Title: WATERPROOF CONNECTOR AND MANUFACTURING METHOD THEREOF

Abstract: A waterproof connector includes a flat cable having an insulating sheath part in which a conductive wire is coated with an insulating film, a terminal connected to the conductive wire, and a connector housing fitted to a mating connector so as to connect the terminal to a mating terminal of the mating connector. The connector housing includes a mold part which is integrally formed with an end part in an extending direction of the flat cable and which covers a connecting part of the conductive wire and the terminal.
Published: with international search report (Art. 21(3))
DESCRIPTION

WATERPROOF CONNECTOR AND MANUFACTURING METHOD THEREOF

Technical Field

The present disclosure relates to a waterproof connector for a flat cable and a manufacturing method thereof.

Background Art

Usually, for wiring in a narrow space, a flat plate-like flat cable having flexibility is used. In this flat cable, a terminal connected to a mating terminal of a mating connector is connected to a part in which a conductive wire of the flat cable is exposed. A connecting part of such a conductive wire and the terminal needs to be waterproofed. Accordingly, a flat cable waterproof connector having a waterproofing performance is proposed (for instance, see patent literature 1).

The flat cable waterproof connector disclosed in the patent literature 1 has a waterproof plug provided between a connector housing and the flat cable.

Citation List

Patent Literature


Summary of Invention
Technical Problem

However, in the flat cable waterproof connector disclosed in the patent literature 1, since the waterproof plug needs to be attached to the connector housing, a problem arises that an attaching operation is complicated.

The present disclosure is devised by considering the above-described problem and it is an object of the present disclosure to provide a waterproof connector for flat cable in which a waterproofing performance can be obtained and an attaching operation is easy and a manufacturing method of the waterproof connector.

Solution to Problem

In order to solve the above-described problems and achieve the object, there is provided a waterproof connector according to the present disclosure, including: a flat cable having an insulating sheath part in which a conductive wire is coated with an insulating film, a terminal connected to the conductive wire, and a connector housing fitted to a mating connector so as to connect the terminal to a mating terminal of the mating connector. The connector housing includes a mold part which is integrally formed with an end part in an extending direction of the flat cable and which covers a connecting part of the conductive wire and the terminal.

For example, the mold part includes: a waterproof mold part which covers the connecting part; and a holding mold part arranged between the waterproof mold part and the flat cable to cover the flat cable.
For example, the insulating sheath part has a pair of cut-out parts or through holes, the pair of cut-out parts are formed at positions which are covered with the connector housing and located at side end parts of the insulating sheath part opposed to each other in a transverse direction of the insulating sheath part, and the through holes are formed at positions which are covered with the connector housing.

For example, the connector housing includes a fitting part which is fitted to the mating connector, and the fitting part has a hood part which accommodates at least a part of the mating connector.

For example, the fitting part has a fitting lock part which holds a fitting state to the mating connector.

According to the present disclosure, there is also provided a manufacturing method of a waterproof connector, comprising:

- providing a flat cable having an insulating sheath part in which a conductive wire is coated with an insulating film; and
- forming a connector housing fitted to a mating connector so as to connect a terminal to a mating terminal of the mating connector by integrally forming the connector housing with both of the flat cable and a connecting part of the conductive wire and the terminal in a state that the terminal is connected to the conductive wire.
Advantageous Effects of Invention

In the waterproof connector according to the above configuration, since the connector housing is formed integrally with the end part in the extending direction of the flat cable so as to cover the connecting part of the conductive wire and the terminal, a waterproofing performance can be obtained without attaching a waterproof plug between the connector housing and the flat cable. As a result, the waterproofing performance is obtained and an attaching operation is made to be easy.

The waterproof connector according to the above configuration, since the mold part includes the waterproof mold part which covers the connecting part and the holding mold part located more inward in the extending direction of the flat cable than the waterproof mold part to cover the flat cable, a load applied to the waterproof mold part is reduced by the holding mold part. Thus, the waterproof mold part can be prevented from being broken. As a result, the waterproofing performance of the waterproof mold part can be improved.

The waterproof connector according to the above configuration, since a resin forming the connector housing enters the pair of cut-out parts or the through holes, the connector housing is strongly held on the flat cable.

