Sept. 19, 1950 A. H. BEEDE 2,522,498

VACUUM CLEANER

Filed Dec. 6, 1945 2 Sheets-Sheet 1

Fig. 1

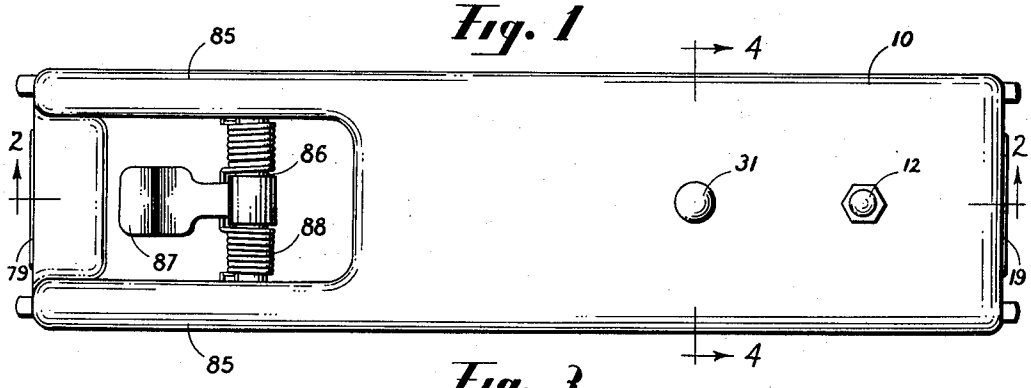


Fig. 3

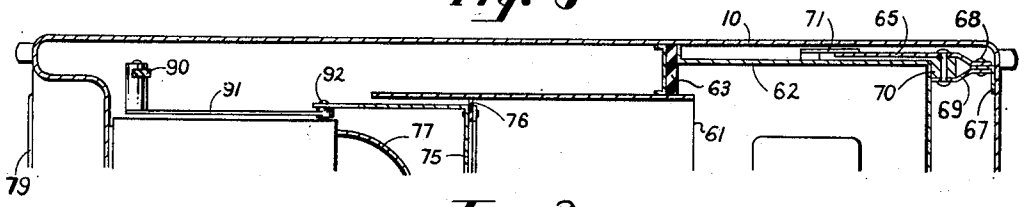


Fig. 2

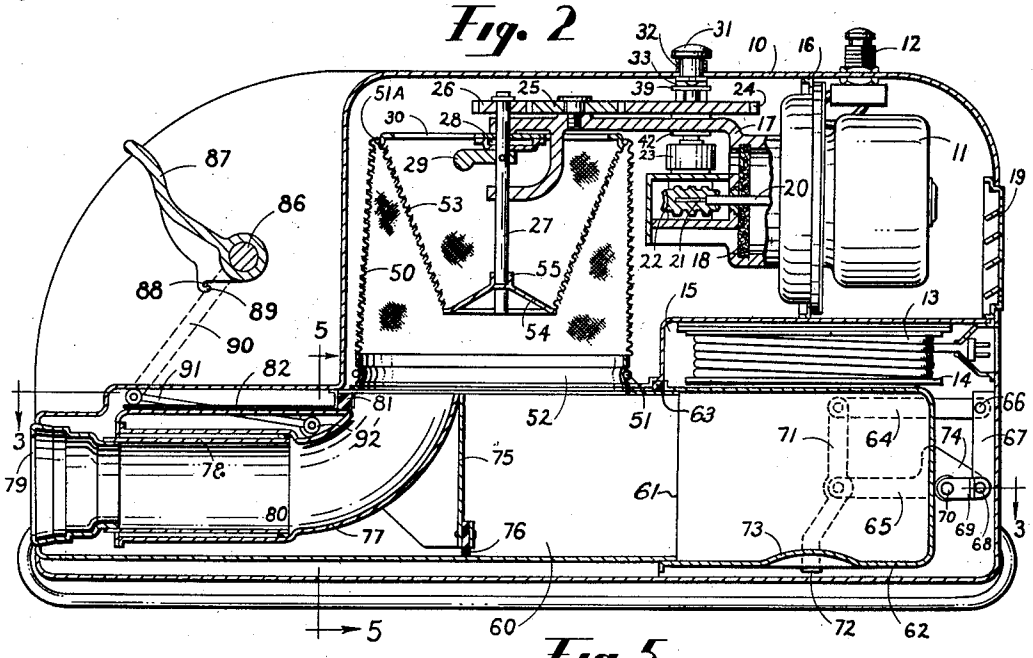
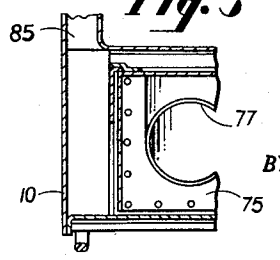


Fig. 5



INVENTOR.

