

## [54] CATHETER ADAPTER

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[51] Int. Cl.<sup>2</sup> ..... A61M 3/00

[58] Field of Search ..... 128/247, 274, 349, 275,  
128/348, 350, 351, 221, 214, 347

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[57]

## ABSTRACT

A catheter adapter comprising a body member having a recess for receiving a catheter. The recess is defined, at least in part, by a plurality of coaxial cylindrical surfaces of diameters corresponding to a plurality of different standard catheter outer diameters. A second member, formed from a resilient material, engages the body member adjacent the recess therein and has an opening for admitting a catheter to that recess. The opening is coaxial with the cylindrical surfaces and has a diameter, when the resilient material is unstressed, which is no greater than the diameter of the smallest of the cylindrical surfaces in the recess. The cylindrical surfaces are arranged according to size with the largest diameter cylindrical surface being disposed closest to the opening in the second member.

10 Claims, 7 Drawing Figures

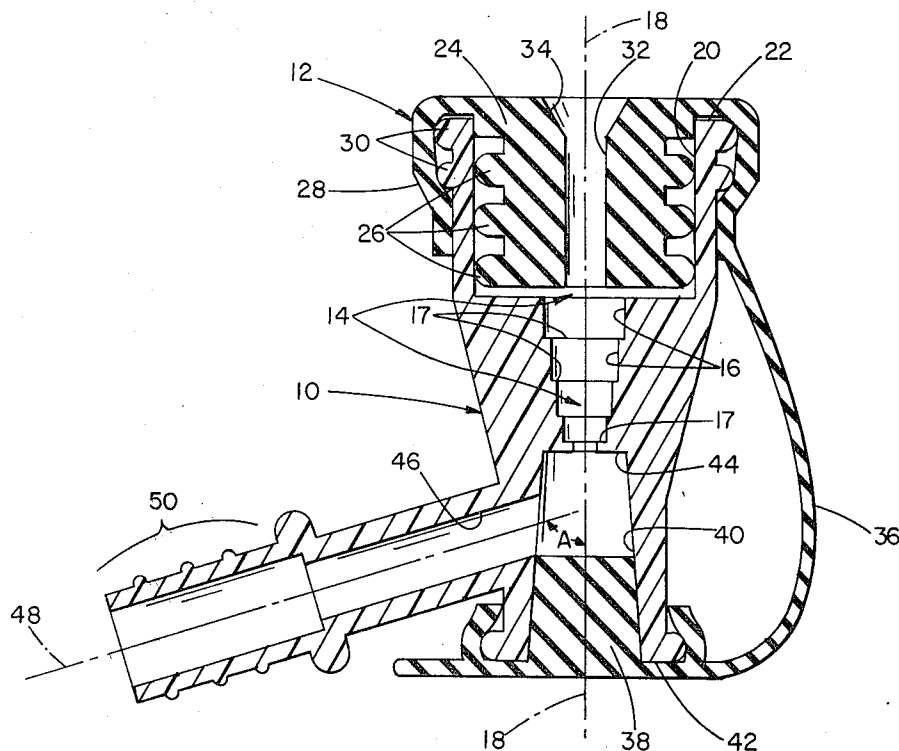


FIG 1

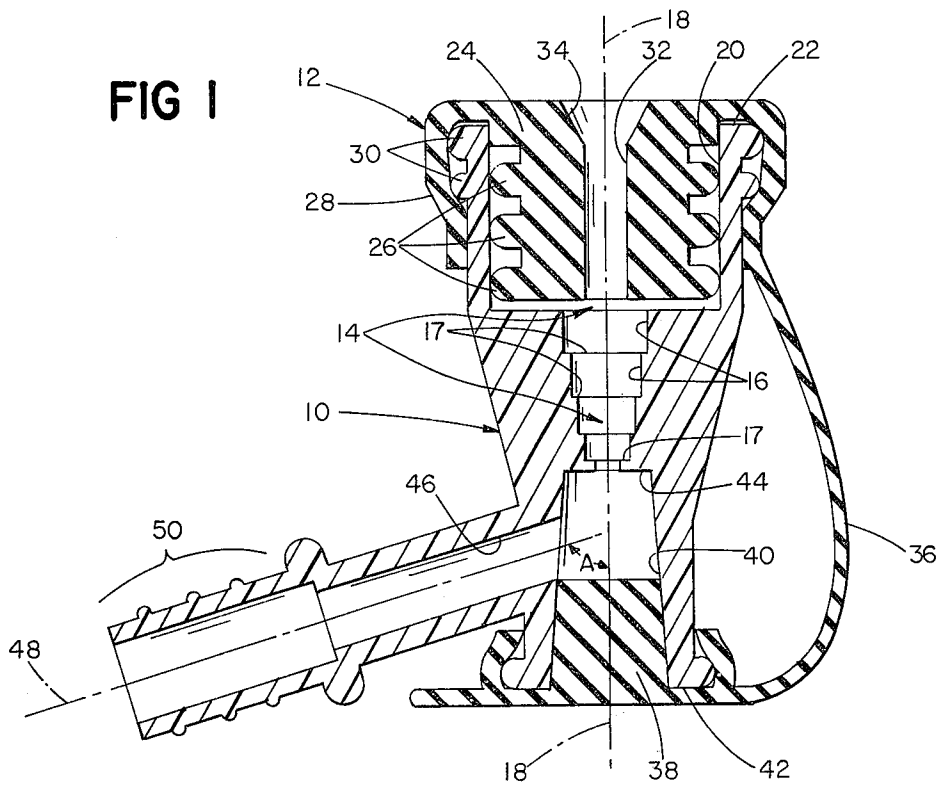


FIG 2

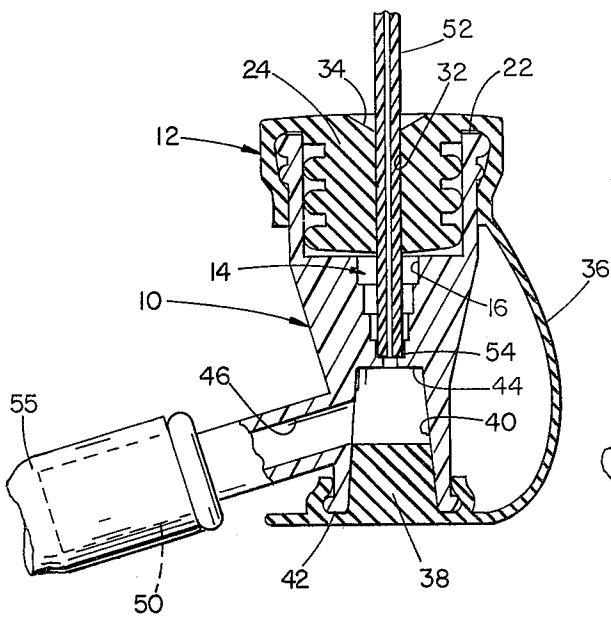
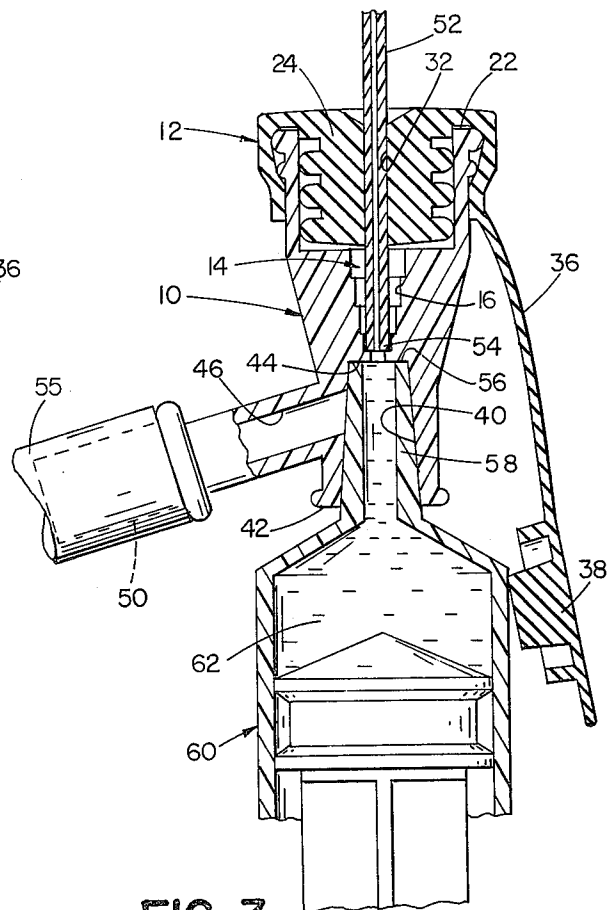
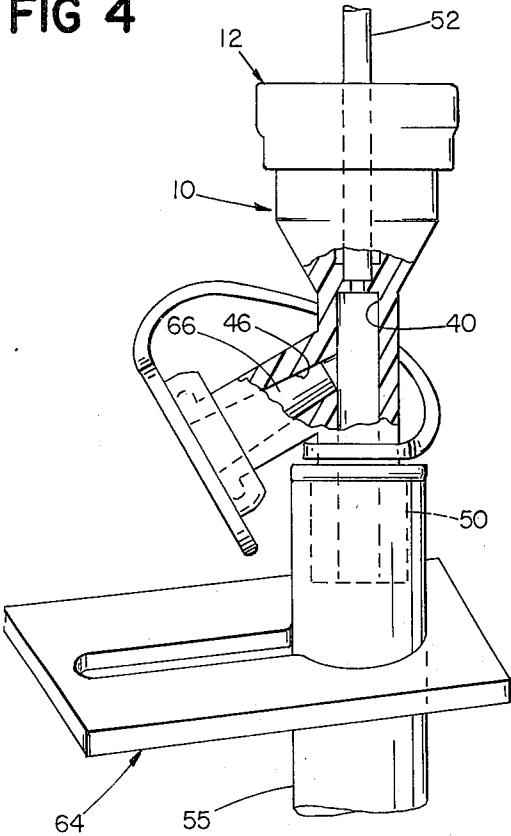


