

Description

[0001] The present invention refers to a multipolar connection system for connecting an electric apparatus, specifically a fuel burner, which may generate electromagnetic interferences or noise during its operation, comprising a first part having a male connector, a second part having a female connector and an electric filter for suppressing said electromagnetic interferences.

[0002] In order to avoid propagation of said interferences along the connecting cables between the electric apparatus (burner) and the remainder of the system (control station, electric supply lines), it is known to interpose a suitable electric filter between such an apparatus generating interferences and the connecting cables.

[0003] It is usual to interpose the filter on the cables connecting the apparatus (burner) that generates the interferences and the multipolar connector which allows the connection of the apparatus with the remainder of the system.

[0004] Such a known system has some drawbacks as described herebelow, where for clarity's sake reference is made to the specific case of a fuel burner forming part of a heating system in a building.

[0005] Under these circumstances, a triple wiring is required, i.e.:

- a first wiring between the burner and the filter;
- a second wiring between the filter and the female part of the seven-poles connector, whose male part is connected with the electric supply line and the remainder of the heating system (thermal station, etc.);
- a third wiring between the burner and the female part of the connector.

[0006] Such a triple wiring has to be remade in the event of a filter replacement, either due to a failure or to improve the suppression of interferences, following a modification to the burner or to another device of the system; this represents quite a high cost.

[0007] It is an object of the present invention to provide an improved multipolar connector of the described type, which allows to solve the drawbacks of the known systems.

[0008] In order to achieve such aim, it is the object of the present invention a multipolar connection system having the features of the annexed main claim.

[0009] Other preferred embodiments of the present invention are described in the subclaims; all claims form an integral part of the present description.

[0010] The invention will be described in a detailed way with reference to the annexed drawings, which represent a possible embodiment of the invention, and consequently has to be intended as a non limiting example, wherein:

- Figure 1 shows, by a wiring diagram and a schematic view, a known system for connecting a fuel burner to the remainder of a heating system;
- Figure 2 shows, by a wiring diagram and a schematic view, a seven-poles connection system according to the present invention;
- Figure 3 shows in section the female part of the connector of the system according to the invention represented in Fig. 2;
- Figure 4 shows, by a schematic and perspective view, the female part of the connector of the system according to the invention represented in Fig. 2.

[0011] Figure 1 shows a known system for connecting a fuel burner and the remainder of a heating system.

[0012] In Figure 1, reference number 1 indicates the fuel burner, which is shown schematically on the right; reference number 2 indicates a 2-poles cable, for connecting the burner 1 to the noise suppressor electric filter, indicated by reference number 3.

[0013] Reference number 4 indicates a 3-poles cable for connecting the burner 1 to the female part of a connector, said part being indicated by reference number 5; reference number 6 indicates a 4-poles cable for connecting the filter 3 to the same female part 5 of the connector.

[0014] Reference number 7 indicates the male part 7 of the connector, which is connected through a 7-poles cable, indicated by reference number 8, to the electric supply line and the thermal station of the heating system (not shown in the figure).

[0015] The wiring diagram of the electric connection is illustrated in Figure 1 on the left; the filter 3 is a filter available in trade; reference can be made, for instance, to a catalogue of the company Eichhoff, being specialized in the field.

[0016] Figure 2 shows a 7-poles connection system according to the present invention.

[0017] In Figure 2 the elements similar to the ones shown in Figure 1 are indicated with the same reference numbers, consequently, the burner has the same number 1 used in Figure 1, the male part of the connector has the same number 7 used in Figure 1 and the 7-poles cable connecting said male part with the remainder of the system has the same number 8 used in Figure 1.

[0018] In Figure 2, reference number 11 indicates a 5-poles cable outcoming from the assembly 19, which comprises the female part 12 of the connector and the electric filter, as it will be better seen from the description of Figure 3; the other end of the cable 11 is provided for the connection with the terminal board of the burner 1.

[0019] The relevant wiring diagram is shown on the left, specifically, the diagram of the noise suppressor electric filter can be seen, indicated as a whole by reference number 15, with the connecting cables to the female part 12 of the connector; the filter is particularly

optimized for the type of burner 1 it is connected with; in this way, a far better interference suppression can be obtained, with respect to any standard filter selected from a catalogue, such as in the known instance of Figure 1.

