April 26, 1955 H. F. BRAMSTEDT 2,706,987

INSERT FOR SURGICAL NEEDLE CLAMP

Filed Sept. 12, 1952

Fig. 3

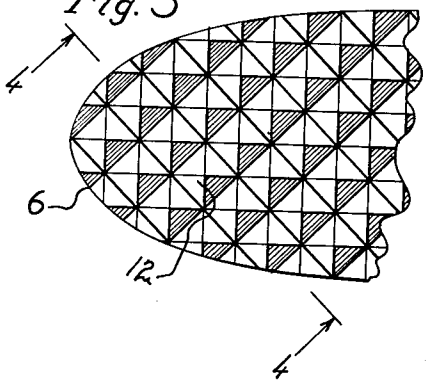


Fig. 1

Fig. 2

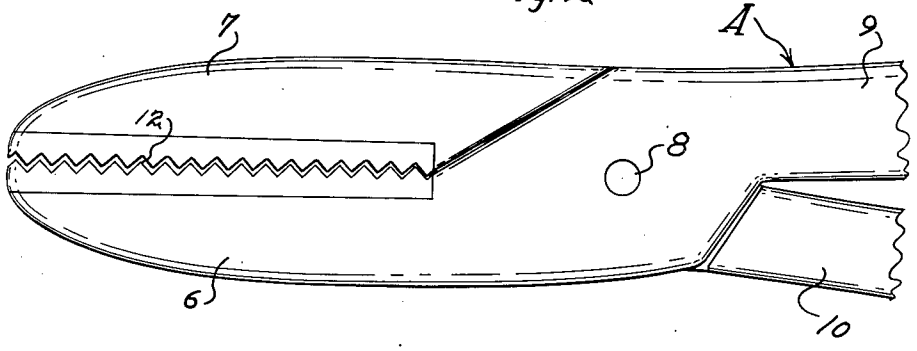
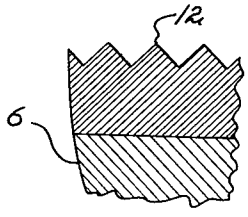


Fig. 4



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United States Patent Office 2,706,987 Patented Apr. 26, 1955

2,706,987

INSERT FOR SURGICAL NEEDLE CLAMP

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Application September 12, 1952, Serial No. 309,319

3 Claims. (Cl. 128—340)

This invention relates to an insert member for surgical needle clamps.

It is an object of my present invention to provide a new surgical needle clamp insert having improved gripping teeth which will be relatively durable yet will securely and positively hold a needle therebetween when mounted between the jaws of a needle clamp.

It is still another object to provide an insert for needle clamps having a plurality of closely spaced teeth with each tooth being constructed in the shape of a small pyramid having a square base with a predetermined hardness and a predetermined angle of inclination for the sides of said pyramid and the height of each tooth being maintained between certain prescribed predetermined limits.

More specifically, it is an object to provide a needle clamp jaw insert having pyramidal teeth and made from a material having a Rockwell hardness of between 53 and 70 with the angle of inclination of the sides of the pyramid forming each tooth being between 40 and 45 deg. and the height of each tooth being between .004 and .008 inch.

I have found through experimentation that, to provide durable gripping teeth which will securely hold a surgical needle against slipping, the hardness of said teeth, the size and shape of said teeth, as well as their position relative to one another in the jaws of the clamp, are extremely critical and that deviation from the above prescribed limits will produce teeth which will break off if too brittle, or sharp-pointed, or too long, and will not grip satisfactorily if they are too short or too blunt and will become dull if the hardness of the material is below a Rockwell hardness of 53.

