

Oct. 8, 1946.

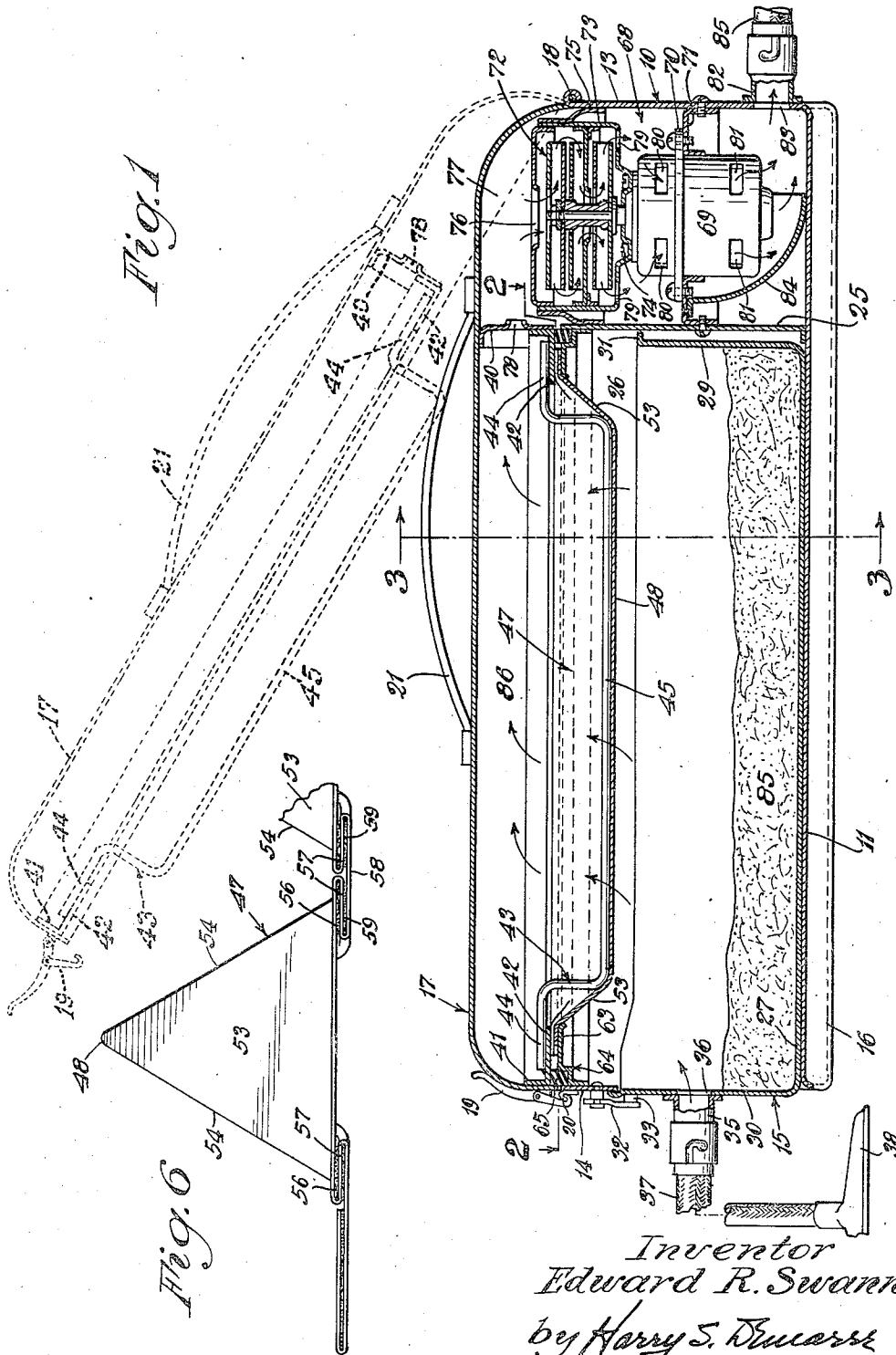
E. R. SWANN

2,409,078

SUCTION CLEANER

Filed Oct. 13, 1943

3 Sheets-Sheet 1



Inventor
Edward R. Swann
by Harry S. Bussard
Attorney

Oct. 8, 1946.

