April 21, 1931. P. WITTE 1,802,228

DUSTPROOF BAG

Filed Nov. 27, 1929

Fig. 2.

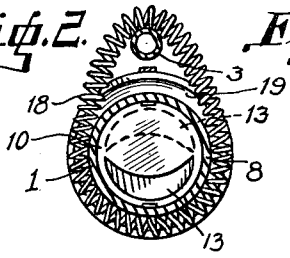
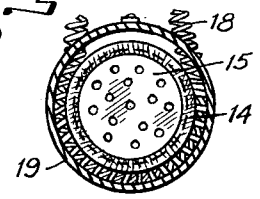


Fig. 4.



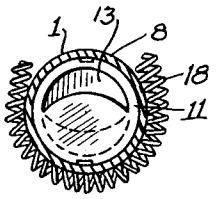
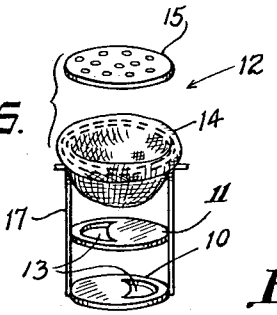


Fig. 3.

Fig. 1.

Fig. 5.

Fig. 6.



Inventor

Paul Witte

By Mason Fenwick & Lawrence

Attorneys

Patented Apr. 21, 1931

1,802,228

UNITED STATES PATENT OFFICE

PAUL WITTE, OF SCRANTON, PENNSYLVANIA

DUSTPROOF BAG

Application filed November 27, 1929. Serial No. 410,218.

This invention relates to improvements in dust collectors for vacuum cleaners, and proposes a dust bag which, in contra-distinction to the usual type of dust bag, is made of material impervious to dust and air, the dust being separated from the air by means effecting abrupt changes in the direction and velocity of the flow of air through said bag, the air being finally discharged from the mouth of the bag in filtered condition, while the dust is collected in the bag from which it may, from time to time, be conveniently removed.

One of the objects of the invention is to provide a dust bag of the character above indicated having an inner partition defining a conduit of uniform and restricted cross-section communicating on the one hand with the vacuum cleaner, and on the other hand with a capacious chamber constituted by the rest of the bag so that while the dust laden air is carried with undiminished velocity through said conduit, its velocity is checked upon its reaching the capacious chamber so that the major particles of dust and foreign matter are separated by gravity, and fall into the lower part of the bag.

Another object of the invention is the interposition in the path of flow of dust laden air after its emergence from said conduit of baffles arranged to divert the air current in a circuitous path, whereby, not only is its direction abruptly changed, but its velocity suddenly checked.

A further object of the invention is the provision of a filter at the emergence end of the dust bag for removing such impalpable impurities as may be created by the baffles.

Still another object of the invention is the provision of the filters and baffles as a unitary construction which may be readily removed from the mouth of the bag for emptying purposes.

Another object of the invention is a provision of a deflector to divert the discharging air from the direction of the operator.

Other objects of the invention will appear as the following description of a preferred and practical embodiment thereof proceeds.

In the drawings, in which the same characters of reference are used in the several figures to designate identical parts:

Figure 1 is a longitudinal section through a dust bag for vacuum cleaners embodying the principles of the present invention;

Figure 2 is a section taken along the line 2—2 of Figure 1;

Figure 3 is a section taken along the line 3—3 of Figure 1;

Figure 4 is a section taken along the line 4—4 of Figure 1;

Figure 5 is a section taken along the line 5—5 of Figure 1; and

Figure 6 is a perspective view of the enclosing elements of the filter shown in separated relation.

Referring now in detail to the several figures, numeral 1 represents the dust bag which is preferably made of nonporous material impervious to the passage of dust and air.

Within the bag 1 is a partition 2 also preferably made of dust and air-proof material, said partition being preferably of tubular construction and stitched or otherwise suitably secured to the wall of the bag 1 preferably adjacent the handle 3 of the vacuum cleaner.

The conduit 4 formed by the partition 2, is connected at one end to a suitable nipple or coupling 5 by means of which the dust collector is attached and placed in communication with the fan chamber of the vacuum cleaner.

As is shown in the drawings, the bag 1, partition 2 and nipple 5 are all held together in operative relation by means of a contractile spiral spring ring 6, although this feature is immaterial to the invention, since any desired fastening means may be used.

