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(54) **Sterilizer for toilet spray attachment.**

(57) A sterilizer for toilet spray attachment includes a reservoir (71) filled with sterilizing agent or cleaning chemical, a delivery tube (74) connected with the reservoir (71), a mixing portion (75) connected with the delivery tube (74) and connected between a water conduit (51 or 61) for supplying a pressurized water and a spray nozzle (5 or 6) adapted for spraying user's anus or genitals, whereby upon the supply of pressurized water, the liquid in the reservoir will be automatically drained or sucked into the mixing portion for thorough mixing and for final spraying and cleansing purposes for the toilet user. An automatic closer (8) may be further provided within the delivery tube (74) of chemical liquid for automatically closing the liquid drainage from the sterilizer reservoir (71) once the user leaving the toilet seat.

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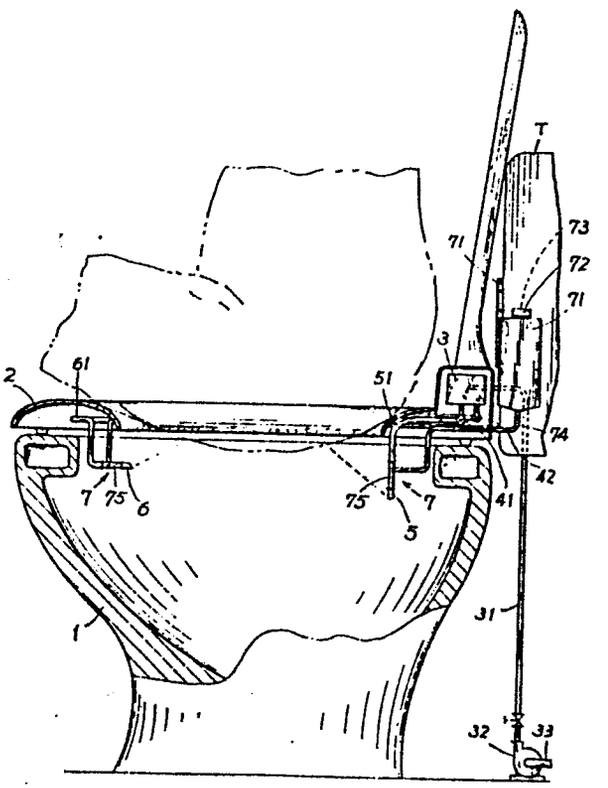


FIG. 1

STERILIZER FOR TOILET SPRAY ATTACHMENT

Umann's U. S. Patent No. 2,875,450 disclosed a device for automatically applying water for cleansing purpose and for applying forced draft of warm air to the cleansed parts of the user's body, which however did not provide means to apply sterilizing agent or cleaning chemical on the user's body for enhanced hygienic purpose. If by further injecting a sterilizing or cleaning agent into the delivery tube, the chemical mixed with the water stream may contaminate the related electric apparatus in the water delivery system.

The present inventor has found the defects of such a conventional water-spray toilet and invented the present sterilizer for toilet spray attachment.

According to the present invention there is provided a sterilizer filled with sterilizing agents or cleaning chemicals which will be conveniently directed into the spray nozzle adapted for spraying and cleansing an user's anus or genitals for hygienic purpose.

The present invention will be further described with reference to the accompanying drawings, in which:-

Figure 1 is an illustration of the present invention.

Figure 2 is a sectional drawing of the present invention.

Figure 3 shows another preferred embodiment of the present invention.

Figure 4 is a systematic illustration showing still another preferred embodiment of the present invention.

Figure 5 is a sectional drawing of the present invention as viewed from II direction of Figure 4.

Figure 6 is a side-view drawing of the present invention as viewed from Figure 5.

Figure 7 shows a rear spray nozzle of the present invention as shown in Figure 4.

Figure 8 shows a front spray nozzle of the present invention as shown in Figure 4.

Figure 9 shows further preferred embodiment of the automatic closer of the present invention.

As shown in Figures 1 and 2, the present invention comprises a toilet bowl 1, a toilet seat 2, a warm water reservoir 3, a pair of water valves 41, 42 fixed on the two branch conduits 51, 61 communicated with the water reservoir 3, a rear spray nozzle 5, a front spray nozzle 6 and a pair of sterilizers 7.

Each sterilizer 7 includes a liquid reservoir 71 having a top cover 72 drilled with a venting hole 73 on the cover 72, a delivery tube 74 connected with the reservoir 71, a mixing portion 75 perpendicularly connected with the lower portion of the tube 74, a sealer 77 resiliently held by a spring link 76 which is secured towards the mixing portion 75 to normally seal a lower port 78 of delivery tube 74 and operatively opened by the downcoming water from pressurized water source and a mixing mesh 79 inserted in mixing portion 75. The reservoir 71 may be filled with sterilizing agents or cleaning chemicals A for enhanced hygienic cleaning purposes for the toilet users.

