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InVue Security Products Inc.

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ALTERNATIVE CHARGE CONTROL SYSTEM FOR MERCHANDISE DISPLAY SECURITY SYSTEM

FIELD OF THE INVENTION

[0001] Embodiments of the present invention relate generally to a charge control system for items of merchandise on display in a retail store.

BACKGROUND OF THE INVENTION

[0002] Items of merchandise are often displayed for a potential purchaser to examine, and in some instances, to operate the item of merchandise. For example, retail stores typically provide items of merchandise, particularly handheld devices (e.g., cell phones, cameras, MP3 players, video recorders/players, etc.), on a display that allows a potential purchaser to examine and operate the item of merchandise in a powered state, and thereby enabling the purchaser to learn more about the operational features of the item of merchandise. In order to deter theft of the item of merchandise, retailers often times attach the item of merchandise to a merchandise display security device while also providing power to the item of merchandise. The security device, may include for example, mechanical tethers, sensors coupled to the merchandise by electrical or optical cables, and wireless monitoring systems, which activate an alarm if the item of merchandise is detached from the security device by an unauthorized person, such as a potential shoplifter attempting to remove the merchandise from the display.

[0003] Handheld devices typically require specific voltages to maintain maximum power. Additionally, various items of merchandise (e.g., cell phones, cameras, MP3 players, video recorders/players, etc.) from different manufacturers, as well as from the same manufacturer, require different voltage requirements to maintain the maximum power. Power cords and connectors may contribute to a loss of voltage capable of being provided to maintain a maximum charge on an item of merchandise on display. Many variations of operating voltages required to operate and power different items of merchandise make it difficult for a retailer to efficiently power items of merchandise on display.

BRIEF SUMMARY OF THE DRAWINGS

[0004] FIG. 1 illustrates an alternative charge control system and merchandise display system according to one embodiment of the present invention.

[0005] FIG. 2 illustrates an exploded view of the display stand as shown in FIG. 1.

[0006] FIG. 3 illustrates a cross-sectional view of the sensor as shown in FIG. 1.

[0007] FIG. 4 illustrates an enlarged plan view of the alternative charge control system as shown in FIG. 1.

[0008] FIG. 5 illustrates an alternative charge control system and merchandise display system according to another embodiment of the present invention.

[0009] FIG. 6 illustrates a side view of the alternative charge control system and merchandise display system of FIG. 5 attached to the support surface.

[0010] FIG. 7 illustrates a perspective view of a sensor lifted off of a display stand according to one embodiment of the present invention.

[0011] FIG. 8 illustrates a perspective view of a proximity mechanism according to one embodiment of the present invention.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0012] Embodiments of the present invention will now be described more fully hereinafter with reference to the accompanying drawings, in which various embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein. Rather, these embodiments are

provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art.

[0013] Referring now to the accompanying figures wherein identical reference numerals denote the same elements throughout the various views, illustrated embodiments of methods and systems according to the present invention are capable of not only protecting an item of merchandise against theft or unauthorized removal, but may also provide the item of merchandise with an amount of power sufficient to maintain the item of merchandise in a continuously charged state. An item of merchandise may be any portable electronic device, such as, for example, a mobile or cellular phone, a Smartphone, a tablet, notebook, laptop computer, accessories, or the like. Although described in relation for use in a retail environment, the alternative charge control system shown and described herein is suitable for powering and securing an item of merchandise in other settings, such as for example, a residential or commercial environment, and is not intended to be limited to use only as a system for powering protecting against theft in a retail environment.

[0014] In an exemplary embodiment, as shown FIG. 1, an alternative charge control system 10 for a merchandise display security system 1 may generally include one or more display stands 15, one or more alarm modules 9 and one or more sensors 25. The display stands 15 may be mechanically connected (e.g. fasteners, adhesives, etc.) to a display support surface 13 and operably connected to the alarm modules 9. The display stands 15 may be connected to a remote source of electrical power 5 by an electrical power cord 7. Conventional electrical power cords are 120V-AC and as such, some embodiments may require a mechanism such as a transformer 23 to convert the 120V-AC voltage to a voltage of between 3V and 9V-DC. In some embodiments, the voltage conversion is about 5V-DC which is the voltage generally required for supplying power to many of the types of portable electronic products. The desired voltage, however, can vary without affecting the scope of the present invention. The alarm modules 9 may be positioned beneath the display support surface 13 or located in a remote location. In some cases, each display stand 15 may include an alarm module 9. The alarm modules 9 may be hard-wired or configured to wirelessly communicate (e.g. Bluetooth or Wi-Fi communications) with the display stands 15, sensors 25, and/or items or merchandise 3. The sensors 25 may be

operatively and removably connected to the display stands 15 and/or items of merchandise 3 such that the item of merchandise 3 can be readily and freely inspected or used by a user.

