

(57) Abstract: The present invention relates to a household appliance (1) comprising a modular cable bundle. In the household appliance (1) of the present invention, the electrical connection between the control panel (3) and the electrical devices such as motor, pump, etc. in the household appliances (1) is realized by means of the first cable bundle (5) and the second cable bundle (7) which are connected to each other by means of the first connection member (4) and the second connection member (6), creating a modular structure and thus, the assembly time of the cable bundles (5, 7) is shortened and the assembly process is facilitated.

Description**A HOUSEHOLD APPLIANCE COMPRISING A MODULAR CABLE BUNDLE**

- [0001] The present invention relates to a household appliance comprising a modular cable bundle.
- [0002] Household appliances such as dishwashers comprises control panels which enable the user to input to perform the functions determined by the user and electrical devices such as motors and pumps which enable the household appliance to perform the desired functions. Said control panels generally comprise control units, also called motherboards, which determine the operation time and the way of operation of the electrical devices such that the household appliance can perform the desired function. The control panel and the electrical devices are connected to each other by a cable bundle comprising a large number of cables in order to supply the electricity required for the control panel to operate, especially the control unit, and to transmit the necessary electrical signals to the electrical devices such that the control unit enables the electrical devices to be operated according to a certain order.
- [0003] In state of the art household appliances (1), a single-piece cable bundle (PA) which provides the electrical connection between the control panel (3) and the electrical devices extends continuously between the control panel (3) and the electrical devices (Figure 1). Since a single cable bundle harness which is quite long is used during the production of the household appliance, this situation complicates the mounting of the cable bundle and causes the production process of the household appliance to prolong. Moreover, if any cable in said cable bundle malfunctions in the course of time, it becomes difficult to remove the damaged cable bundle and reattach the same to the household appliance.
- [0004] In the state of the art Korean Patent Document No. KR20070047447, a dishwasher is disclosed, comprising a cable fixing means which enables a cable providing electrical connection between the various electrical devices such as the motor of the dishwasher and the control panel to be fixed at a certain place formed in the body of the machine.
- [0005] The aim of the present invention is the realization of a household

appliance comprising a modular cable bundle with decreased mounting time and facilitated mounting process.

[0006] The household appliance realized in order to attain the aim of the present invention, explicated in the first claim and the respective claims thereof, comprises a body; at least one control panel which is provided on the body; at least one electrical device which is electrically connected to the control panel and which functions with the commands received through this connection; at least one first cable bundle which is electrically connected to the control panel from one end and which has at least one connection member at the other opposite end; and at least one second cable bundle which is electrically connected to at least one electrical device from one end and which has at least one connection member at the other opposite end, which is configured to be electrically connected to the first connection member. In the preferred embodiment of the present invention, the first connection member and the second connection member have a structure, for example a socket-shaped structure, which enable the first cable bundle and the second cable bundle to be electrically connected to each other. In the household appliance of the present invention, by means of the modular structure obtained by electrically connecting a plurality of cable bundles, instead of a single cable bundle, to each other by means of connection members between the control panel and at least one electrical device, the electrical connection between the control panel and at least one electrical device is quickly realized in a very short time. Thus, the assembly time is decreased and the assembly process is facilitated during the production of the household appliance.

[0007] In an embodiment of the present invention, the household appliance further comprises at least one casing which defines a certain area therein in order to connect the first connection member and the second connection member to each other so as to establish electrical communication between the first cable bundle and the second cable bundle. In the preferred embodiment of the present invention, the casing is preferably positioned at the base region, also called machine room, wherein most of the electrical devices are disposed in the body of the

household appliance. As the location of the casing in the body is defined and the casing defines an area for the cable bundles to be connected to each other, the operator is enabled to identify the connection point without any difficulties in assembly and disassembly processes, thus further reducing the assembly time.

