

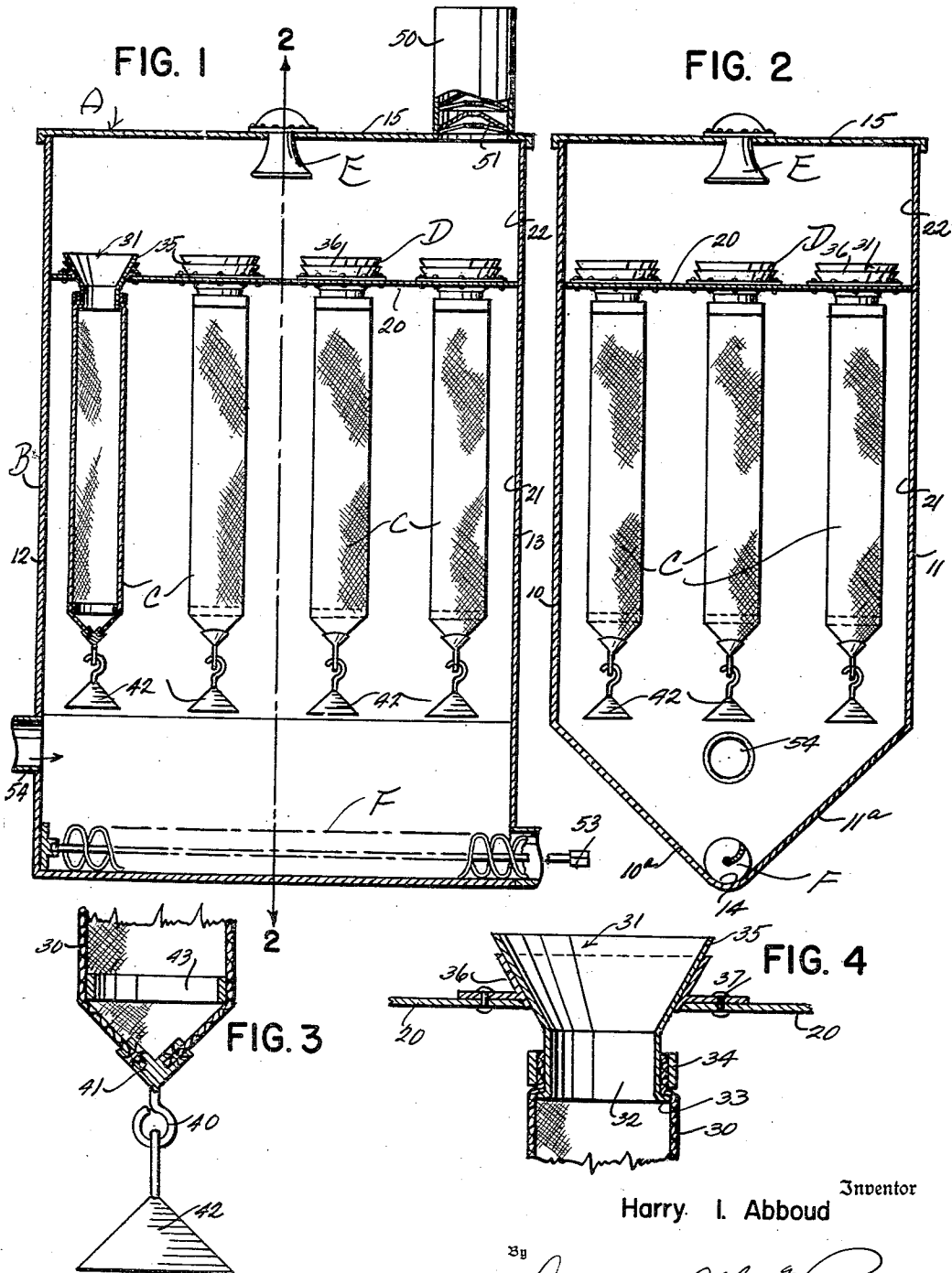
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APPARATUS FOR SEPARATING AEROSOLS FROM GASES

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APPARATUS FOR SEPARATING AEROSOLS FROM GASES

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4 Claims. (Cl. 183-58)

This invention relates to improvements in means for filtering aerosols from gases.

The primary object of this invention is the provision of improved means for filtering aerosols from gases through the use of sound waves.

A further object of this invention is the provision of a relatively simple and positive means for shaking collected aerosols from filtering bags through vibration caused by sound waves produced in any approved manner, as by horns, sirens or cymbals, etc.

Other objects and advantages of this invention will be apparent during the course of the following detailed description.

In the accompanying drawing, forming a part of this specification, and wherein similar reference characters designate corresponding parts throughout the several views.

Figure 1 is a vertical cross sectional view taken through the improved aerosol separating device, showing the arrangement of details thereof.

Figure 2 is a transverse cross sectional view taken through the device substantially on the line 2-2 of Figure 1.

Figure 3 is a fragmentary sectional view of the lower end of one of the aerosol filter bags, showing the means by which the bag is retained in fully extended position.

Figure 4 is a fragmentary cross sectional view showing the upper supporting means for the filter bag.

In the drawing, wherein for the purpose of illustration is shown only the preferred embodiment of the invention, the letter A may generally designate the improved aerosol filtering device. It may consist of a casing structure B, having filter bags C supported by means D therein. Sound wave generating means E, such as a horn or siren is shown. Means F is provided for removing the collected and separated aerosols from the casing structure B.

The casing structure B can assume any approved form. In the drawing it is shown as comprising vertical front and rear walls 10 and 11, and vertical side walls 12 and 13. Walls 10 and 11 at their lower ends converge at 10^a and 11^a to provide a trough 14 wherein the aerosol removing means F is mounted. A removable cover 15 may be provided on top of the walls 10 to 13 inclusive. The casing has a chamber wherein the bags C and the supporting means D are disposed.

