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(54) **5-in-1 connector**

(57) The 5-in-1 connector of the present invention has a cartridge (10) with three insertion slots (11, 12, 13) which each is provided fixedly with a contact pin set (20) correspondingly connecting with circuit contact points of one of various memory cards, thereby an electric device can be inserted therein with at least three memory cards (41, 42, 43) of different specifications; the

first of the three insertion slots (11) can afford insertion of one of CF (41) and MD memory cards, the second insertion slot (12) can afford insertion of one of SD (42) and MMC memory cards, the third insertion slot (13) can afford insertion of an MS memory card (43), hence the electric device at least can proceed to reading and writing on five memory cards of different specifications.

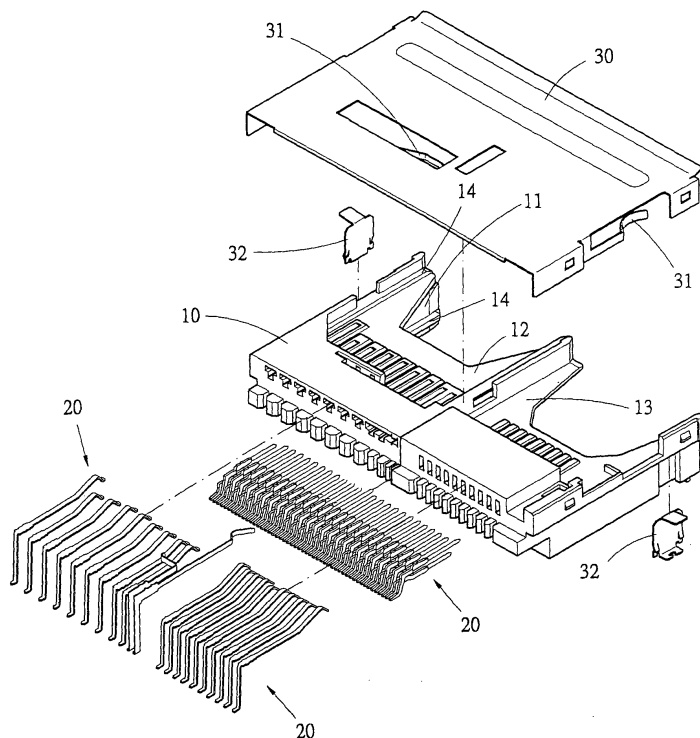


FIG. 2

Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention is related to a 5-in-1 connector, and especially to a 5-in-1 connector to render an electric device to execute data reading, exchanging and transferring with memory cards of five specifications including those of CF memory cards (CompactFlash cards), MD memory cards (Micro Drive Cards), MMC memory cards (MultiMedia Cards), MS memory cards (Memory Stick Cards) and SD memory cards (Secure Digital Cards) on the connector.

2. Description of the Prior Art

[0002] Generally, a main body of a 3C digital electric device such as a notebook, a digital camera, a digital video camera, a PDA and a personal computer etc. partly is built therein with a connector at least specific for a set of specifications in addition to providing those necessary input and output ports (such as a USB port) for peripheral devices, and an insertion slot is provided for a flash memory card to allow drawing out of it for changing in time to increase its capability of storage of data and convenience of data exchanging, reading and writing; however, specifications of memory cards in the markets are too many that the electric device is required to be built therein with a connector meeting various specifications, thereby, the insertion slot of the connector can afford insertion of the memory cards to make connection and data exchange of the memory cards with the electronic circuit of the electric device.

[0003] However, digital electric devices carried on ones' person such as a notebook or a PDA etc. not only are continuously elevated in their functions, but also are designed aiming at the direction of lightening weight in order to meet the feature of being convenient for carrying and receiving. Thereby, the built-in connector preferably not occupies too much space of an electric device; and some manufacturers even do not allow to build in connectors corresponding to memory cards of non-specific specifications to avoid the connectors not in use to occupy spaces in need.

[0004] Therefore, there have been developed one-for-plurality card readers specific for memory cards of various specifications in the markets to afford connection and use of 3C electric devices with memory cards of non-specific specifications, this can elevate the function of connection of the 3C electric devices with the memory cards. However, the constructions of the one-for-plurality card readers sold in the markets can be regarded each as a main body of a device connecting with plural connectors (for example, a 6-in-one card reader needs 6 connectors), costs of them are high, and they are cumbersome in assembling and has a larger vol-

ume, they do not suit digital electric devices carried on ones' person such as a notebook or a PDA etc.

