United States Patent

Bowerman

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[54] FLUSHING SYSTEM

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[52] **U.S. Cl.** ..... **4/57 P**

[51] **Int. Cl.** **E03d 1/34**

[58] **Field of Search** ..... 4/57, 67, 67 A, 53, 57 P

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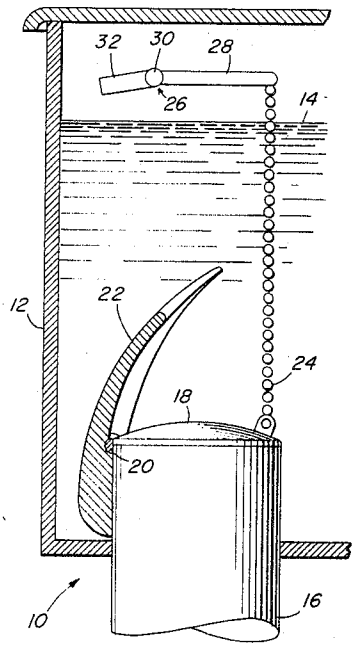
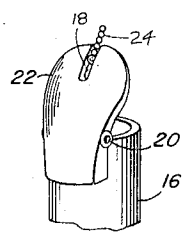
[57] **ABSTRACT**

A flushing control mechanism is provided for use particularly with water closets and the like. At the vertical upper end of a drain pipe extending into a tank is a hinged lid which, together with the end of the pipe, is normally located within the tank below the normal level of liquid contained therein. A shield extends above and partially over the end of the pipe whereby, when the lid is opened, the pressure of water flowing into the pipe will hold the lid open and against the shield until the water level drops sufficiently for the lid to drop of its own weight and then close the valve automatically.

3 Claims, 3 Drawing Figures





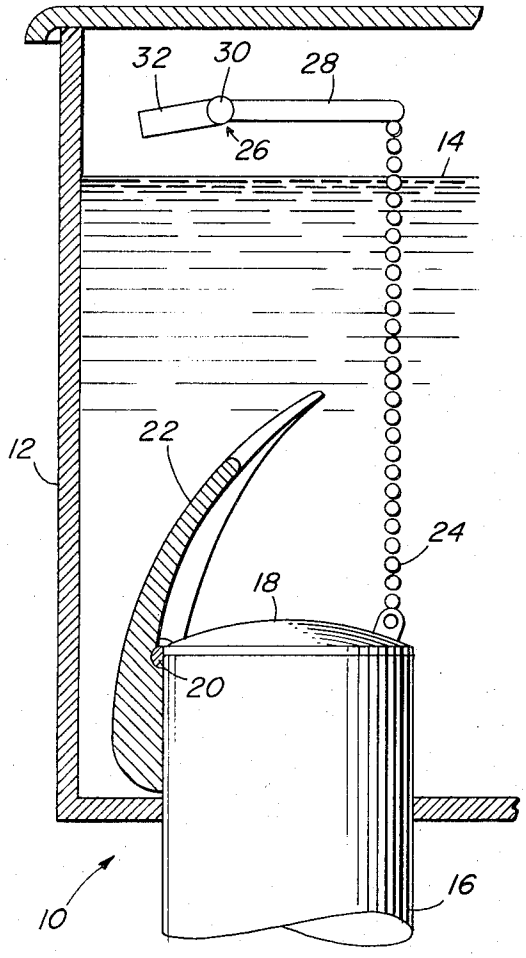


FIG. 1

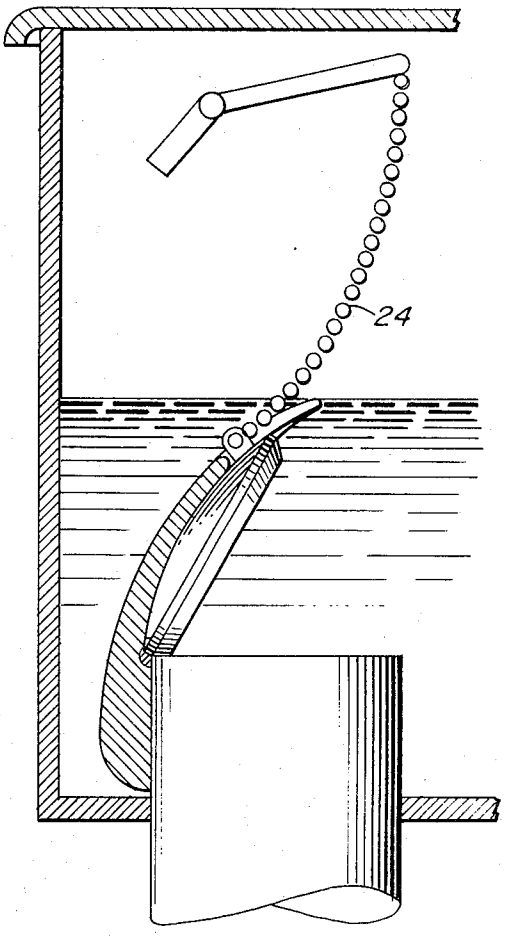


FIG. 2

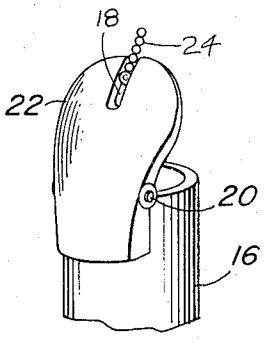


FIG. 3

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FLUSHING SYSTEM

BACKGROUND OF THE INVENTION

1 Field of the Invention

This invention relates generally to valves and more particularly is directed towards a new and improved flushing valve system for use with water closets or the like.

