

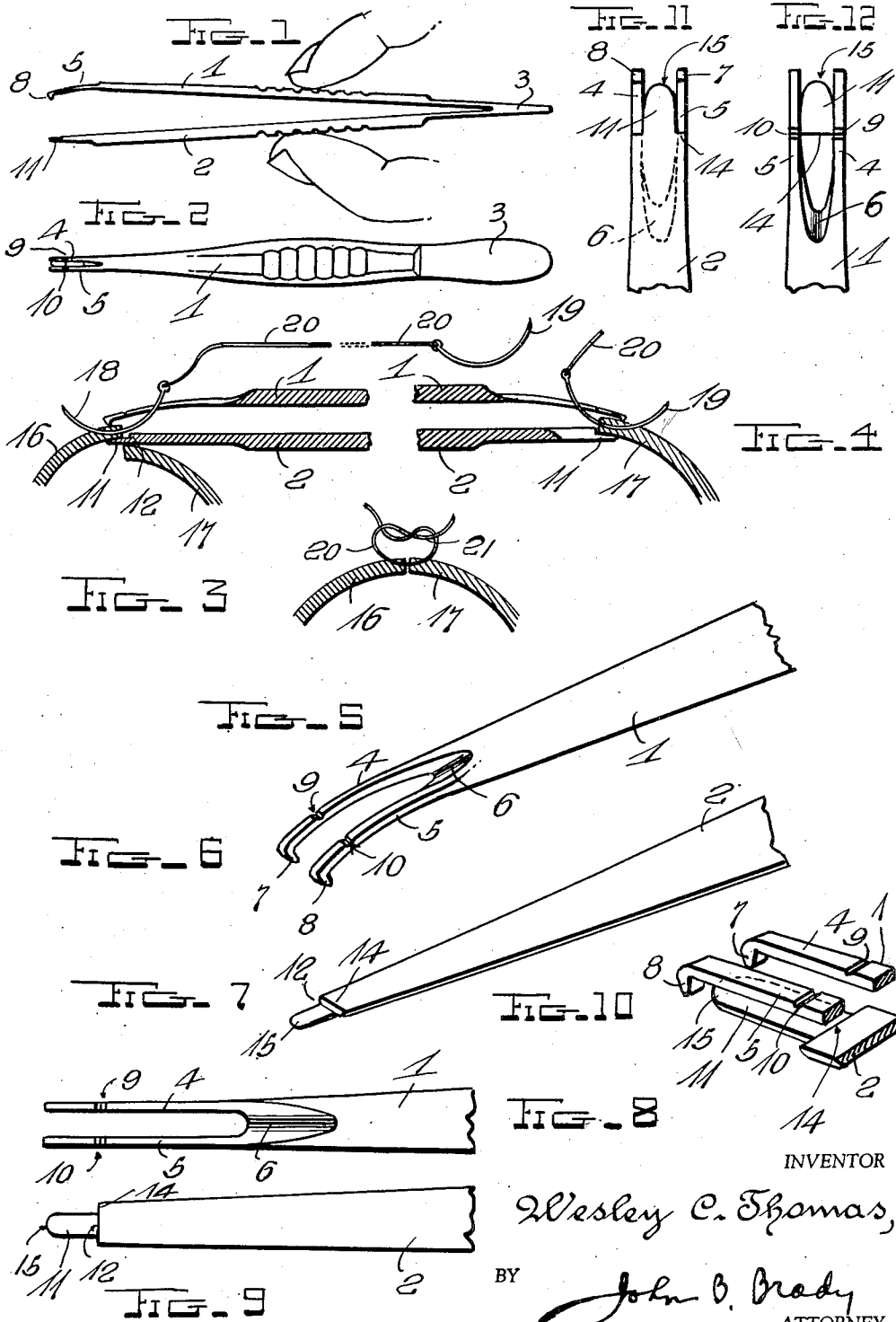
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CORNEOSCLERAL SUTURING FORCEPS

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CORNEOSCLERAL SUTURING FORCEPS

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My invention relates broadly to surgical instruments and more particularly to a forceps for corneal or scleral suturing.

One of the objects of my invention is to provide a construction of forceps particularly adapted for use in eye surgery in facilitating corneal or scleral suturing.

Another object of my invention is to provide a construction of corneoscleral suturing forceps for facilitating the closing of an incision where the surgeon is provided with reliable means for gripping and stabilizing the cornea or sclera while the suturing needle is guided through the coaptation margin of the cornea or sclera and prevented from penetrating too deeply in the thickness of the cornea in performing the suturing operation.