[0015] In one embodiment of a charge control system 20 shown in FIG. 4, each of the display stands 15 may be connected to the alarm modules 9 by a display stand cable 17. In the example where the alarm module 9 is integrated with a display stand 15, the display stand cable 17 may be omitted. Each of the display stands 15 may also be connected to a remote source of electric power 5 by a display stand power cord 21. In some embodiments, a transformer 23 may be used to convert the 120V-AC voltage to between 3V and 9V-DC. The display stand cables 17 may be connected to the alarm modules 15 by extending through a hole 19 formed in display surface 13 and into an interior of each of the display stands 15, as discussed further below. The display stand power cords 21 may also extend through the holes 19 formed in display surface 13 or may extend through a different hole formed in the display surface 13 for connection to the display stands 15. The display stand power cords 21 may terminate in a releasable connector 22 which allows for removable attachment of the display stand power cord 21 to and from the display stands 15. In some embodiments, one or more sensors 25 may be operatively connected to the display stands 15 by a sensor power cord 27. Each of the sensors 25 may be mechanically and electrically connected to an item of merchandise 3 on display by a merchandise power cord 29 and may be attached to the item of merchandise 3 by various means such as a pressure sensitive adhesive 26, mechanical brackets, zip ties, and/or other types of fasteners.

[0016] In some embodiments, as shown in FIG. 2, the display stands 15 may include a display stand housing 33. The display stand housing 33 may include a hole 59 formed in a bottom thereof wherein the hole 59 may be configured to receive a display stand cable 17 and/or a display stand power cord 21 therethrough for operatively connecting to a power output jack 61 and a power input jack 73, respectively. The releasable connector 22 of the display stand power cord 21 may be releasably connected to the power input jack 73. Display stand cable 17 may be configured to terminate with a connector 79 at one end thereof, wherein the connector 79 may be configured to engage with the one or more alarm modules 9. In some embodiments, the display stand cord 17 may further include one or more conductors 96, 97 configured to facilitate communication with the power output jack 61.

[0017] In some embodiments, the display stand housing 33 may be further configured to contain engagement features 41, for instance magnets. The engagement features 41 may be configured to facilitate a releasable engagement of the sensors 25 with the display stands 15. In some embodiments, the display stand housing 33 may also include fastener openings 37 configured to receive fasteners 35 therein. The fasteners 35 and/or a pressure sensitive adhesive pad 51 may be used to secure the display stands 15 to a display support surface 13.

[0018] In some embodiments, as shown in FIGS. 3 and 4, the sensor 25 may be secured to an item of merchandise 3 by a pressure sensitive adhesive pad 26 or other similar attachment device. In one embodiment, the sensor 25 may include a sensor housing 47 configured to receive a sensor power cord 27 and a merchandise power cord 29. The sensor power cord 27 may be configured to facilitate an electrical connection between the display stand 15 and the sensor 25. The merchandise power cord 29 may include a power connector 89 at one end thereof and a plug 91 (e.g. such as a USB-A, USB-C, micro-USB, or like connector) mounted at an opposing end thereof. The power connector 89 may be configured to be received in a power output jack 87 formed in the one or more sensors 25, although the merchandise power cord 29 may be hardwired into the sensor in other embodiments thereby omitting the power connector 89. The plug 91 may be configured to be received in a merchandise input port 93 formed in an item of merchandise. In some embodiments, engagement of the power connector 89 with the output jack 87 of the sensor 25 and engagement of the plug 91 with contacts 95 formed in the merchandise input port 93 of the item of merchandise 3 facilitates an electrical connection between the sensor 25 and an item of merchandise 3. For instance, the plug 91 may also be configured to align with and electrically connect with the contact 95 thereby facilitating an electrical connection. As such, the item of merchandise 3 may be configured to be connected to a remote source of power 5 wherein an internal battery or power source of the item of merchandise 3 may be capable of receiving power for operatively displaying features of the item of merchandise 3 for users and for maintaining a charge in order for the item of merchandise 3 to be displayed and operated in a continuously powered state. In some embodiments, the sensor 25 may include a sensing mechanism, which may be a proximity mechanism such as a plunger switch 83 having an outwardly extending plunger 84. In one embodiment, the sensor power cord 27 may be

configured to facilitate an electrical connection between the sensor 25 and the plunger switch 83. In some embodiments, the sensor housing 47 may also be configured to house and contain an engagement feature 49, for instance a magnet, therein. The engagement feature 49 may be configured to interact with the engagement feature 41 to facilitate a releasable engagement of the sensor 25 with the display stand 15.

[0019] In another embodiment of an alternative charge control system 50 (see FIGS. 5-8), one or more display stands 15 may be configured to communicate wirelessly (e.g. Bluetooth or Wi-Fi communications) with one or more sensors 25, such as for determining a proximity between a display stand and a sensor. The display stand 15 may be engaged with a display stand power cord 21. As in previous embodiments, the display stand power cord 21 may be configured to connect to a remote source of electrical power 5. In some cases, the display stand power cord 21 may extend through a hole 19 formed in a display support surface 13. In some embodiments, the display stand 15 may house an alarm module 9. In some embodiments, the display stand 15 may be configured to be secured to a display support surface 13 by conventional attachment devices such as fasteners and/or a pressure sensitive adhesive. In some embodiments, as shown in FIG. 8, the one or more sensors 25 may be configured to include a proximity mechanism such as a plunger switch 83 having an outwardly extending plunger 84 for detecting removal of the display stand 15 from the display support surface 13. Unauthorized removal of the display stand 15 from the display support surface 13 or movement of the sensor beyond a predetermined distance from the display stand may result in the alarm module 9 generating an audible and/or visible alarm.

