

[54] **OBTURATOR**

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[58] Field of Search ..... **128/214.4, 28, 348, 349, 128/221, 214, 214.2**

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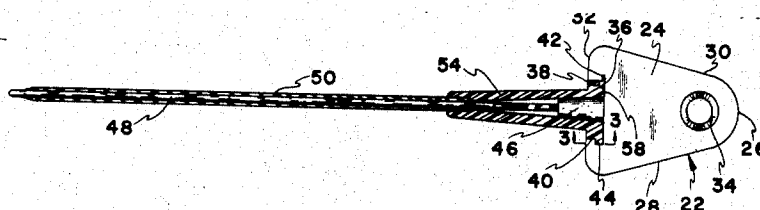
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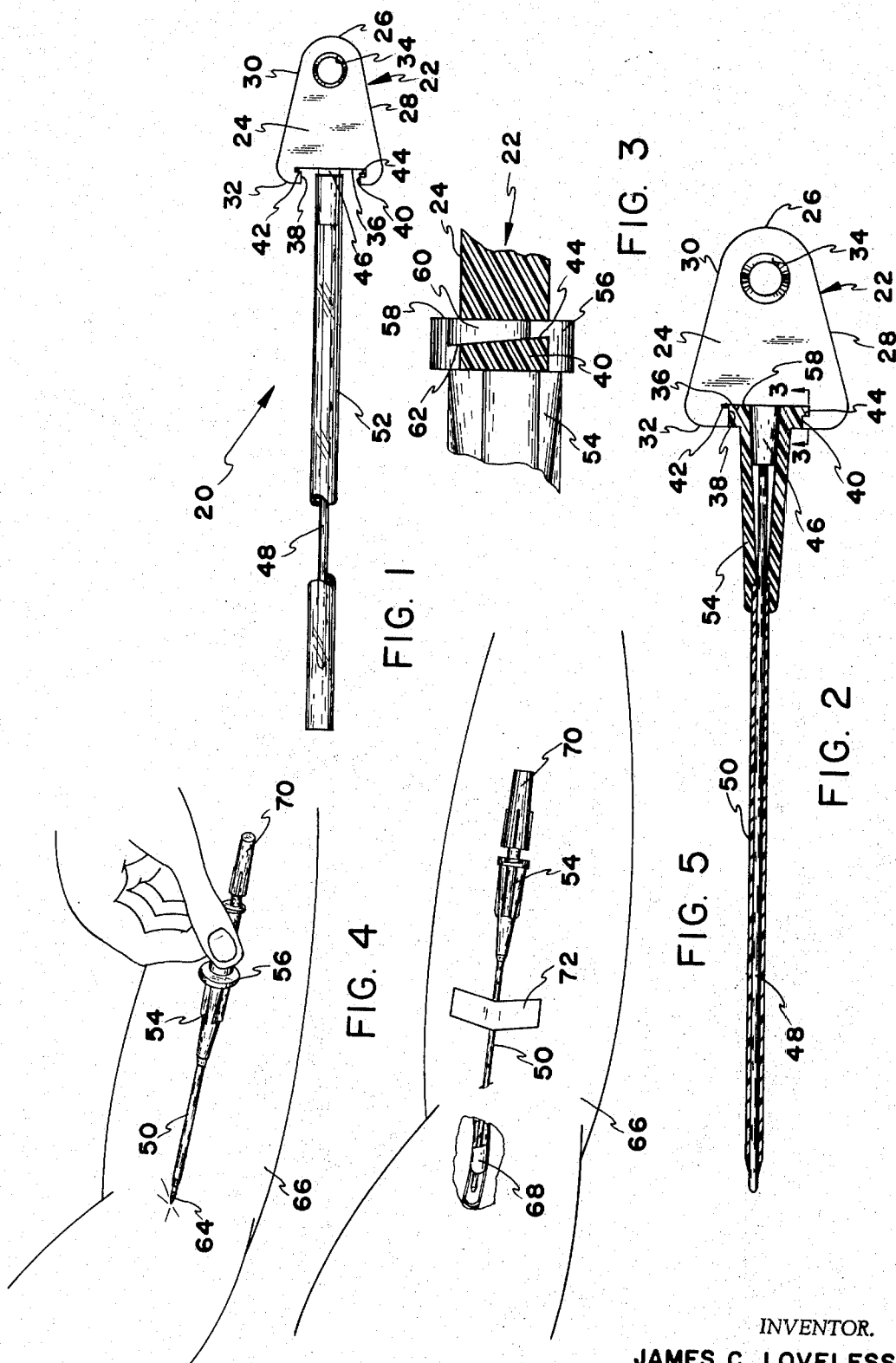
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**ABSTRACT**

