

TITLE: TWO-STAGE FLUSH DEVICE FOR A TOILET TANK

BACKGROUND OF THE INVENTION

This invention concerns a two-stage flush device for a toilet tank, particularly having a press button and a push or pull button for respectively flushing a small volume of water and a large volume of water.

5 A conventional two-stage flush device for a toilet tank shown in Fig. 1 has a single water volume control outlet tube with a valve for flushing two different volume of water by two press buttons A and B for opening the valve C in different degress. A
10 second conventional two-stage flush device for a toilet tank shown in Fig. 2 has an auxiliary button E and a main button F, and the auxiliary button E can be pushed only or both the buttons E and F are pushed at the same time for flushing different volume of water.

15 The two kinds of conventional two-stage flush devices have only one outlet tube for different volume of water to flush out, but the the main and the auxiliary button are to be pressed in the same direction. Then chances are that a user may carelessly, easily or wrongly press the two buttons at the same time to flush a large volume of water, losing water saving function they are
20 designed for.

A third conventional two-stage flush device shown in Fig. 3 has two outlet tubes H and I respectively having a high level and a low level, but if the opening time for the valve cap of each outlet tube H or I should not be controlled, it would be of on
25 use. It has an auxiliary press rod J and a main press rod K for

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operating respectively a high and a low level outlet valve for flushing different volume of water. But maybe both press rods J and K will be carelessly or mistakenly pressed at the same time as the first and the second conventional one described above.

5 A fourth conventional two-stage flush device shown in Fig. 4 has two different buttons L and M, nevertheless, these two buttons need two holes N and O for fixing them. But most toilet tanks in use now always has only one hole for fixing pressing levers or rods, and onsequently, a new water tank has to be used or an
10 old one has to be transformed a little for the fourth one.

SUMMARY OF THE INVENTION

This invention has been devised to offer several embodiments of two-stage flush device for a toilet tank having two kinds of pressing or pulling directions for a side press rod and a longi-
15 tudinal pull or push rod and able to be fixed in a single hole of the wall of a conventional toilet tank.

A two-stage flush device for a toilet tank in the present invention includes a side press rod for operating a high level outlet tube to flush a small volume of water, and a longitudinal
20 push or pull rod for operating a low level outlet base to flush a large volume of water. Both the side press rod and the longitudinal rod are fitted in a center through hole of a locking sleeve fixed in a hole of the wall of a conventional toilet tank by means of a nut and a washer, extending out of the tank wall for operat-
25 ing.

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Several features of the present invention are listed as follows.

1. A pressing device for flushing water consists of a side press button for operating a low level outlet tube and a push
5 button for operating a high level outlet tube.

2. The push button can be displaced by a pull button to have the same function.

3. Although the press device has two separate components for operating two-stage flush, they have different direction for
10 pushing, preventing them from mistakenly operated.

BRIEF DESCRIPTION OF DRAWINGS

The invention will be better understood by reference to the accompanying drawings, wherein:

Figure 1 is a perspective view of a first conventional two-
15 stage flush device for a toilet tank;

Figure 2 is a side cross-sectional view of a second conventional two-stage flush device for a toilet tank;

Figure 3 is a side view of a third conventional two-stage flush device for a toilet tank;

20 Figure 4 is a side view of a fourth conventional two-stage flush device for a toilet tank;

Figure 5 is an exploded perspective view of a first embodiment of a two-stage flush device for a toilet tank in the present invention;

25 Figure 6 is a perspective view of the first embodiment of a

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two-stage flush device for a toilet tank in the present invention;

Figure 7 is a cross-sectional view of the first embodiment of a two-stage flush device for a toilet tank in the present invention;

5 Figure 8 is a perspective view of the first embodiment of a two-stage flush device for a toilet tank in the present invention, showing it combined with a water volume control device;

10 Figure 9 is an exploded perspective view of a second embodiment of a two-stage flush device for a toilet tank in the present invention;

Figure 10 is a cross-sectional view of the second embodiment of a two-stage flush device for a toilet tank in the present invention.

15 Figure 11 is a perspective view of the second embodiment of a two-stage flush device for a toilet tank in the present invention;

Figure 12 is a side view of the second embodiment of a two-stage flush device for a toilet tank in the present invention, showing it assembled in a toilet tank;

20 Figure 13 is an exploded perspective view of a third embodiment of a two-stage flush device for a toilet tank in the present invention;

Figure 14 is a perspective view of the third embodiment of a two-stage flush device for a toilet tank in the present invention;

25 Figure 15 is a operational view of a side press rod in the

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third embodiment of a two-stage flush device for a toilet tank in the present invention;

Figure 16 is a cross-sectional view of the third embodiment of a two-stage flush device for a toilet tank in the present invention, showing action of a front press rod;

Figure 17 is a perspective view of the third embodiment of a two-stage flush device for a toilet tank in the present invention;

Figure 18 is a perspective view of a first embodiment of a water volume control device in the two-stage flush device for a toilet tank in the present invention;

Figure 19 is a cross-sectional view of the first embodiment of a water volume control device in the two-stage flush device for a toilet tank in the present invention;

Figure 20 is a magnified view of the part A in Fig. 2;

Figure 21 is a cross-sectional view of a second embodiment of a water volume control device in the two-stage flush device for a toilet tank in the present invention;

Figure 22 is a cross-sectional view of a third embodiment of a water volume control device in the two-stage flush device for a toilet tank in the present invention;

Figure 23 is a magnified view of the part marked A in Fig. 22;

Figure 24 is a magnified view of the part marked B in Fig. 22;

Figure 25 is a cross-sectional view of a fourth embodiment

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of a water volume control device in the two-stage flush device for a toilet tank in the present invention;

Figure 26 is a magnified view of the part marked A in Fig. A.;

5 Figure 27 is a perspective view of a fifth embodiment of a water volume control device in the two-stage flush device for a toilet tank in the present invention;

10 Figure 28 is a cross-sectional view of the fifth embodiment of a water volume control device in the two-stage flush device for a toilet tank in the present invention;

Figure 29 is a magnified view of the part marked A in Fig. 28;

15 Figure 30 is a perspective view of a sixth embodiment of a water volume control device in the two-stage flush device for a toilet tank in the present invention.

Figure 31 is a cross-sectional view of the sixth embodiment of a water volume control device in the two-stage flush device for a toilet tank in the present invention;

20 Figure 32 is a magnified view of the part marked A in Fig. 31;

Figure 33 is an exploded perspective view of a seventh embodiment of a water volume control device for the two-stage flush device for a toilet tank in the present invention;

25 Figure 34 is a magnified view of the part marked A in Fig. 33;

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Figure 35 is a magnified view of the part marked B in Fig. 33;

Figure 36 is a cross-sectional view of the seventh embodiment of a water volume control device in the two-stage flush device for a toilet tank in the present invention;

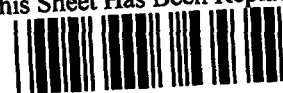
Figure 37 is a magnified view of the part marked A in Fig. 36; and,

Figure 38 is a perspective view of the two-stage flush device combined with the water volume control device in the two-stage flush device for a toilet tank in the present invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

A two-stage flush device for a toilet tank in the present invention, as shown in Figs. 5 - 8, includes a position sleeve 1 having a center through hole 21 for receiving a connect shaft portion 7 of a side press rod 4 therein, fixed firmly in a hole of a toilet tank by means of a nut 2 and a washer 3 as shown in Fig. 12. The position sleeve 1 further has a shaft base 32 standing on an outer surface of an inner end, and the nut 2 has a notch 31 to fit with the shaft base 32 so as to be located surrounding the outer surface of the position sleeve 1 after assembled with the sleeve 1. The shaft base 32 has a shaft hole for a shaft 24 to fit therein and also through holes in one end of a first actuating arm 17 so that the arm 17 may be combined with the position sleeve 1. The first actuating rod 17 has the other end connected with a first chain 30 of a high water outlet tube.

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The two-stage flush device further includes a side press rod 4 having a connect shaft portion 7, straight male teeth 10 cut in an outer surface of an inner end for a toothed hole 12 in an end of a second actuating arm 11 to engage with, a threaded lateral hole 13 bored in the end for a screw 14 to secure the second actuating arm 11 with the side press rod 4. The side press rod 4 further has a center through hole 22 for a push rod portion 16 of a push rod 5 to extend through, a male thread 38 around a left end of a larger diameter than the right end for a cover nut 15 to screw with after the push rod 5 is inserted through the press rod 4, with a push button 36 of the push rod 5 protruding forward out of a hole of the cover nut 15. A spring 37 is provided to be placed around the rod portion 16 between an inner surface of the button 36 and an annular bottom in the center hole 22 so that the push rod 5 may be pushed back by the spring 37 to an original position wherein the button 36 protrudes the sleeve 15 after pushed inward. The rod portion 16 has its rear end 40 urging on a vertical wall surface 41 of the first actuating arm 17 after the push rod portion 16 extends through the center through hole 22 of the side press rod 4. Therefore, when the push button 36 of the push rod 4 is pressed inward, the first actuating arm 17 may be forced to swing upward by pushing movement of the push rod portion 16. Then the first actuating arm 17 pulls up the first chain 30, which lifts the valve 29 of the high level tube 28 to allow water in the toilet tank to flow out in a small pre-set volume. If the button

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35 of the side press rod 4 is pressed, the second actuating arm 11 is swung upward to pull a second chain 27 up, with the valve 26 of the outlet tube 25 being lifted up allowing water to flow out for a large pre-set volume.

5 A second embodiment of a two-stage flush device for a toilet tank is shown in Figs. 9 - 11, has a position sleeve 1 the same as that in the first embodiment, but a different pressing method, wherein a side press rod 4 and a pull rod 5 are used. The side
10 press rod 4 has the same structure as that of the first embodiment but the pull rod 5 is different, having a structure of pulling outward operation. Then a cover nut 15' with a female thread has a front center hole 39' of a smaller diameter than that of the
15 cover nut 15 in the first embodiment, with a front side wall 39A for an outer end of the spring 37 to urge thereon. The pull rod 5 has an elongate rod portion 51 extending through the center
20 through hole 22 of the side press rod 4, a shaft hole 52 laterally provided near the front end for a shaft 53 to fit through therein to stop the rear end of the spring 37, and a round button 54 fixed with a front end of the rod portion 51. Then if the button 54 is
25 pulled outward together with the rod portion 51, then the inner end of the rod portion 51 connected with a first chain 30 will pull up the chain 30 and the valve 29 of the outlet tube together, which allows water in the toilet tank flow out of the tube 28 for a small volume. And if the side press rod 4 is pressed down, a large volume of water will be flowed out of the valve 26 as shown

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in the same way as the first embodiment.

The second embodiment has a two-stage flush function in a different operating method wherein the side press rod 4 is functioned by pressing, but the pull rod 5 is done by pulling. So
5 wrong operation can be prevented to attain the object of water economizing.

A third embodiment of a two-stage flush device shown in Fig. 13 at least has a position sleeve 1 provided with a center through hole 21 for receiving a connect shaft portion 17 of a side press
10 rod 4, and fixed in a hole of a toilet tank by means of a nut 2 and a washer 3 in the same way as the first and the second embodiment.

The third embodiment further includes a side press rod 4 having at least a connect shaft portion 7, which has straight
15 teeth 10 around an inner end, a center through hole 22 for a connect rod portion 16 of a front press rod 5 to extend therein, and a side press button 38 for pressing to rotate the side press rod 4, and a lateral shaft hole 23 bored in an intermediate portion of
20 of the connect shaft portion 7 for a small shaft 24 to fit through and also through a shaft hole 17 of the connect rod portion 16 of the front press rod 5 so that the connect rod portion 16 may function as a lever with the shaft 24 as a fulcrum. The third embodiment further has a connect rod 11 with the same structure as the
25 first embodiment, provided with a shaft hole 12 at one end, a threaded hole 13 for a screw to engage and secure the second actu-

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ating arm 11 with the end of the connect shaft portion 7 of the side press rod 4. The other end of the second actuating arm 11 is connected with the second chain 27 of the valve 27 for flushing a large volume of water by pressing the side press rod 4.

5 The third embodiment further has a front press rod 5, which is provided with connect rod portion 16 extending through the center through hole 22 of the side press rod 4 and having a shaft hole 17 in an intermediate point for the shaft 24 to fit through to function as a fulcrum relative to the rod portion 16, and with
10 a plate-shaped end 19 with two threaded holes for screws 20 to secure a front button 18 with the plate end 19. Then if the front button 18 is pressed down, the rod portion 16 functions as a lever, forcing its end to lift the chain 30 connected with the valve 29 of the outlet tube 28 for flushing a small volume of water.

15 Though the front press rod 5 and the side press rod 4 are in some degree connected with each other, and the side press rod 4 moves also the front press rod 5, the water volume flushed out by the side press rod 4 is a large volume and the front press rod 5 is a small volume, therefore the water volume flushed out in total
20 is the same as the large volume flushed out by the side press rod 4, not increasing at all the water volume flushed out, in the third embodiment. On the other hand, the front press rod 5 cannot move the side press rod at all in operating.

25 A water volume control device 60 for the flush device in the present invention, will be described in many kinds of struc-

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tures below. They generally have a low level outlet tube 61 and a high level outlet tube 62, a common outlet tube 63, and an overflow tube 64 located between the two outlet tubes 61 and 62. Each outlet tube 61; 62 has a valve 65; 66, and two end feet 67 of the valve 66 have outer ends fixed on an outer surface of the lower end of the overflow tube 64, but the end feet 68 of the outlet tube 66 are pivotally connected with a shrinkable tube forming the outlet tube 66 or a side of an inner tube and can be changed in their position according to the height of the outlet tube 66 adjusted. Each valve is bound with a pull chain 69 or 70 which is to be pulled up by the pressing structure for flushing out a small or a large volume of water for use.

In the following embodiments, the high water level outlet tube 62 is structured to be able to adjust the water volume to be flushed out thereof.

A first embodiment of a water volume control device includes a high level outlet tube 62 formed of an inner tube 71 and an outer tube 72 combined together, as shown in Figs. 18 - 20. The inner tube 71 has a plurality of rings 73 around proper locations of an outer surface, preventing water leak through contact surfaces of the inner and the outer tube 71, 72 by blocking function of them. Then the outer tube 72 can be adjusted in its location relative to the inner tube 71, altering the level or volume of water to be flushed out with numerous stages.

A second embodiment of a water volume control device shown

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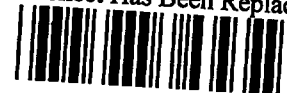


in Fig. 21 has a stationary inner tube 74 provided with a male thread 76 and thread 76 and an movable outer tube 75 provided with a female thread 77 to engage with the male thread 76 so as to adjust the level or volume of water to be flushed out.

5 A third embodiment of a water volume control device, as shown in Figs. 22 - 24, includes a high level outlet tube 62 formed of an stationary inner tube 78 having a plurality of adjusting semicircular recesses 80 spaced apart equidistantly in a vertical line on an outer surface, a position groove 81 on an
10 opposite side of the recesses 80, and an movable outer tube 79 having a locking pin 82 fitted in a position hole 83 in the wall thereof and a spring 84 fitted around a lower end of the locking pin inside of the position hole 83 and a position annular projection 85 engaging with the position groove 81 of the inner tube 78
15 so that the outer tube 79 may be lifted or lowered in a definite vertical position for adjusting its height, i.e. the level of water to be flushed out. And the position pin 82 is used to lock the outer tube 79 at an adjusted position, moved to engage one of the recesses 78.

20 A fourth embodiment of a water volume control device, as shown in Figs. 25 and 26, has the same structure as the third one except a locking ball 82A being used instead of the locking pin 82 of the third one and confined in a ball room 82B and being urged by a spring 82C and a cap 82D covered on the spring 82C to always
25 compress the spring 82C to push the locking ball 82A. Then the

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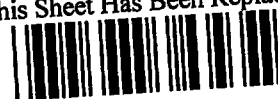
locking ball 82a has the same function as the locking pin 82 in the third one.

A fifth embodiment of a water volume control device, as shown in Figs. 27 - 29, has the same structure as the third one except a movable inner tube 86 and a stationary outer tube 87. The inner tube 86 includes a plurality of sloping up teeth 88 continuously arranged in a vertical position on an outer surface, and the outer tube 87 includes a movable grip 90 extending down from a lower end and an engaging tooth 89 provided on an inner surface of the movable grip 90 and able to engage with any of the teeth 88 of the inner tube so that the outer tube 87 may be lifted or lowered relative to the inner tube in a stationary position and locked at an adjusted position, to alter the height of the outer tube, i.e. the water level to be flushed out.

Figs. 30 - 32 show a sixth embodiment of a water volume control device, which has an inner tube 91 extensible, an outer stationary tube 92 provided with a male thread 93, a constrict ring 94 with a female thread and a washer 95 engaging and fitting around a male thread 93, and a cover cap 96 with a female thread to engage with the male thread 93 of the outer tube so that the cover cap 96 can tighten and loosen the ring 94 and the inner tube by screwing and then the inner tube 91 can be secured tightly at an adjusted position so as to adjust the water volume to be flushed out.

The seventh embodiment of a water volume control device

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shown in Figs. 33 - 37 has a stationary inner tube 97 provided with a plurality of grooves 99 spaced apart equidistantly and connected with a vertical slot 100 at a right side, a movable outer tube 98 provided with a locking projection 101 on an inner surface. Then when the outer tube 98 is moved up and down relative to the inner tube 97, the locking projection 101 can engage with any of the grooves 99 of the inner tube 97 by rotating a little the outer tube so that the height of the outer tube 98 can be altered and locked at that position.

10 It should be noted that each embodiment of the water volume control device has a washer 102 for preventing water leak, and a direction orienting slot for allowing either the inner or the outer tube extensible and shrinkable in a definite direction so that the valve of either the high or the lower level base does not change its location and direction, permitting the valve to open or close normally to let flushing operation smooth according to a preset small or large volume.

20 While the preferred embodiments of the invention have been described above, it will be recognized and understood that various modifications may be made therein and the appended claims are intended to cover all such modifications which may fall within the spirit and scope of the invention.

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WHAT IS CLAIMED IS:



1. A two-stage flush device for a toilet tank, comprising at least a high level outlet tube and a low level outlet tube which are respectively provided with a valve connected with a lower end of a chain, the other end of which is connected with either a front press rod or a side press rod, further comprising;

a position sleeve having a center through hole for a connect shaft portion of said side press rod to extend therethrough, and fixed in a hole in a wall of a water tank; and,

characterized by said side press rod having a connect shaft portion extending through said center through hole of said position sleeve, said connect shaft portion provided with a center through hole and a shaft hole vertical to said center through a press button fixed at a front end of said connect shaft portion, a second actuating arm connected at a front end firmly with a front end of said connect shaft portion, said center hole of said connect shaft portion being protruded through by a connect rod portion of said front press rod; said front press rod having a shaft hole for a shaft protruding through said shaft hole of said connect shaft portion to insert through so that said connect rod portion of said front press rod may function as a lever with said shaft as a fulcrum; said connect rod portion of said front press rod having its front end fixed with a press button; said side press rod operating said low level outlet tube and said front press rod operating said high level outlet tube for flushing separately a large and a small volume of water.

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2. The two-stage flush device for a toilet tank as claimed in Claim 1, wherein said front press rod and said side press rod have a different direction for pressing .

3. A two-stage flush device for a toilet tank comprising:
5 a position sleeve having a center through hole and fixed in a hole in a side wall of a toilet tank by means of a nut and a washer;

a side press rod and a longitudinal push rod provided to operate respectively a low and a high level outlet tube; said side
10 push rod at least having a connect shaft portion extending through said center through hole of said position sleeve and provided with a center through hole and a side press button at a front end, said side press button having a male thread and a cavity for receiving a push button and a spring urging said push button of said push
15 rod therein; said male thread engaging a cover cap after said said longitudinal press rod is placed to extend through said center through hole of said connect shaft portion, said press rod able to be pressed inward; said connect shaft portion having straight teeth around its end to combine with a second actuating
20 arm; said actuating arm having an inner end provided with a shaft hole with a toothed hole for a screw to secure said connect shaft portion of said side press rod with said first actuating arm, and an outer end connected with a valve of a low level outlet tube via a chain;

25 said longitudinal push rod having a push rod portion and a

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push button fixed with an outer end of said rod portion, a spring provided to push back said push button after pushed inward, said push rod portion extending out of said connect shaft portion of said side press rod and urging a vertical side wall of a first
5 actuating arm, said first actuating arm connected pivotally with a shaft base of said position sleeve and having an outer end connected with a valve of a high level outlet tube via a first chain, said side press rod operating to open said low level outlet tube, said longitudinal push rod operating to open said high level out-
10 let tube.

4. The two-stage flush device for a toilet tank as claimed in Claim 3, wherein said position sleeve has a shaft base to be combined pivotally with a forked end of said first actuating arm by means of a shaft so that said first actuating arm may swing
15 with said shaft as a fulcrum.

5. The two-stage flush device for a toilet tank as claimed in Claim 3, wherein said nut engaged with said position sleeve at an outside has a notch corresponding to said shaft base and fitting with said shaft base, enabling said nut engage with said
20 position sleeve at an outside, not blocked by said shaft base.

6. A two-stage flush device for a toilet comprising:
a position sleeve having a center through hole and fixed in a hole in a side wall of a toilet tank by means of a nut and a washer;

25 a side press rod and a longitudinal pull rod respectively

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operated to open a high level outlet tube and a low level outlet tube, said side press rod having at least a connect shaft portion extending through said center through hole of said position sleeve end, having a center through hole, a press button fixed at a front
5 end, a male thread and an inner cavity for receiving a recovery spring therein; a cover cap engaging with said male thread of said side press button after said longitudinal pull rod is placed extending through said center through hole of said connect shaft portion so as to enable said pull rod pulled and returned back;
10 said connect shaft portion having straight teeth at an inner end to engage with an inner end of a second actuating arm; said second actuating arm having a toothed hole in the inner end engaging said toothed end of said connect shaft portion and secured by a screw engaging a threaded hole in said inner end, said second actuating
15 arm having its outer end connected with a valve of said low level outlet tube via a chain;

said longitudinal pull rod having a round button and a pull rod portion, said round button fixed at a front end of said pull rod portion, said rod portion extending through said center
20 through hole of said connect shaft portion of said side press rod and having a lateral shaft hole for a shaft to insert through to stop and urge a spring located between said shaft and a front wall of a cover cap engaging said male thread of said side press button, said spring resiliently always urging said round button to
25 protruding out of said cover cap, said round button being pulled

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outward together with the rod portion for operating to open the said valve of said high level outlet tube.

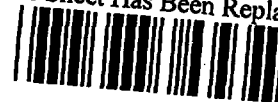
5 7. A two-stage flush device for a toilet tank comprising a water volume control device consisting of a high level outlet tube a low volume outlet tube, and an overflow tube, said high level outlet tube having a valve, said low level outlet tube hav-
10 ing a valve, and characterized by said high level outlet tube provided with an inner tube and an outer tube, either said inner tube or said outer tube being movable to extend and shrink in order to alter the height of said outlet tube and accordingly alter the volume of water flushed through said outlet tube.

15 8. The two-stage flush device for a toilet tank as claimed in Claim 7, wherein said high level outlet tube includes said inner tube provided with a plurality of rings, and said outer tube can be extended and shrunk with numerous stages by means of said rings forming resistance against an inner surface thereof.

20 9. The two-stage flush device for a toilet tank as claimed in Claim 7, wherein said inner tube is provided with a male thread, and said outer tube is provided with a female thread to engage with said male thread, with said inner tube being extended and shrunk in numerous stages.

25 10. The two-stage flush device for a toilet tank as claimed in Claim 7, wherein said inner tube is provided with a plurality of semicircular recesses spaced apart equidistantly in a vertical line in an outer surface, and said outer tube is provided with a

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locking pin urged by a spring , said locking pin selectably engaging with any of said recesses of said inner tube, said outer tube being able to extend and shrink.

5 11. The two-stage flush device for a toilet tank as claimed in Claim 7, wherein said locking pin is displaced by a locking ball confined in a ball chamber in said outer tube and a spring provided to urge said locking ball and secured by a cap.

10 12. The two-stage flush device for a toilet tank as claimed in Claim 7, wherein said inner tube is provided with a sloped continuous teeth on an inner surface, and said outer tube is provided with a locking tooth supported on a grip, said locking tooth selectably engaging with any of said sloped teeth of said inner tube to enable said outer tube be secured at an adjusted position.

15 13. The two-stage flush device for a toilet tank as claimed in Claim 7, wherein said outer tube is provided with a male thread, a constrict ring with a female thread, a washer and a cover cap being provided to fit around an upper end of said outer tube, said cover cap having a female thread engaging said male
20 thread of said outer tube so that said inner tube may be extended and in said outer tube and secured at an adjusted position by means of said cover cap engaging tightly with or disengaging from said outer tube.

25 14. The two-stage flush device for a toilet tank as claimed in Claim 7, wherein said inner tube is provided with a plurality

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of grooves connected with a vertical slot at their right side, and said outer tube is provided with a locking projection movable along in said slot of said inner tube and engageable with any of said grooves to secure said outer tube at an adjusted position.

5 15. The two-stage flush device for a toilet tank as claimed in Claim 7, wherein said valve of said high level outer tube is provided with two opposite feet pivotally fixed with said outer or said inner tube at an outer surface.

10 16. The two-stage flush device for a toilet tank as claimed in Claim 7, wherein said inner tube is provided with a direction orienting slot for a position projection of said outer tube to fit in and slide along in said slot, enabling said outer tube to move in a definite direction.

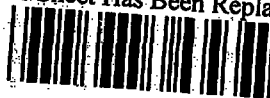
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ABSTRACT OF THE DISCLOSURE

A two-stage flush device for a toilet tank is provided with a side press rod for operating to open a valve of a low level outlet tube for flushing a large volume of water, a longitudinal press rod or pull rod for operating to open a valve of a high level outlet tube for flushing a small volume of water. The side press rod and the longitudinal press rod are combined together and supported in a position sleeve fixed in a hole of a side wall of a toilet tank. This device further includes a water volume control device, whcih has a high level outlet tube for flushing a small volume of water and a low level outlet tube for a large volume of water. The side press rod is connected with the low elvel outlet tube for operating to open a valve of the low level outlet tube, and the longitudinal press or pull rod is connected with that of the high level outlet tube.

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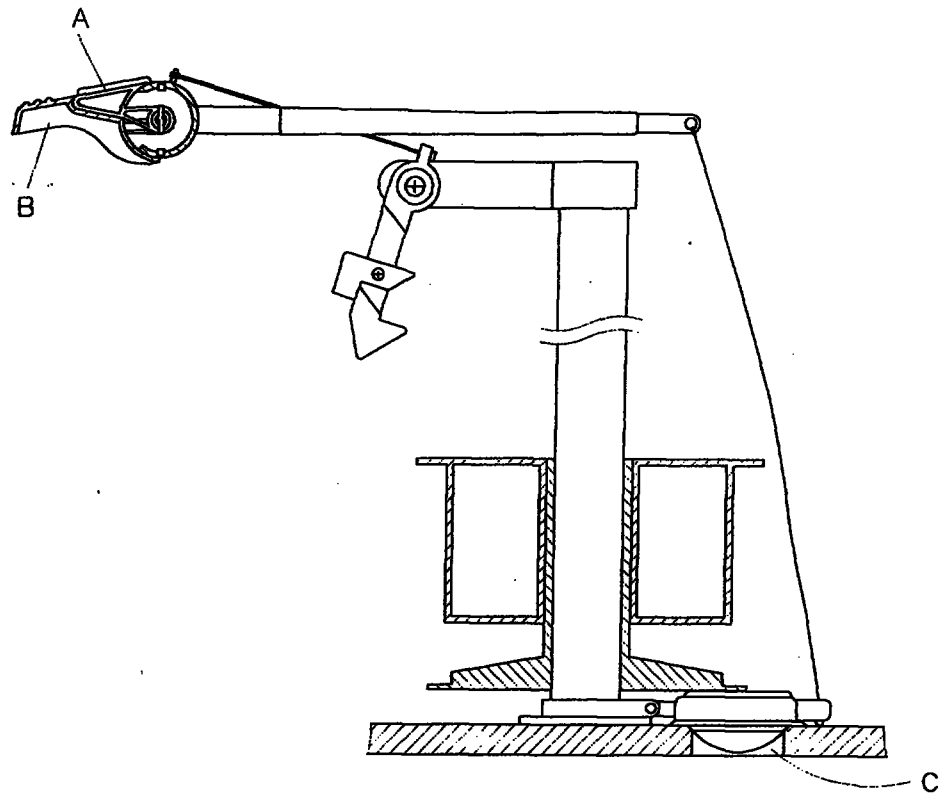


Fig 1 (PRIOR ART)

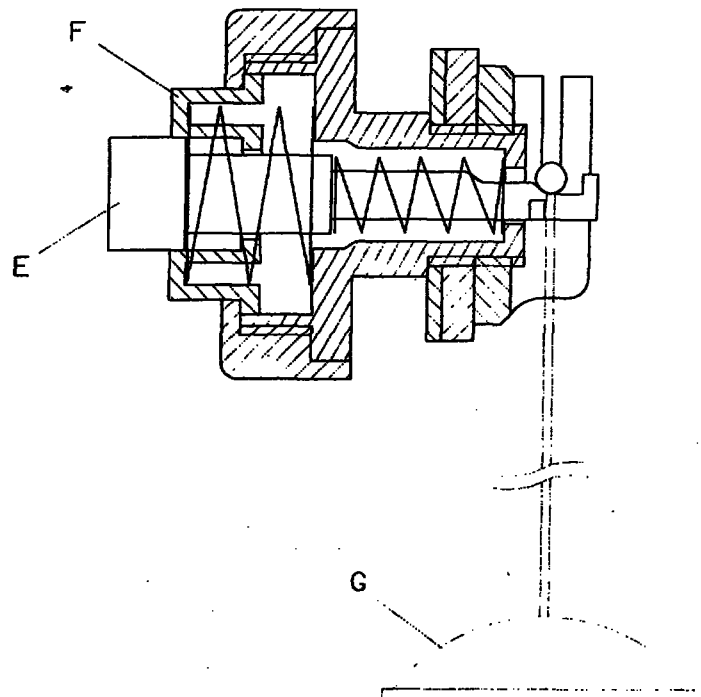


Fig 2 (PRIOR ART)



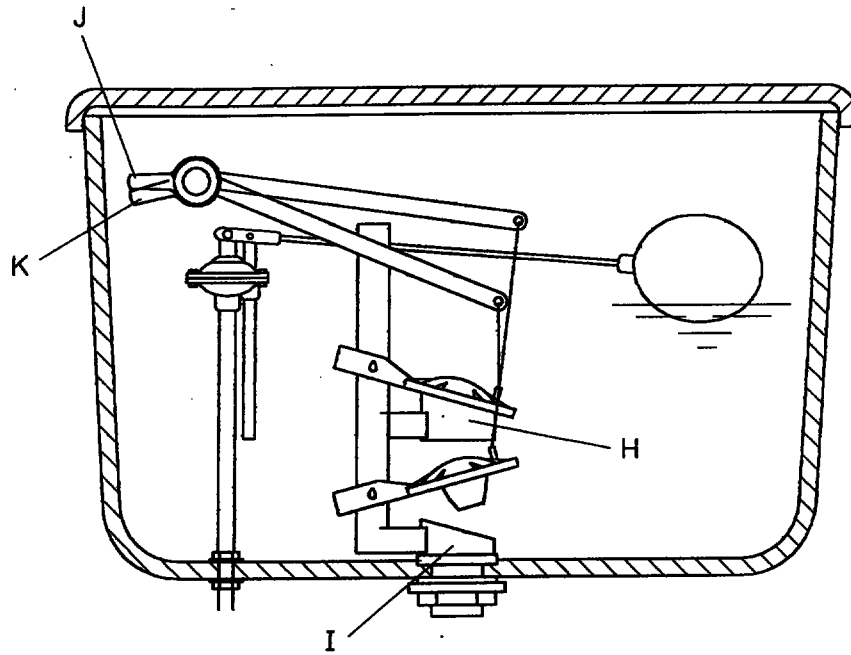


Fig 3 (PRIOR ART)

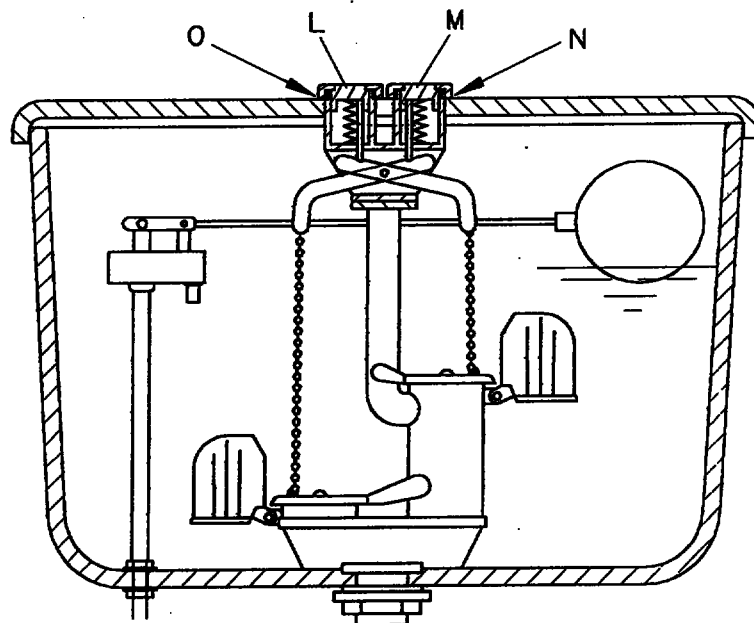


Fig 4 (PRIOR ART)



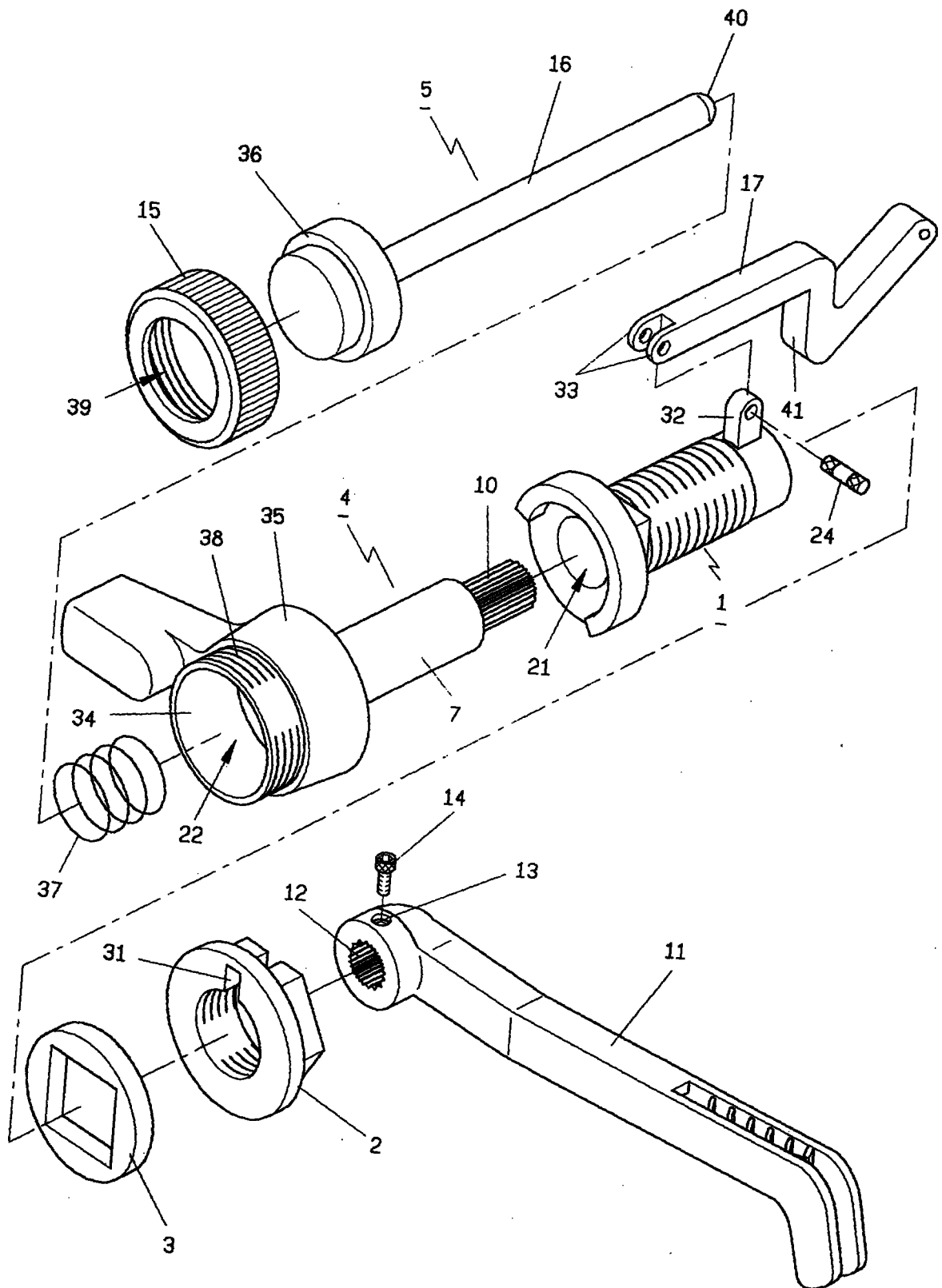


Fig 5

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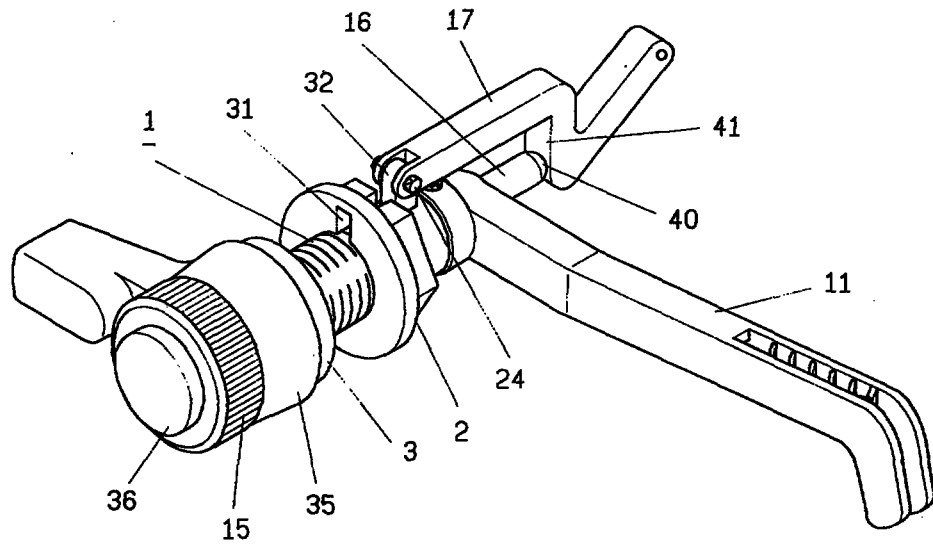


