

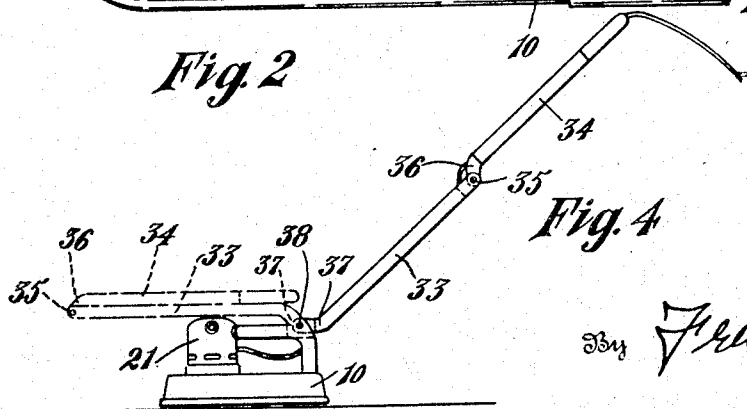
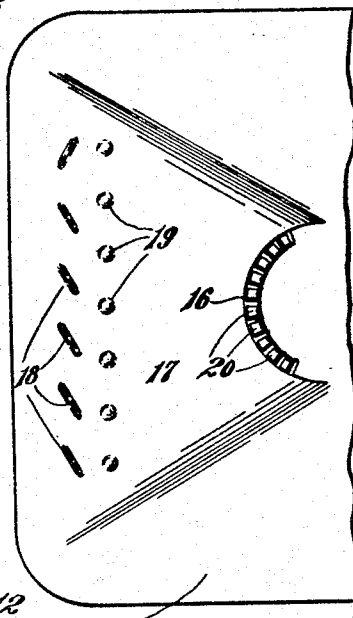
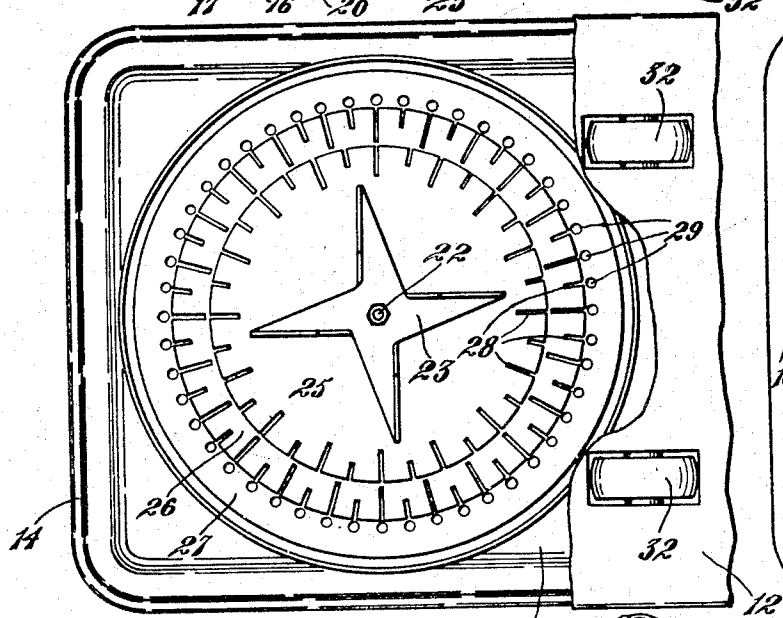
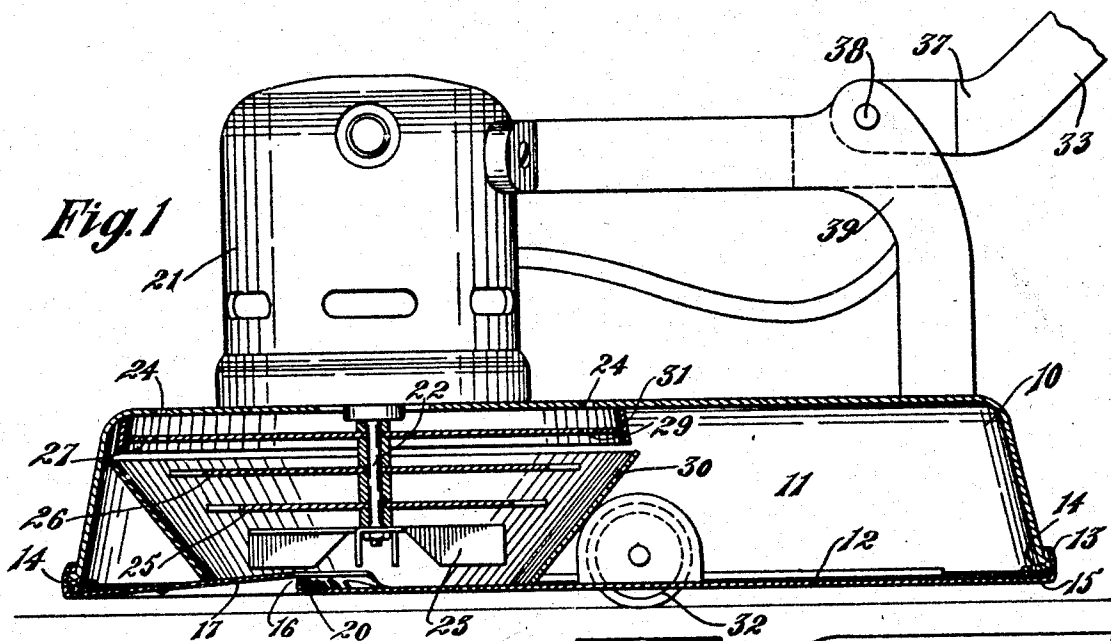
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VACUUM CLEANER

