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(11)

EP 1 280 174 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:

29.01.2003 Bulletin 2003/05

(51) Int Cl.7: **H01H 25/04**

(21) Application number: **02015030.6**

(22) Date of filing: **05.07.2002**

(84) Designated Contracting States:

**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
IE IT LI LU MC NL PT SE SK TR**

Designated Extension States:

AL LT LV MK RO SI

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(30) Priority: **23.07.2001 EP 01401968**

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(54) **Selector switch, especially a four- or multi-position switch**

(57) A selector switch (10) is proposed to select or manipulate at least one function of a consumer product. The selector comprises an operating element having at

least one operating area. The selector switch (10) comprises two key switches (22,24; 26,28; 30,32; 34,36) underneath the operating area to control the desired function.

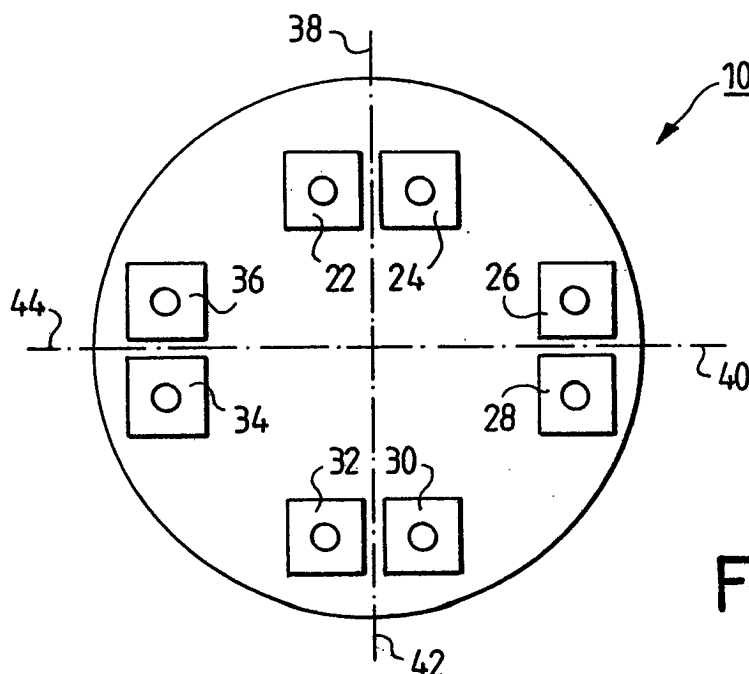


FIG. 2

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Description

[0001] The invention relates to a selector switch, especially a four- or multi-position push-button selector switch, to select or manipulate at least one function of a consumer product, such as a video recorder, television, comprising an operating element having at least one operating area, which corresponds to at least one key switch located underneath the operating area to control the desired function.

[0002] In above mentioned selector switches the operating element may be designed like a push-button switch or like a joystick, with a single key switch arranged underneath at least one area. Due to a component defect or operating errors the design may lead to mistriggering.

[0003] Generally, a given function is controlled by a single key switch. For instance, in U.S. patent No. 5,902,972, a first switch triggers a first function (window down), a second switch triggers a second function (window up), whereas pressing both switches triggers a third function (automatic). Similarly, U.S. patent No. 5,796,056 relates to a multi-stage switch which is specifically designed so that an increasing force leads to a successive operation of the switch elements. U.S. patents No. 4,975,547 and 6,069,327 describe multi-position switches of this type where various functions are controlled depending on the combination of the various switch elements.

[0004] Recent consumer electronic products, such as video recorders, monitors and the like, use four- or multi-position push-button switches comprising a round button either to select or navigate a required function. In order to have a uniform feel on the button itself, these buttons will always be designed so that the four buttons will incorporate in a single piece.

[0005] As the button is a single piece, and the functions are controlled by a single key switch, there are always a problem of accidentally triggering an adjacent function. The switches are located at the East, South, West and North positions. If a user wants to press any one position, the user's finger has to hit that particular position. If the user presses the plastic button between two switch locations, a detecting unit cannot detect the operation, or detect an unintended operation.

