Jan. 1, 1946. N. B. WALES 2,392,205

VACUUM CLEANER

Filed Sept. 23, 1944

FIG. 1

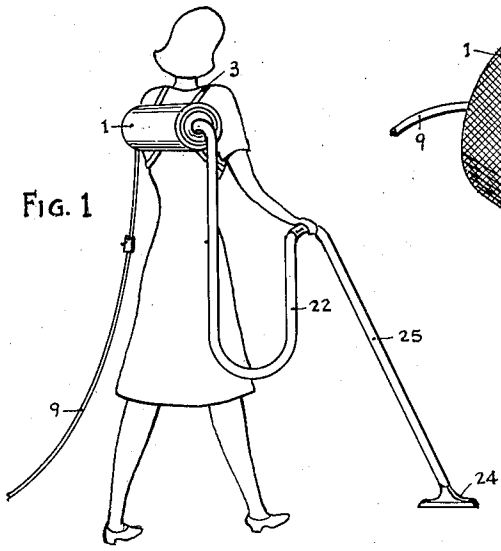


FIG. 3

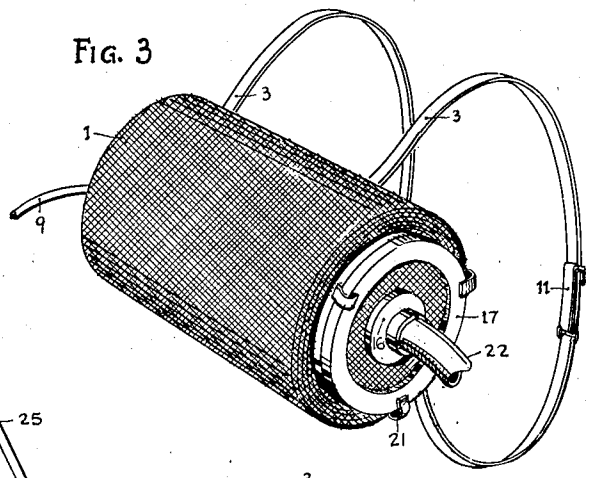


FIG. 4

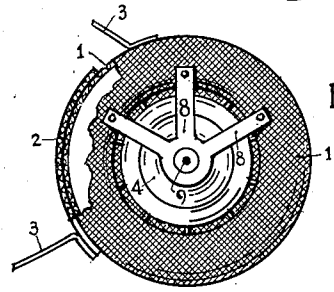
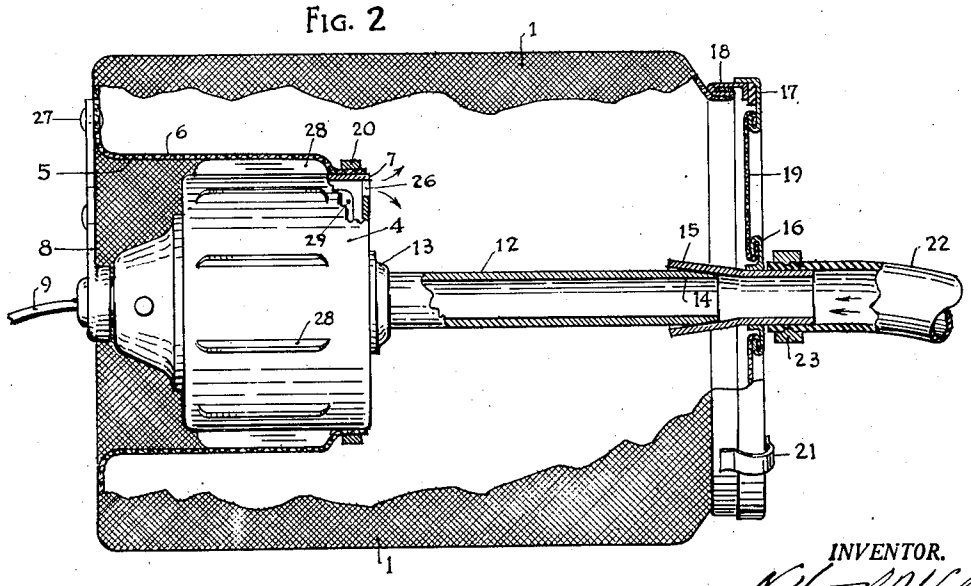


FIG. 2



INVENTOR.

