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(54) **Lever switch for safe breaking of a circuit of an exercise apparatus**

(57) A lever switch for safe breaking of a circuit of an exercise apparatus includes two conductive copper pieces spaced apart and stably received within a housing by means of elastic pieces. A rotatable cylinder with two journals is positioned in the area of the contact portions of the conductive copper pieces within the housing. Moreover, a rectangular piece is provided at one side of the rotatable cylinder such that the contact portions of the conductive copper pieces are just clampable to the top

and bottom ends of the rectangular piece. In addition, the middle portion of the conductive copper pieces is inwardly bent to form corresponding conductive contact surfaces. As a result, an insertion lever may fit into the body of the rotatable cylinder for in-place-moving the rotatable cylinder such that the rectangular piece is turned to bring the conductive contact surfaces of the conductive copper pieces in an electric disconnection or connection state for safe breaking and making of a circuit.

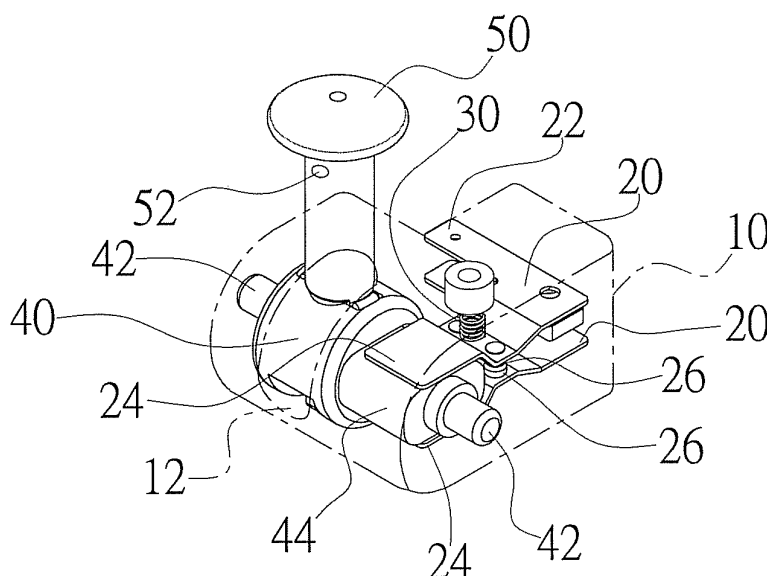


FIG.1

Description

BACKGROUND OF THE INVENTION

1. Fields of the Invention

[0001] The invention relates to a lever switch for safe breaking of a circuit of an exercise apparatus, and more particularly, to lever switch that permits a safe breaking and making of a circuit by turning an insertion lever.

2. Description of the Related Art

[0002] Generally, most of the conventional power-driven exercise apparatuses are provided with an emergency cutout switch for an easy and rapid interruption of electric current in case of emergency such that the safety of the operator and people around the apparatus may be ensured.

[0003] The most common safety switch is constructed in the shape of a safety pin. The operation principle lies in that an electric connection and disconnection is established by inserting and removing the pin, respectively. In this way, an expected safety effect is achieved.

[0004] In view of the conventional design, the pin made of plastic material acts as an insulator. In brief, the power contacts are interconnected when the insulator is inserted, and they are disconnected from each other when it is removed. According to this structure, all of the power contacts are received within the housing. If the insulating pin is partially broken, the broken part will stay within the housing forever. As a result, the disconnection effect is not achieved even when the insulating pin is removed. Thus, the operation safety is no more ensured.

[0005] It is often heard that the operator is injured due to the failure of the normal disconnecting function with the conventional safety pin. In order to eliminate the above-mentioned drawbacks, the manufacturer has developed an improved structure in which an intermediate conductive body and a pin are combined in one piece. The intermediate conductive body will be simultaneously pulled out when the pin is removed. In this way, both of the power contacts within the housing won't be contacted with each other forever. As a result, the safety is further ensured.

[0006] In view of the long-term use, however, the intermediate conductive body is easily worn and deformed due to an improper storage when it is removed from the housing with the pin. Thus, the electric connection effect and the power supply stability can be seriously affected. In other words, another problem is created. Consequently, a further improvement is required.

