

June 28, 1955

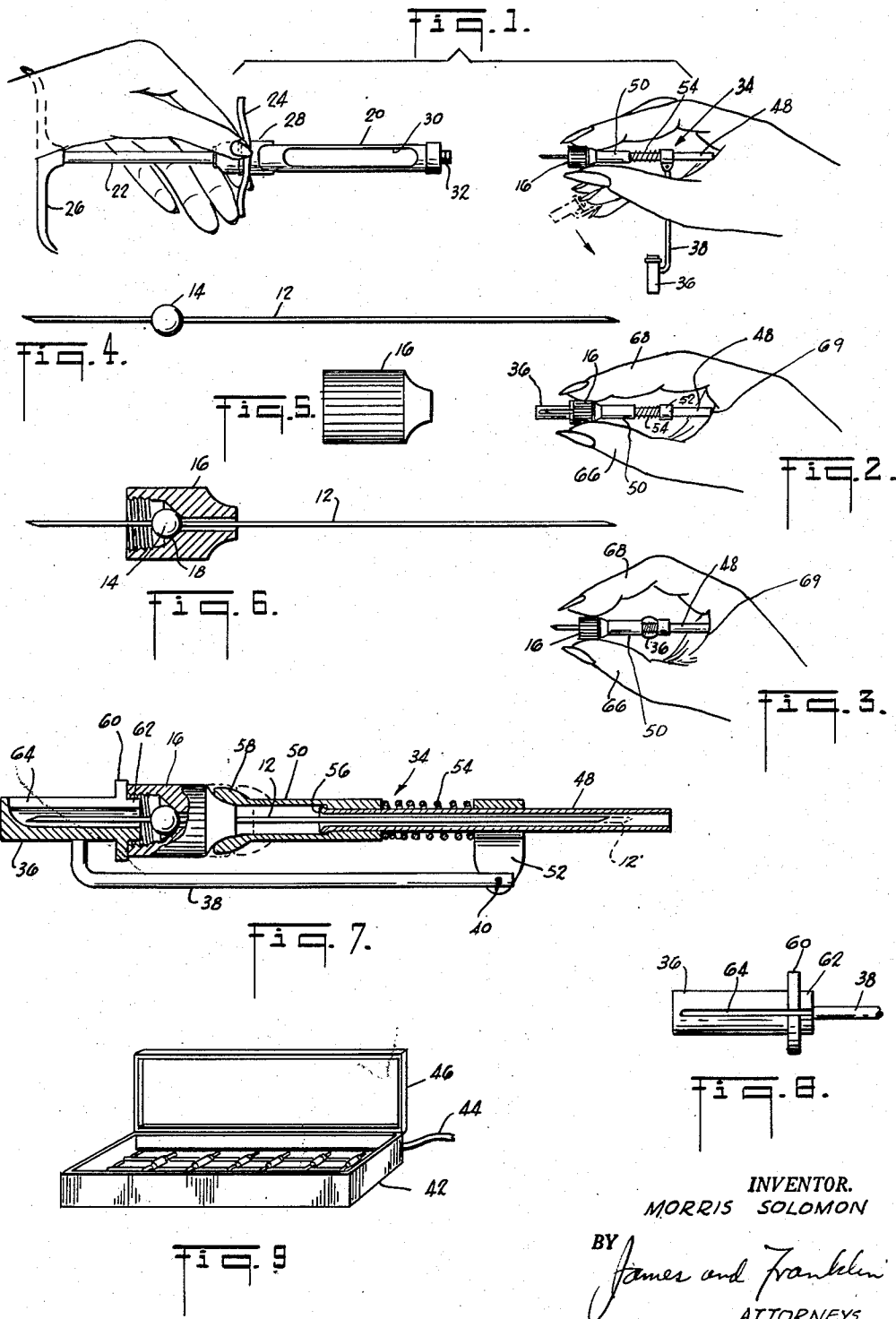
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2,711,732

