Aug. 29, 1950 J. F. CAVANAGH 2,520,877

VACUUM CLEANER

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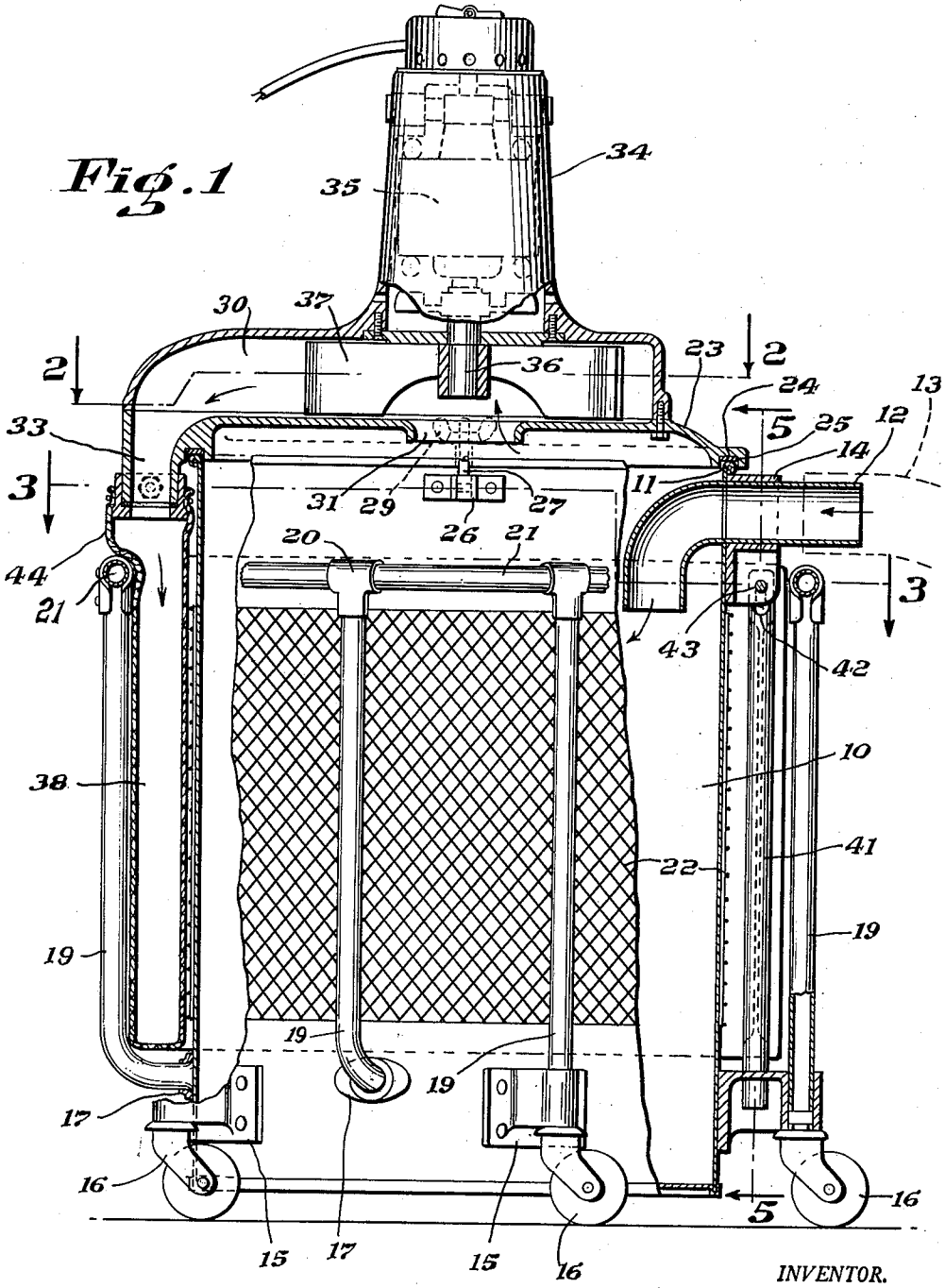
Fig. 1



