. with dimming lenses as described in paragraph 10 of the Utility Model Registration claims, characterized in that the distance sensor is an ultrasonic distance sensor.
(13) A structure for eyeglasses or helmets, etc. with a dimming lens as described in paragraphs 1 to 12 of the Utility Model Registration claims, characterized in that the electronic circuit is configured on a flexible blintz board.
(14) The structure of eyeglasses, etc. with dimming lenses as described in paragraphs 1 to 8 of the Utility Model Registration Claims, characterized in that the electronic circuit excluding the power supply battery is located in the bridge portion of the eyeglass frame.
(15) The structure of eyeglasses, etc. with light-dimming lenses as described in paragraphs 1 to 8 of the Utility Model Registration Claims, characterized in that the power supply battery for the electronic circuit is located in the wisdom portion of the eyeglass frame.

3. Detailed description of the idea
(Industrial Applications)
This invention relates to the construction of a helmet for motorcycles, light motorcycles, passenger cars, light airplanes, and various other types of vehicles, and to the construction of glasses or helmets with light-controlling lenses for improving sunglasses, etc. worn during general riding.

(Conventional technology)
Various types of head protection helmets are in use in accordance with the mandatory wearing of helmets when riding motorcycles, and many of them are equipped with a wind visor that doubles as a sun visor in the opening to secure a field of vision. However, helmets with sun visors have the disadvantage that visibility varies depending on the intensity of sunlight, and especially when driving on roads with many tunnel entrances and exits, visibility suddenly drops when entering a tunnel, resulting in a blind state.

The same is true for sunglasses used in general, and it was necessary to change glasses depending on the intensity of outside light.

(Problem to be solved by the device)
Therefore, when wearing the above helmet, on roads with frequent tunnel entries and exits, the driver had to stop and change the sun visor each time when entering or exiting a tunnel, and it was impossible to use the helmet when using the highway because it was not possible to stop on the road.

In particular, in the case of eyeglasses such as sunglasses, the electronic circuit for electrically controlling the liquid crystal and EC material used in the lens section must be equipped in a limited location on the eyeglass frame, which has been extremely difficult to arrange and has not been embodied in practice.

The purpose of this invention is to provide a structure for glasses or helmets with light-controlling lenses that automatically adjusts or switches the translucent lenses of sun visors or

sunglasses installed on helmets according to the external illumination level, and also to provide a structure for glasses or helmets with light-controlling lenses that detect obstacles in front and issue warning signals to warn the wearer of obstacles in front. The purpose is to provide a structure for glasses or helmets with light-dimming lenses with an added function of detecting obstacles in front and issuing a warning signal. In addition, it is intended to provide a technology to place the electronic circuit for electrically controlling the liquid crystal and EC material used in the lens section in a limited location on the eyeglass frame.

(Means to solve the problem)
The structure of the proposed helmet or helmet, etc., with a light-dimming lens is a helmet or sunglasses, etc., for motorcycles, in which an element having an electrode substrate and in which the color or light transmittance is changed by the application of an external voltage is used in the lens part or visor part, wherein the control circuit of the element, light sensor to detect external light, power supply battery and a power switch are housed in the body of the glasses or helmet, etc.

The above electronic circuit is equipped with a light sensitivity switching mechanism that switches or varies the element, which changes color or light transmittance by the application of an external voltage, to a specific light intensity range or to an arbitrary light intensity range, and is used in response to the intensity of ambient light.

The liquid crystal element that causes the color or light transmittance to change upon application of the above external voltage can be composed of a guest host liquid crystal cell or a twisted nematic liquid crystal cell.

The light sensitivity switching mechanism can be an automatic control structure that automatically controls the external voltage applied to the liquid crystal element by a microcomputer, and the light sensitivity switching mechanism can be configured to switch or vary the output impedance, or to place a filter with different light transmittance in the light input window of the optical sensor and switch or vary the filter. The light sensitivity switching mechanism can be configured to switch or vary the output impedance, or to place a filter with a different light transmittance in the light input window of the light sensor and adjust the liquid crystal element or EC cell to a specific light intensity range or an arbitrary light intensity range.

Furthermore, the aforementioned liquid crystal element or EC cell is housed between two synthetic resin transparent plates with a columnar or spherical radius of curvature to eliminate external pressure directly applied to the lens.