[0008] In an embodiment of the present invention, the casing comprises at least one casing body which contains at least the first connection member and the second connection member, and at least one lid which can move to allow or prevent access into the casing body. In this embodiment, for example, in the step of providing electrical connection between the control panel and at least one electrical device during the production of the household appliance, the operator establishes the electrical connection between the first cable bundle and the second cable bundle, hence between the control panel and at least one electrical device, by connecting the first connection member and the second connection member to each other, and afterwards closes the lid and isolates the inner volume of the casing body from the external environment. Thus, the risk of the first connection member and the second connection member, which is stored in the casing body, hence the electrical connection established between the first cable bundle and the second cable bundle being affected by adverse conditions such as water, moisture, high temperature, etc. is eliminated.

[0009] In an embodiment of the present invention, the casing comprises at least one housing which enables at least one of the first connection member or the second connection member to be at least partially borne therein. Thus, the electrical connection established between the first cable bundle and the second cable bundle is enabled to be stable and durable by preventing the connection member borne in the housing and the other connection member connected to the same from moving due to the movement which may occur for example during the transportation of the household appliance.

[0010] In a special embodiment of the present invention, the casing body comprises at least two housings which are oppositely positioned and each

being suitable for bearing two opposite sides of a single connection member. In this embodiment, the connection member, for example, has a nearly quadrilateral smooth prism shape, while said housings have a linearly extending channel shape. By means of the said embodiment, while one of the connection members is fixed in the casing body by engaging the opposite edges thereof into the housings, the other connection member is connected with the connection member fixed by means of the housings, thus establishing the electrical connection between the first cable bundle and the second cable bundle.

- [0011] By means of the present invention, the electrical connection between the control panel and the electrical devices such as motor, pump, etc. in the household appliances such as dishwasher, etc. is realized by means of the first cable bundle and the second cable bundle which are connected to each other by means of the first connection member and the second connection member which are preferably in the form of a socket, creating a modular structure and thus, the assembly time of the cable bundles and hence of the household appliance is shortened and the assembly process is facilitated. Moreover, by storing the connection members which enable the cable bundles to be connected to each other in a casing, said connection members are isolated in the body of the household appliance so as not to be affected by possible adverse factors such as water, humidity, high temperature, etc.
- [0012] A household appliance comprising the modular cable bundle realized in order to attain the aim of the present invention is illustrated in the attached figures, where:
- [0013] Figure 1 - is the perspective view of a state of the art household appliance.
- [0014] Figure 2 - is the perspective view showing the detail of the region where the cable bundles of the household appliance are connected to each other in a household appliance comprising the modular cable bundle of the present invention.
- [0015] Figure 3 - is the exploded perspective view of the casing and the cable bundle group in a household appliance comprising the modular cable bundle of the present invention.

[0016] Figure 4 - is the perspective view of the casing when the cable bundles are connected to each other in a household appliance comprising the modular cable bundle of the present invention.

[0017] The elements illustrated in the figures are numbered as follows:

1. Household appliance
2. Body
3. Control panel
4. First connection member
5. First cable bundle
6. Second connection member
7. Second cable bundle
8. Casing
9. Casing body
10. Lid
11. Housing

[0018] PA. State of the art cable bundle

[0019] The household appliance (1) comprises is a body (2); at least one control panel (3) which is disposed on the body (2) and which enables the user to input so as to carry out the functions determined by the user such that the functions are performed in a controlled manner depending on user inputs; and electrical devices (not shown in the figures) which are disposed in the body (2), which are in electrical communication with the control panel (3) and which are configured to operate in accordance with the commands given by the control panel (3). For example, in a household appliance (1) like a dishwasher, the user inputs the function desired to be performed via the control panel (3) positioned at the front top side of the body (2). In order to carry out the function entered by the user, the control panel (3) determines the operating times and operating conditions of electrically operated electrical devices such as motor, pump, etc. disposed at the base region of the household appliance (1), which is preferably called the machine room, and transmits the relevant commands to said devices via the electrical connection with said electrical devices.