INVENTOR.
JOHN F. CAVANAGH
BY
Geo B Rawlings.
ATTORNEY

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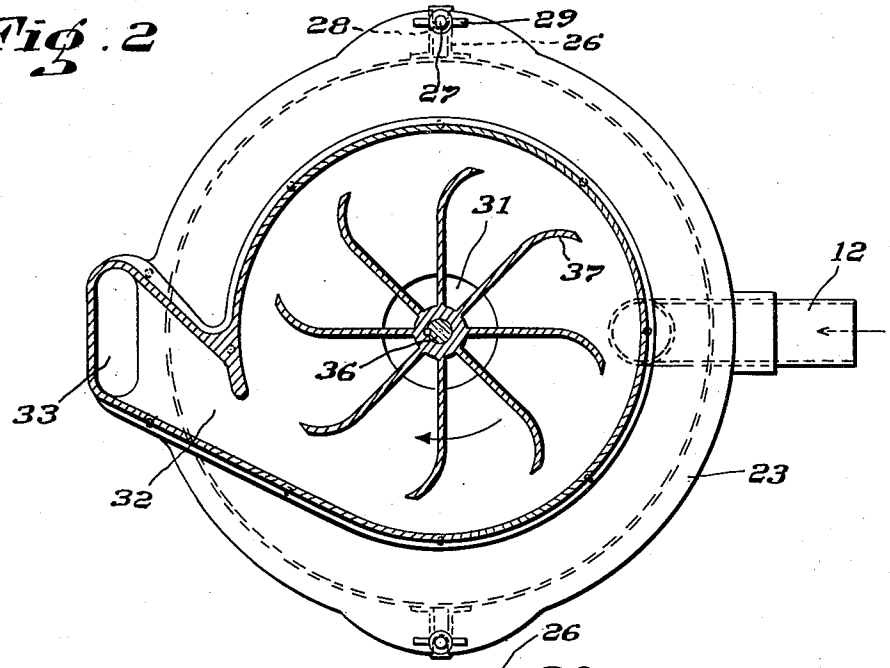
Fig. 2



