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2,930,147

FILTER DEMONSTRATION DEVICE FOR SUCTION CLEANER

Filed July 17, 1957

2 Sheets-Sheet 1

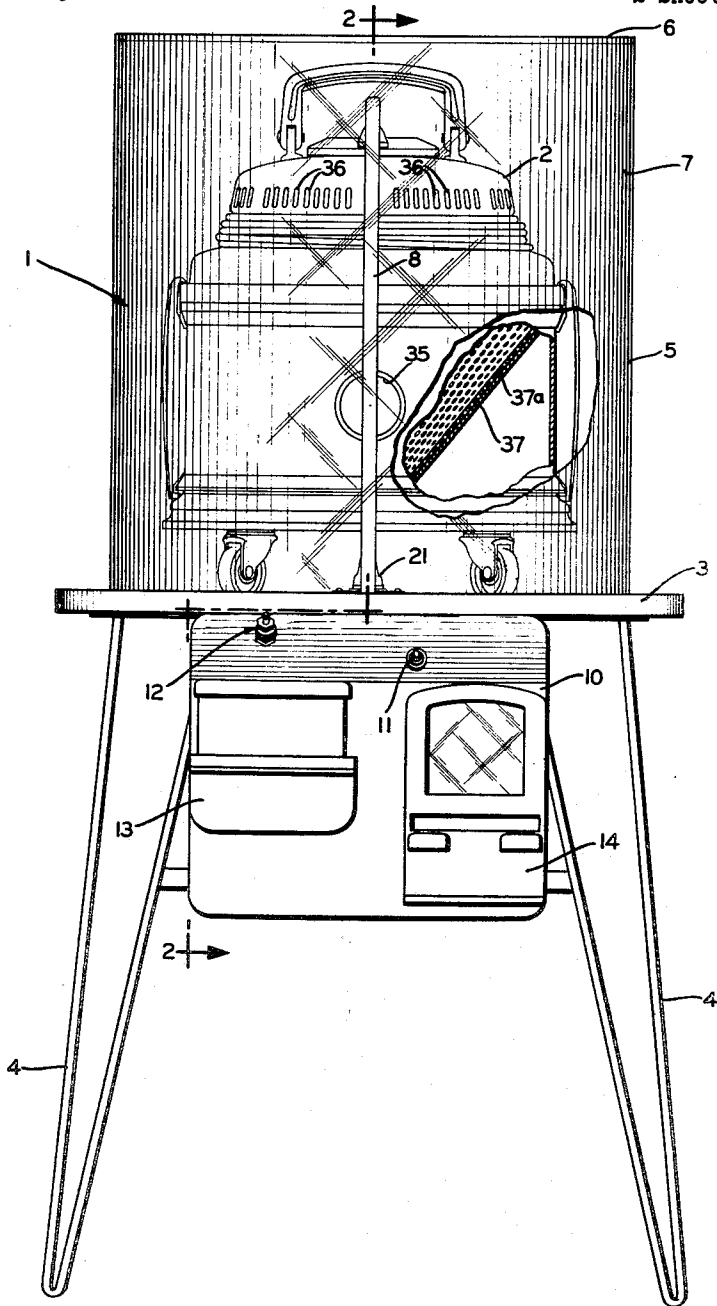


Fig. 1

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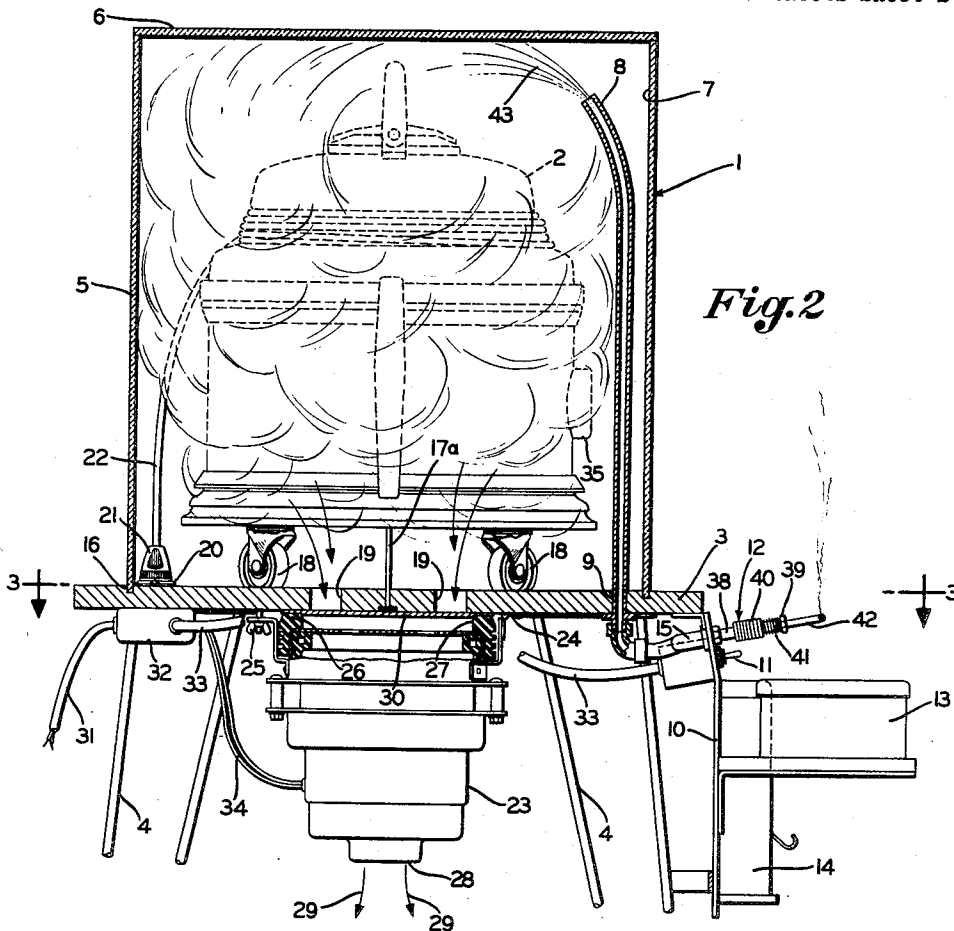


Fig. 2

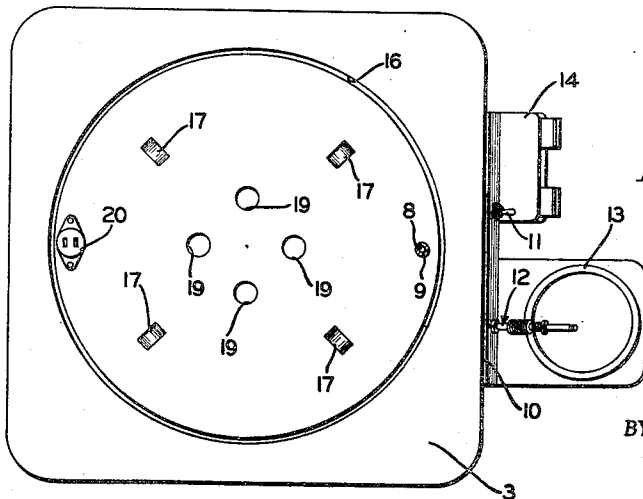


Fig. 3

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FILTER DEMONSTRATION DEVICE FOR SUCTION CLEANER

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5 Claims. (Cl. 35-49)

This invention relates to a demonstration device and more particularly it pertains to a device for demonstrating the efficiency of a suction cleaner for filtering tobacco smoke and other fumes from the atmosphere.

One way to sell suction cleaners to prospective customers is to demonstrate visually the effectiveness or efficiency of the cleaner as a filter of tobacco smoke. A suction cleaner provided with the proper filter for separating dust and other matter from the air should also filter tobacco smoke having particle size relatively small compared to other matter ordinarily entering the cleaner.