[0020] The household appliance (1) of the present invention comprises at least

one first cable bundle (5) which is connected to the control panel (3) from one end and which has at least one first connection member (4) at the other end, and at least one second cable bundle (7) which is connected to at least one electrical device from one end and which has at least one second connection member (6) at the other end which is configured to be electrically connected to the first connection member (4). In the preferred embodiment of the present invention, the first connection member (4) and the second connection member (6) have a socket-like structure which enable the first cable bundle (5) and the second cable bundle (7) to be electrically connected to each other. In the preferred embodiment of the present invention, the first connection member (4) and the second connection member (6) are connected to each other for example at the easily-accessible base region of the household appliance (1) which is also called the machine room and which contains a plurality of electrical devices. By connecting the first cable bundle (5) connected to the control panel (3) from one end and the second cable bundle (7) connected to at least one electrical device from one end to each other, an electrical connection is established between the first cable bundle (5) and the second cable bundle (7), thus enabling the control panel (3) to transmit commands to at least one electrical device via said connection. By means of such a connection, the need for using a single cable bundle for electrical communication between the control panel (3) and the electrical devices is eliminated, thereby ensuring modular electrical communication with the first cable bundle (5) and the second cable bundle (7), considerably reducing the mounting of the cable bundles (5, 7) and significantly facilitating the assembly process.

[0021] In an embodiment of the present invention, the household appliance (1) further comprises at least one casing (8) which is positioned in the body (2) and which defines a certain area therein in order to connect the first connection member (4) and the second connection member (6) to each other so as to establish electrical communication between the first cable bundle (5) and the second cable bundle (7). In the preferred embodiment of the present invention, the casing (8) is positioned in the machine room

of the household appliance (1). In this embodiment, since the connection point of the first connection member (4) and the second connection member (6) is clearly defined by the casing (8), the mounting time of the first cable bundle (5) and the second cable bundle (7) is further reduced.

[0022] In an embodiment of the present invention, the casing (8) comprises at least one casing body (9) which bears at least the first connection member (4) and the second connection member (6) therein, and at least one lid (10) which is at least partially connected to the casing body (9) and which can move between a position which allows access at least to the first connection member (4) and the second connection member (6) borne in said casing body (9) and another position which prevents access. In this embodiment, particularly in order to connect the first cable bundle (5) and the second cable bundle (7) to each other or for example to separate the same from each other in case of a malfunction, the lid (10) is shifted to the position which allows access into the casing body (9), and the first connection member (4) and the second connection member (6) are connected to or separated from each other in the casing body (9). After this process, the lid (10) is shifted back to the position which prevents access to the inner volume of the casing body (9), thus isolating the inner volume of the casing body (9) from the external environment after assembly or disassembly. Thus, by isolating the first connection member (4) and the second connection member (6) establishing the electrical connection between the cable bundles (5, 7) from the outer environment, said connection members (4, 6) and hence the electrical connection are prevented from being affected by adverse ambient conditions such as water, moisture, high temperature, etc.

[0023] In an embodiment of the present invention, the casing body (9) comprises at least one housing (11) which enables at least one of the first connection member (4) or the second connection member (6) to at least partially enter therein so as to be borne. Thus, at least one of the first connection member (4) or the second connection member (6) inserted into the housing (11) is fixed by the housing (11) so as to remain fixed against outer factors, providing a stable and durable electrical connection between

the first cable bundle (5) and the second cable bundle (7).

[0024] In a special embodiment of the present invention, the casing body (9) comprises two housings (11) which are oppositely positioned so as to face each other. In this embodiment, one of the first connection member (4) or the second connection member (6) is fitted into the housings (11) from the opposite ends and the other connection member (4 or 6) is connected to the connection member (4 or 6) fitted into the housings (11), thus establishing the electrical connection between the first cable bundle (5) and the second cable bundle (7).