[0020] Figures 3 and 4 represents respectively by a section and a schematic view, the female part of a 7-poles connector according to the invention, which incorporates also the noise suppressor electric filter, according to Figure 2.

[0021] In Figure 3, reference number 19 indicates as a whole the assembly of the female part of the connector and the noise suppressor filter 15; reference number 12 indicates the body of said female part of the connector, which is obtained from a thermoplastic technopolymer (such as self-extinguishing polyamide VO/UL94); reference number 13 indicates a galvanic treated brass contact, provided for receiving on its left the pin of the male part 7 of the connector and, on its right, a contact foot, indicated by reference number 18, of the noise suppressor filter 15.

[0022] The filter 15, which is assembled in a known way, has a housing 15a made of thermoplastic material and is enclosed in resin, to ensure a good stability of both the mechanical features and electric features.

[0023] Reference number 17 indicates one of seven locking screws, which ensures a perfect electric contact between the seven feet 18 and the seven contacts 13, and also ensures an excellent mechanical fastening of the filter 15 with the female part 12 of the connector; however, such a fastening is not final as, in fact, the filter 15 can be replaced by simply unscrewing the locking screws 17, if so required.

[0024] Reference number 14 indicates a protecting cover, made of a self-extinguishing thermoplastic technopolymer VO, which is kept in place by two screws, one of them being indicated with reference number 16, which is also used to further strengthen the assembly 19.

[0025] In fact, the cover 14 is provided with protruding elements 14a, engaging in corresponding protruding elements 12a of the body 12 and with an edge or tip 14b engaging in a recess 15b on the housing 15a of the filter 15.

[0026] From the above description, the advantages of the multipolar connection system according to the present invention are clear, in particular its easy wiring compared to the known systems, the stability and reliability of the system and its filtering efficiency, due to the possibility of adopting a customized filter on all types of electric apparatus producing interferences and to the lasting performance of the electric features of the noise suppressor filter, plus an easy replacement of the filter.

[0027] The above description has been made with reference to a burner and a heating system, but it is obvious that the present invention can also be applied to other types of apparatus producing electromagnetic noise, and that in the practical embodiment of the inven-

tion the components and materials described above may differ in form and size from the ones described, and be replaced with technical equivalent elements.

[0028] For instance, the fixing of the cover 14 on the filter 15 may be of the snap-in type which can only be opened using a tool, instead of the screws 16.

[0029] Moreover, in order to ensure a correct mating between the assembly (19) and the male part 7 of the connector, an appropriate key protection of a known type can be provided between the assembly and the connector, to hinder polarity inversion.

[0030] It is also clear that changes to the electric connections or number of poles are possible, with respect to the ones described above by way of example.

Claims

1. A multipolar connection system for connecting an electric apparatus (1), in particular a fuel burner, which may generate electromagnetic interferences or noise during its operation, comprising a first part (7) having a male connector, a second part (12) having a female connector, and an electric filter (15) for suppressing said electromagnetic interferences or noise, characterized in that said filter (15) is provided on one side with a multipolar connection cable (11) for the connection to said electric apparatus (1) and, on the other side, with a set of contacts (18) for the coupling with a corresponding set of contacts (13) arranged on one (12) of said two parts forming a coupling connector, and in that said part (12) and said filter (15) form an integral assembly (19).
2. A multipolar connection system according to claim 1, characterized in that said filter (15) is connected with the female part (12) of the connector by means of male contacts (18), which couple with female contacts (13) of said female part (12) of the connector.
3. A multipolar connection system according to claim 2, characterized in that the contact between said male contacts (18) of said filter and said female contacts (13) of said female part of the connector is ensured by means of locking screws (17).
4. A multipolar connection system according to one or more of the previous claims, characterized in that said filter (15) is specifically optimized to ensure utmost suppression of the interferences or noise generated by said apparatus (1), to which it is connected with by means of said multipolar connection cable (11).
5. A multipolar connection system according to one or more of the previous claims, characterized in that said filter (15) is enclosed in a resin block.

