

Jan. 23, 1951

H. T. LANG

2,539,195

INLET DIRT DEFLECTOR AND FILTER ARRANGEMENT
FOR SUCTION CLEANERS

Filed May 2, 1950

Fig.1.

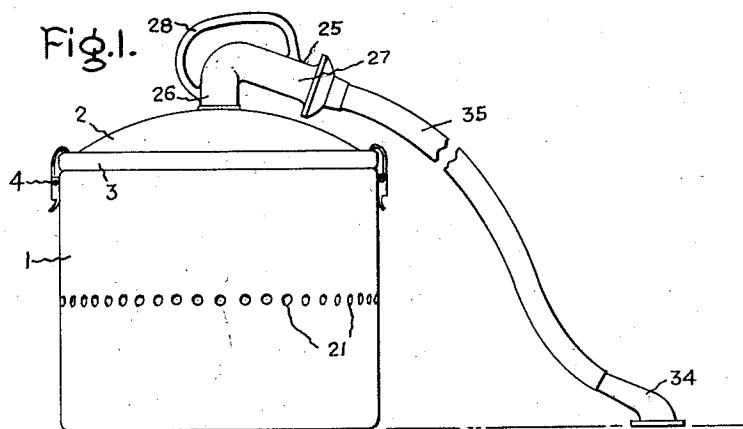
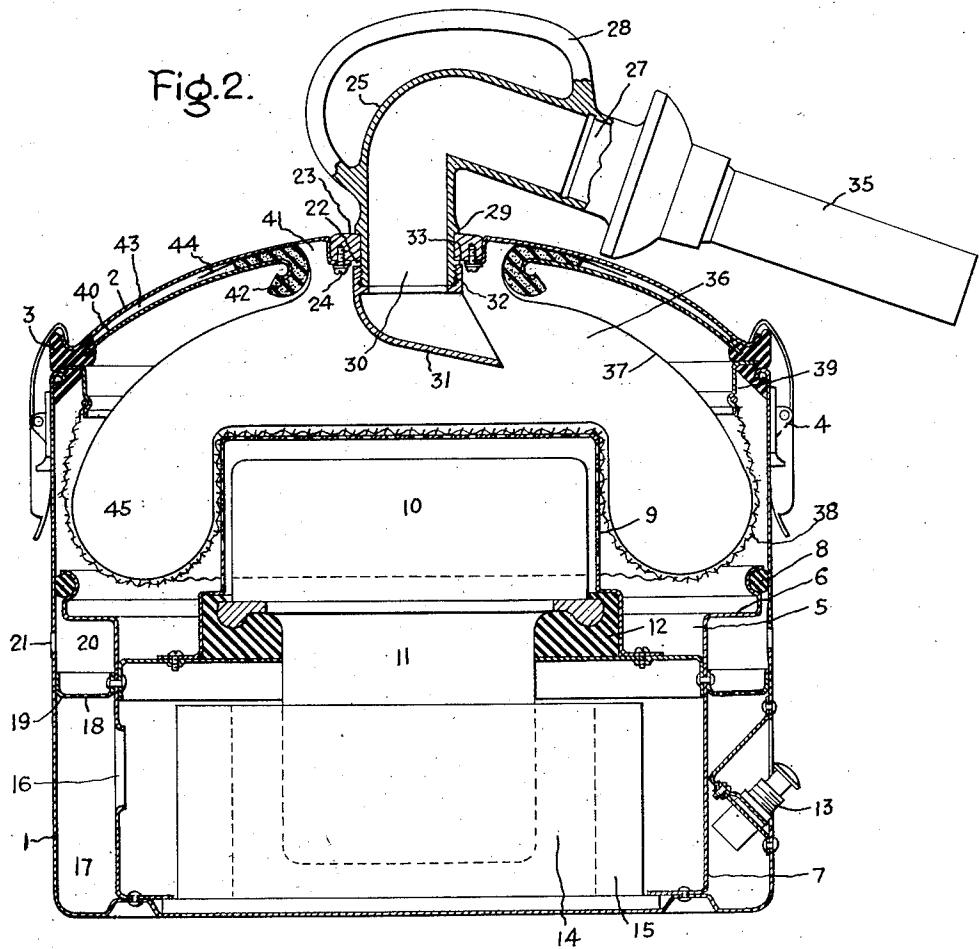


Fig.2.



Inventor:

Henry T. Lang,

by *Sheridan & Brey's*
His Attorney.