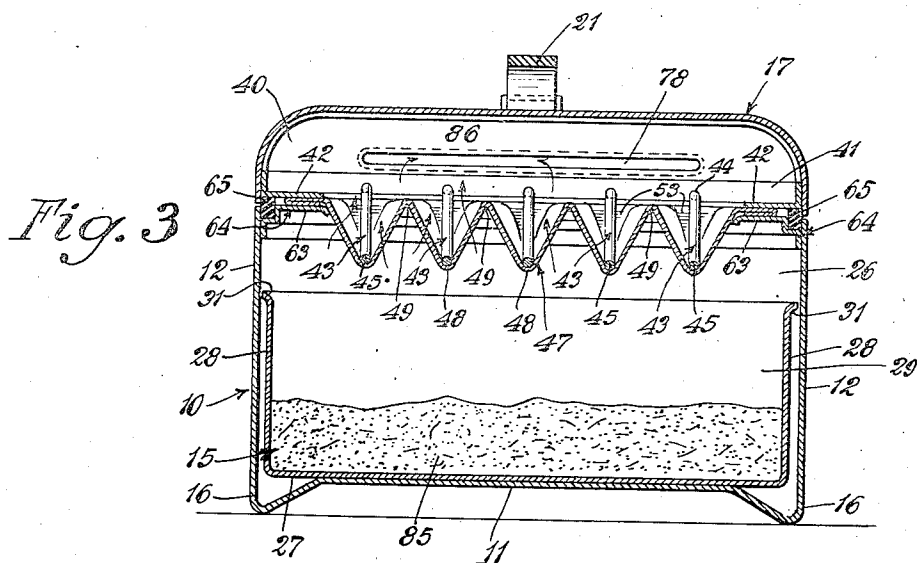
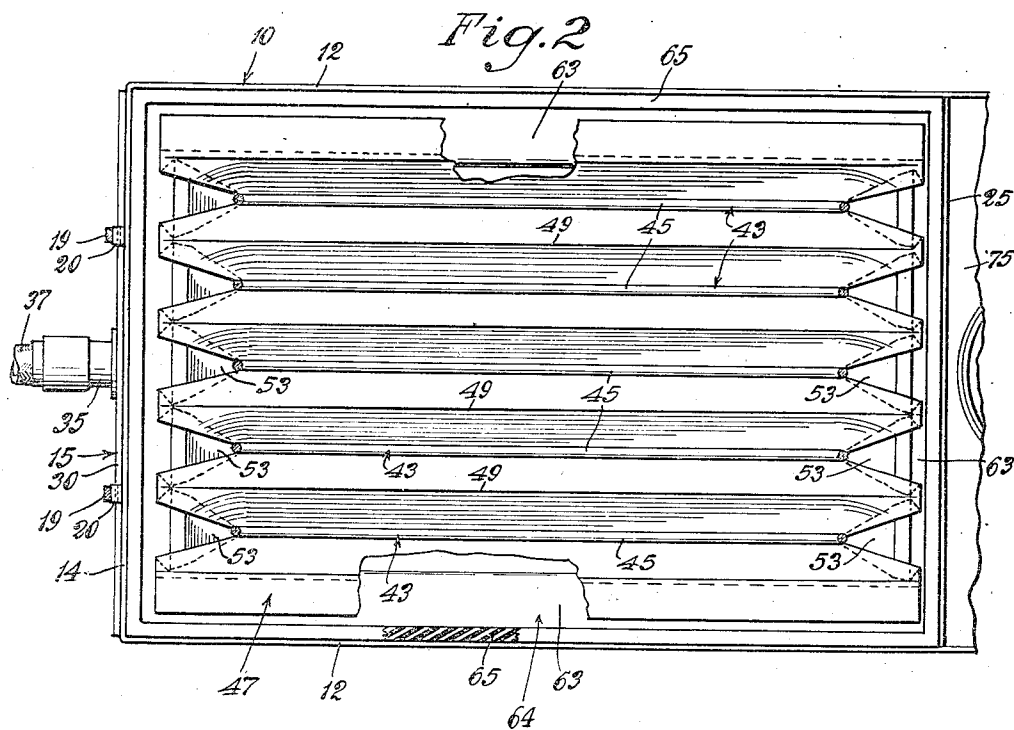
E. R. SWANN

2,409,078

SUCTION CLEANER

Filed Oct. 13, 1943

3 Sheets-Sheet 2



Inventor
Edward R. Swann
by Harry S. Drusser
Attorney.

Oct. 8, 1946.