The structure of glasses or helmets, etc., with light-dimming lenses is such that, in addition to the above-mentioned light-dimming lenses, a part of the helmet or glasses, etc., is equipped with an obstacle warning device that detects the distance from a forward obstacle by a distance sensor and switches or varies the detection distance to a specific distance or less or any detection distance through a detection distance switching mechanism, which is installed on the helmet or glasses, etc. The pusher can be used as a bell. In the case of glasses, a vibrating body that directly stimulates the wearer's skin can be provided instead of a pusher.

The above distance sensor can be composed of an infrared distance sensor or an ultrasonic distance sensor.

In addition, the structure of glasses or helmets, etc. with light-dimming lenses of the present invention can achieve the purpose by configuring the electronic circuit with a flexi ble printed circuit board and placing the electronic circuit excluding the power supply battery in the bridge part of the eyeglass frame and the power supply battery in the wisdom part of the eyeglass frame. The power supply battery is located in the bridge of the eyeglass frame.

(Action)
The structure of glasses or helmets, etc., with light-dimming lenses in the above configuration can obtain appropriate transmitted light presentation in places where there are differences in the intensity of external light, such as daytime and nighttime use, use inside or outside a tunnel, etc., by means of a light-dimming action that changes light transmission by switching the voltage applied to the liquid crystal cell of the light-dimming visor or lens by the light sensitivity switching mechanism. This allows the user to change the light transmittance without the need to replace the polarizers or lenses.

In addition, the above flat liquid cell is housed in the gap between two transparent synthetic resin plates with a cylindrical or spherical curved surface, which protects the liquid cell from external shocks and ensures sufficient strength against shocks.

Furthermore, the obstacle detection mechanism detects obstacles in front of the helmet with a distance sensor and sounds a buzzer when the distance is less than a preset or adjusted distance, thus acting as a distance warning device.

In addition, the control circuitry can be downsized without changing the appearance of conventional eyeglasses, so the design of eyeglasses can be implemented without compromising the design.

(Example)
The following is an example of the structure of glasses or helmets, etc. with light-dimming lenses of the present invention, which will be described in accordance with the drawings. Figures 1 to 6 show an example of a helmet for motorcycles, and Figures 1 to 3 show its appearance.

The sign 1 is the helmet body which covers the user's head and consists of a visor 2 for securing a field of vision in the front. As shown in the second figure, the visor 2 consists of lenses L, L consisting of flat liquid crystal cells La, La via a liquid crystal cell storage frame 6 between two synthetic resin transparent plates 4, 5 such as plastic resin having a cylindrical or spherical radius of curvature separated by a spacer 3, wherein the liquid crystal cells La are of the In the case of a twisted nematic type, a polarizing film 8 is attached to the back surface of a synthetic resin transparent plate 4. As shown in Figure 4, the liquid crystal cell La consists of glass plates 10 and 10 with transparent electrode films 9 formed on their inner surfaces through insulating spacers 11 and filled with liquid crystal 12 in the minute gaps between the transparent electrode films 9 and 9, respectively, as shown in Guest-host type A, and twisted-nematic type B. The liquid crystal cell La is composed of a helmets. The liquid crystal cell La is driven by a power supply unit 13 such as a battery equipped in the helmet body 1, and an output voltage is applied to both transparent electrode films 9 and 9 from a control means 15 that adjusts the output voltage by inputting a signal from an optical sensor 14 such as a CdS element fixed to the front face of the helmet body 1. The light sensitivity can be switched by the light sensitivity switching switch 16 installed in the main body 1, and the control circuit described below controls the applied voltage to the lense s L and L.

The obstacle detection mechanism 20 is composed of a control circuit including a light emitter 22 made of LED and a light receiver 23 made of PSD fixed on the forehead of the helmet body 1, as shown in the block diagram in Figure 5. . The control drive circuit inputs the output of the bias circuit 24 of the light-receiving element 23, which receives light through the light-receiving lens 24, and the output of the differential amplifier 27, which is driven by the difference in output from the two pulse crawling conversion amplifiers 25 and 26, to a sample and hold circuit 28, and the output of the sample and hold circuit 28 and the detection distance setting knob The output of the sample and hold circuit 28 is compared with the output of the variable resistor 29, the setting of which is changed by the detection distance setting knob 21, by the comparator 30 in the latter stage, and the comparative output drives the buzzer 32 installed inside the helmet body 1 via the buzzer drive circuit 31. The above sample-and-hold circuit 28 is synchronized with the timing generator 33, and the LED drive circuit 34 energizes the above light projector 22, which consists of LEDs, to emit infrared rays toward obstacles located in front of the helmet through the light projection lens 35, and the reflected light of the infrared rays is input to the light receiving element 23. The reflected light of the infrared ray is input to light receiving element 23.