SUMMARY OF THE INVENTION

[0007] A primary object of the invention is to provide a power cut off switch for an exercise apparatus whose conductive body is constantly received within the hous-

ing. Moreover, the corresponding elements are properly coupled and positioned such that the damage of the conductive body is avoided. In addition, the expected disconnection function is ensured.

[0008] According to the invention, a lever switch for safe breaking of a circuit of an exercise apparatus includes two conductive copper pieces spaced apart and stably received within a housing by means of elastic pieces. A rotatable cylinder with two journals is positioned in the area of the contact portions of the conductive copper pieces within the housing. Moreover, a rectangular piece is provided at one side of the rotatable cylinder such that the contact portions of the conductive copper pieces are just clamp able to the top and bottom ends of the rectangular piece. In addition, the middle portion of the conductive copper pieces is inwardly bent to form corresponding conductive contact surfaces. As a result, an insertion lever may fit into the body of the rotatable cylinder for in-place-moving the rotatable cylinder such that the rectangular piece is turned to bring the conductive contact surfaces of the conductive copper pieces in an electric disconnection or connection state for safe breaking and making of a circuit.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The accomplishment of this and other objects of the invention will become apparent from the following description and its accompanying drawings of which:

FIG. 1 is a perspective view of a preferred embodiment of the invention;

FIG. 2 is a side view of the preferred embodiment of the invention according to FIG. 1;

FIG. 3 is a perspective view of the preferred embodiment of the invention according to FIG. 1, wherein an insertion lever fits into an insertion hole of a rotatable cylinder;

FIG. 4 is a side view of the preferred embodiment of the invention according to FIG. 3;

FIG. 5 is a schematic drawing of the invention applied to an electronic meter of an exercise apparatus;

FIG. 6 is a perspective view of another embodiment of the invention; and

FIG. 7 is a side view of another embodiment of the invention according to FIG. 5, wherein the operation thereof is illustrated.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0010] The present invention will now be described in

more detail hereinafter with reference to the accompanying drawings that show various embodiments of the invention.

[0011] In order to achieve a better demonstration effect, the housing 10 of the invention is marked with dash-dotted line for a better understanding of the basic arrangement of the internal components within the housing 10.

[0012] Referring to FIGS. 1 through 5, a lever switch for safe breaking of a circuit of an exercise apparatus in accordance with a preferred embodiment of the invention includes a housing 10 wherein a guide slot 12 is within the movement range of the insertion lever 50.

[0013] The conductive copper pieces 20 are stably positioned within the housing 10 and properly spaced apart. Each of the conductive copper pieces 20 includes an insertion portion 22 at one end thereof for establishing an electric connection to a socket (not shown) of an electronic meter 60. A contact portion 24 is provided at the other end of the conductive copper piece 20. Moreover, the middle portion of the conductive copper pieces 20 is inwardly bent to form corresponding conductive contact surfaces 26.

[0014] The elastic pieces 30 are interposed between the housing 10 and the conductive copper pieces 20 in a compressed way.

[0015] The rotatable cylinder 40 includes two journals 42 at both sides thereof. A rectangular piece 44 is positioned in the area of the contact portion 24 of the corresponding conductive copper piece 20. Moreover, an insertion hole 46 is formed in the rotatable cylinder 40. In addition, the contact portions 24 of the conductive copper pieces 20 are constantly clamped at the top and bottom ends of the contact polygon 44 of the rotatable cylinder 40.

[0016] The insertion lever 50 fits into the insertion hole 46 of the rotatable cylinder 40 for moving the rotatable cylinder 40. The insertion lever 50 is detachable from the insertion hole 46 as well. A cord hole 52 is disposed at one end thereof for the passage of a cord 62.

[0017] Based on the assembly of the above-mentioned components, the insertion lever 50 is received within the insertion hole 46 of the rotatable cylinder 40 to achieve a closed circuit. In this case, the contact portions 24 of the conductive copper pieces 20 are positioned at the slim portion of the rectangular piece 44 of the rotatable cylinder 40 such that the conductive contact surfaces 26 of the conductive copper pieces 20 are in contact with each other to establish an electric connection. When the insertion lever 50 is moved by an external force, the rotatable cylinder 40 is moved as well. When the rectangular piece 44 is so turned that the contact portions 24 of the conductive copper pieces 20 are positioned at the thick portion of the rectangular piece 44, the conductive contact surfaces 26 of the conductive copper pieces 20 are detached from each other to create a disconnection state.

