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GAS AND AIR CLEANER

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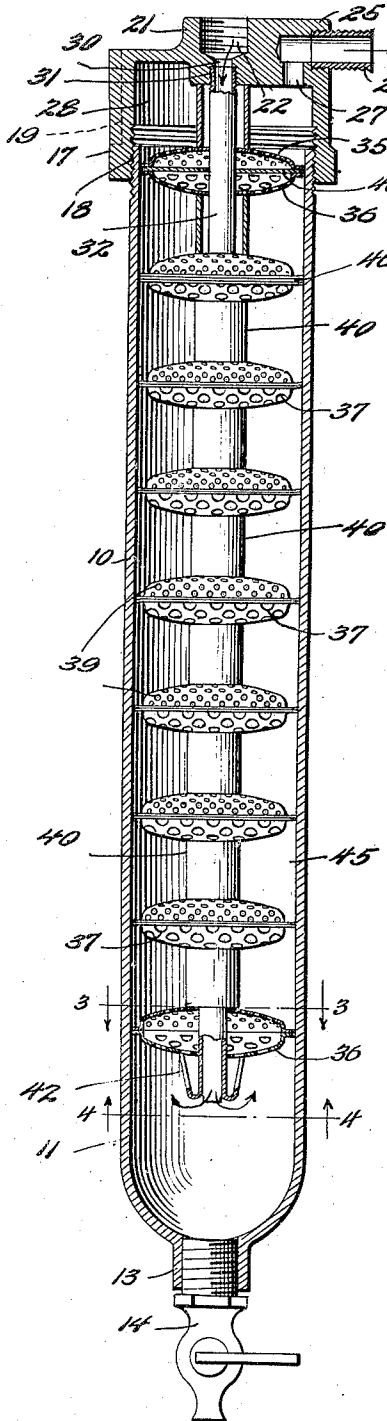


FIG. 1.

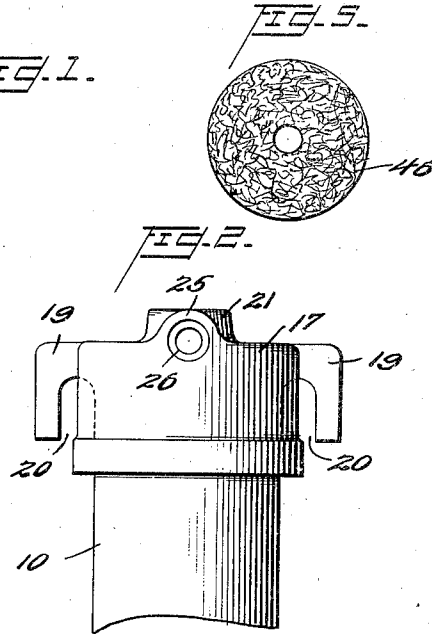


FIG. 2.

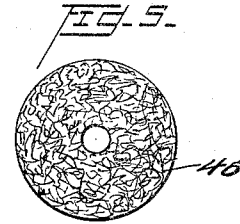


FIG. 3.

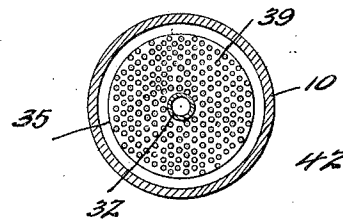


FIG. 4.

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GAS AND AIR CLEANER

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This invention relates to gas and air cleaners, and more particularly to the type adapted for use in connection with the compressed air supply for paint spray apparatus.

5 It is a general object of the invention to simplify, improve, and reduce the cost of manufacture of gas or air cleaners of this character.

10 It is a further object of the invention to provide a gas or air cleaner in which the air is introduced downwardly in a vertical direction and then flows upwardly against the action of gravity through a series of spaced, substantially horizontal cleaning elements.

15 Another object of the invention is to utilize the action of gravity in removing foreign particles from a gas or air supply.

20 Still another object of the invention is to provide improved means for removing the trapped particles of foreign matter.

25 Compressed gas or air is used for a great number of industrial processes, in many of which the presence of foreign material has a very bad effect upon the efficiency of the processes and the grade of the product.

30 It is, therefore, the principal aim of my invention to provide a gas or air cleaner for compressed air which will effectually remove foreign particles from the supply without greatly reducing the pressure or interfere with the flow, and which at the same time will be simple of construction and economical to manufacture.