BY Arnold H. Beede

H. T. Sperry

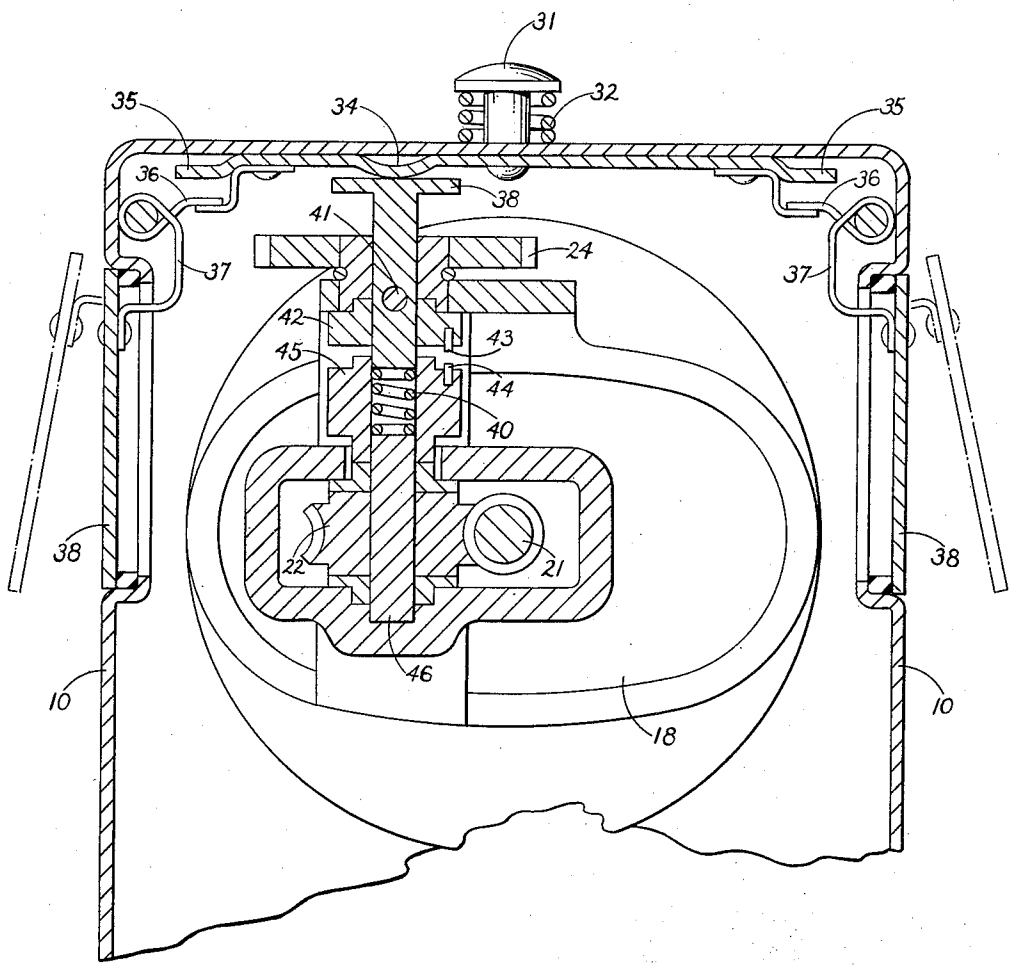
ATTORNEY.

Sept. 19, 1950 A. H. BEEDE 2,522,498

VACUUM CLEANER

Filed Dec. 6, 1945 2 Sheets-Sheet 2

Fig. 4



INVENTOR.

BY Arnold H Beede

A. T. Spiesy

ATTORNEY.

Patented Sept. 19, 1950

2,522,498

UNITED STATES PATENT OFFICE

2,522,498

VACUUM CLEANER

Arnold H. Beede, Stamford, Conn., assignor to Electrolux Corporation, Old Greenwich, Conn., a corporation of Delaware

Application December 6, 1945, Serial No. 633,233

4 Claims. (Cl. 183—37)

1

This invention relates to vacuum cleaners and is particularly concerned with problems of dirt and dust collection and disposal in connection therewith.