The waterproof connector according to the above configuration, since the connector housing includes the fitting part having the hood part which accommodates at least a part of the mating connector and fitted to the mating connector, the waterproofing performance of a connecting part of the terminals
and mating terminals can be ensured.

The waterproof connector according to the above configuration, since the fitting part has the fitting lock part for holding the fitting state to the mating connector, the fitting state of the connector housing to the mating connector can be more strongly held.

Further, since the manufacturing method of the waterproof connector includes the integrally forming step in which the connector housing is formed integrally with the connecting part of the conductive wires and the terminals and the flat cable, the waterproofing performance can be obtained without attaching the waterproof plug between the connector housing and the flat cable. As a result, the waterproofing performance is obtained and the attaching operation is made to be easy.

Brief Description of Drawings

Fig. 1 is a perspective view of a flat cable waterproof connector according to an exemplary embodiment of the present disclosure.

Fig. 2 is a top view of the flat cable waterproof connector shown in Fig. 1.

Fig. 3 is a sectional view taken along a line A-A in the flat cable waterproof connector shown in Fig. 2.

Fig. 4 is an enlarged view of a periphery of a mold part shown in Fig. 1.

Fig. 5 is a diagram of a flat cable shown in Fig. 1 and terminals connected to the flat cable.
Fig. 6 is a view showing the flat cable waterproof connector shown in Fig. 1 and a mating connector in a state before the mating connector is fitted to a connector housing shown in Fig. 1.

Fig. 7 is a sectional view taken along a line B-B in a state that the connector housing is fitted to the mating connector shown in Fig. 6.

Figs. 8A to 8C are diagrams showing a manufacturing method of the flat cable waterproof connector shown in Fig. 1.

Fig. 9 is a perspective view of a flat cable waterproof connector of a first modified example of the exemplary embodiment of the present disclosure.

Fig. 10 is a diagram of a flat cable shown in Fig. 9 and terminals connected to the flat cable.

Fig. 11 is a perspective view of a flat cable waterproof connector of a second modified example of the exemplary embodiment of the present disclosure.

Fig. 12 is a diagram of a flat cable shown in Fig. 11 and terminals connected to the flat cable.

Description of Embodiments

Now, by referring to the drawings, a preferred exemplary embodiment of a flat cable waterproof connector and its manufacturing method according to the present disclosure will be described below in detail.

(Exemplary Embodiment)

Fig. 1 is a perspective view of a flat cable waterproof connector 1 according to an exemplary embodiment of the present disclosure. Fig. 2 is a
top view of the flat cable waterproof connector 1 shown in Fig. 1. Fig. 3 is a sectional view taken along a line A-A in the flat cable waterproof connector 1 shown in Fig. 2. Fig. 4 is an enlarged view of a periphery of a mold part 32 shown in Fig. 1. Fig. 5 is a diagram of a flat cable 10 shown in Fig. 1 and terminals 20 connected to the flat cable 10. Fig. 6 is a view showing the flat cable waterproof connector 1 shown in Fig. 1 and a mating connector 50 in a state before the mating connector 50 is fitted to a connector housing 30 shown in Fig. 1. Fig. 7 is a sectional view taken along a line B-B in a state that the connector housing 30 is fitted to the mating connector 50 shown in Fig. 6.

As shown in Fig. 1 to Fig. 4, the flat cable waterproof connector 1 includes a flat cable 10, three terminals 20 and a connector housing 30.

The flat cable 10 includes, as shown in Fig. 5, a conductor part 11 and an insulating sheath part 12.

The conductor part 11 is formed with copper or copper alloy and has three flexible conductive wires 11a. The conductive wires 11a of the three conductive wires 11a are respectively arranged in parallel at intervals corresponding to intervals at which the terminals 20 are arranged in parallel.

In the present exemplary embodiment, is exemplified the conductor part 11 having the three conductive wires 11a, however, the present disclosure is not limited thereto. Namely, the number of the conductive wires 11a may be one or more.

The insulating sheath part 12 is a part having the conductor part 11 coated with an insulating film 12a such as polypropylene.