35 Other objects and features of novelty will be apparent from the following description, and the accompanying drawings in which:

Figure 1 is a vertical cross section through the cleaner;

40 Figure 2 is a partial elevation showing the upper part of the cleaner casing and head;

Figure 3 is a transverse section along the line 3—3 of Fig. 1;

45 Figure 4 is a transverse section on the line 4—4 of Fig. 1; and

Figure 5 is a plan view of a felt insert for the screen.

Referring more particularly to the drawings, the cleaner comprises a vertical casing 50 10 having its lower end portion 11 smoothly

rounded, and terminating in a boss 13, threaded to receive a drain cock 14.

At the upper end of the casing is mounted a head 17 which is detachable from the casing and preferably secured thereto by a 55 threaded connection 18. Ears 19 are provided at either side of the head as shown in Fig. 2, and each of these ears is provided with a notch 20 to receive a bolt or other suitable attaching means by means of which the 60 entire cleaner may be suspended from a wall or other support. A boss 21 is formed in the center of the top of the head, and is threaded as at 22 to receive a suitable connection by means of which air is introduced to the 65 cleaner from the supply. The head is also formed with a lateral boss 25 which is threaded to receive a connecting element 26 from which the purified air may be conducted for use. A vertical bore 27 connects the outlet 70 with the hollow interior portion 28 of the head. Concentric with the threaded portion 22 is a reduced bore 30 which is threaded at 31 to receive a central supply tube 32 which extends substantially the full length 75 of the casing 10 and terminates near the lower portion 11.

The cleaning element of this cleaner comprises a pair of spaced perforated dish-shaped plates or screens 35 and 36. Each 80 pair of plates 35 and 36 is provided with flat, horizontal marginal flanges which extend to the wall of the casing 10 and are adapted to contact evenly and firmly around their entire peripheries when the device is assembled, 85 whereby none of the fluid being filtered may pass between the flanges of each pair of plates, nor between the edges of the flanges and the wall of the casing 10. The plate 36 as shown in Fig. 4 has comparatively large 90 perforations 37 therein, the edges of which will trap any very large particles. The plates 35 have much smaller perforations 39 which will retain still smaller articles which fail to be trapped by the larger perforations 95 in the lower plate.

The entire cleaner is very well adapted for the purification of gas as well as air. Furthermore, the cleaner can be made even more effective if between several of the pairs of 100

baffle plates, especially the upper ones, felt inserts are assembled between the coarse and fine screens.

This arrangement is illustrated in Figure 1, in which a felt insert 46 has been placed between the coarse and fine screens of the two upper pairs. However, it is within the purview of my invention to omit the felt insert, 46, or to place one between any or all pairs of screens. Each pair of screens 35 and 36 together with the intervening insert 46 when this element is employed, constitute a "group" of cleaning members within the meaning of this term as used in the subjoined claims.

A plan view of one of these inserts 46 is shown in Figure 5, from which it will be apparent that the felt will retain particles which might even pass through the screens having the smallest perforations.

Another advantage accruing from the use of these inserts 46 lies in the provision of further means for the prevention of the passage of fluid between the flanges of adjacent plates 35 and 36. When the device is assembled, these flanges bear with sufficient pressure upon the margins of the felt inserts 46 to compress them slightly and provide a seal in the nature of a gasket, which effectively prevents the passage of fluid between the plates or screens of each group.

As shown in Fig. 1 a large number of pairs of these plates are located one above the other along the tube 32, held in spaced relation by the sleeves 40, interspersed between each pair of plates. When the plates and sleeves have been placed upon the pipe 32 the lower end thereof is split and the sides are bent outward as shown at 42 in Figs. 1 and 3, securely holding the assembled parts in position on the pipe 32.

The gas or air supplied to the inlet 22 will be conducted through the passage 30 to the tube 32. The gas or air will pass through the tube to the bottom of the portion 11 and then start upward through an annular passage 45 between the tube and the casing 10. As the outer edges of the plates substantially contact with the casing 10 the gas or air must pass through each pair of discs on its way upward through the annular chamber. The lower disc 36 having the large perforations 37 will trap the larger particles and the upper discs having the small perforations 39 will trap the smaller particles which were not retained by the lower discs. This effect is repeated through each pair of discs and when the gas or air passes through the last pair, it is in suitable condition for use. The purified gas or air in the chamber 28 passes through the bore 27 and the connection 26 to the conduit by which it is conveyed away for use.

It will be apparent that by introducing the gas or air from the tube 32 to the bottom of the casing 10 and forcing it upward through the annular passage 45, the action of

gravity will assist the screens in removing the foreign particles. The foreign particles or moisture, as the case may be, may be removed by merely opening the stop cock 14 and permitting the foreign material to drain out at this point.

