

J. B. KIRBY.
VACUUM CLEANING MACHINE.
APPLICATION FILED OCT. 30, 1916.

1,265,791.

Patented May 14, 1918.

3 SHEETS—SHEET 1.

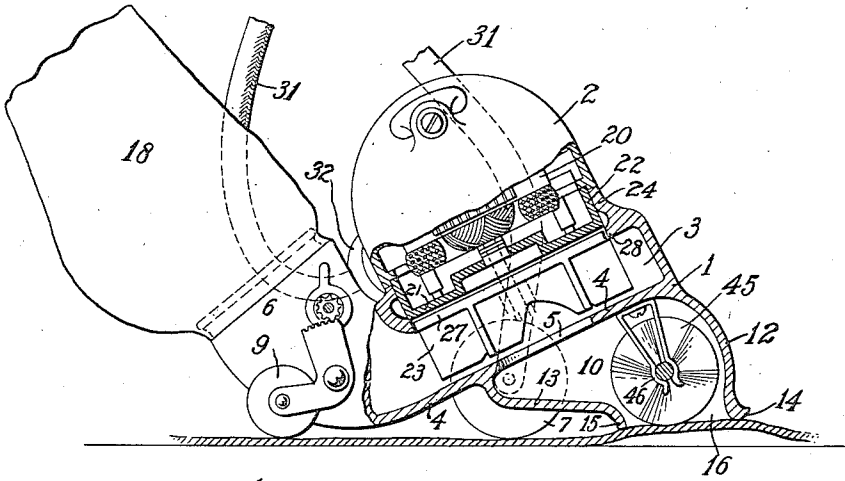


Fig. 1

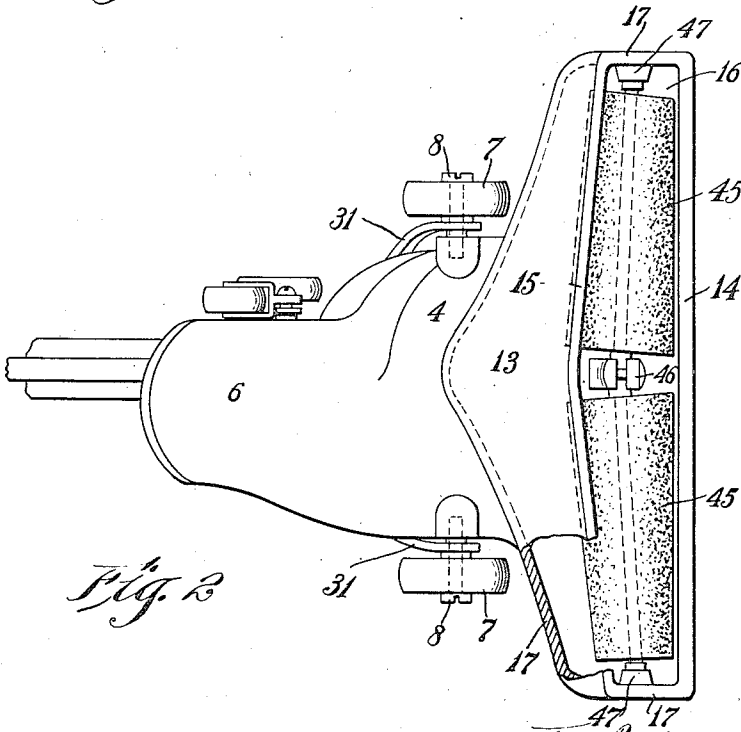


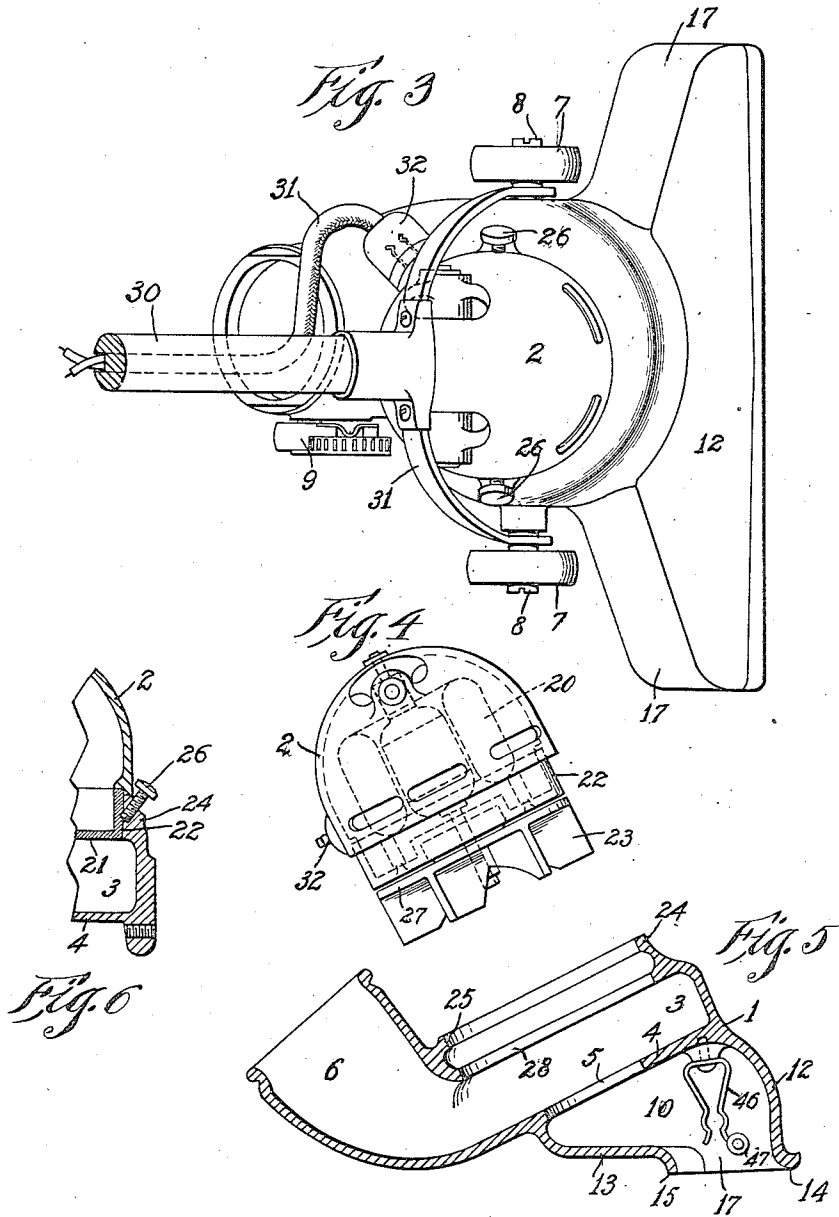
Fig. 2

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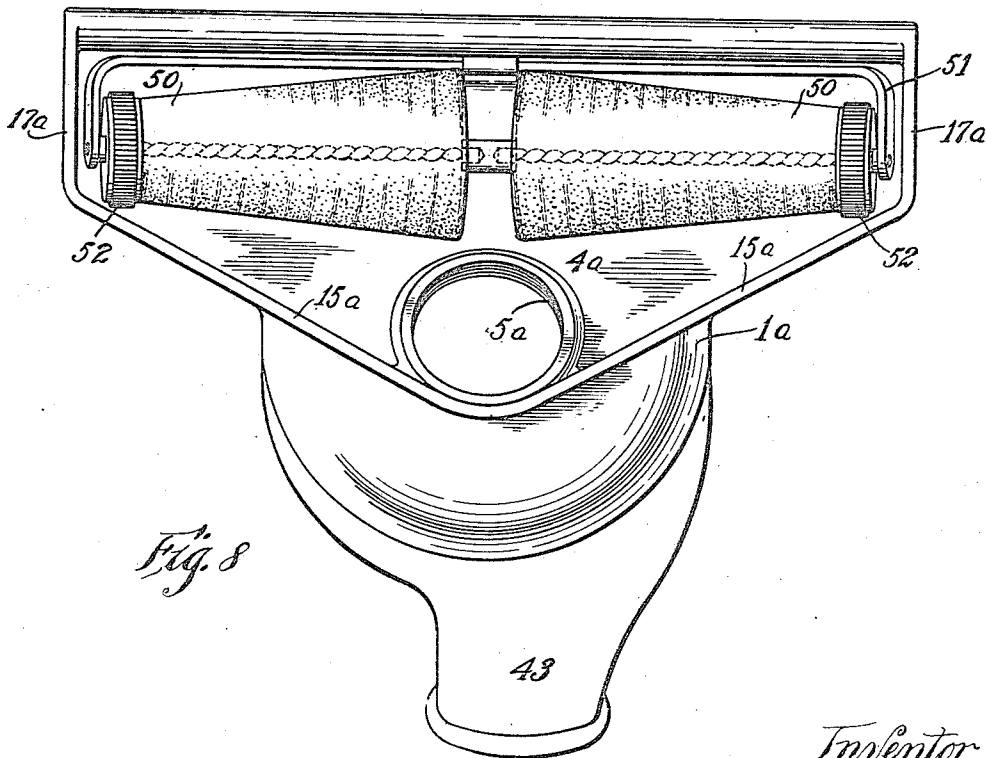
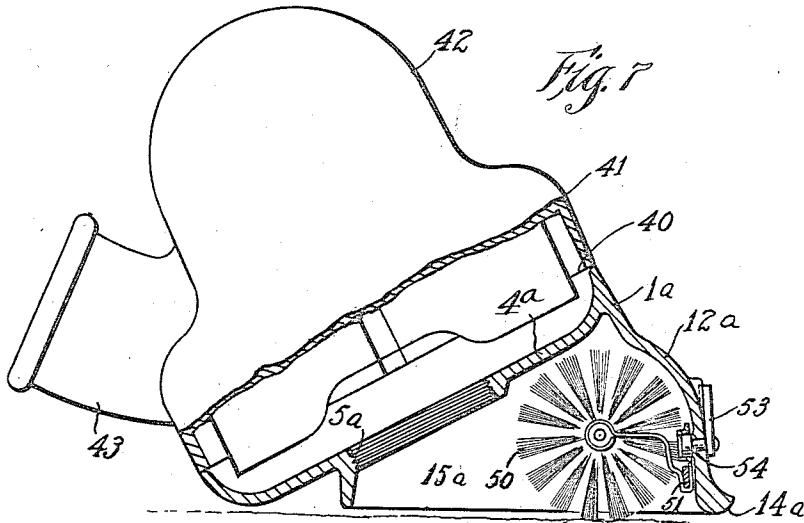


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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

JAMES B. KIRBY, OF CLEVELAND, OHIO.

VACUUM CLEANING-MACHINE.

1,265,791.

Specification of Letters Patent.

Patented May 14, 1918.

Original applications filed April 4, 1913, Serial No. 758,804, and September 15, 1913, Serial No. 789,745.

Divided and this application filed October 30, 1916. Serial No. 128,385.

To all whom it may concern:

Be it known that I, JAMES B. KIRBY, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Vacuum Cleaning-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to suction cleaners and has for its objects the provision of a suction cleaner of minimum height for the size of the various parts; the provision of a device of this character of maximum compactness and simplicity; the provision of a suction cleaner of maximum efficiency for the work in view; the provision of a machine in which the danger of upsetting shall be a minimum; the provision of new expedients for containing and housing the brushing devices, while further objects and advantages of the invention will become apparent as the description proceeds. The present application forms a division of my two earlier applications filed April 4, 1913, Serial No. 758,804, and filed Sept. 15, 1913, Serial No. 789,745.