NEEDLE STERILIZING ACCESSORY

Filed Aug. 9, 1952

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

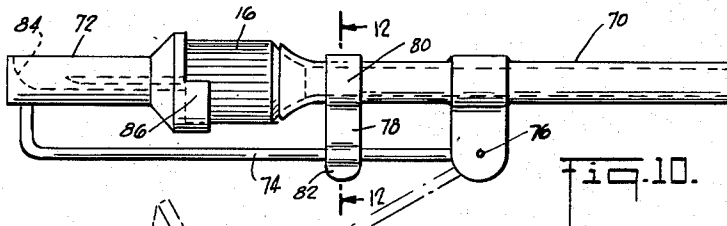


Fig. 10.

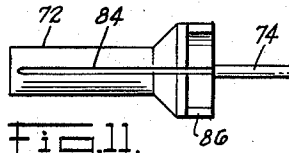
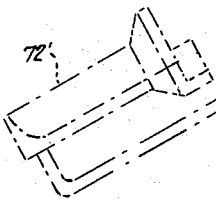


Fig. 11.

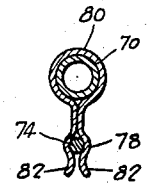


Fig. 12.

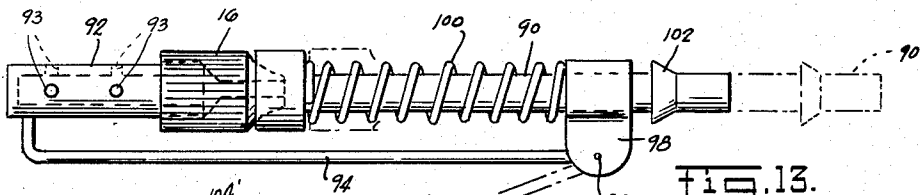


Fig. 13.

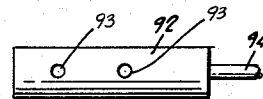
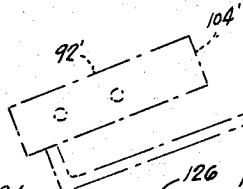


Fig. 14.

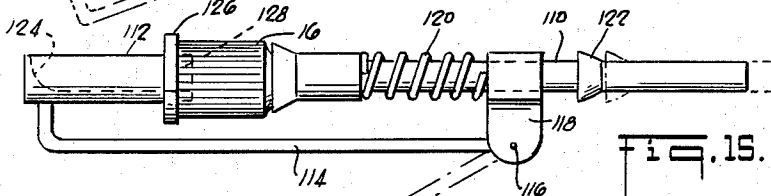


Fig. 15.

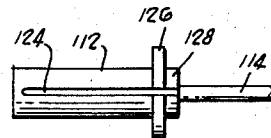
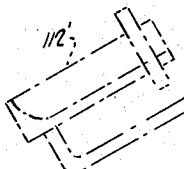


Fig. 16.

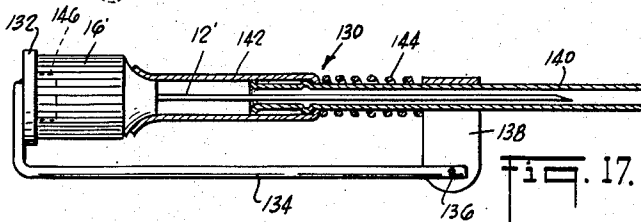


Fig. 17.

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**NEEDLE STERILIZING ACCESSORY**

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Application August 9, 1952, Serial No. 303,559

15 Claims. (Cl. 128—215)

This invention relates to hypodermic or similar needles, and more particularly to an accessory to help maintain the chain of sterilization up to the instant of use.

