March 11, 1958 F. P. WRIGHT 2,825,921

CENTRAL VACUUM CLEANING SYSTEM

Filed Feb. 20, 1956 4 Sheets-Sheet 1

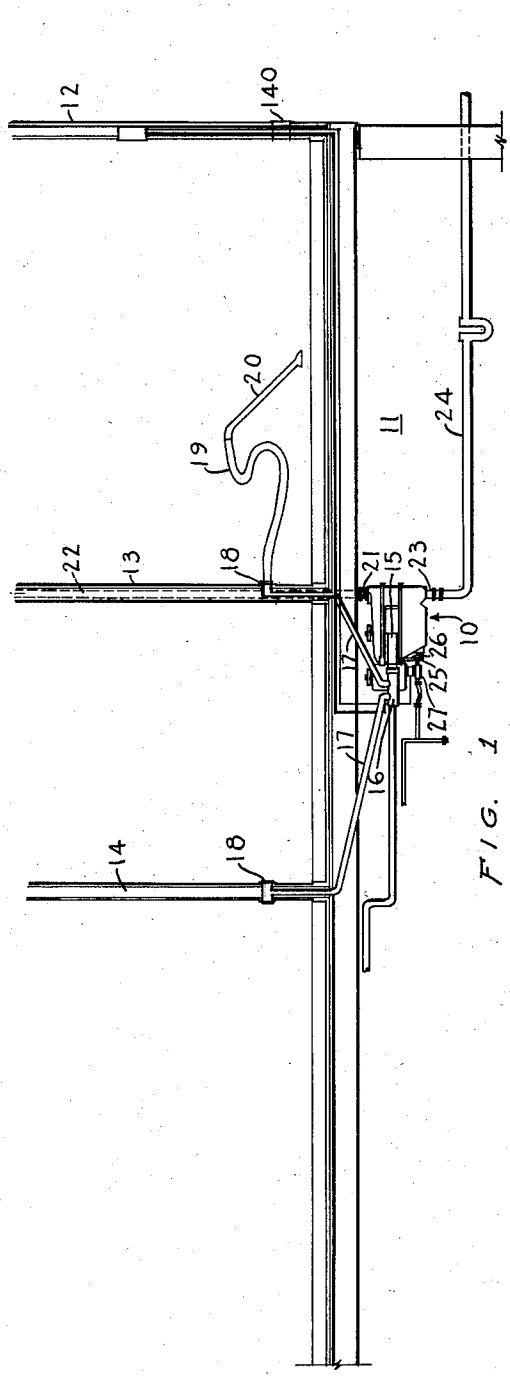


FIG. 1

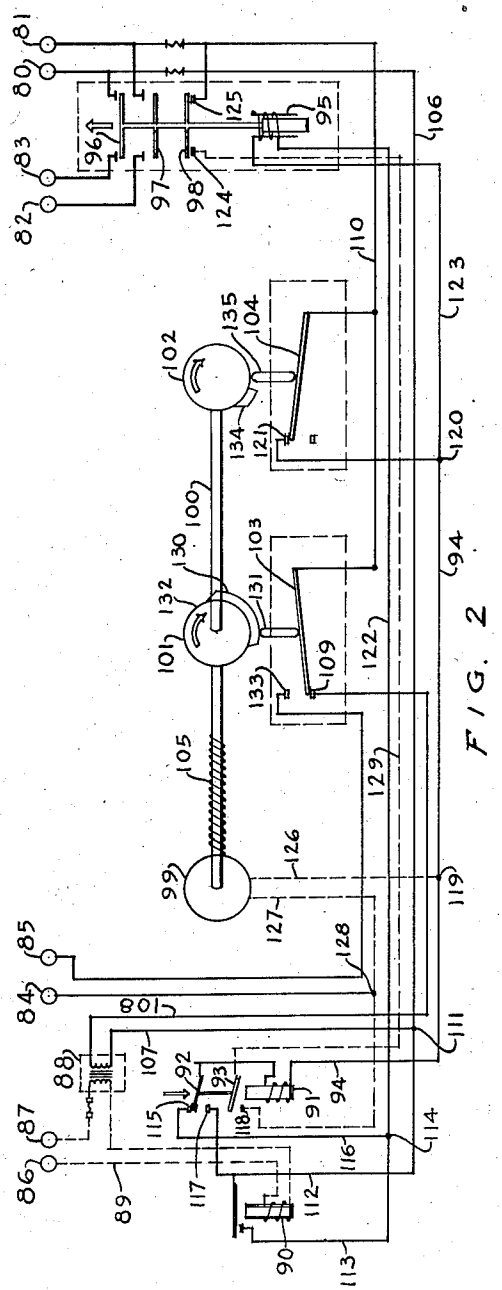


FIG. 2

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CENTRAL VACUUM CLEANING SYSTEM

