March 22, 1927. 1,621,596

G. W. MINUTH

VACUUM CLEANER

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Fig. 1.

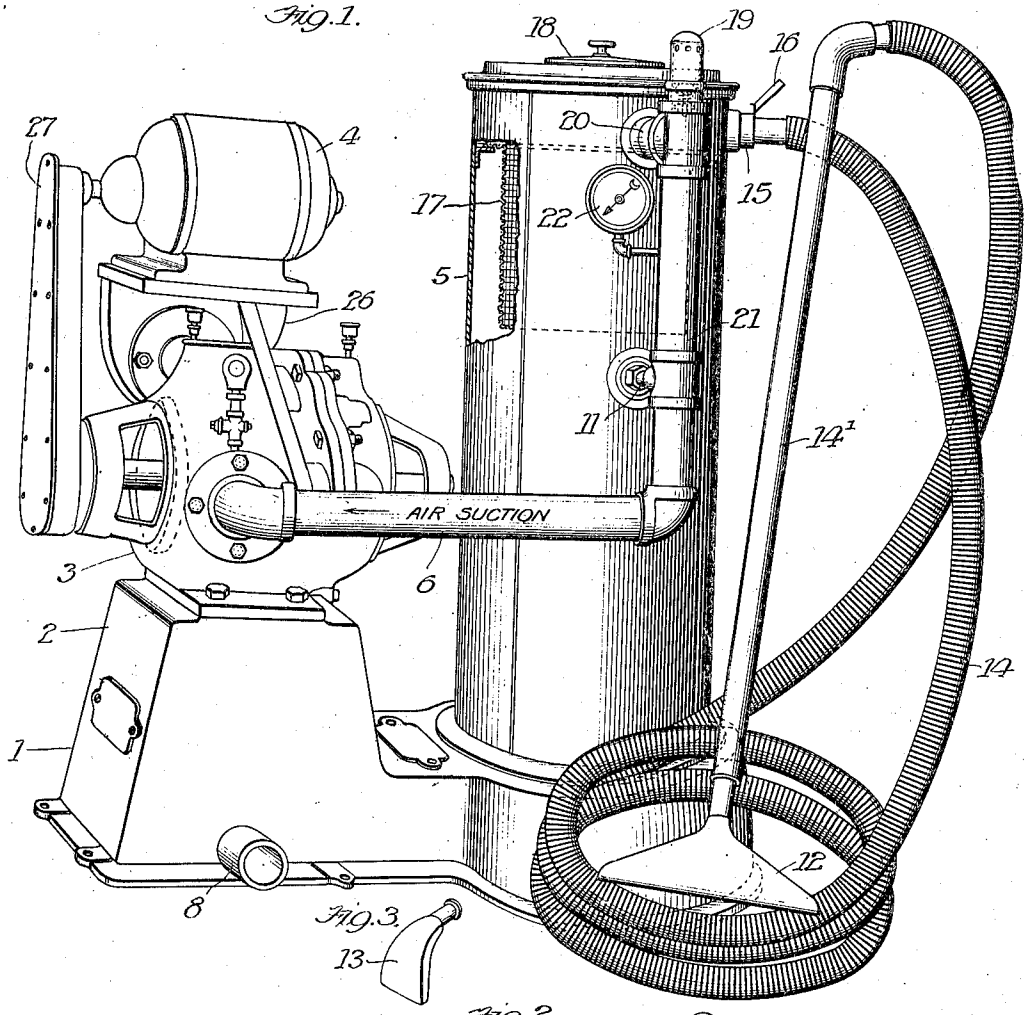
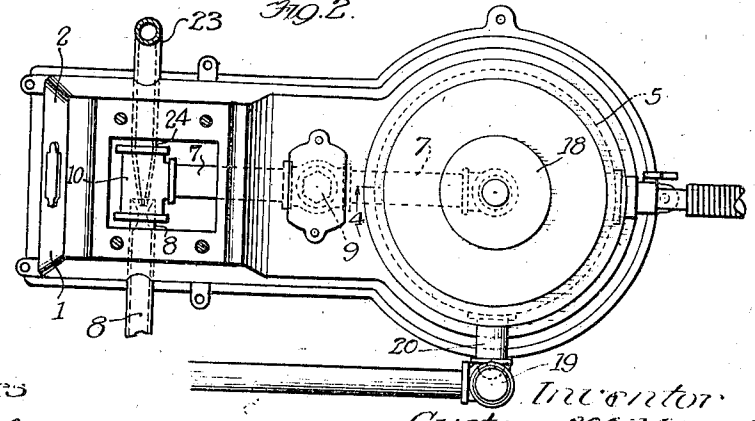