[0020] In this embodiment, the display stand 15 does not include a cord connecting the display stand 15 to the sensor 25. Instead, in one embodiment for instance, the display stand 15 may include one or more electrical contacts 56 (e.g., four shown in one embodiment, see FIGS. 7 and 8). Although four contacts 56 are shown, the number is exemplary, as the number of contacts may be varied in other embodiments. The contacts 56 may be configured to facilitate power transfer between the display stand 15 and the sensor 25 when the sensor is seated on the display stand. In one embodiment, the contacts 56 may also be configured to facilitate power transfer to the item of merchandise 3. In one embodiment, the sensor 25 may include electrical

contacts 54 (e.g., four shown in one embodiment, see FIGS. 7 and 8). Although four magnets are shown, the number is exemplary, as the number of contacts may be varied in other embodiments. The contacts 54 may be configured to align and mate with the contacts 56 to facilitate power transfer between the sensor 25 and the display stand 15 when the sensor is seated on the display stand.

[0021] In some embodiments, the sensor 25 may be configured to be secured to an item of merchandise 3 by an attachment device such as a pressure sensitive adhesive, mechanical brackets, and/or other similar attachment device. In one embodiment, the sensor 25 may be configured to be operably engaged with and disengaged from an item of merchandise 3. For example, a merchandise power cord 29 may include a plug 91, such as a USB-A, USB-C, micro-USB, or like connector at one end and a power connector 89 at an opposing end thereof although the merchandise power cord 29 may be hardwired into the sensor in other embodiments thereby omitting the power connector 89. The plug 91 may be configured to be received in a merchandise input port 93 formed in an item of merchandise 3. In some embodiments, the plug 91 and merchandise input port 93 may be configured to facilitate an electrical connection between the sensor 25 and the item of merchandise 3. For example, engagement of the plug 91 with the merchandise input port 93 of the item of merchandise 3 facilitates an electrical connection between the sensor 25 and an item of merchandise 3. In one embodiment, the item of merchandise 3 may be configured to be connected to a remote source of power 5 wherein an internal battery or power source of the sensor 25 and/or the item of merchandise 3 may be capable of receiving power for operatively displaying features of the item of merchandise 3 for potential purchasers to examine and for maintaining a charge in order for the item of merchandise 3 to be displayed and operated in a continuously powered state. In some embodiments, the sensor 25 may include circuitry for detecting when the item of merchandise 3 is disconnected from the sensor and/or the merchandise power cord 29 is disconnected or cut.

[0022] Some manufactures have begun to incorporate “smart” technologies into handheld and other portable electronic devices for automatically reducing its charge rate when an insufficient amount of voltage is being provided. This reduction in power is designed to slow down the charge rate of the handheld device in an attempt to maintain a maximum supply of

power to be continuously provided to the handheld device. In some embodiments, for instance, as in the alternative charge control systems 10, 20, the display stand 15 and/or sensor 25 may contain circuitry that facilitates power transfer from the remote source of electrical power 5 to the display stand and/or sensor at a reduced charge rate.

[0023] In one embodiment, the power transfer may be provided continuously or intermittently. The display stand 15 and/or sensor 25 may include a switch 90 for alternating between an “on mode” and an “off mode”. For instance, when an item of merchandise 3 is electrically connected to the display stand 15 and/or sensor 25, the switch 90 is in an “on mode” wherein power is supplied to the item of merchandise 3. When an item of merchandise 3 is no longer electrically connected to the display stand 15 and/or sensor 25, the switch 90 is considered as being in an “off mode” wherein no power is supplied to the item of merchandise 3. In one example, the switch 90 is a pulse-width modulation (PWM) switch. In some embodiments, the display stand 15 and/or sensor 25 may be configured to vary, for instance, intermittently alternate, power delivery in order to reduce the charge rate of the item of merchandise 3. For example, the switch 90 used to alternate power delivery between an “on mode” and an “off mode” may be used to vary the power for reducing the charge rate of the item of merchandise 3. In one embodiment, the switch 90 may be configured to vary the voltage supplied to the item of merchandise 3. As such, the power provided to the item of merchandise 3 may be controlled by the sensor 25 and/or the display stand 15. In some embodiments, the power supplied to the item of merchandise 3 may be varied (e.g. such as between 4.25V and 5.2V for a device having 5V maximum voltage) intermittently in small alternating voltage amounts (e.g. such as between 5-10% or 10-15% of the maximum voltage of the item of merchandise) and/or voltage pulses thereby maintaining a minimum voltage required to power the item of merchandise 3 but while also causing the item of merchandise 3 to draw less power and preserve the powered state of the item of merchandise 3. In contrast to conventional systems, by providing the sensor 25 and/or the display stand 15 with the ability to control the power supply in a manner that causes the item of merchandise to reduce its power draw, the input power can be reduced thereby resulting in smaller, lower cost systems that do not require high power at all times for charging.

