US 20050229298A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2005/0229298 A1**

Bayer (43) **Pub. Date: Oct. 20, 2005**

(54) **DUAL FLUSH CONTROL MECHANISM AND TOILET INCORPORATING THE SAME**

(76) Inventor: **Seth Bayer**, Boulder, CO (US)

Correspondence Address:
TIMOTHY J MARTIN, PC
9250 W 5TH AVENUE
SUITE 200
LAKEWOOD, CO 80226 (US)

(21) Appl. No.: **10/907,520**

(22) Filed: **Apr. 4, 2005**

Related U.S. Application Data

(63) Continuation-in-part of application No. 10/658,903, filed on Sep. 10, 2003.

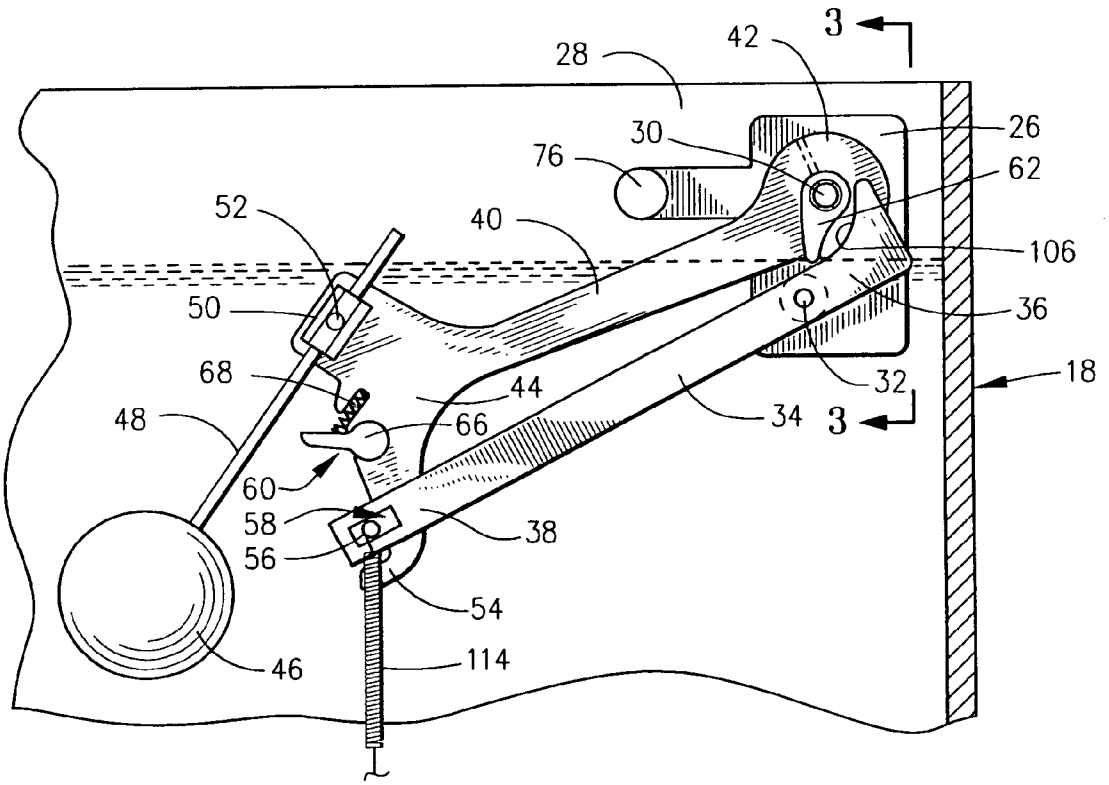
Publication Classification

(51) **Int. Cl.**[7] **E03D 1/14**; E03D 3/12

(52) **U.S. Cl.** **4/325**

(57) **ABSTRACT**

A toilet flush control has a base member that secures to the toilet tank and supports an actuator shaft for rotational movement about a first axis. A flush arm is mounted to the base member for pivotal movement about a second axis that is spaced from the first axis and connects to the flapper. A float rod has a first end supported on the shaft whereby movement of the shaft in a first rotational direction pivots the float arm from a first float rod position to a second float rod position, and an end of the float arm is configured to engage the flush arm to move the flush arm to an intermediate position. A cam element is disposed on the shaft whereby, when the shaft is rotated in another rotational direction, the cam moves the flush arm from a first to a second flush arm position.



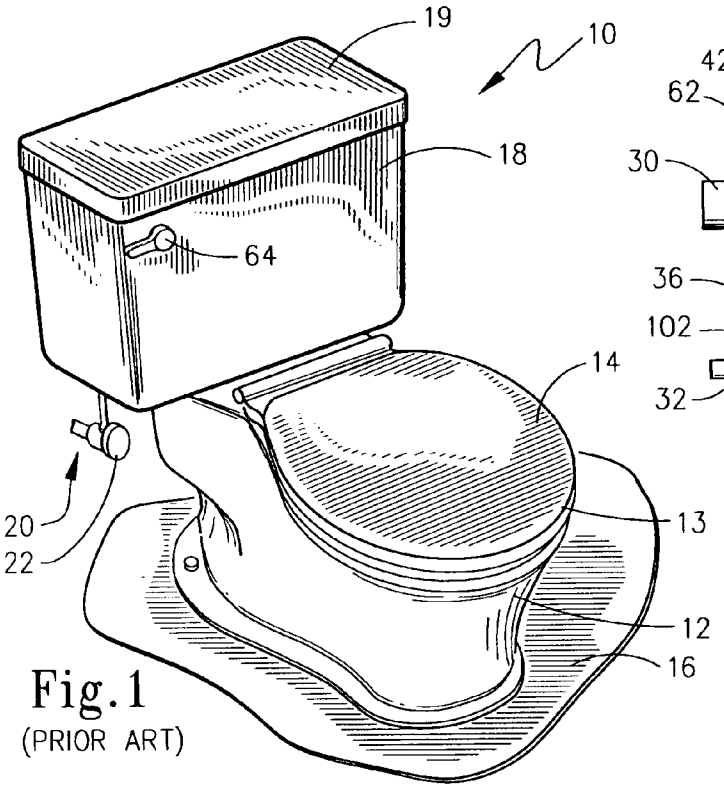


Fig.1
(PRIOR ART)