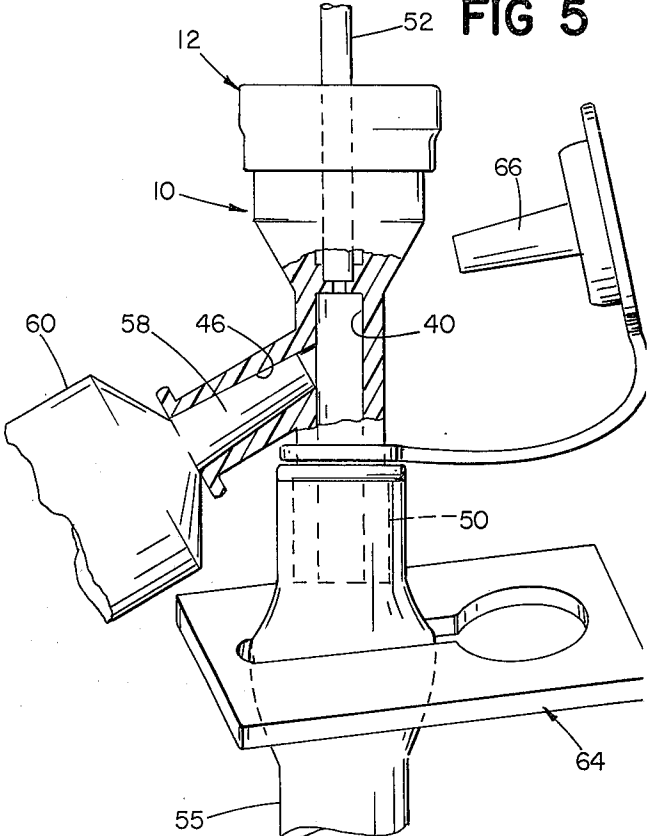
FIG 3



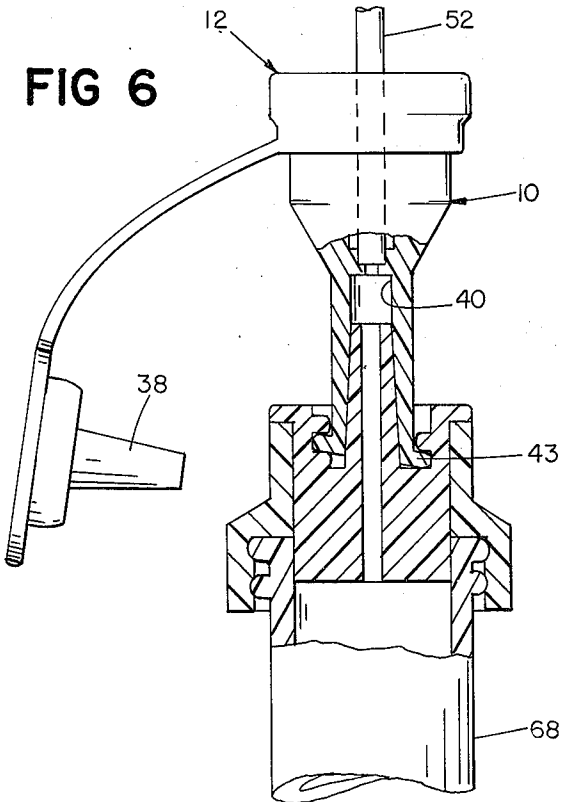
**FIG 4**



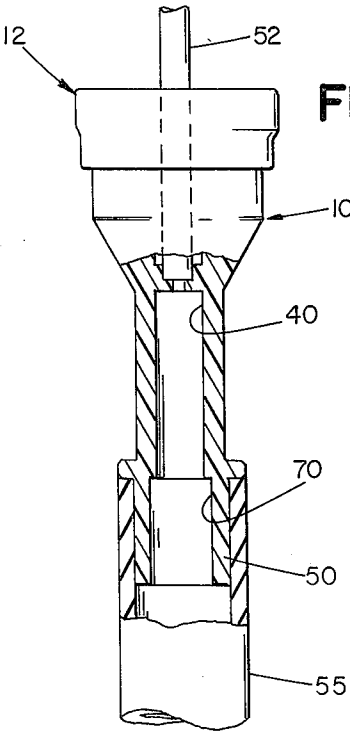
**FIG 5**



**FIG 6**



**FIG 7**



## CATHETER ADAPTER

This invention relates to connectors for use in body liquid drainage or irrigation systems, and more particularly to an adapter which facilitates the communication of a catheter with one or more items employed in conjunction with the catheter.

In various medical and surgical procedures the distal end of a catheter is introduced into a body cavity or fluid pathway (e.g., the urinary ureter) and the proximal end of the catheter is to be connected to one or more items (e.g., a receptacle for collecting the liquid, a syringe or other fluid delivery means for accomplishing irrigation or applying medication, etc.).

It is a principle object of the present invention to provide an improved adapter in which various catheters may be retained in a firm, leak-proof engagement and which provides a convenient communication with other items. Additionally, it is an object to provide such an adapter which achieves a substantially leak proof communication between the catheter proximal end and an irrigation fluid delivery means so that it is not necessary to insert a portion of the delivery means into the catheter itself (and thus a smaller diameter catheter may be employed in various procedures).

To achieve these and other objects as shall further appear, the invention features a catheter adapter for establishing communication between a catheter and another item, the adapter comprising a body member having a first recess for receiving a catheter, said recess being defined at least in part by a plurality of coaxial cylindrical surfaces of diameters corresponding to a plurality of different standard catheter outer diameters. A second member, formed from a resilient material, engages the body member and has an opening there-through for admitting a catheter to the first recess, the opening being coaxial with the above mentioned cylindrical surfaces and having a diameter, when the resilient material is unstressed, which is no greater than the diameter of the smallest of the cylindrical surfaces in the first recess. Those cylindrical surfaces are arranged according to size with the largest diameter cylindrical surface being disposed closest to the opening in the second member.

