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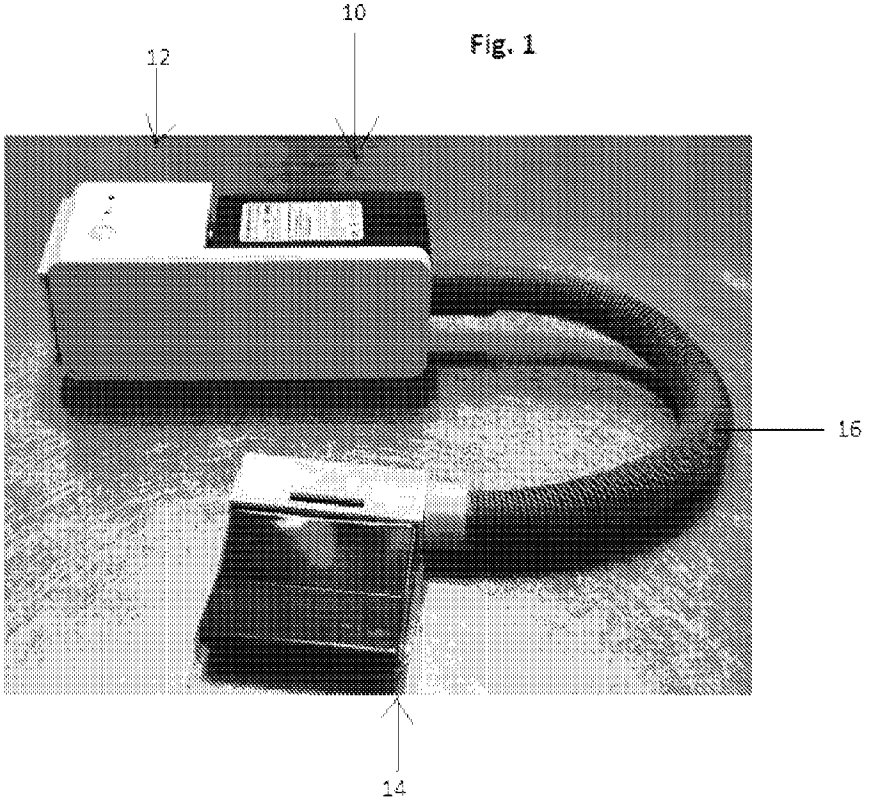
(54) Titre : ENSEMBLE DE FILTRATION POUR REDUIRE LES MAUVAISES ODEURS DANS L'AIR ET LES DECHETS AEROSOLISES PROVENANT DE TOILETTES

(54) Title: FILTRATION ASSEMBLY FOR REDUCING MALAODORS IN AIR AND AEROSOLIZED WASTE FROM TOILETS

Fig. 1



(57) Abrégé/Abstract:
An assembly for filtering toilet bowl odors including a first housing respectively disposed in spaced relation to and in fluid communication with the toilet bowl. A conduit connects interiors of the first and second housings in fluid communication with one

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(57) Abrégé(suite)/Abstract(continued):
another. A fan assembly is mounted within said first housing in fluid communicating relation with second housing, via the conduit, and is disposed and structured to define a path of fluid flow extending from an inlet of said second housing, through said conduit and a filter assembly, disposed in the first housing and/or second housing, to the exterior of said first housing, concurrent to activation of the fan assembly.

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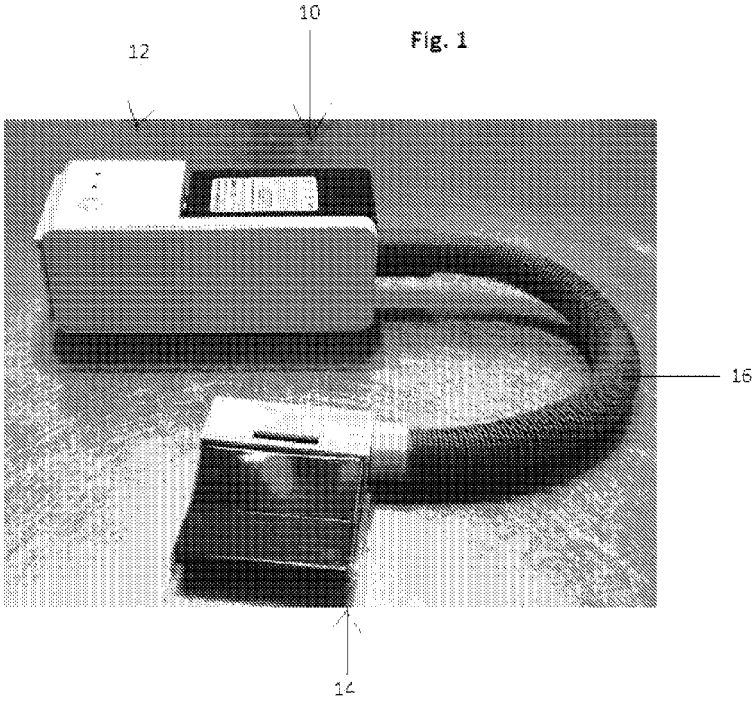
Fig. 1



(57) Abstract: An assembly for filtering toilet bowl odors including a first housing respectively disposed in spaced relation to and in fluid communication with the toilet bowl. A conduit connects interiors of the first and second housings in fluid communication with one another. A fan assembly is mounted within said first housing in fluid communicating relation with second housing, via the conduit, and is disposed and structured to define a path of fluid flow extending from an inlet of said second housing, through said conduit and a filter assembly, disposed in the first housing and/or second housing, to the exterior of said first housing, concurrent to activation of the fan assembly.

[Continued on next page]

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FILTRATION ASSEMBLY FOR REDUCING MALAODORS IN AIR AND AEROSOLIZED WASTE FROM TOILETS

BACKGROUND OF THE INVENTION

Claim of Priority

The present application claims priority to previously filed U.S. Patent Application having Serial No. 16/362,063, filed on March 22, 2019, which claims priority to a Continuation-In-Part application of previously filed, now pending application having U.S. Application No. 15/909,344, which was filed on March 1, 2018, to which a claim of priority is made under 35 U.S.C. Section 119(e) to a provisional patent application having U.S. Application No. 62/465,963, which was filed on March 2, 2017, and which are incorporated herein by reference.

A further claim of priority is made under 35 U.S.C. Section 119(e) to a provisional patent application that is currently pending in the U.S. Patent and Trademark Office, namely, that having U.S. Application No. 62/726,624, which was filed on September 4, 2018, and which is incorporated herein by reference.

Field of the Invention

This invention is directed to an assembly for the filtration and other processing of air and aerosolized fluid issuing from the interior of a toilet bowl.

DESCRIPTION OF THE RELATED ART

The odor of human waste released by people into a toilet bowl can enter the general surrounding area and remain suspended during toilet use and for periods of time post toilet use. This can be unpleasant to the present toilet user, to others located in the nearby environment, or to others that enter the area later to use the same toilet.

Air purifiers and air filters are widely used in interior spaces such as homes and offices to minimize the amount of dust, allergens, and micro-organisms that are present in the air. These systems typically include a fan for circulating air and a mechanical filter disposed in an air path to filter or purify air flowing there through. Larger fans, air purifiers and/or air filters tend to be more effective due to the large volume of air they can remove, filter and/or purify at a given time. However, larger units of this type are usually obtrusive and take up a considerable amount of space in the home or office. Further, these larger systems may require more electricity and are often loud due to the size of the fans included in the system.

Although fans, air purifiers and air filters may provide a solution to combating the presence of contaminants such as dust, allergens and micro-organisms, they may lack the means to effectively remove the odors from the air. Individuals are well aware of the offensive odors that may be released from flatulence, feces, or urine. These odors can be disruptive and unpleasant to individuals located in the vicinity of such odors. When unpleasant odors are present in the air, individuals usually commonly use air freshener sprays, plug in air fresheners or the like, to "cover-up" the unpleasant odor with a more pleasant scent. However, this tactic merely masks the presence of the unpleasant odor and does nothing to actually remove the odor.

Additionally, the use of air fresheners or sprays presents an unfortunate problem because an individual must first come in contact with the unpleasant odor before these devices can be used to mask the scent. Furthermore, while the scent of air fresheners, sprays, etc. may provide a more pleasant odor, as compared to odors released from flatulence, feces or urine, some individuals may not enjoy still not enjoy or even be able to tolerate such fragrances.

