

Dec. 2, 1958

T. H. GEWECKE

2,862,495

HYPODERMIC NEEDLE

Filed May 6, 1955

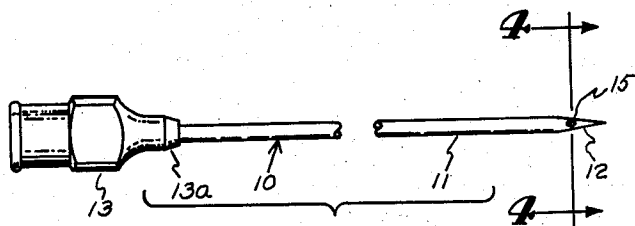


Fig. 1.

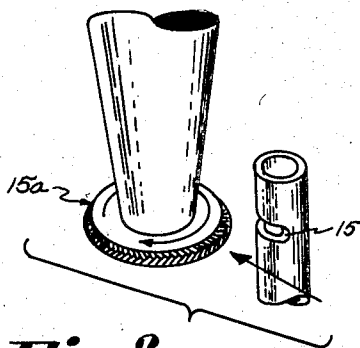


Fig. 2.

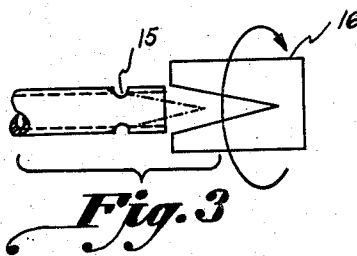


Fig. 3.

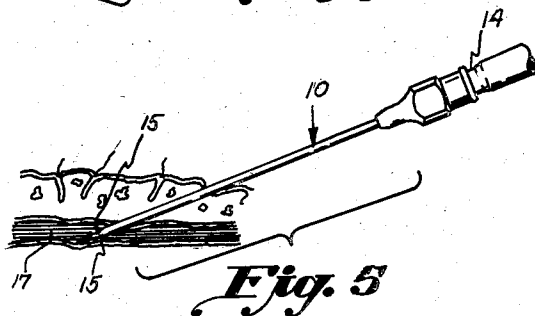


Fig. 5.

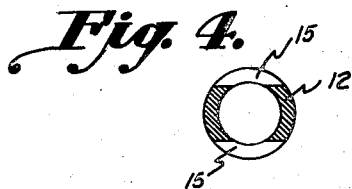


Fig. 4.

THEODORE H. GEWECKE

INVENTOR.

BY *Jerome F. Fallon*

ATTORNEY

1

2,862,495

HYPODERMIC NEEDLE

Theodore H. Gewecke, Glenview, Ill., assignor to
Baxter Laboratories, Inc.

Application May 6, 1955, Serial No. 506,448

3 Claims. (Cl. 128—221)

This invention relates to a hypodermic needle and, more particularly, to a hypodermic needle incorporating an improved structural arrangement whereby the need for orienting the sharpened end is eliminated.

Although many forms of hypodermic needles have been used in the past, the most popular form has consisted of a tube of stainless steel provided with a sharpened end achieved by a bevel cut. Although the bevel may be at a substantial angle, there is presented an elliptical opening which, upon skin puncture, may cause undesirable coring. Coring is deemed undesirable not only because of the increased pain, which is necessarily attendant on any skin puncture, but also because the cored portion might find its way into the blood stream which might result in an embolism. Furthermore, the puncture made by the conventional needle generally results in a scar which takes some time to disappear.

A real drawback in the conventional bevel-ended needle is the need for orienting the inserted end with respect to the vein wall. If care is not exercised, the beveled edge will lie against the vein wall, substantially retarding flow of liquid through the needle. To overcome this, many needle manufacturers provide some mark on the needle hub to indicate the plane of the beveled end. Notwithstanding such marking, often needles are inserted improperly or otherwise assume a position where the flow is retarded, necessitating the painful operation of orienting the needle.

It is, therefore, an object of my invention to provide a needle overcoming the above-mentioned disadvantages, especially in eliminating the need for orienting the needle. Another object is to provide a needle capable of achieving a substantially non-coring skin puncture. Another object is to provide a novel hypodermic needle structure wherein the fluid flow to and from the needle is achieved through at least two openings in the side wall thereof. Other objects and advantages of my invention will be seen as this specification proceeds.

Essentially, my invention includes a rigid tubular needle having a closed pointed end, the point thereof lying in the axis of the needle and being the end portion of an integral tapered section of the needle. To communicate the bore of the needle with the exterior, I provide at least two openings in this tapered portion.

