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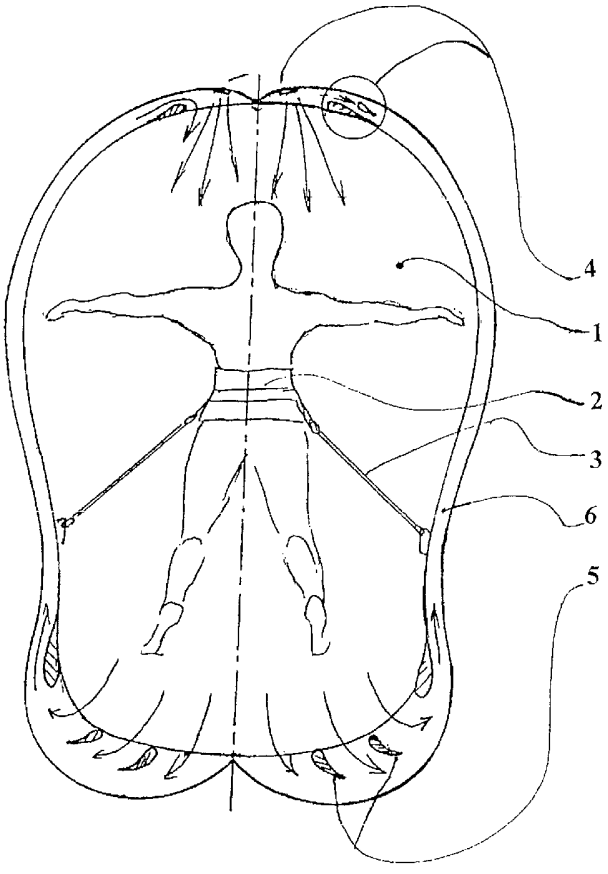
(54) Title: REHABILITATIVE, RECREATIONAL, AND CONDITIONING FACILITY FOR SWIMMING, MUSCLE EXERCISE, AND MOBILITY IMPROVEMENT



(57) Abstract: The invention relates the rehabilitative, recreational, and conditioning facility for swimming, muscle exercise, mobility improvement which comprises of a specifically shaped water vessel (1), means for securing the position of the swimmer within the vessel (3), at least one nozzle in the front of the vessel (4), at least one return channel returning the water flow from the rear to the front end of the vessel (1), at least one drain (5), connected with at least one return channel and at least with one nozzle (4).

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REHABILITATIVE, RECREATIONAL, AND CONDITIONING FACILITY FOR SWIMMING, MUSCLE EXERCISE, AND MOBILITY IMPROVEMENT

TECHNICAL FIELD

This invention relates to a rehabilitative, recreational, and conditioning facility for swimming, muscle exercise, and mobility improvement (from now on only PAPOOL) consisting of a special type of water vessel.

BACKGROUND OF THE INVENTION

At present there are in use many different types of facilities, designed for rehabilitation, recreational swimming, conditioning of muscles, and mobility improvement, which all utilize the beneficial properties of the water. There are, for instance, many types of swimming pools, enhanced with a variety of additional equipment, which contribute to their usefulness. As examples of this additional equipment there are various nozzles, used for water massage, or to cause water jets to facilitate swimming. To this end, there are in use many different kinds of machinery based on variety of principles. The disadvantages of most of the above mentioned facilities include their excessive sizes and volumes of treated water, the corresponding space requirements, and mainly, their purchase and installation prices. Also, the treatment of such volumes of water is very demanding as to time, money and equipment.

When swimming in such pools against the water jet, the swimmer must continuously monitor his position to stay within the jet and to prevent collision with the sides of the pools or with other swimmers. In addition most pools, utilizing water jets, are very demanding as to the maintenance of the additional equipment and energy consumption. There are also in existence many kinds of relatively small pools or spas that may be installed within the interior. They also may be equipped with various nozzles and bubble generating equipment mainly for massage purposes. Considering their small sizes, these vessels are not suitable for vigorous swimming but are intended mainly for passive relaxation.