[0024] The foregoing has described one or more exemplary embodiments of an alternative

charge control system. Embodiments of an alternative charge control system have been shown and described herein for purposes of illustrating and enabling one of ordinary skill in the art to make, use and practice the invention. Those of ordinary skill in the art, however, will readily understand and appreciate that numerous variations and modifications of the invention may be made without departing from the spirit and scope thereof. Accordingly, all such variations and modifications are intended to be encompassed by the appended claims.

That which is claimed is:

1. An alternative charge control system for a merchandise display security system comprising:
 - one or more display stands configured to be mounted to a support surface; and
 - one or more sensors configured to be operatively connected to an item of merchandise on display and configured to be operatively connected to the one or more display stands, wherein the sensor is configured to be removably supported on the one or more display stands; wherein the one or more display stands and/or the sensors are configured to operatively control power transfer to the item of merchandise on display such that the item of merchandise reduces its charge rate.
2. The alternative charge control system according to claim 1, wherein the one or more display stands and/or sensors include a switch.
3. The alternative charge control system according to claim 2, wherein the switch is a pulse-width modulation switch.
4. The alternative charge control system according to claim 2, wherein the switch is configured to intermittently alternate the flow of power to the item of merchandise.
5. The alternative charge control system according to claim 2, wherein the switch is configured to vary power transfer between 10-15% of a maximum voltage of the item of merchandise.
6. The alternative charge control system according to claim 1, further including one or more alarm modules operatively connected to the one or more sensors and the one or more display stands.
7. The alternative charge control system according to claim 1, further including a sensor

power cord operatively connecting the item of merchandise and the sensor.

8. The alternative charge control system according to claim 1, further including a display stand power cord operatively connecting the proximity mechanism to the electrical power source.

9. A method of providing an item of merchandise on display with an alternative charge comprising:

mounting one or more display stands to a support surface;

providing one or more sensors and one or more items or merchandise;

connecting the one or more sensors to the one or more items of merchandise and the one or more display stands; wherein the one or more sensors are configured to be removably connected to the one or more display stands; and

operatively controlling power transfer to the item of merchandise on display such that a charge rate of the item of merchandise is reduced.

10. The method according to claim 9, further comprising intermittently alternating the flow of power to the item of merchandise.

11. The method according to claim 9, further comprising varying the flow of power between 10-15% of a maximum voltage of the item of merchandise.

ABSTRACT

An alternative charge control system for maintaining a powered state of items of merchandise on display in a retail store. The alternative charge control system includes one or more display stands, one or more sensors configured to intermittently alternate the power provided to an item of merchandise while on display in a retail store such that a charge rate of the item of merchandise is reduced.