Tubular needles are widely used in medical and dental practice, typically for use with hypodermic syringes. They are also used by laymen, for example, in home administration of insulin by diabetics. The needle is first sterilized in any of a number of known sterilizers, such as those using boiling water, boiling mineral oil, or chemicals, or autoclaves using steam under pressure. After sterilization the needle is secured to the syringe, usually by means of an internally threaded collar on the needle which is manually screwed on to a threaded nipple at the end of the syringe. If the needle itself is touched during this operation it will be contaminated, thereby breaking the chain of sterilization.

In the office of a busy doctor or dentist the assembly is usually taken care of by an assistant or helper, and it may be difficult to insure that proper precaution is taken. The problem is aggravated by the widespread use of the so-called "double-ended needle," in which the needle has a small enlargement or ball intermediate its ends, and is otherwise freely slidable in the collar, for in such case if the collar is inadvertently tilted downward instead of upward the needle will slide out of the collar to the floor.

The primary object of the present invention is to overcome the foregoing difficulty, and to provide an accessory which helps maintain the chain of sterilization. The accessory comprises connected but relatively movable parts for enclosing or protectively housing the needle. The connecting means affords movement of one of said parts away from the collar while leaving the end of the needle protectively housed during the operation of screwing the collar on to the nipple of the syringe. The accessory is relatively small and inexpensive, so that one may be provided around each needle during the sterilizing operation.

The accessory may be made in a number of different forms, some of which are disclosed in the following specification. In the form which I most prefer, and in answer to a further object of my invention, the accessory is designed for one-hand operation, so that the syringe may be held ready in the other hand, and the two joined as readily and indeed even more expeditiously than when working with a simple exposed needle.

To accomplish the foregoing objects, and others which will hereinafter appear, my invention resides in the sterilizing accessory elements, and their relation one to another, as are hereinafter more particularly described in the following specification. The specification is accompanied by drawings, in which:

Fig. 1 shows the accessory in use;

Fig. 2 is a plan view showing how the accessory is held before opening the same;

Fig. 3 shows the accessory opened to expose the short end of the needle;

Fig. 4 is an enlarged view of a double-ended needle;

Fig. 5 shows the collar which receives the needle;

Fig. 6 is a partially sectioned view showing the assembly of needle and collar;

Fig. 7 is a partially sectioned elevation of the accessory shown in Figs. 1, 2 and 3;

Fig. 8 is a fragmentary plan view of the cap of the accessory shown in Fig. 7;

Fig. 9 is a perspective view of a sterilizer;

Fig. 10 is a front elevation of a modified accessory;

Fig. 11 is a plan view of the cap;

Fig. 12 is a section taken approximately in the plane of the line 12—12 of Fig. 10;

Fig. 13 is a front elevation of another modification;

Fig. 14 is a plan view of the cap;

Fig. 15 is a front elevation of still another modification;

Fig. 16 is a plan view of the cap; and

Fig. 17 is a front elevation of a modification for use with a single end needle.

Referring to the drawing, and more particularly to Figs. 4, 5 and 6, the needle 12 is a slender steel tube having its ends severed at an acute angle to point the same, without obstructing the tubular passage through the needle. At an intermediate point an enlargement or ball 14 is permanently secured to the needle, and serves to divide it into short and long ends. The needle is used with a collar 16 shown in Figs. 5 and 6. This is knurled on the outside and threaded on the inside. It has a bore or passage which freely receives the long end of the needle, with the ball 14 resting on a suitable seat 18.

Referring now to Fig. 1, the syringe can take any of a number of forms, but in general has a barrel 20 slidably receiving a plunger 22. There is usually a crossbar 24 at the upper end of the barrel and a handle 26 at the upper end of the plunger. In the particular case here shown the syringe is of a quick-opening type in which the plunger together with the upper end portion 28 may be swung aside to permit a prepared cartridge of fluid to be inserted into the barrel 20. This cartridge may be a so-called "carpule," which is a discardable tube provided with its own piston which in turn is actuated by the plunger 22 of the syringe. When using such prepared units the barrel 20 acts only as a holder, and therefore the sides may be partly cut away, as indicated at 30. The end of the barrel has a threaded stud or nipple 32 dimensioned to receive the collar 16. It will be understood that when using a double-ended needle as here shown, the end of the nipple 32 is slightly recessed to form a rounded seat cooperating with the ball 14 on the needle, so that when the collar is tightened the ball is squeezed between the opposed seats.