UNITED STATES PATENT OFFICE

2,539,195

INLET DIRT DEFLECTOR AND FILTER ARRANGEMENT FOR SUCTION CLEANERS

Henry T. Lang, Cleveland, Ohio, assignor to General Electric Company, a corporation of New York

Application May 2, 1950, Serial No. 159,493

6 Claims. (Cl. 183—37)

1

My invention relates to suction cleaners, particularly known as vacuum cleaners. More particularly my invention relates to suction cleaners of the canister type, that is, cleaners in which the body of the machine is in the form of a bucket or canister. The particular parts of a canister cleaner to which my invention relates are improvements in an inlet to the cleaner which is located at the top of the cleaner, in a dirt deflector within the cleaner, and in the air filtering or dust collecting arrangement within the cleaner.

The objects of my invention are to provide a cleaner which may be operated over long periods of time without substantial decrease in the efficiency of the cleaner and to prevent damage of the air filter within the cleaner, which damage might be caused by the air blast from the intake in the cleaner. Thus with my invention relatively fragile materials may be used for the dust filter.

Other objects and details of that which I believe to be novel and my invention will become apparent from the following description and the claims appended thereto taken in conjunction with the accompanying drawing in which is illustrated an exemplary form of canister cleaner embodying the present invention and incorporating my improvements. In the drawing, Fig. 1 is a side view of a canister cleaner which may embody my invention, and Fig. 2 is a cross section on an enlarged scale showing the interior parts of the cleaner of Fig. 1.

A suction cleaner of the character involved here has the usual cylindrical outer tank or canister 1 with an open top closed by a cover 2. A gasket 3, of rubber or other similar material, seals the joint between the top of the canister and the bottom of the cover. Cover clamps 4, of any suitable design, secure the cover to the canister when the cleaner is in use.

Within the canister a support for the usual motor and fan is required, and I have shown this in the form of a frame or platform 5 having a generally horizontal portion 6 and vertical walls 7 supporting the platform from the bottom of canister. An annular gasket 8 of rubber or similar material seals the edges of the horizontal portion at the sides of the canister, thereby forming an upper suction section above the horizontal platform, and a lower discharge section below the platform. The frame or platform is open at its center, and the central opening is covered by a perforated metal screen 9, shown as covering the inlet end of the fan unit 10.

2

which is driven by the motor unit 11. The fan and motor unit are secured together and both may be mounted in a rubber ring 12 which is secured around the central opening in the frame or platform 5. A pushbutton type motor control switch 13, which may be located as shown near the bottom of the canister on the outside, is suitably connected as by wires (not shown) to the motor 11. Other wires (not shown) lead to the switch from a suitable power source in the usual fashion.

Air coming from the fan and motor unit may be discharged directly to the outside atmosphere but I prefer the novel arrangement described below. This includes an exhaust space 14 below and around the motor unit within the canister, in which space is located an annular muffler or noise deadening ring 15 which rests on the bottom of the canister but has an open top below the horizontal portions 6 of the platform 5. Air will pass over the top of the muffler, through the opening 16 in the vertical wall 7 of the platform member and into a space 17 between the outer tank wall and the vertical platform wall. From the space 17 the air will pass upwardly through holes 18 in a horizontal ring 19 which is secured to the platform supporting member. Above the ring 19 is a discharge space 20 which may be filled with glass wool, shredded paper, soft felt or other similar material for the purpose of finally filtering the air and further suppressing noise from the motor and fan of the cleaner. From the discharge space 20 the air leaves the cleaner as by a series of discharge holes 21 in the outer tank walls.

I refer now to the suction inlet and dust collection parts of the cleaner, these being mounted on and directly underneath the cover of the tank or canister. As can be readily understood from the drawings, the cover 2 is provided with a circular opening 22, preferably located at the center of the cover. This inlet opening is surrounded by a bearing ring or surface 23 which is suitably held in place on the cover as by screws 24. Extending through this bearing ring and having a close but rotatable fit therewith is the tubular inlet fitting 25, shown here as of generally L-shape. This fitting has a vertical portion 26 communicating with an approximately horizontal portion 27. The fitting may be provided with a handle 28 for manipulating the inlet fitting, for lifting the cover and for carrying the entire cleaner when the cover is clamped to the canister. It may be noted that the approximately horizontal portion 27 is directed at an

angle toward the floor and is not exactly parallel to the floor. This is for a purpose more fully described and claimed in my patent application Ser. No. 159,494, filed concurrently herewith and assigned to the same assignee as the present application.

The vertical portion of the inlet fitting is provided with an annular shoulder 29 which rests on the bearing ring, and an open end 30 which is directed downwardly generally toward the perforated screen 9 on the motor supporting frame. In order to prevent direct flow of air from the open end of the inlet fitting to the top of the perforated screen, I provide a horizontally directed deflector trough 31 which is suitably secured over the open end of the inlet fitting as by co-operating screw threads 32 on the deflector and on the fitting. The top edge 33 of the deflector may be used to prevent accidental withdrawal of the fitting from the cover opening, this top edge bearing against the under side of the bearing ring.