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VACUUM CLEANER

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7 Claims. (Cl. 183-77)

The invention relates to vacuum cleaners and more particularly to the type of cleaner which does not include a dust collector bag.

It is desirable that vacuum cleaners be so constructed that the dust and dirt be completely separated from the air without creating an undesirable back pressure upon the air. For this reason it is common practice to make the usual dust collector bag many times larger than would be necessary to accommodate the volume of dust and dirt delivered thereto.

The object of the present invention is the provision of a vacuum cleaner which entirely eliminates the usual cumbersome dust collector bag and provides a compact and efficient dust separator, so that the dust receiving compartment or receptacle required for use therewith may be only of sufficient size to accommodate the dust and dirt removed from the air.

Another object is to provide a vacuum cleaner having a casing provided with a nozzle or intake opening and housing a fan located adjacent to said opening and one or more rotatable disks perforated at or near the periphery and adapted to centrifugally separate the dust from the air stream, air outlet openings being provided in the casing beyond said disk or disks, and a dust receiving compartment being located adjacent to the separator.

A further object is to provide the disks in a series of successively increasing diameters from the fan to the air outlet openings, and to surround the fan and disks with an inverted conical wall over the top of which the separated dust and dirt is discharged by centrifugal force into the dust collector chamber.

A still further object of the invention is to provide a folding handle for manipulating the cleaner so that the cleaner will occupy a minimum of space when not in use.

The above objects together with others which will be apparent from the drawing and following description, may be attained by constructing the improved vacuum cleaner in the manner illustrated in the accompanying drawing, in which

Figure 1 is a vertical, longitudinal sectional view through a vacuum cleaner constructed in accordance with the invention;

Fig. 2, a fragmentary bottom plan view of the cleaner with parts broken away for the purpose of illustration;

Fig. 3, a fragmentary bottom plan view showing the nozzle or air intake opening; and

Fig. 4, a small side elevation of the cleaner.

Similar numerals refer to similar parts throughout the several views.

In the embodiment of the invention illustrated in the drawing and described herein, the improved vacuum cleaner may include the casing 10 of rectangular shape and preferably elongated so as to house the separator mechanism in its forward portion while the rear portion of the casing forms a dust collector chamber 11.

This casing may be in the general form of an inverted pan having its lower, open side normally closed by the removable bottom wall 12, the upturned rim flange 13 of which may be shaped to have a snap fit over the rim bead 14 of the casing, whereby the bottom wall is quickly and easily removable to permit the dust to be emptied from the chamber 11.

For the purpose of forming a tight joint at this point, to prevent dust from escaping from the chamber 11, a gasket 15, of felt or the like may be located around the edge portions of the bottom wall for contact with the bead 14 of the casing.

The nozzle, or air inlet opening 16 is formed in the bottom wall 12 of the casing, near the front end thereof, and may be substantially semi-circular in shape, as best shown in Fig. 3. The forward side of this opening may be raised above the plane of the bottom wall 12, as shown in Fig. 1, and a substantially triangular portion of the bottom wall may be inclined upwardly and rearwardly toward the opening as indicated at 17.

At the forward end of this inclined, triangular portion of the bottom wall may be provided a plurality of projections in the form of a row of angularly disposed ribs 18 and a row of round projections 19, adapted to agitate the nap of the carpet or other objective surface over which the cleaner is operated.

To further assist in agitating the surface and opening up the nap of the carpet, the half-round nozzle opening 16 may be provided with a plurality of angular teeth 20.

As best shown in Figure 1 it will be seen that the rear edge of the opening 16 is adapted to substantially contact the surface of the carpet, the teeth 20 being upwardly disposed toward the forward edge of said opening which is located at the rear extremity of the inclined portion 17 of the bottom and slightly above the toothed edge of the opening. In actual practice the carpet will be drawn up by the air suction against the teeth 20 and toward the forward edge of the opening 16.