SUMMARY OF THE INVENTION

The disadvantages mentioned above are to a large extent eliminated in the rehabilitative, recreational, and conditioning facility for swimming, muscle exercise, and mobility improvement (PAPOOL) realized in accordance with this technical solution. It is basically a small vessel, sized only large enough to allow free movement of the swimmer, swimming in any known swimming style. The shape of the vessel is derived from anthropological and ergonomic measurements of contemporary man. It envelops the extreme positions of limbs during the swimming, with just a small reserve to prevent contact with the walls and bottom of the vessel. The swimmer does not move in the water through the pool, but the water moves past the swimmer who stays in a secured position. It is accomplished by a flexible attachment of the swimmer to the vessel. The attachment allows just a slight lengthwise glide, thus providing a damping effect. To secure more laminar flow of the water in the vessel there is at least one return channel alongside of the vessel, returning the water back from the rear to the front end.

In the front of the vessel there is at least one nozzle, fed from an external water loop, taking in water from at least one drain, located in the rear thereof. These nozzles enhance the water flow through the vessel and allow the control of its direction. In an advantageous implementation of the idea there is, in addition, at least one slot ejector fed also from the external water loop, in order to enhance the water flow through the return channel and, in turn, the overall circulation. To aid the change in the water flow direction in the rear end of the vessel and its subsequent entry into the return channels, there may be installed several airfoils. Within the external water loop connecting the nozzles with the drains, there is a centrifugal pump, a cartridge filter, an electric heater, and possibly other additional equipment. The vessel is equipped with a hard top with an entrance opening covered by a detachable transparent lid.

The small size of the PAPOOL makes it suitable for installation in any small area and especially within common houses or apartments. The manufacturing cost of such a small vessel is significantly lower in comparison with pools serving the same purpose. The attachment of the swimmer to the vessel may be realized in various ways. For

instance it may be a harness, consisting of a comfortable belt encircling the swimmer's waist, and at least two flexible cords or straps that connect the belt with the sides of the vessel. Other possibilities include an attachment to a spring loaded sliding support of the swimmer's belly, protruding from the bottom of the vessel. The attachment maintains the swimmer's position within the vessel regardless of the speed of swimming.

The swimmer is thus freed from constant monitoring of his position within the vessel. He does not adjust the speed of his swimming to the speed of the water flow, but the flow of water follows his speed of swimming. The swimmer by the movement of his limbs causes the water to flow from the front to the rear end of the vessel, where it changes its direction and enters the return channels to come out in the front thereof against the swimmer. This arrangement by itself allows continuous, uninterrupted swimming for any length of time. The circular flow of the water through the vessel is therefore generated by the swimmer's own muscle energy and does not require any external source of power. However, since the external water loop is installed for the sake of filtration and other means of water treatment, it may also be employed for the enhancement of the water flow in the vessel by attaching to it slot ejectors. Slot ejectors, located elsewhere in the return channel, but most advantageously in its mouth, enhance the water circulation and together with the airfoils smooth out the water pulsation and turbulence. The external water loop therefore serves several purposes. It is used not only for water filtration, heating, and other water treatments, but in addition, it may be advantageously utilized for enhancing the water circulation within the vessel. Since the cartridge filter with a large active area poses only negligible resistance to the effluent water, and the volume of water set in motion is very small, the power consumption of the pump can be as low as 0.25KW. To increase the rehabilitative, recreational, and conditioning effects it is desirable to warm up the water to a pleasant temperature, to which end serves the electric heater.