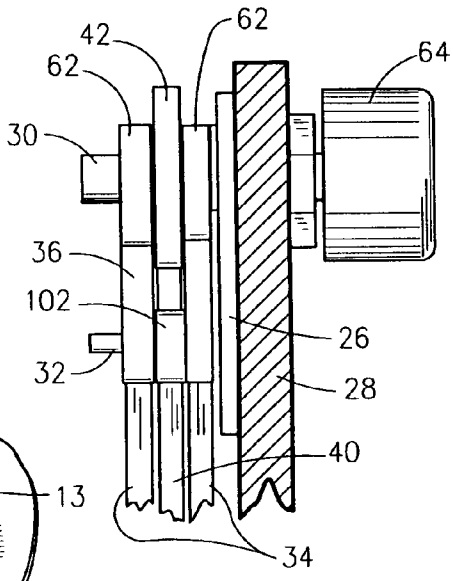


Fig.3

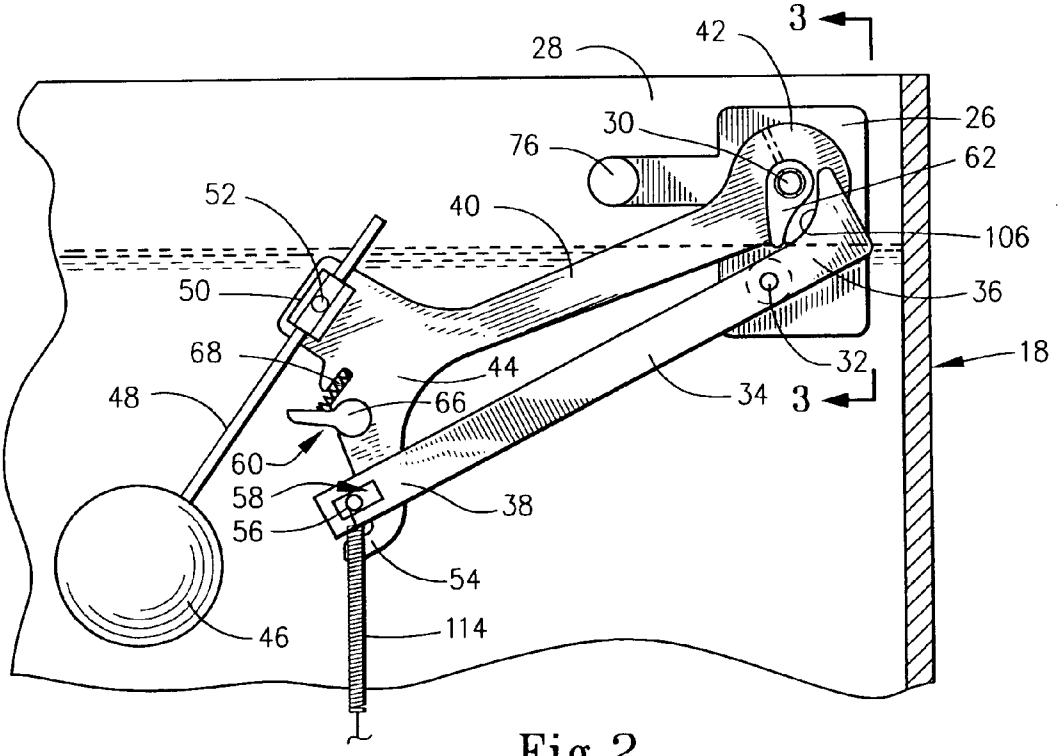


Fig.2

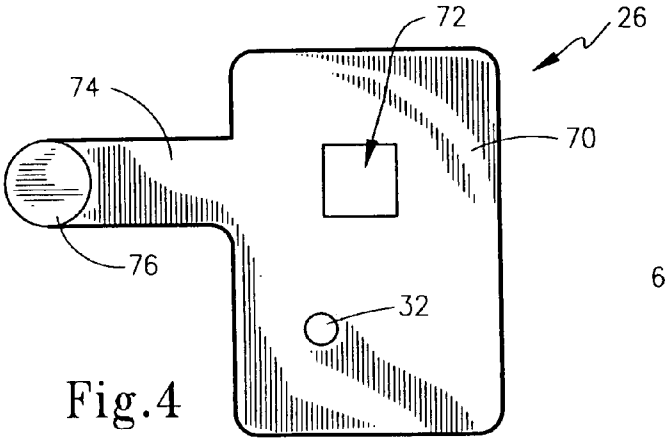


Fig.4

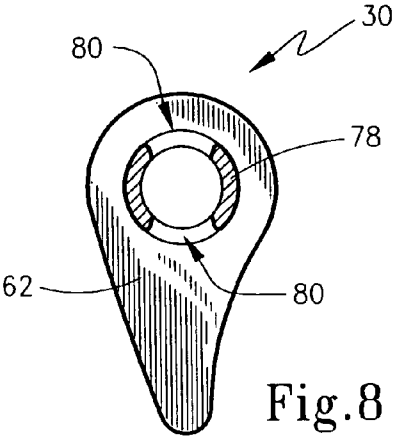


Fig.8

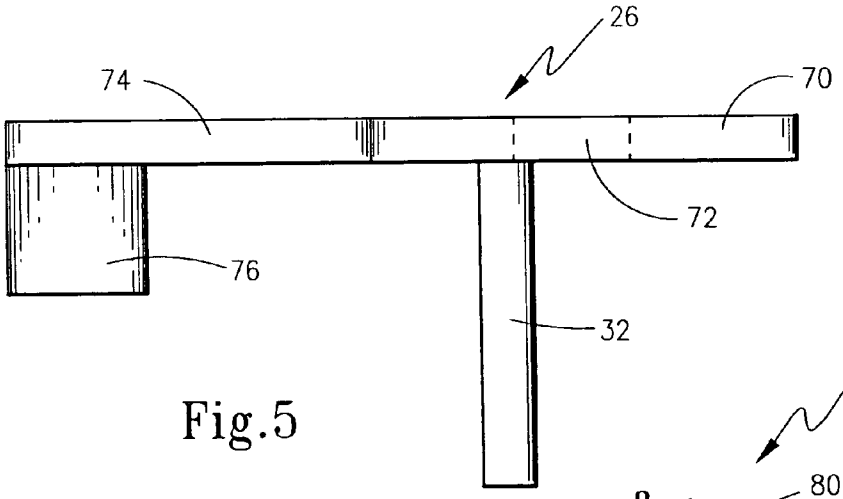


Fig.5

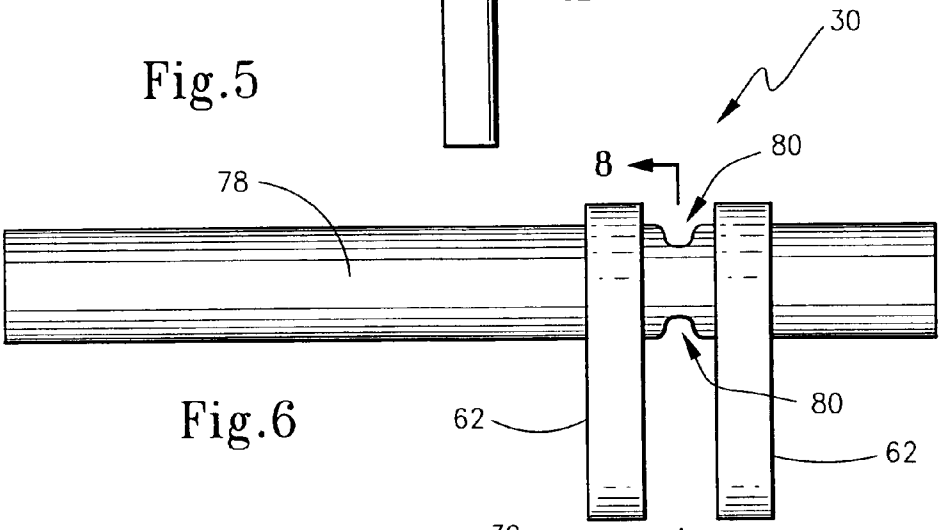


Fig.6

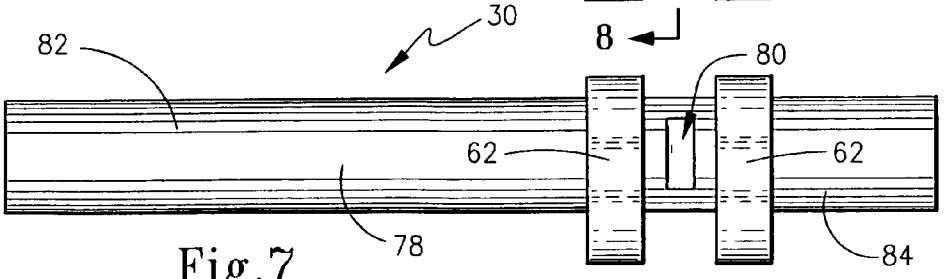


Fig.7

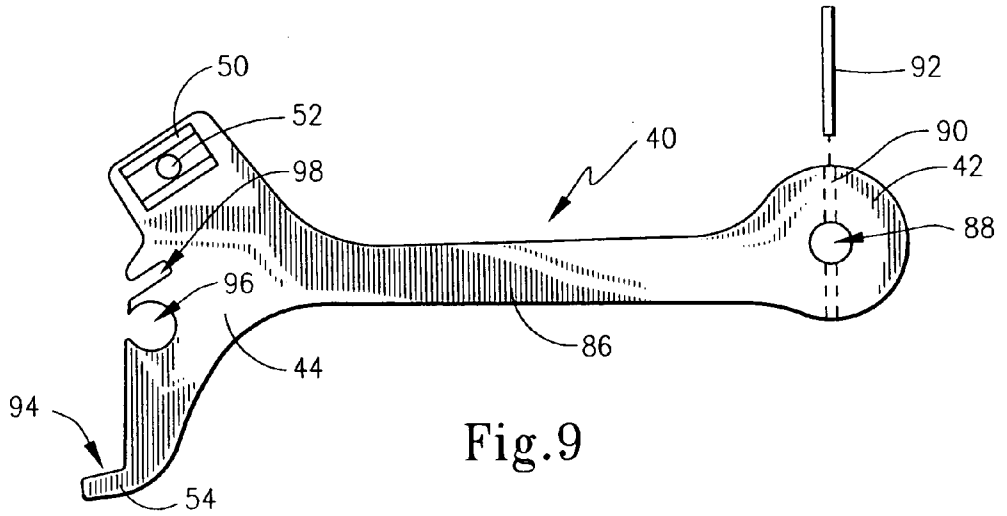


Fig.9

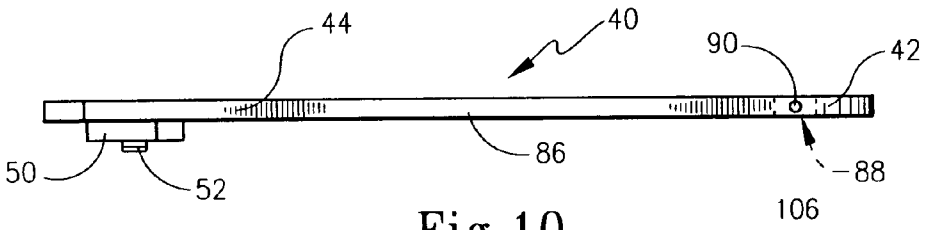


Fig.10

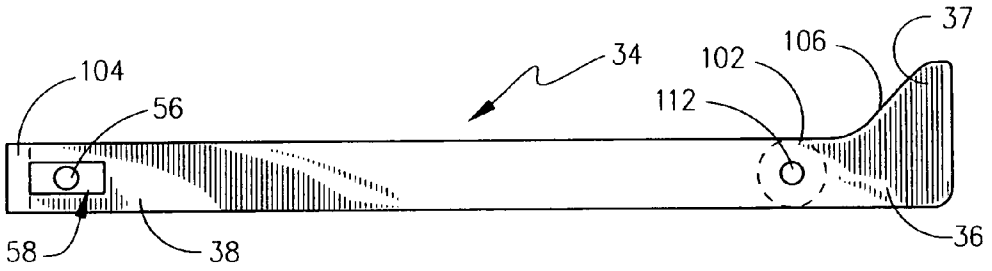


Fig.11

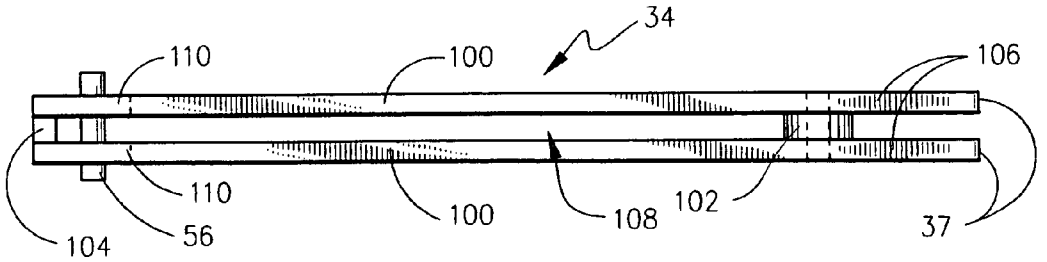


Fig.12

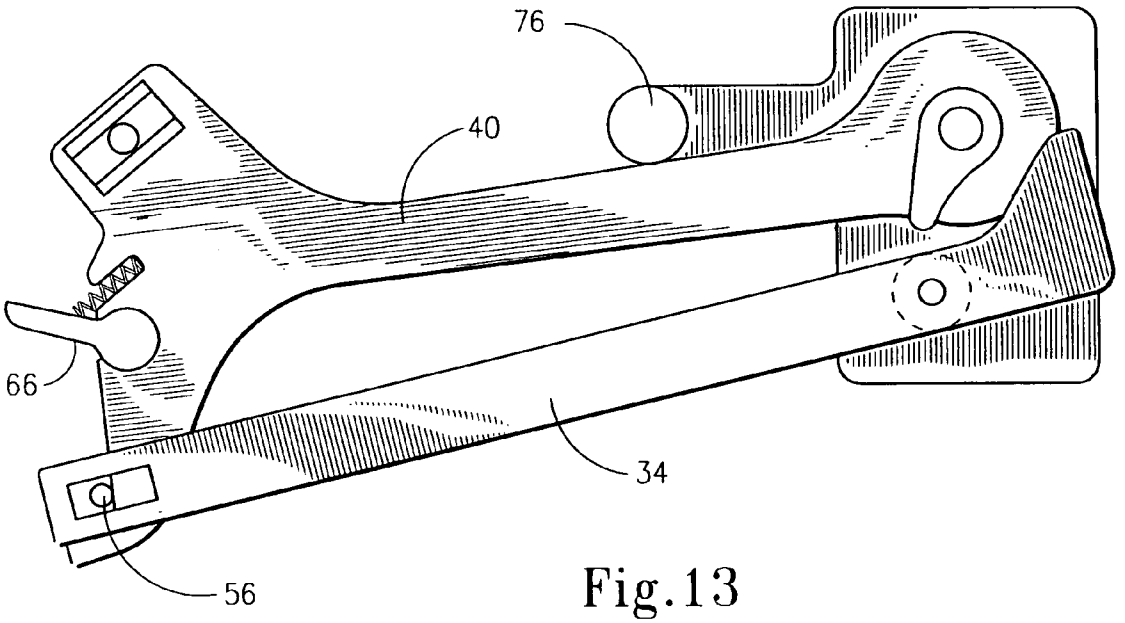


Fig.13

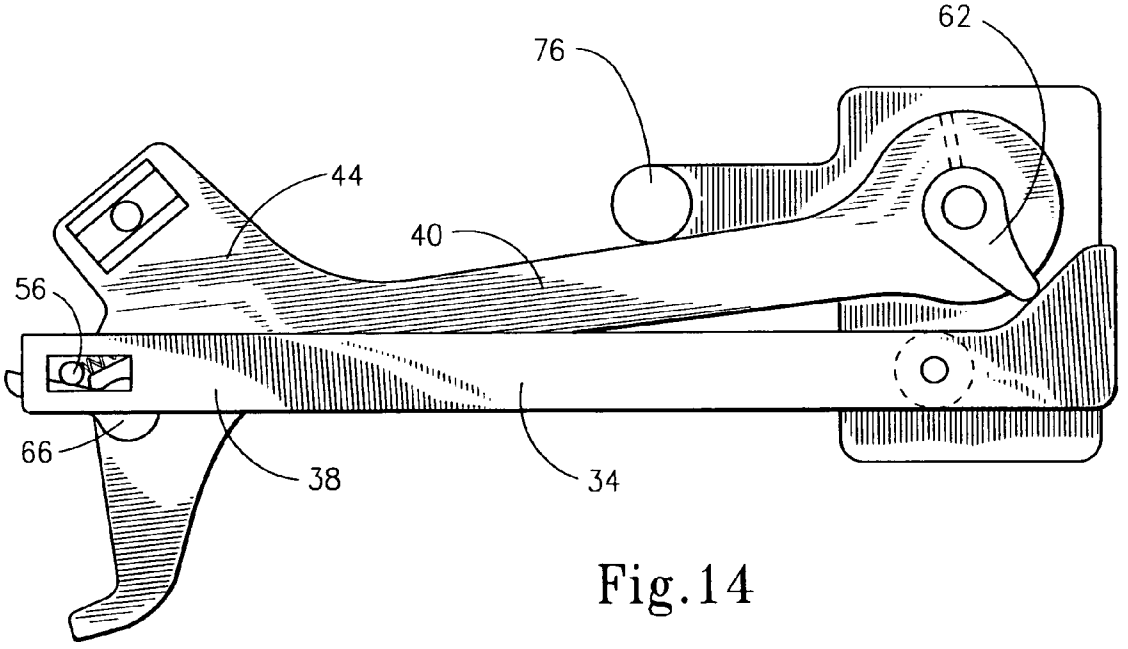


Fig.14

