March 29, 1955 J. H. LADE 2,704,897

ARM FOR TEACHING VENIPUNCTURE AND INTRAVENOUS THERAPY

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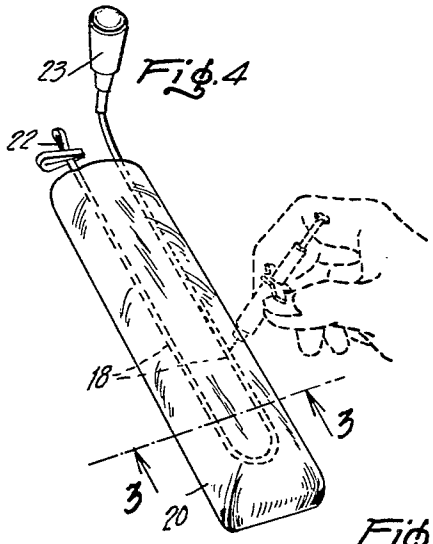


Fig. 4

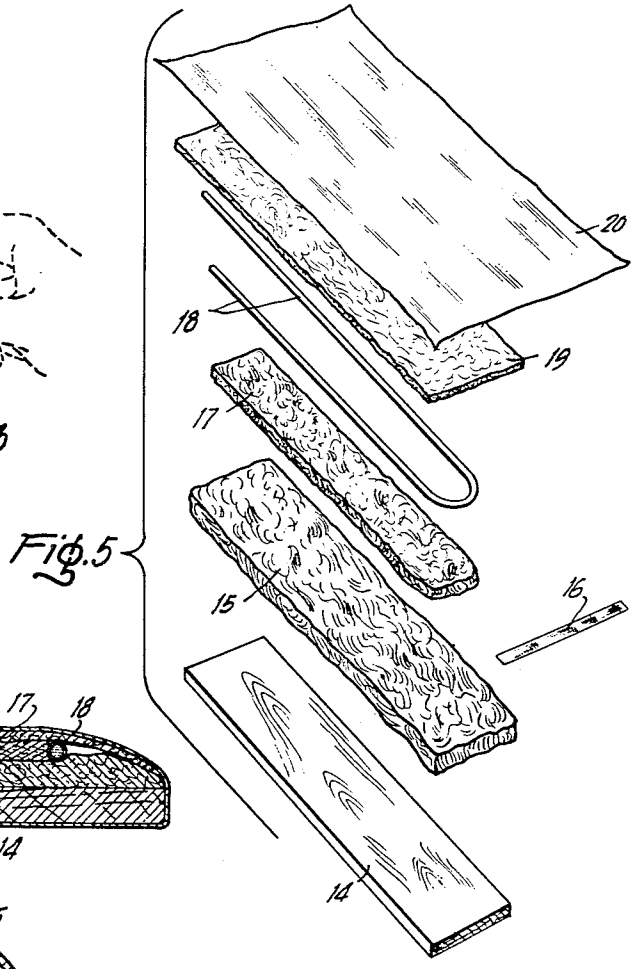


Fig. 5

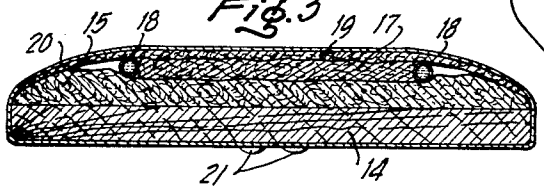


Fig. 3

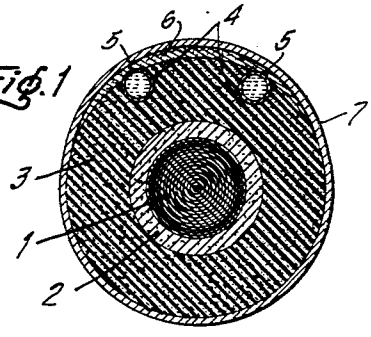


Fig. 1

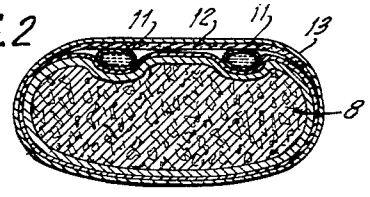


Fig. 2

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ARM FOR TEACHING VENIPUNCTURE AND INTRAVENOUS THERAPY

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1 Claim. (Cl. 35—17)

My invention relates to a device for use in teaching venipuncture and intravenous therapy. More particularly, it refers to a device simulating a human arm and which is provided with a rubber or latex tube therein adapted to be filled with water or other suitable liquid to simulate veins.

So called "training arms" of this general character are already known but they are not satisfactory for a number of reasons.

One of the objects of my invention is to provide a training arm which may be so constructed as to have the palpability of a human arm and, if desired, may approximate a human arm in form or shape. Another object is to provide a device of this character which may be penetrated by a needle with substantially the same facility as a human arm and in which it will be easy to detect when the needle penetrates the tubing used to simulate the veins. Another object is to provide a training arm in which the tubing will be of such character and so positioned that it will simulate the roll of a natural vein. A further object is to provide a device of this character which is simple and inexpensive to make.

I accomplish these objects by constructing my arm in the manner described below and illustrated in the accompanying drawing in which—

Fig. 1 is a cross section of my preferred type of arm;

Fig. 2 is a similar cross section of a modified type;

Fig. 3 is a section of Fig. 4 in the plane **3—3**, and is similar to those shown in Figs. 1 and 2, but illustrates an extremely simple but serviceable type of arm;

Fig. 4 is a perspective view of the arm shown in cross section in Fig. 3; and

Fig. 5 is an exploded perspective view showing the elements incorporated in the arm illustrated in Figs. 3 and 4.

