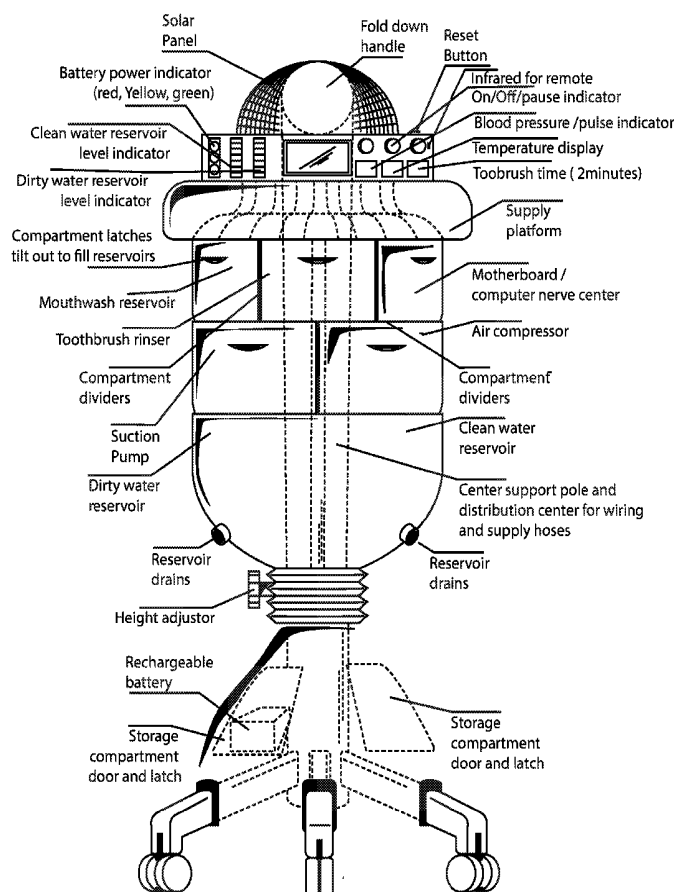




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(19) **United States**(12) **Patent Application Publication**
Prince(10) **Pub. No.: US 2017/0000677 A1**(43) **Pub. Date: Jan. 5, 2017**(54) **MOBILE DENTAL INTELLIGENCE CENTER****A61C 17/06** (2006.01)**A61C 17/02** (2006.01)(71) Applicant: **KevinTyrone Prince**, Upper Marlboro,
MD (US)(52) **U.S. Cl.**CPC **A61G 15/16** (2013.01); **A61C 17/046**
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A61B 5/002 (2013.01); **A61B 34/30** (2016.02);
A61B 5/742 (2013.01)(21) Appl. No.: **14/977,258**(22) Filed: **Dec. 21, 2015****Related U.S. Application Data**(60) Provisional application No. 62/188,075, filed on Jul.
2, 2015.**Publication Classification**(51) **Int. Cl.****A61G 15/16** (2006.01)**A61C 1/00** (2006.01)**A61B 1/24** (2006.01)**A61B 1/04** (2006.01)**A61B 34/30** (2006.01)**A61G 12/00** (2006.01)**A61B 5/022** (2006.01)**A61B 5/01** (2006.01)**A61B 5/00** (2006.01)**ABSTRACT**

The Mobile Dental Intelligence Center (MobiDIC) will roll up alongside the patient's Bedside or Chairside where Oral Hygiene can be performed by the patient's Caregiver, with no need to have a sink or basin in the area. Using the MobiDIC the Caregiver will be able to brush the patient's teeth, rinse and suction the patient's mouth at the Bedside or Chairside; also the Caregiver will monitor the patients Vital Signs. The unit's unique cylindrical design makes it easy for the Caregiver to wipe clean and disinfect the unit. The air, water, suction and power supply hoses are internal to the unit reducing cord entanglement and trip hazards. The MobiDIC allows the Caregiver the ability to easily connect various medical monitoring devices including Intra and Extra Oral Cameras capturing images of the patient's mouth inside and the patient's general appearance. All MobiDIC innovations will facilitate assessing the patient's current general health.