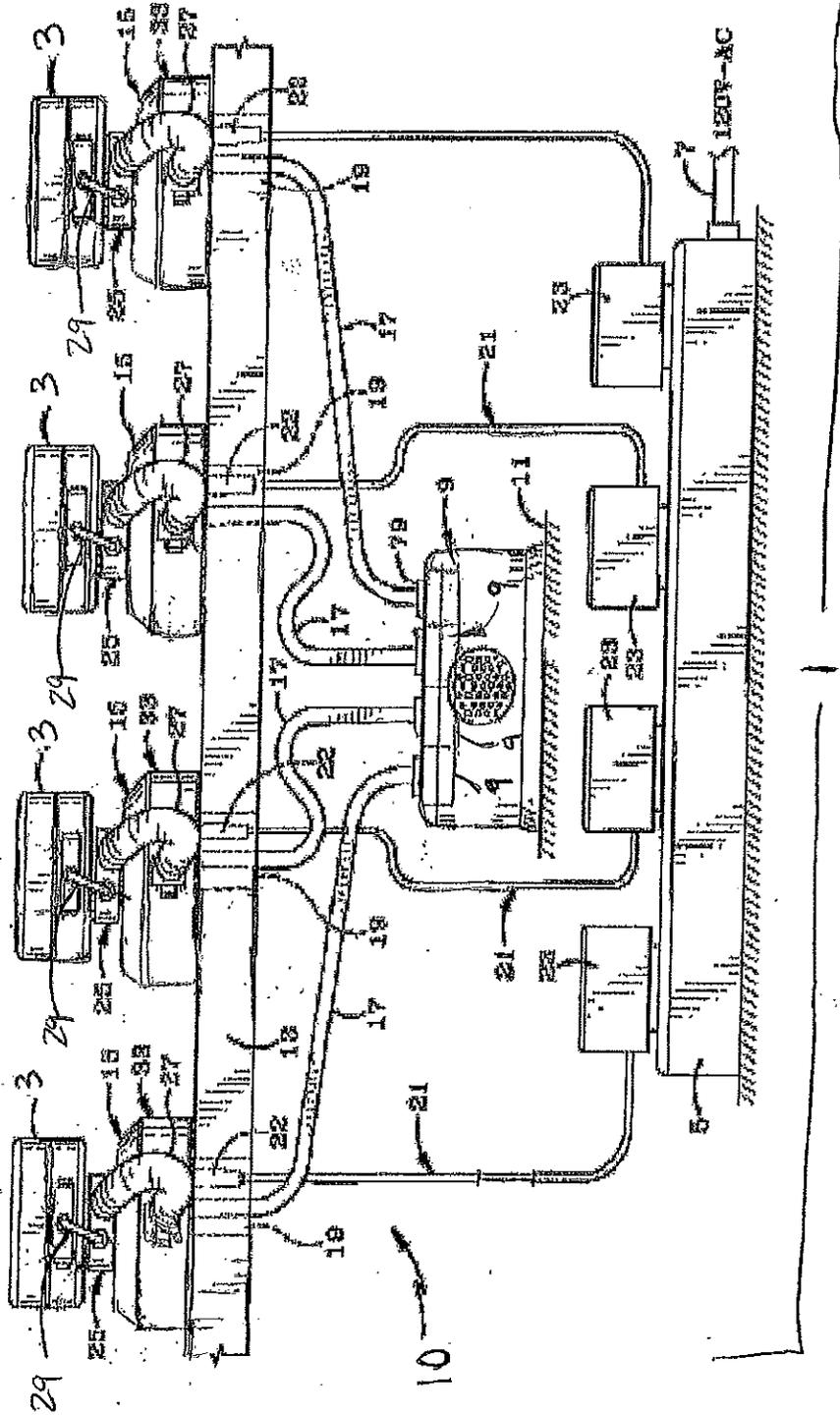


FIG-1

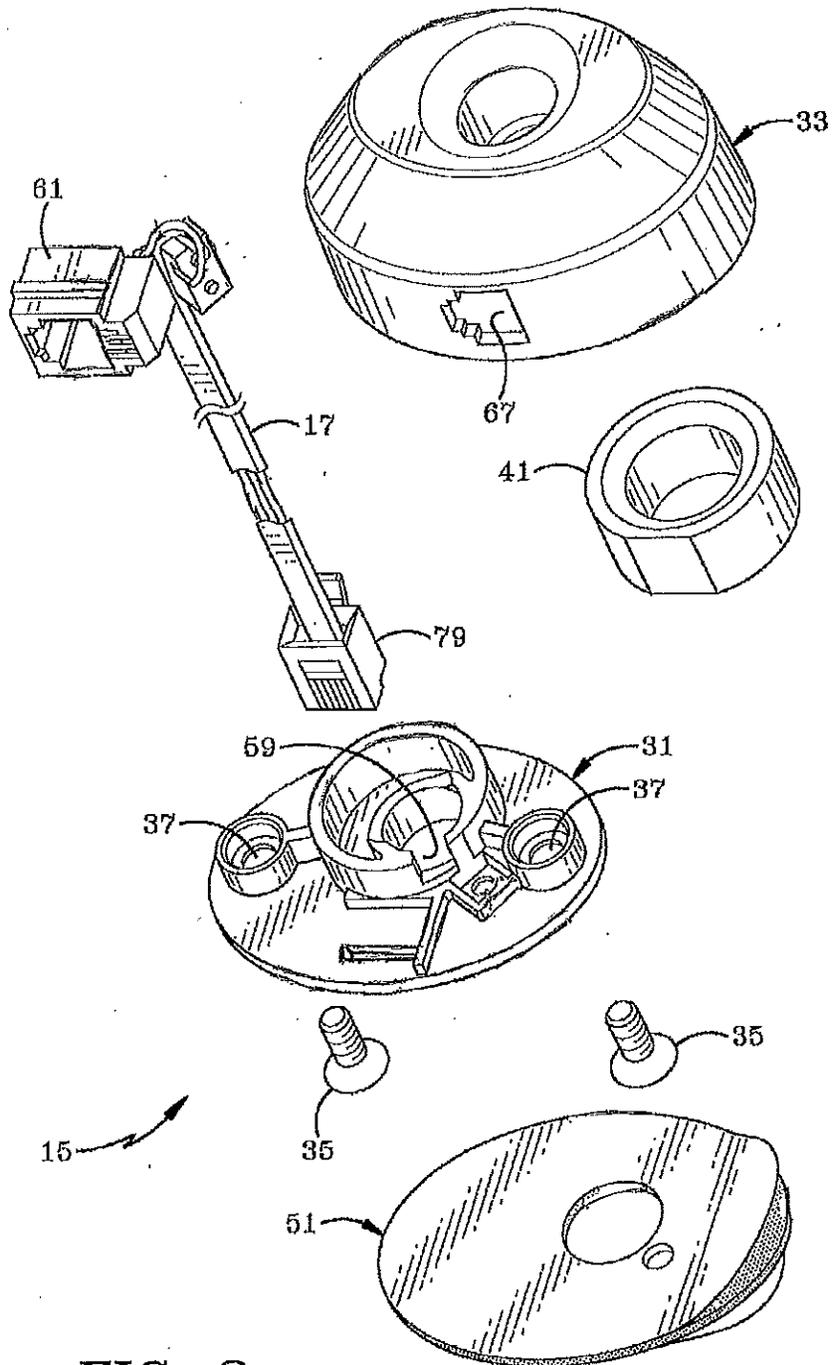


FIG-2

