June 7, 1960 W. P. WOOD 2,939,152

WATER SAVING MEANS FOR WATER CLOSETS

Filed Oct. 30, 1958

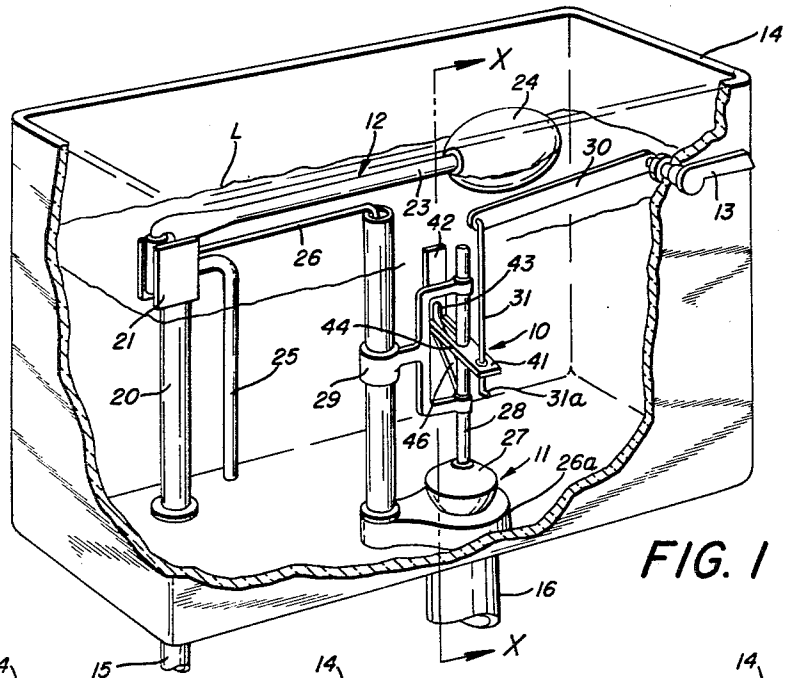


FIG. 1

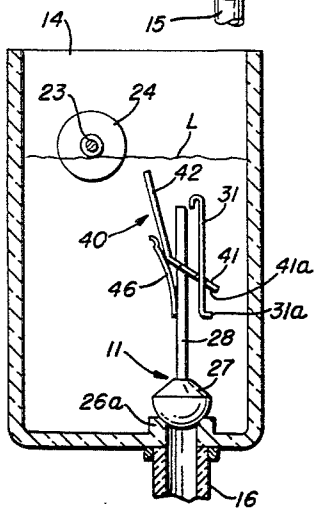


FIG. 2

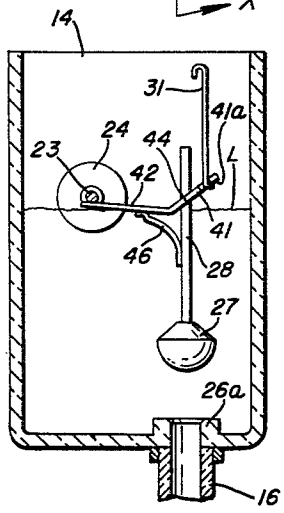


FIG. 3

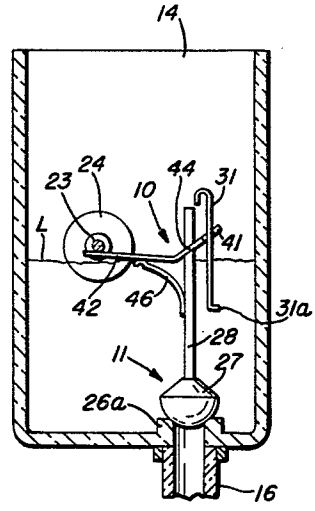


FIG. 4

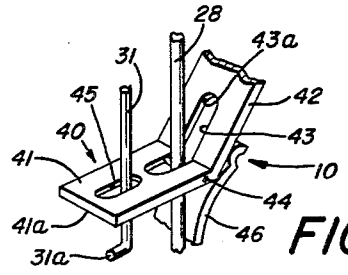


FIG. 5

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United States Patent Office 2,939,152 Patented June 7, 1960

2,939,152

WATER SAVING MEANS FOR WATER CLOSETS

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Filed Oct. 30, 1958, Ser. No. 773,537

5 Claims. (Cl. 4—67)

This invention relates to the art of water closet construction and in particular has reference to water saving improvements designed for use in connection with the flushing of a water closet so as to selectively control the amount of water used during each such flushing operation.

