Nov. 6, 1934. W. C. GROENIGER 1,979,739

COMBINED FLUSH VALVE AND WATER CLOSET

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Fig. 1.

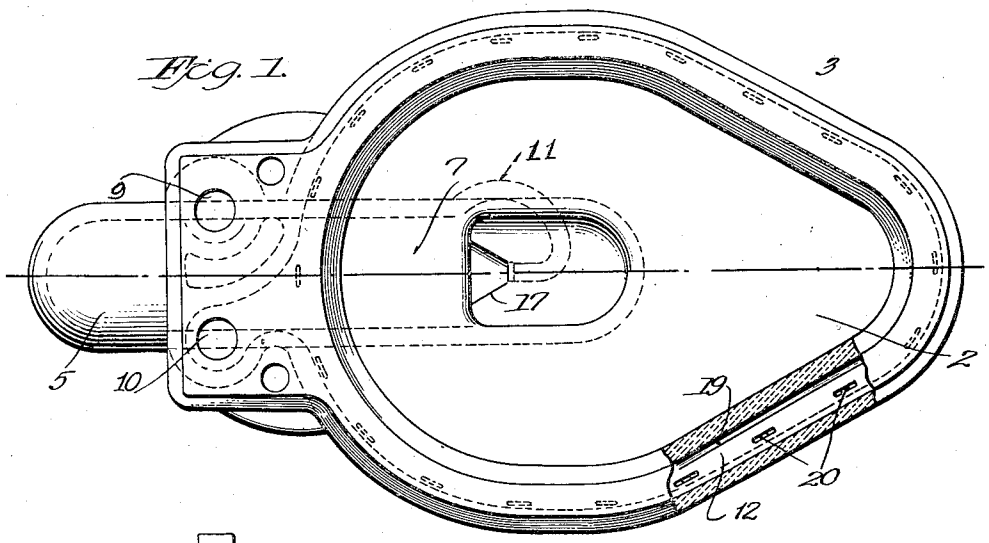
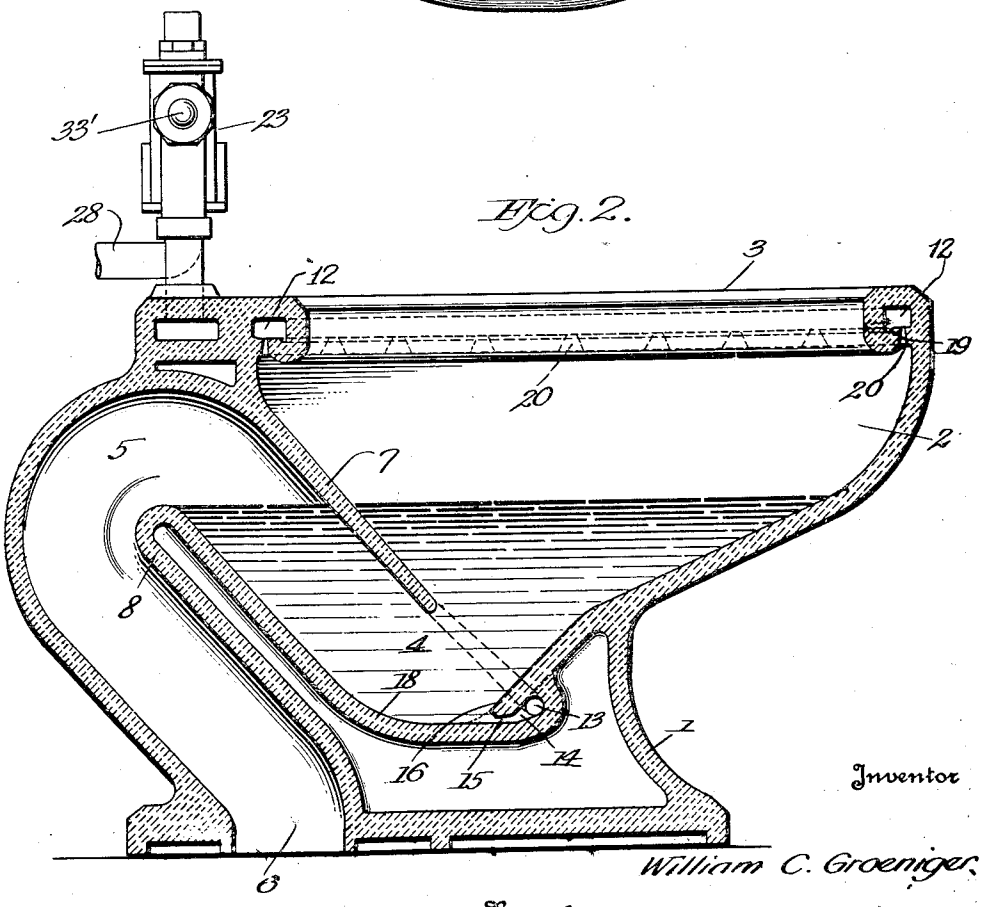


Fig. 2.



