United States Patent [19]

McCombs

[11] **3,787,902**

[45] **Jan. 29, 1974**

[54] **FLUSH TANK WATER-REGULATING ATTACHMENT**

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[22] Filed: **Dec. 6, 1971**

[21] Appl. No.: **204,903**

[52] **U.S. Cl.** ..... **4/67 A,** 4/34

[51] **Int. Cl.**..... **E03d 1/34,** E03d 5/02, E03d 5/10

[58] **Field of Search**..... 4/67, 53, 37, 34, 57, 57 P, 4/61 A

[56] **References Cited**

UNITED STATES PATENTS

2,526,294	10/1950	Stegeman	4/67 A
3,156,930	11/1964	Moulton et al.	4/67 A
2,532,977	12/1950	White	4/67 A
1,586,655	6/1926	Cook	4/57 R
3,141,177	7/1964	Kertell	4/53
3,538,519	11/1970	Weisz	4/67

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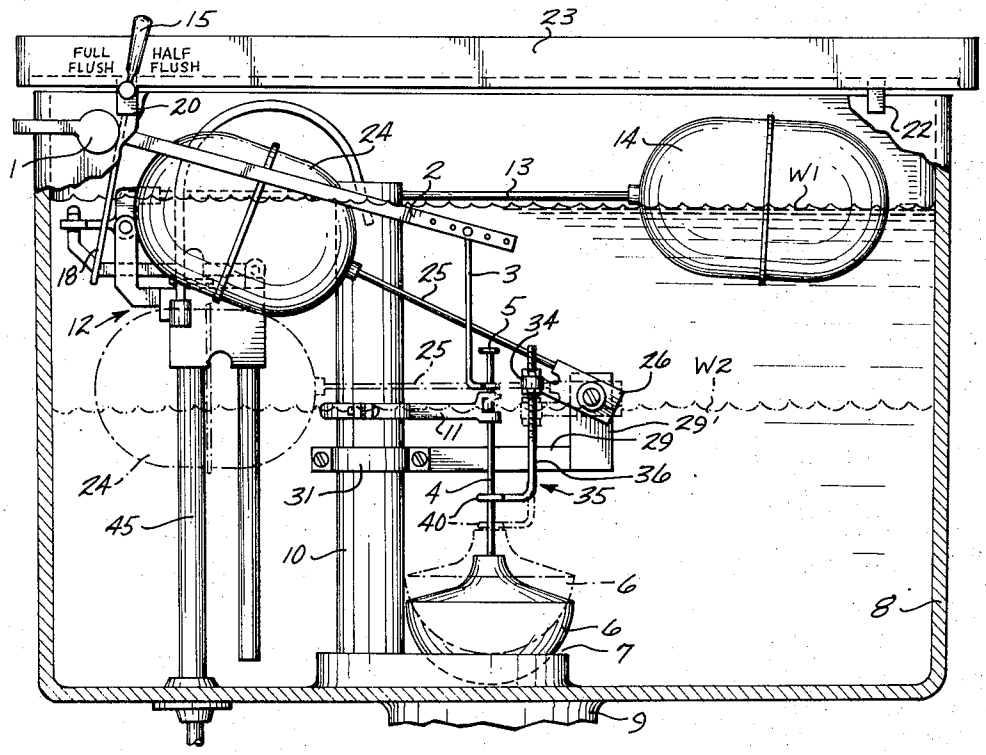
[57] **ABSTRACT**

The volume of water supplied to flush a toilet bowl is selected by setting a handle mounted externally on a flush tank, which handle swings a support lever between a nonlimiting position and a position for limiting downward travel of an auxiliary float. A float-actuated lever carries adjacent to its pivot a link for engaging the flush tank discharge valve to limit upward travel of such valve. The valve thereby remains close to its valve seat so that the valve is closed more quickly by pressure of the water on its upper surface and suction created by water flowing through the valve port, thereby substantially reducing the volume of water supplied to the bowl.

