Office de la Propriété Intellectuelle du Canada
Un organisme d'Industrie Canada

Canadian Intellectual Property Office
An agency of Industry Canada

CA 2139263 C 2007/04/17

(11)(21) 2 139 263

(12) BREVET CANADIEN
CANADIAN PATENT

(13) C

(86) Date de dépôt PCT/PCT Filing Date: 1993/06/28
(87) Date publication PCT/PCT Publication Date: 1994/01/20
(45) Date de délivrance/Issue Date: 2007/04/17
(85) Entrée phase nationale/National Entry: 1994/12/29
(86) N° demande PCT/PCT Application No.: DK 1993/000211
(87) N° publication PCT/PCT Publication No.: 1994/001800
(30) Priorité/Priority: 1992/07/06 (DK0885/92)

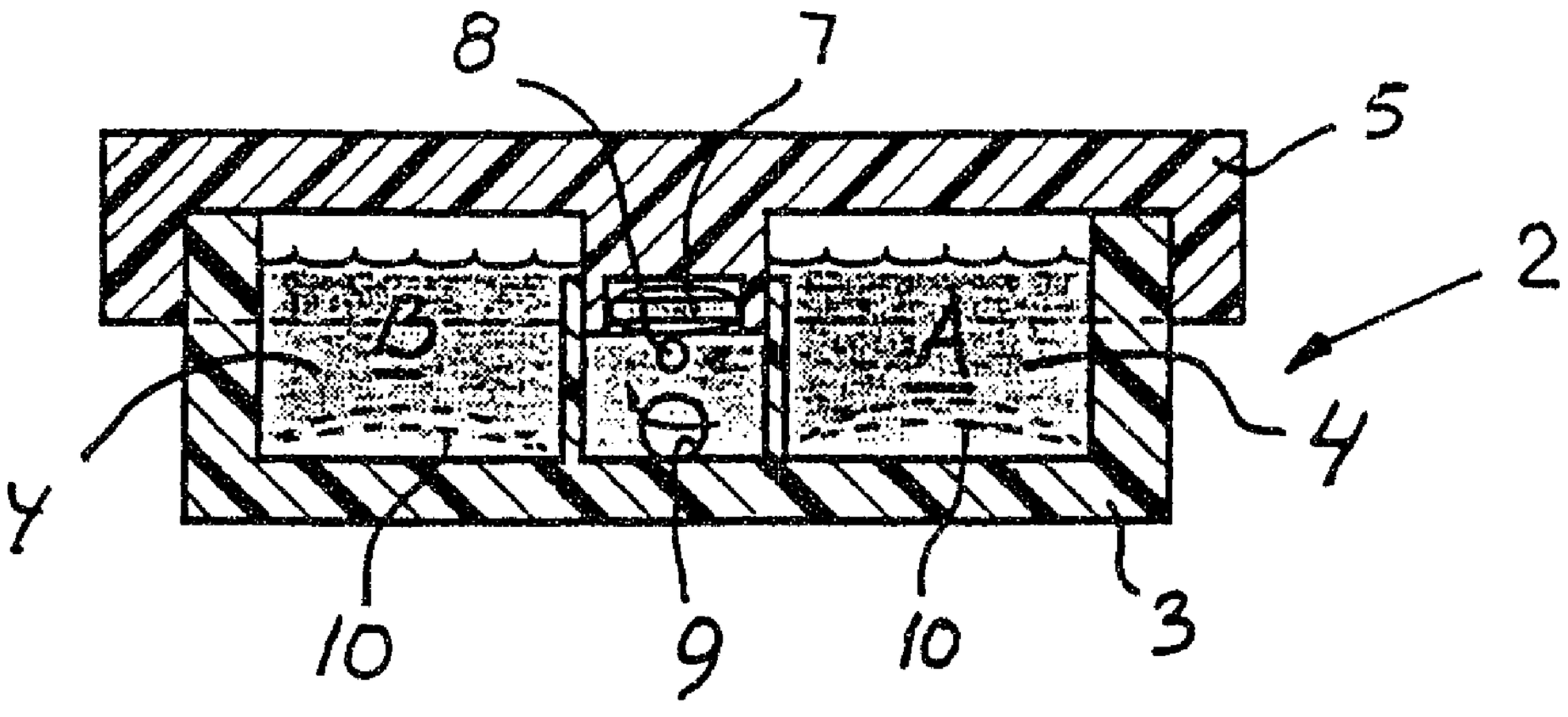
(51) Cl.Int./Int.Cl. *G02C 13/00* (2006.01), *A45C 11/00* (2006.01), *A61L 12/08* (2006.01), *A61L 12/12* (2006.01), *A61L 2/18* (2006.01)

(72) Inventeur/Inventor:
NIELSEN, TOM BURIS, DK

(73) Propriétaire/Owner:
NIELSEN, TOM BURIS, DK

(74) Agent: DENNISON ASSOCIATES

(54) Titre : METHODE ET BOITIER POUR LA DESINFECTION DES LENTILLES CORNEENNES
(54) Title: METHOD AND CASE FOR DISINFECTION OF CONTACT LENSES



(57) Abrégé/Abstract:
A method and a case (2) for disinfection of contact lenses is described, where the contact lenses are placed in a double chamber (4) filled with cleaning fluid, for instance hydrogen peroxide, the case (2) comprises a third chamber (6) or position connected with the double chamber (4), and which is adapted to take up or hold a tablet (7) containing a neutralization agent (catalase), so that the hydrogen peroxide in the double chamber (4) is neutralized suitably slowly by the admission to dissolve the tablet (7). By the dissolution of the catalase tablet (7) oxygen is generated, and an oxygen bubble is formed around the tablet, so that the hydrogen peroxide alternately is kept away from the tablet (7) and alternately gets admission to the tablet (7).

PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 5 : G02C 13/00, A61L 2/18

A1

(11) International Publication Number: WO 94/01800

(43) International Publication Date: 20 January 1994 (20.01.94)

(21) International Application Number: PCT/DK93/00211

(22) International Filing Date: 28 June 1993 (28.06.93)

(30) Priority data:
0885/92 6 July 1992 (06.07.92) DK

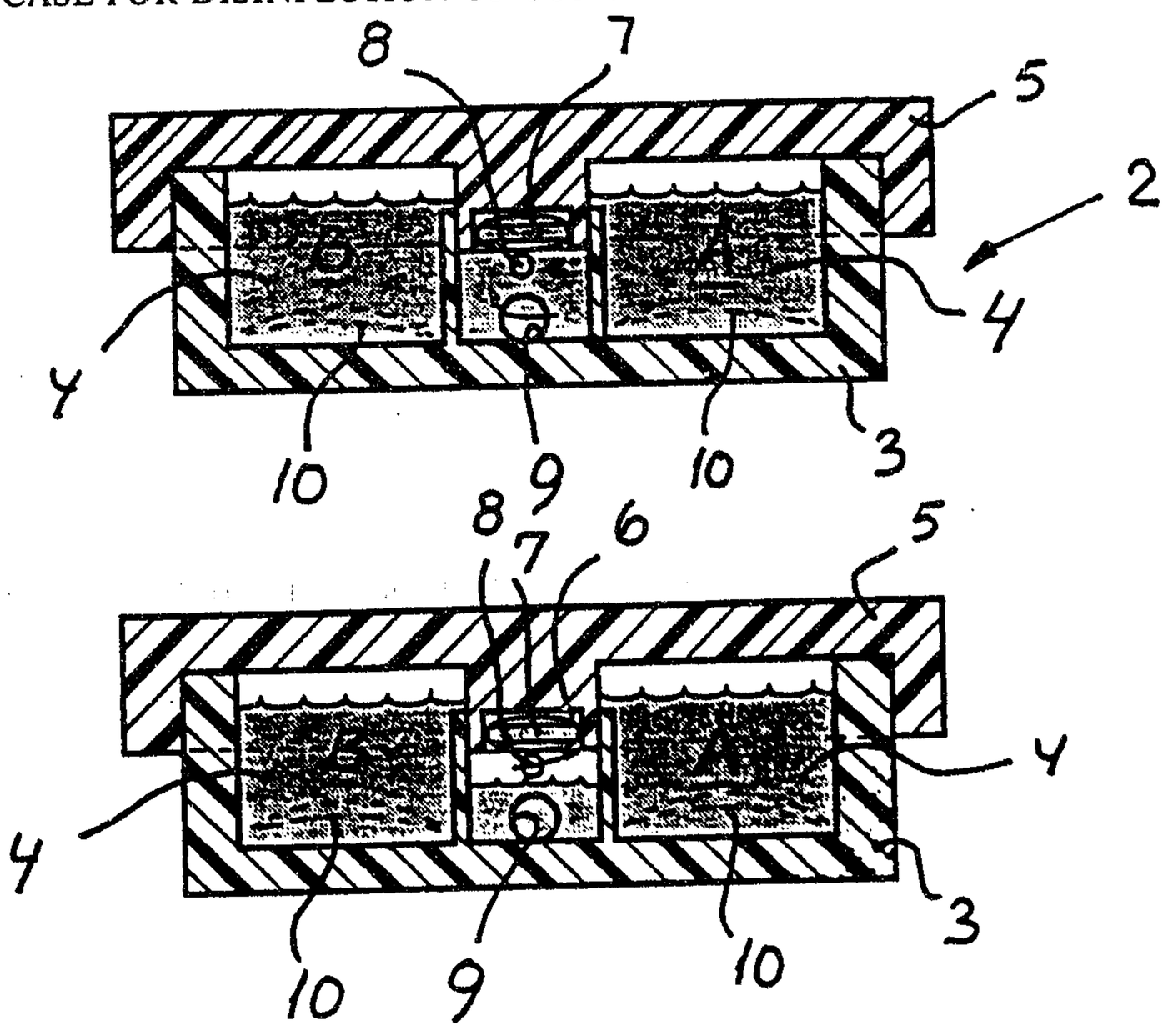
(71)(72) Applicant and Inventor: NIELSEN, Tom, Buris [DK/DK]; Taalforvej 16, DK-8250 Egaa (DK).

(74) Agent: GREGERSEN, N., H.; Aarhus Patentkontor, Skanderborgvej 40, DK-8000 Aarhus C (DK).

(81) Designated States: AT, AU, BB, BG, BR, CA, CH, CZ, DE, DE (Utility model), DK, DK (Utility model), ES, FI, GB, HU, JP, KP, KR, LK, LU, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SK, UA, US, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).

Published
With international search report.

(54) Title: METHOD AND CASE FOR DISINFECTION OF CONTACT LENSES



(57) Abstract

A method and a case (2) for disinfection of contact lenses is described, where the contact lenses are placed in a double chamber (4) filled with cleaning fluid, for instance hydrogen peroxide, the case (2) comprises a third chamber (6) or position connected with the double chamber (4), and which is adapted to take up or hold a tablet (7) containing a neutralization agent (catalase), so that the hydrogen peroxide in the double chamber (4) is neutralized suitably slowly by the admission to dissolve the tablet (7). By the dissolution of the catalase tablet (7) oxygen is generated, and an oxygen bubble is formed around the tablet, so that the hydrogen peroxide alternately is kept away from the tablet (7) and alternately gets admission to the tablet (7).

Method and case for disinfection of contact lenses

The present invention relates to a method for disinfection of contact lenses.

Users of contact lenses, particularly soft contact lenses, are familar with the fact that contact lenses frequently, preferably daily, have to be cleaned to avoid inconveniences by the use of contact lenses.

Normally hydrogen peroxide is used for disinfection of the contact lenses, which for this purpose is placed in special cases, which may be used for the keeping of the contact lenses as well as for disinfection of these. The contact lenses are kept in the cleaning fluid (hydrogen peroxide) until next use, for instance through the night.

In order to neutralize the hydrogen peroxide before next use of the contact lenses, it is known to neutralize the hydrogen peroxide - by using of a "platinum star", which acts as a catalyst, or by using an enzyme tablet - containing for instance catalase - to neutralize the hydrogen peroxide.

US-A-4 011 941 discloses an apparatus comprising a cleaning capsule for the sterilizing of soft contact lenses in an aqueous hydrogen peroxide solution and a method where the neutralizing agent is brought into contact with the cleaning solution by inverting the cleaning capsule - and where use is made of a catalytic reactor coated with a layer of platimum.

To ensure that there will be time enough for the hydrogen peroxide to disinfect the contact lenses for micro organism and virus before the neutralization, it is furthermore known to delay the effect of the catalase by using a special tablet, where the catalase is coated with methyl-cellulose or a PVP-film. EP-A-0 209 071 discloses the use of such an encapsulated neutralizing tablet which is inserted into the cleaning solution and releases the neutralizing agent with delay.

Catalase is an enzyme, which is capable to convert the hydrogen peroxide into water and free oxygen. In practise the used tablet contains a salt with catalase, so that the hydrogen peroxide is converted into physilogical salt water.

The purpose of the invention is to provide a method enabling a further improvement by disinfection of the contact lenses cf. the method as mentioned introductorily.

