



## Modular Bidet, Cartridge Based Liquid Dispenser and Blow-Dryer System

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*by:*

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## **ABSTRACT**

A modular system consisting of a hand-held bidet, a cartridge based liquid dispenser and a blow-dryer that are concealed inside a single cabinet. Separate cabinets can also be utilized for each of the subassemblies, thus allowing them to be used together in any combination together or independently of each other. This unique system mounts onto a standard water tank, and is shaped to match the tank so that it blends well with the existing toilet design to make it inconspicuous for discretion and aesthetics. The bidet assembly uses a built-in, on-demand hot water apparatus, a mixing water valve unit and an electronic control device. The liquid dispensing assembly uses a replaceable and refillable cartridge that provides for a means to add medicinal or cleansing solutions to the bidet spray. The blow-dryer assembly allows the use of any standard hand-held blow-dryer and is used for personal drying after bidet use.

## **BACKGROUND – FIELD OF THE INVENTION**

The present invention relates in general to hygienic devices and more specifically, a modular bidet system consisting of a bidet, a cartridge based liquid dispenser and blow-dryer assembly that is mounted on a standard toilet water tank.

## **BACKGROUND – DESCRIPTION OF THE PRIOR ART**

Bidets have not been widely accepted in the United States, in spite of the many benefits. Bidets provide enhanced personal cleanliness and help can minimize the use of toilet paper which is an increasing ecological concern.

Bidets with special spray nozzle attachments can be used to cleans internal body cavities to perform douches or enemas. Bidet accessories can be used to administer cleaning or medical solution to said body cavities as well.

Many people find that a doctor recommends they either rinse or soak following surgery procedures in the genital and rectal areas, such as after an episiotomy or a hemorrhidectomy. Further, medicines may need to be added to the rinse or soak water. The usual way to accomplish this is by immersion in a tub. A bidet device that would allow rinsing and medicating of the genital and rectal areas without immersion in a tub would be desirable.

Currently, there is a variety of bidet designs that are available to the consumer. However, a number of shortcomings are seen in these prior art bidet devices.

The most common bidets are stand-alone units that are prominently and permanently installed in bathrooms, requiring additional bathroom floor space and appropriate separate plumbing to install. These bidets are large, the size of toilets, and thus cannot be added to an existing structure without extensive remodeling. Costs are therefore very high for installation. Thus there are few homes in the United States having bathrooms with either plumbing or floor space provisions adequate for the installation of bidets.

As an alternative, some designers have developed portable bidet units that can be used in conjunction with an existing toilet. However, these portable units are typically bulky and awkward to use. Portable bidet devices that have been created have proven to be difficult to install, and/or unsightly once installed. Portable bidets need to be connected to the faucet each time it is to be used and then to disconnect it after use is an awkward procedure which results in considerable inconvenience and deters persons from using the bidet. These devices usually require that the bidet basin be stored when not in use.

The majority of the other prior art bidets have sprayers added to the existing toilet systems. The spray nozzles are placed around the toilet in permanent methods, having many drawbacks:

- 1) The bidet sprayer is built into the basin and thus originates from a fixed location. The fixed nozzle leaves the user with no control over the application of cleansing water. Consequently, the bidet spray cannot be directed at a particular location and cannot be redirected if desired. Because of the immobility of the sprayer nozzle, some of them require the user to maintain a specific body alignment to obtain better cleansing.
- 2) Some devices provide a nozzle located some distance below the seat which requires reaching down into the bowl to obtain adjustment of the spray.

- 3) Some bidets that do have movable nozzles still have very minimal spray patterns.
- 4) Many of these devices are characterized by an undue level of mechanical complexity which may affect their reliability, the mechanisms and moving parts of the said combinations are unsightly, exposed and cumbersome.
- 5) Special seats that have nozzles located inside the toilet bowl modify the appearance of the toilet.
- 6) Many devices have need of frequent sanitation because the nozzles stay inside the bowl when used.
- 7) Their proximity to the toilet bowl make them difficult to clean, and may cause unpleasant odors.

Some bidet devices include a hand-held nozzle that offers a maximum of utility, allowing the user to direct the spray. Most hand-held bidets that are mounted on or adjacent to the toilet are stored out in the open. Some have a volume control that is attached to a sink faucet with a flexible hose, where the volume and temperature controls are often not accessible to the toilet. They can be obtrusive, significantly affecting appearance or use of the toilet.

A bidet device suitable for retrofit installation to existing toilet fixtures, or original installation into manufactured fixtures that is easily installed, inexpensive does not detract from the aesthesis of the bathroom would be highly desirable.

Therefore, it can be appreciated that there exists a continuing need for a new and improved heated bidet attachment for a toilet device that can be used for providing a personal hygiene device having a warm water spray and further being connected with the existing toilet. In this regard, the present invention substantially fulfills this need.

## **OBJECTS AND ADVANTAGES**

One object of the present invention is to provide a bidet which serves as cleansing equipment for personal hygiene.

A further object of the invention to provide a bidet device that does not require a second commode or basin to be installed.

A further object of the invention is to provide a device that offers a warm water spray with temperature control.

It is still yet another object of the invention to provide a multi-featured bidet device for dispensing medicating solutions to the genital and rectal areas.

A further object of the invention is to provide an apparatus that can use a safe and sanitary nozzle for body treatments.

A further object of the present invention to provide a bidet that does not require extensive plumbing when installed in an existing structure.

A further object of the invention is to provide such a system which can be easily installed by a homeowner without the necessity of employing a professional plumber.

A further object of the invention is to present an add-on bathroom fixture to provide convenience of use that is attractive when installed without appearing obtrusive.

A further object of the present invention is to provide equipment that will have universal application to a wide variety of existing installed toilets.

A further object of this invention is for it to be easily added to an existing toilet and just as easily removed again, such as would be desired by apartment dwellers.

An even further object of the present invention is to provide a new bidet apparatus which is susceptible of a low cost of manufacture with regard to both materials and labor, and which accordingly is then susceptible of low prices of sale to the consuming public, thereby making such bidet apparatus economically available to the buying public.

Lastly, it is an object of the present invention, while achieving the above stated objectives, is to provide a bidet having a protective housing which provides ready storage of the apparatus and permits ready removal, usage and concealed restorage.

## **SUMMARY OF THE INVENTION**

In the view of the foregoing disadvantages inherent in the known types of toilet devices and accessories now present in the prior art, the present invention provides an improved bidet attachment for a toilet. As such, the general purpose of the present invention, which will be described subsequently in greater detail, is to provide a new and improved bidet attachment for a toilet that has all the advantages of the prior art and none of the disadvantages.

The present invention accomplishes the above-stated objectives, as well as others, as may be determined by a fair reading and interpretation of the entire specification.

### **Modular Cabinet:**

The present invention is designed to take advantage of the unused space that exists directly above the average toilet water tank for the placement of a modular bidet system. This invention utilizes a unique modular cabinet designed to be strategically placed onto the top rim of a standard toilet's water tank. It is shaped to blend in with the design of the water tank for aesthetics. The bottom of the cabinet has guides so that the cabinet can fit well on a variety of water tank sizes. The top of the cabinet is a rim just like that of the water tank to allow the original toilet's lid to be re-installed. This allows the stock toilet lid to be reused so that the general design of the toilet can be maintained and to help the cabinet to blend into the existing bathroom décor. This modular design allows other modular cabinets or special purpose cabinets to be installed onto it. The cabinet can have its own custom lid as well. This modular cabinet provides the housing and space for the components of the bidet system, which includes a bidet device with a hose reel and water sprayer, a cartridge based liquid dispenser for dispensing of cleaning solutions or medicines to the bidet sprayer, and a blow-dryer. This is an apparatus that can either be attached to an existing toilet as an aftermarket product or manufactured in combination with a new toilet.

The bidet, cartridge based liquid dispenser and blow-dryer could each reside inside separate modular cabinets, or could be assembled in any combination. This would allow the consumer to choose which assemblies to install. For example, a consumer may not desire to use the cartridge based liquid dispensing element, so a cabinet could be made available that omits it. Later, if the consumer then desires to have the cartridge based liquid dispenser, a separate modular cabinet that contains one could be added to the base assembly.

Another feature of the modular nature of this invention is that other components can be attached or stacked onto the top of it to add yet other unique features, allowing it to work with other modular devices under development by the same inventor. Although the additional features can be also built into just one modular cabinet, for the sake of modularity, some additional devices may be best kept as separate devices, similar to a component stereo system.

### **Bidet System:**

The modular bidet cabinet system is mounted on the water tank, within easy reach behind a person using the toilet. A swing door on the front of the cabinet opens to gain access to a compartment containing a retractable hand-held bidet sprayer. As the water hose that feeds this sprayer utilizes a tensioned reel, the user only has to easily withdraw the sprayer to the desired area of the body part to be sprayed. The automatic reel mechanism will lock the hose, preventing it from recoiling. The hand-held spray head can then be directed at any desired area or areas which are to be washed. The sprayer, similar to a garden hose sprayer, has a finger control lever that starts and stops the flow of water as well as allow for the volume and spray pattern to be administered. If desired, the sprayer can also be hung from a hook or cradle that can be mounted on the bidet sprayer door or on a nearby wall. With only a gentle tug on the bidet hose, the automatic reel mechanism allows the bidet sprayer and hose to be conveniently reeled back inside the modular cabinet.

The bidet system is designed with a rapid hot water device and electronically controlled mixing valves that enable a user to control the temperature of the water. It is generally known that sensitivity to temperature is subjective to each individual and, therefore, the present invention allows an electronic control to exactly adjust the temperature of the water to be sprayed. A temperature control unit with a digital readout of the water temperature is conveniently located at the end of the hose, between the hose and the sprayer. This allows the person to select the desired water temperature of the spray, and also monitor the temperature of the water being dispensed, so that the correct

temperature is known before contacting the user. For example, it may take a few moments for the mixing valves to operate and receive feedback from the sprayer's temperature probe for a specified water temperature to be reached. A user only has to spray the water into the toilet bowl until the desired temperature is reached. The electronic control could beep when the exact temperature water is available. The user is then confident to spray the water onto the user's body parts. Buttons are available on the controller to allow multiple users to store favorite temperature settings.

### **Cartridge Based Liquid Dispenser System:**

The present invention allows a cleaning liquid or medicine solution to be mixed with the bidet water stream. It is a unique cartridge based liquid dispenser that is also built into the bidet cabinet. The removable cartridge is designed with a cap so that it can be filled with any desired liquid. A user simply removes the cartridge from the cabinet to add any desired solution into it, such as cleaning fluid or medicinal solution. The cartridge is then reinserted into the modular cabinet where the cartridge docks with a liquid pumping unit. A spring-loaded orifice in the cartridge allows the liquid to enter a mating orifice in the liquid pump. The pump then transfers the liquid from the cartridge to an electronically controlled mixing valve which regulates the amount of liquid to be discharged to the bidet sprayer.

A programmable electronic controller allows the user full control of the liquid mixing valve, including the two other mixing valves that are used to mix hot and cold water. This provides the user the ability to dispense any desired ratio of liquids from the valves so that any desired measure of cold water, hot water or liquid additive can be delivered to the sprayer. For example, an ordinary premixed douche solution could be purchased and added to the cartridge. As this solution is already premixed, it may be desired to administer the solution undiluted by the hot or cold water supplies. Therefore, the controller would only activate the mixing valve for the liquid cartridge supply, allowing only the liquid from the cartridge to be pumped to the sprayer. A user could also choose to add pure vinegar (a common douche solution) to the cartridge and set the controller to mix the vinegar with warm water at an appropriate ratio. Likewise, medicine solutions may be used full strength or diluted this way as desired.

The electronic bidet controller has several programmable buttons, which would allow a user to apply a solution to be dispensed from the cartridge and mixed with warm water as long as the button is depressed. Once the button is released, the solution would be turned off to allow only warm water to be dispensed. This is desirable for the case of administering a cleansing solution to the body for a brief time interval.

The cartridges may be made to be disposable as well. The present invention offers the ability to provide the consumer with commercially available disposable cartridges that can contain any desired solutions, such as sterile medicines, douches or soaps as mentioned above. Once the cartridge's product has been consumed, the user simply disposes it.