SUMMARY OF THE INVENTION

[0005] The 5-in-1 connector of the present invention has a cartridge with three insertion slots which each is provided fixedly with a contact pin set correspondingly connecting with circuit contact points of one of various memory cards, the contact pin sets are extended toward the bottom and the rear sides of the cartridge to connect and fix to the electronic circuit of an electric device, thereby the electric device can be inserted therein with at least three memory cards of different specifications; the first of the three insertion slots can afford insertion of one of CF, MD memory cards, the second insertion slot can afford insertion of one of SD, MMC memory cards, the third insertion slot can afford insertion of an MS memory card, hence the electric device at least can proceed to reading and writing on five memory cards of different specifications.

[0006] In which the insertion slots of the cartridge are divided into: the first insertion slot located at a lower layer as well as the second and third insertion slots that are located in juxtaposition with each other above the first insertion slot. The first insertion slot is common to the CF, MD memory cards with closely similar sizes to it, and is provided internally thereof with a channel mating with the width and thickness of either of the CF, MD memory cards to prevent wrong insertion of memory cards; the second insertion slot is common to the SD, MMC memory cards with closely similar sizes to it, and is provided internally thereof with a channel mating with the width and thickness of either of the SD, MMC memory cards to prevent wrong insertion of memory cards; while the third insertion slot is of the construction meeting the MS memory card; so that the entire space arrangement of the insertion slots of the electric device can be reduced to the most simplified degree without occupying too much space of the electric device, and the three memory cards of different specifications can be simultaneously inserted therein.

[0007] The present invention will be apparent in its structural combination and the entire mode of operation thereof after reading the detailed description of the preferred embodiment thereof in reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008]

Fig. 1 is a schematic perspective view showing the apparent structure of the connector of the present invention and the state of connection of the connector with memory cards;

Fig. 2 is an analytic perspective view showing the structure of the connector of the present invention;

Fig. 3 is a schematic perspective view showing al-
location of contact pin sets of the connector of the
present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0009] The entire structure combination of the 5-in-1
of the connector of the present invention is as shown in
Figs. 1 and 2, it takes a cartridge 10 made of plastic as
a main body; the cartridge 10 is provided on the front
side thereof with an insertion slot in coincidence with
any of the memory cards of five specifications including
those of CF, MD, MMC, MS and SD memory cards. In
the embodiment as shown in drawings, the entire car-
tridge 10 is provided with three insertion slots which in-
clude a first insertion slot 11 as well as a second inser-
tion slot 12 and a third insertion slot 13 located in juxta-
position with each other above the first insertion slot 11.

[0010] Wherein the first insertion slot 11 is common
to a CF memory card 41 and an MD memory card (not
shown) with closely similar sizes to it but with slightly
different thickness, and is provided internally thereof
with a channel 14 mating with the length, width and
thickness of either of the CF memory card 41 and the
MD memory card (not shown) to prevent wrong insertion
of memory cards; the second insertion slot 12 is com-
mon to an SD memory card 42 and an MMC memory
card (not shown) with closely similar sizes to it, but with
slightly different length, and is provided internally there-
of with a channel 14 mating with the length, width and
thickness of either of the SD memory card and the MMC
memory card (not shown) to prevent wrong insertion of
memory cards. While the third insertion slot 13 is of the
construction meeting an MS memory card 43, so that
the entire space arrangement of the insertion slots of
the electric device can be reduced to the most simplified
degree without occupying too much space of the electric
device.

[0011] As shown in Figs. 2 and 3, the first, second and
third insertion slots 11, 12, 13 of the cartridge 10 are
provided fixedly with contact pin sets 20 correspond-
ingly connecting with circuit contact points of the mem-
ory cards, the contact pin sets 20 are extended toward
the bottom and the rear sides of the cartridge 10 to
render the insertion slots 11, 12, 13 to connect by weld-
ing and fix to an electronic circuit 50 of the electric device
via the contact pin sets 20, thereby the electric device
can proceed to reading and writing on at least the above
stated CF, MD, MMC, MS and SD memory cards to
largely increase the convenience of use and applicabil-
ity in connecting and use of the electric device with the
memory cards.