The mixing portion 75 of the sterilizer 7 is vertically connected between the rear spray nozzle 5 having an injection port 52 and the water conduit 51, and positioned beyond the perpendicular connection of the lower portion of the delivery tube 74. Another mixing portion 75 of another sterilizer 7 is horizontally connected with the front spray nozzle 6 having an injection port 62 and the water conduit 61, and positioned beyond the perpendicular connection of the lower portion of the other delivery tube 74. The installation position of the mixing portion 75 on the spray nozzle 5 or 6 is not limited and can be optionally chosen, such as in a horizontal, vertical or tilted position depending upon the applying situations. The warm water reservoir 3 is supplied with a pressurized water through a pipe 31 by a boosting pump 32 which boosts the pressure of the incoming water from a water source (not shown) direction from inlet pipe 33.

When using the present invention, the water valves 41, 42 are opened to allow pressurized water flowing through the two branch conduits 51, 61 towards the downstream mixing portions 75 to open the sealers 77,

whereby the liquid in tube 74 gravitationally flowing from each reservoirs 71 will be drained into the mixing portion 75 and thoroughly mixed with the downcoming water within the mixing mesh 79 and finally sprayed through nozzles 5, 6 for cleaning the user's anus and genitals respectively.

Another preferred embodiment of the present invention based on the toilet spraying system as aforementioned is shown in Figure 3, which comprises a sterilizer 7 including a reservoir 71 having a top cover 72 drilled with a venting hole 73, a delivery tube 74a connected with the reservoir 71 and having a tapered small hole 78a on the discharge port of the tube 74a and a mixing portion 75a having a throat portion 75b communicated with tapered small hole 78a and a mesh 79 inserted in the mixing portion 75a. The mixing portion 75a is connected with either spray nozzle 5 or 6, communicated with either water conduit 51 or 61 of water source 3 near the injection port 52 or 62 of either nozzle.

When using the sterilizer 7 as shown in Figure 3, either valve 41 or 42 is opened to direct pressurized water downwards to suck the liquid A from the reservoir 71 through the throat portion 75b and small hole 78a, whereby the liquid is thoroughly mixed with water in the mixing portion 75a for spraying and cleaning purposes for the users. When valve 41 or 42 is closed, the water is no longer drained and the liquid in tube 74a will be normally held in situ as the cohesive force of the liquid acts upon the tube wall to cause no drainage-loss of the liquid.

The boosting pump 32 of the present invention can be suitably chosen to develop a sufficient water pressure to open a sealer 77 of delivery tube 74 as shown in Figure 2 for liquid drainage or to suck the liquid through the small hole 78a and throat portion 75b as shown in Figure 3.

If the toilet of the present invention is installed on a floor having an enough inlet water head, for example, as installed in a high building, the boosting pump 32 will then be omitted.

As shown in Figures 4 - 8, still another preferred embodiment of the present invention provides a similar system as aforementioned, in which each sterilizer 7 includes a liquid reservoir 71 having a top cover 72 drilled with a venting hole 73 on the cover 72, a delivery tube 74 connected with the reservoir 71 and having its lower port 78 connected with either conduit 51 or 61, and an automatic closer 8 provided on the delivery tube 74 and positioned in between an upstream tube portion 741 and a downstream tube portion 742 of the tube 74 directing toward either nozzle 5 or 6. Between the reservoir 71 and the automatic closer 8, there is provided a manual valve 740 in each delivery tube 74.

The automatic closer 8 includes a cylinder body 81 having a flange 814 mounted on a socket 211 formed inside an upper seat cover 21 of the toilet seat 2, a resilient plug 82 reciprocatively held within the cylinder body 81, a stem portion 83 extending downwards from the plug 82, a restoring spring 84 inserted within the cylinder body 81 and resiliently retaining the plug 82, a spring plate 85 having its inner end secured to a bracket 212 in the seat 2 and having its outer end contacting the stem portion 83, and an actuating rod 86 extending

upwards from an outer end of cushion 23 and normally biasing the cushion 23 downwards to ride on bowl 1 as resiliently acted by the spring plate 85 to suspend the seat 2 without raising the stem portion 83 to thereby normally close the plug 82.

The cushion 23 having formed with such an actuating rod 86 is suitably selected from a plurality of cushions 23 fixed under the lower plate 22 of the toilet seat 2. By modifying one of the two elastic nails 24 mounting the cushion 23 on the plate 22 through holes 25 as an actuating rod 86 as above-mentioned, the cushion 23 as shown in Figure 5 is pivoted around the inner elastic nail 24 serving as a "fulcrum" to stably ride on bowl 1, when the outer rod 86 is biased downwards by the spring plate 85.

The cylinder body 81 is formed with an upper cylindrical hole 811 for inserting the spring 84 therein, an inverse truncated-cone hole 812 adjacent to the hole 811 and adapted to engage with the plug 82 shaped as inverse truncated cone, a lower cylindrical hole 813 formed under the truncated-cone hole 812 and having a diameter smaller than that of the upper hole 811, a liquid inlet hole 815 fluidically communicated with the upstream tube portion 741 and a liquid outlet hole 816 fluidically communicated with the downstream tube portion 742. Both holes 815, 816 are fluidically communicated with the inverse truncated-cone hole 812 and capable of being sealed by the plug 82 shaped as inverse truncated cone.