The supporting means D preferably includes a wall or plate 20 mounted upon the walls 10 to 13 inclusive (as by soldering or welding) and dividing the chamber in the casing structure B into a lower elongated compartment 21 wherein the gases with the aerosols in suspension are admitted, and an upper compartment 22 wherein the gases pass from the bags C freed of suspended aerosols. This wall 20 may be a diaphragm capable of vibrating under the influence of sound waves.

Any approved number of the bags C may be provided, and each of them is preferably supported as shown in the sectional view Figure 4. They each consist of an elongated porous flexible body 30, of screening, textile or

other material, to the upper mouth end of which is connected a flared supporting ring or member 31, of metal, plastic or other rigid material. This ring 31 preferably consists of a lower ring portion 32 flanged at its marginal edge at 33, over which the upper end of the bag 30 is drawn and crimped in position by means of a clamping band 34. The upper funnel-shaped flared exit mouth or supporting portion 35 is adapted to be supported within a tapered funnel-shaped seat 36 mounted at 37 upon the wall 20.

The bag body 30 is of any desired length. At their lower ends they are each provided with a weight connecting hook 40, secured at 41 to the lower end of the bag. The weight 42 is releasably connected to the hook as shown in Figure 3. The lower end of the bag is held expanded by means of a spreader ring 43.

It will be apparent from the foregoing that the bags C are held in extended uncollapsed position at all times to take advantage of maximum filter surface.

The horn, siren or cymbal E is mounted upon the cover 15 as shown. This cover also supports an exhaust stack, through which the clean gases pass. It is shown at 50 in the drawing and internally is provided with any desired arrangement of sound baffles 51 to muffle the sound produced by the wave generating means E. The sound waves may be sonic or ultra-sonic, as found desirable.

The aerosol removing means F preferably consists of a spiral screw type conveyor mounted in any suitable fashion in the trough 14. It may have a crank or other connection 53 thereon for attachment to some mechanical means for its continuous rotation. The wall 12 is provided with an entrance duct 54, through which the gases with the entrained aerosols flow into the compartment 21.

The operation will be apparent from the foregoing. The sound wave generating means E may be operated continuously or in cycles. The gases with the entrained aerosols rise through the compartment 21. The gases pass through the porous bag body 30, leaving the aerosols caked upon the external surface of the bag body 30. Vibration of the bags caused directly by the sound wave producing means frees the aerosols from the external surfaces of the bag bodies 30. In this connection the wall 20 may if desired also act as a vibrating diaphragm, since it need only be sufficiently rigid to support the bags and the weights.

The advantages of the aerosol separating device will be apparent to those skilled in the art. For the most part aerosols are separated from gases by means of bag filters utilizing expensive mechanical shakers which are, at the very best, inefficient and present expensive and difficult maintenance problems. With such types of shakers it is necessary at times to use repressuring gas fans and ducts. There are no mechanical parts attached to the bags to cause wear and consequently they will have long life. Any vibrating movement of the bags is hardly detectable to the human eye. There will be continuous use of all the bags, since it will not be necessary to halt filtering of aerosols for repair. Furthermore, by filtering the aerosols upon the external surfaces of the bags a maximum filtering area will be provided. The aerosols cake upon the external surfaces of the bag and add to the filtering action without causing stoppage.

Various changes in the shape, size and arrangement of parts may be made to the form of the device without departing from the spirit of the invention or the scope of the claims.

I claim:

1. In a device for separating aerosols from gases, the combination of a casing structure having a first compartment and a second compartment, a porous filter bag positioned in said second compartment, a support member secured to the casing structure for dividing same into

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said first compartment and said second compartment and for supporting said filter bag within said second compartment, said bag having an open top, means for passing the gases through the compartments in a direction so they will pass from externally of the bag through the bag and out of the top of the bag opening whereby the aerosols will collect externally upon the bag, and a sound generator positioned in said first compartment for directing the waves therefrom in a direction towards and into the interior of said filter bag to subject the aerosols on the external surface of the bag to the action of the waves to cause the aerosols to drop by gravity from the external surface of the bag without causing appreciable visible vibration of the bag.

2. The structure set forth in claim 1, including a funnel-shaped member at said open top of said filter bag for assisting in directing the waves from said sound generator into the interior of said filter bag.

3. A device for removing aerosols or the like from gases or the like, comprising an enclosed casing structure having an inlet opening thereto and an outlet opening therefrom, a filter bag having a filter surface disposed in said casing structure between said inlet opening and said outlet opening, barrier means rigidly connected to said casing structure and to said filter bag to confine the flow of the gases through said filter bag as such gases are directed through said casing structure from said inlet opening to said outlet opening whereby said filter surface of said filter bag collects the aerosols in the gases passing through the casing structure on one side thereof, and a sound generator means positioned in the casing structure on the side of said filter bag opposite from the side of the bag on which said aerosols collect for producing pul-

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sations of the sonic type in the casing structure for displacing the collected aerosols from said filter surface.

4. A device for removing aerosols or the like from gases or the like, comprising an enclosed casing structure having an inlet opening thereto and an outlet opening therefrom, a filter bag having a filter surface disposed in said casing structure between said inlet opening and said outlet opening, barrier means rigidly connected to said casing structure and to said filter bag with said filter bag extending to one side of said barrier means to confine the flow of the gases through said filter bag as such gases are directed through said casing structure from said inlet opening to said outlet opening whereby said filter surface of said filter bag collects the aerosols in the gases passing through the casing structure, and a sound generator means positioned in the casing structure on the side of said barrier means opposite from the side on which said filter bag extends for producing pulsations of the sonic type in the casing structure for displacing the collected aerosols from said filter surface.

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