Ordinarily it is not possible to visually demonstrate the efficiency of a suction cleaner for filtering smoke from the atmosphere in a normal room because smoke is thinly dispersed and substantially invisible in a room and is not confined in a small concentrated readily visible volume. The less efficient filters will remove dust and dirt having relatively large particle size. However, such filters readily pass tobacco smoke with the air without separating the two when they pass through the filter.

It has been found that where the cleaner is provided with a filter which passes air but not smoke particles, a demonstration of the efficiency of the cleaner for filtering smoke may be satisfactorily shown.

The device of the present invention includes a transparent hood or globe in which a suction cleaner is mounted for observation. Tobacco smoke is drawn into the globe and around the cleaner by means of a suction device which draws air but not smoke out of the globe chamber. When the atmosphere within the globe is completely filled with tobacco smoke, the process of filling the globe with smoke is terminated. Thereafter the cleaner is turned on and the atmosphere within the globe is cleared of smoke in a very short period of time.

Accordingly, it is an object of this invention to provide a demonstration device which enables the visual observation of the effectiveness of a suction cleaner for filtering smoke.

It is another object of this invention to provide an effective device for demonstrating to prospective customers the efficiency of the suction cleaner for filtering tobacco smoke from the atmosphere.

It is another object of this invention to provide a demonstration device by which smoke contained in the atmosphere surrounding a suction cleaner may be filtered out of the air and thereby returning smokeless air to the surrounding atmosphere.

Finally, it is an object of the present invention to provide a demonstration device for a suction cleaner by which the described difficulties are overcome and the foregoing objects and desiderata are obtained in a simple, effective, and inexpensive manner.

These and other objects and advantages apparent to those skilled in the art from the foregoing description and claims may be obtained, the stated results achieved, and the described difficulties overcome and solved by the parts, elements, constructions, mechanism, combinations, sub-combinations, and arrangements which comprise the pres-

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ent invention, the nature of which is set forth in the following general statement, a preferred embodiment of which—illustrative of the best mode in which applicant has contemplated applying the principles—is set forth in the following description and shown in the drawings, and which is particularly and distinctly pointed out and set forth in the appended claims forming part hereof.

The nature of the apparatus of the present invention may be stated generally as including a suction cleaner enclosed within a transparent globe, the globe and cleaner being mounted on a base, the globe being joined to the base in an airtight manner, air suction means communicating with the interior of the globe as by being attached to the base for removing air from the interior of the globe, a smoke filter attached to the air suction means, said filter passing air but not smoke, a smoke inlet means for passing smoke into the globe when the air suction means is operated, and the suction cleaner including air suction and filter means removing smoke from smoke-laden air passed through the cleaner when operated.

By way of example, a preferred embodiment of the apparatus of the present invention is shown in the accompanying drawings, wherein:

Figure 1 is a front elevational view of the apparatus having a portion broken away, and showing a cleaner mounted within a transparent airtight container;

Fig. 2 is a vertical sectional view taken on the line 2-2 of Fig. 1; and

Fig. 3 is a horizontal sectional view taken on the line 3-3 of Fig. 2.

Similar numerals refer to similar parts throughout the several views of the drawings.

In Fig. 1 a smoke demonstration device is shown. It includes a transparent globe or container 1 enclosing a suction cleaner 2, both of which are supported on a base 3 having a plurality of similar legs 4. The globe or container 1 is composed of a transparent material, such as glass, Plexiglas, or the like. It includes a cylindrical side wall 5 having a circular top 6 attached thereto in an airtight manner. The side wall 5 and the top 6 of the globe form a globe chamber 7 in which the suction cleaner 2 is disposed for visual demonstration purposes.

A smoke inlet pipe 8 is mounted within the globe chamber 7 and extends upwardly through an aperture 9 in the base 3 as shown in Fig. 2. The inlet pipe 8 delivers tobacco smoke to the upper portion of the chamber 7. At one side of the base 3 a support plate 10 is attached on which is mounted an electric switch 11, a cigarette holder 12, an ash tray 13, and a cigarette dispenser 14. The cigarette holder 12 is connected to the lower end of the smoke inlet pipe 8 by a connecting conduit 15 (Fig. 2).