Accordingly, there is a need for an air filter and/or odor processing assembly and/or system operative to withdraw, filter and otherwise treat or process odors, specifically including those emanating from flatulence, defecation and/or urination, directly from a toilet bowl airspace. Treatment of such odors thereby eliminate or significantly reduce the release thereof into the

surrounding airspace. Such processing and/or treatment of such odors may include passing air or aerosolized fluid containing such odors across a filter assembly operatively structured to absorb the odors. In addition, a proposed assembly and/or system of the type referred to may also include a filter assembly capable of removing aerosolized particles contained in a "toilet plume".

Moreover, the treatment or processing of fluid removed from the interior of a toilet bowl may also include sterilizing capabilities operative to remove germs, bacteria, etc. prior to reaching the air or space surrounding the toilet. In addition, modification of certain structural and operative features may serve to enhance the versatility of an improved odor elimination assembly and/or system, thereby enabling its use in both domestic and commercial environments. Finally, a proposed and improved toilet odor processing assembly and or system which overcomes known disadvantages of the type set forth above, should be designed to be inexpensive, easily serviceable and convenient enough to change install and maintain.

SUMMARY OF THE INVENTION

The present invention is directed to an assembly for filtering/removing odors issuing from a toilet bowl. In addition, one or more preferred embodiments of the filter assembly is operative to filter/remove odors from air as well as processing aerosolized fluid, resulting from a "toilet plume" which may develop when the toilet is flushed. As will be explained in greater detail hereinafter, different ones of a possible plurality of embodiments of the filtering assembly may be structurally and operatively adapted for use in either a domestic environment or commercial environment and/or both.

Accordingly, at least one preferred embodiment of the present invention comprises a first housing disposed in spaced relation to the toilet bowl and having a fan assembly disposed therein. A second housing is disposed in adjacent relation to the toilet bowl and includes an inlet disposed in fluid communication with the toilet bowl interior. The second housing includes a filter

segment and a connector segment removably connected to one another, wherein a filter is fixedly disposed and retained within the filter segment. Moreover, the fixedly retained filter is disposed adjacent to and/or otherwise downstream of the inlet, in receiving relation to fluid passing into the interior of the filter segment of the second housing through the inlet.

An elongated conduit is disposed in interconnecting, fluid communicating relation between interiors of the first and second housings. The elongated conduit is disposed and structured to direct the flow of fluid entering the second housing through the inlet and retained filter in the filter segment, through the interior of the connecting segment and along the length of the conduit into first housing. Accordingly, a path of fluid flow is established from the inlet, through the filter in the filter segment of the second housing, through the connector segment, along the length of the conduit and into and through the interior of the first housing, concurrent to activation of the aforementioned fan assembly, within the first housing.

Further, the fan assembly is disposed and structured, when activated, to direct fluid flow from the interior of the first housing outwardly therefrom to an exterior thereof. As a result, air/fluid passing into the second housing, through the aforementioned inlet will be sufficiently processed, at least in terms of removing or significantly eliminating odor contained therein, for subsequent entry back into the space or area surrounding the toilet.

Additional structural and operative features of at least one embodiment of the filtering assembly includes the aforementioned fan assembly, being disposed in the first housing and comprising at least one or in the alternative a plurality of fan units. As such, when activated, the one or more fan units are individually and/or collectively disposed to direct fluid flow along the path of travel from the interior of the second housing, through the conduit, and through and outwardly from the interior of the first housing.

As indicated, the filter segment and the connector segment collectively and at least partially defining the second housing are removably connected to one another, such that the

interiors thereof are in direct fluid communication. The removable connection therebetween preferably comprises, but is not limited to, an inner end of both the filter segment and connector segment being cooperatively structured to accomplish removable attachment to one another. Moreover, in at least one embodiment cooperative structural features of the inner ends of the filter and connector segments of the second housing facilitate a telescopic connection therebetween as well as a "snap-fit" attachment. This enables a quick and easy detachment from one another.

In association therewith, another practical advantage of this embodiment of the filter assembly includes the filter segment and the fixedly retained filter therein being collectively detached from the connector segment and structured for disposal after a predetermined period of use. A new filter segment and enclosed filter may then the connected to the existing and/or same connector segment for continued and prolonged use of the remainder of the filter assembly.

In order to facilitate packaging, shipping, installation and maintenance of the filter assembly, the elongated conduit may be removably attached to both the first housing and to the second housing, the latter via the connector segment.

Yet additional features may include the inclusion of a secondary filter disposed within the interior of the first housing and further positioned upstream of the fluid entering the first housing through the conduit and downstream of the fan assembly. As a result, additional filtering of the fluid passing into the inlet of the filter segment of the second housing and therefrom along the conduit into the first housing will be additionally filtered to further facilitate removal of odor. A scent releasing structure or device may also be included, preferably, but not necessarily, within the first housing.

The above noted embodiment of the filter assembly for home use, in a domestic environment, may include a manual on/off user interface. Such interface may be preferably disposed in an exposed location on the exterior of the first housing. Further control circuitry may

be contained in the first housing, in the form of a printed circuit board or other appropriate control circuitry. Further, the control circuitry may include time delay capabilities facilitating the automatic turnoff of the fan assembly after the expiration of a predetermined period of time from its manual activation. In the alternative and or in addition thereto the manual on/off user interface may be manipulated to extend the activation of the fan assembly or to cease activation thereof before the predetermined time period has elapsed. In cooperation therewith, this embodiment may preferably be operated by and appropriately powered battery pack, in order to facilitate quick and easy installation, maintenance, etc.

One or more additional embodiments of the filter assembly of the present invention may be structurally and operatively similar to the above described embodiment, but may be more adapted for use in a commercial environment. As such, the additional one or more embodiments of the filter assembly includes a first housing disposed in spaced relation to the toilet bowl and including a filter assembly contained therein. A second housing is disposed adjacent the toilet bowl and includes an inlet disposed in fluid communicating relation with the interior of the toilet bowl. An elongated conduit may be disposed in interconnecting, fluid communicating relation between the interiors of the first and second housings.

Further, a fan assembly is mounted within the first housing in fluid communication with the conduit and through the conduit, in fluid communication with the interior of the second housing and the inlet associated therewith. Therefore, the fan assembly is disposed and structured to direct fluid flow from the conduit through the interior of the first housing and outwardly therefrom to an exterior of the first housing, subsequent to being processed. Accordingly, an activation of the aforementioned fan assembly, within the interior of the first housing, defines or establishes a path of fluid flow extending from said inlet of the second housing, through the conduit and into the interior of the first housing, through the filter assembly, to the exterior of the first housing and back into the space, area or environment surrounding the toilet.

Yet additional features of the additional one or more embodiments of the filter assembly, which may render it more adaptable for use in a commercial environment, comprises the filter assembly including a first filter unit and a second filter unit, both located upstream of the conduit and downstream of the fan assembly. The first filter unit may be a carbon-based filter primarily operative to remove odors from air/gas passing there through. The second filter unit of the filter assembly is preferably structured to process aerosolized fluid and any particulate matter contained therein and may be comprise an HEPA filter. As indicated, aerosolized fluid may result from the toilet being flushed and the creation of a "toilet plume", possibly containing odor causing particulate waste material.

In addition to the filter assembly including, the first and second filter units, a fluid sterilizing assembly may be disposed within the first housing, upstream of the conduit and downstream of the fan assembly. The sterilizing assembly may comprise at least one or in the alternative a plurality of ultraviolet (UV) lights disposed in the path of fluid flow exiting from the aforementioned filter assembly, or otherwise passing through the interior of the first housing.

Possible installation and use of this additional embodiment of the filter assembly of the present invention may include the inclusion of a sensor assembly such as, but not limited to a motion sensor. The sensor assembly may be preferably mounted on the first housing and be positioned/oriented to detect the presence of an individual utilizing the toilet. The sensor assembly may be further structured to activate the fan assembly while an individual remains in a predetermined detection zone. Automatic shutoff of the fan assembly will result upon an absence of an individual from the aforementioned detection zone. Powering of the fan assembly may best be accomplished by a direct wired connection to a conventional AC power source typically associated with most commercial locations which include restrooms and or semi-public toilet facilities.

