

- [54] **TISSUE GRIPPING SURGICAL FORCEPS**
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 Long Island City, N.Y.
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- [58] **Field of Search** ..... 128/354, 321, 324, 355,  
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 HE, 255 G, 255 TZ, 259 FF, 259 HC, 259 A,  
 259 HE

[56] **References Cited**  
**UNITED STATES PATENTS**

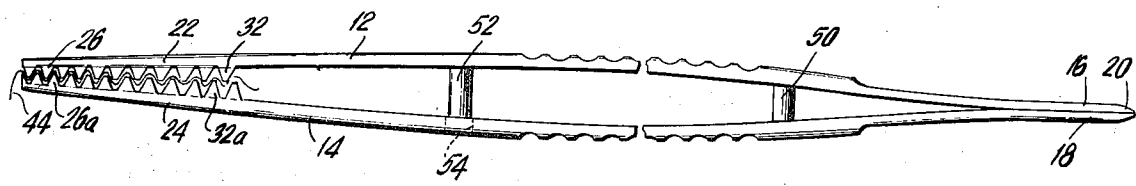
2,668,538	2/1954	Baker.....	128/321
2,686,520	8/1954	Jarvis et al.....	128/346
2,796,065	6/1957	Kapp.....	128/321
3,265,068	8/1966	Holohan.....	128/354

3,515,139 6/1970 Mallina..... 128/346

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 Merle J. Smith; John J. Archer

[57] **ABSTRACT**  
 Surgical forceps for atraumatically gripping tissue during surgical procedures provides two parallel rows of teeth which interdigitate; they interlock but do not make direct contact. The rows of teeth are separated by a groove which extends into the jaw face below the base of the teeth for the reception of tissue. Elongated members have opposed faces and resilient distal ends, at which ends the members are joined. The members are biased away from each other and require a small finger pressure to move the faces into an abutting relation. When the faces are forced into the abutting relation, teeth on the proximal ends interdigitate and positively grip, but do not puncture or otherwise injure, the tissue.