Inventor

William C. Groeniger.

By Lueliman, Dyer & Darby

Attorneys

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Fig. 3.

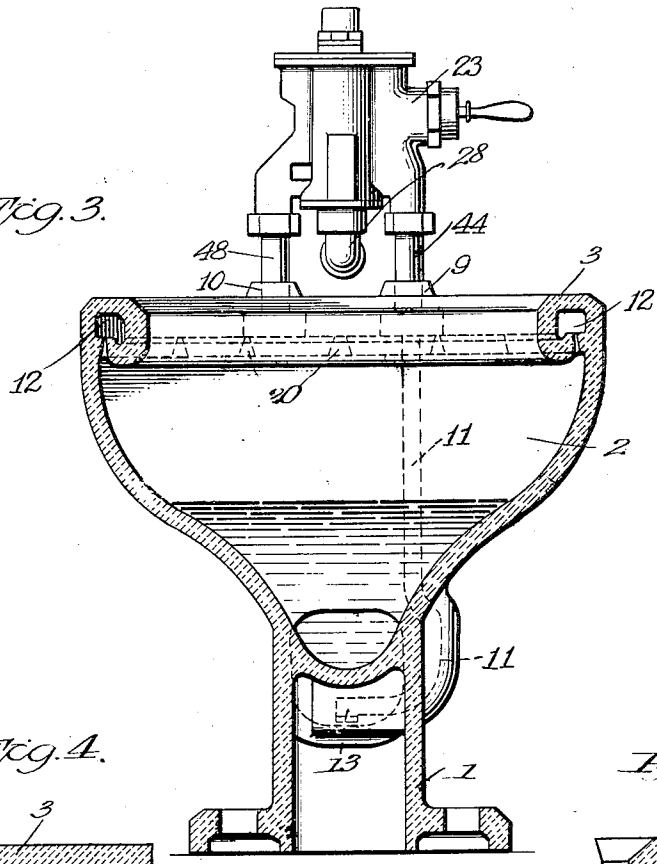


Fig. 4.

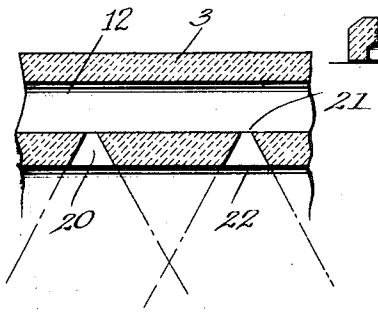


Fig. 5.

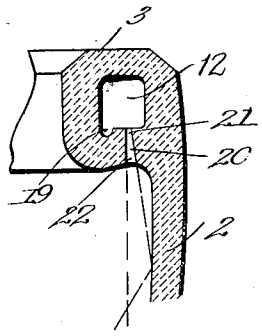
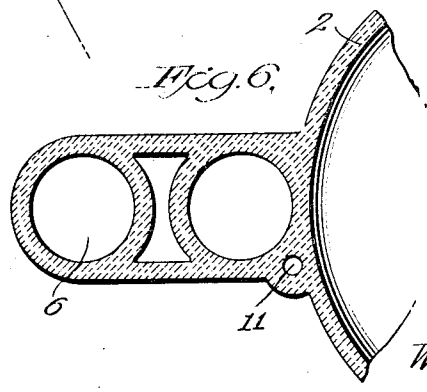


Fig. 6.



Inventor

William C. Groeniger.

By Cushman, Darby & Cushman

Attorneys

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UNITED STATES PATENT OFFICE

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COMBINED FLUSH VALVE AND WATER CLOSET

William C. Groeniger, Columbus, Ohio, assignor to Mueller Co., Decatur, Ill., a corporation of Illinois

Application November 10, 1930, Serial No. 494,741

2 Claims. (Cl. 4—73)

The invention relates to water closets and more particularly to the bowl construction.

Generally, water closet bowl construction is designed to accommodate a single water supply opening. The water is baffled into the various passages for the rim and jet operations. This is true of the siphon jet or blowout types of bowls, and the energy used to accomplish the desired result is volume of water, and the efficiency of operation is dependent on this factor.

