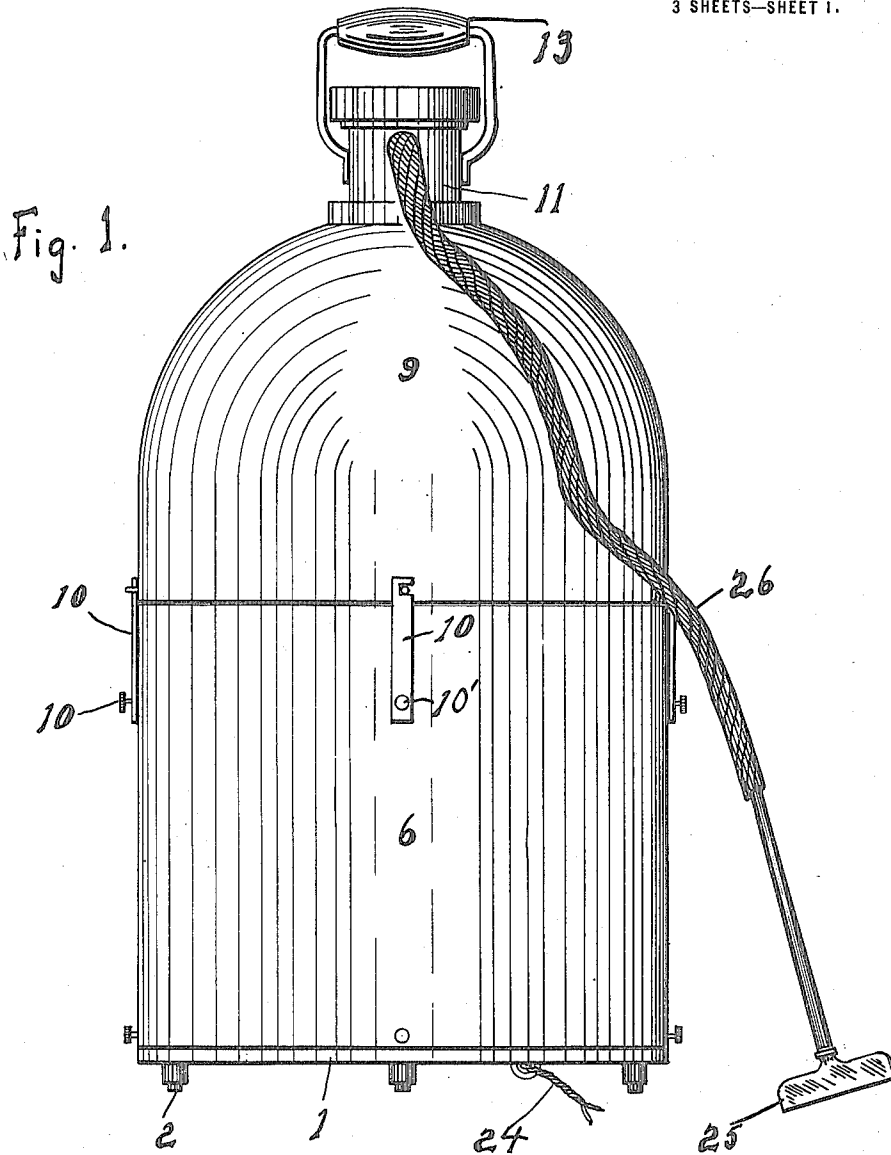


O. A. SCHLESINGER.
PNEUMATIC CLEANING APPARATUS.
APPLICATION FILED DEC. 28, 1909.

1,184,574.

Patented May 23, 1916.
3 SHEETS—SHEET 1.