**3 Claims, 4 Drawing Figures**



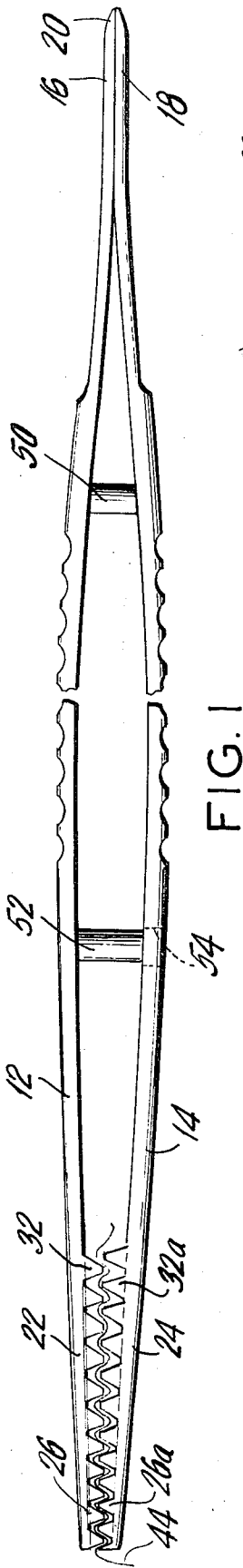


FIG. 1

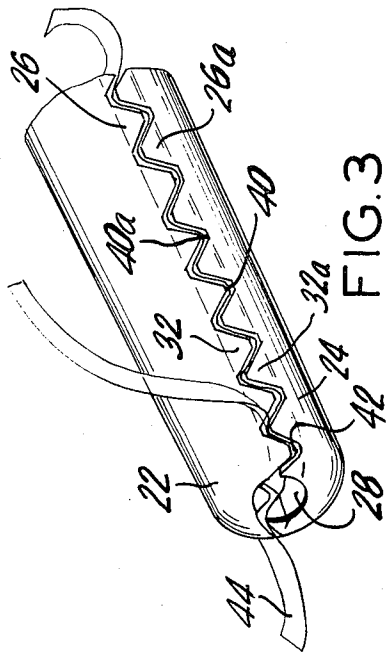


FIG. 3

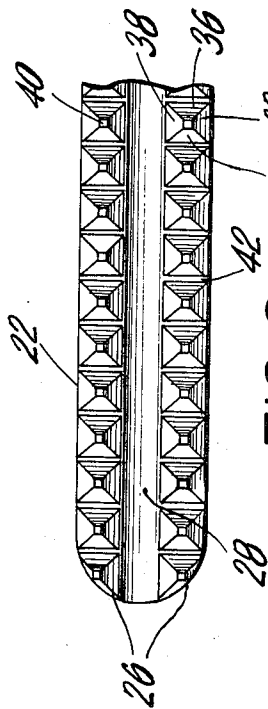


FIG. 2

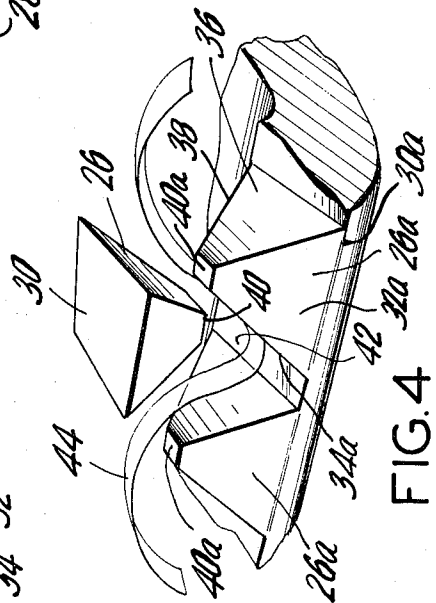


FIG. 4

## TISSUE GRIPPING SURGICAL FORCEPS

## BACKGROUND OF THE INVENTION

The present invention relates to surgical forceps adapted to grip tissue without causing injury thereto.

In many surgical procedures the surgeon is required to hold, lift or displace tissue. During the operation the surgeon must positively grip the tissue, but he must do so in a manner which causes as little damage to the tissue as is possible. This is particularly true where the tissue to be gripped is quite thin or delicate.

There are several prior art forceps and other gripping devices capable of positively grasping the tissue, but they do not perform adequately where the tissue to be grasped is quite thin or delicate. Such tissue can easily be punctured, torn or otherwise injured. Most prior art forceps comprise opposing teeth or ridges which are exactly opposed. In other words the tips of the teeth touch when the jaws are forced together. When thin or delicate tissue is grasped with such devices the teeth tend to produce puncture holes and can even cause the tissue to tear. This is a most disadvantageous characteristic of the prior art and the present invention is directed at providing a solution to this problem. The forceps embodied in the instant invention provide a positive gripping of the tissue but avoid puncture or tearing. The surgical procedure, unhampered by tissue destruction, can be completed without any attendant complication from tissue injury.

## SUMMARY OF THE INVENTION

It is an object of the present invention to provide surgical forceps which permit positive gripping of thin or delicate tissue.

Another object of the present invention is the provision of surgical forceps which cause little or no injury to the tissue.

In accordance with the above designs the present invention is preferably embodied in a tweezer-like structure having cooperating jaw portions. A pair of elongated members are joined at distal, resilient ends. The members are joined such that they are normally biased away from each other and need only a small amount of finger pressure to urge the faces into relative abutting relation. The intermediate portions of the members are knurled so that the instrument can be positively grasped by the surgeon.

The forward or proximal ends of the members have gripping sections formed on the respective faces. Each jaw comprises two parallel rows of teeth separated by a groove which extends into the face of the elongated members below the teeth. The teeth interdigitate when the jaws are forced together; that is, they interlock, but do not make direct contact in normal use. The tissue gripped tends to fill the spaces between the teeth in an undulated or wave-like configuration. In this manner there is relatively little puncture of the tissue and no injury of any other kind. The interdigitating of the teeth permit the positive gripping of even very thin or delicate tissue without harm thereto. The groove provides an additional area filled by tissue, which tissue will be completely free of trauma.

The above and other objects of the present invention will be apparent as the description continues and when read in conjunction with the drawings.

## DESCRIPTION OF THE DRAWINGS

FIG. 1, illustrates a side elevational view of the preferred embodiment of the instant invention.

FIG. 2, illustrates a plan view of a jaw section of the embodiment of FIG. 1.

