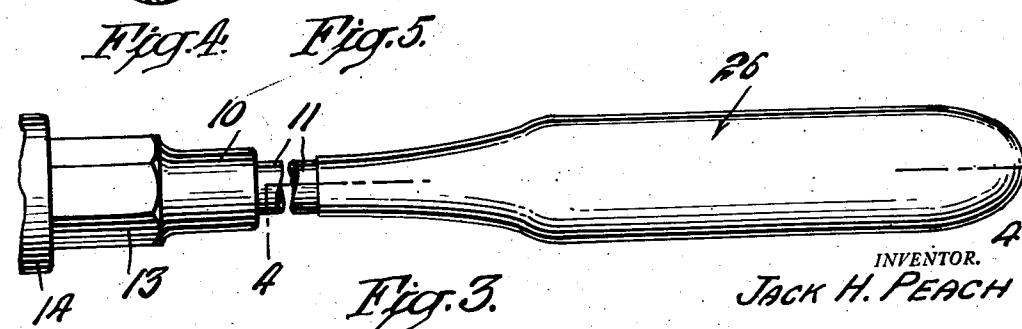
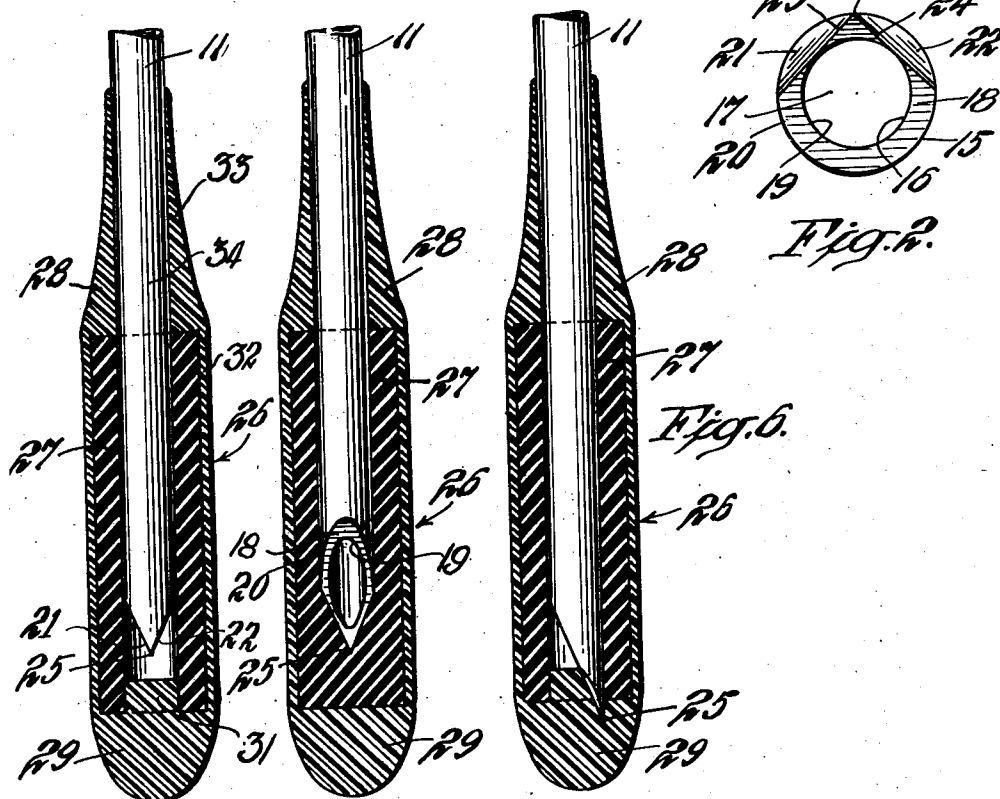
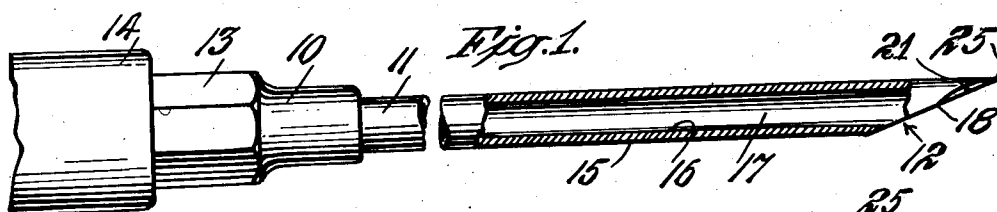


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J. H. PEACH  
HYPODERMIC NEEDLE GUARD  
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INVENTOR.  
JACK H. PEACH  
BY Frank A. Bauer  
ATTORNEY

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2,799,272

## HYPODERMIC NEEDLE GUARD

Jack H. Peach, New York, N. Y.

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6 Claims. (Cl. 128—221)

This invention relates to the packaging of medical needles and relates particularly to the protection of the penetrating end.