It should be noted that this cleaner is susceptible of a very easy flushing operation. By merely introducing a water hose at the outlet 26, the water will flow down over the screens and carry all of the sediment thereon down to the bottom of the casing. The cleaning water and the sediment can then be drained out at 14. If, for any reason, it is necessary to inspect or repair the cleaner it can be disassembled by merely disconnecting the threaded connection 18 which will expose the interior for overhauling.

It is obvious that the effects produced by this filter might be produced by inverting the entire device, reversing the screens 35 and 36 and also reversing the inlet and outlet. With this arrangement, the air would flow downward through the cleaning screens, with the operation of gravity. However, this arrangement would constitute mere reversal of parts and obviously come within the scope of my invention.

Other alterations and modifications might also be made to this filter and therefore my invention is not limited to the form shown but includes such changes as come within the scope of the appended claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A cleaning device for separating foreign substances from a fluid, comprising in combination, a hollow container, one end of said container having inlet and outlet apertures, a tube connected to one of said apertures and adapted to conduct the fluid from one end of said container to the other, and a series of groups of cleaning members surrounding said tube in spaced relation and extending to the wall of the container, and adapted to permit the passage of the fluid therethrough, but prevent the passage of foreign material, the margins of said members of each group arranged in mutual contact whereby the passage of fluid between them is prevented, the other of said apertures being in communication with the space between the tube and container.

2. A cleaning device for separating foreign substances from air, comprising in combination, a tubular container, an inlet at one end of said container, a tube connected thereto adapted to conduct the air to the other end of said container, and a series of pairs of perforated members mounted on said tube in spaced relation and extending to the wall of the container, and adapted to permit the passage of the air therethrough, but prevent the passage of foreign material, means for pre-

venting leakage of unfiltered fluid between the peripheries of the perforated members of each pair and an outlet in communication with the space between the tube and container.

5 3. A cleaning device for separating foreign substances from air, comprising in combination, a hollow container having a rounded lower end, an inlet at one end of said container, a tube connected thereto adapted to conduct the air to the other end of said container, and a series of perforated members arranged in pairs, supported by said tube in spaced relation and extending to the wall of the container, and adapted to permit the passage of the air therethrough, but prevent the passage of foreign material and retain it, means for connecting the peripheries of the members of each pair to prevent passage of fluid therebetween, an outlet in communication with the space between the tube and container, and means mounted in said rounded lower end permitting the removal of the retained foreign material.

25 4. A cleaning device for separating foreign substances from a fluid, comprising in combination, a hollow container, an inlet at one end of said container means providing a passageway connected thereto adapted to conduct the fluid to the other end of said container, and a series of pairs of dished perforated plates surrounding said means in spaced relation with the peripheries of each pair in contact with each other, said plates adapted to permit the passage of the fluid therethrough, but prevent the passage of foreign material and retain it, and an outlet in communication with the space between the passageway and container.

40 5. A cleaning device comprising in combination, a head, a casing extending therebelow and normally closed at its lower end, an inlet for the head, an open ended tube connected thereto and extending down within the casing terminating adjacent its lower end, a series of downwardly concave screen plates having small perforations mounted in spaced relation on said tube, a series of upwardly concave screen plates having larger perforations interspersed between the first series and sleeves interposed between mating pairs of said plates to hold them in pairs in spaced relation on said tube, and an outlet in said head from which the purified gas or air may be withdrawn.

55 6. A compressed gas or air filter for paint spray supply, comprising in combination, a head, a casing extending therebelow and normally closed at its lower end, an inlet for the head, an open ended tube connected thereto and extending down within the casing terminating adjacent its lower end, a series of screen plates having small perforations mounted in spaced relation on said tube, a series of screen plates having larger perforations interspersed between the first series, sleeves interposed between mating pairs of said plates to hold them in pairs in spaced relation on said tube, an outlet in said head, and means at the lower end of said tube for securing all of said elements on said tube.

70 7. A compressed gas or air filter comprising in combination, a head having lugs by which it may be hung from a support, a casing extending therebelow and normally closed at its lower end, a central inlet for the head, an open ended tube connected thereto and extending down within the casing terminating adjacent its lower end, a series of downwardly concave screen plates having small perforations mounted in spaced relation on said tube, a series of upwardly concave screen plates having larger perforations interspersed between the first series and sleeves interposed between mating pairs of said plates to hold them together in pairs and in spaced relation on said tube, and an outlet in said head from which the purified air may be withdrawn, said casing being detachably secured to said head, whereby the entire device may be exposed for overhaul by merely detaching said barrel.