One delivery tube 74 has its lower port 78 connected with the rear spray nozzle 5 as shown in Figure 7 in which the rear nozzle 5 includes a water passage 53 upperly communicated with the water conduit

51 and terminated with a water injection hole 531 inclinedly projecting upwardly, a chemical liquid passage 55 communicated with the delivery tube 74 and terminated with a chemical injection opening 551 positioned above the water injection hole 531, a partition plate 54 separating the two passages 53, 55 and a spray cone portion 56 divergently formed from the lower end of the partition plate 54.

The other delivery tube 74 has its lower portion 78 connected with the front spray nozzle 6 as shown in Figure 8 in which the front nozzle 6 includes a water passage 63 communicated with a water injection hole 631 inclinedly projecting upwardly, a chemical liquid passage 65 communicated with the other delivery tube 74 and terminated with a chemical injection opening 651 positioned above the water injection hole 631, a partition plate 64 separating the two passages 63, 65 and a spray cone poriton 66 divergently formed from the outer end of the partition plate 64.

When using the present invention, the depression by the user's gravity on the toilet seat 2 will biase the cushion 23 and its actuating rod 86 upwards to raise the stem poriton 83 of the plug 82 to open the liquid holes 815, 816 to flow chemical liquid from reservoir 71 towards either nozzle 5 or 6 and whereby upon the opening of valve 41 or 42,. the water will be sprayed through either nozzle 5 or 6 to mix with the chemical liquid for hygienic flushing purpose. However, when the user leaves the toilet seat, the spring plate 85 will biase the cushion 23 downwards to recover the plug 82 which is also restored by the spring 84 to close the liquid holes 815, 816 to stop liquid drainage.

If the user wants to adjust the liquid quantity or to stop the liquid supply, he or she may close the valve 740 of the chemical tube 74.

As shown in Figures 7 and 8, each water injection hole 531 or 631 is located under each liquid opening 551 or 651 and each spray cone portion 56 or 66 is made as trumpet shape so that the liquid drained from the delivery tube 74 will be immediately laden in the water stream as sprayed through either hole 531 or 631 without causing any backflow of water into liquid passage.

Another preferred embodiment of the present invention is shown in Figure 9, in which the aforementioned cylinder body 81 is formed with a cylindrical hole 811 for inserting the spring 84 and the plug 82. The plug 82 includes a packing plunger 82a normally sealing the liquid holes 815, 816, a rod portion 82b lowerly adjacent to the plunger 82a and having smaller diameter than that of the plunger 82a, a packing ring 82c sealing the lower portion of the hole 811 and a stem 83 protruding downwards to contact the spring plate 85. The plug 82 is limited by the cylinder bottom 810. Upon the depression of toilet seat 2, the stem 83 will be raised to move the packing plunger 82a upwards to open the holes 815, 816 whereby the liquid from upstream tube 741 will flow through the aperture between the rod portion 82b and the cylindrical hole 811 towards the downstream tube 742 for end use.

CLAIMS

1. A sterilizer for toilet spray attachment comprising a liquid reservoir (71) filled with sterilizing agents or cleaning chemicals and having a top cover (72) in which is drilled a venting hole (73), a delivery tube (74) connected to said liquid reservoir (71), a mixing portion (75) in which is inserted a mixing mesh (79) and which is connected perpendicularly to the lower portion of said delivery tube (74), said mixing portion (75) being connected between a water conduit (51 or 61), controlled by a valve (41 or 42), and a spray nozzle (5 or 6) adapted for spraying user's anus or genitals, said mixing portion positioned beyond the perpendicular connection of the lower portion of the delivery tube, a warm water reservoir (3) supplied with pressurized water by a boosting pump (32) provided on a water inlet pipe, a sealer (77) normally sealing the lower port (78) of said delivery tube, characterised in that said sealer (77) is resiliently held by a spring link (76) which is secured towards said mixing portion (75) to normally seal said lower port of said delivery tube and is operatively opened by the downcoming pressurized water from a water source, whereby upon the opening of said valve (41 or 42) of said water conduit (51 or 61), the pressurized water flowing towards said mixing portion (75) will open said sealer (77) to drain the liquid from said liquid reservoir (71) so that the water and the liquid will be thoroughly mixed in said mixing portion and finally sprayed through said spray nozzle (5 or 6) for cleansing a user's anus or genitals.

2. A sterilizer for toilet spray attachment comprising a liquid reservoir (71) filled

with sterilizing agents or cleaning chemicals, a delivery tube (74a) connected to said reservoir, and a mixing portion (75a) having a mixing mesh inserted therein and being connected between a water conduit which communicates with a pressurized water source (3) controlled by a valve (41 or 42), and a spray nozzle (5 or 6) adapted for spraying user's anus or genitals, characterised in that said mixing portion (75a) has a throat portion (75b) communicating with a smaller tapered hole (78a) which is formed in discharge port (78) of said delivery tube (74a) to normally hold the liquid from said liquid reservoir in situ without drainage loss, whereby upon the opening of said valve (41 or 42), the pressurized water will flow downwards to suck the liquid in said liquid reservoir (71) through said small tapered hole (78a) so that the water and the liquid will be thoroughly mixed in said mixing portion (75a) for spraying and cleaning purposes.

