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AIR CLEANER FOR ATTACHMENT TO PAINT BOOTH DOORS

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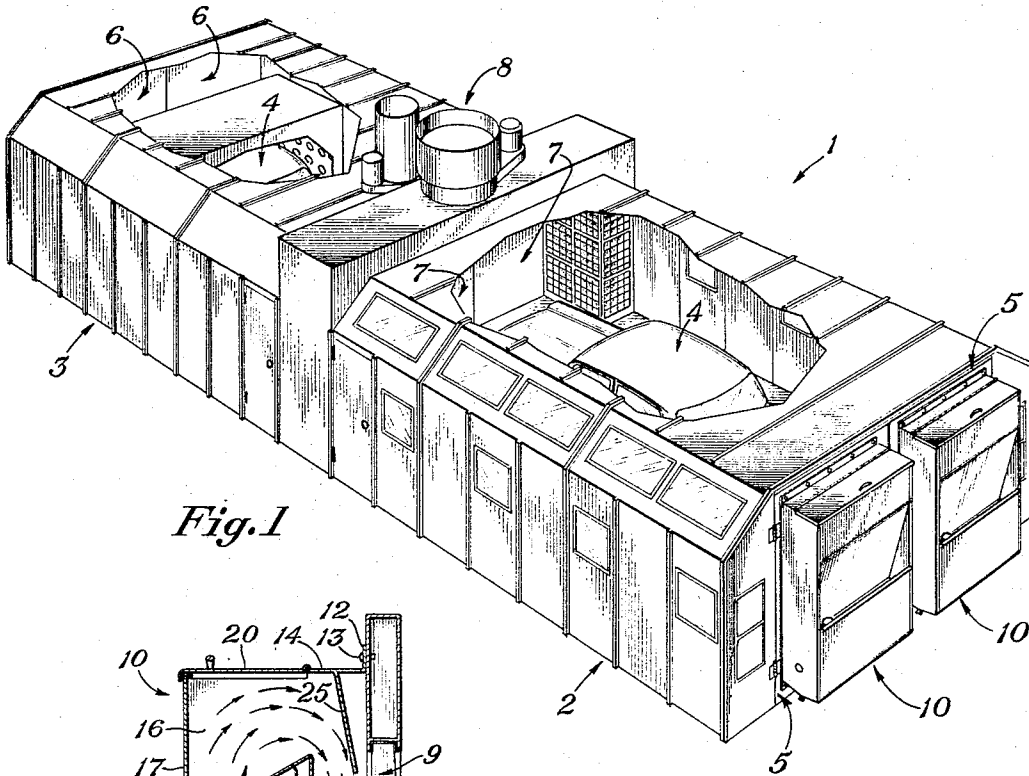


Fig. 1

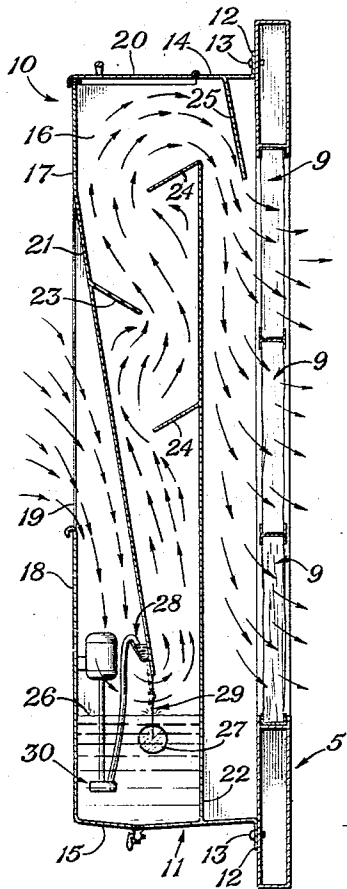


Fig. 2

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**AIR CLEANER FOR ATTACHMENT TO
 PAINT BOOTH DOORS**
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ABSTRACT OF THE DISCLOSURE

A light weight, compact air cleaning and conditioning unit for attachment to the outside of one of the doors of a paint booth of a type which is commonly used for painting automobiles, for example, and having filter panels therein through which air is drawn, usually by means of an exhaust fan at the opposite end of the booth.

According to the invention the incoming air is thoroughly cleaned and conditioned, before passing through the filter panels, to improve the quality of the work, to safeguard the health and comfort of persons working in the booth, and to increase the useful life of the filter panels.

This invention relates to an air cleaner for attachment to paint booth doors, and it concerns more particularly a light weight, compact air cleaning and conditioning unit for attachment to the outside of one of the doors of a paint booth of a type which is commonly used for painting automobiles, for example, as hereinafter described.

Commercial paint booths for the painting of automobiles are ordinarily prefabricated according to standard specifications, and a pair of doors are usually provided at one end of the booth for driving an automobile in or out, as desired.

