Jan. 14, 1941. S. F. CRABB 2,228,919

VACUUM CLEANER

Filed Feb. 8, 1939 2 Sheets-Sheet 1

Fig. 1.

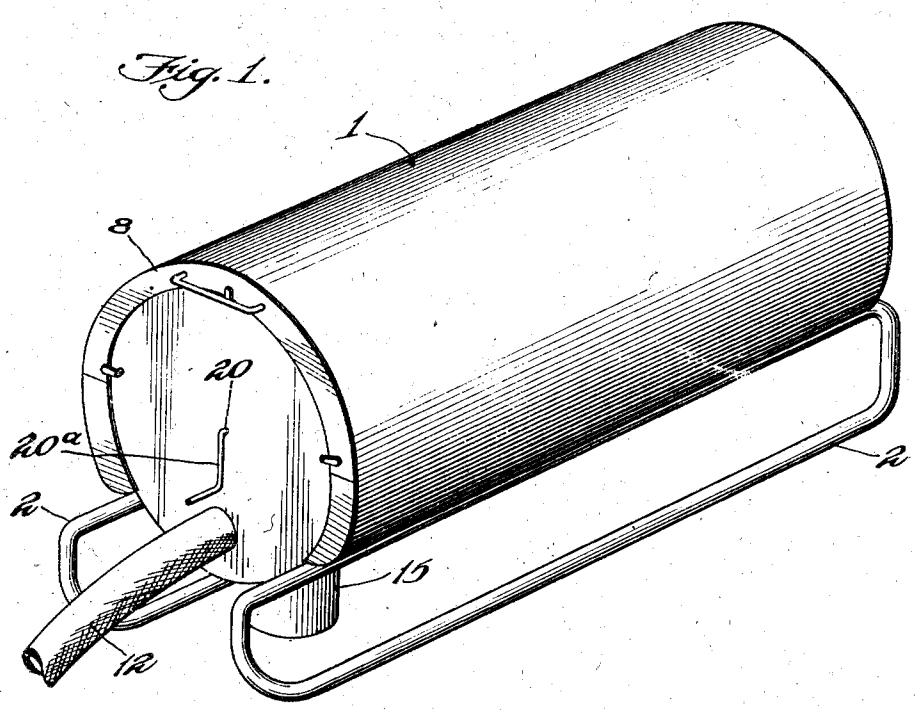
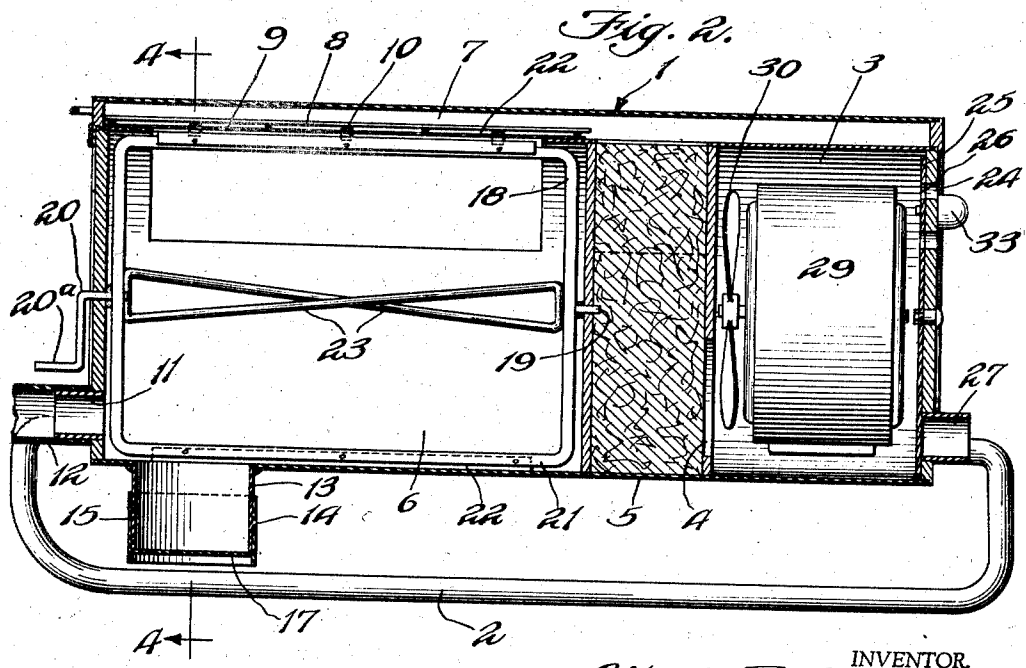


Fig. 2.



