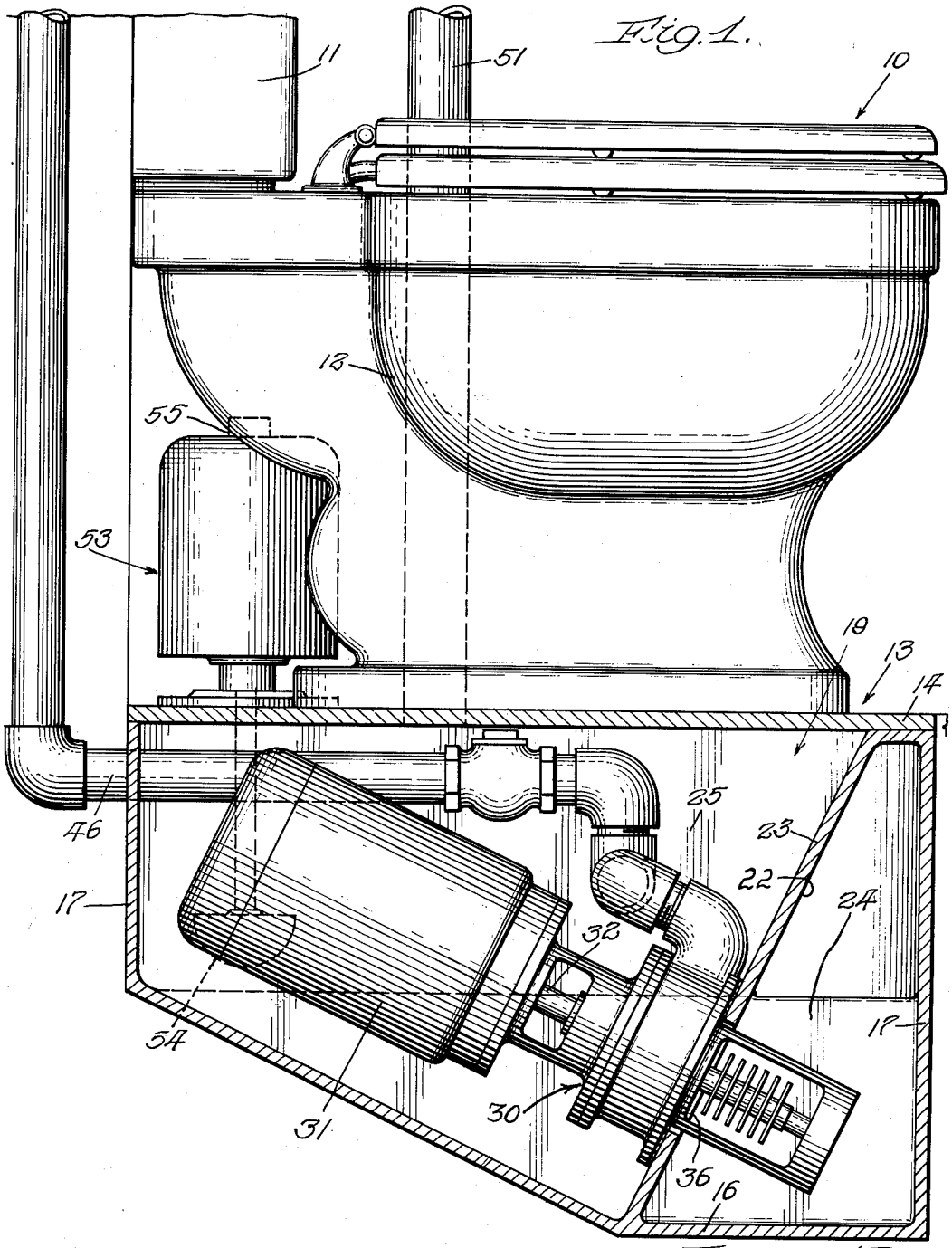
Sept. 20, 1955 E. F. HOWE 2,718,012

SELF-CONTAINED TOILET UNIT AND PUMP USABLE THEREWITH

Filed Oct. 11, 1952 3 Sheets-Sheet 1

Fig. 1.



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Filed Oct. 11, 1952 3 Sheets-Sheet 2

Fig. 2.