3. A sterilizer for toilet spray attachment comprising a liquid reservoir (71) filled with sterilizing agents or cleaning chemicals and having a top cover in which is drilled a venting hole, a delivery tube (74) having a manual valve (740) formed thereon and connected between said liquid reservoir (71) and a spray nozzle (5 or 6) which is adapted for spraying a user's anus or genitals and which is fluidically connected to a water source (3) and said tube (74), characterised in that there is also provided an automatic closer (8) connected between an upsteam tube portion (741) and downstream tube portion (742) of said delivery tube (74), which comprises a cylinder body (81) mounted in a toilet seat and formed with an upper cylindrical hole (811), an inverse truncated-cone hole (812), and

a lower cylindrical hole (813), a resilient plug (82) having a truncated-cone shape engaged with said truncated-cone hole (812) and retained by a restoring spring (84) inserted in said upper hole (811) and normally sealing a liquid inlet hole (815) and a liquid outlet hole (816), respectively disposed on both sides of said truncated-cone hole (812) and fluidically connected to said tube (74), a stem portion (83) having a smaller diameter than said plug (82) and extending downwards from said plug through said lower hole (813), a spring plate (85) secured to said toilet seat (2) and contacting said stem portion (83), and a cushion (23) pivoted under seat (2) and having its outer end formed with an actuating rod (86) extending upwards to be normally biased by said spring plate (85) to ride said cushion (23) on a toilet bowl (1) so as to float said toilet seat (2) to allow said plug (82) normally sealing said liquid holes (815, 816) of said liquid delivery tube, and whereby upon the depression of said toilet seat (2) by a user's weight the actuating rod (86) of said cushion (23) will be biased to raise said plug (82) to open said liquid holes for liquid drainage.

4. A sterilizer as claimed in Claim 3, characterised in that said automatic closure (8) includes a cylinder body (81) having a cylindrical hole (811) inserted with a plug (82) having a packing plunger (82a) normally sealing said liquid holes (815, 816) a rod portion (82b) having a smaller diameter than said plunger (82a) and lowerly adjacent to said packing plunger (82a), a lower packing ring (82c) sealing the lower portion of said cylindrical hole (811) and a stem (83) protruding downwards to contact said spring plate (85), whereby upon the depression of said toilet seat (2), said stem (83)

and plug (82) will be raised to open said liquid holes (815, 816) for liquid flow.

5. A sterilizer according to Claim 3, characterised in that said spray nozzle (5 or 6) includes a water passage (53 or 63) connected to a conduit (51 or 61) of water source (3) having a water injection hole (531 or 631) projecting upwards at an inclined angle, and liquid passage (55 or 65) having a liquid opening (551 or 651) positioned above said water injection hole (531 or 631), and a spray cone portion (56 or 66) formed divergently from the outer end of a partition plate (54 or 64) separating said water and liquid passages.