The pair of cut-out parts 12b are rectangular cut-out parts formed at
positions which are covered with the connector housing 30 and located at side end parts 12d of the insulating sheath part 12 opposed to each other in a transverse direction of the insulating sheath part 12. In the present exemplary embodiment, the cut-out parts 12b of the pair of cut-out parts 12b are respectively formed at positions substantially equal to a position of an attaching side end 30a of the flat cable 10 of the connector housing 30 in the extending direction of the flat cable 10.

In such a flat cable 10, as shown in Fig. 5, the conductor part 11 is coated with the insulating film 12a in a flat plate form so that the flat cable 10 has a flexibility. Further, in the flat cable 10, the insulating film 12a of an end part 10a of a side connected to the terminals 20 is removed so that the conductive wires 11a are respectively exposed. To the exposed conductive wires 11a, the terminals 20 are respectively connected.

Now, the three terminals 20 will be described below.

The terminals 20 of the three terminals 20 respectively have forms corresponding to those of the conductive wires 11a, and are respectively connected to the conductive wires 11a by an ultrasonic welding method or a pressure welding method. In the present exemplary embodiment, the terminals 20 are respectively male terminals and end parts 20b opposed to end parts 20a in a side connected to the conductive wires 11a are connected to below-described mating terminals 51.

In the present exemplary embodiment, the flat cable waterproof connector 1 which has the three terminals 20 is exemplified, however, the
present disclosure is not limited thereto. Namely, the terminals 20 having the
terminals 20 being simply provided.

Now, the connector housing 30 will be described below.
The connector housing 30 is formed with a synthetic resin and is fitted
to the existing mating connector 50 of the connection mate so that the terminals
20 are connected to the mating terminals 51, as shown in Fig. 6 and Fig. 7.
The connector housing 30 is formed integrally with a connecting part
40 of the conductive wires 11a and the terminals 20 and the flat cable 10, and
includes a fitting part 31 fitted to the mating connector 50 and a mold part 32.

The fitting part 31 has an elliptic tubular outer form in section and the
existing mating connector 50 is fitted thereto. Namely, when the mating
connector 50 is fitted to the fitting part 31, the terminals 20 are respectively
connected to the mating terminals 51. Further, the fitting part 31 has a hood
part 31a and a fitting lock part 31b.
The hood part 31a is a part for accommodating at least a part of the
mating connector 50.
The fitting lock part 31b is a part for holding a fitting state to the mating
connector 50. The fitting lock part 31b is, for instance, a protruding part
extending straight along a fitting direction from an outer surface of the fitting part
31. As shown in Fig. 6, in the mating connector 50, a fitting lock part 50a of
the mating connector 50 is formed so as to cover the fitting lock part 31b is
provided correspondingly to the fitting lock part 31b. Accordingly, when the
connector housing 30 is fitted to the mating connector 50, the fitting lock part 31b is fitted to the fitting lock part 50a side. Thus, the fitting state can be more strongly held.

The mold part 32 is a part which molds the connecting part 40 and holds the end part 10a of the flat cable 10 in the side to which the terminals 20 are connected, namely, the end part 10a in the extending direction of the flat cable 10 integrally with the fitting part 31. More specifically, the mold part 32 includes a waterproof mold part 32a and a holding mold part 32b as shown in Fig. 4.

The waterproof mold part 32a is extended to the extending direction of the flat cable 10 from the fitting part 31 to cover the connecting part 40 so as to waterproof it. Accordingly, since the connecting part 40 is allowed to strongly come into close contact by the connector housing 30, a waterproofing property is improved in the connecting part 40.

The holding mold part 32b is a part located more inward in the extending direction of the flat cable 10 than the waterproof mold part 32a to cover the flat cable 10. More specifically, the holding mold part 32b is further extended toward the extending direction of the flat cable 10 from the waterproof mold part 32a to cover the end part 10a in the direction of the flat cable 10. Therefore, since the end part 10a in the extending direction is covered with the connector housing 30 in a wider area, the flat cable 10 is stably held by the holding mold part 32b.