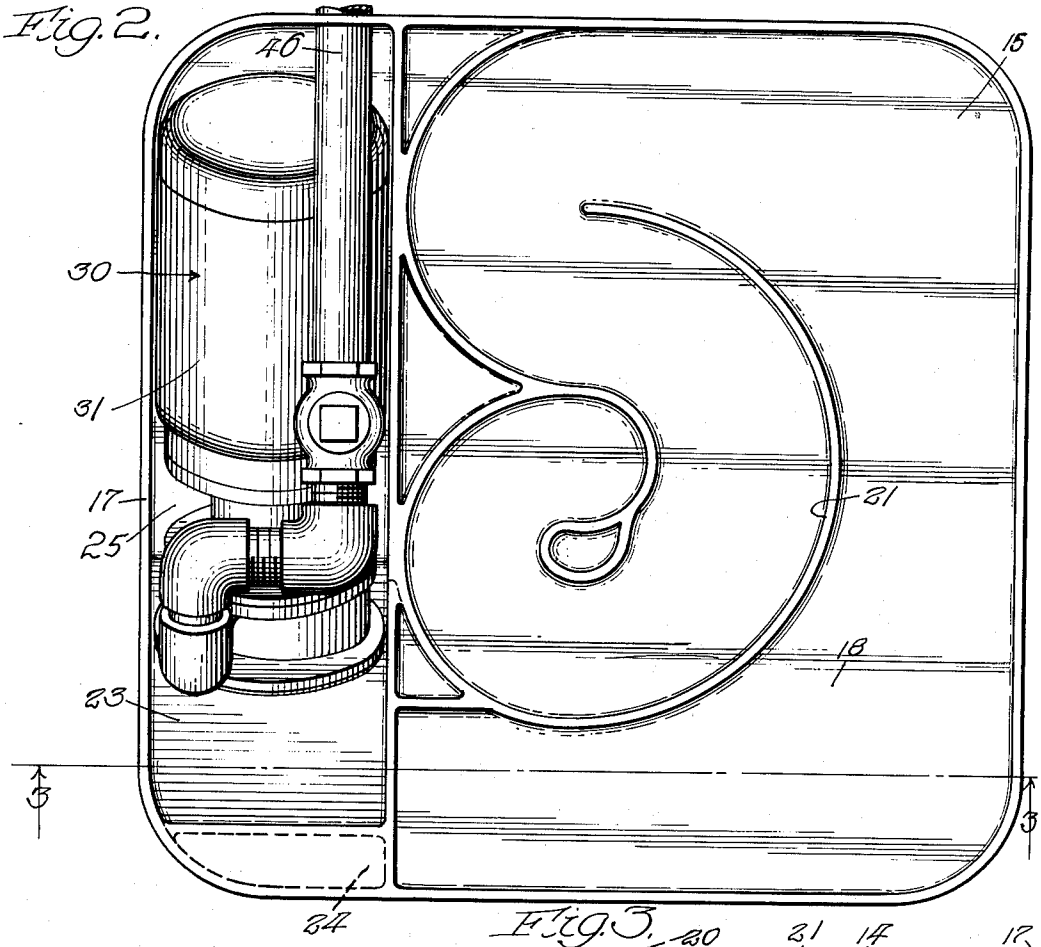
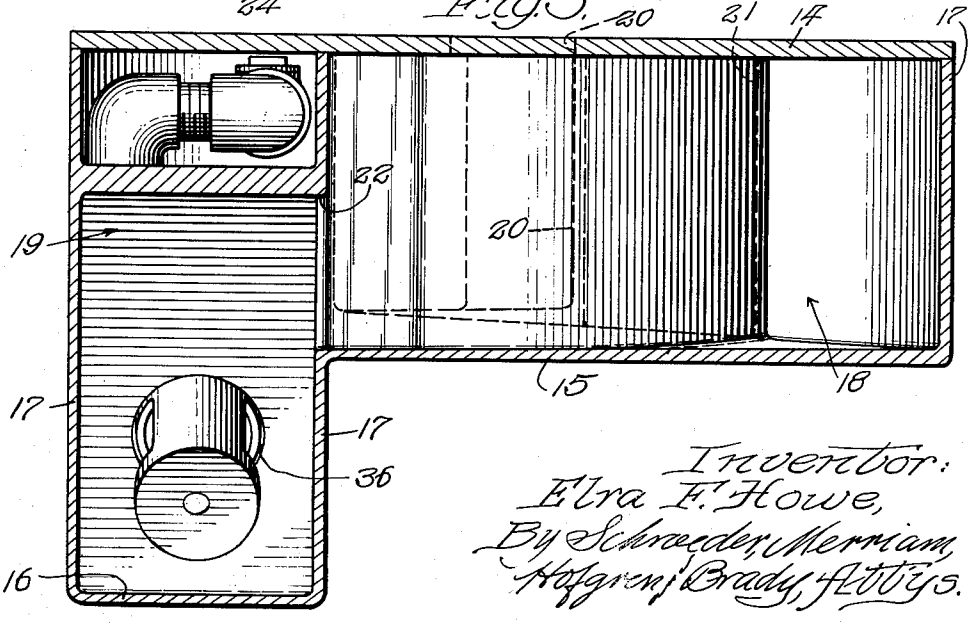