These and other objects, features and advantages of the present invention will become

clearer when the drawings as well as the detailed description are taken into consideration.

BRIEF DESCRIPTION OF THE DRAWINGS

For a fuller understanding of the nature of the present invention, reference should be had to the following detailed description taken in connection with the accompanying drawings in which:

Figure 1 is a perspective view of one embodiment of the assembly of the present invention in an assembled form.

Figure 2A is a schematic representation of the assembly of the embodiment of Figure 1 in one operative position.

Figure 2B is a schematic representation of the assembly of the embodiment of Figure 1 in a different operative position from that represented in Figure 2A.

Figure 3 is a perspective interior view of a first housing of the embodiment of the assembly as represented in Figure 1.

Figure 4A is an exterior perspective view of a second housing of the embodiment of the assembly as represented in Figure 1

Figure 4B is a longitudinal sectional view in perspective of the interior of the embodiment of Figure 4A.

Figure 4C is a transverse sectional view in perspective of the interior of the embodiment of Figures 4A and 4B.

Figure 5 is a front elevational view in schematic form of one operative position of the embodiment of Figures 4A-4C.

Figure 6 is a perspective view of yet another embodiment of the assembly of the present invention operatively positioned at different toilet structures.

Figure 7 is a front perspective view in partial cutaway of a portion of the embodiment of

the assembly as represented in Figure 6.

Figure 8 is an interior view in schematic form of the embodiment of the assembly as represented in Figure 6.

Figure 9 is a longitudinal sectional view of the interior of the schematic representation of the embodiment of Figure 8.

Like reference numerals refer to like parts throughout the several views of the drawings.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention is directed to an assembly for filtering odors issuing from a toilet bowl, including one or more embodiments which are operative to filter/remove odors from air and/or aerosolized fluid or "toilet plume", resulting from the toilet being flushed. As described hereinafter in greater detail, different ones of a possible plurality of embodiments of the filtering assembly may be structurally and operatively adapted for use in either a domestic environment or commercial environment and/or both.

Therefore, with primary reference to Figures 1-5 at least one preferred embodiment of the filtering assembly is generally indicated as 10 and comprises a first housing 12 and a second housing 14. As schematically represented in Figures 2A-2B, the first housing 12 is disposed in spaced relation to the toilet bowl 100, such as being mounted on the water tank 102 operatively associated with the toilet bowl 100. In addition, the second housing 14 is adapted to be removably mounted and/or supported on an outer peripheral rim 100' of the toilet bowl 100 in immediately adjacent, fluid communicating relation with the interior 103 of the toilet bowl 100. The operative positioning of the second housing 14 may vary, such as being mounted on a side portion of the toilet bowl 100, as represented in Figure 2A and/or on a rear portion of the toilet bowl 100, substantially adjacent the connecting area 105 of a toilet seat 106 (see Figure 5), as represented in Figure 2B.

The filtering assembly 10 further includes an elongated, preferably flexible material conduit 16 disposed in interconnecting, fluid communicating relation with the interiors of both the first housing 12 and the second housing 14. As demonstrated, the length and flexibility of the conduit 16 may also vary so as to facilitate selective dispositioning and mounting of the second housing 14 in different operative locations on the outer/upper periphery 100' of the toilet bowl 100, as represented in Figures 2A-2B. In order to facilitate shipping, storage, installation, maintenance, etc. of the filtering assembly 10, the conduit 16 is removably connected to both the first and second housing 12 and 14 respectively.

Also, the first and second housings 12 and 14 may be removably but securely disposed in different operative positions on the toilet bowl 100 and water tank 102 utilizing an adhesive, or other appropriate connecting structure. Such an adhesive or other connecting structure is preferably disposed on or directly associated with under or rear surface portions of the first and second housings 12 and 14, which engage the water tank 102 and toilet bowl periphery 100', respectively.

With primary reference to Figure 3, structural and operative features of the first housing 12 includes an at least partially hollow interior appropriately dimensioned to enclose a plurality of operative components. More specifically, the first housing 12 includes a fan assembly generally indicated as 18 comprising at least one but alternatively a plurality of fan units 20. As represented, the one or more fan units 20 are operatively disposed to direct fluid from the interior of the first housing 12 and conduit 16 outwardly to an exterior of the first housing 12 into the area or space surrounding the toilet 100. As indicated, the conduit 16 is removably connected to the first housing 12 by an appropriate fitting 16', such that the interior the conduit 16 is disposed in direct fluid communication with the interior the first housing 12.

Additional structural components within the first housing 12 includes control circuitry generally indicated as 24 which may be in the form of a printed circuit board or other appropriate

circuitry, which in turn may be powered by a battery 26 or in the alternative by an AC power source (not shown). Because of the structural and operative versatility of the filtering assembly 10 including, but not limited to, it being battery-powered as well as its ease-of-use, installation, maintenance, etc., as set forth above, the filtering assembly 10 may be suited for use in a home and/or domestic environment.

Also, in order to assure an adequate and effective filtering of fluid passing from the interior of the toilet bowl 100 through the filtering assembly 10, the first housing 12 may also include a secondary filter 22 to be used in conjunction with a primary filter 36, both of which may be activated carbon, associated with the second housing 14, as explained in greater detail hereinafter.

Accordingly, as primarily represented in Figures 4A-4C, the second housing 14 comprises a filter segment 30 and a connector segment 32 removably connected to one another such that the interiors thereof are disposed in direct fluid communication with one another. In addition, the filter segment 30 includes an air/fluid inlet 34 formed at and at least partially defining an outer end of the filter segment 30. Also, a primary filter structure 36 is fixedly disposed within the interior of the filter segment 30 in direct fluid communication with fluid passing into the interior of the filter segment 30 through the inlet 34.

The connector segment 32 includes an appropriate fitting as at 16" which facilitates a removable connection to a corresponding end of the conduit 16. As such, when the filter assembly 10 is assembled as represented in at least Figures 1 and 2A-2B, the interior of the elongated conduit 16 is disposed in direct fluid communication with the interior of the second housing 14 including the interiors of both the removably connected filter segment 30 and the connector segment 32 and the interior of the first housing 12.

Further, the removable connection between the filter segment 30 and the connector segment 32 of the second housing 14 may be defined by a substantially telescopic and/or snap-fit

connection as represented in both Figures 4A-4B. As such, the inner end of the filter segment 14 may be at least partially flexible so as to at least partially pass into the interior of the open inner end 32' of the connector segment 32. Further, the inner end of the filter segment 30 includes fixation ribs or like structures 38 disposed, dimensioned and configured to be removably received within a correspondingly disposed apertures or recesses 38' formed adjacent the inner end 32' of the connector segment 32. The flexibility of at least the inner end portion of the filter segment 14 will result in the one or more fixation ribs 38 being "snap-fit" into the correspondingly disposed one or more recesses 38'.

The removable connection of the filter segment 30 from the connector segment 32 facilitates the connector segment 14 and the filter 36 contained therein being accurately described as a replaceable, "single-use" filter medium. More specifically, after a predetermined period of use, the filter 36 may require replacement in order to efficiently operate. Replacement of the filter 36 is accomplished by removal of the second housing 14 from its operative position (see Figures 2A-2B) and the subsequent detachment of the filter segment 30 from the connector segment 32. Once detached, the filter segment 30 and the filter 36 fixedly retain therein are collectively structured for disposal. Thereafter, a new or replacement filter segment 30 and fixedly retained filter 36 may be reattached to the connector segment 32 for continued use of the filter assembly 10, once the second housing 14 is disposed in the intended operative position.

Accordingly, once completely assembled and disposed in the intended operative position as represented in Figure 2A or Figure 2B, a path of fluid flow is defined and/or established from the inlet 34 of the filter segment 30 of the second housing 14 through the filter 36, the interior of the connector segment 32, along the length of the interior of the conduit 16, into and through the first housing 12,through the secondary filter 28 and out of the first housing 12, through the fan assembly 18, comprising the one or more fan units 20.

Additive features of the filter assembly 10 may comprise the inclusion of additional

fragrance or scent materials 40 disposed in one or both the first and second housings 12 and 14 as clearly represented in at least Figures 4B and 4C.