Accordingly, a load applied to the waterproof mold part 32a is reduced by the holding mold part 32b, so that the waterproof mold part 32a can be
prevented from being broken. As a result, a waterproofing performance of the waterproof mold part 32a can be improved.

Since such a connector housing 30 is formed integrally with the connecting part 40 and the flat cable 10 with the synthetic resin forming the connector housing 30, the connector housing 30 is allowed to come into close contact with the connecting part 40 and the flat cable 10 so as to cover the connecting part 40 and the flat cable 10. Accordingly, a waterproof plug does not need to be provided separately from the connector housing 30. The waterproofing performance is obtained by the connector housing 30.

Further, the attaching side end 30a of the connector housing 30 is arranged in the extending direction of the flat cable 10 and at the position substantially equal to the positions of the pair of cut-out parts 12b. Accordingly, since the resin forming the connector housing 30 enters the pair of cut-out parts 12b, the connector housing 30 is strongly held on the flat cable 10. Further, as shown in Fig. 2, since the resin is formed so as to cover one sides of sides forming the cut-out parts 12 in directions intersecting the extending direction of the flat cable 10, the flat cable 10 is held with a high holding force to a tensile force (a direction D shown by an arrow D in Fig. 2) in the extending direction of the flat cable 10.

Now, a manufacturing method of the flat cable waterproof connector 1 will be described below by referring to Figs. 8A to 8C. Figs. 8A to 8C are diagrams showing the manufacturing method of the flat cable waterproof connector 1 shown in Fig. 1.
Initially, the insulating film 12a of the end part 10a in the extending direction is removed to expose end parts of the conductive wires 11a respectively. The exposed end parts of the conductive wires 11a are respectively connected to the terminals 20 by a method such as the ultrasonic welding method or the pressure welding method (see Fig. 8A).

Then, in the flat cable 10, the pair of cut-out parts 12b are formed (see 8B). The pair of cut-out parts 12b are formed at the positions where at least parts thereof are covered with the side end parts 12d opposed to each other in the transverse direction of the insulating sheath part 12 and the connector housing 30. More specifically, the cut-out parts 12b of the pair of cut-out parts 12b are respectively formed at the positions substantially equal to the position of the attaching side end 30a of the flat cable 10 of the connector housing 30.

After that, the connector housing 30 is formed integrally in the end part 10a in the extending direction of the flat cable 10 so as to cover the connecting part 40 (see Fig. 8C). Thus, the connector housing 30 is allowed to come into close contact with the connecting part 40 and the flat cable 10 so as to cover the connecting part 40 and the flat cable 10.

In the flat cable waterproof connector 1 of the exemplary embodiment of the present disclosure, since the connector housing 30 includes the mold part 32 formed integrally with the end part 10a in the extending direction of the flat cable 10 so as to cover the connecting part 40 of the conductive wires 11a and the terminals 20, the waterproofing performance can be obtained without attaching the waterproof plug between the connector housing 30 and the flat cable 10. As a result, the waterproofing performance is obtained and an
attaching operation is made to be easy.

Further, in the flat cable waterproof connector 1 of the exemplary embodiment of the present disclosure, since the connecting part 40 is covered with the resin forming the connector housing 30, strength of the connecting part 40 can be improved.

Further, in the flat cable waterproof connector 1 of the exemplary embodiment of the present disclosure, since the resin forming the connector housing 30 enters the pair of cut-out parts 12b, the connector housing 30 is strongly held on the flat cable 10.

Further, in the flat cable waterproof connector 1 of the exemplary embodiment of the present disclosure, since the mold part 32 includes the waterproof mold part 32a which covers the connecting part 40 and the holding mold part 32b located more inward in the extending direction of the flat cable 10 than the waterproof mold part 32a to cover the flat cable 10, the load applied to the waterproof mold part 32a is reduced by the holding mold part 32b. Thus, the waterproof mold part 32a can be prevented from being broken. As a result, the waterproofing performance of the waterproof mold part 32a can be improved.

Further, in the flat cable waterproof connector 1 of the exemplary embodiment of the present disclosure, since the connector housing 30 includes the fitting part 31 having the hood part 31a which accommodates at least a part...
of the mating connector 50 and fitted to the mating connector 50, the
waterproofing performance of the connecting part of the terminals 20 and the
mating terminals 51 can be ensured.