[0018] As depicted above, the insertion lever 50 can

be removed from the insertion hole 46 of the rotatable cylinder 40. In creating the closed circuit again, the insertion lever 50 has to be inserted back into the insertion hole 46. In this way, the rotatable cylinder 40 and the rectangular piece 44 can be rotated to bring the conductive contact surfaces 26 of the conductive copper pieces 20 in the electric connection state. In other words, the electric connection or disconnection may be easily and safely achieved, thereby ensuring the safety in use.

[0019] As shown in FIGS. 6 and 7, a closed circuit is maintained. In order to prevent the insertion lever 50 from an undesired removal for a better safety in use, a position-limiting element 14 is disposed near the guide slot 12 of the housing 10. Meanwhile, the insertion lever 50 includes an annular groove 54 facing to the position-limiting element 14 such that the insertion lever 50 has to be moved to a certain place for the removal from the rotatable cylinder 40 to create an open circuit for the electronic meter 60. In other words, the insertion lever 50 must be inserted back to move the rotatable cylinder 40 to a certain place for establishing the closed circuit. As a result, a reliable operation is ensured.

[0020] Based on the above-mentioned design, the drawbacks of the conventional product in design and use can be eliminated, thereby achieving a safe operation and a prolonged service life.

[0021] Many changes and modifications in the above-described embodiment of the invention can, of course, be carried out without departing from the scope thereof. Accordingly, to promote the progress in science and the useful arts, the invention is disclosed and is intended to be limited only by the scope of the appended claims.

Claims

1. A lever switch for safe breaking of a circuit of an exercise apparatus wherein two conductive copper pieces (20) are spaced apart and stably received within a housing (10) by means of elastic pieces (30), and wherein a rotatable cylinder (40) with two journals (42) is positioned in the area of the contact portions (24) of the conductive copper pieces (20) within the housing (10), and wherein the rotatable cylinder (40) is provided with a rectangular piece (44) at one side thereof such that the contact portions (24) of the conductive copper pieces constantly lie against the top and bottom ends of the rectangular piece (44), and wherein the middle portion of the conductive copper pieces (20) is inwardly bent to form corresponding conductive contact surfaces (26), whereby an insertion lever (50) may fit into the body of the rotatable cylinder for in-place-moving the rotatable cylinder such that the rectangular piece may be turned to be detached from or to be in contact with the conductive contact surfaces of the conductive copper pieces to achieve a safe electric disconnection or connection.

2. A lever switch for safe breaking of a circuit of an exercise apparatus, comprising a housing (10), two conductive copper pieces (20), two elastic pieces (30), a rotatable and cylindric element (40) and an insertion lever (50),
wherein the housing includes a guide slot (12) within the movement range of the insertion lever;
wherein the conductive copper pieces are stably positioned within the housing and
spaced apart, and each of the conductive copper pieces includes an insertion portion (22) at one end thereof and a contact portion at the other end thereof, and the contact portions (24) of the conductive copper pieces constantly lie against the top and bottom ends of the rectangular piece, and the middle portion of the conductive copper pieces is inwardly bent to form corresponding conductive contact surfaces (26) ;
wherein the elastic pieces are constantly interposed between the housing and the conductive copper pieces;
wherein the rotatable cylinder includes two journals (42) at both sides thereof, and a rectangular piece is positioned near the contact portions of the conductive copper pieces, and an insertion hole (46) is formed in the body of the rotatable and cylindric element,
wherein the insertion lever fits into the insertion hole of the rotatable cylinder for turning the rotatable cylinder, and the insertion lever is detachable from the insertion hole as well, and a cord hole is disposed at one end thereof;
whereby the rotatable cylinder may be turned by the insertion lever fitting into the body of the rotatable cylinder such that the rectangular piece may be turned to be detached from or to be in contact with the conductive contact surfaces of the conductive copper pieces to achieve a safe electric disconnection or connection.
3. The lever switch for safe breaking of a circuit of an exercise apparatus as recited in claim 2, wherein a position-limiting element is disposed near the guide slot of the housing, and wherein the insertion lever includes an annular groove facing to the position-limiting element such that the insertion lever has to be moved to a certain circuit-breaking place for the removal from the rotatable cylinder.