[0025] By means of the present invention, the electrical connection between the control panel (3) and the electrical devices such as motor, pump, etc. in the household appliances (1) is realized by means of the first cable bundle (5) and the second cable bundle (7) which are connected to each other by means of the first connection member (4) and the second connection member (6), creating a modular structure and thus, the assembly time of the cable bundles (5, 7) is shortened and the assembly process is facilitated. Moreover, by storing the first connection member (4) and the second connection member (6) which enable the cable bundles (5, 7) to be connected to each other in a casing (8), said connection members (4, 6) are isolated so as not to be affected by possible adverse factors such as water, humidity, high temperature, etc. from the outer environment.

Claims

1. A household appliance (1) **comprising** a body (2); at least one control panel (3) which is disposed on the body (2) and which enables the user to input so as to carry out the functions determined by the user such that the functions are performed in a controlled manner depending on user inputs; and electrical devices which are disposed in the body (2), which are in electrical communication with the control panel (3) and which are configured to operate in accordance with the commands given by the control panel (3), **characterized by** at least one first cable bundle (5) which is connected to the control panel (3) from one end and which has at least one first connection member (4) at the other end, and at least one second cable bundle (7) which is connected to at least one electrical device from one end and which has at least one second connection member (6) at the other end which is configured to be electrically connected to the first connection member (4).
2. A household appliance (1) as in Claim 1, **characterized by** at least one casing (8) which is positioned in the body (2) and which defines a certain area therein in order to connect the first connection member (4) and the second connection member (6) to each other so as to establish electrical communication between the first cable bundle (5) and the second cable bundle (7).
3. A household appliance (1) as in Claim 2, **characterized by** the casing (8) comprising at least one casing body (9) which bears at least the first connection member (4) and the second connection member (6) therein, and at least one lid (10) which is at least partially connected to the casing body (9) and which can move between a position which allows access at least to the first connection member (4) and the second connection member (6) borne in said casing body (9) and another position which prevents access.
4. A household appliance (1) as in Claim 3, **characterized by** the casing body (9) comprising at least one housing (11) which enables at least one of the first connection member (4) or the second connection member (6) to at least partially enter therein so as to be borne.
5. A household appliance (1) as in Claim 4, **characterized by** the casing body (9) comprising two housings (11) which are oppositely positioned so as to face each other.