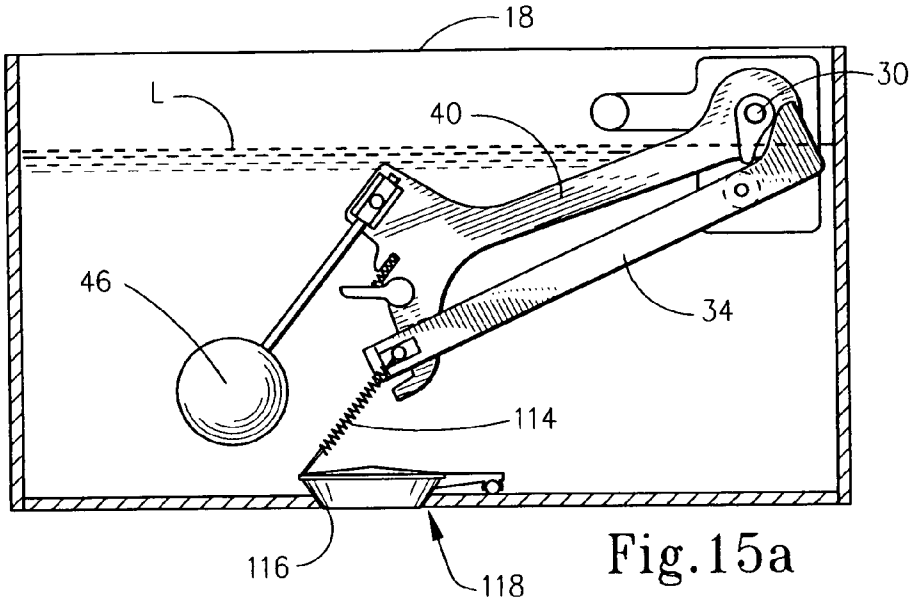


Fig.15a

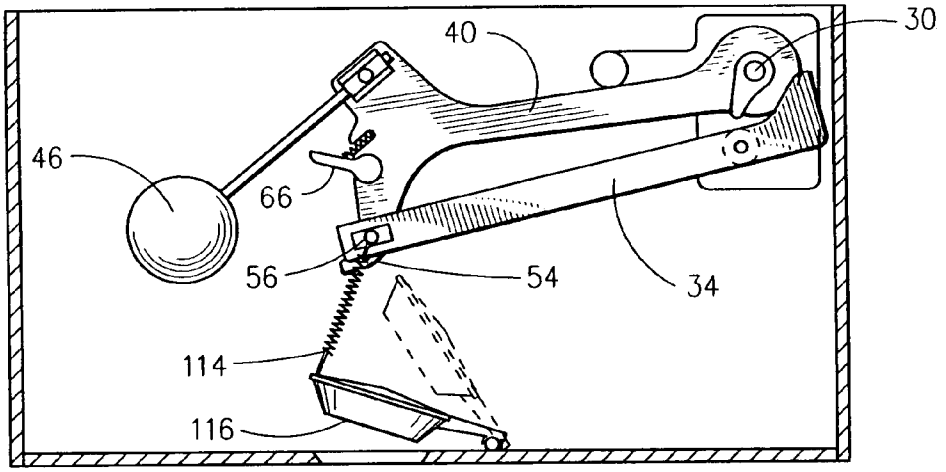


Fig.15b

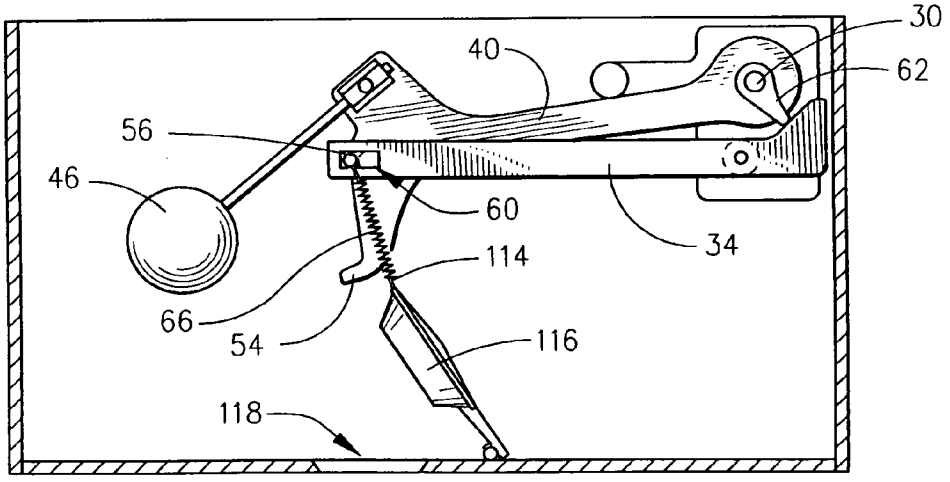


Fig.15c

DUAL FLUSH CONTROL MECHANISM AND TOILET INCORPORATING THE SAME

FIELD OF THE INVENTION

[0001] The present invention broadly concerns flush mechanisms and toilets which incorporate such flush mechanisms in order to control water discharge from a toilet tank reservoir through a toilet bowl. More particularly, the present invention is directed to a dual flush control mechanism which provides the capability of both a low volume and a high volume flush at the same flow rate.

BACKGROUND OF THE INVENTION

[0002] Habitation of an area by human population has always been dependent upon the availability of a clean source of fresh water. Thus, cities typically have both elaborate fresh water distribution systems and wastewater collection and treatment facilities. Rural areas, on the other hand, typically rely on fresh water wells as a water source and septic tanks for the collection and dispersal of wastewater. In either case, the availability of clean water is a precious commodity. This can either result from excessive demand on a water source or the vary scarcity of water in more arid climates. Therefore, the conservation of water resources has become increasingly important in modern times.