Fig 6

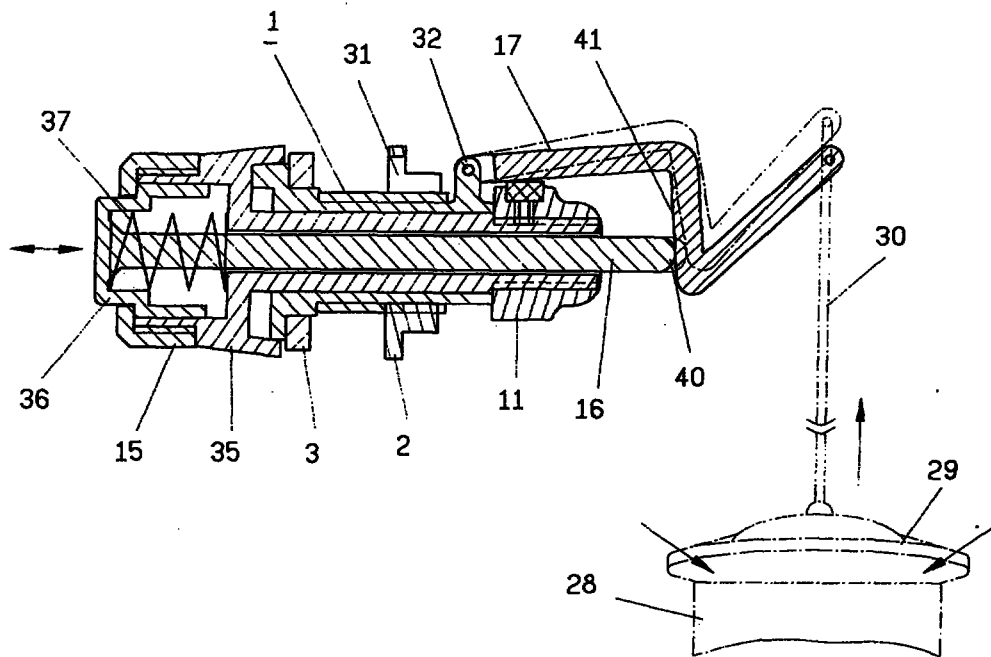


Fig 7

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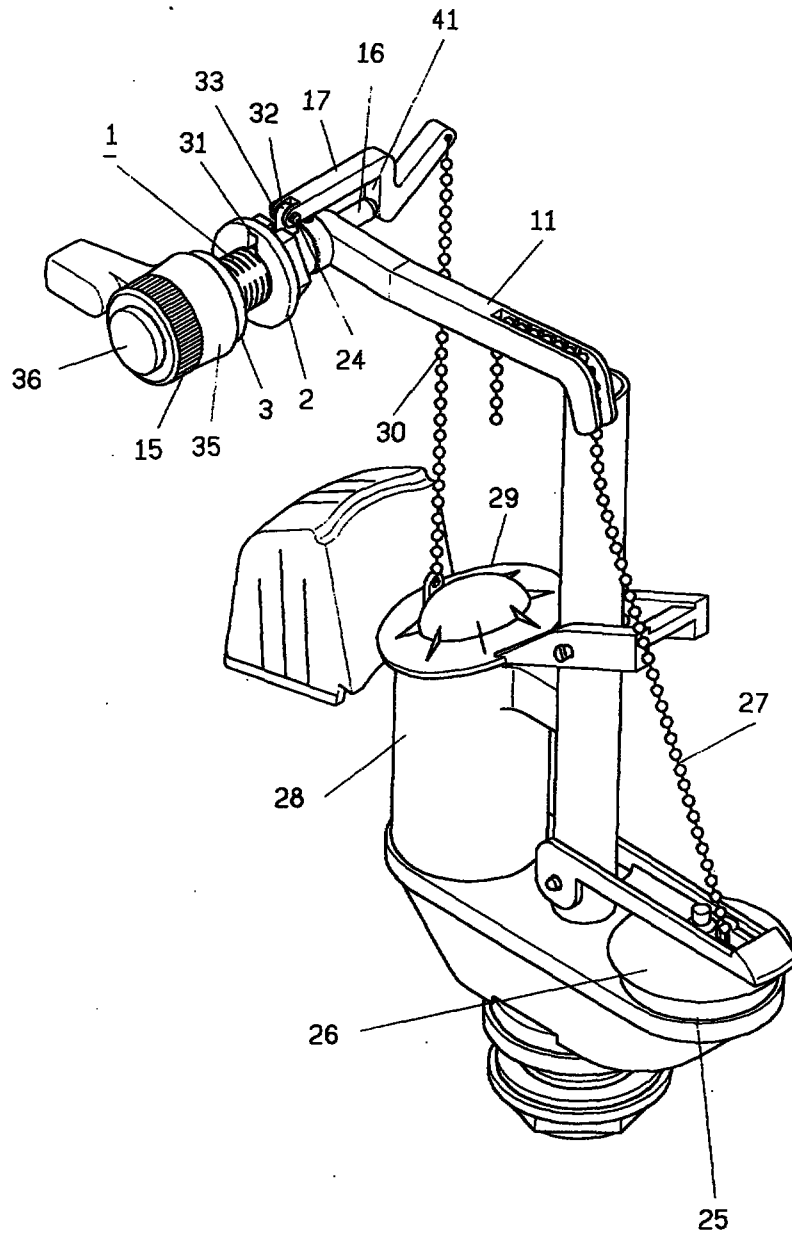
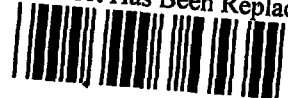


Fig 8

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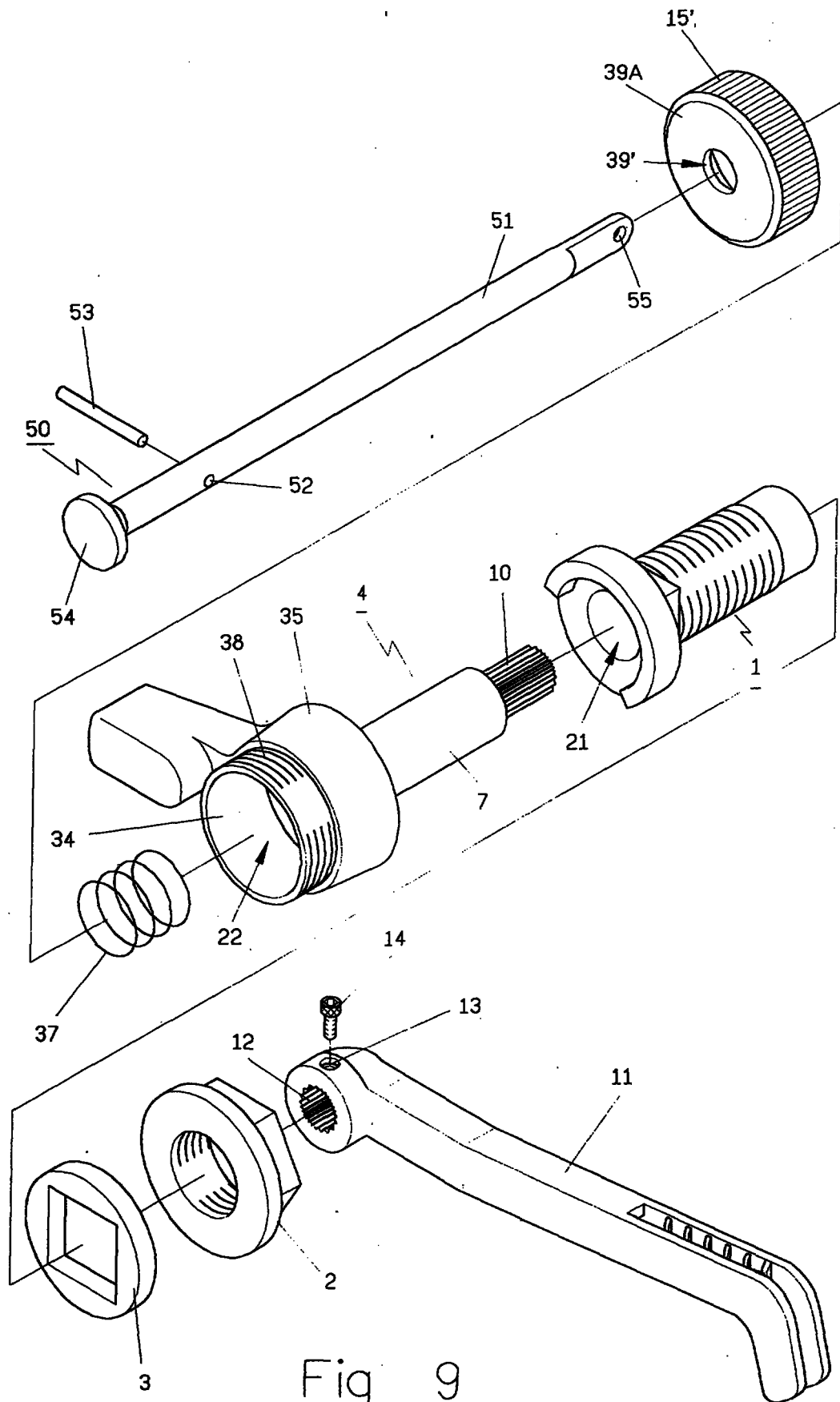


Fig 9

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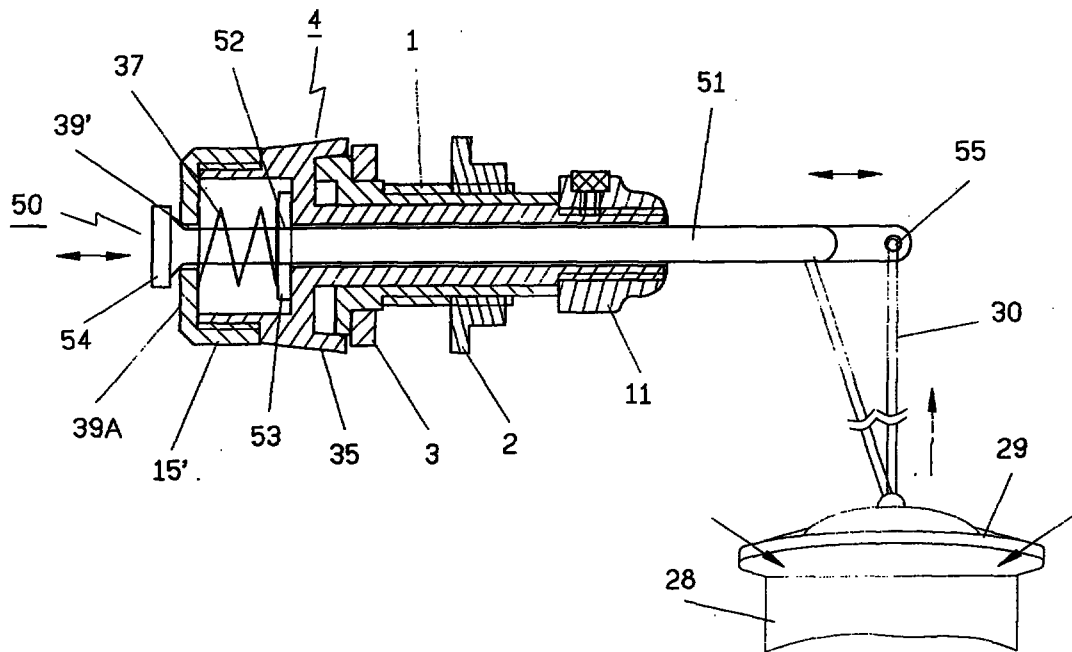


Fig 10

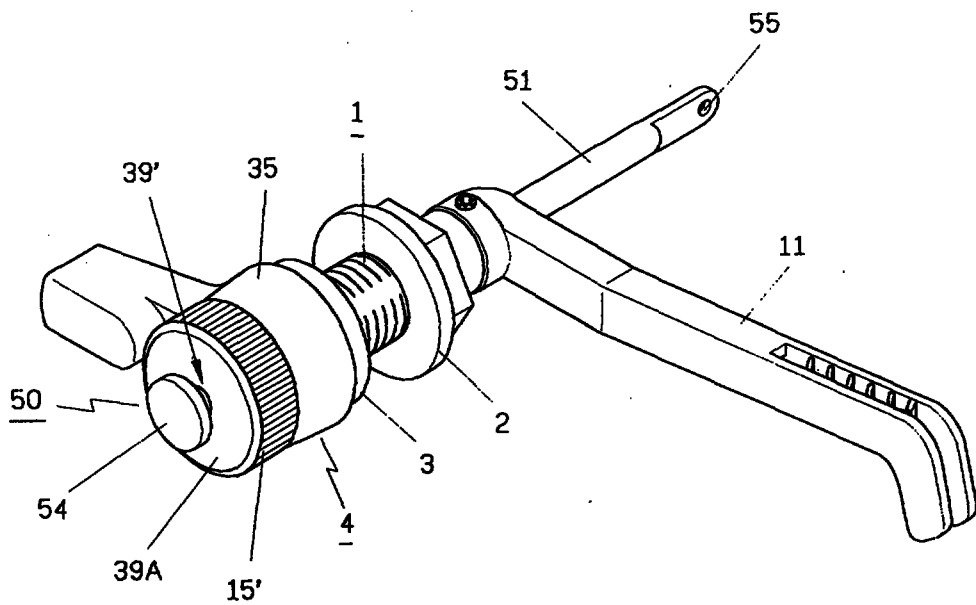


Fig 11

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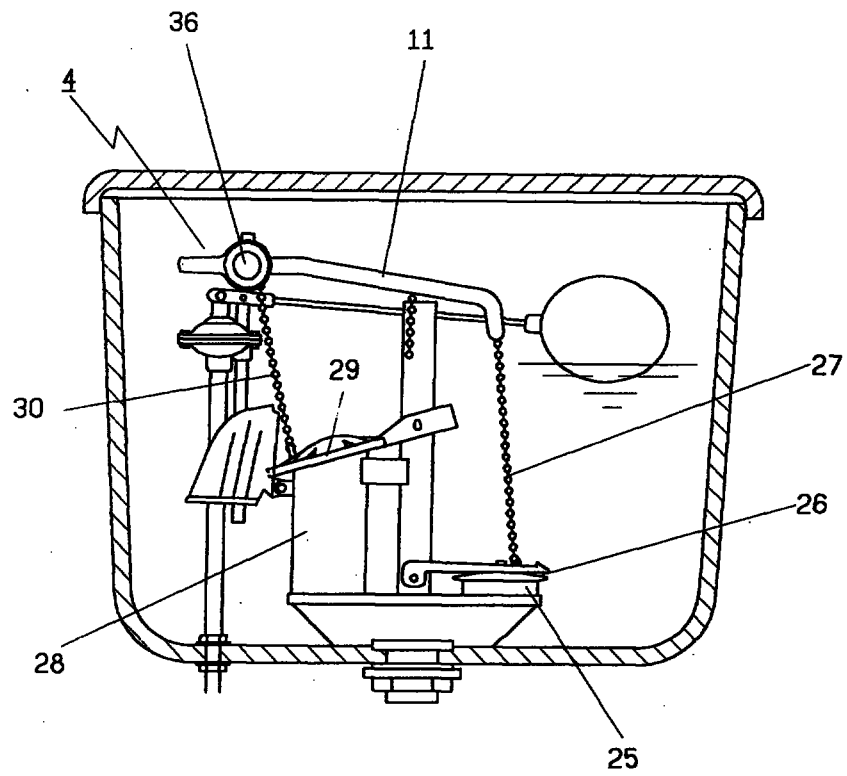


Fig 12

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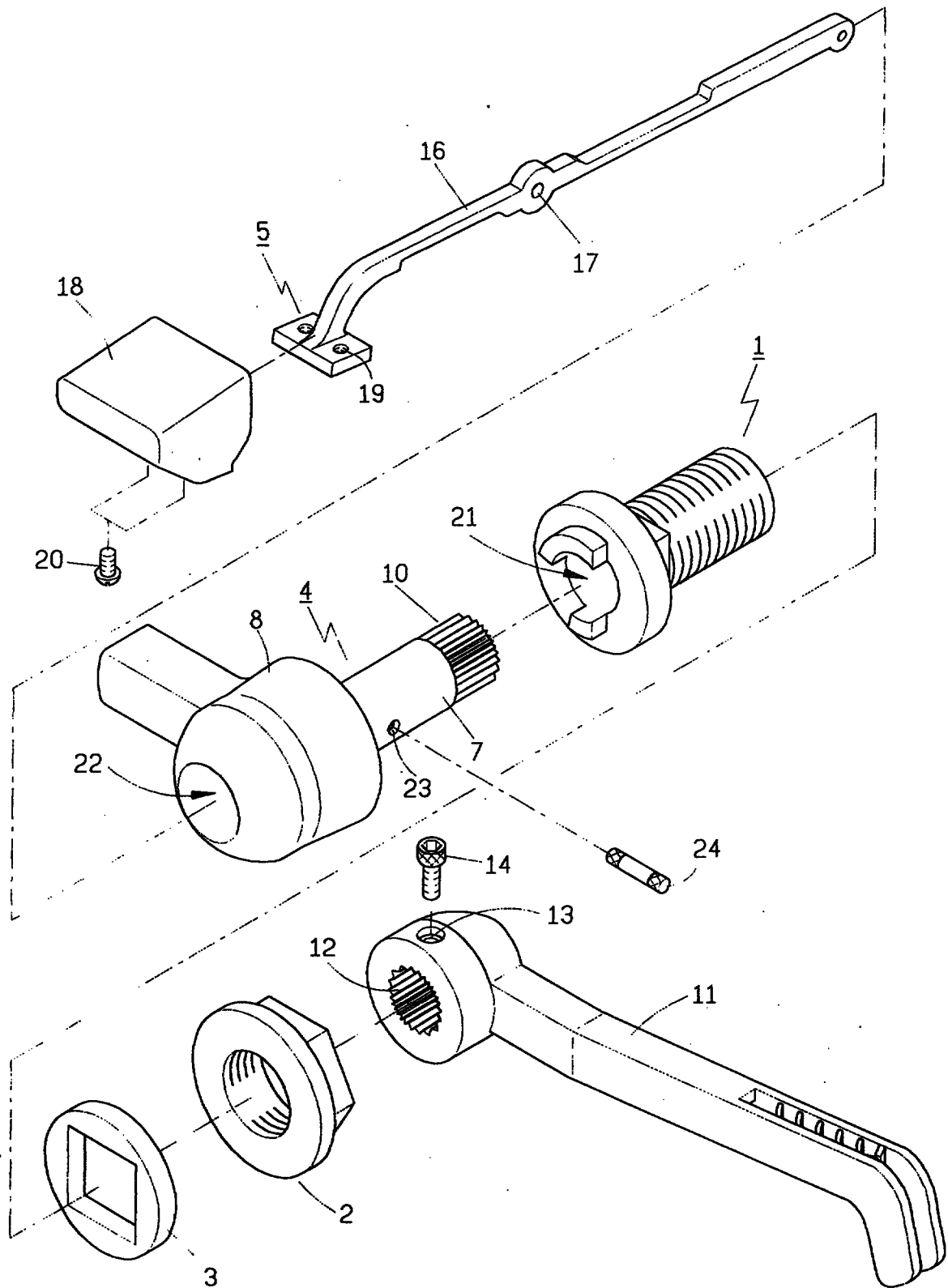


Fig 13

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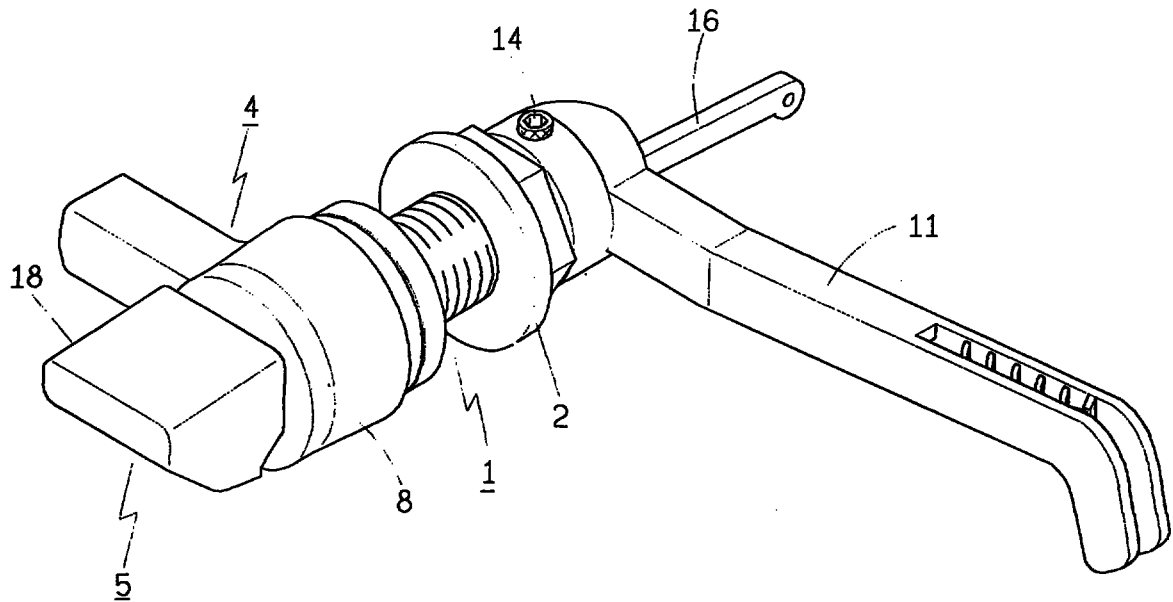


Fig 14

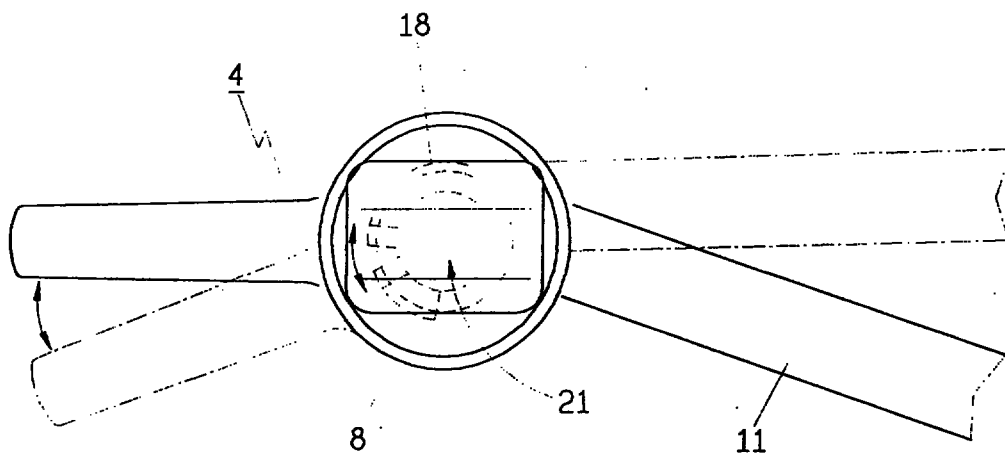


Fig 15



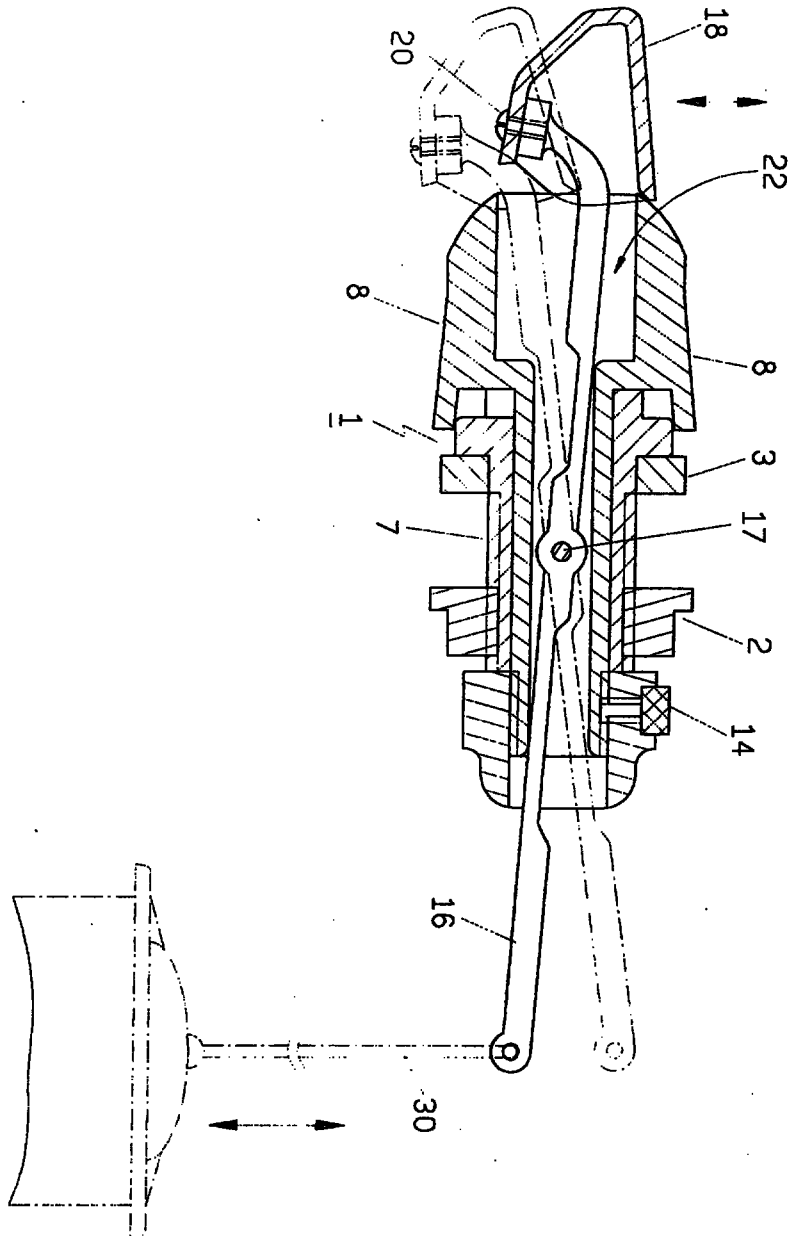


Fig. 16

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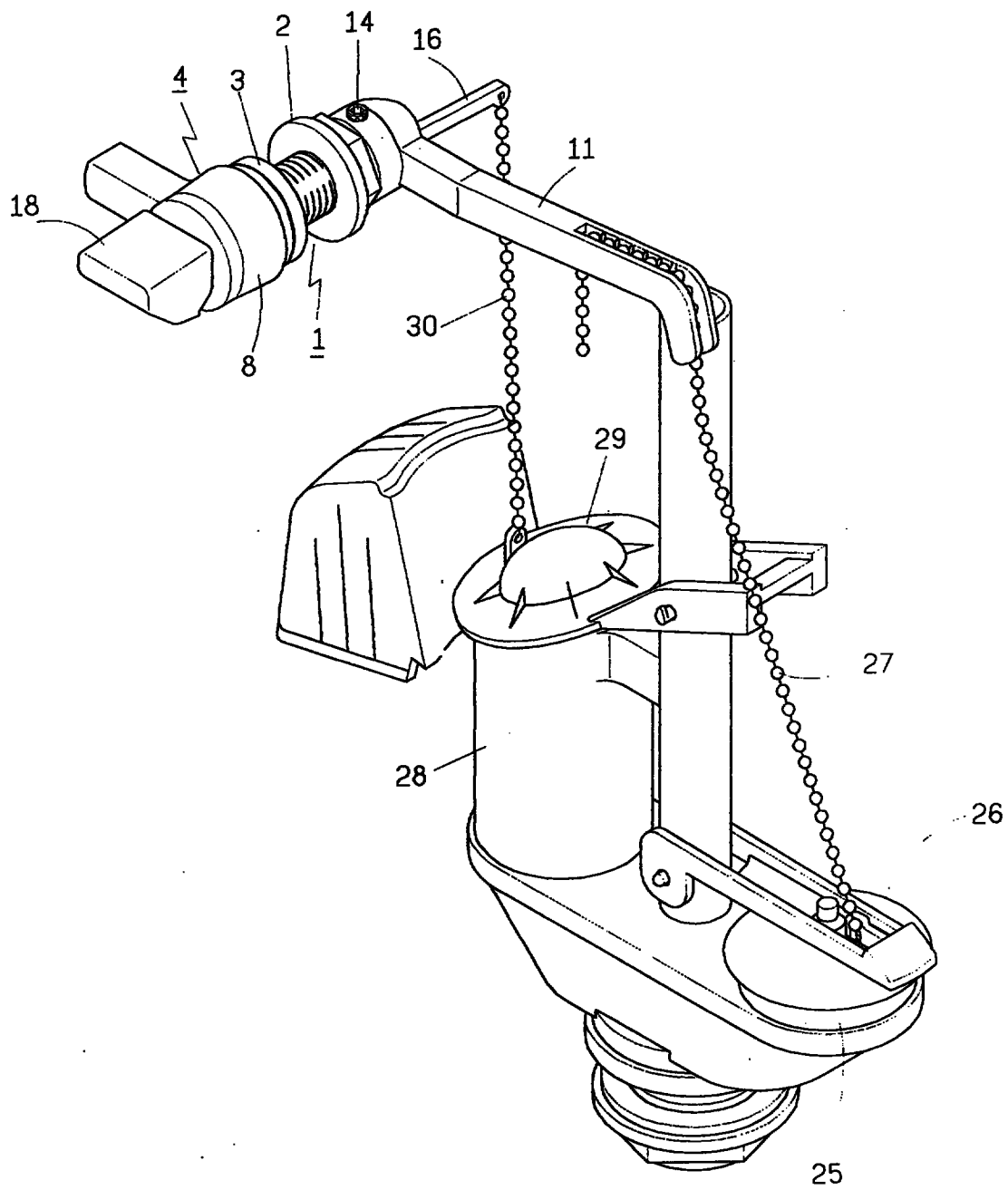


Fig 17

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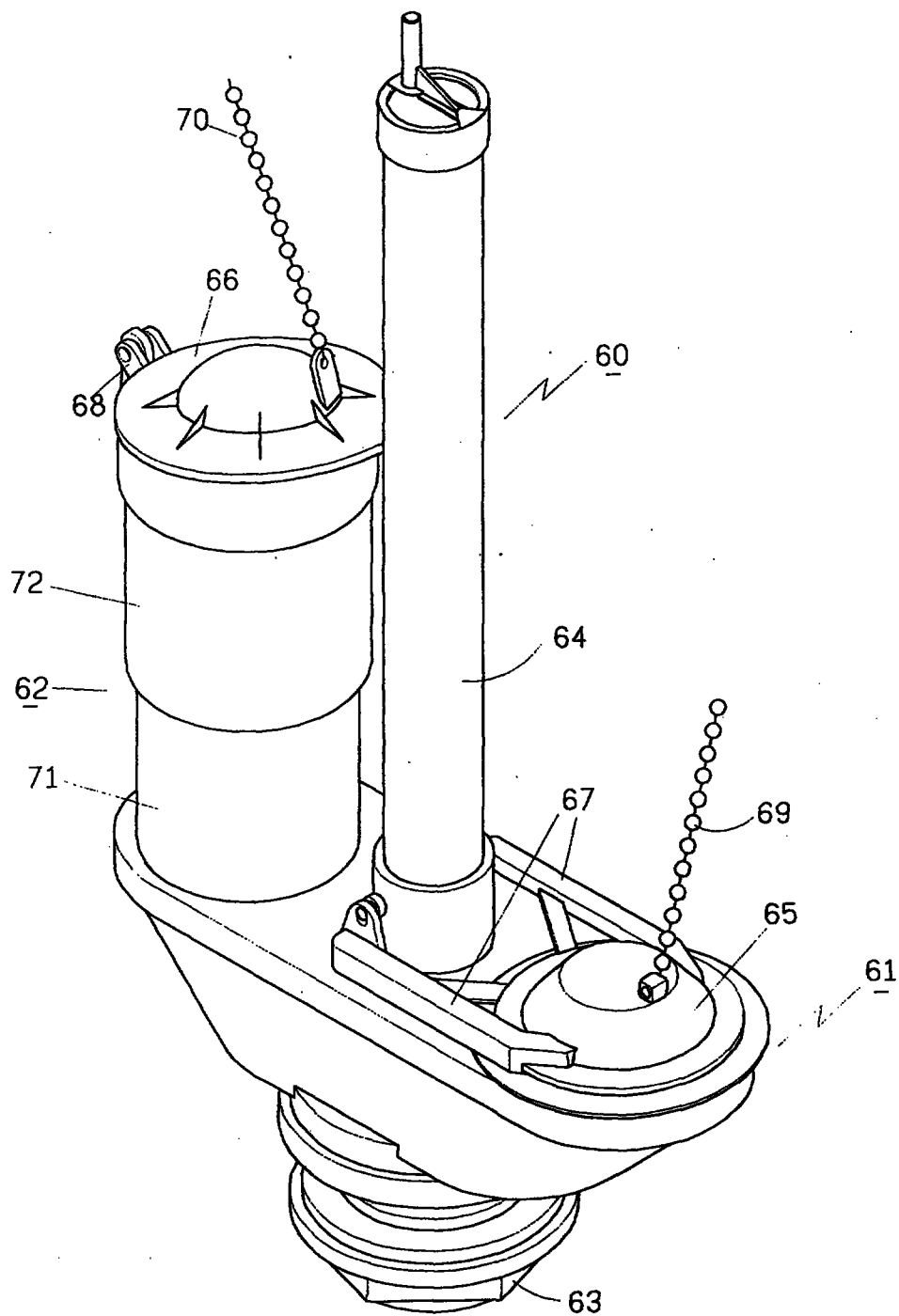
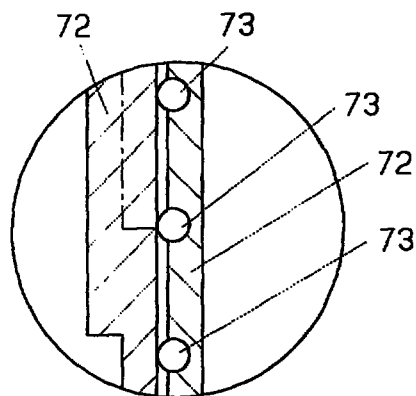
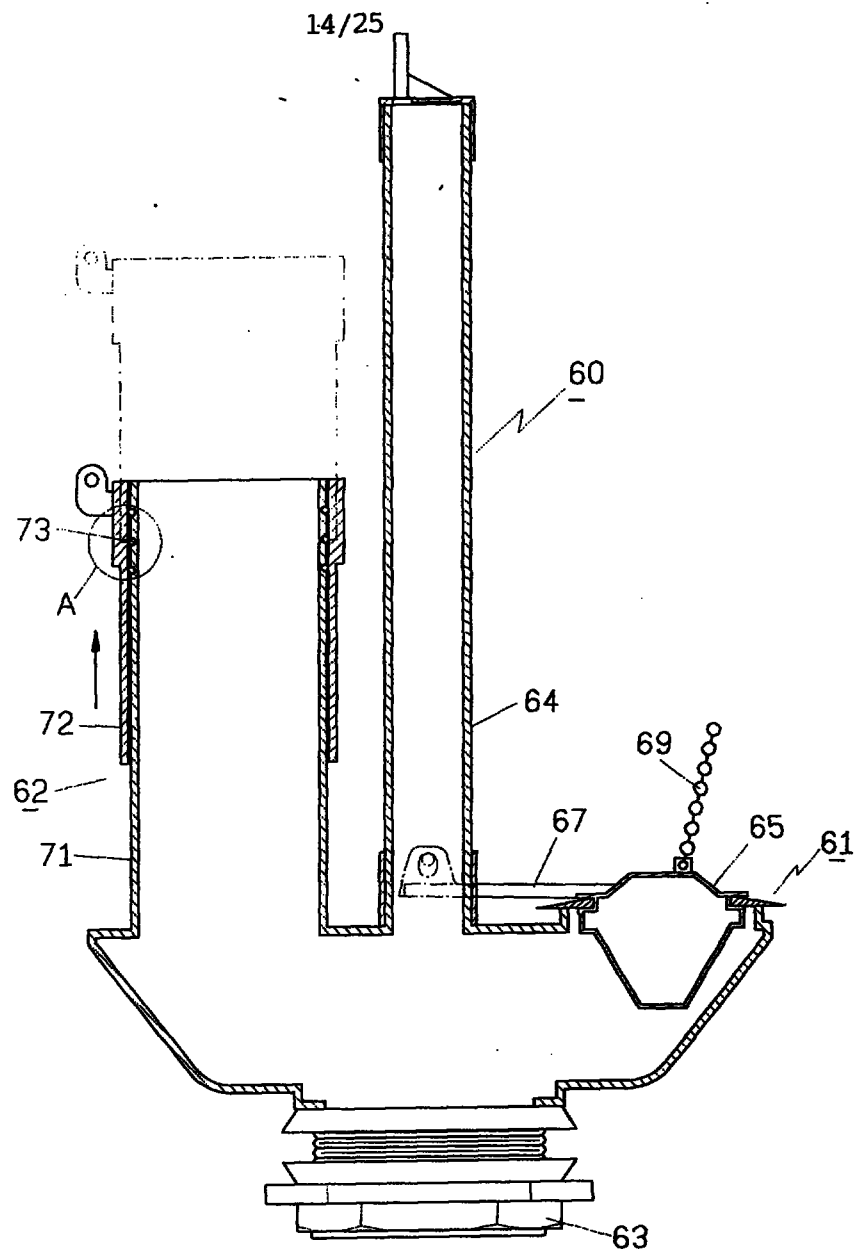


Fig 18

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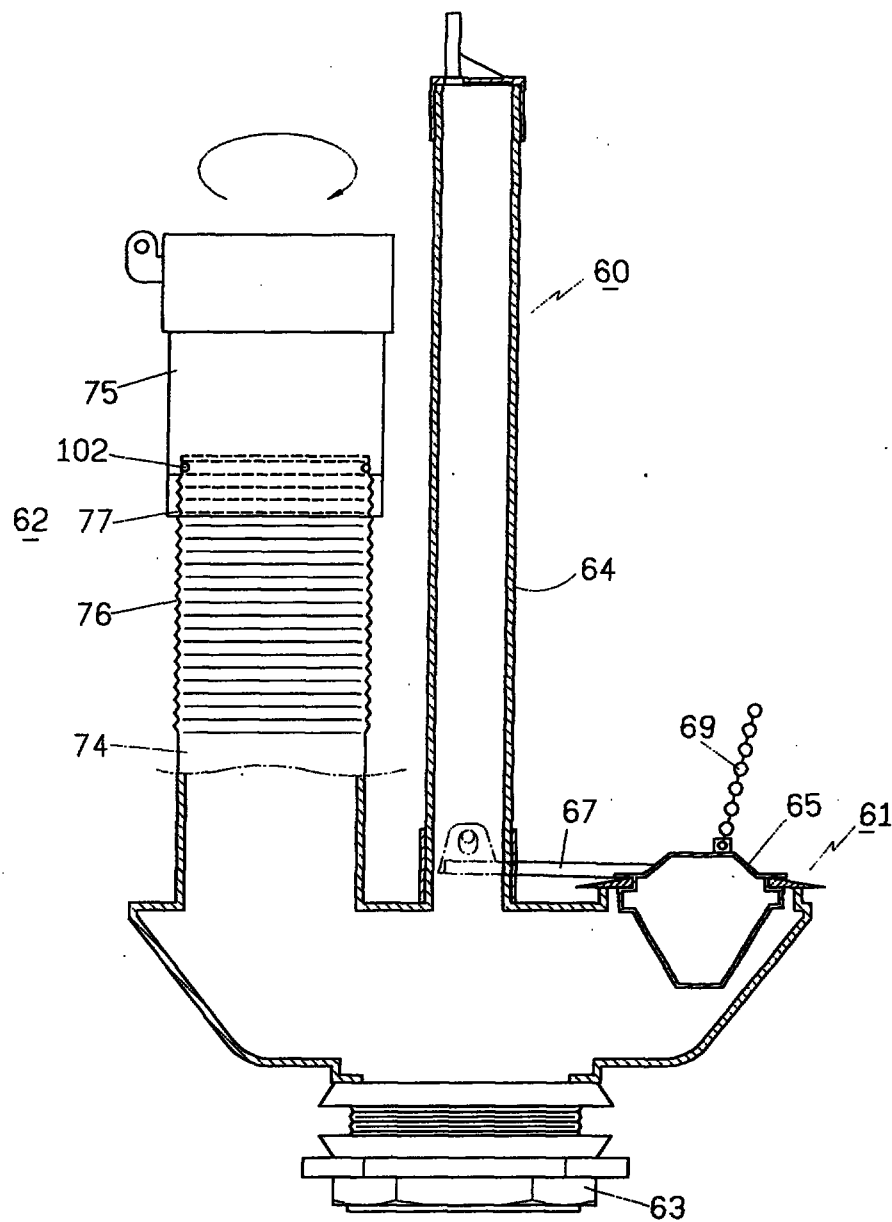