As shown in Fig. 3, the base 3 includes an annular groove 16 in which the lower end of the globe side wall 5 is seated in an airtight manner (Fig. 2). The base 3 also includes four equally spaced notches 17 for receiving casters 18 beneath the suction cleaner 2, and the cleaner may be bolted to the base by a bolt 17a. Moreover, the base 3 includes a plurality of spaced apertures 19 through which air is drawn during operation of the demonstration device as will be set forth hereinbelow. The apertures 19 are substantially remote from the inlet pipe 8.

Finally, the base 3 is provided with an electric socket 20 for a plug 21 at the end of an electric cord 22 for the cleaner 2 as shown in Fig. 2.

Below the base 3 an air suction unit 23 is attached, preferably by a hinge 24 on one side and a wing nut 25 on the other side. The upper end of the air suction unit 23 includes an annular gasket 26 forming an air inlet 27 and surrounding the four holes 19 in the base 3. The lower end of the unit 23 provides an air outlet 28 through

which smoke-filtered air passes as indicated by the arrows 29.

As shown in Fig. 2, the annular gasket 26 holds a disk-like filter member 30 snugly in place against the under-surface of the base 3 and covering all of the holes 19 so that air drawn from the globe chamber 7 by the air suction unit 23 passes through the filter 30. The filter 30 is composed of sufficiently small passages to permit the passing of air but prevents the passage of particles of other substances such as tobacco smoke. The suction unit 23 creates a low suction in the globe chamber 7 sufficient for smoking a cigarette. Thus, the suction unit 23 withdraws air from the chamber 7, the smoke inlet pipe 8, the conduit 15, and cigarette holder 12, without drawing excessive amounts of smoke through the apertures 19. Though a small amount of smoke is thereby deposited on the filter 30, most of the smoke remains in and wholly occupies the globe chamber 7 around the cleaner 2 as shown in Fig. 2.

The electrical system for the demonstration device includes an electric cord 31 leading from a source of electric power to a distribution center 32. The distribution center 32 distributes electric current for the operation of the various parts of the demonstration device and suction cleaner. Among other things, the socket 20 is connected to the distribution center 32. The electric switch 11 is connected to the distribution center 32 by a wire 33. Finally, a motor (not shown), within the suction unit 23, is connected to the distribution center 32 by a wire 34.

The switch 11 is a double-throw switch that in one direction operates the suction unit 23 and in the opposite direction operates the cleaner 2. In this manner the motor either in the suction unit 23 or in the suction cleaner 2 may be operated alternately.

As shown in Fig. 1, the cleaner 2 includes an air inlet port 35, a plurality of air outlet ports 36, and an air filter 37 disposed over a perforated backup member 37a therefor. Thus, when the cleaner 2 is operated, air enters through the port 35, passes through the filter 37 and perforated backup member 37a, and subsequently leaves the cleaner as filtered air through the air outlet ports 36 to reoccupy the chamber. In order to separate the smoke from the air, the filters 30 and 37 preferably have air passages of such size that air passes but smoke particles do not and the smoke particles are thereby filtered out of the air.

The demonstration device is operated by taking a cigarette from the cigarette dispenser 14 and inserting it into the cigarette holder 12 and lighting it. The holder 12 includes a tubular member 38 having an annular flange 39, and a sleeve member 40 surrounds the member 38 and is movable longitudinally thereon against a spring 41 to eject a cigarette 42 from the inside of the member 38. The coil spring 41 is disposed around the tubular member 38 for normally holding the sleeve 40 away from the flange 39. The switch 11 is then turned in one direction to actuate the air suction unit 23. Due to the partial vacuum created within the globe chamber 7 and within the smoke inlet pipe 8 and connecting conduit 15, smoke 43 from the cigarette 42 is drawn into the globe chamber 7 as shown in Fig. 2. The amount of smoke 43 necessary to fill the chamber for demonstration purposes is substantially equal to the amount of smoke drawn from one cigarette 42.

