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(54) **Watertight solid block electrical connector**

(57) The present invention (fig.1) relates to a watertight connector (1) consisting of a single unit or solid block of soft plastic comprising a pre-cabled terminal block (2) with a cable for its connection (3), buried in a housing (of

isolating material) (4) during the moulding of the latter, so to form a single piece or solid block of soft plastic airtight on all its perimeter sides, except for the front one, where the terminal block (2) opening is located.

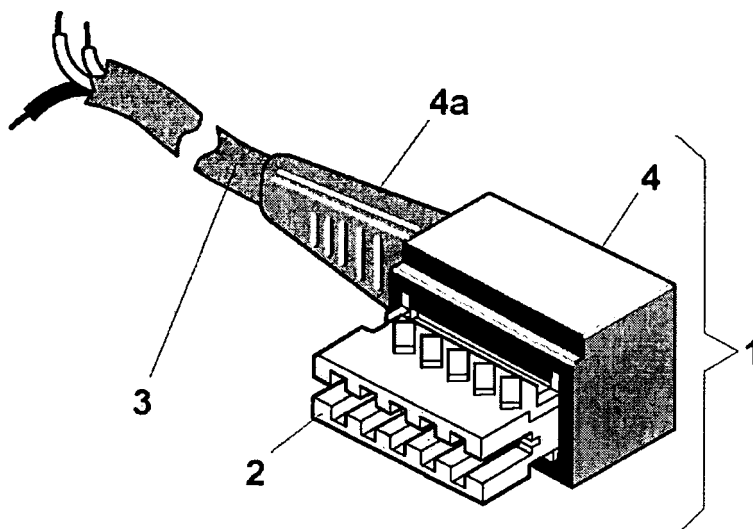


Fig-1

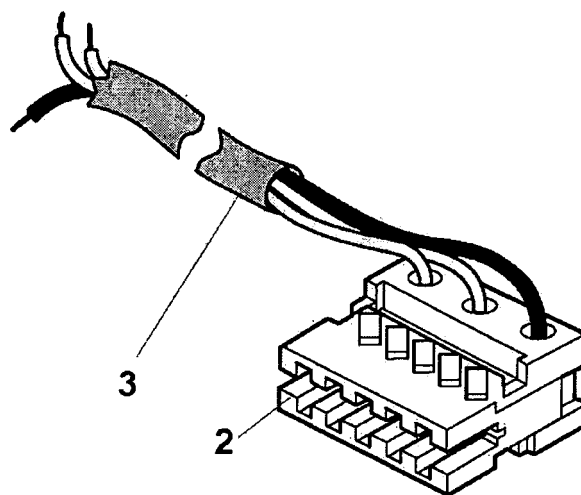


Fig-2

Description

[0001] The invention herein represented relates to a watertight electrical connector specially suited to be used on electrical motors cables, or on other different electrical components installed on through-flow machines (for example, wall or floor mounted boilers), for which the relevant safety regulations dictate the adoption of special watertight connectors suitable for preventing water reaching any inside contacts. All connectors currently in use are formed by a plug and a socket with a male and female open connection, that is with no protection against water seepage.

[0002] Said connectors, of increasingly compact size, are usually used for all main electrical components connection installed on through-flow machines, with the aim of both speeding up said components assembly and easing the replacement of the same in case of failure. In particular, said connectors, for the purpose of protecting them against the water, are positioned under a crankcase or covers, or are protected by a soft rubber moulded casing, mounted on said connectors, already pre-cabled, before their relevant installation.

[0003] It has to be considered that the plug is always mounted on the motor and on all main electrical components installed on through-flow machines, and the socket is positioned at the end of a cable for the connection to the control panel of said through-flow machines.

[0004] In consideration of the aforesaid, it has to be stated that the invention herein represented has been conceived with the purpose of making said connector watertight, and, at the same time, of easing and making economical its relevant assembly.

[0005] For the purpose of solving the above problem, the invention herein represented provides a watertight connector for through-flow machines, comprising a pre-cabled terminal block with related connection cable, characterized by the fact that said terminal block is buried in a casing of isolating plastic material so as to form a solid block.