One of the important parts of medical needles such as hypodermic, parenteral, spinal, venous, and special with or without two or more hollow or solid cannulae and/or stiletts is the inserted end of the needle. The edges and surfaces of the inserted end of the needle should be smooth and even so as not to cause pain or irritation. A venous needle with a rounded end surface that has become rough will cause irritation on prolonged insertion. When hypodermic needles are forced into the flesh dull or rough cutting edges will cause pain. In the case of hypodermic syringes the needles are usually detachable from the barrel of the syringe and when a needle becomes dull it is replaced by a sharp needle. The sharp smooth edges and surfaces may be protected by caps or guards placed over the end of the needle after grinding of the cutting edges to maintain the needle in a sharp smooth condition.

An object of the invention is to provide a guard for protecting tips of the various types of needles against dulling and roughening action.

Another object of the invention is to provide a guard that is easily mounted on the end of a needle and readily removed leaving the needle clean and ready for use.

A further object of the invention is to provide a guard that is inexpensive and durable.

Other objects and advantages will be apparent from the following specification taken in connection with the drawings in which:

Fig. 1 is a sectional view of a hypodermic needle;

Fig. 2 is an end view of the point of a hypodermic needle;

Fig. 3 is a plan view of a hypodermic needle with a guard;

Fig. 4 is a sectional view taken along lines 4—4 of Fig. 3; and

Fig. 5 is a sectional view of a needle with another form of guard;

Fig. 6 is a sectional view of a needle inserted into the tip of the guard.

In the embodiment for illustrating the invention a hypodermic needle is shown in Figs. 1 and 2 comprising a base 10 and a shaft or stem 11 with a piercing or penetrating point 12. The base 10 has a tapered slip fit female portion 13 for mounting the hypodermic needle on the barrel 14 of a syringe. The stem 11 has a cylindrical wall with an outer surface 15 and an inner surface 16 defining the cylindrical passage 17. The tip of the stem is ground at an angle to the axis of the stem to form an oval-shaped surface 18 (Fig. 5). An inner cutting edge 19 and an outer cutting edge 20 is formed between the surface 18 and the inner surface 16 and the outer surface 17, respectively. The outer surface 15 at the end is ground to form two beveled surfaces 21 and 22. The surfaces 20 and 21 intersect with the end surfaces 18 to form cutting edges 23 and 24, respectively. Grinding of the surfaces 21 and 22 sharpens the point to form a

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thin piercing tip 25 which initially severs the flesh on insertion of the needle. The beveled surfaces form with the end surface 18 the flaring piercing edges 23 and 24 which shape the tip 25 into a V-shape.

5 The protection of the sharp cutting edges is of paramount importance so that each needle will be sharp and acceptable at the time of usage. In the use of these needles in hospitals, clinics and the like, it is desirable that each needle should be at its maximum sharpness whether new or reconditioned and that none are dull or rough.

10 The cutting edges are protected by a guard 26 formed over the point of the needle. The guard comprises a rubber cap 27 and an outer plastic sheath 28. The cap 27 is preferably of a soft pliable rubber into which the needle is easily inserted without dulling the cutting edges. The rubber should be of such a firmness as to prevent the tip from passing through the entire length of the cap under normal pressure. A number 65 neoprene rubber is preferred. The cap may be solid rubber with a cylindrical shape as shown in Fig. 5 or may be tubular as shown in Fig. 4. The solid form of cap is preferably used for small diameter needles and the tubular cap is preferably used for larger diameter needles. The cap is inserted on the end of the needle and the edges are embedded to isolate or protect them from shocks and blows.

15 The rubber cap has a shaft or stem gripping portion which is stretched or distended as the piercing point is inserted longitudinally into the cap. This portion grips the end of the stem to hold the cap from dislodgement by random hits. The other end of the cap extending beyond the pointed tip is flexible and resilient to normal forces and pressures. The end will distort or flex. This flexure does not loosen the gripping of the stem portion. The gripping of the stem is firm and is preferably removed by a longitudinal pull or push sliding the cap off of the needle. The stem may extend through the entire length of cap and have a portion projecting beyond the end as shown in Fig. 6. The rubber cap is then firmer on the needle. The sharp edges are protected by the cap and any blows are cushioned by the rubber. The exposed tip is protected by the end 29 of the coating or plastic sheath 28. The guard seals the end of the passage 17 so that foreign matter will not enter the passage and circulation of air is prevented through the passage so that foreign matter is not carried into the passage.

20 When the rubber cap is in place the stem and cap are inserted vertically into a bath of liquid ethyl cellulose. The cap is submerged and then removed and held vertically. The ethyl cellulose forms a liquid film around the stem, the cap and the end of the cap. On cooling the ethyl cellulose forms a solid plastic sheath around the stem adjacent to the cap. With the needle or stem in a vertical downward position a hemispherical drop forms on the end of the cap. The liquid bath of ethyl cellulose is at a temperature of approximately 450° F. At this temperature the viscosity of the ethyl cellulose is low and the ethyl cellulose spreads without being too fluid and running off of the end of the cap. This coating provides a resilient cushion to further protect the cutting edges.