[0006] The problem underlying the present invention is to provide an selector switch of the above mentioned type which rules out mistriggering cause by operating errors. The problem is attained in accordance with the invention by a selector switch comprising two key switches underneath the operating area of the operating element to control the desired function.

[0007] Compared to the existing selector switch, each function on the control element is controlled by two switches. Only when two key switches belonging to the same operating area are turned on, then the keystroke can be recognized. Otherwise this keystroke will be ignored.

[0008] According to a preferred embodiment of the invention the operating element comprises a single piece push-button, having several adjacent operating areas with at least two key switches underneath each operating area to control desired functions. Advantageously, if a user operate the push-button between two adjacent operating areas, then only on key switch of each operating area is pressed and a detecting circuit is designed so that when only one key switch is pressed, this function/key stroke will be ignored.

[0009] It is proposed in accordance with the invention that the two switches located underneath the same operating area are connected in series. Preferably a first end of the series connection is coupled to a first reference potential such as a ground and a second end is coupled to an input from the detecting circuit and to a second reference potential such as a operating voltage via a resistor. In another embodiment the first end of the series connection is connected to ground and via a resistor to operating voltage and the second end is connected to the input from the detecting circuit. The detecting circuit is designed in such a way that only when the two switches are turned on at the same time the detecting circuit can detect that button is being pressed by the user.

[0010] To select or navigate four functions A, B, C, D the operating areas with associated key switches are located at East, South, West and North compass positions.

[0011] In another embodiment of the invention the two key switches are arranged opposing each other referred to a center line which corresponds to the operating area.

[0012] Advantageously the push-button is formed as a single-piece button with circular, rectangular or annular shape.

[0013] Additional details, characteristics and advantages of the invention can be found not only in the claims and their relevant characteristics - only and/or in combination - but also in the following descriptions of one of the preferred embodiments contained in the drawings.

[0014] They show:

Fig. 1 a top plan view of a four-position switch incl. push-button,

Fig. 2 a top plan view of a four-position switch without push-button,

Fig. 3 a schematic drawing of an detecting unit,

Fig. 4 perspective view of switching elements of the four-position switch on a motherboard and

Fig. 5 the button of the four-position switch from different angles.

[0015] Fig. 1 shows a top plan view of the selector switch 10 designed as a four-position push-button selector switch as specified by the invention, including an operating element formed as a single-piece, round push-button 12 with operating areas 14, 16, 18, 20 in the compass positions East, South, West and North, to

select the desired functions A, B, C or D of an electronic device such as a video recorder, a monitor or similar device.

[0016] Fig. 2 shows a top plan view of the four-position switch 10 without push-button 12. The four-position switch is designed in such a manner, that under each of the operating areas 14, 16, 18, 20 at least two, individual key switches 22, 24; 26, 28; 30, 32; and 34, 36 are arranged, to prevent mistripping. In the preferred embodiment the individual key switches are each in a opposite arrangement towards a center line 38, 40, 42, 44 of the operating segments.

[0017] Fig. 3 shows a purely schematic drawing of a circuit to indicated the selector switch 10 as shown in Fig. 2. This provides for the key switches 22, 24; 26, 28; 30, 32 as well as 34, 36 assigned to operating areas 14, 16, 18, 20 form one serial circuit. As an example, Fig. 3 shows a serial circuit 46 of the key switches 22, 24 as well as a serial circuit 48 of the key switches 26, 28. The serial circuits are each connected to a first end 50, 52 with ground potential 54 and to a second end 56, 58 each with an input 60, 62 of an detecting unit 64, which in the current example is provided as a microprocessor. The inputs 60, 62 are each connected through a resistor 66, 68 with the operating voltage (5V).

