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(54) Electric household appliance comprising a self-cleaning filtering device

(57) An electric household appliance (1) having a casing (2); a laundry drum (6) housed inside the casing (2); a drying circuit (8) for feeding air into the drum (6) to dry the laundry inside the drum; and a self-cleaning filtering device (10), in turn having at least a filter (11) for removing fibre and/or fluff from the air supplied by the drying circuit (8), and a cleaning device (12) for removing the accumulated fibre and/or fluff from the filter (11). The self-cleaning filtering device (10) has a chirp signal generating module (13) for generating an electric chirp signal (S_{CHIRP}); and a transducer module (14) connected to the filter (11), and which receives and converts the electric chirp signal (S_{CHIRP}) into mechanical vibration to vibrate the filter

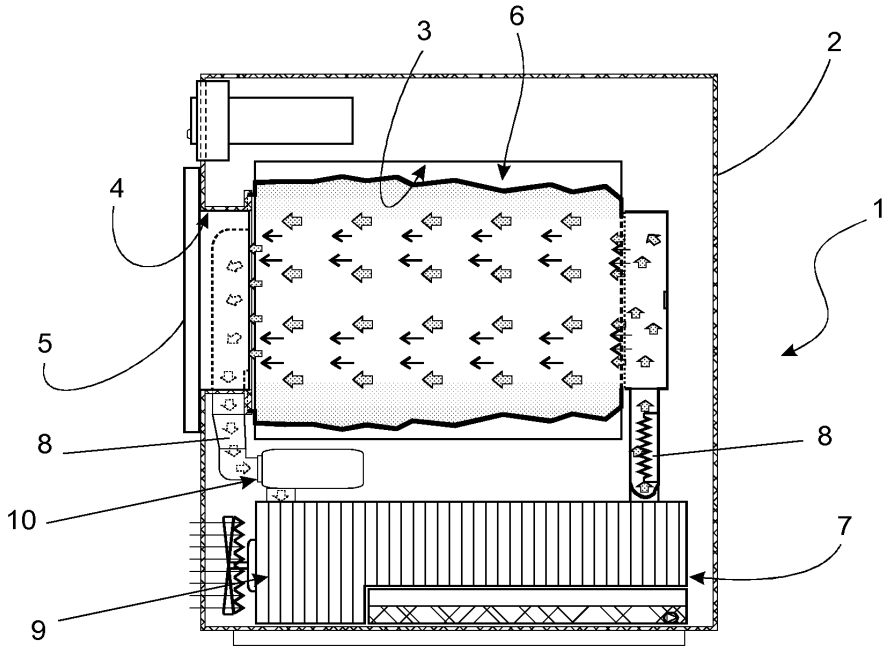

Fig. 1

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Description

[0001] The present invention relates to an electric household appliance comprising a self-cleaning filtering device.

[0002] More specifically, the present invention relates to an electric household appliance, such as a drier or washing machine-drier, of the type comprising a substantially parallelepiped-shaped casing; a cylindrical laundry drying tub or chamber fixed inside the casing, directly facing a laundry loading/unloading opening; a door hinged to the front face of the casing to close the opening; and a cylindrical, perforated-wall laundry drum housed inside the drying tub.

[0003] Appliances of the above type also comprise a drying assembly, in turn comprising a drying circuit connected to the drying tub; a hot-air generator for circulating air inside the drying circuit; and a filter located along the drying circuit to remove fibre and/or fluff shed by the laundry in the drum, and so prevent clogging of the drying assembly devices.

[0004] At the end of each or a number of drying cycles, the filter must be removed by the user to clean off the accumulated fibre and/or fluff, to ensure correct performance of subsequent drying cycles.

[0005] As is known, market demand is for appliances equipped with a device for automatically cleaning the filter of accumulated fibre and/or fluff, with no manual intervention on the part of the user.

[0006] Accordingly, considerable effort has been spent over the past few years in devising integrated filter cleaning devices designed specifically for appliances of the above type, but which still leave considerable room for improvement.

[0007] It is an object of the present invention to provide an electric household appliance comprising a self-cleaning filtering device that is straightforward and cheap to produce.

[0008] A non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a schematic view of an electric household appliance in accordance with the teachings of the present invention;

Figure 2 shows, schematically, a self-cleaning filtering device integrated in the Figure 1 appliance.

[0009] Number 1 in Figure 1 indicates as a whole an electric household appliance, such as a drier or washing machine-drier, comprising a substantially parallelepiped-shaped casing 2; a cylindrical laundry drying tub or chamber 3 fixed inside casing 2, directly facing a laundry loading/unloading opening 4; a door 5 hinged to the front face of casing 2 to close opening 4; and a cylindrical, perforated-wall laundry drum 6 housed inside drying tub 3.