Fig. 3.



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Filed Oct. 11, 1952 3 Sheets-Sheet 3

Fig. 4.

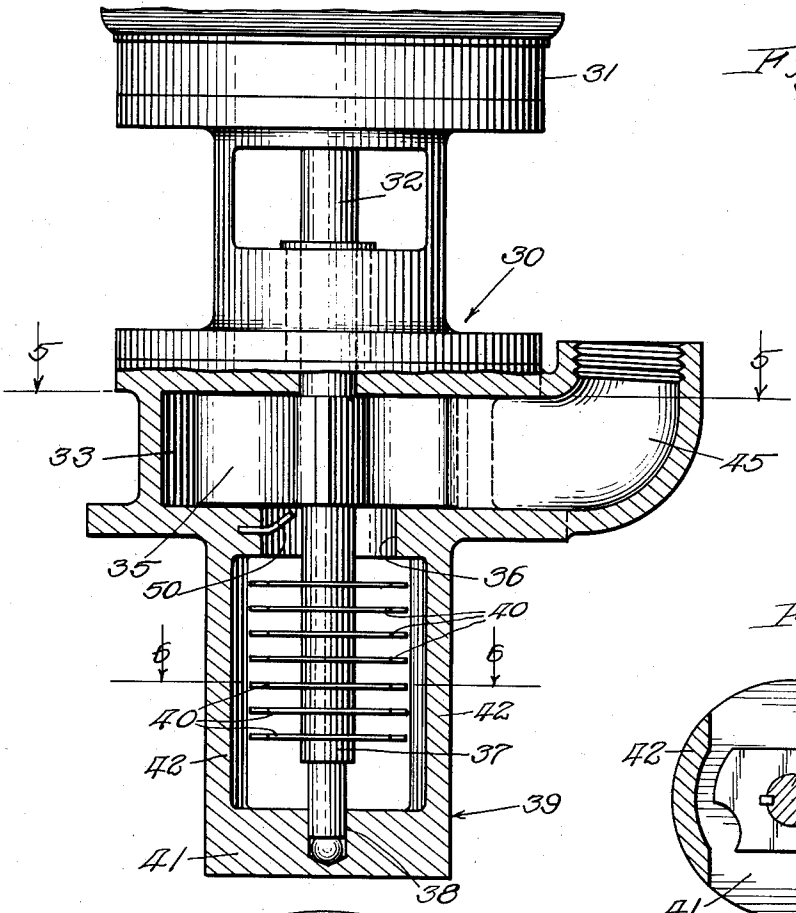
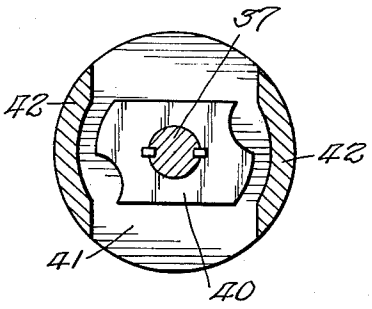


Fig. 6.



