C. W. BARNES.

VACUUM CLEANING APPARATUS.

APPLICATION FILED AUG. 29, 1918.

1,336,994.

Patented Apr. 13, 1920.

3 SHEETS—SHEET 1.

Fig. 1

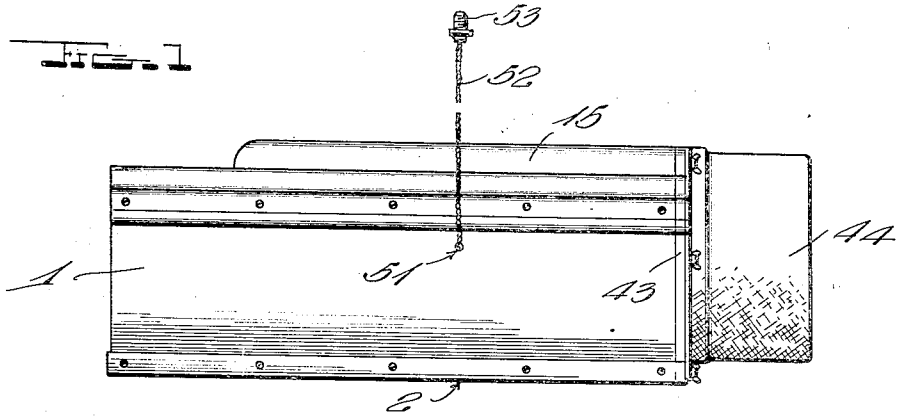


Fig. 2

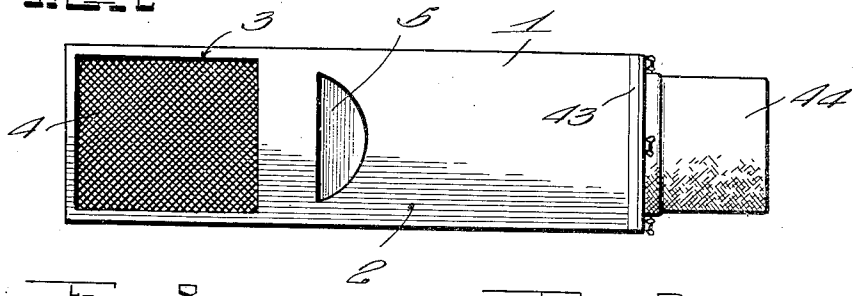
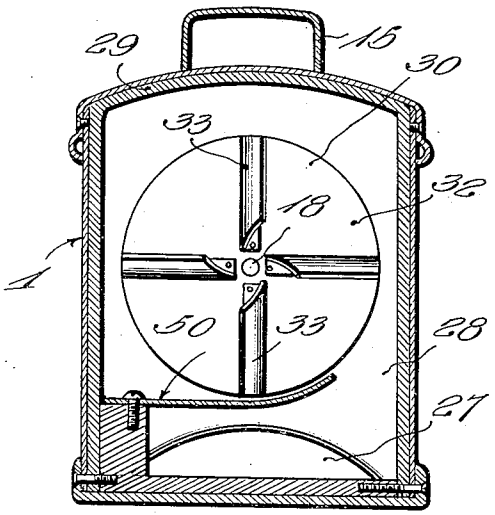


Fig. 8

Fig. 9



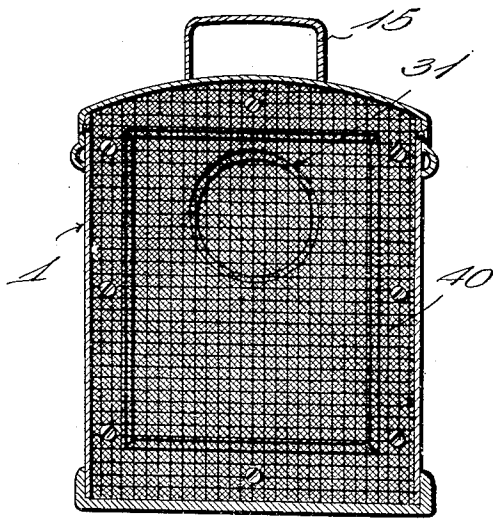
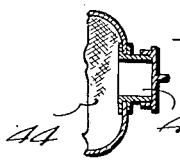


Fig. 10



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3 SHEETS—SHEET 2.