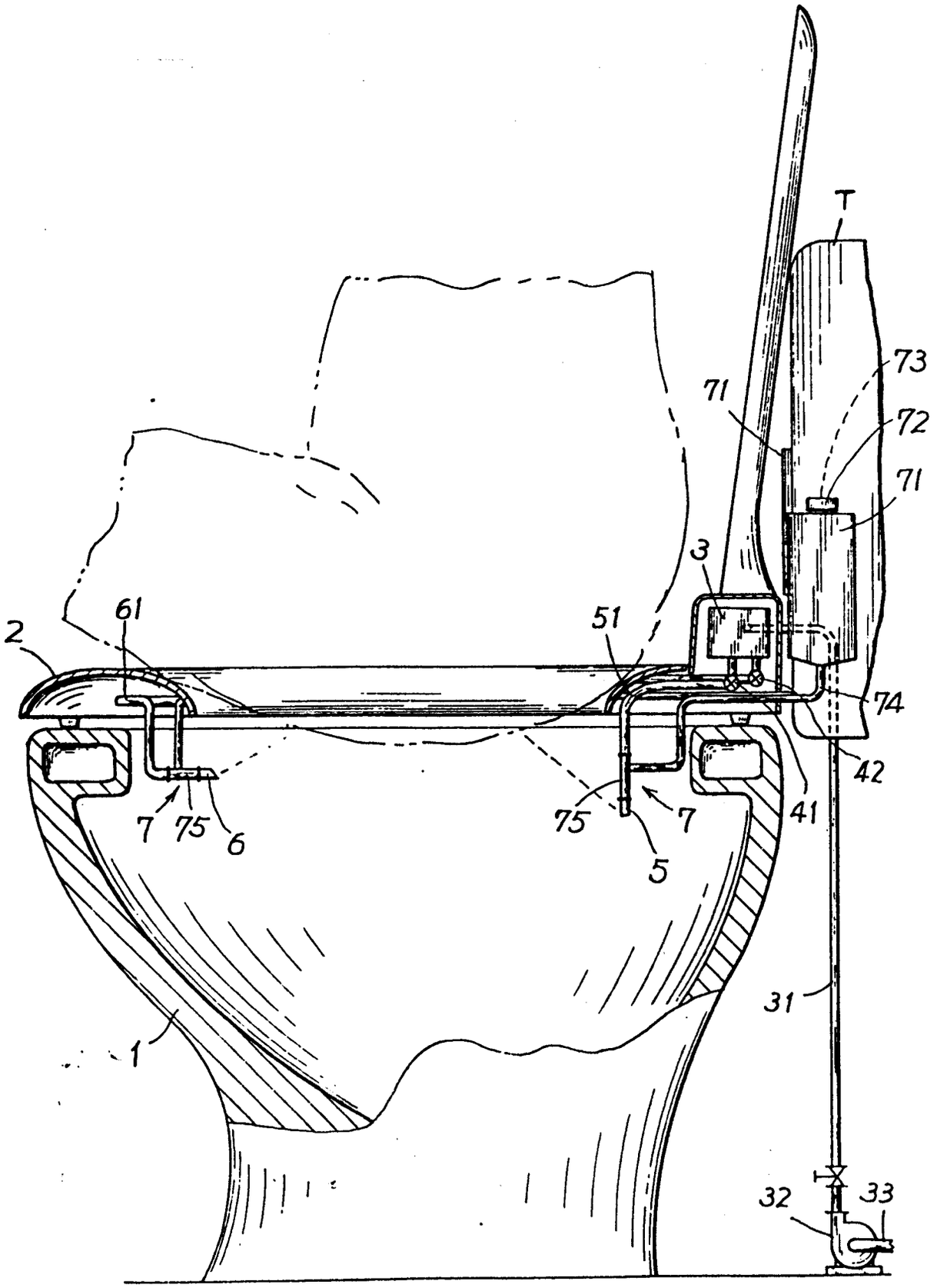


FIG. 1

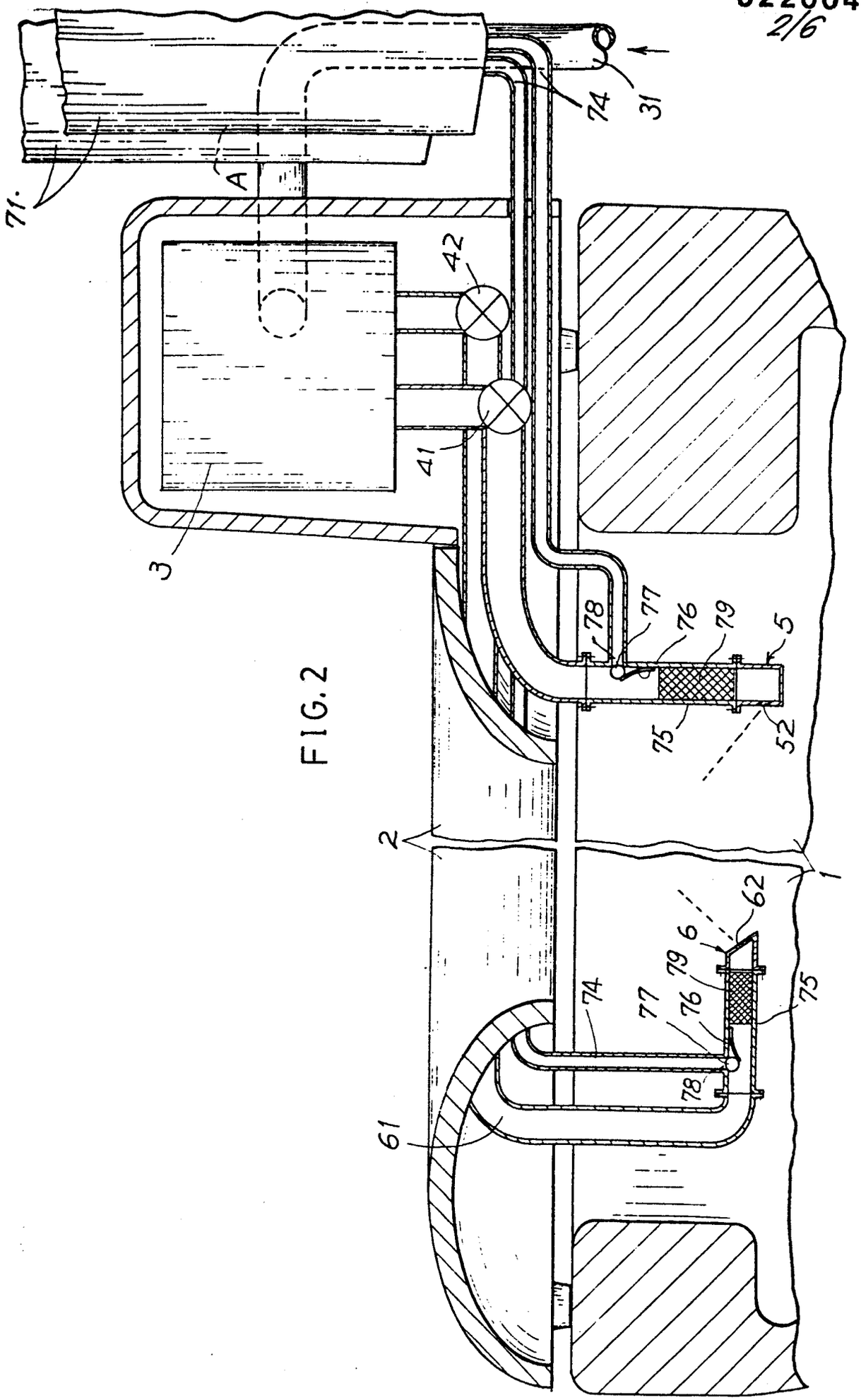