Referring to Fig. 1, which illustrates a preferred type of structure, the central portion **1** thereof simulates the bone of the arm. This portion may be formed from a roll of newspaper or the like about **13"** long which may be tapered to simulate generally the shape of a human arm and secured in shape with Scotch tape. Surrounding the central portion **1** is a plaster of Paris bandage **2** which is wrapped firmly around the central portion **1** and molded to the desired shape. When the bandage is dry, a layer of foam rubber **3** is fitted snugly around the bone and held by adhesive tape. A U-shaped groove **4**, such as shown in dotted outline at **18** in Fig. 4, is then cut or burned in the foam rubber to accommodate the rubber or latex tubing **5** simulating the veins. The burning may be done by heating red hot the tip of a 16 penny nail held with pliers, or, an electric soldering iron with a loop tip may also be used provided the tip temperature is high enough. These grooves should be burned to a depth of about ⅛" and about 5/16" wide at the surface. However, they should be only wide enough to allow a slight roll of the vein-simulating tubing in order to resemble the roll of a natural vein. Where the grooves are burned, powder dusted therein will absorb some of the gummy residue which remains.

Instead of burning the grooves, they may be formed by first cutting a slit in the foam rubber with a razor blade to a depth of about ⅛", and thereafter widening the slit to about 5/16" at the surface with scissors.

In order to hold the tubing in place, a small quantity of glue or rubber cement may be applied to the bottoms of the grooves but it must be used sparingly so that the

veins will roll even though they are attached to the foam rubber.

The tubing is then laid in the grooves and a thin layer of cotton **6**, say 1/16" to ⅛" thick, simulating the subcutaneous tissue and making the veins less prominent, is laid thereover. The whole thing may then be covered with a veterinary sleeve **7**, simulating the skin, which is slipped thereon and tied at each end. If necessary, in order to make the arm large enough so that the sleeve will fit smoothly thereover, it may be built up with additional cotton.

Referring now to Fig. 2, which shows a cross section of a modified type of arm, here, the bone-simulating structure **8** is formed of papier-mache which may be made by tearing enough newspaper into bits to make about three quarts of torn pieces. These are soaked in hot water for an hour and then boiled until soft. The mass is then rubbed into a fine pulp and the excess water squeezed out. A quarter of a cup of salt and enough flour, say 3 to 4 cups, is then mixed therewith to make a clay-like mixture. The mixture may then be spread on a strip of newspaper or the like, molded to the desired shape, and secured with Scotch tape.

A U-shaped groove for the rubber tube may then be pressed into the molded form with the eraser end of a lead pencil. The groove should be about ⅛" deep and wide enough to allow a slight roll of the tube.

The molded arm is then allowed to dry in a warm place for about 24 hours, after which the tube **11** may be placed in the grooves and secured by strips of Scotch tape. A thin layer of cotton **12** is then placed over the tube and the arm is snugly wrapped in thin, plastic sheet material **13**.

In Figs. 3, 4 and 5, I have illustrated a very simple modification of my invention. Here, a wood splint **14** about 4" wide and 18" long forms a rigid base for the arm. The top of the splint is covered with a ¼" layer **15** of cotton which can be secured in place with adhesive tape **16**. An additional strip of cotton **17**, about ⅛" thick and 2" wide, is placed upon the first layer of cotton; one end thereof being about 2" from the end of the splint. The tube **18** simulating the veins is then laid in U-shape form, as shown in Fig. 4, on the first layer of cotton along the edges of the second layer of cotton, as best shown in Fig. 3. A third thin layer of cotton **19**, say 1/16" to ⅛" thick, simulating the subcutaneous tissue, is placed over the tubing and makes it less prominent; and a thin plastic or latex cover **20**, representing skin, is wrapped firmly and smoothly around the structure and secured to the bottom of the splint by thumb tacks **21**.

Fig. 4 illustrates generally how the device is used. Both ends of the tubing **18** project beyond one end of the arm. One end **22** is closed by tying or clamping, and a 10 cc. syringe **23** filled with water is fitted to the other end of the tube. An intravenous needle (not shown) is inserted in the tied or clamped end of the tube and the tubing is filled with water from the syringe **23**; the air being allowed to escape through the needle. The needle is then removed and the syringe functions as a reservoir to maintain the tube full of water at all times.

From the foregoing, it will be apparent that the vein-simulating tubing is disposed in grooves in the tissue-simulating portions of the arm or, at least partially surrounded by such portions, as shown in Fig. 3, but that it may roll to a slight degree like a natural vein.

The thickness of the layer of cotton overlying the veins may be varied or, where a new trainee is about to practice venipuncture, omitted entirely, so that the trainee will be able to see the veins as well as feel them. As the trainee progresses, a thin layer of cotton may be placed over the veins thus making them less visible but easy to palpate. As the trainee becomes more skilled, a thicker layer of compressed cotton may be placed over the veins making them impossible to see and therefore making it necessary to depend entirely upon palpation in order to locate them.

While I have described my invention in its preferred embodiment, it is to be understood that the words which I have used are words of description rather than of limitation and that changes, within the purview of the

appended claim, may be made without departing from the true scope and spirit of my invention in its broader aspects.

What I claim is:

A training arm for teaching venipuncture and intravenous therapy; said arm comprising a rigid element simulating bone; a first covering for said element formed of yielding material simulating tissue and having a U-shaped groove therein; a latex tube simulating veins disposed in said groove and projecting at least slightly outwardly beyond the surface of said covering; a thin layer of yielding material simulating subcutaneous tissue overlying said tube, a thin, sheet material simulating skin overlying said thin layer of yielding material; and means for maintaining said tube substantially filled with liquid; said tube being secured in said groove substantially at the bottom only and being otherwise free to roll slightly in said groove when palpated.

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