[0010] Appliance 1 also comprises a drying assembly 7, in turn comprising a drying circuit 8 connected to drying tub 3; and a hot-air generator 9 for circulating air inside drying circuit 8 and, hence, tub 3.

[0011] Appliance 1 also comprises a self-cleaning filtering device 10, in turn comprising a filter 11 located along drying circuit 8 to remove fibre and/or fluff shed by the laundry in drum 6; and a cleaning device 12 connected to and for transmitting vibration to filter 11 to detach the fibre and/or fluff from filter 11.

[0012] More specifically, in the Figure 2 example, cleaning device 12 comprises a generator module 13 for generating an electric signal; and a transducer module 14 connected mechanically to filter 11 and for converting the electric signal into mechanical vibration to vibrate filter 11 and so detach the fibre and/or fluff from the filter.

[0013] Generator module 13 comprises an electronic chirp stage 15 for generating a chirp signal S_{CHIRP}; an amplifying stage 16 which receives, amplifies, and supplies chirp signal S_{CHIRP} to transducer module 14; and preferably, though not necessarily, a power stage 17 for electrically powering electronic chirp stage 15 and amplifying stage 16.

[0014] Electronic chirp stage 15 may conveniently comprise a microprocessor for generating a substantially sinusoidal chirp signal S_{CHIRP} with a frequency of over roughly 50 Hz and below roughly 500 Hz.

[0015] Transducer module 14 may comprise a transducer of the type comprising, for example, a vibrating motor, or a piezoelectric actuator, or an electrodynamic exciter, or a magnetostrictive actuator.

[0016] In actual use, generator module 13 generates sinusoidal chirp signal S_{CHIRP}, which is converted by transducer module 14 into mechanical vibration transmitted to filter 11. The mechanical vibration vibrates filter 11 to detach the accumulated fibre and/or fluff, which fall by gravity into a vessel (not shown) underneath, thus cleaning filter 11.

[0017] The self-cleaning filtering device of appliance 1 has the advantage of being extremely straightforward, cheap, and effective. Moreover, in addition to being cheap, the chirp signal generating module generates a sinusoidal signal capable of effectively exciting the aforementioned transducers.

[0018] Clearly, changes may be made to the appliance as described herein without, however, departing from the scope of the present invention as defined in the accompanying Claims.

Claims

1. An electric household appliance (1) comprising a casing (2); a laundry drum (6) housed inside the casing (2); a drying circuit (8) for feeding air into said drum (6) to dry the laundry inside the drum (6); and self-cleaning filtering means (10), in turn comprising at least a filter (11) for removing fibre and/or fluff from the air supplied by said drying circuit (8), and cleaning means (12) for removing the accumulated said

fibre and/or fluff from said filter (11);
said appliance (1) being **characterized in that** said cleaning means (12) comprise:

- chirp signal generating means (13) for generating an electric chirp signal (S_{CHIRP}) ; and
- transducer means (14) connected to said filter (11), and which receive and convert said electric chirp signal (S_{CHIRP}) into mechanical vibration to vibrate the filter (11).

2. An appliance as claimed in Claim 1, wherein said electric chirp signal (S_{CHIRP}) is substantially sinusoidal with a frequency of over roughly 50 Hz and below roughly 500 Hz.