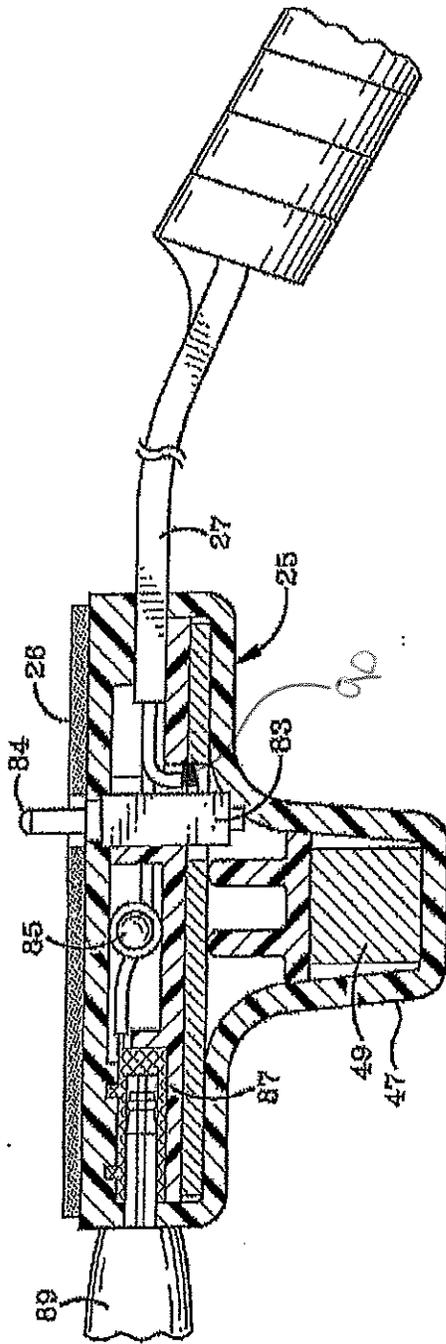


FIG-3

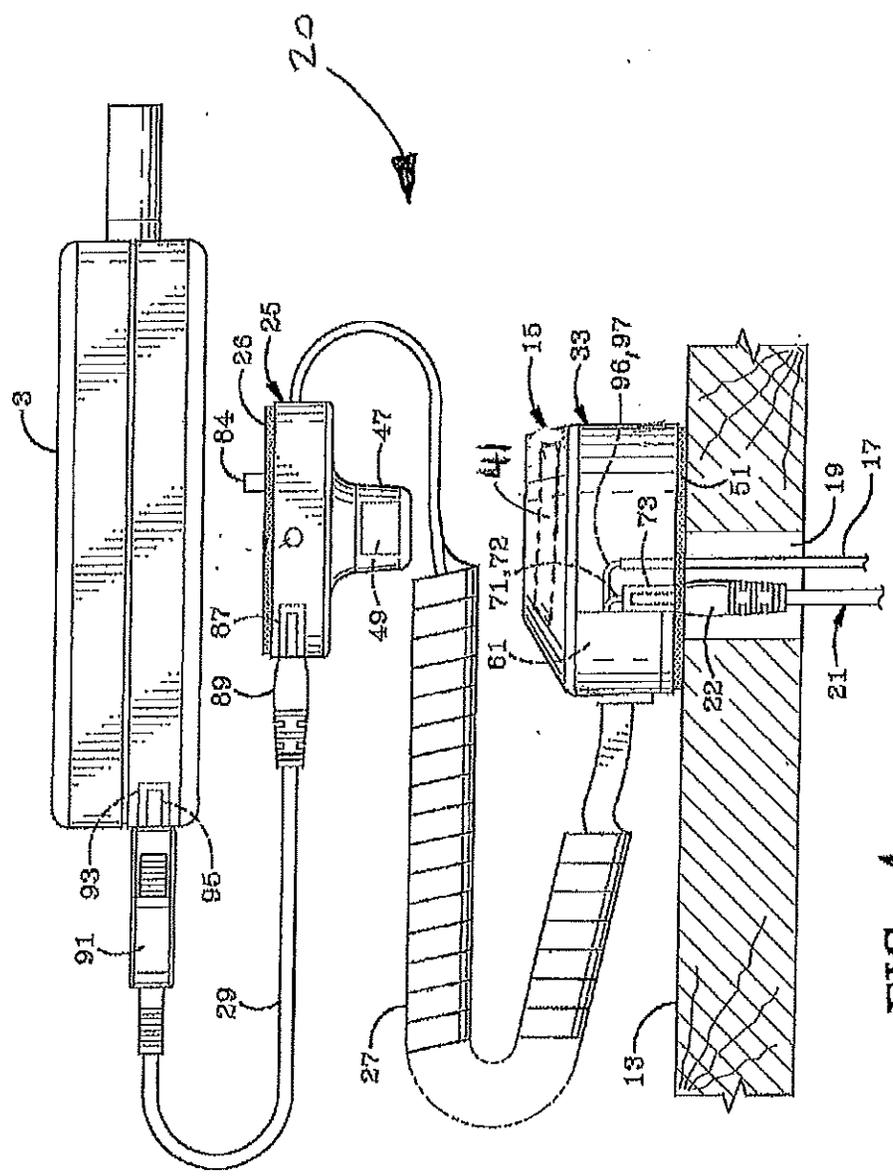


FIG-4

