

[54] **RETENTION CATHETER AND
SUPRAPUBIC SHUNT**

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[51] Int. Cl. **A61m 25/00**

[58] Field of Search 128/347, 348, 349 R, 350 R,
128/345, 241, 242, 243, 3-6

[56] **References Cited**

UNITED STATES PATENTS

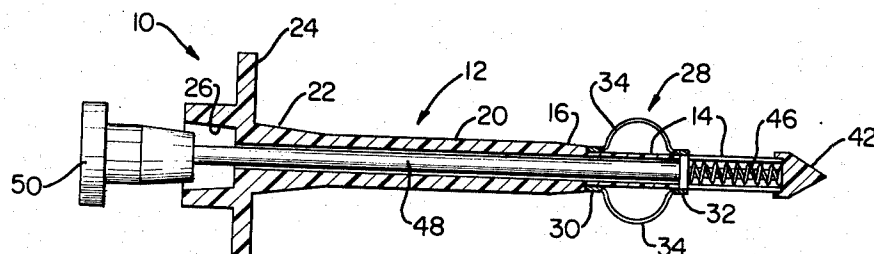
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Primary Examiner—Dalton L. Truluck
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[57] **ABSTRACT**

Retention catheter or suprapubic shunt of the expandable wing type characterized by a retainer comprising a sleeve affixed to a trochar tube, a second sleeve axially slidable on the tube, the wings extending between the sleeves, the slidable sleeve having spokes extending through longitudinal slots in the tube, the central portions of which may be engaged by a removable rod or stylet within the tube for collapsing the wings during insertion or removal of the catheter, the wings being expandable by a spring upon release or removal of the stylet. The insertable or distal end of the tube may be constructed to removably carry various tips or filiforms. The outer or proximate end is constructed to be removably connected by a suitable conduit fitting to a drain tube or cannula or to a source of fluid. The trochar tube, or portions thereof, may be relatively rigid or flexible, depending upon the requirements of the body entry passage configuration.