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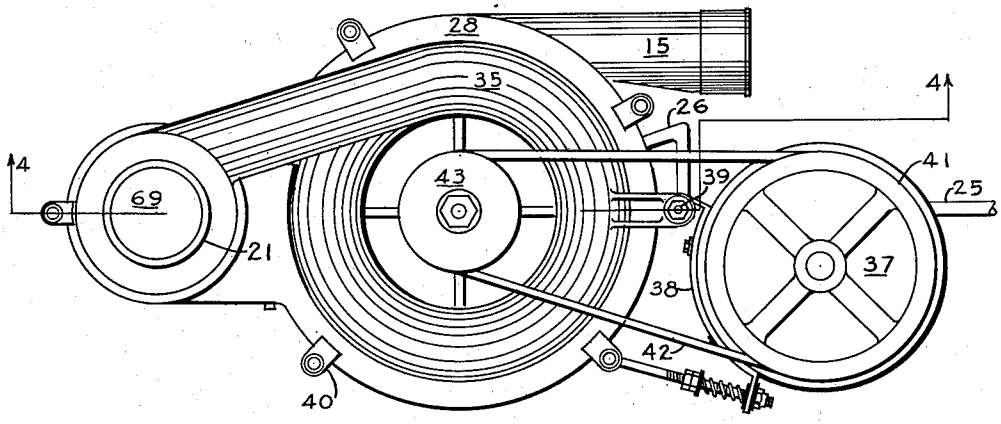


FIG. 3

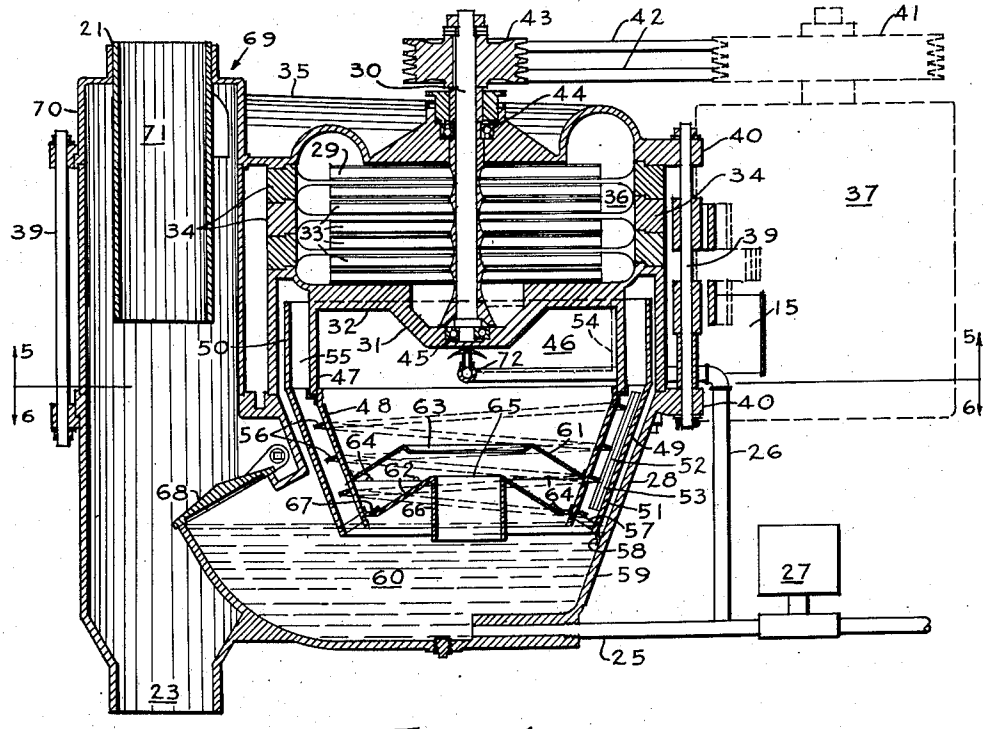


FIG. 4

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CENTRAL VACUUM CLEANING SYSTEM

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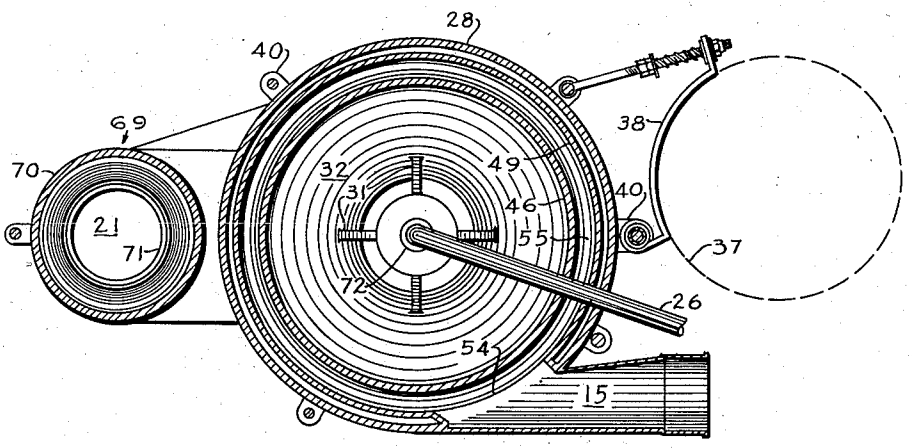