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UNITED STATES PATENT OFFICE

2,392,205

VACUUM CLEANER

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Application September 23, 1944, Serial No. 555,462

5 Claims. (Cl. 183—36)

This invention relates to a portable vacuum cleaner in which all the vacuum cleaner elements are incorporated within a knapsack, except the nozzle and the flexible duct connected thereto.

This knapsack is carried on the back of the operator eliminating the effort now required to pull or push the vacuum cleaner from point to point, and the often occurring damage to furniture. It further eliminates the necessity of actually moving furniture to permit the movement of the vacuum cleaner.

It is essential to devise such a cleaner so that its weight will be a minimum and to this end I have reduced this weight to approximately seven pounds, without sacrificing its cleaning power, by utilizing the knapsack as the dust separating medium and also utilizing it as a pneumatic support or chassis for the compact motor driven fan assembly.

Furthermore, due to the inflation of the dust separating knapsack by the exhaust pressure of the fan therein, I utilize the pneumatic factor thus created to absorb the vibration of the high speed motor driven fan unit from being transmitted to the operator's body.

A further object of my invention is to guard against a film of fine dust from being deposited on the operator's clothing by limiting the permeability of the dust separating knapsack to those areas which are not normally in direct contact with the operator's body.

Another object of my invention is to facilitate the manual closing of the dust removal cover in the very flexible knapsack, by arranging a rigid suction tube member, extending from the major mass of the motor driven fan unit, so that the pressure required to make such closure is resisted by this mass and it is not necessary for the operator to handle the dust separating knapsack during such procedure.

I attain these objects by the illustrative embodiment of my invention in the accompanying drawing, in which:

Figure 1 is a drawing in perspective of my invention as it is carried by the operator while in action.

Figure 2 is an enlarged rear elevation and partly shown in section to clearly show the pneumatic suspension between the motor and the operator's body.

Figure 3 is an isometric view of the knapsack showing specifically the dust removal cover in the knapsack and suction tube connection therethrough, wherein the flexible tube is permanently attached to the dust removal cover to reduce the assembling of parts. This view also clearly shows the supporting harness and its angle of suspension in relation to the inflated knapsack.

Figure 4 is an end elevation of the opposite end of the knapsack showing the flexible and pneumatic mounting therein of the motor driven fan unit as well as the accessibility of the motor, recessed within the contour of the knapsack.

Similar numerals refer to similar parts throughout the several views.

The knapsack body 1 is of conventional-dust-separating bag texture except a cloth strip 2, shown partly in section in Figure 4, and which extends the full length of the knapsack, which directly contacts the operator's back when the knapsack is inflated and is made of non-porous material.

The supporting means 3 are made adjustable by any well known means as is indicated at 11, and passes over the shoulders of the operator, and are secured to the body of the knapsack so that when worn and the knapsack is inflated, the cloth strip 2 normally contacts the body.

The motor driven fan unit 4, which is of conventional design, is positioned in a recess 5 formed by an air permeable cylindrical extension 6 of the knapsack 1 and which is hermetically secured around the periphery of the fan housing 7 by a band 20 or any suitable means. A spidered support, preferably of flexible material 8 is secured to the outer end of the motor driven fan unit 4 and is likewise secured at 27 to the fabric of the knapsack 1.

An electrical supply cable 9 is conventionally connected to the motor of the fan unit 4.

The knapsack body 1 is preferably made cylindrical in form, however it may be elliptical, or of any pleasing symmetrical design. It is to be noted that the support straps 3 are secured to the knapsack 1 at a suitable angle thereon to permit it to hang, when inflated, so that only the area 2 impervious to air passage contacts the body.

The rigid suction duct 12 is secured to the fan housing 7 at 13, which is the suction opening to the fan 29, and at the other end thereof 14, duct 12 is formed in a taper so as to make a slip-fit joint with the central member 15 in the dust removal cover 16. Inasmuch as the perimeter of the cover 17 must form an air tight seal with its companion member 18, which is secured to the knapsack 1, as well as making a seal between members 14 and 15, I preferably insert into the dust removal cover 16 an annulus of fabric 19 so that each joint will make its own independent seal without disturbing the other.