Fig. 3.

Fig. 2.



Witnesses
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Fig. 5.

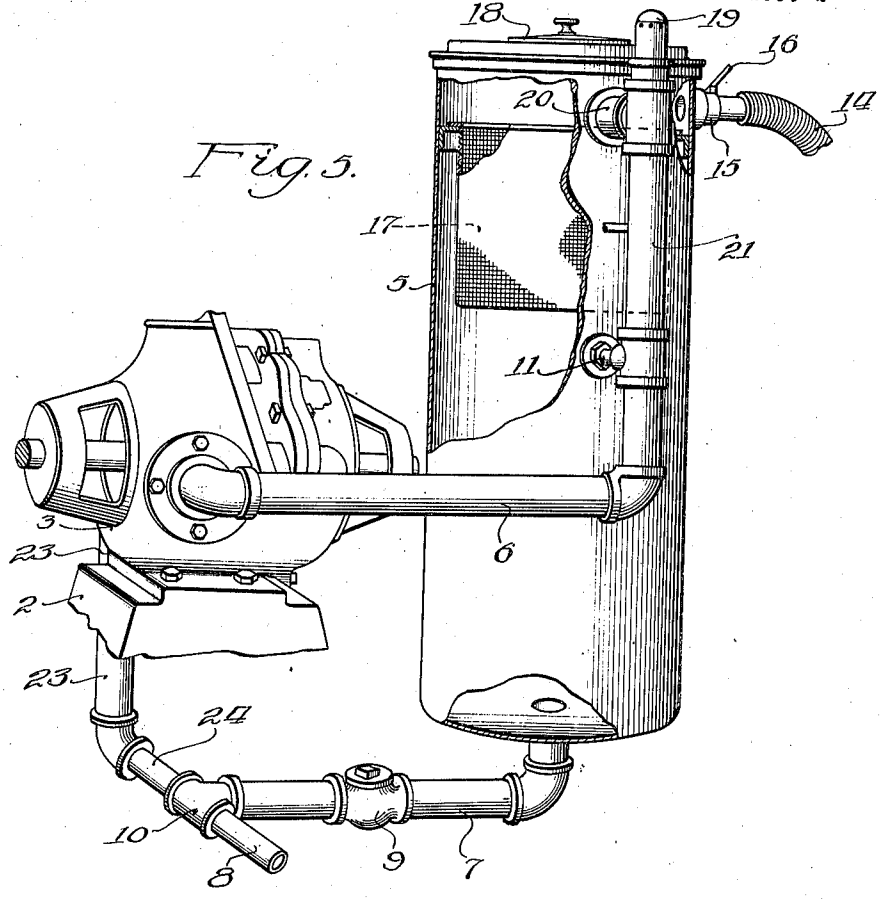


Fig. 6

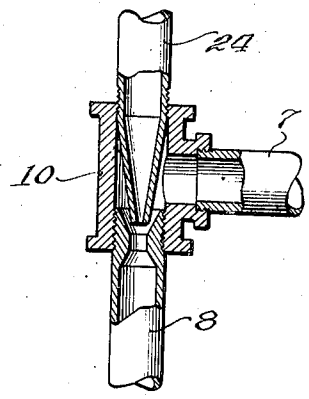
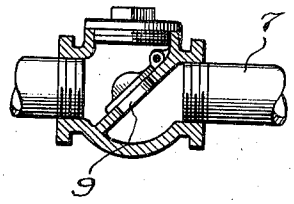


Fig. 4.



