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2,896,629

CATHETERS

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Fig. 1.

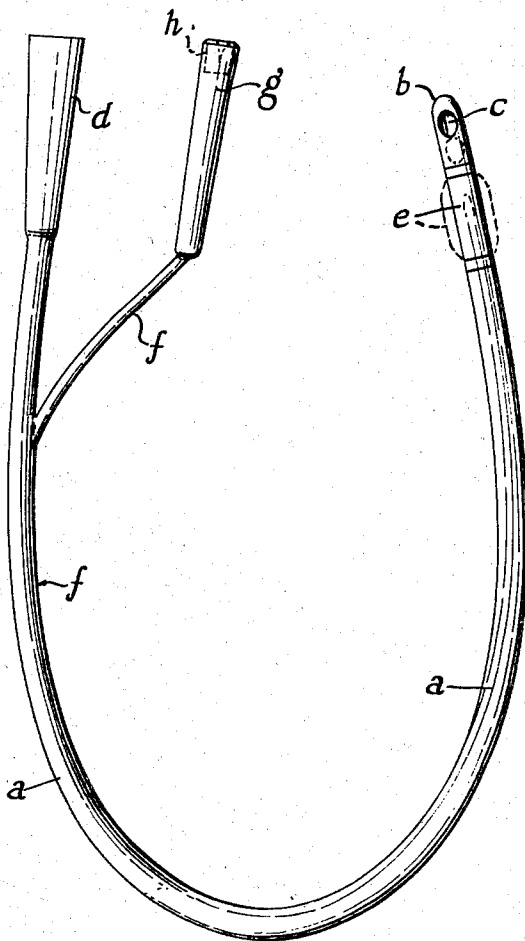
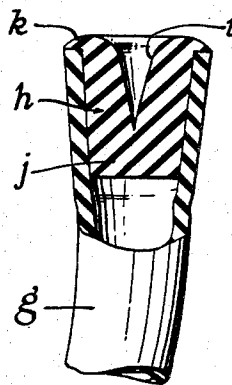


Fig. 2.



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CATHETERS

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2 Claims. (Cl. 128—349)

This invention relates to catheters of the kind comprising an inflatable self-retaining bladder or balloon on one end of an inflating tube the other end of which is closed by a plug adapted to be pierced by a hypodermic syringe for inflating and deflating the balloon.

A solid plug having a plain or flat outer face is normally used in the inflating tube of a catheter of the above kind. The main disadvantage of such plug is that after a relatively short period of use the plug becomes pierced in a number of different places owing to the impossibility of locating the original piercing hole, and in consequence the plug leaks and has to be renewed. A further disadvantage is that unless extreme care is taken to pierce the plug axially the side wall of the funnel portion of the inflating tube beyond the plug will also be pierced.

The object of the present invention is to provide an improved plug which will obviate the above two disadvantages.

Broadly the present invention consists in a plug for the inflating tube of a catheter which is formed during manufacture with means for guiding the point of a hypodermic syringe when piercing the plug, said means operating to ensure that during each subsequent use of a syringe its needle will always tend to penetrate the plug through the original piercing.

In the preferred embodiment of the invention the plug is formed during manufacture with a blind axial hole having tapering sides and extending only partially through the plug so as to leave at the inner end of the hole a relatively thin wall to be pierced by the needle of the hypodermic syringe. Such a plug is preferably made in one piece of natural and/or synthetic rubber by moulding, and the taper hole is central and dimensioned so as closely to engage the end of the syringe needle and centralise its point for piercing the aforesaid wall at the bottom of the guiding hole.

The improved plug of the present invention may be formed with a flange at its outer end to prevent the same from being pushed too far into the funnel of the inflating tube. It is finally cemented in place.

The material left to be pierced at the bottom of the guide hole may conveniently be one eighth of an inch thick as this thickness can more easily be pierced than a normal solid rubber plug. Furthermore it will act to self-seal the piercing after each withdrawal of the syringe needle.

In order that the invention may be clearly understood and carried into effect an embodiment will now be described, by way of example, by aid of the accompanying drawings in which:

Fig. 1 shows a typical catheter embodying the improvements of the present invention.

Fig. 2 is a sectional view of the proximal or outer end of the inflating tube of the catheter having in position therein an improved plug according to the invention which is also shown in section.