In the known prior art, it has been proposed on several occasions to provide water closets wherein a reduced amount of water can be used for flushing the same. It has been further contemplated by the known prior art to provide means for selectively determining the amount of water to be used during each flushing cycle, with the result that larger or smaller amounts of water can be employed, dependent upon the setting of the water saving mechanism.

While the above devices of the known prior art have been satisfactory in some respects, the same are uniformly characterized by the fact that the same require modification of the basic water closet construction, with the result that either a specially built water closet must be provided or a number of components must be substituted to permit use of such devices. In addition to the above cost disadvantage, the known prior art devices are also characterized by the fact that the components thereof must be adjusted or otherwise set to change the amount of water used in flushing, with the result that the user, if desirous of varying the amount of water used, must reset the device in each instance where a change is desired.

It has been discovered that the above disadvantages can be obviated by providing a simple lever arm attachment on the buoyant valve portion of the water closet, with operation of the conventional handle mechanism serving to pivot the arm relatively of the buoyant valve so that the same will be positioned in the path of movement of the conventional ball float. In this manner the ball float will, upon dropping during the flushing operation, become suspended on the pivoted lever arm, and the added weight thereof will cause the buoyant valve to seat and prematurely terminate water discharge from the tank portion.

In addition to the aforementioned discovery, it has been found that if the aforesaid lever arm is normally biased to a position where the same is out of the path of movement of the ball float during flushing, that the operation of the handle per se can determine the amount of water that will be used during each flushing operation.

Accordingly, it becomes the principle object of this invention to provide an improved type of water saving means that is attachable to the operating structure of a conventional water closet so as to selectively control the amount of water used during each flushing operation.

It is a still further object of this invention to provide an improved water saving means of this type that is simple in use and economical in cost so that the same can be readily attached to a conventional water closet by the average home owner with a minimum of expense and effort.

These and other objects of the invention will become more apparent upon a reading of the following brief

specification, considered and interpreted in the light of the accompanying drawings:

Of the drawings:

Figure 1 is a perspective cut away view showing the improved water saving means attached to a conventional water closet.

Figures 2, 3 and 4 are partially schematic views illustrating the position of the component parts in various stages of the flushing operation, with the views being taken on the lines *x*—*x* of Figure 1.

Figure 5 is a perspective view showing the improved water saving means in greater detail.

Referring now to the drawings and in particular to Figure 1 thereof, the improved water saving means, generally designated by the numeral **10**, are shown carried by a buoyant valve assembly **11** so as to be engageable with portions of the ball float mechanism **12** upon operation of the handle assembly **13**. In this regard, the water saving means **10**, as well as the aforementioned component parts, are housed within the usual tank **14** that is provided with an inlet opening **15** and a discharge opening **16**.

For the purposes of explaining the environmental background of the component parts with which the water mechanism **10** is associated, it is to be understood that the inlet **15** communicates with pipe **20** that in turn leads to a control valve **21**, with control valve **21** pivotally receiving arm **23** that serves to open and close the valve **21** dependent on the position of ball **24**. In this regard, the pivotal movement of arm **23** is conventionally effectuated by the floating action obtained through the use of hollow ball **24** that is attached to the projecting end of arm **23**. The tank supply line **25**, as well as an auxiliary suction line **26**, lead from valve **21** as shown in Figure 1, with line **25** serving to fill tank **14** during the period that valve **21** is opened, while line **26** leads to fitting **26***a* that is disposed adjacent the discharge line **16**.