One persistently difficult problem in the art of vacuum cleaning is that of dirt disposal. Vacuum cleaners of both the "bag-on-handle" type and the "tank" type, as now in common use, require the removal of the dust collecting bag from the machine and the emptying of the dirt therefrom at periodical intervals. No commercially successful means has yet been devised by which this tedious and unpleasant task may be avoided. In both types of cleaners, the disconnection of the bag from the cleaner and the transportation of the bag to the place of final disposal as well as the emptying operation are not only difficult and tedious but the operator is rendered liable to contamination by the dirt and dust accumulated by the bag during such manipulations.

It is among the prime objects of the present invention to provide novel and improved means for dislodging accumulated dirt and foreign matter from the fabric used for the separation of such dirt and foreign matter from the air stream.

A further object of the invention is to provide mechanical means for agitating a dust separating screen so as to dislodge accumulated dust and foreign matter therefrom.

A still further object of the invention is to provide means operated by the motor-fan-unit of a vacuum cleaner to shake the dust screen thereof in order to dislodge accumulated matter therefrom.

A further object of the invention is to provide a power operated vibrator for the dust screen of the vacuum cleaner in combination with means for diverting the flow of air through the screen during agitation so as to enhance the action of the agitation in dislodging foreign matter.

Numerous other features and objects of the present invention will be apparent from the following specification when taken in conjunction with the accompanying drawings, in which:

Fig. 1 is a top plan view of one embodiment of the present inventive concept;

Fig. 2 is a vertical longitudinal section of that form of the invention illustrated in Fig. 1, taken on the line 2—2 of that figure.

Fig. 3 is a fragmentary horizontal longitudinal section taken on line 3—3 of Fig. 2;

Fig. 4 is a fragmentary section taken on the line 4—4 of Fig. 1, and

Fig. 5 is a detailed section taken on the line 5—5 of Fig. 2.

2

The present embodiment of the invention is shown as applied to tank type vacuum cleaners which are characterized by the provision of a suitable housing within which is mounted a motor-fan assembly in combination with a fabric dust screening member. The structural embodiment of the present inventive concept is shown as provided with means by which suction may be diverted from flow through the screen and simultaneously therewith the screen may be agitated by the motor to dislodge clinging dirt thereof.

Referring now more particularly to the drawings the herein disclosed embodiment of the invention comprises a casing 10 which is generally rectangular in configuration. In the casing 10, there is disposed a motor-fan unit 11, the circuit to which may be suitably controlled by a switch actuator 12, current being supplied thereto from a conductor 13 which is mounted upon a cord reel 14 disposed within a compartment 15 located beneath the motor. Suitable means preferably of a resilient nature are provided to normally wind the conductor upon the reel so as to eliminate the necessity of manually winding or otherwise disposing of the conductor externally of the machine when the device is not in operation. The motor-fan unit is preferably resiliently mounted within the casing 10 by means of a supporting gasket 16 and is provided with a forwardly extending casting 17 which is centrally apertured to admit air therethrough and to the unit. An air filter 18 is provided to filter from the air before discharging any fine dust particles which may have penetrated the interstices of the primary filter screen. Air which is so drawn through the unit is discharged to the atmosphere through a suitable exhaust opening 19 centrally located in the rear end of the casing above the cord reel compartment.

A motor shaft 20 extends forwardly from the motor and through the filter 18 and is provided within a portion of the casting 17 with a worm gear 21 keyed thereto which drivingly engages a worm wheel 22 which drives the driven element of a clutch mechanism 23. When engaged the clutch drives a gear 24 which by an intermediate pinion 25 rotates a gear 26 which is keyed upon a shaft 27, which shaft also carries an eccentric 28 and a counter-balance weight 29. Eccentric 28 is mounted within a ring 30 whereby rotation of the eccentric will impart oscillatory vibration to the dust collecting screen hereinafter described. The clutch 23 is adapted to be engaged so as to impart rotation from the shaft 20 to the gear by the application of foot pressure to a

vibrator treadle 31 which is normally maintained in raised position by a spring 32. The vibrator treadle 31 is mounted upon an internal transverse actuator bar 33 having a depending clutch actuating depression 34 and terminating in vent actuating arms 35 which engage the upper ends 36 of the pivotally mounted vent hinges 37 to which are attached vent doors 38 normally covering vent apertures on the casing 10. The depression 34 bears against the upper end of a clutch pin 39 which is normally urged upwardly against the depression 34 by the spring 40 and which engages the gear 24 for rotation therewith by a transverse pin 41. The clutch pin 39 also carries a driven clutch hub 42 which has a driven clutch projection 43 which when depressed engages a driving clutch pin 44 mounted in a driven clutch hub 45 which in turn is mounted upon and rotates with a shaft 46 carried by the worm wheel 22.