The small size of the vessel is conducive to protecting it with a hard top. In case of indoor installation, the hard top protects the surrounding area against splash outs and evaporation, and in case of outdoor installation, it protects the water content against atmospheric influences, pollutants of all kinds, rain, wind, sun (UV light) and make it

easy to secure for winter months. Regardless of the place of installation, it reduces the need for make up water and prevents the escape of heat. The hard top therefore protects not only the facility, but also the swimmer against weather inconveniences. The greenhouse effect caused by the sun may also be utilized for warming up the water. When swimming in more vigorous swimming styles, such as the butterfly or dolphin kick, the lid covering the hard top may be left on ajar to prevent splash out through the entrance opening and to secure ventilation. The costs of water fill, chemical treatment, and heating are in comparison with other facilities, offering the same scope of exercise, significantly lower. The small amount of treated water also allows the usage of more innocuous chemicals that are more costly as well as other methods of water treatment, such as ozonizing, ionizing, and UV lamp irradiation. Also, because of the small amount of treated water, the number of functional work hours obtainable from the additional equipment such as the water pump, filter, heater, UV lamp, ozone generator, etc. are significantly extended.

BRIEF DESCRIPTION OF DRAWINGS

The PAPOOL consisting of a special purpose water vessel in accordance with this technical solution, will be described in detail according to the concrete example of an existing, tested and proven in prototype facility with the help of the attached drawings, where Fig.1 is a sectional front view, Fig.2 is a sectional top view, and Fig.3 is a sectional side view.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The existing prototype of PAPOOL consists of vessel 1 with a volume of 3,7 m^3. The two return channels 6 alongside the walls return the water from the rear end of the vessel 1 to the front thereof, thus completing the two water flow circles. The harness consisting of a belt 2 and two flexible straps 3 connects the swimmer with the sides of the vessel 1. The shape of the vessel 1 is derived from anthropological and ergonomic measurements of the user and envelops his extreme positions of limbs during the swimming, with just a small reserve to prevent contact with the walls and bottom of the vessel 1. In the front of the vessel 1 there are four nozzles 4, which serve as outlets for

the effluent during water filtration and for the enhancement of the water flow control during the swimming. Two of the four nozzles 4 located in the mouth of the return channels 6, are actually slot nozzles, which together with the shape of the mouth of return channels 6 comprise slot ejectors 4 that make the flow of water through the vessel 1 more laminar. The drain is located in the rear end of the vessel 1. The external water loop, connecting the drain with the nozzles 4 and containing the water pump, filter, and heater, is a commonly used technology and therefore, not being a novelty, is not depicted. The change of the water flow direction in the rear of the vessel is facilitated with airfoils 5.The whole vessel is covered with a hard top 7 and the lid 8 for closing the entrance opening. The swimmer, wearing the harness, attaches himself to the sides of the vessel 1 with the two adjustable straps 3 to suit his actual height. The straps 3 allow only a small lengthwise glide to provide a dumping effect and also secure the crosswise position of the swimmer within the vessel 1.

As the swimmer swims in any style, he forces the water to flow, with the power of his limbs, from the front to the rear of the vessel 1. The airfoils 5 in the rear end facilitate the change of the water flow direction and the subsequent entrance of the return channel 6. After passing through the return channel 6 and being speeded up with the two slot ejectors 4 the water comes out in the front of the vessel 1 against the swimmer. This gives the swimmer the feeling of swimming up stream. The forced water flow in the vessel 1 is thus accomplished by the muscle energy of the swimmer in combination with the effects of the powered water jets from nozzles 4. The usage of the jets however, is not necessary during swimming, since muscle energy suffices. However, since the external water loop is installed anyway for the sake of water filtration and other water treatments, it may be utilized as well during swimming. Since the cartridge filter with a large active area poses only negligible resistance to the water flow and the volume of water set to motion is very small, a pump with the intake of 0.25 KW, proved to be sufficient. The installation of a separate system to force water flow with water jets is therefore completely unnecessary. The hard top 7 has an entrance opening, equipped with a detachable transparent lid 8 that closes the facility while not in use. The greenhouse effect caused by the sun is utilized for warming up the water.

INDUSTRY UTILIZATION

The PAPOOL disclosed here represents an attempt to create the smallest possible water environment still allowing a free movement of the swimmer, swimming in any style. It is intended for active exercise and rehabilitation and therefore the emphasis is on utilizing one's own muscle energy, instead letting oneself be entertained by sophisticated machinery. It may be utilized first of all in households, spa resorts, rehabilitative institutions, and also in recreational facilities, hotels, etc.