75 8. A cleaning device for separating foreign substances from a fluid, comprising in combination, a hollow container, one end of said container having inlet and outlet apertures, a tube connected to one of said apertures and adapted to conduct the fluid from one end of said container to the other, and a series of cleaning members surrounding said tube in spaced relation and extending to the wall of the container, and adapted to permit the passage of the fluid therethrough, but prevent the passage of foreign material, the other of said apertures being in communication with the space between the tube and container, said cleaning members comprising flat pieces of felt.

100 9. A cleaning device for separating foreign substances from air, comprising in combination, a tubular container, an inlet at one end of said container, a tube connected thereto adapted to conduct the air to the other end of said container, and a series of pairs of perforated members mounted on said tube in spaced relation and extending to the wall of the container, and adapted to permit the passage of the air therethrough, but prevent the passage of foreign material and an outlet in communication with the space between the tube and container, certain of said pairs of perforated members having a felt insert therebetween.

105 10. A cleaning device comprising in combination, a head, a casing extending therebelow and normally closed at its lower end, an inlet for the head, an open ended tube connected thereto and extending down within the casing terminating adjacent its lower end, a series of downwardly concave screen plates having small perforations mounted in spaced relation on said tube, a series of upwardly concave screen plates having larger perforations interspersed between the first series and sleeves interposed between mating pairs of said plates to hold them together in pairs and in spaced relation on said tube, and an outlet in said head from which the purified air may be withdrawn, said casing being detachably secured to said head, whereby the entire device may be exposed for overhaul by merely detaching said barrel.

110 11. A cleaning device for separating foreign substances from a fluid, comprising in combination, a hollow container, one end of said container having inlet and outlet apertures, a tube connected to one of said apertures and adapted to conduct the fluid from one end of said container to the other, and a series of cleaning members surrounding said tube in spaced relation and extending to the wall of the container, and adapted to permit the passage of the fluid therethrough, but prevent the passage of foreign material, the other of said apertures being in communication with the space between the tube and container, said cleaning members comprising flat pieces of felt.

115 12. A cleaning device for separating foreign substances from a fluid, comprising in combination, a hollow container, one end of said container having inlet and outlet apertures, a tube connected to one of said apertures and adapted to conduct the fluid from one end of said container to the other, and a series of cleaning members surrounding said tube in spaced relation and extending to the wall of the container, and adapted to permit the passage of the fluid therethrough, but prevent the passage of foreign material, the other of said apertures being in communication with the space between the tube and container, said cleaning members comprising flat pieces of felt.

120 13. A cleaning device for separating foreign substances from a fluid, comprising in combination, a hollow container, one end of said container having inlet and outlet apertures, a tube connected to one of said apertures and adapted to conduct the fluid from one end of said container to the other, and a series of cleaning members surrounding said tube in spaced relation and extending to the wall of the container, and adapted to permit the passage of the fluid therethrough, but prevent the passage of foreign material, the other of said apertures being in communication with the space between the tube and container, said cleaning members comprising flat pieces of felt.

125 14. A cleaning device for separating foreign substances from a fluid, comprising in combination, a hollow container, one end of said container having inlet and outlet apertures, a tube connected to one of said apertures and adapted to conduct the fluid from one end of said container to the other, and a series of cleaning members surrounding said tube in spaced relation and extending to the wall of the container, and adapted to permit the passage of the fluid therethrough, but prevent the passage of foreign material, the other of said apertures being in communication with the space between the tube and container, said cleaning members comprising flat pieces of felt.

130 15. A cleaning device for separating foreign substances from a fluid, comprising in combination, a hollow container, one end of said container having inlet and outlet apertures, a tube connected to one of said apertures and adapted to conduct the fluid from one end of said container to the other, and a series of cleaning members surrounding said tube in spaced relation and extending to the wall of the container, and adapted to permit the passage of the fluid therethrough, but prevent the passage of foreign material, the other of said apertures being in communication with the space between the tube and container, said cleaning members comprising flat pieces of felt.

relation on said tube, a series of upwardly
concave screen plates having larger perfora-
tions interspersed between the first series and
sleeves interposed between mating pairs of
said plates to hold them in pairs in spaced
5 relation on said tube, and an outlet in said
head from which the purified gas or air may
be withdrawn, a felt insert being assembled
between a downwardly concave screen plate
and the adjacent upwardly concave screen
10 plate.

In testimony whereof I hereunto affix my
signature.

ALEXANDER F. JENKINS.

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