

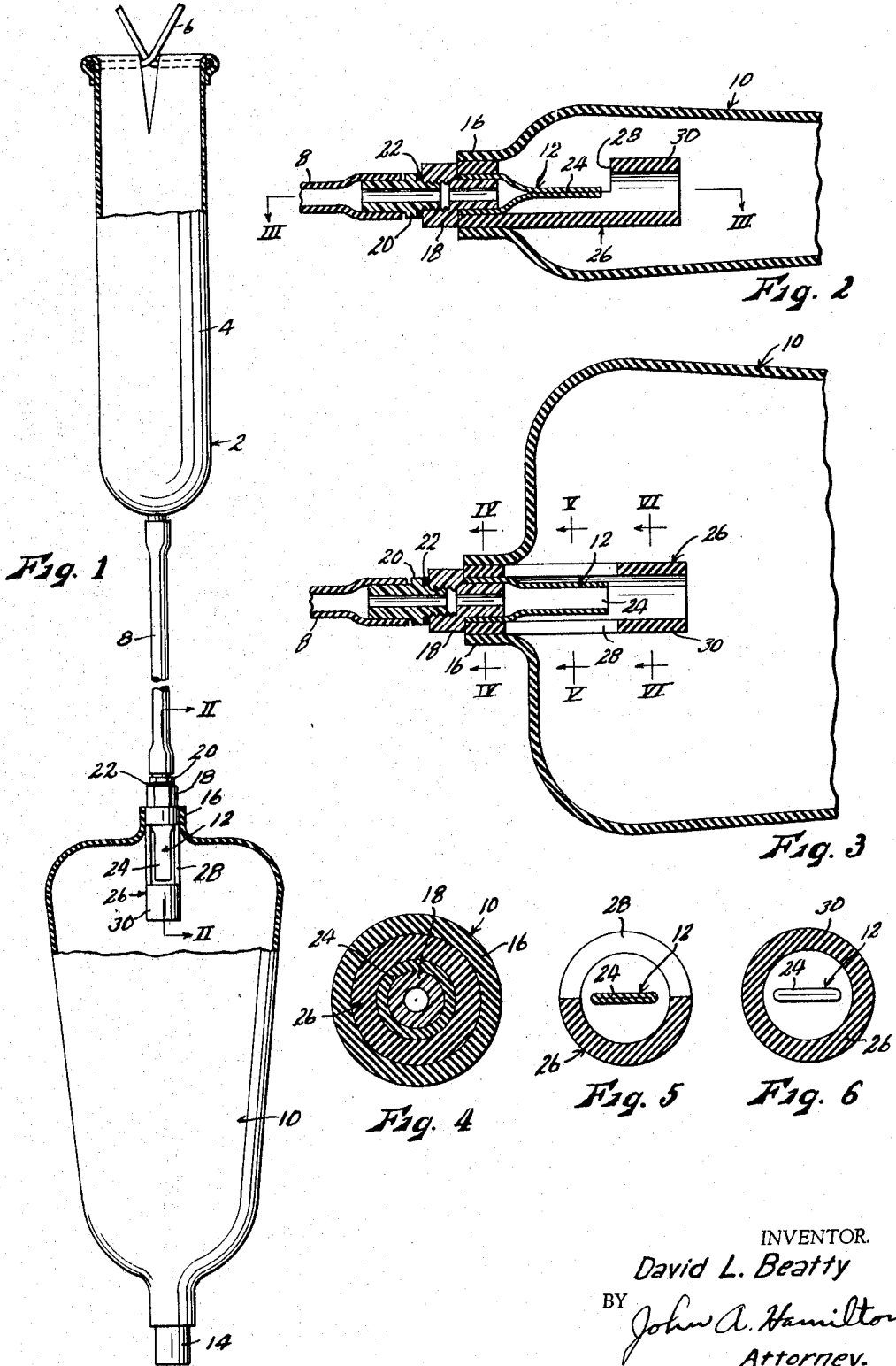
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URINAL VALVE

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**URINAL VALVE**  
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This invention relates to new and useful improvements in urinal valves, having particular reference to the type of urinals commonly employed by persons having no urinary control. Urinals of this type commonly consist of a sheath for the penis of a male patient, or a catheter for a female patient, connected by a flexible tube to a rubber urinal bag which is suitably attached to the patient's leg, and which may be drained periodically. Customarily, a check valve is provided at the inlet of the bag for preventing the possibility that due to the bodily movements and position of the user, urine could flow in a reverse direction through the tube, with resultant soilage of clothing or possible danger to the patient's health. For comfort to the patient, and to avoid objectionable bulk under his clothing, it has been customary to use a urinal bag, and even a check valve, formed of soft pliable rubber, the check valve consisting of a rubber tube sealed in the inlet neck of the bag and projecting into the bag, the walls of the free end portion of the tube being normally collapsed, whereby to open and permit the flow of urine into the bag under very slight pressure, but to close to prevent reverse flow.