The method according to the invention is distinctive in that disinfection of the contact lenses and neutralization of the cleaning fluid, respectively, are controlled by means of a tablet which without being coated contains the enzyme catalase, said tablet is placed in a separate chamber or in a special position, and that the admission for the cleaning fluid to this chamber or this position is controlled by the generation of oxygen by the reaction between the cleaning fluid and the enzyme catalase.

In a simple manner it hereby becomes possible to control the duration of the disinfection as well as the neutralization of the cleaning fluid by using a simple catalase tablet, which does not need any coating, that is that a rather cheap catalase tablet may be used for control of a slowly, delayed neutralization of the cleaning fluid.

The invention furthermore relates to a case for use by carrying out the method according to the invention, which case is distinctive in that it comprises a chamber with a room for a right contact lense and a room for a left contact lense, and a chamber or a special position, which is adapted to receive a catalase tablet, said chambers are connected with each other in such a manner that the admission of the cleaning fluid to the neutralization agent is controlled.

Expediently the case is such provided, that an opening is provided between said chamber for the contact lenses and said chamber for the catalase tablet, said opening for free access of fluid being placed in a level just under the tablet in the chamber, the position of said opening being adapted to control the speed of the neutralization by con-

trolling the oxygen stream from said chamber or said special position, respectively to the chamber for the contact lenses.

The invention is described in the following with reference to the drawing, in which:

Fig. 1 shows a sectional view through a preferred embodiment for a case according to the invention - shown with contact between tablet and cleaning fluid,

Fig. 2 shows a similar sectional view cf. Fig. 1, but shown in a situation, where the cleaning fluid because of the air generation is forced away from the tablet,

Fig. 3 shows the case - seen from above and without a lid part,

Fig. 4 shows a side sectional view of a lid part with a holding cavity for the neutralization tablet,

Fig. 5 shows a sectional view through another embodiment for a case according to the invention, shown in a situation, where an air bubble is keeping the cleaning fluid away from the tablet,

Fig. 6 shows a similar sectional view cf. Fig. 5, but shown in a situation, where the air bubble is escaping and permits access of fresh cleaning fluid to the tablet,

Fig. 7 shows the case cf. Figs. 5 and 6 - seen from above and without a lid part,

Fig. 8 shows an end view of a known case for keeping and cleaning contact lenses and provided with a combined lense and tablet holder using the method according to the invention, and

Fig. 9 shows a side view of the combined lense and tablet holder cf. Fig. 8.

A case 2, shown in Figs. 1 - 3, consists of a lower part 3 with a chamber with a room A for a right contact lense and a room B for a left contact lense and a lid part 5 (Fig. 4) with a chamber 6 or a special position adapted to keep or fix a tablet 7 containing catalase or another enzyme.

A pair of contact lenses 10 to be cleaned or disinfected is placed in the double chamber 4, and cleaning fluid in the form of hydrogen peroxide (Fig. 1) is filled in. A catalase tablet 7 is squeezed in the chamber 6 or the special position of the lid part. The chamber 6 has for that purpose a projecting, lower edge 11, behind which the tablet 7 is squeezed, before the lid part 5 is again placed on the lower part 3.

By contact between the catalase tablet 7 and the hydrogen peroxide free oxygen is generated, and an air bubble (Fig. 2) is formed around respectively under the tablet 7, so that the generation of oxygen is reduced. In the side of the chamber 6 an opening 8 is provided into the double chamber 4, through which opening 8 the oxygen bubble may escape. Afterwards the hydrogen peroxide gets re-admission to the catalase tablet 7, and a new portion of oxygen is generated and escaping through the opening 8 or escapes otherwise - and this procedure continues until the tablet 7 is dissolved.

Eventually the lower part 3 on level with the chamber 6 in the lid part 5 may comprise a complementary part, which is provided with a side opening 9 in order to improve the circulation between the rooms of the double chamber - around the contact lenses 10 (Figs. 1 and 2).

An other embodiment of a case 12 according to the invention - shown in Figs. 5 - 6 - comprises a lower part 13 having a double chamber 14 with two positions for a pair of soft contact lenses and a lid part 5 with a similar configuration as that of the lid part 5 shown in Fig. 4.

In Fig. 8 is shown a known case 15 comprising a lower part 16 and a screw lid 17 with a central socket 18 for a top end portion 19 of a holding member 20 with two basket-

like chambers 21 adapted to keep a pair of contact lenses - as the holding member 20 is submerged into cleaning fluid. At the bottom end of the holding member 20 a special cavity 22 or position with a collar 23 adapted to receive and fix a catalase tablet 7 is provided. The holding member 20 is shown from the side in Fig. 9.

CLAIMS:

1. A method for disinfecting contact lenses, the method comprising the steps of:

placing the contact lenses in a cleaning fluid contained in a case said cleaning fluid comprising hydrogen peroxide, and

controlling a period of time for disinfecting the contact lenses and neutralization of the cleaning fluid by placing a non-coated NaCl-tablet containing a neutralization agent catalase in a separate chamber in the case in such a position that the tablet within the chamber is submerged in the cleaning fluid in the case and admission of the cleaning fluid to the tablet in the separate chamber is delayed by the formation of at least one oxygen bubble generated by a reaction between the cleaning fluid and the catalase, whereby the tablet is slowly dissolved and the cleaning fluid is converted into a pure physiological saline solution.

2. A method according to claim 1, wherein the case contains a lower case part having an open end and containing the cleaning fluid and a lid part for closing the open end of the lower case part, the lid part includes a recessed portion for accommodating the tablet and for defining the separate chamber, and wherein the step of placing of the tablet includes inserting the tablet into the recessed portion of the lid part for accommodating the tablet, and placing the lid part on the lower case part thereby submerging the tablet in the separate chamber within the cleaning fluid.

3. A method according to claim 1, wherein the step of placing of the contact lenses in a cleaning fluid includes mounting the respective contact lenses in a lens holder, and submerging the lens holder with the mounted contact lenses into the cleaning fluid in the case.

4. A method according to claim 2, wherein the step of placing of the contact lenses in a cleaning fluid includes placing the respective contact lenses in two spaced lens accommodating rooms provided in the lower case part of the case.

5. A method according to claim 4, further comprising the step of providing circulation of the cleaning fluid between the two rooms accommodating the respective lenses via an opening between said lens accommodating rooms.