[0012] Particularly, the entire electric device has the
first insertion slot 11, the second insertion slot 12 and
the third insertion slot 13 connecting with the electronic
circuit 50 of the electric device via the contact pin sets
20, so that the first, second and third insertion slots 11,

12, 13 can be regarded as three independent connec-
tors to render the electric device to have three kinds of
swappable hardware for data storage occupying only a
space affording conventionally only one connector, in fa-
vor of operation of an IC of the electronic circuit 50 in
controlling the first, second and third insertion slots 11,
12, 13, thereby the electric device can execute data ex-
changing, reading and writing simultaneously on the
memory cards inserted in the first, second and third in-
sertion slots 11, 12, 13, or execute data exchanging and
storing among the first, second and third insertion slots
11, 12, 13.

[0013] For example, the electric device mounted with
the connector of the present invention is a notebook,
and the first insertion slot 11 is inserted therein with an
CF memory card, the second insertion slot 12 is inserted
therein with an SD memory card, the third insertion slot
13 is inserted therein with an MS memory card, then the
notebook can execute data exchanging, reading and
writing simultaneously on the CF memory card, the SD
memory card and the MS memory card, or execute mu-
tual data exchanging and storing among the CF memory
card, the SD memory card and the MS memory card.

[0014] Moreover, the entire connector is further pro-
vided on the cartridge 10 with a metallic lid 30 which is
connected with the electronic circuit 50 and a grounding
piece 32 to get an effect of grounding; the metallic lid 30
is further provided on its top and lateral sides in corre-
sponding respectively to those of the cartridge 10 each
with an elastic contact sheet 31, positioning and con-
necting of memory cards can be acquired by means of
these elastic contact sheet 31; and in connecting of the
memory cards with the electronic circuit 50, a shielding
function against electromagnetic interference (EMI) can
be attained through grounding of the metallic lid 30.

[0015] The 5-in-1 connector of the present invention
provides another better practical structure of connector
for 3C electric device. The description and drawings are
only for illustrating a preferred embodiment of the
present invention, and not for giving any limitation to the
scope of the present invention. It will be apparent to
those skilled in this art that various modifications or
changes without departing from the spirit, scope and
characteristic of this invention shall also fall within the
scope of the appended claims of the present invention.
Having thus described my invention, what I claim as new
and desire to be secured by Letters Patent of the Uni-
ted States are:

Claims

1. A 5-in-1 connector, said connector comprises: a
cartridge made of plastic as a main body; said car-
tridge is provided with three insertion slots which in-
clude a first insertion slot located at a lower layer as
well as a second insertion slot and a third insertion
slot located in juxtaposition with each other above

said first insertion slot, wherein:

said first insertion slot is common to CF and MDmemory cards, and is provided internally thereof with a channel mating inwidth and thick- 5
ness with either of said CF and MD memory cards to prevent wrong insertion of memory cards;

said second insertion slot is common to the SD and MMC memory cards, and is provided inter- 10
nally thereof with a channel mating in width and thickness with either of said SD and MMC memory cards to prevent wrong insertion of memory cards;

while said third insertion slot is of the construc- 15
tion meeting an MS memory card;

said insertion slots each is provided fixedly with a contact pin set correspondingly connecting with circuit contact points of one of various memory cards, said contact pin sets are ex- 20
tended toward a bottom and a rear side of said cartridge to connect and fix to an electronic circuit of an electric device, thereby said electric device at least is adapted to executing reading and writing on five memory cards of different 25
specifications and being inserted therein with three memory cards of different specifications.

2. The 5-in-1 connector as in claim 1, wherein said car- 30
tridge is provided thereon with a metallic lid which is connected with said electronic circuit and a grounding piece to get an effect of grounding.
3. The 5-in-1 connector as in claim 1, wherein said car- 35
tridge is provided on its top and lateral sides each with an elastic contact sheet; positioning and connecting of memory cards are acquired by using of said elastic contact sheet.

