

June 7, 1927.

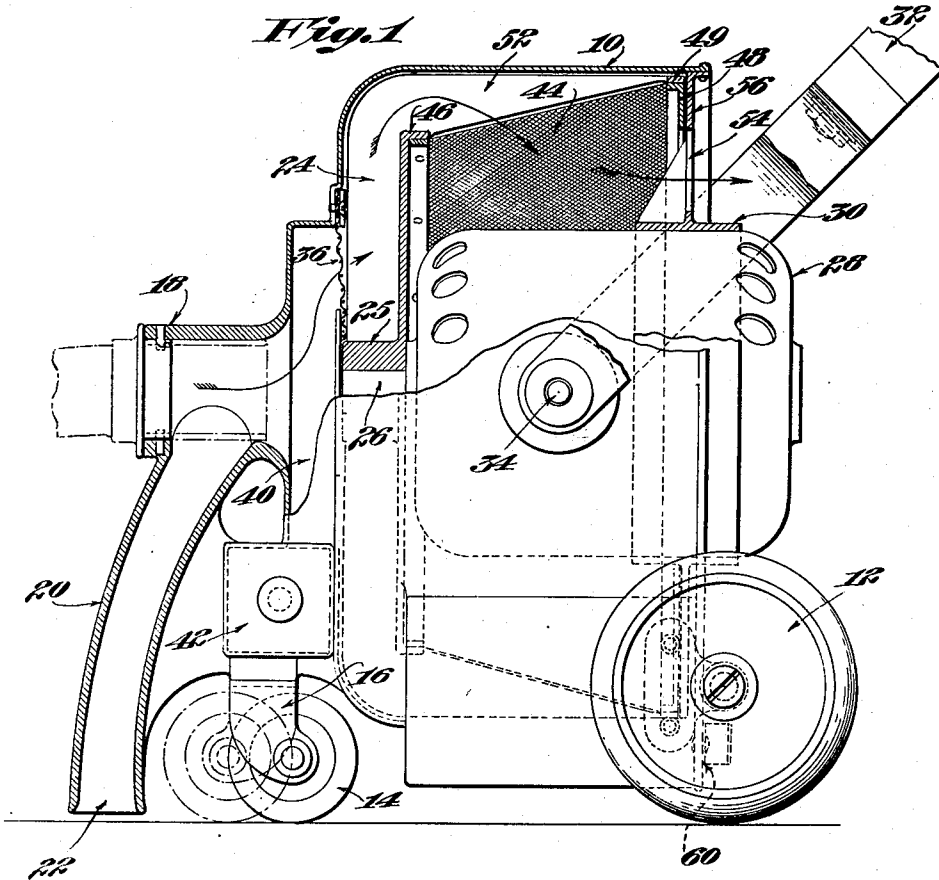
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VACUUM CLEANER