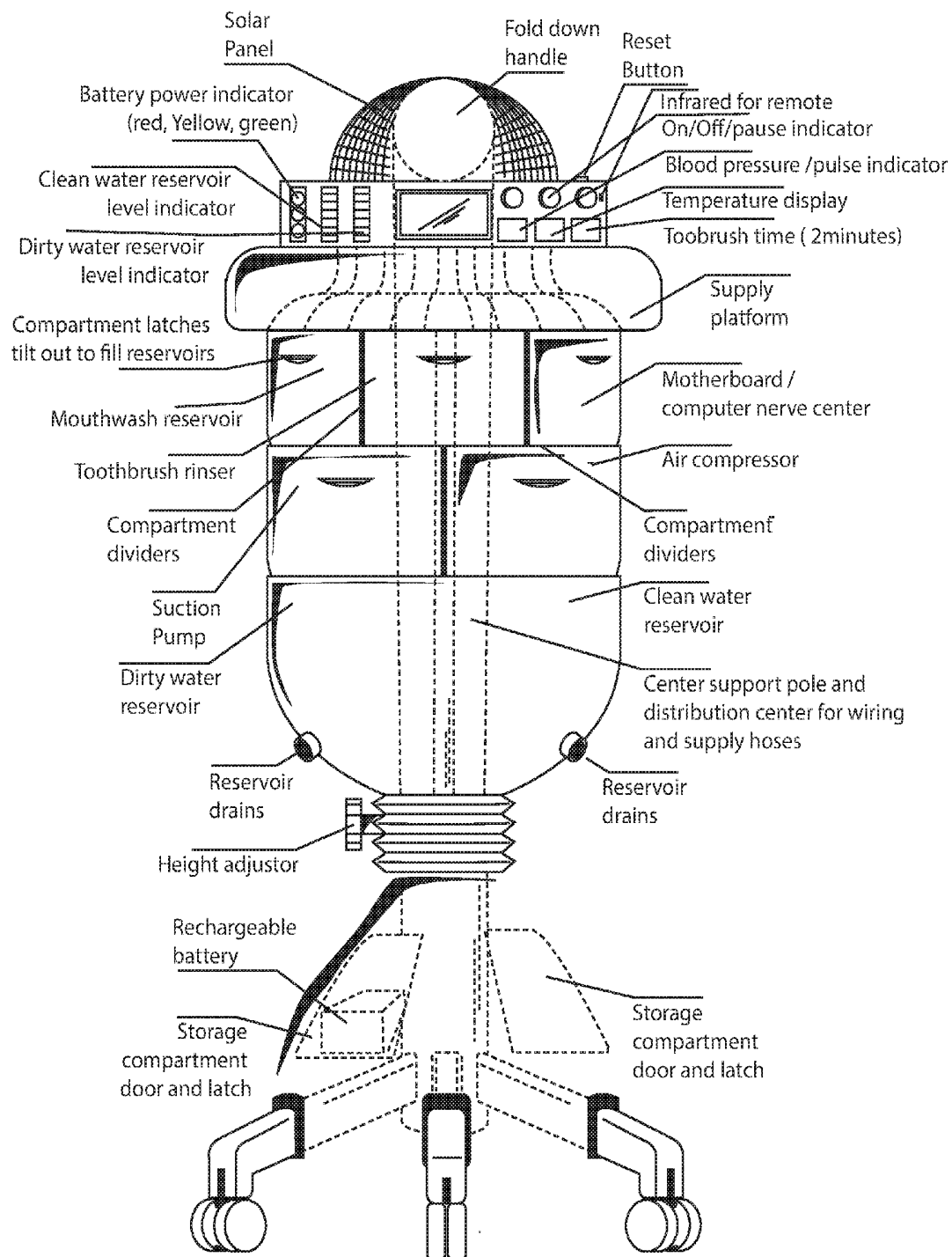


FIG. 1

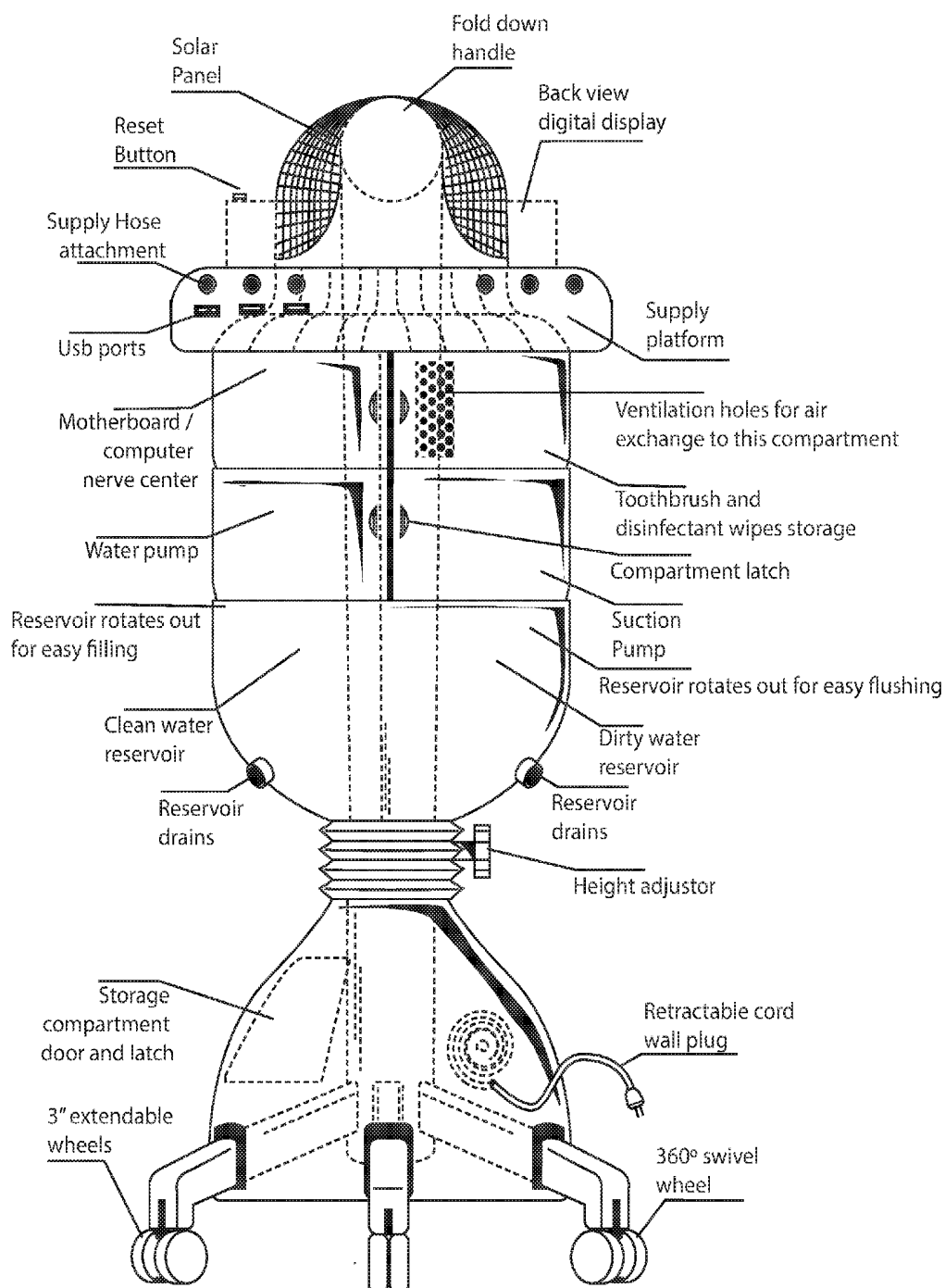


FIG. 2

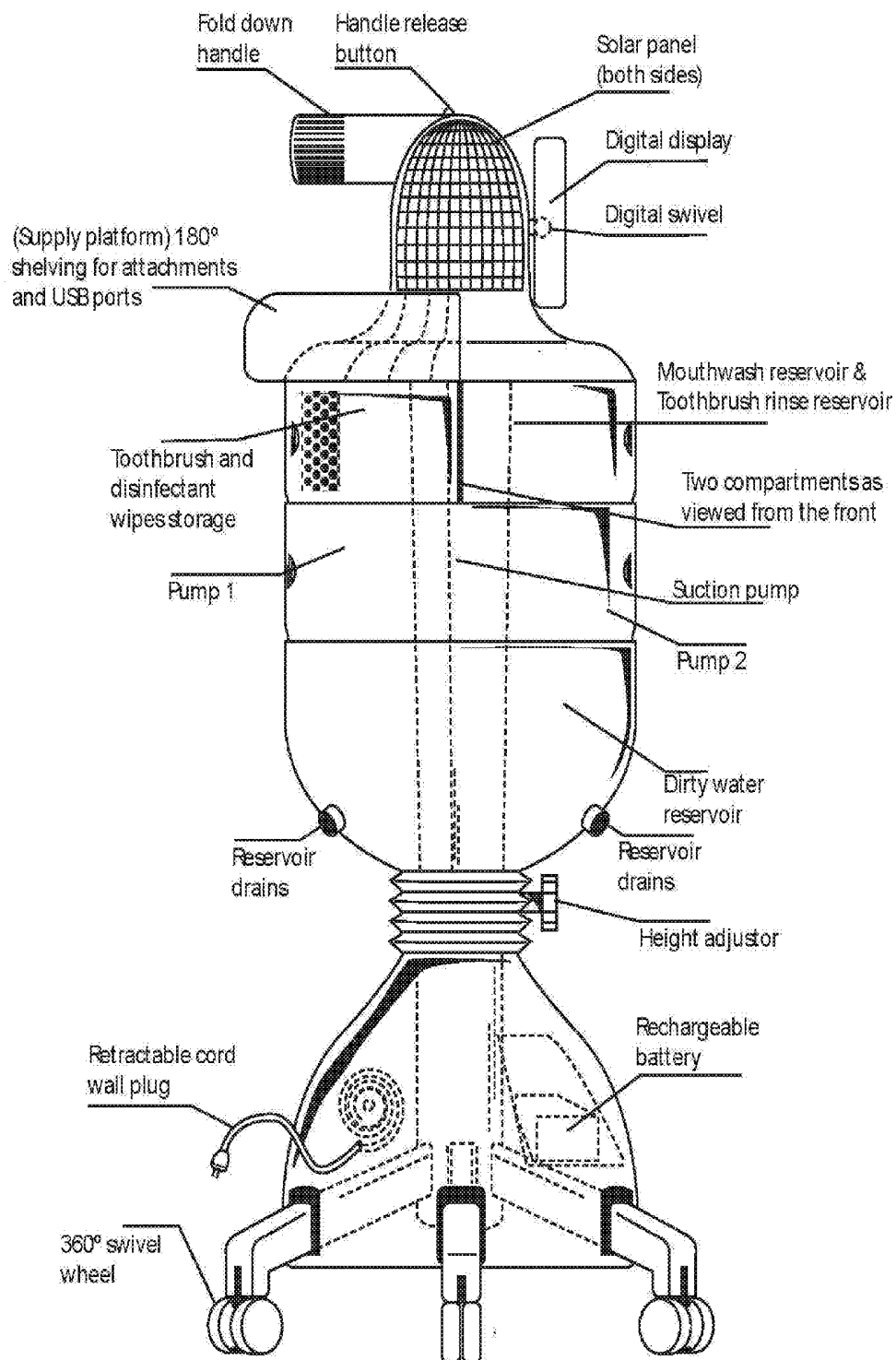


FIG. 3

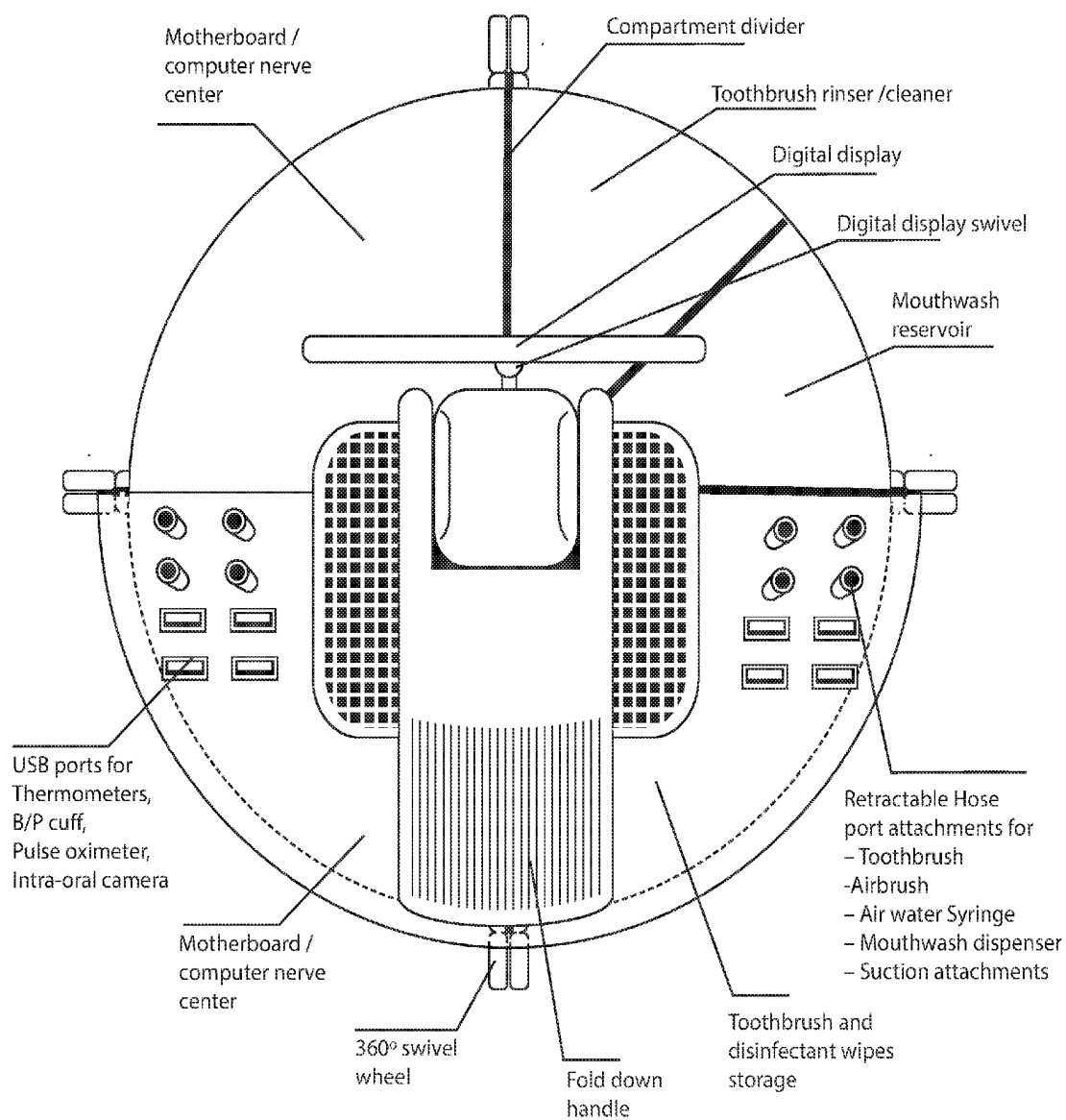


FIG. 4

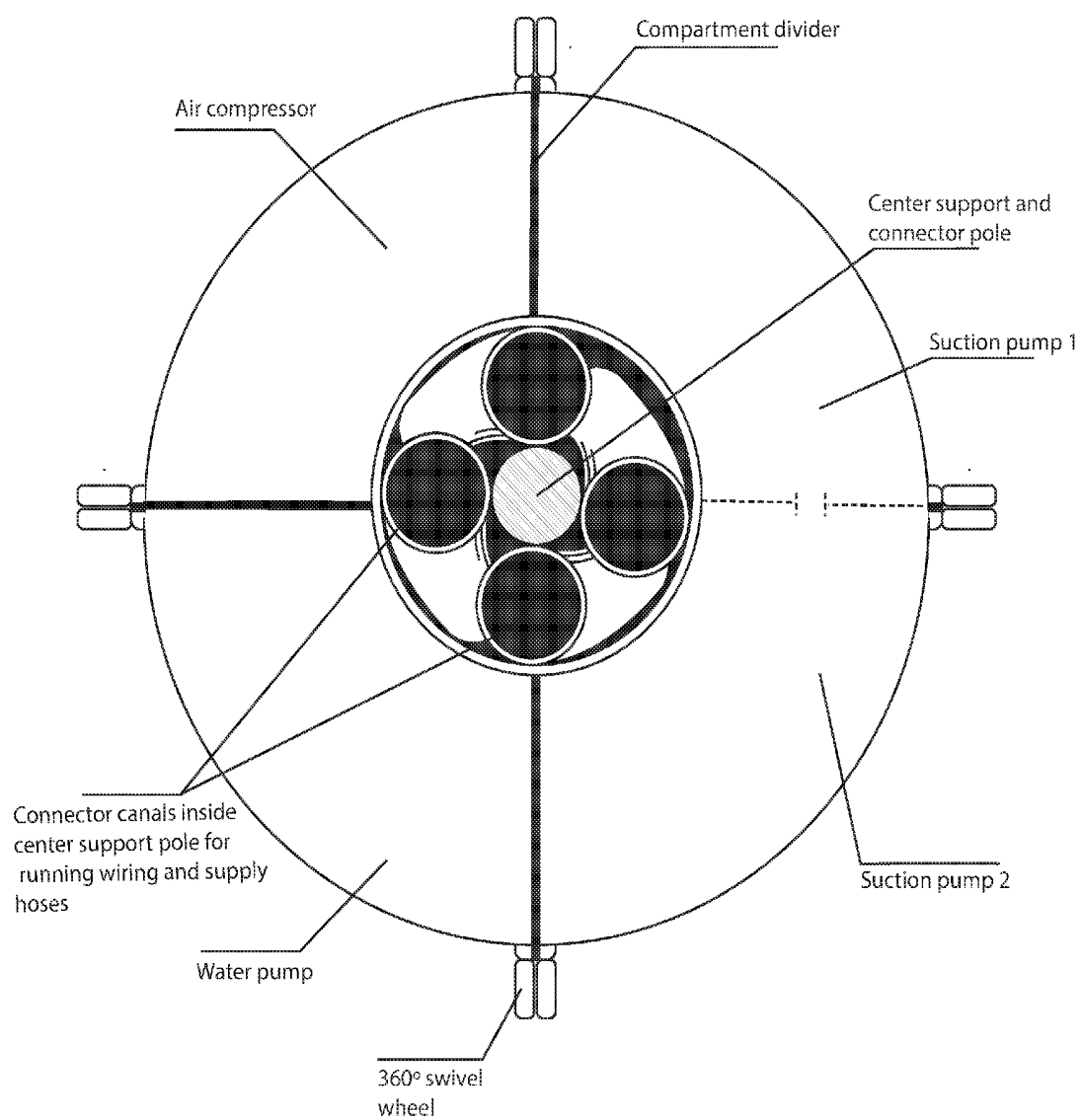


FIG. 5

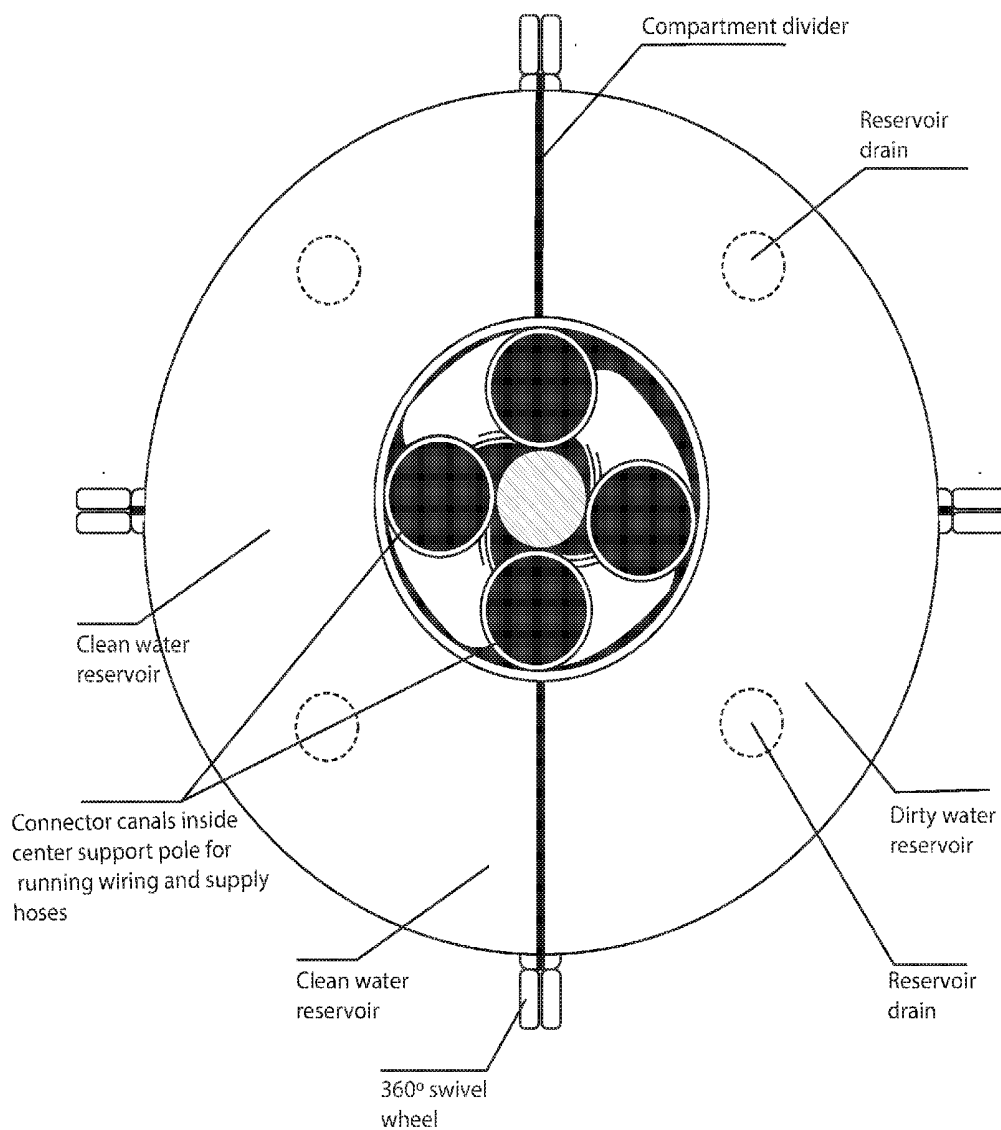


FIG. 6

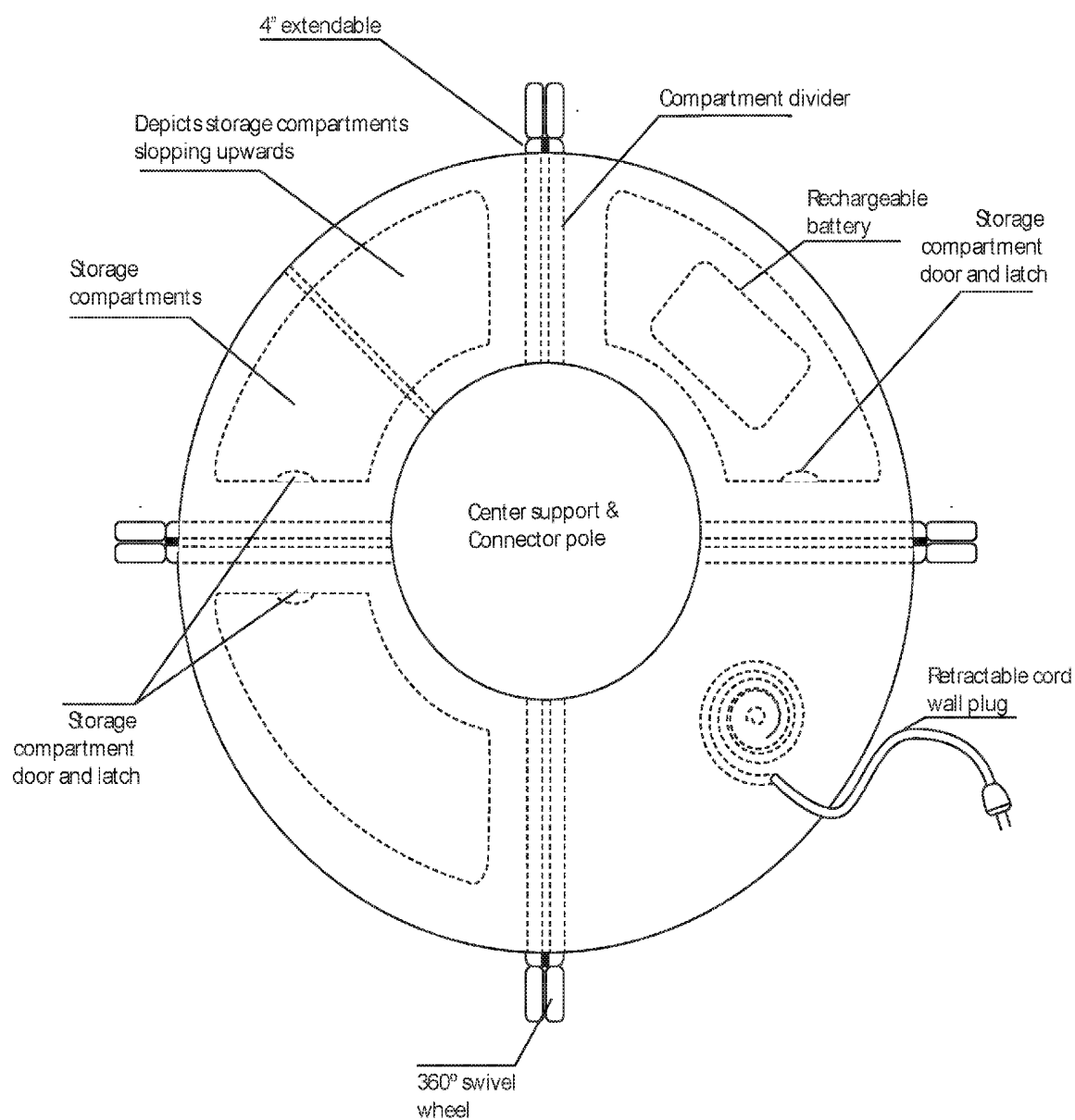


FIG. 7

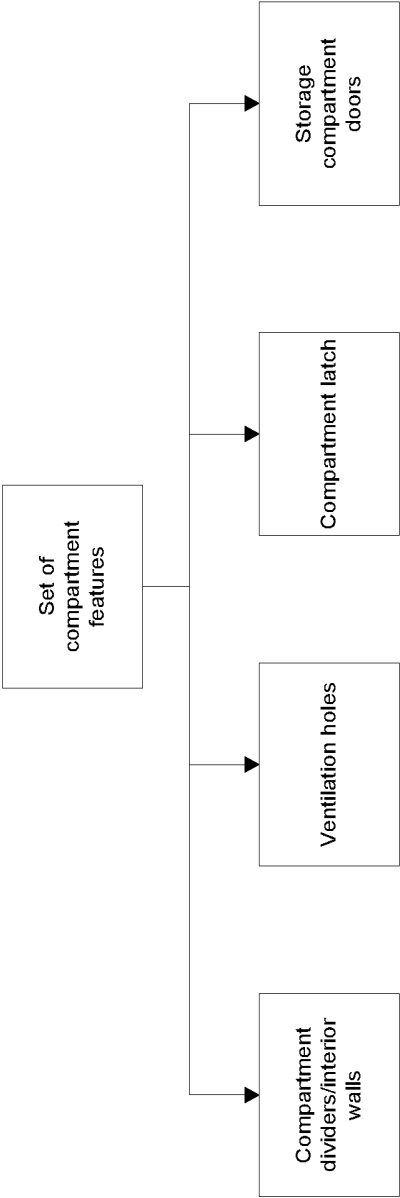


FIG. 8

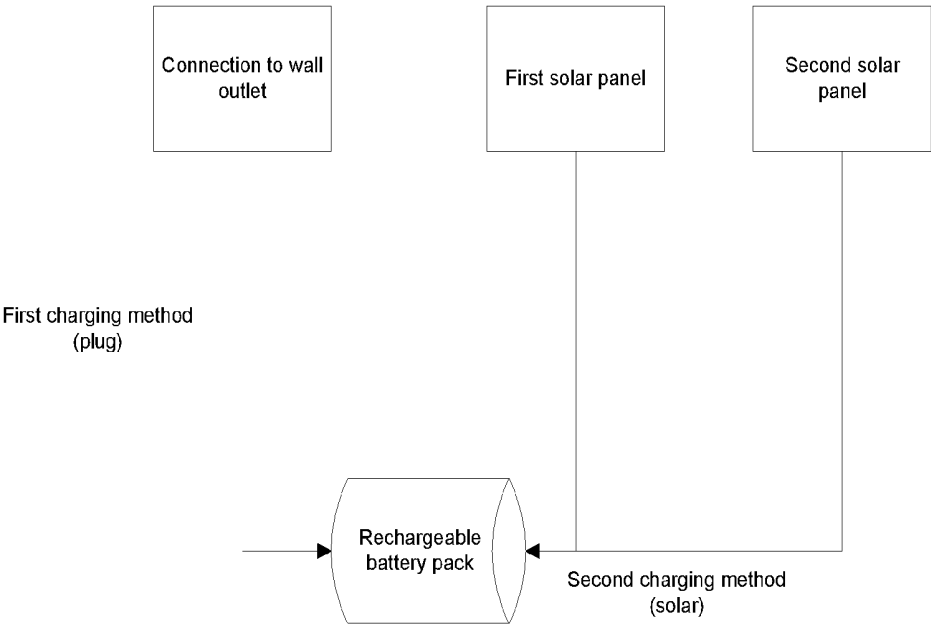


FIG. 9

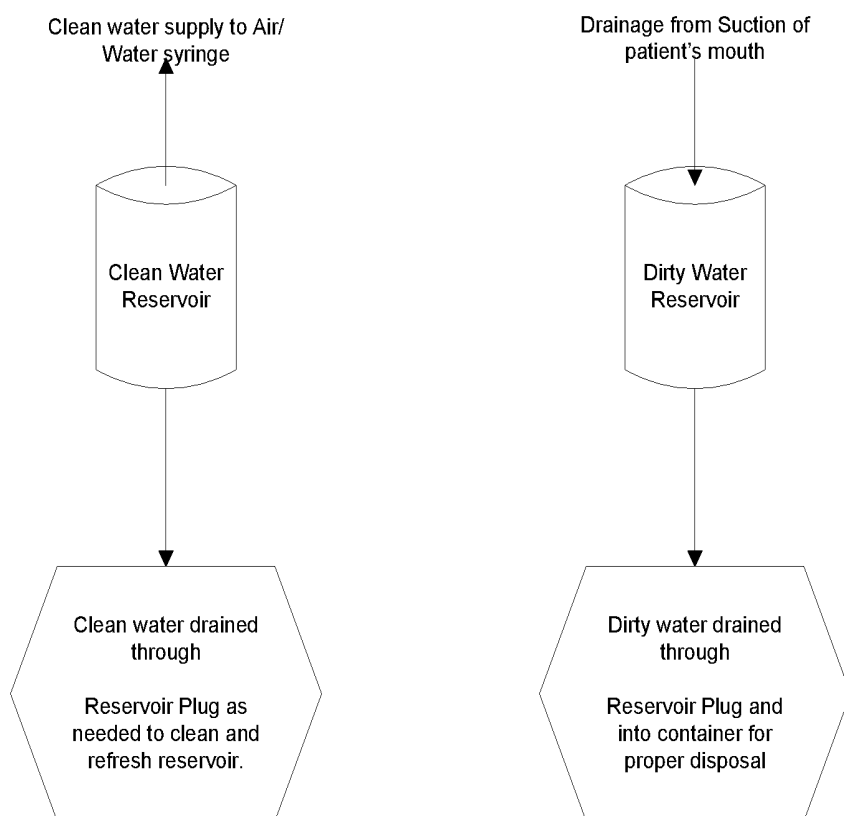


FIG. 10

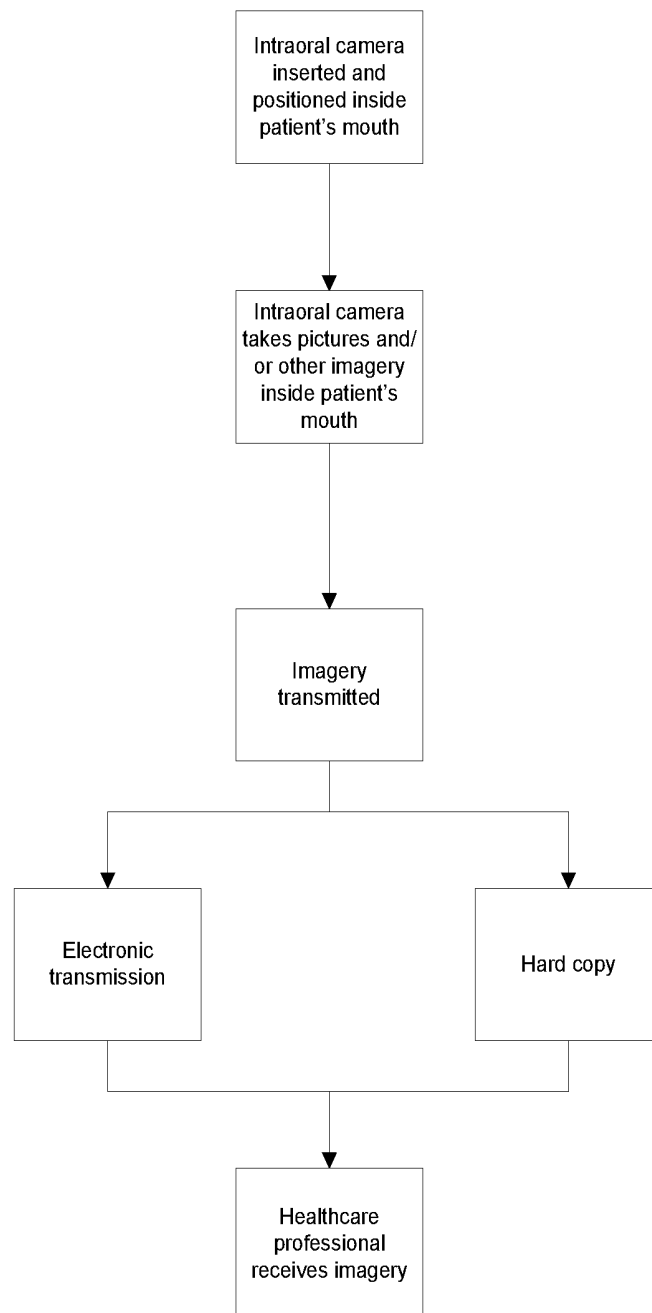


FIG. 11

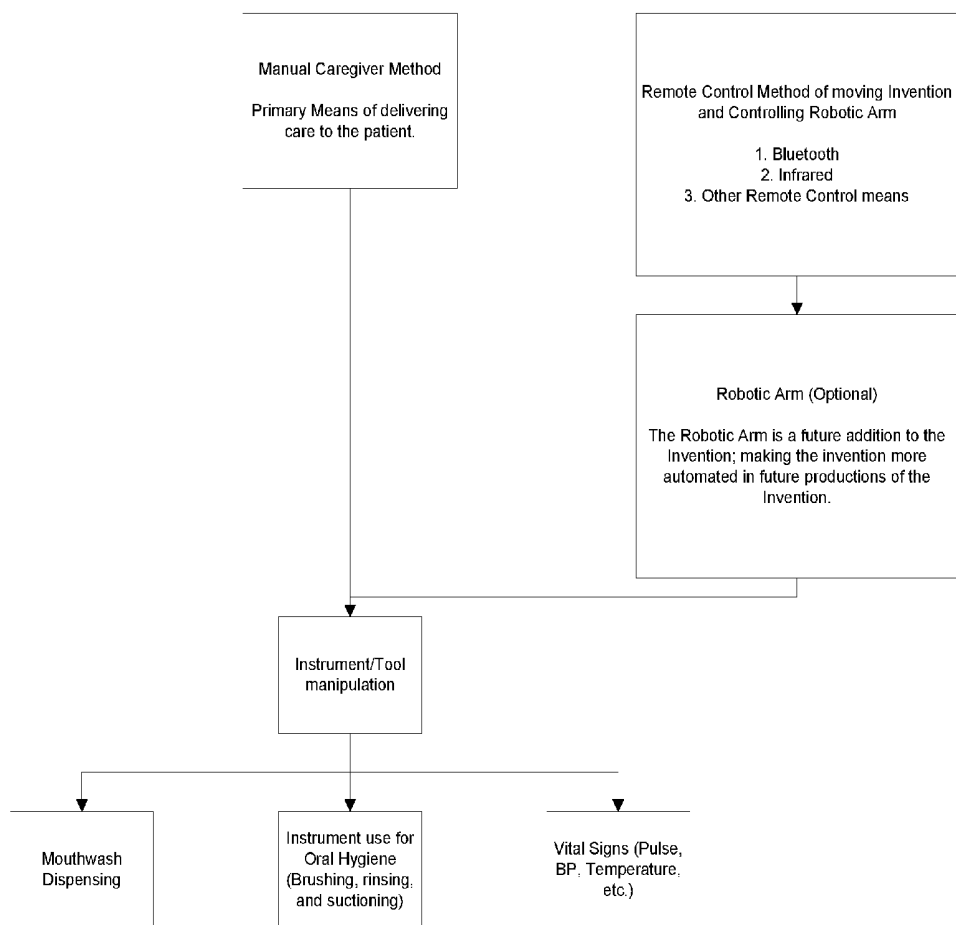


FIG. 12

MOBILE DENTAL INTELLIGENCE CENTER

FIELD OF INVENTION

[0001] The invention relates generally to a portable dental unit that can provide the majority of basic tools and instruments necessary for oral hygiene maintenance and vital sign monitoring. The objective of the present invention is to provide caregivers of disabled, bedridden and incapacitated patients with the ability to conveniently provide adequate and timely oral hygiene to the patient. Additionally, the invention will provide caregivers the ability to monitor and report on the patient's vital signs. The present invention may be utilized for a daily regimen of oral hygiene and to check the vital signs of the patients through care delivered by the caregiver.

BACKGROUND OF THE INVENTION

[0002] Present day, the global population is aging and people are living longer lives due to rapid advances in medicine, which now grants physicians the means to prolong life by providing effective treatment for what were once fatal diseases. The internet has helped to make the world's population become smarter, in regards to taking care of one's overall health and finding ways to improve health outcomes through preventive medicine.