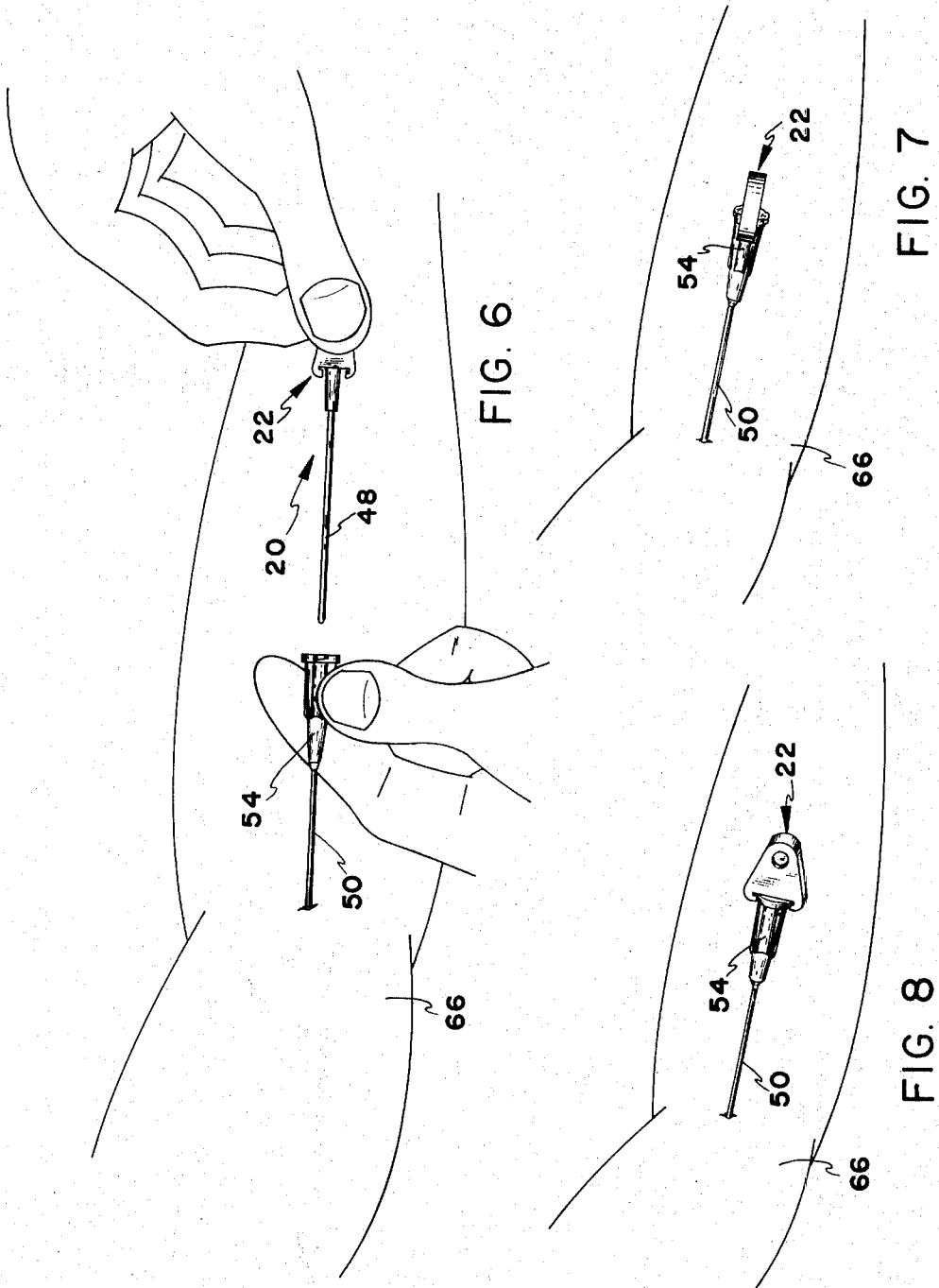
A device for selectively occluding the flow of fluid through an indwelling catheter, the device having an elongated stem adapted to be interposed snugly within the catheter, a handle with opposed generally flat sides and luer coupling structure for releasibly connecting the device to the catheter.