Further, in the flat cable waterproof connector 1 of the exemplary
embodiment of the present disclosure, since the fitting part 31 has the fitting
lock part 31b for holding the fitting state to the mating connector 50, the fitting
state of the connector housing 30 to the mating connector 50 can be more
strongly held.

Further, since the manufacturing method of the flat cable waterproof
connector 1 of the exemplary embodiment of the present disclosure includes an
integrally forming step in which the connector housing 30 is formed integrally
with the connecting part 40 of the conductive wires 11a and the terminals 20
and the flat cable 10, the waterproofing performance can be obtained without
attaching the waterproof plug between the connector housing 30 and the flat
cable 10. As a result, the waterproofing performance is obtained and the
attaching operation is made to be easy.

(First Modified Example)

Now, a first modified example of the flat cable waterproof connector of
the exemplary embodiment of the present disclosure will be described below by
referring to Fig. 9 and Fig. 10.

Fig. 9 is a perspective view of a flat cable waterproof connector 2 of a
first modified example of the exemplary embodiment of the present disclosure.
Fig. 10 is a diagram of a flat cable 60 shown in Fig. 9 and terminals 20 connected to the flat cable 60.

The flat cable waterproof connector 2 of the first modified example is different from the flat cable waterproof connector 1 in view of a point that pair of cut-out parts 12c are further formed in addition to pair of cut-out parts 12b in the flat cable 60.

Other structures are the same as those of the exemplary embodiment, and the same component parts as those of the exemplary embodiment are designated by the same reference numerals.

The pair of cut-out parts 12c are rectangular cut-out parts formed at positions which are entirely covered with the connector housing 30 and located at side end parts 12d of the insulating sheath part 12 opposed to each other in a transverse direction of the insulating sheath part 12.

In the flat cable waterproof connector 2 of the first modified example, since a resin forming the connector housing 30 enters the pair of cut-out parts 12b and the pair of cut-out parts 12c, the connector housing 30 is strongly held on the flat cable 60.

(Second Modified Example)

Now, a second modified example of the flat cable waterproof connector of the exemplary embodiment of the present disclosure will be described below by referring to Fig. 11 and Fig. 12.

Fig. 11 is a perspective view of a flat cable waterproof connector 3 of a
second modified example of the exemplary embodiment of the present disclosure. Fig. 12 is a diagram of a flat cable 70 shown in Fig. 11 and terminals 20 connected to the flat cable 70.

The flat cable waterproof connector 3 of the second modified example is different from the flat cable waterproof connector 1 in view of a point that through holes 12e are formed in an insulating sheath part 12 of the flat cable 70 in place of the pair of cut-out parts 12b.

Other structures are the same as those of the exemplary embodiment, and the same component parts as those of the exemplary embodiment are designated by the same reference numerals.

The through holes 12e are formed at positions covered with a connector housing 30. In the second modified example, the through holes 12e are formed between conductive wires 11a as shown in Fig. 12.

The positions where the through holes 12e are formed are not limited to positions between the conductive wires 11a. Namely, the through holes 12e may be formed at other positions covered with the connector housing 30.

In the flat cable waterproof connector 3 of the second modified example, since a resin forming the connector housing 30 enters the through holes 12e, the connector housing 30 is strongly held on the flat cable 70.

The flat cable waterproof connectors 1 and 2 according to the exemplary embodiment of the present disclosure are exemplified which respectively have the rectangular cut-out parts 12b and 12c. However, the present disclosure is not limited thereto and cut-out parts having other shapes
may be formed. For instance, U-shaped cut-out parts may be formed.

The flat cable waterproof connectors 1 and 2 according to the exemplary embodiment of the present disclosure are exemplified in which the cut-out parts 12b of the pair of cut-out parts 12b are respectively formed at the positions substantially equal to the position of the attaching side end 30a of the connector housing 30. However, the present disclosure is not limited thereto. Namely, the pair of cut-out parts 12b may be formed at the positions where at least parts thereof are covered with the side end parts 12d opposed to each other in the transverse direction of the insulating sheath part 12 and the connector housing 30. For instance, all the cut-out parts 12b of the pair of cut-out parts 12b may be respectively covered with the connector housing 30.