FIG. 5

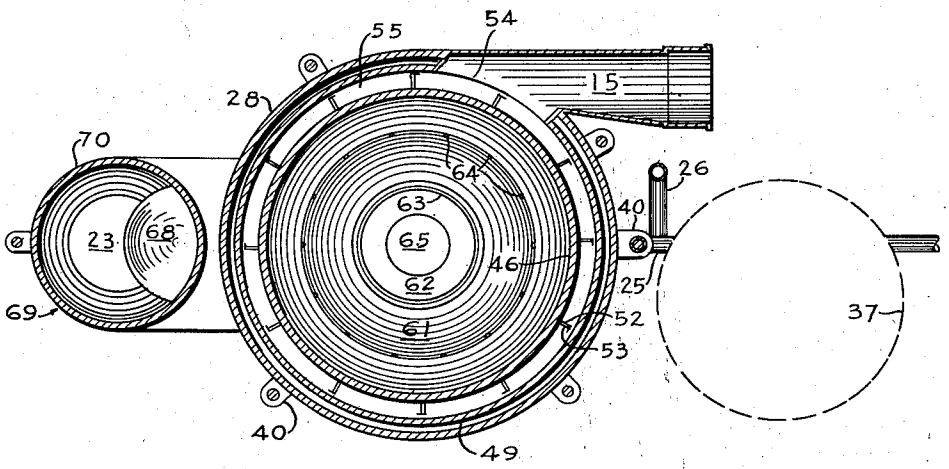


FIG. 6

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CENTRAL VACUUM CLEANING SYSTEM

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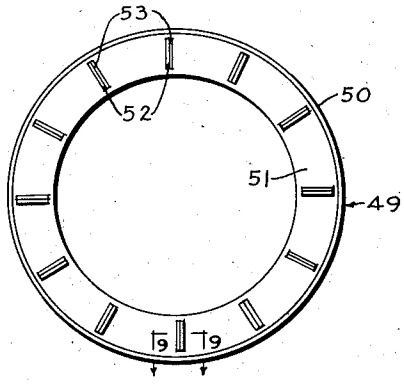


FIG. 7

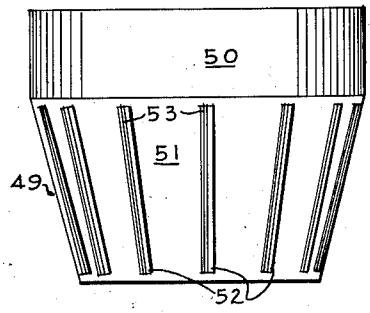


FIG. 8

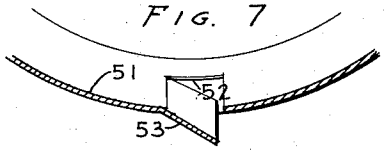


FIG. 9

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United States Patent Office

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CENTRAL VACUUM CLEANING SYSTEM

Frank P. Wright, Chattanooga, Tenn., assignor, by mesne assignments, to Armstrong-Delay, Inc., Chattanooga, Tenn., a corporation of Tennessee

Application February 20, 1956, Serial No. 566,429

18 Claims. (Cl. 15—314)

This invention relates to a central vacuum cleaning system in which the vacuum cleaner is permanently installed, attached to the sewage disposal system, and operated completely automatically.

The general type of vacuum cleaner now in use comprises a portable unit employing a filter and suction means for drawing air through the filter. Because the unit is ordinarily located in the room or space to be cleaned, the air passing through the filter is discharged back into the same room. It has been found that vacuum cleaner filters separate only the larger particles of dirt and waste from the processed air, and the air that returns to the room still contains very fine solid particles. For this reason, the housewife finds it necessary to dust her furniture and room after each vacuum cleaning operation. Some attempts have been made to eliminate these difficulties by removing the cleaning unit from the space to be cleaned and providing a central vacuum cleaning system. However, most of such systems still employ the conventional dust bags and filters and are not completely automatic.

It is therefore an object of this invention to overcome the disadvantages enumerated by providing a central vacuum cleaner system which is completely automatic and includes automatic means for waste disposal.

Another object of this invention is to provide a central vacuum cleaning system which will completely remove all waste material from the space to be cleaned.

Another object of this invention is to provide a central vacuum cleaning system communicating with a plurality of outlets in various rooms of a building.

Another object of this invention is to provide a central vacuum cleaning system having the vacuum cleaner unit permanently installed outside the spaces to be cleaned.

A further object of this invention is to provide a central vacuum cleaning system of simple construction which may be easily and economically installed in a building.

Another object of this invention is to provide a cleaner provided with means for mechanical separation of solids from the air, and also a fluid through which the air is percolated for the further separation of finer particles and liquids.

A further object of this invention is to provide a central vacuum cleaner unit permanently installed, connected to the sewage disposal system, and communicating with a plurality of outlets in various rooms of a building, the operation of the system being completely automatic.

Another object of this invention is to provide a central vacuum cleaner system having an automatic control system which sequentially conducts a cleaning cycle, a flushing cycle, and a re-set operation.

Another object of this invention is to provide a central vacuum cleaning system which is completely sanitary, not only from the standpoint of the cleaning operation, but also from the standpoint of waste disposal.

Further objects and advantages of the invention will be apparent from the following description taken in conjunction with the drawings, wherein:

Fig. 1 is a side elevation of a schematic diagram of the installation of the central vacuum cleaning system;

Fig. 2 is a schematic diagram of the automatic electrical control system;

Fig. 3 is a top plan view of the vacuum cleaner unit;

Fig. 4 is a section taken along the lines 4—4 of Fig. 3;

Fig. 5 is a section taken along the lines 5—5 of Fig. 4;

Fig. 6 is a section taken along the lines 6—6 of Fig. 4;

Fig. 7 is a top plan view of the static stripper cone;

Fig. 8 is a side elevation of the static stripper cone; and

Fig. 9 is a section taken along the lines 9—9 of Fig. 7.