6. A case for enabling disinfection of a pair of contact lenses, the case comprising a lower case part containing a cleaning fluid comprising a hydrogen

peroxide solution, a first chamber provided in the lower case part for the contact lenses including a first room for accommodating one of the contact lenses, and a second room spaced from the first room for accommodating the other of the contact lenses, and a lid part for closing an open end of the lower case part, the lid part including a projecting portion having a second chamber for accommodating a non-coated tablet containing a neutralization agent catalase, the tablet being submerged in the cleaning fluid when the lid part is placed on the lower case part and admission of the cleaning fluid to the tablet being delayed by the formation of at least one oxygen bubble generated by the reaction between the cleaning fluid and the catalase within the second chamber, whereby a period of time for disinfecting the contact lenses and neutralization of the cleaning fluid is controlled and the tablet is slowly dissolved, thereby converting the cleaning fluid into a pure physiological saline solution.

7. A case according to claim 6, wherein a further chamber is formed in the lower case part of the case for accommodating the tablet within said second chamber, said further chamber being arranged so that the projecting portion is inserted therein and the tablet is submerged in the cleaning fluid when the lid part is placed on the lower case part.

8. A case according to claim 7, wherein a first opening is provided in a wall of said further chamber which opening communicates with said first chamber formed in the lower case part for enabling a free access of cleaning fluid between the first chamber and said further chamber.

9. A case according to claim 8, wherein a second opening is provided in the wall of said further chamber at a level below the tablet and above said first opening in order to increase the period of time for disinfection and neutralization by controlling a volume of oxygen bubbles escaping through said second opening.

10. A method for disinfecting contact lenses which comprises the steps of placing the contact lenses in a cleaning fluid comprising hydrogen peroxide within a container and effecting neutralization of the cleaning fluid by introducing a non-coated tablet containing a neutralization agent catalase, the step of introducing the tablet comprising positioning the tablet in a separate chamber within said container so that admission of the cleaning fluid into said chamber is delayed by the generation of the at least one oxygen bubble by reaction between the cleaning fluid and the neutralization agent catalase whereby cleaning of the contact lenses and

neutralization of the cleaning fluid, respectively, are controlled by dissolution of said tablet in said cleaning fluid.

11. A method according to claim 10, wherein the container comprises a lower case part having an open end and containing the cleaning fluid and a lid part for closing the open end of the lower case part, the lid part including a projecting portion having a chamber for accommodating the tablet and the lower case part having another chamber in which the projecting portion is inserted upon placing the lid part on the lower case part, said projecting portion and said another chamber defining the separate chamber wherein the tablet is positioned and wherein the at least one oxygen bubble is generated by a reaction between the cleaning fluid and the neutralization catalase in said separate chamber and the at least one oxygen bubble acts to control contact of the cleaning fluid with the tablet.

12. A container for disinfecting contact lenses comprising a first chamber containing a cleaning fluid comprising hydrogen peroxide and having a room for a right contact lens and a room for a left contact lens, and a second chamber adapted to receive a non-coated tablet containing a neutralization agent catalase, said first chamber being connected to said second chamber via a first opening and the tablet being positioned in the second chamber in such a manner that admission of the cleaning fluid through said opening into the second chamber is delayed by generation of at least one oxygen bubble by reaction between the cleaning fluid and the neutralization agent catalase.

13. A container according to claim 12, wherein a second opening is provided between said first chamber and said second chamber, said second opening being placed at a level below the position of the tablet in the second chamber and above said first opening, the position of the second opening being adapted to delay the rate of neutralization by delaying discharge of the at least one oxygen bubble from the second chamber.

14. A container according to claim 13, wherein the tablet is positioned at an upper portion of the second chamber.

15. A method for disinfection of contact lenses comprising the steps of placing the contact lenses in a cleaning fluid in the form of hydrogen peroxide in a container, and carrying out neutralization of the cleaning fluid by means of a tablet containing a neutralization agent catalase, characterized by the step of placing said

tablet containing the enzyme catalase, in a separate chamber within said container, said chamber having an opening for free access of fluid being placed in a level just under the tablet, such that the admission for the cleaning fluid to this chamber is controlled by the generation of oxygen by the reaction between the cleaning fluid and the enzyme catalase, whereby disinfection of the contact lenses and neutralization of the cleaning fluid, respectively, are controlled by means of said tablet.

16. A method according to claim 15, characterized in that use is made of a tablet containing the enzyme catalase without being encapsulated or coated.

17. A container for use in the method according to claim 15, said container comprising a chamber with a room for a right contact lens and a room for a left contact lens, and a chamber which is adapted to receive said enzyme catalase tablet, said chamber having an opening for free access of fluid being placed in a level just under the tablet, said chamber for the contact lenses being connected to said chamber for the catalase tablet in such a manner that the admission of the cleaning fluid to the neutralization agent is controlled by the generation of oxygen by the reaction between the cleaning fluid and the enzyme catalase table.