Fig 21

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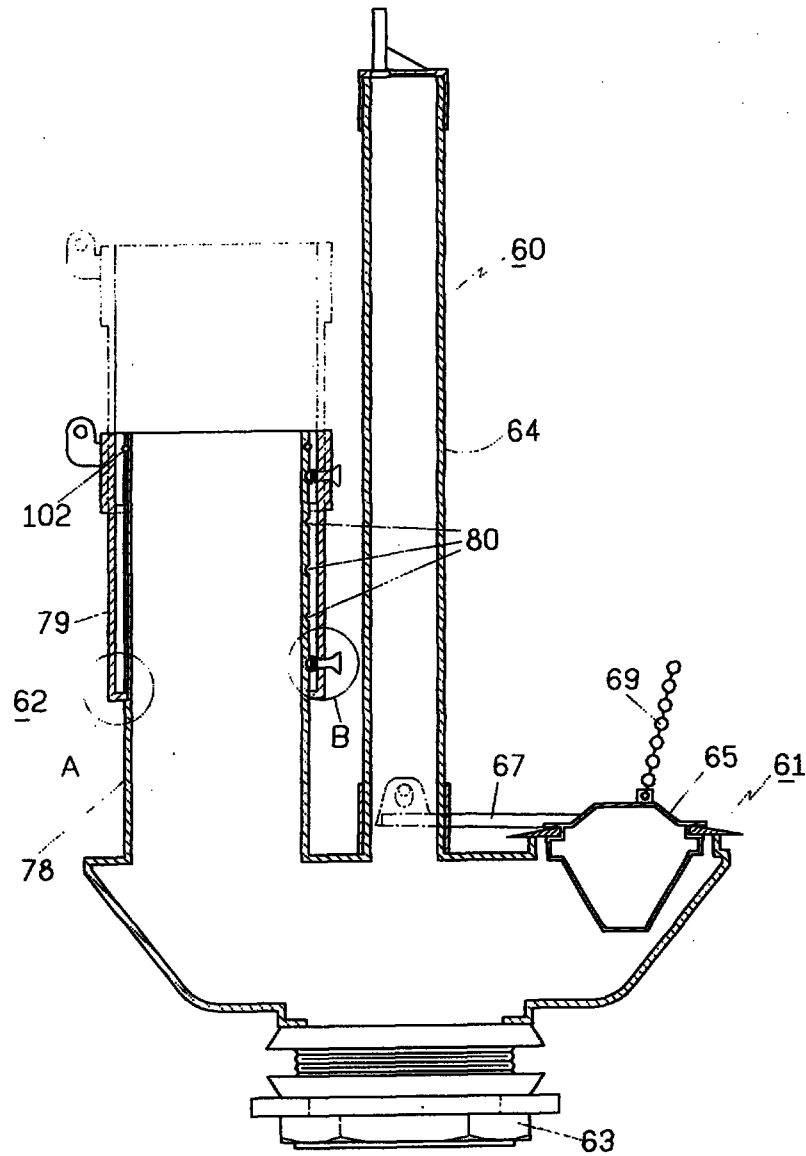


Fig 22

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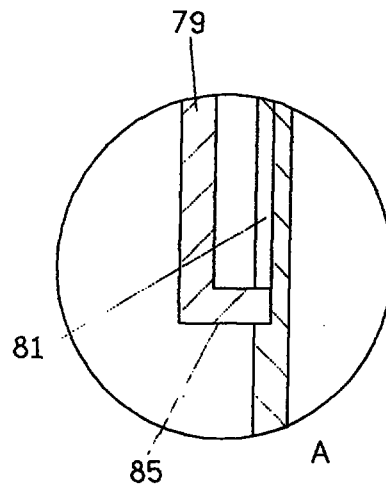


Fig 23

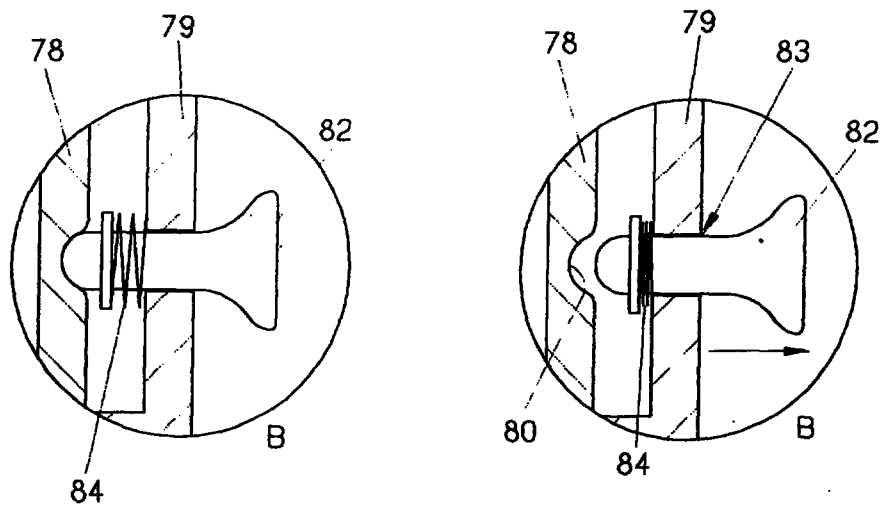


Fig 24



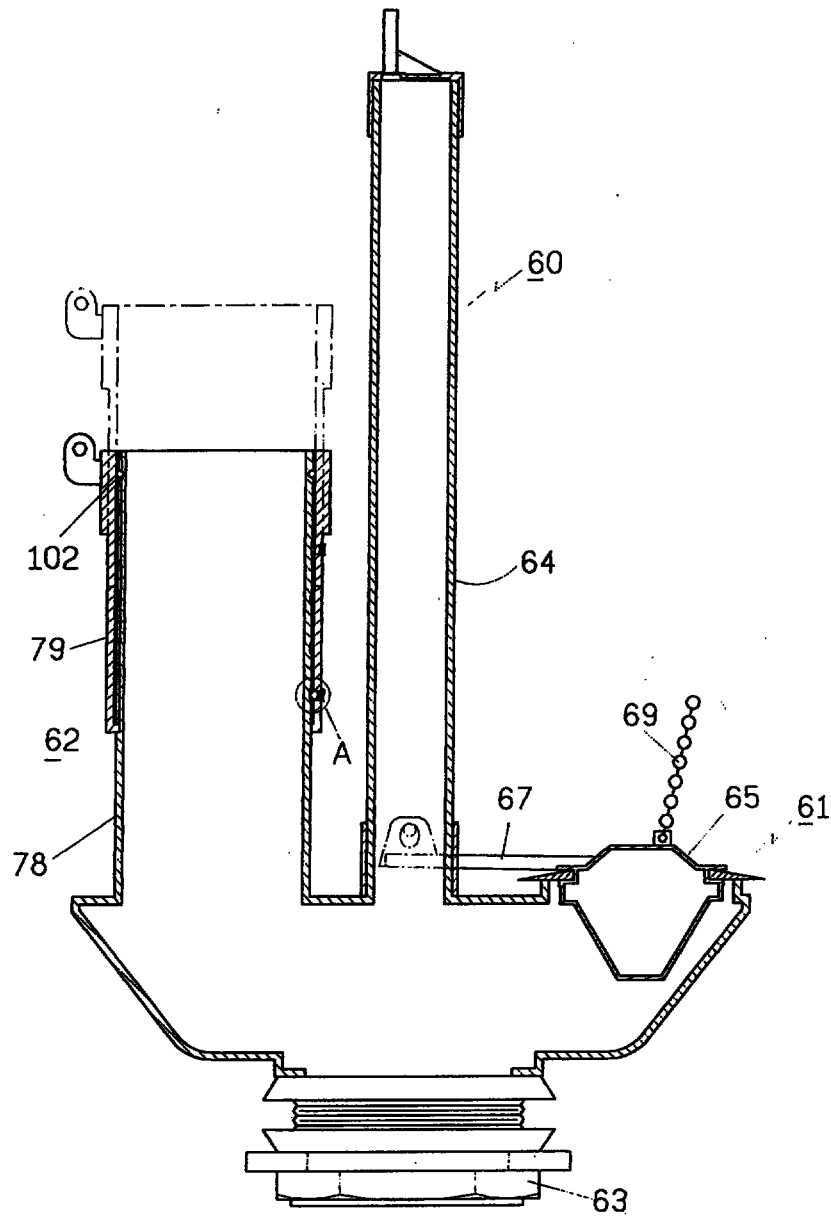


Fig 25

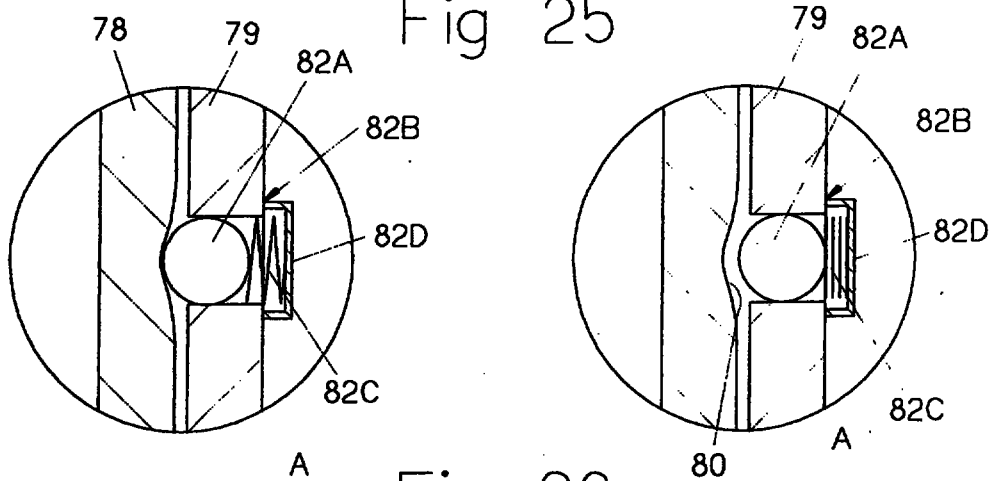


Fig 26



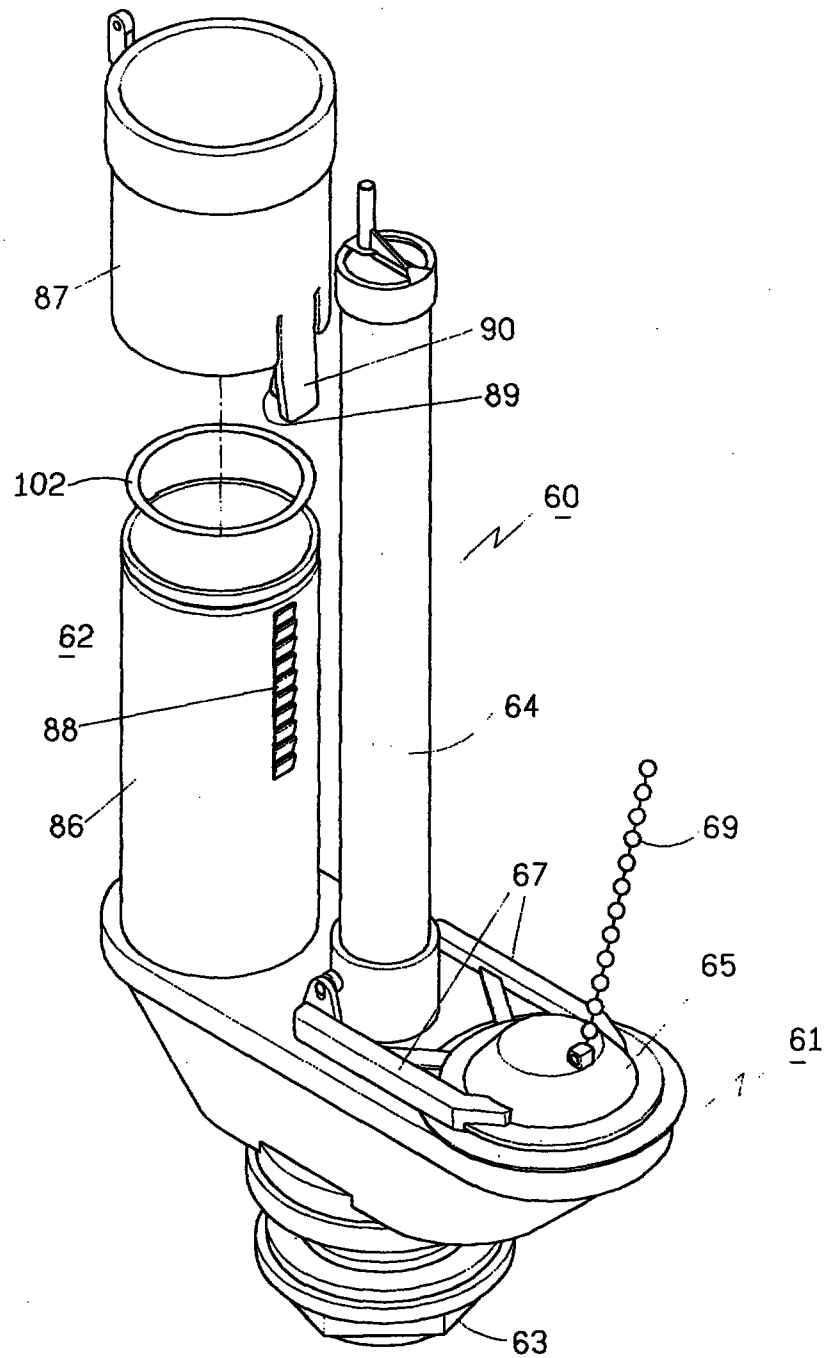


Fig 27

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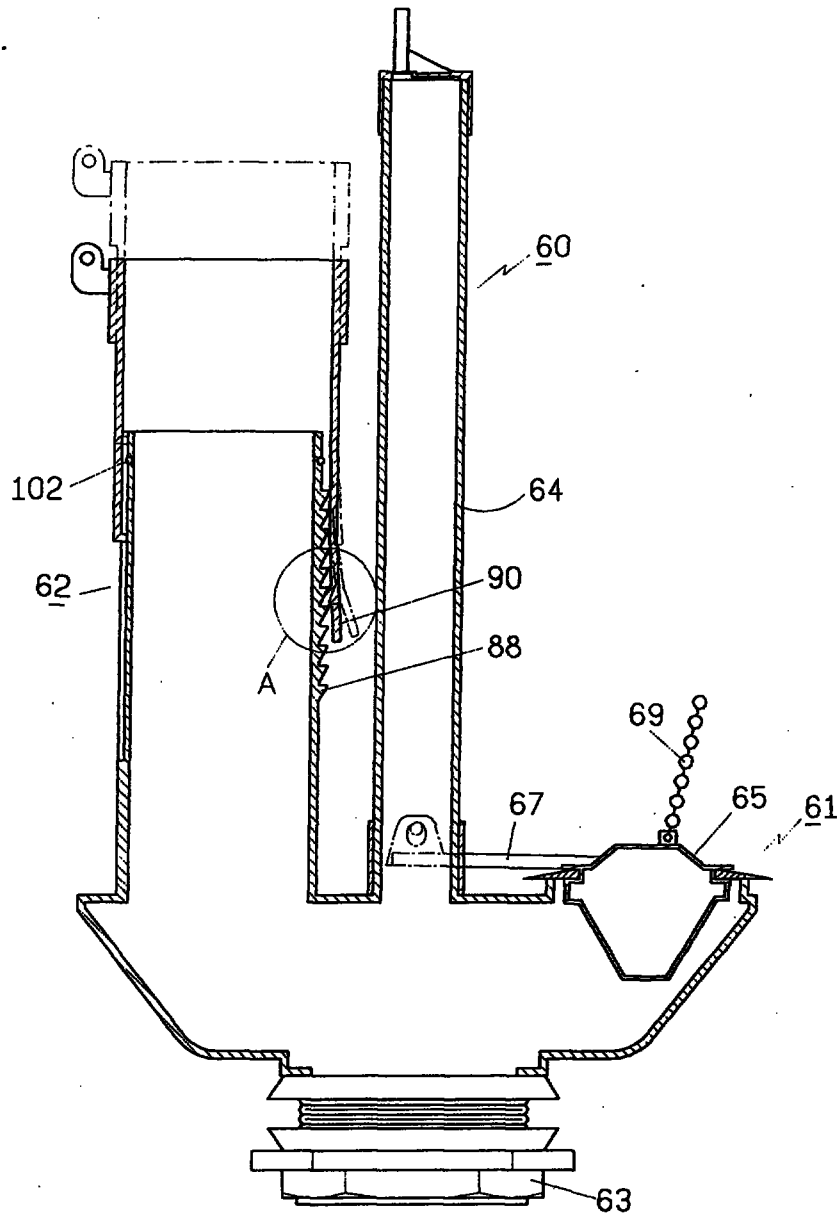


Fig 28

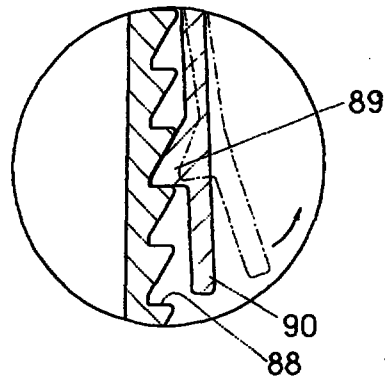


Fig 29

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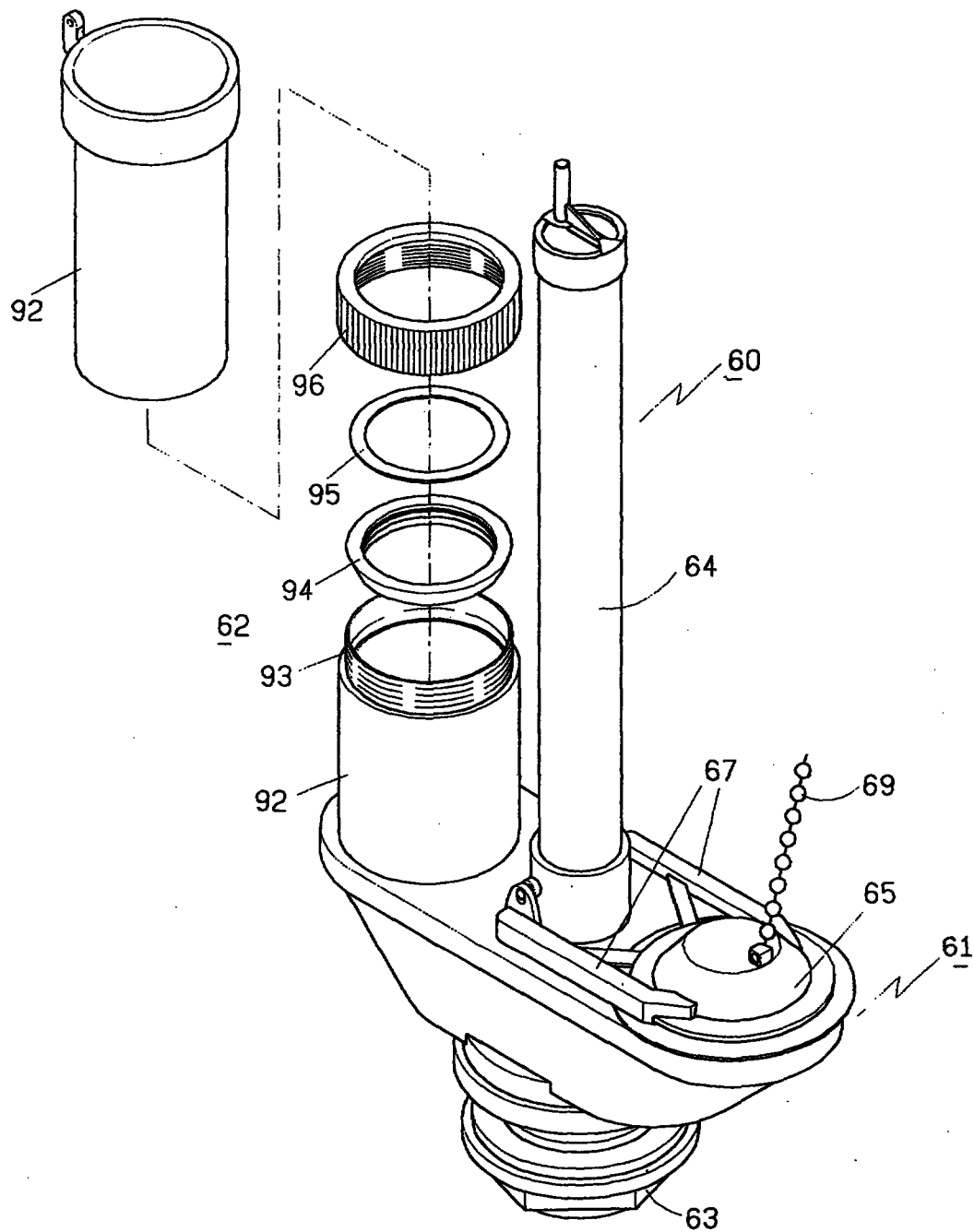


Fig 30

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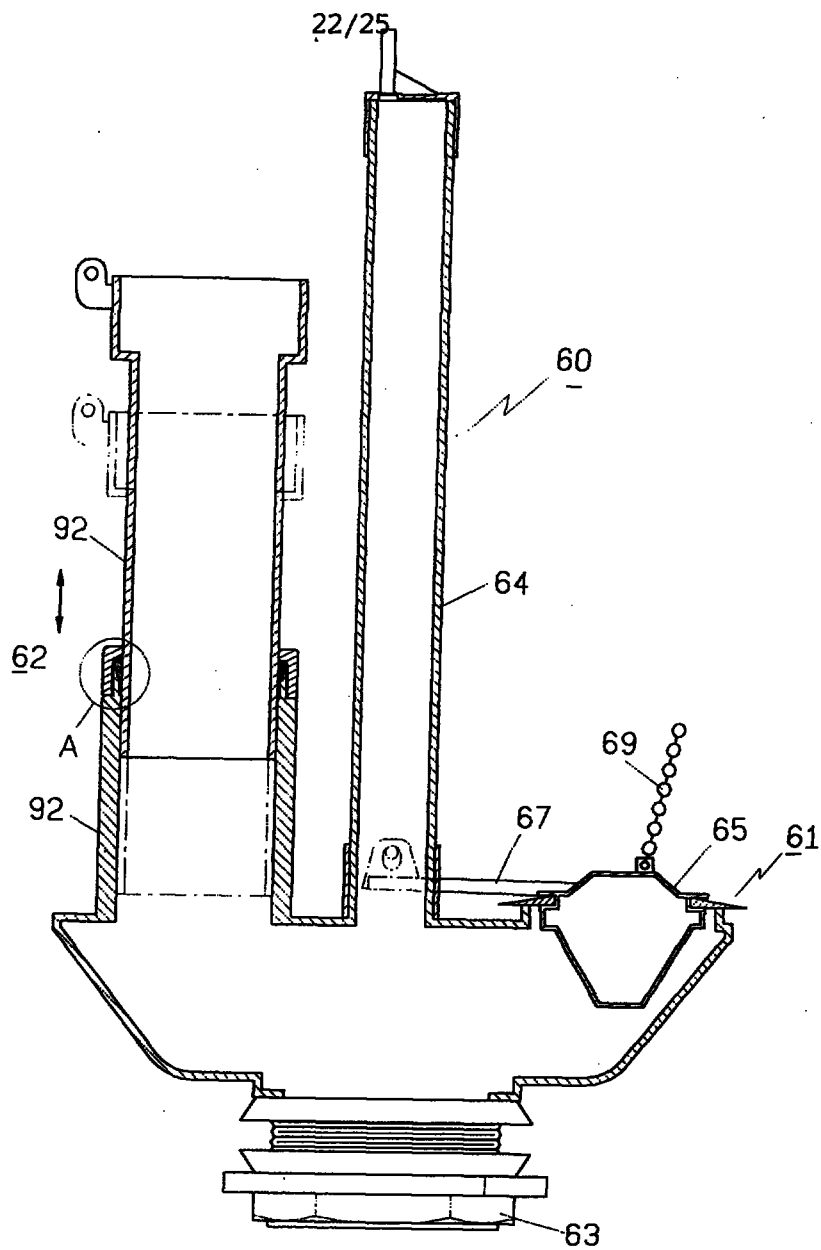


Fig 31

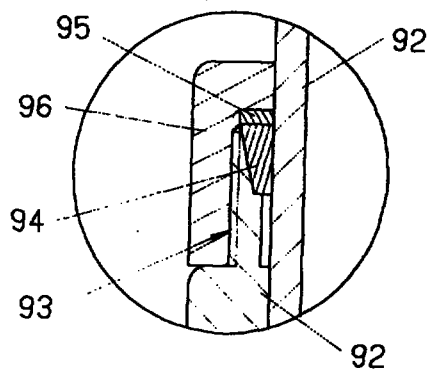


Fig 32

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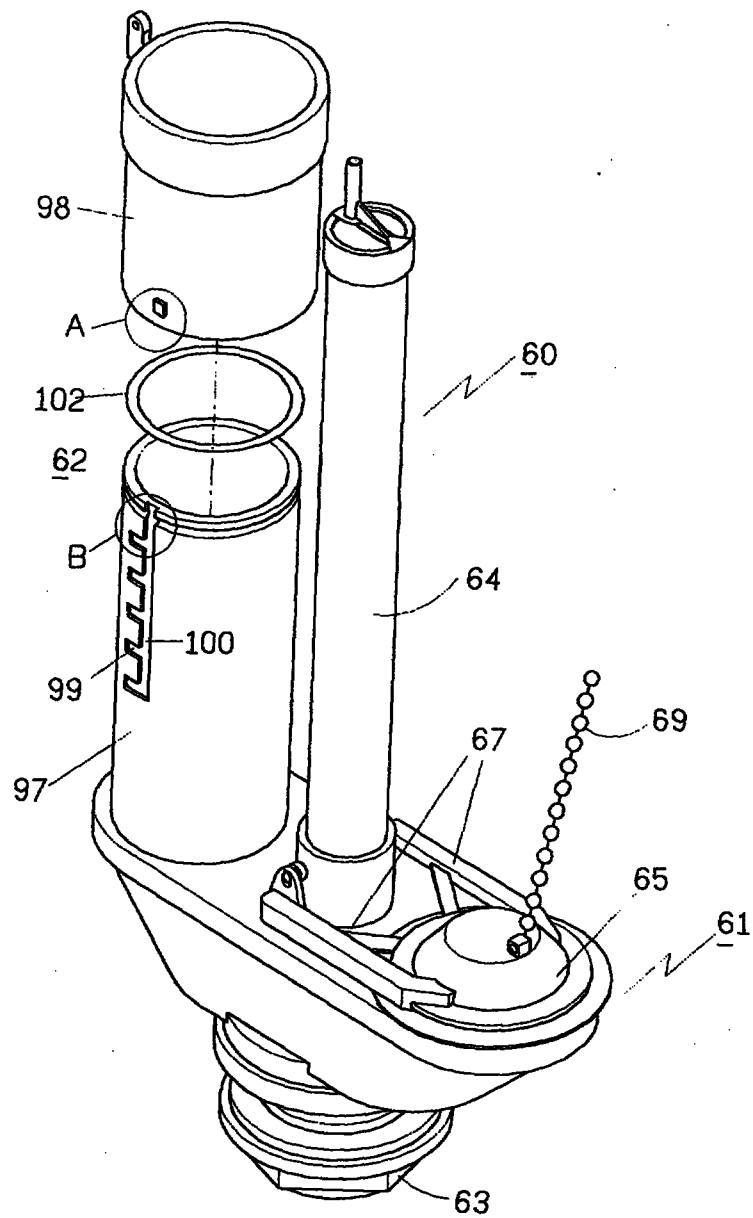


Fig 33

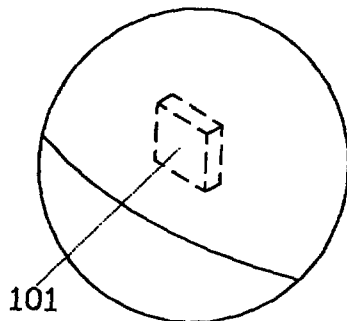


Fig 34

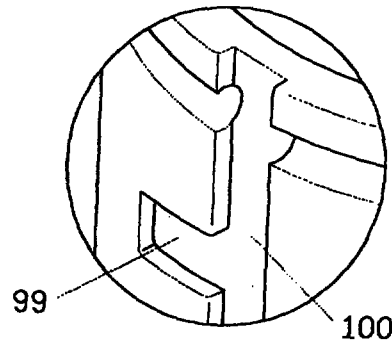


Fig 35

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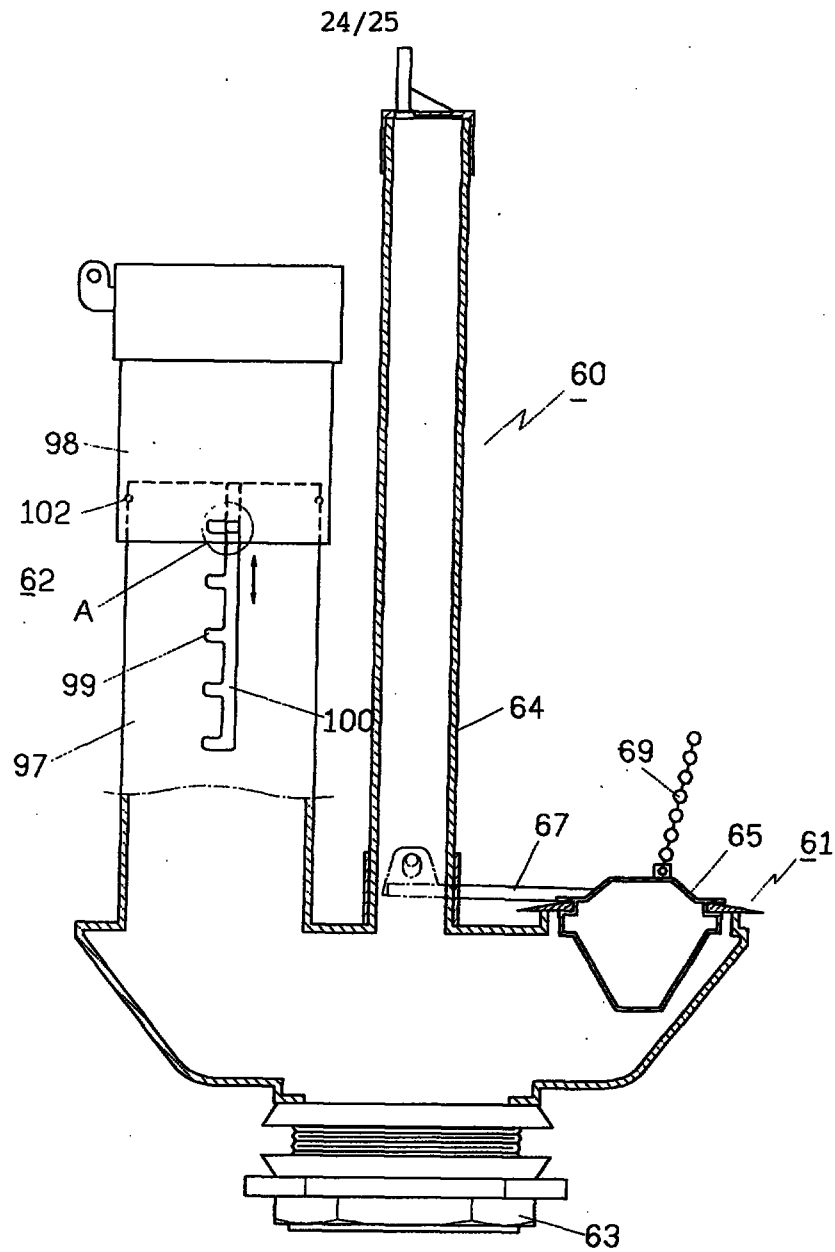


Fig 36

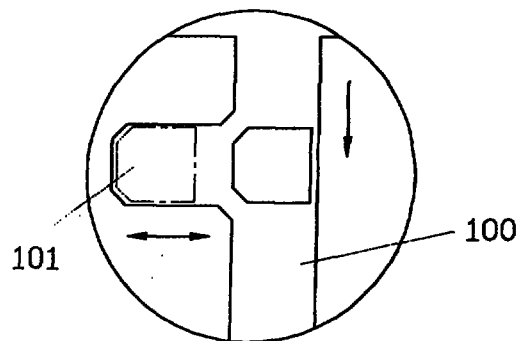


Fig 37

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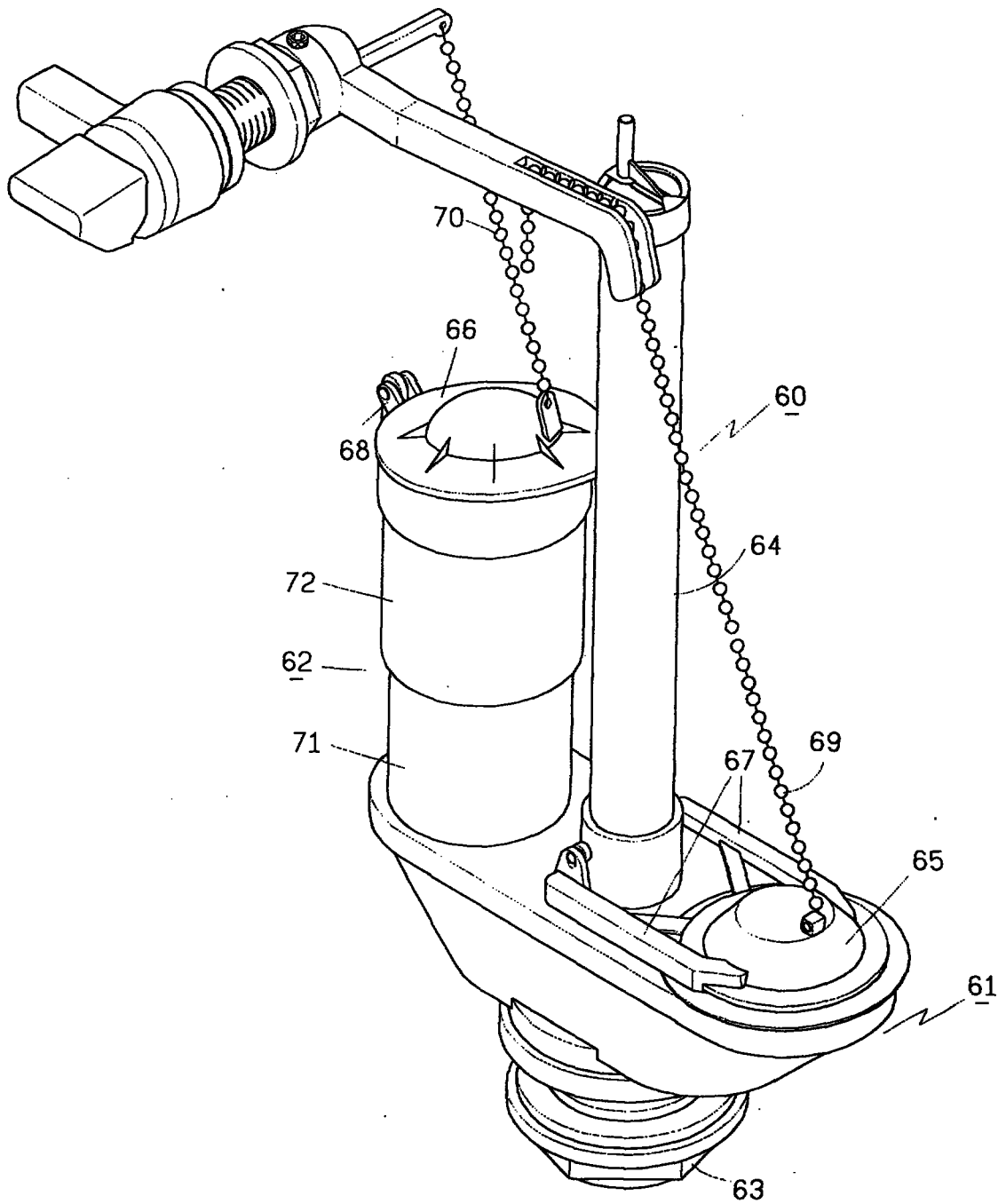


Fig 38

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TITLE: TWO-STAGE FLUSH DEVICE FOR A TOILET TANK

BACKGROUND OF THE INVENTION

This invention concerns a two-stage flush device for a toilet tank, particularly having a press button and a push or pull button for respectively flushing a small volume of water and a large volume of water.

A conventional two-stage flush device for a toilet tank shown in Fig. 1 has a single water volume control outlet tube with a valve for flushing two different volume of water by two press buttons A and B for opening the valve C in different degress. A second conventional two-stage flush device for a toilet tank shown in Fig. 2 has an auxiliary button E and a main button F, and the auxiliary button E can be pushed only or both the buttons E and F are pushed at the same time for flushing different volume of water.

The two kinds of conventional two-stage flush devices have only one outlet tube for different volume of water to flush out, but the the main and the auxiliary button are to be pressed in the same direction. Then chances are that a user may carelessly, easily or wrongly press the two buttons at the same time to flush a large volume of water, losing water saving function they are designed for.

A third conventional two-stage flush device shown in Fig. 3 has two outlet tubes H and I respectively having a high level and a low level, but if the opening time for the valve cap of each outlet tube H or I should not be controlled, it would be of on use. It has an auxiliary press rod J and a main press rod K for

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operating respectively a high and a low level outlet valve for flushing different volume of water. But maybe both press rods J and K will be carelessly or mistakenly pressed at the same time as the first and the second conventional one described above.

A fourth conventional two-stage flush device shown in Fig. 4 has two different buttons L and M, nevertheless, these two buttons need two holes N and O for fixing them. But most toilet tanks in use now always has only one hole for fixing pressing levers or rods, and onsequently, a new water tank has to be used or an old one has to be transformed a little for the fourth one.

SUMMARY OF THE INVENTION

This invention has been devised to offer several embodiments of two-stage flush device for a toilet tank having two kinds of pressing or pulling directions for a side press rod and a longitudinal pull or push rod and able to be fixed in a single hole of the wall of a conventional toilet tank.

A two-stage flush device for a toilet tank in the present invention includes a side press rod for operating a high level outlet tube to flush a small volume of water, and a longitudinal push or pull rod for operating a low level outlet base to flush a large volume of water. Both the side press rod and the longitudinal rod are fitted in a center through hole of a locking sleeve fixed in a hole of the wall of a conventional toilet tank by means of a nut and a washer, extending out of the tank wall for operating.