3. An appliance as claimed in Claim 1 or 2, wherein said transducer means (14) comprise a vibrating motor.

4. An appliance as claimed in Claim 1 or 2, wherein said transducer means (14) comprise a piezoelectric actuator.

5. An appliance as claimed in Claim 1 or 2, wherein said transducer means (14) comprise an electrodynamic exciter.

6. An appliance as claimed in Claim 1 or 2, wherein said transducer means (14) comprise a magnetostrictive actuator.

7. An appliance as claimed in any one of the foregoing Claims, and corresponding to a drier or a washing machine-drier.

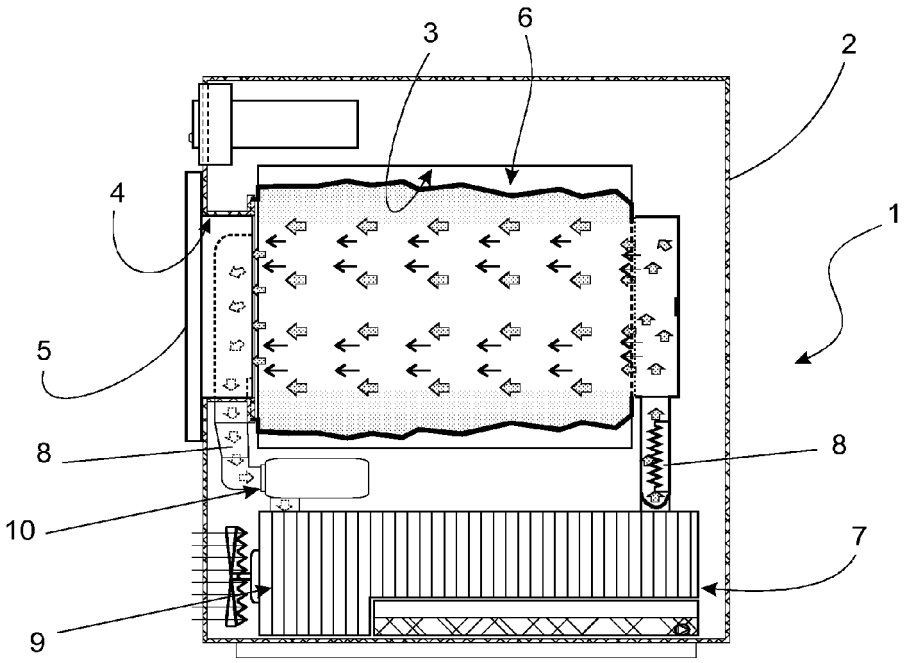

Fig. 1

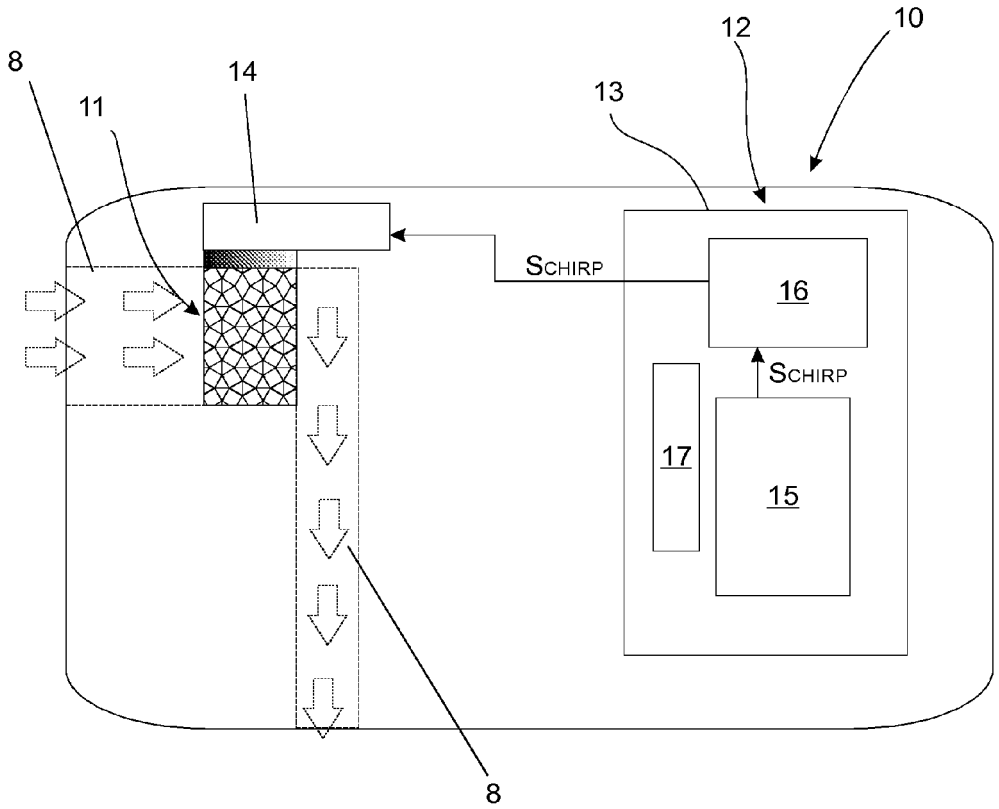

Fig. 2

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EUROPEAN SEARCH REPORT

Application Number
EP 08 16 0354

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	DE 34 38 575 A1 (KANNEGIESSER H GMBH CO [DE]) 30 April 1986 (1986-04-30) * page 6, line 25 - page 7, line 7 * * page 8, line 5 - line 9; figure 1 * -----	1,3-7	INV. D06F58/22
Y	EP 0 615 017 A (GOLD STAR CO [KR]) 14 September 1994 (1994-09-14) * column 7, line 2 - line 23; claim 1 * * column 6, line 22 - line 28; figure 7 * -----	1,3-7	
			TECHNICAL FIELDS SEARCHED (IPC) D06F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	11 December 2008	Westermayer, Wilhelm

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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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 08 16 0354

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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11-12-2008

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82