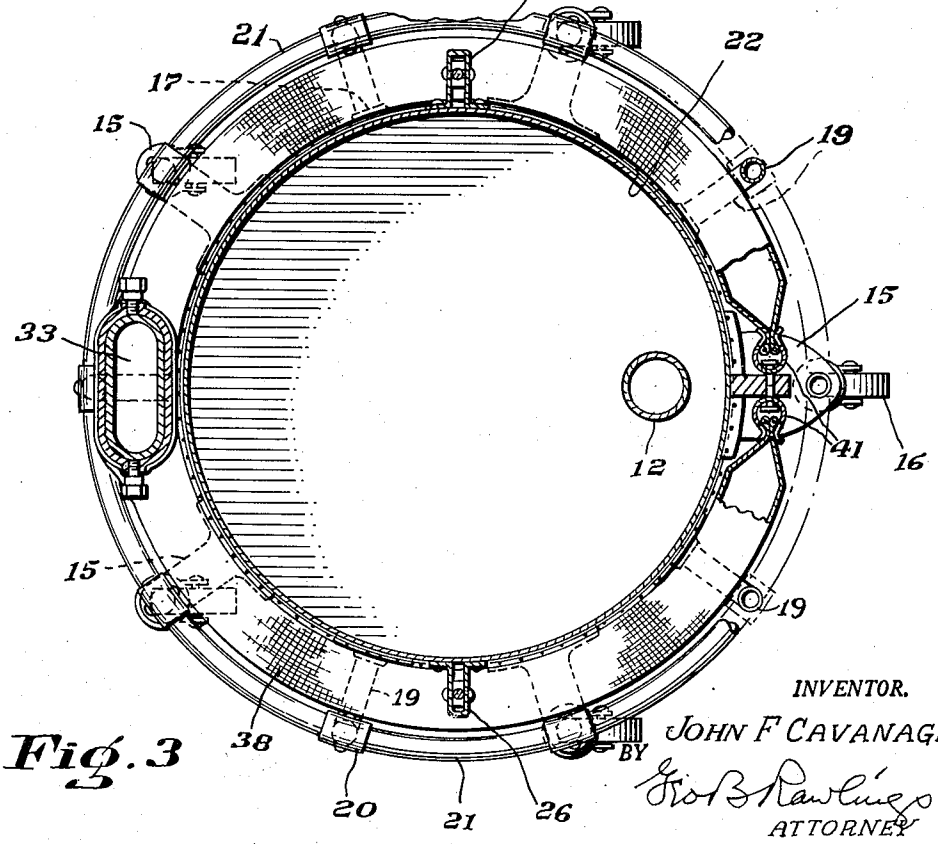


Fig. 3

INVENTOR.
JOHN F CAVANAGH
BY
Robert B Rawlings.
ATTORNEY

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Fig. 4

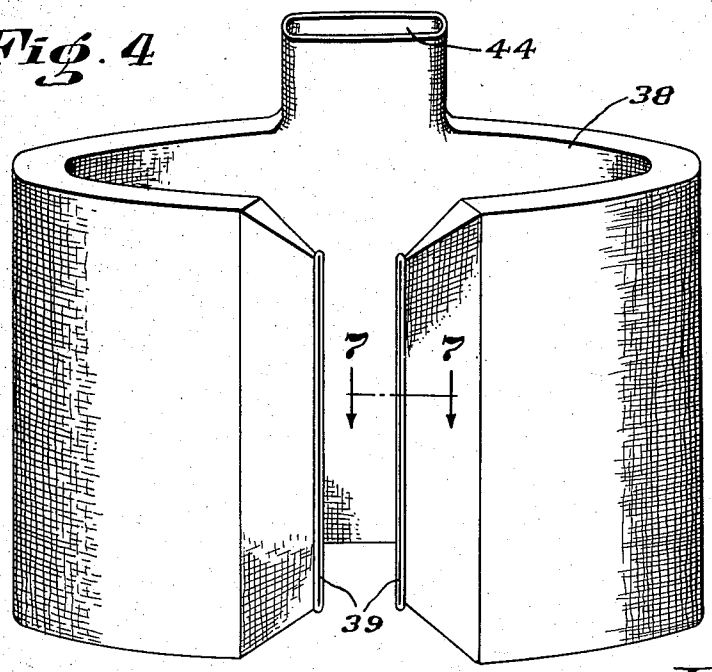


Fig. 5

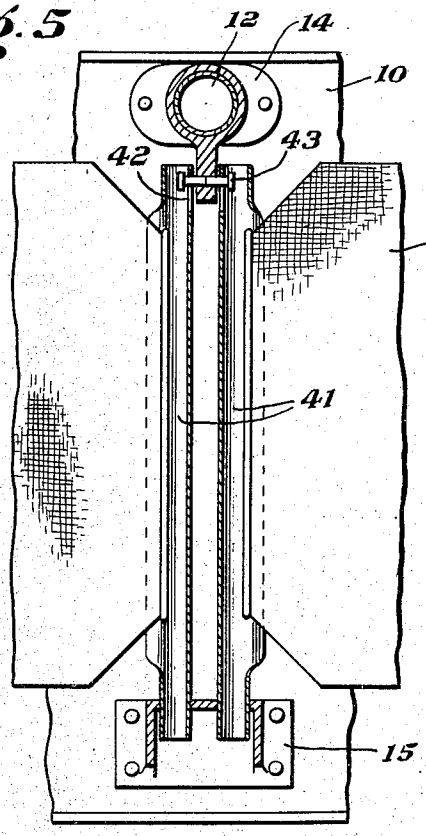
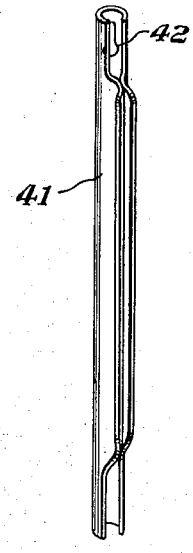


Fig. 6



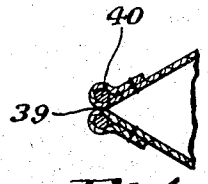


Fig. 7

INVENTOR.
JOHN F. CAVANAGH
BY
Robert B. Rawlings.
ATTORNEY

Patented Aug. 29, 1950 2,520,877

UNITED STATES PATENT OFFICE

2,520,877

VACUUM CLEANER

John F. Cavanagh, Providence, R. I., assignor to Masury-Young Company, Charlestown, Mass., a corporation of Massachusetts

Application October 5, 1946, Serial No. 701,601

9 Claims. (Cl. 183—36)

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This invention relates to vacuum cleaners of the portable type, and has for its main object to provide a cleaner of compact structure and neat and attractive appearance which may be operated in congested places, such as garages, machine shops, and in and among articles of furniture without exposing either the machinery of the device, or the filter bag, to injury.

Other objects and novel features of the construction and arrangement of parts comprising my improved cleaner will appear as the description of the invention progresses.

