

[54] **FORCEPS**

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[58] Field of Search 128/354, 321, 322, 303.1

[56] **References Cited**

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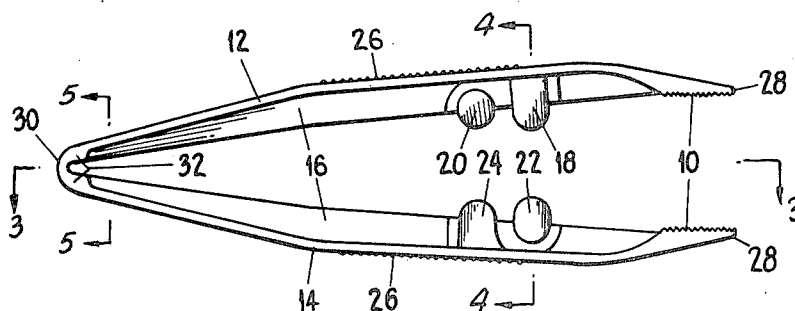
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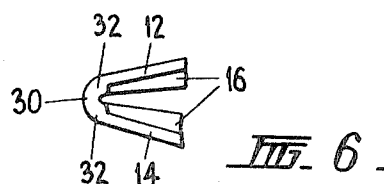
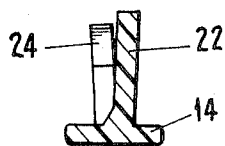
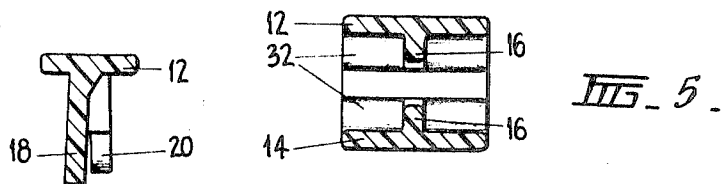
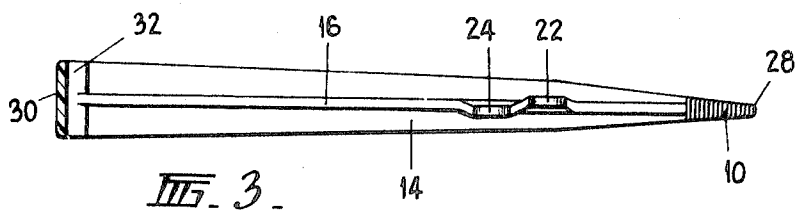
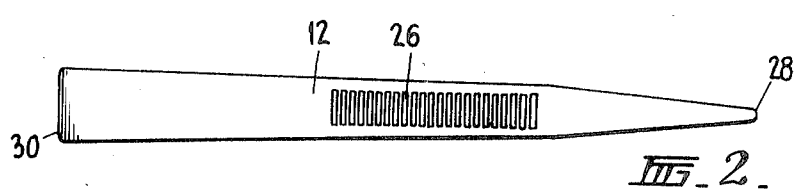
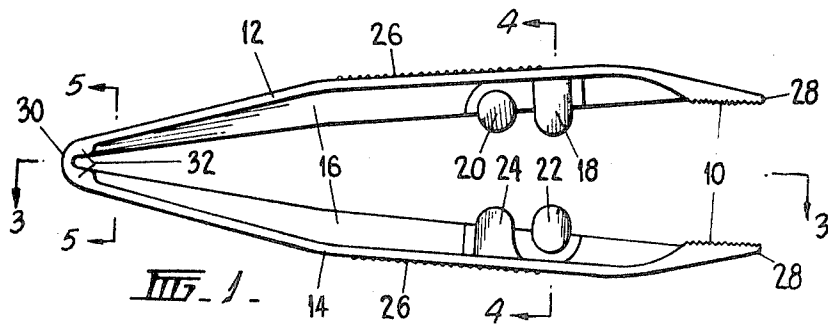
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ABSTRACT

A surgical forceps moulded from plastic material having two arms forming a generally U-shaped configuration having a closed end and an open end, the arms extending in a longitudinal direction in a given plane and movable toward and away from each other in said plane, the arms being generally T-shaped in cross-section, the arms being joined at the closed end of the forceps by a thin hinge strip of resilient plastic material moulded integrally with the arms, said thin strip having a small thickness dimension extending in said longitudinal direction in said given plane, a width dimension, and a length dimension extending in and parallel to said given plane, said length being small in comparison to the width of the strip.

7 Claims, 6 Drawing Figures





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FORCEPS

This invention relates to improved surgical forceps and more particularly to forceps manufactured from thermoplastic materials.

Because of cost factors, there has been a trend in recent years away from stainless steel surgical equipment towards equipment made from plastic materials and, in this connection, there have been considerable efforts made to produce satisfactory surgical forceps.

The normal pattern of plastic forceps involves the manufacture by injection moulding of a generally U-shaped unitary construction having two arms tapering to points at their forward ends as seen in side view, and having serrations to permit gripping of sutures or other articles. The arms are usually T-shaped in cross-section and arrangements must be provided whereby they can be caused to move relative to each other.

Various methods have been tried for permitting pivotal movement of the arms but all have suffered from various disadvantages including uneven pivotal movement of the two arms resulting in failure of the points to meet correctly, and instability of the hinges permitting one arm to move sideways in relation to the other as the arms are pressed inwardly towards each other.

A fairly commonly attempted solution is to weaken each arm at a position spaced from the junction point of the two arms, but this has been found unsatisfactory for the reasons outlined above.

It is an object of this invention to provide an improved pair of surgical forceps.