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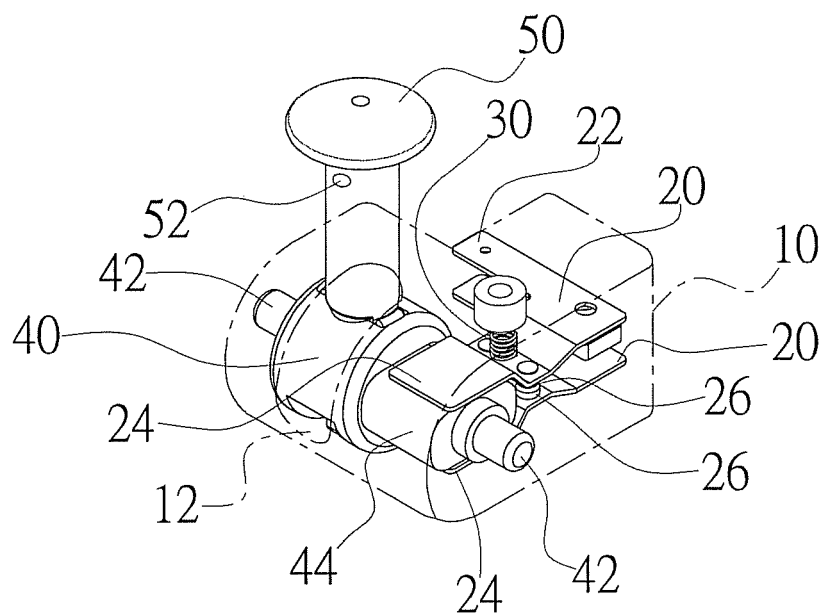