In order to assure proper operative placement of the second housing 14 in direct, fluid communicating relation with the interior 103 of the toilet bowl 100, an outer end 14' of the filter segment 14 is appropriately dimensioned and configured to fit within a clearance space 109, beneath a closed seat 106 associated with the toilet bowl 100, as schematically represented in Figure 5. For purposes of clarity the filter assembly 10, specifically including the second housing 14, is not accurately oriented in order to properly represent the spacing 109 between the toilet seat 106 and the upper or outer periphery 100'.

As commonly structured and utilized, the toilet seat 106 in spaced above the periphery 100' due to the provision of the one or more bumpers 107, typically attached to the undersurface of the toilet seat 106. In cooperation therewith and with reference to Figure 4A the outer end 14' of the filter segment 14 in the area contiguous and/or adjacent to the inlet 34 has a reduced "height" 14", preferably in the range of generally about 13 mm. As such the reduced height of the outer end 14' of the filter segment 14 is sufficiently dimensioned and configured to fit within the space 109 between the toilet seat 106 and the outer periphery 100', in direct fluid communication with the interior 103 of the toilet bowl 100, as schematically represented by directional arrow 111.

As represented in Figures 6-9, one or more additional embodiments of the present invention may include a filter assembly 10', structurally and operatively similar to the above described embodiment of the filter assembly 10, but may be more adapted for use in a commercial environment, as represented in Figure 6. As such, the at least one additional embodiment of the present invention includes the filter assembly 10' having a first housing 50 disposed in spaced relation to the toilet bowl 100 and also in spaced relation to a second housing 52. When in a commercial environment, the first housing 50 may be mounted on an exposed

surface of a wall 110 adjacent to the toilet bowl 100. Further, because of its operative disposition in a commercial environment the filtering assembly 10' may be powered by a conventional AC power supply via a wired connection 112. As also represented in Figure 6, the filtering assembly 10' includes an elongated conduit 54 disposed in interconnecting, fluid communicating relation between the interiors of the first housing 50 and the second housing 52. As such, the elongated conduit 54 may be operatively similar to the conduit 16 of the above described filtering assembly 10.

With primary reference to Figure 7, the second housing 52 includes an inlet 56 operatively disposed immediately adjacent an interior 103 of the toilet bowl 100, such that the inlet 56 is in fluid receiving, fluid communicating relation with the interior 103 of the toilet bowl 100. In order to provide stability, the second housing 52 may be connected to or otherwise supported by a water pipe and/or plumbing fixture 114 associated with the toilet bowl 100 and operative to facilitate the flushing thereof.

As represented in Figures 8 and 9, the first housing 50 includes a filter assembly generally indicated as 58, contained therein. In addition, a fan assembly generally indicated as 60 is mounted within the first housing 50 in fluid communication with the conduit 54 and through the conduit 50, in fluid communication with the interior of the second housing 52 and the inlet 56 associated therewith. Therefore, the fan assembly 58, when activated, is disposed and structured to direct fluid flow 120 exiting the conduit 54, through the interior of the first housing 50 and outwardly therefrom to an exterior of the first housing 50, as schematically represented by directional arrows 120', subsequent to being filtered by filter assembly 58. Accordingly, an activation of the fan assembly 60, within the interior of the first housing 50, defines or establishes a path of fluid flow 120 extending from said inlet 56 of the second housing 52, through the conduit 54 and into the interior of the first housing 50, through the filter assembly 58, to the exterior of the first housing 50 and back into the space, area or environment surrounding the

toilet bowl 100.

Yet additional features of the additional one or more embodiments of the filter assembly 10', which may render it more adaptable for use in a commercial environment, comprise the filter assembly 58 including a first filter unit 64 and a second filter unit 66, both located in the path of fluid flow 120, upstream of the conduit 54 and downstream of the fan assembly 60. The first filter unit 64 may be a carbon-based and/or carbon activated filter, primarily operative to remove odors from air/gas passing there through. The second filter unit 66 of the filter assembly 58 is preferably structured to process aerosolized fluid and any particulate matter contained therein. As such the second filter unit 66 may comprise an HEPA filter. As indicated, aerosolized fluid may result from the toilet being flushed and the creation of a "toilet plume", possibly containing odor causing particulate waste material.

It is also noted and recognized that the inlet 56 of the second housing 52 is disposed immediately adjacent and preferably exteriorly of the interior 103 of the toilet bowl 100. Accordingly, the fan assembly 60 is adequately powered and otherwise structured to expose the interior 103 of the toilet bowl 100 to a sufficiently strong fluid flow, to "draw" and/or collect aerosolized fluid along the path of fluid flow 120, from the interior 103 of the toilet bowl 100, through the inlet 56 and through the conduit 54, into the interior of the first housing 50, through the filter assembly 58 and outwardly from the exterior of the first housing 50.

In addition to the filter assembly 58 including, the first and second filter units 64 and 66 respectively, a fluid sterilizing assembly 70 may be disposed along the path of fluid flow 120, within the first housing 50, upstream of the conduit 54 and downstream of the fan assembly 60. The sterilizing assembly 70 may comprise at least one or in the alternative a plurality of ultraviolet (UV) lights 72 disposed in the aforementioned path of fluid flow 120 exiting from the filter assembly 58, or otherwise passing through the interior of the first housing 50.

Possible installation and use of this additional embodiment of the filter assembly 10' of

the present invention may include a sensor assembly 74 such as, but not limited to, a motion sensor. The sensor assembly 74 may be preferably mounted on and at least partially exposed location on the first housing 50 facing a frontal portion of the toilet bowl 100 and be so positioned/oriented to detect the presence of an individual utilizing the toilet bowl 100. The sensor assembly 74 may be further structured to activate the fan assembly 60 while an individual remains in a predetermined detection zone, associated with the use of the toilet bowl 100. Automatic shutoff of the fan assembly 60 will result upon an absence of an individual from the aforementioned detection zone. Powering of the fan assembly 60 may best be accomplished by the direct wired connection 112 to the conventional AC power source, typically associated with most commercial locations, which include restrooms and or semi-public toilet facilities. Interconnection of the fan assembly 60, sensor assembly 74, one or more light units 72 and other electrically powered structures of the filter assembly 10' may be accomplished by appropriate control circuitry such as, but not limited to, printed circuitry 24, as described above with reference to the filtering assembly 10.

As a possible additive feature, a fragrance scent dispensing device or structure 40' may be included within the interior of the first housing 50 similar to the fragrance or scent dispensing structure 40 of the embodiment of Figures 4B and 4C.

Since many modifications, variations and changes in detail can be made to the described preferred embodiment of the invention, it is intended that all matters in the foregoing description and shown in the accompanying drawings be interpreted as illustrative and not in a limiting sense. Thus, the scope of the invention should be determined by the appended claims and their legal equivalents.

What is claimed is:

1. An assembly for filtering toilet bowl odors comprising:

a first housing disposed in spaced relation to the toilet bowl,

a fan assembly disposed within said first housing in communicating relation with an exterior thereof,

a second housing including an inlet, said inlet disposed in fluid communication with an interior of the toilet bowl,

said second housing including a filter segment and a connector segment removably connected to one another; said filter segment disposed in retaining relation to a filter,

an elongated conduit disposed in interconnecting, fluid communicating relation between interiors of said first and second housings,

a path of fluid flow from said inlet, through said filter, long the length of said conduit, into and through said first housing to the exterior thereof, concurrent to activation of said fan assembly, and

said filter segment and said filter structured for disposal upon detachment from said connector segment.

2. The assembly as recited in claim 1 wherein said fan assembly includes at least one fan unit disposed to direct fluid flow along said path of travel.

3. The assembly as recited in claim 2 wherein said fan assembly includes a plurality of fan units collectively disposed to direct fluid flow along said path of travel.

4. The assembly as recited in claim 2 further comprising a secondary filter disposed within said first housing downstream of said fan assembly and upstream of said conduit; said path of fluid flow including said secondary filter.

5. The assembly as recited in claim 1 wherein said connector segment is disposed in interconnecting, fluid communicating relation between said filter segment, including said filter,

and said conduit.

6. The assembly as recited in claim 5 wherein said conduit is removably connected to said second housing via said connector segment.