2 Claims, 5 Drawing Figures



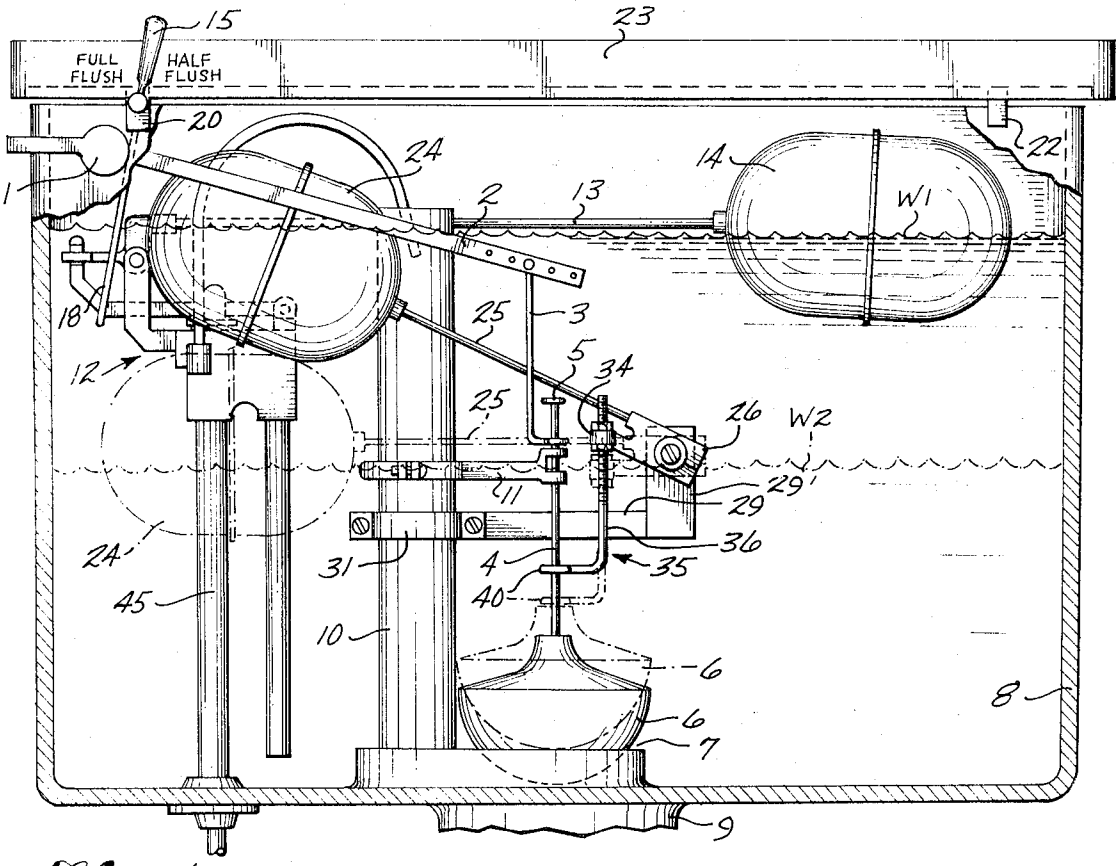
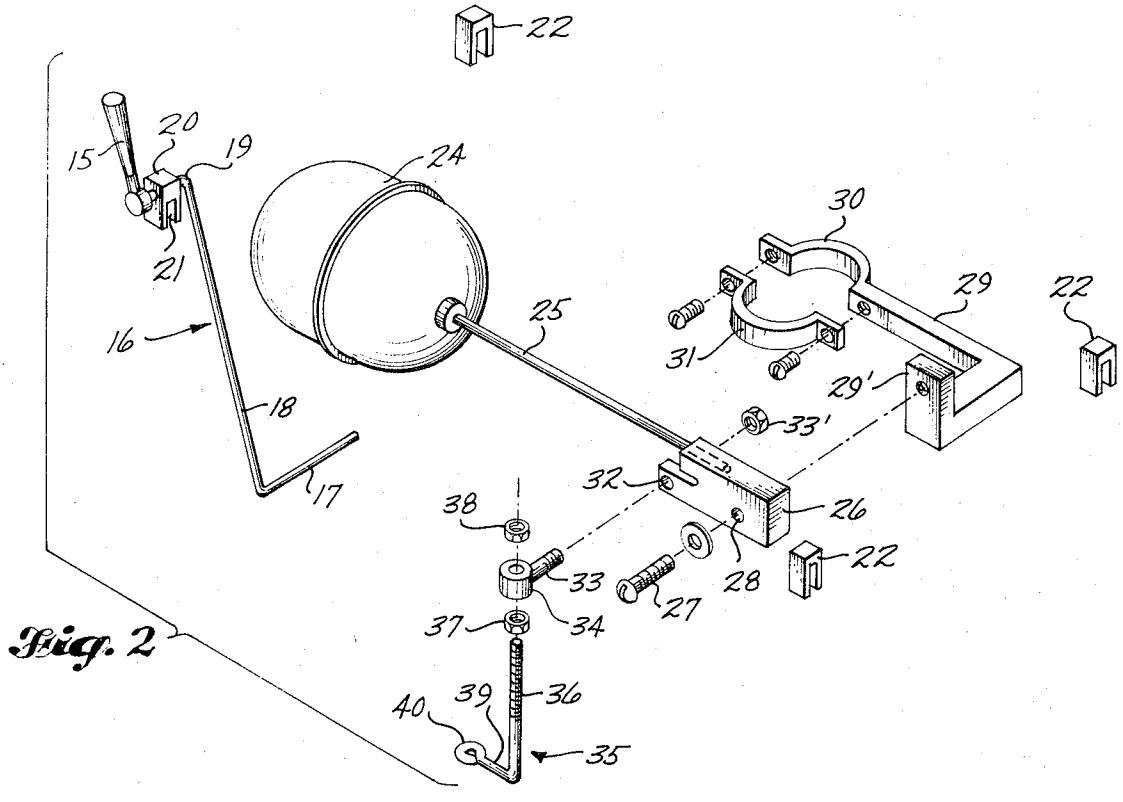