[0018] The inventive embodiment of the four-position switch 10 is characterized in that at the inputs 60 and 62 of the detecting unit 64 a signal is only present if both the key switches 22, 24 under the operating segment 14 are pushed, i.e. are closed, at the same time. If only one key switch is closed, an input signal is not recognized.

[0019] If the push-button 12 is moved to the provided operating areas 14, 16, 18, 20, the key switches arranged under each of the operating areas react so that a corresponding input signal is generated. If the operating button is pushed, say, at a spot between North and East, closing key switches 24 and 26, the detecting unit 64 receives no input signal. Thus, mistripping is ruled out.

[0020] In other words the detecting unit 64 only reacts if the key switches integral to one operating position are pressed. Otherwise the action of pressing of the push-button 12 is ignored.

[0021] Fig. 4 shows a perspective view of a mother-board 70, on which the key switches 22, 24; 26, 28; 30, 32 as well as 34, 36 are arranged as specified by the invention. The individual key switches 22, 24 can also be designed in one piece as so-called dual-switch.

[0022] Fig. 5 shows various views of the push-button 12. The single-piece button 12 in a round design in the current example, can be made of metal or plastic.

[0023] Fig. 5a shows an underside 72 of the button 12. Operating elements 74 - 80 allocated to the key switches 22, 24; 26, 28; 30, 32 as well as 34, 36, extend downwards substantially vertically to operate the key switches. Along the circumferential edge 82 of the push-button 12 locking elements 84 - 90 also extend down-

wards from the underside 72 which are provided to hold the push-button 12 in a housing of an electronic device (not shown). Fig. 5b shows a side view of the push-button 12, in which the locking elements 84 - 90 are visible.

[0024] Fig. 5c shows a top plan view of the push-button 12 and the operating segments 14, 16, 18, 20. Here the operating areas 14, 16, 18, 20 are optically separated by the reference numbers 92, 94, the reference number 92, for example is designed as a protrusion and the reference number 94 as an indent, to optically distinguish the operating areas 14, 16, 18, 20 from each other.

[0025] The inventive selector switch which was described in the current example as four-position push-button selector switch, can of course also be designed as a multi-position switch. A special advantage worth mentioning is that based on the arrangement of at least two key switches under one operating area, an error caused by pressing the button inaccurately is ruled out. Special advantages worth mentioning are the fact that the embodiment is simple and low-cost since no specialized electronic and mechanical elements are required.

Claims

1. Selector switch (10), especially a four- or multi-position push-button selector switch, to select or manipulate at least one function (A, B, C, D) of a consumer product, such as a video recorder, television, comprising an operating element (12) having at least one operating area (14, 16, 18, 20), which corresponds to at least one key switch (22,24; 26,28; 30,32; 34,36) located underneath the operating area (14, 16, 18, 20) to control the desired function (A, B, C, D), wherein the selector switch (10) comprises two key switches (22,24; 26,28; 30,32; 34,36) underneath the operating area (14, 16, 18, 20) to control the desired function (A, B, C, D).
2. Selector switch according to claim 1, wherein the operating element (12) is formed as a single piece push-button, having several adjacent operating areas (14, 16, 18, 20) with at least two key switches underneath each operating area (14, 16, 18, 20) to control desired Functions (A, B, C, D).
3. Selector switch according to claim 1 or 2, wherein the two switches (22,24; 26,28; 30,32; 34,36) located underneath the same center location (14, 16, 18, 20) are connected in series.
4. Selector switch according to at least one of the claims 1 to 3, wherein a first end (50, 52) of the series connection (46, 48) is coupled to a first reference potential (54)

such as a ground and a second end (56, 58) is coupled to an input (60, 62) from a detecting circuit (64) and to a second reference potential such as a operating voltage via a resistor (66, 68).