[0003] Although the population worldwide is aging and living longer, many in our population suffer from incapacitating illnesses that leave them partially or completely disabled. Hence, the rapid increase in home healthcare, assisted living facilities, nursing homes, and rehabilitation facilities etc.

[0004] Many in the country's aging population are receiving the basic nursing care they require on a daily basis in these types of settings. Such care includes: feeding, cleaning, medication delivery, transportation, and basic personal hygiene, which, more often than not, do not include basic dental/oral hygiene care. Caretakers often forget about or neglect Oral Health when they are tending to the overall health of the person they are delivering care to. This is not the caretaker's fault; it is a result of the under-emphasis on good oral health and its relationship to overall health in our society. Most medical school students receive little if any training on the oral cavity and the relationship of the mouth to the rest of the human body. The oral cavity/mouth is a major organ of the human body, and is the only portal or gateway food, good nutrition, and hence good health.

[0005] Many in the medical and dental communities are starting to realize the importance of good oral/dental health in the total health of the human body. Many medical schools are starting to expand their curriculums providing students with a more robust knowledge of oral/dental health and its relationship to the total health of the humans' species.

[0006] More and more in-depth research is underway, and finding important links between conditions common to the mouth and their relationship to systemic conditions in the rest of the body. The relationship between diabetes, a systemic condition and periodontal disease in the mouth has been established through copious research and published peer-reviewed articles.