From this construction it will be seen that upon depression of the vibrator treadle 31, the vent doors 38 will be open to permit air to pass directly to the motor from the atmosphere thus cutting off suction through the screen and at the same time the driving clutch member 42 will be depressed and be engaged with the driven clutch member 45 to cause rotation to the shaft 27 and its eccentric 28, which rotation will impart the desired vibration to the dust screen.

The screen preferably used in the present construction is of the reentrant type comprising a pair of substantially concentric frustoconical sections, the outer and larger section 50 having its open end secured as by a band 51 to an air inlet ring 52. The upper or smaller end of the section 50 is secured by band 51A to member 30 from which the smaller or inner section 53 extends downwardly to be secured to a closed terminal plate 54 in which the shaft 27 has a bearing as at 55, tension applied to the screen during its application being such as to retain the member 54 against the shaft 27. By this construction it will be seen that when the shaft 27 imparts bodily rotary movement to the member 30, such movement will cause a vigorous vibration to both sections of the screen and since such vibration is imparted only when the treadle 31 is depressed and thus only when the doors 38 are open, accumulated and clinging dust will be shaken from the screen. It is important to note that the doors are open during the shaking operation since otherwise air would be continuously drawn through the screen during its vibration and it has been found that in such an event the vibration will not be effective in loosening adhering dirt.

Beneath the inlet ring 52 there is provided a dust receiving chamber 60, the rear end of which under the cord reel 14 is open as indicated at 61 and removably receives thereover a removable dust receptacle 62, the open mouth of which is normally sealed against a gasket 63 when the receptacle is in position. The receptacle is retained in such position and sealed against the gasket 63 by a latching mechanism including pairs of parallel bars 64 and 65. The bars 64 are pivoted as at 66 in the brackets 67 secured to the rear wall of the machine and the arms 65 are similarly pivoted as at 68. The arms 65 carry with them companion arms 69 to which are applied clamping rollers 70. The arms 64 and 65 are joined at their free ends by a handle arm 71 which extends beyond the arms to provide an actuating handle 72 which in cooperation with the recesses 73 in the receptacle 62 permits manipulation of the handle arm to swing the arms 64 and 65 outwardly to release the clamping members 70 and permitting removal of the receptacle. The arms 65 are further provided with a projection 74 which acts as a limit to the pivotal movement of the arms 64 and 65.

Within the opposite or forward end of the chamber 62 is mounted a combined inlet conduit and ram, a perpendicular end wall 75 of which constitutes the ram surface, packing material 76 being provided on the sides and bottoms thereof to seal the same. Forwardly of the wall 75 the member is provided with a downwardly inclined and forwardly extending air conduit 77 which encircles a fixed air inlet at 78 which communicates with a suction hose receiving fixture 79. Packing 80 is provided between the member 77 and 78 to prevent air leakage therebetween and top packing element 81 is provided to seal the inner end of the conduit 77 by engagement with the top wall 82 of this unit.

In the normal operation of the cleaner it will be seen that with the motor operating and a suction hose and cleaner nozzle applied to the fixture 79, air will be drawn in through the tube 78 and conduit 77 and will thus be drawn through the screen sections 50 and 53 and exhausted through the motor and exhaust outlet 19. Heavy dirt particles entrapped by the inflow of air will be prevented from passing through the screen and will drop downwardly in front of the ram surface 75 into the chamber 60. Some lighter particles of dust and dirt may cling to the screen until such time as the screen is vibrated and the air suction bypassed to the motor through the doors 38, at which time such particles will also drop into the compartment 60 in front of the ram. It will be noted that the air which is admitted through conduit 77 is directed upwardly and away from compartment 60 and thus there is a minimum of agitation of such foreign matter which has fallen thereinto from the screen.

