

Jan. 10, 1928.

1,656,031

C. AALBORG
VACUUM SWEEPER

Filed July 14, 1923

2 Sheets-Sheet 1

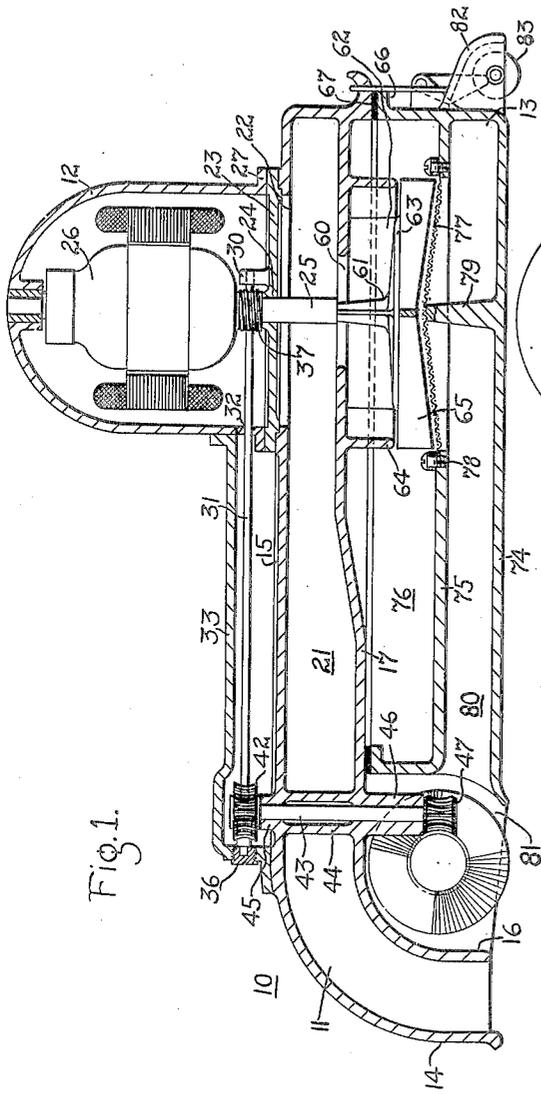


Fig. 1.

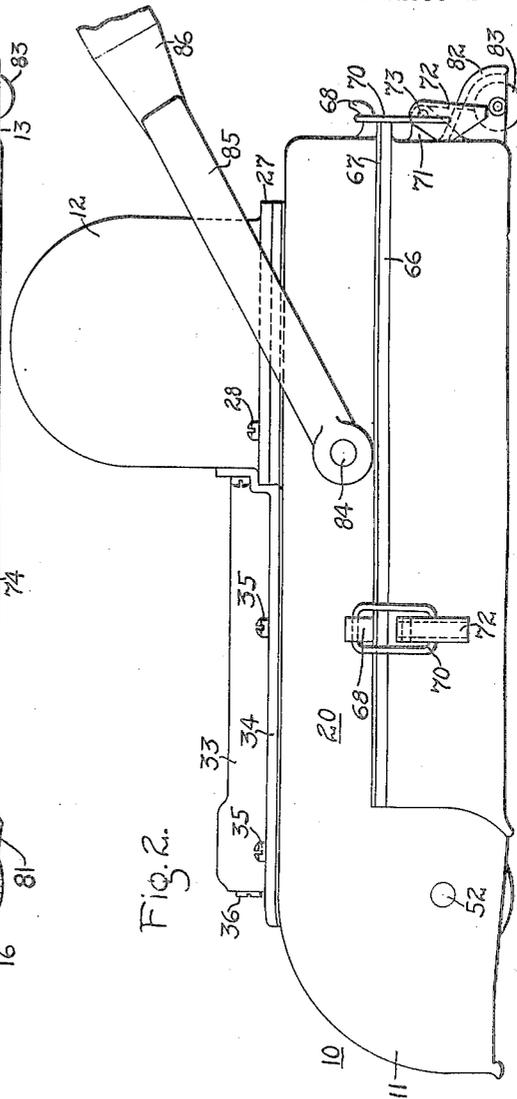


Fig. 2.