11 Claims, 12 Drawing Figures



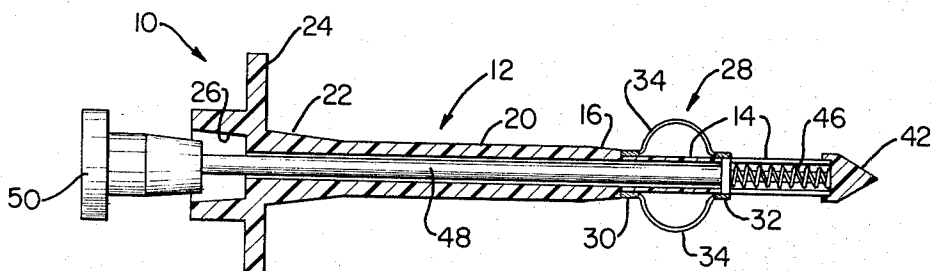


FIG. 1

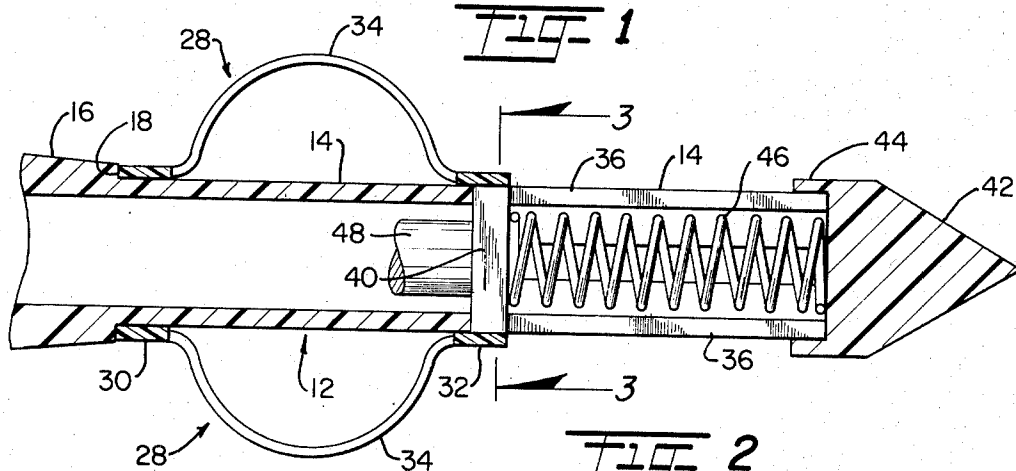


FIG. 2



FIG. 6

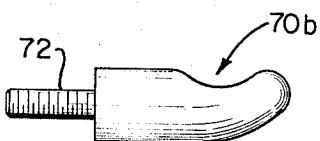


FIG. 7

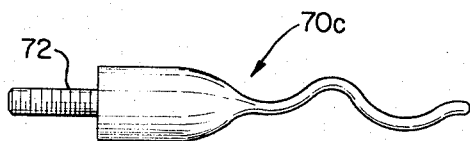


FIG. 8

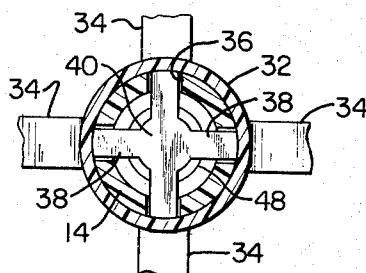


FIG. 3

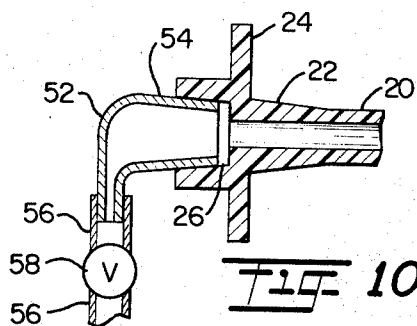


FIG. 10

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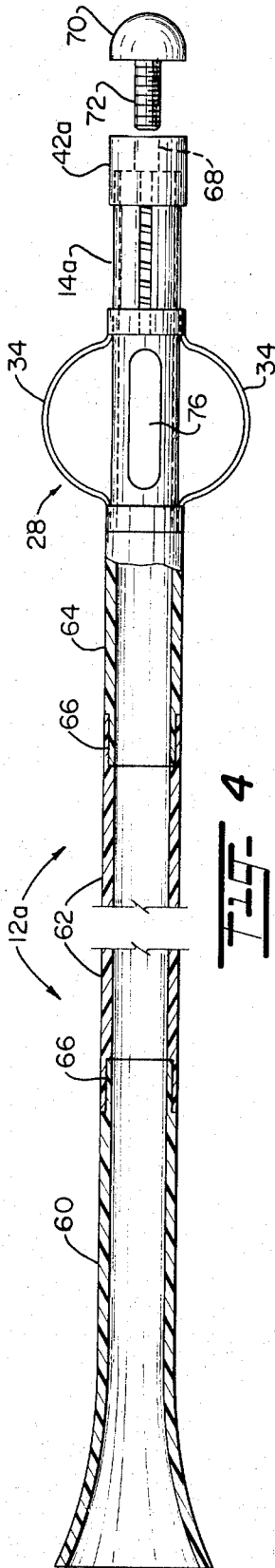