FIG.2

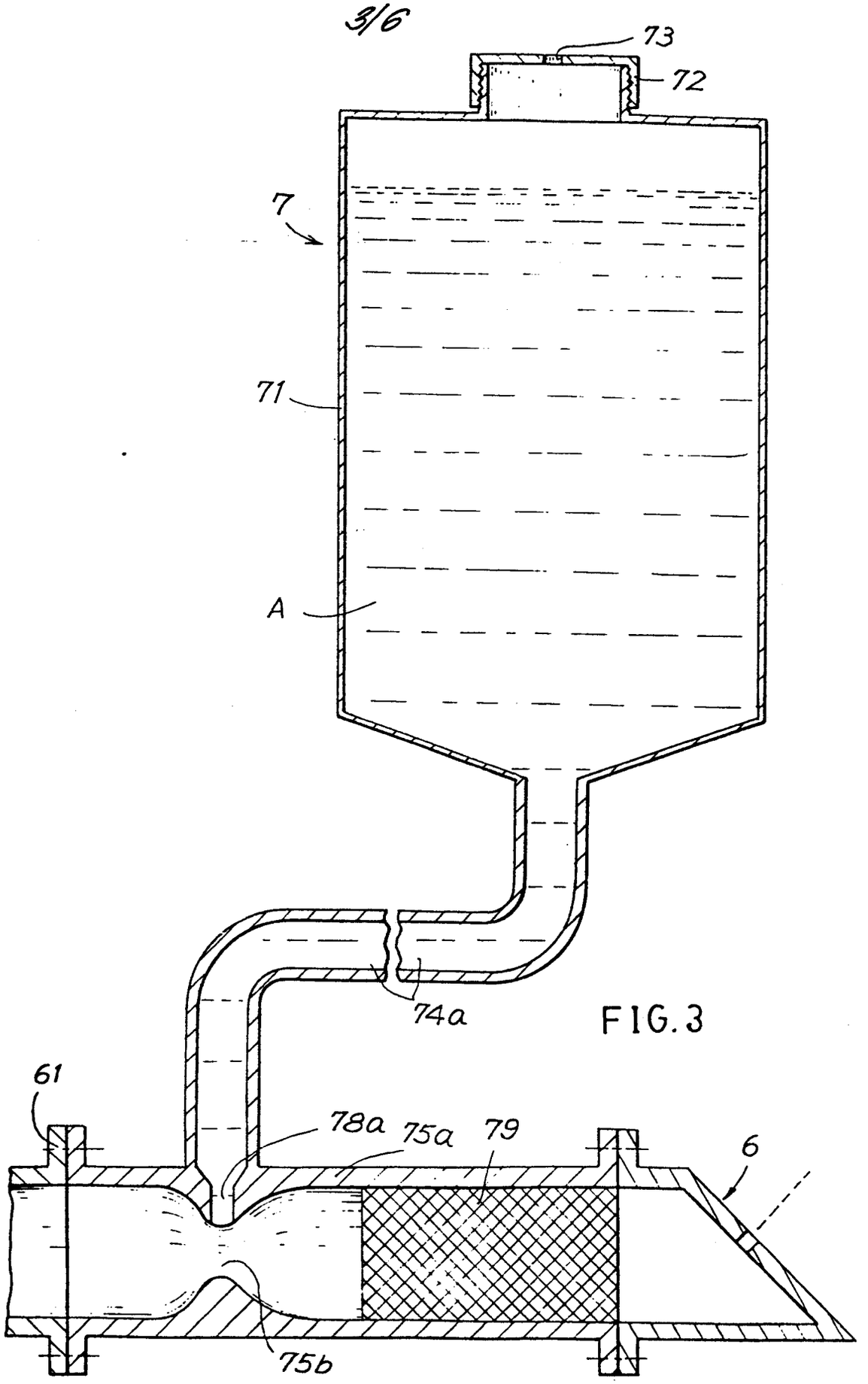
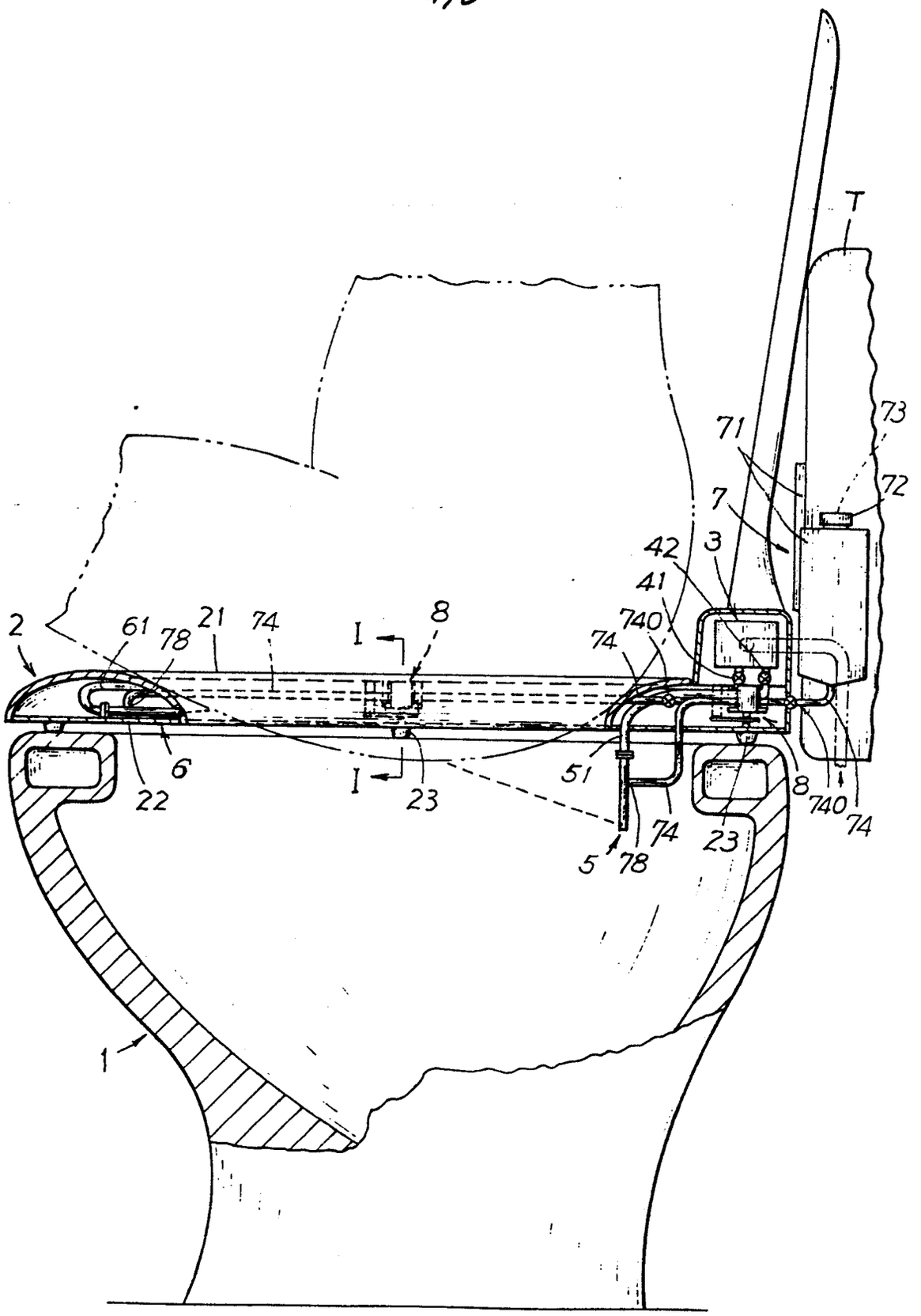