CLAIMS

1. The rehabilitative, recreational, and conditioning facility for swimming, muscle exercise, and mobility improvement which comprises a specifically shaped water vessel, ***characterized by that,*** water vessel (1) comprise belt (2) for securing the position of the swimmer within the vessel (1), at least one nozzle (4) in the front of the vessel (1), at least one return channel (6) returning the water flow from the rear to the front end of the vessel (1), at least one drain (5) connected with at least one return channel (6) and at least with one nozzle (4).

2. The rehabilitative, recreational, and conditioning facility for swimming, muscle exercise, and mobility improvement as defined in claim 1 ***characterized by that,*** at least one nozzle (4) is a slot nozzle that together with the shape of the channel (6) comprises a slot ejector.

3. The rehabilitative, recreational, and conditioning facility for swimming, muscle exercise, and mobility improvement as defined in claim 1 and/or 2 ***characterized by that,*** it comprises several airfoils in the rear end (5) of the vessel (1).

4. The rehabilitative, recreational, and conditioning facility for swimming, muscle exercise, and mobility improvement as defined in claim 1, 2 or 3 ***characterized by that,*** it comprises a water pump connected to at least one of the return channels (6).

5. The rehabilitative, recreational, and conditioning facility for swimming, muscle exercise, and mobility improvement as defined in all previous claims ***characterized by that,*** it comprises a cartridge filter connected to at least one of the return channels (6).

6. The rehabilitative, recreational, and conditioning facility for swimming, muscle exercise, and mobility improvement as defined in all previous claims ***characterized by that,*** the vessel (1) comprises a water heater.

7. The rehabilitative, recreational, and conditioning facility for swimming, muscle exercise, and mobility improvement as defined in all previous claims ***characterized by that,*** it comprises a permanently installed hard top (7) that covers the vessel (1).

8. The rehabilitative, recreational, and conditioning facility for swimming, muscle exercise, and mobility improvement as defined in claim 7 ***characterized by that,*** it comprises an entrance opening in the hard top (7) and a detachable lid (8) that seals the opening.