Briefly stated, the invention comprises a central vacuum cleaning system in which the vacuum unit is permanently installed outside the spaces to be cleaned, for example, in the basement of a building. The inlet to the vacuum unit for receiving dust-laden air is connected to a plurality of outlets within various rooms of the building. When it is desired that a particular room be cleaned, then the operator need only insert the hose of the cleaning tool into the outlet, where a switch automatically activates the electrical control system for starting the motor and creating suction within the unit.

The unit itself comprises three sections. The upper section houses the impeller, driven by a motor either directly or through continuous belts, for creating suction within the unit. The bottom portion of the unit comprises a sump which is filled with water or other suitable fluid. The middle portion comprises concentric casings for directing the dust-laden air in a centrifugal and downward path into the water, when the unit is in operation. Before the whirling, dust-laden air enters the water, it is thrown against a slotted casing which separates the heavier solid particles from the air. The suction of the machine causes the air to percolate through the water to remove the finer dust particles. The clean percolated air then rises through the central portion of the unit, is devaporized by contact with baffles, and is then discharged from the unit through a muffler.

After the room is cleaned, the hose is removed from the outlet, stopping the suction and automatically starting the flushing operation. The dirty water is flushed to the sewage disposal system for a predetermined period of time, then the sump is refilled with clean water, and the unit motor is reset for a repeat cycle.

Referring now to the drawings in more detail, Fig. 1 discloses the vacuum unit **10** constructed in accordance with this invention, permanently installed in a basement **11** of a building **12** having rooms separated by walls **13** and **14**. The air inlet **15** of the unit **10** is connected to a manifold **16**, which in turn communicates with tubes **17**, terminating in sockets **18** in the walls **13** and **14**. In Fig. 1, a hose **19** connected to a cleaning wand **20** is shown coupled to the socket **18** in wall **13**. The air outlet **21** of the unit **10** communicates with a discharge vent **22** rising within the wall **13**, for discharging the foul air from the unit **10** to the atmosphere above the building **12**. The drain **23** communicates with the sewer pipe **24**, which in turn discharges into the sewer, not shown. Water inlet pipes **25** and **26** controlled by solenoid valve **27** are connected to the unit **10** for flushing the waste material within the unit to the drain.

The vacuum unit **10** itself comprises a housing **28**. Within the upper portion of the housing **28**, a multi-stage impeller **29**, is mounted for rotation about a vertical shaft **30**. The bottom of the shaft **30** is rotatably mounted on a spider frame **31** integral with a horizontal partition **32** within the housing **28**. The impeller blades **33** may be mounted on the shaft **30** in as many stages as desired. The number of spacer rings **34** may be added or removed, according to the number of stages of the impeller blades **33**. A tubular discharge ring **35** is pro-

vided around the periphery of the top of the housing 28 and in communication with the space 36 around the periphery of the impeller blades 33, to provide for discharge of air from the housing 28. The impeller shaft 30 may be driven by a motor 37 mounted on the housing 28 by means of the motor mounting bracket 38, pin 39 and lugs 40. The motor is linked to the inpeller shaft 30 by means of the motor driven pulleys 41, belts 42 and shaft pulleys 43. The shaft 30 is rotatably supported in the top of the housing 28 by bearings 44 and in the spider frame 31 by bearings 45. As an alternative, the shaft 30 may also be driven directly by a motor mounted on top of the housing 28.

Depending from the horizontal partition 32 is an inner casing 46 having a cylindrical upper portion 47 and a truncated conical lower portion 48. The upper and lower portions, 47 and 48, may be integral with each other, or they may be made in two sections as indicated in Fig. 4, for simplicity of assembly.

Surrounding and concentric to the inner casing 46 is an outer static stripper casing 49 having an upper cylindrical portion 50 and a lower truncated conical portion 51, similar to the upper and lower portions, 47 and 48, of the inner casing 46. As indicated in Figs. 7, 8 and 9, the upper portion 50 is of imperforate sheet material, while the lower portion 51 comprises longitudinal slots 52 having struck-out elements 53.

The air inlet 15 extends through the housing 28 and through an opening 54, so that the air flowing through the inlet 15 may communicate with the space 55 between the inner casing 46 and the outer casing 49. Within the space 55 and mounted on the outside of the lower portion of the inner casing 48, is a spiral guide 56 to direct the centrifugal flow of air downward.

The outer casing 49 may be mounted within the housing 28 by attachment strips 57 connecting the outer casing to the inner casing 46, and also by strips 58 connecting the outer casing 49 to the housing 28.

Within the bottom of the housing 28 is a sump 59 adapted to contain water 60, or other suitable fluid. The level of the water is maintained above the bottoms of the inner casing 46 and the outer casing 49 to provide a liquid seal through which the descending centrifugal flow of dust-laden air must pass to completely separate the dirt and other waste material not separated through the slotted casing 51. The air is actually percolated through the water 60 so that the air is cleaned by the greater affinity of the dirt and fine solid particles for the water. The clean air is then drawn upward through the inside of the inner casing 46 by the suction created by the multi-stage impeller 29.

To separate water vapor from the clean air passing through the inner casing 46, truncated conical baffles, 61 and 62, are disposed in the path of the ascending air so that moisture will condense upon their surfaces and drop back into the water 60. Both of the conical baffles, 61 and 62, slope upwards to provide glancing contact with the upward air stream. The upper baffle 61 has an opening 63 in the top thereof for permitting the upward passage of the air, and located around the periphery of the bottom of the baffle 61 are a plurality of tiny drainage apertures 64. The bottom periphery of the baffle 61 is attached to the lower portion of the inner casing 48 by soldering, or any other convenient securing means. The purpose of the apertures 64 is to permit drainage of any water condensed from the air which has passed through the baffles.