However, the valve as described above has been subject to the disadvantage that the pressure of user's clothing on the bag sometimes pinches the valve tube and prevents it from opening under normal pressures. As a result, urine backed up in the connecting tube, sometimes overflowing at the connection to the body, particularly in the case of a male user, or backed up into the user's bladder, particularly in the case of a female user. Either occurrence is of course highly objectionable, and the prevention thereof is the primary object of the present invention.

Another object is the provision of a shield or guard which effectively protects the valve tube from being pinched or pressed closed by any reasonable pressure exerted on the urinal bag, but which at the same time does not appreciably increase the bulk or stiffness of the parts, and which hence causes no discomfort.

Other objects are extreme simplicity and economy of construction, efficiency and dependability of operation, and freedom from malfunctioning or necessity of servicing.

With these objects in view, as well as other objects which will appear in the course of the specification, reference will be had to the accompanying drawing, wherein:

FIG. 1 is an elevational view of a urinal including a valve embodying the present invention, with parts broken away and foreshortened,

FIG. 2 is an enlarged fragmentary sectional view taken on line II—II of FIG. 1,

FIG. 3 is a sectional view taken on line III—III of FIG. 2, and

FIGS. 4, 5 and 6 are enlarged sectional views taken respectively on lines IV, V—V and VI—VI of FIG. 3.

Like reference numerals apply to similar parts throughout the several views, and the numeral 2 applies generally to a urinal shown in FIG. 1 and including, as shown, a sheath 4 formed of pliable film and adapted to be fitted over the penis of a male user and secured thereabout by any suitable means such as elastic drawstring 6. The closed end of said sheath has a flexible rubber tube 8 connected thereto so as to communicate with the interior thereof. The opposite end of said tube is connected to a urinal bag 10, also formed of pliable rubber, through a

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check valve device 12 forming the subject matter of the present invention. Bag 10 is provided at its opposite end with a drainage valve 14, not herein detailed, through which the contents of the bag may be emptied periodically. Sheath 4 may be further secured in place, and bag 10 secured to the leg of the user, by any suitable means such as tie strings, not shown. It will of course be understood that if the user is female, a catheter apparatus would ordinarily be used in place of sheath 4.

Urinal bag 10 is formed of soft, pliable rubber, so as to conform to the body in order to form the least possible bulk under the user's clothing, such bulk of course being objectionable, and in order to cause the least possible discomfort to the user. Sealed in the neck portion 16 is a rigid, tubular nipple 18 formed of plastic or other suitable material. The outer end portion of said nipple is internally threaded for receiving the corresponding externally threaded end of a tubular coupling 20, the opposite end of said coupling being fitted snugly in tube 8. A gasket 22 seals the connection between said nipple and said coupling.

A flexible rubber valve tube 24 forms the central portion of urinal valve 12. One end of said tube is fitted snugly about nipple 18, being disposed between said nipple and neck 16 of the bag, and extends inwardly therefrom into said bag as shown. The walls of said tube are normally collapsed, so that in the free end portion thereof of the opposite sides thereof normally lie in close engagement with each other, as shown. Tube 24 thus acts as a check valve, in that liquid entering said tube from nipple 18 forces the walls of the tube apart and enters bag 10. Flow in this direction is quite easy, since only a very slight internal pressure is required to open the tube. However, flow in a reverse direction is prevented since liquid cannot enter the free end of tube 24 to form any internal opening pressure therein, and any external pressure on bag 10 increases the external fluid pressure on tube 24, which simply pressure the walls thereof more tightly together.

The structure thus far described is common. The present invention concerns novel protection means for preventing the possibility that pressure of the user's clothing, or some other member of his body, on bag 10 might exert a direct pinching pressure on tube 24 and thus prevent it from opening responsively to urine entering it from nipple 18. If this should occur, urine would back up in tube 8, possibly causing overflow of sheath 4 and embarrassment to the user. Particularly in the case of a female user where the urinal bag is connected to a catheter, urine could back up into the user's bladder with possibly injurious effects.

The protective means mentioned above consists of a shield or guard consisting of a tube 26 also formed of flexible rubber, but preferably somewhat stiffer than tube 24, and arranged coaxially with tube 24. One end of the tube 26 is fitted snugly about the portion of tube 24 engaged over nipple 18, being disposed between tube 24 and bag neck 16, and tube 26 extends inwardly into said bag beyond the free end of tube 24. The internal diameter of tube 26 is greater than the transverse width of the normally collapsed portion of tube 24. Also, the wall thickness of tube 26 is more than twice the wall thickness of tube 24, so as to be greater than the total thickness of the collapsed portion of said last named tube. This relationship is most clearly shown in FIGS. 5 and 6. Tube 26 has a semi-cylindrical window 28 formed therein. Said window, formed by cutting away one-half of the circumference of the tube, extends longitudinally of the tube from the inner end of nipple 18 to a point spaced just outwardly from the free end of valve tube 24. The free end portion 30 of tube 26, outwardly from window 28, is of full cylindrical form.

