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TREPHINE FOR CORNEAL GRAFTING

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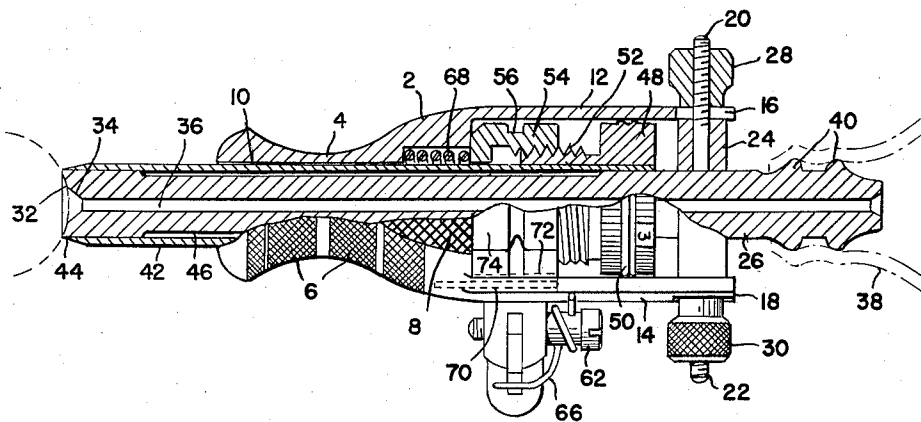


FIG. 1.

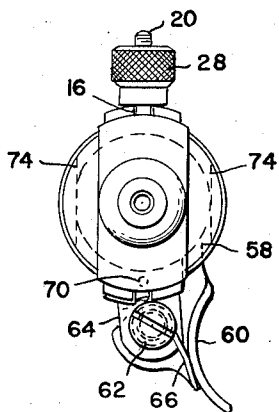


FIG. 2

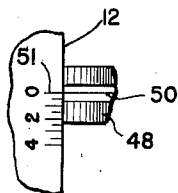


FIG. 3.

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TREPHINE FOR CORNEAL GRAFTING

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6 Claims. (Cl. 128—310)

This invention relates to a trephine for corneal grafting adapted for the cutting and removal of a portion of a cornea to be transplanted and to cut an opening of a proper size in the cornea to which transplanting is effected.

It is the general object of the present invention to provide a trephine which may be readily and accurately manipulated by a surgeon. In the attainment of this general object there are provided associated elements permitting a systematic mode of manipulation which will become more apparent from the following description read in conjunction with the accompanying drawings in which:

Figure 1 is a side elevation, partly in section, illustrating a preferred embodiment of the invention;

Figure 2 is an end view of the same; and

Figure 3 is a fragmentary elevation showing graduations utilized for indicating the depth of a cut.

The trephine comprises a body 2 which has the form of a surface of revolution providing a narrow neck portion 4 which is knurled as indicated at 6, the body 2 having flat portions 8 provided on opposite sides thereof, which portions are also desirably knurled to provide for secure gripping, in conjunction with the neck portion 4, by the surgeon's fingers. The body 2 is provided with a central bore 10 and has extensions 12 and 14 which are slotted at 16 and 18 to receive screws 20 and 22 projecting from a head 24 in which is secured a rod 26, the head 24 being secured in adjusted axial position by means of the knurled nuts 28 and 30 which effect clamping in association with the extensions 12 and 14.

The rod 26 is provided at its active end with a spherical socket portion 32 having a radius corresponding to that of a cornea. This radius may vary somewhat in different instruments depending upon the radius of the cornea to be operated upon. A countersink 34 communicates with a bore 36 extending axially through the rod 26, the other end of the rod being provided with annular projections 40 on which may be secured a rubber bulb 38, or alternatively, a tube leading to a suction producing means.

Surrounding the rod 26 and located within the bore 10 for slidable movement is a sleeve 42 forming the trephining knife and for this purpose provided with an external taper forming a sharp cutting edge indicated at 44. The sleeve 42 must slide freely on the rod 26 and for this purpose it desirably has its guiding engagement with the rod only at the ends thereof, the major portion of the length of the rod being of reduced diameter as indicated at 46 to minimize friction.