7. The assembly as recited in claim 6 wherein said conduit is removably connected to said first housing.

8. The assembly as recited in claim 5 wherein said filter segment includes an inner end cooperatively structured with a correspondingly disposed portion of said connector segment to define a removable, telescopic engagement therewith.

9. The assembly as recited in claim 8 wherein said removable, telescopic engagement further comprises a substantially snap-fit connection; said snap-fit connection at least partially defined by at least one fixation rib mounted on said filter segment and disposed and dimensioned to be removably received within a recess formed in said connector segment.

10. The assembly as recited in claim 1 wherein said filter segment comprises an outer end contiguous to said inlet; said outer end dimensioned and configured for operative disposition in removable, supported relation on a rim of the toilet bowl, beneath a closed seat thereof.

11. The assembly as recited in claim 10 wherein a portion of said outer end contiguous to said inlet includes a height no greater than about 13 mm.

12. The assembly as recited in claim 10 wherein said first housing is disposed on an exterior of a water tank operatively associated with the toilet bowl in interconnected relation to said second housing, via said conduit.

13. The assembly as recited in claim 1 wherein said filter is fixedly mounted in enclosed relation within said filter segment, downstream of said inlet.

14. An assembly for filtering toilet bowl odors comprising:

a first housing disposed in spaced relation to the toilet bowl and including a filter assembly,

a second housing disposed adjacent the toilet bowl and including an inlet disposed in fluid communicating relation with an interior of the toilet bowl,

a conduit disposed in interconnecting, fluid communicating relation between interiors of said first and second housings,

a fan assembly mounted within said first housing in fluid communicating relation with said conduit,

said fan assembly disposed to direct fluid flow from said conduit through said interior of said first housing and outwardly therefrom to an exterior of said first housing, and

a path of fluid flow extending from said inlet, through said conduit and said filter assembly to the exterior of said first housing, concurrent to activation of said fan assembly.

15. The assembly as recited in claim 14 wherein said filter assembly includes a first filter unit structured to process odor in fluid passing therethrough.

16. The assembly as recited in claim 15 wherein said first filter unit comprises a carbon-based filter.

17. The assembly as recited in claim 15 wherein said filter assembly further comprises a second filter unit structured to process particulates in aerosolized fluid passing there through.

18. The assembly as recited in claim 15 wherein said second filter unit comprises an HEPA filter.

19. The assembly as recited in claim 17 further comprising a fluid sterilizing assembly disposed within said first housing, upstream of said conduit and downstream of said fan assembly.

20. The assembly as recited in claim 19 wherein said fluid sterilizing assembly comprises at least one UV light unit.

21. The assembly as recited in claim 19 wherein said first filter unit, said second filter unit and said fluid sterilizing assembly are disposed within said path of fluid flow.

22. The assembly as recited in claim 14 further comprising a fluid sterilizing assembly, including at least one UV light unit, disposed within said first housing upstream of said conduit and downstream of said fan assembly.

23. The assembly as recited in claim 14 further comprising a sensor assembly mounted on said first housing and structured and disposed to determine the use of the toilet bowl by an individual.

24. The assembly as recited in claim 23 wherein said sensor assembly comprises a motion sensor.

25. The assembly as recited in claim 23 wherein said first housing is structurally adapted for wall mounting in a spaced, operative position relative to the toilet bowl.

26. The assembly as recited in claim 25 wherein said spaced, operative position comprises said first housing and said sensor assembly facing outwardly from a supportive wall for said first housing, in an exposed relation to a substantially frontal portion of the toilet bowl.

27. The assembly as recited in claim 25 wherein said spaced, operative position further comprises said first housing connected to said second housing via said conduit, concurrent to said inlet disposed at a rear portion of the toilet bowl adjacent a connection of a toilet seat to the toilet bowl.

Fig. 1

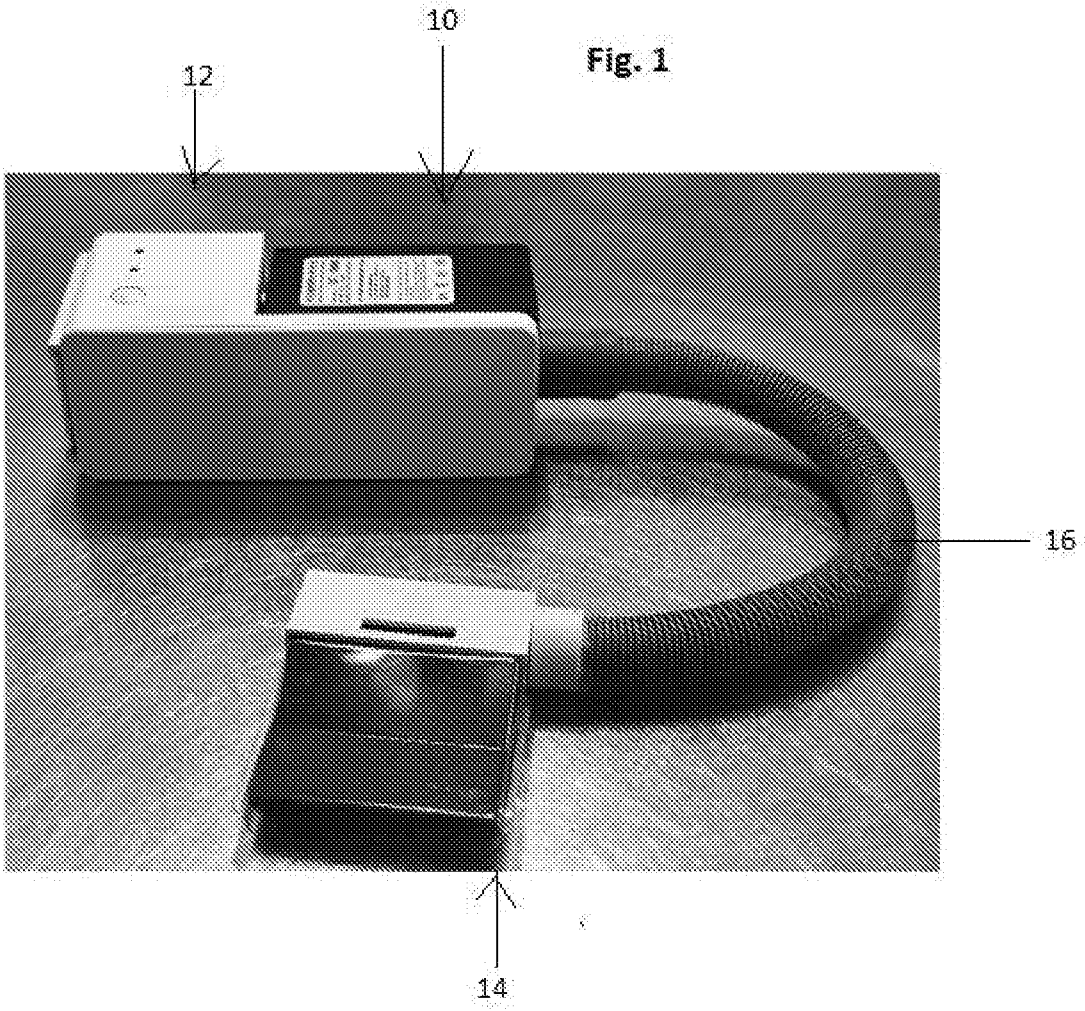
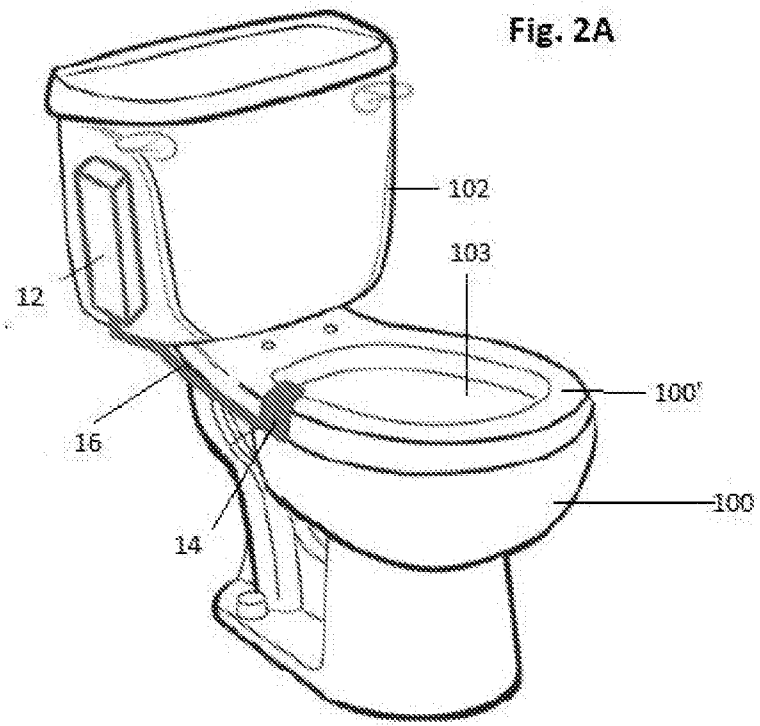