It is also found that the trapway is baffled and restricted to produce a head of water in order to obtain siphonage. These baffles, restrictions, and turns in the trapway, while aiding in obtaining siphonage, also act as a trap for solid matter and cause stoppage and overflow of the bowl.

In such constructions, regulation and control of operation is not possible.

To overcome the aforementioned objections in the usual water closet construction, it is one of the objects of the invention to adequately and efficiently accomplish the two distinct functions of water closet performance, namely, removal of the contents of the trap and the scouring of the exposed bowl surface between the water closet seal and the flush rim.

Another object of the invention is to utilize a small volume of water and high pressure as compared with a large volume of water and different degrees of pressure found in ordinary water closet bowls.

Still another and important object of the invention is to procure the greatest possible sanitation.

With these and other objects and advantages in mind, attention is called to the drawings, in which

Figure 1 is a plan view of the water closet without the flush valve;

Figure 2 is a sectional side view of the water closet with the flush valve in elevation;

Figure 3 is a sectional end view of the water closet with the flush valve in elevation;

Figure 4 is an enlarged view of the rim nozzles;

Figure 5 is an enlarged sectional view of the rim passage and rim nozzles, and

Figure 6 is an enlarged sectional view of the trapway and supply to the jet, taken on the line C—C of Figure 2.

Referring specifically to the drawings in which like numerals indicate like parts, the bowl comprises a pedestal 1, a receptacle 2 and a rim 3. A trapway 4 and trap-return bend 5 leading into a waste outlet 6 are formed by the inverted dam 7 and the upright dam 8.

Provided at the rear of the rim of the bowl are two openings 9 and 10 through which water is supplied from the flush valve to a jet passage 11 and a rim passage 12 respectively.

The jet passage 11 comprises a small circular passage which extends from the opening 9 to the entrance of a jet 13 and is smooth surfaced and free from any obstructions, enlargements, and restrictions which might cause loss of pressure or head. There is provided a jet inlet 14 leading into a jet outlet 15. It will be noted that from the entrance to the jet 13 to the jet inlet 14, the shape of the jet passage changes from one of circular cross section to one of rectangular cross section, and continues in its transition from the jet inlet 14 to the jet outlet 15 and reaches the minimum of rectangular cross section at the latter point. The width of the jet remains constant and is equal to the diameter of the jet passage 11.

This construction results in a jet which delivers the water at a high velocity causing the water in the bowl to move up the trapway and out of the bowl.

A jet splash guard is provided at 16 and jet stream guides at 17 which control and direct the discharge from the jet. Jet passage 11 and the jet structure are so designed as to empty into the bottom of the trapway when the bowl is drained, thereby preventing breakage of the bowl due to water freezing in the jet passage.

The trapway is so designed that it is absolutely non-clogging and any objects passing into the trapway will continue out of the bowl. The use of the long radius trap-return bend 5 and the short radius curve 18 at the bottom of the trapway accomplish this result.

The rim passage 12 extends around within the rim 3 and is supplied with water from the flush valve through opening 10. On the bottom of the inner side there is provided a groove 19 filled with excess enamel in order that there will be a smooth waterway to allow drainage and prevent clogging due to obstructions. Rim ports 20 are arranged at various intervals in the bottom of the rim passage to give a two-directional flow to the water and are designed with small inlets 21 which diverge in width and depth to the outlets 22. The divergence in width causes the discharge from the adjacent nozzles to meet a short distance below the point of discharge, thereby scouring the inside surface of the bowl with a jet of water, as shown in Fig. 4; and the divergence in depth of the nozzles causes the particles of water adjacent the inside surface of the bowl to

strike said surface and be deflected back into the main discharge from the nozzles as shown in Fig. 5. Other particles of water which strike lower on the bowl surface act similarly and the result is a stream of water free from splash and noise which employs the energy of the pressure or head to discharge a small amount of water at a high velocity to scour the inside surface of the bowl.

The flush valve, which is the subject of another application, is designed to distribute the water at different sequences or simultaneously through the rim passage and jet passage.

It is understood that various modifications of the invention may be made without departing from the scope of the appended claims.

I claim:

1. The combination in a water closet of a bowl, a jet flush for said bowl, said jet flush comprising a passage having an outlet orifice to the bowl, the passage being substantially circular in cross-section and the orifice being substantially rectangular in cross-section.

2. A water closet having a bowl, a trap opening from the lowermost portion of said bowl, a jet flush valve, a jet passage extending from the valve to the lower portion of the bowl, the outlet thereof being inclined toward the bottom of the bowl and being vertically and laterally flared to provide a relatively wide opening into the trap for the jet.

WILLIAM C. GROENIGER.