FIG- 4

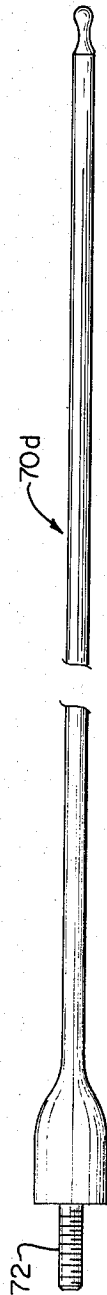


FIG- 9

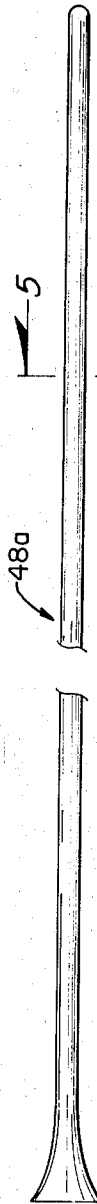


FIG- 4A

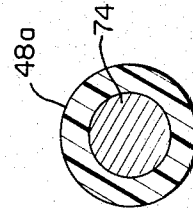


FIG- 5

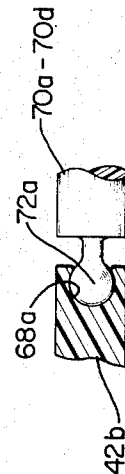


FIG- 11

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RETENTION CATHETER AND SUPRAPUBIC SHUNT

BACKGROUND OF THE INVENTION

Catheters for insertion into body cavities, either natural or surgically opened, are well known in the art. When it is desired to retain the catheter in desired position, expandable devices have been employed as exemplified by the U.S. Pat. to Kohl, No. 3,397,699 and Overment, U.S. Pat. No. 3,108,595, these being particularly applicable for insertion into the bladder through the urethra. Similar surgical drains are exemplified by the U.S. Pat. to Bowker, No. 781,763 and Innes, U.S. Pat. No. 1,863,057. Urethral catheters, as is well known, are employed for various purposes, such as emergency evacuation of the bladder and in pneumothorax and gynecology procedures.

SUMMARY OF THE INVENTION

The invention is characterized by a catheter having a trochar tube to which is affixed expandable retainer wings which are positively urged to a normally expanded position by a spring and which are positively urged to a collapsed position by a slidable rod or stylet which, when removed from the trochar tube, provides a flow channel which is the full inside diameter of the trochar tube and without any flow restrictions therein. The wings are integrally connected to a pair of spaced sleeves, one affixed to the trochar tube and the other slidable thereon, the latter having spokes extending through slots in the trochar tube, the central portion of the spokes forming an abutment against which an end of the stylet rod engages for moving the slidable sleeve. In one embodiment of the invention insertion and removal of the device is facilitated by a flange or the like on the outer or proximate end of the trochar tube against which a forefinger and middle finger engage, the thumb engaging the end of the stylet. When so clamped between the fingers, the stylet moves to a positive stop at which position the wings are collapsed, thus facilitating insertion or removal and complete control over the wing movement with one hand of the operator, such as a surgeon. The proximate end is also constructed in a manner such that a conduit fitting may be quickly attached to same, the fitting adapted to be connected to a flexible drain or cannula tube. If desired, the inner or distal tip of the trochar tube is constructed to removably receive tips of various shapes and lengths which may be needed for entry into openings of various configurations. The expandable wing retainer is essentially the same in all embodiments of the invention; however, the trochar tube may be varied depending upon its particular use. By constructing the retainer and trochar tube as separate elements, rather than integral, materials may be selected which better serve the requirements of each component.

One of the broader objects of the invention is, accordingly, the provision of a catheter having a trochar tube constructed of one material selected to best serve its function and an expandable wing retainer constructed of a material of different flexibility which will best serve its purpose.

Another object is the provision of a retainer, in accordance with the foregoing object, which is provided with a movable abutment within the trochar tube which may be engaged by a removable stylet for collapsing the wings of the retainer.

A further object, consonant with the foregoing object, is the provision of a spring engaging the abutment and urging the wings to expanded position.

Still further objects, advantages, and salient features will become more apparent from the detailed description to follow, the appended claims and the accompanying drawing to now be briefly described.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a central longitudinal section through one embodiment of the invention, illustrating an expandable wing construction which may be employed with various types of trochars;

FIG. 2 is an enlarged detail of a portion of FIG. 1;

FIG. 3 is a section taken on line 3—3, FIG. 2;

FIG. 4 is a section, like FIG. 1, illustrating an alternative form of trochar, employing the expandable wing construction of FIGS. 1 to 3, a portion being broken away and another portion being illustrated in exploded relationship;

FIG. 4A is a side elevation of a stylet which is insertable into the trochar of FIG. 4;

FIG. 5 is an enlarged section taken on line 5—5, FIG. 4A.