Several features of the present invention are listed as follows.

1. A pressing device for flushing water consists of a side press button for operating a low level outlet tube and a push button for operating a high level outlet tube.
2. The push button can be displaced by a pull button to have the same function.
3. Although the press device has two separate components for operating two-stage flush, they have different direction for pushing, preventing them from mistakenly operated.

BRIEF DESCRIPTION OF DRAWINGS

The invention will be better understood by reference to the accompanying drawings, wherein:

Figure 1 is a perspective view of a first conventional two-stage flush device for a toilet tank;

Figure 2 is a side cross-sectional view of a second conventional two-stage flush device for a toilet tank;

Figure 3 is a side view of a third conventional two-stage flush device for a toilet tank;

Figure 4 is a side view of a fourth conventional two-stage flush device for a toilet tank;

Figure 5 is an exploded perspective view of a first embodiment of a two-stage flush device for a toilet tank in the present invention;

Figure 6 is a perspective view of the first embodiment of a

two-stage flush device for a toilet tank in the present invention;

Figure 7 is a cross-sectional view of the first embodiment of a two-stage flush device for a toilet tank in the present invention;

Figure 8 is a perspective view of the first embodiment of a two-stage flush device for a toilet tank in the present invention, showing it combined with a water volume control device;

Figure 9 is an exploded perspective view of a second embodiment of a two-stage flush device for a toilet tank in the present invention;

Figure 10 is a cross-sectional view of the second embodiment of a two-stage flush device for a toilet tank in the present invention.

Figure 11 is a perspective view of the second embodiment of a two-stage flush device for a toilet tank in the present invention;

Figure 12 is a side view of the second embodiment of a two-stage flush device for a toilet tank in the present invention, showing it assembled in a toilet tank;

Figure 13 is an exploded perspective view of a third embodiment of a two-stage flush device for a toilet tank in the present invention;

Figure 14 is a perspective view of the third embodiment of a two-stage flush device for a toilet tank in the present invention;

Figure 15 is a operational view of a side press rod in the

third embodiment of a two-stage flush device for a toilet tank in the present invention;

Figure 16 is a cross-sectional view of the third embodiment of a two-stage flush device for a toilet tank in the present invention, showing action of a front press rod;

Figure 17 is a perspective view of the third embodiment of a two-stage flush device for a toilet tank in the present invention;

Figure 18 is a perspective view of a first embodiment of a water volume control device in the two-stage flush device for a toilet tank in the present invention;

Figure 19 is a cross-sectional view of the first embodiment of a water volume control device in the two-stage flush device for a toilet tank in the present invention;

Figure 20 is a magnified view of the part A in Fig. 2;

Figure 21 is a cross-sectional view of a second embodiment of a water volume control device in the two-stage flush device for a toilet tank in the present invention;

Figure 22 is a cross-sectional view of a third embodiment of a water volume control device in the two-stage flush device for a toilet tank in the present invention;

Figure 23 is a magnified view of the part marked A in Fig. 22;

Figure 24 is a magnified view of the part marked B in Fig. 22;

Figure 25 is a cross-sectional view of a fourth embodiment

of a water volume control device in the two-stage flush device for a toilet tank in the present invention;

Figure 26 is a magnified view of the part marked A in Fig. A.;

Figure 27 is a perspective view of a fifth embodiment of a water volume control device in the two-stage flush device for a toilet tank in the present invention;

Figure 28 is a cross-sectional view of the fifth embodiment of a water volume control device in the two-stage flush device for a toilet tank in the present invention;

Figure 29 is a magnified view of the part marked A in Fig. 28;

Figure 30 is a perspective view of a sixth embodiment of a water volume control device in the two-stage flush device for a toilet tank in the present invention.

Figure 31 is a cross-sectional view of the sixth embodiment of a water volume control device in the two-stage flush device for a toilet tank in the present invention;

Figure 32 is a magnified view of the part marked A in Fig. 31;

Figure 33 is an exploded perspective view of a seventh embodiment of a water volume control device for the two-stage flush device for a toilet tank in the present invention;

Figure 34 is a magnified view of the part marked A in Fig. 33;

Figure 35 is a magnified view of the part marked B in Fig. 33;

Figure 36 is a cross-sectional view of the seventh embodiment of a water volume control device in the two-stage flush device for a toilet tank in the present invention;

Figure 37 is a magnified view of the part marked A in Fig. 36; and,

Figure 38 is a perspective view of the two-stage flush device combined with the water volume control device in the two-stage flush device for a toilet tank in the present invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

A two-stage flush device for a toilet tank in the present invention, as shown in Figs. 5 - 8, includes a position sleeve 1 having a center through hole 21 for receiving a connect shaft portion 7 of a side press rod 4 therein, fixed firmly in a hole of a toilet tank by means of a nut 2 and a washer 3 as shown in Fig. 12. The position sleeve 1 further has a shaft base 32 standing on an outer surface of an inner end, and the nut 2 has a notch 31 to fit with the shaft base 32 so as to be located surrounding the outer surface of the position sleeve 1 after assembled with the sleeve 1. The shaft base 32 has a shaft hole for a shaft 24 to fit therein and also through holes in one end of a first actuating arm 17 so that the arm 17 may be combined with the position sleeve 1. The first actuating rod 17 has the other end connected with a first chain 30 of a high water outlet tube.

The two-stage flush device further includes a side press rod 4 having a connect shaft portion 7, straight male teeth 10 cut in an outer surface of an inner end for a toothed hole 12 in an end of a second actuating arm 11 to engage with, a threaded lateral hole 13 bored in the end for a screw 14 to secure the second actuating arm 11 with the side press rod 4. The side press rod 4 further has a center through hole 22 for a push rod portion 16 of a push rod 5 to extend through, a male thread 38 around a left end of a larger diameter than the right end for a cover nut 15 to screw with after the push rod 5 is inserted through the press rod 4, with a push button 36 of the push rod 5 protruding forward out of a hole of the cover nut 15. A spring 37 is provided to be placed around the rod portion 16 between an inner surface of the button 36 and an annular bottom in the center hole 22 so that the push rod 5 may be pushed back by the spring 37 to an original position wherein the button 36 protrudes the sleeve 15 after pushed inward. The rod portion 16 has its rear end 40 urging on a vertical wall surface 41 of the first actuating arm 17 after the push rod portion 16 extends through the center through hole 22 of the side press rod 4. Therefore, when the push button 36 of the push rod 4 is pressed inward, the first actuating arm 17 may be forced to swing upward by pushing movement of the push rod portion 16. Then the first actuating arm 17 pulls up the first chain 30, which lifts the valve 29 of the high level tube 28 to allow water in the toilet tank to flow out in a small pre-set volume. If the button

35 of the side press rod 4 is pressed, the second actuating arm 11 is swung upward to pull a second chain 27 up, with the valve 26 of the outlet tube 25 being lifted up allowing water to flow out for a large pre-set volume.

A second embodiment of a two-stage flush device for a toilet tank is shown in Figs. 9 - 11, has a position sleeve 1 the same as that in the first embodiment, but a different pressing method, wherein a side press rod 4 and a pull rod 5 are used. The side press rod 4 has the same structure as that of the first embodiment but the pull rod 5 is different, having a structure of pulling outward operation. Then a cover nut 15' with a female thread has a front center hole 39' of a smaller diameter than that of the cover nut 15 in the first embodiment, with a front side wall 39A for an outer end of the spring 37 to urge thereon. The pull rod 5 has an elongate rod portion 51 extending through the center through hole 22 of the side press rod 4, a shaft hole 52 laterally provided near the front end for a shaft 53 to fit through therein to stop the rear end of the spring 37, and a round button 54 fixed with a front end of the rod portion 51. Then if the button 54 is pulled outward together with the rod portion 51, then the inner end of the rod portion 51 connected with a first chain 30 will pull up the chain 30 and the valve 29 of the outlet tube together, which allows water in the toilet tank flow out of the tube 28 for a small volume. And if the side press rod 4 is pressed down, a large volume of water will be flowed out of the valve 26 as shown

in the same way as the first embodiment.

The second embodiment has a two-stage flush function in a different operating method wherein the side press rod 4 is functioned by pressing, but the pull rod 5 is done by pulling. So wrong operation can be prevented to attain the object of water economizing.

A third embodiment of a two-stage flush device shown in Fig. 13 at least has a position sleeve 1 provided with a center through hole 21 for receiving a connect shaft portion 17 of a side press rod 4, and fixed in a hole of a toilet tank by means of a nut 2 and a washer 3 in the same way as the first and the second embodiment.

The third embodiment further includes a side press rod 4 having at least a connect shaft portion 7, which has straight teeth 10 around an inner end, a center through hole 22 for a connect rod portion 16 of a front press rod 5 to extend therein, and a side press button 38 for pressing to rotate the side press rod 4, and a lateral shaft hole 23 bored in an intermediate portion of the connect shaft portion 7 for a small shaft 24 to fit through and also through a shaft hole 17 of the connect rod portion 16 of the front press rod 5 so that the connect rod portion 16 may function as a lever with the shaft 24 as a fulcrum. The third embodiment further has a connect rod 11 with the same structure as the first embodiment, provided with a shaft hole 12 at one end, a threaded hole 13 for a screw to engage and secure the second actu-

ating arm 11 with the end of the connect shaft portion 7 of the side press rod 4. The other end of the second actuating arm 11 is connected with the second chain 27 of the valve 27 for flushing a large volume of water by pressing the side press rod 4.

The third embodiment further has a front press rod 5, which is provided with connect rod portion 16 extending through the center through hole 22 of the side press rod 4 and having a shaft hole 17 in an intermediate point for the shaft 24 to fit through to function as a fulcrum relative to the rod portion 16, and with a plate-shaped end 19 with two threaded holes for screws 20 to secure a front button 18 with the plate end 19. Then if the front button 18 is pressed down, the rod portion 16 functions as a lever, forcing its end to lift the chain 30 connected with the valve 29 of the outlet tube 28 for flushing a small volume of water.

Though the front press rod 5 and the side press rod 4 are in some degree connected with each other, and the side press rod 4 moves also the front press rod 5, the water volume flushed out by the side press rod 4 is a large volume and the front press rod 5 is a small volume, therefore the water volume flushed out in total is the same as the large volume flushed out by the side press rod 4, not increasing at all the water volume flushed out, in the third embodiment. On the other hand, the front press rod 5 cannot move the side press rod at all in operating.

A water volume control device 60 for the flush device in the present invention, will be described in many kinds of struc-

tures below. They generally have a low level outlet tube 61 and a high level outlet tube 62, a common outlet tube 63, and an overflow tube 64 located between the two outlet tubes 61 and 62. Each outlet tube 61; 62 has a valve 65; 66, and two end feet 67 of the valve 66 have outer ends fixed on an outer surface of the lower end of the overflow tube 64, but the end feet 68 of the outlet tube 66 are pivotally connected with a shrinkable tube forming the outlet tube 66 or a side of an inner tube and can be changed in their position according to the height of the outlet tube 66 adjusted. Each valve is bound with a pull chain 69 or 70 which is to be pulled up by the pressing structure for flushing out a small or a large volume of water for use.

In the following embodiments, the high water level outlet tube 62 is structured to be able to adjust the water volume to be flushed out thereof.

A first embodiment of a water volume control device includes a high level outlet tube 62 formed of an inner tube 71 and an outer tube 72 combined together, as shown in Figs. 18 - 20. The inner tube 71 has a plurality of rings 73 around proper locations of an outer surface, preventing water leak through contact surfaces of the inner and the outer tube 71, 72 by blocking function of them. Then the outer tube 72 can be adjusted in its location relative to the inner tube 71, altering the level or volume of water to be flushed out with numerous stages.

A second embodiment of a water volume control device shown

in Fig. 21 has a stationary inner tube 74 provided with a male thread 76 and thread 76 and an movable outer tube 75 provided with a female thread 77 to engage with the male thread 76 so as to adjust the level or volume of water to be flushed out.

A third embodiment of a water volume control device, as shown in Figs. 22 - 24, includes a high level outlet tube 62 formed of an stationary inner tube 78 having a plurality of adjusting semicircular recesses 80 spaced apart equidistantly in a vertical line on an outer surface, a position groove 81 on an opposite side of the recesses 80, and an movable outer tube 79 having a locking pin 82 fitted in a position hole 83 in the wall thereof and a spring 84 fitted around a lower end of the locking pin inside of the position hole 83 and a position annular projection 85 engaging with the position groove 81 of the inner tube 78 so that the outer tube 79 may be lifted or lowered in a definite vertical position for adjusting its height, i.e. the level of water to be flushed out. And the position pin 82 is used to lock the outer tube 79 at an adjusted position, moved to engage one of the recesses 78.

A fourth embodiment of a water volume control device, as shown in Figs. 25 and 26, has the same structure as the third one except a locking ball 82A being used instead of the locking pin 82 of the third one and confined in a ball room 82B and being urged by a spring 82C and a cap 82D covered on the spring 82C to always compress the spring 82C to push the locking ball 82A. Then the

locking ball 82a has the same function as the locking pin 82 in the third one.

A fifth embodiment of a water volume control device, as shown in Figs. 27 - 29, has the same structure as the third one except a movable inner tube 86 and a stationary outer tube 87. The inner tube 86 includes a plurality of sloping up teeth 88 continuously arranged in a vertical position on an outer surface, and the outer tube 87 includes a movable grip 90 extending down from a lower end and an engaging tooth 89 provided on an inner surface of the movable grip 90 and able to engage with any of the teeth 88 of the inner tube so that the outer tube 87 may be lifted or lowered relative to the inner tube in a stationary position and locked at an adjusted position, to alter the height of the outer tube, i.e. the water level to be flushed out.

Figs. 30 - 32 show a sixth embodiment of a water volume control device, which has an inner tube 91 extensible, an outer stationary tube 92 provided with a male thread 93, a constrict ring 94 with a female thread and a washer 95 engaging and fitting around a male thread 93, and a cover cap 96 with a female thread to engage with the male thread 93 of the outer tube so that the cover cap 96 can tighten and loosen the ring 94 and the inner tube by screwing and then the inner tube 91 can be secured tightly at an adjusted position so as to adjust the water volume to be flushed out.

The seventh embodiment of a water volume control device

shown in Figs. 33 - 37 has a stationary inner tube 97 provided with a plurality of grooves 99 spaced apart equidistantly and connected with a vertical slot 100 at a right side, a movable outer tube 98 provided with a locking projection 101 on an inner surface. Then when the outer tube 98 is moved up and down relative to the inner tube 97, the locking projection 101 can engage with any of the grooves 99 of the inner tube 97 by rotating a little the outer tube so that the height of the outer tube 98 can be altered and locked at that position.

It should be noted that each embodiment of the water volume control device has a washer 102 for preventing water leak, and a direction orienting slot for allowing either the inner or the outer tube extensible and shrinkable in a definite direction so that the valve of either the high or the lower level base does not change its location and direction, permitting the valve to open or close normally to let flushing operation smooth according to a preset small or large volume.

While the preferred embodiments of the invention have been described above, it will be recognized and understood that various modifications may be made therein and the appended claims are intended to cover all such modifications which may fall within the spirit and scope of the invention.



WHAT IS CLAIMED IS:

1. A two-stage flush device for a toilet tank, comprising at least a high level outlet tube and a low level outlet tube which are respectively provided with a valve connected with a lower end of a chain, the other end of which is connected with either a front press rod or a side press rod, further comprising:

a position sleeve having a center through hole for a connect shaft portion of said side press rod to extend therethrough, and fixed in a hole in a wall of a water tank; and,

characterized by said side press rod having a connect shaft portion extending through said center through hole of said position sleeve, said connect shaft portion provided with a center through hole and a shaft hole vertical to said center through a press button fixed at a front end of said connect shaft portion, a second actuating arm connected at a front end firmly with a front end of said connect shaft portion, said center hole of said connect shaft portion being protruded through by a connect rod portion of said front press rod; said front press rod having a shaft hole for a shaft protruding through said shaft hole of said connect shaft portion to insert through so that said connect rod portion of said front press rod may function as a lever with said shaft as a fulcrum; said connect rod portion of said front press rod having its front end fixed with a press button; said side press rod operating said low level outlet tube and said front press rod operating said high level outlet tube for flushing separately a large and a small volume of water.



2. The two-stage flush device for a toilet tank as claimed in Claim 1, wherein said front press rod and said side press rod have a different direction for pressing .

3. A two-stage flush device for a toilet tank comprising:
a position sleeve having a center through hole and fixed in a hole in a side wall of a toilet tank by means of a nut and a washer;

a side press rod and a longitudinal push rod provided to operate respectively a low and a high level outlet tube; said side push rod at least having a connect shaft portion extending through said center through hole of said position sleeve and provided with a center through hole and a side press button at a front end, said side press button having a male thread and a cavity for receiving a push button and a spring urging said push button of said push rod therein; said male thread engaging a cover cap after said said longitudinal press rod is placed to extend through said center through hole of said connect shaft portion, said press rod able to be pressed inward; said connect shaft portion having straight teeth around its end to combine with a second actuating arm; said actuating arm having an inner end provided with a shaft hole with a toothed hole for a screw to secure said connect shaft portion of said side press rod with said first actuating arm, and an outer end connected with a valve of a low level outlet tube via a chain;

said longitudinal push rod having a push rod portion and a



push button fixed with an outer end of said rod portion, a spring provided to push back said push button after pushed inward, said push rod portion extending out of said connect shaft portion of said side press rod and urging a vertical side wall of a first actuating arm, said first actuating arm connected pivotally with a shaft base of said position sleeve and having an outer end connected with a valve of a high level outlet tube via a first chain, said side press rod operating to open said low level outlet tube, said longitudinal push rod operating to open said high level outlet tube.

4. The two-stage flush device for a toilet tank as claimed in Claim 3, wherein said position sleeve has a shaft base to be combined pivotally with a forked end of said first actuating arm by means of a shaft so that said first actuating arm may swing with said shaft as a fulcrum.

5. The two-stage flush device for a toilet tank as claimed in Claim 3, wherein said nut engaged with said position sleeve at an outside has a notch corresponding to said shaft base and fitting with said shaft base, enabling said nut engage with said position sleeve at an outside, not blocked by said shaft base.

6. A two-stage flush device for a toilet comprising:
a position sleeve having a center through hole and fixed in a hole in a side wall of a toilet tank by means of a nut and a washer;

a side press rod and a longitudinal pull rod respectively



operated to open a high level outlet tube and a low level outlet tube, said side press rod having at least a connect shaft portion extending through said center through hole of said position sleeve end, having a center through hole, a press button fixed at a front end, a male thread and an inner cavity for receiving a recovery spring therein; a cover cap engaging with said male thread of said side press button after said longitudinal pull rod is placed extending through said center through hole of said connect shaft portion so as to enable said pull rod pulled and returned back; said connect shaft portion having straight teeth at an inner end to engage with an inner end of a second actuating arm; said second actuating arm having a toothed hole in the inner end engaging said toothed end of said connect shaft portion and secured by a screw engaging a threaded hole in said inner end, said second actuating arm having its outer end connected with a valve of said low level outlet tube via a chain;

said longitudinal pull rod having a round button and a pull rod portion, said round button fixed at a front end of said pull rod portion, said rod portion extending through said center through hole of said connect shaft portion of said side press rod and having a lateral shaft hole for a shaft to insert through to stop and urge a spring located between said shaft and a front wall of a cover cap engaging said male thread of said side press button, said spring resiliently always urging said round button to protruding out of said cover cap, said round button being pulled



outward together with the rod portion for operating to open the said valve of said high level outlet tube.

7. A two-stage flush device for a toilet tank comprising a water volume control device consisting of a high level outlet tube a low volume outlet tube, and an overflow tube, said high level outlet tube having a valve, said low level outlet tube having a valve, and characterized by said high level outlet tube provided with an inner tube and an outer tube, either said inner tube or said outer tube being movable to extend and shrink in order to alter the height of said outlet tube and accordingly alter the volume of water flushed through said outlet tube.

8. The two-stage flush device for a toilet tank as claimed in Claim 7, wherein said high level outlet tube includes said inner tube provided with a plurality of rings, and said outer tube can be extended and shrunk with numerous stages by means of said rings forming resistance against an inner surface thereof.

9. The two-stage flush device for a toilet tank as claimed in Claim 7, wherein said inner tube is provided with a male thread, and said outer tube is provided with a female thread to engage with said male thread, with said inner tube being extended and shrunk in numerous stages.

10. The two-stage flush device for a toilet tank as claimed in Claim 7, wherein said inner tube is provided with a plurality of semicircular recesses spaced apart equidistantly in a vertical line in an outer surface, and said outer tube is provided with a



locking pin urged by a spring , said locking pin selectably engaging with any of said recesses of said inner tube, said outer tube being able to extend and shrink.

11. The two-stage flush device for a toilet tank as claimed in Claim 7, wherein said locking pin is displaced by a locking ball confined in a ball chamber in said outer tube and a spring provided to urge said locking ball and secured by a cap.

12. The two-stage flush device for a toilet tank as claimed in Claim 7, wherein said inner tube is provided with a sloped continuous teeth on an inner surface, and said outer tube is provided with a locking tooth supported on a grip, said locking tooth selectably engaging with any of said sloped teeth of said inner tube to enable said outer tube be secured at an adjusted position.

13. The two-stage flush device for a toilet tank as claimed in Claim 7, wherein said outer tube is provided with a male thread, a constrict ring with a female thread, a washer and a cover cap being provided to fit around an upper end of said outer tube, said cover cap having a female thread engaging said male thread of said outer tube so that said inner tube may be extended and in said outer tube and secured at an adjusted position by means of said cover cap engaging tightly with or disengaging from said outer tube.

14. The two-stage flush device for a toilet tank as claimed in Claim 7, wherein said inner tube is provided with a plurality



of grooves connected with a vertical slot at their right side, and said outer tube is provided with a locking projection movable along in said slot of said inner tube and engageable with any of said grooves to secure said outer tube at an adjusted position.

15. The two-stage flush device for a toilet tank as claimed in Claim 7, wherein said valve of said high level outer tube is provided with two opposite feet pivotally fixed with said outer or said inner tube at an outer surface.

16. The two-stage flush device for a toilet tank as claimed in Claim 7, wherein said inner tube is provided with a direction orienting slot for a position projection of said outer tube to fit in and slide along in said slot .enabling said outer tube to move in a definite direction.

ABSTRACT

Title: Two-stage flush device for a toilet tank

A two-stage flush device for a toilet tank is provided with a side press rod for operating to open a valve of a low level outlet tube for flushing a large volume of water, a longitudinal press rod or pull rod for operating to open a valve of a high level outlet tube for flushing a small volume of water. The side press rod and the longitudinal press rod are combined together and supported in a position sleeve fixed in a hole of a side wall of a toilet tank. This device further includes a water volume control device, whcih has a high level outlet tube for flushing a small volume of water and a low level outlet tube for a large volume of water. The side press rod is connected with the low elvel outlet tube for operating to open a valve of the low level outlet tube, and the longitudinal press or pull rod is connected with that of the high level outlet tube.

(FIGURE 8)

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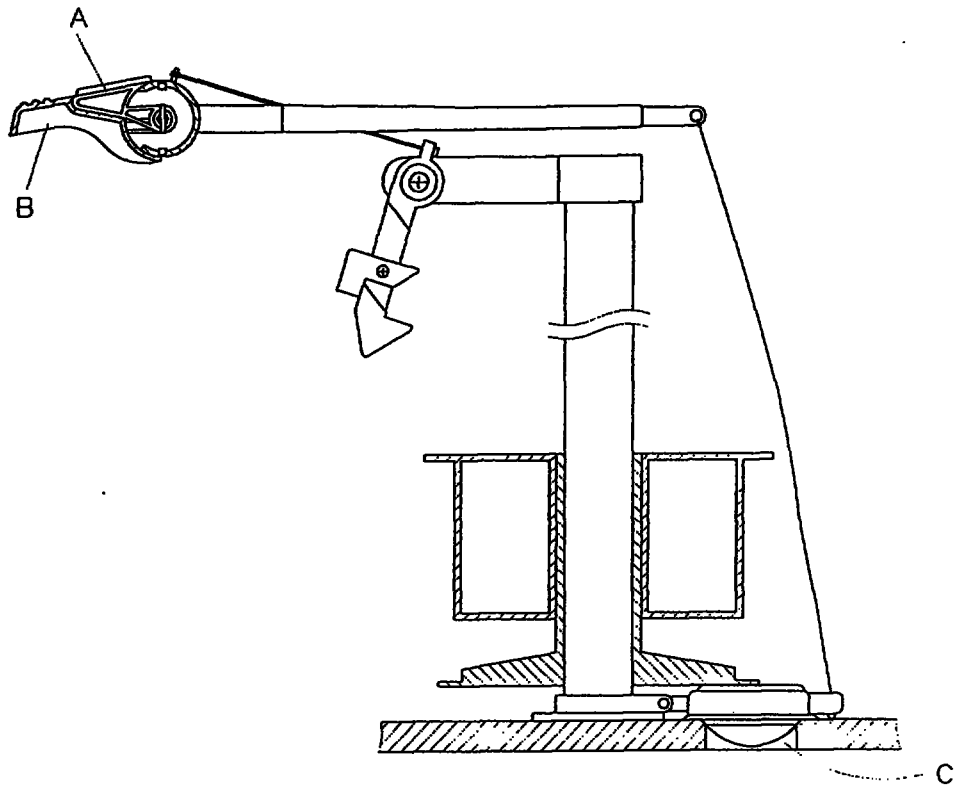


Fig 1 (PRIOR ART)

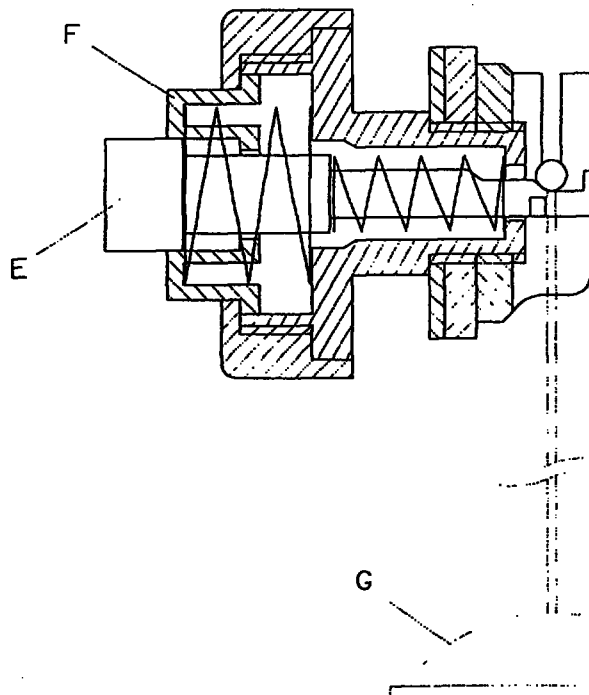


Fig 2 (PRIOR ART)

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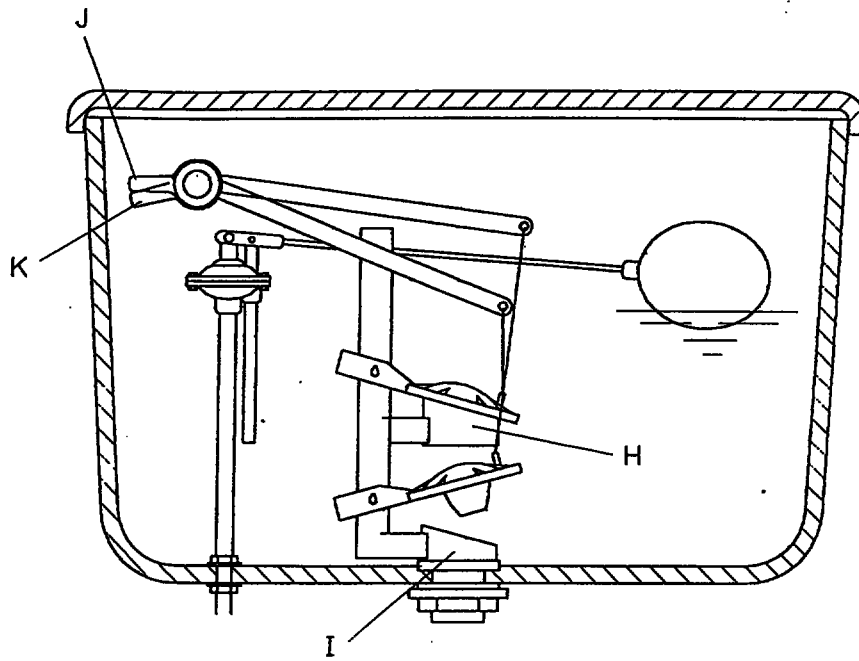


Fig 3 (PRIOR ART)

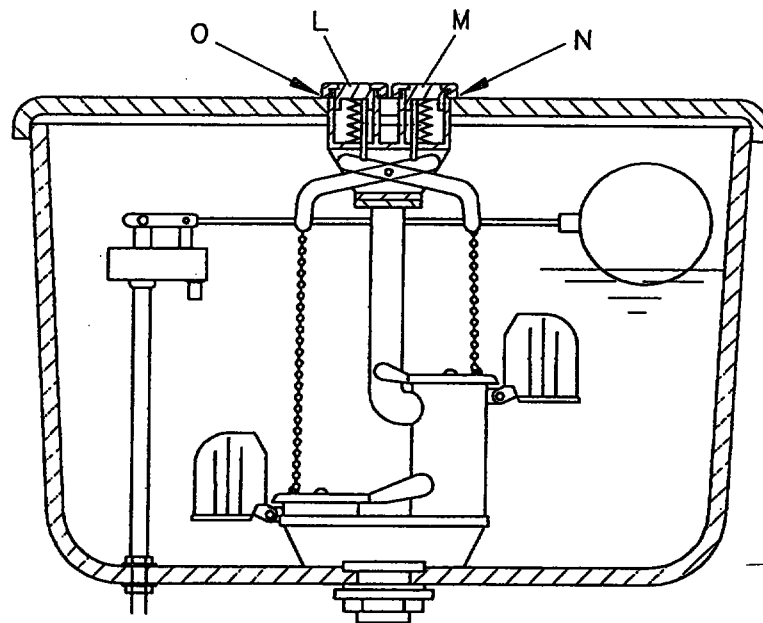


Fig 4 (PRIOR ART)



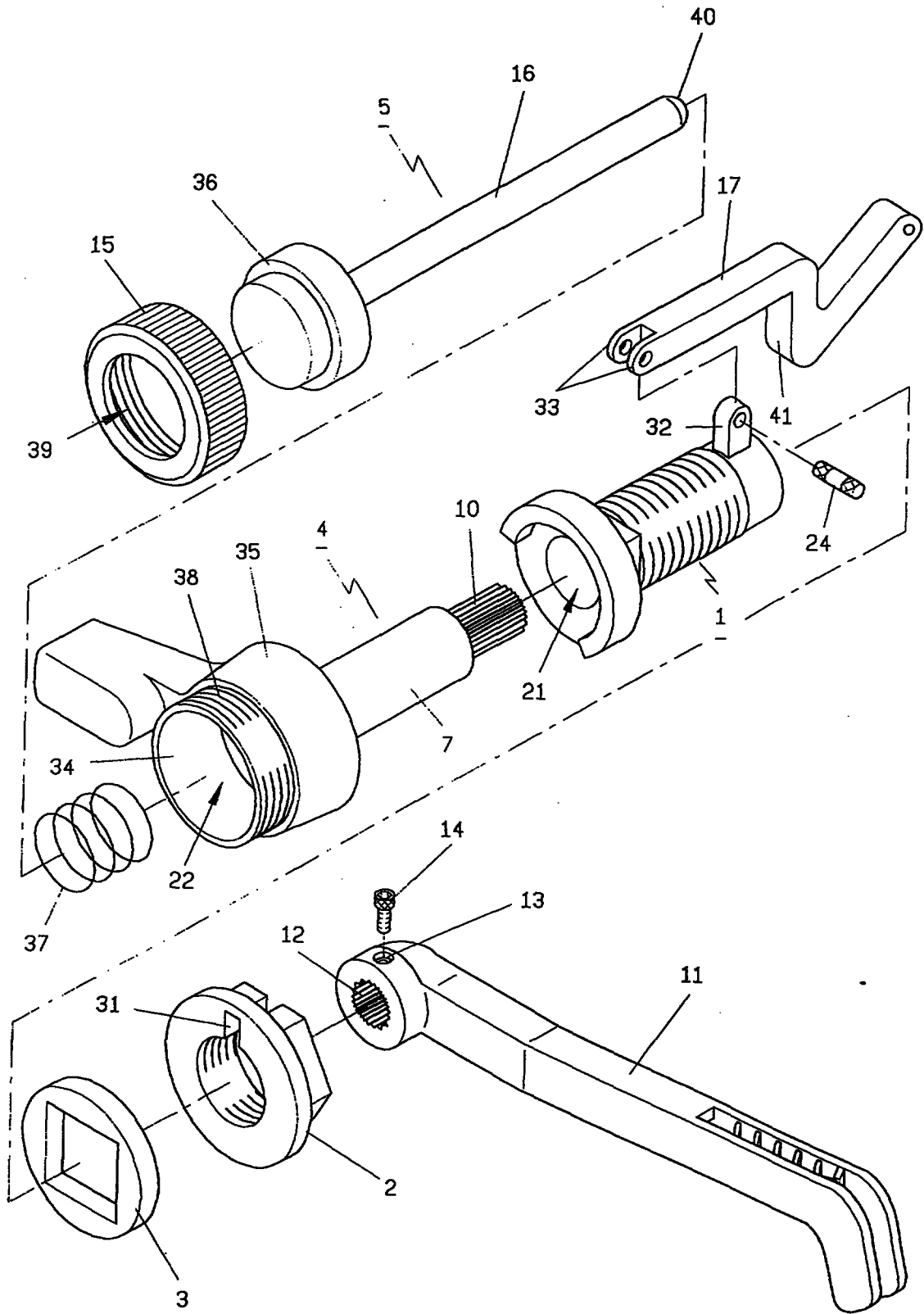


Fig 5

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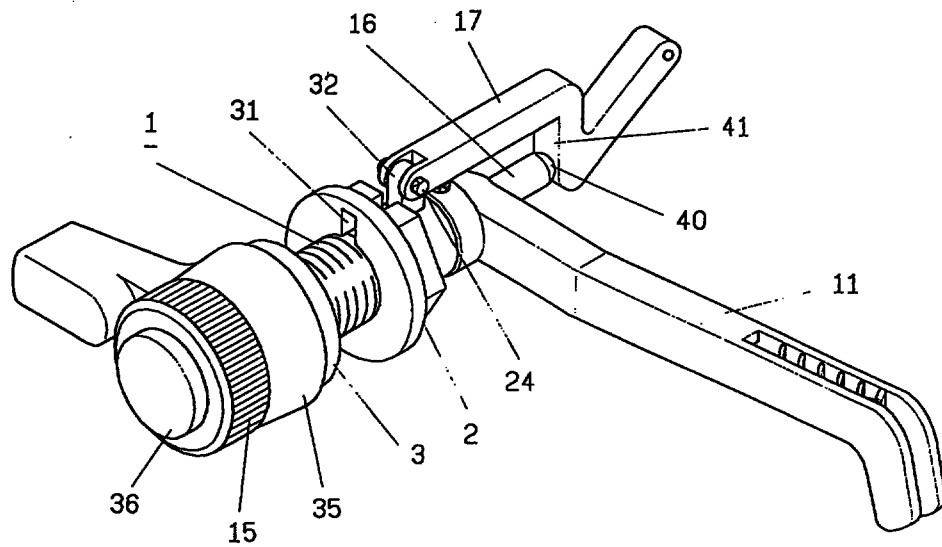


Fig 6.