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5. Selector switch according to at least one of the claims 1 to 4,
wherein a first end (50, 52) of the series connection (46, 48) is coupled to a first reference potential (54) such as a ground and to a second reference potential such as a operating voltage via a resistor (66, 68) whereby a second end (56, 58) is coupled to an input (60, 62) from a detecting circuit (64). 10
6. Selector switch according to at least one of the claims 1 to 5,
wherein the operating areas (14, 16, 18, 20) with associated key switches (22,24; 26,28; 30,32; 34,36) are located in East, South, West and North compass direction. 15 20
7. Selector switch according to at least one of the claims 1 to 6,
wherein the two key switches (22, 24; 26,28; 30,32; 34,36) are located opposite each other symmetrically to a center line (38, 40, 42, 44) which corresponds to the operating area (14, 16, 18, 20). 25
8. Selector switch according to at least one of the claims 1 to 7,
wherein the push-button (12) is formed as a single-piece button with circular, rectangular or annular shape. 30

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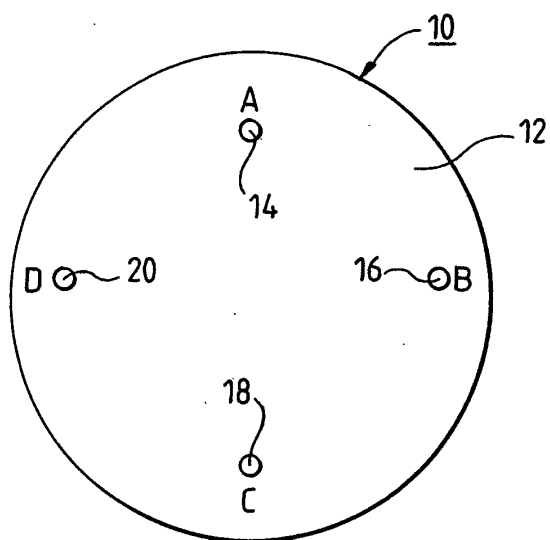


