Nov. 17, 1964 C. J. MOULTON ETAL 3,156,930

WATER SAVER FOR FLUSH TANK TOILETS

Filed Oct. 28, 1963 2 Sheets-Sheet 1

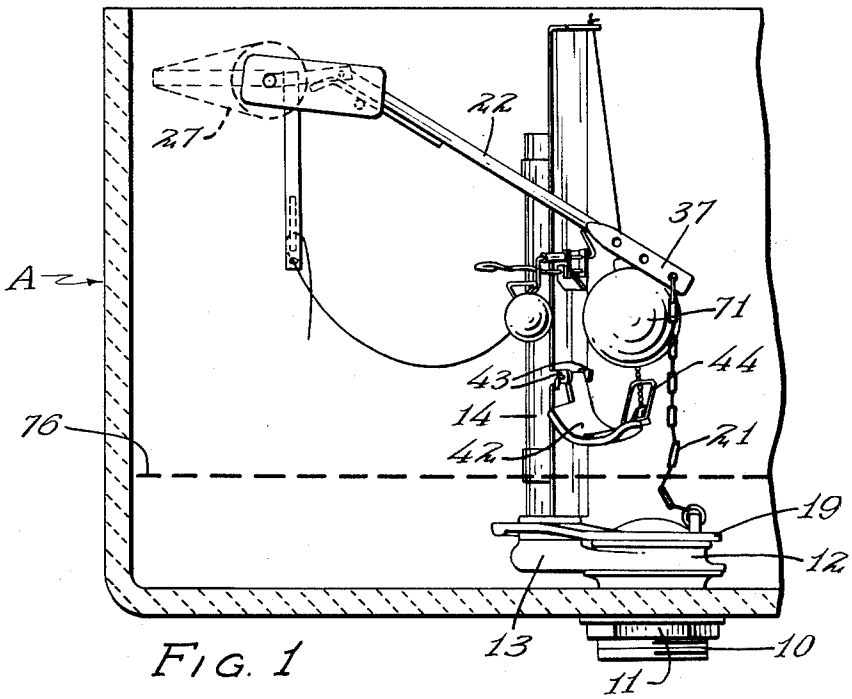


FIG. 1

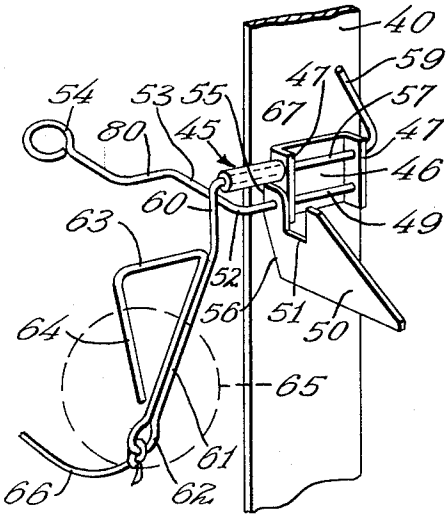


FIG. 2

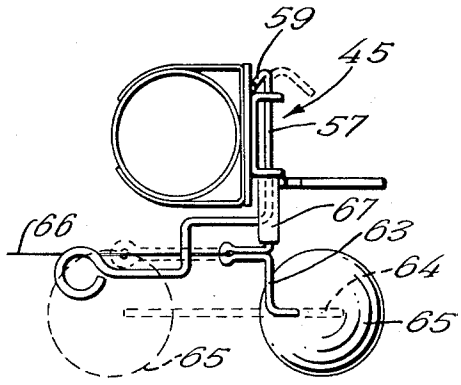


FIG. 3

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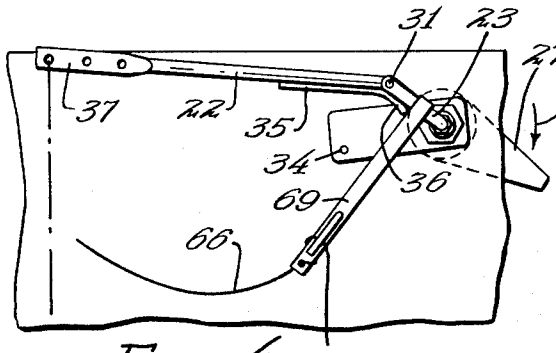