A cartridge based liquid container for a bidet provides for a number of advantages and options, such as:

- 1) **Convenient Access:** The replaceable cartridge is inserted into a slot in the front of the modular cabinet, behind an access panel. This position allows the user easy reach to service the unit.
- 2) **Convenient Packaging to Reduce Mess:** The cartridge is a convenient, leak free container for liquids, allowing the user to handle it without coming in contact with the liquid inside. The cartridge contains a small, spring-loaded liquid valve that is normally closed to prevent any leakage while the cartridge is removed from the cabinet. The liquid valve automatically opens when the cartridge is simply inserted into the cabinet.
- 3) **User Choice of Liquids:** A refillable cartridge provides a user the ability to utilize any desired kind of cleaning solution, medicine or other liquid.
- 4) **Convenience of Service:** An optional disposable cartridge allows the user the convenience of simply discarding a spent cartridge. This relieves the user from the task of refilling the cartridge and from the potential of making a mess. A user has only to flip down a convenient access door on the front panel of the cabinet, pull out and discard a spent cartridge and then simply insert a fresh cartridge into the device.
- 5) **Solution Level Indication:** A cartridge made of a transparent or semitransparent material would allow a user to visually see the fluid level inside the cartridge simply by glancing at it, thereby allowing the user to know how much fluid remains in the cartridge. An optional electronic fluid level detector could also be

used sense the level of the liquid inside the cartridge and then provide feedback for the user, whereby the controller could flash a lamp and/or signal a beeper to occasionally chirp to indicate a low fluid level condition.

The present invention's feature of utilizing a removable cartridge also allows the consumer to own a plurality of cartridges for the purpose of storing different types of solutions. This provides the user with the convenience of only having to select the desired cartridge and then insert it into the modular cabinet without having to empty and then refill a single cartridge each time a different solution is desired.

The current invention also allows the use of multiple liquid cartridge dispensers to be installed into the modular cabinet, thus allowing the user the ability to select from a variety of solutions without having to swap out different cartridges from a single dispenser unit. For example, a dual-cartridge unit would allow one cartridge to contain a basic cleaning solution while the second cartridge can contain a medicinal solution. The current invention utilizes a single electronic controller that is designed to allow each cartridge to be independently programmed and controlled. Each fluid can be separately programmed for the amount of liquid to be dispensed.

### **Hot Air Blow-dryer System:**

The present invention utilizes an optional hand-held blow-dryer assembly that allows the bidet user to dry off after having a bidet rinse, which reduces the need for toilet paper. The modular bidet cabinet system is mounted on the water tank, within easy reach behind a person using the toilet. The present invention provides a compartment inside the modular cabinet to house this blow-dryer. A tensioned reel is utilized to keep the blow-dryer's cord coiled and hidden inside the cabinet. A swing door on the front of the cabinet opens to gain access to the retractable blow-dryer. As the blow-dryer utilizes a tensioned reel, the user only has to easily withdraw the blow-dryer to the desired area of the body part to be dried. The automatic reel mechanism will lock the hose, preventing it from recoiling. The blow-dryer can then be directed at any desired area or areas which are to be dried. If desired, the blow-dryer can be hung from a hook or cradle that can be mounted on the blow-dryer door or on a nearby wall. The blow-dryer is attached to a hose reel, that is spring loaded so that it can conveniently reel the cord and blow-dryer back inside. A gentle tug on the cord will allow it to be automatically recoiled back into the cabinet.

The present invention is designed to utilize a standard design electric hot-air blow-dryer. This ability allows the consumer the choice of virtually any type of commercial hair-dryer. A top panel of the modular bidet cabinet could be removed to reveal the blow-dryer compartment. A standard blow-dryer could be plugged into a power cord plug as protruding from the cord reel. The blow-dryer's cord can then be wound around the reel and then placed into the compartment. It is then ready for use.

The hand-held blow-dryer system is designed as optional accessory to the bidet cabinet but can also be provided inside its own separate, modular cabinet. This would allow the blow-dryer system to be added onto an existing bidet cabinet at any time. A separate blow-dryer system could also be by itself without the bidet product, since it would still provide a convenient place to store a hair-dryer, which is a common bathroom item.

### **Sanitary Operation:**

Some prior art utilize spray nozzles that reside inside the toilet bowl area, where they can become easily contaminated, considering the normal environment of the bowl. Upon activation of said nozzle, water with contaminants could be sprayed onto the body. Most people would not desire to spray this contaminated water onto their bodies, especially in the groin area. The current invention removes the spray nozzle from the unsanitary bowl environment to the dry and sanitary storage inside the modular bidet cabinet. There are no components mounted in the toilet bowl or on the seat, and the bidet can thus be used in a hygienic manner. No frequent sanitation of the device is necessary.

The hand-held sprayer also allows the device to hygienically administer liquid to internal body cavities. A disposable nozzle attachment can be simply applied to the end of the water sprayer to allow the user to insert it into the body. After use, the nozzle attachment can be removed and disposed of.

### **Bathroom and Toilet Aesthetics:**

One object of the current invention is to provide the most inconspicuous and unobtrusive device as to maintain look the traditional bathroom. The current invention achieves this by the previously mentioned features: The present invention fully conceals the bidet, cartridge based liquid dispenser and blow-dryer components inside a modular cabinet that is shaped to fit and blend in with the existing toilet design, making it inconspicuous. The unit is very



compact so it occupies little space, which is often at a premium in crowded bathroom areas. The added cabinet does not detract appreciably from the appearance of the water closet. The aesthetics of the toilet then appear normal, with the appearance of only a slightly taller than usual water tank. This modular cabinet also utilizes the original stock water tank lid to better preserve the original toilet aesthetics. The modular cabinet could be provided with its own detachable lid, but reusing the existing toilet water-tank lid would retain the original look of the toilet.

### **Ease of Installation:**

It is another object of this invention to provide an apparatus capable of easy installation onto an existing toilet tank of generally standard design that requires no alterations in the toilet. Another goal of this invention is for it to be easily added to an existing toilet and just as easily removed again, such as would be desired by apartment dwellers. The current invention accomplishes this through a very simple design that allows it to be easily installed or uninstalled on conventional toilet tank structures requiring no professional skill or special tools for installation. The modular cabinet is simply sat down in place on top of the water tank. This position also allows easy installation of the device as it merely sits on the water-tank, using no fasteners. Guides on the cabinet's bottom mates with the water-tank's rim to keep the cabinet securely in place. The top of the modular cabinet has a rim just like the water tank so that the original lid can be attached to it. This modular design allows it to be easily removed so that quick service to the components inside the water-tank can be made, such as freeing up a stuck flush valve. The only plumbing alteration that is required is the addition of an incoming cold water tap line. Thus, the toilet bidet of this invention does not require a complicated connection to a hot water line.

### **Ease of Use:**

The present invention is a modular cabinet and mounted on the water tank, within easy reach behind a person using the toilet. Swing doors on the front of this cabinet allow the user to easily extract the bidet sprayer or blow-dryer for use. A light tug on them allows mechanisms to automatically recoil them back into the cabinet for inconspicuous and hygienic storage.

### **Universal Applications:**

A further object of the present invention is to provide equipment that will have universal application to a wide variety of existing installed toilets. The current invention achieves this objective by its modular nature as it can be shaped to fit any water tank. The component of this invention requiring the concern for universal application is the mainly the shape of the water tank mounted modular cabinet and its mounding element. This modular cabinet can be shaped to perfectly fit each different model toilet which also allows it to blend in for aesthetics. This modular cabinet could also be offered in a generic cabinet shape or skin that is designed to work on and look good with a wide range of brands and models, thus enhancing the ability to more widely use this product on existing toilets.

### **Customization:**

The present invention's bidet system is designed with a replaceable sprayer to allow the attachment of most commercially available sprayers. This allows the consumer to choose a sprayer that has a specific desired size, shape or spray pattern.

The present invention's blow-dryer system is designed to utilize a standard design electric hot-air blow-dryer. This ability allows the consumer the choice of virtually any type of commercial hair-dryer.

### **Economic Design:**

A particularly important advantage of the present invention that it can be constructed from readily available parts so that its cost is reduced in comparison to more complicated devices which require special toilet bowls, special water tanks or other specialized components. The bidet hose reel and blow-dryer cord reel are commonly available products. The hand-held bidet sprayer is of standard design, thus allowing most available bidet sprayer to be utilized. Even garden hose sprayers could be used. The blow-dryer assembly utilizes a standard hair-dryer style device. Thus, the present invention can be economically manufactured.

### **Conclusion:**

Although only a few embodiments of the present invention have been described, it should be understood that the present invention may be embodied in many other specific forms without departing from the spirit or the scope of the present invention. The present examples are to be considered as illustrative and not restrictive, and the invention is not to be limited to the details given herein, but may be modified within the scope of the appended claims along with their full scope of equivalents.

The above mentioned objectives and advantages of this invention and the manner of attaining them will become more apparent and the invention itself will be better understood by reference to the accompanying drawings.

## **DETAILED DESCRIPTION OF THE DRAWINGS**

As required, detailed embodiments of the present invention are disclosed herein; however, it is to be understood that the disclosed embodiments are merely exemplary of the invention which may be embodied in various forms. Therefore, specific structural and functional details disclosed herein are not to be interpreted as limiting, but merely as a basis for the claims and as a representative basis for teaching one skilled in the art to variously employ the present invention in virtually any appropriately detailed structure.

Reference is now made to the drawings, wherein like characteristics, and features of the present invention shown in the various FIGURES are designated by the same reference numerals.

The current invention with all options consists of bidet, cartridge based liquid dispenser and blow-dryer assemblies. It incorporates a modular construction to increase its ability to be utilized in various ways thereby enhancing its usefulness to the consumer. The idea is to allow the use of any one or combination these three assemblies that are either installed into a single cabinet or installed into multiple cabinets. This modular concept is illustrated in **FIG. 1** through **FIG. 6**, where the bidet, cartridge based liquid dispenser and blow-dryer assemblies are mounted in various modular cabinet configurations and shown as mounted on standard toilet water tanks **52**.

**FIG. 1** is a front perspective view of the present invention that includes a modular bidet and cartridge based liquid dispenser assembly **65** in one cabinet and a modular blow-dryer cabinet assembly **68** in a separate cabinet, both modularly stacked together on a water tank **52**.

**FIG. 2** is a front perspective view of the present invention that includes a bidet, a cartridge based liquid dispenser and blow-dryer that are all mounted into one cabinet assembly **64**.

**FIG. 3** is a front view of the modular bidet with a cartridge based liquid dispenser cabinet assembly **65** as mounted on a standard toilet with the modular blow-dryer cabinet assembly **68** omitted from the system.

**FIG. 4** is another variation of components with only a bidet assembly and blow-dryer assembly **66** installed into one modular cabinet whereby the cartridge based liquid dispensing unit has been omitted.

**FIG. 5** illustrates how the blow-dryer assembly **68** can be used by itself where it can be used in a general purpose way, such as drying wet hair after a shower. The blow-dryer cabinet assembly **68** then serves as a convenient place to retrieve and store a blow-dryer.

**FIG. 6** is a front perspective view of yet another variation of the invention whereby each of the three components of the present invention, a bidet assembly **63**, a cartridge based liquid dispenser assembly **67** and a blow-dryer assembly **68**, all reside in separate modular cabinets and shown mounted on a standard toilet. Each component of the system can be used in any combination together or separately.

**FIG. 7** is a lower front perspective view of the modular bidet cabinet with cartridge assembly **65** as mounted on a standard toilet water tank **52** to illustrate the water line connections. The existing bathroom toilet water supply line **72** is connected to a standard water shutoff valve **95**. From the outlet of this shutoff valve **95**, a water-T **102** is added to tap into the toilet water tank supply line **101**. Bidet water line **100** is then attached to this water-T **102** to supply water to the bidet assembly **65**.

**FIG. 8** is a lower rear perspective view of the modular bidet cabinet with cartridge cabinet assembly **65** as mounted on a standard toilet tank **52** to illustrate the water line connections. Bidet water supply line **100** can be seen extending from the water-T **102** to the back side of the bidet cabinet assembly **65**.

**FIG. 9** is a top front perspective view of the modular bidet and cartridge based liquid cabinet assembly **65** to illustrate the components mounted inside it. A water hose reel **60** is used to compactly hold the bidet water hose **59**, shown in **FIG. 24**. The reel **60** is a tensioned device designed to uncoil the water hose once the bidet sprayer **58** is pulled on. It will automatically lock the water hose in place so that the bidet sprayer **58** can be used. A quick tug on the bidet water hose **59** would cause the hose reel **60** tensioned mechanism to automatically recoil the water hose **59**.



back onto the reel **60**. A bidet swing door **97** is shown open to reveal a sprayer **58** inside. A simple divider **81** acts to compartmentalize the hot water and mixing valve assembly **69** from the sprayer **58**. Air vents **75** in the back side of the cabinet assembly **65** is designed to allow the cabinet to breathe so that any water droplets that may dribble from the end of the sprayer **58** can vent out of the cabinet **65**. The bottom of the cabinet assembly **65** can also have a slightly ramped or funnel shaped bottom with a small drain tube that will allow any leaks from the sprayer **58** to drain down into the water tank **52**.