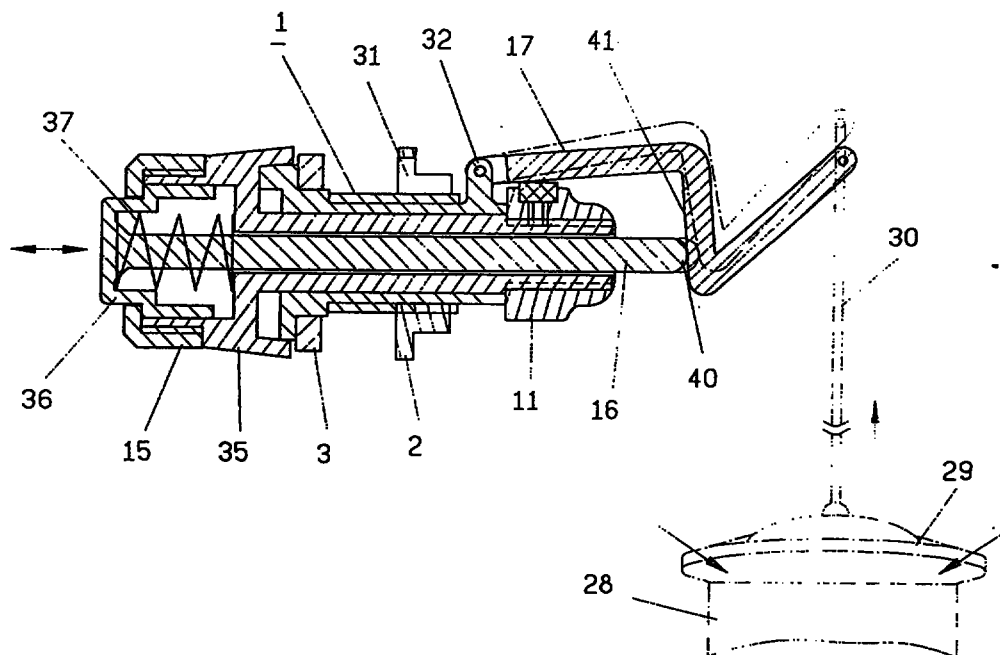


Fig 7

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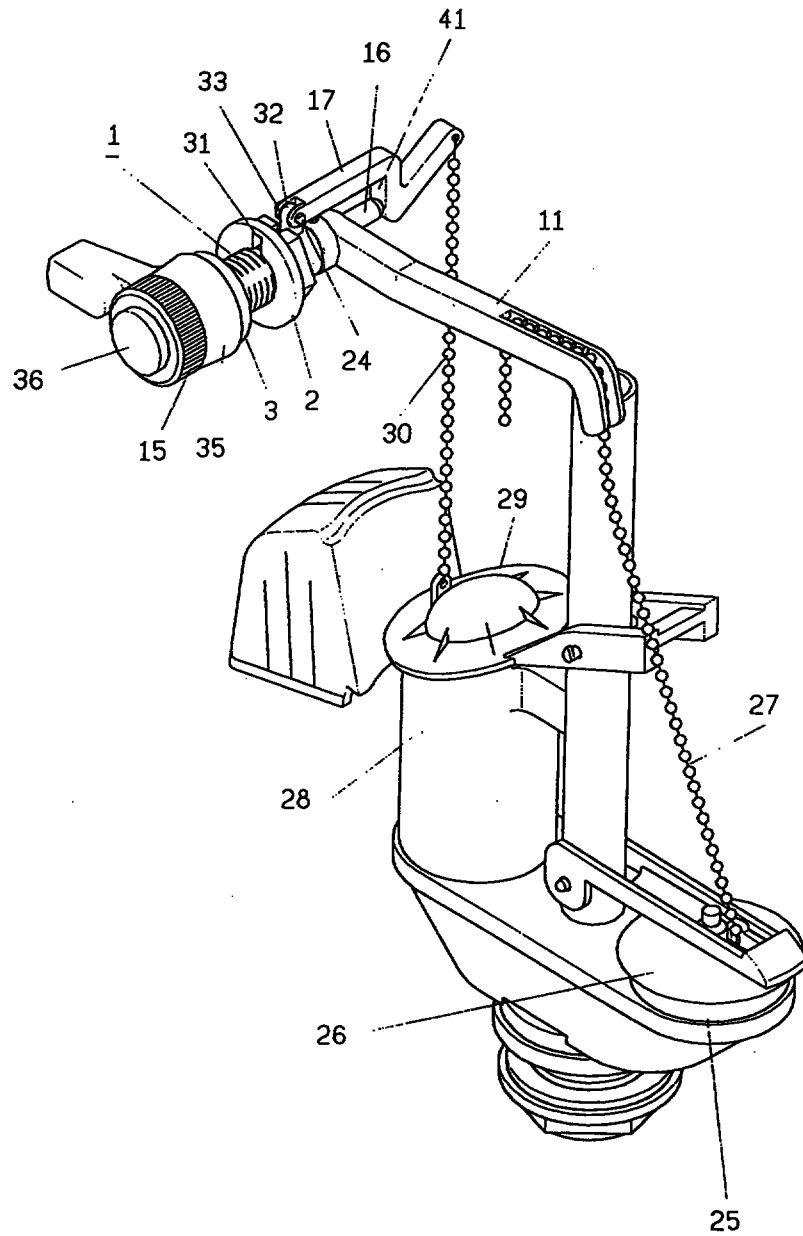
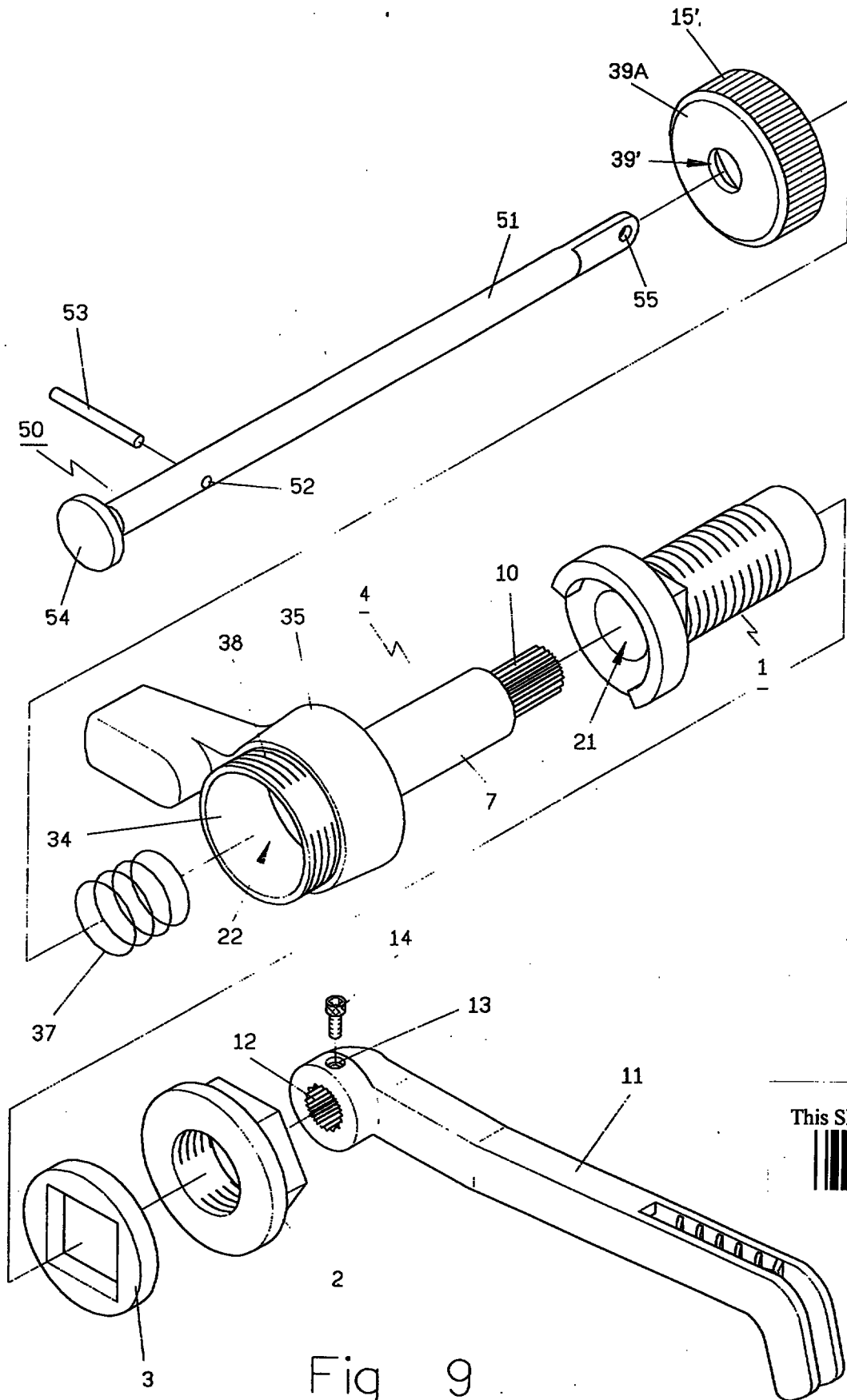


Fig 8

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Fig 9

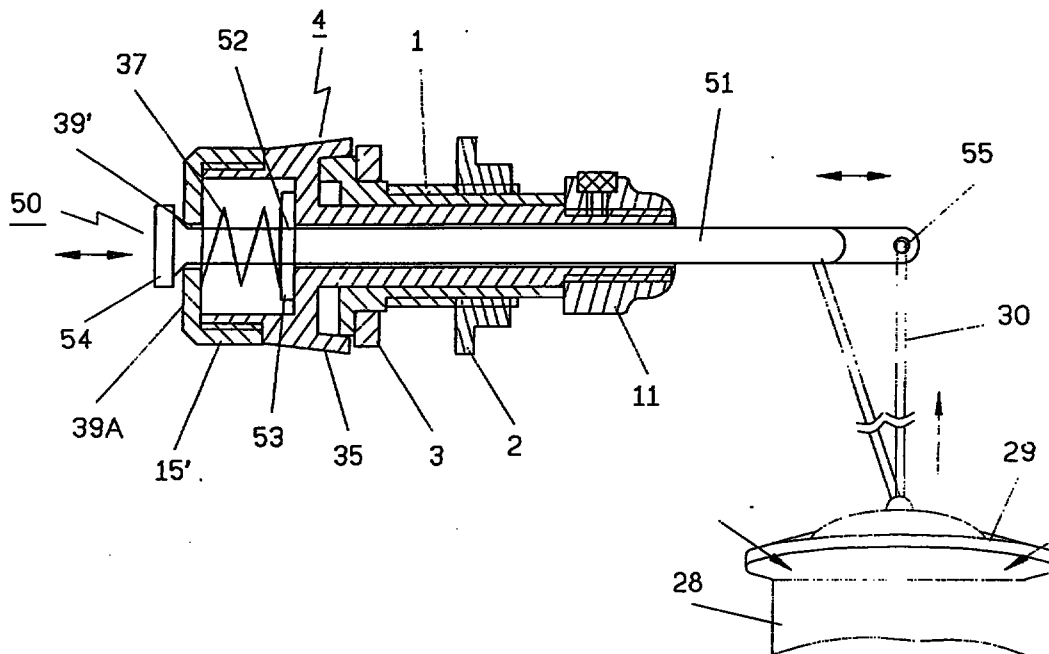


Fig 10

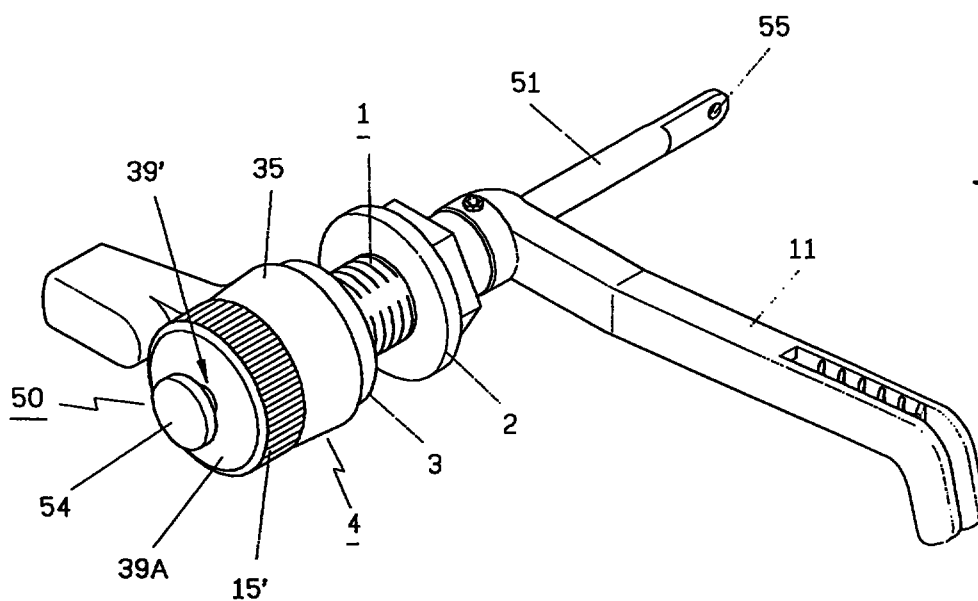
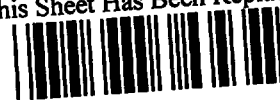


Fig 11

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8/25

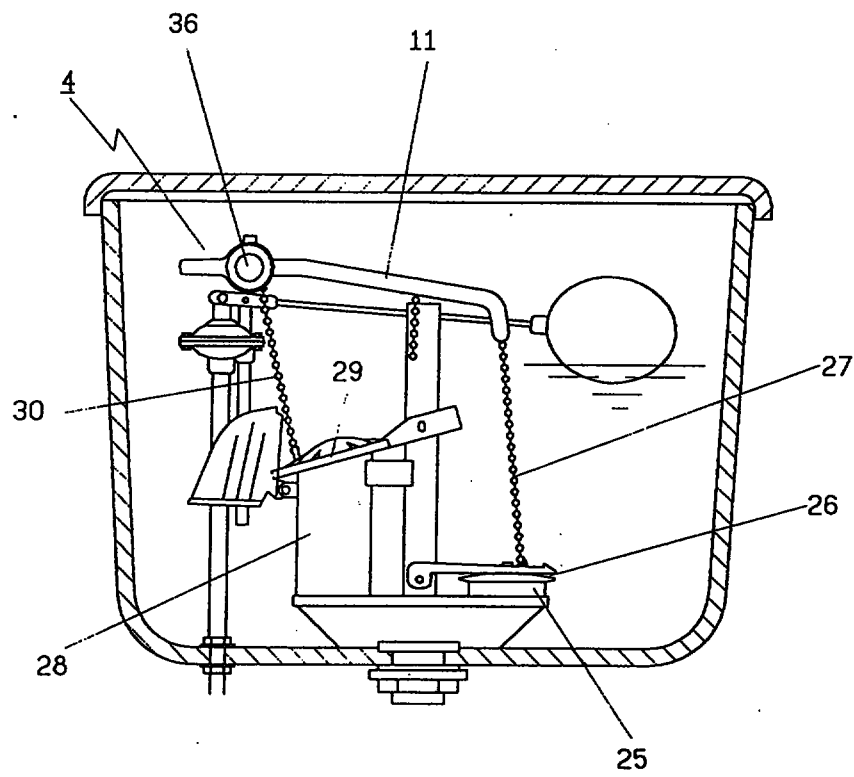


Fig. 12

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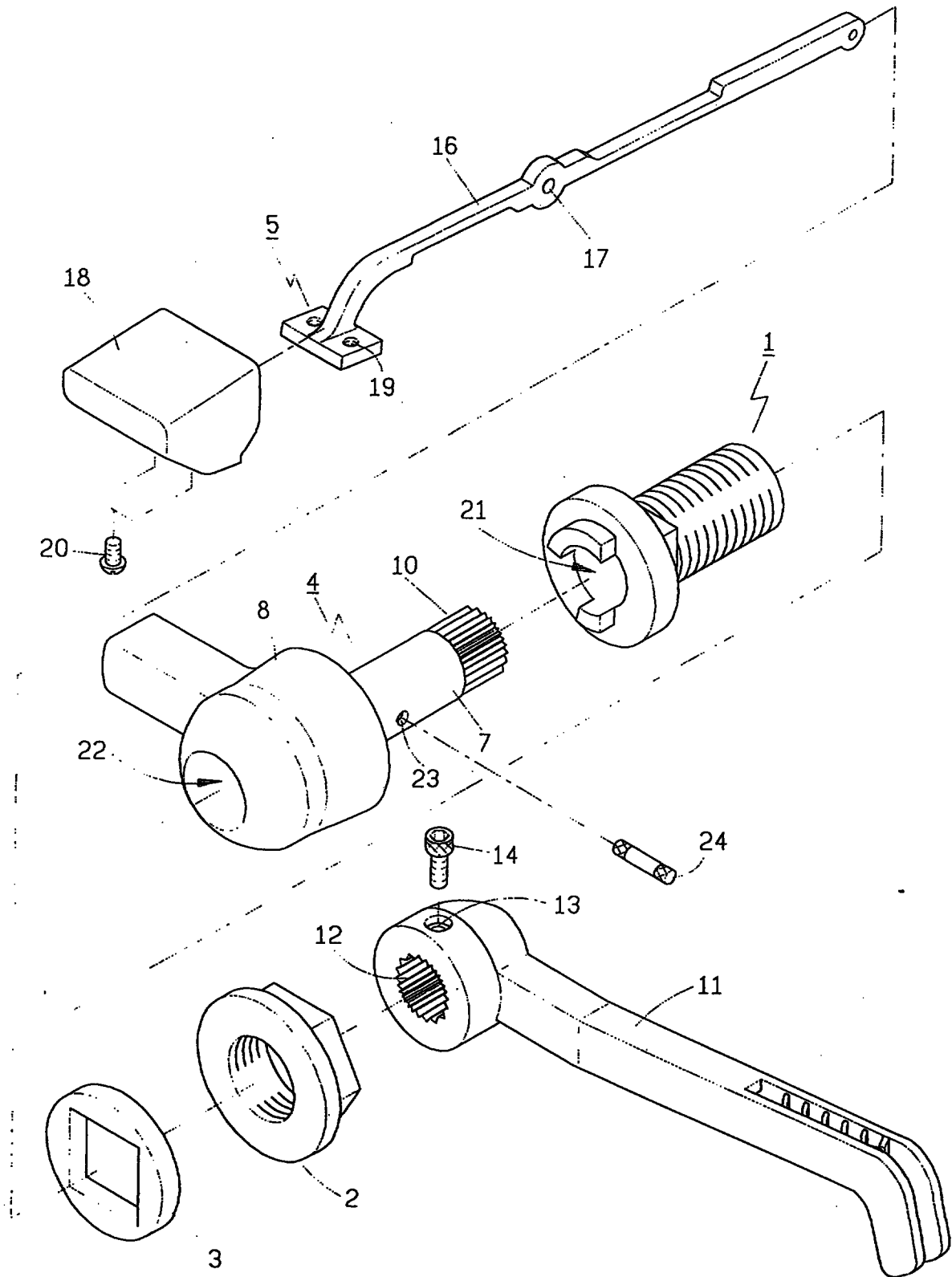


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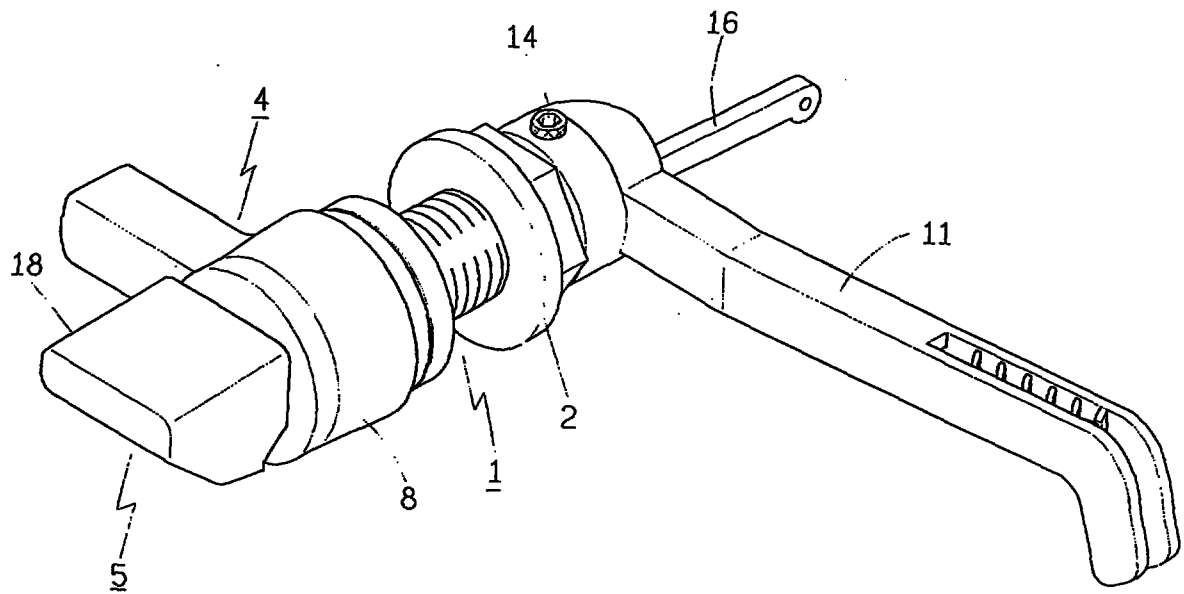


Fig 14

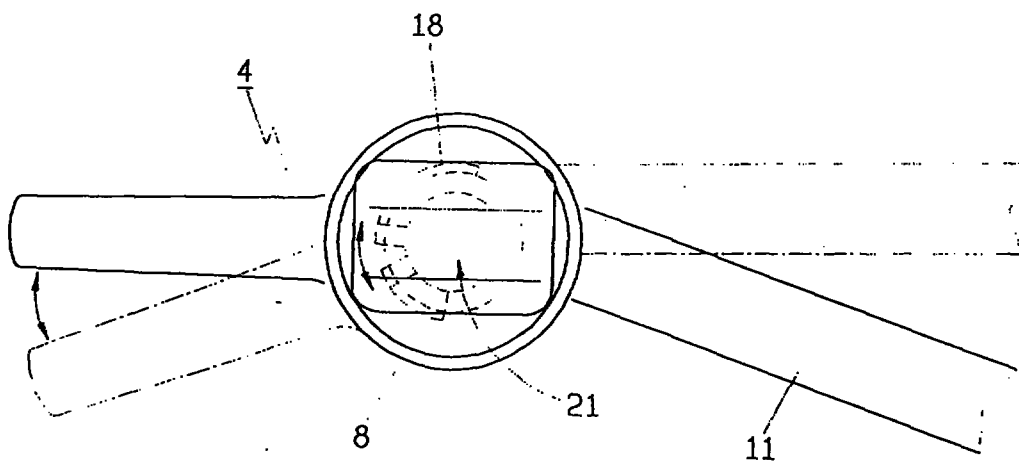


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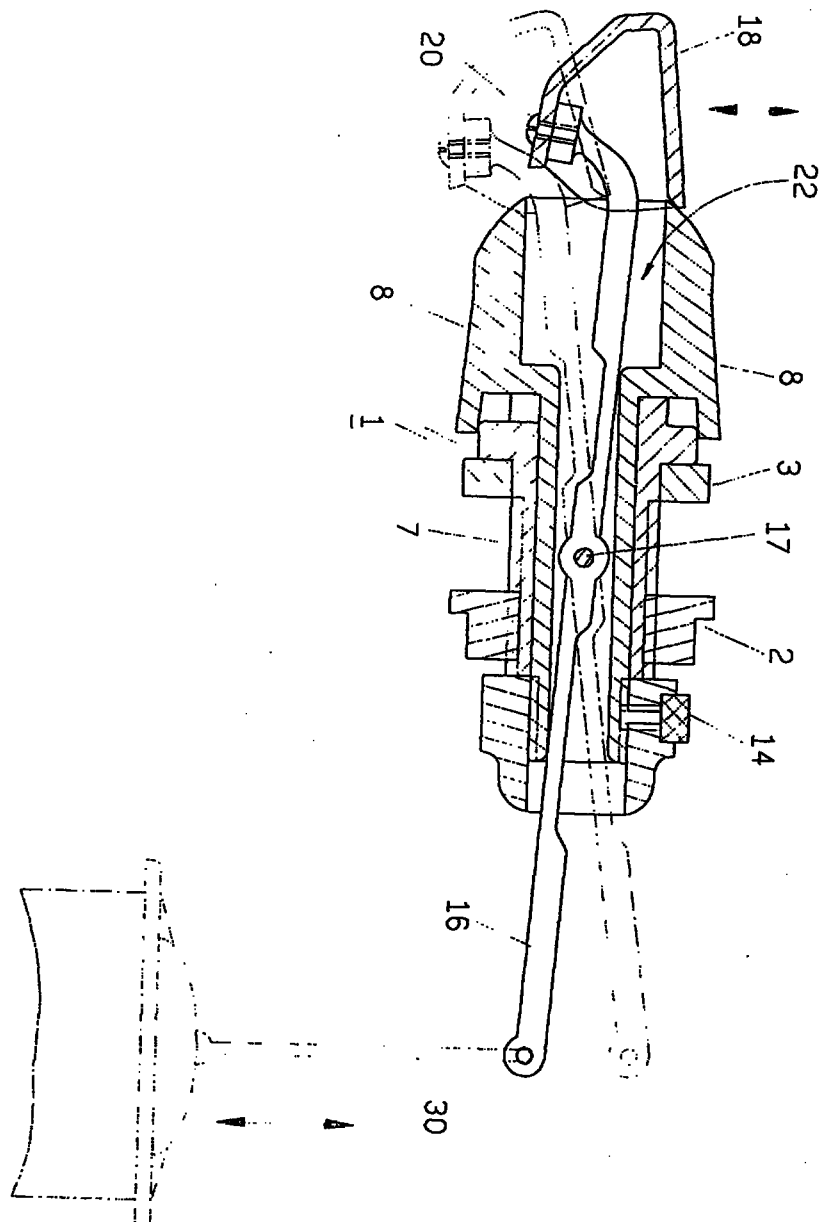


Fig 16

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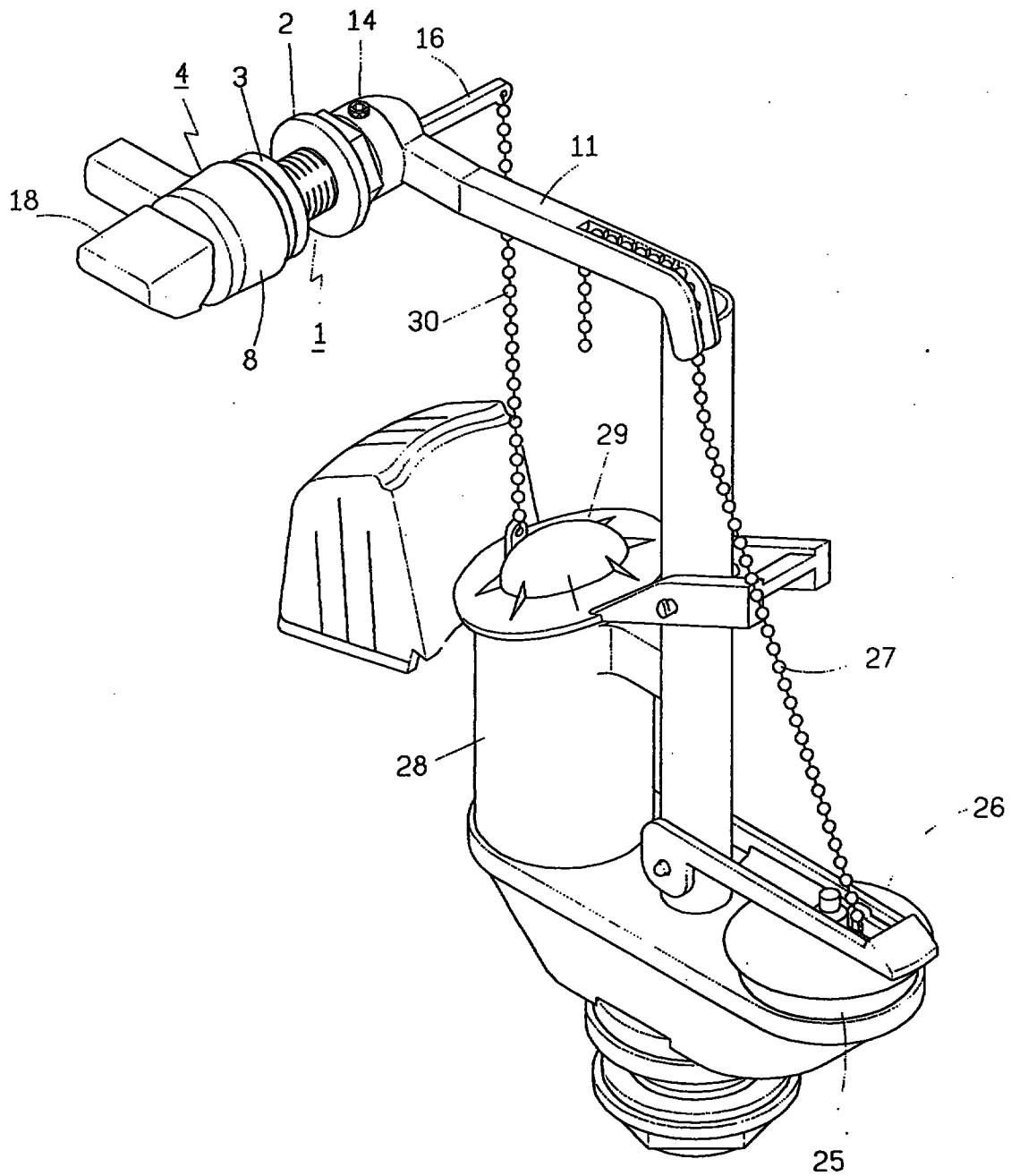


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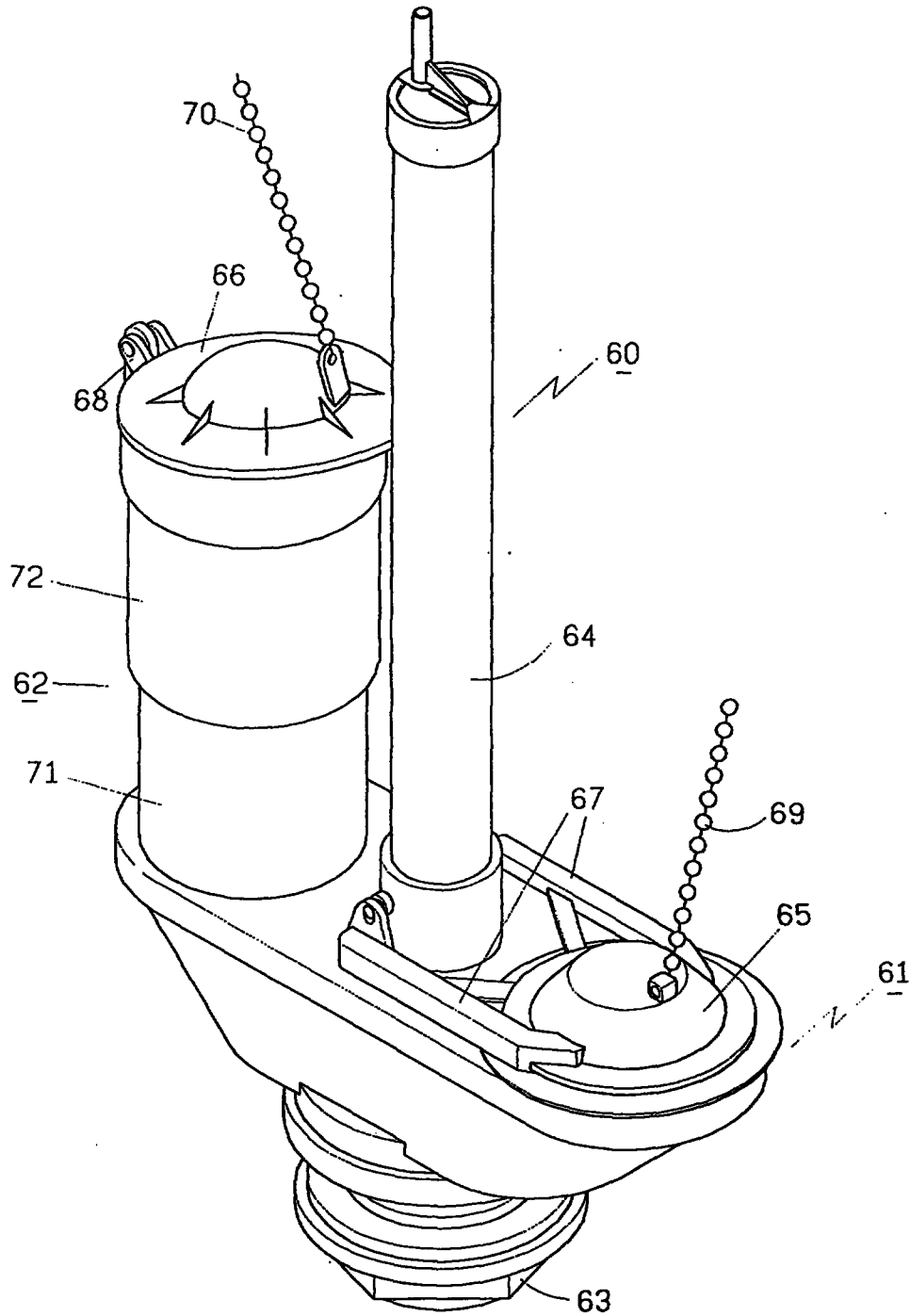
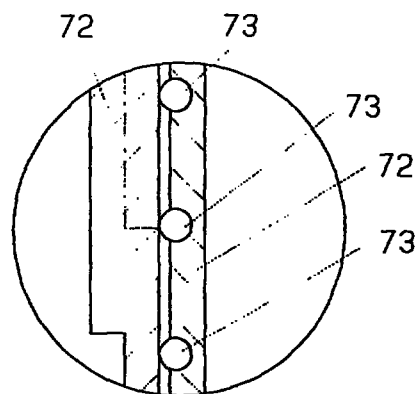
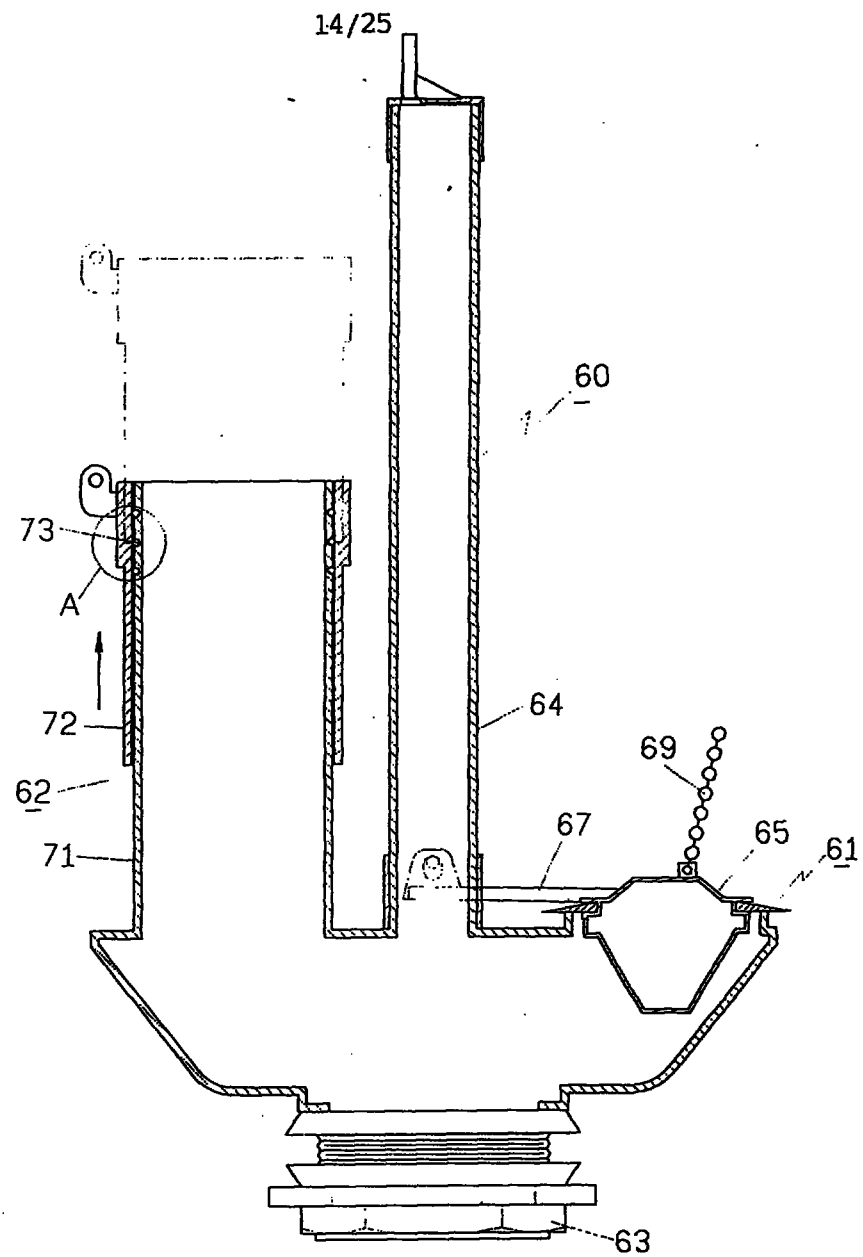


Fig 18

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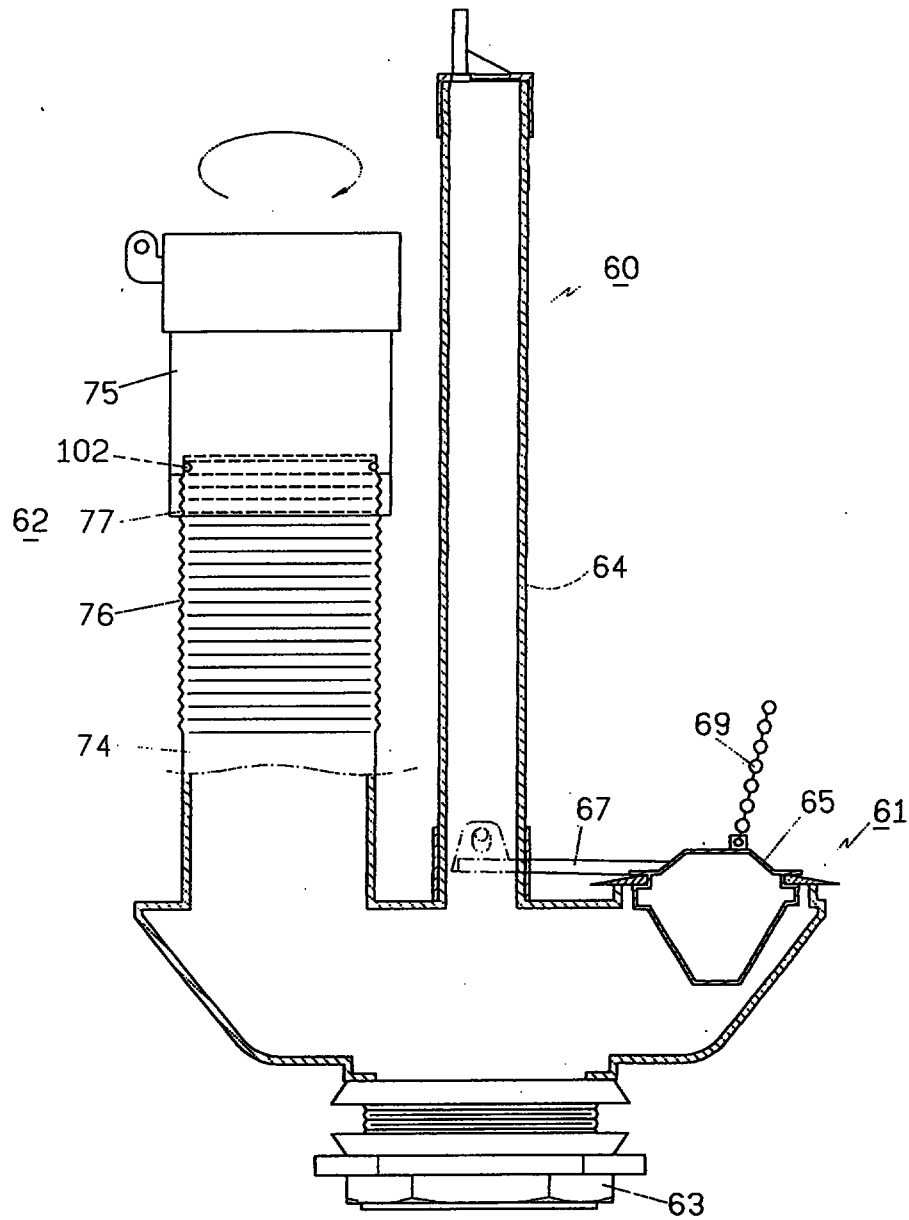


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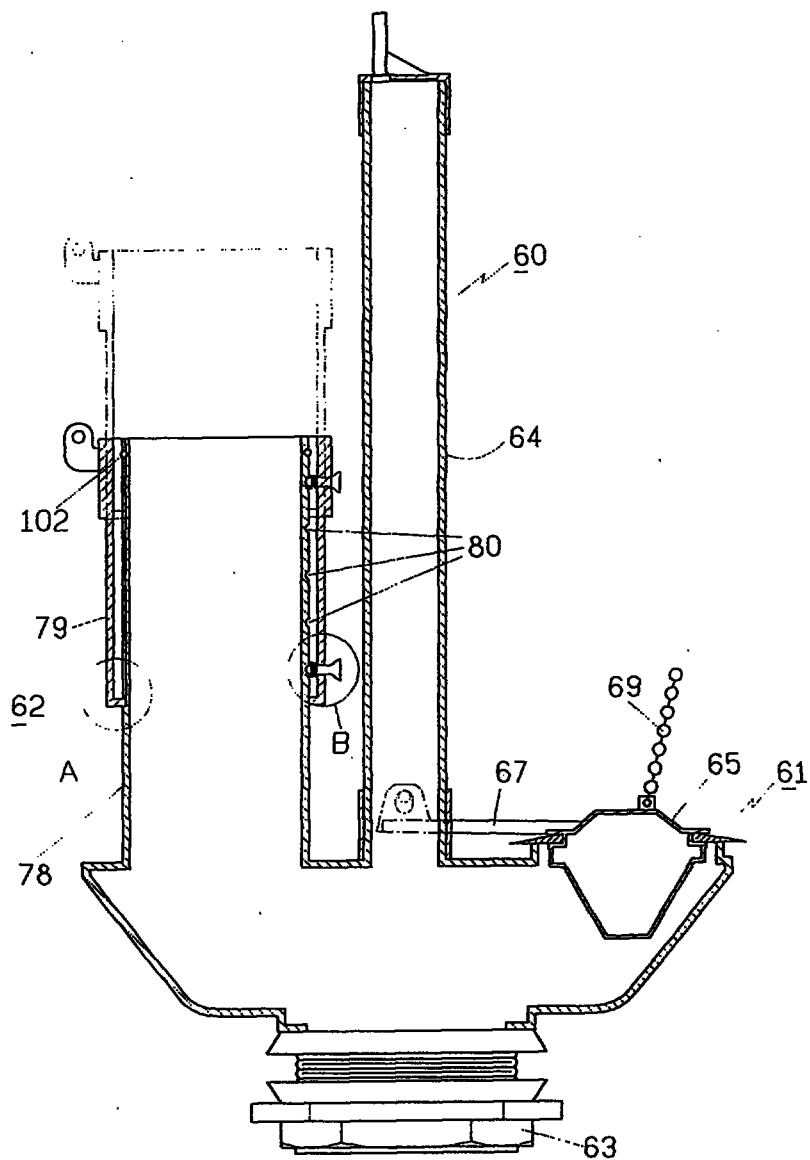