25 The hemispherical end 29 provides a cushion at the end of the cap in case the tip of the cutting edge projects slightly through the end of the cap. It also reduces the shock of any endwise blow with the solid sheath on the cap. The needle may be handled without dislodging the cap from the end of the needle. The sheath extends along the longitudinal sides of the cap forming a film covering 32 and above the cap the sheath extends in a tapered portion 33 along portion 34 of the needle adjacent the end of the cap. The tapered portion 33 of the sheath 28 adheres to the surface of the portion 34 and grips

it to hold the rubber cap securely in place. The guard covers the tip portion of the stem and preferably does not extend to the base of the needle. A major portion of the stem even for short needles is exposed. The cap covers the cutting edges and the portion of the stem to provide a firm grip on the needle.

In the dipping of the tubular cap and needle in the molten plastic a small amount of plastic extends in the passage of the tube to form an insert 31. The insert 31 projects inward for a short distance preferably short of the tip 25. The tip 25 may, however, extend beyond the end of the cap and project into the cushion 29. The cushion 29 protects the tip from abrasive action and retains the edges sharp. The plastic is yieldably solid. The insert 31 will overlap the tip 25 and extend preferably only a short distance along the surface 18. With the insert only projecting along a portion of the surface 18 the end of passage 17 does not become plugged. When the guard is removed the insert 31 is integral with the cushion 29.

The cap and coating may be easily removed by pulling the guard off. Usually the cap and coating will pull off together, leaving the end of the needle clean. However, if shreads or pieces of the sheath adhere to the end of the needle they may be easily pulled off with the fingers without leaving any film or residue to be removed by a solvent. The burnished surface of the needle is smooth so that there are no rough surfaces into which the liquid ethyl cellulose can be deposited.

It is thus seen that the guard provides adequate protection for the cutting edges under all conditions of handling, packing and shipping of the needles. Yet the guard on the needle can be easily removed when the needle is to be used.

Various modifications and changes may be made in the embodiments shown without departing from the scope of the invention.

I claim:

1. In combination with a medical needle having an inner passage and an insertable tip, a guard comprising a soft pliable solid cap fitted longitudinally on the tip of the needle to protect the tip and gripping said needle along the tip and immediately adjacent thereto to securely hold said cap on the needle, a plastic sheath formed over said tip and having a plastic cushion at one end and extending along the sides of said cap and needle in a thin cylindrical coating and extending in a tapering portion along said needle beyond the end of the cap to adhere to the needle and assist in retaining the guard thereon.

2. In combination with a hypodermic needle having an inner passage and an insertable tip, a guard comprising a tubular rubber cap fitting longitudinally on the needle with the tip inside the cap, said cap having a gripping portion overlapping a portion of the stem adjacent to the tip, a plastic sheath having a cushion at the open end of said cap to seal it against foreign matter and having a plastic coating extending along the cylindrical

side of the cap and along a short portion of the needle adjacent the cap to retain the cap on the needle.

3. In combination with a medical needle having an inner passage and an insertable tip with cutting edges, a guard comprising a cylindrical soft pliable rubber cap having an outside diameter substantially greater than the outside diameter of said needle and having a length greater than the length of the tip, said cap positioned lengthwise on said needle to cover the full length of the tip, a plastic ethyl cellulose sheath having a hemispherical shaped portion on the end of said cap and a film portion extending along the side of said cap to a gripping portion in contact with said needle and holding said cap on said needle against unintentional removal.

4. In combination with a medical needle having an inner passage and an insertable tip, a guard comprising a soft pliable elongated cap having a longitudinal passage fitted over said tip end of the needle with the point partially extending beyond the end of the cap and having a portion gripping the needle adjacent the tip a plastic sheath having a hemispherical shaped portion on the end of said cap embedding said extending point and a film portion extending along the side of said cap to a gripping portion in contact with said needle and holding said cap on said needle against unintentional removal.

5. In combination with a medical needle having an insertable tip and the end of a stem a guard comprising a soft pliable elongated cap telescopically fitted in gripping contact with the tip and a stem portion adjacent said tip, said cap having a protective portion projecting longitudinally off of said stem to recess the tip in said cap to cushion the impact of blows, a pliable plastic sheath formed over said cap and having a plastic cushion projecting longitudinally from the end of the cap to extend the protective portion, said sheath having a plastic film along the elongated outside surface of said cap and a tapered portion extending in adhering contact with said stem extending outside of said cap to securely hold the cap on said stem against unintentional removal.

6. In combination with a medical needle having an insertable tip at the end of a stem a guard comprising a soft pliable elongated cap telescopically fitted in gripping contact with the tip and a stem portion adjacent said tip, said tip protruding a fraction of the cutting edges from the end of said cap, a plastic sheath on said cap having a plastic cushion extending from the end of said cap with the protruding tip to protect said cutting edges, said sheath having a plastic film along the elongated outside surface of said cap and a tapered portion extending in adhering contact with said stem extending outside of said cap to securely hold the cap on said stem against unintentional removal.

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