At its inner end the sleeve 42 is secured in a circular head 48 which is knurled and provided with a groove 50 the position of which may be read against a scale 51, graduated, for example, in half millimeters provided on the edge of the body extension 12 as indicated in Figure 3. The head may be provided with indices to facilitate measurements to, for example, 0.1 mm. The head 48 is threaded at 52 for reception in a nut member

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54 which is provided with annular groove 56 for engagement by the nose 58 of a latch 60 which is pivoted on a stud 62 in a bracket 64 secured to the extension 14 of the body. A spring 66 surrounds the stud 62 and urges the latch nose into the groove 56. A spring 68 housed in the body 2 urges the nut 54 toward the right as indicated in Figure 1, but the latch normally holds the nut in the position illustrated in that figure. The nut 54 is prevented from rotating by engagement within an axial slot 72 in the edge thereof of a pin 70 secured in the body 2. The nut 54 is flattened at its opposite sides as indicated at 74 to avoid interference with the fingers of the surgeon which engage the flat portions 8 of the body.

In preparing the trephine for use, the head 48 is adjusted to a zero position of the groove 50 with respect to the scale 51 by rotating it within the nut 54 which is held in position by the latch 60 and pin 74. The axial position of the rod 26 is then adjusted to bring its operating end coincident with the knife edge 44. The trephine, sterilized in the usual fashion, may then be placed in contact with the cornea of the eye, the bulb 38 being first pressed and then released to provide suction which will cause the cornea to be engaged tightly with the spherical socket 32 of rod 26. By a progressive projection of the knife, involving back and forth rotational movements of the head 48, the surgeon may then cut into and through the cornea, using the position of the groove 50 relative to the scale 51 to judge the extent of penetration which has occurred. When the cut is complete, the surgeon may use his finger to trip the latch 60 with the result that the sleeve 42 will be withdrawn beyond the end of the rod 26 through movement by the spring 68 of the assembly comprising the tube 42, the head 48 and the nut 54, these parts being moved to a position where the head 48 engages the member 24. Desirably the spring 68 is so chosen that the movement thus taking place is a gentle one to avoid mechanical shock in the instrument. The corneal disc remains held by suction on the end of the rod 26 and may be displaced to a glass plate or the like by pressure on the suction bulb 38.

What has just been described is carried out both on the eye from which the corneal graft is taken and on the eye to which transplanting is to occur, in the latter case the operation being for the production of the opening into which the corneal disc is to be transplanted. The transplanting of the corneal disc into the eye is accomplished in the usual fashion without the use of the instrument, the transplanting involving the usual suturing.

From the foregoing it will be evident that the instrument is well adapted for the purposes indicated. By reason of its construction it may be readily taken apart for cleaning and is also adapted to conventional sterilization procedure.

The instrument may be provided in different sizes for the provision of different diameters of the cutting blade, for example, convenient inside diameters of the cutting blade may be 5.5, 6.5 and 8 millimeters. The arrangement which has been described provides clean cut edges and in view of the fact that the taper of the blade is on the outside of the tube 42 the cutting action provides a tapering of the edge of the cut cornea which aids in holding it in its transplanted position. The use of the same instrument for both cutting operations insures a perfect fit of the transplanted cornea in the socket in which it is received.

It will be evident that various details of the apparatus may be modified without departing from the invention as defined in the following claims.

What is claimed is:

1. A trephine for corneal grafting comprising a body portion, a corneal holding element mounted in said body

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portion and provided with a socket and connections for partial evacuation of the region of the socket, an annular knife surrounding the holding element, and means for projecting the knife beyond the socket end of said holding element.

2. A trephine according to claim 1 in which the projecting means also rotates said knife.

3. A trephine according to claim 1 provided with means for effecting quick withdrawal of said knife.

4. A trephine according to claim 2 provided with means for effecting quick withdrawal of said knife.

5. A trephine according to claim 3 in which the last mentioned means comprises a spring and latch.

6. A trephine according to claim 4 in which the last mentioned means comprises a spring and latch.

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