**2 Claims, 8 Drawing Figures**





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# 1 OBTURATOR

## BACKGROUND

### 1. Field of Invention

The invention relates to intravenous catheters and more particularly to a novel obturator device for selectively occluding an intravenous catheter, when desired.

### 2. The Prior Art

The use of indwelling catheters to accommodate fluid infusion into the circulatory system of a patient is well-known in the medical art. It has recently become desirable to place an indwelling catheter in a patient's vein and allow the catheter to remain in the vein between periods of fluid administration or, for purposes of obtaining a series of blood samples at spaced time intervals.

Heretofore, it has been common to use a plug to occlude the indwelling catheter during the time periods when the catheter is not being used for fluid infusion or for drawing blood samples. When a plug is used, blood pressure within the circulatory system will frequently force blood into the lumen of the indwelling catheter where the blood clots. Forcible ejection of clotted blood from the indwelling catheter may be hazardous to the patient in that a dangerous embolism is easily formed. If the clotted blood cannot be ejected from the indwelling catheter, the catheter may be permanently occluded so that it is necessary to remove the occluded catheter to introduce another catheter into the circulatory system.

A conventional plug modification, known to me, adapted to prevent clotting of blood in an indwelling catheter is made of two pieces, i.e. a threaded cylindrical cap and a stem bonded to the interior of the cap. The plugs of the mentioned type have proven to be disadvantageous in that it is difficult to manipulate and, when assembled with an indwelling catheter, cannot be conveniently secured to the skin without presenting a bulky and uncomfortable obstruction adjacent the venipuncture site thereby introducing tissue trauma in the patient.

## BRIEF SUMMARY OF THE INVENTION

The present invention includes an improved one-piece obturator which prevents blood from entering into a dormant indwelling catheter and which is uniquely configured so as to be easily manipulated into and out of locking relation with the catheter.

It is a primary object of the present invention to provide an improved one-piece obturator.

It is another primary object of the present invention to provide a novel obturator device which is uniquely configured so as to lay flat against the skin in the assembled condition while at the same time avoiding use of a cumbersome coupling structure.

These and other objects and features of the present invention will become more fully apparent from the following description and appended claims taken in conjunction with the accompanying drawings.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan view of the presently preferred obturator embodiment with a protective cover attached;

2

FIG. 2 is an enlarged top view of the obturator of FIG. 1 disposed within a conventional indwelling catheter, the catheter being shown in longitudinal and cross-section;

FIG. 3 is a cross-section taken along lines 3—3 of FIG. 2;

FIG. 4 is a schematic illustration of a placement procedure for situating an indwelling catheter within a vein;

FIG. 5 is a schematic illustration of the properly placed indwelling catheter with a conventional plug situated therein; and

FIGS. 6—8 schematically illustrate sequential procedural steps in properly situating the obturator of FIG. 1 within a properly located indwelling catheter.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Reference is now made to the figures wherein like parts are designated with like numerals throughout. With reference particularly to FIGS. 1—3, the obturator generally designated 20 comprises a handle 22 which is peripherally contoured and has opposed planar faces 24. The trailing end 26 of the handle 22 is rounded and the sides 28 and 30 taper outwardly toward the leading end 32 of the handle. In the illustrated embodiment, an annular recess 34 exists in each planar face 24.