Referring now to Fig. 7, it will be seen that the needle 12 with its collar 16 are received in an accessory which acts as a housing for the needle, although preferably exposing the collar. The housing comprises connected but relatively movable parts 34 and 36. More specifically, the part 34 is a tube for receiving the long end of the needle 12, while the part 36 is a cap for receiving the short end of the needle. The connecting means 38 therebetween consists of an arm which carries the cap 36 at one end, and which is pivotally secured at 40 to the tube 34. This affords movement of the cap away from the collar 16 (and the short end of the needle), thereby exposing the same for attachment to the syringe, while the tube 34 still protectively houses the long end of the needle. In passing it may be mentioned that the modifications of Figs. 10, 13, 15 and 17 all employ the same general arrangement, as so far described, although they differ in detail as later described.

Referring now to Fig. 9 I there show a typical sterilizer 42, electrically heated through a supply cord 44, and normally closed by a cover 46. In the office of a doctor or dentist there may be a quantity, say one or even several

dozen needles which have been sterilized. In accordance with my invention each needle is placed in its own accessory prior to sterilization, and when the cover 46 is opened the doctor, nurse or assistant picks up an accessory containing a sterile needle, without having to touch the needle at all.

Referring now to Fig. 1 it will be seen that the cap 36 has been dropped downwardly away from the collar 16, thus clearing the way for screwing the collar on to the nipple 32, and during this operation the long end of the needle is still protectively housed in the tube 34. The cap 36 is preferably dropped away by a one-hand operation, thus permitting the syringe to be held in the other hand, as shown in Fig. 1. The manner in which this is done may be explained by reverting to Fig. 7 for a more detailed description of the accessory. The tube 34 is a telescopic tube comprising an outer portion 48 and an inner portion 50. The term "outer" refers to location rather than diameter, for the outer tube is here shown as the one of smaller diameter. The arm 38 which carries the cap 36 is pivoted on a bearing 52 bent around and secured to the tube 48. The inner tube 50 is normally urged toward the cap 36 by means of a compression spring 54 wound about the tube 48 between the righthand end of tube 50 and the bearing 52. The resulting movement is limited by flaring the end of tube 48 outwardly, as shown at 56, where it cooperates with a step or shoulder on the inside of tube 50. This limits the spring movement of tube 50 to an amount which will receive and hold the collar 16, and the free end of tube 50 may be flared outward, as shown at 58, to better fit the adjacent part of the collar 16. Movement to the right of tube 50 is limited, most simply by closing of the coils of the compression spring 54. The permitted movement to the right is less than the excess length of tube 48 at its righthand or free end, so that if the collar 16 and needle are pulled toward the right the point of the long end of the needle is still safely housed within the end of tube 48, as shown by the broken line position 12'.

The cap 36 may be provided with a stop flange 60 and with a centering boss 62. The top of the cap is also longitudinally slotted as shown at 64 in Figs. 7 and 8. Because of the slot 64 the cap can drop downward about the pivot 40 of arm 38 to assume the hanging position shown in Fig. 1. However, it is normally held in aligned relation with the telescopic tube 34 by the centering boss 62, which enters the free end of the collar 16. The parts are normally held in this relation by the spring 54, so that broadly speaking the spring acts as a resilient means to help hold the cap 64 in alignment with the tube 34.

