Title: A FILTER HOUSING AND A DOOR ON A FILTER HOUSING

Abstract: The present invention relates to a filter assembly (1) including a housing (4), an electro-filter (3) contained in the housing and means (23) for supplying a high-voltage to the electro-filter, said housing comprising a door (6) allowing access to the electro-filter, which door, on the inside thereof, has connectors (7,8) for connecting said high-voltage supply means to the electro-filter when said door is closed. According to the invention said high-voltage supply means (23) are arranged in a separate unit (9), which is disposed on the outside of said door (6) and connected to a control unit (24) for controlling the filter assembly, said unit being disposed on another part of the housing (4) than said door (6).
TECHNICAL FIELD

The present invention relates to a filter assembly including a housing, an electro-filter contained in the housing and means for supplying high-voltage to the electro-filter, said housing comprising a door allowing access to the electro-filter, which door, on the inside thereof, has connectors for connecting said high-voltage supply means to the electro-filter when said door is closed.

BACKGROUND OF THE INVENTION

In order to clean air in environments in which for example oil is present in the air, for example in factories or machining workshops, filter assemblies having electrostatic filters are used. To such filters a high voltage of up to 15000 volts is supplied during use of the filters. The housings containing those electro-filters are provided with doors allowing access to the filters for maintenance or replacement thereof. In order to allow safe access to the filters the high voltage supply to the filters is automatically interrupted when the door is opened by contact plates provided on the inside of the door being brought out of contact with contact wires of the filter.

In known filter assemblies high-voltage cables are disposed on the inside of the door allowing access to the electro-filter. The mounting of high-voltage cables is for safety reasons well regulated, for example must high-voltage cables be mounted so that they do not move during opening or closing movements of the door. The mounting of high-voltage cables is thus time consuming and costly. Moreover, if a damage on high-voltage cables occurs there is also a risk that an operator will be damaged.
The objective of the invention is to reduce the risk for damage on high-voltage cables. It is also an objective of the invention to improve filter assemblies having electro-filters so that the mounting thereof is simplified.

**SUMMARY OF THE INVENTION**

Said objectives are accomplished by a filter assembly including a housing, an electro-filter contained in the housing and means for supplying a high-voltage to the electro-filter, said housing comprising a door allowing access to the electro-filter, which door, on the inside thereof, has connectors for connecting said high-voltage supply means to the electro-filter when said door is closed, characterised in that said high-voltage supply means are arranged in a separate unit, which is disposed on the outside of said door and connected to a control unit for controlling the filter assembly, said unit being disposed on another part of the housing than said door. By such a filter assembly there is no need for the mounting of high-voltage cables leading from the high-voltage means to the inside of the door whereby the risk for damage of high-voltage cables and the mounting costs are reduced.

In a preferred embodiment of the inside of said door is free from electrical cables and said connectors for connecting said high-voltage supply means to the electro-filter on the inside of said door extend through the wall of the door from the inside thereof to the outside thereof and are connected to the outputs of said high-voltage supply means.

A particle filter is preferably disposed in the filter housing upstream of the electro-filter.
The invention also relates to a door on a filter housing allowing access to an electro-filter contained in the housing, which door, on the inside thereof, has connectors for connecting said electro-filter to high-voltage supply means when the door is closed, characterised in that said high-voltage supply means are arranged in a separate unit disposed on the outside of the door.

In a preferred embodiment the inside of the door is free from electrical cables and said connectors for connecting said high-voltage supply means to the electro-filter on the inside of said door extend through the wall of the door from the inside thereof to the outside thereof and are connected to the outputs of said high-voltage supply means.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described with reference to the enclosed Figures, of which;

Fig. 1 shows a perspective view of a filter assembly according to a preferred embodiment of the present invention,

Fig. 2 shows an exploded view of a housing for a high-voltage supply unit and the connectors for connecting said unit to an electro-filter,

Fig. 3 shows a plan view of the housing in Figure 2 with the connectors mounted therein, and

Fig. 4 shows a sectional view along line IV-IV in Figure 3.

DESCRIPTION OF EMBODIMENTS
In figure 1 a perspective view of a filter assembly 1 according to a preferred embodiment is disclosed. This filter assembly 1 includes a particulate filter 2 and an electrostatic filter 3 contained in a housing 4. The filters 2,3 are connected to the air to be cleaned from oil and/or other contaminants by an inlet 5 connected to an air distribution channel (not shown in Fig. 1). Air is drawn through the filters 2,3 by a fan (not shown in Fig. 1).

Access to the filters 2,3 for maintenance or exchange is allowed by a swingable door 6 shown in Figure 1 in an open position. The electro-filter 3 is connected to a high-voltage supply unit by connectors 7,8 projecting out from the inside of the door 6. In the open position of the door the power supply is interrupted. This high-voltage supply unit is accommodated in a housing or box 9 affixed to the outside of door 6.

In Figures 2-4 the connectors 7,8 and the box for accommodating the high-voltage supply unit is shown in more detail. The connectors 7,8 are identical so the description of connector 7 is thus valid also for connector 8.