[0007] It is an objective of the present invention to put the appropriate emphasis on good oral/dental health as an integral component of good overall health. The present invention will provide caregivers of disabled, bedridden and

incapacitated patients a portable instrumentation platform with the ability to conveniently provide adequate and timely oral/dental hygiene to the patient on a regular basis along with vital sign monitoring.

[0008] The invention may be marketed at organizations and entities such as: Nursing Homes, Assisted Living Facilities, Mentally & Physically Disabled Patients who require caregivers in-home, Remote Military Medical facilities and other Locations, Hospitals (Public/Private/VA with incapacitated/critical patients, Dental Assisting/Medical Assisting Trade Schools, Nursing Schools, Inpatient Rehabilitation Centers, and Mental Health Facilities with Disabled Patients

SUMMARY OF THE INVENTION

[0009] The present invention is a portable instrumentation platform equipped with a variety of dental tools and related equipment, designed to allow a caregiver the ability to provide oral hygiene maintenance. The caregiver will be able to monitor the patient's vital signs and if necessary, provide timely information to the patient's physician or dentist. The caregiver can utilize the intraoral/extraoral camera to take pictures inside and outside of the patient's mouth, and relay that information to the healthcare professional electronically via a secure network.

[0010] The present invention is designed to be easily cleaned and disinfected. It is also designed for simplicity, it is meant to make it easy for the caregiver to provide oral hygiene care at the patient's chairside or bedside.