Referring now to Fig. 2, when the accessory is picked up from the sterilizer it is held in one hand with the collar 16 between the thumb 66 and first finger 68, and with the free end of the tube 48 resting against the upper palm 69 of the hand between the thumb and the first finger. By now bending the fingers 66 and 68 slightly toward the palm 69, as shown by the change from Fig. 2 to Fig. 3, the collar 16 is moved back a little, thus freeing the centering boss 62 (Fig. 7) and permitting the slotted cap 36 to fall downward to the hanging position shown in Fig. 1. This operation is performed after already picking up the syringe and holding it in the other hand, as shown in Fig. 1, whereupon the parts are simply screwed together.

Because of the one-hand release operation, this assembly may be performed readily and even more expeditiously than when using an exposed needle, for there is no need to take precaution to avoid contact with the long end of the needle. The short end of the needle is inserted through threaded nipple 32 as the collar 16 is screwed on to the nipple, and later serves to penetrate the end of the carpule when the plunger of the syringe is actuated.

Referring now to Figs. 10, 11 and 12 of the drawing, I there show a modified form of the invention which again comprises a tube 70 and cap 72 carried by an arm 74 pivoted at 76. In this case there is no axial movement,

and the motion of the cap 72 is solely a radial movement about the pivot 76, as is indicated by the broken line position 72'. In this case the resilient means to hold the cap and tube in alignment is a leaf spring jaw arrangement 78 also secured on tube 70. The construction will be clear from inspection of Fig. 12, the part 80 being permanently secured to the tube 70, and the free end 82 being suitably shaped to receive and hold the arm 74. The cap 72 is longitudinally slotted as shown at 84 in Fig. 11. The centering part 86 is in this case a semi-circular boss or flange which bears against the outside of the knurled collar 16.

It will be understood that the needle is inserted in tube 70, whereupon cap 72 is moved upward to the closed position shown. It is there held by the detent spring 78. The entire unit is placed in the sterilizer, and after sterilization, when the needle is to be used, the cap 72 is pushed downward, thereby exposing the short end of the needle and the collar 16 for attachment to the threaded nipple of the syringe.

Another form of the invention is shown in Figs. 13 and 14. Here again the accessory comprises a tube 90 and a cap 92, the latter being carried by an arm 94 pivoted at 96 on a bearing 98 carried by the tube 90. However, in this case the tube 90 is axially slidable in the bearing 98. It is normally urged to the left by means of a compression spring 100, and its motion in that direction is limited by a stop 102 on tube 90. The spring 100 is openly wound, and the slidable part 90 of the tube is of such length that the tube may be pulled relatively far to the right, as shown by the broken line position 90'. This distance exceeds the projection of the short end of the needle into the cap 92, so that the parts may be separated by holding the cap 92 and wire 94 in one hand, and the collar 16 in the other, the latter being pulled to the right its full distance, thus moving the short end of the needle out of the cap and permitting the latter to be dropped downward, as shown by the broken line position 92'.

It should be noted that in this case the cap 92 is not longitudinally slotted. Holes 93 may be provided for free circulation of the sterilizing mechanism. It is not essential to provide the cap with a stop flange, and instead the inner end 104' of the cap comes to rest against the inside of the collar 16. However, a stop flange and a short centering boss may be provided, as before.

Still another form of the invention is shown in Figs. 15 and 16 of the drawing. In this case the arrangement resembles that described in connection with Fig. 7, in combining both axial movement to free the cap, and slotting of the cap so that it can move downward by radial movement when once freed. Specifically, I provide a tube 110 and a cap 112 carried by an arm 114 pivoted at 116 in a bearing 118 carried by tube 110. Here again tube 110 is slidable in bearing 118, and is normally urged to the left by means of a compression spring 120 which in effect acts as resilient means to hold the cap in alignment with the tube. Movement of the tube to the left may be limited by a stop 122. There is no need to closely limit movement to the right, although some limit is provided by closing of the coils of the spring 120. The cap 112 is longitudinally slotted, as shown at 124. It may be provided with a stop flange 126 and a centering boss 128, although these are not essential. It will be evident that by moving the collar 16 toward the right while holding the cap 112, the centering boss 128 will be freed, thus permitting the cap to be dropped down out of the way. This modification of the invention, although quite close to that described in connection with Fig. 7, does not permit the one-hand operation there described.

