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S. J. EVERETT

2,830,587

HYPODERMIC NEEDLES

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Fig. 1.

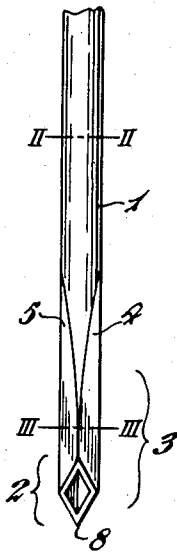


Fig. 2.



Fig. 3.



Fig. 13.



Fig. 6.

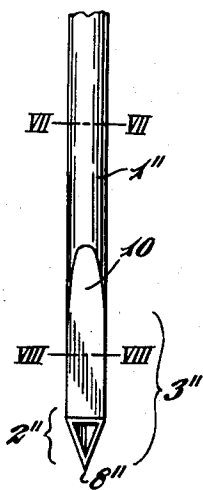


Fig. 7.



Fig. 8.



Fig. 4.

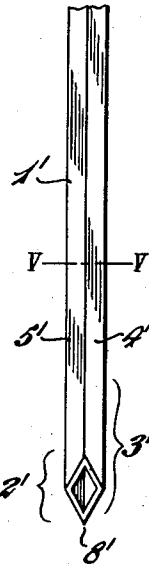


Fig. 5.

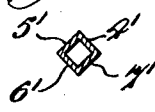


Fig. 12.

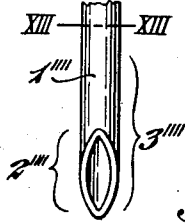
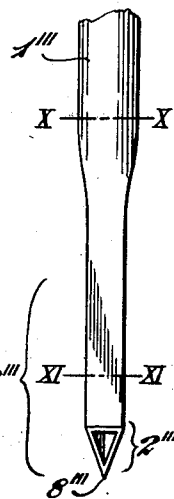
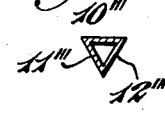


Fig. 9.

Fig. 10.



Fig. 11.



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1

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HYPODERMIC NEEDLES

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8 Claims. (Cl. 128—221)

This invention relates to needles for the injection of a fluid into or the withdrawal of fluid from the body of man or animal. Such needles are herein referred to as hypodermic needles.

The object of my invention is to provide a hypodermic needle having certain advantages both as to manufacture and use compared with the standard hypodermic needle employed at the present time, which comprises a cylindrical tubular shaft with a coaxial bore and a point that is constituted by a concave bevel imposed on the shaft and that is ground off to an acute tip.

The improved hypodermic needle in accordance with my invention comprises a point formed by imposing a plane or longitudinally concave bevel on to an end portion of a tubular shaft that is of uniform or substantially uniform wall thickness transversely, said end portion being of symmetrical non-circular section such that it has a greater resistance to bending in one axial plane than in an axial plane at an angle to the first-mentioned plane, the bevel being symmetrical with the end portion.

Drawn tube of the requisite section of uniform or substantially uniform wall thickness transversely may be readily produced so that it is possible to make a hypodermic needle in accordance with my invention merely by imposing the bevel on a piece of drawn tube of the required length.

The shaft need not have the same section throughout its length and the section of the shaft could, for example, change from that required to give the required point to a circular section. Thus the end of the shaft which is to be held in the hub for attaching the needle to a syringe may be of circular section which may be blended into the required section at the other end of the shaft by pressing or stamping such other end of the shaft into the required shape, all grinding of the surface of the shaft being thus obviated.

For the production of certain shafts in accordance with my invention I may use a soft core of, for example, low melting point metal, or I may use, for example in the production of a shaft end which is, in section, part triangular and part segmental, some other suitable core or mandrel which is withdrawn from the shaft subsequently to the desired shaping thereof.

By the invention a needle can be formed from a shaft of a section which, when pointed, provides a strong needle with good puncturing power. It is also possible to constrict the outlet of the needle whilst maintaining a large diameter bore elsewhere in the needle and thereby to reduce trauma when injecting certain medicaments. Moreover, needles according to the invention are stronger in the axial plane containing the tip than in a plane at right angles thereto. For example, a shaft of oval section would be more resistant to bending in the plane containing the major axis than in the plane containing the minor axis. This is of advantage in injection when it is necessary to locate the point of the needle accurately.