Figure 1

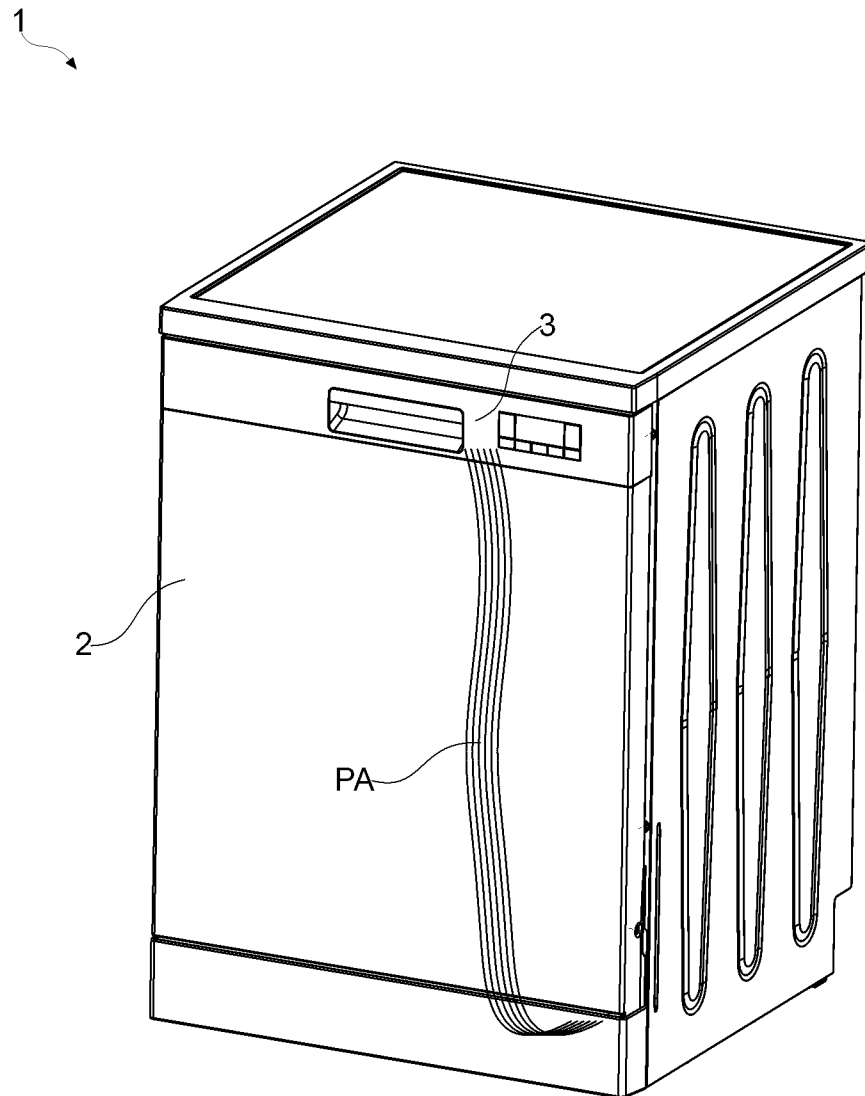


Figure 2

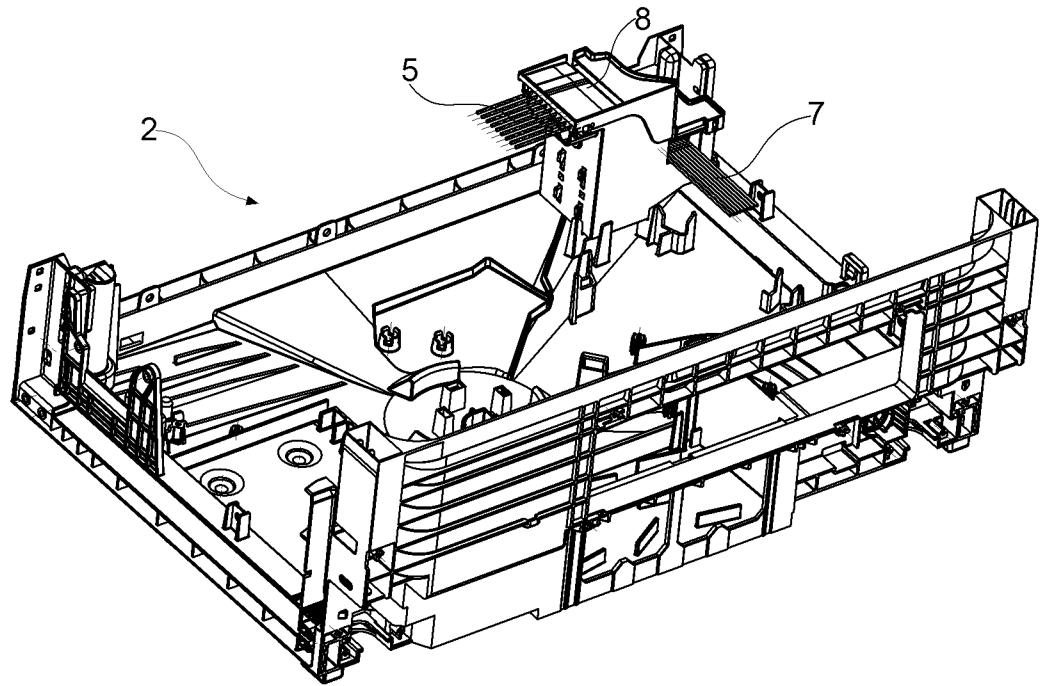