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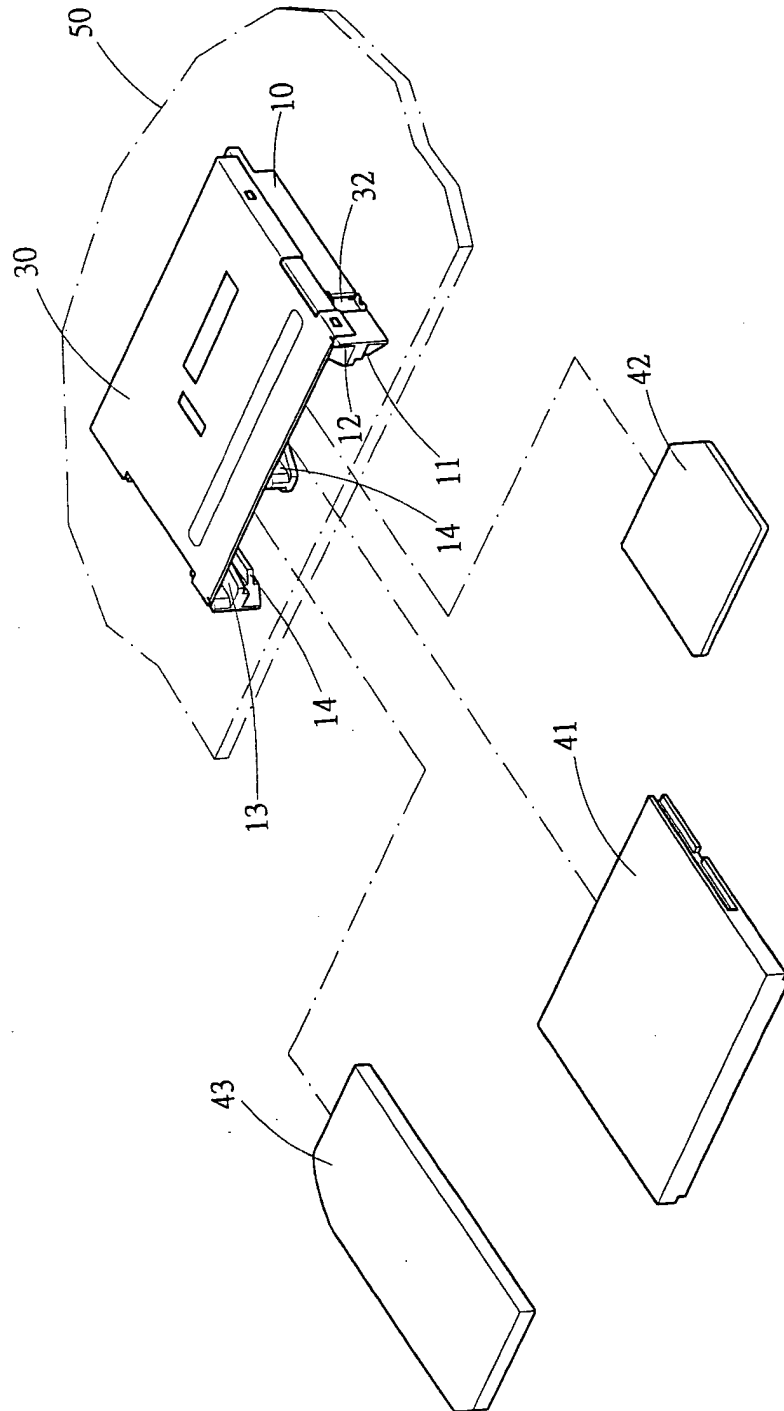