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Fig. 3.

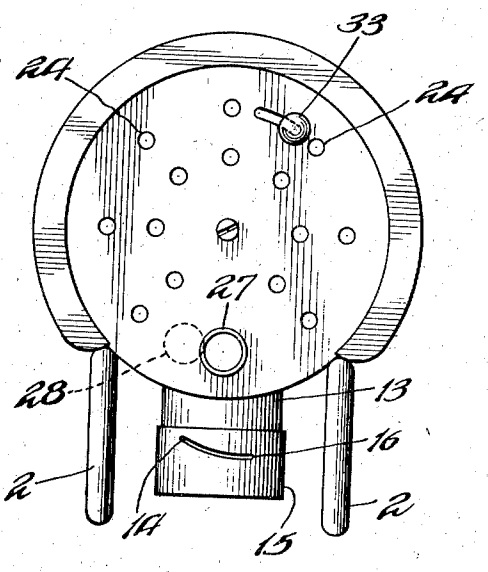


Fig. 4.

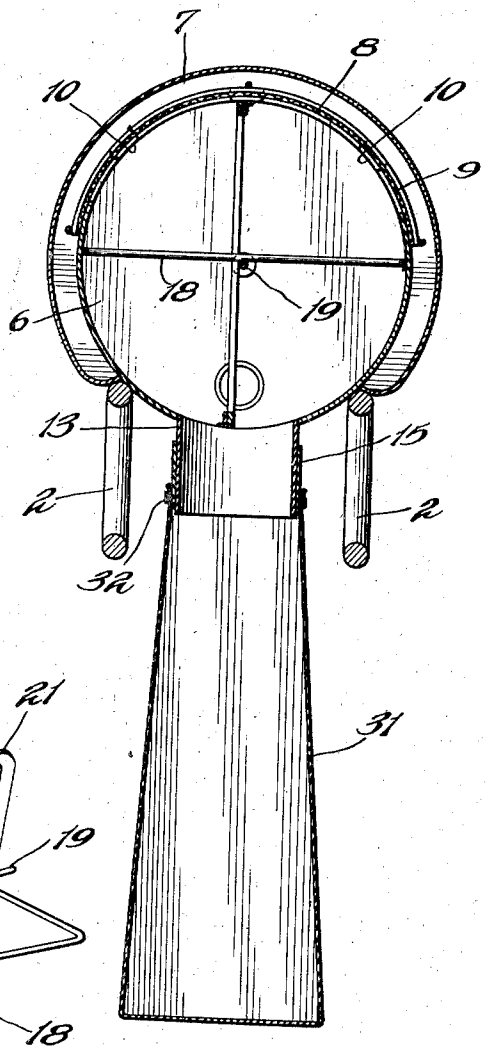


Fig. 5.

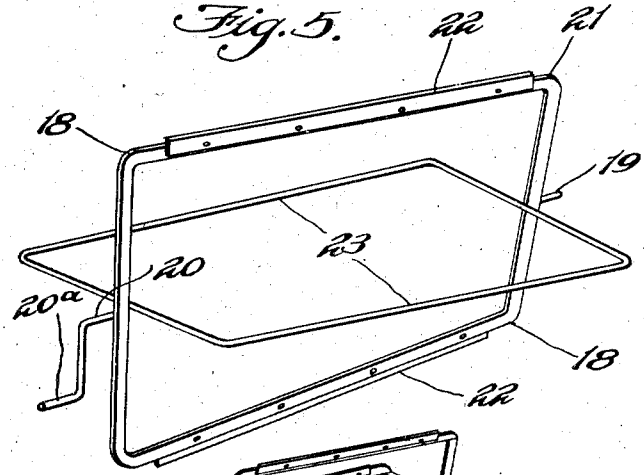
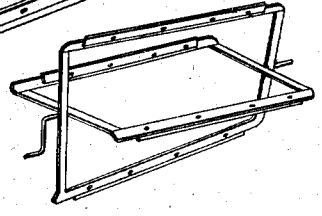


Fig. 6.