FULL FLUSH
HALF FLUSH
15
23
20
24
14
22
1
2
13
W1
18
25
3
12
5
34
25
26
W2
29'
11
29
24'
36
31
4
35
45
40
10
6
8
6
7
9

Fig. 1


22
15
20
19
24
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21
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29
22
16
31
29'
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33'
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26
38
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Fig. 2

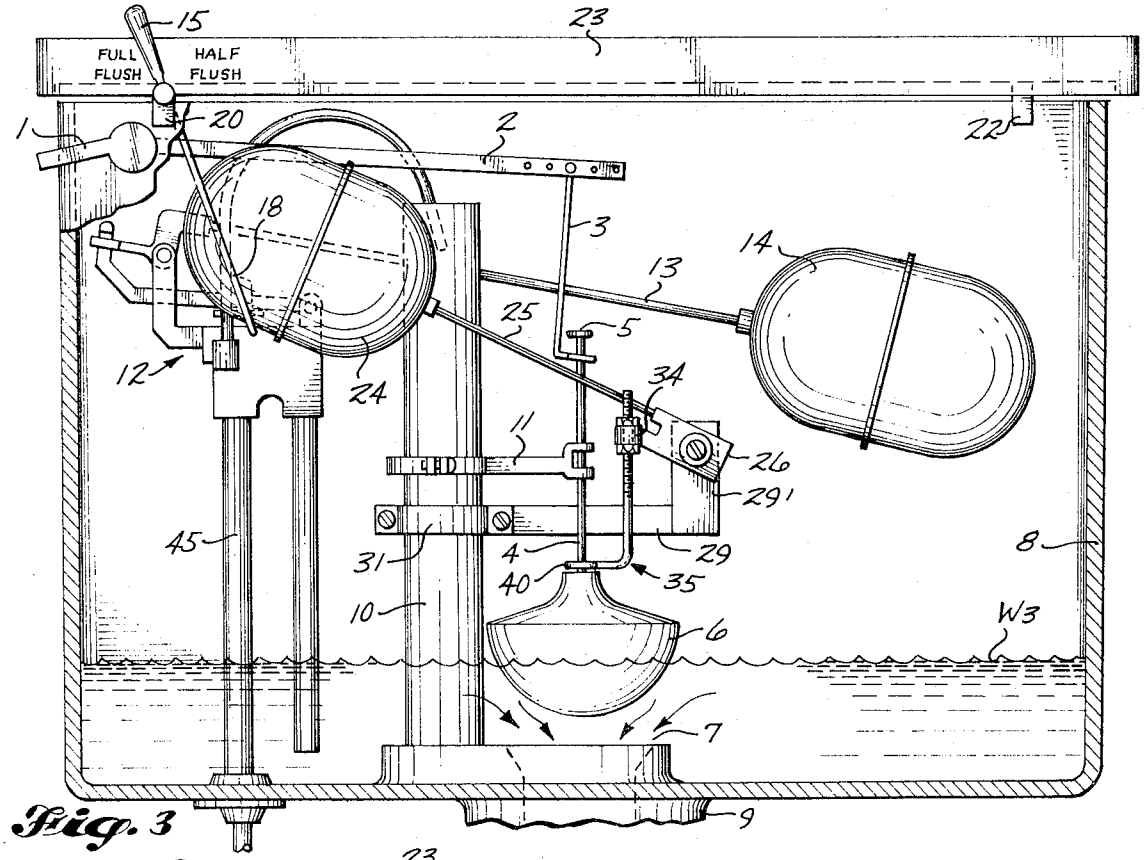

Fig. 3

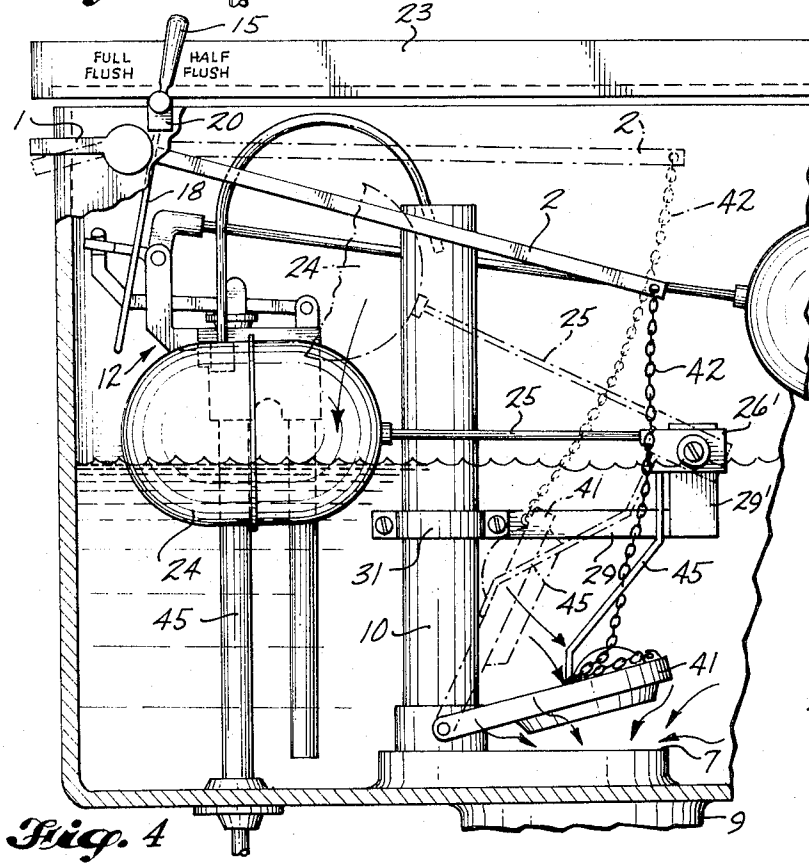

Fig. 4

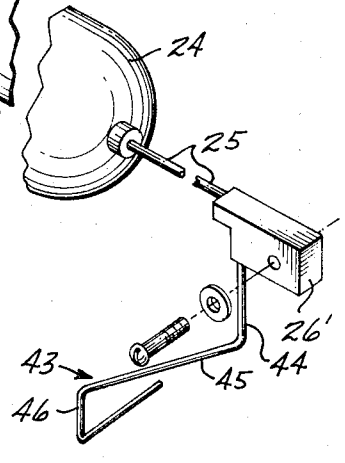

Fig. 5

FLUSH TANK WATER-REGULATING ATTACHMENT

It is the principal object of the present invention to provide an attachment for installed toilets whereby the volume of water supplied to the toilet bowl can be increased for flushing solid wastes and decreased for flushing liquid wastes to conserve water.

A further major object is to provide such an attachment which fits into a flush tank without modification of the tank or the flushing mechanism.

Another important object is to provide such an attachment whereby the water volume can be regulated independently of the operation of a standard flushing handle.

A further object is to provide a water volume control handle at a readily accessible location externally of the flush tank.

An additional important object is to provide an attachment which can be readily installed by an unskilled person using a minimum of tools.

It is a further object to provide water-volume-regulating attachments adaptable to be used with different types of flush valves.

Prior attempts to permit regulation of the water volume supplied by a flush tank to a toilet bowl, particularly when it is desired to modify an installed toilet, have either required replacement of standard parts of the flushing mechanism such as disclosed in United States Pat. No. 2,351,672, wherein a modified overflow pipe is required, or attachment of parts affecting the flush valve seal, such as the seal between the overflow pipe and the valve port in Pat. No. 2,351,672, or the auxiliary base conduit connected to the standard valve seat as in United States Pat. No. 3,237,211. Such modifications require greater skill by the installer both with respect to effecting watertight seals and to understanding the flushing mechanism.