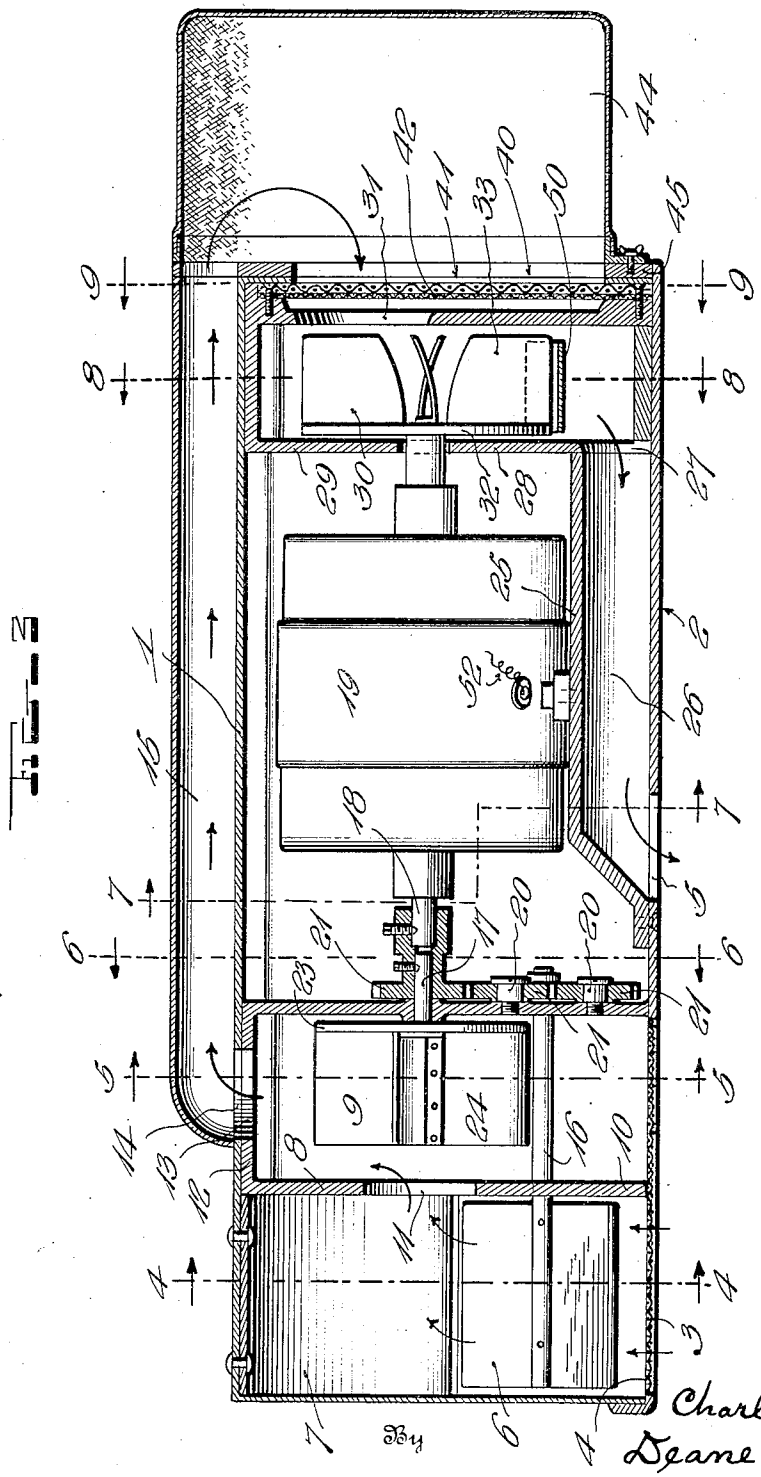


Fig. 2.

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3 SHEETS—SHEET 3.