Heretofore it has been the general practice to attach the filter bag to the top of the tank unit and permit it to inflate above and to one side of said tank unit. The bag is not only exposed to frequent injury but the cleaner assembly is bulky and awkward to use in congested places such as machine shops, garages and among articles of furniture.

In carrying out my invention, I dispense entirely with the loosely mounted, inflatable filter bag on the top or on the side of the tank of the cleaner. In place of the prior cumbersome devices I provide an annular form of filter bag surrounding the tank and enclosed within a guard rail or grill or housing which performs the double function of protecting the filter bag against injury, and of furnishing convenient gripping means to move the cleaner from place to place or when emptying the tank.

Thus, in my improved cleaner the air filter is in the form of an annulus surrounding the tank and protected by the grill or guard. This construction provides maximum filter area for a given volume. It also provides a compact cleaner assembly in which the filter is amply protected against injury.

In the accompanying drawings illustrating a preferred embodiment of my invention:

Fig. 1 is a side elevation, partly in section, of a vacuum cleaner embodying my invention;

Fig. 2 is a sectional plan view, taken on the line 2—2 of Fig. 1;

Fig. 3 is a sectional plan view taken on the line 3—3 of Fig. 1;

Fig. 4 is a perspective view of my improved filter bag;

Fig. 5 is a vertical section, taken on the line 5—5 of Fig. 1, looking in the direction of the arrows;

Fig. 6 is a perspective view of the clamp for the filter bag, and;

Fig. 7 is a section taken on the line 7—7 of Fig. 4, and looking in the direction of the arrows.

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Referring to the drawings, and particularly to Fig. 1, there is shown a cylindrical tank 10 of suitable diameter and length, said tank being open at the top and with its top edge rolled at 11 to provide a smooth rounded surface. Adjacent the top of the tank is a perforation through which extends the horizontal arm of an elbow 12 and the vertical arm of said elbow is positioned to direct matter passing therethrough downwardly into the tank 10. To the horizontal arm of the elbow 12 may be removably secured the end of the usual flexible tube 13, as indicated by the dash lines. Adjacent the top of the tank 10 and associated with the elbow 12, is a flange 14. The flange 14 not only acts as a support for the elbow 12, but as a support for a filter bag to be hereinafter described.

Symmetrically arranged about the periphery of the tank 10, near the bottom thereof, are the brackets 15, in which are swivelly mounted the casters 16, one of such brackets being in vertical alignment with the flange 14 and acting as the lower support for the closure member of the filter bag.

Symmetrically arranged about the tank 10, near the bottom thereof, and with respect to the brackets 15, are the flanges 17. Secured to the flanges 17 are the lower ends of pipes or tubes 18. Fitting into the brackets 15 are the lower ends of pipes or tubes 19. These pipes or tubes 18 and 19 are spaced apart from the outer wall of the tank 10 and extend upwardly and parallel to the wall of said tank. The upper ends of the pipes or tubes 18 and 19 are secured to T's 20 which are symmetrically arranged on the circular, tubular ring 21. The pipes or tubes 18 and 19, and the circular, tubular ring 21 constitute the grill or guard hereinbefore referred to, forming an enclosing protecting means for the filter bag to be hereinafter described, and also providing a plurality of gripping facilities when it becomes necessary to lift the cleaning unit, or when emptying the tank 10.

Immediately surrounding the tank 10 and within the area enclosed by the pipes or tubes 18 and 19 is a surface 22 of closely disposed protuberances for providing an air space between the filter bag and tank 10.

Fitting into the top of the tank 10 is a cover 23, having on its lower surface a circumferential groove 24 fitted at its bottom with a gasket 25 which engages with the rolled edge 11 of the tank 10. Diametrically secured to the sides of the tank 10 are the ears 26 carrying the screws 27 housing in slots 28 cut in the cover 23. The

screws 27 are engaged by the wing nuts 29 and by means of which the housing 23 is secured to the top of the tank 10.

Within the cover 23 is formed a chamber 30, and such chamber communicates with the interior of the tank 10 by the passage 31 in the cover 23. Integral with the cover 23 and tangentially arranged with respect to the chamber 30, is a passage 32 and which passage extends downwardly as indicated by 33.

Formed integral with the cover 23 and above the chamber 30 is a housing 34, within which is mounted a motor 35, on the driving shaft 36 of which is secured a fan 37 housed in the chamber 30.

