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METHOD OF MAKING A HYPODERMIC SYRINGE

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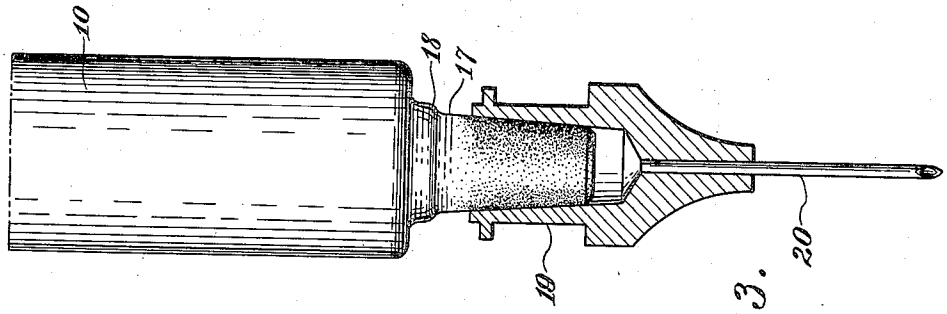


Fig. 3.

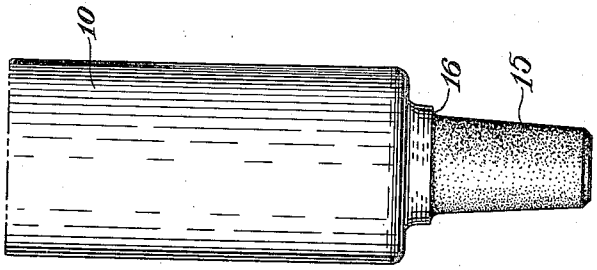


Fig. 2.

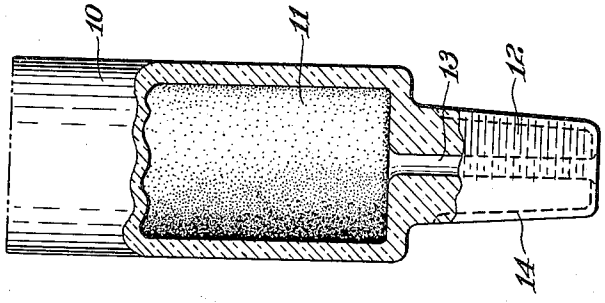


Fig. 1.

Inventor

LOGAN EISELE

By Robert J. Killman

Attorney

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METHOD OF MAKING A HYPODERMIC SYRINGE

Logan Eisele, Nashville, Tenn.

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6 Claims. (Cl. 49—84)

This invention relates to the manufacture of hypodermic syringes of glass or like material and particularly to that type of syringe having a conically ground nozzle adapted to be inserted into the hub of a suitable hypodermic needle. The object of this invention is to provide a method of strengthening such nozzles particularly by glazing or forming a new skin on the glass surface at certain points where the grinding operation has left conditions which are likely to cause fracture under strain.

Heretofore, syringe barrels of this type have been prepared by forming a nozzle blank upon the end of the barrel by the application of suitably shaped tools after the glass had been softened by heat. A portion of this blank was then ground to the proper conical shape and dimensions by means of a grinding tool having a tapered cavity of suitable size and shape. Due to this operation a shoulder or ridge was formed at the boundary line on the blank where the ground portion joined the unground portion. Due to the abrupt change in diameter at this point and to the fact that the skin of the glass has been ground away, this region was relatively weak and breakage was frequent.

It is an object of the present invention to eliminate this weak point by reglazing or reforming a skin upon the glass at this point and by making the change in diameter more gradual.

Three steps in the carrying out of this invention are represented by the accompanying drawing in which

Figure 1 is an elevation of a syringe barrel having formed thereon a nozzle blank, and

Figure 2 is an elevation of a syringe barrel after the grinding operation has been performed on the nozzle blank, and

Figure 3 is an elevation of the completed syringe barrel showing the reglazed portion of the nozzle and also showing in section a conventional hypodermic needle in place thereon.