The type of suction cleaner to which this invention relates is characterized by having a movable casing provided with a floor-engaging working mouth and movable about by means of a suitable handle, the casing containing also a suction fan and a motor to operate the same. Two varieties of this machine are in common use; one wherein the fan chamber is arranged substantially horizontal with the suction mouth projecting from the front and the motor from the rear; and the other wherein the motor is located above the fan chamber, the suction mouth being generally below and sometimes more or less forward of this fan chamber. The location of the fan chamber beneath the motor decreases the height to which it is necessary to raise the refuse by suction, which therefore tends to make this type of device the more efficient, while the location of the suction mouth immediately adjacent to the fan chamber makes for compactness, the only real drawback being the decrease in stability owing to the elevated location of the electric motor which is by far the heaviest part of the machine. The present invention overcomes in large part the instability of this type locating the fan chamber and motor in an inclined position intermediate between

the directly upright type and the directly horizontal type, the rearmost edge of the fan chamber is brought as near to the floor as possible thereby rendering the machine of less height than either of the other types mentioned, while the elevation of the forward edge of the fan chamber affords space for the nozzle and for any brushing mechanism desired; and the location of the discharge neck or bag connection directly at the rear of the chamber affords a direct path from the nozzle through to the bag.

In the drawings accompanying and forming a part of this application, Figure 1 is a longitudinal vertical sectional view through one embodiment of suction cleaner embodying my invention; Fig. 2 is a bottom plan view of the same; Fig. 3 is a top plan view of the same; Fig. 4 represents a side elevation of the power plant element, comprising the motor and fan removed from the cleaner casing; Fig. 5 is a sectional view of the main casing with the walls, brushes, motor and fan removed; Fig. 6 is a detail view showing the means for securing the power plant to the main casing; Fig. 7 is a cross sectional view of a slightly modified form of cleaner showing the upper parts merely in dotted lines; and Fig. 8 is a bottom plan view of the embodiment illustrated in Fig. 7.

Describing the parts by reference characters, 1 represents generally the body and 2 the top section or dome of my improved cleaner. The former contains a substantially cylindrical fan chamber 3 having a flat bottom wall 4 formed with a central circular opening 5 and also having at one side the laterally projecting outlet neck 6. Suitable carrying wheels 7, 7 are journaled upon horizontal axles 8—8 projecting laterally from the body, one at each side thereof at a point forward of its center of gravity, said wheels being so positioned that the outlet neck 6 lies at their rear substantially midway between them as shown in Figs. 2 and 3; and the third roller 9 is journaled to this outlet neck to cooperate with said carrying wheels in supporting the machine. The rearmost portion of the fan chamber casing is supported very near to the floor as shown in Fig. 1 while its forward portion is raised considerably thereabove so as to afford space for the suction nozzle 10 and also for any brushing or agitating implements which are desired to be employed therein.

This nozzle is preferably formed by a forward wall 12 which projects downwardly and forwardly from the wall of the fan chamber at its forward point, said nozzle wall extending laterally in each direction parallel with the wheel pivots 8—8 to a point considerably beyond the same; and by a rearward or lower wall 13 which joins the wall 4 of the fan chamber at a point in the rear of the opening 5 and extends forwardly from that point in a more or less inclined fashion to a point removed from the wall 12 by a distance equal to the width of the inlet mouth desired. The extremities of the walls 12 and 13 form lips 14, 15, respectively, which define the inlet mouth 16 aforesaid, the plane of this mouth passing near to the lowermost portion of the fan chamber previously mentioned. These lips do not ordinarily scrape the floor but are elevated thereabove by a certain amount by the wheels, so that in the operation of the device the carpet or floor covering is raised from the floor as illustrated in Fig. 1 and the air is sucked through it. The ends of the nozzle are closed by cheeks 17, 17 integral with the walls 12 and 13 and cooperating therewith to inclose the nozzle space. The outlet neck 6 is curved upward in a wide sweep to receive the dust bag 18.