During the smoking of the cigarette 42, the air suction unit 23 withdraws the air from the chamber 7, but the smoke 43 within the chamber remains because it does not pass through the filter 30. Thereafter the cigarette 42 is removed from the holder 12 and extinguished. The switch 11 is moved to the second direction in which the motor within the cleaner 2 is operated and the air suction unit 23 is inoperative.

Within a few seconds all of the atmosphere within the globe 1 is passed through the cleaner 2 and because the

filter 37 passes air but not tobacco smoke, the smoke 43 is completely filtered out of the globe chamber 7 and its residue is deposited on the filter 37. The atmosphere within the globe chamber 7 is again restored to clear visibility (Fig. 1) with no smoke whatsoever remaining therein.

Inasmuch as the globe 1 is transparent, the foregoing operation may be clearly observed from the beginning, including the steps of smoking the cigarette 42, filling the atmosphere within the globe 7 completely with tobacco smoke 43, and clearing the air in the fraction of a minute by the cleaner. The success of the demonstration device is dependent upon the use of filters 30 and 37 which, though not necessarily composed of the same material, are provided with passages sufficiently small to pass air but not particles of tobacco smoke so that when smoke-filled air passes through either filter, the smoke fumes are arrested and prevented from passing through the filters.

Accordingly, the demonstration device of the present invention provides an expedient means for demonstrating visually the effectiveness of the suction cleaner 2 for filtering cigarette smoke, noxious fumes, and the like from the atmosphere. By providing the device with a transparent enclosure for the cleaner, which enclosure is first filled with smoke and subsequently cleared of smoke by the cleaner, the effectiveness and efficiency of the cleaner is visually demonstrated to a prospective customer.

The improved demonstration device can be used not only to effectively demonstrate the efficiency of a cleaner in filtering smoke from air, but it may be used to demonstrate the effectiveness of various filter papers or other filtering media used in a suction cleaner. For instance, the conical air filter 37 may be formed of paper filter material, and if such filter paper is not effective in filtering smoke, recirculation of a smoke-filled atmosphere within the globe 7 upon operation of the device will leave a visible smoke-contaminated atmosphere within the globe demonstrating lack of filter efficiency. The demonstration device may be used in this manner to demonstrate the efficiency of different filtering materials provided as filters 37 for the cleaner 2.

Also, the device may be used to compare the operation of different cleaners with the same or different filter material. A particular cleaner with a particular filter 37 therein which is very efficient in completely filtering all smoke from a smoke-filled atmosphere within the globe 7 may be demonstrated with the device. Then another type of cleaner may be placed within the globe 7 having its usual filter and the device operated. If the filter in the second cleaner is not efficient in completely filtering all smoke from smoke-contaminated air recirculated through the cleaner the inefficiency of the second cleaner and its filter will be visually apparent.

An advantageous and extraordinary use of a suction cleaner may be explained and appreciated by operating the improved demonstration device. Thus, operation of the device to visually demonstrate that a cleaner and its filter completely filter all smoke from smoke-laden air passed through the cleaner enables a user to understand that if the cleaner is placed in a closed, smoke-filled room and operated for a sufficient period of time to circulate all of the air in the room through the cleaner, the smoke in the room will be filtered and removed from the air.

Such a showing is important since normally the removal of annoying smoke from the atmosphere in a room, railroad car or private or public gathering place requires either prolonged airing or the installation and use of special air-conditioning equipment.

A filter demonstration device for suction cleaners which is portable and incorporates the principles of the present invention is described and claimed in my copending application filed July 23, 1957, Serial No. 673,675, en-

titled Portable Filter Demonstration Device for Suction Cleaner.

In the foregoing description certain terms have been used for brevity, clearness and understanding, but no unnecessary limitations are to be implied therefrom beyond the requirements of the prior art, because such words are used for descriptive purposes herein and are intended to be broadly construed.