Further, the flat cable waterproof connectors 1, 2 and 3 of the exemplary embodiment of the present disclosure are exemplified in which the terminals 20 are the male terminals. However, the present disclosure is not limited thereto and the terminals 20 may be female terminals.

Further, in the flat cable waterproof connectors 1, 2 and 3 of the exemplary embodiment of the present disclosure, the connector housing 30 is exemplified which has the fitting part 31 of an elliptic tubular outer form in section and to which the mating connector 50 is fitted. However, the present disclosure is not limited thereto. Namely, other forms may be used to which the mating connector 50 is fitted.
As described above, the invention devised by the inventor is specifically explained in accordance with the above-described exemplary embodiment of the present disclosure. However, the present disclosure is not limited to the above-described exemplary embodiment of the present disclosure and may be variously changed within a range that does not deviate from the gist thereof.

The present application is based on Japanese Patent Application No. 2011-175612 filed on August 11, 2011, the contents of which are incorporated herein by reference.

Industrial Applicability

By the above configuration of the present disclosure, a waterproof connector in which a waterproofing performance can be obtained and an attaching operation is easy can be obtained.

Reference Signs List

1, 2, 3 waterproof connector
10, 60, 70 flat cable
10a end part in an extending direction
11 conductor part
11a conductive wire
12 insulating sheath part
12a insulating film
12b, 12c cut-out part
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<td>12e</td>
<td>through hole</td>
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<td>20</td>
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<td>30a</td>
<td>attaching side end</td>
</tr>
<tr>
<td>31</td>
<td>fitting part</td>
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<tr>
<td>31a</td>
<td>hood part</td>
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<td>31b</td>
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<tr>
<td>10</td>
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</tr>
<tr>
<td>32a</td>
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</tr>
<tr>
<td>32b</td>
<td>holding mold part</td>
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<tr>
<td>40</td>
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CLAIMS

1. A waterproof connector comprising:
   a flat cable having an insulating sheath part in which a conductive wire is coated with an insulating film;
   a terminal connected to the conductive wire; and
   a connector housing fitted to a mating connector so as to connect the terminal to a mating terminal of the mating connector,
   wherein the connector housing includes a mold part which is integrally formed with an end part in an extending direction of the flat cable and which covers a connecting part of the conductive wire and the terminal.

2. The waterproof connector according to claim 1, wherein the mold part includes:
   a waterproof mold part which covers the connecting part; and
   a holding mold part arranged between the waterproof mold part and the flat cable to cover the flat cable.

3. The waterproof connector according to claim 1 or 2, wherein the insulating sheath part has a pair of cut-out parts or through holes;
   wherein the pair of cut-out parts are formed at positions which are covered with the connector housing and located at side end parts of the insulating sheath part opposed to each other in a transverse direction of the insulating sheath part; and
   wherein the through holes are formed at positions which are covered...
with the connector housing.

4. The waterproof connector according to any one of claims 1 to 3, wherein the connector housing includes a fitting part which is fitted to the mating connector; and wherein the fitting part has a hood part which accommodates at least a part of the mating connector.

5. The waterproof connector according to claim 4, wherein the fitting part has a fitting lock part which holds a fitting state to the mating connector.

6. A manufacturing method of a waterproof connector, comprising:
   providing a flat cable having an insulating sheath part in which a conductive wire is coated with an insulating film; and forming a connector housing fitted to a mating connector so as to connect a terminal to a mating terminal of the mating connector by integrally forming the connector housing with both of the flat cable and a connecting part of the conductive wire and the terminal in a state that the terminal is connected to the conductive wire.
FIG. 3
### A. CLASSIFICATION OF SUBJECT MATTER

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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): 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

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

**"I"** 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.

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**"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.

**"A"** document member of the same patent family.

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Further documents are listed in the continuation of Box C. See patent family annex.

Date of the actual completion of the international search: 20 November 2012

Date of mailing of the international search report: 28/11/2012

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:
Leduex, Serge
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