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UNITED STATES PATENT OFFICE

2,228,919

VACUUM CLEANER

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Application February 8, 1939, Serial No. 255,235

4 Claims. (Cl. 183—37)

The object of my invention is to provide a bagless vacuum cleaner and also a vacuum cleaner provided with means for removing the dust and accumulated dirt therefrom without exposing to the atmosphere and without possibility of spilling the same, and for concomitantly cleaning and renovating the dust filter therein.

One of the outstanding objections to the present day vacuum cleaners is the noise generated therefrom resulting from expelling the strong blast of air necessary in their operation. I have found that by breaking up this blast of air into a multiplicity of small streams in the fan chamber as by providing a large number of small apertures or outlet ports for the expulsion of the air instead of the large opening now in use on vacuum cleaners, it is possible to so quiet such a cleaner that the noise is barely noticeable and not in the least objectionable.

Another objection to the vacuum cleaners now on the market is the difficulty experienced in removing the dirt therefrom. It is customary to provide a large fabric bag attached to the cleaner for the storing of this dirt which bag is detachable and is intended to be emptied from time to time. This emptying process is not only laborious but usually results in an escape of a considerable amount of dirt from the bag. My invention comprehends a device in the interior of which the dirt and dust is accumulated and having a means for connecting this compartment to a disposable bag, such as of paper or the like, and also having means for propelling the dirt from the compartment into the paper bag.

Important objects of the invention are to provide a novel disposable closure or valve for the outlet port, means for disposing of this closure into the disposable bag while attached to the collar around this port and the means for attaching the bag to the collar whereby to eliminate any possibility of escape of the accumulated dust and dirt during its removal.

It is a further object of my invention to provide a bagless vacuum cleaner so arranged and combined that the accumulated dirt may be readily dislodged and conveyed to a dirt discharge port. It is a further object of my invention to provide means whereby the accumulated dirt when desired may be discharged directly from the machine into a disposal receptacle without manually handling the dirt and without exposing it to the atmosphere. A further object is to provide means in my machine for deodorizing the air before discharging the air from the machine.

Further objects are to provide a construction of maximum simplicity, efficiency, economy and ease of assembly and operation, and such further objects, advantages and capabilities as will later more fully appear and are inherently possessed thereby.

The invention further resides in the construction, combination and arrangements of parts illustrated in the accompanying drawings, and while I have shown therein a preferred embodiment, it is to be understood that the same is susceptible of modification and change, and comprehends other details, arrangements of parts, features and constructions without departing from the spirit of the invention.

In the drawings:

Fig. 1 is a view in perspective of a bagless vacuum cleaner embodying one form of my invention;

Fig. 2 is a side view in horizontal cross section thereof;

Fig. 3 is an end view of the rear of this embodiment;

Fig. 4 is a vertical sectional view taken on the line 4—4 of Fig. 2, showing the removable bag attached to the cleaner;

Fig. 5 is a perspective view of the dirt expelling and filter renovating device;

Fig. 6 is a perspective view of an alternate form of dirt expelling and filter renovating device.

In the particular embodiment shown, my new and novel bagless vacuum cleaner comprises an outer longitudinally extending casing 1 substantially circular in cross section, and which is mounted on any suitable means such as runners 2 for supporting and making the device easily movable. At the rearward end is compartment 3 containing the motor and fan or blower. This compartment is provided with means (not shown) for connecting the motor with a suitable source of electric current. The inner wall of the compartment 3 is provided with an opening 4 leading into adjoining compartment 5 which is provided with a suitable substance for deodorizing the air and for removing objectionable odors therefrom before the air is discharged into the room.