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UNITED STATES PATENT OFFICE.

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VACUUM CLEANER.

Application filed April 6, 1925. Serial No. 21,116.

This invention relates to vacuum cleaners of the power operated type adapted for the use of water and suds in cleaning and scrubbing floors, carpets, rugs, upholstered furniture and the like.

The main objects of the invention are to provide an improved form of mechanism of the character referred to, of simpler and more practical construction and better adapted for general use; to provide such a device adapted for compact embodiment and free from the necessity of mounting part of the equipment on an upper floor or in a position materially higher than the work to be operated upon as required by machines dependent on a gravity head of water; to provide such a device of largely automatic self regulating character and adapted for ready manual control to insure effective regulation of the flow and discharge of the water collected; and to provide such a device of simple form adapted for inexpensive manufacture, operation and maintenance.

An illustrative embodiment of this invention is shown in the accompanying drawings, in which:

Figure 1 is a perspective view of a complete machine such as referred to.

Fig. 2 is a plan of the device, the motor being removed to show parts below.

Fig. 3 is a perspective view of a furniture cleaning nozzle.

Fig. 4 is a detail view of the water discharge check valve mechanism.

Fig. 5 is a perspective view of the machine, with the motor removed, the supporting base and parts of the collecting tank being broken away to show more clearly the pipe connections and their relative positions.

Fig. 6 is an enlarged detail partly in section of the ejector mechanism.

In the construction shown in the drawings, the device as a whole is mounted on a substantially unitary base 1 of oblong shape in plan and provided at one end with a pedestal part 2 on which is mounted a pump 3 having a belt connected motor 4 secured thereto, as shown in Figure 1. On the other end of said base is mounted a vacuum tank 5 and separator mechanism provided with an air discharge pipe 6 communicating with said pump. The said tank is also provided with a water outlet passageway 7 extending through the base 1 and communicating by way of pipe 8 with connections, (not shown) which lead to the sewer. The said passageway 7 contains a gravity valve 9 which is normally held closed by its own weight supplemented by suction in the tank. This valve 9 is mounted in an inclined position, as shown by Fig. 4. Connected to said water discharge pipe is an ejector device 10 of the Venturi type adapted to generate discharge suction tending to open said valve 9 against the tank suction and the weight of said valve. The ejector 10 is positioned and arranged to discharge into the waste pipe 8. Said ejector is operated by a blast of air from the pump 3, which is fed from the separator tank 5.

If at any time, or whenever the air jet in the ejector is not sufficient to generate enough suction to keep the water level down to a normal level in tank 5, the water rises until it reaches the small pipe 11 which branches from the air pipe 6, and some of it flows over through pipe 6 with the air to the pump 3 and is forced in a spray with the air through the ejector and so enhances the pulling action thereof to withdraw and discharge water through pipe 7.

By reason of this provision of the water discharge positive control means, through the ejector 10, the vacuum tank may be assembled as a unit on the same base with the motor and pump all on substantially the same level and all in the same room or on the same floor where the work is to be performed, and is not dependent upon having a head of water to control the discharge valve action, as in devices heretofore commonly used.

In using the device, the object to be cleaned, as for instance a carpet on the floor, is first scrubbed with water and soap. Then when ready for the suction device the object is well saturated with suds. In order

to most effectually remove the suds together with the dirt, a suction head or mouthpiece 12 or 13 is secured to the end of a flexible tubular connection 14 including a stiff handle part 14′ leading to the inlet 15 of the tank. The suction head 12 is designed for use on a carpet or floor, and the head 13 is designed for use on upholstered furniture.

The tube 14 is detachably connected to the tank at 15, and when removed the aperture at 15 is closed by the cover 16. The air and accompanying liquid and dirt carried thereby are discharged directly into the basket-like screen member or separator 17, which is suspended in the upper part of the tank 5. Access may be had to this screen or basket member by means of the removable cover 18 on the top of the tank. A pressure relief valve is provided at 19 on the upper end of the air discharge member, whereby outside air may be admitted to the pump in case the suction head becomes clogged, and thus an unnecessary load on the pump and motor is avoided. Said valve is enclosed in a perforated cap, and the valve is mounted to admit air when the suction becomes sufficient to overcome the tension of a spring which normally holds it closed, as will be understood. The air is discharged from the tank 5 through a horizontal outlet 20, leading directly to the vertical tube 21 which communicates at its lower end with the suction pipe 6.