Connector 7 consist essentially of a threaded bolt 10 passing through a rear wall 11 of box 9 and through the door 6 and elements for isolating the bolt 10 from the wall 11 and the wall of door 6. The first end of bolt 10, i.e. the end closest to a viewer of Figure 2, is electrically connected to the end of an electric cable 12, as is best seen in Figure 2, said cable 12 leading to the high-voltage supply unit (not shown in the Figures). The bolt 10 is projecting out from the inside of the door 6 and a contact plate 13 is screwed onto the second end of bolt 10. In the closed position of door 6, the contact plates 10 of bolts 7 and 8 are in contact with the ends of the respective filter contact wire 14,15,
said filter contact wires projecting out from the electro-filter 3 as can be seen in Figure 1.

A ceramic insulator 16 distances the head of bolt 10 from the rear wall 11 of box 9 and a ceramic insulator 17 distances a nut 18 from the wall of door 6. Said nut 18 is screwed onto the bolt 10 so that the head of bolt 10 is tightly pressed against the end of the electric cable 12 in the mounted state of the connector 7. A ceramic spacer tube 19 surrounds the stem of bolt 10 in the region thereof level with the wall 11 of box 9 and the wall of door 6. In order to ensure air-tightness of the lead-through of the bolt 10, a grommet seal 20 surrounds the tube 19 and press against the wall of the door 6 on both sides of the opening 21 therein through which the bolt passes. Furthermore, the side of the grommet seal 20 facing the interior of box 9 is covered by a layer 22 of adhesive extending from the outside of the tube 19 to the inside of the opening in the rear wall 11 through which the bolt 10 is passing.

As stated before, a high-voltage supply unit, schematically shown as a box 23 in Figure 3, is present within the box or housing 9, said box 9 being covered by a cover (not shown) after mounting of the supply unit 23 and the connectors 7,8. The high-voltage supply unit 23 transforms low-voltage power to high-voltage power and is connected by a low-voltage cable to a control unit 24 for controlling the filter assembly. The control unit 24 is affixed to the front wall 25 of housing 4.

For the high-voltage supply unit 23 any commercially available unit can be used, for example a unit from Warmbier & Kegler, Germany, transforming a net voltage (230-240V) to a high voltage of between 5.8 kV - 11.5 kV.
By placing the high-voltage unit 23 in the box 9 and by letting the connectors 7,8 connecting the high-voltage unit to the electro-filter 3 pass from the outside of door 6 to the inside thereof, no high-voltage cables are necessary on the inside of the door. Furthermore, since the high-voltage unit is disposed close to the connectors, only very short high-voltage cables 12 are present. The mounting of the components of the filter assembly 1 is thus significantly facilitated in comparison with prior art. The safety is also improved since no high-voltage cables are present on the inside of the door 6 of the filter housing 4.

The described embodiment can of course be modified without leaving the scope of invention. For example, can the connectors have another construction, e.g. the contact plates can be substituted by spring elements. Although it is preferred that a particulate filter is disposed upstream of the electro-filter in the present application it can be disposed with in other applications. The scope of invention shall therefore only be defined by the enclosed patent claims.
Claims

1. A filter assembly (1) including a housing (4), an electro-filter (3) contained in the housing and means (23) for supplying a high-voltage to the electro-filter, said housing comprising a door (6) allowing access to the electro-filter, which door, on the inside thereof, has connectors (7,8) for connecting said high-voltage supply means to the electro-filter when said door is closed, characterised in that said high-voltage supply means (23) are arranged in a separate unit (9), which is disposed on the outside of said door (6) and connected to a control unit (24) for controlling the filter assembly, said unit being disposed on another part of the housing (4) than said door (6).

2. The filter assembly according to claim 1, wherein the inside of said door (6) is free from electrical cables.

3. The filter assembly according to claim 2, wherein said connectors (7,8) for connecting said high-voltage supply means (23) to the electro-filter on the inside of said door extend through the wall of the door (6) from the inside thereof to the outside thereof and are connected to the outputs of said high-voltage supply means.

4. The filter assembly according to claim 3, wherein a particle filter (2) is disposed in the filter housing (4) upstream of the electro-filter.

5. A door (6) on a filter housing (4) allowing access to an electro-filter (3) contained in the housing, which door, on the inside thereof, has connectors (7,8) for connecting said electro-filter to high-voltage supply means (23) when the door is closed, characterised in that said high-voltage supply means (23) are arranged in a separate unit (9) disposed on the outside of the door (6).
6. The door according to claim 5, wherein the inside thereof is free from electrical cables.

7. The door according to claim 6, wherein said connectors (7,8) for connecting said high-voltage supply means (23) to the electro-filter (3) on the inside of said door (6) extend through the wall of the door from the inside thereof to the outside thereof and are connected to the outputs of said high-voltage supply means.
**INTERNATIONAL SEARCH REPORT**

**PCT/SE2007/050211**

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### A. CLASSIFICATION OF SUBJECT MATTER

**IPC:** see extra sheet

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### B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

**IPC:** B03C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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Electronic database consulted during the international search (name of database and, where practicable, search terms used)

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### EPO-INTERNAL, WPI DATA, PAJ

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**Date of mailing of the international search report:** 04.12.2007

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B03C 3/66 (2006.01)
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