Figure 3

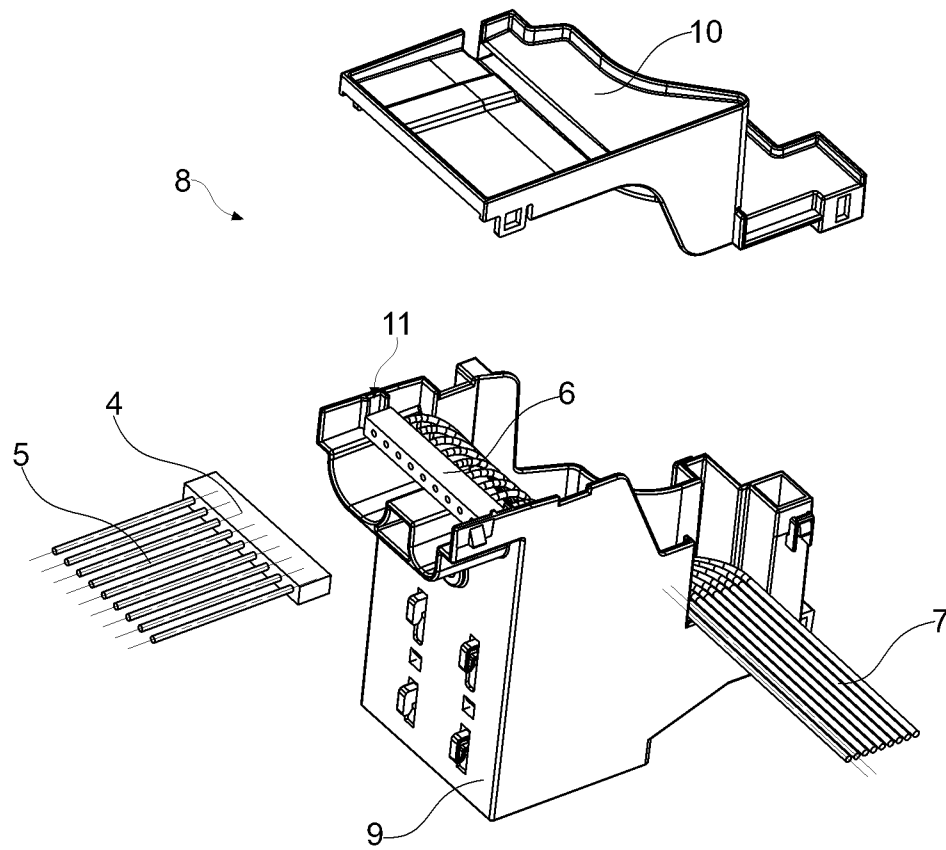
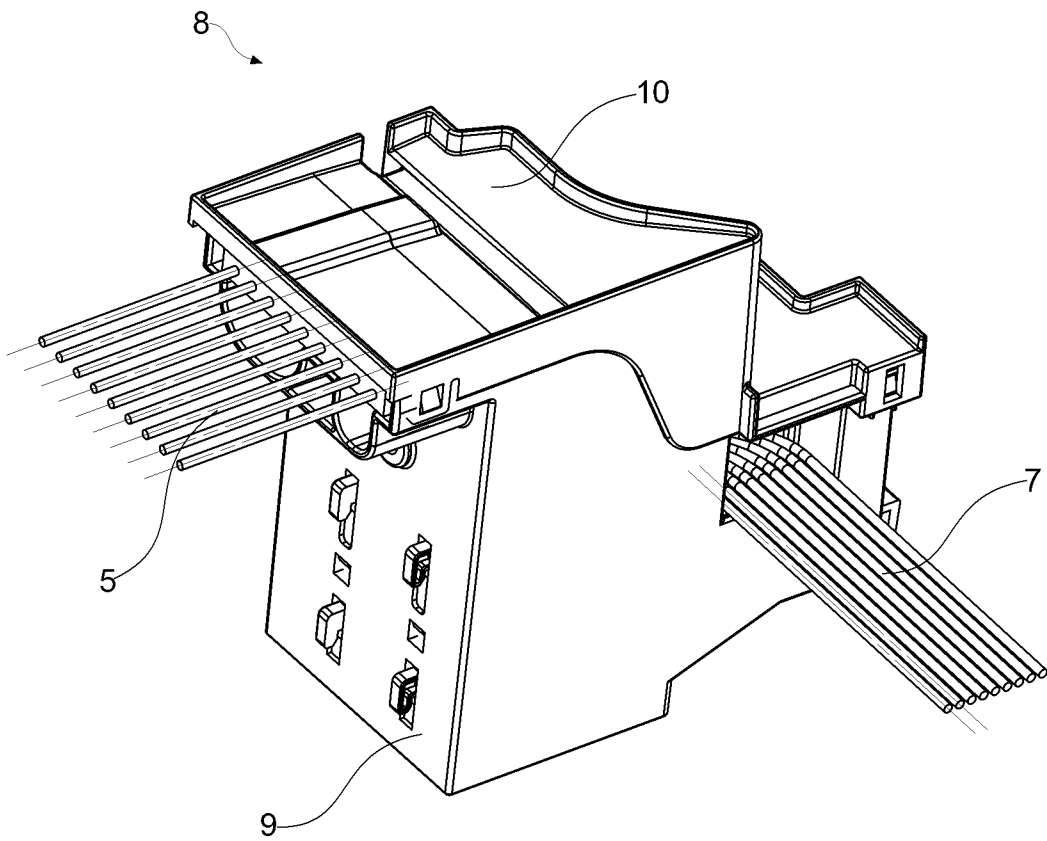