FIGS. 6—9 and 11 are side elevations of various tips which may be interchangeably attached to the distal end of a trochar; and

FIG. 10 is a section through a coupling which may be detachably connected to the proximate end of a trochar.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawing, and first to FIGS. 1 to 3, catheter 10 comprises a circular tube 12 having a distal portion 14 of uniform diameter, a conical portion 16 of larger diameter, and forming a shoulder 18, a central portion 20 of uniform diameter, and a conical portion 22 joined to a circular flange 24 having a conical bore 26.

Retainer 28 comprises a first circular sleeve 30 disposed adjacent shoulder 18 and fixed to tube portion 14 in any suitable manner, such as with an adhesive. A second like sleeve 32 is slidably mounted on tube portion 14 and a plurality of angularly spaced collapsible strap-like wings 34, such as three or four, extend between the two sleeves. Tube portion 14 is provided with angularly spaced longitudinal slots 36 which slidably receive spokes 38 of spider member 40, the outer ends of the spokes being affixed to sleeve 32. A tapered head 42, having a collar portion 44, is adhesively secured to the end of tube 14 and a vinyl coated compression spring 46 is disposed between head 42 and spider member 40. The spring normally urges wings 34 to the position illustrated in which position they engage the inner end of the body opening and prevent unauthorized removal of the catheter.

A rod or stylet 48 may be inserted into the bore of tube 12, its distal end being engageable with spider 40. It is preferably provided with an enlarged finger engaging head or button 50. During insertion of the catheter the thumb engages head 50 and the index finger and middle finger are disposed behind flange 24. When a squeezing force is applied by the fingers, stylet 48 moves to the right forcing collar 32 away from collar 30, which flattens wings 34 into contact with distal por-

tion 14. To prevent the application of excessive traction force on the wings, head 50 is preferably spaced from collar 32 so that it bottoms against same when the wings are collapsed. After insertion, stylet 48 is removed from the trochar tube, the bore of which now provides a channel for drainage from the body cavity or delivery of fluid thereto. To facilitate the foregoing, and with reference to FIG. 10, a suitable fitting, such as an elbow 52, having a conical end 54, is connected to conical bore 26 after the stylet is removed. The fitting may be connected to a hose 56 which may be provided with a valve 58 for controlling fluid flow therethrough.

In the construction so far described the trochar tube is relatively rigid, formed of plastic or the like. The wings 34 of the retainer should be highly flexible (as distinguished from resilient) and may be formed of plastic material such as polyvinyl chloride. In the interests of economy of manufacture, sleeves 30, 32 wings 34 and spider 40 may be formed integrally by injection moulding techniques.

Referring now to FIGS. 4-9, retainer 28 may be constructed as previously described and associated with an alternative form of trochar tube 12a, which as illustrated, comprises three sections, 60, 62 and 64, telescopically connected by cylindrical stepped joints 66 which retain the outer diameters and bores of the sections of uniform dimensions. Preferably, adhesive is employed at the joints to prevent separation of the sections. With this construction, the overall length of the catheter may be readily varied by proper choice of the lengths of the sections and its flexibility may also be varied by suitable choice of materials, vinyl, polyvinyl chloride, silastic and rubber being exemplary. Thus, by choice of materials, section 64 may be relatively rigid and sections 62, 60 may be of desired flexibility, thus providing a catheter of desired softness which is essential to comfort in some instances. Head 42a differs from head 42 in that it is provided with a threaded aperture 68, permitting detachable connection of various tips thereto. As illustrated in FIG. 4, a rounded tip 70, having an imbedded stud 72, may be threadedly connected to head 42a. FIG. 6 illustrates an "olive" tip 70a; FIG. 7 illustrates a Conde tip 70b; FIG. 8 illustrates a pig-tail tip 70c; and FIG. 9 illustrates a filiform tip 70d which may be straight as shown or formed with tip shapes as illustrated in FIGS. 6-8. All of the tips may be constructed of vinyl, polyvinyl chloride or other plastic material.