Snap-lock fasteners 21 of any conventional design hermetically secure the perimeter 17 of the dust removal cover to its companion sealing member 18 in the knapsack 1. It should be noted that the diameter of the dust removal cover 16 is smaller than the inflated diameter of the knapsack 1 so that the rigid member 17 will not in any event contact the body.

Spacers 28 formed around the fan-motor housing 7 keep the cloth cylinder 6 away from the housing, so that air may pass through the cloth recess 5 and assure an added area of permeability in the knapsack.

Referring to Figure 2 the fan discharge air ports 26 exhaust directly within the knapsack. Details of the motor fan unit are not shown as the entire assembly is the conventional type used in cannister vacuum cleaners.

Considering the main weight of the entire cleaning device, which is the motor driven fan unit, it should be noted that cloth sections, positioned in one or more planes, at right angles to each other, and under inflation pressure are interposed between this mass and the suspension harness as well as the area on which the knapsack contacts the body. These cloth sections under inflation pressure effectively dampens out vibration. However, these provisions to eliminate vibration, and support the motor weight, are inherent in the general concept of my invention without any addition to the weight of the device.

I claim:

1. A portable vacuum cleaner, adapted to be sustained from the operator's body, comprising an electric motor and suction fan assembly, supported within the contour of a permeable dust bag, an exhaust duct from said fan directed into the interior of said bag, a suction duct entering one end of said bag through a detachable dust removable cover therefor, and connecting to the suction orifice of said fan; an open recess formed in the opposite end of said permeable bag and supporting means between said motor and said bag to position said motor-fan assembly in said recess, so that one end of said motor is accessible through the open end of said recess for ventilation and service thereof.

2. A portable vacuum cleaner, adapted to be supported from the operator's body, comprising an electric motor and suction fan assembly, a suction duct connected to said fan, said assembly supported within the contour of a permeable dust bag by a supporting member secured to said bag on one end of said assembly, and by said suction duct on the other end of said assembly, said suction duct detachably connected to a companion member secured into and passing through a detachable dust removable cover for said dust bag, an open recess in the first mentioned end of said dust bag and means to hermetically secure the inner end of said open recess of said dust bag to said motor-fan assembly, so that one end of said motor is accessible through said open recess in said dust bag.

3. A portable vacuum cleaner, adapted to be supported from the operator's body, comprising a cylindrically formed permeable dust bag, an electric motor-fan assembly positioned within said bag, and supported by the inflated surfaces of said cylindrical bag, a discharge duct from said fan opening into the interior of said bag, a suction duct extending from said suction side of said fan and detachably connected to a companion member secured to, and extending through, a detachable dust removable closure fitting into one end of said cylindrical bag, and electric supply means, having access to said motor through an open recess in the other end of said bag and sealing means to secure said bag to said motor-fan assembly around the inner end of said open recess.

4. A portable vacuum cleaner, adapted to be supported from the operator's body, comprising a permeable dust bag, an electric motor-fan assembly positioned within said bag, and supported by the inflated surfaces of said bag, a discharge duct from said fan, opening into the interior of said bag, a suction duct extending from said suction side of said fan and detachably connected to a companion member secured to, and extending through, a detachable dust removable closure fitting into one end of said bag, and electric supply means, having access to said motor through an open recess in the other end of said bag and sealing means to secure said bag to said motor-fan assembly around the inner end of said open recess.

5. A portable vacuum cleaner, adapted to be supported from the operator's body, comprising an electric motor and suction fan assembly, positioned inside the contour of a hollow permeable dust bag by supports extending from each end of said assembly to the adjacent ends respectively of the said dust bag, one of said supports being hollow and connected to the suction side of said suction fan, said hollow support passing through a dust removal cover, detachably formed in one of said ends of said bag, and a discharge duct from said suction fan in open communication with the interior of said permeable dust bag.

NATHANIEL B. WALES.