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2,907,405

FILTER-SILENCER

Jule F. Marshall, Greenwich, Conn., assignor to American Felt Company, Glenville, Conn., a corporation of Massachusetts

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1 Claim. (Cl. 183—41)

This invention comprises a novel filter-silencer adapted to be disposed over the air exit passage of a vacuum cleaner or the like and serve to filter the exhaust air and substantially muffle and deaden the resulting noise vibrations. The filter embodies a felt disk having one or a plurality of openings therethrough and normally closed by flexible felt louvres located in the disk and disposed to be opened by air pressure thereagainst, the disk being of substantial thickness serving to catch and hold dust particles and the louvres acting as air pressure relief valves. The production of a novel filter-silencer of this nature comprises the primary object of the invention.

The louvres are preferably an integral part of the felt disk, being cut therefrom along a line or lines forming their contour and leaving each louvre attached to the disk at one margin. The louvres are normally disposed in the plane of the disk and cooperate therewith to filter the exiting air but are free to flex sufficiently to relieve the air pressure and substantially deaden the resulting noise vibrations. Preferably the disk is supported by a grill including bars at its air exit face and externally of the louvres, thus permitting pressure opening of the louvres for the purpose described. The production of a novel filter-silencer of this nature as illustrated and described comprises a further object of the invention.

These and other features of the invention will be best understood and appreciated from the following description of preferred embodiments of the invention selected for purposes of illustration and shown in the accompanying drawings in which:

Fig. 1 is a view in elevation of a vacuum cleaner housing, broken away at the air exit end,

Fig. 2 is an enlarged view of the air exit end of the housing broken away to show my novel filter-silencer therein,

Fig. 3 is a longitudinal sectional view through the filter cap of the housing together with the filter-silencer in side elevation,

Fig. 4 is a front elevation of the filter-silencer,

Fig. 5 is a side elevation of the filter-silencer and illustrating the passage of air therethrough,

Fig. 6 is a front elevation of the filter-silencer together with a supporting grill, and

Fig. 7 is a sectional view taken on line 7—7 of Fig. 6.

In the drawing 10 indicates the housing of a vacuum cleaner having an inlet hose 12 at its forward end and a filter holding cap 14 on its exhaust end. Disposed within the housing is a primary filter comprising an air filtering bag and a motor operated fan arranged to draw the dust laden air through the hose into the bag and force the spent air outwardly of the exhaust opening 16. A filter unit or pad as, for example, of the nature shown in Patent 2,521,984, Lang, is commonly disposed over the opening 16 to serve as a secondary filter to screen out fine dust particles which may escape through the primary filter.

My present invention contemplates an improved, relatively simple and inexpensive secondary filter unit embodying a felt disk having preferably a plurality of openings therethrough together with flexible felt louvres

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normally closing the openings but adapted to be flexed in open direction by air pressure, thus providing pressure relief valves facilitating the operation of the cleaner. The openings and louvres can be formed in any manner desired and in the drawing I have illustrated the filter as embodying a simple felt disk 18 of substantial thickness and having cuts 20 therein providing a plurality of louvres 22 each integral with the disk along a margin of the louvre. The louvres are normally disposed in the plane of the disk and are adapted to be flexed outwardly by air pressure thereagainst.

The filter disk 18 is disposed to fit within the cap 14 and against an annular shoulder 24 therein and when the cap is fully threaded onto the housing the disk is clamped tightly at its margin between the shoulder 24 and the cooperating end of the housing. The shape of the filter disk is unimportant and its thickness and the particular blend of felted fibres employed will depend on the use and functions to be accomplished. Patent 2,521,984 discloses one satisfactory type of felt for purposes of this invention. In any event, the louvres are resilient and normally remain in the closed position of Fig. 2 but can open outwardly to relieve air pressure within the housing. Thus the disk serves as a secondary filter to catch and hold fine dust particles, substantially deadens the noise vibrations, and the louvres function as relief valves permitting escape of trapped air under predetermined pressure and facilitating freer exhaust of the air from the housing. The end wall of the cap 14 is open at 26 to permit free escape of the exhaust air.

It may be desirable to provide additional support or guard for the filter disk 18 and in Figs. 6 and 7 I have illustrated a grill 28 for this purpose. The grill includes bars 30 extending across the air exit face of the disk externally of the louvres 22, thus supporting the disk without interfering with the opening of the louvres.

It will be apparent that the movable louvres are effective to relieve back pressure whenever a neglected filter has become plugged and so restricts the air flow that the efficiency of the machine is impaired. When the ports do open due to excessive back pressure the filter action is largely reduced but the silencer still serves that part of its original function that consists in silencing air borne sounds.

The term "felt" is used herein in a broad sense to include any three-dimensional fabric or laminations of fabric or any type of conventional felt construction or porous material like felt in sheet form and appropriate shape.

Having thus disclosed my invention and described in detail an illustrative example thereof, I claim as new and desire to secure by Letters Patent:

In a vacuum cleaner, a housing having an air exit opening therefrom disposed within and through a cylindrical flange, a cap threaded to the flange and having an air exit opening therethrough in alignment with the first named opening, a felt disk of substantial thickness disposed over the first named opening and having its margin overlapping the outer end of the flange, the disk having openings therethrough and flexible louvres integral therewith and normally closing the openings and adapted to be flexed outwardly to open position by air pressure thereagainst, and an annular shoulder carried by the cap in position clamping said margin of the disk to and between the shoulder and flange.

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