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(54) **Title:** TREPAN FOR CORNEAL TRANSPLANTATION

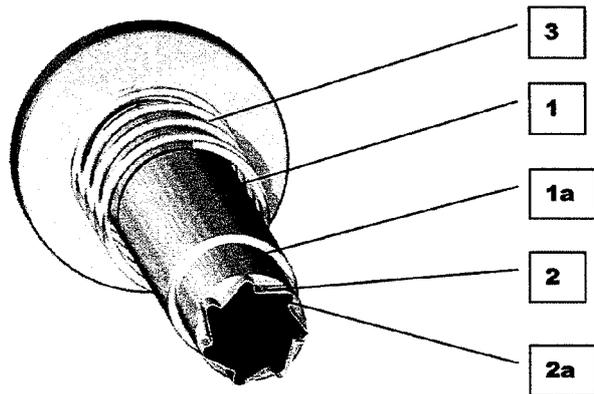


Fig. 2

(57) **Abstract:** It consists of a surgical cutting device for cutting and marking of the cornea or its layer for unique positioning of the obverse and reverse sides during a consequent transplantation procedure, namely during the procedure of a sc. lamellar endothelial transplantation. The working part of the cutting device (1) is formed by a cutting edge (2) at its end. The cutting edge (2) of the tubular body (1a) with the cutting device (1) is equipped with asymmetrically shaped and/or asymmetrically arranged notches (2a) for marking the donor membrane for its proper positioning during the consequent transplantation when the upper and lower sides of the graft are uniquely distinguishable by the edge relief on its periphery.



TREPAN FOR CORNEAL TRANSPLANTATION

Field of technology

The invention is related to the trepan (trephine) for corneal transplantations that is designed for the use for cutting and marking the cornea of the eye and its layer (donor membrane) for its proper positioning during the consequent transplantation.

State of the art

During a corneal transplantation there arises a main issue of the proper positioning of the donor tissue. To ensure the necessary precision of the tissue position and the safety of the whole tissue transfer process, for instance a device according to the Japanese patent application 2002136540 is utilized. It is, however, rather a complex and cost-demanding surgical device.

The ways of a proper positioning of the donor corneal tissue in the transplantation process are dealt with also in the international patent application PCT WO 2008030718 and in the Russian patent 2187989. In all these stated cases the transplantation type is a so called penetrating transplantation when the whole cornea is intersected (the thickness of ca 1mm). It has not been possible so far to successfully identify (denote) the obverse and reverse side during a sc. lamellar transplantation of endothelium for instance when a 10 micrometer thin layer of cornea is used.

Principle of the invention

To some extent, a trepan (trephine) for corneal transplantation according to the invention contributes to solution of the above mentioned problem. It is a device comprising of a surgical cutting device designed for cutting or marking the cornea or its layers, the working part of which is formed by a tubular body with a cutting edge at the end. The nature of the invention lies in the fact that the cutting edge of the tubular body of the cutting device is equipped with asymetrically shaped and/or asymetrically arranged notches for obvious

identification of the obverse and reverse side of the donor membrane for its proper positioning during the consequent transplantation.

The asymmetrically shaped and/or asymmetrically arranged notches are on the periphery of the cutting edge of the tubular body of the trephine formed and situated so that the upper and lower side of the graft is uniquely distinguishable by the edge relief on its periphery.

The main advantage of the trephine according to the invention lies in an easy and quite precise and unambiguous positioning of the obverse and reverse sides of the cornea during the transplantation procedure, mainly during the so called procedure of lamellar endothelial transplantation.

Brief description of drawings

To illustrate the principle nature of the invention, the drawings are attached, where Fig. 1 - represents the overall set of the trephine for corneal transplantation, Fig. 2 - represents the detail of the working part of the cutting device of the trephine.

Example

The trephine for corneal transplantation set - a device containing a surgical instrument designed for cutting and marking of the cornea or some of its layers - in the exemplary embodiment (see Fig. 1) comprises of a stand 4 with the base 5, where on the base 5 a plastic bed is formed 6 for the donor tissue 8 and above the bed 6 in the stand 4 the surgical cutting device 1 for cutting and marking of the donor tissue layer 8 (namely of the cornea) is attached and by a spring 3 to the stand 4 cushioned. A connector 7 for connecting a plastic tube for vacuum control of the tissue fixation is led to the bed 6.

The working part of the cutting instrument 1 of the trephine (see the detail in Fig. 2) is formed by a tubular body 1a, typically a metal one with the cutting edge 2 at its end. The nature of the invention lies in the fact that the cutting edge 2 of the tubular body 1 of the cutting device is equipped with asymmetrically shaped and/or asymmetrically arranged notches 2a for marking the donor membrane for its proper positioning during the consequent transplantation. As is shown in Fig. 2, the asymmetrically shaped and/or asymmetrically arranged notches 2a are on the periphery of the cutting edge 2 of the tubular body 1 of the trephine shaped and situated so that the upper and lower sides - the obverse and reverse sides of the graft then becomes uniquely distinguishable by the edge relief on its periphery.