Another feature of this construction resides in the catheter guide or stylet 48a illustrated in FIG. 4A. This may be constructed of relatively stiff plastic or, as shown in FIG. 5, may be constructed with a malleable metallic core 74. With this construction the stylet may be bent or pre-shaped to a desired configuration for inserting the catheter into a tortuous passage. It, of course, also serves the purpose of collapsing the wings when the catheter is removed from the body passage.

The construction of FIG. 4 also differs from that of FIGS. 1-3 in that distal portion 14a is provided with angularly spaced elongated slots 76 which provide larger flow passages as compared to FIGS. 1-3 wherein the flow passages are through slots 14 and the spaces around spider 40. Also, since slots 76 are immediately adjacent the inner surface of an organ wall, such as the bladder, all explosive gas accumulation therein, which

might otherwise be ignited, is vented from the organ as distinguished from some prior art devices wherein the discharge opening or "eye" is spaced inwardly of the organ wall, producing a pocket or space in which such gases could accumulate.

FIG. 11 illustrates a modification of FIGS. 6-9 wherein the various tips 70a - 70d are each provided with a ball end 72a, rather than a threaded stud 72, which snaps into a spherical socket 68a in a resilient tip 42b.

I claim:

1. A catheter comprising;

a. an elongated trochar tube having proximal and distal ends and being provided with a bore extending from its rear or proximate end to its front or distal end said distal end having angularly spaced, elongated slots therein communicating with said bore,

b. a retainer device carried by the distal end comprising angularly spaced elongated flexible wings affixed at their rear ends to an outer portion of the trochar tube and extending substantially parallel to one another in a forward direction thereof,

c. and annular member affixed to the forward ends of the wings and slidable on the distal end,

d. said member having angularly spaced spokes extending through said elongated slots in the trochar tube and into the bore thereof,

e. a stylet removably inserted in said bore from its proximate end and engageable with the central portion of said member, and

f. a spring in said bore urging said member in a rearward direction toward said proximal end for expanding said wings outwardly away from the trochar tube,

g. said stylet adapted to be moved inwardly to compress said spring and flatten said wings to a position lying adjacent the trochar tube.

2. A catheter in accordance with claim 1 wherein said flexible wings are affixed at their ends to a sleeve and said member comprises a like sleeve.

3. A catheter in accordance with claim 1 wherein said wings are formed of a different material than said distal end of the trochar tube and which is of greater flexibility than the distal end.

4. A catheter in accordance with claim 1 wherein said spring is disposed within the trochar tube between said member and a head disposed at the extreme distal end of the trochar tube.

5. A catheter in accordance with claim 1 wherein the proximate end of the trochar is provided with a flange adapted to be engaged by an index and middle finger of an operator, and the proximate end of the stylet is adapted to be engaged by the thumb of the operator; whereby a squeezing action of the fingers, moves the stylet inwardly of the trochar tube.

6. A catheter in accordance with claim 1 wherein the proximate end of the trochar is provided with a circular tapered bore, and a conduit fitting having a mating male end adapted to seat in said bore when the stylet is removed from the trochar tube.

7. A catheter in accordance with claim 1 wherein said trochar tube is provided with a head disposed at its extreme distal end, and a plurality of tips of various configurations, each having the same means at one end

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thereof for interchangeably attaching same to said head.

8. A catheter in accordance with claim 7 wherein said head is provided with a central threaded aperture and said same means comprises a threaded stud adapted to be disposed in said threaded aperture. 5

9. A catheter in accordance with claim 7 wherein said head is provided with a central spherical socket and said same means comprises a spherical member adapted to be disposed in said spherical socket. 10

10. A catheter in accordance with claim 1 wherein at least a portion of the trochar tube adjacent its proxi-

mate end is flexible, said stylet being malleable and adapted to be bent to a desired configuration, said portion adapted to conform to the stylet configuration.

11. A catheter in accordance with claim 1 wherein said trochar tube is constructed of a plurality of aligned sections having joints which provide a uniform bore and outside diameter throughout their lengths, whereby the length of the trochar tube may be varied by selection of the lengths of one or more of the sections.

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