Figure 6 shows a block diagram of the obstacle detection mechanism 20 using an ultrasonic sensor, which consists of a wave transmitter sensor 41 and a receiver sensor 42 fixed to the forehead of the helmet body 1, replacing the light emitter 22 and receiver 23 of the previous example. Sign 43 is the sensitivity adjustment volume of the receiver sensor 42, 44 is the receiver signal shaping circuit, 45 is the distance pulse generation circuit, 46 is the distance coefficient circuit, and the buzzer 50 is driven by comparison with the timing generator 49 via the buzzer drive circuit 47. The timing generator 49 sends a drive signal to the distance pulse generation circuit 52 and the wave sensor drive circuit 48 according to the input value from the distance setting switch 51, which is composed of a digital switch circuit, and the wave sensor drive circuit 48 oscillates a high frequency for distance measurement at a predetermined frequency from the wave sensor 41. The structure is designed to oscillate a high-frequency wave for distance measurement at a predetermined frequency from the wave transmitter sensor 41 by the wave transmitter sensor drive circuit 48.

Figures 7 through 9 show the implementation of this idea in sunglasses.

The main body 61 of the glasses consists of the eyeglass frame 62, the lenses L, L, and the light sensor window 64 and light sensitivity switching switch 65 formed on the eyeglass frame 62. The electronic circuit and power supply battery, which will be described later, are built into a part of the eyeglass frame 62. The lenses L, L use liquid crystal cells, each of which electrically controls the amount of transmitted light.

As shown in Figure 8, the above electronic circuit is configured in the bridge section of the eyeglass frame 62, and is the control electronic circuit described below with CdS cell 67, analog IC 68, power switch 69, chip capacitor 70, and chip resistor 71 mounted on flexible print substrate 66.

The above control electronic circuits can be mounted using conventional techniques such as chip mounter machines and reflow solder machines, which allow for compact microfabrication and high-density mounting that can be accommodated in the bridge section of the above eyeglass frame 62.

Furthermore, because the 66 flexible printed circuit board is a film-like substrate, it is capable of forming electric circuits that follow its shape even in uneven or deformed locations.

The connection between the control electronic circuit and the liquid crystal cell of the lens L, L is made at the connection indicated by the sign 72 via conductive adhesive or the like. The power supply wiring section 73 extending from the flexible printed circuit board 66 is wired from the bridge section of the eyeglass frame 62 to the wisdom section, leading to the electrode section of the power supply battery 74 shown in the 9th figure.

The control circuits for the voltage applied to the lenses L, L of the helmet's light modulating visor for motorcycles shown in the first example above and the sunglasses shown in the second example are described below in Figs. 10 through 16.

The control circuit in Figure 10 shows a basic example of this idea.

This circuit shows an example in which an operational amplifier is used as the analog IC68, and the analog IC68, capacitor C3, CdS cell 67, resistors R3 and R4 constitute a multivibrator circuit. Therefore, in this circuit, the oscillation frequency of the multivibrator is increased when the light level is high, and is decreased when the light level is low. The signal thus obtained is applied to the liquid crystal cell La of lens L, L via resistor R5.

However, since the liquid crystal cell La forms a capacitive load C in terms of electrical characteristics, R5 and CL constitute a low-pass filter as shown in the equivalent circuit in Figure 23. Therefore, the voltage V2 between the two ends of the liquid crystal cell La becomes low at high frequencies, and conversely becomes high at low frequencies. In other words, when the amount of light is high, the voltage applied to the liquid crystal cell La is low and the light transmittance of the lens L is suppressed, and when the amount of light is low, the voltage applied to the liquid crystal cell La is high and the light transmittance of the lens L is increased, thus demonstrating the light-shielding effect of sunglasses in response to external light.

Next, the control circuit equipped with the light sensitivity switching mechanism is described. The power supply connections are omitted from the circuit diagrams in Figures 11 through 16. The connection of the power supply is made as needed depending on the elements used, and the circuit diagrams are examples of the minimum necessary.