Fig. 2A



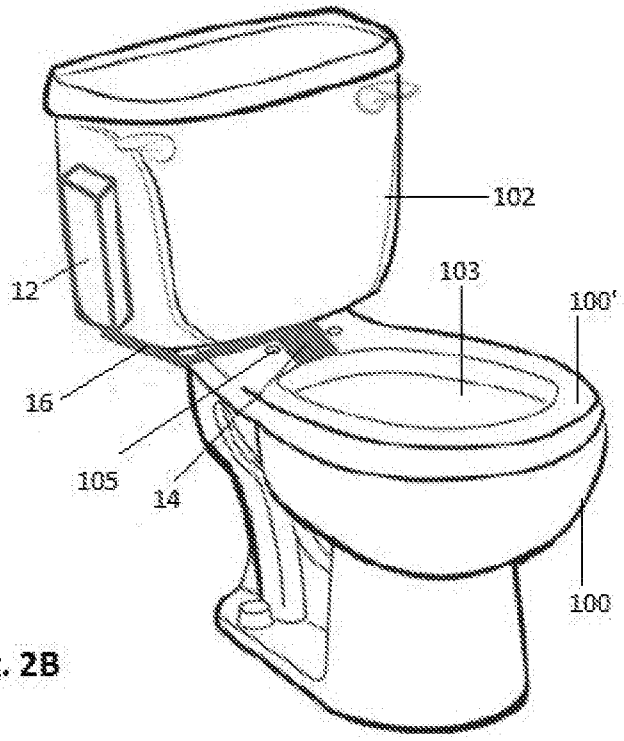


Fig. 2B

Fig. 3

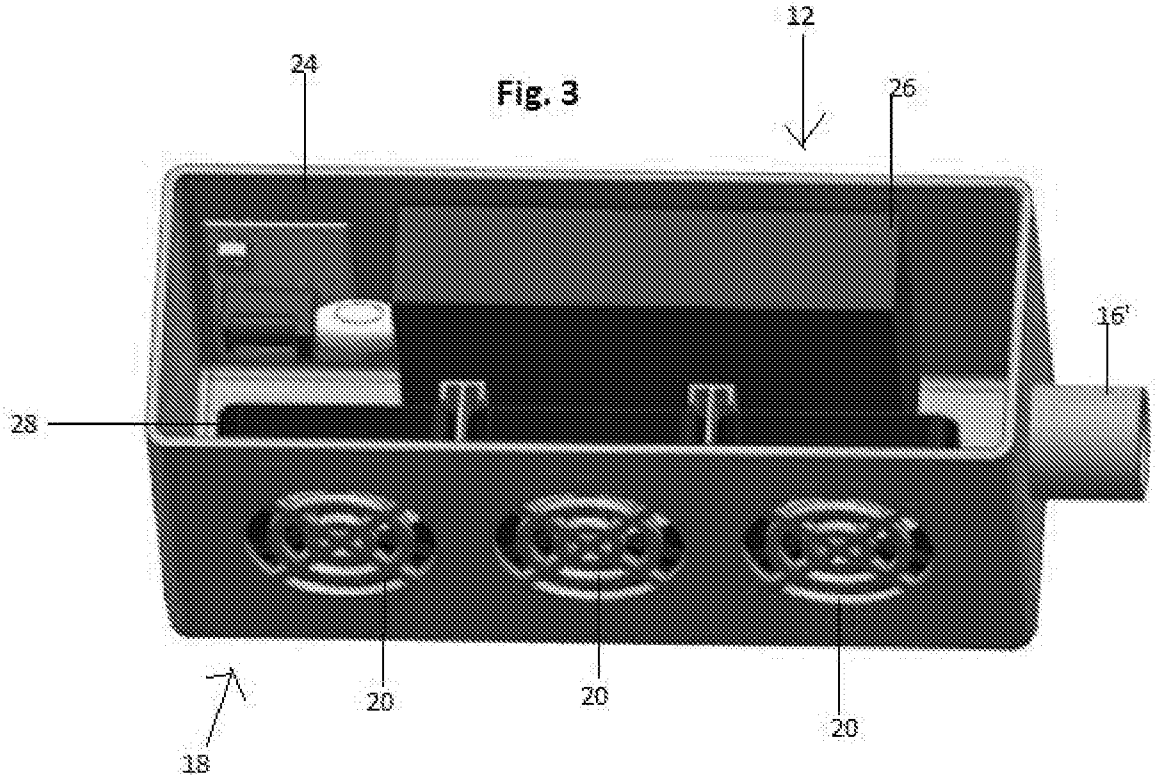
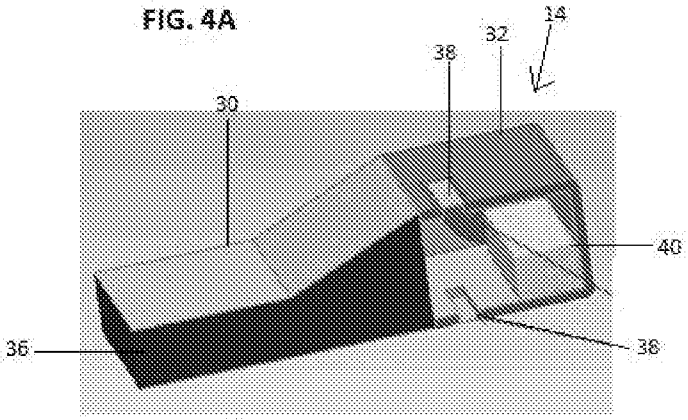