For actuating the ram, the upper portion of the front of the casing is formed to provide a pair of parallel walls 85 between which extends a ram actuating shaft 86 to which is attached a foot pedal 87, the pedal being normally retained in raised position and the shaft urged in clockwise direction by a coil spring 88 which engages a hook 89 depending from the lower side of the pedal 87. Within the side members 85 and attached to the ends of the shaft 86 which extend therein is a pair of ram actuating cranks 90, each of which are connected by links 91 to the side wall of the ram and inlet unit as indicated at 92. From this construction it will be seen that in normal operation the parts are shown in Fig. 2 with the foot pedal raised and the ram in its most forward position. When it is desired to discharge the accumulated dirt the treadle 31 is first actuated whereby accumulated dust is shaken from the screen and disposed in the chamber 60 together with such heavy particles which have already dropped into it by gravity. After the desired shaking, the motor 11 is preferably deenergized by manipulation of the switch 12 and thereafter the operator's foot is applied to the treadle 87 whereby through the cranks 90 and links 91 the ram is moved longitudinally through the chamber 60 forcing the accumulated dirt out the open end 61 and into the receptacle 62 where it is compressed. Pressure may then be relieved from the treadle 87 and the handle 72 manipulated to release the container 62 which may then be removed, emptied and subsequently

reapplied when the cleaner is again to be used.

From a consideration of the foregoing, it will be seen that the present invention provides a novel and improved cleaner having a motor driven screen vibrator for shaking the dust from the screen into the dust compartment, from where it may be displaced into a removable dirt receptacle, it being understood that the compartment may be cleared many times and the screen vibrated many times before it is necessary to remove the receptacle in which the dirt may be compressed by the repeated operations of the ram.

It will be understood, of course, that the invention is not limited to the various structural features here shown by way of illustration and that numerous changes and modifications thereof may be resorted to without departure from the spirit or scope of the invention as outlined in the appended claims.

What I claim is:

1. In a vacuum cleaner, a casing formed with an inlet opening and an exhaust opening, a dust separating member in said casing disposed in the path of flow between said inlet and said outlet, an electric motor, a fan driven by said motor for producing flow of air through said casing, agitating means associated with said member, clutch mechanism for selectively connecting said agitating means to said motor, control means movable to engage said clutch, valve means in said casing operable for diminishing flow of air through said member, and means actuated by said control means for operating said valve to diminish flow through said member when said clutch is engaged.

2. In a vacuum cleaner, a casing formed with an inlet opening and an exhaust opening, a dust separating member in said casing disposed in the path of flow between said inlet and said outlet, an electric motor, a fan driven by said motor for producing flow of air through said casing, agitating means associated with said member, normally disengaged clutch mechanism for selectively connecting said agitating means to said motor, spring biased control means manually movable to engage said clutch, valve means in said casing operable for diminishing flow of air through said member, and means actuated by said control means for operating said valve to diminish flow through said member when said clutch is engaged and for restoring normal flow through said member when said clutch is disengaged.

3. In a vacuum cleaner, a casing formed with an inlet opening and an exhaust opening, a dust separating member in said casing disposed in the path of flow between said inlet and said outlet, an electric motor, a fan driven by said motor and disposed in said casing between said member and said outlet, agitating means associated with said member, clutch mechanism for selectively connecting said agitating means with said motor, control means movable to engage said clutch, said casing being provided with an auxiliary inlet opening between said member and said fan, valve means for controlling flow through said auxiliary opening, and means actuated by said control means for opening said valve means to diminish flow through said member when said clutch is engaged.

4. In a vacuum cleaner, a casing formed with an inlet opening and an exhaust opening, a dust separating member in said casing disposed in the path of flow between said inlet and said outlet, an electric motor, a fan driven by said motor and disposed in said casing between said member and said outlet, agitating means associated with said member, normally disengaged clutch mechanism for selectively connecting said agitating means with said motor, control means manually movable to engage said clutch, said casing being provided with an auxiliary inlet opening between said member and said fan, a valve for controlling flow through said auxiliary opening, means connecting said valve with said control means for opening said valve to diminish flow through said member when said control means is moved to engage said clutch, and spring means for biasing said control means towards clutch disengaging position and for closing said valve.

ARNOLD H. BEEDE.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,316,924	Ross	Sept. 23, 1919
1,341,129	Hopkins	May 25, 1920
1,621,824	Boesger	Mar. 22, 1927

FOREIGN PATENTS

Number	Country	Date
621,415	Germany	Nov. 6, 1935
698,817	Germany	Nov. 18, 1940