The lower baffle 62 has an opening 65 in its top and a tubular portion 66 depending from the opening 65. The bottom periphery of the conical portion of the baffle 62 is connected by strips 67 to the lower portion of the inner casing 48. The purpose of the structure of the lower baffle 62 is to trap moisture within the intersection of the tubular portion 66 with the conical portion 62.

Between the sump 59 and the drain 23 is a check valve 68. When suction is created by the multi-stage impeller 29, the check valve 68 remains closed to prevent any of the water 60 from escaping, to maintain a closed air circuit from inlet 15 to discharge ring 35, and also to prevent any suction of waste material in the sewer pipe 24 back into the sump 59. When the suction operation has been terminated and the flushing operation initiated, the valve 68 will open under pressure of the water discharging from the sump 59 into the drain 23.

After the air has been cleaned and de-vaporized, it passes through the impeller space 36 and into the tubular discharge ring 35. The discharge ring 35 communicates with a muffler 69. The muffler 69 comprises a cylindrical muffler housing 70 which communicates with the drain 23. Depending from the air outlet 21 is a muffler tube 71 concentrically disposed within the muffler housing 70. The foul, but clean, air, when discharged from the tubular ring 35, enters the muffler housing 70 at a tangent and circulates in the space between the housing 70 and the muffler tube 71. The centrifugal motion of the air will separate any remaining moisture, which will drop into the drain 23. When the circulating air descends to the bottom of the muffler tube 71, which is located considerably above the drain 23, the air then passes upward through the muffler tube 71, the air outlet 21, and into the discharge vent 22. The purpose of this particular muffler structure is to provide additional means for separating any remaining moisture from the air, as well as to eliminate noise.

The flushing operation is conducted by means of discharging water through the water inlet pipes 25 and 26, after the suction operation is terminated. The water inlet pipe 26 extend through the housing 28, the outer casing 49, the inner casing 46, and terminates in a spray head 72. The water discharged from the spray head cleans out the inside of the inner casing 46 and the surfaces of the baffles 61 and 62. Water discharged from the inlet pipe 25 flushes the dirty water from the sump 59 through the check valve 68 and through the drain 23. When the solenoid valve 27 is inactivated, the flushing operation ceases, and the unit is ready for a repeat cleaning operation.

One of the most important features of this invention is that the entire operation is completely automatic. The only manual operation involved is the insertion of the hose 19 into one of the sockets 18, which automatically starts the operation of the system.

Fig. 2 discloses a schematic diagram of the entire electrical control system which renders the invention completely automatic. Terminals 80 and 81 represent the power source for the circuits. 82 and 83 are the motor terminals. 84 and 85 are the terminals for the solenoid 27, which controls the flush valve operating the inlet water pipes 25 and 26. 86 and 87 are the terminals connected to the starting switch within each outlet 18. The transformers 88 reduces the 230 power volt supply to 6 volts in the starting switch pilot circuit 89, represented by dashed lines. Solenoid starting switch 90 is controlled by the pilot circuit 89. Solenoid switch 91 has two armature bridges 92 and 93 linked in the same relative position and is controlled by the lead 94 from the upper bridge 92. The solenoid motor switch 95 controls the motor starting switch bars 96 and 97, and the time motor switch bar 98.

Time motor 99 is adapted to rotate shaft 100, upon which are fixedly mounted cams 101 and 102. The cam 101 is adapted to operate switch 103, and the cam 102 is adapted to operate switch 104. A coil spring 105 around the shaft 100 is adapted to reverse the rotation of the shaft after the time motor has stopped and to bring the cams 101 and 102 back to their starting positions.

Fig. 2 discloses the positions of the controls when the vacuum cleaner system is inoperative, just before

the starting switch is closed. When the system is inoperative, the only portion of the circuit which is "hot" is that traced from terminal 80 through line 106, line 107, transformer 88, line 108, terminal 109, switch 103, power line 110, and terminal 81.

When the starting switch in socket 18 is closed by insertion of hose 19, contact is made between terminals 86 and 87 to close the pilot circuit 89, which in turn closes the solenoid starting switch 90. Current from power line 106 then passes through junction 111, line 112, switch 90, line 113 to junction 114. When the control circuit is inoperative, the armature bridges 92 and 93 are in their raised positions, and the upper armature bridge 92 is in contact with terminal 115, permitting the current from line 113 to pass through line 116, upper bridge 92, and line 94 to activate the solenoid switch 91. Activation of the switch 91 depresses the upper armature bridge 92 into contact with the terminal 117 and depresses the lower bridge 93 into contact with the terminal 118, rendering the line 116 dead, and permitting current from line 112 to pass through terminal 117, bridge 92, line 94, junction 119, junction 120, terminal 121, switch 104, and power line 110. The current passing through switch 90, line 113 and junction 114, passes through line 122 to the solenoid motor switch 95, thrusting the motor switch bars 96 and 97 upward to connect the motor circuit to the power circuit. The current from the motor switch 95 returns through line 123, junction 120, terminal 121, switch 104 and power line 110. The circuit control will remain in these positions until the hose is disconnected from the outlet 18, thus opening the starting switch.