Witnesses.
Roswell P. Rogers.
Edmund Hotchner

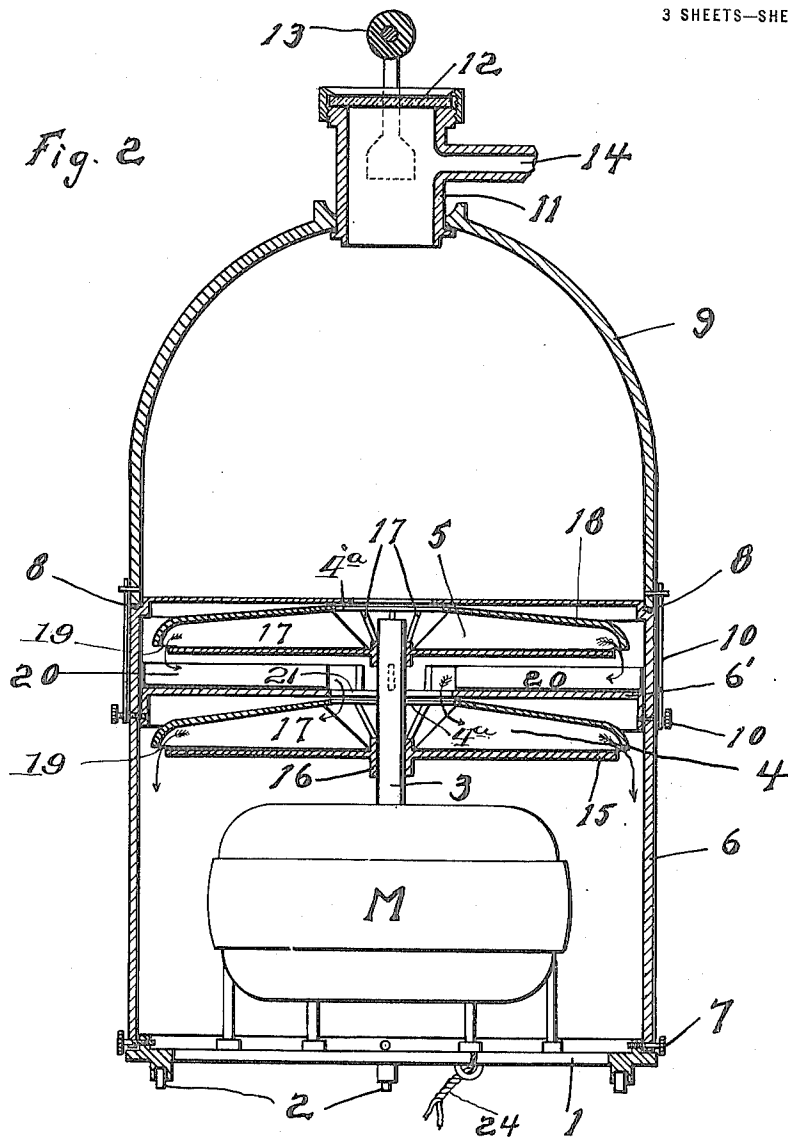
Inventor.
O. A. Schlesinger. by,
Carlos P. Griffin atty.

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3 SHEETS—SHEET 2.



Witnesses.
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3 SHEETS—SHEET 3.

Fig. 3.

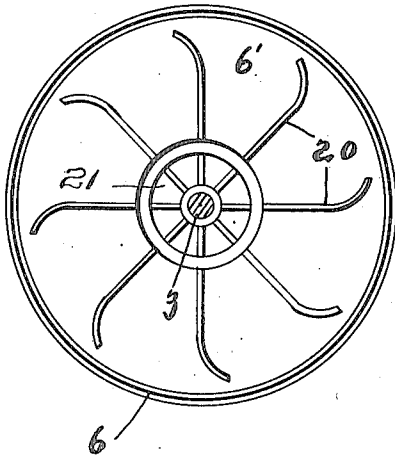


Fig. 4.

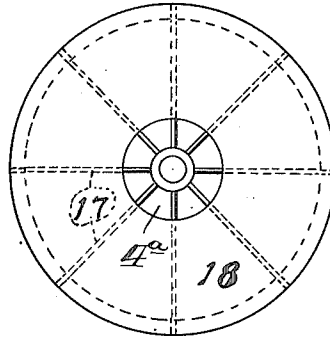


Fig. 5.

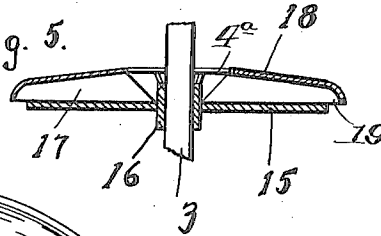
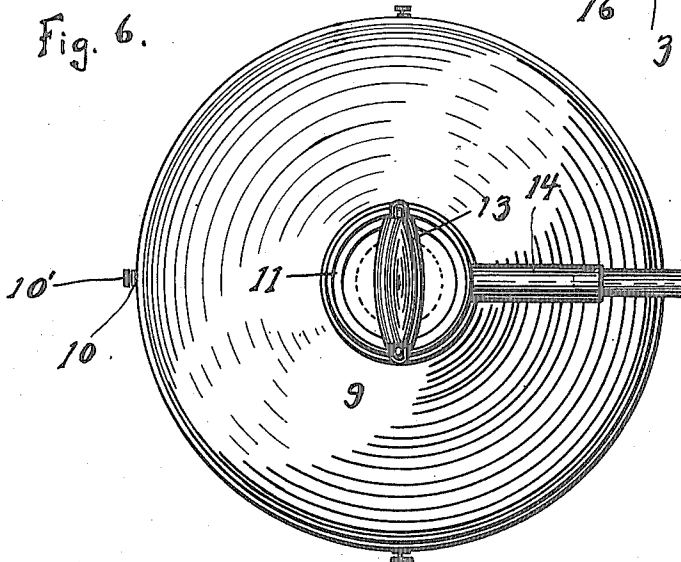


Fig. 6.