My invention will be explained in conjunction with the accompanying drawing, in which Fig. 1 represents an elevational view of the hypodermic needle of my invention; Fig. 2 is a perspective view of the needle of my invention in its first stage of manufacture wherein openings are provided in the sidewall of a tube; Fig. 3 represents an elevational view of the hypodermic needle of my invention in the swaging stage of its manufacture, the completed needle being shown in dotted lines; Fig. 4 is a cross-sectional view taken along the line 4—4 of Fig. 1; and Fig. 5 is an elevational view partially in section of the hypodermic needle of my invention shown inserted into a vein.

Referring now to the drawing and, in particular, to Fig.

2

1, the numeral 10 generally designates the hypodermic needle of my invention. Needle 10 includes three integral elements: a straight tubular portion 11 which has a substantially uniform cross-section, a conical or tapered portion 12 at one end of straight portion 11, and a hub 13 affixed to the other end of straight portion 11. It is not essential that hub 13 be provided, since it is possible to connect needles to flexible tubing without such a hub. However, a hub is generally provided to facilitate insertion of an adapter 14, as can be appreciated from a consideration of Fig. 3.

I provide at least two openings 15 in tapered portion 12, which communicate with the bore of straight tubular portion 11. A method for providing this structure can be appreciated from a consideration of Figs. 2 and 3, wherein the needle is shown before the openings and sharpened point are provided. To achieve openings 15 I merely grind, as by use of grinding wheel 15a, or cut out portions of the side wall of member 11, adjacent the end thereof opposite the end provided with hub 13, as shown in Fig. 2. I consider it desirable to provide openings 15 as close as possible to the end of straight portion 11 so as to permit use of the needle in small veins. Once member 11 is achieved in the form shown in solid lines in Fig. 3, the end adjacent openings 15 is subjected to a swaging operation wherein tapered portion 12 is provided, the point thereof lying generally in the axis of straight portion 11, the resultant needle being depicted in dotted lines in Fig. 3.

The swaging operation is depicted in Fig. 3, where a swaging die is denoted 16. Swaging is a form of rotary reducing and, in essence, consists of uniformly hammering from a number of lateral directions the metal to be worked. The lateral direction of the applied force distinguishes this operation from "staking," wherein the force is applied longitudinally of the member. Staking, for example, may be employed in securing hub 13 to tubular member 11, resulting in tapered portion denoted 13a in Fig. 1. Swaging is generally performed through the use of at least two rotating dies which have complementary faces. These dies are forced together at various angular positions to effect shaping of the stationary member inserted therebetween. This shaping in the present invention results in a portion characterized by a uniformly decreasing cross-section terminating in a point lying in the axis of tubular member 11.

By swaging the end portion of tubular portion 11, I achieve in one step an end that is superior to the ends of conventional hypodermic needles that required a number of operations to achieve. Conventionally, a needle is cut, ground, buffed and the like in order to achieve sharp cutting edges. Many times conventional needles also have depressed portions in the vicinity of the heel of the elliptical opening in an attempt to minimize coring. Thus, the manufacture of such needles is an involved process.

The advantages of my hypodermic needle can be appreciated from a study of Fig. 5, wherein the needle is shown inserted into a vein 17. Openings 15 are so related with respect to the walls of the vein that it is impossible to block off the flow of fluid as frequently occurs in conventional "bevel cut" hypodermic needles. When such a situation arises, the nurse or doctor in attendance has to readjust the position of the hypodermic needle, which often causes pain or discomfort to the patient.

I prefer to provide oppositely disposed openings 15 in the tapered portion of the needle, as shown in Fig. 4. However, any angular disposition of openings 15 permits the achievement of a needle that is substantially non-blockable in the environment shown in Fig. 5.

The foregoing detailed description has been given for

clearness of understanding only, and no unnecessary limitations are to be inferred therefrom.

I claim:

1. A hypodermic needle comprising a metal tubular portion and a tapered end portion, an adapter-receiving hub on the other end of said tubular portion integral with said tubular portion, said tapered portion being provided with at least two angularly opposed openings communicating with the bore of said tubular portion, the angular disposition of said openings being such that when said needle is inserted into a vein and one of said openings is blocked by the inner wall of said vein, the other of said openings is unobstructed by said vein wall.

2. The structure of claim 1, in which said openings are contained within only the said tapered portion.

3. A hypodermic needle comprising a cylindrical metal tube having a pointed end achieved by swaging, at least

two angularly opposed openings being provided in the wall of said tube adjacent the pointed end thereof, said pointed end being swaged a distance sufficient to include said openings.

References Cited in the file of this patent

UNITED STATES PATENTS

648,858	Dolge	May 1, 1900
1,951,654	Green	Mar. 20, 1934
1,957,235	Simpson	May 1, 1934
2,073,069	Lee	Mar. 9, 1937
2,112,629	Lloyd	Mar. 29, 1938
2,746,455	Abel	May 22, 1956

FOREIGN PATENTS

818,246	Germany	Oct. 22, 1951
---------	---------	---------------