FIG. 4

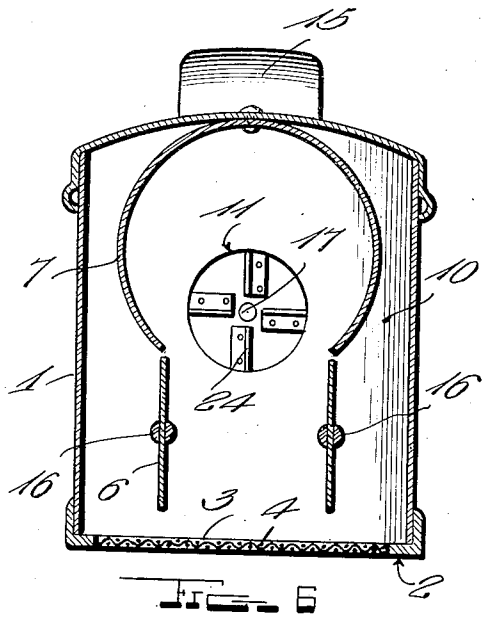


FIG. 5

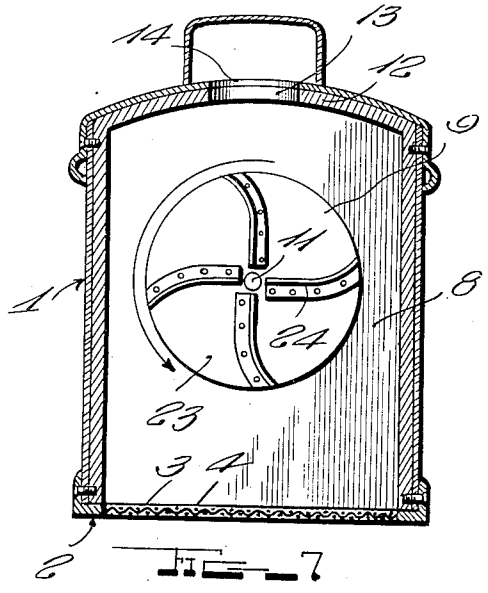


FIG. 6

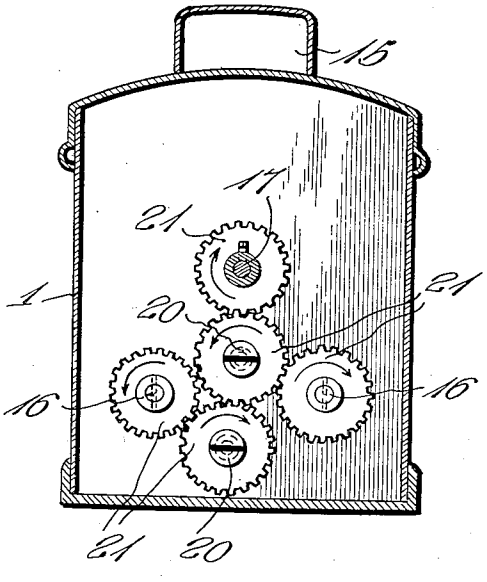
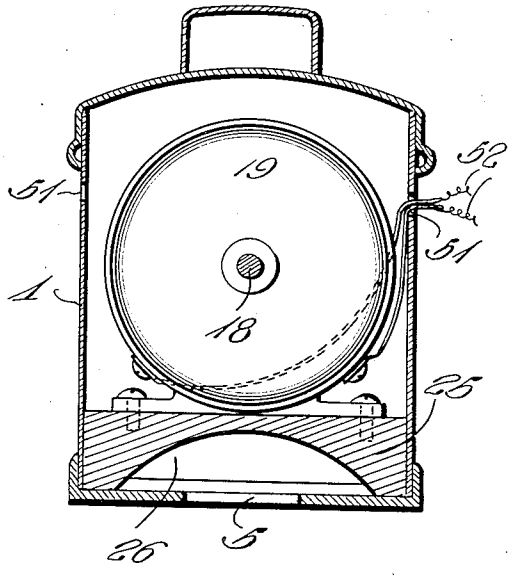


FIG. 7



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UNITED STATES PATENT OFFICE.

CHARLES W. BARNES, OF LOGANSPORT, INDIANA.

