

[54] **CANNULA FOR INTRODUCING A FLEXIBLE CATHETER**

[75] Inventor: **Hans Jürgen Forberg**, Lensahn, Germany

[73] Assignee: **Transcodan Sven Husted-Andersen**, Germany

[22] Filed: **Nov. 15, 1973**

[21] Appl. No.: **416,292**

[30] **Foreign Application Priority Data**

Nov. 18, 1972 Germany..... 2256748

[52] U.S. Cl..... **128/214.4; 128/DIG. 16**

[51] Int. Cl.²..... **A61M 05/00**

[58] Field of Search..... 128/214.4, 221, DIG. 16, 128/348

[56] **References Cited**

UNITED STATES PATENTS

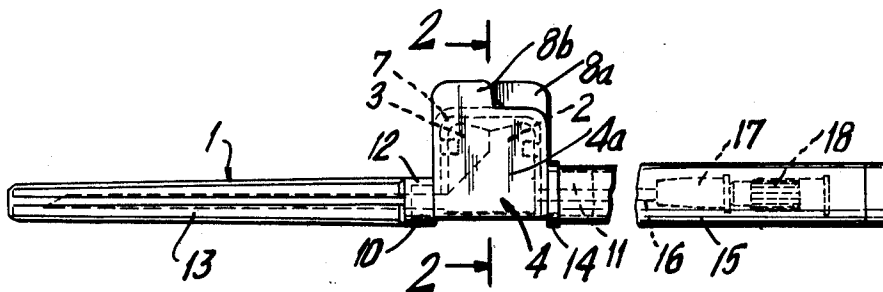
3,297,030	1/1967	Czorny et al.	128/214.4
3,537,451	11/1970	Beck et al.	128/214.4
3,568,673	3/1971	Cowley	128/214.4
3,592,193	7/1971	Higgins	128/214.4
3,766,915	10/1973	Rychlik	128/214.4

Primary Examiner—Dalton L. Truluck
Attorney, Agent, or Firm—McGlew & Tuttle

[57] **ABSTRACT**

A cannula for the introduction of a flexible catheter comprises a cannula having a wing of a foil material joined to each side and it includes a cannula protective cap at a spaced location from a guard cap for the catheter. An intermediate bacteria-proof shell encloses the cannula between the protective cap and the guard cap and it has two separable portions which are arranged in juxtaposition over the wings. The protective shell includes projecting portions to permit it to be spread open to cause a corresponding movement of the wings and the breaking open of the cannula. The protective shell is made preferably of a single molded part which is joined together at a hinge but which includes a separate foil hinge and which include inwardly projecting dogging elements which engage against the wings after the lower portion of the housing is engaged around the cannula. The half shell portions are each provided with interengageable projections and recesses so that the shell portions are locked together to form a bacteria-proof joint.