The handle 22 is provided with a channel 36 which opens at the leading end 32 of the handle and also at the planar faces 24. Channel 36 has inwardly directed shoulders 38 and 40, the shoulders 38 and 40 being spaced one from another and also being spaced from the bottom of the channel 36. Each of the shoulders 38 and 40 has ramp surfaces 42 and 44 which slope in opposite directions.

The channel 36 and ramp surfaces 42 and 44 cooperate to form a luer lock coupling site so that conventional luer lock dogs 60 on an indwelling catheter 50 may be connected to the handle 22 (see FIG. 2) as will be subsequently more fully described.

A forwardly tapered male fitting 46 is centrally disposed within the channel 36 and is oriented in the plane of handle 22. An elongated shank 48 is integral with the male fitting 46 and is disposed coaxially therewith. The shank 48 may be of any suitable length, but is preferably slightly longer than the length of indwelling catheter 50 (FIG. 2.) Preferably, the shank 48 is provided initially with a protective cover 52 (FIG. 1) which is adapted to be press-fit onto the male fitting 46. Thus, during storage, the sterility of the shank 48 and male fitting 46 may be preserved. When desired, the protective cover 52 may be removed from the shank 48 and the male fitting 46 so that the obturator 20 may be inserted into and coupled to the indwelling catheter 50 as shown in FIGS. 2 and 3.

The indwelling catheter 50 is integral with a female fitting 54, as is conventional, the female fitting having an annularly enlarged flange 56 at the open end 58 thereof. Preferably, the flange 56 is provided with conventional opposed luer dogs 60 (see FIG. 3) which project radially outward in opposite directions from the flange 56. Each luer dog 60 conventionally has a sloped surface 62, the sloped surface being received by the corresponding ramp surfaces 42 and 44 of the handle 22. Thus, as the female fitting 54 is telescoped over the male fitting 58, the dogs are initially oriented normal to the planar surfaces 24 until the end 58 of the flange 56

meets or nearly meets the bottom of channel 36. Thereafter, the handle 22 may be rotated approximately one quarter-turn relative to the female fitting 54 so that the dogs 60 advance over the respective ramp surfaces 42 and 44 until the end 58 of the fitting 54 is pressed tightly against the bottom of the channel 36.

The method of using the obturator 20 is best understood by reference to FIGS. 4-8. As shown in FIG. 4, a stylet needle 65 is inserted within the catheter 50 and a venipuncture is made according to accepted techniques in the arm 66 of a patient. When the catheter 50 has been properly placed within a vein 68 (FIG. 5) the needle 64 is removed and, conventionally, a plug 70 is nested within the female coupling 54. If desired, a strip of tape 72 may be used to prevent inadvertent removal of the indwelling catheter 50.

According to the present invention, it is presently preferred that the plug 70 be replaced with the obturator 20 in the manner illustrated in FIGS. 6-8. Specifically, the obturator 20 is grasped at the handle 22 and inserted into the indwelling catheter 50. The length of the shank 48 of the obturator 20 is sufficiently long so as to completely fill the catheter 50 as shown in FIG. 2. When the obturator has been inserted completely into the catheter 50 and female coupling 54 as shown in FIG. 7, the obturator is rotated about 90° relative to the female coupling 54 to the position illustrated in FIG. 8. In the FIG. 8 position, the luer dogs 60 are wedged tightly upon the ramp surfaces 42 and 44 in the handle 22 (see FIG. 3) so that the obturator 20 is securely, though releasably, coupled to the indwelling catheter 50.