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Inventor
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Charles P. Griffin Att'y.

UNITED STATES PATENT OFFICE.

OSCAR ANDRESEN SCHLESINGER, OF OAKLAND, CALIFORNIA, ASSIGNOR TO VACUUM SPECIALTY MANUFACTURING COMPANY, A CORPORATION OF ARIZONA.

PNEUMATIC CLEANING APPARATUS.

1,184,574.

Specification of Letters Patent. Patented May 23, 1916.

Application filed December 28, 1909. Serial No. 535,271.

To all whom it may concern:

Be it known that I, OSCAR ANDRESEN SCHLESINGER, a citizen of the United States, residing at Oakland, in the county of Alameda and State of California, have invented a new and useful Pneumatic Cleaning Apparatus, of which the following is a specification in such full and clear terms as will enable those skilled in the art to construct and use the same.

This invention relates to a vacuum cleaner, and its object is to produce a higher vacuum than is ordinarily possible with a free-running fan. In the art of vacuum cleaning, it is customary to use either free-running fans of the centrifugal type, or some form of a positively operating pump for small powers; the positively operating pump is not advantageous for the reason that it must be operated at a considerable speed, and its operation causes considerable vibration of the cleaning machine. Such a machine also has the disadvantage that its weight cannot be reduced low enough to be readily carried from place to place. On the other hand, the small single fan does not produce a high enough vacuum to be as satisfactory as the pump machines, and to obviate these several difficulties, the present machine has been constructed.

In the drawings, Figure 1, is a side elevation of the complete machine, showing the hose and cleaning tool attached thereto. Fig. 2 is a vertical sectional view of a machine, showing the relation of the fans and motor. Fig. 3 is a plan view of the machine casing, with the top and one of the fans removed, showing the eight stationary vanes. Fig. 4 is a plan view of one of the fans. Fig. 5 is a sectional view of one of the fans; and Fig. 6 is a plan view of the complete machine.

The numeral 1 represents the base of the machine, which may be of any desired form, said base having rubber feet 2 to prevent injury to polished floors. This base 1 supports the motor M, which has a vertical shaft 3. This vertical shaft is provided with two substantially identical fans or impellers 4 and 5 which comprise opposite upper and lower walls arranged transversely to the shaft and connected by a series of radial blades forming confined chambers; covering the motor, and fans, is a casing 6, having an opening immediately over the center of

the upper fan, and having a packing joint around its upper corner at 8. This casing is secured to the base by means of set screws 7. Between the two fans there is placed a diaphragm 6', which is secured to the casing 6 by means of the screws 10', which secure the hooks 10 in place on the casing 6. The diaphragm 6' is provided with a central aperture 21 and carries a series of vanes 20, screwed thereto which are curved at their outer ends. The object of these vanes is to deliver the air to the secondary fan with as little shock and with as little eddying as possible. Each fan comprises a flat disk 15, provided with a head 16, to be secured to the motor shaft, a series of vanes or blades 17 and a coned cover plate 18. The vanes or blades are wider near the inlet of the coned cover plate than at their outer ends, so that the cross-sectional area upon any arc of the impeller-chambers may be substantially the same, thereby preventing any expansion of the air traversing the impellers and thus maintaining a maximum velocity of the air currents, and the conical cover plate is curved downwardly at its outer edge to direct the air to the delivery vanes with as little loss due to eddying and friction against the side walls of the casing as possible. This construction of the impeller causes the air ejected from the elongated peripheral slot 19, of the upper impeller, to be directed downward substantially parallel to or concentric with the axis of the impeller, the rotary motion causing the streams of air to strike the outer concave portions of the vanes 20, which direct it toward the central aperture 21 of the diaphragm 6', this action being greatly enhanced by the strong pull of the lower impeller 4, causing a constant suction or draft through the eye 4^a.

In portable pneumatic apparatus it is of importance that the parts shall coöperate to produce the greatest efficiency possible and that the losses shall be reduced to a minimum, by reason of the fact that the weight, space, and power must be kept very small indeed. It will therefore be observed that I place the inlet opening or eye 4^a, of the impellers as near as possible to the diaphragms, leaving only enough clearance for proper operation. Again, the conical upper wall of the impeller, by slanting toward the lower wall 15, not only forms a wedge-

shaped contour, which offers a small amount of resistance while rotating in a substantially closed space, but said slanting upper wall directs the air gradually toward the peripheral slot 19. This construction materially enhances the efficiency, in effect placing the peripheral slot at the point or apex of the wedge-shaped chambers, and yet without causing any back pressure or compression, due to the fact that the chambers extend transversely upon increasing arcs. The value of these features will be appreciated by engineers and others skilled in this art.