FIG. 1

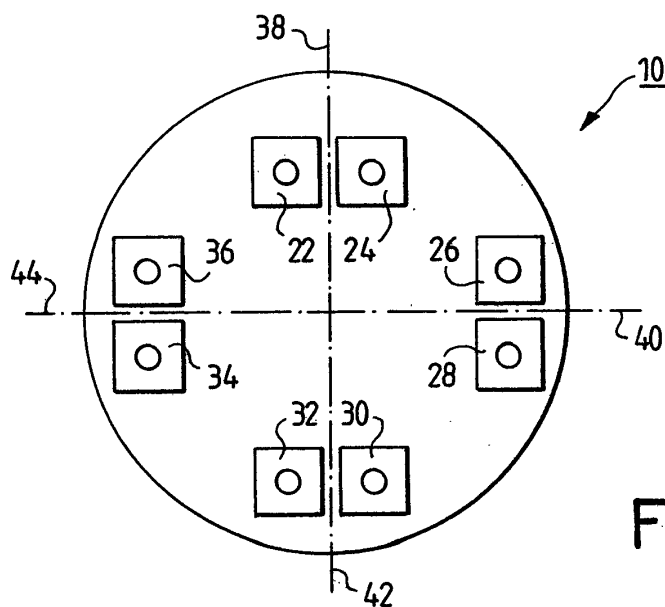


FIG. 2

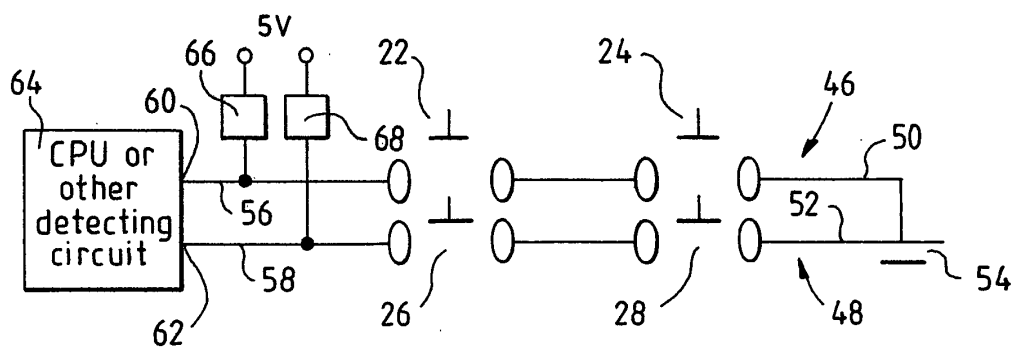


FIG. 3

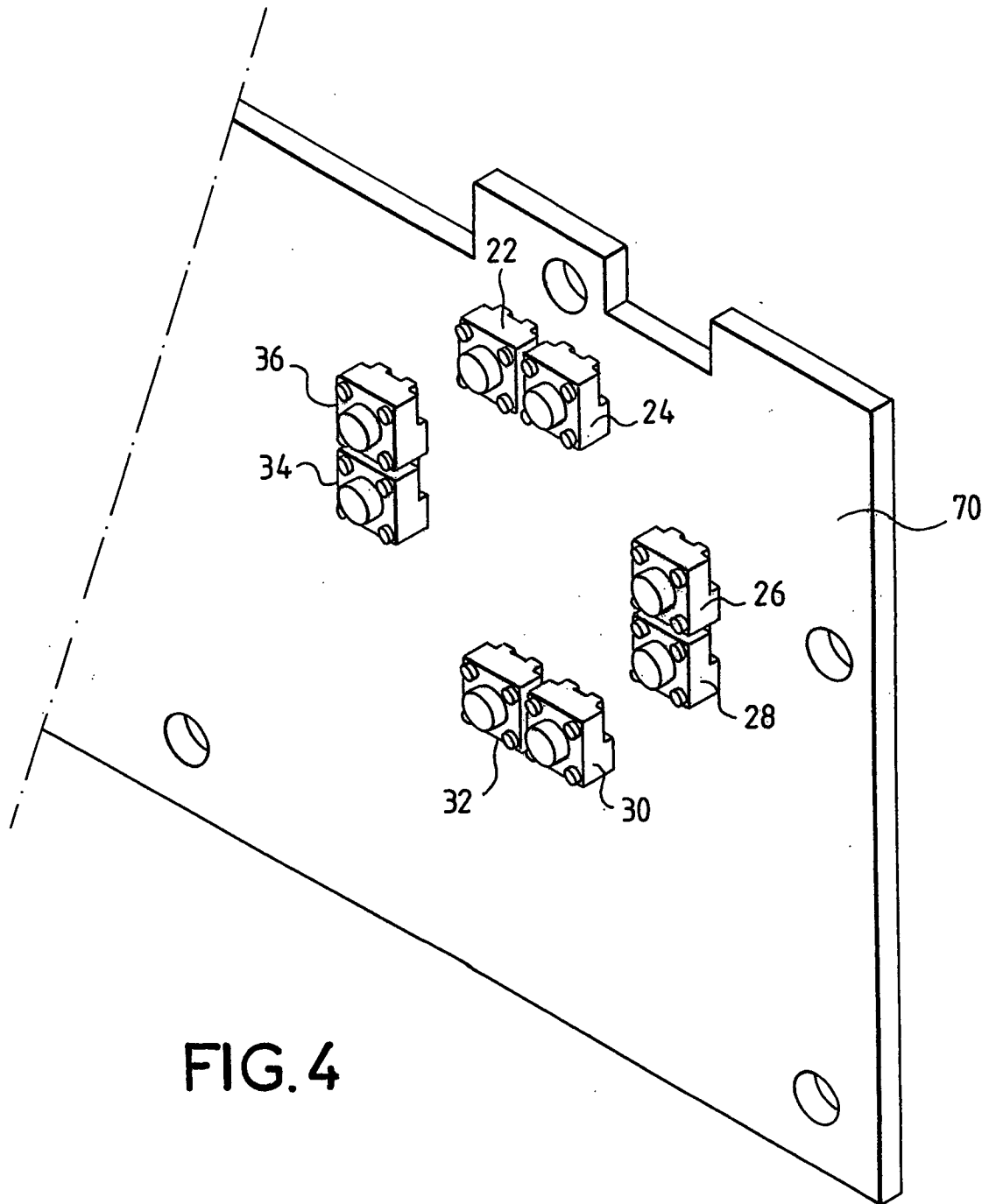


FIG. 4

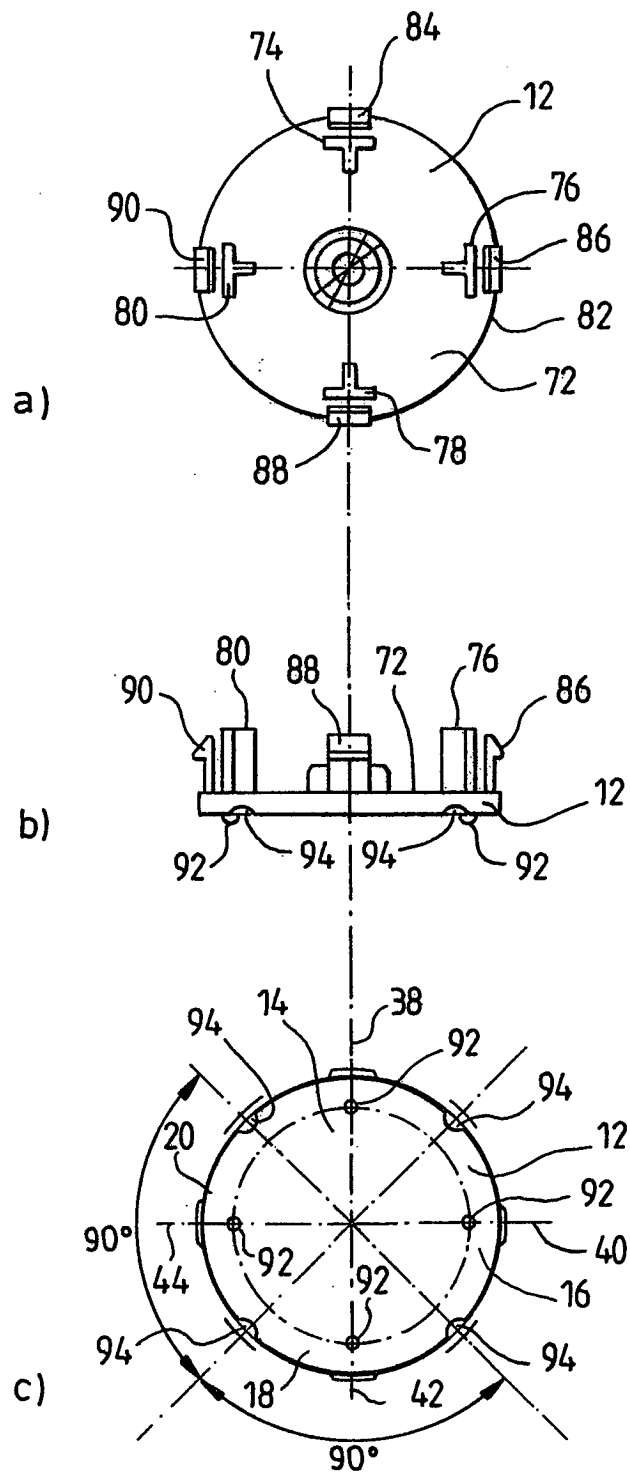


FIG. 5



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EUROPEAN SEARCH REPORT

Application Number
EP 02 01 5030

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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X	EP 0 516 870 A (SCHADOW RUDOLF GMBH) 9 December 1992 (1992-12-09) * the whole document * -----	1	<div>TECHNICAL FIELDS SEARCHED (Int.Cl.7)</div> <div>H01H</div>
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 11 September 2002	Examiner Simonini, S
<div>CATEGORY OF CITED DOCUMENTS</div> <div> 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 </div>			

EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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