The motor 21 is mounted upon the top of the forward portion of the casing 10 in upright position and the vertically disposed shaft 22 thereof

is extended downwardly into the casing and provided with the impeller fan 23 at its lower end located directly above the nozzle opening 16 in the bottom wall of the casing.

One or more air outlet openings 24 are provided in the top wall of the casing 10 surrounding the motor 21 so that the air drawn through the nozzle opening 16 and into the casing is exhausted to the atmosphere through these openings.

For the purpose of centrifugally separating the dust and dirt from the air before the air is exhausted through the outlet openings 24 one or more disks having perforations at or near their peripheries are fixed upon the motor shaft 22 above the fan 23.

In actual practice the best results have been obtained by providing three disks as indicated at 25, 26, and 27 in the drawing, these disks increasing in diameter from the bottom to the top of the shaft and preferably the two lower disks 25 and 26 are provided with radial slots 28 at their peripheries while the upper disk 27 is provided with apertures 29 located near its periphery.

An inverted conical partition wall 30 is preferably located around the fan and disks extending from the bottom wall to a point spaced from the top of the casing so that the dust and dirt centrifugally separated from the air by the disks is discharged over the top of this partition wall and into the dust compartment 11.

A depending peripheral wall 31 preferably extends downwardly from the top wall of the casing to a point just below the upper disk 27.

One or more casters 32 may be mounted in the bottom wall 12 preferably at or near the center of the same in order to assist in moving the cleaner to and fro upon the objective surface.

The handle for manipulating the cleaner may be formed in two sections indicated at 33 and 34 pivotally connected together at 35, the upper section 34 having a curved lower end 36 at the pivotal point and the lower section 33 having a curved lower end 37 which is pivoted as at 38 to the angular bracket 39 which may be connected to the top wall of the casing and to the housing of the motor.

With this construction, when the cleaner is not in use the handle may be folded to the position shown in broken lines in Fig. 4 so that the cleaner will occupy a minimum of storage space.

I claim:

1. A dust separator including a casing having an air inlet opening in its lower side and an air outlet opening in its upper side, a vertical, rotary shaft in the casing, a fan fixed upon the lower end of the shaft adjacent to the inlet opening, and a disk fixed upon the shaft above the fan and having openings adjacent its periphery.

2. A dust separator including a casing having an air inlet opening in its lower side and an air outlet opening in its upper side, a vertical, rotary shaft in the casing, a fan fixed upon the lower end of the shaft adjacent to the inlet opening,

and a plurality of spaced disks fixed upon the shaft above the fan and provided with openings adjacent their peripheries, said disks increasing in diameter from the bottom to the top of the shaft.

3. A dust separator including a casing having an air inlet opening in its lower side and an air outlet opening in its upper side, a vertical, rotary shaft in the casing, a fan fixed upon the lower end of the shaft adjacent to the inlet opening, and a plurality of spaced disks fixed upon the shaft above the fan and increasing in diameter from the bottom to the top of the shaft, the lower disks having radial slots at their peripheries, and the top disk having apertures near its periphery.

4. A dust separator including a casing having an air inlet opening in its lower side and an air outlet opening in its upper side, a vertical, rotary shaft in the casing, a fan fixed upon the lower end of the shaft adjacent to the inlet opening, a disk of larger diameter than the fan fixed upon the shaft above the fan and having openings adjacent its periphery, and a conical partition wall surrounding the fan and disk, and extending from the bottom of the casing to a point spaced from the top of the casing.

5. A dust separator including a casing having an air inlet opening in its lower side and an air outlet opening in its upper side, a vertical, rotary shaft in the casing, a fan fixed upon the lower end of the shaft adjacent to the inlet opening, a plurality of spaced disks fixed upon the shaft above the fan and provided with openings adjacent their peripheries, said disks increasing in diameter from the bottom to the top of the shaft, and a conical partition wall surrounding the fan and disks and extending from the bottom of the casing to a point spaced from the top of the casing.

6. A dust separator including a casing having an air inlet opening in its lower side and an air outlet opening in its upper side, a vertical, rotary shaft in the casing, a fan fixed upon the lower end of the shaft adjacent to the inlet opening, a plurality of spaced disks fixed upon the shaft above the fan and provided with openings adjacent their peripheries, said disks increasing in diameter from the bottom to the top of the shaft, a conical partition wall surrounding the fan and disks and extending from the bottom of the casing to a point spaced from the top of the casing, and a depending annular wall extending downward from the top of the casing to a point below the top disk.

7. A dust separator including a casing having an air inlet opening in its lower side and an air outlet opening in its upper side, a vertical, rotary shaft in the casing, a fan fixed upon the lower end of the shaft adjacent to the inlet opening, and a plurality of spaced disks fixed upon the shaft above the fan and provided with openings adjacent their peripheries.

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