[0003] The average American uses about 42 gallons of water per day for domestic living. Of this consumption, more water is used for toilet flushing than for any other domestic water application. As is known, a conventional toilet includes a toilet bowl for the collection of human waste, either as solid matter (i.e., fecal waste) or as liquid waste (i.e., urine) and a reservoir or tank that stores water for use in flushing the contents of the toilet bowl. This flush tank is therefore in fluid communication with the toilet bowl through a discharge port. A flapper or other valve closes this discharge port, but it may be opened to permit water to flow out of the reservoir and through the toilet bowl. It is well known that a larger water volume capacity is necessary to flush solid matter than the volume necessary to sufficiently flush liquid waste. Nonetheless, the flow rate should be maintained to complete a flush of either solid or liquid waste materials.

[0004] As a result of these competing needs, toilets are generally set so as to provide a high volume, high velocity flush in order to ensure that solid waste is properly disposed. Since the majority of flushes are used for flushing only liquid waste. this practice results in the waste of an excessive amount of water during normal use over a period of time. Indeed, more water is used, and therefore wasted, for toilet flushing than for any other domestic water application.

[0005] In response to this problem, dual flush toilets have been developed to allow the user the choice of selecting between a large volume flush to dispose of solid waste and a smaller volume flush to dispose of liquid waste. One such example is shown in U.S. Pat. No. 6,041,452 issued Mar. 28, 2000 to Hsiao, et al. In the water saving toilet described in Hsiao, et al, two separate discharge ports are provided with an upper most opening establishing a low volume flush and a lower most opening establishing a high volume flush. Each opening has an independent chain and flapper. Rotation of the handle in one direction opens one of the flappers while counter rotation opens the other.

[0006] U.S. Pat. No. 4,881,279 issued Nov. 21, 1989 to Harney discloses a dual flush mechanism that is operated by two separate flush handles. Operation of one flush handle allows the flush valve to move into a full open position for a full volume flush. Operation of the other handle is restricted so that the flush valve-actuating arm only partially raises thus allowing for a lower volume flush.

[0007] U.S. Pat. No. 5,206,960 issued May 4, 1993 to Hooshley, et al. teaches a dual flush toilet control mechanism utilizing a multi-lobed cam. Rotation of the flush handle in one direction partially raises the flush control arm whereas rotation in an opposite direction fully raises the flow control arm. In this manner, either a full volume or a partial volume flush is achieved.

[0008] Despite the existence of these different functions to accomplish full and partial volume flushes, there remain disadvantages of the existing structures. For example, some of the structures are relatively difficult to retrofit on to existing toilets so that a user may be required to replace a substantial portion of the toilet assembly. Other devices only partially open the flush control valve or flapper resulting in a reduction of discharge flow velocity for the partial flush. By retarding the discharge velocity, an incomplete flush may result when employing the device in a low volume mode. Other dual mode flush control mechanisms have been found to be excessively complicated and thus expensive to manufacture.

[0009] Accordingly, there is a need for improved dual mode flush control mechanisms, and toilet incorporating such mechanisms, that are relatively inexpensive to manufacture and may be supplied as both original equipment and as retrofit structures. There is further a need for dual mode flush control mechanisms which discharge different volumes of water from a toilet tank reservoir while maintaining the discharge velocity. The present invention is directed to meeting these needs.

SUMMARY OF THE INVENTION

[0010] It is an object of the present invention to provide a new and useful flush control mechanism and toilet incorporating such flush control mechanism that allows a user to select between large volume flushes and low volume flushes.

[0011] It is another object of the present invention to provide a flush control mechanism and a toilet containing such a mechanism, wherein the water discharge velocity from the reservoir tank of a toilet is substantially the same in both a high volume flush mode and low volume flush mode.

[0012] Still another object of the present invention is to provide a new and useful flush control mechanism, and toilet incorporating such mechanism, which may be supplied as original equipment or that can be conveniently retrofitted onto existing toilets.

[0013] According to the present invention, then, a flush control mechanism is provided as well as an improvement to a toilet. The flush control mechanism is adapted to mount against the sidewall of a toilet reservoir tank in the interior thereof so as to control the flapper that acts as a valve to

selectively close and open the discharge opening of the tank so as to prevent and allow dispensing of water through the toilet bowl in order to accomplish a flush.

[0014] Broadly, the flush control mechanism includes a base member that is adapted to secure to the sidewall of the tank. An actuator shaft is supported by the base member for rotational movement about a first axis. A flush arm is pivotally mounted at a flush arm first end portion to the base member for pivotal movement about a second axis that is spaced apart from the first axis. The flush arm is thus pivotable between a first flush arm position to a second flush arm position through an intermediate flush arm position. The flush arm includes a flush arm second end portion that is adapted to connect to the flapper. A float rod is then provided and includes a float rod first end portion supported on the actuator shaft whereby rotational movement of the shaft in a first rotational direction pivots the float rod from a first float rod position to a second float rod position. The float rod includes a float rod second end portion opposite the float rod first end portion that is configured to engage the flush arm when the float rod moves from the first float rod position to the second float rod position thereby to move the flush arm from the first flush arm position to the intermediate flush arm position. At least one cam element is secured to the actuator shaft and is operative to act upon the flush arm second end portion when the shaft is rotated in a second rotational direction opposite the first rotational direction thereby to move the flush arm from the first flush arm position to the second flush arm position.

[0015] In the exemplary embodiment, a limit stop is provided that is operative to prevent movement of the float rod past the second float rod position. This limit stop may include a stop block disposed on the base member. Moreover, in order to rotate the actuator shaft in the first and second rotational directions, the shaft may extend through the sidewall of the reservoir tank, and a manually operable flush handle is mounted on the shaft exteriorly of the tank. The flush arm first end portion may be pivotally mounted to a pintle that is disposed in the base member with the pintle defining the second axis.

[0016] A float may be secured to the float rod. Here, a float stem may have a proximal end secured to the second float rod end portion and a distal end supporting a float at a selected position relative to the second float rod end. This position may be adjustable. For example, the proximal end of the float stem may be secured by an adjustable bracket disposed on the second float rod end.

[0017] To enable the engagement of the float rod with the flush arm, the float rod second end portion of the exemplary embodiment includes a finger extending therefrom that engages the second flush arm end portion. A catch may also be provided on the second float rod end portion to help position the flush arm. This catch may be a spring-biased trip lever. Moreover, the flush arm can have a slot formed in the flush arm second end portion. A pin is then slideably received in the slot with this pin adapted to connect to a tether and thus to the flapper.

[0018] The actuator shaft, in the exemplary embodiment, is a hollow tubular cylinder that includes a sidewall having a pair of opposed slots each extending partially around the circumference thereof. The first float rod end portion is then rotatably journaled on the shaft, and a radial pin mounts to the first float rod end portion and extends through the slots. The flush arm may include a pair of spaced-apart, generally parallel flush arm sections that generally open a region therebetween. The float arm second end portion is then interposed between the flush arm sections. Here, also, a pair of cam elements may be provided, if desired, on the actuator shaft. Each cam element is then operative to act on a respective flush arm section when the shaft is rotated in the second rotational direction. In any event, the flush arm first end portion has a cam surface formed thereon, and the cam is operative to engage the cam surface when the actuator shaft is rotated in the second rotational direction.

