Feb. 19, 1929. 1,702,424

C. AALBORG

VACUUM CLEANER

Filed June 13, 1924 2 Sheets-Sheet 1

Fig. 1.

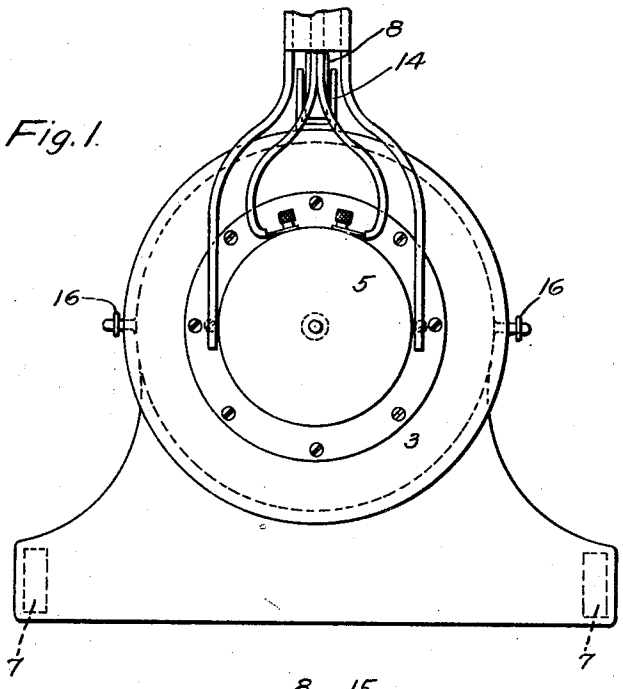
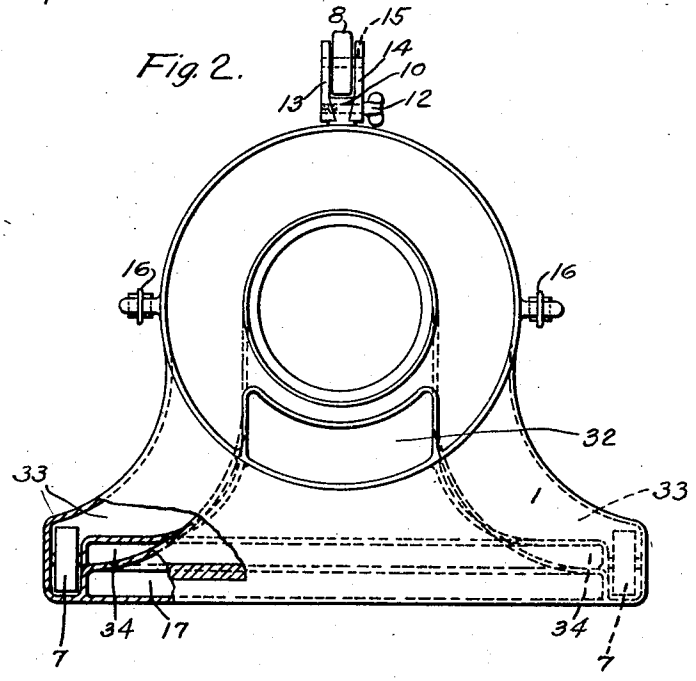


Fig. 2.



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Fig. 3.

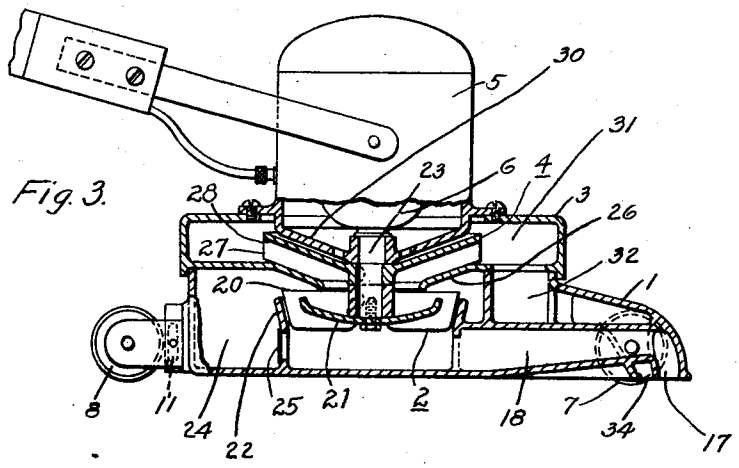


Fig. 4.