Adjacent the chamber 5 is a dirt collection chamber 6. The top and sides of chambers 5 and 6 are spaced from the upper and side walls of the casing 1 thus providing communicating chamber 7 between chambers 6 and 5. The upper portion of the chambers 5 and 6 are open, the opening in chamber 6, however, being provided

with removable covering 8 comprising a frame work of metal or other suitable material covered with a filter 9 of cloth or other suitable material in which is embedded a plurality of projecting buttons or the like 10. Suitable locking means are provided for retaining this covering in place, the covering being removable through a slot in the end wall, a handle being provided to facilitate this movement. The chamber 6 extends to the other end of the device and in which is provided an opening fitted with a suitable collar 11 for attachment to the hose 12 at the end of which is provided the usual cleaning nozzle (not shown).

In the lower portion of the dirt compartment 6 is a discharge port through which the accumulations in the chamber 6 are discharged. This port comprises a downwardly extending tubular neck or collar 13 provided with an outwardly projecting pin 14. Surrounding and extending downward from the collar 13 is a tubular sleeve 15. This sleeve is provided with an arcuate slot 16 through which the pin 14 extends. Thus the sleeve is so mounted as to afford when in operation a rotary reciprocatory unidirectional movement through the sleeve. The neck 13 and sleeve 15 are so constructed and arranged that when the sleeve is rotated in one direction it is raised vertically as it rotates, and when rotated in the opposite direction it is lowered as it rotates. When the sleeve has reached its limit of movement in one direction, a pin 14 is at one extremity of the slot and the outer edges of the neck and sleeve will be in substantially the same plane. When the sleeve is rotated in the opposite direction, and the pin is at the opposite end of the slot, the sleeve then extends substantially below the lower edge of the neck. When in this position, a stopper or valve 17 may be inserted in the sleeve and there retained either frictionally or by the suction of the machine against the outer edge of the neck 13, this outer edge at that time forming a shoulder against which the stopper rests. This stopper or valve 17 is preferably formed of paper or other suitable inexpensive material, and when positioned in the sleeve as before described, provides a closure for the dirt discharge opening.

Rotatably mounted in the dirt collecting chamber 6 is a combined rotary scraper, beater and conveyor 18. This combined scraper, beater and conveyor is rotatably mounted at one end by means of the stub shaft 19 in one wall of the chamber 6, and at the opposite end in the forward wall by the shaft 20, which shaft is provided with the crank arm 20a. By means of the crank arm this combined scraper, beater and conveyor is rotated when desired. The combined scraper, beater and conveyor is preferably formed of metal. It comprises a framework in the particular embodiment shown, consisting of two substantially rectangular members at substantially right angles to each other, which provide opposed longitudinal members 21, which members have secured thereto, longitudinal wipers 22 of rubber or other suitable similar material. Opposed longitudinal spaced members 23 preferably of metal and with rounded operating edges are mounted in the framework between the members 21. The members 21 and 23 are arranged at right angles to their axis of rotation in such a manner that the leading ends in the direction of rotation are some distance in advance of the opposite or trailing end, whereby upon rotation of the device in the proper direction, the dirt will be removed from the filter by the wipers 22 and forced or conveyed toward the discharge port of the chamber 6 and discharged through that port. During operation, the longitudinal members 23 beat or strike the buttons 10 in the filter cloth, thus agitating or vibrating the filter to thereby remove the dirt and dust lodged therein for the purpose of cleaning and renovating the filter.

It is understood of course that the filter may itself be readily removed and the cloth or other filtering material replaced from time to time when desired.

The outer end of the motor chamber 3 is provided with a plurality of openings or ports 24. Rotatably mounted in this chamber and adjacent its outer end is a closure device for the openings 24 comprising rotating disk 25 provided with a plurality of openings 26 complementary to and adapted to register with the openings 24. This outer end is also provided with a large opening 27 having a neck for attachment to a hose for a spraying device, not shown. The rotating disk is also provided with opening 28 adapted to register with this opening 27. The openings in the disk and outer end wall are so arranged that when the openings 27 and 28 are in registry the openings 24 in the end wall will be closed by the disk, but when the openings 27 and 28 are not in registry so that the disk closes the opening 27, the openings 24 and 26 are in registry. Hence, when the spraying device is not in use the opening 27 is closed and the air is expelled substantially without noise through the plurality of openings 24 and 26. Handle 33 is provided for moving the disk. It is understood that the pressure of air against the disk will act to force it against the end wall when the fan is in operation to assist in the seal of the port or ports.