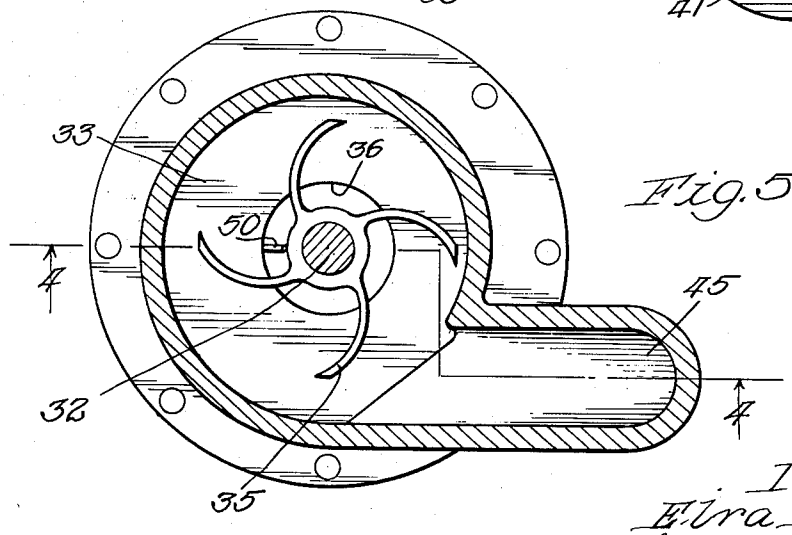


Fig. 5.

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SELF-CONTAINED TOILET UNIT AND PUMP USABLE THEREWITH

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Application October 11, 1952, Serial No. 314,252

7 Claims. (Cl. 4—10)

This invention relates to a self-contained toilet unit together with a sump pump particularly adaptable for use with such unit.

It is the general object of this invention to produce a new and improved self-contained toilet unit and sump pump for use therewith.

Many situations arise in which it is desirable to install toilet facilities on a temporary basis such as in barracks, tents, and temporary buildings or where it is desirable to more or less permanently install a toilet in locations so confined as to seriously interfere with the installation of the normal facilities. Small boats such as cabin cruisers and the like are an example of the latter type installation. The foregoing difficulties arise principally because the normal toilet closet requires a considerable amount of plumbing before it can properly be installed and in the case of shipboard installation requires means for pumping effluent overboard, all of which render the installation of the normal type of toilet facility quite difficult.

One of the features of the present invention is the provision of a self-contained toilet unit which may be readily installed for temporary use or in difficult locations. A further feature of the invention is the provision of a toilet unit having housing adapted to support a normal toilet closet and provided with a passage leading to a sump in the housing wherein is located a sump pump. Means are provided for operating the pump each time the toilet is used so as to discharge the waste matter either to a septic tank in land installations or overboard in shipboard installations. The unit is designed to reduce to a finely divided state any suspended solid matter in the effluent and thus to prevent clogging of the pipes. For this reason pipes of smaller diameter may be used without danger of clogging and, if a septic tank be used in conjunction therewith, the reduction of solid matter to relatively fine particles accelerates bacterial digestion.

Because of the solid matter normally accompanying liquid wastes in toilet installations, the pump designed for use with a self-contained toilet unit is provided with means not only for disintegrating the solid matter, but also with additional means for preventing fibrous matter such as paper from wrapping around the drive shaft for the pump and hence from clogging the inlet.

Other and further features of the invention will be readily apparent from the following description and drawings, in which:

Fig. 1 is a side elevation partially in section showing a self-contained toilet unit embodying the invention;

Fig. 2 is a top elevational view of the apparatus shown in Fig. 1 with the top cover removed;

Fig. 3 is a vertical section taken along line 3—3 of Fig. 2;

Fig. 4 is a vertical section of the sump pump shown in Fig. 1;

Fig. 5 is a horizontal section along line 5—5 of Fig. 4; and

Fig. 6 is a horizontal section along line 6—6 of Fig. 4.

While this invention is susceptible of embodiments in

many different forms, there is shown in the drawings and will herein be described in detail one specific embodiment, with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiment illustrated. The scope of the invention will be pointed out in the appended claims.

Referring now to the drawings, there is shown a normal toilet closet **10** provided with an inlet pipe **11** through which water is admitted into the bowl **12** of the toilet, which closet is mounted on top of a housing **13**. The housing is provided with a substantially rectangular top wall **14** and, as shown in Fig. 3, with a first partial bottom wall **15** and a second partial bottom wall **16** spaced farther from the top wall **14** than the wall **15**, together with side walls indicated at **17** to divide the housing into a first compartment **18** defined between the walls **14** and **15** and a second compartment **19** defined between the walls **14** and **16**. The top wall **14** is provided with an opening **20** therein in communication with the bowl **12** of the closet and opening into a tortuous passageway **21** located in the compartment **18**. Waste matter introduced into the passage **21** flows therethrough in the direction indicated by the arrows and through an opening **22** and into the second compartment **19**. A wall **23** is provided in the second compartment to divide the same into a sump **24** and a pump chamber **25**. The opening **22** previously mentioned connects with the sump portion **24** of the compartment **19** and thus the effluent flows downwardly into the lower portion of the housing.