When the removal of the hose 19 from the outlet 18 opens the starting switch, the pilot circuit 89 is broken, opening the solenoid switch 90, to break the circuit 113 and 122 to the motor solenoid switch 95, causing a depression of the motor starting switch bars 96 and 97 to break the connections between the power circuit and the motor circuit. The bridge 92 remains in contact with the terminal 117, and the bridge 93 remains in contact with the lower terminal 118. By opening the switch 90 and breaking the circuit 122 to inactivate the motor switch 95, the time motor switch bar 98 descends into contact with terminals 124 and 125, causing current to flow from line 94 through junction 119, line 126 and time motor 99. The return current from time motor 99 passes through line 127, junction 128, terminal 118, bridge 93, line 129, terminal 124, bar 98, terminal 125, and power line 110. Activation of the time motor 99 rotates the shaft 100, causing the cams 101 and 102 to rotate in a clockwise direction, as schematically disclosed in Fig. 2. The raised portion 130 of the cam 101 is designed to remain in contact with the cam follower 131 for a predetermined period, preferably about 10 seconds. During this period of 10 seconds, the hose 19 may be re-inserted into the outlet 18 to start the motor again. However, after the raised portion 130 rides over the cam follower 131, and the cam follower engages the recessed portion 132 of the cam 101, the switch 103 is permitted to break contact with terminal 109 and make contact with terminal 133. This action breaks the power circuit through the transformer 88. As long as the transformer circuit is broken, no power can be transmitted to the pilot circuit 89. Therefore, connection of the hose 19 to an outlet 18 will have no effect in restarting the motor, until the switch 103 re-engages the terminal 109. The contact of switch 103 with terminal 133 opens the flush valve circuit. The current from power line 106 passes through line 112, bridge 92, line 94, junction 119, line 126, time motor 99, line 127, and junction 128 to flush valve terminal 84. The return current from flush valve terminal 85 passes through terminal 133, switch 103, through the return power line 110 to terminal 81.

After the shaft has been rotated by the time motor 99 for a period of approximately 40 seconds, or any other predetermined period, the raised portion 134 of the cam 102 will engage cam follower 135 to depress the switch 104, causing the switch to break contact with terminal 121. This action will break the circuit 94 controlling the solenoid switch 91, permitting the bridges 93 and 92 to rise to their original positions. Thus, the lines 127 and 129 will be broken by disengagement of the bridge 93 with the terminal 118, causing the time motor 99 to stop; and the circuit to the flush valve terminals 84 and 85 will also be broken to stop the flushing operation. After the time motor 99 stops, the coil spring 105, being in tension from rotation of the shaft 100, will uncoil and reverse the rotation of the shaft 100 until the cams 101 and 102 assume their original positions disclosed in Fig. 2. The controls are thus reset to their original positions, disclosed in Fig. 2, ready for a repeat cycle.

The operation of the machine is as follows:

When the operator inserts the hose 19 into any one of the outlets 18, the starting switch, not shown, within the outlet 18 is closed to start the motor 37. The motor 37 then drives the multi-stage impeller 29 through pulleys 41, belts 42, and pulleys 43. The suction created by the impeller blades 33 is transferred to the cleaning wand 20 in one of the rooms of the building 12. Air, containing waste material, such as dirt, dust, sand, or other solid particles, or water, chemicals, or any other liquid waste material, is drawn through the wand 20, hose 19, outlet 18, tube 17, manifold 16, and air inlet 15. When the air containing the waste material enters the space 55 at a tangent to the housing 28, a centrifugal motion is set up in the air stream. The air stream is then directed downwardly by gravity and the spiral guides 56, and the heavier waste particles are thrown outward through the slots 52 in the lower portion of the outer casing 51. These heavier particles immediately drop into the water 60 in the sump 59.

The suction created by the impeller 29 raises the level of the water 60 within the lower portion of the inner casing 48 and also draws the dust-laden air from the space 55 through the water, which seals the lower portions of the inner and outer casings 48 and 51. The resulting percolation of the air through the water 60 washes the air and separates the remaining waste particles from the air stream. The clean air then rises into the inner casing 46. Part of the air stream will rise vertically through the tubular portion 66 and openings 65 and 63. Other portions of the air stream will rise between the strips 67, connecting the periphery of the lower conical baffle 62 to the lower portion of the inner casing 48, and through the opening 63. This portion of the air stream will contact the sloping under-surface of the truncated conical baffle 61, causing moisture to condense and drop into the sump 59. Another portion of the air stream will rise into the space created by the intersection of the lower baffle 62 with the tubular portion 66, not only causing the air to lose some of its moisture but forcing the air back into the water 60 for additional percolation and washing.

The washed and devaporized air stream continues past the baffles 61 and 62, through the spider frame 31, and into the path of the impeller blades 33, where the air is centrifugally thrown into the space 36 and upward through the tubular discharge ring 35. From the discharge ring 35, the air is blown into the muffler housing 70 at a tangent between the housing 70 and the muffler tube 71. The resulting centrifugal motion further devaporizes the air, which is discharged upward through the muffler tube 72 and outlet 21, into the discharge vent 22. The moisture separated from the air falls into the drain 23. The muffler structure is specifically designed for the dual purpose of noise elimination and devaporization.