4 Claims, 5 Drawing Figures



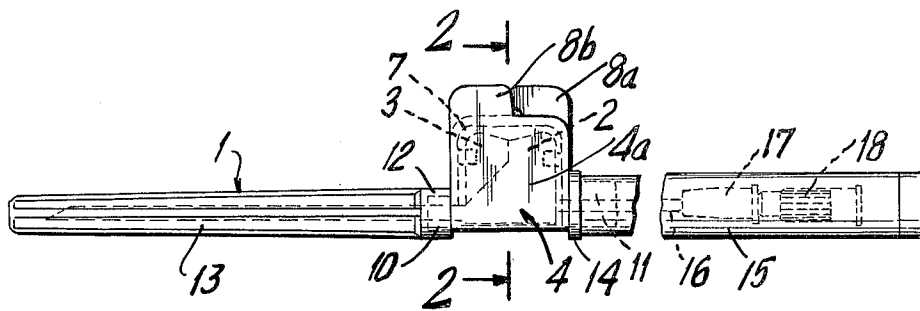


FIG. 1

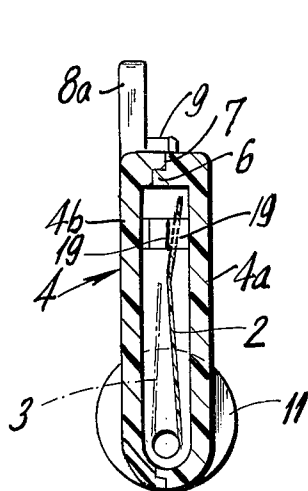


FIG. 2

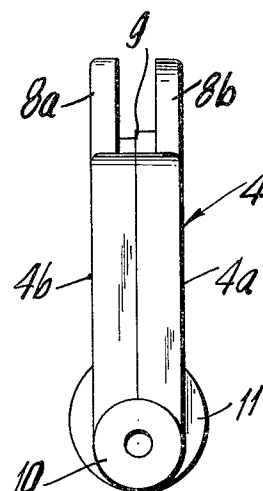


FIG. 5

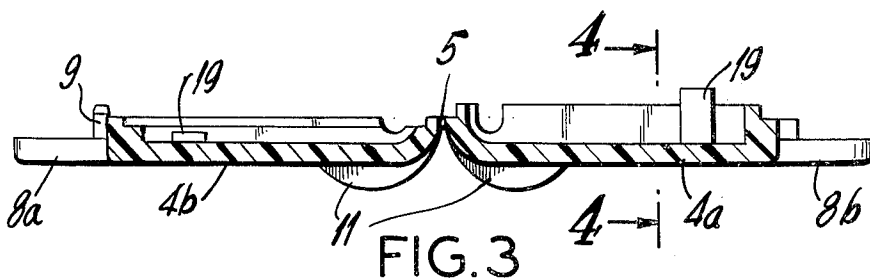


FIG. 3

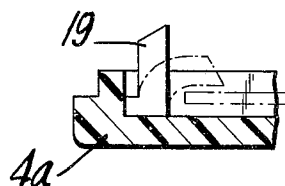


FIG. 4

CANNULA FOR INTRODUCING A FLEXIBLE CATHETER

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates in general to the construction of containers and, in particular, to a new and useful antiseptic container construction for a cannula for introducing a flexible catheter.

2. Description of the Prior Art

The present invention deals in particular with a cannula for the introduction of a flexible catheter and cannula is provided with a protective cap and a catheter guard. There are known cannulas for the introduction of a catheter into a blood vessel. With the aid of the catheter, liquid is withdrawn from, or injected into the vessel. The withdrawal or injection of the liquid must take place under sterile conditions. With the cannulas known at the present time, there is always a risk that, after the cannula has been taken out of the sterile packing, germs or poisonous matter become deposited on the cannula in the space between the cannula and the catheter and in the slit opening of the cannula, and there is a danger that these germs will pass into the vessel during the subsequent introduction of the catheter. A further disadvantage is that after the insertion of the cannula for example, blood penetrates into the interspace between the catheter and the cannula or it escapes from the slit opening of the latter. The escaping blood comes into contact with the surrounding objects in the ambient air which is not only troublesome but may lead to infection.

In the known devices, the cannula can be broken apart or it is formed of two pieces having a semicircular cross-section and is capable of being taken apart. The rear end portions of the cannula have the shape of a scissor handle and are firmly connected to the protective tube of the catheter which is provided with tear strips. By means of these tear strips, the protective tube of the catheter is ripped open as soon as the cannula is withdrawn and broken apart after the puncture. However, the danger that during the puncture and manipulation, germs or other matter penetrate for example, into the slits of the cannula and cause an infection is not eliminated with this cannula construction either.

SUMMARY OF THE INVENTION

The present invention is based on the problem of improving a cannula of the type described above so as to securely prevent an infection during the manipulation and a contamination with the escaping liquid. In accordance with the invention there is provided a cannula which includes wing elements on each side which are held in and enclosed by a bacteria-proof housing or shell which can be easily opened and which is formed with interengageable projections and recesses for locking the parts together and also which has a receiving projection at one end for receiving a catheter guard and a receiving projection at an opposite end for engaging with the cannula protection cap so that it may be interfitted between the cap and the guard.

The cannula of the invention has the advantage that after removing the protective cap and during the subsequent manipulation, the rear part as well as the part in the front of the cannula to be introduced are tightly closed so that neither germs nor other matter can penetrate into these regions, nor can blood escape out-

wardly. After the puncture is made under these entirely sterile conditions, the catheter tube is introduced into the vessel. The sterile closure is maintained and blood cannot leak out. As soon as the introduction of the catheter is terminated, the catheter guard is removed, the cannula is withdrawn from the vessel and thereupon, the shell is opened. The cannula is then taken away in a well-known manner. The device in accordance with the invention ensures a perfectly sterile manipulation and it is simple in construction and inexpensive to manufacture.