**FIG. 9** also shows the components of the cartridge based liquid dispenser. Door **98** is shown in an open position to reveal a refillable and replaceable cartridge **78** that is docked into the cabinet assembly **65**. Electronic controller **54** is an optional controller to the bidet hose mounted controller **82**, that allows the cabinet assembly **65** to dispense any desired liquid mixtures to the bidet sprayer **58**. The Cartridge Alignment and Support Guide **108** keeps the cartridge **78** aligned and supported as it is inserted into the cabinet assembly **65** so that it can properly mate with the liquid pump assembly **83**.

**FIG. 10** is the same top front perspective view of the modular bidet and cartridge based liquid cabinet assembly **65** as in **FIG. 9** but shows the cartridge **78** removed to illustrate its removability. A cap **79** on the cartridge **78** is used to refill the cartridge **78**. Liquid pump assembly **83** can be seen at the back end of the cabinet assembly **65**, which mates with the cartridge **78** once it is inserted into the cabinet assembly **65**.

The present invention is designed to fit onto the rim of a standard water tank **52**. **FIG. 10** illustrates the top rim **56** where the stock water tank lid **53** can be installed or another module cabinet assembly can be stacked. **FIG. 14** illustrates the modular guide **57** where it allows the modular cabinet assemblies to be secured onto the water tank or onto each other.

**FIG. 11** is a top front perspective view of the modular bidet and blow-dryer cabinet assembly **66** to illustrate the components mounted inside. A compact blow-dryer **61** can be seen inside the cabinet assembly **66** next to its cord rewind reel **55**.

**FIG. 12** is a top rear perspective view of the modular bidet and blow-dryer cabinet assembly **66** to illustrate the components mounted inside and the back cabinet panel detail. The bidet water supply hose **100** is shown with a female quick-disconnect **71** that mates with a male quick-disconnect **70** so that the bidet water supply line **100** can be quickly disconnected from the bidet and blow-dryer cabinet assembly **66**. This would allow for the quick removal of the modular bidet cabinet assembly **66** so that the internal components of the toilet tank **52** can be made, such as freeing up a stuck toilet tank flush valve. A valve inside the female quick-disconnect fitting **71** would prevent the water flow in the event the male quick-disconnect **71** fitting is removed from it. Cold water is then supplied from the quick-disconnect fitting **70**, to the hot water and mixing valve assembly **69**. This assembly **69** is made up of industry standard components, designed to heat and then mix the heated water with the cold water supply. A standard male power receptacle **76** allows for a standard female power cord to be attached to a household receptacle.

**FIG. 13** is a top front perspective view of the modular blow-dryer cabinet assembly **68** to illustrate the components mounted inside it. This full sized cabinet allows for larger blow-dryers **61** to be utilized.

**FIG. 14** illustrates the modular guide **57** where it allows the modular cabinet assemblies to be secured onto the water tank or onto each other. This guide **57** can be made to be adjustable so that a single cabinet shape can be made to fit a wide variety of tanks **52**.

**FIG. 15** illustrates a power receptacle **74** that is mounted in the cord reel **55**. This will allow a blow-dryer's power plug **73** to be connected to it. The blow-dryer's cord **62** can then be wound around it. This feature will allow just about any standard type of blow-dryer **61** to be utilized.

**FIG. 16** is a front perspective view of a replaceable and refillable cartridge **78** shown with its refill cap **79**. The refill cap **79** is ventilated, which allows a one-way flow of air into the cartridge **78** as its solution is consumed. The refillable cartridge **78** can be removed at any time, where a spring loaded drain valve **104** located inside its drain tube **84** closes whenever it is pulled away from the pump assembly **83**, shown in **FIG. 19**. The refill cap **79** can be removed and more solution added. A cartridge label **80** can be used to identify the contents of the refillable cartridge **78**.

**FIG. 17** is a front perspective view of a disposable liquid cartridge **77**. This disposable cartridge **77** has no refill cap **79** since it is meant to be disposable. However, a refillable cartridge **78** could also be disposable. **FIG. 17** also

shows a pressure relief valve **109** which allows a one-way flow of air into the cartridge **77** as its solution is consumed. The disposable cartridge **77** can be removed at any time, where a spring loaded drain valve **104** located inside its drain tube **84** closes whenever it is pulled away from the pump assembly **83**, as depicted in **FIG. 19**. Cartridges with various liquid types can be made available that allows a user to simply install the cartridge from its wrapper into the cabinet. Once the cartridge's content is consumed, the cartridge **77** can be conveniently disposed. A cartridge label **80** can be used to identify the contents of the disposable cartridge **77**.

**FIG. 18** is a rear perspective view of the cartridge **78** and liquid pump assembly **83** to illustrate how the cartridge **78** mates with liquid pump assembly **83**. A tube **86** is attached to the liquid pump outlet fitting **87** to communicate the liquid from the cartridge **78** to the bidet mixing valve **94**, as shown in **FIG. 24**.

**FIG. 19** is a rear lower perspective view of the liquid pump assembly **83** as slightly cocked from its normal alignment with the cartridge **78** to illustrate the mating of the cartridge drain tube **84** with the liquid pump inlet fitting **85** that conveys the liquid from the cartridge **78** into the pump assembly **83**. Once the cartridge **78** is completely inserted into the cabinet assembly **64**, its drain tube **84** becomes mated with liquid pump inlet fitting **85**. An O-ring style seal **105** is used around the outside circumference of the drain tube **84** so that it can seal with the inlet fitting **85**. A stationary valve actuator pin **103** inside the pump inlet fitting **85** pushes against the liquid drain valve **104** inside the cartridge drain tube **84**, causing it to open and allows the liquid inside cartridge **78** to flow into the pump inlet fitting **85**. Once the pump assembly **83** is activated, liquid is drawn out of the cartridge **78** and is discharged through a liquid pump discharge fitting **87** where a flexible liquid discharge tube **86** then directs the liquid to the cartridge liquid mixing valve **94**, shown in **FIG. 24**.

**FIG. 19** also shows an electronic liquid level sensor **106** on the pump assembly **83** and a liquid level window pane **107** on the cartridge **78**. The pane **107** normally rests within very close proximity to the level sensor **106**. The window pane **107** portion of the cartridge **78** is made of a transparent material so that the sensor **106** can detect the level of the fluid inside the cartridge **78**. The level sensor **106** communicates with the control module **54** so that the fluid level can be known and displayed. The control module **54** could flash a lamp or provide a periodic audible beep to signal a low fluid level condition.

**FIG. 20** is an illustration of how a variety of standard design of replaceable water sprayers **58** can be installed onto the bidet water hose sprayer fitting **88**. This feature allow for user customization so that any desired sprayer can be utilized.

**FIG. 21** illustrates a view of the water temperature and computer controller **82** that is mounted on the end of the bidet water supply hose **59**. This electronic device contains a water temperature probe, a digital readout of the sprayer water temperature, switches and electronic circuits to control the water mixing valves **92**, **93** and **94**, shown in **FIG. 24**. A water temperature probe not only measures the temperature of the water for display to the user, but also allows feedback to the water temperature and computer controller **82** so that a constant water temperature output can be maintained. Electrical conductors are embedded inside the jacket of the bidet hose **59** that provides low voltage power to the device as well as provides control lines to the mixing valves. A user can simply pick a desired water temperature, and the controller **82** will then control the water mixing valves **92** and **93** to deliver the desired water temp, shown in **FIG. 24**. This device also allows the user to control the liquid cartridge mixing valve **94**. This allows a user to dispense the liquid from the cartridge **78** into the bidet sprayer at a desired measured amount. The user can allow the liquid to be mixed in with warm water for a perfect temperate spray, or can simply switch the mixing valves so that an undiluted liquid is dispensed to the sprayer **58**.

**FIG. 22** illustrates the bidet water hose **59** with temperature and computer controller **82** with a water sprayer **58** mounted onto it.

**FIG. 23** illustrates a water sprayer **58** with a nozzle **89** to demonstrate its removability and shows a standard nozzle **89** compared with an optional body cavity nozzle **90**. This cavity nozzle **90** can be disposable. This demonstrates how the bidet sprayer **58** can be used for the hygienic rinsing of body cavities.

**FIG. 24** is a diagram to illustrate the general construction of the current invention. Water flows under pressure from the bathroom cold water supply line **72** into a shut-off valve **95**. The water then flows through a water-T **102** connection whereby it communicates with a female quick-disconnect **71**. This female quick-disconnect is coupled with a male quick-disconnect **70** which then provides the internal components of the cabinet with pressurized cold water. A dashed line is shown around the water heater and mixing valves assembly **69** to illustrate the components inside. The water supply hose **100** supplies water to a water heater **91** and to a cold water mixing valve **92**. A hot water mixing valve **93** is attached to the output of the water heater **91**. The output from the cold water valve **92** and

hot water mixing valve **93** are fluidly connected together to allow precise mixing of the hot and cold water to achieve any desired water output temperature to the water sprayer **58**. An electronic controller **82** that contains a temperature water probe provides feedback and control to the mixing valves to provide a constant water temperature at the sprayer **58**. The mixed water supply then flows to a water hose reel **60**, which is a standard device to allow the water hose to be uncoiled and automatically recoiled back onto it. A bidet water hose **59** is connected to the reel **60** and is normally coiled around said reel **60**. The electronic controller **82** can be seen mounted on the end of the bidet water hose **59**, where the bidet water sprayer **58** is connected onto it.

**FIG. 24** also illustrates the connections of the cartridge based liquid dispenser apparatus and shows how the system can introduce a liquid into the bidet sprayer water stream. It consists of a refillable cartridge **78**, a pumping unit **83**, a liquid mixing valve **94** and electronic controller **82**. Note that the pumping unit **83** and mixing valve **94** could be built together as a single device, but is shown here as separate units for clarity. The pump assembly **83** sucks liquid from the bottom back end of the cartridge **78** and then pumps it under pressure to the mixing valve **94**. The electronic controller **82** allows full control over all three mixing valves, from full off to full to control the water temperature and amount of liquid flow from the cartridge **78** into the bidet sprayer **58**. This allows the user to dispense a diluted liquid from the cartridge **78** whereby it is mixed with a warm water supply from the cold water mixing valve **92** and hot water mixing valve **93**. It can also be dispensed full strength, whereby only the solution from the cartridge **78** is pumped to the bidet sprayer **58**.

**FIG. 24** also illustrates the third element of the invention, which is makes use of a commonly available hand-held hot-air hair blow-dryer **61**. A commonly available cord reel **55** is used which is a standard device to allow the blow-dryer's electrical cord **62** to be uncoiled and automatically recoiled back onto it. The cord reel **55** is connected to a power supply line **96** to supply household power to the blow-dryer **61**.

### **Drawings – Reference Numerals**

- 52** Water tank
- 53** Lid, Water tank
- 54** Controller, Computer
- 55** Reel, Blow-dryer Rewind
- 56** Rim
- 57** Guide, Mounting
- 58** Sprayer, Hand-held Water
- 59** Hose, Water Supply
- 60** Reel, Water Hose Rewind
- 61** Blow-dryer
- 62** Cord, Blow-dryer Power
- 63** Assembly, Bidet Modular Cabinet
- 64** Assembly, Bidet with Cartridge Based Liquid Dispenser and Blow-Dryer Modular Cabinet
- 65** Assembly, Bidet with Cartridge Based Liquid Dispenser Modular Cabinet
- 66** Assembly, Bidet with Blow-dryer Modular Cabinet
- 67** Assembly, Cartridge Based Liquid Dispenser Modular Cabinet
- 68** Assembly, Blow-dryer Modular Cabinet
- 69** Assembly, Water Heater and Mixing Valve
- 70** Inlet, Water Quick Disconnect (Male)
- 71** Outlet, Water Quick Disconnect (Female)
- 72** Line, Water Supply
- 73** Plug, Power
- 74** Receptacle, Reel Power
- 75** Vent, Air
- 76** Receptacle, Power Inlet
- 77** Cartridge, Disposable Liquid
- 78** Cartridge, Refillable Liquid
- 79** Cap, Refillable Cartridge

- 80** Label, Cartridge
- 81** Partition, Bidet
- 82** Control, Water Temperature and Computer
- 83** Assembly, Liquid Dispensing Pump
- 84** Tube, Cartridge Drain
- 85** Fitting, Liquid Pump Inlet
- 86** Tube, Liquid Pump Outlet
- 87** Fitting, Liquid Pump Outlet Hose
- 88** Fitting, Water Sprayer
- 89** Nozzle, Detachable Sprayer
- 90** Nozzle, Body Cavity
- 91** Heater, Water
- 92** Valve, Water Mixing (Cold Water)
- 93** Valve, Water Mixing (Hot Water)
- 94** Valve, Water Mixing (Cartridge)
- 95** Valve, Water Supply Shutoff
- 96** Cord, Power Supply
- 97** Door, Swing (Bidet)
- 98** Door, Swing (Cartridge)
- 99** Door, Swing (Blow-dryer)
- 100** Hose, Water Supply (to Bidet)
- 101** Hose, Water Supply (to Toilet Water Tank)
- 102** Water-T
- 103** Pin, Valve Actuator
- 104** Valve, Liquid Drain
- 105** Seal, O-ring
- 106** Sensor, Liquid Level
- 107** Pane, Cartridge Liquid Level Window
- 108** Guide, Cartridge Alignment and Support
- 109** Valve, Pressure Relief