After the hose 19 is disconnected from the outlet 18, the motor 37 is stopped and the suction is terminated. After a time delay of about 10 seconds in which the motor may be restarted, the motor is blocked out by the

automatic electrical control system as previously described. The flush valve solenoid **27** is then activated to discharge water through the inlet pipe **26** and spray head **72** to wash down the interior of the inner casing **46** and baffles **61** and **62**, and to discharge water through the inlet pipe **25** to flush the waste material from the sump **59** through the check valve **68** into the drain **23** and sewer pipe **24**. The flushing operation continues for a predetermined period, preferably about 40 seconds, until the flush valve solenoid **27** is inactivated. The electrical control system then automatically resets the controls for a repeat cycle.

The structure of the vacuum cleaner unit comprises mainly cast parts which are easily assembled so that the maximum of economy may be practiced in manufacturing and installation. The tubes **17**, the hose **19**, and the check valve **68** are preferably made of polyethylene, or a similar inert material, for durability in the handling of all types of waste material, including active chemicals. All the parts including the electrical controls are assembled into a compact unit so that the unit may be installed easily in a minimum of space and connected to the spaces to be cleaned and to the sewer with a minimum of effort.

Contrary to most vacuum cleaners, the motor **37** is located outside the path of the air stream so that the operation of the motor will not be affected by the clogging, wearing, or corrosion of the waste material carried by the air stream. This factor alone will increase the effective life of the vacuum unit many years.

The importance of the device is not limited to its efficient cleaning operation but also includes the healthful benefits of air purification and fresh air circulation. Such advantages would be welcome to the sufferers of asthma, hay fever, tuberculosis, lung ailments, and numerous dust allergies. By providing a filtered vent **140** in an outside wall of the building **12**, as disclosed in Fig. 1, clean fresh air may be maintained in the rooms of the building at all times.

The invention eliminates the use of filters and dust bags, and the labor associated with replacing these articles. The novel separating system eliminates entirely the recirculation of dust-laden air within the room or space to be cleaned. Moreover, the completely automatic controls, the choice of materials, and the simple but compact structure of the machine reduces maintenance to a minimum.

It will be apparent to those skilled in the art that various changes may be made in the invention, without departing from the spirit and scope thereof, and therefore the invention is not limited by that which is shown in the drawings and described in the specification, but only as indicated in the appended claims.

What is claimed is:

1. A central vacuum cleaning system comprising a housing, a sump within the bottom of the housing containing a fluid, an inlet for dust-laden air in said housing, suction means for creating centrifugal motion for said air within said housing, slotted means within said housing for separating heavier solid particles from said air, means for subsequently forcing said air through said fluid and upward through said housing, and means for discharging said fluid-treated air from said housing, automatic electrical control means for sequentially driving said suction means, flushing the fluid from said sump, and resetting said control means for a repeat cycle.

2. A central vacuum cleaning system comprising a housing, a sump within the bottom of the housing containing a fluid, an inlet for dust-laden air in said housing, suction means for creating centrifugal motion for said air within said housing, slotted means within said housing for separating heavier solid particles from said air, means for subsequently forcing said air through said fluid and upward through said housing, and means for discharging said fluid-treated air from said housing, a cleaning tool, a plurality of vacuum couplings for said cleaning tool, said couplings communicating with said air inlet, automatic electrical control means for sequentially driving said suction means, flushing the fluid from said sump, and resetting said control means for a repeat cycle, and switch means for starting said electrical control means when said cleaning tool is coupled to said air inlet.

3. A vacuum cleaner comprising a housing, drive means outside said housing for creating suction within said housing, a sump in the bottom of said housing, an inner casing having a cylindrical upper portion and a truncated conical lower portion in closed communication with said suction means, an outer casing of similar shape to and concentric with said inner casing, struck-out longitudinal slots in the truncated conical portion of said outer casing, a fluid within said sump, the upper surface of said fluid being above the bottoms of said inner and outer casings, an inlet in said housing for admitting dust-laden air into the space between the cylindrical portions of said inner and outer casings, spiral guide means disposed in the space between the inner and outer casings for centrifugally directing the dust-laden air downward into said fluid, baffles within said inner casing for separating fluid entrained within the air drawn upward by said suction means, an outlet for said air communicating with said suction means, a muffler communicating with said outlet, a drain communicating with said sump, a check valve to prevent communication between said sump and said drain during the operation of the suction means, and means for flushing said sump when said suction means is inoperative.

4. The invention according to claim 3 in which said muffler communicates with said drain, and means are provided in said muffler for separating any fluid entrained in the air passing therethrough, said separated fluid passing to said drain.

5. The invention according to claim 3 in which the baffles within said inner casing comprise truncated conical members converging upward and having openings in the tops thereof.

6. In a vacuum cleaner comprising a housing, a sump in the bottom of said housing containing a fluid, suction means for creating centrifugal motion of dust-laden air within said housing, and mechanical means for separating the heavier solids from said dust-laden air; automatic electrical control means comprising means for driving said suction means, and timing means for automatically maintaining said drive means responsive for restarting for a predetermined period after said drive means has stopped, said timing means operating a flushing cycle for a predetermined period after said restarting period, said drive means being inoperative during said flushing cycle, and means for resetting said control means for restarting said drive means after said flushing cycle.