[0011] The caregiver using the present invention, with appropriate training, should be able to brush the patient's teeth, rinse the patient's mouth, and deliver a mouthwash rinse right at the patient's bedside/chairside. Additionally, the caregiver will have all the tools necessary to accurately monitor the patient's vital signs.

[0012] This device is design to improve the oral health and monitor the overall health of the patient. The goal would be to enhance the caregiver's ability to attend to the overall health and welfare of the patient, which includes providing daily oral hygiene maintenance.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] FIG. 1 depicts the front view of the present invention.

[0014] FIG. 2 depicts the back view of the present invention.

[0015] FIG. 3 depicts the side view of the present invention.

[0016] FIG. 4 depicts the top view of the present invention, through the handle and unit supply platform.

[0017] FIG. 5 depicts an exploded, interior mechanical view of the present invention.

[0018] FIG. 6 depicts the reservoir view of the present invention.

[0019] FIG. 7 depicts the lower base view of the present invention.

[0020] FIG. 8 is a flowchart depicting the constituent relationship of the compartment features.

[0021] FIG. 9 is a flowchart depicting the possible methodologies for charging the battery, including the solar panels.

[0022] FIG. 10 is a flowchart depicting the water flow in relation to the reservoirs.

[0023] FIG. 11 is a flowchart depicting the intraoral/extraoral camera sub-processes.

[0024] FIG. 12 is a flowchart depicting the sub-processes pertaining to the futuristic robotic arm.

DETAIL DESCRIPTIONS OF THE INVENTION

[0025] All illustrations of the drawings are for the purpose of describing selected versions of the present invention and are not intended to limit the scope of the present invention.