FIG. 4

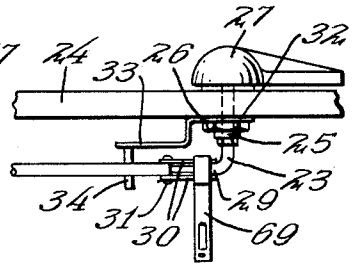


FIG. 6

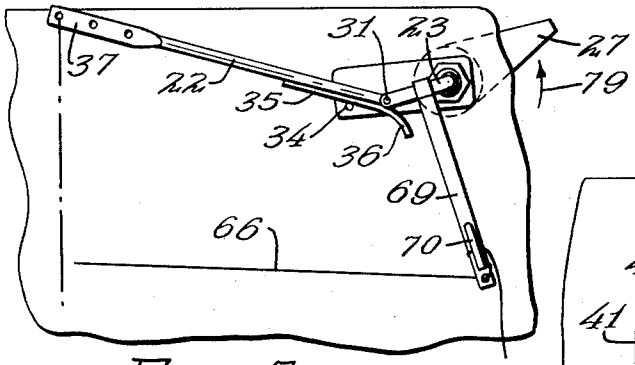


FIG. 5

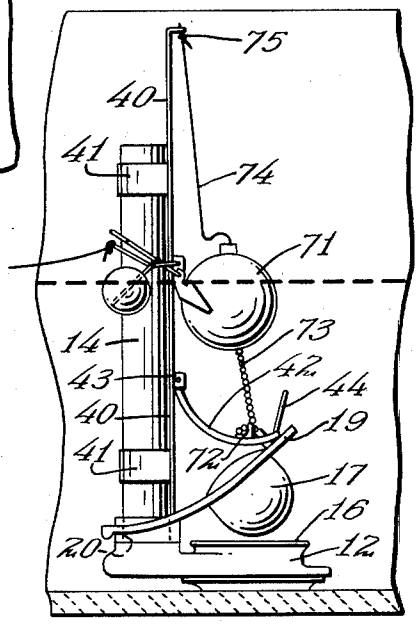


FIG. 8

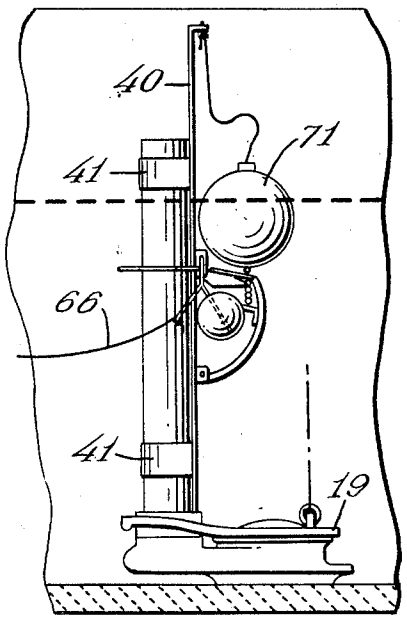


FIG. 7

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United States Patent Office 3,156,930 Patented Nov. 17, 1964

3,156,930

WATER SAVER FOR FLUSH TANK TOILETS

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Filed Oct. 28, 1963, Ser. No. 319,431
10 Claims. (Cl. 4—67)

This invention relates to an improvement in water saver for flush tank toilets and deals particularly with an apparatus capable of providing either a partial flush or a full flush of the toilet.