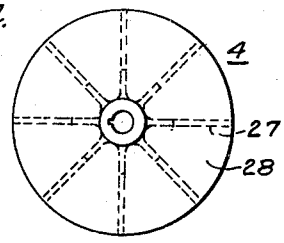


Fig. 6.

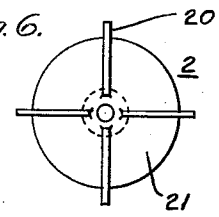


Fig. 5.

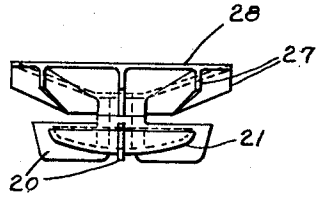


Fig. 7.

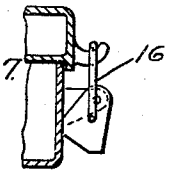
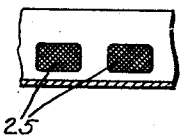


Fig. 8.



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UNITED STATES PATENT OFFICE.

CHRISTIAN AALBORG, OF PITTSBURGH, PENNSYLVANIA.

VACUUM CLEANER.

Application filed June 13, 1924. Serial No. 719,704.

My invention relates to vacuum cleaners and has special relation to vacuum cleaners of the so-called bagless type.

An object of my invention is to provide a vacuum cleaner with a dust separator for air and an air impeller, both operated by a motor.

Another object of my invention is to provide a vacuum cleaner having a centrifugal separator with a stationary container for receiving dust from said separator.

A further object of my invention is to provide a portable vacuum cleaner with an apparatus for imparting rotary movement to the air and advancing it in a throat of increasing cross-sectional area for separating dust therefrom.

A still further object of my invention is to provide a centrifugal cleaning device wherein air which has been subjected to the cleaning action of a separator, is returned to separator for a more thorough cleaning.

A still further object of my invention is to provide a vacuum cleaner in which the air, acting upon an object to be cleaned, travels in substantially a closed path to and from a centrifugal separator.

Reference may be had to the accompanying drawings in which

Figure 1 is a plan view of a vacuum cleaner embodying my invention, parts being broken away.

Fig. 2 is a plan view similar to Fig. 1, the upper hood portion being removed and other parts being broken away to disclose the nozzle structure.

Fig. 3 is a view, partly in vertical section and partly in side elevation, of the cleaner.

Fig. 4 is a detail view, in plan, of an impeller.

Fig. 5 is an elevational view showing the impeller and the separator together.

Fig. 6 is a bottom plan view of a separator.

Fig. 7 is a detail view of a clip, and

Fig. 8 is a detail view of a filter.

The vacuum-cleaner casing comprises a lower hood portion 1 in which a separator 2 is disposed, an upper hood portion 3 in which an impeller 4 is disposed and a housing 5 for a motor 6.

The lower hood portion 1 is supported at the front by rollers 7 and at the rear by a roller 8.

For securing the roller 8 to the lower hood portion 1, a lug 10 is formed on the lower hood portion having therein a slot 11 through which is directed a screw 12 which is screwed at one end to a clamp 13. The head of the screw is adapted to be brought into contact with a second clamp 14 for tightening of the clamps on the lug 10. A pin 15, extending from one of the clamps to the other, supports the roller 8 for rotation. Adjustment upwardly or downwardly of the roller 8 may be effected in an obvious manner.

The lower hood portion 1 is secured to the upper hood portion 3 by means of releasable clips 16.

An air intake nozzle 17 is provided at the front of the lower hood portion 1 and communicates with the interior thereof by means of an air intake passage 18 which extends inwardly and below the separator 2.