A pressure gage 22 is mounted on the side of the vertical tube 21 and indicates the degree of vacuum in the tank, which owing to the large size of tube 20 is the same as the vacuum in tube 21. From the pump 3 a tube 23 leads downwardly to the lower part of the base 1 where it communicates with the primary side 24 of the ejector 10. The secondary side of the ejector communicates with the discharge tube 8 leading to the sewer.

The motor 4 which is mounted above the pump 3 is carried by a supporting bracket 26, and the connecting belt or chain is enclosed in the protective casing 27.

From the foregoing it will be seen that the air and water, or dirt carrying suds, entering the head 12 or 13, is carried up through the handle 14′ and on through the pipe 14 to the tank inlet 15, where it is discharged into the strainer basket 17. Here the dirt is separated and the water drops to the bottom of the tank while the air is discharged through the outlet 20, pipe 21 and pipe 6. The dirt may be removed from time to time by taking out the strainer 17 through the opening at the top.

Although but one specific embodiment of this invention has been herein shown and described, it will be understood that numerous details of the construction shown may be altered or omitted without departing from the spirit of this invention as defined by the following claims.

I claim:

1. A vacuum cleaner device of the character described comprising in combination a frame member, a power pump mounted on one end thereof having an intake and an outlet, a separator tank mounted on the opposite end of said frame, tubular means attached thereto having a collector at one end adapted to take up moisture and discharge same into said tank, a separator in said tank to remove solid material from the air and liquid drawn in through said tube, an air passageway connected to the upper part of said tank and communicating with the suction inlet of said pump, a water passageway connected to the lower part of said tank and arranged to discharge surplus water therefrom, and a Venturi ejector connected to said pump outlet and arranged to discharge air under pressure into and through the water discharge pipe to cause discharge of the water from said tank.

2. In combination in a vacuum cleaner, a vacuum tank, a separator in said tank to remove solid material from air and liquid, an air pump having a suction inlet and an outlet, a connection from said tank to said pump inlet, a suction cleaner nozzle connected to said tank, an ejector having a nozzle, a discharge pipe connected from the bottom of the tank to the ejector, a check valve in said pipe, and said ejector nozzle connected to said pump outlet.

3. A vacuum cleaner device of the character described comprising a vacuum tank, means to exhaust air therefrom, an intake nozzle and tubular connection through which air and liquid is discharged into said tank, means in said tank to separate solid particles from the air and liquid entering said tank, a liquid outlet in the lower part if said tank, an air actuated ejector operatively connected to said outlet to cause discharge of liquid against atmospheric pressure, the outlet for air being in the upper part of said tank, and an intermediate outlet being provided for the discharge of liquid with said air when the liquid rises to a certain point in said tank whereby the effect of said ejector may be accentuated upon an excessive rise of liquid in said tank.

4. In combination in a vacuum cleaner, a vacuum tank having a suction nozzle, a separator in said tank to remove solid material from air and liquid, an ejector, a pipe connected from the ejector to said tank, a check valve in said pipe, means for drawing air out of the top of the tank and discharging the same through said ejector so as to draw liquid out of the bottom of the tank without losing the vacuum in the tank.

5. In a device of the class described, a

tank, a vacuum cleaner hose connected to the upper end of the tank, a strainer in said tank below the connection of said hose, a vacuum pump having an inlet and an outlet, a connection from the top of the tank to said inlet, a discharge pipe connected into the bottom of the tank, a check valve in said discharge pipe, an ejector connected to said pipe, said ejector also connected to said pump outlet for operation.

Signed at Chicago this 16th day of October, 1924.

GUSTAVE WILLIAM MINUTH.