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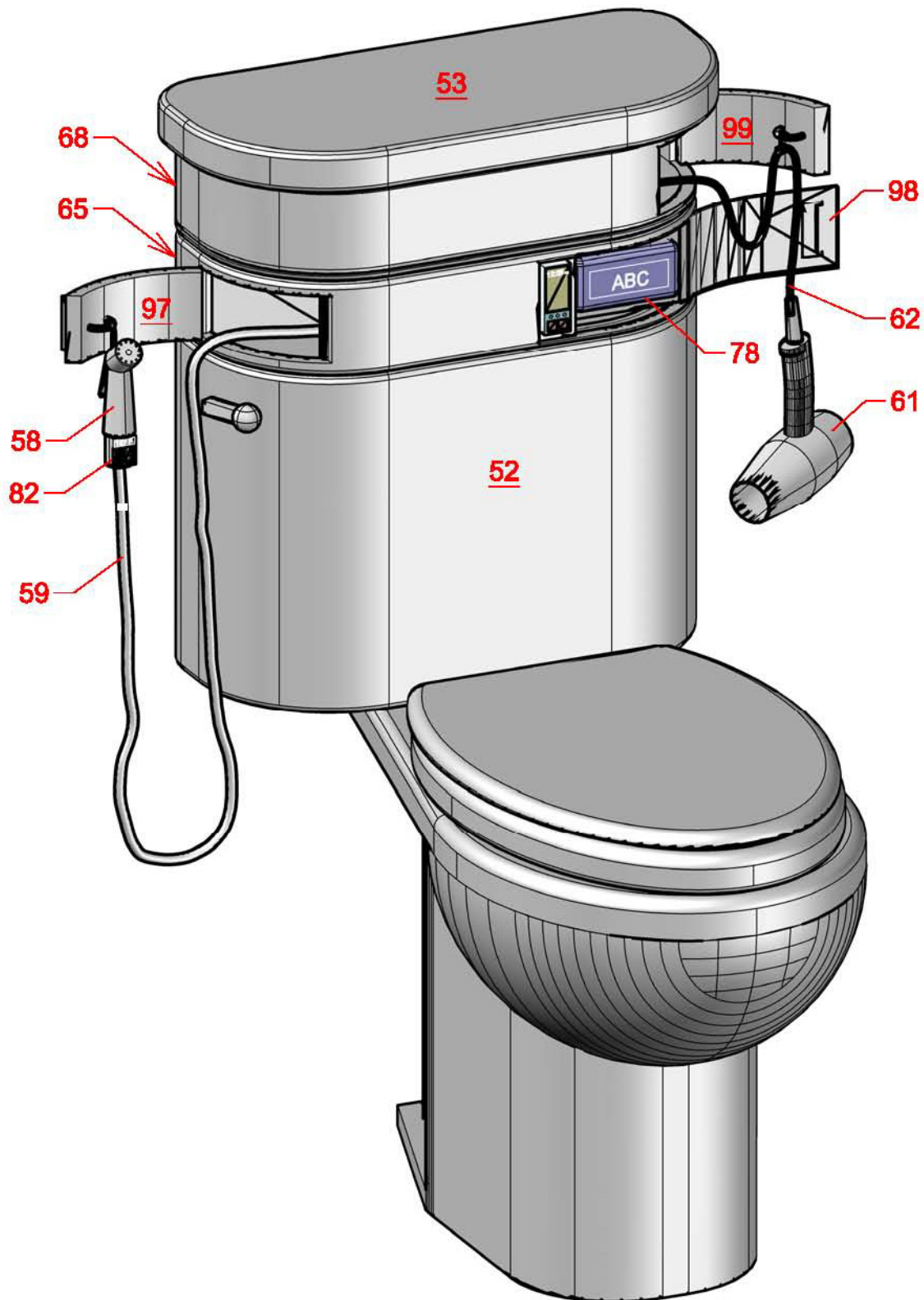


FIG. 1



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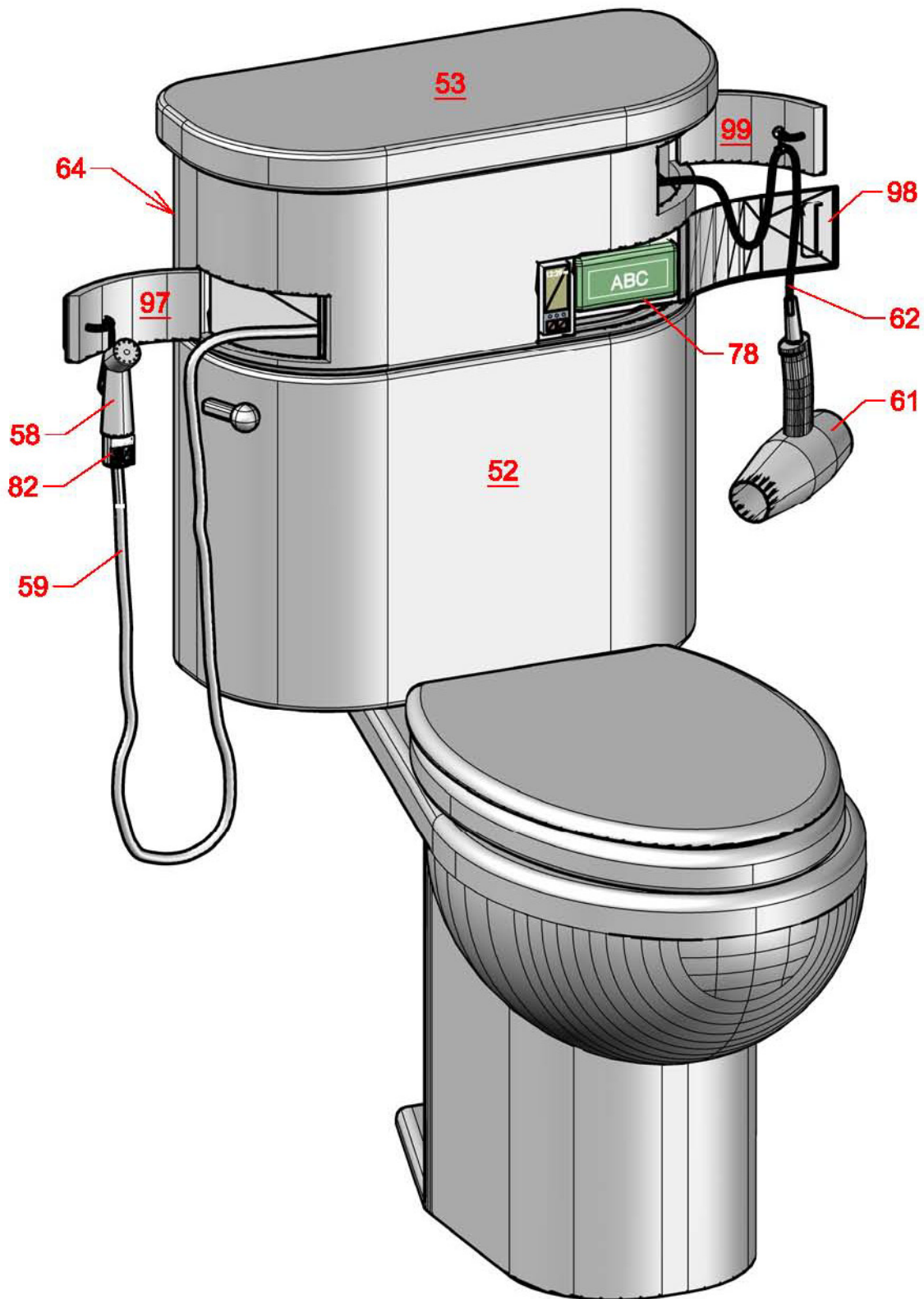


FIG. 2

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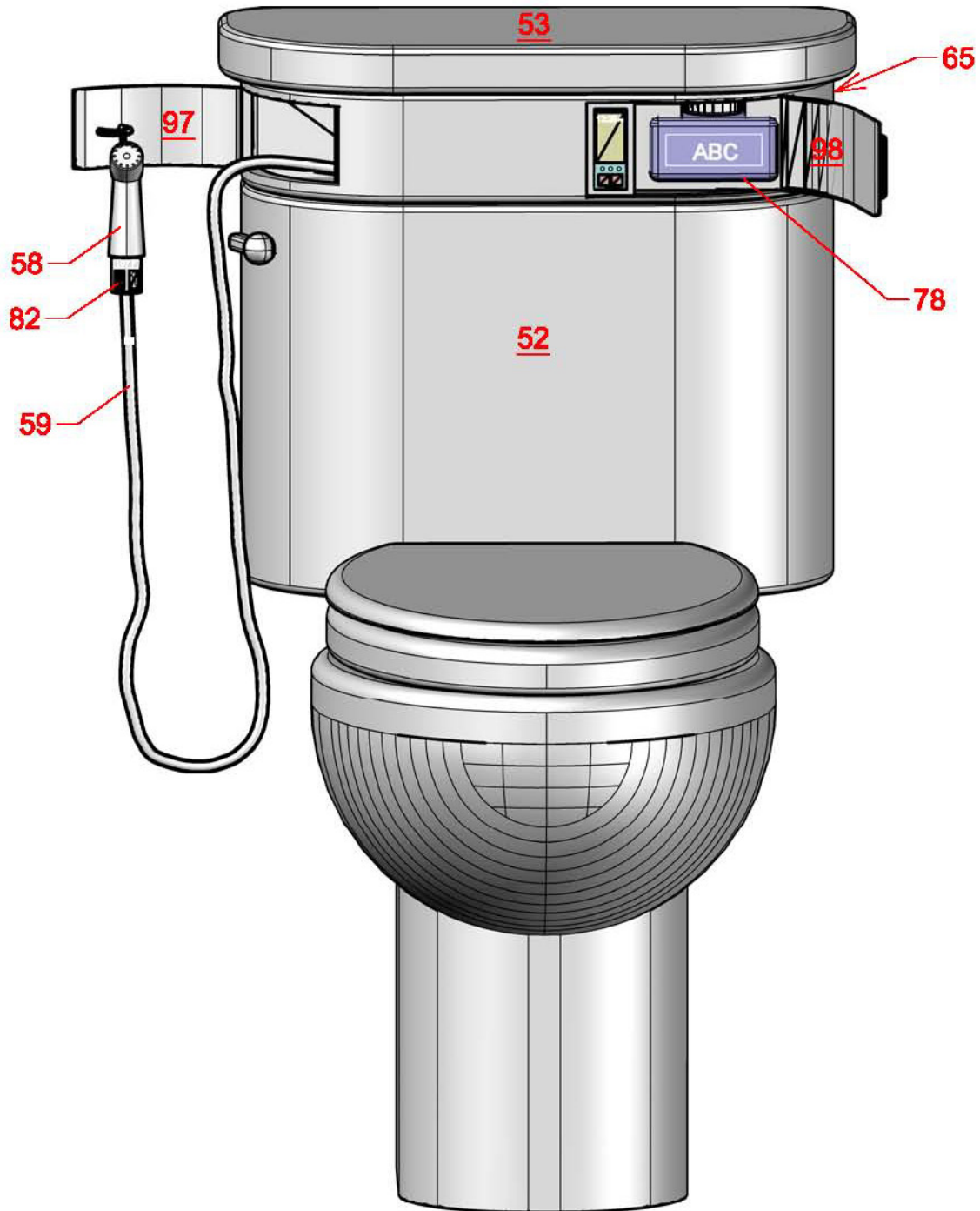