As so far described the needle has been a double-ended needle. However, the invention is also applicable to a single-ended needle such as is used with an ordinary hypodermic syringe having its own cylinder and piston and

into which liquid is drawn through the needle. All forms of the invention so far shown may be used with a single-ended needle. In such needles the needle is permanently fixed to the collar. It is not essential to have a relatively long slotted cap when working with a single-ended needle, and therefore the accessory may, if desired, be simplified somewhat if it is known that it is to be used exclusively with a single-ended needle.

Such a modification is shown in Fig. 17, which is like the preferred form of the invention shown in Fig. 7 in comprising a tube 130, and a cap 132 carried by an arm 134 pivoted at 136 on a bearing 138 secured to tube 130. In preferred form the tube 130 is a telescopic tube comprising an outer end 140, and an inner end 142. The inner end of the tube is urged to the left by means of a compression spring 144. The cap 132 consists essentially of a stop flange and a centering boss shown in dotted lines at 146, the latter entering the collar 16' of the single-ended needle 12'. It will be understood from the description already given that with the syringe in one hand, by placing the assembly in the other hand as shown in Fig. 2, and then slightly flexing the fingers toward the palm as shown in Fig. 3, the cap 132 will automatically fall away, thus permitting the collar 16' to be screwed on to the nipple of the syringe, during which time the needle 12' remains protectively housed in the sterile tube 130.

It is believed that the construction and method of use of my improved needle sterilizing accessory, as well as the advantages thereof, will be apparent from the foregoing detailed description.

In Fig. 17 it will be noted that the tubes 140 and 142 are made of uniform thickness metal and that desired stop flanges and seats are formed by spinning the edge of the metal inwardly or flaring it outwardly or by beading the metal at an intermediate point. It will be understood that such structural features may be applied to the forms of the invention illustrated in Figs. 7, 10, 13 and 15. It will also be understood that a cap devoid of a stop flange, as shown in Fig. 13, may be used with the forms of the invention illustrated in Figs. 7 and 15, and that, conversely, the form of the invention shown in Fig. 13 may have a stop flange added thereto. It will also be understood that a relatively flat cap, as shown in Fig. 17 for use with single-ended needles, may be employed with the forms of the invention shown in Figs. 10, 13 and 15, although in the case of Fig. 10 the centering part would preferably take the form of an outside projection, such as that shown at 86 in Fig. 10.

Among the advantages of the present invention it should be noted that no increased time is needed to sterilize the needle. The accessory does not interfere with normal sterilization, there being free access of the sterilizing medium to the needle. Thus there is no sacrifice in the efficiency of sterilization in order to gain the facility of assembly with the syringe, and the needle, having once been sterilized, is kept that way up to the time of use.

It will therefore be apparent that while I have shown and described my invention in several forms, changes may be made in the structures disclosed without departing from the scope of the invention, as sought to be defined in the following claims.

I claim:

1. An accessory for helping maintain the chain of sterilization of a needle having a collar, said accessory comprising two relatively movable parts for enclosing and protectively housing the needle, and a connecting means permanently connecting the same to one another, said connecting means affording movement sidewardly of one of said parts away from the collar but leaving the working end of the needle protectively housed in the other of said parts while securing the collar to a syringe.

2. An accessory for helping maintain the chain of sterilization of a needle having a collar, said accessory

comprising a tube for receiving and protectively housing the needle, a cap for bearing against the collar, an arm carrying the cap and pivotally mounted on the tube by means of a pivot running transversely of the tube, the pivoted mounting of the arm affording movement of the cap sidewardly away from the collar, thereby freeing the same for attachment to a syringe while the tube still protectively houses the needle.