Preferably, the body member is formed from a rigid material and the first recess includes an additional cylindrical surface adjacent an end of the adapter, the second member comprising an elastomeric plug member which engages that additional cylindrical surface; the plug member is formed from an elastic material and the opening therein is counter-sunk to facilitate insertion of a catheter therethrough; a second recess is provided coaxial with the cylindrical surfaces of the first recess; a third recess is provided which links the second recess with the exterior of the adapter, the third recess having an axis which makes an acute angle with the axis of the second recess; one of the second and third recesses is tapered to accommodate a standard syringe luer; the body member is formed from a transparent plastic material; and the plug member includes an integral web to which is secured a secondary plug for blocking said second recess when not in use. Other objects, features, and advantages of the invention will appear from the following description of particular preferred embodiments taken together with the accompanying drawings. In the drawings:

FIG. 1 is a sectional view of a catheter adapter;

FIG. 2 is a view similar to FIG. 1 with the adapter interconnecting a catheter and a drainage tube;

FIG. 3 is a view similar to FIG. 2 with a syringe luer also being received in the adapter for injecting a fluid into the catheter;

FIGS. 4 and 5 are views, similar to FIGS. 2 and 3, of an alternative adapter embodiment; and

FIGS. 6 and 7 are partially broken away side elevations of still other alternative adapter embodiments.

Referring to FIG. 1, the adapter comprises a transparent plastic rigid body member 10 and a second resilient member 12 in the form of a rubber plug insertable into a first recess 14 within the body member 10. The recess 14 is defined, in part, by a series of coaxial adjacent cylindrical surfaces 16, which define axis 18, and perpendicular step surfaces 17.

A larger cylindrical surface 20 adjacent an open end 22 of the body member 10 receives a central portion 24 of plug 12. Integral circumferential ridges 26 of the central portion 24 are sized to provide for a snug leak-proof engagement with the surface 20. The plug also includes an integral outer annular portion 28 disposed exterior of the body member 10 and engageable with integral beads 30 on the exterior surface of the body member 10 adjacent the end 22 to further assure a snug fit and leak-proof seal of the plug 12 with the body member 10. An opening 32, having a counter-sunk portion 34, is provided in the central portion 24 of plug 12 and is aligned with the axis 18. Also integral with the plug 12 are web 36 and secondary plug 38, the purpose of which is further discussed below.

The rigid body member 10 also includes a second recess 40 which is coaxial with axis 18 and which tapers from a larger diameter adjacent end 42 of the member 10 to a smaller diameter adjacent the first recess 14. A stop surface 44 is disposed generally perpendicular to the axis 18 at the end of recess 40 adjacent recess 14. The size and taper of recess 40 and the size of surface 44 are chosen to accommodate the size and shape of a standard syringe luer, as further discussed below.

A third recess 46 is provided in the body member 10 which communicates with the second recess 40. The recess 46 has an axis 48 which intersects the axis 18 in an acute angle A. A connector portion 50 is provided at the exterior end of recess 46.

The operation of this adapter may be described with reference to FIGS. 2 and 3. As shown in FIG. 2, a standard ureteral catheter 52 whose distal end (not shown) has been inserted into the patient's ureter has its proximal end 54 passed through the opening 32 in plug 12 and positioned within the recess 14 being engaged by the appropriately sized surfaces 16 and 17. The catheter is thus supported firmly at two locations. The various pairs of surfaces 16 and 17 are sized to accommodate the various standard French catheter sizes which typically differ by mere thousandths of an inch in outer diameter. (The diameter increments between adjacent surfaces 16 have been exaggerated in the drawing for clarity.) The opening 32 is sized to receive the smallest French size catheter in a leak-proof fit but is expandable, owing to the resilient nature of the material of plug 12, to accommodate the larger sizes for which the adapter is intended.