Fig 22

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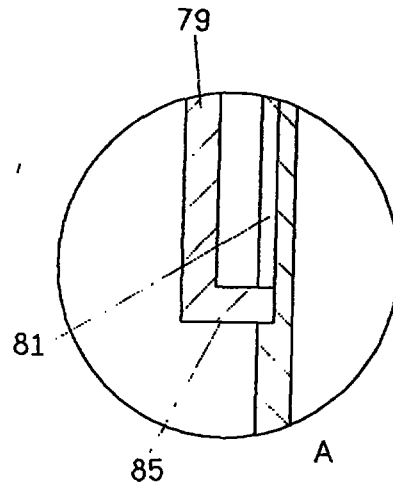


Fig 23

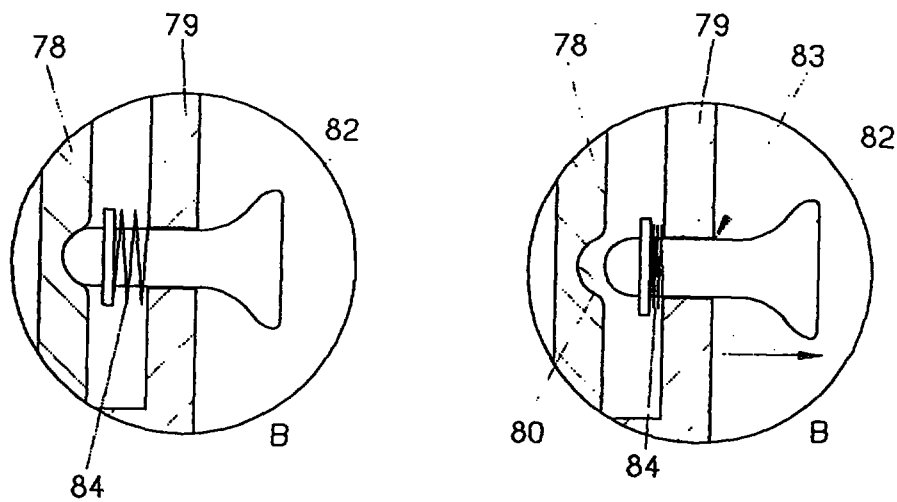


Fig 24



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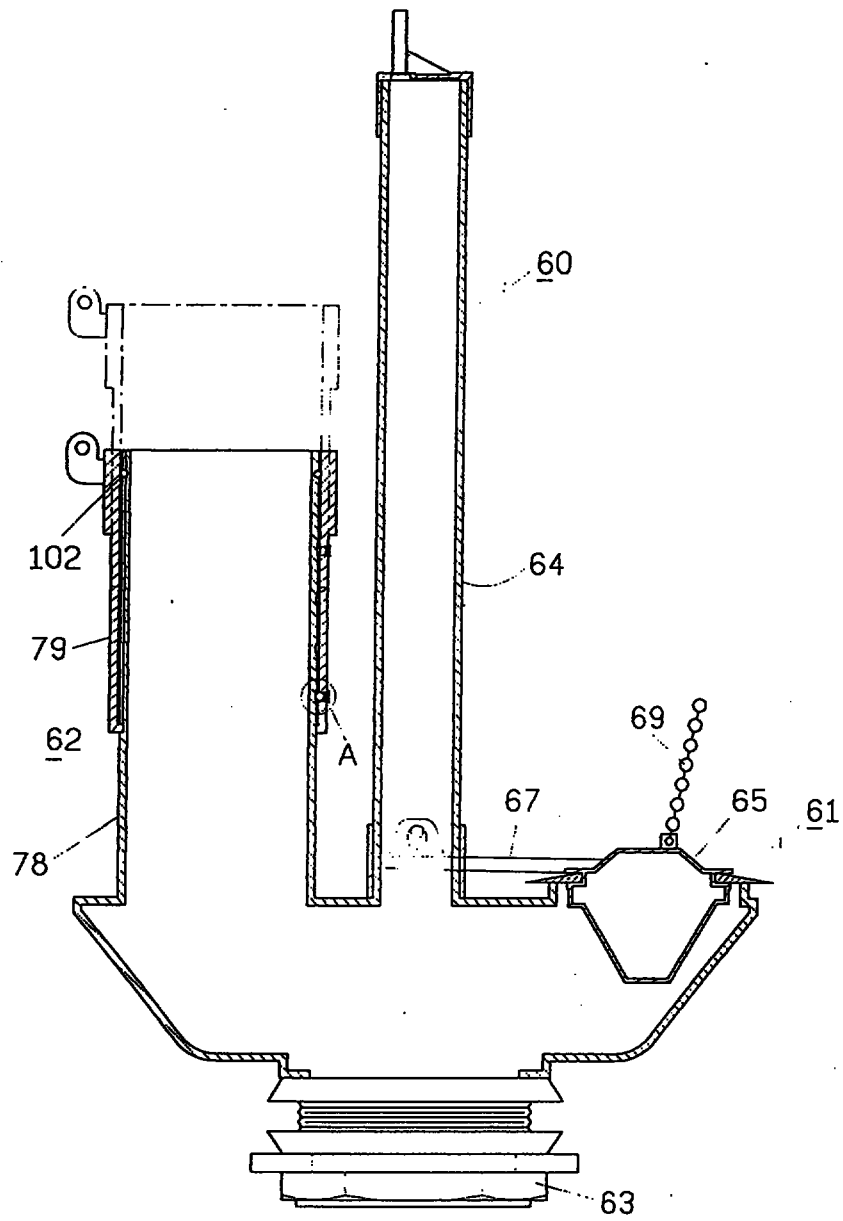


Fig 25

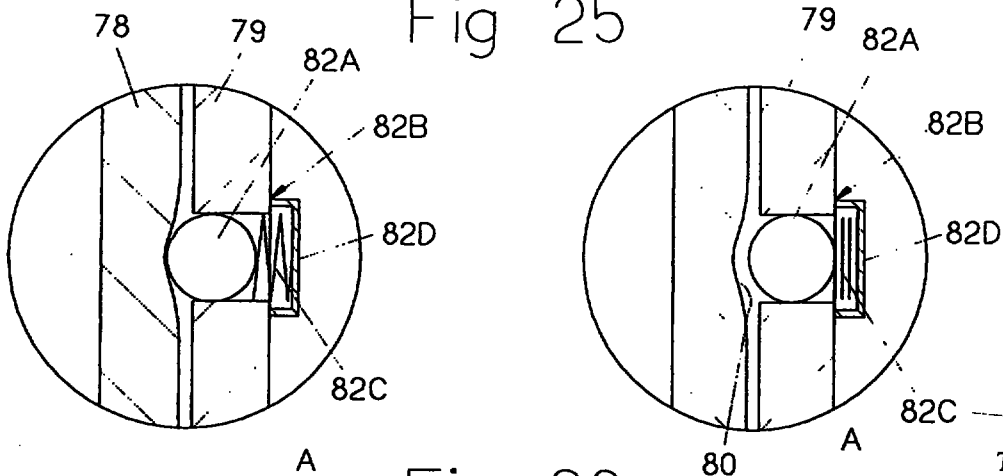


Fig 26

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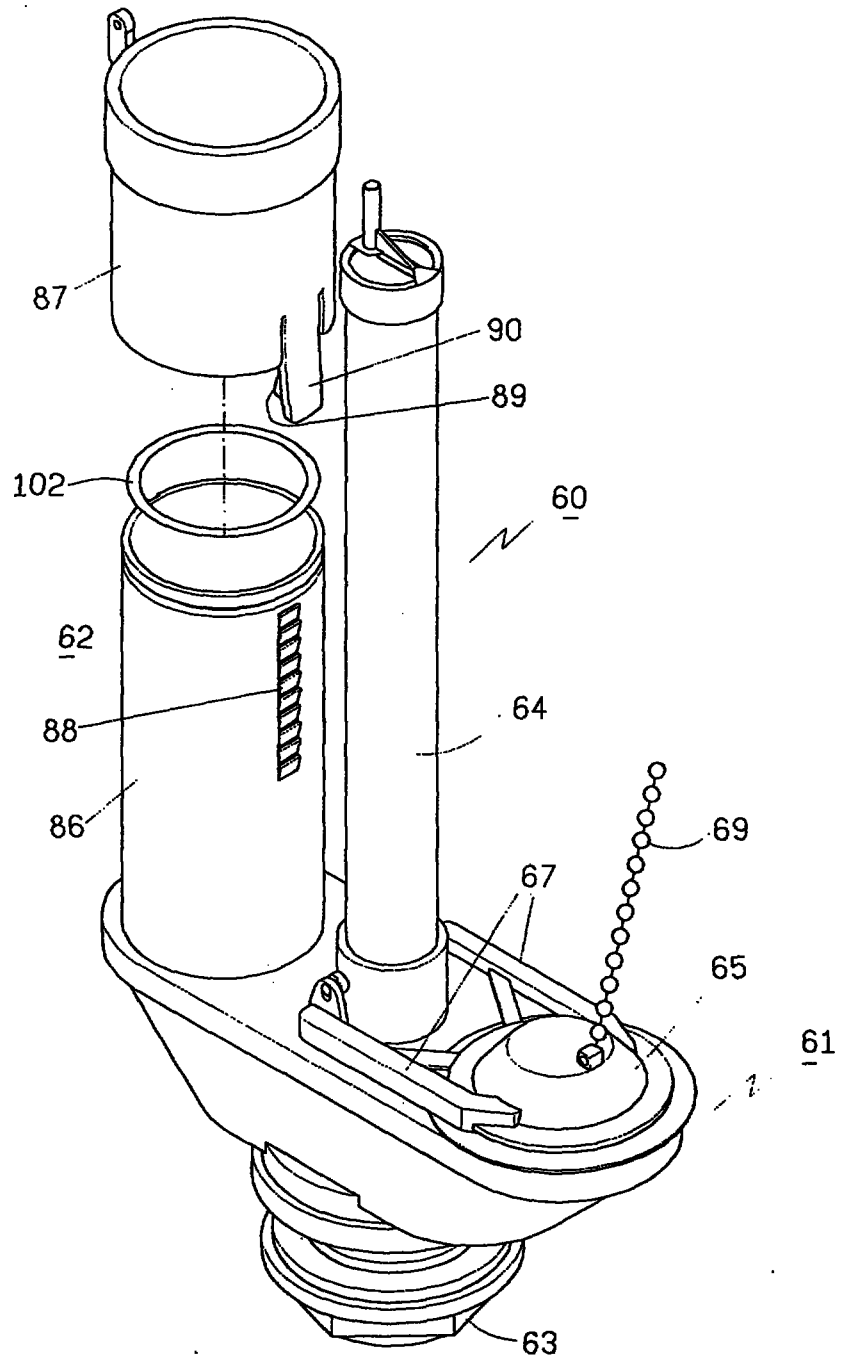


Fig 27

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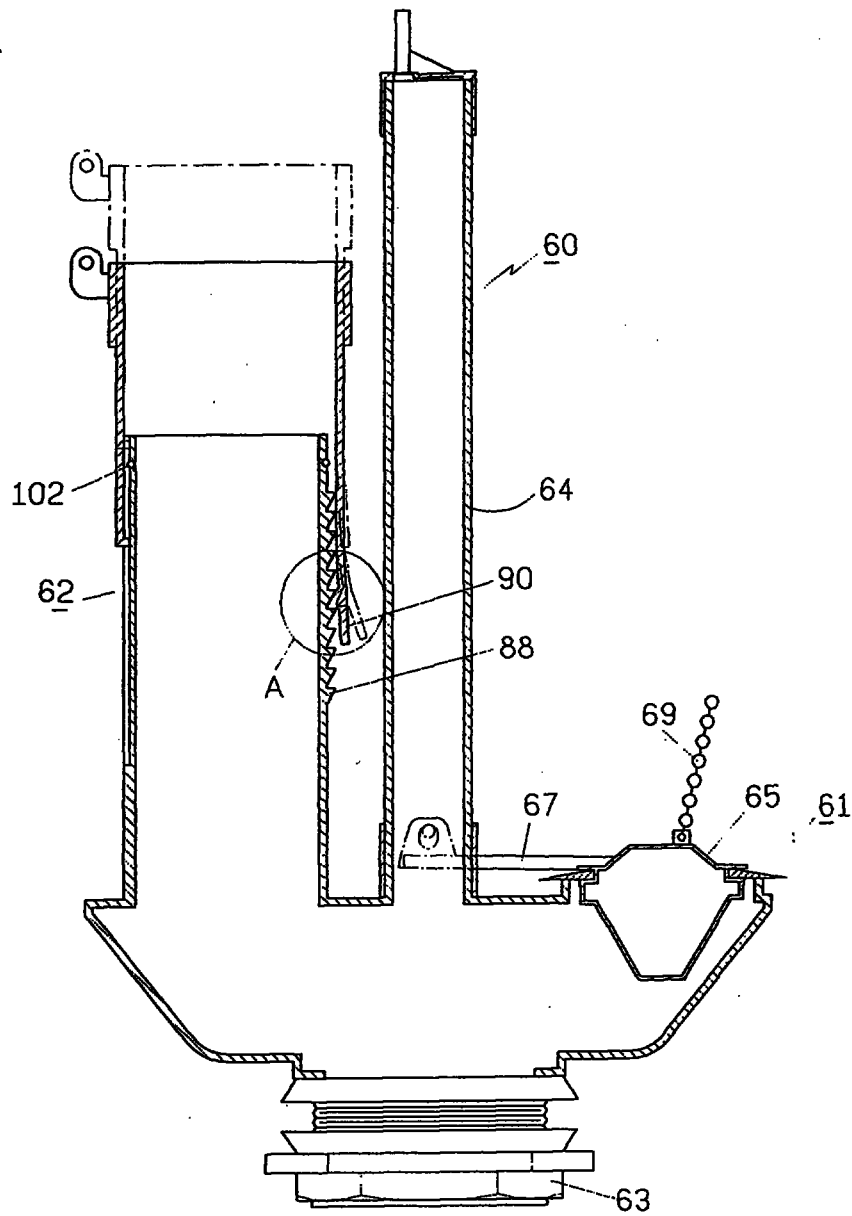


Fig 28

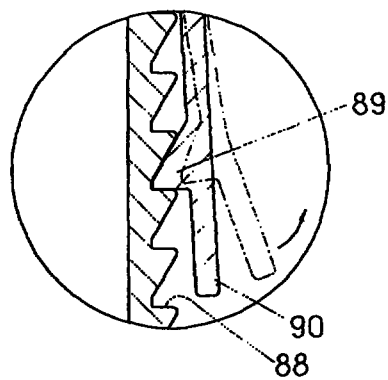


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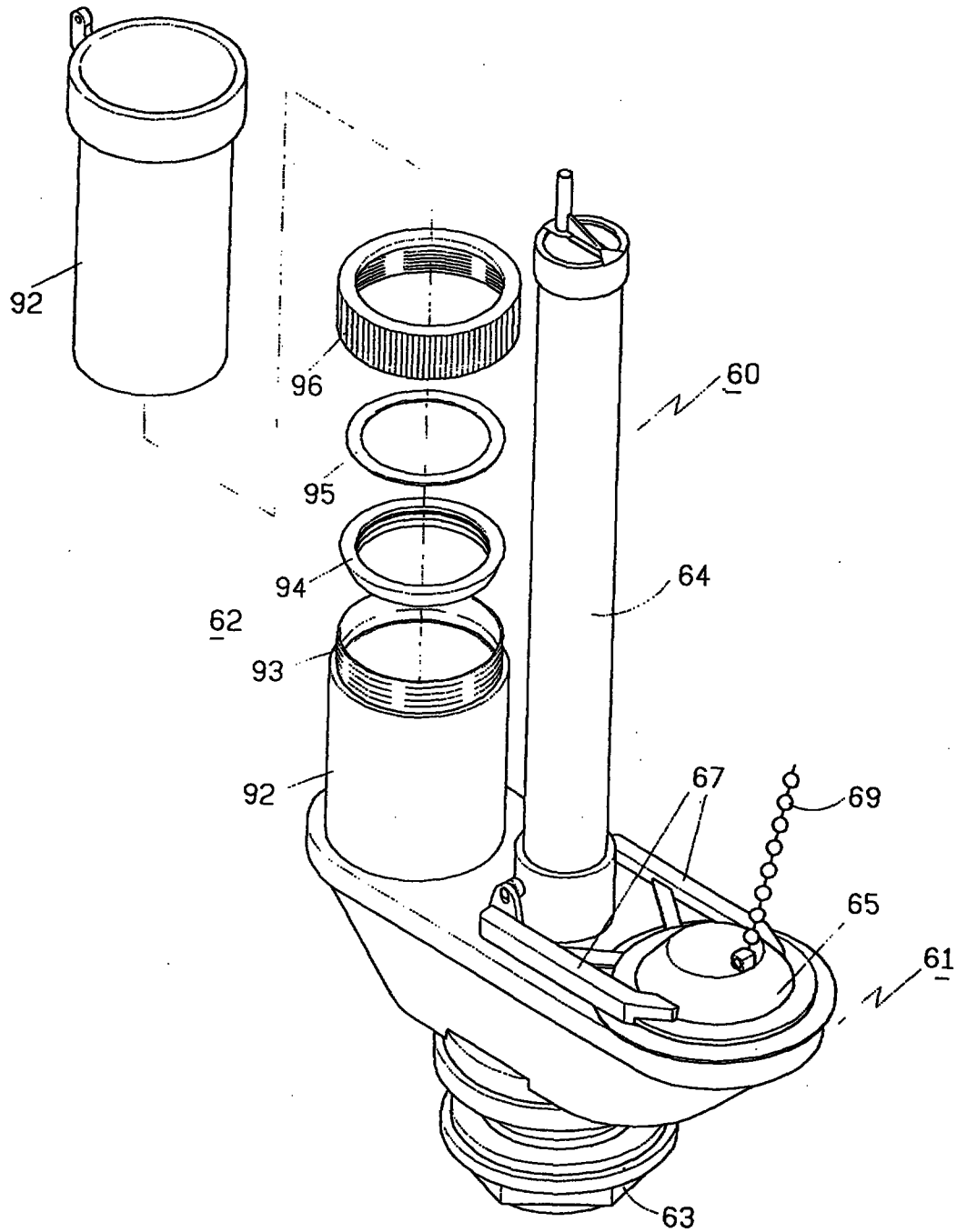


Fig 30

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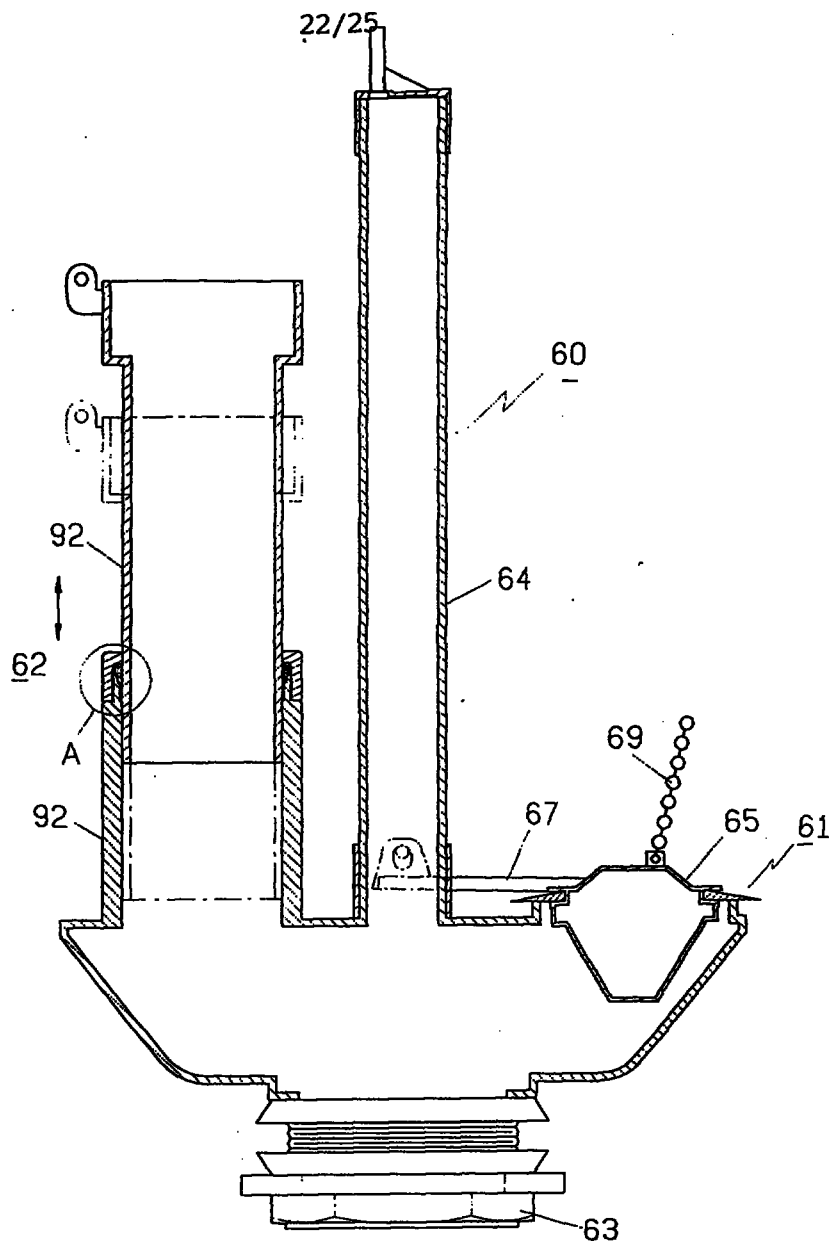


Fig 31

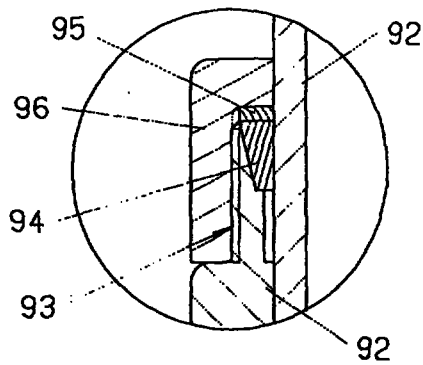


Fig 32

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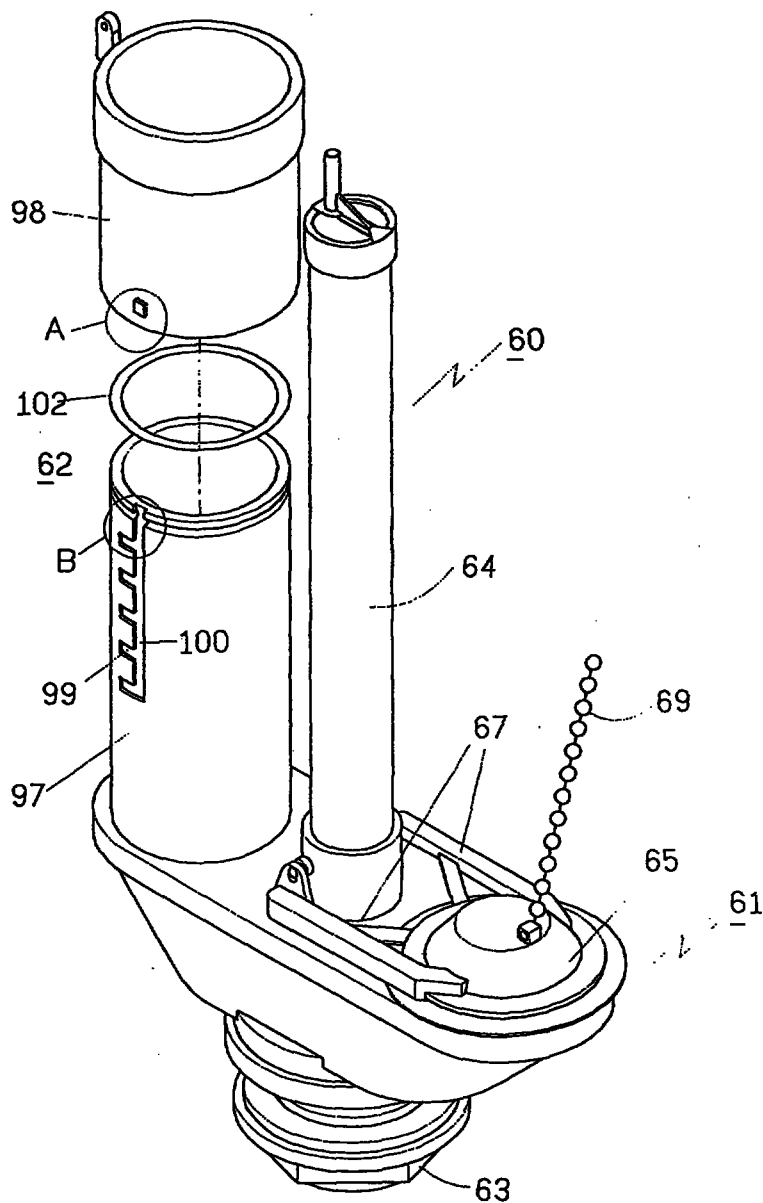


Fig 33

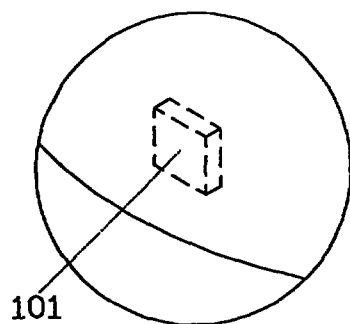


Fig 34

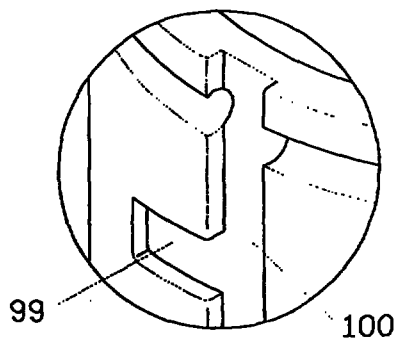


Fig 35



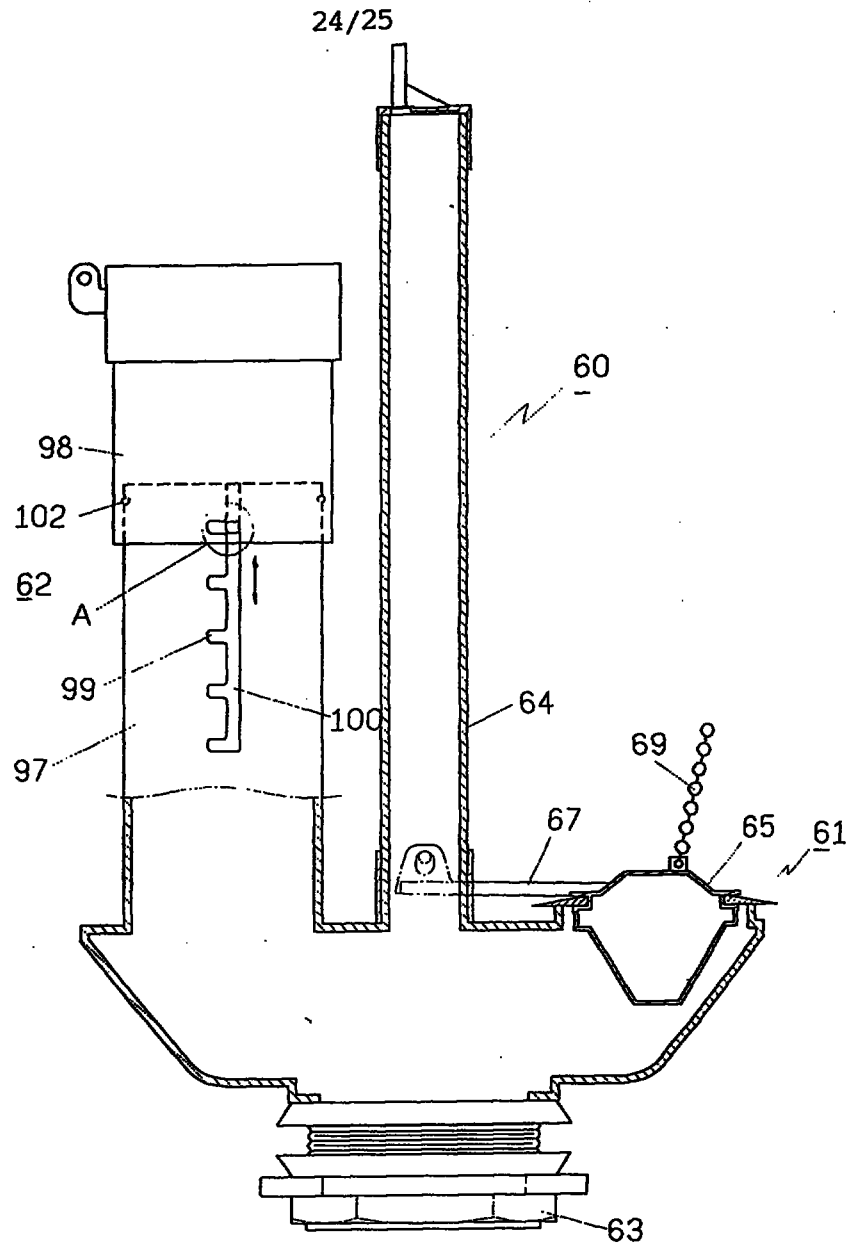


Fig 36

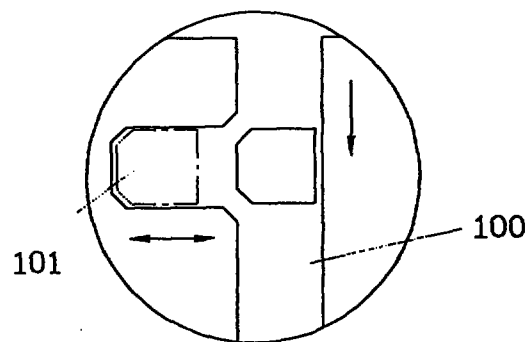


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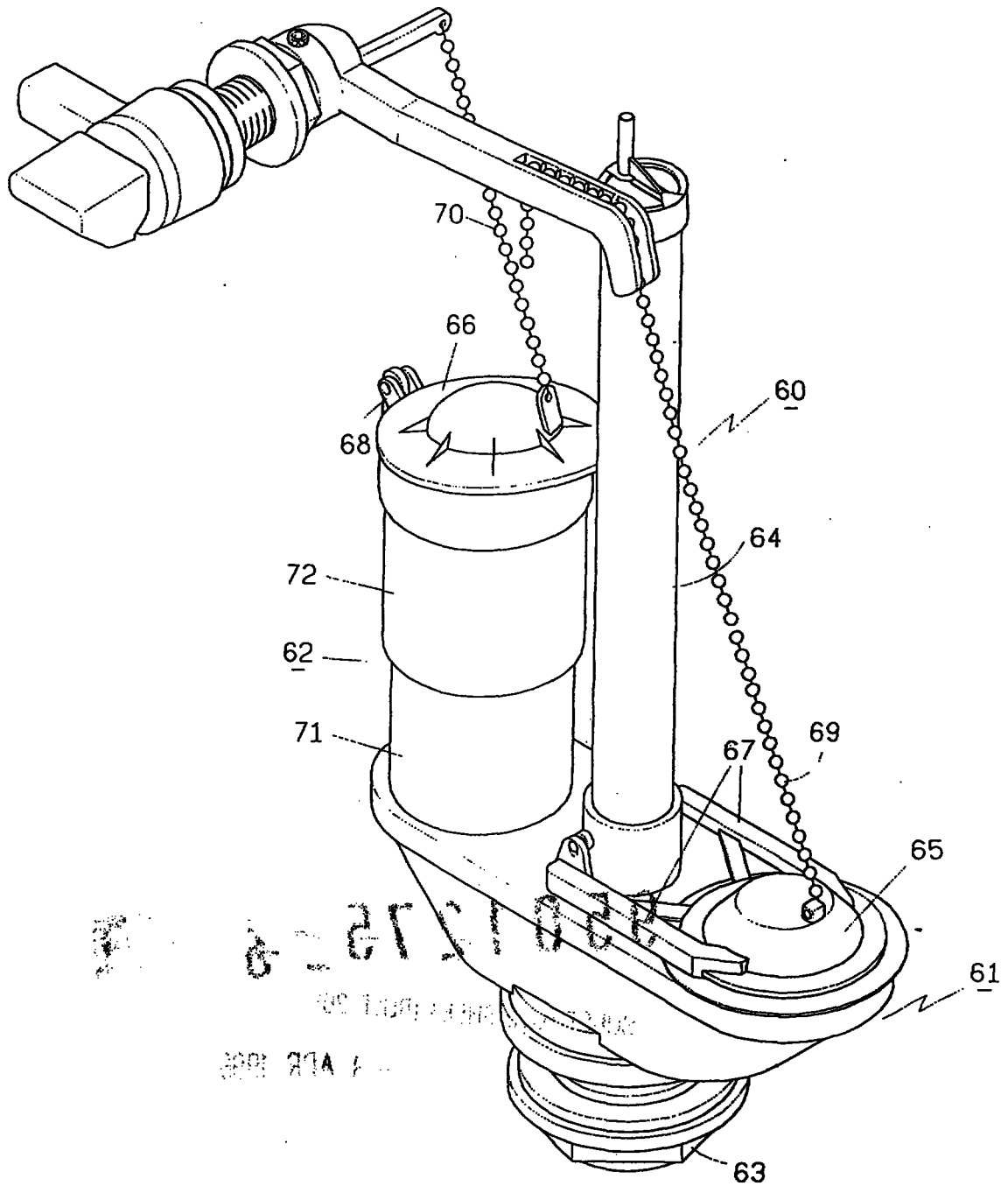


Fig 38

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TITLE: TWO-STAGE FLUSH DEVICE FOR A TOILET TANK

BACKGROUND OF THE INVENTION

This invention concerns a two-stage flush device for a toilet tank, particularly having a press button and a push or pull button for respectively flushing a small volume of water and a large volume of water.

A conventional two-stage flush device for a toilet tank shown in Fig. 1 has a single water volume control outlet tube with a valve for flushing two different volume of water by two press buttons A and B for opening the valve C in different degress. A second conventional two-stage flush device for a toilet tank shown in Fig. 2 has an auxiliary button E and a main button F, and the auxiliary button E can be pushed only or both the buttons E and F are pushed at the same time for flushing different volume of water.

The two kinds of conventional two-stage flush devices have only one outlet tube for different volume of water to flush out, but the the main and the auxiliary button are to be pressed in the same direction. Then chances are that a user may carelessly, easily or wrongly press the two buttons at the same time to flush a large volume of water, losing water saving function they are designed for.