It is a further object of the invention to provide a pair of surgical forceps made from plastic material in which the arms will bend substantially evenly towards each other to give satisfactory meeting of the points.

A still further object of the invention is to provide a pair of plastic surgical forceps in which sideward deflection of the arms will be minimized.

According to the invention there is provided a pair of surgical forceps moulded from plastic material having a generally U-shaped configuration, each arm being generally T-shaped in cross-section, the two arms being joined by a thin strip of resilient plastic material moulded integrally with the arms. This arrangement permits even bending of the points of the forceps towards each other but, if the length of the strip of thin material measured around the configuration of the "U" is unduly great, the forceps can be weakened and there will be sideward deflection of the arms relative to each other as pressure is applied to cause the points to meet.

It is therefore a further feature of the invention that the strip of joining material is of relatively short length as compared with its width.

In order that the invention may be more readily understood, it will now be described by way of example with reference to the accompanying drawings wherein:

FIG. 1 is a front elevational view of a pair of surgical forceps according to the invention,

FIG. 2 is a side view of the same forceps,

FIG. 3 is a sectional view on line 3—3 of FIG. 1,

FIG. 4 is a sectional view on line 4—4 of FIG. 1,

FIG. 5 is a sectional view on line 5—5 of FIG. 1, and

FIG. 6 is a fragmentary side elevational view corresponding to the left-hand end of FIG. 1 and illustrating an alternative form of the invention.

It will be observed that the forceps, in accordance with normal practice, are of generally U-shaped configuration and are provided with serrations 10 for gripping purposes on the end faces of the arms 12, 14. Each arm is generally T-shaped in cross-section as can be seen more distinctly in FIG. 4.

The web 16 of each arm is provided with two projections 18, 20 and 22, 24, respectively, of which projection 18 is opposite projection 22 and projection 20 is opposite projection 24. Each of projections 18 and 24 is displaced from the general surface of web 16 to the left as viewed in FIG. 3, and each of projections 20 and 22 is displaced from the general plane of web 16 to the right as viewed in FIG. 3.

As a result of this arrangement, the projections interlock as the arms 12, 14 approach to prevent sideward movement of the arms relative to each other.

The outer surface of each of the arms 12, 14 is provided with a series of ridges 26 which form a nonslip grip.

The arms taper to a point 28 at their free ends.

At the base of the "U" the web 16 is dispensed with to leave a strip of substantially flat thermoplastic material 30 which forms a hinge for the arms 12, 14. This enables the arms to move towards each other under light finger pressure but it has been found that, unless some form of reinforcement is provided and the length of strip 30 measured around the circumference of the "U" is made relatively small, the arms are readily deflected sideward and the projections 18, 22 and 20, 24 fail to interlock.

In the form of the invention illustrated in FIGS. 1 to 5, the reinforcement is provided by means of blocks 32 integrally moulded with the forceps and filling in the space either side of web 16.

The necessity for the arms 12, 14 to move towards each other results in web 16 being of less depth at the hinge end than at a point remote from the hinge end. This reduces the rigidity of the forceps adjacent the hinge, but the reduction in depth of the web 16 is in large measure compensated for by said blocks 32. The blocks result, as can be seen from the drawing, in the formation of a substantially solid mass of plastic material at the hinge end of the forceps, with a line of weakness across the mass to enable the two arms of the forceps to move relative to each other.

FIG. 6 illustrates an alternative form of invention in which the blocks 32 have a somewhat different configuration giving a shorter strip 30 acting as a hinge for the arms. As in the case of the reinforcement illustrated in FIGS. 1, 3 and 5, the space on each side of the web 16 is filled to form a substantially solid mass of plastic material at the hinge end.

The forceps of the invention are preferably made by injection moulding of thermoplastic material. Polypropylene is the preferred material but satisfactory results may be obtained with other thermoplastic materials such as polycarbonate.

I claim:

1. A surgical forceps moulded from plastic material having two arms forming a generally U-shaped configuration having a closed end and an open end, the arms extending in a longitudinal direction and movable toward and away from each other, the arms being generally T-shaped in cross section, the arms being joined at their inner ends at the closed end of the forceps by a thin hinge strip of resilient plastic material which resiliently holds the outer ends of the arms in space-apart relationship moulded integrally with the arms, said thin strip having a small thickness dimension extending in said longitudinal direction, a width dimension, and a length dimension connecting together the inner ends of the arms, said length dimension being small in comparison to the width of the strip and said thickness dimension being less than the thickness of one of said T-shaped arms.

2. A pair of surgical forceps as claimed in claim 1 wherein the web of said T-shaped cross section tapers towards the closed end of said forceps.

3. A pair of surgical forceps as claimed in claim 1 or claim 2 including reinforcing means at said closed end.

4. A pair of surgical forceps according to claim 3 wherein said reinforcing means comprises integrally moulded blocks of plastic material on each side of each web adjacent said closed end.

5. A pair of surgical forceps as claimed in claim 1 wherein the web of each arm, adjacent the open end of said forceps, is provided with two projections displaced one to each side of the plane of said web, the arrangement being such that, as the forceps close, said projections interlock to prevent relative lateral displacement of the free ends of said arms.

6. A pair of surgical forceps as in claim 1 wherein the web of the T-shaped cross sections taper toward the closed end of the forceps and wherein reinforcing means for resisting sideways deflection of the arms are provided at the closed end, said

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reinforcing means comprising an integrally moulded block filling in the space on either side of each web adjacent the closed end of the forceps, each block being integral with its respective web and with said thin hinge strip.

7. A pair of surgical forceps as in claim 1 wherein the thickness dimension of the hinge strip is about equal to the length dimension.

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