In the usual fashion of suction cleaners, the outer end of the inlet fitting is suitably connected to the nozzle 34 of the cleaner as by a flexible hose 35. The free end of the hose 35 may be made as a rigid tube or wand connected to the nozzle as is preferred in many cleaners of this character. Manipulation of the nozzle on the floor or other surfaces surrounding the cleaner causes the inlet and the deflector to rotate within the cleaner as the user walks around the tank. This rotation insures that discharge of dirt laden air from the deflector will not be concentrated in any one place but will be spread fairly evenly around the circumference of the inside of the cleaner.

Co-operating with this rotatable discharge, I have provided a dust collecting filter bag 36 which completely surrounds the inlet and in every position of the discharge deflector presents an initial filtering face 37 very nearly parallel to the direction of air discharged by the deflector. This rotating discharge, its horizontal deflection, and the direction of discharge with respect to the initial filtering area prevents piling of accumulated dirt in one place and prevents the concentrated air blast of the intake from exercising its effect on any single portion of the filter. This is especially important where the filter is made of relatively fragile material such as the porous papers or felted fiber mats now becoming popular for use in disposable bags and filters in vacuum cleaners.

As an example of filter construction using fragile disposable material, I have shown a design in the present application similar to that shown and claimed in the application of A. E. Smith, Ser. No. 57,558, filed October 30, 1948, and assigned to the same assignee as the present application. This filter arrangement includes an outer porous bag or support 38 made of cloth or other relatively sturdy material, this outer bag being held in place as by a supporting ring 39 which is suitably sealed at its edges as by the cover gasket 3. Over the top of this bag and also sealed at its outside edges as by the gasket 3 is positioned a removable dome or cone 40 which has a central opening 41. A sealing gasket ring 42 made of sponge rubber or other suitable compressible material surrounds the opening 41 and seals the edge of the dome opening 41 around the inlet in the cover. There is thus provided a sealed space 43 between the cover and the dome

which is outside of the air flow through the cleaner.

The disposable filter bag, which is the bag 36 previously mentioned, fits generally within the outer supporting bag 38, but has side walls which are the initial filtering surfaces 37 previously mentioned, these side walls extending under the dome, through the central opening 41, expanding into an open mouth portion 44 having edges which pass over the gasket ring 42 into the sealed space 43. This arrangement leaves the edges of the disposable bag clean at all times as outlined more fully in the above noted Smith application, so that these top edges of the disposable bag may be easily closed without soiling the hands and may be conveniently used to carry the disposable bag when throwing it away.

With the present arrangement it will be noted that even though the filter bag is made of comparatively fragile material, the disposable bag need not be damaged by the discharge of air from the inlet, because of the swivel connection of the inlet combined with the deflector which provides impingement of the air blast in a direction at a low angle to the initial filtering surface of the filter bag. It will be noted that a substantial portion of the inside of the filtering bag assumes the shape of an annulus 45 surrounding the perforated screen 9 around the circumference of the canister. This area of the filter bag is relatively free from disturbance by air flowing through the cleaner, being remote from the inlet and outside of the initial air blast area. Therefore, most of the dust will collect in this space and the period of operation of the cleaner, without need for removal of accumulated dust, will be further extended. Noise of operation will be reduced and air blast from the cleaner exhaust will be substantially eliminated by the air discharge arrangement shown and described here, which arrangement obviously also aids in removing dust from air passing through the cleaner.

My application Serial Number 191,034 was filed October 19, 1950, as a continuation-in-part of the present application to cover the air discharge arrangement shown and described here and certain improvements hereto for adapting the cleaner to blowing operations.

As will be evident from the foregoing description, certain aspects of my invention are not limited to the particular details of construction of the example illustrated, and I contemplate that various and other modifications and applications of the invention will suggest themselves to one skilled in the art. It is my intention, therefore, that the appended claims shall cover such modifications and other applications as do not depart from the true spirit and scope of my present invention.

60 What I claim as new and desire to secure by Letters Patent of the United States is:

1. In a canister cleaner of the type having an air inlet opening located on the top of the canister, that improvement which comprises an air inlet fitting extending through and mounted to rotate on a vertical axis in said opening, a lower end on said fitting rotatable therewith and having a substantially horizontally directed air discharge opening therein, a dust filtering bag 65 rounding the end of said fitting within the canister and an annular wall on said bag positioned opposite the discharge opening of said inlet and presenting a dust filtering surface located at a relatively low angle to air discharged from said 70 inlet in all positions of rotation of said fitting.