The obturator 20 is easily removed by rotating the handle 22 about 90° in the opposite direction to free the luer dogs from the ramp surfaces 42 and 44. The obturator may then be axially withdrawn from the catheter tube.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiment is, therefore, to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore to be embraced therein.

What is claimed and desired to be secured by U.S. Letters Patent is:

1. In combination, a flexible catheter and a one piece obturator:

the catheter comprising a relatively long flexible cannula comprised of synthetic resinous material of essentially uniform inside and outside diameters which together define a thin wall, a female hub at the trailing end of a forwardly converging circular interior bore, an annular radial flange integral with the trailing end of the hub defining a round surface about the periphery thereof and a flat rear surface, at least two oppositely directed radially projecting dogs extending beyond though being integral with the flange, each dog defining a peripheral convex rounded surface, a rear flat transverse surface, opposed parallel side surfaces, and a front ramp surface;

the obturator disposed in said catheter and comprising a solid though yieldable rod having a uniform diameter along the entire length thereof substan-

tially the same as the inside diameter of the flexible cannula, the rod having a dull rounded leading tip, a forwardly facing conically tapered solid male plug integral with and disposed at the trailing end of the rod, the plug being sized and shaped to tightly fit within and seal the trailing bore of the catheter female hub, a thin planar handle disposed in a plane for manually gripping integral with and disposed at the trailing end of the male plug, the flat handle having two opposed flat side surfaces and defining at the leading end thereof a mouth, the mouth being disposed in said plane comprising a central flat wall exposed at the front of the flat handle at the back of the mouth and disposed essentially transverse of the axis of the catheter being adapted to be pressed tightly against the entirety of the flat rear face of the female hub of the catheter and opposed inwardly projecting locking dogs forming the sides of the mouth and disposed at approximately 90 degrees to the central wall the locking dogs having opposed concave surfaces adapted to contiguously match the peripheral convex rounded surface of the flange of the female hub, each locking dog being spaced from the central flat wall by a notch each notch being comprised of a rear ramp surface sized and shaped to fully engage and frictionally lock with the entire front ramp surface of the dogs of the catheter hub flange, respectively, with the locking dog concave surfaces fully contiguous with the convex surfaces of the flange and said concave and convex surfaces substantially concealed by the dogs with the flange, respective dogs and surfaces sized and shaped such that the catheter flange and obturator handle present a continuous unobstructed edge within said plane following insertion of the obturator within and partial rotation of the obturator relative to the catheter whereby the cannula, following venipuncture, is sealed, the hollow of the cannula is occupied by the rod to prevent clogging and the like, and the combination is left flatly on the arm of the patient without obstructions projecting therefrom.

2. An obturator for use with a catheter having a female fitting with a flange and radial dogs, the fitting being secured to the proximal end of the catheter, said obturator comprising:

an elongated shaft dimensioned to be telescopically received within said catheter and extendable completely through said catheter,

a male tapered projection disposed about said shaft adjacent the proximal end thereof dimensioned for frictional engagement within said female fitting to close the fitting against intravenous leakage,

a flat, planar tab having a forward central edge thereof secured to the proximal end of said male projection and generally extending laterally and rearwardly from said male projection,

a pair of radially disposed opposed shoulder members comprising said tab the shoulders extending forward of the site where the projection and tab are secured to each other, each shoulder having an interior radial concave surface to match the flange of the female fitting, each shoulder being in spaced relation with but circumscribing said male projection in part, and

a stepped notch interposed between each shoulder and said forward central edge, each notch having

5

a ramp surface projecting radially toward the shaft in a plane diagonal of the axis of the shaft, the ramp surface being formed on the inwardly extending portions of said shoulder members to engage in

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contiguous relation the radial dogs of the female fittings essentially concealing the radial dogs within the stepped notches.

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