Filed April 9, 1923

2 Sheets-Sheet 1



Witness

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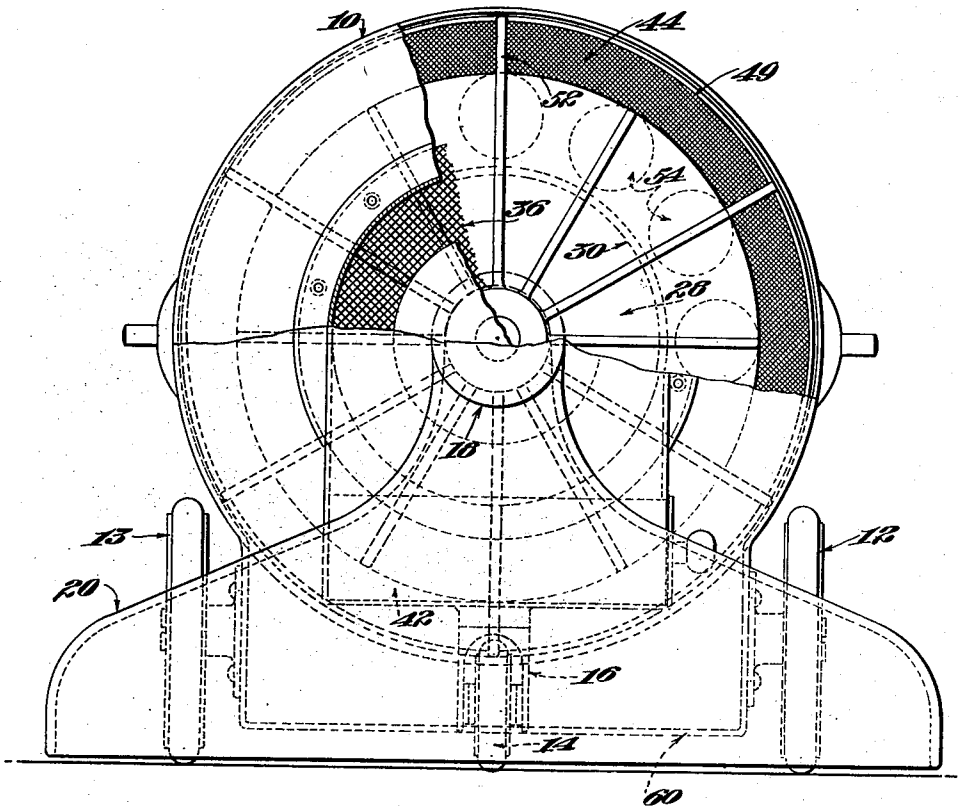
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2 Sheets-Sheet 2

*Fig. 2*



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Patented June 7, 1927.

1,631,549

# UNITED STATES PATENT OFFICE.

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## VACUUM CLEANER.

Application filed April 9, 1923. Serial No. 630,707.

The present invention relates to cleaning devices and more particularly to vacuum cleaners of a new and improved type.

It is desirable in connection with vacuum cleaners, especially of the smaller portable type, that the dust, dirt and other solid matter may be completely removed from the air with a compact and relatively simple form of separating device and without creating an undesirable back pressure upon the air.

It is accordingly an object of the present invention to provide an improved form of cleaning apparatus which embodies certain desirable features more particularly in connection with the separation of the dust, dirt and other solids from the air.

With this and other objects in view the various features of the invention consist in certain novel features of construction, combinations and arrangements of parts hereinafter described and claimed, the advantages of which will be obvious to those skilled in the art from the following description.

In the accompanying drawings illustrating the preferred form of the invention Fig. 1 represents a side elevation partly in section of a cleaner embodying the features of the invention, and Fig. 2 represents a front elevation partly in section of the cleaner shown in Fig. 1.

According to the present invention, the vacuum created by a revolving fan draws air and dirt through a nozzle contacting with the surface to be cleaned. Solid particles of comparatively large size such as pins, buttons or the like which may be drawn into the nozzle are initially removed by a stationary separating device which offers no substantial impedance to the passage of air therethrough. Thereafter the air with the dust and dirt carried thereby is discharged from the fan directly against the surface of a revolving screen, the air passing through the open meshes of the screen and the solid matter, such as dust and dirt, being thrown off centrifugally and collecting in a removable receptacle. This form of apparatus provides a compact and self-contained construction for inducing a draft of cleaning air and separating the dust, dirt and other solid matter from the air, the entire construction including the separating devices occupying substantially no

greater space than the usual type of cleaning apparatus without the separator bag or its equivalent.