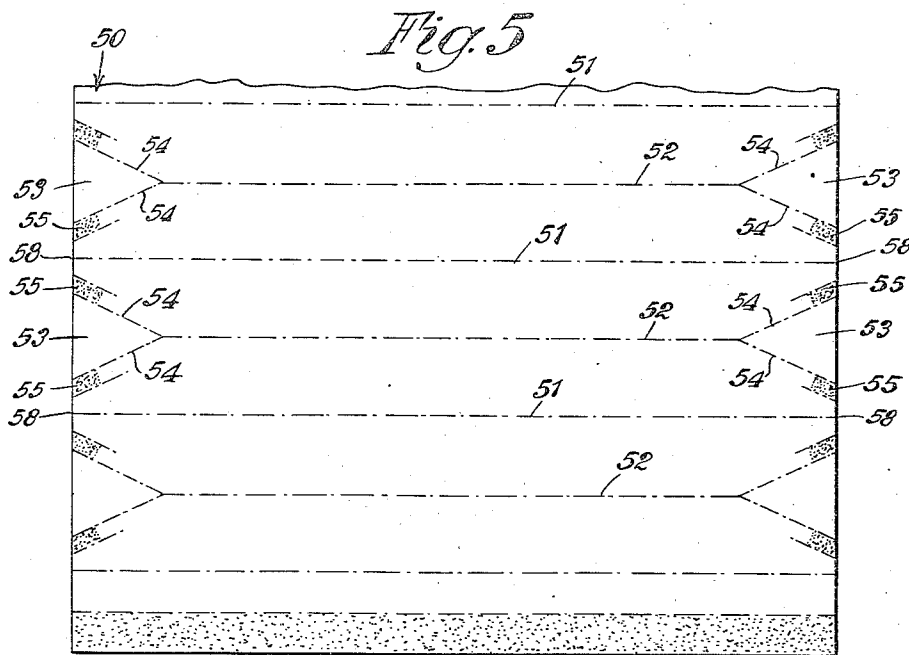
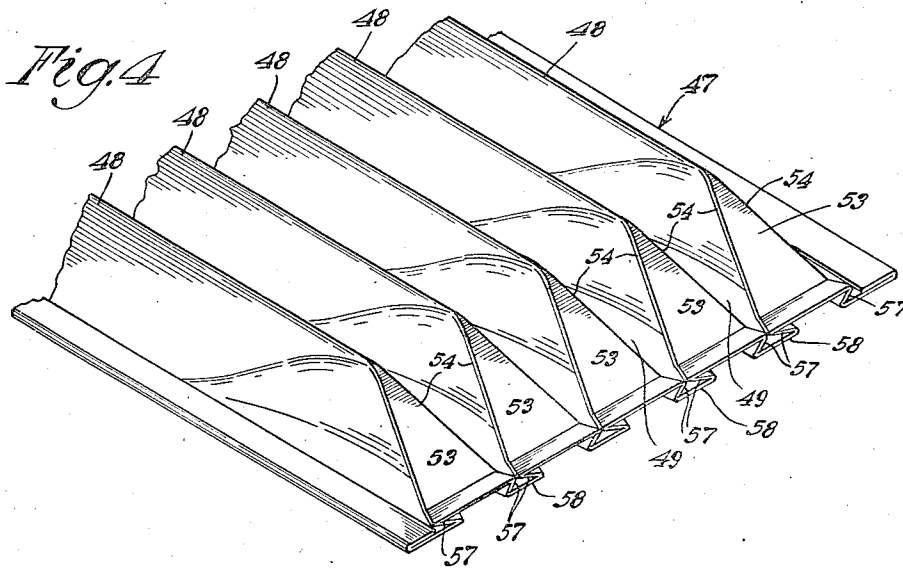
E. R. SWANN

2,409,078

SUCTION CLEANER

Filed Oct. 13, 1943

3 Sheets-Sheet 3



Inventor
Edward R. Swann
by Harry S. Swanson
Attorney.

UNITED STATES PATENT OFFICE

2,409,078

SUCTION CLEANER

Edward R. Swann, Floral Park, N. Y., assignor to
The Hoover Company, North Canton, Ohio, a
corporation of Ohio

Application October 13, 1943, Serial No. 566,043

3 Claims. (Cl. 183—71)

1

The present invention relates to suction cleaners and more particularly to a filter and its arrangement in the suction cleaner.

An object of the invention is to provide a new and improved suction cleaner. Another object is to provide a filter having a corrugated filtering area with ridges and depressions, the ends of the ridges terminating in the plane of the marginal edge of the filter for attachment in a suction cleaner. A further object is to provide a filter formed of paper folded into a corrugated filtering area and having the ends of the ridges folded into one plane surface. Another object is to provide a method for folding a sheet of paper into a corrugated filtering area with the ends of the ridges folded and glued into the plane of the depressions to thus form the corrugated surface. Other objects and advantages of the invention will be apparent from the following specification and drawings, wherein:

Figure 1 is a longitudinal section of the suction cleaner and showing in dotted lines the suction cleaner cover and the filter supporting structure in open position;

Figure 2 is a section along the line 2—2 of Figure 1;

Figure 3 is a section along the line 3—3 of Figure 1;

Figure 4 is a fragmentary perspective view of the corrugated filter showing the ends of the corrugations folded into the plane of the marginal edge of the filter;

Figure 5 is a fragmentary top plan view of the sheet of filter material prior to being folded, and

Figure 6 is an end view of the corrugated filter showing the ends of the ridges folded and glued in the plane of the marginal edge of the filter.