The doors of such paint booths commonly have filter panels therein whereby air which is drawn into the booth through the door, in the closed position thereof, as by means of an exhaust fan at the opposite end of the booth, may be substantially cleaned. The combined area of the filter panels may approach the area of the door.

Skilled painters are well aware that in order to produce a quality finish, as in painting automobiles, for example, it is necessary to fully protect the work, during painting, against dust which is ordinarily present in atmospheric air. Even slight amounts of dust may spoil a paint job, and for best results complete protection against dust must be provided.

In use the filter panels which are now incorporated in paint booth doors, as above described, are only partly effective for the purpose intended, and it has been found that there is a need for more efficient means for providing a dust free environment inside a paint booth.

The air cleaning and conditioning unit of the invention is applied to the outside of a paint booth door, in opposing relation to the filter panels and in fluid communication therewith.

The air cleaning and conditioning unit of the invention, which is positioned upstream relative to the filter panels, thoroughly cleans and conditions the incoming air, before it passes through the filter panels, and improves the quality of the work by positively preventing the painted surfaces from being marred due to the presence of dust particles therein. At the same time the air in the booth is

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better conditioned for the health and comfort of persons working therein, and the filter panels may last indefinitely, without need for replacement.

The air cleaning and conditioning unit of the invention is fully portable and may be readily attached to and removed from a door, as desired. It is applicable to the doors of existing paint booths as well as those of new booths. The unit is characterized by its simplicity, and may be manufactured at low cost.

The invention will be readily understood by referring to the following description and the accompanying drawing, in which:

FIG. 1 is a perspective view showing a conventional two compartment arrangement including a paint booth and a drying booth, for painting automobiles, arranged end to end, the booths having access doors at their opposite ends and having other doors between them whereby an automobile may be driven from one booth to the other, and having a forced draft ventilation system, including an exhaust fan, arranged between the booths and communicating with the adjacent ends thereof, showing a pair of air cleaners embodying the invention as applied to two of the doors of the paint booth; and

FIG. 2 is a sectional elevational view, on an enlarged scale, taken on a median line, showing one of the paint booth doors and showing an air cleaner embodying the invention in its operative position relative to the door.

Referring to FIG. 1 of the drawing, the numeral 1 designates generally a conventional two compartment arrangement which includes a paint booth 2 and a drying booth 3, for painting automobiles, two of which are indicated by the numerals 4.

The paint booth 2 and the drying booth 3, which are arranged end to end, have access doors 5, 6 at their opposite ends and have other doors 7 between them whereby an automobile 4 may be driven from one of the booths 2, 3 to the other.

A forced draft ventilation system, which includes an exhaust fan 8, is arranged between the booths 2, 3 and communicates with the adjacent ends thereof.

As shown in FIG. 2, the doors 5 of the paint booth 2 have filter panels, indicated generally by the numerals 9, through which atmospheric air is drawn into the paint booth 2, in the closed positions of the doors 5, as by means of the exhaust fan 8. The combined area of the filter panels 9 together approaches the area of the respective doors 5.

The structure above described is conventional, and is not claimed herein.

An air cleaning and conditioning unit embodying the invention, designated generally by the numeral 10, is applied to each of the doors 5 of the paint booth 2, at the end of the booth 2 opposite the exhaust fan 8. The air cleaning and conditioning units 10 are applied to the outside of the doors 5, in opposing relation to the filter panels 9 and in fluid communication therewith.

Referring now to FIG. 2 of the drawing, the air cleaning and conditioning unit 10, as hereinafter described, is fully portable and may be readily attached to and removed from a door, such as one of the doors 5 of the paint booth 2, as desired. It is applicable to the doors of existing paint booths as well as those of new booths. The unit 10 is characterized by its simplicity as well as its

light weight and compactness, and may be manufactured at low cost.

The air cleaning and conditioning unit 10 includes a casing, indicated generally by the numeral 11, which is generally rectangular and advantageously may be formed of sheet metal. The casing 11 has height and width dimensions somewhat greater than the corresponding dimensions of the filter panels 9 together, which it overlies, and is comparatively thin, from front to back, relative to its width.

The casing 11, which is open at the back and has outwardly flanged peripheral edges, as at 12, whereby it is connected, by fastening devices 13, to marginal portions of the door 5 surrounding the filter panels 9, has a top 14, a bottom 15, two opposite sides 16, and a pair of front panels 17, 18 which are positioned above and below a front opening 19 as hereinafter described.

The front opening 19, which extends across the casing 11 and has a vertical dimension substantially less than the corresponding dimension of the filter panels 9 together, is positioned nearer the top 14 of the casing 11 than the bottom 15 thereof, opposite the upper portions of the filter panels 9.

The top 14 of the casing 11 is formed in part by a hinged cover, designated generally by the numeral 20, whereby the interior of the casing 11 is readily accessible for cleaning.