6. A multipolar connection system according to one or more of the previous claims, characterized in that said assembly (19) comprises a cover (14) made of plastic material, which is fastened by means of at least a screw (16) to said filter (15) or through a snap-in connection that cannot be opened without the use of tools. 5
7. A multipolar connection system according to one or more of the previous claims, characterized in that the body of said female part (12) of the connector, the housing (15a) of the filter (15) and/or the cover are made of self-extinguishing filled polyamide. 10
8. A multipolar connection system according to claims 6 and 7, characterized in that said cover (14) has at least an element (14a) engaging with a corresponding element (12a) of said body of said female part (12) of the connector and a further element (14b) engaging with a corresponding element (15b) of the housing (15a) of said filter (15). 15 20
9. A multipolar connection system according to claim 1, characterized in that said integral assembly (19) further comprises a set of contacts for connecting said electric apparatus (1), in addition to a supply network, also to other devices being part of the plant associated with the electric apparatus (1). 25
10. A multipolar connection system for connecting an electric apparatus (1), in particular a fuel burner, which may generate electromagnetic interferences or noise during its operation, comprising a first part (7) having a male connector, a second part (12) having a female connector, and an electric filter (15) for suppressing said electromagnetic interferences or noise, characterized in that 30 35
- said filter (15) and said female part (12) form an integral assembly (19), 40
 - said assembly (19) is directly connected from one side with said electric apparatus (1) by means of a single multipolar connecting cable (11),
 - the same assembly (19) is coupled on the other side with said male part (7), in particular with a protection for hindering the polarity inversion, 45
 - said filter (15) is specifically optimized for assuring utmost suppression of the interferences or noise generated by said electric apparatus (1), the filter and the apparatus being connected by means of said multipolar connecting cable (11). 50

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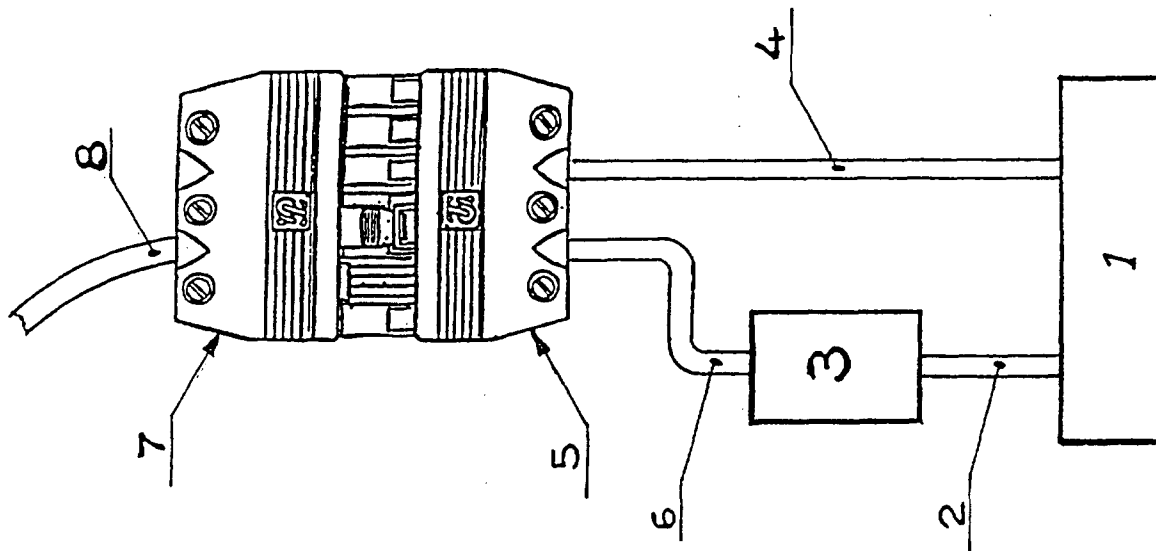
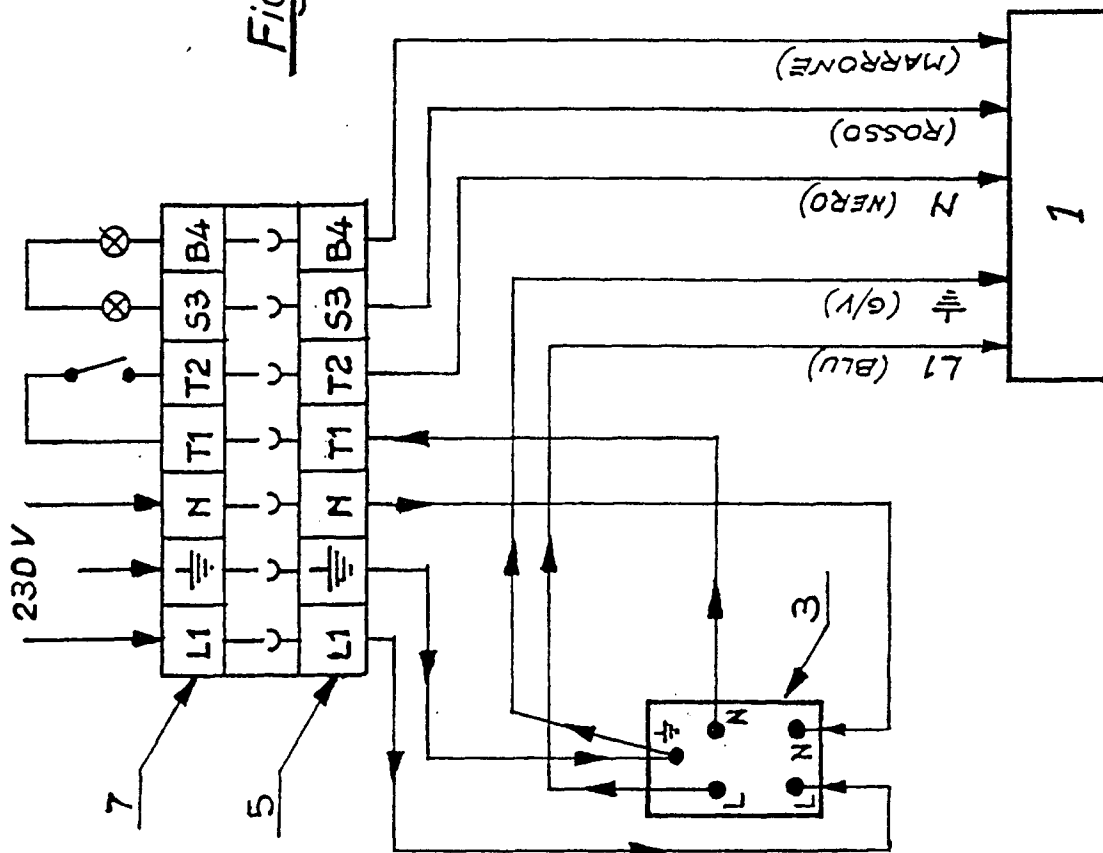