Figures 11 and 12 show the circuit diagram of an example in which the optical sensitivity is switched by switching the amplification level. The oscillation frequency of the multivibrator circuit is determined by C1 and R1, and the oscillation frequency f can be obtained by the following equation (a).

$$f = \frac{1}{2 \cdot C1 \cdot R1} \quad (Hz) \quad \cdots (1)$$

The Al used in this multivibrator circuit can be an operational amplifier IC, comparator IC, or a circuit combining discrete components.

In Figure 11, the signal obtained in the multivibrator circuit described above is supplied to amplifier A2 via optical sensor Rcds. The amplifier A2 has a combination of feedback resistors Rfl and Rfd, and a switch 16(65) to switch between them.

Since the amplification G of amplifier A2 is obtained by the following equation (mouth), it is possible to change the amplification G by switching the switch 16 (65).

$$\text{増幅度 } G = -\frac{Rfl \text{ または } Rfd}{Rcds} \quad \cdots (口)$$

The signal amplified by amplifier A2 is supplied to lenses L and L. The lenses L, L consist of a liquid crystal cell La sandwiched between polarizing plates Lb and Lb'. A twisted nematic liquid crystal cell is used for the liquid crystal cell La, and the polarizing plates Lb and Lb' are placed in an orthogonal niche with their polarization axes orthogonal to each other. When the twisted nematic liquid crystal cell is placed between the orthogonal-nicole polarizing plates, as shown in Figure 19, the optical transmittance decreases when a high-voltage signal is applied, while the optical transmittance increases when a low-voltage signal is applied.

In this example, a CdS cell is used for the light sensor Rcds, and the characteristics of the CdS cell with respect to light are shown in Figure 17, where the resistance value is low when the light level is high and high when the light level is low.

Therefore, as can be seen in equation (mouth), when the light sensor Rcds receives light, the resistance value becomes small, the amplification of amplifier A2 increases, a high voltage signal is applied to lenses L and L, and the light transmittance of lenses L and L decreases. When the amount of light received by the light sensor Rcds is low, the resistance value increases, the amplification of amplifier A2 decreases, a low voltage signal is applied to lenses L and L, and the light transmittance of lenses L and L increases. The circuit that operates in this way has two feedback resistors, Rfl and Rfd, and by switching these resistors, the light sensitivity can be switched.

The relationship between the resistance values of Rfl and Rfd is Rfl<Rfd, and the Rfl side is used during the day when external light intensity is high, and the Rfd side is used at night (or when external light intensity is low). In other words, when the light level is high, the light sensor Rcds operates in the low resistance range, so the resistance value of the feedback resistor Rfl should be set to a low resistance value that matches the change in Rcds. The characteristics of the output voltage of A2 will be as shown in Figure 18. Therefore, the light intensity and lens light transmittance characteristics will be as shown in the 20th figure. In the 20th figure, the characteristic curve of D shows an example of the characteristics when Rfd is connected, and the characteristic curve of L shows an example of the characteristics when Rfl is connected.

In this example, two feedback resistors are used, but more than two may be used depending on the application. In this case, the number of contacts of the changeover switch 16(65) should be the same number of steps as the number of feedback resistors. The 16(65) can be toggle switches, rotary switches, slide switches, or the like, as long as they are capable of switching the circuit.

When the light sensitivity is variable without steps, a variable resistor can be used as a feedback resistor instead of Rfl and Rfd. In this case, the switching switch 16(65) becomes unnecessary, and the light intensity can be set to any desired range.

Figure 9 shows a circuit diagram of an example in which an optical sensor Rcds is used as the feedback resistor of amplifier A2, and the output voltage of amplifier A2 with respect to the light level can be changed to change the light sensitivity by switching the input resistors Rs1 and Rsd.

This example shows a case in which polarizing plates Lb and Lb' with parallel-nickel polarization axes are used for lenses L and L, and a liquid crystal cell La (twisted nematic liquid crystal cell) is placed between them. In this example, in addition to the twisted nematic liquid crystal, a liquid crystal cell using a guest host liquid crystal, which is a mixture of a liquid crystal with positive dielectric anisotropy and a dye that absorbs light in the long axis direction of the dye molecules, may be used for the lenses L, L. In the case of a liquid crystal cell using guest host liquid crystal, polarizing plates Lb and Lb' may not be used at all, or either one of the polarizing plates Lb and Lb' may be used.