7. A central vacuum cleaning system comprising a housing, a plurality of air inlets communicating with said housing, an air outlet in said housing, suction means in said housing for drawing air through said inlets and discharging said air through said outlet, slotted means within said housing for centrifugally separating solid and liquid particles from said air, means within said housing for drawing air through a cleaning liquid, automatic electrical control means comprising switch means within each air inlet for starting said suction means when a cleaning hose is coupled to an air inlet, automatic timing means for simultaneously rendering said suction means inoperative and flushing said cleaning fluid from said housing, said timing means being rendered operative by the stopping of said suction means, and means for resetting said control means for a repeat cycle.

8. The invention according to claim 7 in which the timing means provides a predetermined period in which the suction means may be restarted before the flushing operation begins.

9. A central vacuum cleaning system comprising a housing, a plurality of air inlets communicating with said housing, an air outlet in said housing, suction means

in said housing for drawing air through said inlets and discharging said air through said outlet, slotted means within said housing for centrifugally separating solid and liquid particles from said air, means within said housing for drawing air through a cleaning liquid, automatic electrical control means comprising switch means within each air inlet for starting said suction means when a cleaning hose is coupled to an air inlet, a time motor, first and second cam means driven by said time motor, means for starting said time motor when said cleaning hose is uncoupled from said air inlet, said first cam means being adapted to rotate after said time motor starts and for a predetermined period during which coupling of the hose with the air inlet will restart the suction means, said first cam means being adapted to rotate for a subsequent predetermined period to activate means for flushing said cleaning liquid from said housing and simultaneously to render said suction means inoperative, said second cam means being adapted to reset said control means for a repeat cycle.

10. A vacuum cleaner comprising a housing, drive means for creating suction within said housing, a sump in the bottom of said housing, an inner casing having a cylindrical upper portion and a truncated conical lower portion and being in closed communication with said suction means, an outer casing of similar shape to and concentric with said inner casing, struck-out longitudinal slots in the truncated conical portion of said outer casing, a fluid within said sump, the upper surface of said fluid being above the bottoms of said inner and outer casings under operative conditions, an inlet in said housing for admitting dust-laden air into the space between the cylindrical portions of said inner and outer casings, spiral guide means disposed in the space between the inner and outer casings for centrifugally directing the dust-laden air downward into said fluid and to permit the heavier dust particles to be expelled through the slots in said outer casing, means within said inner casing for separating fluid entrained within the air drawn upward by said suction means, an outlet for said air communicating with said suction means, and means for flushing said sump when said suction means is inoperative.

11. The invention according to claim 10 in which the means for flushing said sump comprises a drain communicating with said sump, a first fluid inlet in the bottom of said sump to permit a discharge of fresh fluid into said sump, a second fluid inlet communicating with the inside of said inner casing to permit a discharge of fluid for cleaning the inside of said casing.

12. A vacuum cleaner comprising a housing, a motor-driven impeller in the upper portion of said housing, a sump in the bottom of said housing, the middle portion of said housing comprising an inner casing having a circular cross-section and a vertical axis, and an outer casing concentric with said inner casing, struck-out vertical slots in said outer casing, a fluid within said sump, the upper surface of said fluid being above the bottoms of said inner and outer casings under operative conditions, an air inlet communicating at a tangent with the annular space between said inner and outer casings, an air outlet communicating with said impeller, automatic electrical control means for sequentially driving the impeller to create a suction within the vacuum cleaner housing, and for automatically flushing the dirty fluid from the sump when said impeller is inoperative.

13. The invention according to claim 12 in which baffles are provided within said inner casing for separating fluid entrained within the air drawn upward by said impeller.

14. The invention according to claim 12 in which the inner and outer casings are of similar shape, the upper portions of which comprise cylinders and the lower portions of which comprise conical sections.

15. The invention according to claim 14 in which spiral guide means are mounted within the space between the truncated conical portions of the inner and outer casings for centrifugally directing the dust-laden air into said fluid and for permitting expulsion of the heavier dust particles through the slots in said outer casings.

16. A central vacuum cleaning system comprising a housing, an inlet for dust-laden air in said housing, an air outlet in said housing, a sump within the bottom of the housing containing a fluid, suction means in said housing for drawing air through said inlet and discharging said air through said outlet, mechanical means within said housing for creating a tortuous path for said air within said housing and through said fluid, automatic electrical control means for sequentially driving said suction means, flushing the fluid from said sump, and resetting said control means for a repeat cycle.

17. A central vacuum cleaning system comprising a housing, an inlet for dust-laden air in said housing, an air outlet in said housing, a sump within the bottom of the housing containing a fluid, suction means in said housing for drawing air through said inlet and discharging said air through said outlet, mechanical means within said housing for creating a tortuous path for said air within said housing and through said fluid, automatic electrical control means comprising means for driving said suction means, and timing means for automatically maintaining said drive means responsive for restarting for a predetermined period after said drive means has stopped, said timing means operating a flushing cycle for a predetermined period after said restarting period, said drive means being inoperative during said flushing cycle, and means for resetting said control means for restarting said drive means after said flushing cycle.

18. In a vacuum cleaner comprising a housing, a sump at the bottom of said housing containing a fluid, suction means for drawing dust-laden air through the fluid in said housing, and mechanical means for creating a tortuous path for said air in said housing and through said fluid; automatic electrical control means comprising means for driving said suction means, and timing means for automatically maintaining said drive means responsive for restarting for a predetermined period after said drive means has stopped, said timing means operating a flushing cycle for a predetermined period after said restarting period, said drive means being inoperative during said flushing cycle, and means for resetting said control means for restarting said drive means after said flushing cycle.

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