While the water is a commodity which is usually furnished at low cost, it is also a commodity which, in some areas at least, is becoming more difficult to obtain. The flushing of a conventional toilet requires the use of several gallons of water. Often this amount of water is not at all necessary in order to properly flush the toilet. Accordingly, it is the purpose of the present invention to provide a means of flushing the toilet with only a portion of the full tank where only this amount of water is necessary to accomplish the desired result.

It is recognized that previous devices have been designed to produce a similar result. However, most of these previous devices do not have the positive action which is present with the device illustrated in the present invention. If a full flush is desired, the tank is flushed in the conventional manner. However, if but a partial flush is desired, a float control pressure plate is provided which functions upon the toilet outlet valve when the level of water in the tank drops to a predetermined level. This pressure plate causes the tank outlet valve to close at a much earlier time than is normal, thereby retaining a predetermined proportion of the water within the tank.

A feature of the present device resides in the fact that the pressure plate acts directly against the tank outlet valve, the weight of the pressure plate causing the premature closing of the valve. When the tank is to be fully flushed, it is only necessary to latch the pressure plate from operating, permitting the tank to flush in the normal manner.

An added feature of the present invention lies in the provision of a novel means of operating the latch which controls the operation of the pressure plate. The latch is controlled by a lever arm which is pivotal on a generally horizontal axis and which supports a float. The lever arm extends downwardly from the pivot and the float is swingable through a dead center position in which the float is directly below the pivot. When the float is in one side of the pivot axis, the latch is held in engaged position. In this position, the latch supports the pressure plate in inoperative position. When the lever arm is swung past dead center position to its other extreme position, it engages the latch in a manner to disengage the same. In either of its extreme positions, the lever arm is normally held from movement by the buoyancy of the float. Means is provided for swinging the float from one extreme position in which the latch is engaged to its other extreme position in which the latch is disengaged.

A feature of the present invention resides in the fact that the apparatus is particularly designed for use in conjunction with a valve which is of resilient nature and which swings from open to close position by the resiliency of the valve body. The pressure plate is supported above the valve and acts to hold the valve in a slightly inclined position. This does not materially affect the operation of the valve during a full flush. However, the weight of the pressure plate acts to swing the valve downwardly more quickly than would otherwise be the case in the event the pressure plate is not held in inoperative position.

A further feature of the present invention resides in the provision of an apparatus of the type described which is adjustable to fit toilets of various sizes and shapes. In the arrangement illustrated, the apparatus comprises an attachment which will be slidably supported upon the standard overflow pipe of a flush toilet which also usually supports the outlet valve of the tank. Means is provided for actuating the device either in conjunction with the conventional handle which acts to unseat the discharge valve so that the tank may flush or it may be controlled by a separate attachment if preferred.

These and other objects and novel features of the present invention will be more clearly and fully set forth in the following specification and claims.

In the drawings, forming a part of the specification:

FIGURE 1 is a sectional view through a portion of a toilet flush tank showing the general arrangement of parts therein.

FIGURE 2 is a perspective view of a detail portion of the operating apparatus.

FIGURE 3 is a top plan view of the operating apparatus in position upon the overflow pipe of the toilet.

FIGURE 4 is a diagrammatic view showing the toilet operating handle which is being operated in a direction to provide a conventional full flush of the tank.

FIGURE 5 is a view similar to FIGURE 4, but showing the toilet operating handle being operated in a manner to provide a partial flush of the tank.

FIGURE 6 is a top plan view of the toilet handle assembly.

FIGURE 7 is a sectional view through the tank showing the operating mechanism in one extreme position.

FIGURE 8 is a view similar to FIGURE 7 showing the operating mechanism for producing a partial flush of the tank.