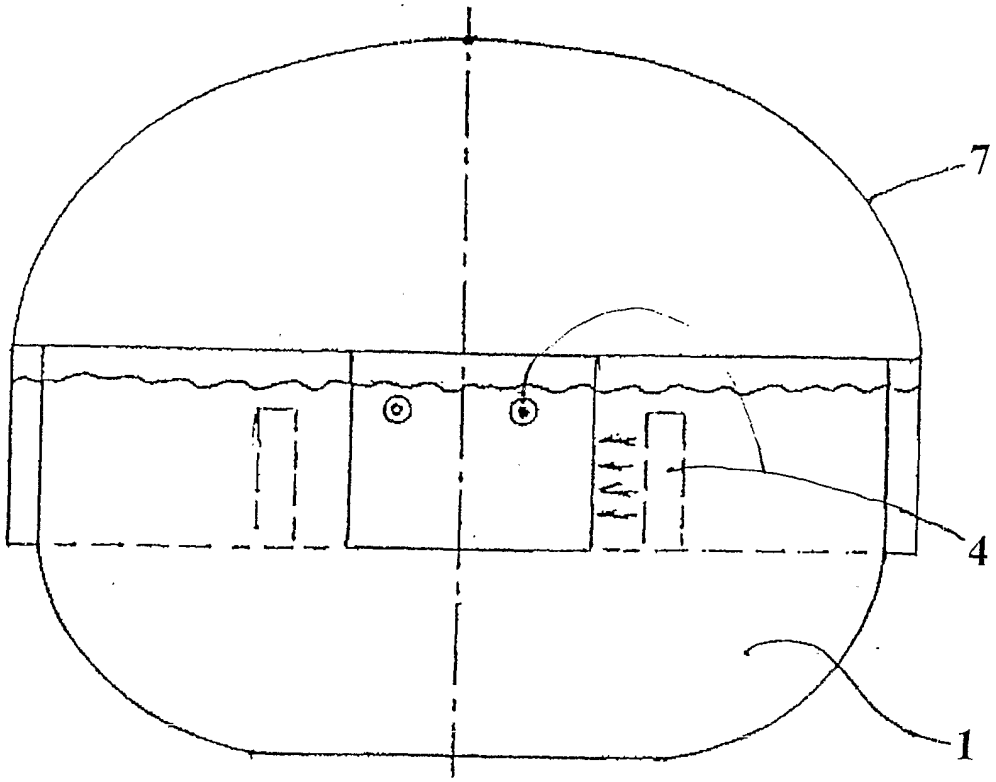

FIG. 1.