[0019] These and other objects of the present invention will become more readily appreciated and understood from a consideration of the following detailed description of the exemplary embodiment of the present invention when taken together with the accompanying drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] **FIG. 1** is a perspective view of a toilet according to the prior art;

[0021] **FIG. 2** is a front view in elevation of the flush control mechanism according to the exemplary embodiment of the present invention shown mounted on the interior of a tank sidewall of the toilet reservoir tank of **FIG. 1**;

[0022] **FIG. 3** is a cross-sectional view taken about lines **3-3** of **FIG. 2**;

[0023] **FIG. 4** is a front view in elevation of the base member shown in **FIGS. 2 and 3**;

[0024] **FIG. 5** is a top plan view of the base member of **FIG. 4**;

[0025] **FIG. 6** is a top plan view of the actuator shaft of the flush control mechanism of **FIGS. 2 and 3**;

[0026] **FIG. 7** is a front view in elevation of the actuator shaft of **FIG. 6**;

[0027] **FIG. 8** is a cross-sectional view taken about lines **8-8** of **FIG. 6**;

[0028] **FIG. 9** is a front view in elevation of the float rod of the flush control mechanism of **FIGS. 2 and 3** with the fastening pin shown exploded therefrom;

[0029] **FIG. 10** is a top plan view of the float rod of **FIG. 9**;

[0030] **FIG. 11** is a front view in elevation of the flush arm of the flush control mechanism of **FIGS. 2 and 3**;

[0031] **FIG. 12** is a top plan view of the flush arm of **FIG. 11**;

[0032] **FIG. 13** is a front view in elevation of the flush control mechanism of the present invention showing the float rod in a second float rod position thereby moving the flush arm to the intermediate flush arm position;

[0033] **FIG. 14** is a front plan view showing the rotation of the actuator shaft in a second rotational direction that has resulted in movement of the flush arm to the second flush arm position with the float rod in the second float rod position;

[0034] **FIG. 15**(*a*) illustrates the flush control mechanism of the present invention with the flush arm in a first flush arm position and with the float rod in a first float rod position;

[0035] **FIG. 15**(*b*) shows rotation of the actuator shaft resulting in movement of the float rod to the second float rod position thereby causing movement of the flush arm to the intermediate flush arm position; and

[0036] **FIG. 15**(*c*) is a front view in elevation showing rotation of the actuator shaft in an opposite rotational direction resulting in movement of the flush arm to a second flush arm position and with the float rod in the second float rod position.

DETAILED DESCRIPTION OF THE EXEMPLARY EMBODIMENTS

[0037] The present invention is broadly directed to a flush control mechanism for a toilet as well as a toilet incorporating such a flush control mechanism. The flush control mechanism is adapted to mount in the toilet reservoir tank and is operative to provide two flush modes, namely, a low volume flush for evacuation of liquid waste from the toilet bowl and a high volume flush for the evacuation of solid waste from the toilet bowl. In either case, however, the water flow rate is maintained for either the low or high volume flush. With the structure of the exemplary embodiment of the present invention, moreover, the low flush volume discharge may be adjusted by the flush control mechanism. As is understood, the amount of water discharged for high volume flush may be adjusted with the traditional float and valve assembly of the toilet.

[0038] As is illustrated in **FIG. 1**, a standard toilet **10** includes a toilet bowl **12** provided with a pivoting seat **13** and a pivoting cover **14** that with bowl **12** supported by a support surface **16**. Bowl **12** supports a reservoir tank **18** having a tank lid **19**. Reservoir tank **18** is adapted to hold water so that the contents of bowl **12** may be flushed into a suitable waste line. To this end, a water intake line **20** is provided with a typical shutoff valve **22** to supply water to the inlet of reservoir tank **18**. Reservoir tank **18** has a discharge outlet communicating with the toilet bowl **12**.

[0039] As is well known, the amount of water, that is the level of water, in the interior of reservoir tank **18** is controlled by an inlet tube, a ball-cock assembly and a float ball. Accordingly, this structure is not shown in the figures. Rather, the present invention is directed to an improved flush control mechanism that controls the volume discharge of water from the reservoir tank through the toilet bowl to accomplish either a low volume flush or a high volume flush.

[0040] The primary components of the exemplary embodiment of the flush control mechanism is illustrated in **FIGS. 2 and 3**. Here, it may be seen that flush control mechanism **24** according to the exemplary embodiment includes a base member **26** that is adapted to secure to the front section of the sidewall **28** interiorly of reservoir tank **18**. An actuator shaft **30** is supported by base member **26** for rotational movement about a first axis that is generally perpendicular to sidewall **28**. A pintle **32** extends perpendicularly from base member **26** to define a second axis that is spaced apart and generally parallel to the rotational axis of actuator shaft **30**.

[0041] With continued reference to **FIGS. 2 and 32**, a flush arm **34** includes a flush arm first end portion that is pivotally mounted to base member **26**, and, specifically, is rotatably journaled on pintle **32**, for pivotal movement about this second axis. Flush arm **34** has a flush arm second end portion **38** that is adapted to connect to the tank ball or flapper of the reservoir tank **18**, as described more thoroughly below. A float rod **40** includes a float rod first end portion **42** that is supported on actuator shaft **30** and has a float rod second end portion **44** that is opposite float rod first end portion **42** with float rod second end portion being configured to engage the flush arm, again as described below.

[0042] In **FIG. 2** it may be seen that float rod second end portion **44** includes a float **46** supported at a distal end of a float stem **48** that is adjustably mounted to float rod second end portion by means of a bracket **50** that received a proximal end portion of float stem **48** with the proximal end being locked into a selected position by means of a screw **52**. This permits adjustment of the location of float **46**. Float rod second end portion also includes a finger **54** that is sized and oriented to engage a barrel or pin **56** located in a slot **58** in flush arm second end portion. Moreover, a catch **60** is also located on float arm second end portion to selectably engage pin **56**, as described more thoroughly below.

[0043] At least one cam element **62** is secured to actuator shaft **30** and is operative to act on flush arm second end portion **36** so as to pivot flush arm **34** about pintle **32** in a manner also as described more thoroughly below. A handle **64** is secured to actuator shaft **30** at a location exteriorly of reservoir tank **18** so as to allow manual operation of flush control mechanism **24**.

[0044] With reference now to **FIGS. 4 and 5**, it may be seen that base member **26** includes a rectangularly shaped base plate **70** that includes a square shaped opening **72** located therein to receive actuator shaft **30**. Pintle **32** is in the form of a solid cylindrical rod which projects perpendicularly to the plane of base plate **70** in spaced relation to opening **72**. An extension arm **74** projects laterally of base plate **70** and supports a limit stop block **76** which limits the rotational movement of float rod **40**, as described below.

[0045] Actuator shaft **30** is best shown in **FIGS. 6-8** wherein it may be seen that actuator shaft **30** includes a hollow cylinder or tube **78** having a sidewall that is provided with a pair of slots **80** diametrically opposed to one another. Cam elements **62** are to affixed to tube **78** on either side of slots **80**. Tube **78** is sized so that it may mount through square opening **72** in base plate **70** of base member **26** and may freely rotate therein. Tube **78** has a first tube end portion **82** that extends through sidewall **28** of reservoir tank **18** so that handle **64** may be connected thereto. Second end portion **84** is located interiorly of reservoir tank **18** and supports flush arm **34**.