The applied voltage and light transmittance characteristics of lenses L and L are shown in Figure 22. When Rsd and Rsl are used as input resistors as in this example, the amplification G of amplifier A2 can be obtained by the following equation (c), and the characteristics of light sensor Rcds with respect to light intensity are as shown in Figure 17, and the characteristics of light sensor Rcds and output voltage of amplifier A2 are shown in Figure 21.

$$\text{増幅度 } G = -\frac{Rcds}{Rsd} \quad \text{又は} \quad G = -\frac{Rcds}{Rsl} \quad \cdots (ハ)$$

Therefore, by switching the input resistors Rsd and Rsl with switch 16(65), the output voltage of amplifier A2 with respect to the light intensity can be changed to change the light sensitivity. The light intensity and lens light transmittance characteristics at this time are shown in Figure 20. In Figure 20, the characteristic curve in D shows an example when Rsd is connected to the input resistor, and the characteristic curve in L shows an example when Rsl is connected.

In this example, two input resistors are used, but more than two may be used depending on the application. In this case, the number of contacts of the changeover switch 16(65) should be the same as the number of input resistors. In this case, the number of contacts of the changeover switch 16(65) should be the same number of steps as the number of input resistors.

When the light sensitivity is to be varied steplessly instead of stepwise, a variable resistor can be used as an input resistor instead of Rsl and Rsd. In this case, the changeover switch 16(65) becomes unnecessary, and the light sensitivity can be set to any light intensity range.

Figure 13 shows a circuit diagram of an example of switching optical sensitivity by changing the output impedance. A3, C2, R2, R3, and Rcds constitute a multivibrator circuit. The oscillation frequency f of this multivibrator circuit can be obtained by the following equation (d).

$$f = \frac{1}{2 \cdot C2 \cdot Rcds} \quad (Hz) \quad \cdots (ニ)$$

Therefore, since the resistance value of the optical sensor Rcds varies with the amount of light as shown in Figure 17, the oscillation frequency f varies with the change in the resistance value of the optical sensor Rcds.

Since the liquid crystal cell exhibits capacitive electrical characteristics, a low-pass circuit can be configured by connecting Rol or Rod in the circuit configuration shown in the 13th figure. Therefore, if the capacitance value of the liquid crystal cell is C, the equivalent circuit is as shown in the 23rd figure, and the voltage V2 applied to the liquid crystal cell can be obtained by the following formula (e). In the 23rd figure, V1 is the output voltage of the multivibrator circuit, V2 is the voltage applied to the liquid crystal cell, R represents Rol or Rod, and C represents the combined capacitance value of the liquid crystal cells of lenses L and L.

$$V2 = \frac{V1}{1 + j\omega CR} \quad \cdots (ホ)$$

ただし、$\omega = 2\pi f$

As shown in equation (e), V2 becomes a low voltage when the frequency is high and a high voltage when the frequency is low, and its frequency characteristic will show a characteristic of 1 6 dB/octave when the cutoff frequency fC or higher as shown in Figure 24. The cutoff frequency fC can be obtained by the following equation (He).

$$fc = \frac{1}{2\pi CR} \quad (Hz) \quad \cdots (ヘ)$$

Therefore, by changing R in equation (he) to Rol or Rod, the cutoff frequency fC can be changed, and the sensitivity to light intensity can be switched.

For the lenses L and L shown in this example, a twisted nematic liquid crystal cell with polarizers Lb and Lb' in parallel niche or a liquid crystal cell with guest host liquid crystal using either polarizers Lb and Lb' or no polarizer at all can be used. In this case, the light intensity and lens transmittance characteristics are as shown in Figure 20. In Figure 20, the characteristic curve in D shows an example when Rod is connected, and the characteristic curve in L shows an example when Rol is connected.

In this example, two output impedances, Rol and Rod, are used, but more than two may be used depending on the application. In this case, the number of contacts of the changeover switch 16(65) should be the number of steps appropriate for the number of output impedances. The changeover switch 16(65) can be a toggle switch, rotary switch, slide switch, or the like, as long as it is capable of switching the circuit.

When the light sensitivity is to be varied steplessly instead of stepwise, a variable resistor can be used as the output impedance instead of Rod and Rol. In this case, the changeover switch 16(65) is not needed, and the light sensitivity can be set to any light intensity range.