VACUUM CLEANING APPARATUS.

1,336,994. Specification of Letters Patent. Patented Apr. 13, 1920.

Application filed August 29, 1918. Serial No. 251,921.

To all whom it may concern:

Be it known that I, CHARLES W. BARNES, a citizen of the United States, residing at Logansport, in the county of Cass and State of Indiana, have invented certain new and useful Improvements in Vacuum Cleaning Apparatus, of which the following is a specification.

My present invention pertains to vacuum cleaning apparatus.

The object of the invention is the provision of a vacuum dust-removing device adapted to be held and manipulated in the hand and to be used to advantage in the effectual removal of dust from clothing, delicate wall paper, fabrics, curtains and other articles in or upon which dust collects; the dust being received and held in a receptacle carried by and forming an appurtenance of the device, and the same current of air being utilized to create the vacuum or partial vacuum and to supply a blast calculated to loosen and displace dust that is in or upon the article that is being cleaned.

To the attainment of the foregoing the invention consists in the peculiar and advantageous construction, certain novel combinations and the adaptation of parts as hereinafter described and definitely pointed out in my appended claims.

In the accompanying drawings which are hereby made a part hereof:

Figure 1 is a side elevation of the device constituting the best practical embodiment of my invention of which I am cognizant.

Fig. 2 is a face view or front elevation of the same.

Fig. 3 is an enlarged longitudinal section of the device.

Figs. 4, 5, 6, 7, 8 and 9 are transverse sections, taken in the planes indicated by the lines 4—4, 5—5, 6—6, 7—7, 8—8 and 9—9, respectively, of Fig. 3.

Fig. 10 is a detail view showing the closure of the dust receptacle.

Similar numerals of reference designate corresponding parts in all the views of the drawings.

It is to be understood that the specific construction herein shown and described constitutes the preferred embodiment of my invention but that I do not limit myself to the said specific construction or the relative arrangement of parts comprised therein as the same are set forth in detail herein merely to impart a full, clear and exact understanding of the said embodiment.

Among other elements the present construction comprises a casing 1 that is preferably of sheet metal for the sake of lightness, and of the approximate configuration shown for convenience in manipulation. In the face wall 2 of the casing is an induction opening 3, of considerable area, guarded by a foraminous diaphragm 4, with a view to avoiding drawing filmy curtains or other fine fabrics into the casing during the extraction of dust and dirt from the fabric. At a point slightly in rear of the opening 3 is an opening 5, of comparatively small size, through which a blast of air is discharged, as hereinafter described, in order to loosen the dust or dirt in the fabric or article and thereby facilitate the thorough cleaning thereof.

Disposed in the casing portion opposite the induction opening 3 are the duplex longitudinally-disposed fans 6, and fixed to the casing, at the opposite side of the fans 6, with reference to the opening 3, is a hood 7 which is curved in cross-section and has its terminal edges arranged immediately adjacent to the circles described by the fans 6 so as to confine in small compass the air and dust drawn into the casing by said fans.

Arranged in fixed relation in the casing 1 immediately in rear of the hood 7 is the sub-casing 8 complementary to the forward transverse fan 9 which it contains. The casing 8 is preferably of cast metal and is provided in its front wall 10 with an opening 11 in communication with the interior of the hood 7, and in its outer wall 12 with an opening 13 that registers with an opening 14 in the back wall of the casing 1. Over the said opening 14 and carried by and forming part of the casing 1 is a longitudinal air and dust conduit 15, closed at its forward end and extending to the rear end of the casing 1 and open at said end for a purpose, hereinafter made clear.

The longitudinal fans 6 are fixed on longitudinal shafts 16, journaled in the

transverse walls of the sub-casing and extended rearwardly beyond said casing. Also journaled in the rear transverse wall of the casing 8 is a shaft 17, fixed directly to the armature shaft 18 of the electric motor 19, and counter-shafts 20—20. These shafts are equipped with spur gears 21 intermeshed and arranged in train as shown, whereby it will be manifest that when the motor 19 is actuated the fans 6 will be driven at a high rate of speed in opposite direction.