In this fashion, the line **26** will divert water into discharge opening **16** to create a suction pressure on the buoyant valve member **27**. The buoyant assembly **11** further includes the usual stem **28** that is journalled within a support **29** so as to be movable through a condition of controlled shifting as will hereinafter be described. Similarly, handle **13** is mounted on the end of crank arm **30** that is provided with an opening through which the vertically disposed arm **31** can be received; the arrangement being such that upon rotation of handle **13**, a vertical lifting movement will be imparted to the member **31**.

Turning now to a detailed consideration of the water saving means **10** and referring particularly to Figure **5**, it will be seen that the same includes a plate member **40** that is bent medianally of its longitudinal extremities so as to define a base section **41** and a leg section **42** that extends at an acute angle from the base portion **41** as is clearly shown in Figure 5 of the drawings.

An elongate slot **43** is provided in plate **40** for the purpose of receiving the stem **28** and, in this regard, it is to be understood that a pin **44** pivotally connects the plate **40** with respect to the stem **28**, with the slot **43** providing clearance for limited pivotal movement of plate **40** around stem **28**. A second slot **45** is provided on the base portion **41** of plate **40**, with this slot facilitating reception of the hooked portion **31***a* of arm member **31** as clearly shown in Figures 1 and 5 of the drawings. Additionally, a spring **46** is secured between the leg section **42** and stem **28** so as to normally bias the leg section **42** towards a condition of substantial parallelism with the shaft **28**, with spring **46** being secured in known manner as shown in the drawings.

The use or operation of the improved water saving device can best be understood from an examination of Figures 2, 3 and 4, where the position of the component parts during operation is best illustrated.

Accordingly, and referring first to Figure 2, it will be seen that the parts are in their normal operating position, with buoyant valve **27** being seated in fitting **26***a* adjacent discharge pipe **16** and with the water level L being high so as to cause the ball **24** to float near the top of the tank **14**. In this condition, both the inlet line **15** and outlet line **16** will be closed.

In Figure 3, the handle **13** has been actuated to pivot the arm **30** around its axis, and accordingly the arm **31** will be vertically raised. During such lifting the lower hook portion **31***a* of the arm **31** will engage the undersurface **41***a* of base portion **41** and cause the member **40** to pivot around its pivot point **44** against the force of the spring **46**. In this regard, it is to be noted that after a certain amount of pivoting of member **40** around shaft **28** occurs, there will be an interference between shaft **28** and end **43***a* of slot **43** (see Figure 5), with the result that no further pivotal movement can occur. Accordingly, at this time and upon further vertical lifting movement of member **31**, there will occur an unseating of the buoyant valve **27**.

With the member **40** pivoted and valve **27** unseated as just described, the leg portion **42** will now be disposed in the path of movement of the arm **23**, which will be falling due to lowering of the water level L, with Figure 3 illustrating the condition of initial contact between leg portion **42** and arm **23**.

The condition of Figure 3 will then exist until the water level L drops to the approximate position of Figure 4, at which time the ball **24** will not be exerting a buoyant force, with the result that the same will become suspended on leg portion **42** as a dead weight. At this time, this additional weight will cause the arm **28** to shift axially downwardly, with the result that the buoyant valve **27** will seat to terminate discharge of the water. Following this shifting just described, it is believed manifest that the water level will then commence rising in view of the fact that the valve **21** has been opened to cause fluid flow upon initial falling of the ball **24** and, accordingly, with the discharge terminated, water entering the tank through line **25** will continue to raise the water level in tank **14** until the ball **24** returned to the position of Figure 1, at which time the supply of water will be terminated.

The above description of operation has been set forth on the basis that the operation is intended to consume a minimum amount of water during each flushing cycle.