These and other objects and advantages of my invention will more fully appear from the following description made in connection with the accompanying drawings wherein like reference characters refer to the same or similar parts throughout the several views and in which:

Fig. 1 is a perspective view of a needle clamp with the jaws in clamping position against a surgical needle held therebetween;

Fig. 2 is an enlarged side elevational view showing the intermeshed relationship of the jaw teeth;

Fig. 3 is a plan view of the teeth of one of the jaws; and

Fig. 4 is a vertical sectional view taken substantially along the diagonal line 4—4 of Fig. 3 through the vertices of a number of the teeth.

As illustrated in the accompanying drawings, I show a conventional surgical needle clamp instrument A having a pair of jaws **6** and **7** pivotally interconnected by the pivot pin **8** and respectively connected with the actuating levers **9** and **10** and adapted to be held in clamped position by the conventional saw-toothed clip arrangement **11**.

Obviously, as pointed out in the Snowden patent, the required resiliency of the actuating levers **9** and **10** to permit the gripping force to be adjustably varied is not desirable from the standpoint of providing a durable gripping surface when engaged with the relatively hard surgical needles. Therefore, suitable insert members of prescribed hardness are connected to the opposed faces of the jaws **6** and **7** by any suitable means such as by silver solder or the like and the design and hardness of the teeth of these insert members determines their gripping power and durability. As best shown in Fig. 2, the teeth of the opposed inserts are disposed to intermesh with one another when in closed position.

The teeth of my insert members are best illustrated in Figs. 2, 3 and 4 and each tooth is in the shape of a small pyramid **12** having a square base and the inserts are cast from dies which provide an extremely efficient and inexpensive means for manufacturing said inserts. As has been previously stated herein, the hardness of the material from which these inserts are cast must be carefully controlled and, after considerable experimentation, I have found that this hardness must be maintained between the Rockwell hardness numbers of 53 to 70 to produce a durable tooth which will neither break off due to brittleness or become dull from being too soft.

Each of these teeth must be carefully designed since the size and shape thereof are also critical in producing efficient and long-lasting gripping action on the needles without roughening the outer surface of the needle.

The optimum angle of inclination of the sides of the pyramid forming each tooth is between 40 and 45 deg. Increasing this angle above 45 deg. produces a tooth which is too sharp and will not only damage the needles but will also tend to break off and become dull. Decreasing this angle below 40 deg. will produce a tooth which is too blunt and which will not effectively grip a needle. The length of the tooth has been also found to be critical and teeth shorter than .004 inch do not satisfactorily grip the needle, and teeth longer than .008 inch are subject to breakage and apt to damage the needles.

Since the needle clamp A rarely, if ever, grips a needle in straight-across relation, it is desirable to provide the grooves between the teeth in diagonal relationship relative to the longitudinal center lines of the jaws **6** and **7**. I have found that an angle of 45 deg. in both directions produces the most effective and usable angle. The number of teeth per inch of length which are required to securely hold a needle are between 40 and 52 and this of course is controlled to some extent at least by the length of each tooth and the angulation of the sides thereof.

It will be seen that I have provided an extremely simple, yet highly efficient tooth design for needle clamp inserts and it should be pointed out that this design is the result of long experimentation and trial and error tests which I have conducted, and variations from the limitations set forth herein will materially reduce the efficiency or durability of the gripping action of the tooth.

It will of course be understood that various changes may be made in the form, details, arrangement and proportions of the parts which, generally stated, consists in the matter shown and described herein and set forth in the appended claims.

What I claim is:

1. A jaw insert for surgical needle clamps comprising a body made from a metal having a Rockwell hardness of at least 53 and not more than 70 and having a plurality of closely spaced teeth, each being constructed in a pyramidal shape with the angle of inclination of the sides of said pyramids being disposed at between 40 and 45 deg. relative to the base and providing between 40 and 52 such teeth to each inch of length.

2. The structure set forth in claim 1 and each of the pyramidal teeth being at least .004 inch in length and not over .008 inch.

3. The structure set forth in claim 2 and the pyramids forming said teeth having a square base with the grooves therebetween being disposed at 45 deg. relative to the longitudinal center line of the insert.

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