The toilet tank is indicated in general by the letter A and is of generally conventional form. The outlet pipe which is connected to the bowl of the toilet extends through the bottom of the tank and is indicated by the numeral **10** being held in place by a nut **11**. A valve chamber **12** is provided within the tank A and is provided with an open upper end. The valve chamber **12** normally includes a laterally extending manifold **13** which communicates with the lower end of a hollow overflow pipe **14**. The arrangement is such that should the tank A receive an excess of water so that the level raises above the top of the outlet overflow pipe **14**, the water will flow downwardly through the overflow pipe and through the manifold **13** and the outlet pipe **10**. In view of the fact that the inlet valves and the floats which control the operation of the inlet valves are well known in the art and have no connection with the present invention, the inlet valve and the water level controlling float have been omitted from the drawings in order to better illustrate the mechanism.

The valve chamber **12** includes an open upper end **16** which is preferably tapered to act as a valve seat. A rounded valve **17** is designed to fit into the valve opening **16** to act as a closure. A valve **17** is preferably formed of molded rubber or similar material and includes a flat supporting portion **19** which includes a circular opening **20** designed to fit snugly about the lower end of the overflow pipe **14** or the upper portion of the socketed part which supports the overflow pipe **14**. A flexible member such as a chain **21** is secured to the outer end of the valve support **19** and is adjustably connected to an arm **22** forming a part of the operating apparatus.

As indicated in FIGURE 6 of the drawings, an angular arm **23** extends through the wall **24** of the tank A and is pivotally supported by an externally threaded bushing **25** extending through the tank wall and held in place by suitable clamping nuts such as **26**. A handle **27** is pro-

vided on the outer end of the angular shaft 23 by means of which the shaft may be rotated through a predetermined arc. The angularly turned end 29 of the arm or shaft 23 extends generally parallel to the tank wall 24 and includes laterally spaced arms 30 forming a bifurcated shaft end. The end of the operating arm 22 most remote from the end connected to the chain 21 is pivotally connected as indicated at 31 to the bifurcated shaft end. The pivotal connection 31 is usually substantially horizontal and normal to the plane of the tank wall 24.

A bracket 32 is secured to the inner surface of the tank wall 24 by the clamping nuts 26 and includes an inwardly offset extremity 33 on which is mounted stop pin 34. As is illustrated in FIGURE 5 of the drawings, the arm 22 is provided at its pivoted end with a bracket arm 35 having an angular end 36 which is designed to engage against an angularly turned end 29 of the angular shaft 23 as is indicated in FIGURE 4 of the drawings. When in its normal position, the operating knob or lever 27 is in a generally horizontal position as indicated in FIGURE 1 of the drawings. However, when the handle or knob 27 is turned in a clockwise direction as viewed in FIGURE 4, the angularity between the shaft 23 and the arm 22 remains the same, and the movement of the handle lever or knob acts to raise the end 37 of the lever 22 to which the chain 21 is attached. Movement of the handle lever 27 in a counterclockwise direction as viewed in FIGURE 5 lowers the pivot point 31 until the arm 22 engages the stop pin 34. Further pivotal movement of the operating handle causes the arm 22 to change angularity with respect to the shaft 23, causing the end 37 of the arm which is connected to the chain 21 to move upwardly. In other words, the operating handle illustrated is double acting so that pivotal movement of the handle in either direction causes the raising of the free end 37 of the arm 22, this movement acting through the chain 21 to raise the valve 17 away from its seat in the valve chamber 12.

The short flush attachment will now be described. In the form illustrated, the attachment comprises an elongated flat strip 40 of material not affected by its immersion in water. The strip 40 is held in place upon the overflow pipe 14 by a pair of vertically spaced spring clamps 41 which encircle the major portion of the circumference of the overflow pipe. A curved pressure plate 42 is pivotally supported by a pair of parallel ears 43 extending from opposite side of the strip 40. The pressure plate 42 is located so as to exert a downward force upon the upper surface of the valve support 19 when the pressure plate is not held in an elevated position. The pressure plate 42 is provided with an upwardly extending latching loop 44 for a purpose which will be described.