In accordance with a further development of the invention, the shell may be of a flat, easily engageable shape, and may comprise two half shell portions which are connected to each other so that they can easily be disconnected or torn apart. In a simple embodiment of this arrangement, the half shells are provided with projections or recesses extending along the inner edges of the shells and they are adapted to engage with the respective opposite projections or recesses of the other half shell so that a tight closure of the space within the shell is obtained. The flat shape of the shell facilitates manipulation.

In order to improve the sealing effect, the cross-sectional outline of the projections or recesses are staggered in one or more steps so as to be able to obtain a more suitable sealing joint. In addition, the half shells or the projections and recesses may engage into each other resiliently so as to interlock whereby the shell is secured against unintentional opening. The shell is advantageously made of a flexible material.

In order to form seats for the connection portions of the protective cap and the catheter guard, the central portion forming the bacteria-proof housing is provided with extensions of complementary shape which are provided on the front and rear sides of the half shell portions so that after closing of the shell, they form the desired seats for the catheter guard and the protective cap for the cannula. The sealing joint is not necessarily on the periphery of the enclosed shell. It is even advantageous to provide projections extending outwardly from each side of the shell housing and make them in the form of grip tabs. A particularly simple manufacture is an embodiment in which the two half shells are made in one piece comprising two main parts with a central thin walled strip therebetween. The thin walled strip may be a film hinge and the parts may be folded together into interlocking closed arrangement. Such a design may thus be used while manufacturing the half shells as injection molded parts with the main walls aligned on a common plane and connected to each other by the film hinge.

In accordance with another advantageous embodiment of the invention, there may be provided on the inner sides of the half shells, catches engaging the wings of the cannula from behind so that simultaneously with the opening of the shell, the wings are drawn laterally and the cannula is bent or torn apart. The half shells may be provided with an additional locking if desired.

Accordingly, it is an object of the invention to provide an improved cannula for the introduction of a flexible catheter which comprises a protective cap for the cannula and a guard for the catheter and which includes a bacteria-proof housing surrounding the cannula in the area of wing formations thereon which can be easily opened and which is provided with two tight interengageable seats, one for the connection piece of

the protective cap of the cannula, and another for the connection piece of the guard cap for the catheter.

A further object of the invention is to provide a cannula for the introduction of a flexible catheter which includes a catheter having a protective cap at a spaced location from a guard cap for a catheter and with an intermediate bacteria-proof shell housing enclosing said cannula between said caps and having a portion engageable with said caps to seal them against the outside and form a bacteria-proof closure, said housing being composed of parts which are readily spreadable to open the housing.

A further object of the invention is to provide a cannula for the introduction of a flexible catheter, which is simple in design, rugged in construction and economical to manufacture.

For an understanding of the principles of the invention, reference is made to the following description of a typical embodiment thereof as illustrated in the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

In the Drawings:

FIG. 1 is a side elevational view partly broken away of a device for introducing a flexible catheter constructed in accordance with the invention;

FIG. 2 is a cross-sectional view taken along the lines 2—2 of FIG. 1;

FIG. 3 is a cross-sectional view of the opened half shell housing portions as they appear at the end of the manufacturing process therefor;

FIG. 4 is an enlarged partial cross-sectional view taken along the line 4—4 of FIG. 3; and

FIG. 5 is an end elevational view of the shell housing taken in the same direction as the cross-sectional view of FIG. 2.

GENERAL DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings in particular, the invention embodied therein, comprises a cannula 1, of a type capable of being broken up or opened and it is provided on its rear side with two wings 2 and 3 which are secured to respective opposite sides and are formed so as to overlap centrally over the cannula 1. The wings are shaped so that they partly overlap as indicated in dotted lines in FIG. 1. By making the wings so that they are shortened longitudinally, they may be separately gripped. The wings serve as a means for tearing or bending the cannula open after the puncture has been made and the catheter is introduced.