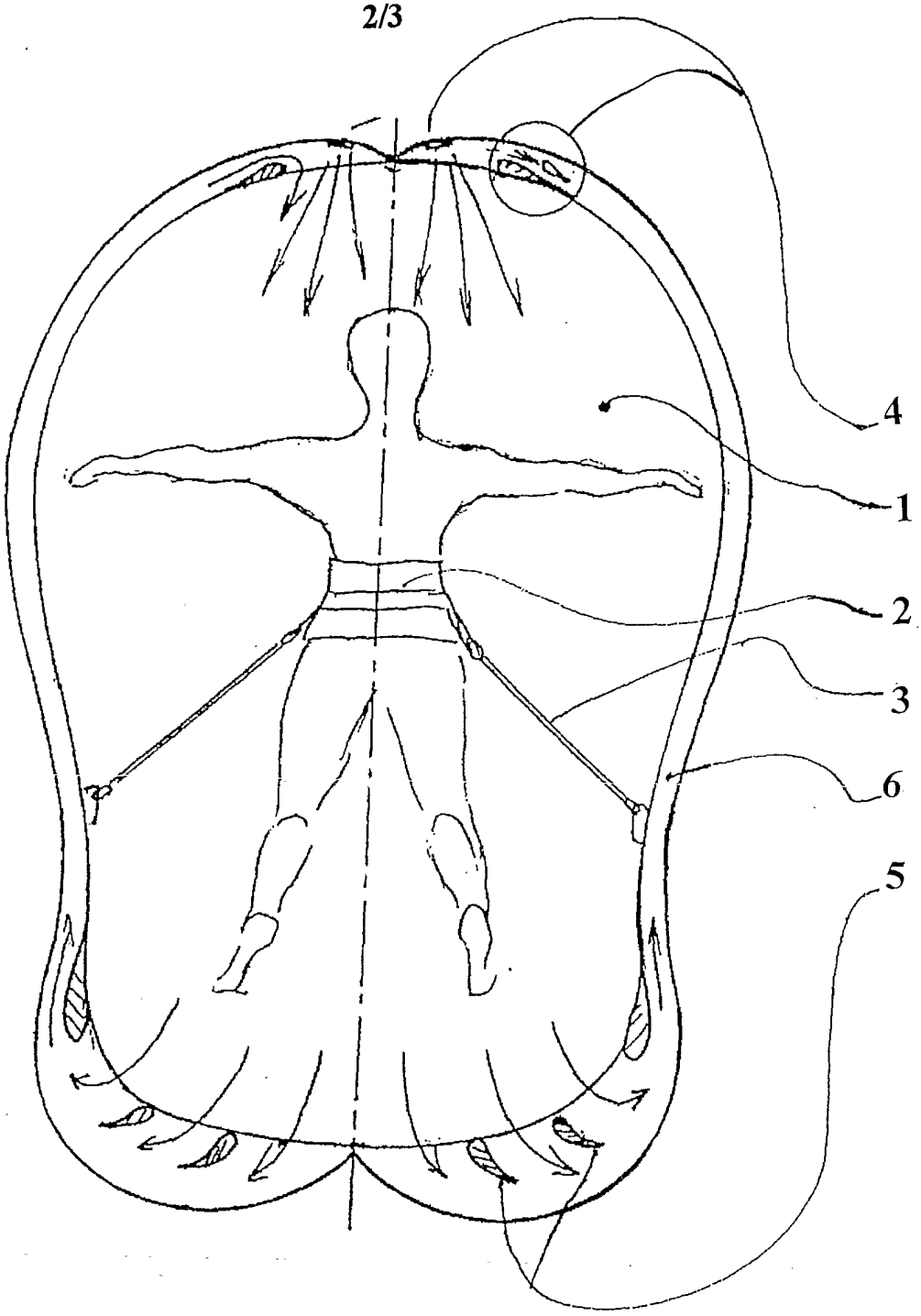

FIG. 2

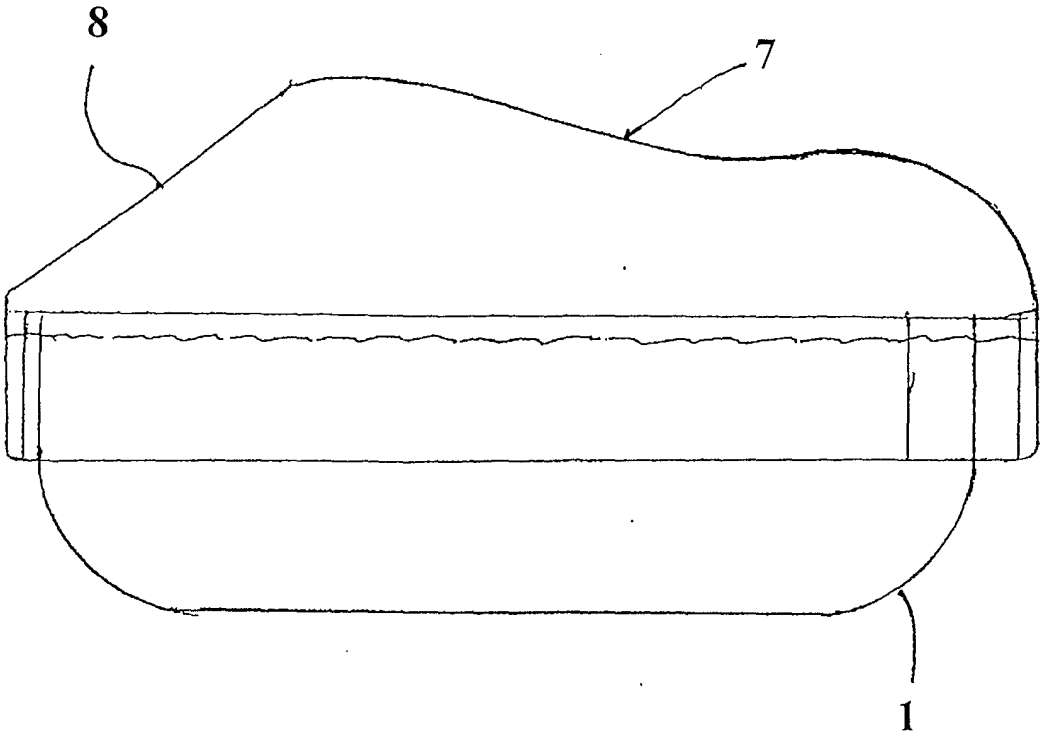

FIG. 3

INTERNATIONAL SEARCH REPORT

International Application No
PCT/CZ 03/00038

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A63B69/12 E04H4/00

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)
IPC 7 A63B E04H

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 practical, search terms used)
EPO-Internal, WPI Data, PAJ

C. 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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Y	FR 1 487 340 A (ANDREAU JACQUES) 7 July 1967 (1967-07-07) page 2, paragraph 12; figures	3
X	GB 2 214 800 A (LANGHAM KEVIN BARRY) 13 September 1989 (1989-09-13) page 1, paragraph 1 -page 4, paragraph 1; figures	1,4-8

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

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Date of the actual completion of the international search	Date of mailing of the international search report
20 October 2003	30/10/2003

Name and mailing address of the ISA	Authorized officer
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INTERNATIONAL SEARCH REPORT

International Application No
PCT/CZ 03/00038

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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