FIG. 3

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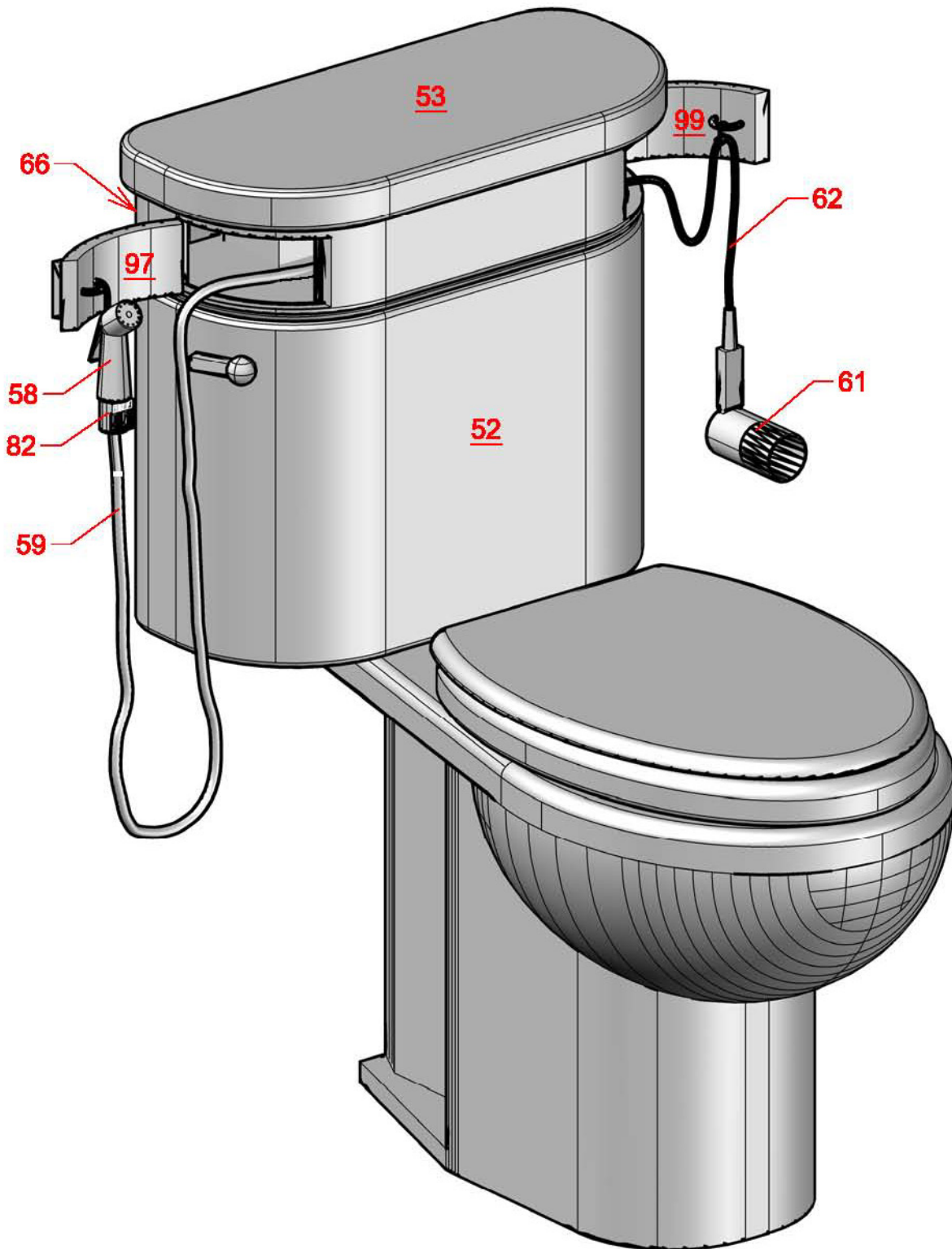


FIG. 4

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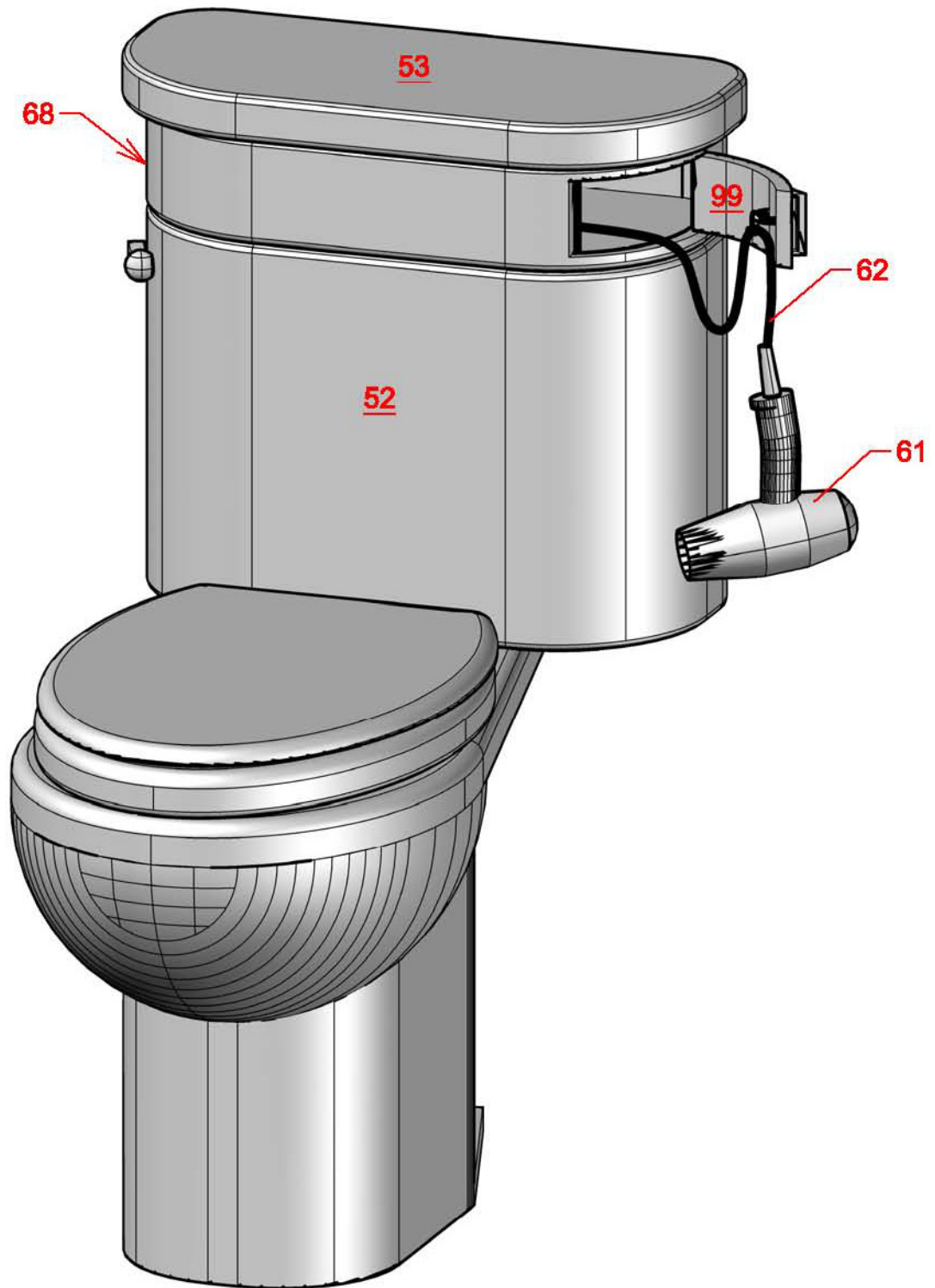


FIG. 5

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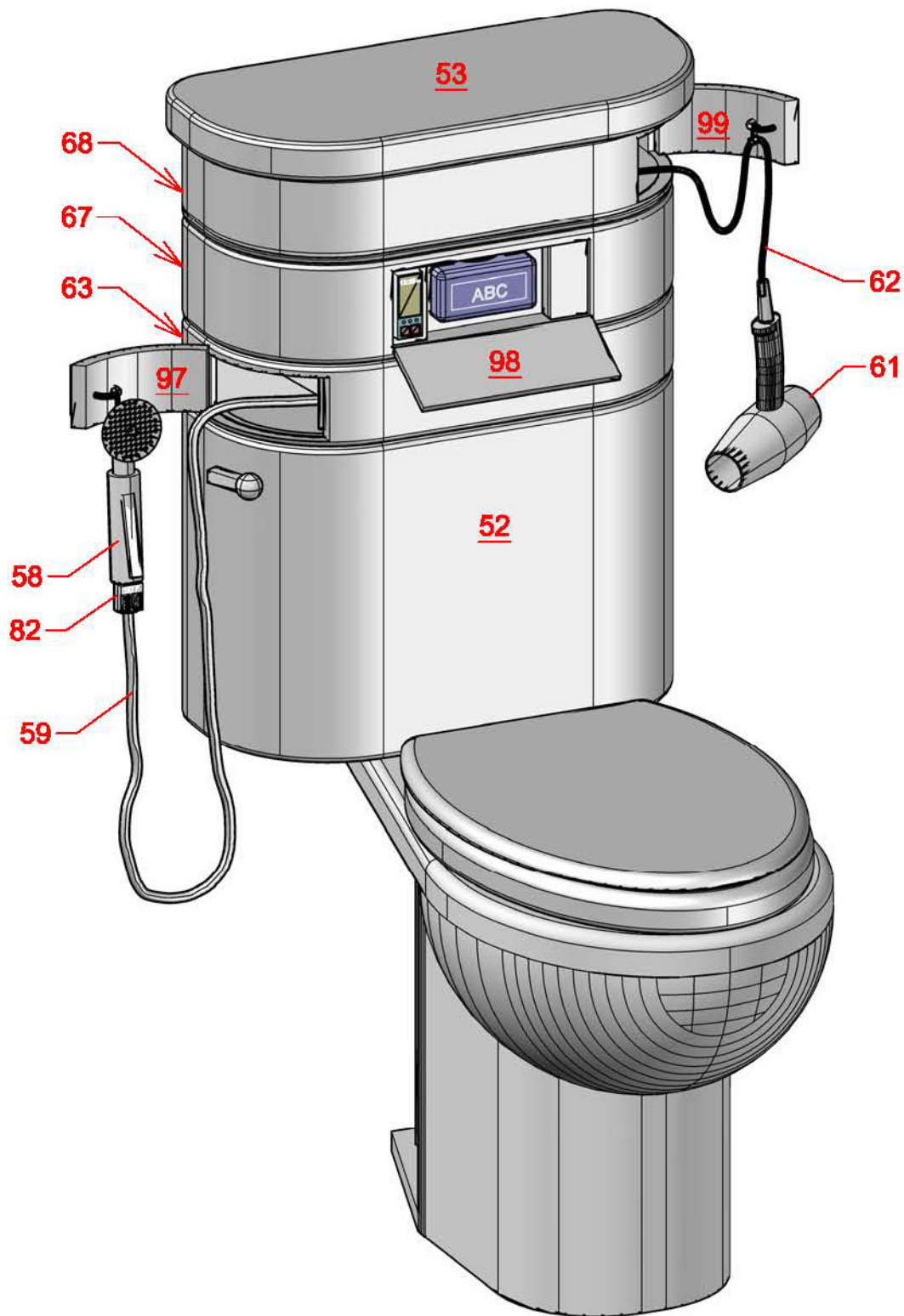


FIG. 6



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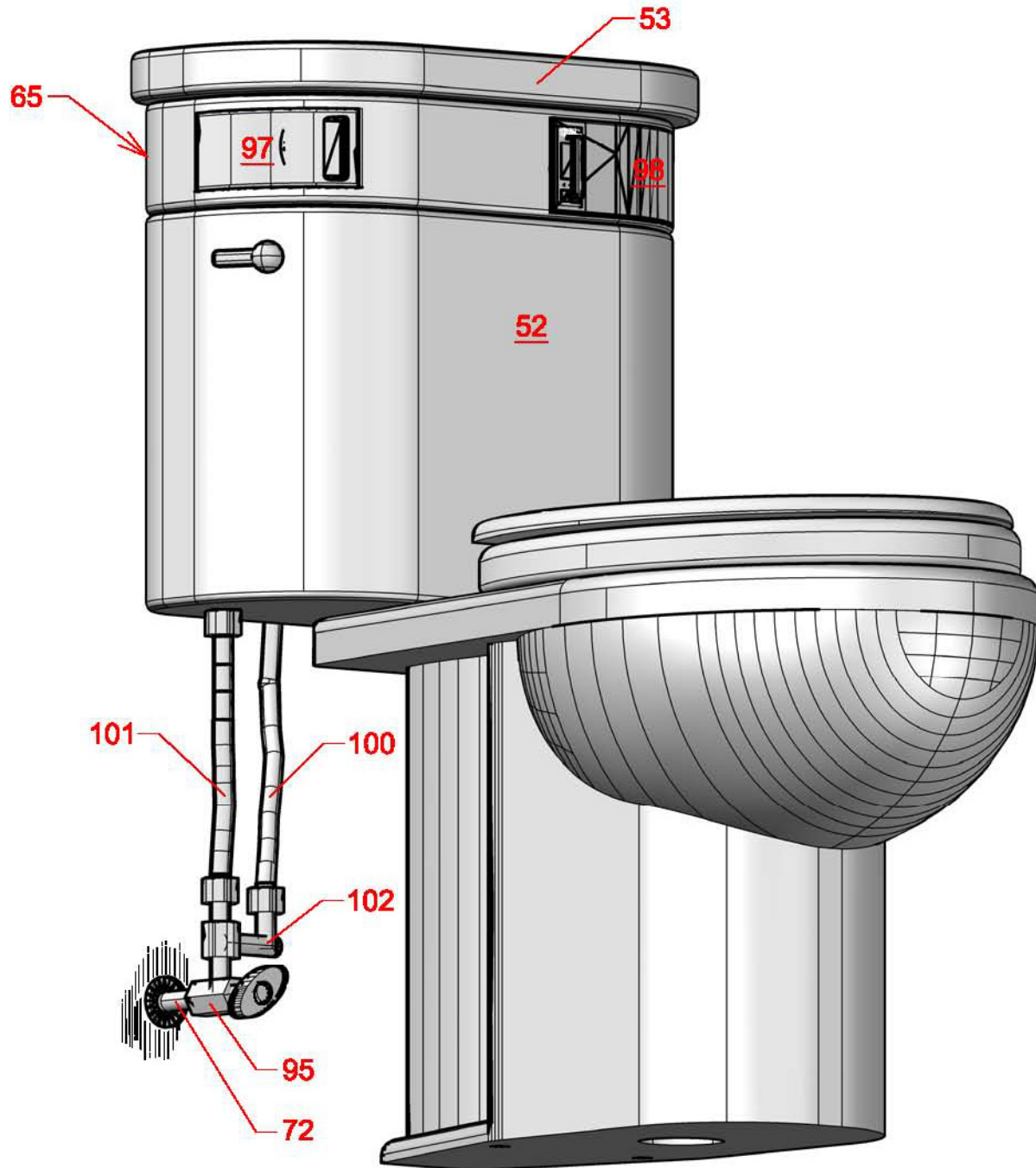