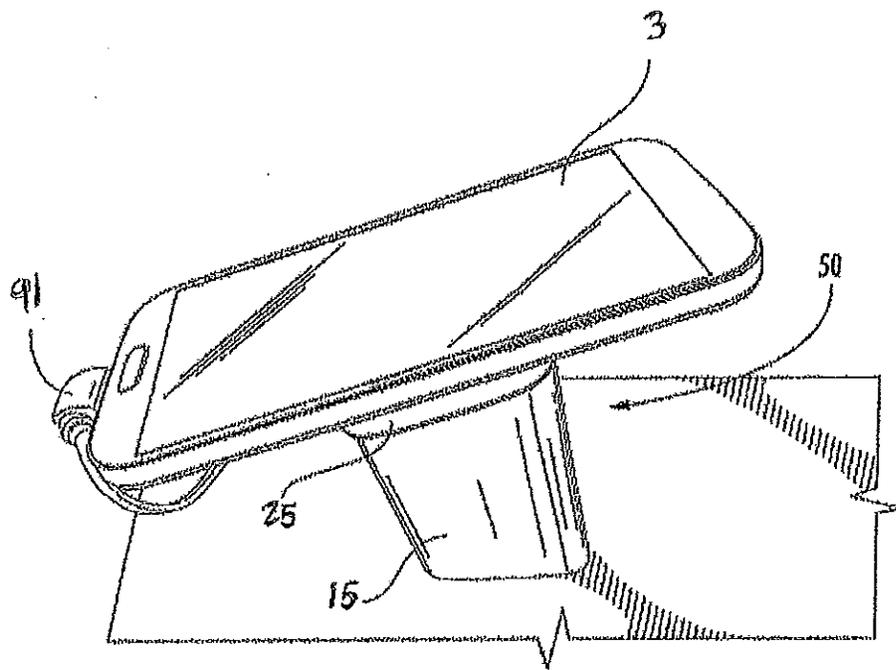


FIG-5

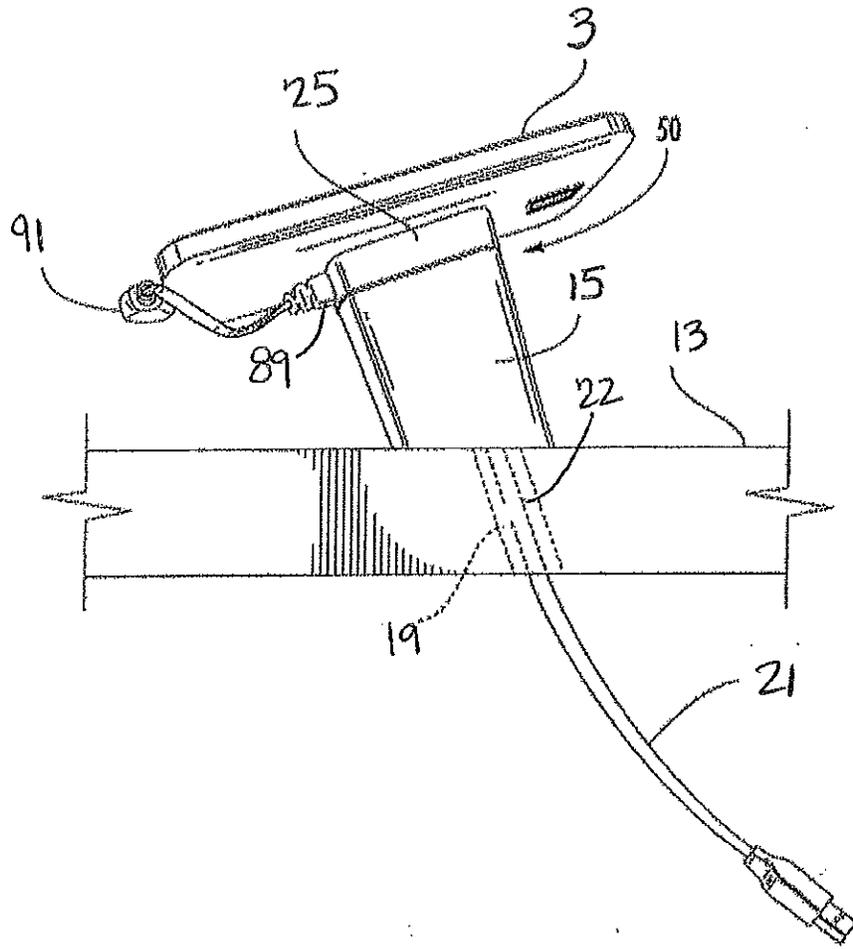


FIG. 6