The operation of the device is as follows: The motor 29 causes the fan 30 to draw air and dirt through the nozzle and hose 12 into the dirt collecting chamber 6 from where the air passes through the filter 9 into the compartment surrounding this chamber, thence down through the filter chamber 5, through the motor and fan chamber 3 and out through the openings 24 and 26, or 27 and 28. The filter 9 separates the dust from the air and causes the dirt to be deposited in the chamber. The chamber 5 is filled with medicated filtering material for deodorizing the air. By reason of the many openings in the outer end of the fan chamber the noise of the air being expelled from the device is practically eliminated and is unobjectionable in volume.

After the device has been operated and it is desired to empty the dirt chamber, the motor is turned off and a bag, receptacle or other container 31 is attached to the sleeve 15 around the dirt removal opening by means of a suitable bracket 32. The sleeve is then turned in a direction to force it upward until the outer or lower edges of the neck and collar are in the same plane which causes the stopper or valve 17 to be released and drop into the paper bag. The rotor is then turned by means of crank 20 causing the accumulated dirt to be removed from the filter of the dirt chamber 6 and forced out the dirt removal port and into the paper bag. The movement of the rotor causes the rubber blades 22 to sweep the heavier material such as carpet nap, hairs, ravel, etc. adhering to the filter while the metal bars 23 will strike the buttons 10 causing the filter to be agitated and vibrate whereby to remove the fine dust from the interstices thereof. After the rotor has been turned a suitable amount of time substantially all the dirt in the chamber will be emptied into the bag 31 which is then un-

clamped from the neck 15 and disposed of, as desired. The collar is then turned in the opposite direction and a new stopper 17 inserted. This stopper 17 need not be of particularly strong material as the suction caused by the fan will serve to hold it in place. In practice I have found that a cardboard stopper will work satisfactorily.

In Fig. 6 I have shown an alternate form of rotor comprising a skeleton frame the bars of which are provided with rubber wipers extending at a forward angle therefrom. When rotated clockwise the blades will contact the filter cloth to remove the heavier dirt therefrom. When the movement of the rotor is reversed the metal bars will strike the buttons to thereby shake the dust from the interstices of the filter and clean it, the dust settling on the floor of the chamber. The movement of the rotor is again reversed to sweep this dirt out the dirt removal port.

Having thus disclosed the invention, I claim:

1. A vacuum cleaner comprising a fixed casing which forms a fixed dirt collecting chamber, a constricted air discharge port, an air and dirt intake port at one end of said fixed dirt collecting chamber, suction means, an air filter interposed in one side surface of said casing, an outer casing spaced from said filter, and a dirt discharge port in the bottom of said dirt collecting chamber for permitting the gravity discharge of dirt therefrom.

2. A vacuum cleaner comprising a fixed casing which forms a fixed dirt collecting chamber, a constricted air discharge port, an air and dirt intake port at one end of said fixed dirt collecting chamber, suction means, an air filter interposed in one side surface of said casing, an outer casing spaced from said filter, a dirt discharge port in the bottom of said dirt collecting chamber for permitting the gravity discharge of dirt therefrom, and rotary means mounted within said dirt collecting chamber and provided with dirt removing elements for vibrating said filter and successively advancing the collected dirt to the discharge port during the rotation of said means.

3. A vacuum cleaner comprising a casing forming a fixed dirt collecting chamber, a dirt discharge port in the bottom of said chamber for permitting the gravity discharge of dirt therefrom, a temporary valve for said dirt discharge port and manually operated means mounted on said port for releasing said temporary closure and permitting it to be discharged from said port.

4. A vacuum cleaner comprising a casing forming a fixed dirt collecting chamber, a dirt discharge port in the bottom of said chamber for permitting the gravity discharge of dirt therefrom, a temporary valve for said dirt discharge port and manually operated means mounted on said port for releasing said temporary closure from said discharge port, said means comprising a depending circular rotatable member having means adapted to engage and eject said temporary closure when rotated.

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