The embodiment of the invention herein disclosed comprises a suction cleaner provided with a rectangular casing 10 having a bottom wall 11, a pair of opposed side walls 12, a rear wall 13 and a front wall 14, the latter being provided with an opening for the removable reception of a dust and dirt receptacle 15, and the bottom wall 11 being formed at its longitudinal corners with projecting ribs forming a pair of runners 16 which support the cleaner. The casing is closed by a cover 17 pivoted at 18 on the rear casing wall 13 and is provided at its front end with a latch 19 which removably engages a catch 20 mounted on the casing front wall 14, and a handle 21 is mounted on the cover 17 for carrying the suction cleaner.

A partition 25 extends between the casing side

2

walls 12 and cooperates with the latter, the bottom wall 11 and front wall 14 to form a compartment 26 for the reception of the dirt receptacle 15. The dirt receptacle has a bottom wall 27, opposed side walls 28, rear wall 29 and a front wall 30, the side and rear walls having their marginal edges outwardly flanged at 31 for engagement with the casing side walls 12 and with the partition 25 to hold the receptacle in position in the casing 10. A latch is mounted on the casing front wall 14 and is provided with a pivoted arm 32 which engages a catch 33 on the dirt receptacle front wall 30 to lock the receptacle in the casing 10. An air inlet conduit 35 is mounted on the dirt receptacle front wall 30 and communicates with an opening 36 in the latter exposed to the dirt receptacle, while a flexible hose 37 is removably connected to the conduit 35. A suitable surface cleaning tool 38, only partially shown, is connected to the opposite end of the hose 37 for cleaning surfaces as is well known in the art.

Mounted within the cover 17 between the side walls is a partition 40, and secured to the latter and depending walls of the cover 17 is an L-shaped bracket 41 having a flange 42 extending in one plane. Spaced rods 43 extend longitudinally of the cover 17 and have their opposite ends 44 supported on the flange 42 of the bracket 41, and the intermediate portions 45 of the rods 43 project beyond the plane of the ends of the rods 43 into the compartment 26 when the cover 17 is closed.

A paper filter 47 permeable to air, but not to dust and dirt, is provided with a corrugated filtering area having alternate longitudinally extending ridges 48 and depressions 49. The paper filter is formed from a single sheet of paper 50, as shown in Figures 4 to 6, and is folded along the alternate lines 51 to form the depressions 49 in the corrugated filtering surface, and the paper is then folded along the lines 52 to form the ridges 48. Triangular areas 53 are provided at the opposite ends of the ridge lines 52 by a pair of diverging lines 54 extending to the marginal edge of the paper, and the paper is folded along the diverging lines 54 over the shaded portions 55 and glued together as indicated at 56, and the resulting adjacent folds 57 are glued to the portion 58 of the paper as indicated at 59. By forming the adjacent folds 57 and gluing them together, that portion of the paper between the adjacent ridge lines 52 is drawn together which causes the paper to become corrugated forming the ridges 48 and the depressions 49. The trian-

gular areas 53 being also glued at the marginal edge of the paper causes the triangular areas to be inclined from the marginal edge of the paper to the ridges 48 and serve to maintain the ridges 48 in projected position relative to the depressions 49. It will be noted that the ridges 48 and depressions 49 terminate in one plane at the marginal edge of the filter.

The filter 47 is supported in the casing 10 by placing the marginal edge on the flange 63 of a bracket 64 mounted on the casing front and side walls and the partition 25, and the ridges 48 of the filter project into the compartment 26, while the depressions 49 lie in the plane of the marginal edge of the filter 47. The rods 43 fit in the ridges 48 of the filter and maintain the ridges in proper position against the force of the dirt-laden air as it travels in the direction indicated by the arrows in Figures 1 and 3. The filter 47 is clamped at its marginal edge between the flanges 42 and 63 of the brackets 41 and 64, respectively, when the cover 17 is locked in position. An air-tight seal is provided adjacent the marginal edge of the filter by means of a rubber 65 supported in the bracket 64 and engages the flange 42 when the cover 17 is locked in position.

