

Feb. 20, 1968

D. R. DAVIS

3,369,348

DISPOSABLE AIR FILTER BAG

Original Filed Aug. 19, 1963

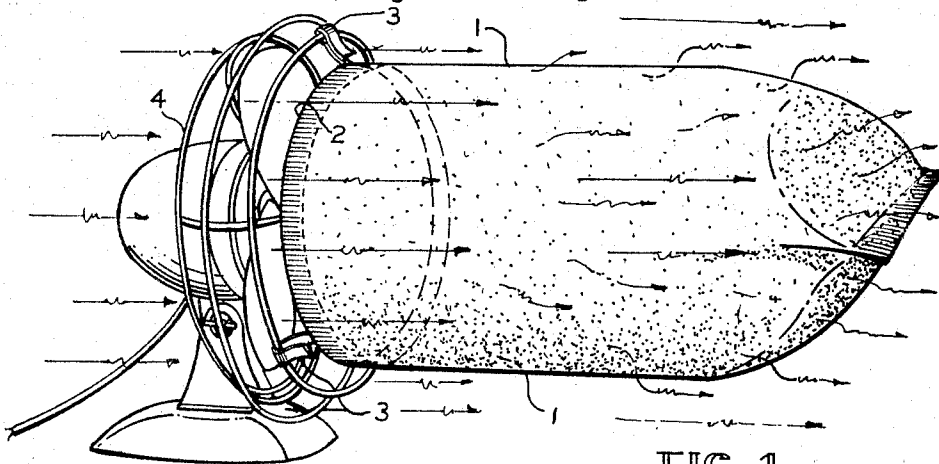


FIG. 1

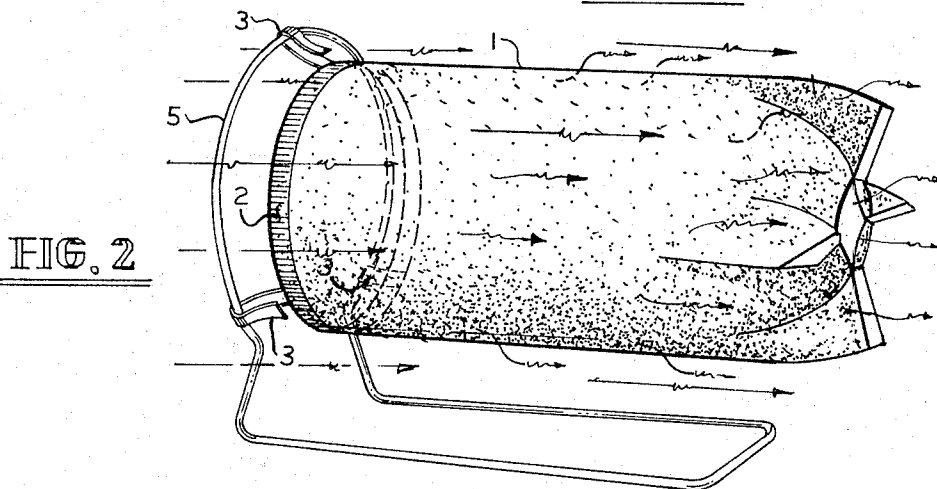


FIG. 2

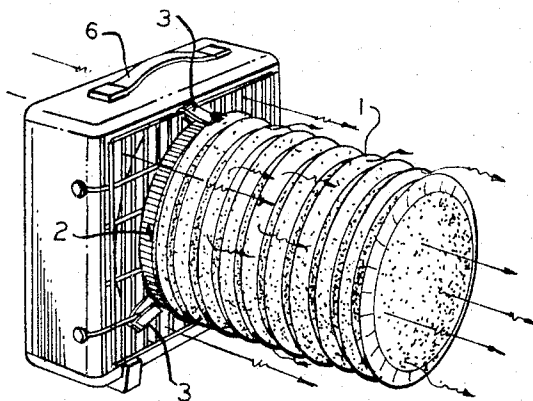


FIG. 3

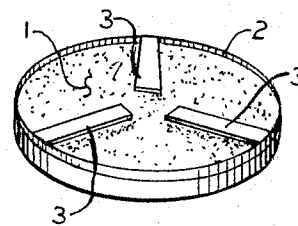


FIG. 4

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DISPOSABLE AIR FILTER BAG
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Continuation of application Ser. No. 302,865, Aug. 19, 1963. This application May 2, 1966, Ser. No. 547,392
1 Claim. (Cl. 55-374)

ABSTRACT OF THE DISCLOSURE

A flexible bag of porous material impregnated with oil and suspended in front of a fan such as a conventional household fan. When the fan is operated, a portion of the air flow generated by the fan passes into the mouth of the bag to inflate the bag and hold it in a generally extended position. Air enters into the mouth of the bag and is turned around at the end of the bag and issues out of the mouth of the bag. Some of the air also goes through the bag itself. Other air in the air flow from the fan passes down the outside surfaces of the bag and dynamically serves to create a pressure differential which holds the bag in an extended, inflated condition. Dust particles and the like are trapped in the bag and thus the bag provides a simple means for filtering the air in a room.

This application is a continuation of my prior co-pending application Ser. No. 302,865, filed Aug. 19, 1963, now abandoned.

This invention relates to a disposable air filter bag.

The object of this invention is to provide an air filter which has a large filtering area which can be folded or condensed into a relatively small and light package for storing, shipping and vending.