CLAIMS

1. The trepan (trephine) for corneal transplantation containing a surgical cutting instrument for cutting and marking the cornea or some of its layers, whereas the working part of the cutting instrument is formed by a tubular body with the cutting edge at its end, characterized in that the cutting edge (2) of the tubular body (1a) of the cutting instrument (1) is equipped with asymmetrically shaped and/or asymmetrically arranged notches (2a) for marking the donor membrane for its proper positioning during the consequent transplantation.
2. The trepan (trephine) according to claim 1 characterized by its asymmetrically shaped and/or asymmetrically arranged notches (2a), on the circumference of the cutting edge (2) of the tubular body (1) of the trephine are formed and located so that the upper and lower side of the cut transplant graft is clearly differentiated by the relief of the edge on its circumference.

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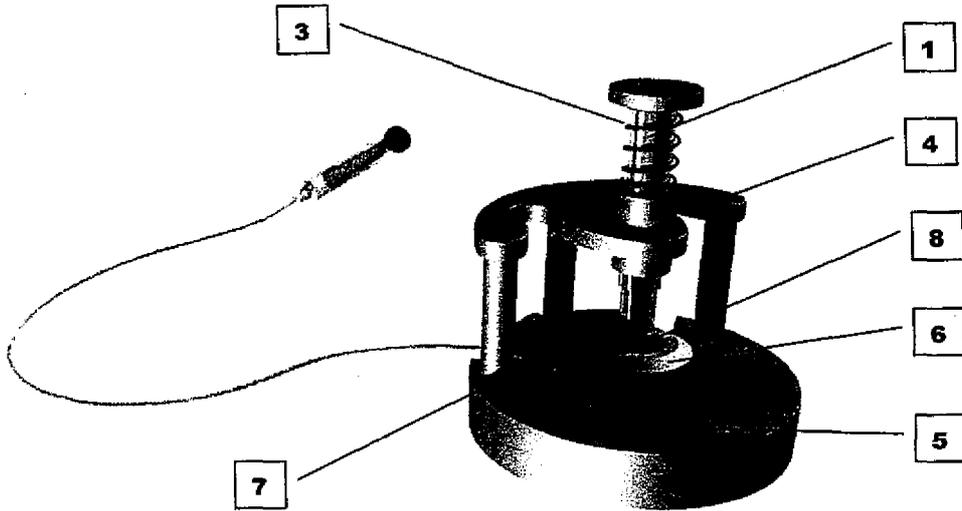


Fig. 1

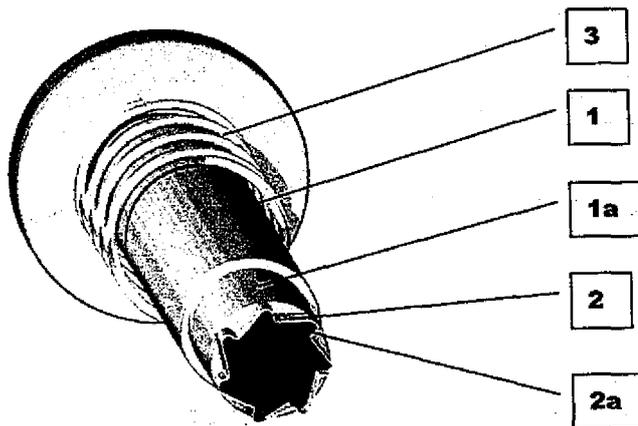


Fig. 2

INTERNATIONAL SEARCH REPORT

International application No
PCT/CZ2014/000054

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61F2/14 A61B17/3205
 ADD.
 According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
 Minimum documentation searched (classification system followed by classification symbols)
A61F A61B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal , WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 718 420 A (LEMP MICHAEL A [US]) 12 January 1988 (1988-01-12) col umn 1, lines 8-10 col umn 2, lines 9-42 col umn 3, line 32 - col umn 4, line 64; claim 4; figure 1 -----	1,2
A	US 5 649 944 A (COLLINS JOSEPH PATRICK [US]) 22 July 1997 (1997-07-22) col umn 2, lines 55-59 col umn 3, line 20 - col umn 4, line 65 col umn 6, lines 48-62; figures 2,3A-D ----- -/- .	1,2

Further documents are listed in the continuation of Box C.

See patent family annex.

- * Special categories of cited documents :
- "A" document defining the general state of the art which is not considered to be of particular relevance
 - "E" earlier application or patent but published on or after the international filing date
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Date of the actual completion of the international search 1 September 2014	Date of mailing of the international search report 09/09/2014
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Merte, Bi rgi t
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INTERNATIONAL SEARCH REPORT

International application No

PCT/CZ2014/000054

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT

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International application No PCT/CZ2014/000054

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