Mounted on the wall **23** is a sump pump generally designated at **30** which includes a casing **31** enclosing an electrical motor for rotating the drive shaft **32** of the pump. The drive shaft **32** extends into an impeller chamber **33** (Fig. 4) in which is located an impeller **35** secured to the drive shaft. Immediately below the impeller chamber and axially aligned therewith is a substantially circular inlet opening **36** which opens through a suitable opening provided in the wall **23** and into the sump **24**. The drive shaft is provided with a portion **37** which extends beyond the inlet and is journaled at **38** in a guard framework **39** which surrounds a plurality of disintegrator blades **40** secured to said portion of the drive shaft. The guard framework **39** includes a circular bottom section **41** and two semicylindrical side walls **42** which extend upwardly from the bottom section and connect with the lower portion of the housing of the pump defining the impeller chamber.

Connected at one side of the impeller chamber is an outlet **45** which connects with a suitable pipe **46** leading to a disposal pipe for the material introduced into the sump. In shipboard installations the disposal may be over the side while in land installations the disposal point may be a suitable septic tank, water course or the like.

Inasmuch as normally a considerable amount of solid material will be introduced into the sump with use of the toilet, the disintegrator blades **40** are provided to break down such solids into finely divided particles before they are drawn into the inlet of the pump. Fibrous matter such as paper has a tendency to wind around the drive shaft **32** and if allowed to accumulate on the drive shaft would ultimately build up to the point where the inlet **36** was substantially blocked. To prevent such build up of solid matter around the drive shaft there is provided a free-flow pin **50** secured in the housing for the pump and extending partially across the inlet, with the inner end of the pin being closely adjacent the drive shaft in the inlet opening. The free-flow pin serves to prevent the accumulation or build up on the drive shaft of solid material, and thus should paper, for example, begin to wrap around the drive shaft at the location of

the pin, such paper would be torn off the drive shaft and directed into the impellers by the pin **50**.

It is preferable that the compartment **18** be vented and for this purpose a vent pipe **51** may be provided which extends through the top wall **14** and into the chamber **18**.

Means are provided for energizing the electrical motor for the sump pump each time the toilet is used. Such means may take the form of the float operated switch **53** which is provided in the normal manner with a float **54** positioned in the passage **21** and buoyed upwardly each time liquid is introduced into the passage. Upward movement of the float closes the contacts of the switch to energize the motor. If desired, manual means in the form of the button **55** may be provided for energizing the pump motor manually as needed.

It will be clear from the foregoing description that the unit herein described is substantially completely self-contained and may be installed merely by placing it on a suitable support or, if desired, supporting legs may be attached to the housing so that the same may be placed in position with the least possible difficulty. As so installed there is required only that a source of water be provided for the inlet **11** and that the outlet pipe **46** be provided to conduct the waste matter to a suitable disposal point. The unit and particularly the sump pump shown as usable therewith will operate without danger of clogging and over a long period of time without need of attention. The particular shape of the housing may be varied, if desired, so that it may accommodate itself to odd shaped installation locations should such be encountered.

I claim:

1. A self-contained toilet unit comprising a watertight closed housing having a substantially flat upper surface portion provided with an opening therein, a toilet closet mounted on said portion with the bowl of the toilet being in communication with the opening, a sump in the lower portion of the housing, a tortuous passage in the housing opening at one end to the sump and communicating at its other end with said opening, a motor operated sump pump in the housing having its inlet in the sump, disintegrator means adjacent the pump inlet and operated with the pump to disintegrate solid matter before the same is drawn into said inlet, and means for initiating the operation of said motor each time the toilet is used.