FIG. 3, illustrates a perspective view of the jaws of the instant invention shown grasping tissue.

FIG. 4, is a greatly enlarged perspective view of a cluster of teeth.

## DETAILED DESCRIPTION

Referring to FIG. 1, it is seen the present invention consists of opposed elongated members 12, 14. The distal ends 16, 18 of members 12, 14 respectively are tapered and joined at section 20. Those ends are resilient and biased away from each other requiring a small, but significant, finger pressure to urge the jaw sections 22, 24 into a mating engagement. An intermediate portion of the outer faces is knurled to facilitate grasping by a surgeon.

Referring to FIG. 2, jaw section 22 is shown in detail and it is to be understood that the description thereof is applicable to jaw 24. The jaw 22 consists of two rows of teeth 26 separated by a groove 28. The teeth 26 are longitudinally spaced and are generally identical. The greatly enlarged view of a cluster of teeth in FIG. 4 illustrates the teeth 26 as generally pyramidal in shape. The teeth 26 comprise a major base 30 and tapered and sloped walls 32, 34, 36, 38 which terminate in the tooth minor base or apex 40. As indicated in FIG. 3 the groove extends into the face of the jaw below the major base 30.

As indicated in FIG. 4, when the jaw sections 22, 24 are forced into a mating engagement the respective teeth 26 on those jaws will mesh. This mesh is characterized by a longitudinal interdigitation by the various teeth; they interlock, but do not make direct contact in normal use. For simplicity, the teeth of jaw 24 as shown in FIG. 4 will be designated the "a" teeth. The cluster of teeth illustrated in FIG. 4 indicates that tooth 26 is centrally received between the teeth 26a with the apex 40 received in the space 42. As previously stated, in normal use there is no direct contact between the teeth 26, 26a. All the teeth on both jaws are similarly received. For instance, teeth 26a would be received between two teeth 26 on the opposing jaw. The only exceptions to this description would be the end teeth on both rows of both jaws. Since there are an equal number of teeth on each jaw, and the teeth on one jaw must be staggered with respect to the other jaw for interdigitation, the forward end teeth on one jaw and the rear end teeth on the other jaw will not fall between two teeth on the opposing jaw.

As shown in FIG. 1, the post 50 is connected to member 12 and bears against member 14 to prohibit the application of excessive pressure. The post 52 is also attached to member 12 and received in hole 54 in member 14 to prohibit any lateral movement of the members with respect to each other which would destroy the alignment of the teeth.

As shown in FIG. 3, the forceps embodied herein are particularly adapted for grasping very thin or delicate layers of tissue. The tissue 44 when grasped lies within the spaces between the teeth 26 and tends to assume the shape of those teeth, however rounding out the edges. In other words, the tissue will assume an undu-

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lated or wave-like configuration. Additionally, a substantial portion of the tissue 44 will fall within the groove 28 and will be entirely free from pressure. In this manner there are many areas for gripping the tissue 44, but the teeth 26 do not puncture the same nor do they exert a substantial pressure thereon. The surgeon can deftly manipulate the tissue 44 without causing any trauma thereto.

The present invention may be embodied in several forms and many changes may be made in the details without departing the spirit and scope of the appended claims, which changes are intended to be embraced therewithin.

What is claimed is:

1. Surgical forceps for atraumatically gripping tissue comprising a pair of opposed elongated members having confronting faces, said members including a rear resilient section and said members joined at said section such that said members are normally biased away from each other, said faces forcible into generally abutting relation with application of a relatively small

amount of pressure, the forward ends of said faces comprising two parallel rows of pyramidal teeth separated by a groove which extends into said face below said teeth, said teeth on the opposed members being identical but longitudinally interdigitating when said faces are in said abutting relation, said teeth adapted for use in surgical procedures requiring the gripping of very thin layers of tissue, said tissue when gripped, tending to fill the spaces between the teeth in an undulated configuration and also tending to fill said groove, whereby the tissue may be positively but atraumatically gripped without puncture or injury.

2. The forceps of claim 1 including a stop post attached to the face of one of said elongated members intermediate the respective ends thereof, said post adapted to abut the opposing face so as to prevent the teeth from making direct contact.

3. The forceps of claim 1 including a knurled intermediate portion adapted for gripping by a surgeon.

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