A third conventional two-stage flush device shown in Fig. 3 has two outlet tubes H and I respectively having a high level and a low level, but if the opening time for the valve cap of each outlet tube H or I should not be controlled, it would be of on use. It has an auxiliary press rod J and a main press rod K for

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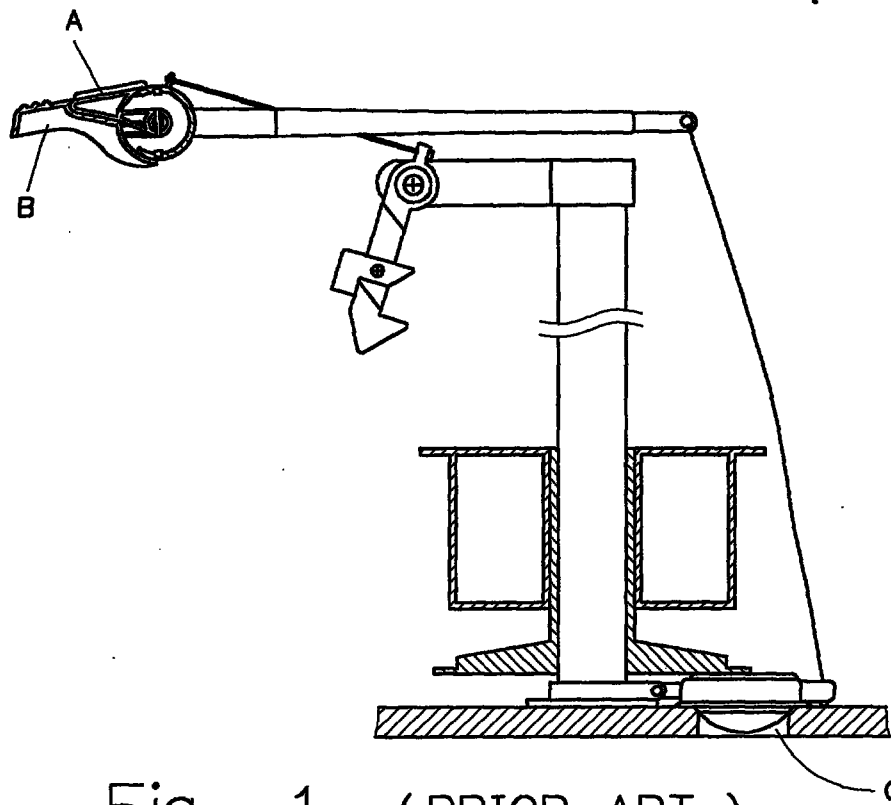


Fig 1 (PRIOR ART)

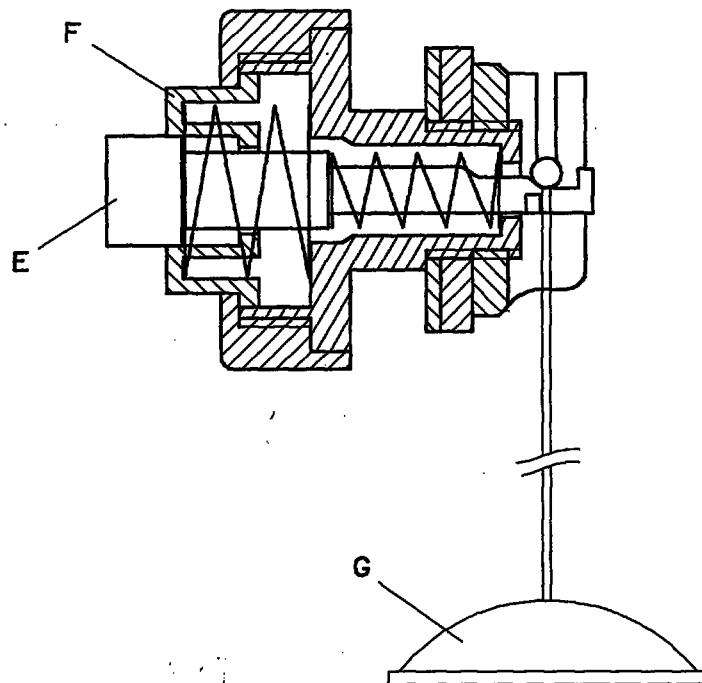


Fig 2 (PRIOR ART)

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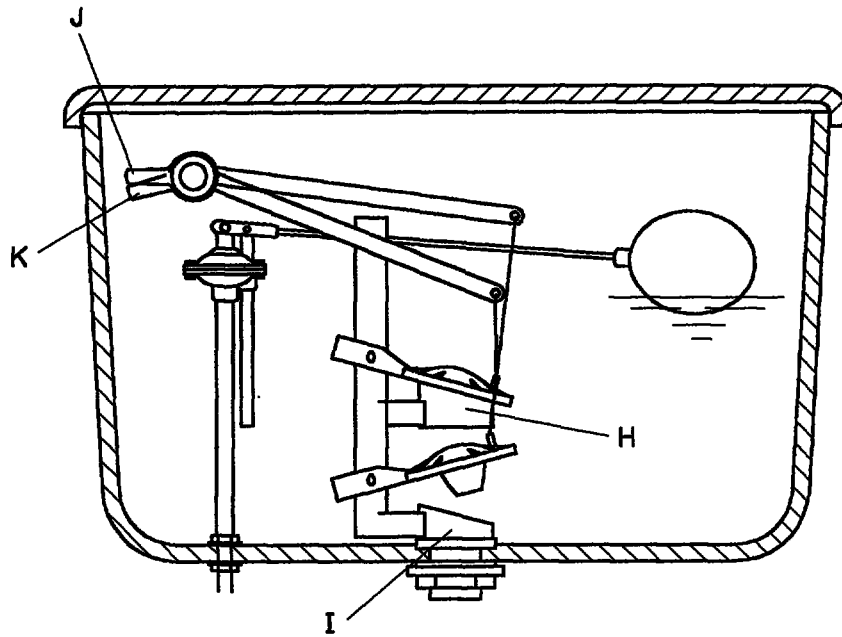


Fig 3 (PRIOR ART)

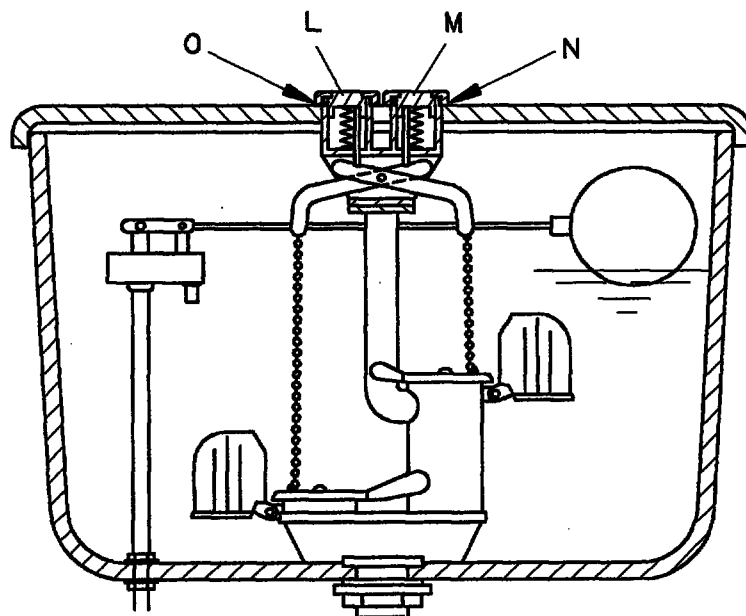


Fig 4 (PRIOR ART)

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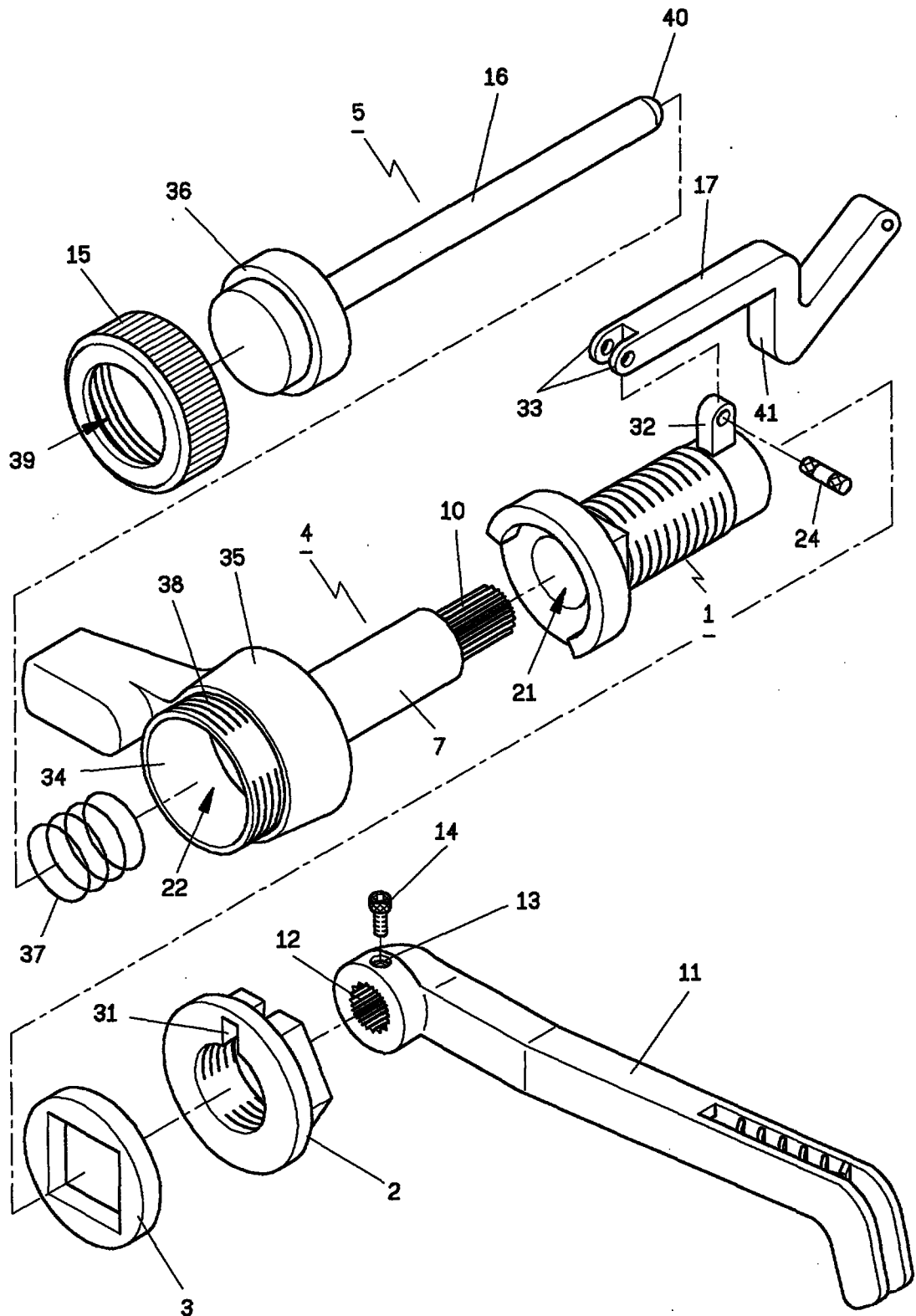


Fig 5

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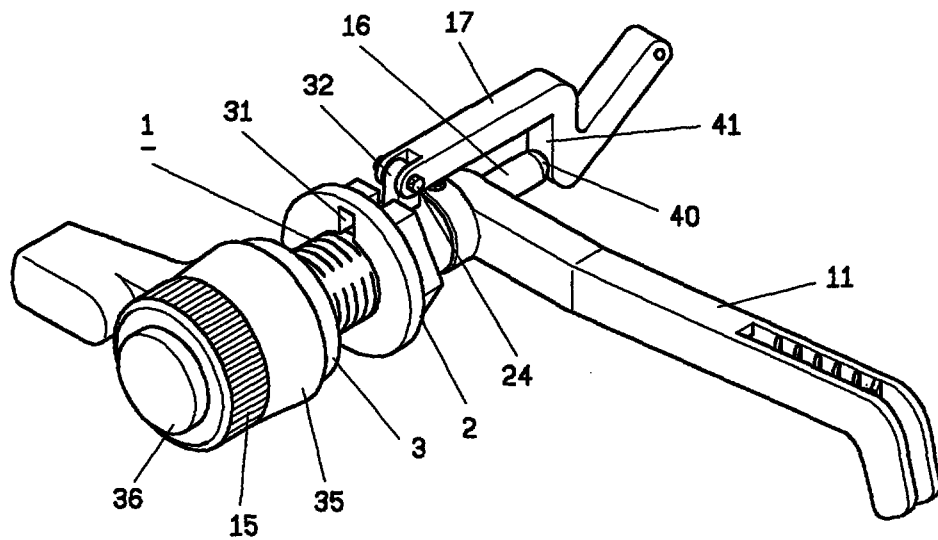


Fig 6

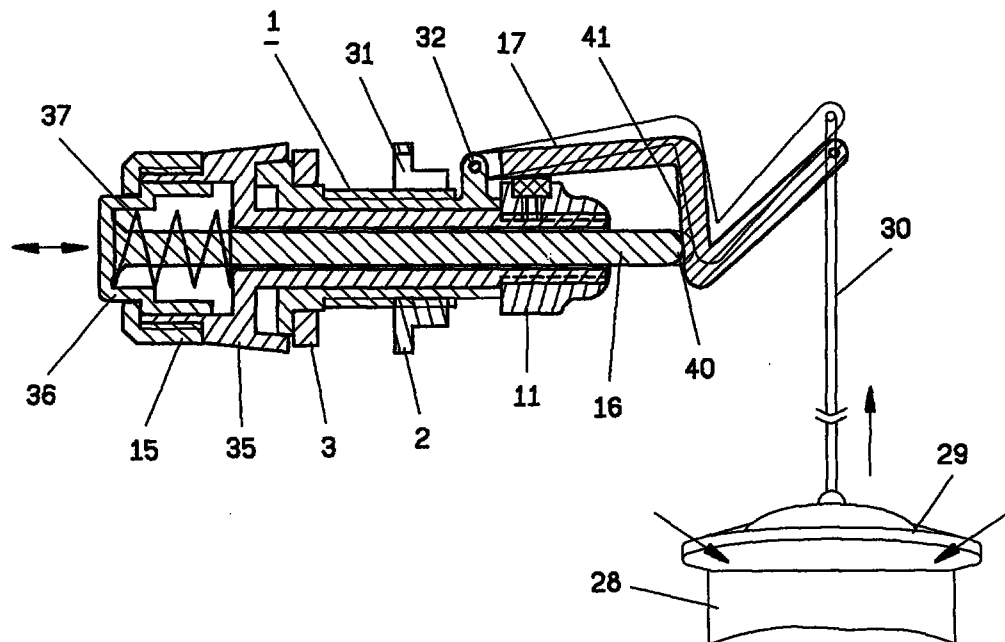


Fig 7

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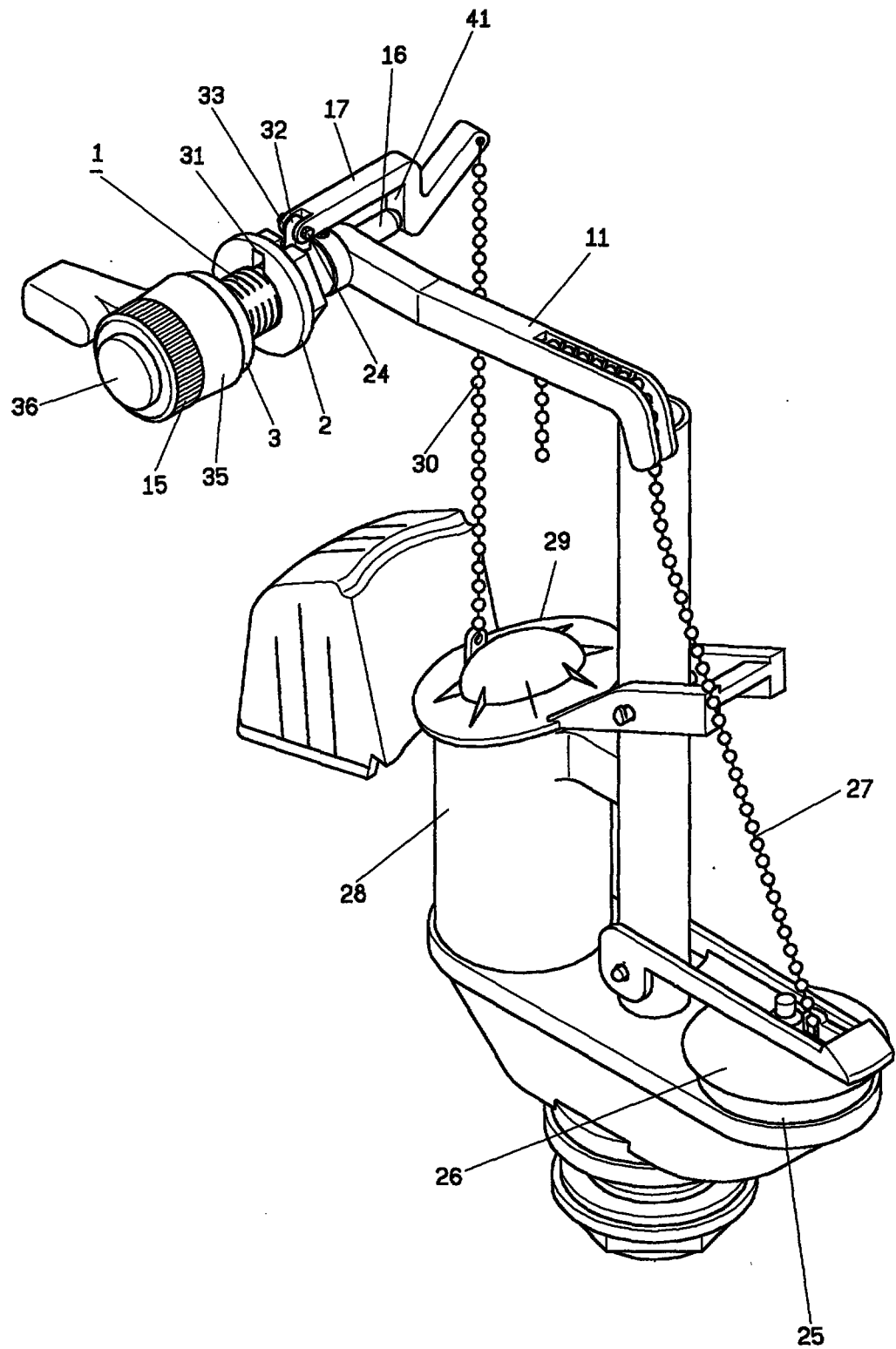


Fig 8

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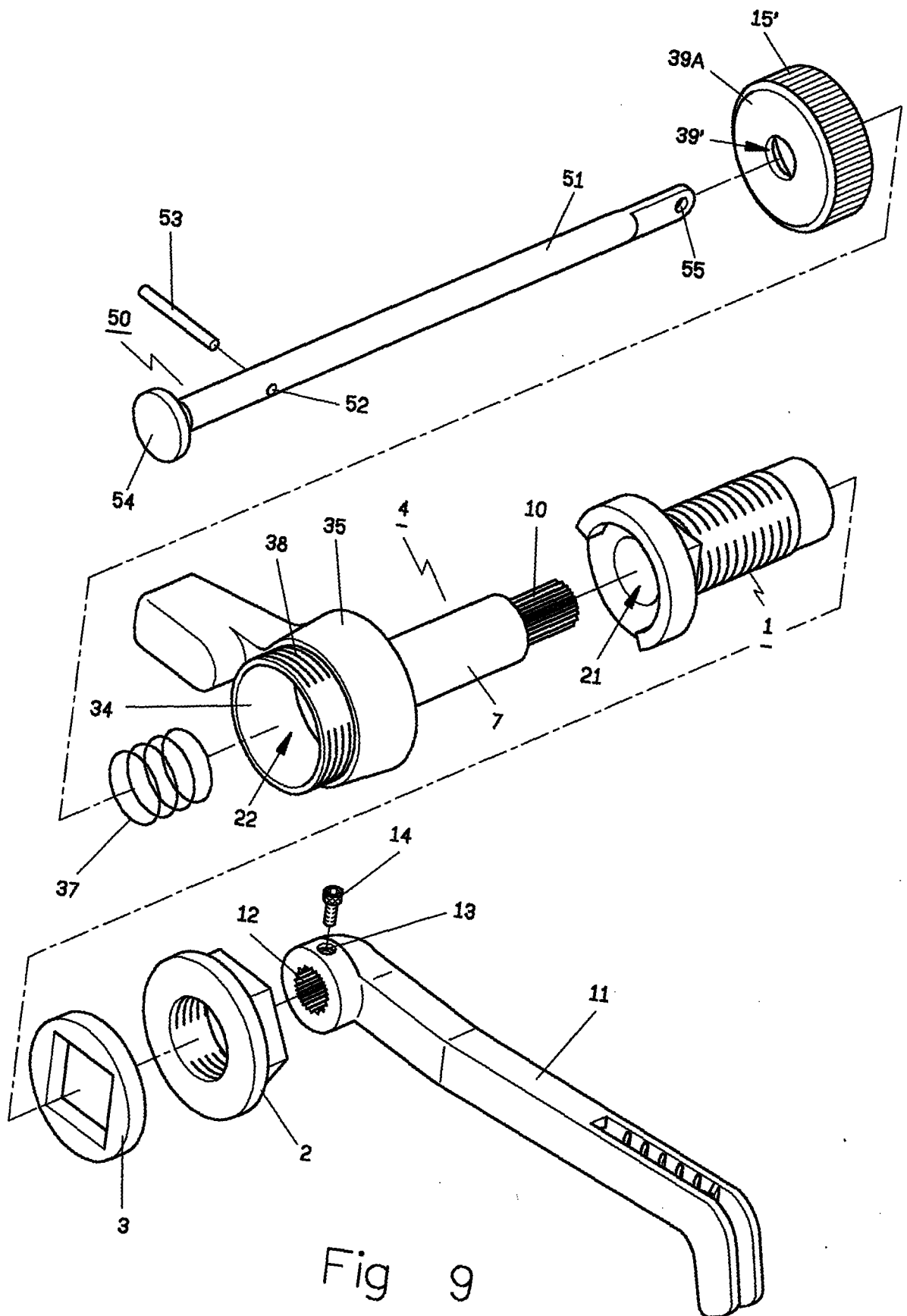


Fig 9

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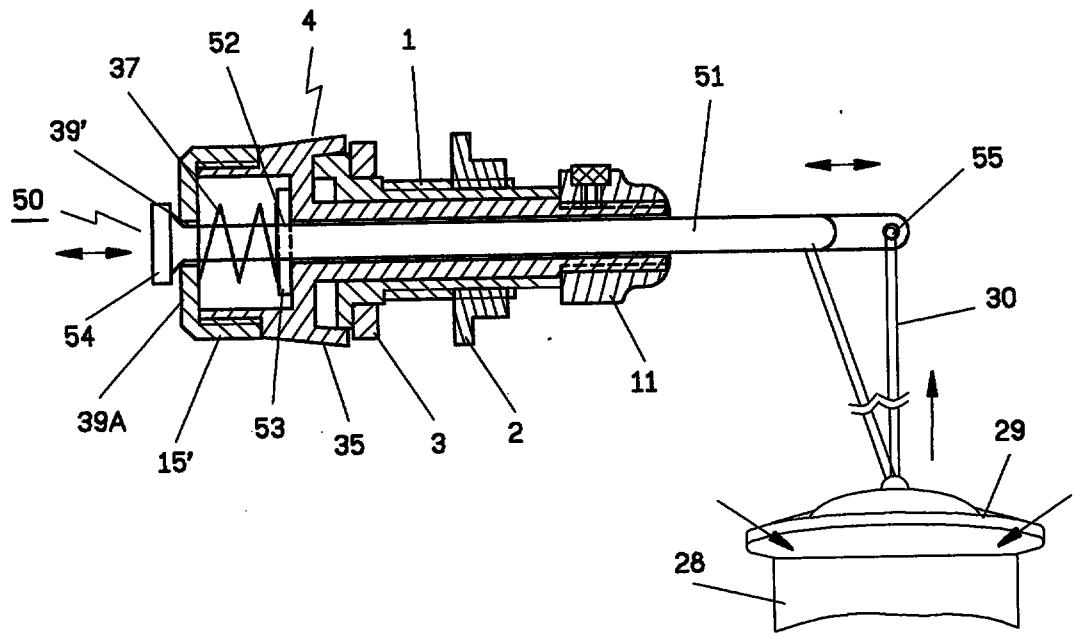


Fig 10

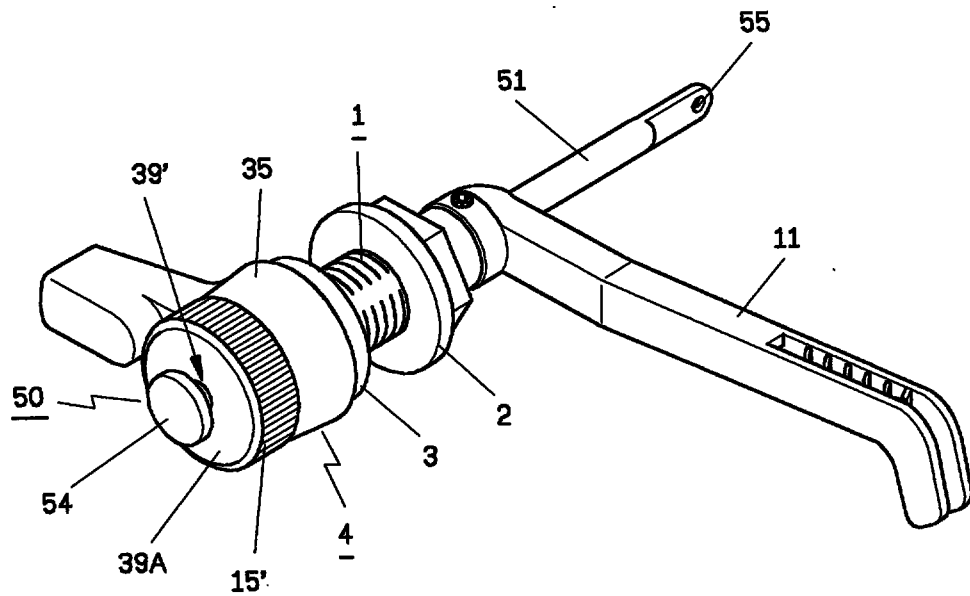


Fig 11

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Date: 2/6/96

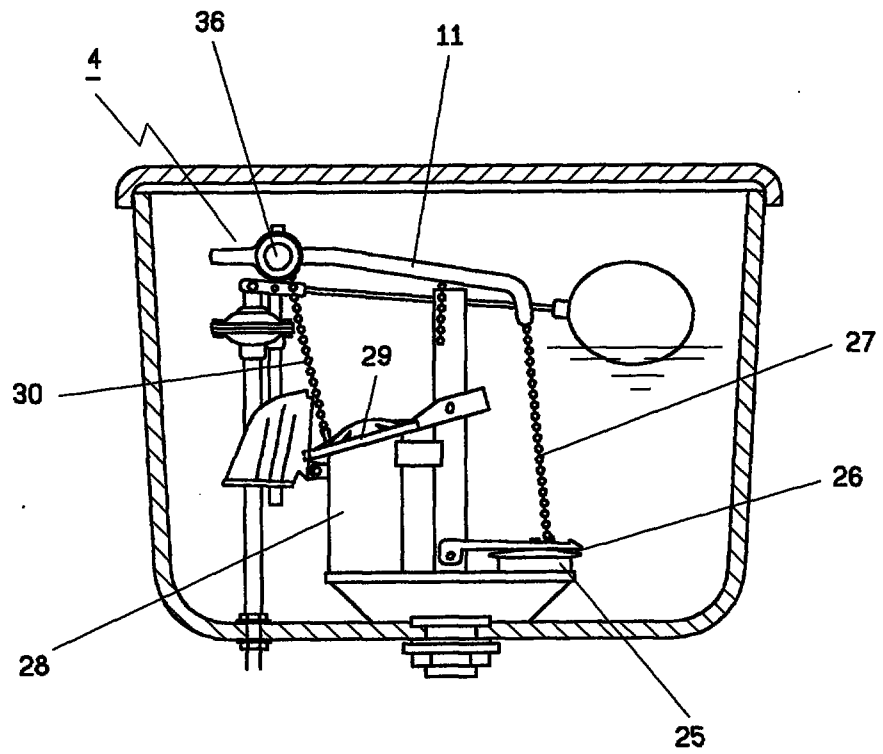


Fig 12

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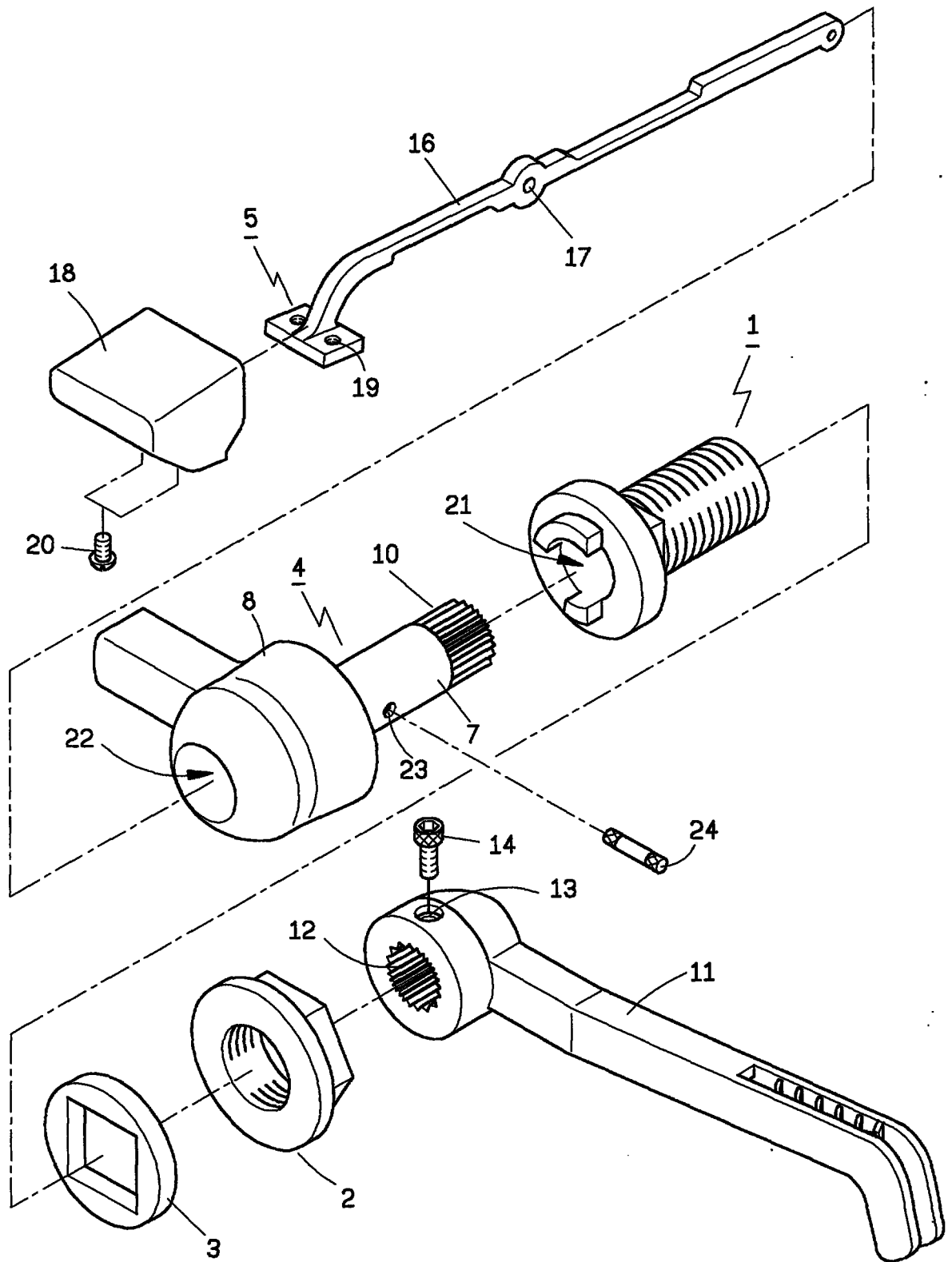


Fig 13

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Date: 2/6/96

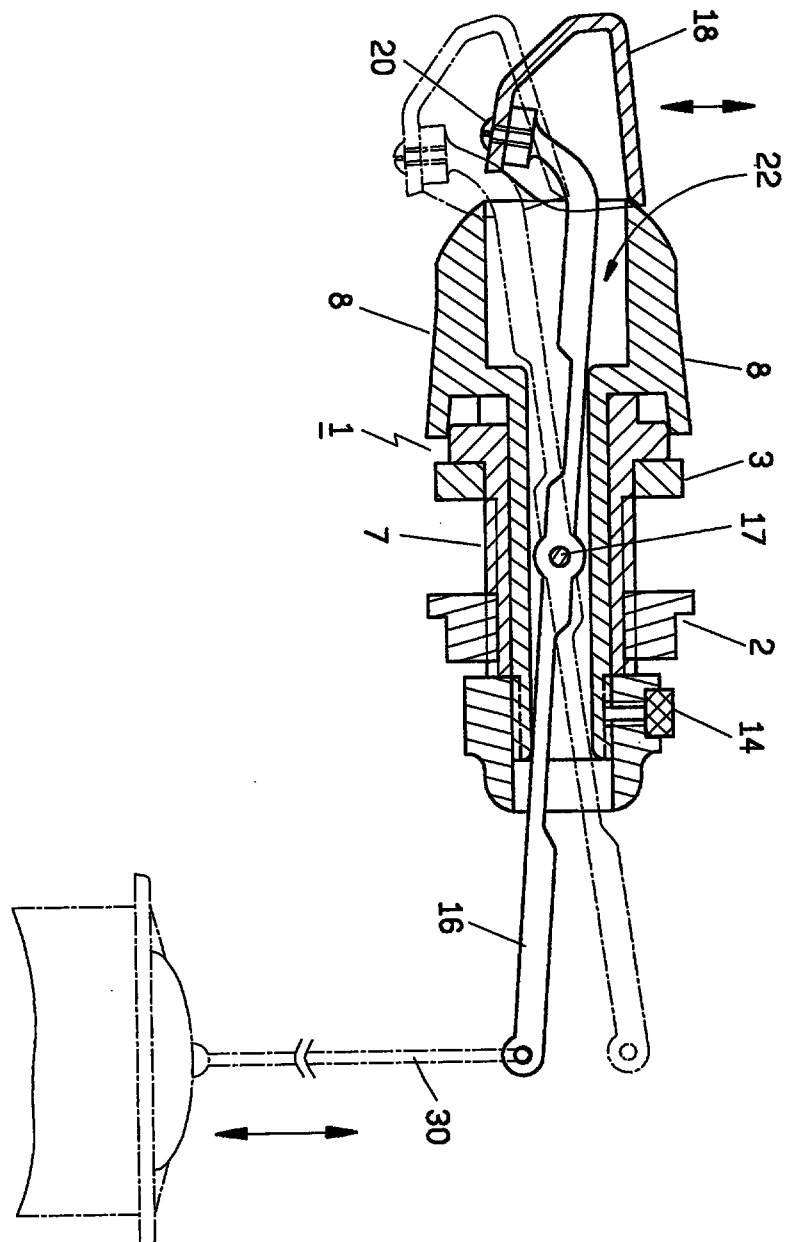


Fig 16

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Date: 2/6/96

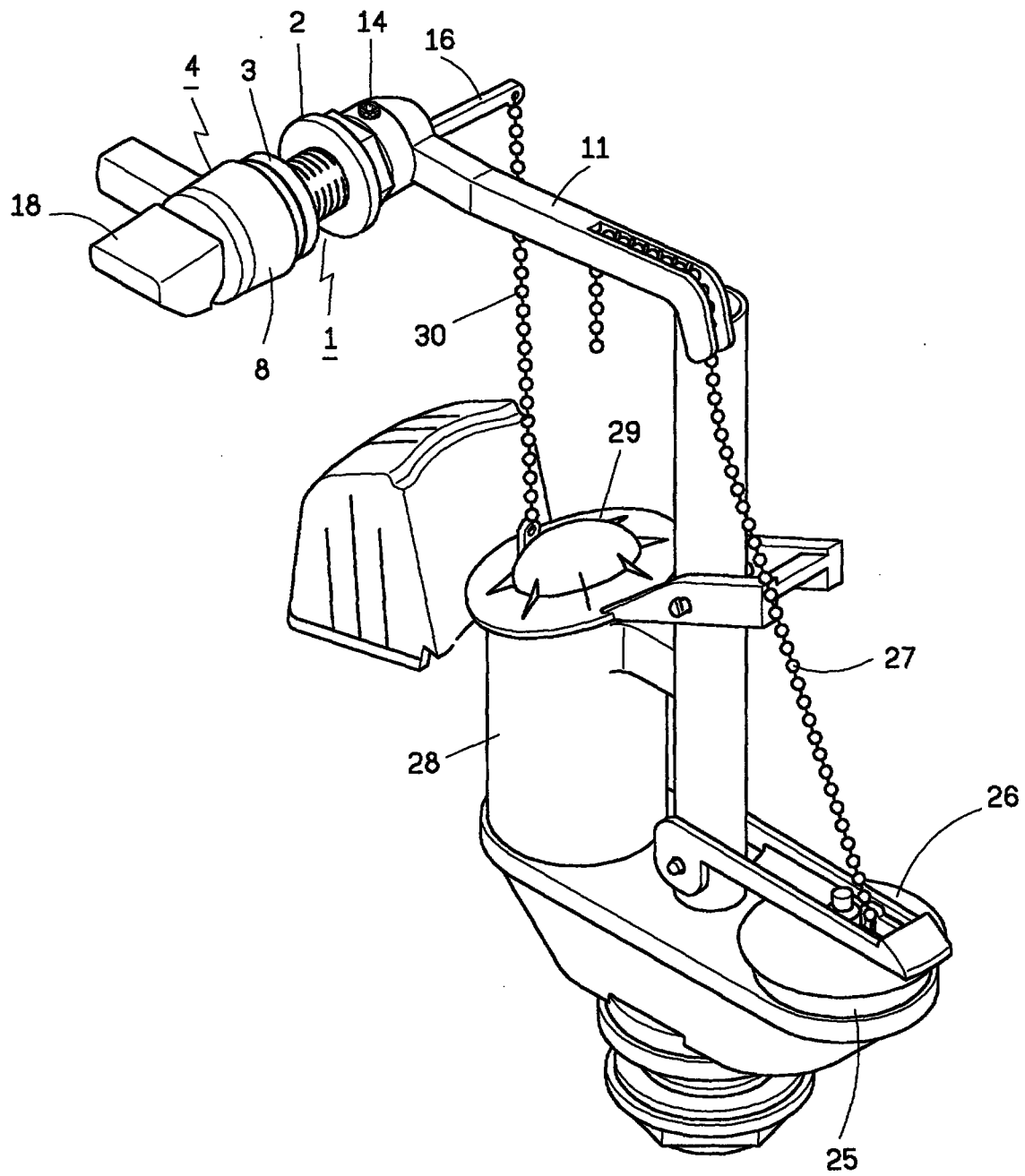


Fig 17

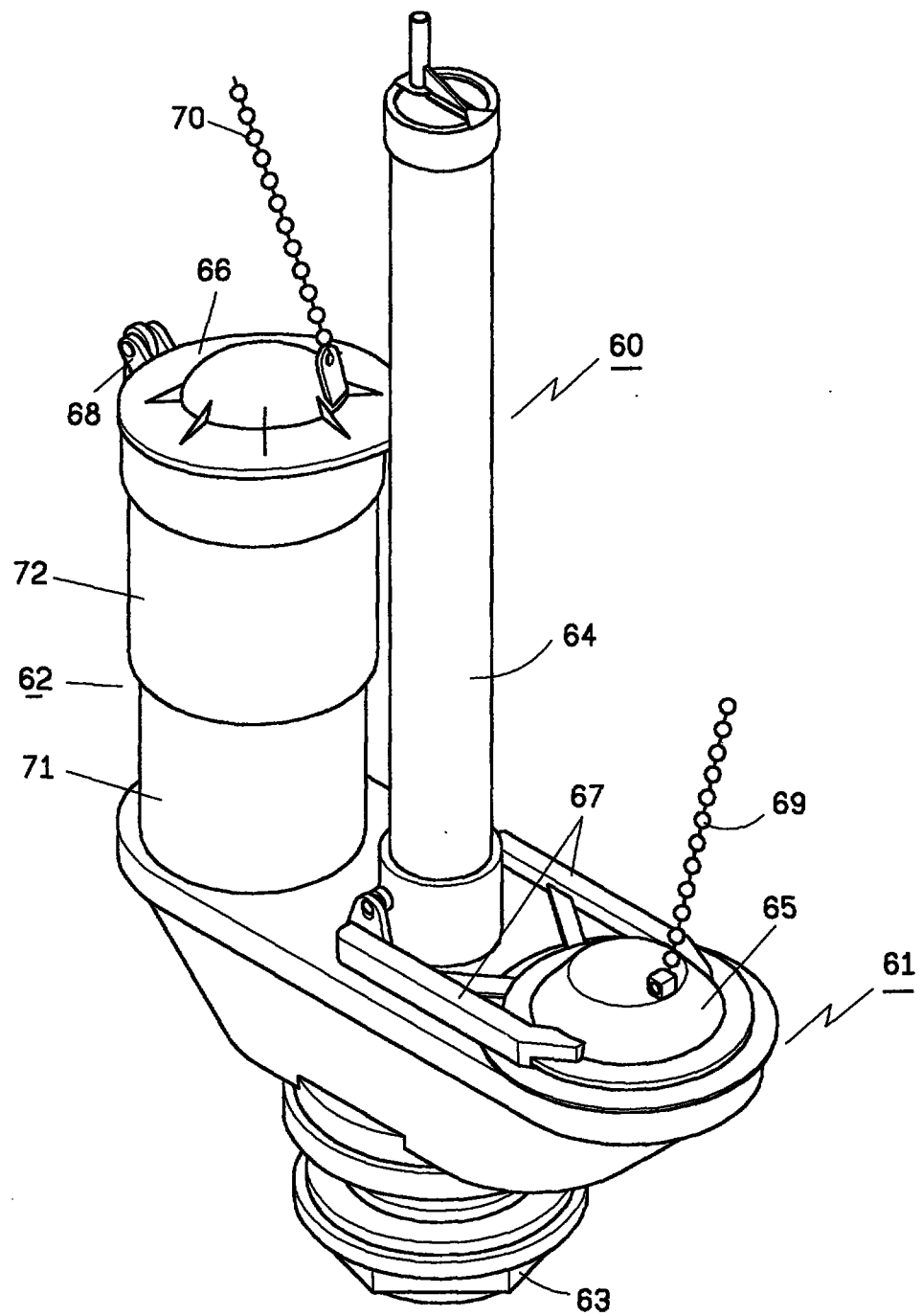


Fig 18

14/25

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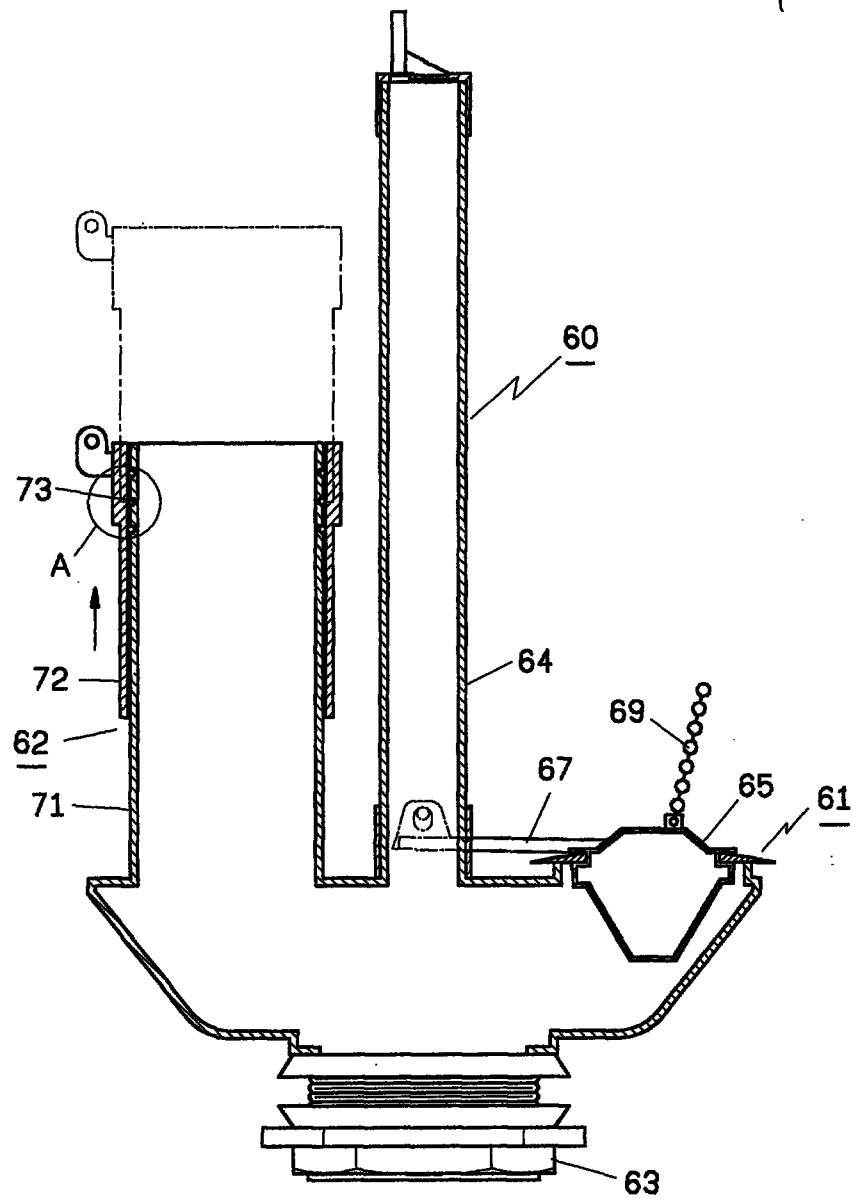