FIG. 7

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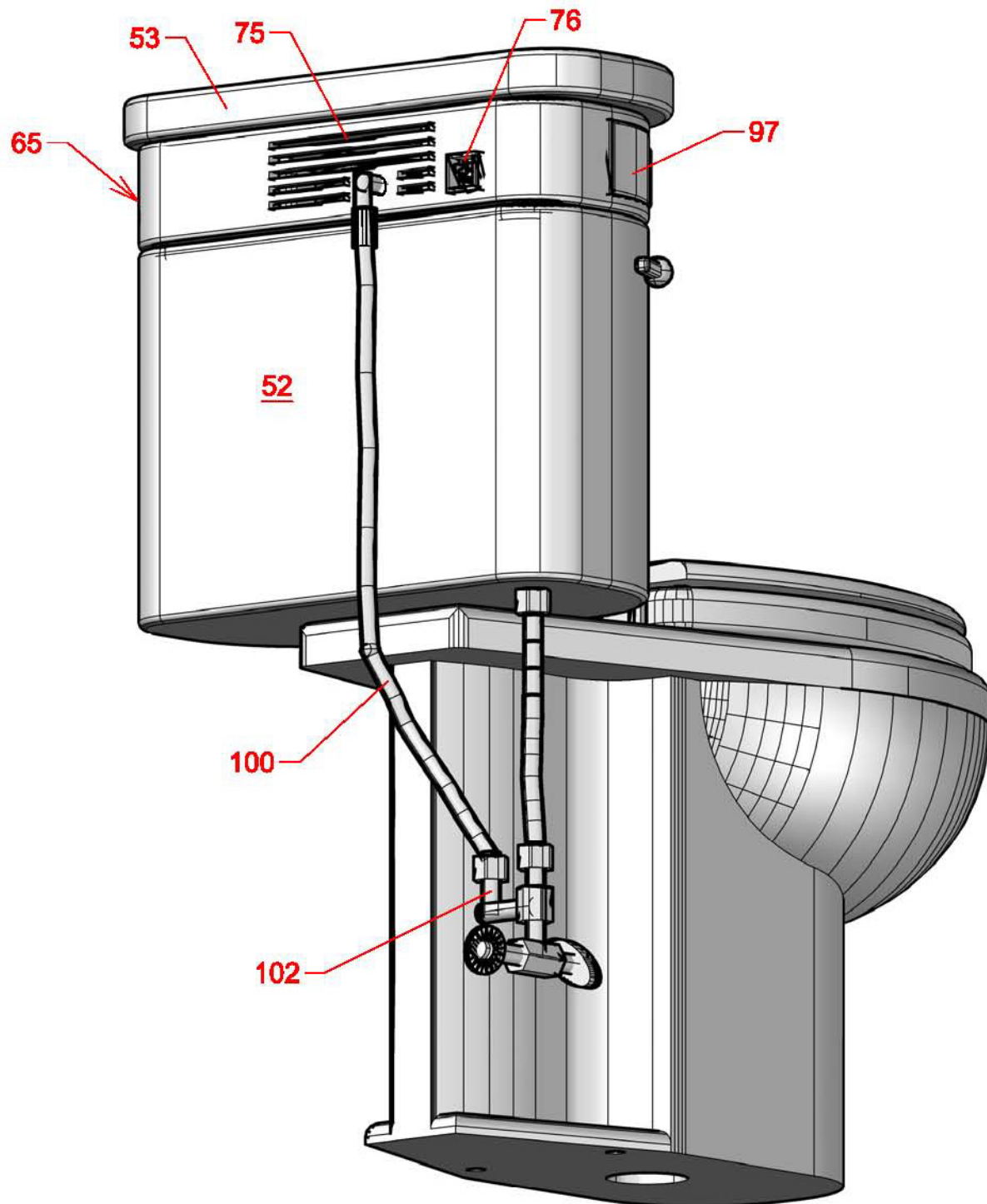


FIG. 8

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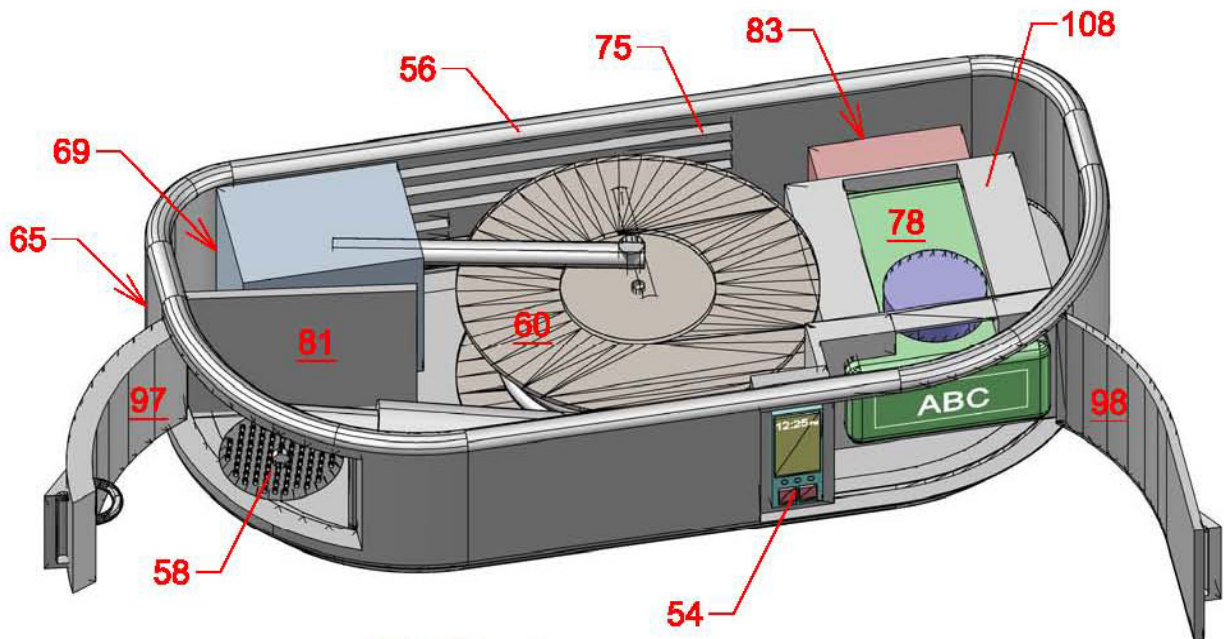


FIG. 9

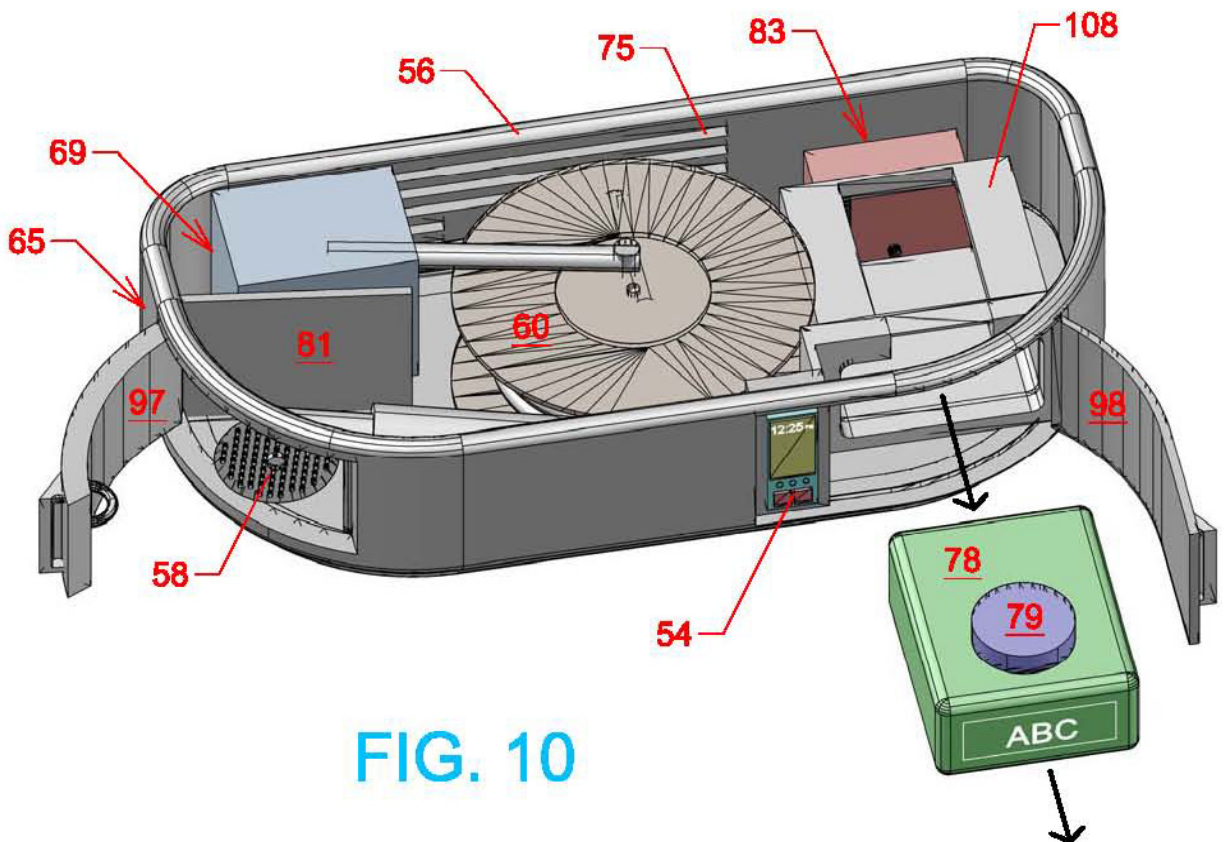


FIG. 10



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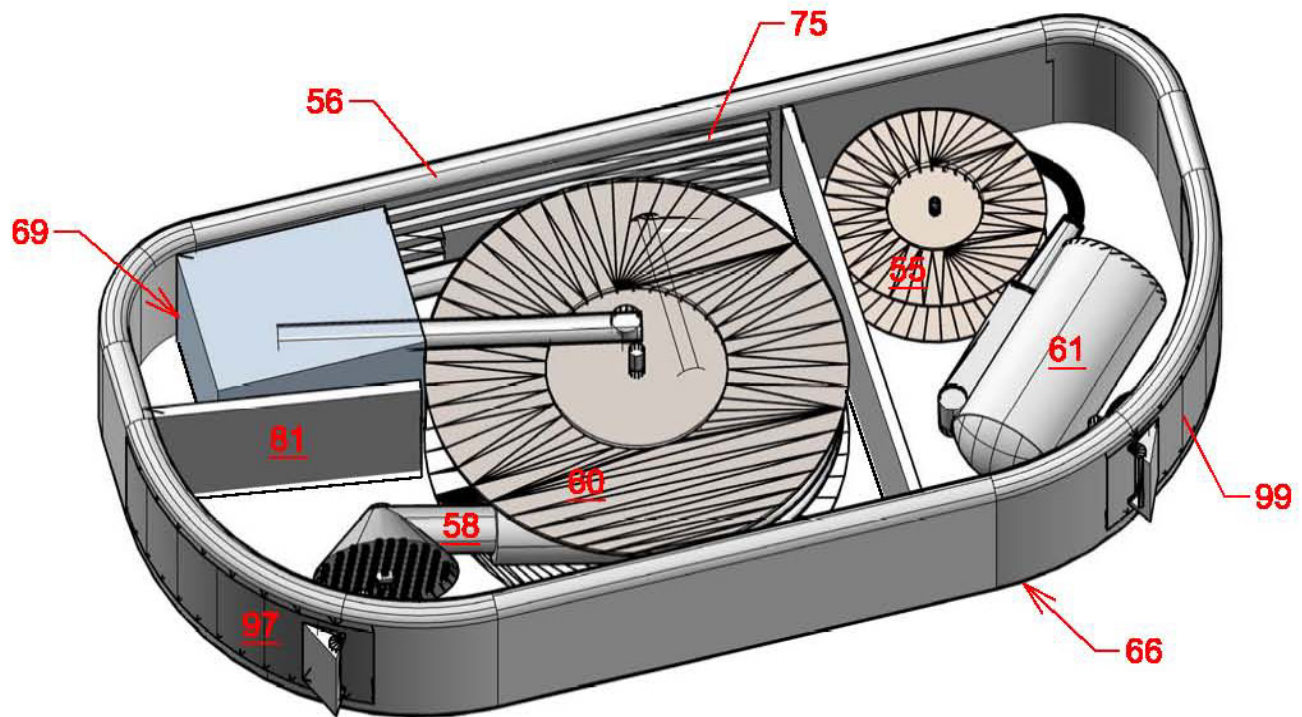