Figure 4



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2020/058328

A. CLASSIFICATION OF SUBJECT MATTER

INV. A47L15/42 D06F34/28 F24C7/08 D06F34/04 H01R4/64
A47L15/46 D06F33/00 H01R13/527

ADD.

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)

A47L F24C D06F H01R

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 practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 201 562 770 U (MIDEA HOLDING CO LTD) 25 August 2010 (2010-08-25)	1
Y	page 1, line 1 - page 2, line 9; figure 1 -----	2-5
Y	JP 2011 129324 A (YAZAKI CORP) 30 June 2011 (2011-06-30) paragraphs [0002], [0003], [0024] - [0032]; figures 1,2 -----	2-5
A	CN 107 837 057 A (HUBEI HONGWEI AIDOU ELECTRONIC TECH CO LTD) 27 March 2018 (2018-03-27) paragraphs [0029] - [0034], [0041] - [0043]; figure 1 -----	1
A	US 8 461 726 B2 (MAKI YOUICHI [JP]; YAZAKI CORP [JP]) 11 June 2013 (2013-06-11) figure 1 ----- -/-	1,2,4



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

13 May 2020

Date of mailing of the international search report

26/05/2020

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Kising, Axel

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2020/058328

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2011 076972 A (YAZAKI CORP) 14 April 2011 (2011-04-14) figures 1,3,4-7 -----	1,2,4
A	JP 2017 028958 A (AUTO NETWORK GIJUTSU KENKYUSHO:KK; SUMITOMO WIRING SYSTEMS ET AL.) 2 February 2017 (2017-02-02) figures 2,5,8,12 -----	1-4

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2020/058328

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
CN 201562770	U	25-08-2010	NONE	
JP 2011129324	A	30-06-2011	NONE	
CN 107837057	A	27-03-2018	NONE	
US 8461726	B2	11-06-2013	DE 102009045438 A1	15-04-2010
			JP 5360967 B2	04-12-2013
			JP 2010111373 A	20-05-2010
			US 2010088004 A1	08-04-2010
JP 2011076972	A	14-04-2011	JP 5378938 B2	25-12-2013
			JP 2011076972 A	14-04-2011
JP 2017028958	A	02-02-2017	CN 107851982 A	27-03-2018
			DE 112016003415 T5	19-04-2018
			JP 6436011 B2	12-12-2018
			JP 2017028958 A	02-02-2017
			US 2018208133 A1	26-07-2018
			WO 2017018178 A1	02-02-2017