[0046] Float rod **40** is illustrated in greater detail in **FIGS. 9 and 10**. Here, it may be seen that float rod **40** includes a linear central section **86** with the float rod first and second end portions **42** and **44** being on opposite ends of central section **86**. Float rod first end portion **42** has a centrally located circular opening **88** sized to receive tube **78** of actuator shaft **30**. When assembled, float rod first end portion **42** is located between cam elements **62**. A bore **90** intersects opening **88** and is sized to receive a fastening pin **92** when assembled with fastening pin **92** extending through slots **80** in tube **78**. As noted above, float rod second end portion **44**

mounts bracket **50** to receive float stem **48** that mounts float **46**. Float rod second end portion **44** forms a distal head that includes finger **54** that creates a ledge **94** to engage pin **56**. Catch **60**, identified above, includes a trip lever **66** and a spring **68** (**FIG. 2**) that are respectively received in cutouts **96** and **98** formed in float rod second end portion **44**.

[**0047**] Flush arm **34** is illustrated in greater detail in **FIGS. 11 and 12**. Here, it may be seen that flush arm **34** is formed by a pair of spaced apart, generally parallel flush arm sections **100** that are identical to one another and are held in spaced apart, generally parallel relation to one another by means of spacers **102** and **104**. Flush arm sections **100** include first end portion **37** that define flush arm first end portion **36**. Each of these end portions **37** provide a cam surface **106** that interacts with a respective cam element **62**, as described below. Accordingly, it should be understood that spacers **102** and **104** position flush arm sections **100** a distance apart from one another that is the same as the distance between cam elements **62** on actuator shaft **30**. Moreover, flush arm **34** has a region **108** between sections **100** that is sized to receive central section **86** of plate rod **40** therebetween. As noted, flush arm second end portion **38** forms a slot **58** defined by rectangular openings **110** which are opposed to one another to receive pin **56** for sliding movement therein. Spacer **102** includes a bore **112** to accommodate pintle **32**.

[**0048**] In assembly, with reference to **FIGS. 2-12**, it may be appreciated that float rod first end portion **42** is secured to actuator shaft **30** between cam elements **62** by fastening pin **92** so that it is located between cam elements **62** which are in turn, rigidly affixed to actuator shaft **30**. First end portion **82** of tube **78** is inserted through opening **72** of base plate **70**, and base plate **70** is secured to sidewall **28** of the reservoir tank. Handle **64** is mounted onto the exterior end of first end portion **82**. Flush arm **34** is mounted to pintle **32** with float rod second end portion **44** and central section **86** received through the region **108** between flush arm sections **100**, as is shown in **FIG. 2**. Cams **62** are thus positioned to act on cam surfaces **106**. Finally, a resilient spring **114**, which controls the discharge valve flapper, is secured to pin **56**. As used herein, "flapper" refers to any valve structure that operates to selectively close the discharge opening.

[**0049**] The various positions of the flush arm **34** and the float rod **40** of control mechanism **24** may now be appreciated with reference to **FIGS. 2, 13** and **14**. Here, it may be seen that rotational movement of actuator shaft **30** in a clockwise direction in **FIG. 2** (which corresponds to counterclockwise rotation of handle **64** when viewed exteriorly of reservoir tank **18**) acts to move float rod **40** from a first float rod position shown in **FIG. 2** to a second float rod position shown in **FIG. 13** with this movement being limited by limit stop block **76**. Here, fastening pin **92** is engaged by the edges of slots **80** in tube **78** so that rotation of tube **78** advances float rod **40** between the first and second float rod positions. When this occurs, ledge **94** of finger **54** engages pin **56** thereby advancing flush arm **34** from a first flush arm position shown in **FIG. 2** to an intermediate flush arm position shown in **FIG. 13**. This will result in a low volume flush as described more thoroughly below.

[**0050**] On the other hand, rotation of actuator shaft **30** in the opposite rotational direction causes cams **62** to act on cam surfaces **106** to pivot flush arm **34** from the first flush arm position shown in **FIG. 2** to the second flush arm position shown in **FIG. 14** through the intermediate flush arm position. This movement also advances float rod **40** from the first float rod position shown in **FIG. 2** to the second float rod position shown in **FIG. 14**. Here, however, flush arm second end portion **38** is advanced upwardly on float rod second end portion **44** such that pin **56** is latched by trip lever **66**. Again, when float rod moves to the second float rod position, float rod **40** abuts limit stop block **76** thereby preventing advancement of float rod **40** past this limit stop.

[**0051**] With reference now to FIGS. **15**(*a*)-**15**(*c*) it may be seen how two different volumetric flushes may be achieved at a common flow rate. In **FIG. 15**(*a*), reservoir tank **18** is filled with water to water level "L". Float **46** is submerged beneath water level "L". Here, flush arm **34** is in the first flush arm position and float rod **40** is in the first float rod position. In **FIG. 15**(*b*), actuator shaft **30** has been rotated clockwise to move float rod **40** to the second float rod position. Finger **54** engages pin **56** so as to lift flapper **116** by way of tether **114** so that discharge opening **118** is opened thereby allowing water in reservoir tank **18** to discharge into the toilet bowl to accomplish a low volume flush. A low volume flush results, since, as the water level in reservoir tank **18** drops, float **46** will likewise drop thereby allowing float rod **40** to move back toward the first float rod position and flush arm **34** to move from the intermediate flush arm position (shown in **FIG. 15**(*b*)) back to the first float rod position. Since a reseating of flapper **116** and discharge opening **118** is controlled by the height of pin **56** above the bottom of reservoir tank **18**, flapper **116** can reseat before the full volume of water is discharged from reservoir **18**. However during throughout the duration of this low volume flush, discharge opening **118** is "full open" such that this low volume flush will be accomplished at a water flow rate determined by the size of opening **118**.

[**0052**] In the full volume flush, illustrated in **FIG. 15**(*c*), actuator shaft **30** is rotated in an opposite rotational direction such that cam elements **62** cause flush arm **34** to completely advance to the flush arm **34** to the second flush arm position. Here, pin **56** is latched by catch at an elevation above finger **54**. Flapper **116** again is disengaged from discharge opening **118** and a full volume flush begins at a flow rate that is the same as the low volume flush. As the water level descends, float **46** will descend allowing float rod **40** to pivot from the second float rod position shown in **FIG. 15** (*c*) toward the first float arm position shown in **FIG. 15**(*a*). However, since pin **56** is latched by catch **60**, flapper **116** is held open for a longer period of time allowing the water to substantially discharge from reservoir tank **18**. When float rod **40** reaches an angular position close to the first float rod position, pin **56** will fall off of trip lever **66** of catch **60** to allow flapper **116** to reseat in discharge opening **118**. Slot **58** is thus positioned and oriented corresponding to the configuration and positioning of trip lever **66** to accomplish this movement.

[**0053**] Accordingly, the present invention has been described with some degree of particularity directed to the exemplary embodiments of the present invention. It should be appreciated, though, that the present invention is defined by the following claims construed in light of the prior art so that modifications or changes may be made to the exemplary embodiments of the present invention without departing from the inventive concepts contained herein.

What is claimed is:

1. A flush control mechanism adapted to mount in a toilet reservoir tank that has a tank side wall and a flapper that is operative in a closed state to prevent dispensing of water in said tank yet movable to an open state thereby to dispense water from said tank and into a toilet bowl, comprising:

(A) a base member adapted to secure to the side wall of said tank;

(B) an actuator shaft supported by said base member for rotational movement about a first axis;

(C) a flush arm pivotally mounted at a flush arm first end portion to said base member for pivotal movement about a second axis that is spaced-apart from the first axis, said flush arm pivotable between a first flush arm position to a second flush arm position through an intermediate flush arm position, said flush arm including a flush arm second end portion adapted to connect to the flapper;

(D) a float rod including a float rod first end portion supported on said shaft whereby rotational movement of said shaft in a first rotational direction pivots said float rod from a first float rod position to a second float rod position, said float rod including a float rod second end portion opposite said float rod first end portion that is configured to engage said flush arm when said float rod moves from the first float rod position to the second float rod position thereby to move said flush arm from the first flush arm position to the intermediate flush arm position; and

(E) at least one cam element secured to said shaft and operative to act on the flush arm second end portion when said shaft is rotated in second rotational direction opposite the first rotational direction thereby to move said flush arm from the first flush arm position to the second flush arm position.