FIG. 11

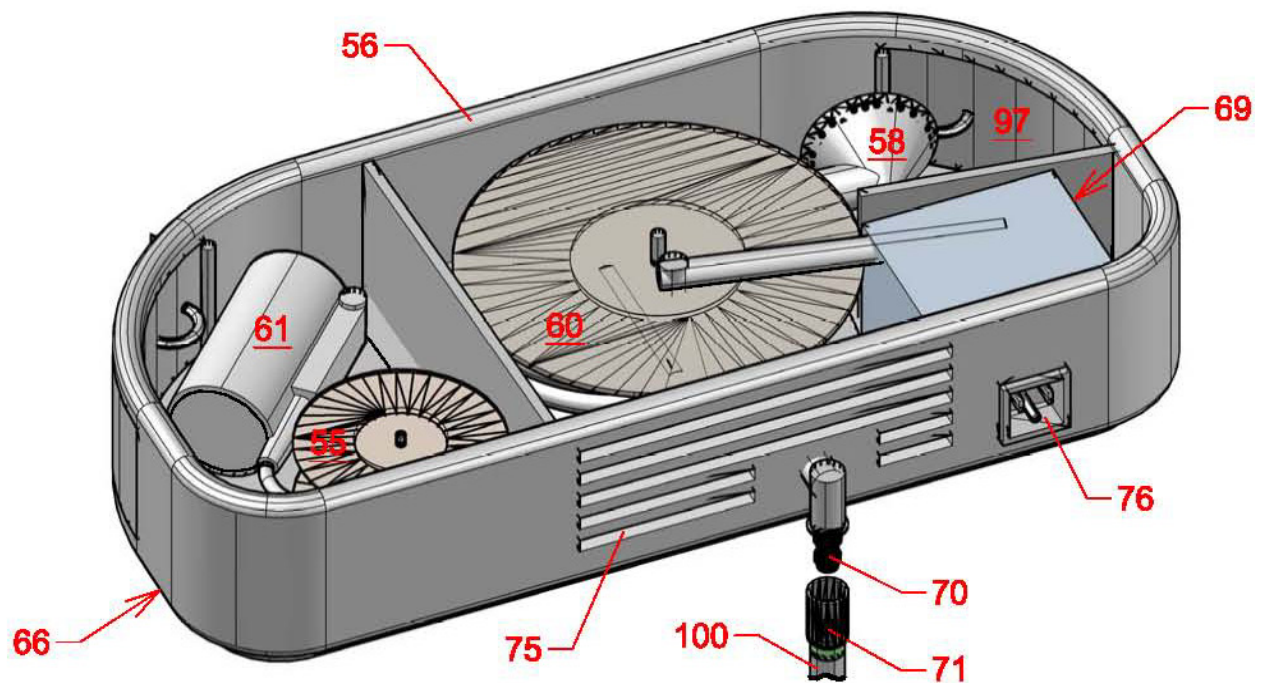


FIG. 12

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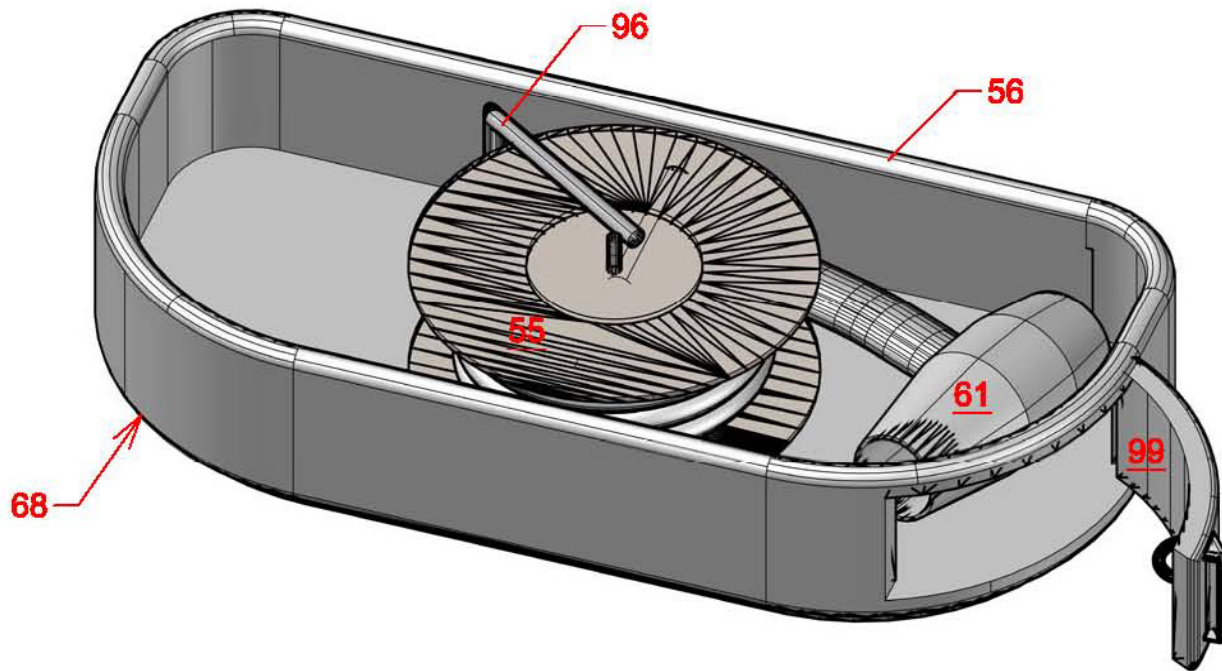


FIG. 13

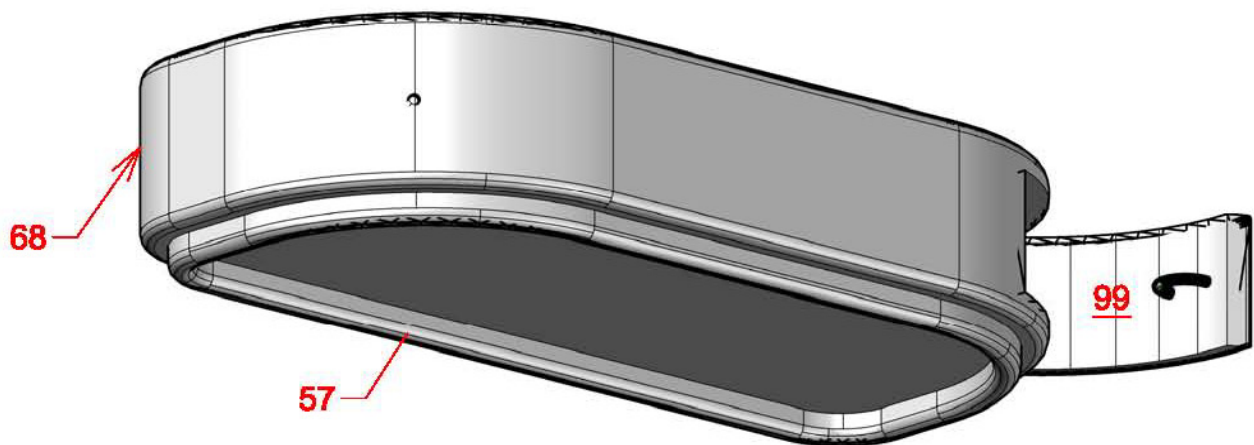


FIG. 14



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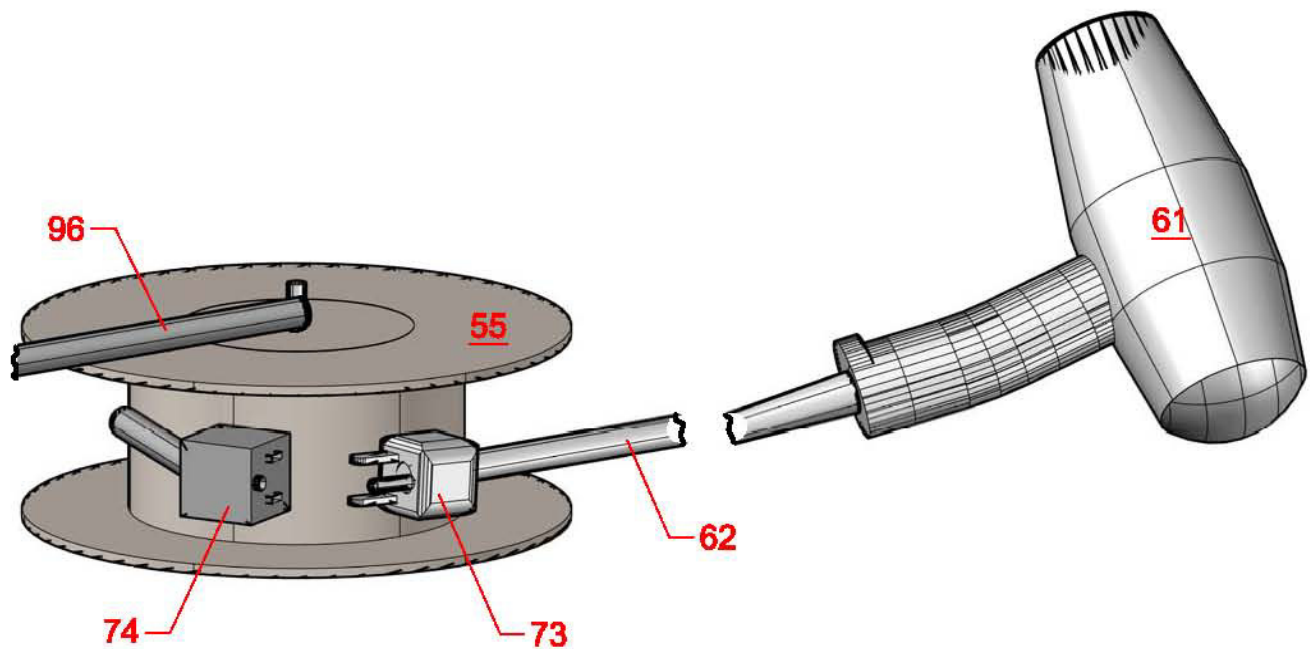