3. An accessory as defined in claim 2, in which the tube has an inner end and an outer end, the inner end being nearer the collar and the outer end being nearer the point of the needle, and in which at least the inner end of the tube is mounted for axial movement relative to the cap.

4. An accessory as defined in claim 2, in which the tube has an inner end and an outer end, the inner end being nearer the collar and the outer end being nearer point of the needle, and in which at least the inner end of the tube is mounted for axial movement relative to the cap, and in which the cap has a stop flange and a centering boss.

5. An accessory as defined in claim 2, in which the tube has telescopically related outer and inner portions, the inner portion being nearer the collar and the outer portion being nearer the point of the needle, and in which the arm is pivoted on the outer portion, and in which the outer portion is long enough to protectively house the long end of the needle even after the needle has been moved outwardly with the inner portion.

6. An accessory for helping maintain the chain of sterilization of a needle having a collar, said accessory comprising a tube for receiving and protectively housing the needle, a cap for bearing against the collar, an arm carrying the cap and pivotally mounted on the tube by means of a pivot running transversely of the tube, and resilient means to help hold the cap in aligned relation with the tube, the pivoted mounting of the arm affording sideward movement of the cap away from the collar, thereby exposing the same for attachment to a syringe while the tube still protectively houses the needle.

7. An accessory as defined in claim 6, in which the resilient means is a spring detent for holding the arm in proper position relative to the tube to dispose the cap in alignment with the tube.

8. An accessory as defined in claim 6, in which the tube has an inner end and an outer end, the inner end being nearer the collar and the outer end being nearer the point of the needle, and in which at least the inner end of the tube is mounted for axial sliding movement relative to the cap, and in which the resilient means is a compression spring urging the inner end of the tube toward the cap.

9. An accessory as defined in claim 6, in which the tube has telescopically related outer and inner portions, the inner portion being nearer the collar and the outer portion being nearer the point of the needle and in which the arm is pivoted on the outer portion, and in which the resilient means is a compression spring which urges the inner portion toward the cap relative to the outer portion, and in which the outer portion is long enough to protectively house the needle even after the needle has been moved outwardly with the inner portion against the action of the compression spring.

10. An accessory for helping maintain the chain of sterilization of a needle having a collar dividing the same into short and long ends, said accessory comprising a tube for receiving and protectively housing the long end, a cap of such length as to receive and protectively house the short end, an arm carrying the cap and pivotally mounted on the tube by means of a pivot running transversely of the tube, the pivoted mounting of the arm affording sideward movement of the cap away from the collar and short end of the needle, thereby exposing the same for attachment to a syringe while the tube still protectively houses the long end of the needle.

11. An accessory as defined in claim 10, in which the motion of the cap relative to the tube is a swinging radial movement about the pivot of the arm, and in which said cap is longitudinally slotted to clear the short end of the needle.

12. An accessory as defined in claim 10, in which at least the inner end of the tube is mounted for axial movement relative to the cap, and in which the cap is longitudinally slotted to clear the short end of the needle during radial movement about the pivot.

13. An accessory as defined in claim 10, in which the tube has telescopically related outer and inner portions, and in which the arm is pivoted on the outer portion, and in which the outer portion is long enough to protectively house the long end of the needle even after it has been moved outward with the inner portion.

14. An accessory for helping maintain the chain of sterilization of a needle having a collar dividing the same into short and long ends, said accessory comprising a tube for receiving and protectively housing the long end, a cap of such length as to receive and protectively house the short end, an arm carrying the cap and pivotally mounted on the tube by means of a pivot running transversely of the tube, and resilient means to help hold the cap in aligned relation with the tube, the pivoted mounting of the arm affording sideward movement of the cap

away from the collar and short end of the needle, thereby exposing the same for attachment to a syringe while the tube still protectively houses the long end of the needle.

15. An accessory as defined in claim 14, in which at least the inner part of the tube is mounted for axial sliding movement relative to the cap, and in which the resilient means is a compression spring urging the inner end of the tube toward the cap.

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