2. A flush control mechanism according to claim 1 including a limit stop operative to prevent movement of said float rod past the second float rod position.

3. A flush control mechanism according to claim 2 wherein said limit stop includes a stop block disposed on said base member.

4. A flush control mechanism according to claim 1 including a pintle disposed on said base member to define the second axis, said first flush arm end portion pivotally mounted to said pintle.

5. A flush control mechanism according to claim 1 including a manually operable flush handle adapted to mount on said shaft and operative upon selective manipulation to rotate said shaft in the first and second rotational directions.

6. A flush control mechanism according to claim 1 including a float secured to said float rod.

7. A flush control mechanism according to claim 6 including an elongated float stem having a proximal end secured to said float rod second end portion and a distal end supporting said float at a selected position relative to said second float rod end.

8. A flush control mechanism according to claim 7 wherein the selected position of said float relative to said float rod second end portion is adjustable.

9. A flush control mechanism according to claim 7 wherein the proximal end of said float stem is secured by a bracket disposed on said float rod second end portion.

10. A flush control mechanism according to claim 1 wherein said float rod second end portion includes a finger extending therefrom that engages said flush arm second end portion when said float rod moves from the first float rod position to the second float rod position thereby to move said flush arm from the first flush arm position to the intermediate flush arm position.

11. A flush control mechanism according to claim 1 including a catch disposed on said float rod second end portion.

12. A flush control mechanism according to claim 11 wherein said catch includes a spring-biased trip lever.

13. A flush control mechanism according to claim 1 wherein said flush arm has a slot formed in the flush arm second end portion and including a pin slideably received in the slot, said pin adapted to connect to the flapper.

14. A flush control mechanism according to claim 1 wherein said shaft is a hollow cylinder including a side wall having a pair of opposed slots each extending partially around the circumference thereof, said float rod first end portion rotatably journaled on said shaft and including a radial pin extending through the slots.

15. A flush control mechanism according to claim 1 wherein said flush arm includes a pair of spaced-apart, generally parallel flush arm sections with a generally open region therebetween, said float arm second end portion being interposed between said flush arm sections.

16. A flush control mechanism according to claim 15 including a pair of said cam elements secured to said shaft, each said cam element operative to act on a respective flush arm section when said shaft is rotated in the second rotational direction.

17. A flush control mechanism according to claim 1 wherein said flush arm first end portion has a cam surface formed thereon, said cam operative to engage the cam surface when said shaft is rotated in second rotational direction.

18. A flush control mechanism adapted to mount in a toilet reservoir tank that has a tank side wall and a flapper that is operative in a closed state to prevent dispensing of water in said tank yet movable to an open state thereby to dispense water from said tank and into a toilet bowl, comprising:

(A) a base member adapted to secure to the side wall of said tank;

(B) an actuator shaft supported by said base member for rotational movement about a first axis;

(C) a pintle disposed on said base member in spaced-apart, substantially parallel relation to said shaft to define a second axis that is substantially parallel to the first axis;

(D) a flush arm pivotally including a flush arm first end portion pivotally mounted on said pintle for pivotal movement about the second axis, said flush arm pivotable between a first flush arm position to a second flush arm position through an intermediate flush arm position, said flush arm including a flush arm second end portion adapted to connect to the flapper;

(E) a float rod including a float rod first end portion supported on said shaft whereby rotational movement of said shaft in a first rotational direction pivots said float rod from a first float rod position to a second float rod position, said float rod including a float rod second

end portion opposite said first float rod end portion that is configured to engage said flush arm when said float rod moves from the first float rod position to the second float rod position thereby to move said flush arm from the first flush arm position to the intermediate flush arm position;

(F) a float secured to said float rod; and

(G) at least one cam element secured to said shaft and operative to act on the flush arm second end portion when said shaft is rotated in second rotational direction opposite the first rotational direction thereby to move said flush arm from the first flush arm position to the second flush arm position.

19. A flush control mechanism according to claim 18 including a manually operable flush handle adapted to mount on said shaft and operative upon selective manipulation to rotate said shaft in the first and second rotational directions.

20. A flush control mechanism according to claim 18 wherein said float rod second end portion includes a finger extending therefrom that engages said second flush arm end portion when said float rod moves from the first float rod position to the second float rod position thereby to move said flush arm from the first flush arm position to the intermediate flush arm position.

21. A flush control mechanism according to claim 18 including a catch disposed on said float rod second end portion.

22. A flush control mechanism according to claim 18 wherein said flush arm has a slot formed in the flush arm second end portion and including a pin slideably received in the slot, said pin adapted to connect to the flapper.

23. A flush control mechanism according to claim 18 wherein said flush arm first end portion has a cam surface formed thereon, said cam operative to engage the cam surface when said shaft is rotated in second rotational direction.

24. A flush control mechanism according to claim 18 including a limit stop disposed on said base member and operative to prevent movement of said float rod past the second float rod position.

25. In a toilet including a bowl, a reservoir tank having a tank interior in fluid communication with said bowl by way of a tank discharge opening, and a flapper which is operative in a closed state to close the discharge opening thereby to prevent dispensing of water said tank yet which is movable to an open state thereby to dispense water from said tank into said bowl, and wherein said tank has a side wall, the improvement comprising a flush control mechanism including a base member secured to the side wall on the interior of said tank, an actuator shaft rotatably supported by said base member for rotation about a first axis and projecting both exteriorly and interiorly of said tank, a handle disposed on an exterior portion of said shaft, a flush arm pivotally mounted at a flush arm first end portion to said base member for pivotal movement about a second axis that is spaced-apart from the first pivot axis, said flush arm pivotable between a first flush arm position to a second flush arm position through an intermediate flush arm position, said flush control arm including a flush arm second end portion connected to said flapper, a float rod including a float rod first end portion supported on an interior portion of said shaft whereby rotational movement of said shaft in a first rotational direction pivots said float rod from a first float rod position to a second float rod position, said float rod including a float rod second end portion opposite said float rod first end portion that is configured to engage said flush arm when said float rod moves from the first float rod position to the second float rod position thereby to move said flush arm from the first flush arm position to the intermediate flush arm position and thus move said flapper toward the open position, and at least one cam element secured to said shaft and operative to act on the second flush arm end portion when said shaft is rotated in second rotational direction opposite the first rotational direction thereby to move said flush arm from the first flush arm position to the second flush arm position and thus move said flapper toward the open position.

26. The improvement according to claim 25 including a pintle disposed on said base member to define the second axis, said float rod first end portion pivotally mounted to said pintle.

27. The improvement according to claim 25 including a float secured to said float rod.

28. The improvement according to claim 25 including a catch disposed on said float rod second end portion.

29. The improvement according to claim 25 wherein said flush arm has a slot formed in the flush arm second end portion and including a pin slideably received in the slot, said pin adapted to connect to the flapper.

30. The improvement according to claim 25 wherein said flush arm first end portion has a cam surface formed thereon, said cam operative to engage the cam surface when said shaft is rotated in second rotational direction.

* * * * *