FIG. 15

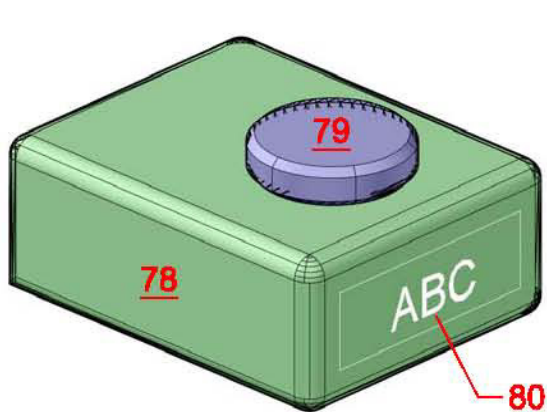


FIG. 16

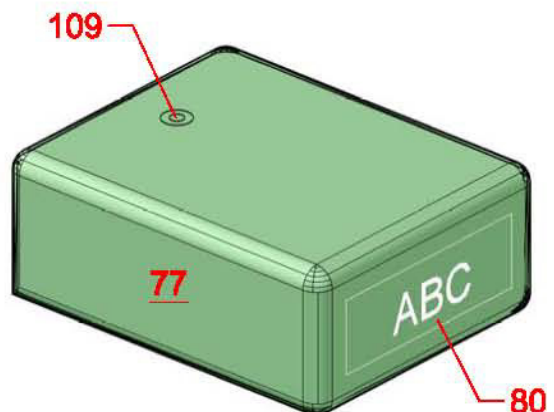


FIG. 17

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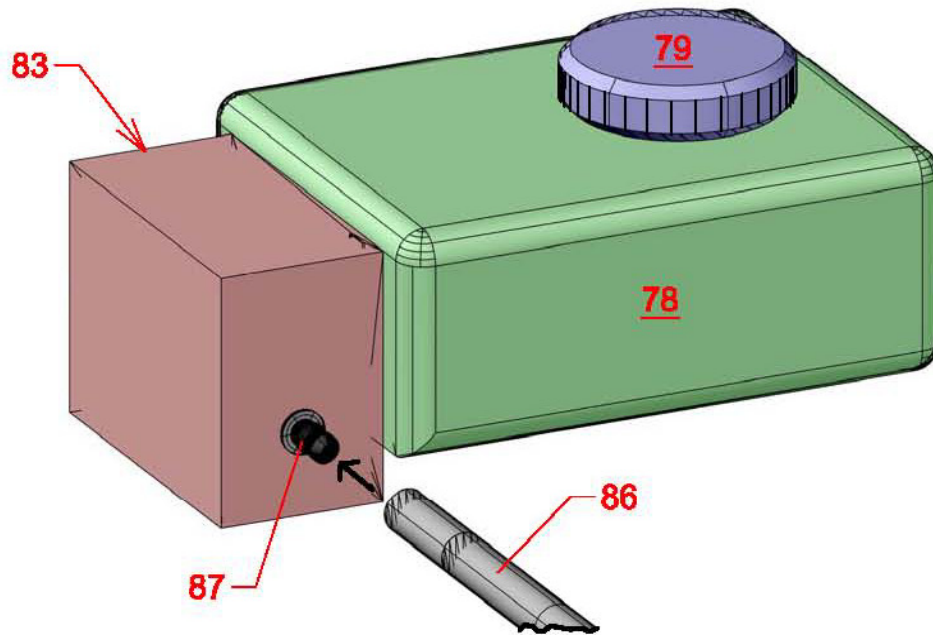


FIG. 18

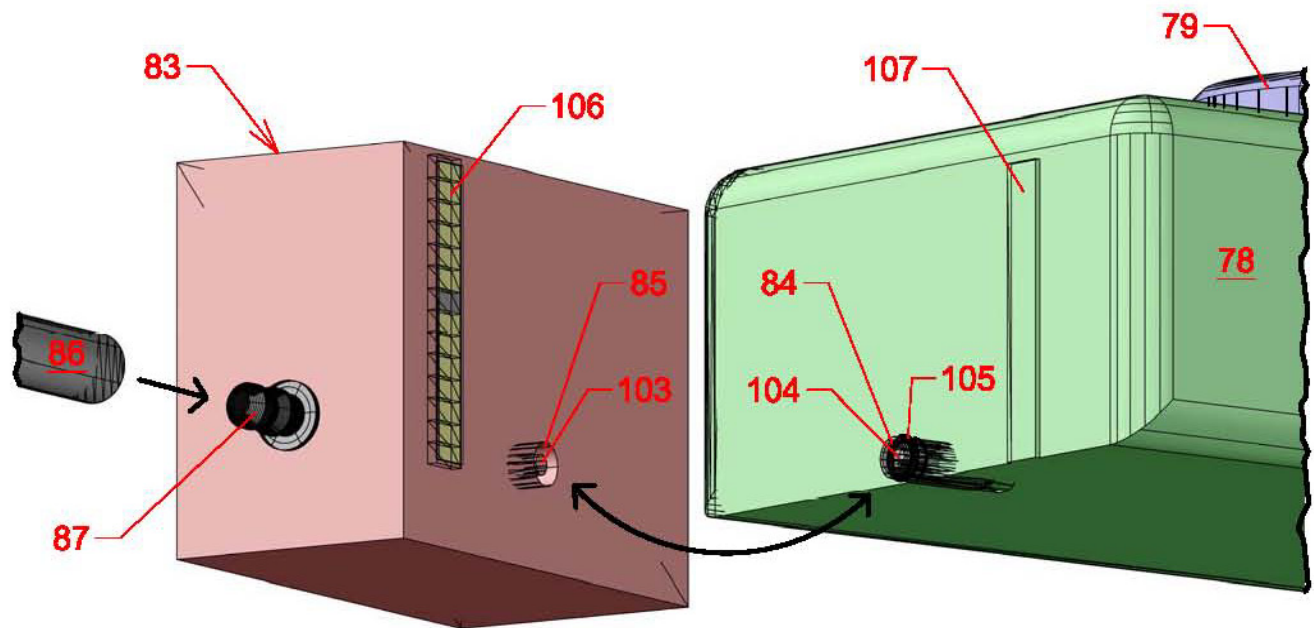


FIG. 19

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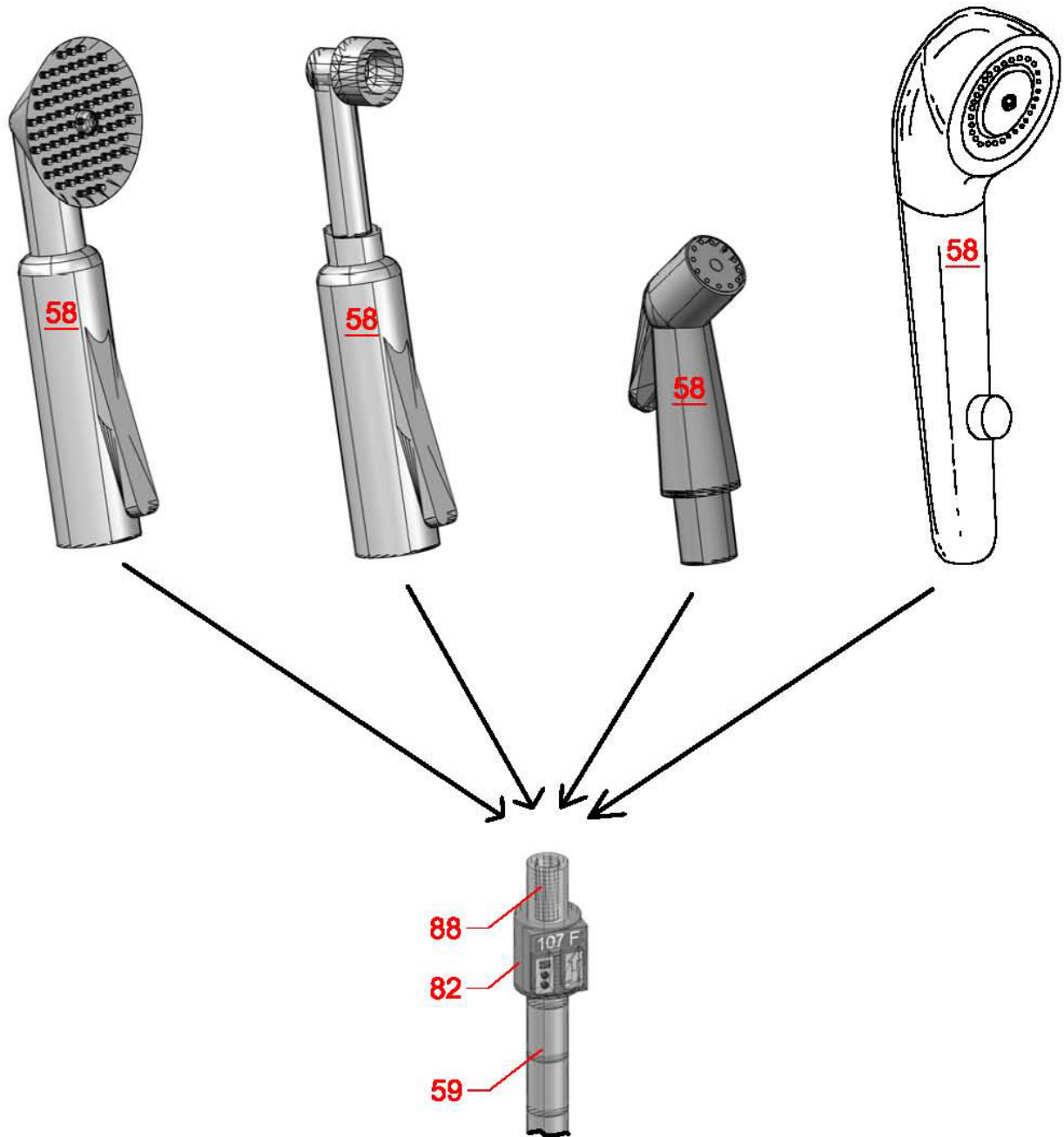


FIG. 20

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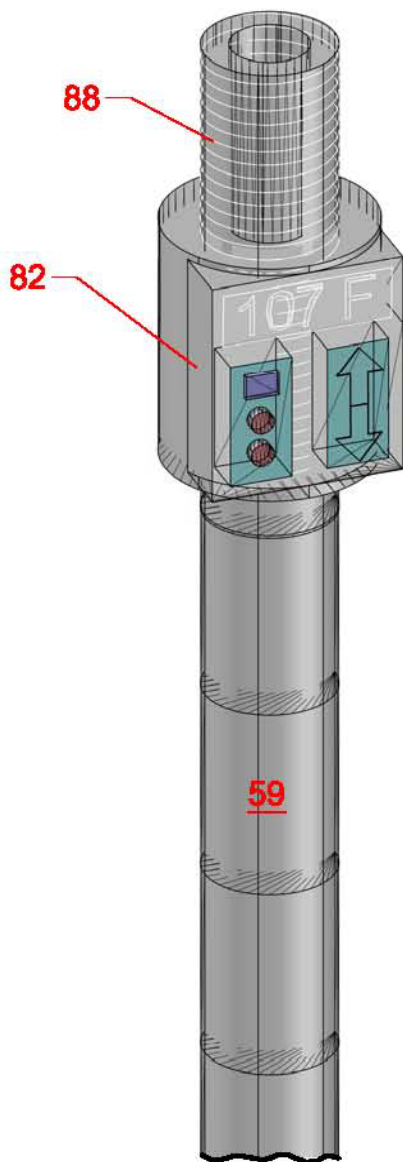


FIG. 21

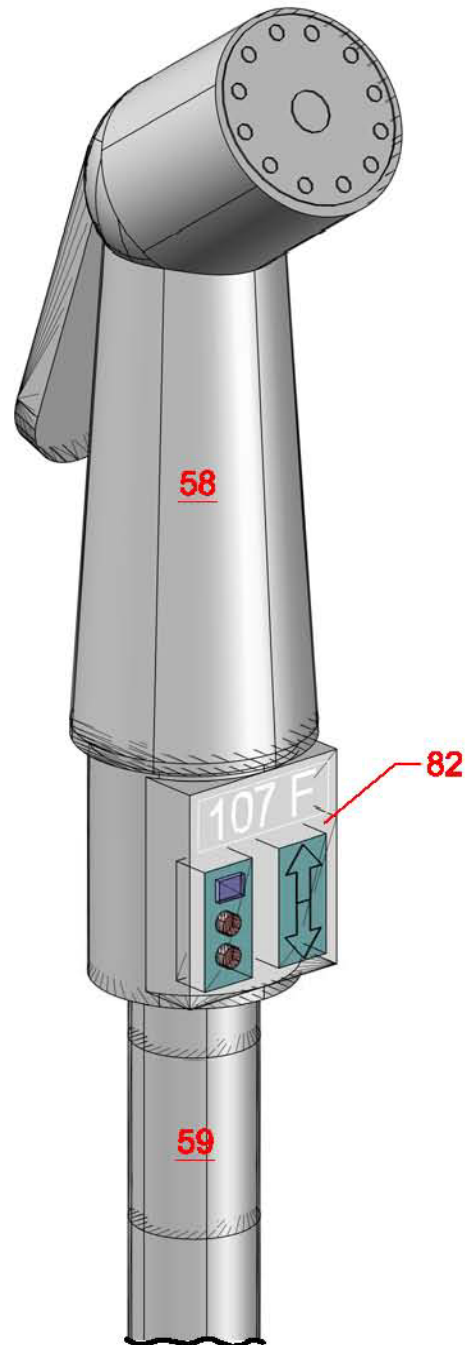


FIG. 22

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FIG. 23



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