[0026] In the present invention, a mobile dental unit comprises of: a cylindrically arranged housing, a center support pole and distribution center for wiring and supply/lines hoses, a set of compartment features, a set of supply hoses, an optional intraoral/extraoral camera, a lightweight materials composition and arrangement process, a set of solar panels, a fold down handle, a digital clock/room temperature display, a mouthwash reservoir, a toothbrush rinse, a motherboard/computer nerve center, a supply platform, an air compressor, a suction pump, a dirty water reservoir, a clean water reservoir, a set of reservoir drains, a clean water reservoir level indicator, a dirty water reservoir level indicator, a water pump, a height adjuster, a rechargeable means of electrical power supply, a main power supply indicator, a set of USB/data port attachments, a set of supply hose/line attachments, a set of USB ports, a blood pressure and pulse indicator, a toothbrush timer, an On/Off/Pause indicator, a reset button, a back view digital display/digital display, a retractable power cord wall plug, a variable speed electric toothbrush, a set of 360 degree rotating and extendable wheels, a digital display swivel, a set of biofilm contamination sensors, a set of data connection capabilities, a remote control, an optional robotic arm for beverage dispensing and tool manipulation, and a set of peripheral items, to include but not limited to an attachable computer monitor.

[0027] Notably, some of these components/processes may themselves be comprised of other subcomponents/sub-processes, which will be described in detail later in this disclosure.

[0028] The first major component/process of the present invention is the cylindrically arranged housing. Notably, the housing is not in the form of a rectangular prism, which is common for most dental units. The cylindrical arrangement makes the present invention more portable, as well as easier to clean and disinfect. The streamlined ergonomic design renders the unit easy to manipulate and handle for the caregiver. Supply lines/hoses and instrumentation are self-contained inside the cylindrical housing, described in the next section.

[0029] The next major component/process of the present invention is the center support pole and distribution center for wiring and supply lines/hoses. Unlike the majority of dental units, the supply hoses are housed in a central column. The hoses are neither exposed nor dangling. This mitigates the chances of entanglement with nearby objects, which is common with conventional dental units.

[0030] The next major component/process of the present invention is the set of compartment features. This set is comprised of compartment dividers, ventilation holes, compartment latches, and storage compartment doors. This is depicted in FIGS. 6 and 8.

[0031] The compartment dividers are interior walls, which divide sections of the present invention's interior. The compartments formed act as extra storage space for attach-

able equipment, such as the camera, blood-pressure cuff, thermometer, pulse oximeter, etc.

[0032] There are ventilation holes as part of the compartment features. These are used for air exchange to the various compartments.

[0033] Each compartment has a latch. This is a closure for the individual compartments.

[0034] The last feature of the compartments is the set of storage compartment doors providing a plurality of access openings.

[0035] The next major component/process of the present invention is the set of supply lines/hoses. These are industry-standard retractable service cords, which provide air and/or water syringe capabilities and also support the toothbrush, suction and other mechanical parts.

[0036] The next major component/process of the present invention is the optional intraoral/extraoral camera. The user can utilize the camera to take pictures inside and outside the patient's mouth. The user can relay that information to the healthcare professional electronically via a secure network.

[0037] The next major component/process of the present invention is the lightweight materials composition and arrangement process. While materials composition normally does not factor into patentability, it matters here due to the needs of the invention.

[0038] Notably, there may be arrangement features, with an industry-standard lightweight, load-bearing efficient framework. The materials composition will be structurally sound but lightweight. The present invention as a whole should be easily portable via the rotating wheels, and the caregiver, without difficulty, can manipulate the present invention.

[0039] The next major component/process of the present invention is the set of solar panels. The user has the option to recharge the main power source using solar energy. In the invention's preferred embodiment, the solar recharge panels are located adjacent to the handle, on the present invention's exterior. These are depicted in FIG. 3. These solar panels can be used to recharge the main power source if sufficient sunlight is available.

[0040] The next major component/process of the present invention is the fold down handle. This is an industry-standard fold down handle with the ability to flip either up or down depending on usage. It comprises of a handle bar with hinges or axles on both sides.

[0041] The next major component/process of the present invention is the digital clock/room temperature display. This is a combination digital clock and room temperature indicator. This functions as a dual-display in the invention's preferred embodiment. Alternative or future embodiments may utilize more displays or attributes, depending on the evolving needs of the industry.

[0042] The next major component/process of the present invention is the mouthwash reservoir. This is a container for storing mouthwash. It must be able to store the liquid with minimal evaporation of alcohol, to preserve the properties of the mouthwash fluid itself. The mouthwash can be dispensed via supply/lines and connectors for use.

[0043] The next major component/process of the present invention is the toothbrush rinse. This is a small component which projects a stream of water, used for cleaning out debris from the electric toothbrushes. Fluid from this small component will drain via supply lines/hoses to the dirty water reservoir.

[0044] The next major component/process of the present invention is the motherboard/computer nerve center. This is the area of the invention that houses the CPU or CPUs. This computer nerve center in the invention's preferred embodiment will have a motherboard with its own compartment. The motherboard will be configured to handle the computer-related demands of this present invention as per standard computer engineering functionality. This can be seen in FIG. 1.

[0045] The next major component/process of the present invention is the unit supply platform. The unit supply platform functions as a central hub or nerve center for the present invention. This is the place where the bulk of the connections to this unit will take place. All supply hose connections and USB data port connections will be made through this supply platform. These connections are discussed later in this disclosure.

[0046] The next major component/process of the present invention is the air compressor. This is depicted in FIG. 5. The air compressor's function is to push air up and out of the present invention to the extendable supply line/hose. Transport of both air and water will occur through the same supply line/hose and attach to the air/water syringe. This will produce an air/water spray, which is used to thoroughly rinse the patient's mouth.

[0047] The next major component/process of the present invention is the suction pump. The suction pump will provide the suction pressure necessary to remove water and small particles of debris from the patient's mouth after rinsing. The suction pump will be attached to an extendable supply hose that will rest on the supply platform, and may connect to a disposable suction tip, which can easily be inserted and removed for disposal.

[0048] The next major component/process of the present invention is the dirty water reservoir. Notably, this is detachable. This reservoir can also be drained without removing it from its emplacement. The reservoirs will have the ability to tilt out for ease of filling and flushing. The drain plug at the base of the reservoir should be connectable to a drain hose for ease of drainage. In the invention's preferred embodiment, the reservoir is a transparent or translucent container, with volume measures visible from the outside looking in.

[0049] The next major component/process of the present invention is the clean water reservoir. Notably, this is also detachable. This can also be drained without removing it from its emplacement. Notably, this reservoir supports the use of distilled water but potable water is also acceptable. In the invention's preferred embodiment, this reservoir is also a transparent or translucent container, with volume measures visible from the outside looking in.

[0050] The next major component/process of the present invention is the set of reservoir drains. In the invention's preferred embodiment, there is a first reservoir drain and a second reservoir drain. These are for the clean water reservoir and dirty water reservoir, respectively.

[0051] As mentioned, the reservoirs should have the ability to tilt out for ease of filling and flushing. The drain plug at the base of the reservoir should be connectable to a drain hose for ease of draining the reservoir. In this process, the upper reservoir drains into the dirty water reservoir. This is depicted in FIG. 10.

[0052] In the invention's preferred embodiment, there is a female-to-male attachment for ease of draining into the dirty water reservoir container, which will be used for emptying and disposal of fluid.

[0053] The next major component/process of the present invention is the clean water reservoir level indicator. This was mentioned earlier as being integrated into the reservoir as simple volume measures. In the invention's preferred embodiment this may be a simple series of measuring lines, on a transparent gauge. In alternative or future embodiments of the invention, this may be electronic or use a mechanical measuring method.

[0054] The next major component/process of the present invention is the dirty water reservoir level indicator. This was mentioned earlier as being integrated into the reservoir as simple volume measures. This is nearly identical to the clean water reservoir level indicator except it is used for the dirty water. The key possible difference is that in electrical or mechanical embodiments of the invention, this indicator may include filters or sheaths to prevent contamination or accumulation of potentially clogging material.

[0055] The next major component/process of the present invention is the water pump. The function of this pump is to transfer water from the clean water reservoir up and out the present invention's main body, and into the extendable supply line/hose, which will attach to an industry-standard air/water syringe.

[0056] The next major component/process of the present invention is the height adjustor. In the invention's preferred embodiment this is an industry-standard telescoping height system. In the invention's preferred embodiment, this height adjustor system is located at the bottom of the present invention. Alternative or future embodiments of the invention may utilize different means of height adjustment, such as a crank and screw or automatic.

[0057] The next major component/process of the present invention is the long life rechargeable main power source. In the invention's preferred embodiment, the rechargeable battery will be used to power all functions related to the present invention, while it is away from a wall outlet. The present invention can also be directly powered through connection to a wall outlet. If given enough sunlight, the set of solar panels may be able to provide power as well. This is depicted in FIG. 9.

[0058] The next major component/process of the present invention is the main power source indicator. In the invention's preferred embodiment, the colors of the indicator may be red, yellow, or green. In alternative or future embodiments of the invention, the indicator may use a different display with finer granularity to more accurately depict the remaining power level. The indicator may utilize quantifiable numbers instead of colors in such embodiments.

[0059] The next major component/process of the present invention is the set of USB/data port attachments. These are depicted in FIG. 2. These include but are not limited to: thermometer, blood pressure cuff, and pulse oximeter. In the invention's preferred embodiment these may be stored inside the interior compartments.