WITNESSES:

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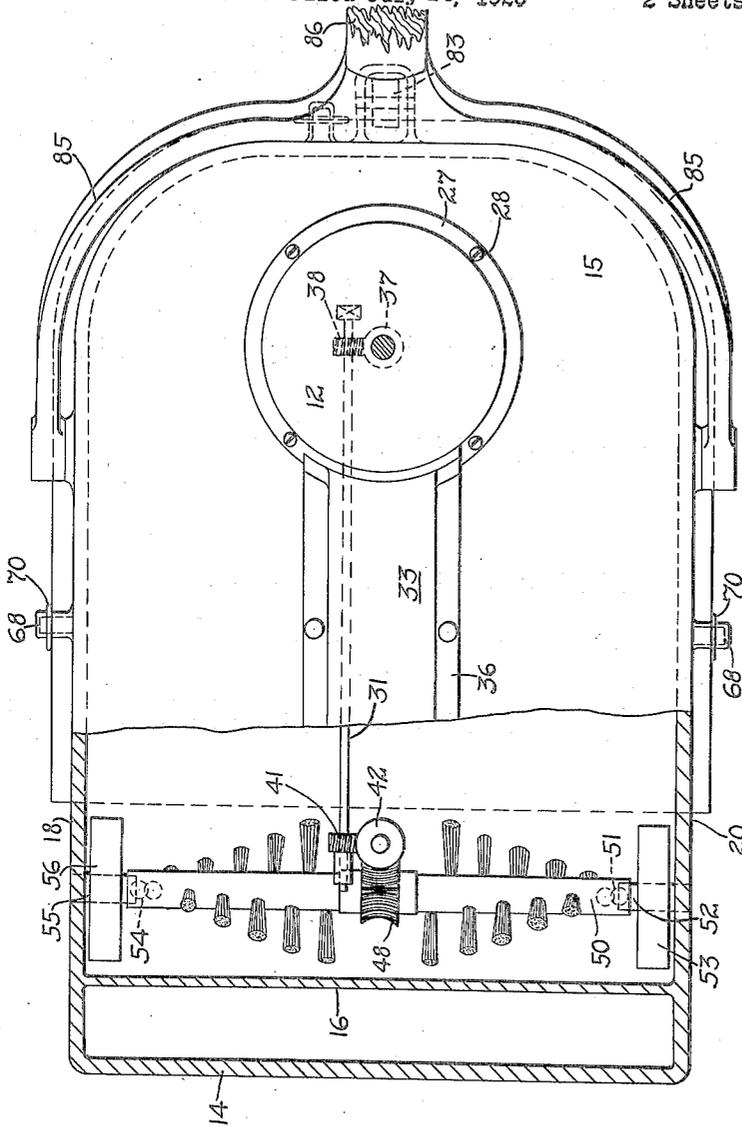
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Fig. 3.



WITNESSES:

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UNITED STATES PATENT OFFICE.

CHRISTIAN AALBORG, OF PITTSBURGH, PENNSYLVANIA.

VACUUM SWEEPER.

Application filed July 14, 1923. Serial No. 651,529.

My invention relates to vacuum cleaners, and it has special relation to the type adapted to be moved over the surface to be cleaned by the operator, more particularly illustrated and described in my copending application Serial No. 652,684 filed July 20, 1923.

The primary object of my invention is the provision of an arrangement for keeping clean the filter which removes dirt and impurities from the air that is circulated through the cleaner.

Another object of the invention is to provide an arrangement for conducting air from a fan to a filter having a raised portion and an inclined surface for shedding dirt deposited in the passage of air through the cleaner.

Another object of the invention is the arranging of operative parts exteriorly of the casing in order that they may not be contaminated by the dirt in the air drawn through the casing.

Another object of the invention is to provide a housing exteriorly of the casing for a drive shaft for rotating a cleaning brush.

Another object of the invention is to provide a dust chamber about a fan for the reception of dirt in the air impelled by the fan.

A further object of the invention is to provide a dust receptacle having a filter therein for cleaning the air.

A still further object of the invention is to provide a pan having a dust chamber therein and a passage way for air below the chamber.

Other objects will appear as the description proceeds.

Fig. 1 is a central vertical sectional view of the vacuum cleaner of my invention;

Fig. 2 is a side elevational view thereof; and

Fig. 3 is a top plan view thereof.