[0006] Based on a further characteristics of this invention, said connector is realized through a process where said terminal block is buried in said casing during a stage of the moulding operation.

[0007] Thanks to said characteristics, the following advantages are obtained:

- 1) the connector represented in the present invention is watertight and of high quality;
- 2) the connector represented in the present invention is made in a simple and economical manner;
- 3) the connector represented in the present invention meets the related sector safety regulations currently in force.

[0008] The present invention is herein further described by way of non-limitative examples of realization, with reference to the figures on the accompanying draw-

ings, wherein:

- Fig. 1 is an overall perspective view of said connector according to the present invention;
- Fig. 2 is a perspective view of the terminal board of the connector in Fig. 1;

[0009] The present invention (fig. 1) consists of a watertight connector (1) comprising an inside pre-cabled terminal block (2) with the cable for its relevant connection (3), buried inside a support of soft plastic, for example of a thermoplastic polymer of the PVC type or similar, so to form a single unit or solid block, air-tight on all its perimeter sides, except for the front one, where the terminal block (2) opening is located.

[0010] Said pre-cabled terminal block (2) is enclosed in the plastic with no significant infiltrations of material inside it, so that its front section, holding the contacts to be connected with the connector mounted on the machine, projects for such a distance to perfectly close itself around the connector mounted on the motor or other different component installed on the machine. On said terminal block (2) front section, in the seat destined to the connection with the plug mounted on said motor, a key (2b) is foreseen for a correct connection between said connector (1) and the one mounted on the machine motor.

[0011] Said terminal block (2) front section seals itself automatically at the precise instant when the mobile or solid block connector is plugged into the fixed connector (not represented for reasons of simplicity) mounted on the motor, reaching a seal created at the end of the casing on all perimeter sides of said terminal block (2). Suitable stops, for example snap-locks (2a), enabling to keep solid the connector represented in this invention to the connector mounted on the machine motor, are foreseen.

[0012] To this end, the fixed connector is provided with a relevant sealing element co-acting with the casing seat.

[0013] Said connector is further characterized by the fact that said casing comprises a cable gland (4a) where the sheath end section is fastened and housed.

[0014] Said connector is further characterized by the fact that said cable gland (4a) is attached to the sheath with such pressure to create a preset tear resistance.

[0015] Said connector is realized in a single unit, or solid block, of soft plastic, comprising a pre-cabled multi pole terminal block, and a pre-cabled cable for its relevant electrical connection.

[0016] Once said cable is connected to said terminal block, the unit, thus formed, progresses to a moulding process of the outside protection casing on the terminal block, therefore creating an airtight seal on all terminal block perimeter sides, except for the front side, where said terminal block (2) opening is located.

[0017] Lastly, it is clear that the watertight connector and related manufacturing process herein described and depicted may be further modified without straying from the scope of the claims hereof.

Claims

1. A watertight connector of a through-flow machine comprising a pre-cabled terminal block with related connection cable **characterized by the fact that** said terminal block is buried in an isolating casing of plastic material so to form a solid block; 5
2. A connector according to claim 1 **characterized by** an air-tight seal on all of its perimeter sides, except for the front one, where said terminal block opening is located ; 10
3. A connector according to claim 1 **characterized by the fact that** the connection cable has a coating whose end section penetrates inside the casing; 15
4. A connector according to claim 1 **characterized by the fact that** said casing comprises a cable gland where the sheath end section is fastened and housed ; 20
5. A connector according to claim 1 **characterized by the fact that** said cable gland is attached to the sheath with such pressure to create a preset tear resistance; 25
6. A connector according to claim 1 **characterized by the fact that** on said terminal block front section a key is foreseen, in the housing destined to the connection with the plug mounted on the motor, enabling a correct coupling between the connector this invention relates to and the one mounted on the machine motor; 30
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7. A connector according to claim 1 **characterized by the fact that** on said terminal block are foreseen suitable stops, for example snap-locks, enabling to keep solid the connector this invention relates to and the connector mounted on the machine motor ; 40
8. A manufacturing process for said connector according to one of the above claims, where said terminal block is buried into the casing during the relevant moulding stage. 45