FIG. 1

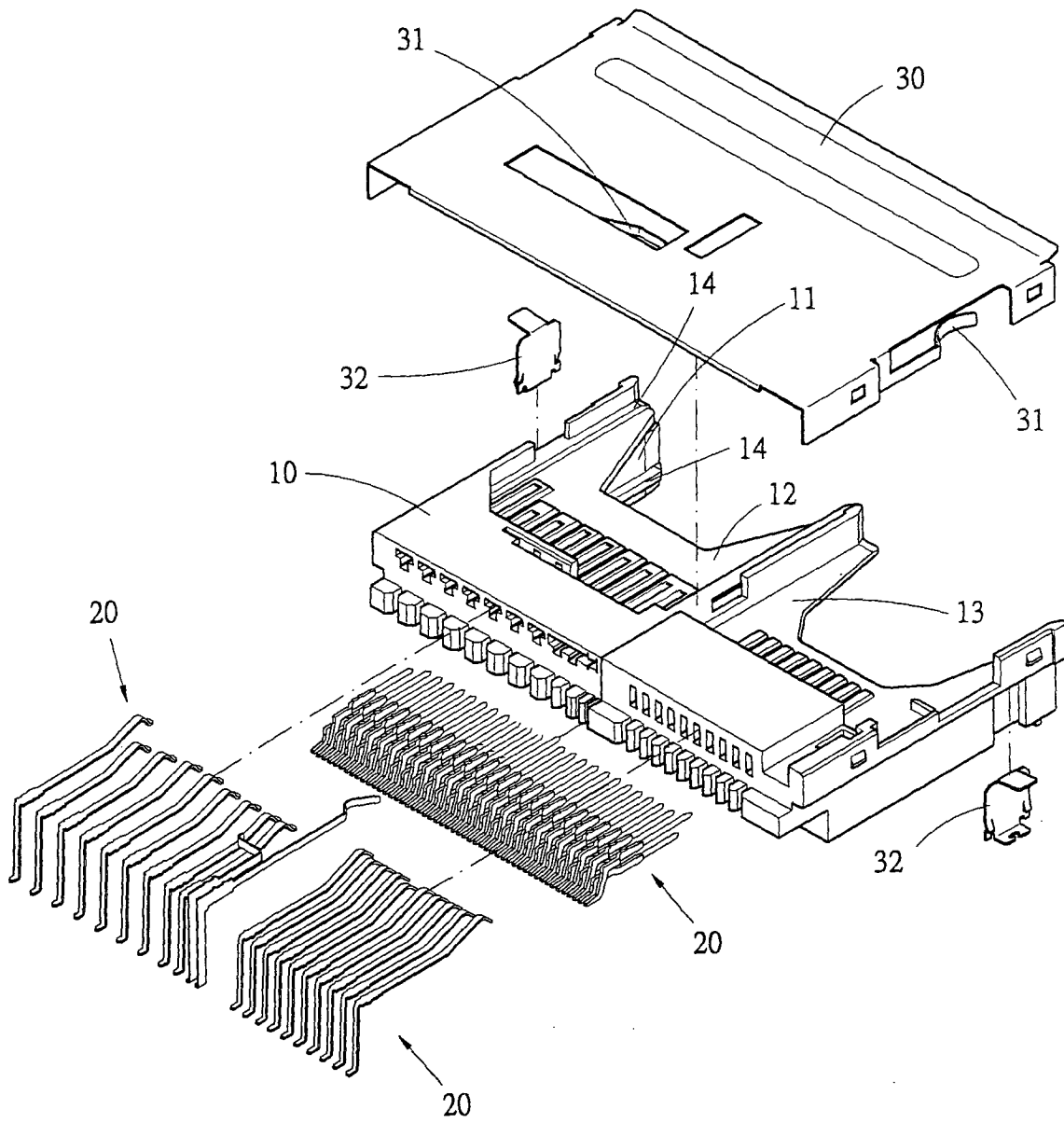


FIG. 2

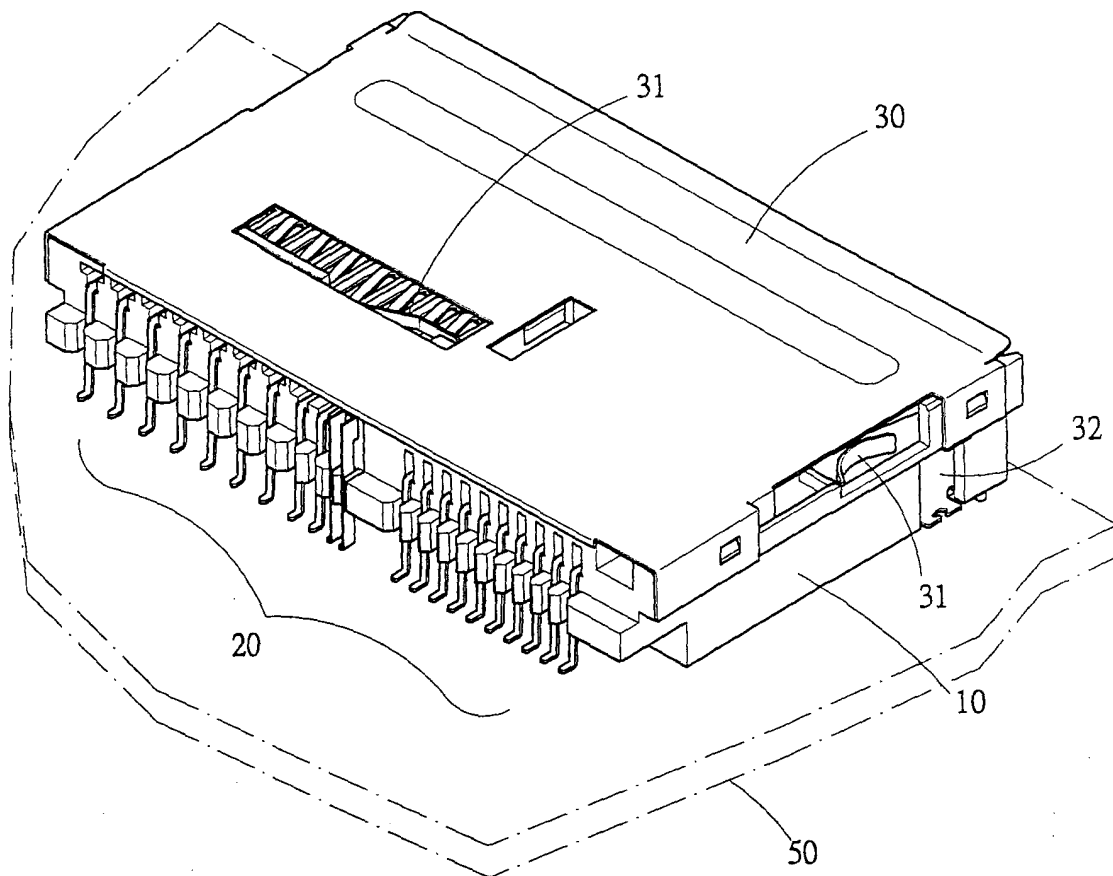


FIG. 3



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 03 25 5576

DOCUMENTS CONSIDERED TO BE RELEVANT				
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)	
X	US 2002/068487 A1 (CHANG JESSICA) 6 June 2002 (2002-06-06) * abstract; figures * * page 1, paragraph 15 - page 2 *	1	H01R27/02	
A	US 2001/039129 A1 (NISHIMURA TAKESHI) 8 November 2001 (2001-11-08) * abstract; figure 3 * * page 2, paragraph 34 - page 4, paragraph 72 *	1		
A	US 5 396 617 A (GLIEM STEFAN ET AL) 7 March 1995 (1995-03-07) * abstract; figures 1-6 * * column 3, line 37 - column 5, line 41 * * column 2, paragraph 16 - column 3, paragraph 37 *	1		
A	US 6 210 187 B1 (TUNG SHUN-CHI) 3 April 2001 (2001-04-03) * abstract; figures 1-5 * * page 1, paragraph 17 - page 2, paragraph 23 *	2		TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A	US 2002/072260 A1 (KUO MING LUN) 13 June 2002 (2002-06-13) * abstract; figures 1-3 * * column 2, line 49 - column 5, line 29 *	3		H01R
The present search report has been drawn up for all claims				
Place of search		Date of completion of the search	Examiner	
THE HAGUE		5 December 2003	Serrano Funcia, J	
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 03/82 (P04C01)

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

EP 03 25 5576

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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05-12-2003

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2002068487 A1	06-06-2002	TW 483535 Y DE 20100025 U1	01-04-2002 26-04-2001
US 2001039129 A1	08-11-2001	JP 2001313107 A TW 508872 B	09-11-2001 01-11-2002
US 5396617 A	07-03-1995	DE 4303620 A1 EP 0609974 A2	04-08-1994 10-08-1994
US 6210187 B1	03-04-2001	TW 383932 Y	01-03-2000
US 2002072260 A1	13-06-2002	TW 467424 Y	01-12-2001