FIG.1

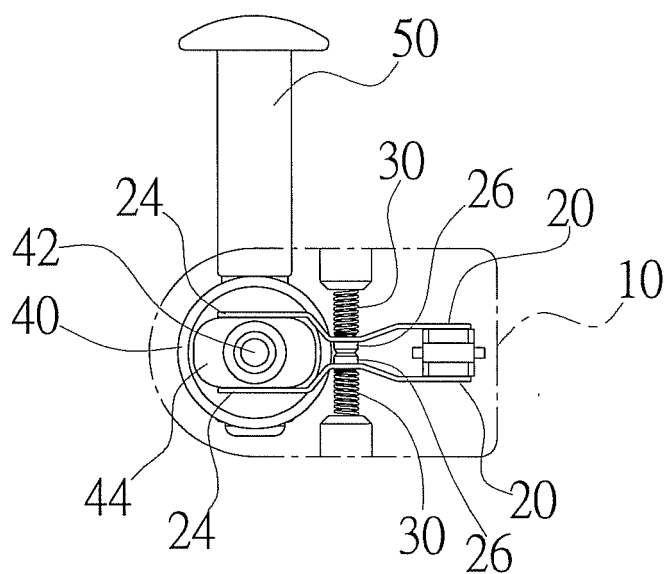


FIG.2

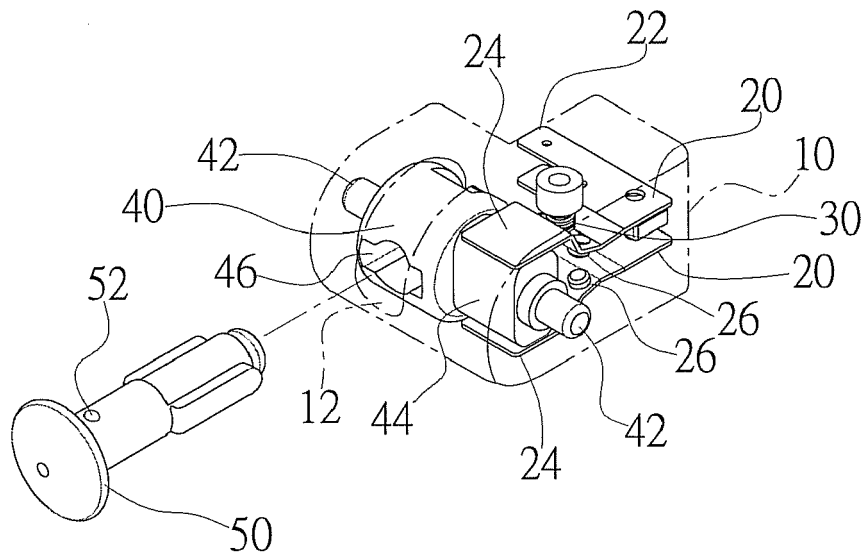


FIG.3

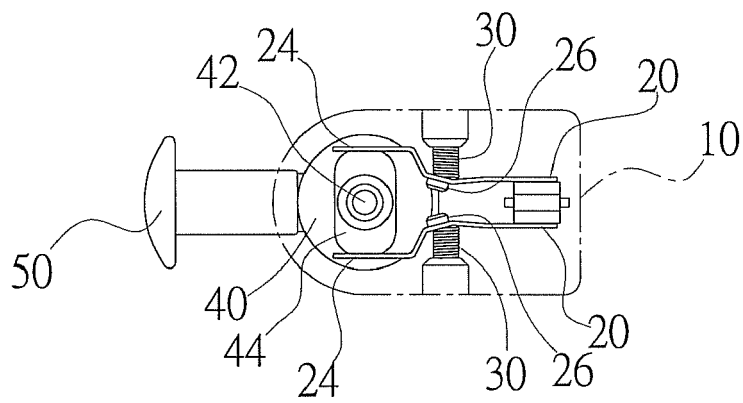


FIG.4

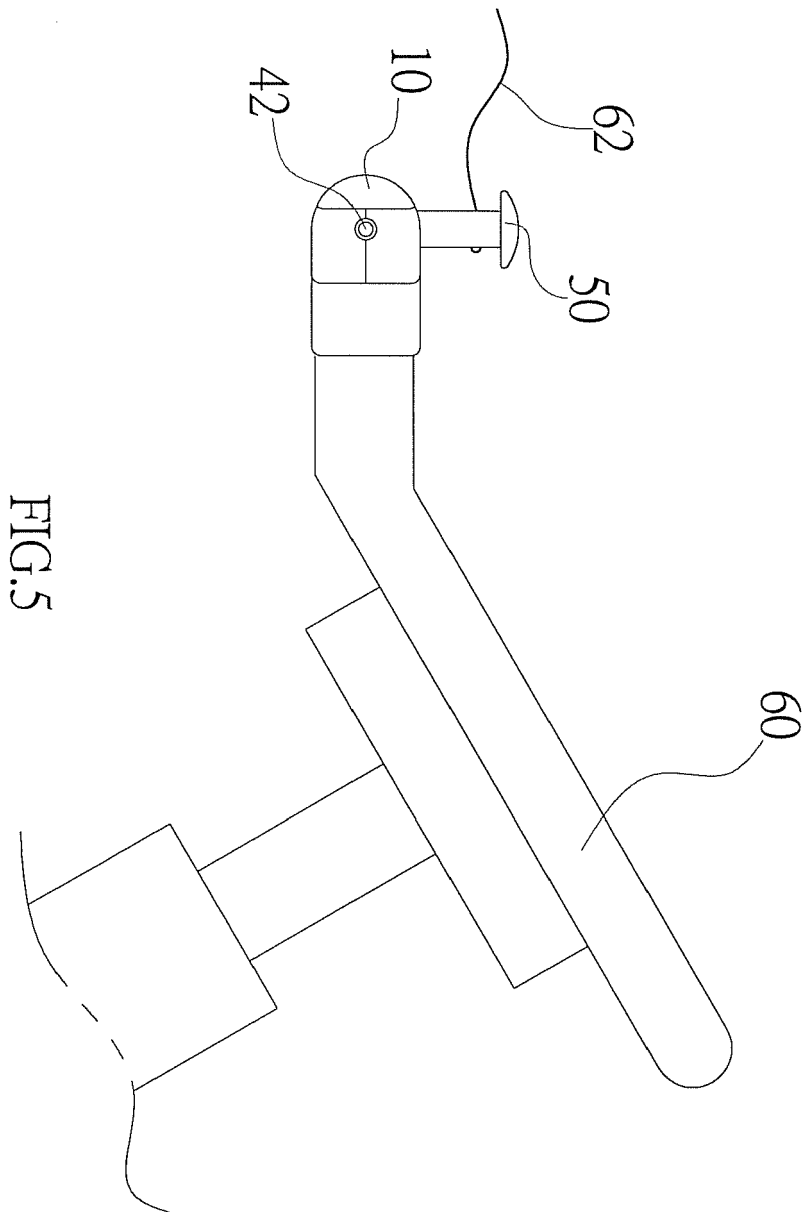


FIG. 5

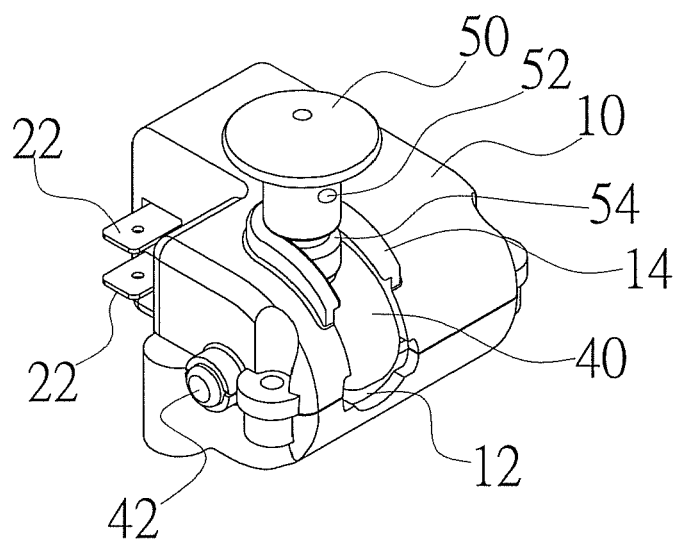


FIG. 6

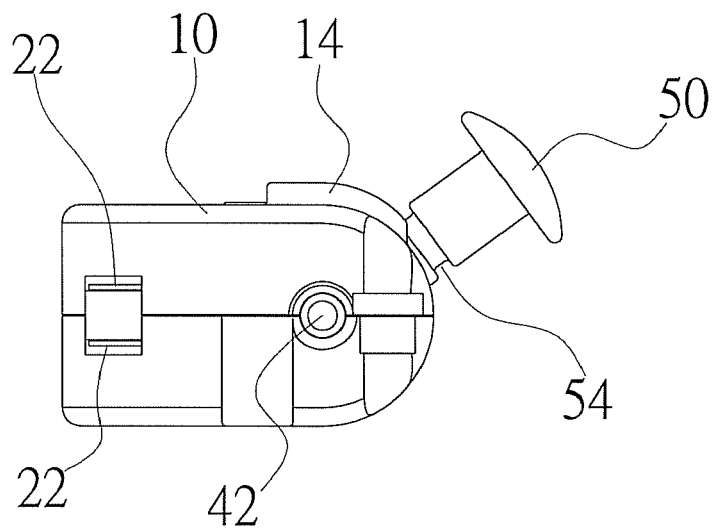


FIG. 7



EUROPEAN SEARCH REPORT

Application Number
EP 10 17 3869

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 1 355 179 A (STANHOPE ALFRED W) 12 October 1920 (1920-10-12) * page 1, line 9 - page 2, line 46; figures 1-5 *	1-3	INV. H01H3/02
A	DE 10 76 787 B (BERKER GEB; JUNG ALBRECHT FA) 3 March 1960 (1960-03-03) * column 2, line 28 - column 4, line 6; figures 1-10 *	1-3	
A	EP 0 655 264 A1 (GEGAUF FRITZ AG [CH]) 31 May 1995 (1995-05-31) * column 2, line 42 - line 45; figure 3 *	1-3	
			TECHNICAL FIELDS SEARCHED (IPC)
			H01H A63B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 1 March 2011	Examiner Jekabsons, Armands
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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EPO FORM 1503 03.02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 10 17 3869

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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01-03-2011

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