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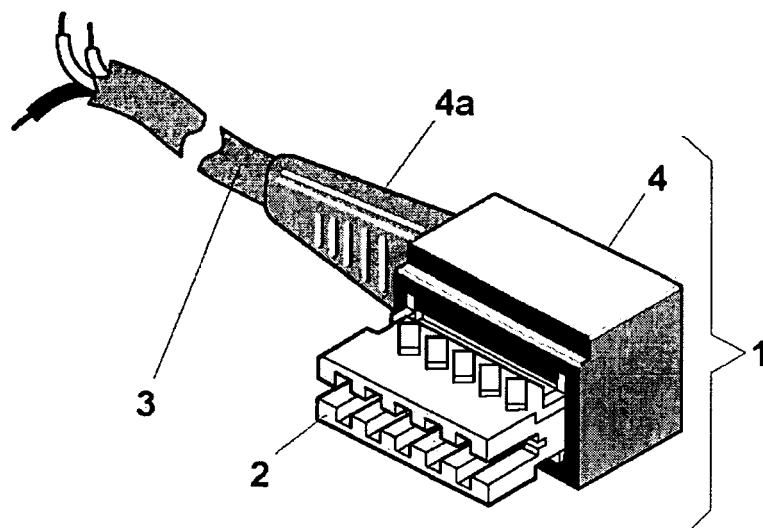


Fig-1

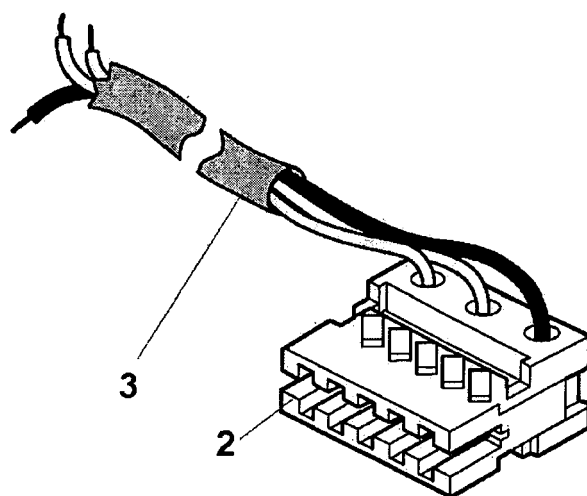


Fig-2



EUROPEAN SEARCH REPORT

Application Number
EP 09 42 5305

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2005/266714 A1 (HIGGINS SIDNEY A [US] ET AL) 1 December 2005 (2005-12-01) * page 2, column 2, paragraph 32-33; figures 1-11 *	1-6,8	INV. H01R13/52
X	FR 688 401 A (FELTEN & GUILLEAUME CARLSWERK) 22 August 1930 (1930-08-22) * page 1, line 1 - line 32 *	1-3,8	
Y		7	
Y	US 6 099 325 A (PARKHILL SCOTT THOMAS [US]) 8 August 2000 (2000-08-08) * sentence 9, paragraph 3 - sentence 20; figures 1-5 *	7	
X	DE 94 00 585 U1 (EILENTROPP KG [DE]) 21 April 1994 (1994-04-21) * page 5; figures 1-3 *	1,2,8	
X	US 2002/031934 A1 (HARA TERUFUMI [JP] ET AL) 14 March 2002 (2002-03-14) * page 2, paragraph 44 - page 3 *	1,8	
			TECHNICAL FIELDS SEARCHED (IPC)
			H01R
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 9 July 2010	Examiner Tapeiner, Roland
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 09 42 5305

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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09-07-2010

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 2005266714	A1	01-12-2005	US 2006160393 A1	20-07-2006
FR 688401	A	22-08-1930	NONE	
US 6099325	A	08-08-2000	NONE	
DE 9400585	U1	21-04-1994	NONE	
US 2002031934	A1	14-03-2002	DE 10144315 A1	13-06-2002
			JP 2002093515 A	29-03-2002