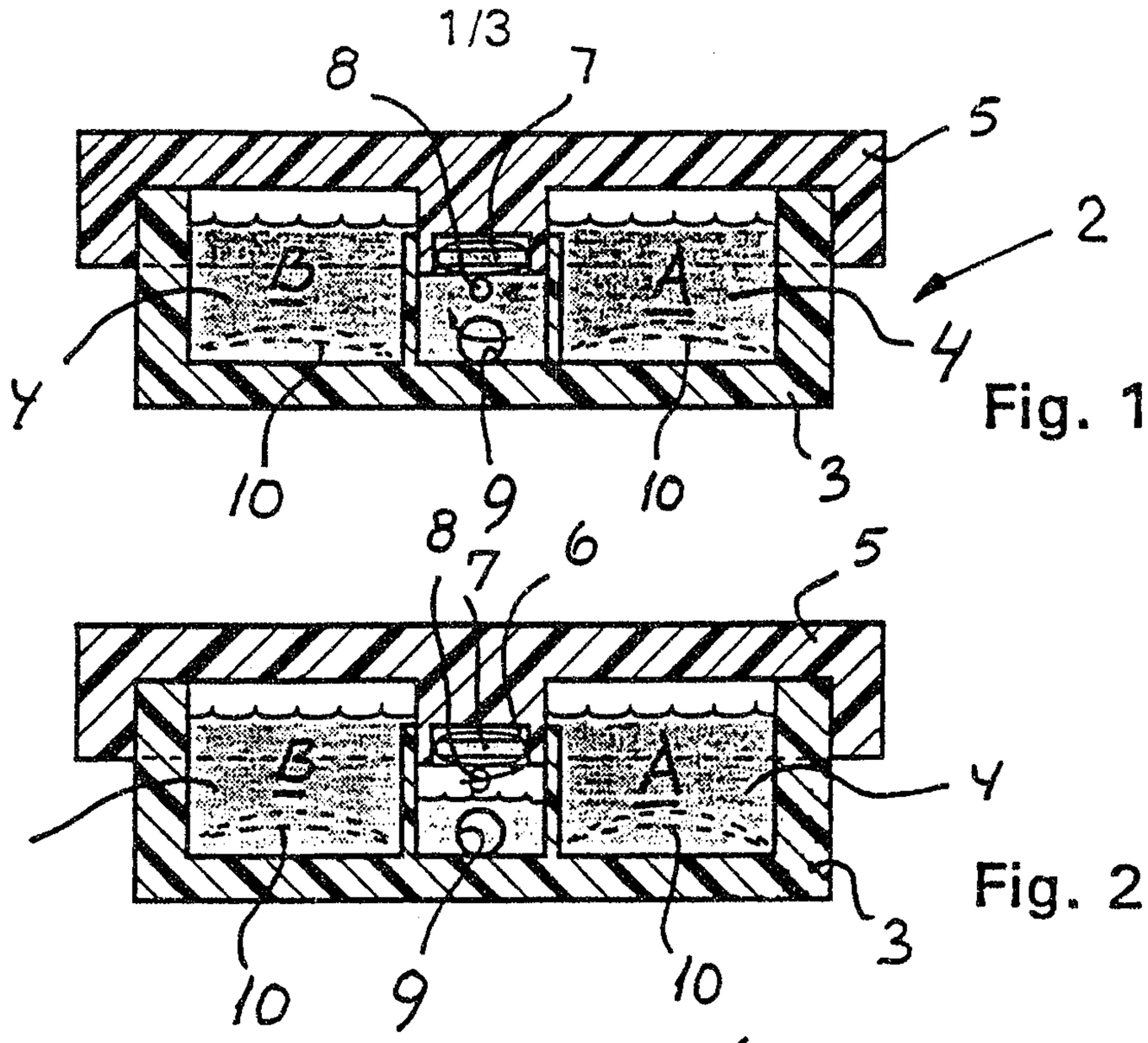


Fig. 1

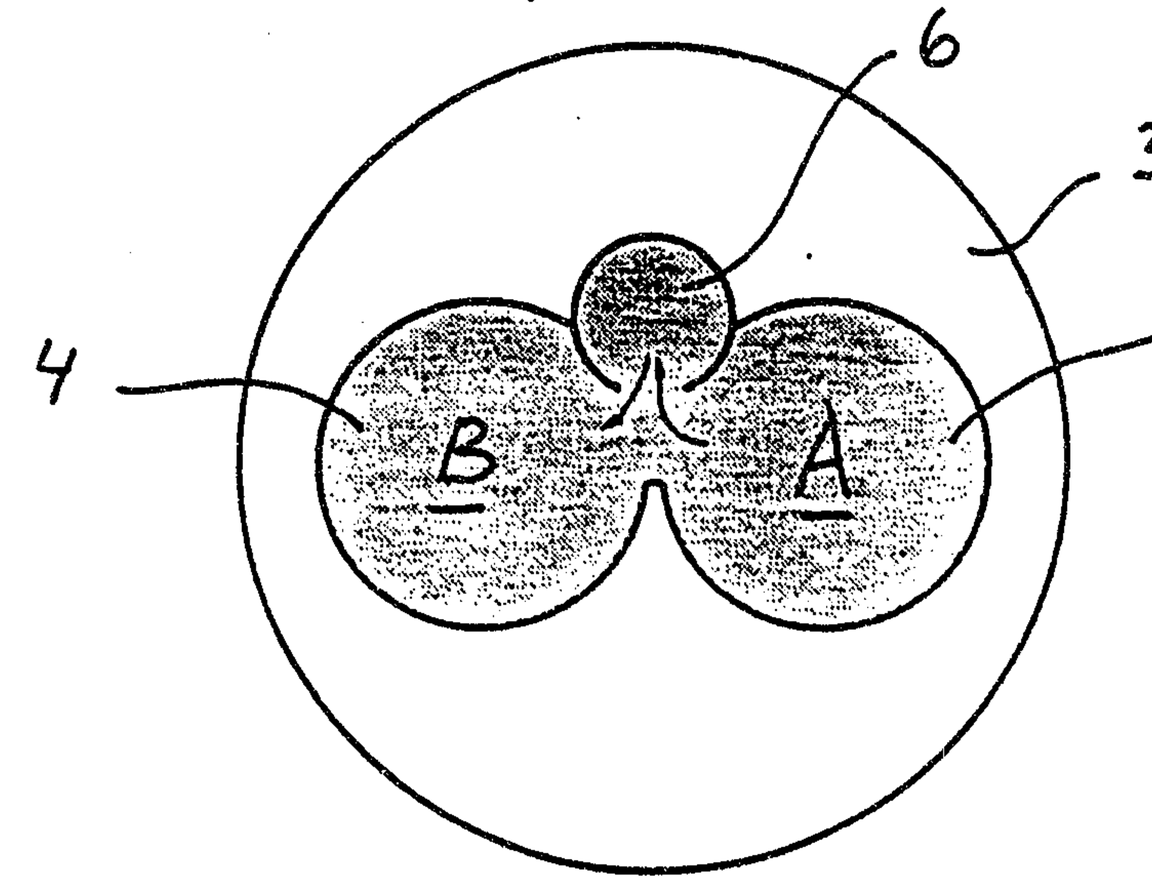


Fig. 2

Fig. 3