Referring to Fig. 1, a casing 10 comprises a hood 11, a dome 12 and a pan or dust receptacle 13. The front wall 14 of the hood 11 merges with a top wall 15 thereof by a gradual curve, and likewise a partition 16 merges with lower wall 17 of the hood. The front wall 14 and partition 16 extend the entire width of the hood between side walls 18 and 20 thereof (Fig. 3) thus defining a suction nozzle which terminates near the bottom of the hood and also communicates with an air channel 21 formed between the side

walls 18 and 20, top wall 15 and lower wall 17.

An opening 22 provided in the top wall 15 of the hood is covered by a circular support 23 having a bearing 24 centrally thereof for receiving the armature shaft 25 of a motor 26. The motor is completely enveloped by dome 12 which has a flange 27 engaging the support 23 adjacent to its outer edge, the dome and the support being secured to the hood by screws 28 extending through the flange and the support.

The support 23 carries a bearing 30 adapted to receive one end of a horizontal shaft 31 extending longitudinally of the hood and passing through hole 32 in the dome 12.

The shaft 31 is covered by a housing 33 which is arcuate in cross section and provided with flanges 34 with which screws 35 cooperate to secure the housing to the top wall 15 of the hood. A plug 36 is threaded in the front end of the housing 33, and constitutes a bearing for the front end of shaft 31. A worm 37 is rigid with shaft 25 and meshes with a worm gear 38 that is mounted on the rear end of shaft 31. Formed on shaft 31, adjacent to the front end thereof, is a worm 41 meshing with a worm gear 42 on a vertical shaft 43 that is enveloped by sleeve 44 forming an upper bearing 45 and a lower bearing 46 for the shaft 43. A spiral gear 47 is provided on the lower end of vertical shaft 43 to mesh with spiral gear 48 carried by brush 50.

One end of brush 50 has a recess therein receiving a ball bearing 51 and the end of a stub shaft 52 which also is provided with a recess to receive the ball bearing 51. The stub shaft is rigid with roller 53 and projects on both sides thereof, the outer end being journaled for rotation in side wall 20 of the hood. The other end of brush 50 is provided with a similar recess with which ball bearing 54 and stub shaft 55 cooperate. A roller 56 is mounted upon the stub shaft 55 which is journaled in side wall 18. The brush 50 is thus supported at its ends by the stub shafts 52 and 55.

The drive shaft 25 extends downwardly through air channel 21 and an orifice 60 in the lower wall 17 of the hood, and is connected to a substantially horizontal fan 61 that is provided with a plurality of radial blades 62 formed integral with a horizontal deflector 63. A cylindrical guide 64 de-

pend from lower wall 17 and surrounds the fan blades 62. A plurality of radial scrapers 65 are formed integrally with deflector 63 and depend therebelow projecting laterally therefrom and extending beyond the ends of the fan blades 62.

The dust pan 13 is provided with a flange 66 along its upper edge engaging flange 67 extending outwardly from the hood 11. The pan 13 is detachable from the hood by a plurality of latches each of which comprises a hook 68 formed on the hood 11, a cooperating loop 70 and a lug 71 formed on pan 13. The loop 70 is pivotally carried by a lever 72 rotating on a pin 73 mounted in lug 71. In locking position, the pin 73 is disposed beyond the loop 70 thereby retaining the lever substantially in engagement with the wall of the pan.

The pan is provided with a bottom wall 74 and a horizontal partition 75 which constitutes the bottom of a dust chamber 76. A conical filter 77 of wire screen is secured by screws 78 to partition 75 and has its apex upwardly disposed in line with the axis of shaft 25, the filter being immediately under the scrapers 65 which are inclined upwardly along their lower edges towards the center of the fan to conform to the surface of the filter with which they engage. The apex of the screen is maintained in position by a support 79 extending upwardly from the bottom 74 of the pan. Between partition 75 and bottom 74, a passageway 80 is provided leading to a nozzle 81 surrounding brush 50.

A guard 82 is formed on the pan 13 to house a roller 83 therein, the roller constituting the rear support for the machine.

A pair of trunnions 84 are provided on the sides of the hood 11 upon which a pair of arms 85 are pivoted, said arms terminating in a handle 86 for the use of the operator.