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The improved catheter shown in Fig. 1 consists in a rubber tube *a* having its distal or inner end *b* closed in normal manner and provided with drainage apertures *c* in the side wall of the tube. The opposite or outlet end of the tube *a* terminates in a discharge funnel *d*.

The distal end *b* of the tube *a*, just below the drainage apertures *c*, is surrounded by a short and thin rubber sleeve *e*. This is closed at opposite ends in the length of the tube *a* by cementing the sleeve to the tube so as to leave an annular space between the inside of the sleeve *e* and the outside of the tube *a* into which liquid or air may be forced to inflate the sleeve *e* into a self-retaining balloon.

The inflated sleeve is shown in dotted lines in Fig. 1.

The sleeve *e* is inflated through an inflating tube *f*. This inflating tube is attached to or moulded onto the extension of the tube *a* for a greater part of its length and at its inner end it opens into the interior of the sleeve *e* and its outer end branches away from the tube *a* and terminates in a funnel *g*. The interior of the sleeve *e* and the inflating tube are sealed off from the atmosphere by means of a plug *h* which is pushed into the funnel *g* through its outer end.

The plug *h* is formed, by moulding, with a blind axial and tapering hole *i*, see Fig. 2, and said hole extends inwards from the outer end of the plug for a portion of the length of the plug so as to leave at the inner end of the hole a relatively thin wall *j* which has to be pierced by the hypodermic needle of a syringe when requiring to inflate or deflate the sleeve *e*.

The tapering blind hole *i* is central of the plug and dimensioned so as closely to engage the syringe and centralise the point of its needle when piercing the wall *j* for the purpose hereinbefore described.

To prevent the plug from being pushed too far into the open end of the funnel *g* of the inflating tube, the outer edge of the plug is formed with a flange *k* to seal against the outer edge of the said funnel when the plug is pushed fully home.

What is claimed is:

1. A pierceable self-sealing plug of resilient material designed for use in conjunction with the inflating tube of a catheter and with hypodermic syringe, said plug having a side wall and inner and outer end walls, said side wall adapted to seal the mouth of the inflating tube, said inner end wall being adapted to face the interior of the inflating tube, said outer end wall being adapted to extend within the mouth of the inflating tube and being provided adjacent said side wall with a circular wall portion merging along the inner surface thereof with a right circular cone-shaped wall surface extending toward said inner end wall, said circular wall portion being provided with a convex and curved section adapted to project above the mouth of the inflating tube and adjacent said side wall for positioning the hypodermic syringe within said circular wall portion, said right circular cone-shaped wall surface forming a tapering blind opening in said plug which is coaxial with said circular wall portion for guiding and centering the point of the hypodermic syringe, said blind opening having a vertex spaced from said inner end wall to leave a relatively thin frangible self-sealing wall through which the point of the hypodermic syringe guided and centered within said blind opening is adapted to be repetitively inserted, the vertex angle of said right circular cone-shaped wall surface being such as to prevent penetration of the point of the hypodermic syringe through said last mentioned wall surface and ensure repetitive penetration of the point of the hypodermic syringe through said vertex.

2. A pierceable self-sealing plug of resilient material designed for use in conjunction with the inflating tube of a catheter and with a hypodermic syringe, said plug

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having a side wall and inner and outer end walls, said side wall being adapted to seal the mouth of the inflating tube, said inner end wall being adapted to face the interior of the inflating tube, said outer end wall being adapted to extend within the mouth of the inflating tube and being provided adjacent said side wall with a circular wall portion merging along the inner surface thereof with a right circular cone-shaped wall surface extending toward said inner end wall, said circular wall portion being provided with a convex and curved section adapted to project above the mouth of the inflating tube and adjacent said side wall for positioning the hypodermic syringe within said circular wall portion, said right circular cone-shaped wall surface forming a tapering blind opening in said plug which is coaxial with said circular wall portion for guiding and centering the point of the hypodermic syringe, said blind opening having a vertex spaced from said inner end wall to leave a relatively thin frangible self-sealing wall through which the point of the hypodermic syringe guided and centered within said

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blind opening is adapted to be repetitively inserted, the vertex angle of said right circular cone-shaped wall surface being of the order of 26° to thereby prevent penetration of the point of the hypodermic syringe through said last mentioned wall surface and ensure repetitive penetration of the point of the hypodermic syringe through said vertex.

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