[0060] The next major component/process of the present invention is the main supply platform. This acts as a docking area for the caregiver's medical devices and instruments.

[0061] The next major component/process of the present invention is the set of supply line/hose attachments. Notably, these are separate from the USB/data port attachments. They

attach to one of the hoses connected to the supply platform. These attachments include but are not limited to electric toothbrushes.

[0062] The electric toothbrush that attaches to the unit will have variable speed. In the invention's preferred embodiment, the available speeds are high, medium, or low. Alternative or future embodiments of the invention may have finer granularity of control.

[0063] The next major component/process of the present invention is the set of USB ports or other forms of data ports. As mentioned these ports are connection points for thermometers, blood pressure cuff, pulse oximeter, intraoral/extraoral camera, etc. These tools form a retrofit biosensor suite, plugged into the data ports. There will be accompanying software to support the USB ports and their connected devices, with possible custom firmware and drivers.

[0064] Notably, alternative or future embodiments of the invention may support other attached devices. One such device may be a portable glucose monitor of the finger-prick type with a display. Alternative or future embodiments of the invention may support a similar device for cholesterol testing.

[0065] The next major component/process of the present invention is the blood pressure and/or pulse indicator. This component warrants separate mention because of its importance in detecting a patient's blood pressure and heart rate.

[0066] The next major component/process of the present invention is the toothbrush timer. In the invention's preferred embodiment, this is a countdown clock for two minutes. At the conclusion of the duration the timer will sound an alarm. Alternative or future embodiments may utilize a different timed duration or time measuring device.

[0067] The next major component/process of the present invention is the On/Off/Pause indicator. These are industry-standard buttons for setting the state of the present invention. "On" will activate the present invention, "Off" will deactivate it, and "Pause" will halt processes but not turn off the machine.

[0068] The next major component/process of the present invention is the reset button. This will reboot the present invention.

[0069] The next major component/process of the present invention is the back view digital display/digital display. This is an illuminated display, which will show all information regarding the patient's vital signs, such as blood pressure, temperature, etc. It will also display any information regarding the status of the unit, such as reservoir fluid levels, power status, and Wi-Fi/Internet connection status where applicable, etc.

[0070] The next major component/process of the present invention is the retractable power cord wall plug and a retractable power cord. This is depicted in FIG. 7. In the invention's preferred embodiment this is an 8-12 foot retractable power cord. It will come standard with the unit, with the option for purchase of an extension power cord if additional length is required. Notably, there is built-in surge protection.

[0071] The next major component/process of the present invention is the set of extendable wheels. In the invention's preferred embodiment the wheels have a 3" diameter. The wheels will have 360-degree rotation, and extend out to 3" from the base. The wheelbase will be wide to maximize stability, with a diameter of 18" in the invention's preferred embodiment. Alternative or future embodiments of the

invention may utilize different dimensions depending on the evolving needs of the industry.

[0072] The next major component/process of the present invention is the display swivel. This is depicted in FIG. 4. This allows the back view digital display/digital display to rotate, possibly via an arm extension. This allows both the user and the patient to view images and readouts with ease.

[0073] The next major component/process of the present invention is the set of biofilm contamination sensors. These ensure biofilms have not contaminated the lines. This detection can be automated, and the set can comprise of internal sensors with notification components inside the hose.

[0074] If the sensor is disposable, it can possibly include a "change sensor" indicator for when the sensor becomes old.

[0075] The next major component/process of the present invention is the set of data connection capabilities. In the invention's preferred embodiment this comprises of both Internet capability as well as Bluetooth functionality.

[0076] In terms of Internet capability, the present invention can be Wi-Fi capable. It may support laptop connection and/or docking, and supports industry-standard Ethernet cords for network connection.

[0077] In addition there is Bluetooth functionality. This is primarily used for the remote controller and streaming data feeds from the attached devices. Notably, all electronic connection via Wi-Fi would require industry-standard cybersecurity measures to preserve the confidentiality of Patient Health Information (PHI).

[0078] The remote controller is discussed later in this disclosure. The remote control and feed may be utilized or viewed via a mobile device, such as a smartphone or tablet. The Bluetooth functionality may also be utilized as Internet capability if it is used as dial-up Internet access.

[0079] The next major component/process of the present invention is the remote control. This is a software process allowing the user to use the Bluetooth functionality as a connection means between a mobile device such as smartphone or tablet, and the present invention. The mobile device can thus act as a wireless remote control unit through relevant software processes. Data can be viewed and attachment tools may be controlled in this manner. Notably, alternative or future embodiment of the invention may include the support of infrared signals instead of Bluetooth. The infrared control may be standalone, or possibly a retrofit device for a mobile device.

[0080] The next major component/process of the present invention is the robotic arm for beverage dispensing and instrument manipulation. It may possess phalanges-type subcomponents. Notably, the arm may be used to perform teeth-brushing actions on the patient. This is depicted in FIG. 12.

[0081] It is important to note that the robotic arm is a complex subcomponent with its own constituent subcomponents and sub-processes, described as follows.

[0082] The arm will be able to grasp an electric toothbrush and deliver it to a patient's mouth for performing oral hygiene.

[0083] The hand of the robotic arm will be able to place the thermometer in the patient's mouth to obtain a temperature reading. The arms will also be able to place and remove the pulse oximeter on the patient's finger to read a patient's pulse.

[0084] The hand of the arm will be able to hold and manipulate the variable speed electric toothbrush in the patient's mouth, moving the electric toothbrush in a pre-programmed pattern based on the geography of the patient's mouth.

[0085] The intraoral/extraoral camera will take pictures of the inside and the outside of the patient's mouth and store images in the present invention's memory bank in the nerve center, to be retrieved and used by the arm to manipulate the electric toothbrush in specific motions based on the geography of the patient's mouth.

[0086] The present invention will have built in indicators that can pinpoint problems within the system, to expedite maintenance and repairs as needed.

[0087] The electric toothbrush will have a slip-resistant grip to make it easier for the human hand and the arm to grip.

[0088] The present invention will have the ability to shut itself down after a set period of non-use, this will conserve energy and protect against power surges.

[0089] The present invention can have optional voice activation much like the iPhone and its Siri persona assistant; this will allow the invention to communicate with those around her.

[0090] The present invention will have the option to carry out various tasks based on voice activation.

[0091] The present invention will be ergonomically designed to the greatest extent possible for ease of use.

[0092] The robotic hands on the arm will be able to pick up the intraoral camera, deliver it to the patient's mouth, and snap pictures based on remote manipulation by a user near the unit.

[0093] The robotic arms should have 360-degree rotation capabilities at all joints, namely the shoulder, elbow and hand.

[0094] The next major component/process of the present invention is the set of peripheral items. These are not directly related components of the present invention, but can be considered to be part of the present invention's overall usage system. These may include marketing products and equipment, including but not limited to: a caregiver training video on recorded media, reservoir-cleaning solutions, disinfectant wipes, etc.

[0095] Herein follows a description of the usage of the present invention.

[0096] The present invention is intended to be rolled up right alongside the patient bedside or chair so that the caregiver, with no need to have a sink or basin at the patient chair or bedside, can perform proper oral hygiene. While the present invention is alongside the patient, the caregiver can provide a host of vital sign assessments to gauge and report on the patient's overall health condition i.e., blood pressure, temperature, pulse, oxygen saturation, blood sugar, cholesterol etc. An intraoral/extraoral camera can also be attached to the present invention, providing a picture and vital information about the condition of the patient's mouth and general appearance. This information can be provided to a dentist/physician for consultation and treatment as deemed necessary. This is depicted in FIG. 11. The patient can view the pictures taken with the intraoral/extraoral camera using a monitor, which will help to facilitate the patient's education regarding their oral health and general health condition. A variety of external attachments can be plugged directly into the present invention to monitor and assess the vital signs and general health of the patient.

[0097] One of the three fluid reservoirs attached to the unit will hold clean potable water to be used to rinse and clean the patient's mouth after brushing, the other large reservoir will be used to store dirty water suctioned from the patient's mouth after brushing and rinsing has occurred. The third and smaller reservoir will have two separate compartments one compartment will hold mouthwash that can be dispensed for patient use, and suctioned back into the dirty water reservoir. The other compartment will be used to rinse the patient toothbrush after use and prior to storage; the water in this reservoir will be suctioned out into the larger dirty water reservoir for proper disposal. The present invention will house several mechanical devices designed to move fluid, such as water and/or mouthwash, and air through the present invention.

[0098] Although the invention has been explained in relation to its preferred embodiment, it is to be understood that many other possible modifications and variations can be made without departing from the spirit and scope of the invention. Obvious changes, modifications, and substitutions may be made by those skilled in the art to achieve the same purpose the invention. The exemplary embodiments are merely examples and are not intended to limit the scope of the invention. It is intended that the present invention cover all other embodiments that are within the scope of the descriptions and their equivalents.