In use, it will be seen that if bag 10 is pressed by the user's clothing or body so as normally to exert closing pressure on tube 24, guard tube 26 will prevent it. If the pressure falls directly on tube 24, said tube will be pressed against the inner surface of the semi-cylindrical portion of tube 26 concurrent with window 28. This surface is of course cylindrically concave, so that even if tube 24 is pressed thereagainst with considerable pressure, the concavity will still provide sufficient space to permit tube 24 to open responsively to internal urinary pressure. Only by exerting a very substantial force on bag 10, sufficient to mash the semi-cylindrical portion of tube 26 completely flat, could tube 24 be pinched off completely and prevented from opening. As previously stated tube 26 is preferably formed of rubber somewhat stiffer than tube 24, so that it cannot be mashed flat by any forces likely to be exerted on the bag under normal circumstances. This may be done with a material which is still sufficiently soft and pliable that it will not appreciably stiffen the bag or cause discomfort to the user. However, this requirement for softness does somewhat limit the stiffness of the material which can be used in tube 26, and there would therefore be the possibility, under unusual circumstances and if tube 26 terminated at the end of tube 24, that excessive forces could still flatten tube 26 completely and thus pinch tube 24. Tube 24 is further protected in these extreme conditions by the added presence of the full-cylindrical outer end portion 30 of tube 26. The bulk of this portion, plus the nipple 18 which of course prevents the opposite end of tube 24 from closing, effectively supports any general pressure exerted on bag 10 immediately adjacent tube 24, but prevents said pressure from being exerted on tube 24 itself. Even if said pressure were sufficient to collapse portion 30 of tube 26 completely, which would of course pinch tube 24 effectively if window 28 were not present, the fact that the thickness of the wall of tube 26 is greater than the total thickness of the collapsed portion of the valve tube would still provide the space necessary to allow tube 24 to open at least slightly, and of course only a slight opening is all that is ever required. The protection offered to tube 24 by portion 30 of tube 26 could of course be still further increased by thickening the wall of portion 30 of tube 26 still further.

It will be seen that urinal bag 10 is of flattened or planar cross-sectional contour, which is a virtual necessity to reduce the bulk thereof under a user's clothing, and that as a consequence pressure of clothing or body thereon is nearly certain to be exerted at right angles to the plane thereof. Therefore, to prevent the possibility that even a slight pressure on the bag in this direction might be transmitted to tube 24 in the plane of the latter and hold said tube open so as to permit accidental backflow of urine, tube 24 is arranged so that its plane, when collapsed, is parallel to the plane of the bag. Also, in order that guard tube 26 cannot similarly exert an opening pressure on tube 24, window 28 of tube 26 lies entirely at one side of a plane including the axis thereof and parallel to the plane of the bag.

While I have shown and described a specific embodiment of my invention, it will be readily apparent that

many minor changes of structure and operation could be made without departing from the spirit of the invention as defined by the scope of the appended claims.

What I claim as new and desire to protect by Letters Patent is:

1. In combination with a urinal bag formed of resiliently pliable material having a rigid tubular nipple sealed in the neck portion thereof and adapted to admit urine therethrough to said bag, a check valve assembly for preventing reverse flow through said nipple, said check valve assembly comprising:

(a) a valve tube having one end thereof sealed about said nipple and extending into said bag, said valve tube being formed of resilient material and being normally collapsed on itself in the free end portion thereof, and

(b) a guard tube formed of resilient material and disposed coaxially with said valve tube and surrounding said valve tube, one end of said guard tube being sealed on said nipple, said guard tube extending from said nipple beyond the free end of said valve tube, and having a longitudinally elongated window formed therein, said window extending from said nipple to a point closely adjacent but spaced outwardly from the free end of said valve tube.

2. The structure as defined in claim 1 wherein said window is disposed entirely at one side of a plane including the axis of said guard tube and parallel to the plane of the collapsed portion of said valve tube.

3. The structure as defined in claim 2 wherein said urinal bag is generally flattened in cross-sectional contour, and wherein the plane of the collapsed portion of said valve tube is generally parallel to the plane of said bag.

4. The structure as defined in claim 1 wherein said guard tube is formed of a resilient material somewhat stiffer and more rigid than the material forming said valve tube.

5. The structure as defined in claim 1 wherein the wall thickness of said guard tube is greater than the total thickness of the collapsed portion of said valve tube.

6. The structure as defined in claim 1 wherein said guard tube is formed of a resilient material somewhat stiffer and more rigid than the material forming said valve tube, and wherein the wall thickness of said guard tube is greater than the total thickness of the collapsed portion of said valve tube.

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