Referring now to Figs. 4 to 7 inclusive, there is shown an improved filter bag 38, substantially annular in shape, hollow, and rectangular in cross section. This bag is made of any of the well known, approved materials, and its ends are reduced in dimensions to provide openings or mouths 39, and by means of which the bag may be emptied of accumulated matter. Such openings or mouths 39 are reinforced as at 40. The cord helps to lock in the bag mouths by thickening the material and such mouths are held in closed relation by the split tubular members 41. Each of the members 41 is provided adjacent its top end with a key hole slot 42 which engages with the bolt 43 carried by the flange 14. The lower ends of the split tubular members 41 fit into holes provided in one of the brackets 15 immediately below the flange 14. The filter bag 38 is provided intermediate its ends and at the top thereof with a tubular member 44, which fits over and is secured at 33 to the passage 32 leading from the chamber 30. In operation, when motor 35 is started, fan 37 is revolved in the direction of the arrow in Fig. 2 to suck the dirt-laden air into tank 10 through connection 12. Any moisture contained in the air drawn into the machine accumulates within said tank. The dirt-laden air is sucked upwardly through passage 31 in cover 23 into chamber 30 for discharge through passage 32 into the intake end 44 of the porous filter bag 38, the discharge mouths 39 of which are closed by the removable closures 41. When the filter bag and/or tank require emptying, cover 23 is removed from the machine to permit the bag and/or tank to be withdrawn, the closures 41 and detached from the bag, and the bag and/or tank emptied.

While I have described the preferred form of my invention somewhat in detail, it is to be understood that I may vary the form and arrangements of parts comprising my device within wide limits without departing from the spirit of the invention.

Having thus described my invention, what I claim as new is:

1. In a vacuum cleaner, a tank open at its upper end and having an intake for dirt-laden air, a cover removably assembled to the open end of said tank and having an inlet passage communicating with the interior of the tank and an air discharge passage extending laterally across the top of the cover and discharging exteriorly of the tank, an annular filter bag surrounding the side wall of the tank and detachably assembled at its upper end to said cover, said bag having an inlet portion in communication with said discharge passage of the cover and having at least one opening for emptying the dirt accumulating within said bag, a removable closure for the dirt-emptying opening of said bag, and suction means for drawing dirt-laden air into said tank and through the passage connecting said head with the interior of the tank and for forcing it along the discharge passage of said head and into the inlet portion of said filter bag.

2. The structure of claim 1 wherein the bag is in the form of a double-walled strip closed at its top and bottom edges, except for said inlet portion, and is provided at each end with a dirt-emptying opening, and wherein there is a separate removable closure for each dirt-emptying opening.

3. The structure of claim 1 wherein the cover is formed to provide a chamber overlying the inlet passage therein which communicates with the interior of the tank, and wherein the suction means consists of a fan mounted within said chamber to rotate in a horizontal plane above said inlet passage.

4. The structure of claim 1 wherein there is a protective grill surrounding the tank and spaced therefrom to define therewith an annular space within which the filter bag is protectively located.

5. The structure of claim 4 wherein the inner wall of said annular space is comprised of a surface of closely disposed protuberances.

6. In a vacuum cleaner, a tank open at its upper end and having an intake for dirt-laden air, a protective grill surrounding the side wall of the tank and spaced therefrom to define therewith an annular space, a cover removably assembled to the open end of said tank, and having a chamber provided with an inlet opening communicating with the interior of the tank and with a discharge passage terminating exteriorly of the tank, a fan located within said chamber, a motor surmounting said cover and having a shaft to which said fan is assembled, an annular filter bag detachably mounted in the space between the side wall of the tank and said grid and having an inlet portion in communication with the discharge passage from said fan chamber and having at least one opening for emptying the dirt accumulating within said bag, and a removable closure for the dirt-emptying opening of said bag.

7. The structure of claim 6 wherein the motor shaft is vertically alined with the inlet opening of the cover which communicates with the interior of the tank and the fan is mounted on said shaft to rotate in a horizontal plane above said opening.

8. The structure of claim 6 wherein the filter bag is in the form of a double-walled strip closed at its top and bottom edges, except for said inlet portion.

9. The structure of claim 6 wherein the strip constituting the filter bag is provided at each end with a dirt-emptying opening extending substantially from top to bottom thereof and wherein there is a separate removable closure for each dirt-emptying opening.

JOHN F. CAVANAGH.

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