FIG. 4A



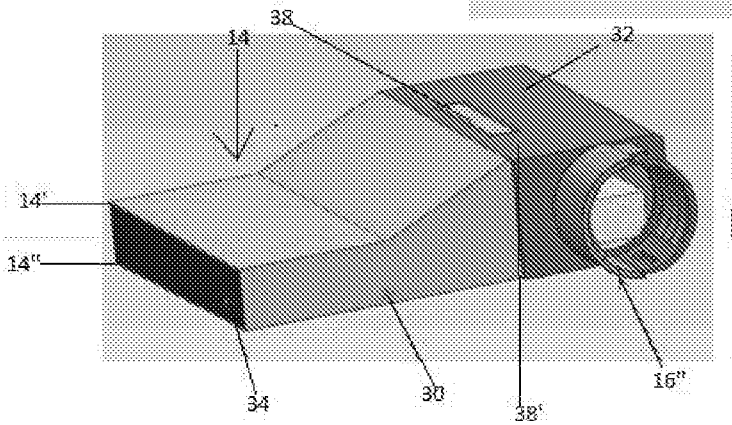


Fig. 4B

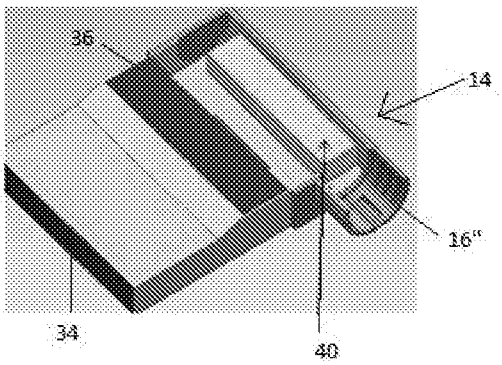


Fig. 4C

Fig. 5

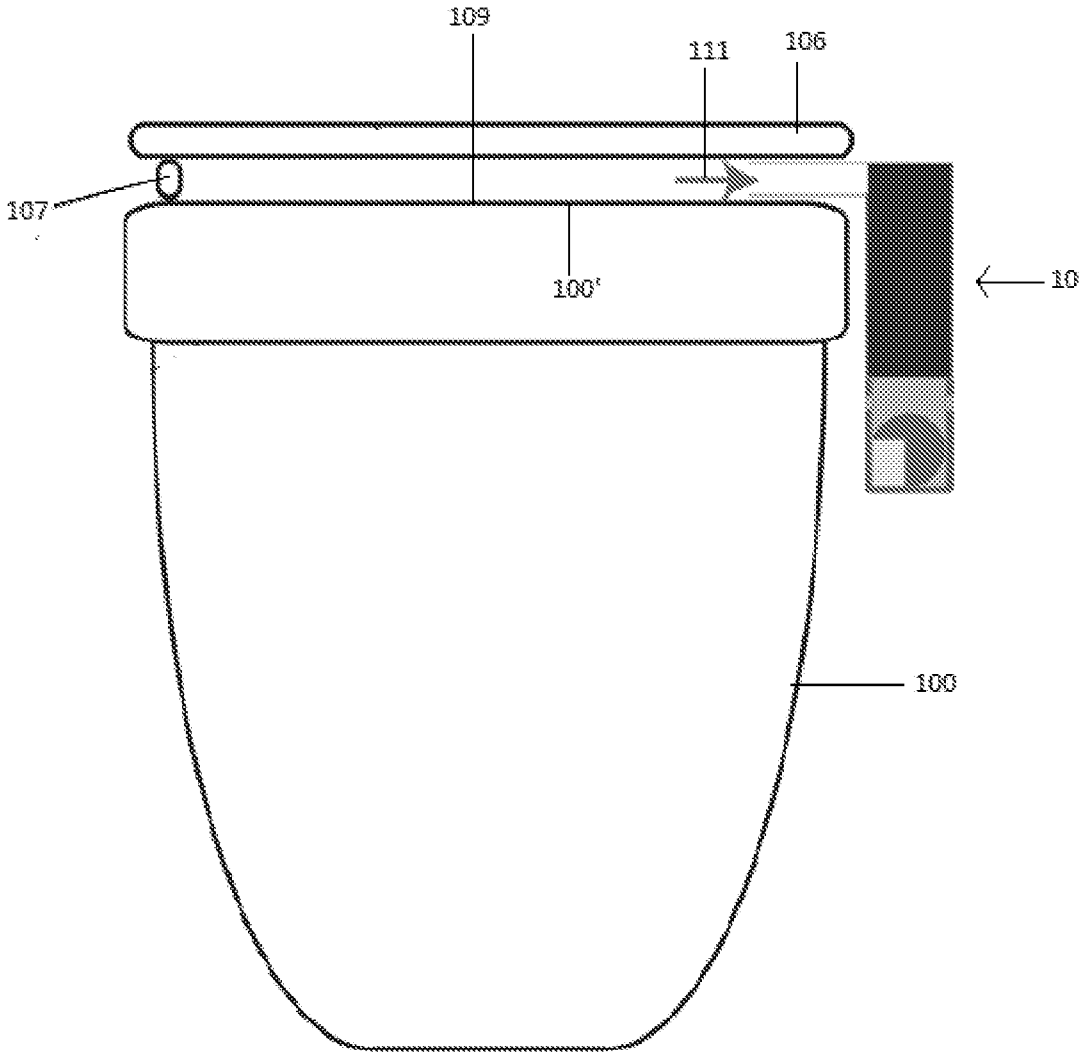


Fig. 6

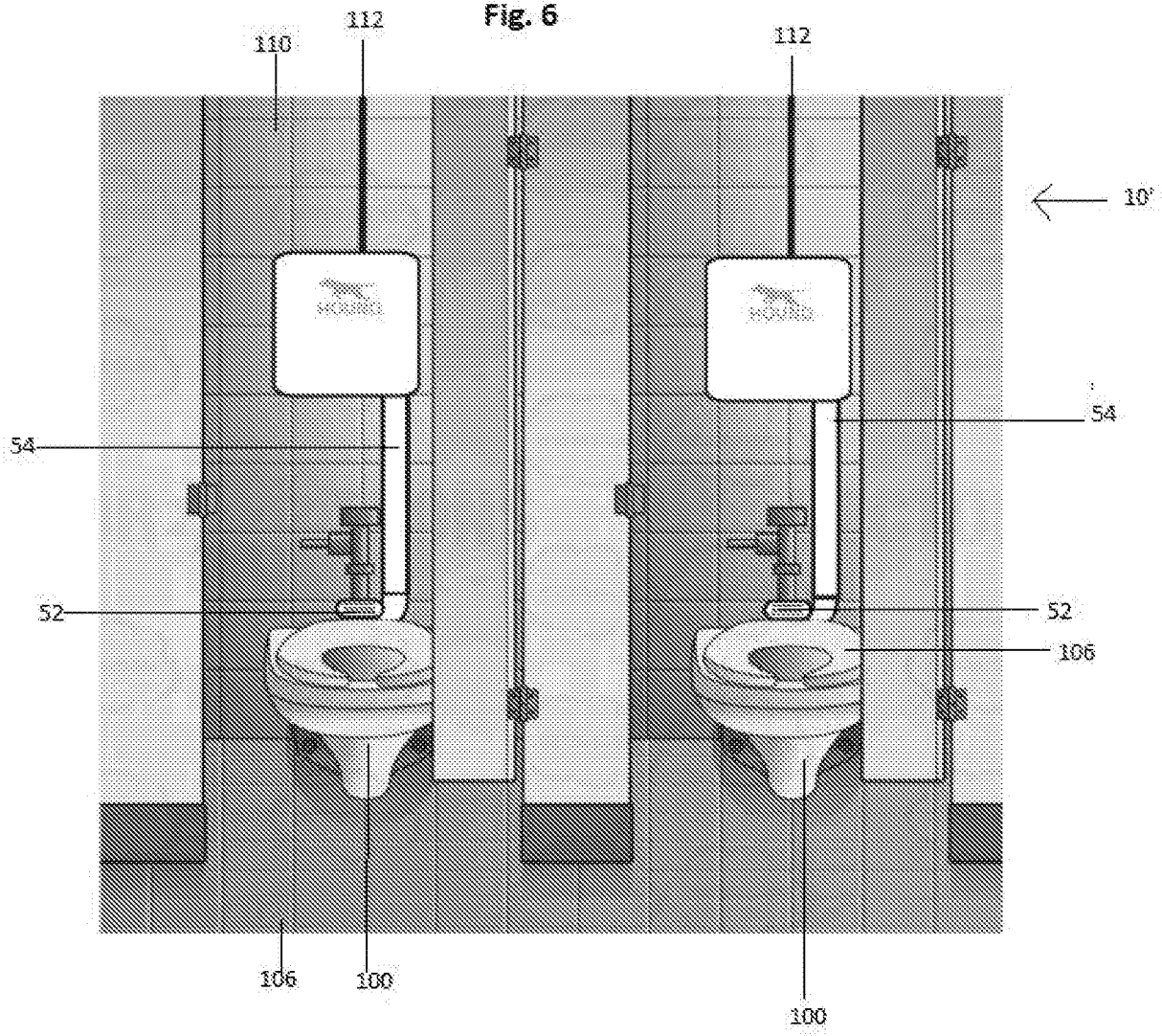