Various embodiments of the invention will now be de-

2

scribed with reference to the accompanying drawing, in which:

Figures 1, 4, 6, 9 and 12 are partial elevations of five different forms of hypodermic needle;

5 Figures 2 and 3 are sections of the first needle taken on the lines II—II and III—III respectively in Figure 1;

Figure 5 is a section of the second needle taken on the line V—V in Figure 4;

10 Figures 7 and 8 are sections of the third needle taken on the lines VII—VII and VIII—VIII respectively in Figure 6;

Figures 10 and 11 are sections of the fourth needle taken on the lines X—X and XI—XI respectively in Figure 9, and

15 Figure 13 is a section of the fifth needle on the line XIII—XIII in Figure 12.

In the figures, like parts in the different needles are denoted by the same reference numerals and distinguished by primes.

20 The first needle, illustrated in Figures 1 to 3 of the drawing comprises a tubular shaft 1 of uniform wall thickness having a main portion which is of circular cross section. The shaft 1 has an end portion designated 3 which, adjacent the point 2, has a square section (Figure 3), the shaft thus being formed with four plane longitudinal faces 4, 5, 6 and 7, which are contiguous at the end portion 3 and which, remote therefrom, merge into the main portion of the shaft. The total length of the faces depends on the gauge of the needle; for a 25 gauge needle the length should exceed $\frac{5}{16}$ " and for an 18 gauge needle this length should exceed $\frac{3}{8}$ ". The point 2 is formed by imposing a plane bevel on the end portion 3 the shaft extending down to the junction of the faces 6 and 7 and symmetrically with respect thereto.

30 It will be appreciated that the imposition of the bevel automatically forms a tip 8 with the requisite cutting edges and no grinding of the surface of the shaft is required.

The second needle illustrated in Figures 4 and 5 is similar to the needle of Figures 1 to 3 except that the tubular shaft is of square cross-section throughout its length, and there is therefore no need for a separate manufacturing step for forming the plane faces 4', 5', 6' and 7'.

45 The third needle illustrated in Figures 6 to 8 is similar to the needle of Figures 1 to 3 except that instead of forming four faces on the end portion of the shaft, only three faces 10, 11 and 12 are formed. These faces are equal whereby the end portion 3" adjacent the point 2" has a section in the form of an equilateral triangle.

50 The fourth needle illustrated in Figures 9 to 11 is similar to the third needle just described except that the main portion of the needle is of oval cross-section.

55 The fifth needle illustrated in Figures 12 and 13 has a tubular shaft 1"" which is of elliptical section throughout its length. The imposition of the bevel on this tube does not automatically result in a tip with the requisite cutting edges, and such edges must be formed subsequently.

60 In all the needles illustrated the end portions are such that there is more resistance to bending in one axial plane than in another axial plane at an angle thereto. The second, fourth and fifth needles have main portions which also have this characteristic, especially the fourth and fifth needles where the resistance to bending in the plane containing the major axis will exceed that in the plane at right angles thereto containing the minor axis.

I claim:

1. A hypodermic needle having a point formed by imposing a bevel on a tubular shaft, the end portion of said shaft having uniform wall thickness (measured perpendicular to the wall) over substantially the whole length of said portion, the cross-section of said end portion being

70

3

symmetrical and noncircular, the bevel being such that the point appears symmetrical when seen in any direction contained by an axial plane perpendicular to the general plane of the bevel, said cross-section being such that the resistance to bending of said portion is greatest in said plane perpendicular to the general plane of the bevel.

2. A hypodermic needle having a point formed by imposing a bevel on a tubular shaft, the end portion of the shaft having uniform wall thickness (measured perpendicular to the wall) over substantially the whole length of said portion, the cross-section of said end portion being symmetrical and uniform apart from the beveled end of said portion and having two sides which intersect on the line of symmetry so as to form an angle and provide two contiguous longitudinal faces on said shaft end portion, the cross-section providing the greatest resistance to bending in the axial plane containing the line of symmetry, and the bevel having its general plane perpendicular to said last mentioned plane and intersecting the line of intersection of said two faces whereby a tip with cutting edges is automatically obtained on imposition of the bevel.

3. A needle as claimed in claim 2 wherein said two sides of the cross-section are straight whereby the two contiguous longitudinal faces of the shaft are plane.

4

4. A needle as claimed in claim 2 wherein the end portion, apart from the beveled part thereof, has a rhomboid section.

5. A needle as claimed in claim 2 wherein the end portion, apart from the beveled part thereof, has a triangular section.

6. A needle as claimed in claim 2 wherein the main portion of the tubular shaft is of circular section and merges into the end portion of noncircular section.

7. A hypodermic needle having a point formed by imposing a bevel on a tubular shaft, the end portion of the shaft having uniform wall thickness (measured perpendicular to the wall) over substantially the whole length of said portion and a uniform oval cross-section apart from the beveled end of the portion, the general plane of the bevel being perpendicular to the axial plane containing the major axis of the oval cross-section.

8. A needle as claimed in claim 7, wherein the bevel is a plane bevel.

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