In the operation of the device, the actuation of the motor rotates armature shaft 25 which, through worm 37, worm gear 38, horizontal shaft 31, worm 41, worm gear 42, vertical shaft 43, and spiral gears 47 and 48 rotates the brush 50 so that the bristles thereof engage the surface to be cleaned.

Simultaneously, the fan 61 is rotated by armature shaft 25 and a suction is produced which causes a reduction of pressure in air channel 21 and orifice 60 to cause the induction of air through the air channel and orifice to the fan 61.

The air passes downwardly among the blades 62 of the fan and is forced radially, outwardly by the deflector 63, within the limits of the cylindrical guide 64. The current of air continues downwardly through the screen 77.

When the air passes through the screen the dust and dirt carried thereby are deposited on the screen. The scrapers 65 passing

along the surface of the screen remove the dust and dirt therefrom and push them outwardly into the dust chamber 76. The simultaneous scraping and centrifugal action of the scrapers cooperate to effect this result. The conical shape of the screen assists in the operation as it tends to shed the dirt which falls downwardly along its surface through gravitational action. The screen 77, therefore, is always maintained clean permitting the air to pass readily therethrough so that there is no clogging of the meshes nor retardation of the sucking and impelling action of the fan. The air passing downwardly from the screen moves forwardly through passage 80 and is discharged at nozzle 81 adjacent to the brush 50. Here the air assists in the cleansing action of the brush, and also to clean the bristles of the brush. Some of the air may be drawn inwardly into the suction nozzle.

The casing is moved freely over the floor on the rollers 53, 56 and 83.

When it is desired to clean the dust chamber 76, the pan 13 is removed by moving the levers 72 outwardly. After the loops 70 have passed beyond the pins 73 they tend to move the levers farther outwardly. The loops are then disengaged from the hooks 68, leaving the pan free to be removed from the hood. The dirt may be shaken out of the dust pan 76 and the pan again positioned under the hood. The loops 70 are reengaged over the hooks on the hood and the levers 72 are pushed downwardly till the loops pass beyond the pins 73.

The invention is capable of extensive variation and modification and is not limited to the details of construction illustrated and described. A substantial range of equivalents within the spirit and scope of the appended claims is contemplated.

I claim as my invention:

1. In a vacuum cleaner, the combination of a casing, a fan for forcing air there-through, a filter for cleaning the air, means for guiding the air from said fan to said filter and a scraper on said fan for cleaning said filter.

2. In a vacuum cleaner, the combination of a casing, an air channel extending through the casing, a fan and filter disposed in the air channel and a wiper carried by the fan for sweeping the filter when the cleaner is in operation.

3. In a vacuum cleaner, the combination of a casing, an air channel in the casing, a fan and filter disposed in the air channel, a wiper carried by the fan for sweeping the filter when the cleaner is in operation and means interposed between the fan and filter for deflecting the air stream.

4. In a vacuum cleaner, in combination, a casing, an air channel extending through the casing, a fan for circulating an air stream

through said air channel, a filter for cleaning the air stream, a wiper carried by the fan for sweeping the filter, a dust pan carried by the casing and disposed to receive particles swept from the filter, said pan being adapted to support the filter.

5 5. In a vacuum cleaner, in combination, a casing, an air channel extending through the casing, a fan for circulating an air stream through said channel, a filter for cleaning the air stream as it circulates, a wiper carried by the fan and filter to prevent the air stream from impinging directly on the filter and a dust pan carried by the casing and disposed to receive particles swept from the filter.

10 6. In a vacuum cleaner, in combination, a casing, an air channel extending through the casing, a fan for circulating an air stream through said channel, a filter for cleaning the air stream, said filter being disposed in alinement with the fan, a dust pan

carried by the casing and disposed to receive particles collected from the air stream, said filter being supported by the dust pan and means carried by the fan for deflecting the air stream to prevent it from impinging directly on the filter.

7. In a vacuum cleaner, in combination, a casing, an air channel extending through the casing, a fan for circulating an air stream through said channel, a filter for cleaning the air stream, said filter being disposed to receive particles collected from the air stream, said filter being supported by the dust pan and means carried by the fan for deflecting the air stream to prevent it from impinging directly on the filter, and a wiper for sweeping the filter carried by the fan.

In testimony whereof, I have hereunto subscribed my name this 7th day of July, 1923.

CHRISTIAN AALBORG.