The upper end of the conduit 4 terminates at a point near the upper end of the dust bag and opens into a relatively capacious chamber 8 formed by that part of the dust bag which is not included in the conduit 4. The dust bag narrows adjacent its upper end forming a neck in which is located the air cleaning unit, which in general, is designated by the reference numeral

9, said unit comprises baffles 10 and 11 and a filter 12. The baffles are shown in Figures 2 and 3, from which it will be noted that each of said baffles consists preferably of a circular plate having a lunar opening 13, said plates being so arranged that the openings occur on opposite sides of the neck of the dust bag as is indicated by the full and dotted positions of the lunar openings in Figure 2.

It is apparent from Figure 1 that the air entering the lunar opening in the baffle 10 is obliged to follow a circuitous path in passing to the lunar opening 13 in the baffle 11. The filter element comprises a receptacle 14 preferably formed as a reticulated screen through which air may freely pass, having a perforate closure 15, the receptacle being filled with porous dust absorbent bodies, such as small sponges 16.

The filter member, as well as the baffles 10 and 11 are preferably secured in unitary relation in a preferably cylindrical cage 17 which may be readily slipped into the neck of the dust bag, and secured in position by means of the spring band 18.

The filter is provided with a hood 19, the peripheral portions of which over-hang the filter and dust bag, said hood being formed as a chamber communicating with the closure 15 of the filter and having peripheral outlets extending in a downward direction.

In operation, dust laden air is expelled from the fan chamber of the vacuum cleaner into the conduit 4. By virtue of the narrow and uniform cross-section of said conduit, the air maintains its high velocity until it emerges from the upper end of the conduit, at which point it opens into a wider portion of the bag where its velocity is somewhat checked and the grosser particles are separated and fall by gravity into the lower or bulged part of the dust bag. The air flow continuing, strikes the first baffle 10 where its velocity is still further checked and its course diverted, this causing a separation of a large part of the remaining dust particles. The air then passes through the lunar opening in the baffle 10, and is forced again to diverge sharply upon meeting the imperforate portion of the baffle.

More of the dust is here drawn down and it will be noted that the lunar opening of the baffle 10 is at the lower part, so that the dust separated from the air between the baffles will gravitate through said lunar opening and reach the bottom of the dust bag. The air emerging from the baffle 11 passes through the filter 12 in which the finest and most impalpable portion of the dust is removed, the pure air passes through the apertures in the closure 15 into the hood from which it discharges downwardly. The purpose of the hood is, of course, to keep the air from being blown upon the operator.

It is preferred that the material of which the conduit 4 and bag 1 are made be of such nature as to have the slick surface on the inside, in the first place, so that no dust or lint will collect in the conduit 4, and in the second place so that when the bag is inverted for emptying all the dust will fall out, none of it clinging to the inner surface of the bag.

This invention possesses a number of advantages not found in the ordinary porous bag, among these being the feature that no dust nor germs can come through the bag, since it is not porous. Unlike porous paper bags, it cannot be torn through moisture or handling.

Neither does it become more and more inefficient with continued use as do ordinary bags from the stoppage of the pores. The spring-like material in the filter also adapts the dust bag to use in connection with a disinfecting liquid through which all of the air drawn through the vacuum cleaner must pass so that the air may be sweetened and disinfected while the vacuum cleaner is in use.

It is obvious that while I contemplate the use of flexible material for the dust collector, it is apparent that the same principle of invention could be embodied in a dust collector made wholly of rigid material.

It is to be understood that the illustrative embodiment of the invention as disclosed in the present specification is merely by way of example, and not to be considered as having a limitative bearing upon the scope of the appended claims.

What I claim is:

1. A dust collector for vacuum cleaners comprising a receptacle, a partition therein dividing the lower part of said receptacle into a relatively narrow compartment of substantially uniform cross-section and a compartment of greater cross-section, into which latter compartment the narrow compartment opens at the upper part of said receptacle, at which point the velocity of the in-flowing air is diminished and preliminary dust separation takes place, the dust gravitating into the lower part of the compartment of greater cross-section, a removable filter unit in the outer end of said receptacle comprising a screen with a perforate closure forming a chamber for pervious filtering bodies, spaced baffles having the openings thereof disposed in opposite relation to direct the air in a circuitous course in which its velocity is further checked and its direction changed abruptly, and a hood at the discharge end of the receptacle constructed as a conduit for deflecting the discharging air toward the base of said receptacle.

2. A dust collector for vacuum cleaners comprising a receptacle, a removable filter unit in the outer end of said receptacle and including a screen with a perforate closure forming a chamber for pervious filtering bodies, spaced baffles having openings disposed in opposite relation to direct the air in a circuitous course, and a hood at the discharge end of the receptacle constructed as a conduit for deflecting the discharging air toward the base of said receptacle.

In testimony whereof I affix my signature.

PAUL WITTE.