The upper portion of the machine is formed of a dome 9 which is secured to the casing 6 by means of hooks 10. This dome is provided with an inlet head 11 having a glass 12 for observing the condition of the dust-laden air driven into the machine, a handle 13, and an inlet pipe 14. This dome is ordinarily made of spun metal, but it may be made of any desired material.

The result of this construction is that one fan is forcing air into the other, whereby the vacuum produced may be very considerably increased. Experiments made show that one fan with a one-eighth horse-power motor will produce a vacuum of about six inches of water, while with the two fans and the same motor, under precisely the same conditions, a vacuum of about eleven and one-half inches of water may be produced.

The motor has suitable lead wires 24 connected therewith, which extend outside the casing for connection to a suitable source of current supply. Any desired form of dust-collecting apparatus may be placed in the dome 9, but this invention relates to the fan construction, and no claim is made to the dust-collecting apparatus.

The operation of the machine is as follows: A tool 25 having a hose 26 is connected with the pipe 14. A suitable dust-collecting sack, not shown, is placed within the dome 9, and connected to the inlet head in such a manner as to cause all of the air to-pass through the dust-collecting device. The motor is then started and the tool placed over the surface to be cleaned. The air is then drawn into the tool through the dome 9, into the fan 5, along the delivery vanes into the fan 4, and out of the casing 5 at the bottom.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is as follows:

1. In combination in a pneumatic cleaning apparatus a casing, a plurality of impellers rotatably mounted therein, each impeller comprising a disk-shaped base-plate, a conical cover having a central opening or eye, and a series of radial blades connecting said base plate and said cover, the periphery

of said cover projecting beyond said base plate and curving downwardly to form a narrow peripheral slot arranged to direct the ejected air downward substantially parallel with the impeller axis, and a diaphragm over each impeller lying in the same plane throughout its extent and having a central aperture in alinement with and in close juxtaposition to the eye of the adjacent impeller, a series of radial blades fixed upon the upper side of the lower diaphragm and having their upper longitudinal edges spaced from the lower side of the adjacent impeller base-plate to thereby reduce the friction upon said plate.

2. In combination in a pneumatic cleaning apparatus a casing, and a plurality of impellers rotatably mounted therein, each impeller comprising a disk-shaped base-plate, a diaphragm above each impeller having a central opening, a conical cover having a central opening or eye concentric with said diaphragm opening, and a series of radial blades connecting said base-plate and said cover, the periphery of said cover projecting beyond said base-plate and curving downwardly to form a narrow peripheral slot arranged to direct the ejected air downward substantially parallel to the impeller axis, and a series of radial blades fixed upon the upper side of the lower diaphragm and having their upper longitudinal edges spaced from the lower side of the adjacent impeller base-plate to thereby reduce the friction upon the lower side of said base-plate.

3. In combination in a pneumatic cleaning apparatus a casing, a plurality of impellers rotatably mounted therein, each impeller comprising a disk-shaped base plate, a conical cover having a central opening or eye, and a series of radial blades connecting said base plate and said cover, the periphery of said cover projecting beyond said base plate and curving downwardly to form a narrow peripheral slot arranged to direct the ejected air downward substantially parallel with the impeller axis, a diaphragm over each impeller lying in the same plane throughout its extent and having a central aperture in alinement with and in close juxtaposition to the eye of the adjacent impeller, and a series of radial vanes secured to the intermediate diaphragm between two impellers and arranged to direct the air ejected from the peripheral slot of an upper impeller to the eye in the adjacent lower impeller, said vanes having their upper longitudinal edges spaced from the lower side of the impeller base-plate to thereby decrease the frictional resistance upon said plate.

4. In combination in a pneumatic cleaning apparatus a casing, and a plurality of impellers rotatably mounted therein, each

impeller comprising a disk-shaped base-plate, a conical cover having a central opening or eye, and a series of radial blades connecting said base-plate and said cover, the 5 periphery of said cover projecting beyond said base-plate and curving downwardly to form a narrow peripheral slot arranged to direct the ejected air downward substantially parallel with the impeller axis, a diaphragm located above each impeller having 10 a central opening in alinement with the eye of said cover and lying in the same plane throughout its extent, said diaphragm being closely adjacent the cover at the center but 15 increasingly spaced therefrom radially to thereby decrease the frictional resistance

upon the top of the impeller, and a series of radial blades fixed upon the upper side of the lower diaphragm and having their upper longitudinal edges spaced from the 20 lower side of the adjacent impeller base-plate to thereby reduce the friction upon the lower side of said base-plate.

In testimony whereof I have hereunto set my hand this 18th day of Dec., A. D. 1909, 25 in the presence of the two subscribed witnesses.

OSCAR ANDRESEN SCHLESINGER.

Witnesses:

C. P. GRIFFIN,
CHARLES R. HOLTON.