The present invention on the other hand can be supplied for various flush tank models requiring the installer only to fasten two clamps onto parts of the flush tank and the flush mechanism which do not affect the water seals.

Another disadvantage of prior devices such as disclosed in the above-identified patents is that the operator of the flush tank must be familiar with and remember to differentiate between two flushing positions of the flush handle. If the flush handle is operated normally by moving it to its maximum extent, the water-saving advantage is lost. Consequently, use of the flush mechanism by a child or a stranger would usually result in maximum water usage and reduce the effectiveness of the mechanism. The attachment of the present invention provides a separate control lever so that water volume usage can be set independently and the standard flush handle may be manipulated normally for any volume setting.

FIG. 1 is a vertical section through a flush tank showing the flush mechanism and the attachment of the present invention in front elevation, parts being shown in different positions.

FIG. 2 is an exploded perspective of the elements of the attachment of the present invention.

FIG. 3 is a view similar to FIG. 1, but showing parts in a different position.

FIG. 4 is a view similar to FIG. 1, but showing a different type of flush valve and a modified form of attachment therefor, parts being broken away; FIG. 5 is an exploded top perspective of components of the attachment shown in FIG. 4, parts being broken away.

One common type of flush mechanism is shown in FIG. 1, which includes a flush handle 1 operable through lever arm 2 to lift a link 3 having an eye encircling the stem 4 of a ball valve. As the link is raised it engages a head 5 on the upper end of the valve stem to lift the ball 6 from its seat 7 to permit water from the tank 8 to pass through flush pipe 9 for flushing the toilet bowl. An over-flow pipe 10 supports a cantilever guide arm 11 for valve stem 4. Tank and bowl refill mechanism 12 is shut off in the usual manner by lever arm 13 being raised by float 14.

The attachment of the present invention includes a water volume control or selection lever 15 for swinging a support arm 16 between a float-supporting position indicated for convenience as the "full flush" position in FIG. 1 and a float-clearing position indicated for convenience by the legend "half flush." Support arm 16 includes a horizontal float-engaging portion 17, a substantially upright link 18, and a through rod 19 connecting the upright link and the control lever 15. Rod 19 extends through a sleeve in clip 20. The control lever 15 and clip 20 are shown on the front of the tank, but may be mounted on the back of the tank depending upon the preference of the installer, the spacing of the installed tank from an adjacent wall, and the clearance with respect to the flush mechanism for swinging of the horizontal float support 17.

Clip 20 having a groove 21 in its lower edge is preferably made of resilient material having a high coefficient of friction, such as a rubber compound, so that it can simply be pressed onto the flush tank rim and will maintain its position despite any normal displacing forces created by operation of the control lever. Since many flush tanks have a continuous horizontal rim and it is preferred that no modification of the installed flush tanks be required, the through rod retaining portion of the clip will extend above the tank rim. Consequently, at least one spacer clip 22 is provided for the same side of the tank rim to prevent rocking of the tank cover 23. Additional spacer clips 22 may be provided for the opposite tank side to level the cover. Some tanks include recesses in the back rim which may be utilized to receive the sleeve clip 20 and thereby eliminate the need for any spacer clips.

An auxiliary float 24 operates a lever arm 25 to swing block 26 about bolt 27. The bolt extends through bore 28 in block 26 and through ear 29′ of stationary bracket 29 whereby the block is swingably supported by such bracket. The bracket is mounted in cantilever fashion on the overflow pipe 10 by a split ring clamp 30,31. Swingable block 26 has an aperture 32 for receiving the threaded stem 33 of a collar 34. Nut 33′ secures the collar stem in the block aperture. A valve ball engaging member 35 has an upright leg 36 threaded along a substantial portion of its length. Leg 36 carrying a lower nut 37 is insertible through collar 34, and an upper nut 38 can be tightened to clamp the collar between the two nuts. The horizontal leg 39 of member 35 terminates in a collar 40 through which the valve stem 4 extends, as shown in FIGS. 1 and 3.

Normally the flush tank stores water at level W1. When the water volume selection lever 15 is set at "half flush," float support arm 16 is swung to the left as shown in FIG. 1, so that auxiliary float 24 can drop with

the water level upon operation of the flush handle **1**. As float **24** drops, block **26** swings downward to lower the member **35**. After the valve ball has been lifted by link **3** to float freely and the water level drops to W2, float **24**, valve ball **6** and member **35** reach their broken-line positions shown in FIG. **1** so that collar **40** engages the top of the valve ball. The valve ball will be pressed downward by collar **40** as the water level continues to drop so that the downward forces exerted by collar **40** and the downward component of the water pressure above the valve ball will override the buoyant forces exerted by the water on the sperical surface of the ball. The decrease in water pressure below the ball created by water flowing through flush pipe **9** additionally cooperates with such forces to close the valve quickly so that the minimum water level will be slightly below level W2.