Still another object of my invention is the production of a construction of suturing forceps in the form of tongs having coating termini developed particularly for gripping and stabilizing the margins of the lips of a corneal or scleral incision while performing a suturing operation as set forth more fully in the specification hereinafter following by reference to the accompanying drawings, in which:

Fig. 1 is a side elevation of the corneoscleral suturing forceps of my invention;

Fig. 2 is a top plan view;

Fig. 3 is a fragmentary view showing the manner in which the corneoscleral suturing forceps are used in performing a suturing operation with respect to the left hand portion of the lip of a corneal or scleral incision;

Fig. 4 is a view similar to the view illustrated in Fig. 3, but showing the corneoscleral suturing forceps used in performing a suturing operation on the right hand lip of a corneal or scleral incision;

Fig. 5 is a schematic view showing the suture being tied;

Fig. 6 is a perspective view showing the construction of the upper jaw of the tongs on an enlarged scale;

Fig. 7 is a fragmentary perspective view showing the construction of the lower jaw of the tongs on an enlarged scale;

Fig. 8 is a fragmentary plan view of the upper jaw of the tongs showing the construction of my invention;

Fig. 9 is a plan view of the lower jaw of the tongs showing the construction of my invention;

Fig. 10 is a fragmentary perspective view on an enlarged scale showing the coaction of the upper and lower jaws of the tongs in the construction of my invention;

Fig. 11 is a plan view showing the termini of the tongs in superimposed relation, the view being taken from the exterior of the lower jaw of the tongs; and

Fig. 12 is a plan view of the termini of the tongs viewed from the reverse side of the tongs with respect to the view illustrated in Fig. 11

My invention is directed to a construction of corneoscleral suturing forceps for use by eye surgeons in closing injuries and surgical incisions in the eyeball. In closing wounds in the eyeball the stitches must not go through the entire thickness of the retaining structure of the eye-

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ball, as is the custom in closing skin wounds. In closing openings in the eyeball the needle must enter the coaptation surface near its middle so that when coaptation is completed the retaining stitch is at no point inside the globe.

The tongs of the forceps terminate in a pair of coating blades one of which consists of a pair of spaced tines and the other of which consists of a flat pallet. The pallet extends from the lower jaw of the tongs while the tines extend from the upper jaw of the tongs. The pallet extends from the lower jaw to a transverse offset shoulder providing an abutment above the surface of the pallet on which the peripheral margin of the lip of the cornea or sclera incision may be supported and grasped by the coaction of the tines on the coating jaw of the tongs. This offset allows only half of the margin of the cornea or sclera which is grasped with the forceps to be seen and the needle sliding along the surface of the pallet or blade must enter the proper place in the coaptation area. The terminal 3 mm. of this pallet or blade is about 1/2 mm. thinner than the rest of the blade. The dividing line between these two sections is the offset previously mentioned. The upper blade of the instrument has two tines 1/2 mm. wide, 8 mm. long and 1 1/2 mm. apart. The margin of the wound is grasped in such a way that the coaptation edge lies against the offset of the plane blade and the blade of two tines is outside. The needle passes between the tines along the surface of the plane blade and at the offset enters the margin of the wound at the proper depth.

The tines carry markers or indicators thereon which correspond in position to the offset in the lower jaw so that when the pallet or blade of the lower jaw is obscured by entry beneath the lip of the cornea the surgeon at all times is aware of the extent of projection of the blade of the lower jaw beneath the cornea or sclera by observing the relationship of the markers or indicators on the tines of the upper jaw with relation to the peripheral edge of the lip of the cornea or sclera. The pallet or blade of the lower jaw is slightly narrower than the overall width of the tines on the upper jaw for insuring more reliable gripping and stabilization of the lip of the cornea or sclera without injury to the wound.

Referring to the drawings in more detail, the corneoscleral suturing forceps comprise the tweezers or tongs having upper and lower arms or jaws 1 and 2 connecting through the junction 3. The upper jaw 1 terminates in the spaced tines 4 and 5 formed by the bifurcation in the upper jaw 1, centered therein at 6. The tines 4 and 5 of upper jaw 1 are curved toward the terminus of the lower jaw 2 and terminate in noses or projections 7 and 8, respectively. The tines 4 and 5 are provided with transverse V-shaped notches or markers 9 and 10 on the exterior sides of the tines as shown more clearly in Figs. 6, 8, 10, and 12.

The lower jaw 2 terminates in a pallet or blade 11 which is spaced from the lower jaw 2 by a shoulder or transverse ridge 14. The pallet or blade 11 has a rounded terminus 15. As represented in Fig. 11 the pallet or blade 11 has a width less than the overall transverse width of the upper jaw 1 measured at the outside limits of tines 4 and 5. The termini of tongs 4 and 5 extend slightly beyond the terminus of the pallet or blade 11 as represented at 7 and 8 in Fig. 11.

In Fig. 12 I have shown more clearly the fact that the V-shaped notches or markers 9 and 10 in the tines 4 and 5 are aligned laterally with the transverse offset 12 and ridge 14, whereby the notches or markers 9 and 10 serve as measuring means to enable the surgeon to precisely gage the position of the blade or pallet 11 when inserted beneath the cornea in the process of a suturing operation.

Referring to Fig. 3, I have indicated diagrammatically the left hand lip of a corneal or scleral incision at 16 grasped in the corneal or scleral suturing forceps of my invention. In Fig. 4 I have illustrated a similar operation where the corneal or scleral suturing forceps grasp the right hand marginal lip 17 of the cornea or sclera. The suturing thread is indicated at 20 connected at one end with curved needle 18 and at the other end with curved needle 19.