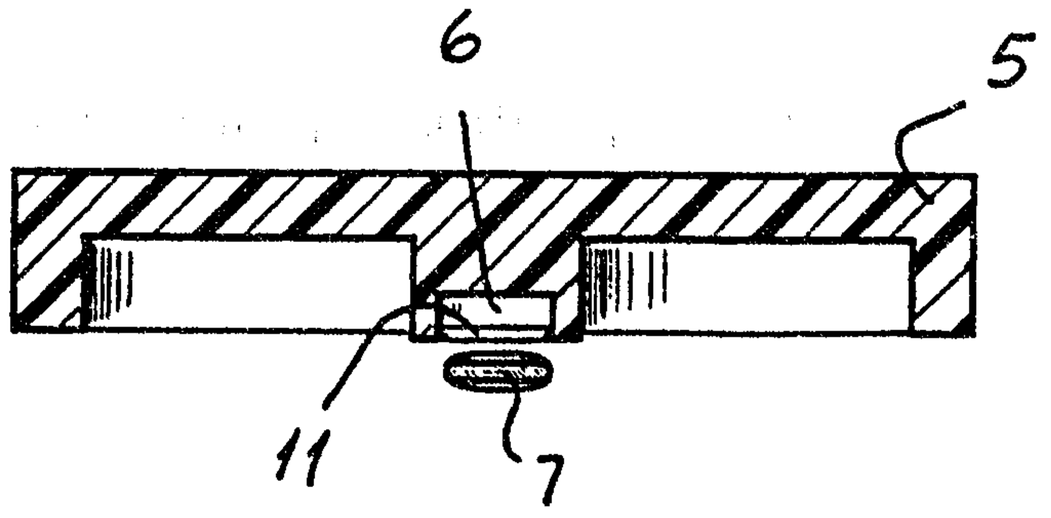


Fig. 4

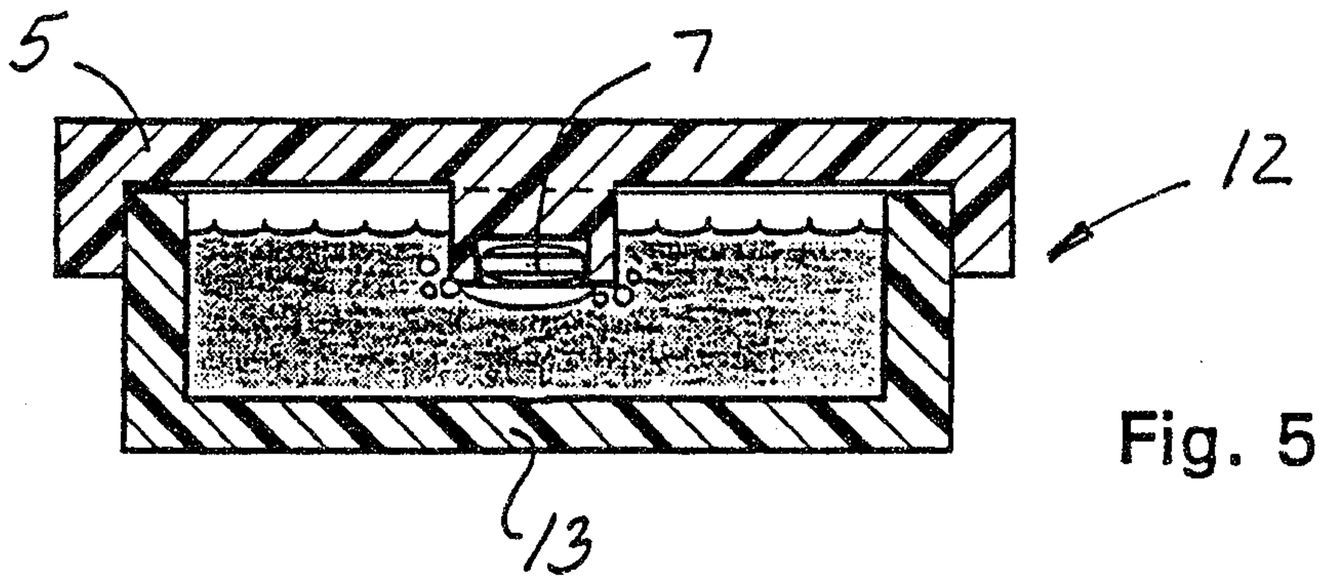


Fig. 5

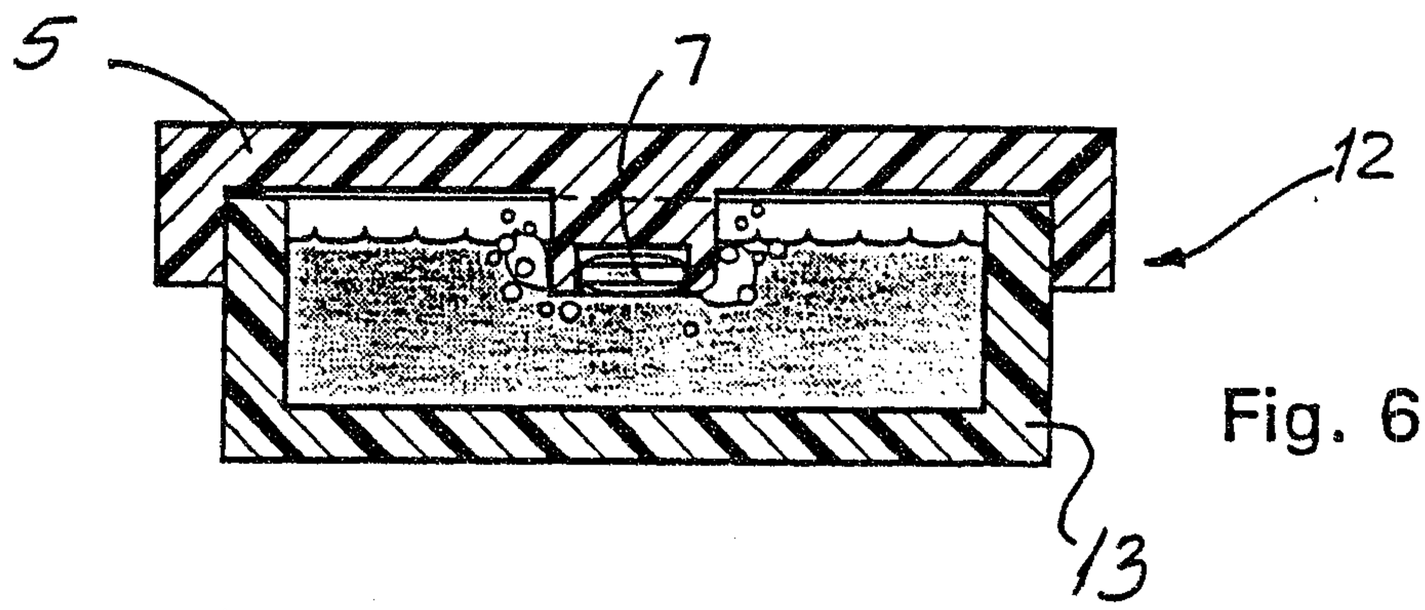