When selection lever **15** is in the "full flush" position shown in FIG. **3**, support arm **16** will be swung to the right as seen in that figure, to prevent downward movement of auxiliary float **24** as the water level drops. While it is not necessary that the auxiliary float rest on float-engaging portion **17** when the tank reservoir is at its normal level W1, link **18** must be sufficiently short and arresting member leg **36** must be adjusted so that downward movement of the float is limited at a location to hold the collar **40** above the level of maximum height to which valve ball **6** can be raised by link **3**. When arm **16** is in its float-supporting position, valve ball **6** will be lifted to its maximum height by flush handle **1** through lever arm **2** and link **3**, to permit the water level to drop to W3, indicated in FIG. **3**, before the valve ball responds to the suction created by outflow of water to close the valve.

A considerable amount of water is saved during each flushing operation when the attachment is set for valve-ball arresting operation which saving is represented by the difference between water lavel W2 in FIG. **1** and level W3 in FIG. **2**. It has been found that the arresting member **35** can be set so at least one gallon is saved in each flushing operation during which the attachment is operable without adversely affecting the efficiency of flushing liquid wastes or even a small amount of solid wastes from the toilet bowl.

The parts of the attachment can be readily fabricated from material resistant to water corrosion. For example, support arm **16**, lever arm **25** and valve-engaging member **35** could be formed from stock copper rod. Auxiliary float **24** can be any standard flush tank float. Block **26**, bracket **29** and clamp **30,31** can be made of lightweight rigid plaStic. It is preferred that collar **40** of the arresting member have a relatively large opening to prevent frictional engagement of the collar with valve stem **4** during normal elevational movement of the stem and to prevent binding from slight tilting of the upright leg **36** due to the arcuate path of collar **34** receiving the valve-engaging member **35**.

The attachment can be readily manufactured to fit various models of installed flush tanks simply by selecting the lengths of support arm **16**, lever arm **25**, bracket **29** and arresting member **35** to clear the standard flushing mechanism.

FIGS. **4** and **5** show a water-saving attachment with a modified valve-engaging member adapted for use with flushing mechanism having a valve flap **41** operated by a chain **42** connected between the flap and lever arm **2** operable by flush handle **1**. The components of the attachment are substantially the same as shown in FIGS. **1** to **3**, except the arresting member **43** which includes an upright **44** projecting downward from the block **26'**. Cantilever stretch **45** extends from the upright substantially horizontally in a vertical plane at an acute dihedral angle to the vertical plane in which float **24** and lever arm **25** swing. From the end of the cantilever stretch remote from upright **44** depends a flap-engaging angle **46**. When the parts are in the broken-line full-flush position of FIG. **4**, the angular disposition of cantilever stretch **45** permits flap **41** to be swung to its maximum open position. When auxiliary float **24** is operable to drop with the water level in the tank, the angle **46** will engage flap **41** to arrest and reverse its opening motion as shown in full lines in FIG. **4**. Although block **26'** is shown to be of somewhat different configuration than the block **26** of FIG. **2**, upright **44** of valve-engaging member **43** could be mounted as shown in that figure by being threaded and secured in a collar **34** by nuts **37** and **38**, or block **26** could include a blind bore in its lower edge to receive upright **44** with a press fit.

In some flush tanks the overflow pipe tilts with the flap of a flap valve, so that alternative bracket means would be required. Such a bracket might be mountable on the water supply tube **45** shown in FIG. **4**, or the bracket might be attached by screws to a mounting block glued or cemented to the back wall of a flush tank.

I claim:

1. A flush tank attachment for cooperating with a flush valve comprising lever means, a float connected to said lever means and movable in response to changes in flush tank water level, valve-engaging means connected to said lever means at a location spaced from said float and operable by downward movement of said float to expedite closing of the valve, a float support movable between a float-supporting position in which said float support is engageable with said float to limit downward movement thereof for operating said valve-engaging means and a float-clearing position, a float support control handle located externally of the flush tank, and means for connecting said float support and said external control handle to effect shifting of the float support between float-supporting position and float-clearing position by movement of said control handle.

2. The attachment defined in claim **1**, and a resilient clamp engageable with the flush tank rim for supporting the connecting means.

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