The separator 2 comprises blades 20 and a baffle 21, the outer portion of which is directed upwardly. A trunco conical guide 22 is secured to the lower hood portion 1, tapering inwardly in a downward direction, the blades 20 of the separator 2 conforming to the shape of the guide 22. The separator is keyed to a motor shaft 23.

Exteriorly of the guide 22, a dust chamber 24 is provided. A pair of filters 25 are disposed between the dust chamber 24 and the air intake passage 18.

Above the separator 2 is an inverted trunco conical deflector 26 carried by the upper hood portion 3.

The impeller 4 is keyed to the motor shaft 23 and is in nesting relation to the deflector 26 and has downwardly disposed blades 27 conforming, and adjacent, to the surface of the deflector 26. The blades 27 are rigid with an inverted conical impeller portion 28 in which a motor end bell 30 is nested. An air discharge passage 31 in the upper hood portion 3 surrounds the impeller 4 and extends forwardly therefrom, communicating with a similar passage 32 of the lower hood portion 1, which is substantially a continuation of the passage 31. The passage 32 extends forwardly and is divided, at the front of the lower hood portion 1, into two passages 33 which are substantially continuations of the passage 32 and terminate at a discharge nozzle 34 rearwardly of the air-intake nozzle 17.

In the operation of the device, the action of the impeller 4 is to draw air inwardly through the air-intake nozzle 17 and air-intake passage 18 to the separator 2. The rotation of the impeller causes an outward centrifugal movement of the air. The baffle 21 prevents movement of the air upwardly centrally of the separator 2, but the edges of

the blades 20 act centrally and through their entire length upon the air.

The rotation of the separator 2 develops a centrifugal action and the particles in the air are thrown outwardly against the guide 22, the inclined surface of which operates to direct the particles upwardly and into the dust chamber 24. Some of the air in the dust chamber passes through the screen 25 and is again subjected to the action of the separator 2.

In the action of the separator, the particles do not pass upwardly to the impeller 4, as the deflector 26 extends inwardly above the separator and permits only the clean air to pass upwardly. The particles striking the upper and outer portion of the deflector 26 are guided downwardly into the dust chamber.

Obviously, the air admitted to the impeller 4 is rendered cleaner by the action of the filters 25 than it would be if no filters were provided, for the reason that air passing from the dust chamber 24 into the air intake passage 18 reduces the concentration of dust in the air, a factor which obviously makes for the withdrawal from this air of a relatively greater portion of cleaned air.

From the impeller 4, the cleaned air passes outwardly through the discharge chambers 31, 32 and 33 and is discharged through the nozzle 34, whence it is sucked in through the air intake nozzle 17 in a manner described in my copending application, Serial No. 652,684, filed July 20, 1923.

It is apparent that the nesting relationship of deflector 26, impeller 4 and motor end bell 30 makes for compactness, saves room and makes possible a low and small vacuum cleaner. At the same time, the shape of the deflector 26 and the shape of the impeller 4 enhance the efficiency of the device.

The arrangement of the intake passage 18, the separator 2, the impeller 4 and the discharge passages 31, 32 and 33 makes for compactness yet provide for the discharge of air adjacent to the intake nozzle 17.

The invention is not limited to the details of construction and operation and the specific embodiment illustrated and described may be widely modified without departing from the invention. For instance, the separator 2 has general application and is not limited to a portable vacuum cleaner. A substantial range of equivalents is contemplated within the spirit of the invention and the scope of the appended claim.

I claim as my invention:

In a portable domestic vacuum cleaner, in combination, a rotatable vertical shaft, an impeller mounted on said shaft at its upper end, a separator mounted on said shaft at its lower end and embodying an upwardly curved radial baffle plate, a dust container surrounding the separator, a stationary substantially cylindrical guide peripherally surrounding the separator for guiding dust particles into the container, and a stationary deflector, of substantially inverted truncoconical shape, located between the separator and the impeller for preventing dust particles moving out of the container.

In testimony whereof, I have hereunto subscribed my name this 6th day of June, 1924.

CHRISTIAN AALBORG.