In the operation depicted in Fig. 3, the lip of the corneal incision 16 is supported on the pallet or blade 11 with the coaptation margin in abutment with the offset of shoulder 12 of the lower jaw 2. The dimensional depth of the offset 12 is such that the thickness dimension of the marginal lip of the cornea or sclera projects substantially above the ridge 14. Noses or termini 7 and 8 of tines 4 and 5 maintain the marginal lip of the cornea 16, in such position that the curved needle 18 connected with thread 20 may be passed through the edge of the cornea or sclera substantially centrally thereof by precisely guiding the curved needle 18 between the spaced tines 4 and 5. Thus, the needle 18 does not pierce the inside surface of the cornea or sclera 16 and is otherwise prevented from piercing the surface of the cornea or sclera by the protection and obstruction offered by the pallet or blade 11. The other lip 17 of the corneal or scleral incision is similarly treated; this is known as a double-armed suture. However, a single-armed suture can be used with the forceps of my invention. In this case the full curved needle is started in the surface of the cornea or sclera and emerges in the coaptation margin just above the elevation in the pane blade. If the point of the needle should go too deep in the thickness of the cornea or sclera the point strikes the ridge 14 and must be withdrawn sufficiently to permit it to emerge above the ridge. From this it will be seen that it is almost impossible to put the needle in too deep if reasonable care is observed, though not altogether as sure and easy as when the double-armed suture is used. In Fig. 4 I have shown the operation where needle 19 is introduced through the coaptation margin of the right hand portion of the corneal or scleral lip 17. In both the operation arrangements of Figs. 3 and 4 the curved needles 18 and 19 connect with thread 20, enabling the thread to be drawn through the lips of the cornea or sclera.

In Fig. 5 I have shown the manner in which the suture is tied at 21 for binding the coaptation marginal edges 16 and 17 together for healing. Fig. 12 shows the view which is generally seen by the surgeon where the lip of the cornea or sclera incision covers the pallet or blade 11 to the offset of shoulder 12. The surgeon visually measures the amount of overlap of the lip of the cornea above the pallet or blade 11 by the position of the notches or markers 9 and 10 on the tines 4 and 5.

The pallet or blade 11 provides adequate protection against penetration of the needle into the cornea or sclera. The tines 4 and 5 are so spaced that they center and guide the needle through the lip of the cornea or sclera in properly centered position without harmful slippage.

While I have described my invention in certain preferred embodiments I realize that modifications may be made and I desire that it be understood that no limitations upon my invention are intended other than may be imposed by the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is as follows:

1. Corneoscleral suturing forceps comprising a pair of coacting tongs for stabilizing the peripheral lip of the cornea adjacent the eyeball during a sewing operation, one of said tongs terminating in a pallet having a transverse offset wall therein forming a transverse ridge, the other of said tongs being bifurcated on the end thereof adjacent said pallet and formed into a pair of transversely spaced tines, said pallet operable to support the peripheral lip of the cornea in abutment with the transverse wall thereof and said tines operable to maintain the peripheral lip of the cornea in position on said pallet whereby a curved needle connected with wound sewing thread may be passed between said tines through coaptation margin emerging through the exterior surface of the cornea just beyond the termini of said tines and restricted from penetrating the interior surface of the cornea by the position of said pallet.

2. Corneoscleral suturing forceps as set forth in claim 1, in which said pallet is of the order of 3 mm. in length and wherein said offset wall rises above the supporting plane of said pallet approximately $\frac{1}{2}$ mm., whereby the coaptation edge of the cornea is supported against said offset wall at least for one-half of the thickness of the cornea and whereby the curved needle pierces the coaptation edge of the cornea at approximately the center of the thickness thereof.

3. Corneoscleral suturing forceps as set forth in claim 1, in which said tines are of the order of $\frac{1}{2}$ mm. wide and each has a length of approximately 8 mm., and wherein said tines are spaced apart transversely for a distance of approximately $1\frac{1}{2}$ mm.

4. Corneoscleral suturing forceps as set forth in claim 1, in which said tines are slightly longer than the terminating end of said pallet.

5. Corneoscleral suturing forceps as set forth in claim 1, in which said pallet is slightly narrower than the overall width of said tines measured transversely across the extreme outside limits of said tines.

6. Corneoscleral suturing forceps as set forth in claim 1, in which said tines are curved toward said pallet and each terminates in a rounded nose adapted to extend at spaced positions on opposite edges of and beyond the curved terminus of the pallet.

7. Corneoscleral suturing forceps as set forth in claim 1, in which each of said tines carries an external marker transversely aligned with the transverse offset wall in said pallet, said markers indicating the extent of overlay of the peripheral lip of the cornea on the pallet from a position viewed exteriorly of the tines above the pallet.

8. Corneoscleral suturing forceps as set forth in claim 1, in which each of said tines contains a V-shaped transverse notch therein aligned with the transverse offset wall in said pallet, said notches indicating the extent of overlay of the peripheral lip of the cornea on the pallet from a position viewed externally of the tines above the pallet.

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