FIG.3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73
71
72
7
3
42
41
740
74
2
61
78
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74
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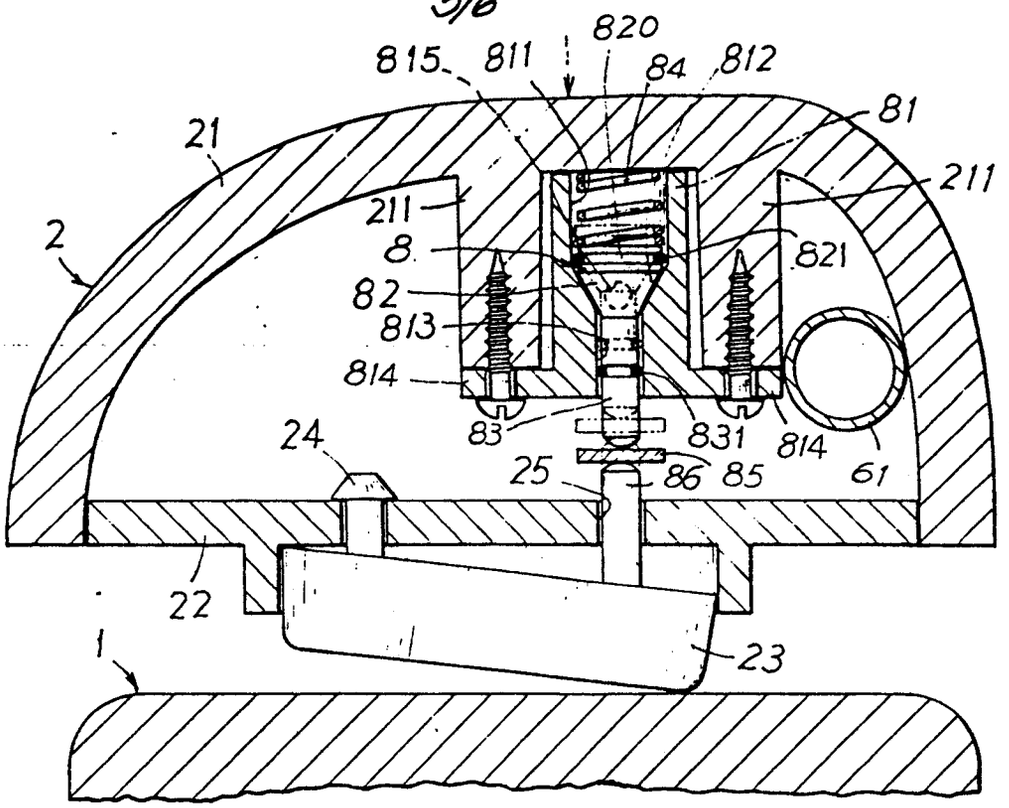
74
1