The top section 2 is made of dome shape, meaning a cylindrical shape with its upper end rounded, and contains the motor 20, the lower end of said section being provided with a removable closure 21 having a cylindrical exterior 22. The motor shaft extends through the center of this closure and carries beneath the same the suction fan 23 whose diameter is not greater than that of the closure. In its preferred form the main casing of the cleaner is formed above the fan chamber 3 with a reduced hollow neck 24 coaxial therewith and having a cylindrical interior 25 of a size to receive snugly the cylindrical portion 22 before mentioned. This arrangement permits the disconnection of the power plant from the rest of the device with a maximum of convenience, the parts being secured together in any suitable manner as by the inclined set-screws 26 carried by the neck 24 and engaging the wall of the closure. The fan is formed with a disk-shaped base 27 facing the closure 21 and of substantially the same diameter, the fan blades being carried upon the exposed face of this disk. The space between this disk and the closure must be kept free from dirt to avoid clogging the motor, and for this purpose the interior of the neck 24 is provided with an internal annular shoulder 28 which approaches closely to the edge of this disk when the motor is in position as shown in Fig. 1.

The machine is preferably guided and moved about by a handle 30 secured to a

fork 31 which is attached to the cleaner casing at a point below and in front of the center of gravity, in the present case by being received upon the wheel pivots 8—8. Electric energy is delivered to the motor through the cord 31 carried by the handle, a detachable connection 32 being preferably provided to permit easy disconnection of the power plant.

In the embodiment shown in Figs. 7 and 8 the general design and mode of operation of the cleaner is the same as hereinbefore described, excepting that the shape of the nozzle and the point of separation of the parts of the main casing are different. In this embodiment the main casing 1^a terminates substantially at the center of the fan chamber as shown at 40, the upper part of the fan chamber being formed by an enlargement 41 carried by the dome section 42, the outlet neck 43 being also carried by the upper section which is secured to the lower section in any suitable manner. The bottom of the fan chamber is formed by an inclined web 4^a as before and has a central inlet opening 5^a. At the side of the main casing opposite the neck 43 there is provided a downwardly extending inclined wall 12^a which is substantially straight in horizontal section and extends for a considerable distance to each side of the fan chamber terminating at its lower end in a lip 14^a. Merging with each end of this wall is a depending skirt 17^a, 17^a, whose rearward ends are deflected together as shown at 15^a, 15^a so as to embrace the opening 5^a. The lower margin of this skirt is flush with the lip 14^a at the forward part but decreases in height rearwardly so as to define a collecting opening or inlet mouth whose plane is inclined at a sharp angle to the web 4^a, being considerably removed therefrom upon the side of the wall 12^a and passing nearly to or even touching the same at the opposite side. When the machine is supported in operative position this collecting opening or inlet mouth is presented to the floor in a substantially horizontal manner, wherefore the fan chamber with its motor dome is inclined rearwardly therefrom as in the first-described instance.

In each of the embodiments described herein the elevation of the forward portion of the fan chamber provides a convenient space for the reception of a floor brush or other dust agitating mechanism. In Figs. 1 and 2 this element is shown as a pair of rotatable brushes 45, 45 having their mid points journaled in a suitable bracket 46 carried by the nozzle wall and having their ends pivoted in boxes 47, 47 carried by the interior of the cheeks 17. Any suitable or convenient expedient may be employed for operating these brushes as will be well understood. In the embodiment shown in 13

Figs. 7 and 8 I have illustrated agitating mechanism comprising the frusto conical brushes 50, 50 journaled in a frame 51 adjustably mounted inside the nozzle. In the last named construction floor engaging wheels or rollers 52, 52 are provided which both support the weight of the machine and operate the brushes; whereas in the first described device separate carrying wheels 7, 7 are provided. Also in Figs. 7 and 8 an adjusting lever 53 is illustrated, the same being connected to the frame 51 in any suitable or convenient manner as by the cam 54 so that the nozzle can be raised or lowered by the adjustment of this frame. The construction and mode of operation of the said brushing and carrying mechanism is not described minutely or claimed in any degree in this application, but remains the subject matter of the original applications hereinbefore identified.