2. A self-contained toilet unit comprising a watertight closed housing having a substantially flat upper surface portion provided with an opening therein, a toilet closet mounted on said portion with the bowl of the toilet being in communication with the opening, a sump in the lower portion of the housing, a tortuous passage in the housing opening at one end to the sump and communicating at its other end with said opening, a motor operated sump pump in the housing having its inlet in the sump, a drive shaft for the pump having a portion extending beyond said inlet and into the sump, a plurality of disintegrator blades on said portion of the shaft, a guard frame surrounding the blades and provided with openings therein to admit liquid and solid matter thereinto for disintegration by the blades before such solids are drawn into said inlet, and means for initiating the operation of said motor each time the toilet is used.

3. A self-contained toilet unit comprising a watertight closed housing having a substantially flat upper surface portion provided with an opening therein, a toilet closet mounted on said portion with the bowl of the toilet being in communication with the opening, a sump in the lower portion of the housing, a tortuous passage in the housing opening at one end to the sump and communicating at its other end with said opening, a motor operated centrifugal sump pump in the housing having a substantially circular inlet opening into said sump, a drive shaft for the pump having a portion extending beyond said inlet and into the sump, a plurality of disintegrator blades on said portion of the shaft, a guard frame surrounding the blades and provided with openings therein to admit liquid and solid matter thereinto for disintegration by the blades before such solids are drawn into said inlet, a pin extending partially across said inlet and having one end closely adjacent said shaft to prevent solids from winding around the shaft, and means for initiating the operation of said motor each time the toilet is used.

4. A self-contained toilet unit comprising a watertight closed housing having a substantially flat upper surface portion provided with an opening therein, a toilet closet mounted on said portion with the bowl of the toilet being in communication with the opening, means including a wall slanted with respect to the vertical defining a sump in the lower portion of the housing, a tortuous passage in the housing opening at one end to the sump and communicating at its other end with said opening, a motor operated centrifugal sump pump mounted on said wall, said pump having a substantially circular inlet opening through the wall and into said sump, a drive shaft for the pump having a portion extending beyond said inlet and into the sump, a plurality of disintegrator blades on said portion of the shaft, a guard frame surrounding the blades and provided with openings therein to admit liquid and solid matter thereinto for disintegration by the blades before such solids are drawn into said inlet, a pin extending partially across said inlet and having one end closely adjacent said shaft to prevent solids from winding around the shaft, and means for initiating the operation of said motor each time the toilet is used.

5. A sump pump adapted for use in a self-contained toilet unit and the like comprising a casing, an impeller chamber in the casing, an inlet opening axially aligned with said chamber, a drive shaft extending axially through said chamber and having a portion extending outwardly of the inlet, a plurality of impeller blades in the chamber and fixed to the drive shaft, a plurality of disintegrator blades on said portion of the drive shaft, a guard frame surrounding the blades, a pin fixed to the casing and extending partially across said inlet to have one end thereof closely adjacent the drive shaft, and motor means connected to the drive shaft to rotate said impeller blades and disintegrator blades.

6. A self-contained toilet unit comprising a watertight closed housing having a substantially flat upper surface portion provided with an opening therein and adapted to support a toilet closet thereon with the toilet bowl in communication with the opening, means including a wall slanted with respect to the vertical defining a sump in the lower portion of the housing, a tortuous passage in the housing opening at one end to the sump and communicating at its other end with said opening, a motor operated sump pump mounted on said wall with its inlet opening through the wall and into the sump, a switch for energizing the motor, and a float in said passage and positioned to be buoyed upwardly by liquid flowing therein to actuate the switch.

7. A self-contained toilet unit comprising a housing having a substantially rectangular flat upper wall provided with an opening therein and adapted to support a toilet closet thereon with the toilet bowl being in communication with the opening, said housing including a first partial bottom wall parallel with the upper wall, a second partial bottom wall spaced further from the upper wall than the first partial wall and side walls joining the partial walls and the upper wall to provide a watertight housing having a first compartment defined between the first partial wall and the upper wall and a deeper second compartment defined between the second partial wall and said upper wall, a wall in the second compartment slanted with respect to the vertical and dividing the same into a sump and a pump chamber, a tortuous passage in the first compartment opening at one end to the sump and communicating at its other end with said opening, a motor operated sump pump in the pump chamber and mounted on said slanted wall with the inlet of the pump opening

through the slanted wall and into the sump, a switch for energizing the motor, and a float in said passage and positioned to be buoyed upwardly by liquid flowing therein to actuate the switch.

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