Fig. 6

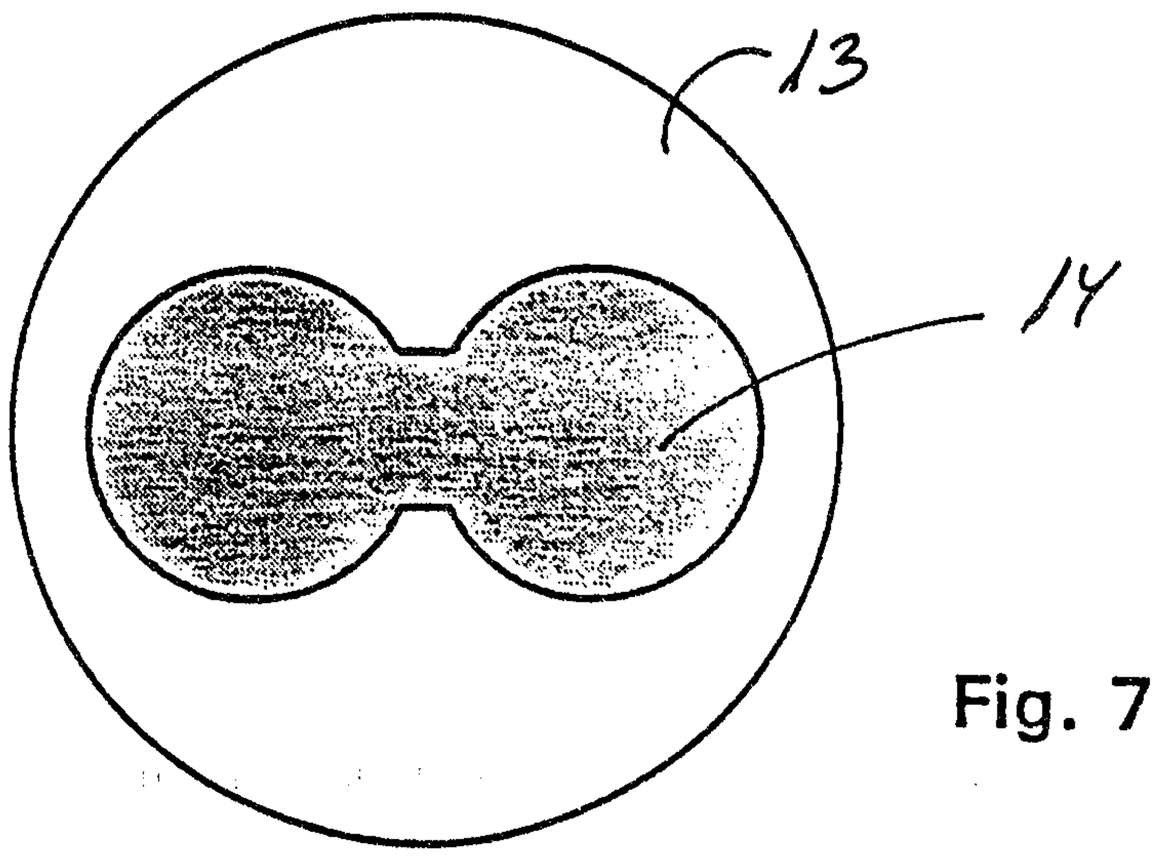


Fig. 7

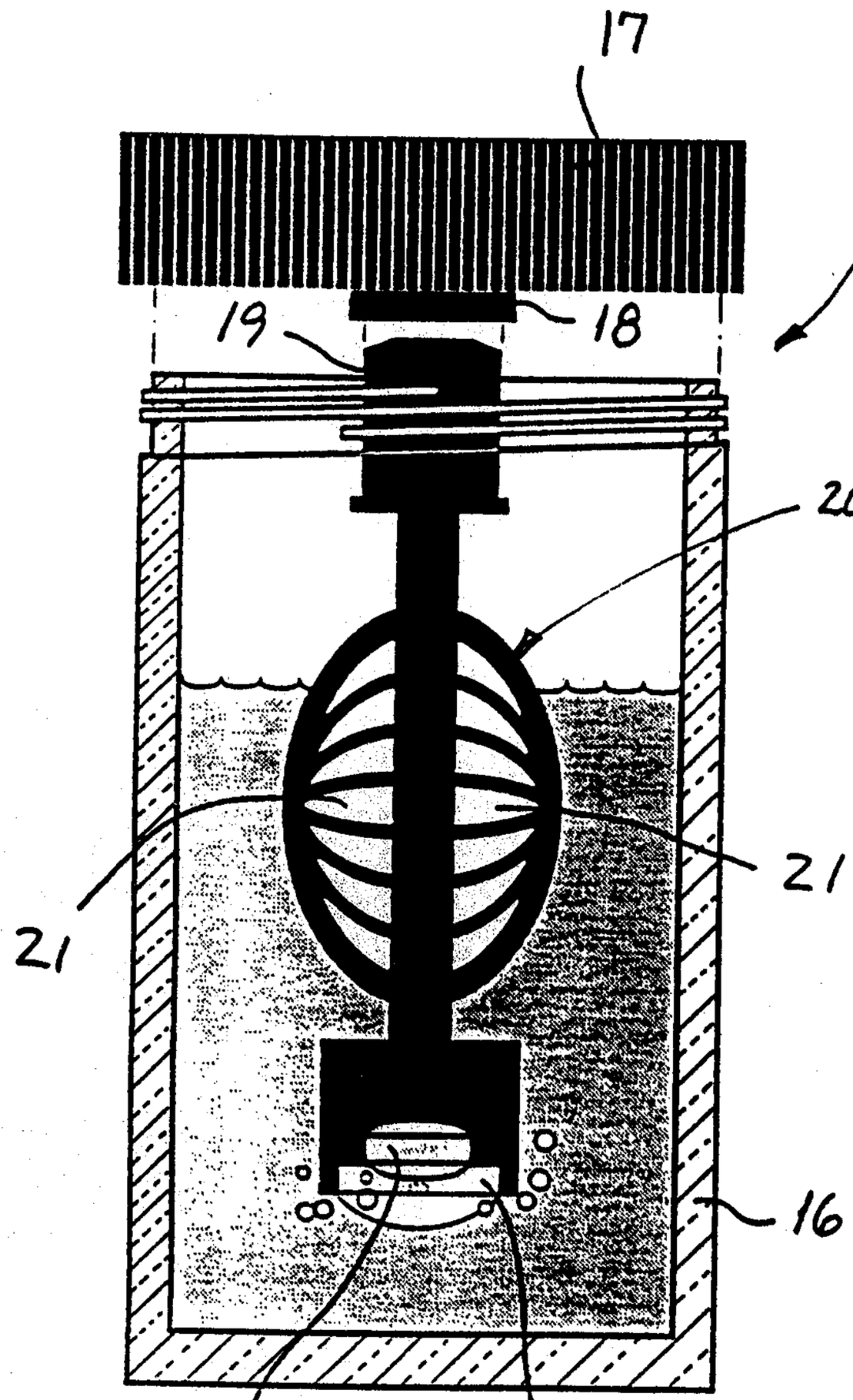


Fig. 8