Having thus described my invention, what I claim is:—

1. In a suction cleaner, a casing having a fan chamber and a nozzle, said fan chamber having a bottom inclined relatively to the plane of the mouth of the nozzle with the rear portion of said bottom adjacent to said plane and its forward portion spaced therefrom, said nozzle being located beneath said forward portion, and the said bottom being formed with an intake aperture which opens into the rearward part of the nozzle.

2. In a suction cleaner, a casing having a fan chamber with an intake opening in the bottom thereof, floor engaging carrying devices arranged to support said casing with said bottom inclined forwardly and upwardly, a collecting nozzle located beneath the elevated portion of said fan chamber and having a downwardly opening inlet mouth, the plane of said inlet mouth substantially touching the lowermost portion of said fan chamber and the rearward portion of said collecting nozzle being in communication with said intake opening.

3. In a suction cleaner, a casing having a fan chamber and a nozzle, said fan chamber having a bottom inclined relatively to the working surface with its rearward portion closely adjacent to such working surface and its forward portion elevated thereabove, said nozzle being located beneath and forwardly of such elevated portion, the forward portion of said nozzle forming a brush receiving chamber lying partly beneath the elevated portion of said fan chamber, and the bottom wall of said fan chamber having a central intake opening communicating with the rearward part of said nozzle.

4. In a suction cleaner, a casing having a fan chamber and a nozzle, said fan chamber having a bottom and said nozzle being lo-

cated beneath and forwardly of said fan chamber, the sides of said nozzle gradually increasing in height from the rear of the casing toward the front thereof, whereby said fan chamber has an inclined position with its portion adjacent to the working surface and its front portion elevated thereabove, and the bottom wall of said fan chamber having an intake opening communicating with the part of said nozzle.

5. In a suction cleaner, a hollow body having floor engaging supporting means, a fan chamber having a bottom wall arranged obliquely to the plane of said means, said wall having an inlet opening, a nozzle below and forward of the elevated portion of said fan chamber and having an inlet mouth whose plane is substantially parallel with the plane of said floor engaging means and closely adjacent thereto, and said fan chamber having an outlet neck whose wall is approximately tangent to the horizontal plane defined by said inlet mouth.

6. In a suction cleaner a casing having a division wall, floor engaging carrying devices arranged to support said casing with said wall inclined relatively to a horizontal plane, the space above said wall forming a fan chamber, a nozzle located beneath the elevated portion of said wall and having a downwardly opening inlet mouth, and an outlet opening at the rear of said casing, and an intake opening in said division wall, said inlet mouth, intake opening, and outlet opening being in substantial alinement.

7. In a suction cleaner, a hollow body having a horizontal nozzle portion across its forward side and a rearwardly inclined fan chamber in superposed relation therewith, said nozzle portion having a downwardly opening inlet mouth whose rearward portion communicates directly with the central portion of said fan chamber, and a rearwardly-inclined motor-receiving dome carried upon said body, the rearward edge of said fan chamber substantially touching the plane defined by said inlet mouth.

8. In a suction cleaner, a casing having in its upper part a substantially cylindrical fan chamber arranged with its axis inclined rearwardly from the vertical and having beneath the front part of said fan chamber a substantially triangular nozzle, and said fan chamber having an axial intake opening communicating with the interior of said nozzle at its rearmost point, the front part of said nozzle having a downwardly opening mouth, and a rotatable brush journaled inside said nozzle in the angle between said mouth and the bottom of said fan chamber.

In testimony whereof, I hereunto affix my signature.

JAMES B. KIRBY.