2. Description of the Prior Art

Conventional flushing mechanisms for water closets and the like employ a relatively complex mechanism which opens the valve during flushing action and closes the valve when the tank is substantially empty. While these mechanisms have long been available and have been put to wide use, they still require periodic servicing, usually as the result of the failure of one of the mechanical components or because one part becomes bound to another.

It is an object of the present invention to provide improvements in flushing valves and more particularly to provide a simplified flush valve of low cost design and one which is highly reliable for long periods of repeated use.

SUMMARY OF THE INVENTION

This invention features a flush valve system comprising a container such as a tank adapted to hold a quantity of liquid such as water, an outlet pipe extending through said container and having an open end thereof located below the normal surface of said liquid, a lid hinged to the end of said pipe, a shield extending up and over the end of said pipe in position to restrain the lid, when opened, the water pressure from the flow of liquid into the pipe serving to hold the lid open and against the shield until the pressure drops sufficiently for the valve to close automatically, and means for initially opening the valve.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a sectional view in side elevation showing a flush valve control mechanism made according to the invention with the valve closed,

FIG. **2** is a view similar to FIG. **1** showing the valve in an open position, and,

FIG. **3** is a view in perspective of the valve and shield assembly.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, the reference character **10** generally indicates a water closet comprised of a tank **12** adapted to contain a quantity of liquid such as water **14** and equipped with a flush or drain pipe **16** normally extending up through the bottom wall of the tank **12**. The upper end of the pipe **16** normally terminates near the bottom of the tank and well below the normal level of the water in the tank when full.

In accordance with the invention, the pipe **16** is provided with a lid or valve member **18** adapted, when closed, to seal the end of the pipe **16** and when open to allow the water to discharge rapidly out through the pipe to carry out the flushing action. The lid **18** is hinged at **20** to one side of the pipe opening along a line that is generally tangential to the peripheral end of the pipe opening.

Arching up over the end of the pipe **16** and connected thereto is a fixed shield **22**, the inner face of which preferably conforms to the outer contours of the lid **18** whereby, when the lid **18** is raised, as best shown in FIG. **2**, it will mate in cooperative engagement with the shield in the manner shown. In the preferred embodiment, the shield **22** is somewhat concave extending from the terminus of the pipe upwardly and inwardly over the open end of the pipe to a point approximately near the center line thereof. The lid **18** preferably is convex over its outer surface to fit against the concave inner face of the shield. The shield thus prevents the lid from swinging backwards beyond a point where it could not close under its own weight.

Attached to the lid **18** at a point opposite the hinge **20** is a chain **24**, or the like, suspended from an actuating device **26**. The device **26** is comprised of a lever arm **28** pivoted at **30** to the tank **12** with the chain **24** connected to the outer free end of the arm. A handle **32**, external to the tank **12**, is operatively connected to the lever arm whereby, when the handle **32** is depressed, the lever arm will be biased upwardly as in FIG. **2** to raise the lid **18**. As the lid is raised, the pressure of the water, which will then flow down through the pipe **16**, will force the lid against the shield **22**, holding it in the open position until most of the water has drained from the tank. As the water level drops, as in FIG. **2**, the pressure against the lid will abate and the lid will close itself automatically under its own weight. When the tank is refilled, the valve remains closed under the pressure of the water against the outside of the valve, the more water in the tank, the more pressure there will be against the valve to hold it tightly sealed.

The valve mechanism is extremely simple and reliable, may be fabricated at low cost and will provide efficient service over an extended period with little or no maintenance.

Having thus described the invention, what I claim and desire to obtain by Letters Patent of the United States is:

1. A flush valve for draining liquids from tanks and the like, comprising

a. a tubular member mountable upright to said tank and formed with an open end terminating below the normal surface level of said liquid,

b. a lid hinged to said member about the open end thereof of a size and shape for closing said end when positioned thereacross,

c. stop means in the form of a shield adjacent to said lid mounted to said member and extending above said end towards the centerline thereof for limiting the swinging movement of said lid wherein the pressure of the water flowing into said tubular member will hold the lid in open position against said shield until the water level drops sufficiently for the lid to drop of its own weight to close the open end of said tubular member, and,

d. actuating means for initially opening said lid.

2. A flush valve according to claim **1** wherein said actuating means includes lever means mounted above said lid and an elongated flexible member connected between said lever member and said lid at a point opposite the hinged portion thereof.

3. A flush valve according to claim **1** wherein said shield is concave.

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