Moreover, the embodiment of the improved construction illustrated and described herein is by way of example, and the scope of the present invention is not limited to the exact details of construction shown.

Having now described the features, constructions and principles of the invention, the characteristics of the new filter demonstration device for suction cleaner, and the advantageous, new and useful results provided; the new and useful discoveries, principles, parts, elements, combinations, subcombinations, structures and arrangements, and mechanical equivalents obvious to those skilled in the art are set forth in the appended claims.

I claim:

1. A demonstration device for visually demonstrating the efficiency of a suction cleaner in filtering smoke from smoke-containing air drawn through the cleaner, including container means having transparent wall portions, the container means forming a chamber in which at least the inlet and outlet means of a suction cleaner are enclosed, suction means communicating with the chamber for exhausting air and creating a partial vacuum within the chamber, means for introducing smoke by said partial vacuum into and retaining such smoke visibly in said chamber, and means for operating said cleaner to remove smoke-containing air through the cleaner inlet means from and to return smokeless air through the cleaner outlet means to said chamber.

2. A demonstration device for visually demonstrating the efficiency of a suction cleaner in filtering smoke from smoke-containing air drawn through the cleaner, including a base, container means including transparent walls mounted on the base, the base and container means forming a chamber in which a suction cleaner supported on the base and having cleaner inlet and outlet means is adapted to be visibly located, suction means communicating with the chamber for creating a partial vacuum within the chamber, means for introducing smoke by said partial vacuum into and retaining such smoke visibly in said chamber, and means for operating a cleaner so enclosed to remove smoke-containing air through the cleaner inlet means from and to return smokeless air through the cleaner outlet means to said chamber.

3. A demonstration device for visually demonstrating the efficiency of a suction cleaner in filtering smoke from smoke-containing air drawn through the cleaner, including a base, container means including transparent walls mounted on the base, the base and container means forming a chamber in which a suction cleaner supported on the base and having cleaner inlet and outlet means is adapted to be visibly located, air suction means mounted on the base communicating with the chamber for exhaust-

ing air from said chamber, smoke filter means interposed in the communication between the air suction means and chamber, smoke inlet means for introducing smoke into the chamber in response to the exhaust of air from said chamber, and means for operating a cleaner so enclosed to remove smoke-containing air through the cleaner inlet means from and to return smokeless air through the cleaner outlet means to said chamber.

4. A demonstration device for visually demonstrating the efficiency of a suction cleaner in filtering smoke from smoke-containing air drawn through the cleaner, including a base, container means including transparent walls mounted on the base, the base and container means forming a chamber in which a suction cleaner supported on the base and having cleaner inlet and outlet means is adapted to be visibly located, suction means communicating with the chamber for creating a partial vacuum within the chamber, a smoke inlet conduit communicating between the exterior and interior of said chamber for introducing smoke by said partial vacuum into and retaining such smoke visibly in said chamber, a cigarette holder mounted on the exterior end of said conduit, and means for operating a cleaner so enclosed to remove smoke-containing air through the cleaner inlet means from and to return smokeless air through the cleaner outlet means to said chamber.

5. A demonstration device for visually demonstrating the efficiency of a suction cleaner in filtering smoke from smoke-containing air drawn through the cleaner, including a base, container means including transparent walls mounted on the base, the base and container means forming a chamber in which a suction cleaner supported on the base and having cleaner inlet and outlet means is adapted to be visibly located, air suction means mounted on the base communicating with the chamber for exhausting air from said chamber, smoke filter means interposed in the communication between the air suction means and chamber, smoke inlet means for introducing smoke into the chamber in response to the exhaust of air from said chamber, power means for operating a cleaner visibly located in said chamber and for operating said air suction means, and switch means for the power means for selectively operating said cleaner and said suction means, whereby the air suction means may be operated to fill the chamber with smoke and a cleaner so enclosed may then be operated to remove smoke-containing air through the cleaner inlet means from and to return smokeless air through the cleaner outlet means to said chamber.

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