1. The Mobile Dental Intelligence Center (MobiDIC) invention comprising of:

- a. a 360 degree rotating extendable wheel;
- b. broad wheel base enhancing unit stability;
- c. long-life rechargeable electrical power supply (such as a Rechargeable Battery);
- d. rechargeable power supply storage compartment;
- e. various unit compartments;
- f. retractable power cord;
- g. supply storage compartment at wheel base;
- h. unit height adjustment lever;
- i. clean water reservoir;
- j. self-cleaning dirty water reservoir;
- k. supply lines/hoses;
- l. suction pump;
- m. air compressor;
- n. water pump;
- o. unit control module (mother board);
- p. unit control module compartment;
- q. unit supply platform with USB ports and other connections for linkage of external delivery and health monitoring devices to the MobiDIC Unit;
- r. fold down handle with grip;
- s. dual solar panels on opposite sides of the unit;
- t. inter-unit supply line/hose chamber;
- u. Intra/Extra-Oral camera;
- v. electric toothbrush;
- w. attachable computer monitor;
- x. PC or tablet compatibility;
- y. Wi-Fi capability;
- z. blue-tooth capability;
- aa. swivel digital display screen;
- bb. air-water syringe connector;
- cc. air/water syringe
- dd. overall cylindrical design;
- ee. mouthwash reservoir;
- ff. toothbrush rinse;
- gg. set of reservoir drains;

- hh. toothbrush timer;
- ii. biofilm contamination sensors;
- jj. retractable power cord wall plug;
- kk. voice activation technology; and
- ll. Hand-held remote controller which allows Caregivers the ability to move the unit remotely to the patient's bedside or chairside.

2. The MobiDIC invention of claim 1 comprising of its unique design and all stated components provides the Patient's Caregiver with additional healthcare innovations to take care of the patient that is unable to care for themselves due to disability, advanced failing health, incapacitation and other conditions that limit or prevent physical movement of the patient, all designs of the MobiDIC will be manufactured with the following, not all inclusive, basic concepts at the foundation of the design: ease of use, ease of cleaning/disinfection, light-weight for ease of mobility, ease of accessibility to mechanical parts, expediting maintenance and repair, and last but not least, ease of adaptation of the unit to new and relevant advances in rapidly changing technologies.

3. The Mobile Dental Intelligence Center (MobiDIC) of claim 1 comprising;

- a. said 360 degree rotating extendable wheels;
- b. said unit remote controller and;
- c. the foldable handle with rubberized grip will allow the unit to move manually or remotely in any direction as controlled by the Caregiver manually or remotely using the controller.
- 4. The MobiDIC unit of claim 1 comprising:
 - a. said long-life rechargeable electrical power supply;
 - b. said rechargeable power supply storage compartment;
 - c. said retractable power cord and;
 - d. the dual solar panels on the opposite side of unit.

The compartment will allow for the safe storage of the rechargeable electrical power supply with two methods of charging the power supply by electricity or solar power.

5. The invention of claim 1 comprising of said unit height adjustment lever will allow the MobiDIC unit to adjust from its standard height up to additional heights that are ergonomically acceptable to the Caregiver that will be delivering care to the patient, future designs of the unit will allow for remote height adjustment using future advances in this type of technology.

6. The MobiDIC invention of claim 1 wherein said clean water reservoir attaches internally to the water pump and air compressor allowing fresh water and air to be pumped up through the unit, via internal supply lines/hoses, through the supply platform and supply hose connector ultimately to the patient's mouth through an Air/Water syringe connector that will spray air and water in the patient's mouth for rinsing and ultimate removal using the disposable suction tip.

7. The MobiDIC invention of claim 1 wherein said self-cleaning dirty water reservoir is attached to the unit, the suction pump with its supply line/hose will connect to the dirty water reservoir allowing dirty water/fluid from the patient's mouth to be suctioned up through a disposable suction tip into the connector hose and down through the supply platform, to the internal suction supply line/hose which will carry the dirty water/fluid to the dirty water reservoir for ultimate disposal, via the reservoir drain.

8. The MobiDIC unit of claim 1 comprising of said air compressor and the water pump will have sufficient function and power to move air and water up through the unit's components via component supply lines/hoses, and to the

patient's mouth for proper rinsing, via the air/water syringe attachment or a functionally comparable component, after oral hygiene is completed by the Patient's Caregiver.

9. The MobiDIC unit of claim 1 comprising of said unit control module (Motherboard) which is the computer control center for the MobiDIC unit and will control all aspects of unit function for delivery of care to the patient and control mobility of the unit.

10. The MobiDIC unit of claim 1 comprising of said Unit Supply Platform, through which all component supply lines/hoses, electrical wiring, connectors and cords will flow internally and externally allowing for external attachment of connector devices to the supply platform such as, said air/water syringe, electric toothbrush, suction connectors, camera connectors, PC/Tablet connectors, vital sign device connectors and any additional innovative devices for healthcare monitoring and delivery of healthcare.

11. The MobiDIC invention of claim 1 comprising of said Swivel Digital Display screen is easy to read and can move in all directions with the ability to display the patient's vital signs on the digital screen and also display the level of functionality of the unit during operation of the MobiDIC (i.e. fluid reservoir levels, main power supply charge level and any other data regarding function/operation of the unit).

12. The MobiDIC invention of claim 1 comprising of said unique overall cylindrical design with all typically visible external supply lines/hoses, electrical wires and cords hidden, MobiDIC's design rendering supply lines/hoses, wires and cords running internal to the unit and invisible renders the unit uniquely distinctive in design across the healthcare industry.

13. The MobiDIC invention in claim 1 is designed and manufactured in a manner that will render the unit easy to clean and disinfect and ready to interface with multiple technological changes in the various attachments that will connect to or communicate with MobiDIC in its current and future designs.

14. The MobiDIC invention of claim 6 comprising of said air compressor and its supply lines/hoses will connect to the supply lines/hoses of the water pump moving fresh air and clean water up through the internal supply lines/hoses, the supply platform, the supply platform connector and the air-water syringe connector to the patient's mouth delivering air and clean water for rinsing out the patient's mouth following oral hygiene care.

15. The MobiDIC unit of claim 7 comprising of said suction pump to move fluid from the patient's mouth through the components of the unit internally and onward to the dirty water reservoir for proper fluid disposal, the suction pump unit will possess sufficient suction power to carry out this function.

16. The MobiDIC unit of claim 9 comprising of the unit supply platform through which all external devices will attach through USB ports and other innovative means of electronic attachment (i.e. Bluetooth, Wi-Fi and more); the Blood Pressure cuff, thermometer, pulse oximeter, intra/extra-oral camera, electric toothbrush, attachable and compatible computer monitors and a host of other innovative devices, enhancing delivery of care, will all attach to the unit directly or remotely via the unit supply platform and unit control module (Motherboard).

17. The MobiDIC invention of claim 1 comprising of all component parts allows the patient's caregiver the ability to brush the patient's teeth using an electric toothbrush, rinse

the patient's mouth with water and air jet stream from the air/water syringe, suction the patient's mouth to remove water/fluid/debris using a disposable suction tip attached to the unit, take photos inside the patient's mouth and external photos to capture the patient's current general well-being, send photos and other vital sign information, (i.e. Blood Pressure, Pulse, Temperature and other indicators), gathered to patient's healthcare provider, upon patient's consent, via secure electronic/cyber networks connections, future unit designs will incorporate rapidly changing technological advances in the healthcare industry (i.e. USB to Wireless, highly advanced robotic arms that can be attached to the MobiDIC, in future designs, for automated delivery of patient care), and additional designs of the MobiDIC can incorporate use of the unit by Dental/Medical Professionals delivering care to the patient using units designed specifically for use by Dental/Medical Professionals, although the invention has been explained in relation to its preferred embodiment, it is understood that many other possible modifications and variations can be made without departing from the spirit and scope of the invention.

18. The MobiDIC invention will enhance the ability of the patient's Caregiver and the healthcare providers, (Dentists and Physicians), to communicate effectively regarding the patient's dental health and general health, via current and future advances in communication technology, the unit is designed to capture and fully incorporate all innovations in communication.

19. The MobiDIC invention comprising of a unique design is created specifically for the Caregiver, the patient's

close relative, an ancillary healthcare provider or someone with little to no experience operating the unit, the unit is designed for safe operation with minimal classroom and/or on-the-job training regarding delivery of oral hygiene care and monitoring of the patient's vital signs, also the ergonomic design makes it comfortable for the Caregiver and easy to incorporate future technological advances that may enhance the unit's capacity and capability to deliver care to the bedside and/or chairside of the patients in need of care, obvious changes, modifications, and substitutions may be made by those skilled in the art to achieve the same purpose of the invention, the exemplary embodiments are merely examples and are not intended to limit the scope of the invention.

20. The MobiDIC is uniquely designed so that Caregivers, with basic training in the use and function of the unit, can move the unit manually or remotely to the patient's bedside/chairside and provide quality, safe and effective oral hygiene care while also monitoring, recording and reporting on the patient's general health using vital sign monitoring devices and photo images, taken inside and outside the patient's mouth, the information gathered can be securely transmitted electronically to the patient's Dentist and/or Physician, as requested by the provider and consented to by the patient, for professional evaluation of the patient's current general health, it is intended that the MobiDIC invention cover all other embodiments that are within the scope of the descriptions and claims and their equivalents.

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公开(公告)号	US20170000677A1	公开(公告)日	2017-01-05
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当前申请(专利权)人(译)	PRINCE , KEVINTYRONE		
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摘要(译)

移动牙科情报中心 (MobiDIC) 将与患者的床边或椅子一起卷起, 患者的护理人员可以进行口腔卫生, 无需在该区域设置水槽或水槽。使用 MobiDIC, 护理人员将能够刷牙患者的牙齿, 在床边或椅子上冲洗并抽吸患者的口腔;护理人员也将监测患者的生命体征。该装置独特的圆柱形设计使护理人员可以轻松擦拭清洁和消毒设备。空气, 水, 吸入和电源软管位于设备内部, 减少了线缆缠绕和绊倒的危险。 MobiDIC使 Caregiver能够轻松连接各种医疗监控设备, 包括内部和外部摄像头, 捕获患者口腔内部的图像和患者的整体外观。所有MobiDIC创新都将有助于评估患者当前的一般健康状况。