As shown in the illustrated embodiment of the invention the apparatus as a whole comprises a substantially cylindrical casing 10 supported at its rear portion by two rubber tired wheels 12 and 13 and at its front end adjacent the nozzle by a smaller rubber tired wheel 14 mounted upon a swivel or castor bearing 16. The front portion of the casing is provided with a tubular neck 18 having a downwardly projecting nozzle 20 of the usual type providing an elongated substantially narrow inlet 22 in close proximity to the surface to be cleaned. A draft of air is induced upwardly in the nozzle by a series of fan blades 24 rotating within a fan chamber formed in the casing 10, the fan blades projecting from a hub 25 which is secured directly to the motor shaft 26, the latter extending from an electric motor of conventional type indicated at 28. The motor is rigidly supported within the casing 10 by an annular shield or casting 30 to which the motor casing is connected. The apparatus as a whole may be guided through the provision of a handle 32 connected to opposite sides of the casing 10 through pivot connections 34. The air drawn upwardly through the nozzle by the fan blades 24 first passes through a coarse mesh screen 36 secured to the inner portion of the casing 10 ahead of the fan. This screen may be secured to the wall of the casing in any desired manner and is in close proximity to but out of contact with the revolving fan blades. Coarse solid particles engaged and intercepted by the screen 36 drop downwardly in a collecting chamber 40 and are received in a removable drawer 42 which may be withdrawn for dumping. The air, together with the dust and dirt passing through the stationary screen 36, is directed outwardly to the tips of the fan blades and thence longitudinally of the casing across the surface of a conical screen 44, which as indicated clearly in Fig. 1 extends longitudinally of the casing 10. This conical screen at its smaller end is connected to a flange 46 forming a part of the fan and rotating therewith and at its opposite end to an annular ring 48 connected through a second ring 49 with the tip ends of arms 52

which form extensions of certain of the fan blades. With this construction, the fan, together with the screen and connecting members, rotates bodily within the casing 10, the air passing freely through the screen and the dirt and other solid matter being intercepted by the screen and thrown off centrifugally. It has been found that by properly designing the mesh of the screen and the speed of movement of the screen surface the dust and dirt even though finely divided may be substantially completely separated from the air. After its passage through the screen the air is discharged rearwardly through openings 54 formed in a web 56 which provides a rear wall of the casing. The dust and dirt thrown off from the separator screen into the space between the casing 10 and the outer surface of the screen is discharged into a receptacle 60 formed in the lower portion of the apparatus and into which the revolving screen dips. The space separating the screen from the wall of the casing is maintained clear by the revolving extensions 52 forming part of the fan.

With this construction it will be evident that the draft of air is induced and the dirt, dust and other solid matter completely separated from the air in a relatively efficient manner and through the employment of apparatus which occupies substantially no greater space than that occupied by the fan and driving motor. Furthermore the provision of the revolving screen as a means of separation permits the substantially complete removal of the dust and dirt without creating any appreciable back pressure on the air. This is due not only to the fact that the air passes freely through the meshes of the screen but in addition to the fact that the revolving screen is self cleaning and the dust and dirt are not permitted to collect

on the surface as is the case with a stationary bag cleaner or its equivalent.

While it is preferred to employ the specific construction and arrangement of parts shown and described it will be understood that this construction and arrangement is not essential except so far as specified in the claims and may be changed or modified without departing from the broader features of the invention.

The invention having been described, what is claimed is:

1. The combination in a vacuum cleaner of an electric motor, a fan connected to one end of the motor, a tubular screen beyond the fan and extending about the motor, and means for rotating the screen with the fan.

2. The combination in a vacuum cleaner of a casing, an electric motor mounted within the casing, a fan connected to one end of the motor and rotating within the casing, and a tubular screen rotating within the casing around the motor, the space between the outer surface of the screen and the casing serving to collect dust and dirt thrown from the screen.

3. The combination in a vacuum cleaner of a fan, a motor for driving the fan, a conical separator screen located beyond the fan and having its smaller end adjacent the fan, and means for collecting dust and dirt thrown off from the screen.

4. The combination in a vacuum cleaner of a casing, a fan, a rotary screen through which the air is directed from the fan, the fan having some of its blades provided with extensions arranged longitudinally of the screen and close to the inner wall of the casing for preventing accumulation of dust on the casing, and means for collecting dust and dirt thrown from the screen.

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