Fig 19

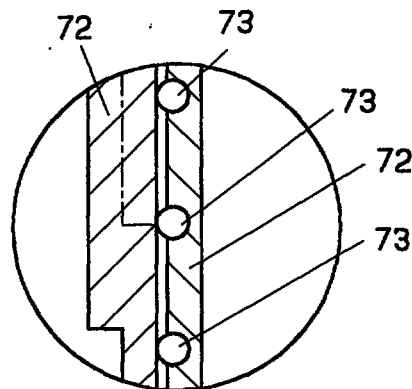


Fig 20

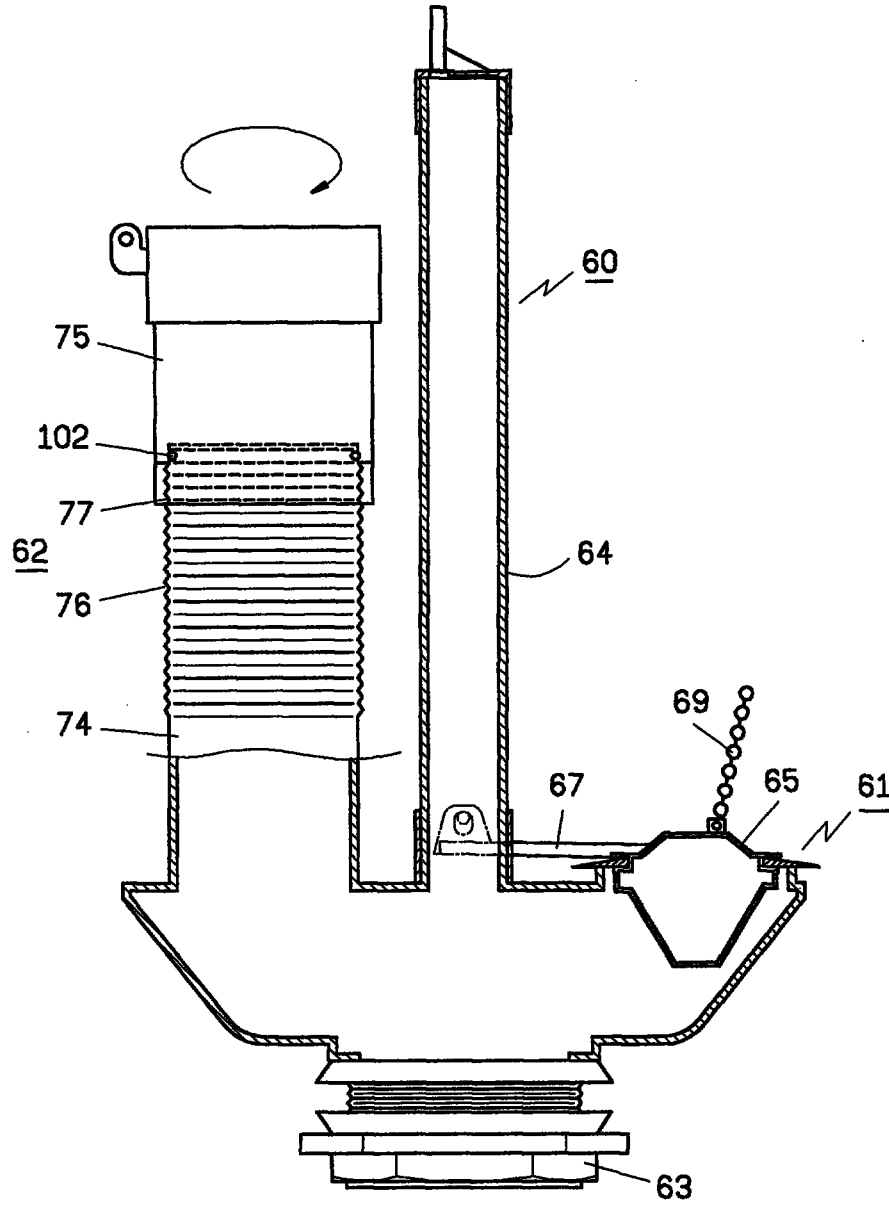


Fig 21

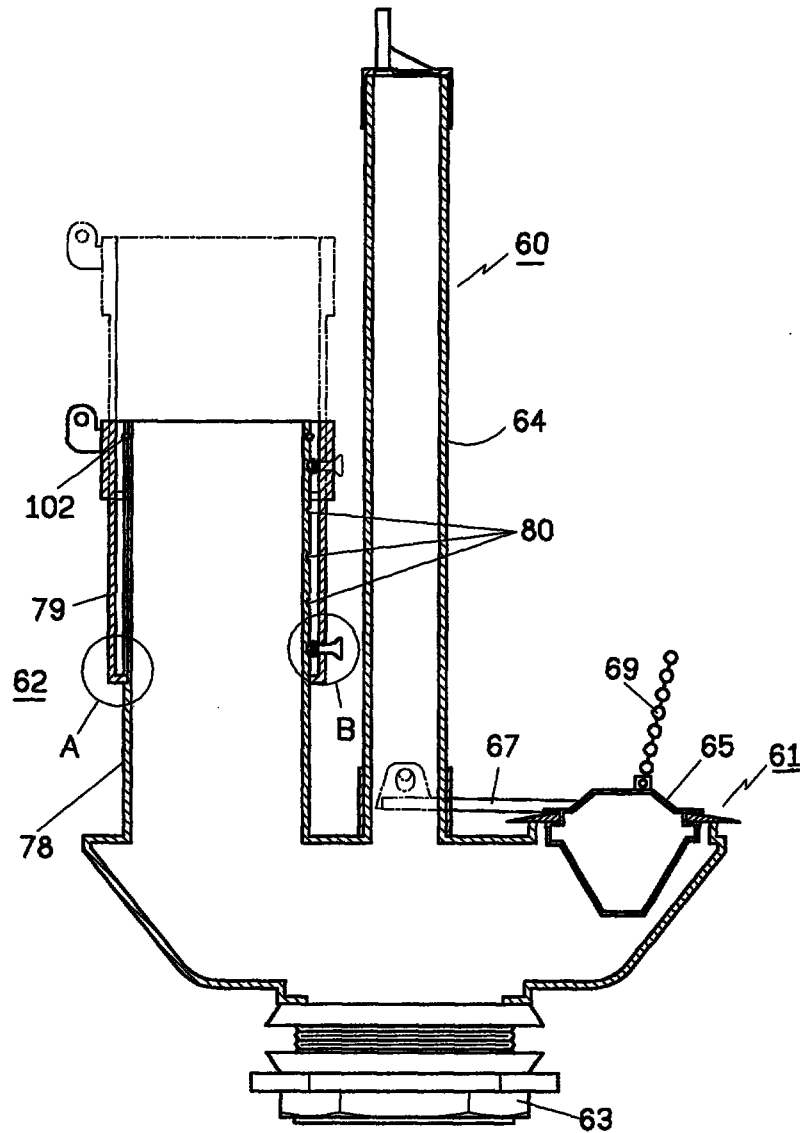


Fig 22

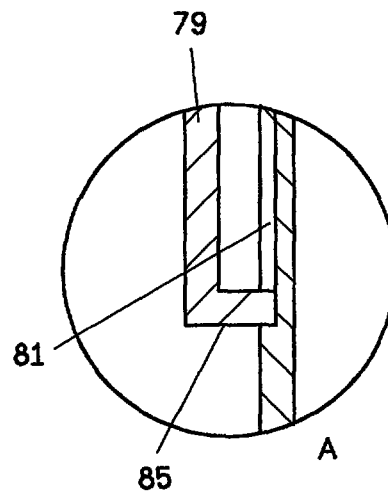


Fig 23

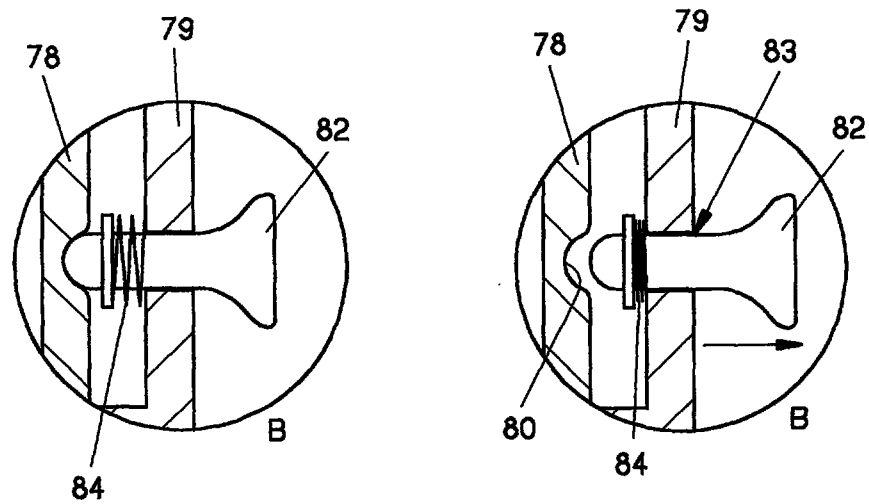


Fig 24

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Date: 21/6/96

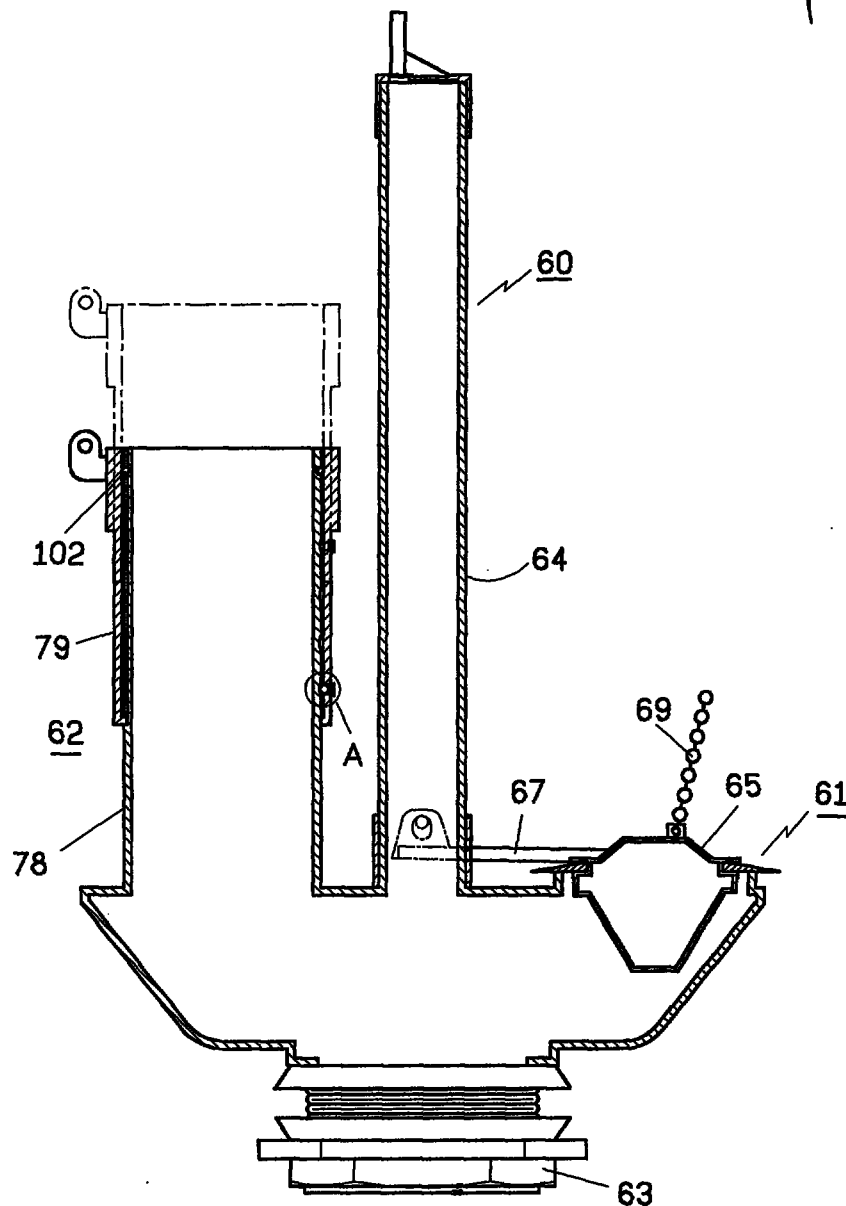


Fig 25

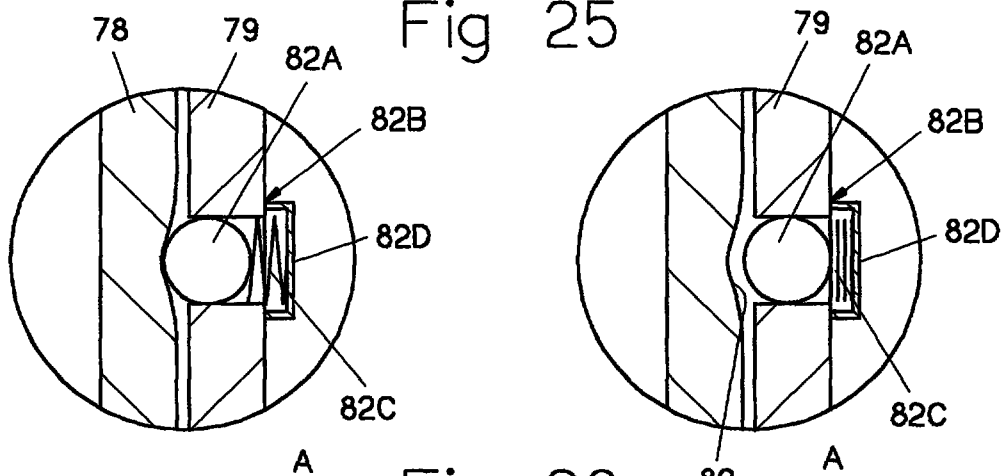


Fig 26

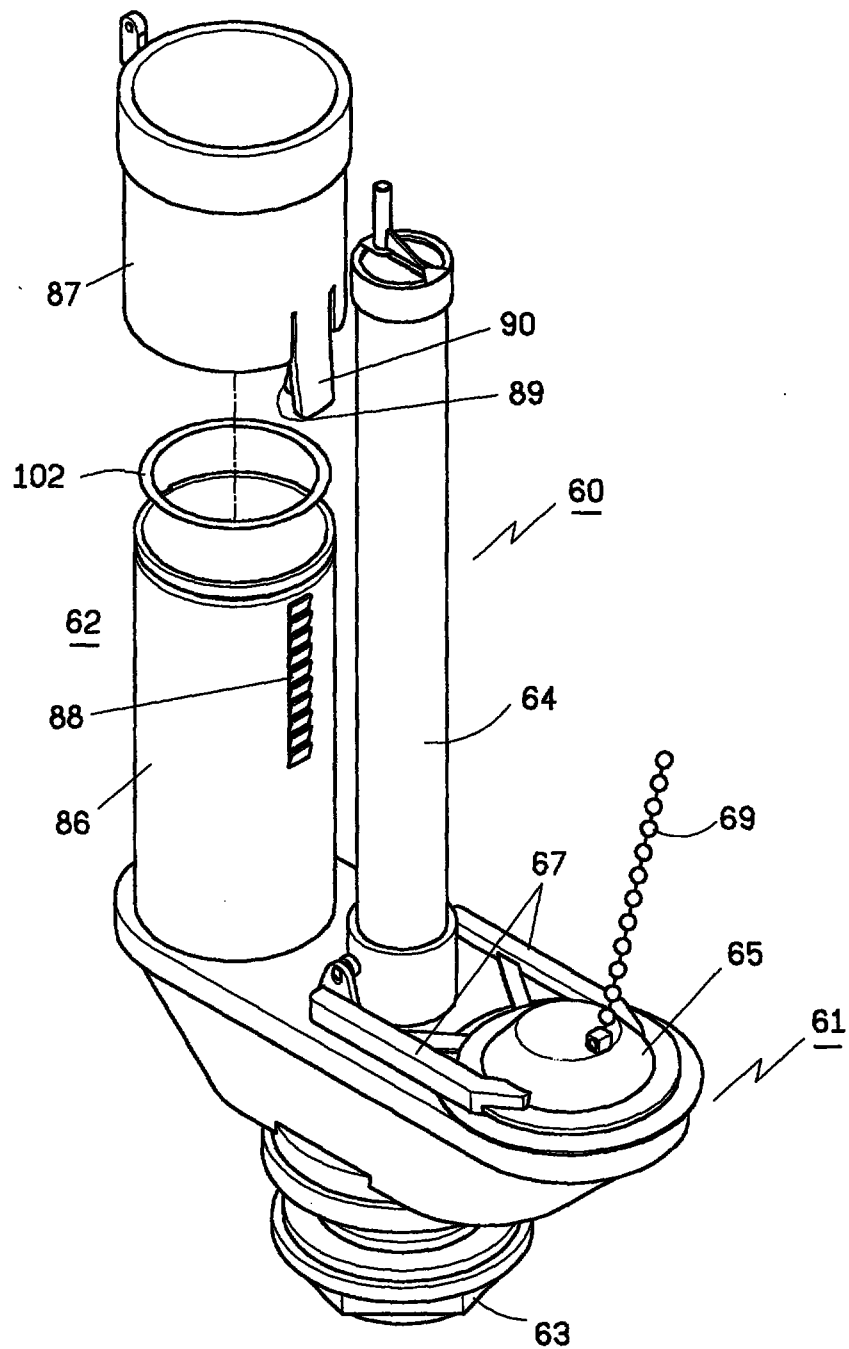


Fig 27

Date: 21/6/96

20/25

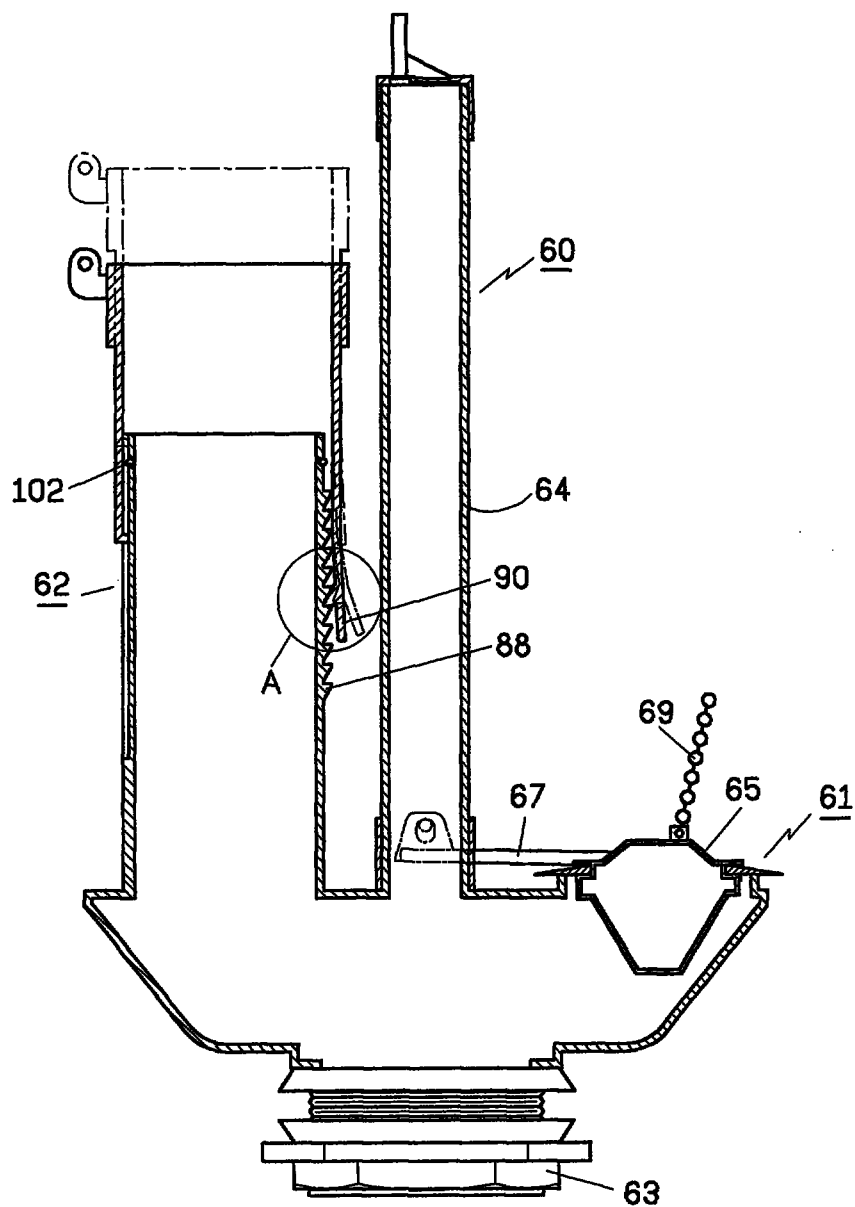


Fig 28

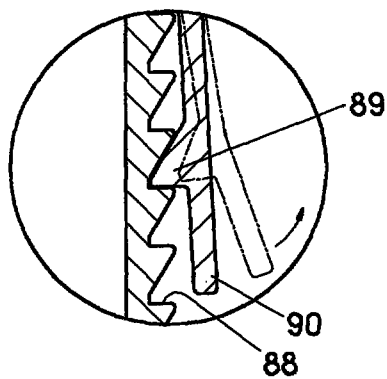


Fig 29

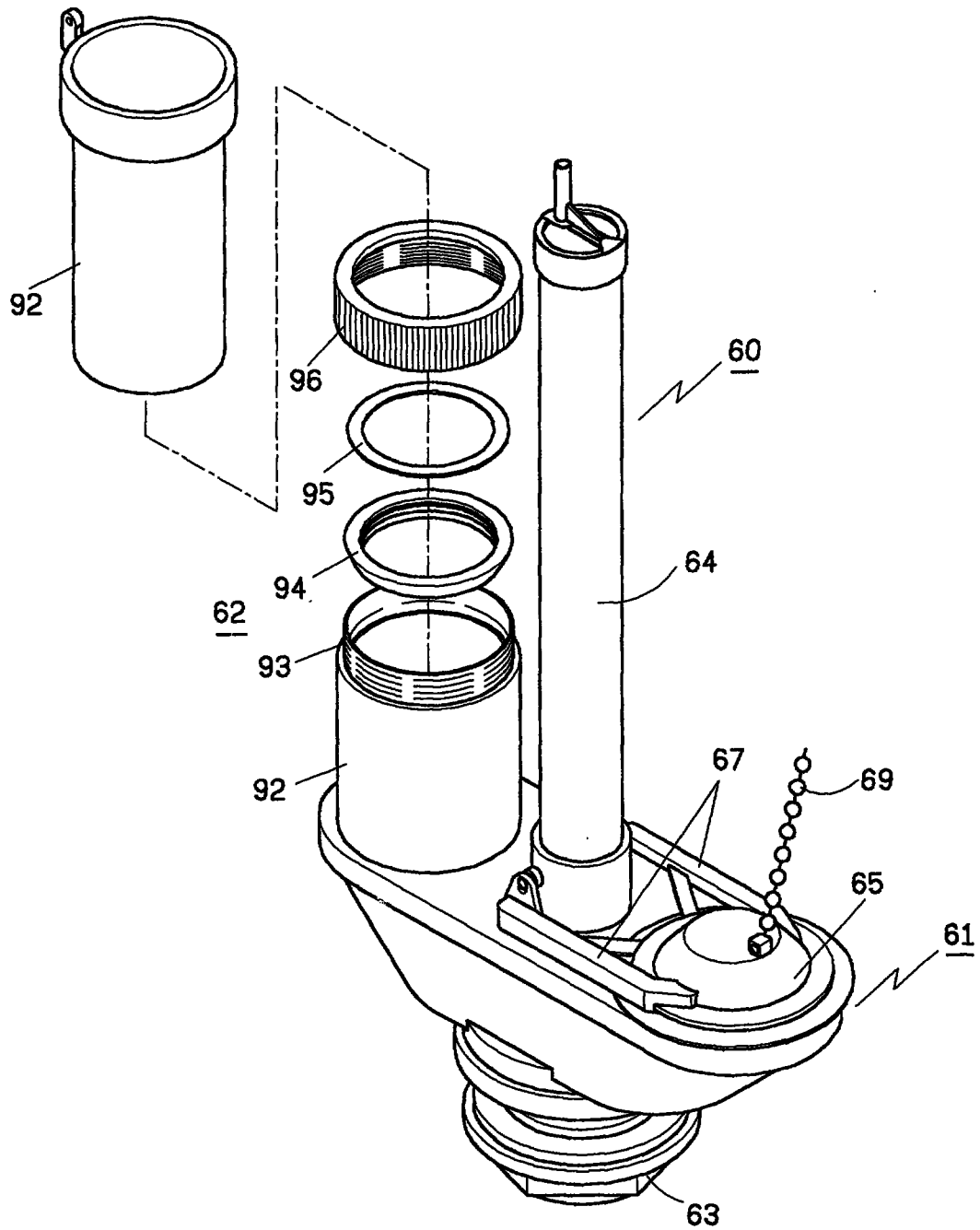


Fig 30

Date: 2/6/96

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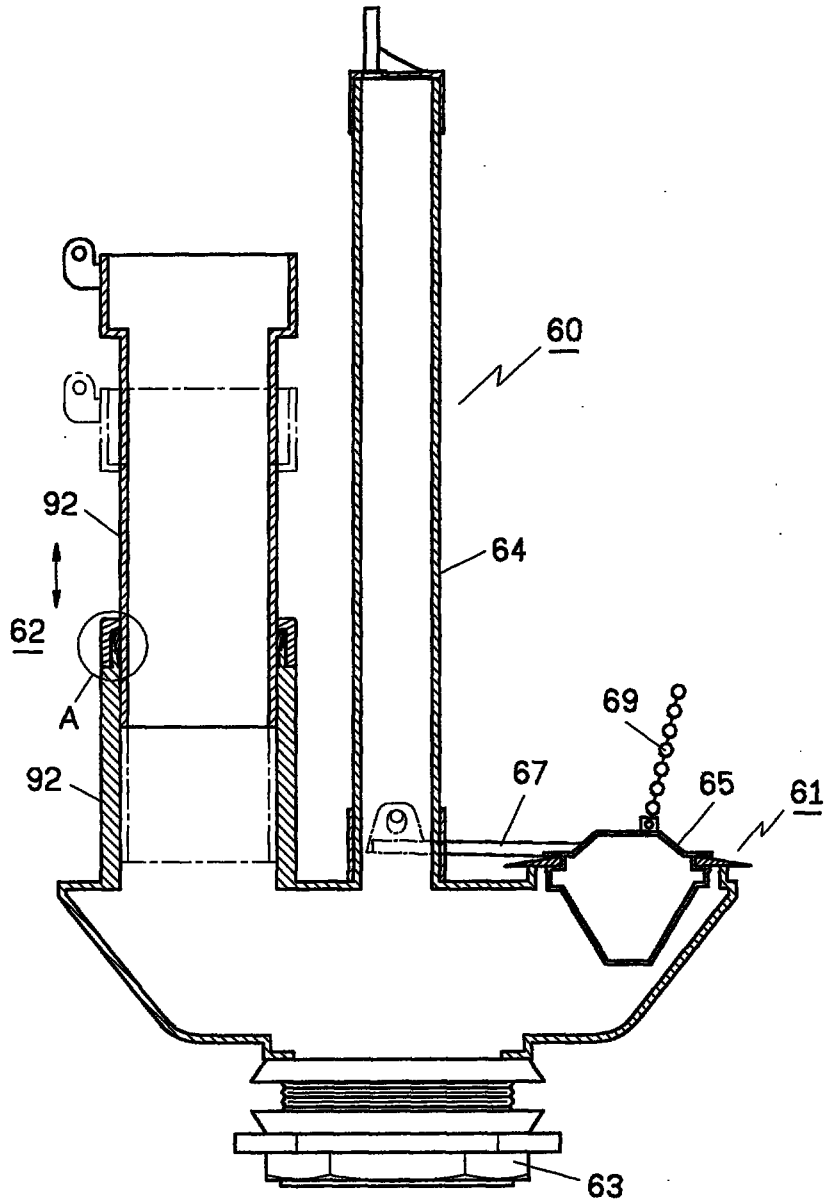


Fig 31

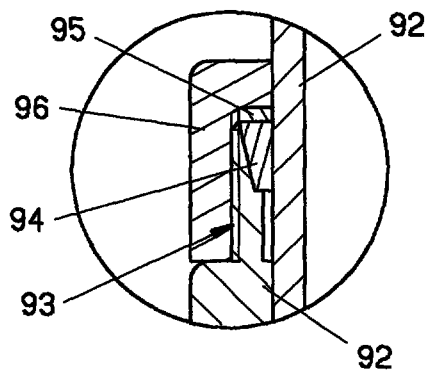


Fig 32

Date: 21/6/96

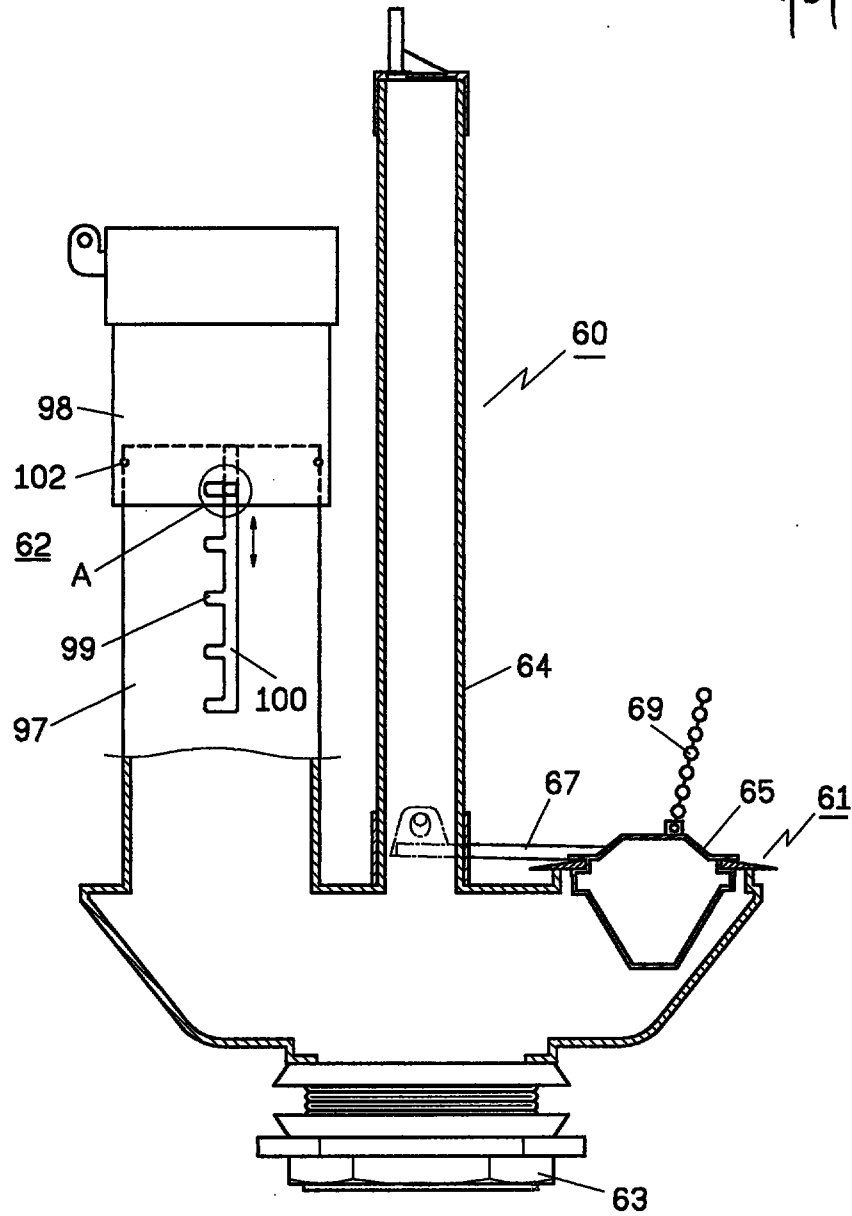


Fig 36

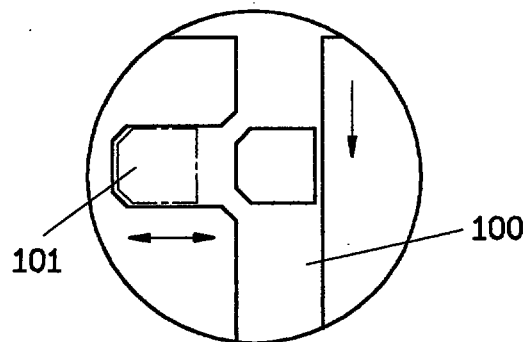


Fig 37

Date: 2/6/96

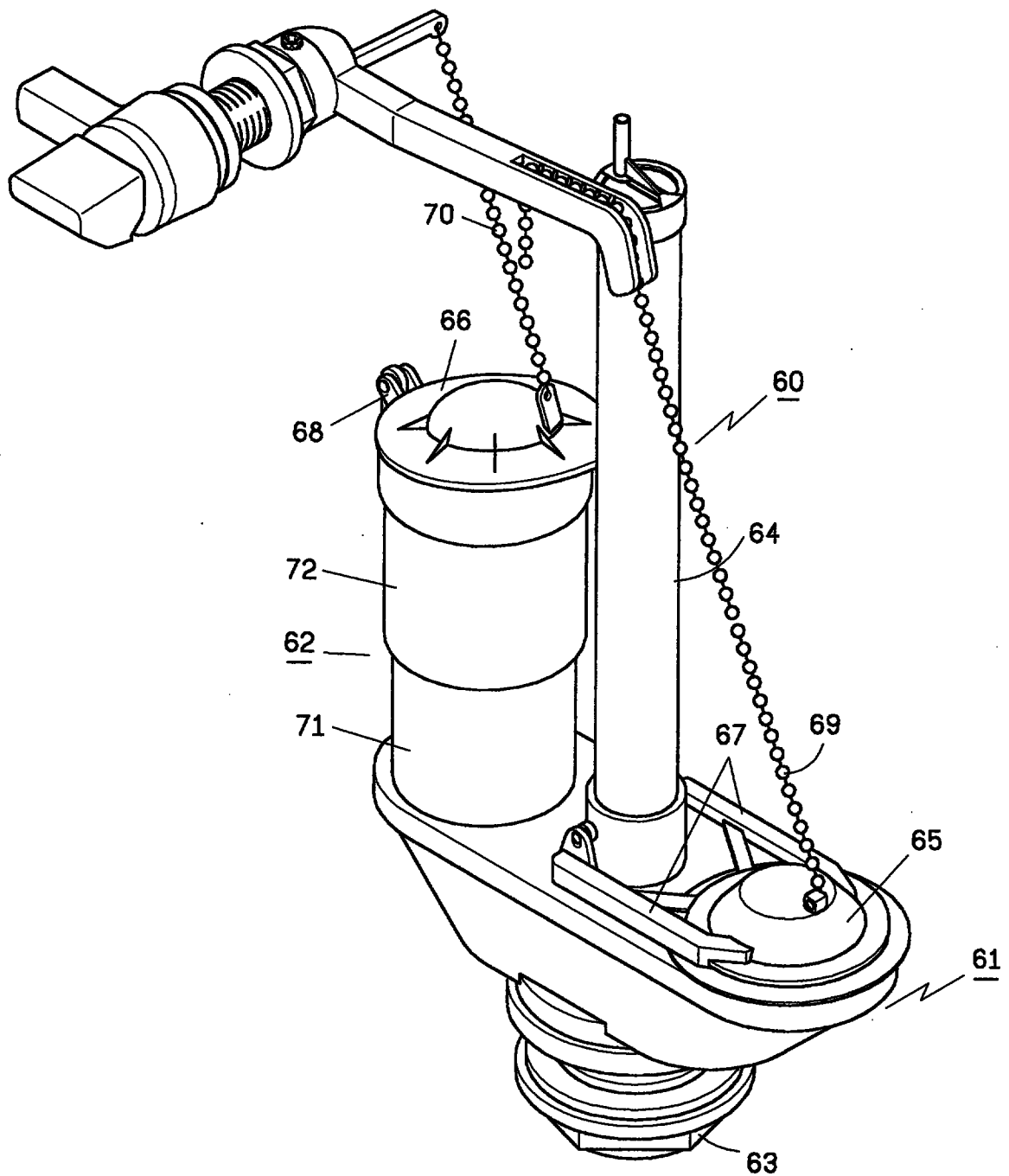


Fig. 38