Fig. 1



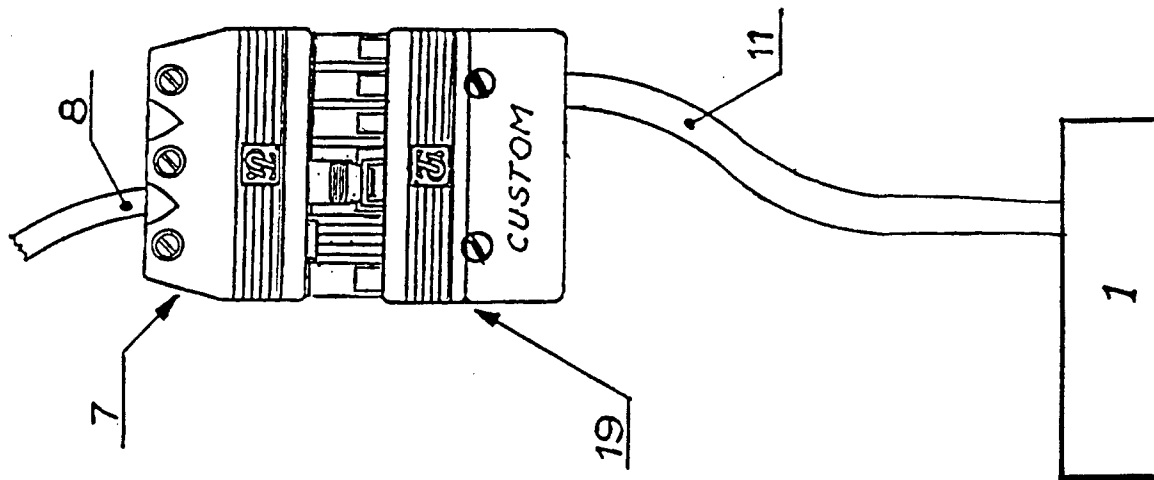


Fig. 2