With the secondary plug 38 engaging the end 42 of body member 10 to block the second recess 40, fluid delivered from the catheter 52 will pass through third recess 46 to a conventional drainage line 55 which may

be secured to the connector portion 50. When it is required to irrigate the catheter, or force liquid through the catheter to alleviate a blocked condition in the catheter, or to apply medication or a radio-opaque dye to the body cavity through the catheter, the secondary plug 38 may be removed to expose the second recess 40 and the luer 58 of a syringe 60 inserted therein. The end surface 56 of the luer will abut the stop surface 44 and the tapering side wall of the luer will block the recess 46 thereby eliminating the need for a separate plug for the recess 46, or clamping of the drain line 55. The fluid 62 may then be forced from the syringe and into the catheter 52. Because of the relatively snug fit of the luer 58 in the recess 40 and against surface 44 and the catheter end 54 in the appropriate surfaces 16, 17, there will be little, if any, leakage of fluid, or loss of pressure, as fluid is forced from the syringe 60 and into the catheter 52. Upon completion of the introduction of fluid to the catheter 52, the syringe 60 may be removed and the secondary plug 38 replaced in its original position.

In the embodiment of FIGS. 4 and 5 the second recess 40 provides communication with the drainage line 55 and the third, angled, recess 46 receives the syringe luer 58. When irrigation is being done (FIG. 5), a clamp 64 is placed on the drainage line 55. A plug 66 blocks recess 46 when that recess is not in use (FIG. 4).

For various medical and surgical procedures certain features of the adapter described above would not be required and of course could be omitted. Thus, for example, in retrograde pyelography where typically a small urine sample is to be collected followed by an injection of radio-opaque dye, the recess 46 and secondary plug 38 would become superfluous since, as shown in FIG. 6, a vial 68 for collecting the urine sample is to be connected directly to the open end 42 of the adapter and can be supported by the bead 43. Upon collection of the sample, the vial would be immediately replaced by a syringe for injection of dye, the syringe being received in recess 40 as has been shown in FIG. 3.

Where drainage alone is required, the adapter may take the form illustrated in FIG. 7 where the connector 50 for drainage line 55 surrounds an extension 70 of recess 40.

While particular preferred embodiments of the invention have been illustrated in the accompanying drawing and described in detail herein, other embodiments are, of course, within the scope of the invention and the following claims:

What is claimed is:

1. A catheter adapter, comprising  
a body member having a first recess for receiving a catheter, said first recess defined, at least in part by

a plurality of coaxial cylindrical surfaces of diameters corresponding to a plurality of different standard catheter outer diameters;

- a second member formed from a resilient material engaging said rigid body member to enclose said first recess and having an opening therethrough for admitting a catheter to said first recess, said opening being coaxial with said cylindrical surfaces and having a diameter, when said resilient material is unstressed, no greater than the diameter of the smallest of said cylindrical surfaces;

said plurality of cylindrical surfaces being arranged according to size with the largest diameter cylindrical surface being disposed closest to said opening in said second member.

2. A catheter adapter as claimed in claim 1 wherein said body member includes a second recess communicating with said first recess, and being coaxial with said cylindrical surfaces.

3. A catheter adapter as claimed in claim 2 wherein a third recess is provided in said body member which links said second recess with the exterior of the adapter, said third recess having an axis which makes an acute angle with the axis of said second recess.

4. A catheter adapter as claimed in claim 3 wherein one of said second and third recesses is tapered to accommodate a standard syringe luer.

5. A catheter adapter as claimed in claim 1 wherein said body member is formed from a rigid material, said first recess including an additional cylindrical surface adjacent an end of the adapter, said second member comprising an elastomeric plug member engaging said additional cylindrical surface.

6. A catheter adapter as claimed in claim 5 wherein said plug member is formed from rubber.

7. A catheter adapter as claimed in claim 5 wherein said plug member includes an integral portion exterior of said first recess.

8. A catheter adapter as claimed in claim 7 wherein said rigid body member includes a circumferential bead on its exterior surface adjacent said additional cylindrical surface, said bead engaging said plug member portion exterior of said first recess.

9. A catheter adapter as claimed in claim 7 wherein said body member includes a second recess communicating with said first recess, said plug member including an integral web and secondary plug for blocking said second recess.

10. A catheter adapter as claimed in claim 1 wherein said body member is formed from a transparent material.

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