The part of the cannula where the wings are provided is enclosed in a shell or housing 4 which comprises two half shell portions 4a and 4b. The half shell portions 4a and 4b are held together by a film hinge 5 and they may be manufactured as a single injection molded piece in the form shown in FIG. 3 prior to their being bent together to enclose over the cannula 1. In the case of manufacture as a single housing made up of two half shell portions 4a and 4b, the portions are placed together so as to extend in a common plane and are connected to the film hinge 5. On their other three side edges, the half shell portions are provided with projections 6 which, as shown in FIG. 2, are of such a shape that the projecting portions engage together and form a sealing joint 7 of the type of a labyrinth packing. In the position shown in FIG. 2, the half shell portions 4a

and 4b seal the enclosed space so that the space is bacteria-resistant.

The component parts may be resilient and the sealing joint may be conformed thereto so that the engaging portions interlock.

In order to facilitate the manipulation of each of the half shell portions 4a and 4b, they are provided with grip tabs 8a and 8b which protrude above the level of projections 6 and are offset from each other, as shown in FIG. 1. An untimely and unintentional opening of the shell may be made more difficult by providing a further locking element 9 between the tabs 8a and 8b. As shown in FIG. 3, the locking element 9 comprises a projection which engages into a receiving recess on the opposite part.

The half shell portions 4a and 4b are provided on both sides with approximately semicircular extensions 10 and 11, respectively, which, in the closed position, form a complete tubular receiving socket for engaging a connecting end portion 12 of a protective cap 13 for the cannula 1 and also for receiving the end portion 14 of a catheter guard 15 at the opposite end of the housing 4.

Half shell portions 4a and 4b are engaged around the cannula 1 and they bear against the wings 2 and 3 and hold them in place. After removing the protective cap 13, the half shell portions 4a and 4b serve as a handle for manipulating the cannula.

Catheter 16 is passed through the cannula and is provided with a connection piece 17 and an aeration filter 18. On the righthand side of FIG. 1, only a portion of the device is represented. The guard 15 and catheter 16 are relatively long. Connecting end portions 12 and 14 hold the parts of the sockets 10 and 11 in assembled orientation so that shell 4 is prevented from opening.

The half shell portions 4a and 4b are provided with dogs 19 on their inner sides which may be of angular shape and which engage behind each of the wings 2 and 3 in the closed position, as shown in dotted lines in FIG. 4. As soon as the half shell portions 4a and 4b are spread apart, the wings 2 and 3 follow this motion and the cannula is bent or broken open.

The cannula 1, in accordance with the invention, is simple in construction and inexpensive to manufacture. The manipulation is also simple. This design prevents the contamination with germs or other matter during manipulation with the cannula. The invention offers a catheter device which is easy to sterilize and remains sterile and free from pyrogens even after the removal of the packing. Moreover, it is well manipulable.

The film hinge 5 may be made so as to easily tear. Instead of the film hinge 5, of course, any other appropriate connection between the two half shell portions 4a and 4b may be provided.

While a specific embodiment of the invention has been shown and described in detail to illustrate the application of the principles of the invention, it will be understood that the invention may be embodied otherwise without departing from such principles.

What is claimed is:

1. A bacteria-resistant packing for a cannula, comprising a tubular protective cap for the cannula having a closed end and an opposite opened end, a tubular catheter guard having a closed end and an opposite opened end and adapted to contain a catheter, an intermediate closed housing having an open chamber therein comprising interengaged side walls having re-

5

spective opposite top and bottom, a connecting web extending between said bottoms of said side walls, said tops being interengaged and closed, said housing having oppositely spaced ends extending from the side wall bottoms each end having an opening over which the open end of said catheter guard and said protective cap extend, said protective cap and said catheter guard being sealed with said intermediate housing when said housing is closed, said intermediate housing side walls being pivotal about a respective said bottom to open said intermediate housing, said side walls having complementary projections and recesses enclosed within said chamber and which interengage to form a closed bacteria-resistant joint.

6

2. A bacteria-resistant packing for a cannula, according to claim 1, including a cannula, a wing extending upwardly from each side of said cannula between said side walls of said intermediate housing and being interengaged with respective ones of said side walls and being spreadable by opening of said side walls to open said housing.

3. A bacteria-resistant packing for a cannula, according to claim 1, wherein said interengaged projections and recesses are staggered.

4. A bacteria-resistant packing for a cannula, according to claim 1, wherein said housing is made of a flexible material.

* * * * *

15

20

25

30

35

40

45

50

55

60

65