FIG.4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1

FIG. 5

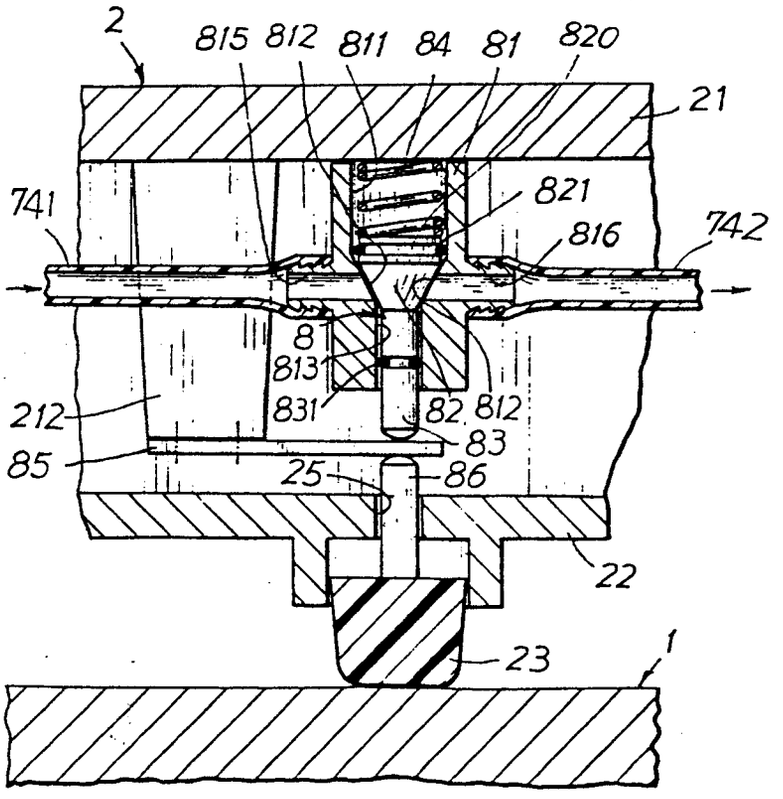
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FIG. 6

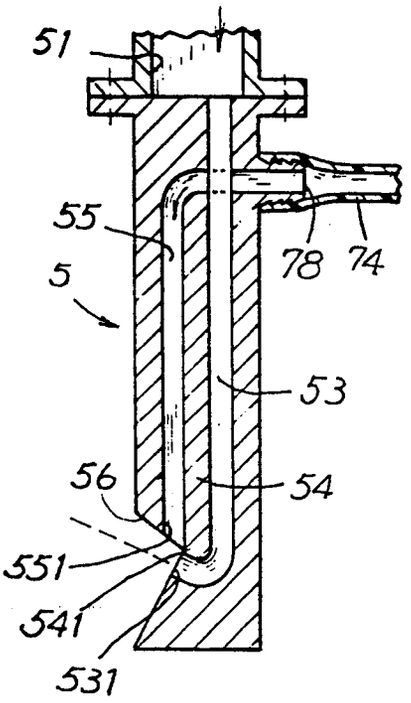

FIG.7

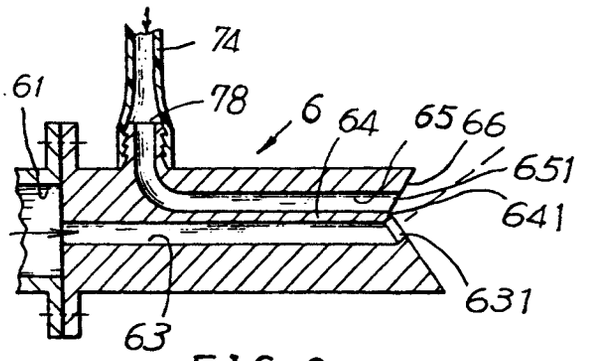

FIG.8

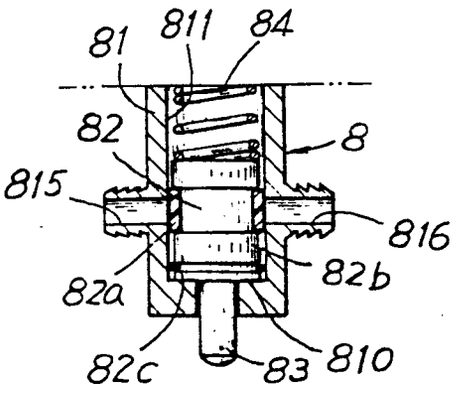

FIG.9