In the drawing the numeral **10** denotes the usual syringe barrel having the interiorly ground piston receiving cylinder **11**. Projecting from the lower end of the barrel **10** is the nozzle blank **12** formed by applying suitable moulding tools to the glass after it has been softened by the application of heat. A duct **13** is formed through the center of the nozzle blank. The formation of this blank and the duct through it is performed by tools and methods which are well known in the art.

The next step is the grinding of the nozzle along the dotted lines **14** of Figure 1. The end is usually ground off, the conical surface ground, and the end chamfered. The results of this operation are shown in Figure 2. It will be seen that there is formed an abrupt shoulder or ridge **16** which marks the boundary between the ground portion **15** and the unground portions of the nozzle. The skin or surface of the glass has been broken at this point and due to the concentration of strain at this point caused by the abrupt change in diameter, fractures at this shoulder are very common.

According to the method of my invention I subject the nozzle to a further step which so changes the contour and surface qualities of the nozzle as to obviate this difficulty by strengthening the nozzle at this point.

This is done as follows. The syringe barrel is given a rotation about its longitudinal axis in a suitable fixture well known in the art. The entire nozzle and particularly the shoulder **16** is given an up heat by means of an air-gas flame. Next the shoulder **16** and the ground surface immediately adjacent are subjected, while rotating, to an oxygen-gas flame which melts the ground surface at this point and causes a new skin to form thereon, which gradually merges into the ground conical surface as shown by numeral **17** in Figure 3. The heat also melts the sharp corner of shoulder **16** of Figure 2 and causes it to become round and smooth as at **18** in Figure 3.

The entire nozzle is then subjected to a down heat in an air-gas flame for annealing purposes.

It is this smoothing out of the sharp edge of shoulder **16** and the forming of a new skin or glazed surface upon the shoulder and the adjacent area which results in the added strength given to the nozzle by my method of manufacture.

The usual hub **19** carrying cannula **20** is shown in place upon the finished nozzle in Figure 3.

It is of course obvious that the details of my method may be varied to suit the individual requirements of manufacture without departing from the spirit of my invention. I therefore desire the above description and the accompanying drawing to be considered as illustrative and not restrictive, my invention being limited only by the scope of the appended claims.

I claim as my invention:

1. In the manufacture of hypodermic syringes having a ground surface thereon, the step which consists in forming a new skin on said ground surface by the application of heat.

2. In the manufacture of hypodermic syringes having a projecting nozzle, said nozzle having a conically ground surface, the step comprising re-

glazing said ground surface by the application of heat.

3. In the manufacture of hypodermic syringes having a projecting conical nozzle having a ground surface, the step comprising subjecting a portion of said ground surface to heat whereby said portion of the ground surface is reglazed.

4. A method of manufacturing hypodermic syringes which comprises the forming of a projecting nozzle blank, the grinding of a portion of the surface of said blank to a conical form, and then subjecting the ground surface immediately adjacent the unground surface of said blank to the action of heat whereby a portion of said ground surface is reglazed.

5. The method of manufacturing glass hypodermic syringes having ground conical nozzles which comprises forming a nozzle blank on the end of the syringe by shaping the glass while soft under the influence of heat, grinding a portion of said blank to a conical shape, leaving an abrupt boundary between the ground and unground portions, subjecting the nozzle and particularly the said boundary and the ground portions adjacent thereto, to an annealing heat, then subjecting the boundary and the ground portion adjacent thereto to a softening heat whereby a glaze is formed thereupon, and finally subjecting the nozzle to an annealing heat.

6. The method of manufacturing glass hypodermic syringes having ground conical nozzles which comprises forming a nozzle blank on the end of the syringe by shaping the glass while soft under the influence of heat, grinding a portion of said blank to a conical shape, leaving an abrupt boundary between the ground and unground portions, subjecting the nozzle and particularly the said boundary and the ground portions adjacent thereto, to an annealing heat, then subjecting only the boundary and the ground portion adjacent thereto to a softening heat whereby a glaze is formed upon a portion only thereof, said glaze merging gradually and imperceptibly into the ground portion without sensible line of demarcation, and finally subjecting the nozzle to an annealing heat.

LOGAN EISELE.