The latch assembly which is illustrated in general by the numeral 45 is best illustrated in FIGURES 2 and 3 of the drawings. A channel 46 having parallel vertically extending channels sides 47 is secured in any suitable manner upon the strip 40. A pivot shaft 49 is pivotally supported by the channel sides 47 and acts to support a generally wedge shaped latch 50 having a notch 51 into which the latching loop 44 on the pressure plate 42 may engage. The pivot shaft 49 is bent at generally right angles at 52 to provide a counter-balancing arm 53 having an offset loop end 54. The counter-balancing arm 53 normally holds the latch 50 in loop engaging position. The upward swinging of the latch member 50 is limited by a shoulder 55 on the latch which engages the surface of the strip 40 when the latch is in extreme position. The latch is free to pivot downwardly to permit the engagement of the loop 44 therewith. The loop 44 is best illustrated in FIGURE 1 of the drawings. The downward pivoting of the latch 50 is limited by a second shoulder 56 of the rear edge of the latch.

The latch mechanism also includes a second pivot shaft 57 which extends through the channel sides 47 and includes an angularly bent end 59 which is designed to engage against the strip 40 to limit the pivotal movement of the shaft 57 in one direction. The other end of the shaft 57 is bent in a downward direction as indicated at 60, the shaft end 60 including an operating arm 61 having a looped end 62, and a second arm portion including a portion 63 which extends generally parallel to the shaft 57 and a down turned extremity 64 which supports a float 65. As indicated in FIGURE 3 of the drawings, the float 65 is normally forwardly of the axis of the shaft 57 and the shaft is normally held in this position by the buoyancy of the float 65. However, a flexible cord or chain 66 is connected to the loop 62 by means of which the arm end 64 may be swung past vertical position where the buoyancy of the float will swing the float indicated in dotted outline in FIGURE 3 of the drawings. In order to hold the various parts properly spaced, a spacing sleeve 67 encircles the shaft 57 outwardly of one of the channel sides 47.

An arm 69 is secured to the angularly turned end 29 of the handle shaft 23 by any suitable means and projects in a generally downward direction therefrom as indicated in FIGURE 1 of the drawings. Adjustable attaching means 70 is provided on the lower end of the arm 69 to which the flexible cord 66 is connected. A float 71 is adjustably connected to the upper surface of the pressure plate 42 as indicated at 72 by a chain or cord 73. A flexible cord or chain 74 connects the float 71 to the upper end of the strip 40 as indicated at 75.

The operation of the apparatus may now be described. Assuming the tank has been flushed, the water level may be indicated in FIGURE 1 at 76, below the mechanism. FIGURE 1 is not strictly a true view as it shows the mechanism in position for a partial flush, but in this particular position, all of the parts may be more readily illustrated. As the water level raises, the float 71 moves upwardly swinging the pressure plate 42 upwardly until the latch 44 engages in the notch 51 of the latch 50. The apparatus is thus reset automatically for the next operation. The float 65 normally assumes its forward position by gravity when the water level falls below the float. Thus as the level of the water increases, the float 65 is urged into the forward position illustrated in full lines in FIGURE 3 by the buoyancy of the float.

When it is desired to completely flush the tank, the operating handle 27 is turned in the direction of the arrow 77 in FIGURE 4 of the drawings. This action causes the valve 17 to be raised from its seat in the usual manner but the latch 50 remains engaged with the latch loop 44 on the pressure plate 42 and as a result, the latch mechanism remains in the position illustrated in FIGURE 7 of the drawings until the tank is flushed. As the tank refills, the latch mechanism still remains engaged.

If it is desired to only partially flush the tank, the handle 27 is turned in the direction of the arrow 79 in FIGURE 5 of the drawings. When turned in this direction, tension is applied to the connecting cord 66 swinging the float supporting shaft 57 in a clockwise direction as viewed in FIGURES 2, 7, and 8 of the drawings. As this occurs, the buoyancy of the float 65 causes the arm 60, 61 to engage the offset portion 80 of the counterweight arm 53 disengaging the latch 50 from the latch loop 44 and permitting the pressure plate 42 to swing downwardly as soon as the water level lowers the float 71 to the extent necessary to permit the downward swinging of this pressure plate. The downward swinging of the pressure plate acts against the valve support 19 to urge the valve 17 downwardly toward its seat long before it would normally do so. As a result, the valve closes while the tank is only partially flushed.