2. In a canister cleaner of the type having an air inlet opening centrally located on the top of the canister, that improvement which comprises an inlet fitting extending through and rotatably mounted on a vertical axis in said opening, a lower end on said fitting rotatable therewith, a horizontally directed air deflector secured to the lower end of said fitting within said canister, a dust filtering bag of relatively fragile material surrounding the end of said fitting within the canister and an annular wall on said bag positioned opposite the deflector on said inlet and presenting a dust filtering surface located at a relatively low angle to air discharged from said inlet in all positions of rotation of said fitting within said canister.

3. In a suction cleaner of the type having an open top canister adapted to be placed on a floor or other supporting surface, a cover closing the open top of the canister, a suction creating fan and motor unit within the canister, and an air inlet opening centrally located in the canister cover, that improvement which comprises an air inlet fitting with a vertically extending tubular portion rotatably mounted on said inlet opening, an open lower end on said fitting rotatable therewith, a horizontally directed air deflector secured to the lower end of said fitting within said canister, a dust filtering bag closely surrounding the end of said fitting within the canister, and an annular wall on said bag positioned opposite the deflector on said inlet and presenting a dust filtering surface located at a relatively low angle to the direction of air discharged from said inlet deflector in all positions of rotation of said fitting, whereby upon rotation of said inlet fitting air is discharged toward a multiplicity of places around the circumference of said dust filtering bag.

4. In a canister cleaner of the type having an air inlet opening located on the top of the canister, that improvement which comprises an air inlet fitting extending through and mounted to rotate on a vertical axis in said opening, a lower end on said fitting rotatable therewith and having a substantially horizontally directed air discharge opening therein, a dust filtering bag surrounding the end of said fitting within the canister, an annular wall on said bag positioned opposite the discharge opening of said inlet and presenting a dust filtering surface located at a relatively low angle to air discharged from said inlet in all positions of rotation of said fitting and an annular dirt collecting pocket in said bag located remotely from said inlet.

5. In a suction cleaner of the type having an open top canister adapted to be placed on a floor or other supporting surface, a cover closing the open top of the canister, a suction creating fan and motor unit within the canister, and an air inlet opening centrally located on the top of the canister cover, that improvement which com-

prises an air inlet fitting with a vertically extending tubular portion rotatably mounted on said inlet opening, an open lower end on said fitting rotatable therewith, a horizontally directed air deflector secured to the lower end of said fitting within said canister, a dust filtering bag closely surrounding the end of said fitting within the canister, an annular wall on said bag positioned opposite the deflector on said inlet and presenting a dust filtering surface located at a relatively low angle to the direction of air discharged from said inlet deflector in all positions of rotation of said fitting, and an annular dirt collecting pocket in said bag positioned around the fan unit of the cleaner and next to the inner walls of the canister, said pocket being remote from said inlet whereby dirt collected in said pocket is free from disturbance by air entering through said inlet and deflector.

6. In a canister cleaner of the type having a vertically standing tank with an open top, a cover closing said open top, and a motor and fan unit located near the bottom of said tank, the cover having an air inlet opening centrally located therein and leading to said motor and fan unit, an inlet, dirt deflector, and filter arrangement for the cleaner comprising a vertically extending tubular inlet fitting rotatably mounted in said air inlet opening in said cover, an open lower end on said fitting rotatable therewith, a horizontally directed air deflector secured to said lower end of said fitting within said tank, a dust filtering bag of relatively fragile material supported above said motor and fan unit within said tank, an open mouth on said bag surrounding the end of said fitting and said deflector, a substantially horizontal annular wall on said bag positioned opposite the deflector on said inlet and presenting a dust filtering surface located at a relatively low angle to air discharged from said deflector in all positions of rotation of said fitting, and an annular dirt collecting pocket in said bag located close to the walls of said tank around said motor and fan unit whereby dust collected in said pocket is free from disturbance by air discharged directly from said deflector.

HENRY T. LANG.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
1,064,412	White	June 10, 1913
1,200,855	Krause	Oct. 10, 1916
2,514,623	Brown	July 11, 1950

FOREIGN PATENTS

Number	Country	Date
60 279,858	Great Britain	Mar. 8, 1928

Certificate of Correction

Patent No. 2,539,195

January 23, 1951

HENRY T. LANG

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows:

Column 3, line 65, for "bing" read *being*; column 5, line 25, for the words "mounted on" read *mounted in*;

and that the said Letters Patent should be read as corrected above, so that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 19th day of June, A. D. 1951.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.