A downwardly and rearwardly inclined baffle 21, which extends across the casing 11 and is connected at its upper edge to the lower edge of the uppermost front panel 17, extends downwardly and rearwardly, inside the casing 11, to a point below the upper edge of the lowermost front panel 18 and rearwardly thereof, in spaced apart relation to the bottom 15.

A vertically extending baffle 22, which extends across the casing 11 and is spaced rearwardly of the inclined baffle 21, extends upwardly from the bottom 15, inside the casing 11, to a point above the lower edge of the uppermost front panel 17, in spaced apart relation to the top 14.

A series of oppositely inclined fins 23, 24, which extend across the casing 11 and have their upper edges connected to the inclined baffle 21 and the vertically extending baffle 22, respectively, are inclined downwardly in mutually opposing, staggered relation to each other.

A downwardly and rearwardly inclined deflector member 25, which is comparatively short relative to the inclined baffle 21 and is positioned above it, in rearwardly spaced, substantially parallel relation thereto, extends across the casing 11 and has its upper edge connected to the top 14, rearwardly of the hinged cover 20. The deflector member 25 extends downwardly and rearwardly to a point rearwardly of the vertically extending baffle 22 and below its upper edge, between the vertically extending baffle 22 and the filter panels 9.

A water reservoir is provided in the lower portion of the casing 11, between the lowermost front panel 18 and the vertically extending baffle 22, as at 26. The water level in the reservoir 26 is spaced below the lower edge of the inclined baffle 21.

The reservoir 26 may be filled with water, and the water level therein may be controlled either manually or automatically, by means not shown. Sight windows advantageously may be provided in the two opposite sides 16 of the casing 11, as at 27, for use in observing the water level in the reservoir 26.

In the operation of the air cleaning and conditioning unit 10, atmospheric air is caused to flow through the unit 10, and thereafter into the paint booth 2, through the filter panels 9 of the door 5, by the action of the exhaust fan 8 as above described.

The incoming air does not flow directly, in a straight, horizontal path, through the unit 10, but is caused to change its direction of flow abruptly and repeatedly as it flows through the casing 11, and follows an indirect, generally zigzag course, downwardly between the inclined baffle 21 and the lowermost front panel 18, through the

body of water in the reservoir 26, upwardly between the inclined baffle 21 and the vertically extending baffle 22, over the several inclined fins 23, 24, and downwardly again between the vertically extending baffle 22 and the deflector member 25.

In an optional arrangement, as shown, a small water trough 28, which has a perforated bottom, extends along the lower edge of the inclined baffle 21, and a strip of comparatively thin filter material, designated by the numeral 29, which may consist of wire mesh, extends along the under side of the water trough 28, below the perforations therein, and depends therefrom.

The filter material 29 has one of its longitudinal edges connected to the water trough 28, and extends from the under side of the water trough 28 to a point immediately below the water level in the reservoir 26.

The water trough 28 is filled with water from the reservoir 26 by means of a small pump 30, and the arrangement is such that a substantially continuous sheet of water is caused to flow downwardly across the filter material 29, and such portion of the incoming air as may bypass the body of water in the reservoir 26, as it changes its direction of flow adjacent the bottom of the casing 11, is subjected to a combined water scrubbing and filtering action as it flows through the water wet filter material 29.

The incoming air will also be cooled to some extent by the action of the water in the reservoir 26, as above described, whereby the temperature inside the booth 2 may be more pleasant in summer. A heater element (not shown) may be added for winter use, if desired.

The invention is not necessarily limited to an operation in which an exhaust fan, such as the exhaust fan 8, is relied on to draw atmospheric air into the booth 2. A suitable fan (not shown) may be added to the unit 10 if desired.

The invention may be modified in various ways without departing from the spirit and scope thereof.

I claim:

1. The combination of a spray booth, for painting automobiles and the like, having a door, and having filter panels in the door whereby atmospheric air drawn into the booth through the door, in the closed position thereof, may be substantially cleaned, the combined area of the filter panels approaching the area of the door, and a light weight, compact air cleaning and conditioning unit removably connected to the outside of the door, in opposing relation to the filter panels and in fluid communication therewith, said unit being movable bodily with the door upon opening and closing the door and consisting substantially in its entirety of a casing, comparatively thin from front to back, overlying the filter panels, the casing being open at the back and having a front opening spaced above the bottom thereof, oppositely extending baffles in the casing whereby air flowing through the casing is caused to follow an indirect course, downwardly, and then upwardly, and downwardly again, a water reservoir in the bottom of the casing, below one of the baffles, in the path of air flowing downwardly and upwardly around said one of the baffles, a water trough having perforations in the bottom thereof extending along the lower edge of said one of the baffles, above the water level in said reservoir and in spaced apart relation thereto, a strip of comparatively thin filter material having one of its longitudinal edges connected to the under side of said trough, and depending therefrom, below said perforations, said filter material extending downwardly from said trough below said water level, and means for supplying water to said trough from said reservoir.

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