It should be understood that the construction which has been illustrated in the drawings are shown for the purpose of illustration other than as the manufactured product. For example, the latch mechanism is shown

formed of bent wire rod which could not in actual practice be readily detached for replacement. Furthermore, the operation of the apparatus has been shown and described as being applicable to toilet tanks of the type which may be flushed by turning the operating handle in either direction. It should be understood that other means may be provided for applying tension to the flexible connector 66 to unlatch the latch mechanism when a short flush is desired.

In accordance with the patent statutes, the principles of construction and operation of this improvement in Water Saver have been described, and while an endeavor has been made to set forth the best embodiment thereof, it should be understood that changes may be made within the scope of the following claims without departing from the spirit of the invention.

What is claimed is:

1. A water saving device for use in conjunction with the flushing mechanism of a flush tank having a discharge opening at its lower end, a valve for controlling said discharge opening, a manually operable arm pivotally supported in said tank and means connecting said arm to said valve to lift said valve upon pivotal movement of said arm, said device including:

a pressure plate,

means movably supporting said plate above said valve for engagement with said valve,

a latch normally supporting said pressure plate out of engagement with said valve, and

manually operable means for releasing said latch to cause said pressure plate to exert a downward force on said valve.

2. The structure of claim 1 and including float means connected to said pressure plate for normally holding said pressure plate from exerting pressure on said valve until the water level in said tank drops a predetermined distance.

3. A water saving device for use in conjunction with the flushing mechanism of a flush tank having a discharge opening at its lower end, a valve for controlling said discharge opening, a manually operable arm pivotally supported in said tank and means connecting said arm to said valve to lift said valve upon pivotal movement of said arm, said device including:

a pressure plate,

means pivotally supporting said pressure plate for movement toward and away from said valve,

a latch engageable with said pressure plate to hold the same from exerting a downward force upon said valve, and

manually operable means for releasing said latch to cause said pressure plate to exert a downward force upon said valve.

4. The structure of claim 3 and including a float connected to said pressure plate to hold said plate from exerting a downward force upon said valve until the water level drops a predetermined distance.

5. The structure of claim 3 and in which said manually operable releasing means includes holding said latch released until the water level in the tank drops a predetermined distance.

6. The structure of claim 3 and in which said manually operable releasing means includes an arm swingably supported adjoining said latch and including a float swingable to opposite sides of a dead center position,

said float urging said arm toward either of two extreme positions on opposite sides of dead center position,

said arm, in one extreme position, holding said latch disengaged.

7. The structure of claim 6 and in which said manually operable releasing means includes means for swinging said arm from the other said extreme position to said one extreme position.

8. A water saving device for use in conjunction with the flushing mechanism of a flush tank having a discharge opening at its lower end, a valve for controlling said discharge opening, a manually operable arm pivotally supported in said tank and means connecting said arm to said valve to lift said valve upon pivotal movement of said arm, said device including:

a pressure plate,

means pivotally supporting said pressure plate for movement toward and away from said valve,

a latch engageable with said pressure plate to hold the same from exerting a downward force upon said valve, and

manually operable means for releasing said latch to cause said pressure plate to exert a downward force upon said valve,

a float valve connected to said pressure plate and capable of returning said pressure plate to latched position upon a rise in water level within said tank.

9. The structure of claim 8 and in which said latch is normally biased toward latched position.

10. The structure of claim 9 and in which said manually operable releasing means includes an arm swingably supported adjacent to said latch and including a float swingable to opposite sides of a dead center position,

said float urging said arm toward either of two extreme positions on opposite sides of said dead center position,

said arm, in one said extreme position, engaging said latch and holding the same disengaged.

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