Another object of this invention is to provide an effective air filter which can be attached to an electric fan or the grating in front of an air duct, and which will "balloon" out in front of an air stream and be supported by the air stream and will not require structural means to hold it in its extended operating position.

A further object of this invention is to provide an air filter whose porous filtering elements have been impregnated with antacid chemicals which will tend to neutralize any acid irritants which might be present in the air which passes through said porous filtering elements.

Another object of this invention is to provide an air filter which will not only function efficiently but will be inexpensive; a "throw away" filter priced within the means of the average pocketbook.

A further object of the invention is to provide a filter which is easy to install or to detach, and which is easily disposed of when its work is done.

The foregoing and additional objects and advantages of the invention will be apparent from the following detailed description of the illustrative embodiment shown in the attached drawings, in which:

FIG. 1, FIG. 2, FIG. 3 and FIG. 4 are perspective views of the invention.

In FIG. 1, filter bag 1 is attached to the wire guard 4 of an electric fan by tethers 3 with the large opening or "mouth" 2 of the bag positioned in front of the fan.

In FIG. 2, filter bag 1 is anchored to wire standard 5 by tethers 3 which extend from three points on the periphery of the filter bag's open mouth 2. The floating filter bag is flying in an air stream supplied from an undisclosed source. The wind direction is indicated by arrows.

In FIG. 3, filter bag 1 is accordion pleated and collapsible like a bellows. Its paper covered wire tethers 3 are anchored to the rectangular wire guard or gratings in front of fan 6 with the open mouth 2 of filter bag 1

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facing into the stream of air whose direction of flow is indicated by arrows.

The drawing in FIG. 4 illustrates the filter bag 1 shown in FIG. 3 when it is at rest and collapsed for storage or shipment. Anchor tabs or tethers 3 have been folded toward the center of the compressed unit.

It is to be understood that the filters illustrated in the patent drawings are fabricated from soft, porous filtering tissues which may be folded or condensed into a relatively small package and that the filter bags illustrated are shown in operation with the bags inflated by the oncoming air which tends to extend them to their largest proportions and to support them along their longitudinal axes without the aid of other mechanical supports or housings. They fly like a flag or a wind sock in the wind and are supported by the interior and exterior pressures which balloons them to their full proportions and tends to present their greatest filtering areas to the air stream. When the wind is shut off, the filter bags deflate. When they are inflated in an air stream, the air pressure within the bags is greater than the outside air pressure which causes the air to percolate through the bag's porous walls, leaving dust and impurities in the bag or absorbed in the bag's tissue filters. When the air in a room is recirculated through the bag, a larger portion of air contaminants are removed.

The large opening or "mouth" 2 in each of the filter bags illustrated in FIG. 1, FIG. 2 and FIG. 3, have circumferences which are similar in girth to the circumferences of the bags at other sections along their length. Thus, the cross-sectional area of the bag preferably corresponds to the cross-sectional area of its mouth throughout a major portion of its length. For most efficient performance the large opening or "mouth" of a filter bag should be at least two thirds as large in circumference as the circumference of the bag at other points along its length.

The filter bags illustrated in FIG. 1, FIG. 2 and FIG. 3 are anchored down stream from fans or air ducts to leave room for the air stream to expand radially in front of the filter bags and to flow down stream over the outside of the bags. This prevents the air stream from being "choked off" and produces a greater pressure differential between the inner and outer surfaces of the filter bag. It can be shown that an increase in the velocity of the air flowing along the outer surface of the bag will result in a lower air pressure over and on the bag's outer surface.

It is obvious that more than three "tethers" may be used to anchor the floating filters from floating down stream, and that the tissues from which the filter bags are made may be impregnated with chemicals which tend to neutralize certain odors or irritants which may be present in contaminated air. Or the bags may be slightly oiled to absorb or retain minute particles which might not cling to a dry surface.

While the inventor has illustrated a preferred embodiment of his invention, it will become apparent to those skilled in the art that many modifications of this invention may be made without departing from the spirit of the invention here disclosed and it is therefore intended that all modifications shall be protected as fall within the scope of the appended claim.

What is claimed is:

1. In combination: a fan including a wire guard; a disposable air filter comprising an elongated bag of flexible porous filter material impregnated with oil and having an open mouth; and a plurality of anchor tabs connected at first ends to circumferentially spaced points about said mouth of said bag and detachably secured at their other ends to said wire guard of said fan to retain the mouth of said bag at a given distance from said fan less than the diameter of said fan, the diameter of the fan being at least

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as large as the diameter of the open mouth of the bag, said bag being of substantially uniform cross-sectional area corresponding to the cross-sectional area of its mouth throughout a major portion of its length when maintained in extended position by air from said fan, said given distance of the mouth of said bag from said fan being such that a portion of the air from said fan is directed into said bag to inflate said bag and maintain it in extended position, other portions of said air expanding radially in front of said mouth to flow downstream over the outside of said bag, whereby a pressure differential is caused between the inner and outer surfaces of said bag to maintain said bag in its extended position and to cause a part of said first-mentioned portion of air to be filtered through said bag.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,369,348

February 20, 1968

David R. Davis

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 71, after "gratings" insert -- or frame structure --; column 2, lines 64 and 70, for "wire guard", each occurrence, read -- frame structure --.

Signed and sealed this 15th day of October 1968.

(SEAL)

Attest:

Edward M. Fletcher, Jr.

Attesting Officer

EDWARD J. BRENNER

Commissioner of Patents