However, if it is desired to use a greater amount of water, a normal flushing operation may be conducted by merely quickly returning the handle **13** to its original position after the unseating of the member **27**. With respect to Figure 3, this would mean that the arm **31** would not be retained in its upper position until the arm **23** engaged the leg portion **42**, but the same would be immediately dropped back to the position of Figure 2 so that the spring **46** could bias the leg portion **42** out of the path of descent of arm **23**. In this fashion, a normal flushing operation would occur due to the fact that the buoyant valve **27** would not seat until the water level approached the bottom of the tank, as is the case in usual operation.

It will be seen from the foregoing that there has been provided a new and novel type of water saving means for use with conventional water closet construction. It has been shown how the operator may merely, by properly operating the handle, either obtain a minimum or maximum amount of water during the flushing operation.

While a full and complete disclosure of the invention has been set forth in accordance with the dictates of the patent statutes, it is to be understood that the invention is not intended to be so limited. Accordingly, appropriate modifications of the invention may be resorted to without departing from the spirit hereof or the scope of the appended claims.

What is claimed is:

1. A water saving device in combination with a float operated toilet flushing mechanism that includes a ball float and a buoyant valve that is movable into and out of seated condition with an opening to control water discharge and which has a stem actuated by an exterior handle mechanism, comprising; an arm member pivoted to said stem intermediate its longitudinal ends and having limited rotational movement with respect thereto; means for pivoting said arm around its point of attachment on said stem during unseating of said buoyant valve by said handle mechanism; said arm being pivotal into the path of movement of said float to suspend said float upon contact therewith; and said stem being axially shiftable to cause said buoyant valve to prematurely seat in said opening upon suspension of said float; said arm being normally retained in a position that is out of the path of movement of said ball float.

2. A water saving device in combination with a float operated toilet flushing mechanism that includes a ball float and a buoyant valve that is movable into and out of seated condition with an opening to control water discharge and which has a stem actuated by an exterior handle mechanism, comprising; an arm member pivoted to said stem intermediate its longitudinal ends and having limited rotational movement with respect thereto; means for pivoting said arm around its point of attachment on said stem during unseating of said buoyant valve by said handle mechanism; said arm being pivotal into the path of movement of said float to suspend said float upon contact therewith; and said stem being axially shiftable to cause said buoyant valve to prematurely seat in said opening upon suspension of said float; and spring means normally biasing said arm to a position that is out of the path of movement of said ball float.

3. The device of claim 2 further characterized by the fact that said spring urges said arm out of the path of movement of said ball float following release of said handle mechanism.

4. A toilet mechanism of the character described, comprising; a tank having a water reservoir; inlet valve means controlling the entrance of water into said tank; a ball float associated with said inlet means and operating the same upon movement thereof relatively of said tank; a water outlet; a buoyant valve receivable over said discharge opening and having a valve stem; a handle mechanism actuating said valve stem to unseat said buoyant valve for flushing said tank; an arm member pivoted to said stem intermediate its longitudinal ends and having limited rotational movement with respect thereto; said arm being pivotally actuated by said handle mechanism upon operation thereof, with said arm being moved into the path of movement of said float during such pivoting, whereby said ball float may be suspended on said arm; the buoyancy of said valve being overcome by the weight of said float on said arm, whereby said discharge opening may be prematurely closed upon suspension of said ball float on said arm; said arm normally being retained in a position that is out of the path of movement of said ball float.

5. A toilet mechanism of the character described, comprising; a tank having a water reservoir; inlet valve means controlling the entrance of water into said tank; a ball float associated with said inlet means and operating the same upon movement thereof relatively of said tank; a water outlet; a buoyant valve receivable over said discharge opening and having a valve stem; a handle mechanism actuating said valve stem to unseat said buoyant valve for flushing said tank; an arm member pivoted to said stem intermediate its longitudinal ends and having limited rotational movement with respect thereto; and spring means normally biasing said arm to a position that is out of the path of movement of said ball float; said arm being pivotally actuated by said handle mechanism upon operation thereof, with said arm

being moved into the path of movement of said float during such pivoting, whereby said ball float may be suspended on said arm; the buoyancy of said valve being overcome by the weight of said float on said arm, whereby said discharge opening may be prematurely closed upon suspension of said ball float on said arm.

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