Disposed in the sub-casing 8 and fixed on the shaft 17 is the forward fan 22, made up of a body 23 and blades 24 fixed to and extending forwardly at right angles from said body.

Manifestly when my novel device is presented to a curtain or other article from which dust is to be removed, and the electric motor is actuated, dust will be drawn through the guarded opening 3 into the casing 1 and hood 7 by the duplex fans 6, and will be drawn by the transverse fan 22 into the sub-casing 8, and forced by the latter fan through the conduit 15 to the rear end of the device.

At this point I would direct attention to the fact that the electric motor 19 is mounted upon a base 25 in which is a longitudinal conduit 26, closed at its forward end and communicating as shown with the opening 5 in the face wall of the casing 1. The rear end of the said conduit 26 communicates with an opening 27 in the front transverse wall 28 of the rear sub-casing 29 complementary to and containing the rear transverse fan 30. A curvilinear baffle 50 arranged in the sub-casing 29 and adjacent to the perimeter of the rear fan 30 is employed as shown in order to increase the efficiency of the said fan. In the rear transverse wall of said sub-casing 29 is an opening 31, through which, when the motor is actuated, air will be drawn by the fan 30. This air will be forced by said fan through the opening 27, the conduit 26 and the eduction opening 5 against the surface or against and into the fabric that is being cleaned. In consequence of this and because of the proximity of the opening 5 to the guarded induction opening 3, it will be readily understood that the dust on the surface or in the fabric will be loosened and displaced with the result that such dust will be quickly drawn from the surface or fabric into the comparatively large induction opening 3.

The rear fan 30 is made up of a body 32 fixed directly on the rear end of the armature shaft of the motor and arranged opposite the opening 31, and blades 33 fixed to and extending from the side of said body.

Carried by the rear transverse sub-casing and guarding the opening 31 in the rear wall thereof is a screen 40 adapted to permit air to freely pass to the opening 31 while effectually barring the passage of dust and dirt. The said screen 40 is preferably, though not necessarily, made up of a section 41, of foraminous or reticulated material, and a section 42, of finely woven cloth.

The rear end of the casing 1 is provided with an inwardly-directed flange 43 against which the rear sub-casing abuts, and to said flange is connected a bag 44 which communicates with and is adapted to receive dust from the rear end of the longitudinal conduit on the casing. In this connection it will be noticed that the screen 40 is in communication with the interior of the bag 44, and that it may be depended upon to permit passage of air from the bag to the rear fan while precluding the passage of dust or dirt. Thus the air that serves as a vehicle to carry the dust collected to the bag 44 (or other receptacle that may be employed without departure from the principle of my invention) for holding the dust, is utilized to form the blast for loosening and displacing the dust in or upon the article that is being cleaned. This will be appreciated as an important advantage when it is stated that it tends to prevent the dissemination of dust in the atmosphere and at the same time renders it feasible to employ simple and compact mechanism for affording the suction and blast utilized in the operation of my cleaner.

Manifestly without affecting my invention the dust receptacle 44 may be provided with a removable closure 45, as shown in Fig. 10, or may be detachably connected to the rear end of the casing 1 as shown in Figs. 1 and 2, in the discretion of the manufacturer of the device.

When deemed expedient by the manufacturer of the device, openings 51 may be provided in the side walls of that portion of the casing 1 in which the electric motor is disposed; also the wires 52 from the motor may be carried through one of the said openings and may be connected to a plug terminal 53 through the medium of which detachable electric connection may be established between a stationary house fixture and the motor. The said wires 52 may be of any desired length, and from this it follows that the device may be held in the hand and may be conveniently moved and manipulated adjacent to the surface or the article that is to be cleaned.

Having described my invention, what I claim and desire to secure by Letters Patent, is:

1. A cleaner comprising a casing having an induction orifice and also having an eduction orifice, a fan chamber disposed in said casing and having an induction ori-

fice in one transverse wall, and an eduction orifice in registration with that of the casing, longitudinal duplex fans arranged in the casing side by side and opposite the induction orifice of the same, a fan disposed in the chamber and connected with the duplex longitudinal fans, and means in the casing for driving said connected fans.