Fig. 7

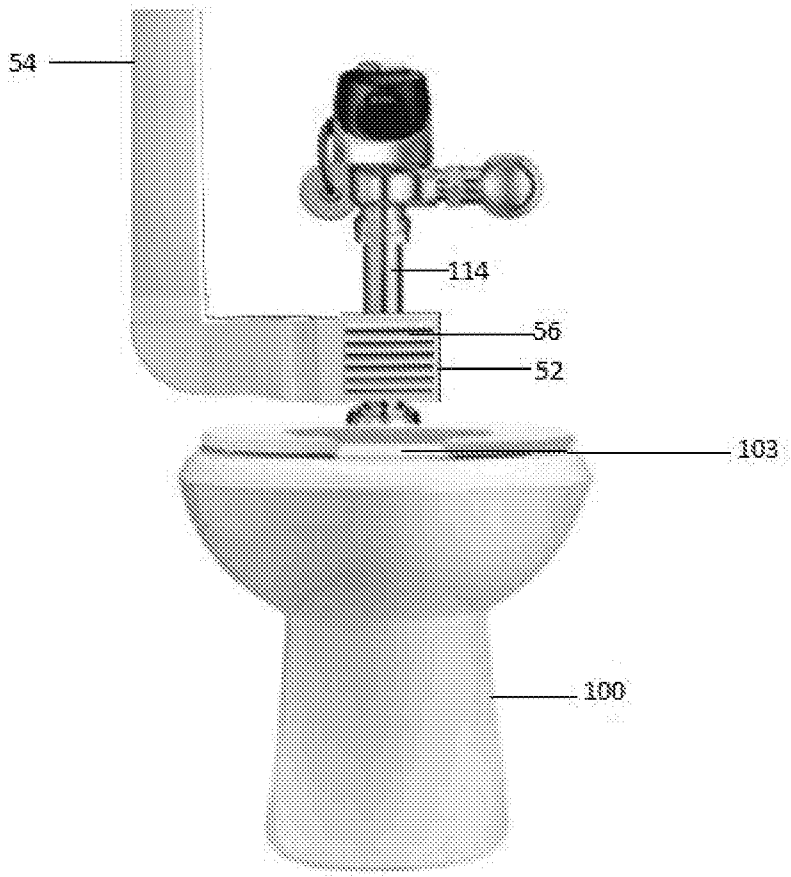


Fig. 8

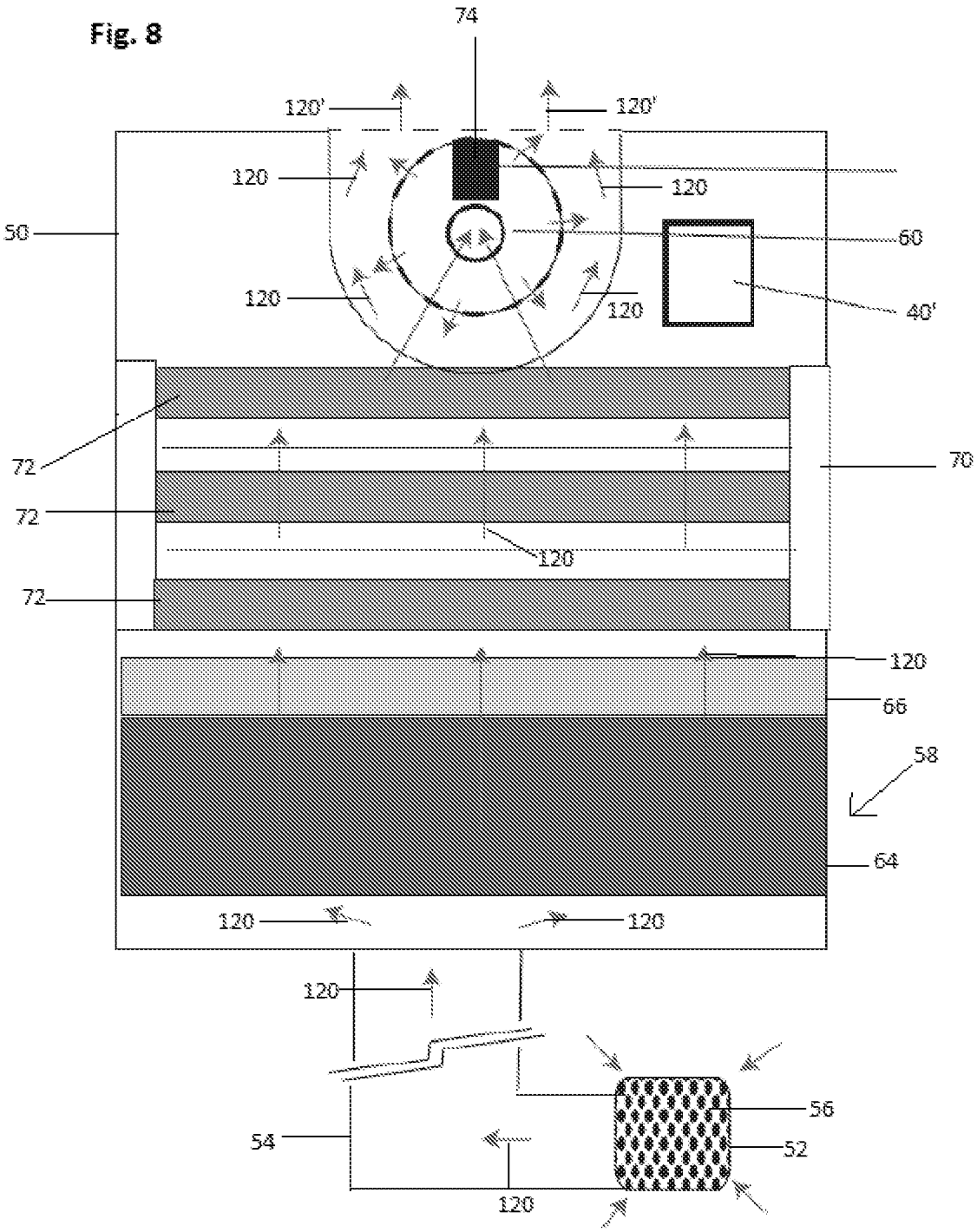

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Fig. 9

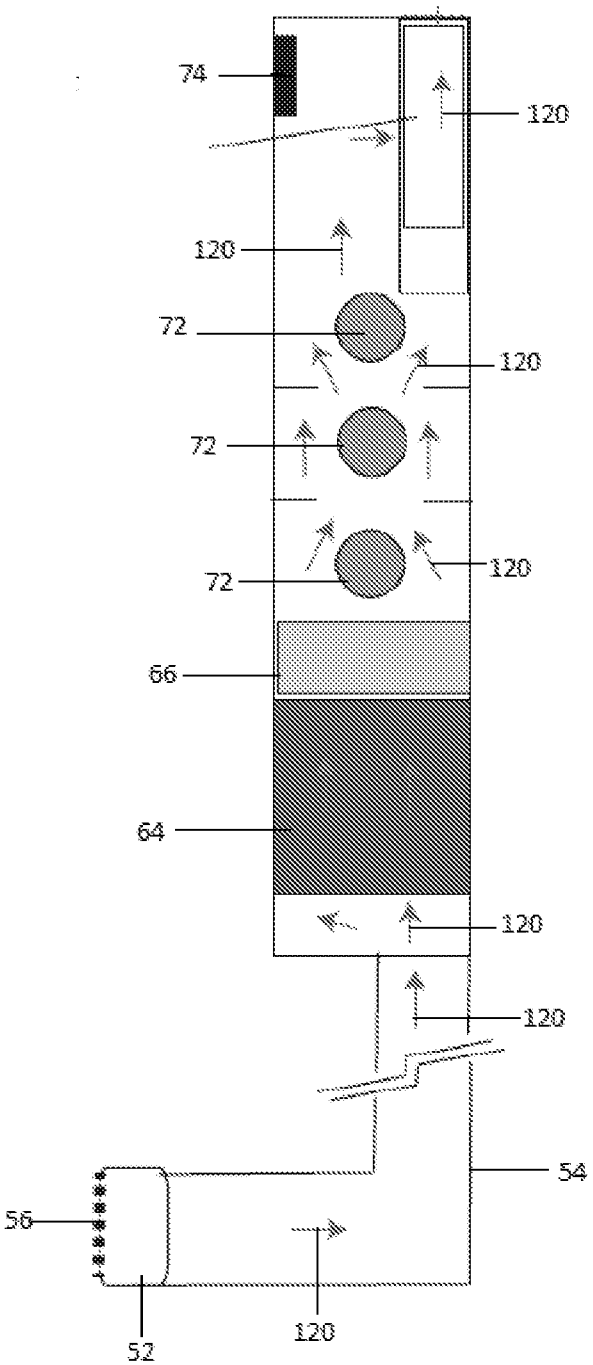

Fig. 1