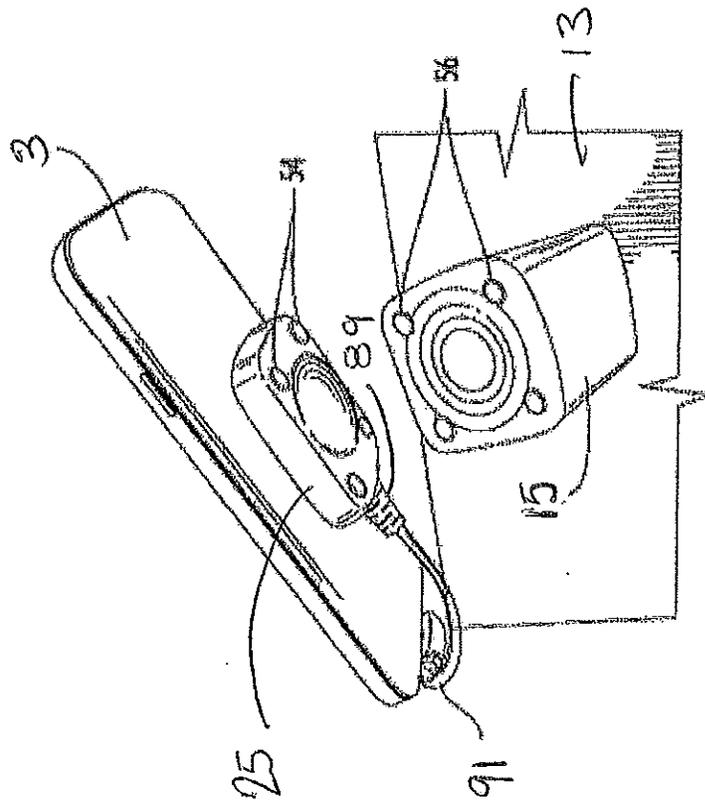


FIG. 7

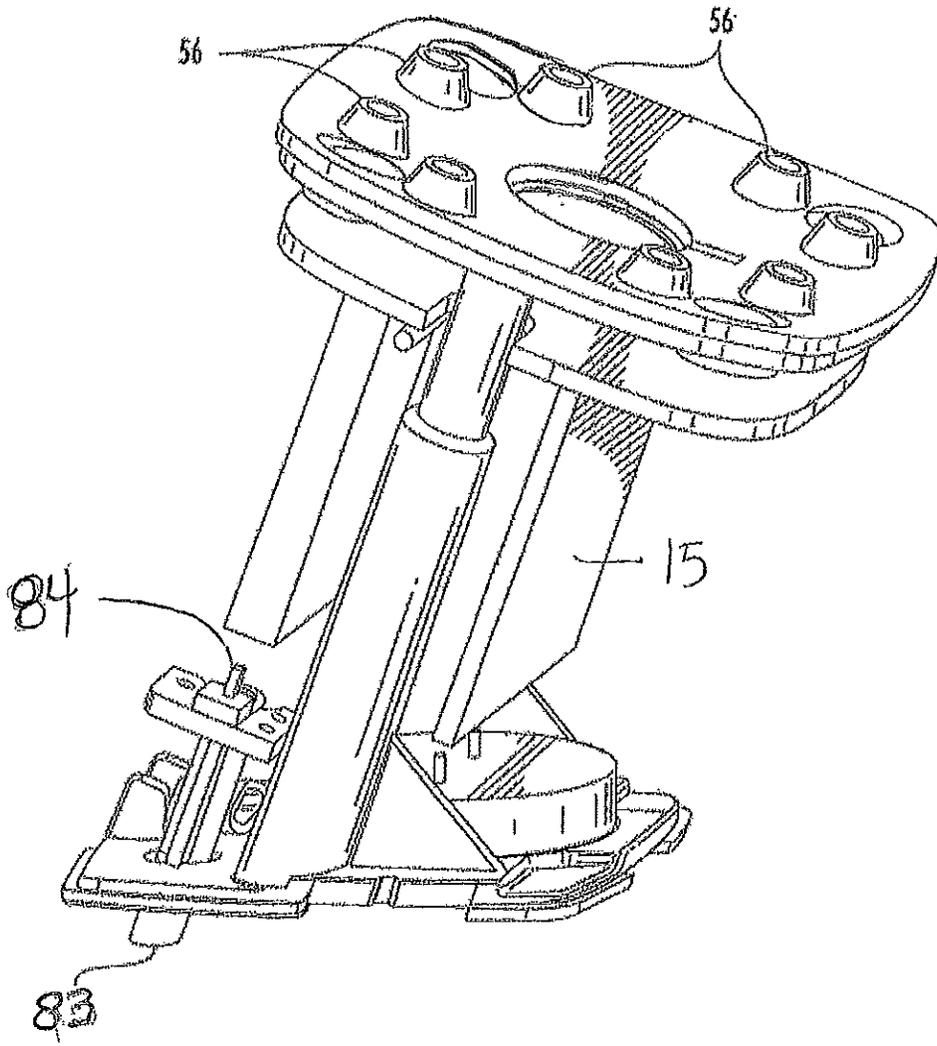


FIG. 8