2. A cleaner comprising a casing having an induction orifice and also having an eduction orifice, a fan chamber disposed in said casing and having an induction orifice in one transverse wall and an eduction orifice in registration with that of the casing, longitudinal duplex fans arranged in the casing side by side and opposite the induction orifice of the same, a fan disposed in the chamber and connected with the duplex longitudinal fans, a longitudinal conduit extending rearwardly from the eduction orifice of the casing, a dust receiver carried by the casing and adapted to receive air and dust from said longitudinal conduit, a rear transverse fan chamber, a screen between said receiver and the latter fan chamber, a transverse fan in the rear fan chamber, a motor arranged in the casing and interposed between and connected with the fans, and a conduit leading from the rear fan chamber, past the motor, and terminating in an eduction orifice disposed adjacent to the induction orifice of the casing.

3. The combination in a cleaner, of a casing having an induction orifice, duplex longitudinal fans arranged opposite said orifice in a chamber having an eduction orifice, and a hood fixed with respect to the casing and disposed in said chamber; said hood communicating with said eduction orifice and having its longitudinal edges arranged adjacent to the circles described by the fans.

4. A cleaner comprising a casing having a face wall and adjacent induction and eduction orifices therein, fan chambers connected with said orifices, respectively, a longitudinal conduit connected with and leading from the chamber communicating with the induction orifice, a dust receiver communicating with the conduit and the fan chamber communicating with the eduction orifice, a screen between the dust receiver and said chamber, fans in the chambers, and means in the casing for driving said fans.

5. A vacuum cleaning apparatus comprising, a casing having a wall dividing the same into a plurality of chambers arranged in close relation, said wall having an opening to establish communication between the chambers, a pair of rotatable fans arranged in one chamber, a curved hood arranged within said chamber and partly surrounding said opening and terminating near said fans, a rotatable fan arranged within the other chamber, outlet means for the last named chamber, a shaft to drive the last named fan, gearing connecting the shaft and the pair of rotatable fans, said casing being provided in its bottom with an induction opening leading into said chambers.

6. A vacuum cleaning apparatus comprising, a casing having means for dividing the same into a plurality of separate chambers having means of communication with each other, said chambers having an induction opening, a rotatable fan arranged within one chamber, a second rotatable fan arranged within the other chamber and arranged so that its axis of rotation is positioned a different distance from the induction opening than the axis of rotation of the fan in the other chamber, means including a motor for driving the fans, and conduit means having communication with one chamber to receive the exhaust of air therefrom and having its discharge end arranged near the induction opening.

7. A vacuum cleaning apparatus comprising, a casing having a plurality of separate chambers at one end thereof which have communication with each other and are provided with an induction opening, and a third chamber at its opposite end, a plurality of fans arranged within the chambers at the same end of the casing, a fan arranged within the chamber at the opposite end of the casing, a conduit connected with one of the plurality of chambers and extending longitudinally of the casing upon one side thereof, and having communication with the chamber at the opposite end of the casing, a conduit connected with the last named chamber and extending longitudinally upon the opposite side of the casing and having its discharge end arranged near the induction opening, and a motor arranged within the casing between the conduits and between the two sets of fans, said motor having an armature shaft connected with the two sets of fans to drive them.

8. A vacuum cleaning apparatus comprising, a casing having a plurality of separate chambers at one end thereof which have communication with each other and are provided with induction opening or openings, and a third chamber at its opposite end, a plurality of fans arranged within the chambers at the same end of the casing, said fans having their axes of rotation arranged different distances from the induction opening or openings, a fan arranged within the chamber at the opposite end of the casing, a conduit connected with one of the plurality of chambers and extending to the opposite end of the casing in proximity to the chamber at such opposite end, a strainer element arranged to control the air inlet of the last named chamber, a removable bag

connected with the casing at the last named chamber and serving to establish communication between the conduit and the air inlet, a second conduit communicating with the last named chamber and having its discharge end disposed near the induction opening or openings, and a motor arranged within the casing between the conduits and between the sets of fans and connected with the fans to drive them.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES W. BARNES.

Witnesses:
MARY E. SMITH,
ELIZEBETH HOFFMAN.