A compartment 68 is formed in the casing by the partition 25, the casing side walls 12, rear wall 13 and bottom wall 11. A vertically arranged motor in the compartment 68 has its housing 69 provided with a flange 70 which is removably supported on a bracket 71 mounted on the casing 10 and partition 25. Mounted above the motor on the armature shaft is a dual-stage suction creating fan 72 enclosed in a fan housing 73 supported by screws 74 on the motor housing 69. An annular bracket 75 positions the fan housing 73 in the compartment 68 and provides an air tight seal between the upper end of the fan housing 73 and the adjacent walls of the compartment 68. The fan housing 73 has a fan eye 76 which communicates through a passageway 77 with an elongated opening 78 in the partition 40, the passageway 77 being formed by the partition 40, cover 17 and the fan housing 73. Annularly arranged in the fan housing 73 are air outlet ports 79 which exhaust air into the compartment 68 and thence to inlet ports 80 in the motor housing 69 from which the air is exhausted through ports 81 to thus cool the motor. The filtered air discharged by the fan passes through an opening 83 connected to an exhaust conduit 22 mounted on the casing rear wall 13, and an arcuate wall 84 guides the air to the opening 83. A hose 85, only partially shown, may be connected to the conduit 82 when it is desired to clean surfaces by blowing air as will be understood by those experienced in the art.

In operation, assume the casing cover 17 is closed and the motor and fan operating. The suction caused by the rotating fan draws dirt-laden air from the surface being cleaned through the cleaning tool 38, hose 37 into the compartment 26 and the dirt-laden air strikes the surface of the filter 47 exposed to the dirt receptacle 15. The filter 47 removes the dirt and dust from the air and the dirt particles drop into the receptacle 15 as indicated at 85. Heavy particles of dirt may drop directly into the receptacle 15 without striking the filter 47 due to the enlarged area of the compartment 26 relative to the hose 37. The filtered air passes through the air passageway 86 disposed between the cover 17 and

the filter 47 and thence through the elongated opening 78 to the eye 76 of the fan chamber, and the air is expelled into the chamber 63 and thence through the ports 30 and 31 to ventilate the motor, and all of the air is exhausted through the air conduit 82. During the cleaning operation, the filter supporting rods 43 maintain the ridges 48 in the filter 47 against the force of the air stream, and the force of the latter maintains the depressions 49 in the filter.

In order to clean the dirt receptacle the latch arm 32 is rotated and the receptacle removed by pulling on the inlet conduit 35. When it is desired to remove the filter 47, the latch 19 is unlocked and the cover 17 raised to the dotted line position shown in Figure 1, and the filter is removed from the flat flanged surface 63 of the bracket 64. To replace the filter, the marginal edge of the latter is arranged on the flat flange 63 with the filter ridges 48 projecting into the compartment 26, and thereafter the cover 17 is closed whereby the rods 43 enter the ridges 48 of the filter. When the latch 19 is locked, the marginal edge of the filter is clamped in one plane between the two flat flanges 42 and 63 of the brackets 41 and 64, respectively, and the rubber 65 provides an air seal between the cover 17 and the lower part of the casing.

I claim:

30 1. A suction cleaner comprising a casing, a movable cover for said casing, a filter having elongated corrugations including alternate ridges and depressions each terminating at their opposite ends in one plane at the marginal edge of said filter, cooperating means on said cover and casing each in one plane, closing said cover clamping said marginal edge of said filter in one plane, and a filter supporting frame mounted in said cover and movable therewith, closing said cover positioning said frame only in the said ridges of said filter to support said ridges against the force of said air stream and said depressions unsupported.

45 2. In a suction cleaner, a casing having an opening, a filter closing said opening, said filter having elongated corrugations including alternate ridges and depressions each terminating at their opposite ends in the same plane, means on which the marginal edge of said filter rests to close said opening, and a filter supporting frame movably mounted on said casing and movable into operative position to arrange said frame in said ridges of said filter but leaving said depressions unsupported, said marginal edge of said filter being the sole support of said ridges and depressions when said supporting frame is moved to inoperative position.

60 3. In a suction cleaner, a casing having an opening, a filter removably closing said opening, said filter having elongated corrugations including alternate ridges and depressions each terminating at their opposite ends in the same plane, means for supporting the marginal edge of said filter to close said opening, a cover pivotally mounted on said casing, a filter supporting frame carried by said cover and arranged with respect to said filter to support said ridges of said filter but leaving said depressions unsupported when said cover is in closed position, said cover movable to open position to remove said frame from said filter whereby said depressions and ridges are unsupported for removal of said filter from said marginal filter supporting means.

EDWARD R. SWANN.