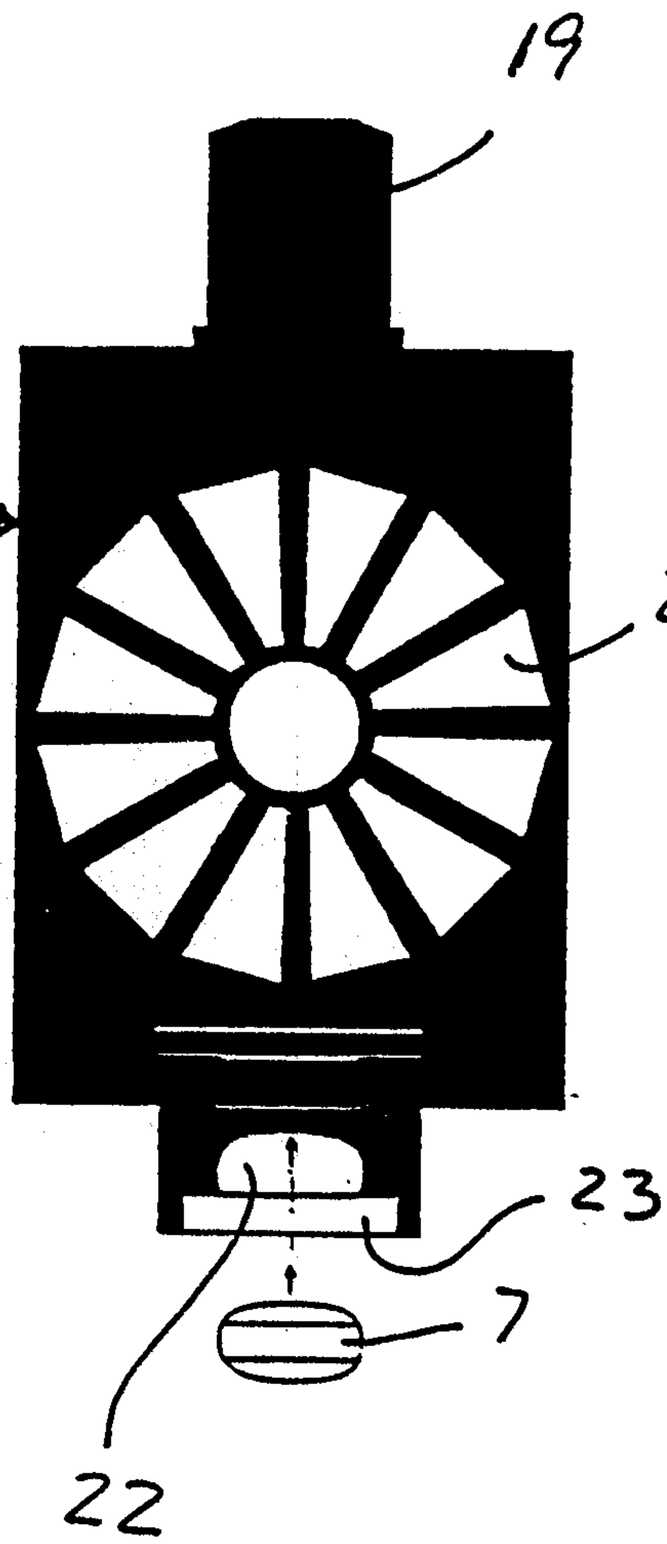
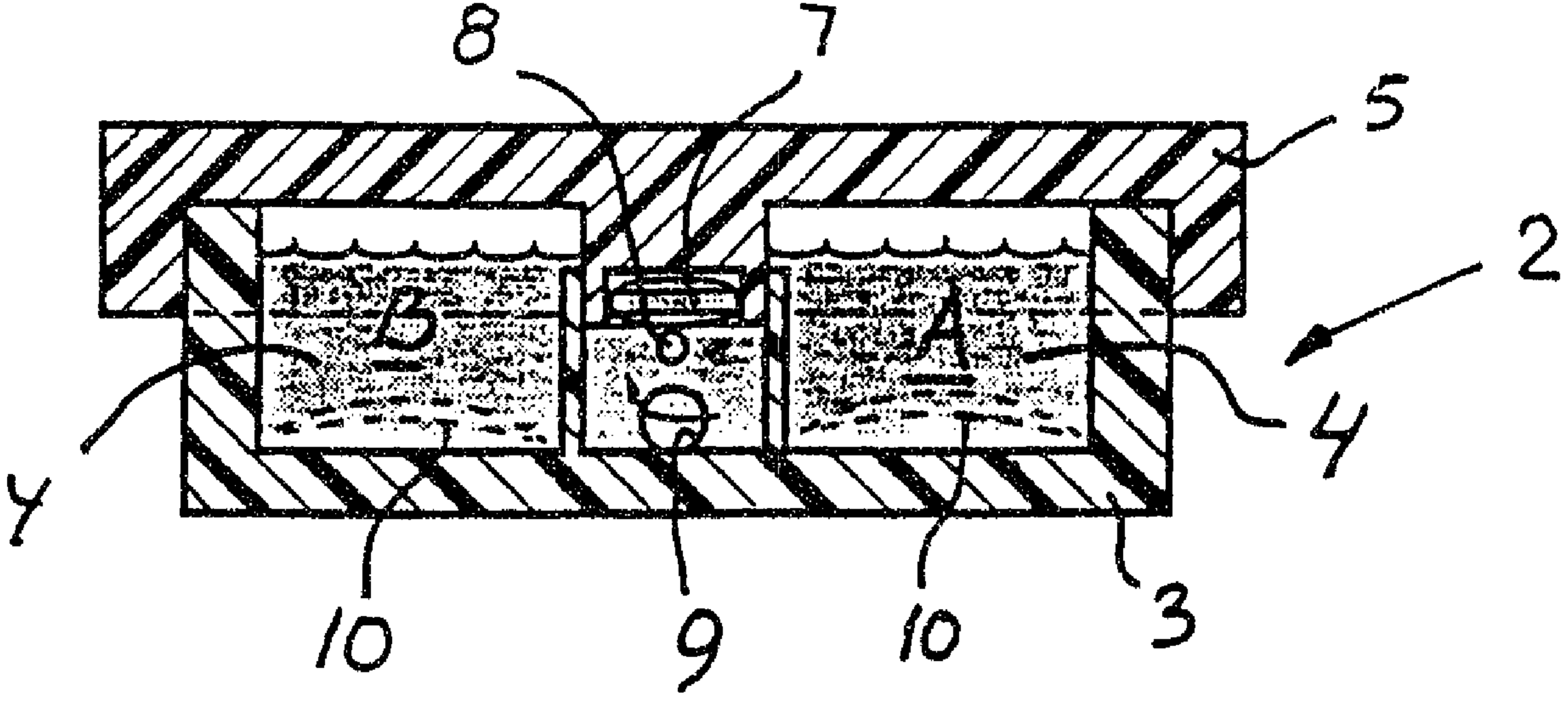


Fig. 9


8
7
5
2
B
A
4
Y
10
9
10
3