Nov. 15, 1966 J. MADL, JR 3,285,693

APPARATUS FOR DECONTAMINATING PERSONNEL

Filed Sept. 17, 1962 2 Sheets-Sheet 1

Fig. 1.

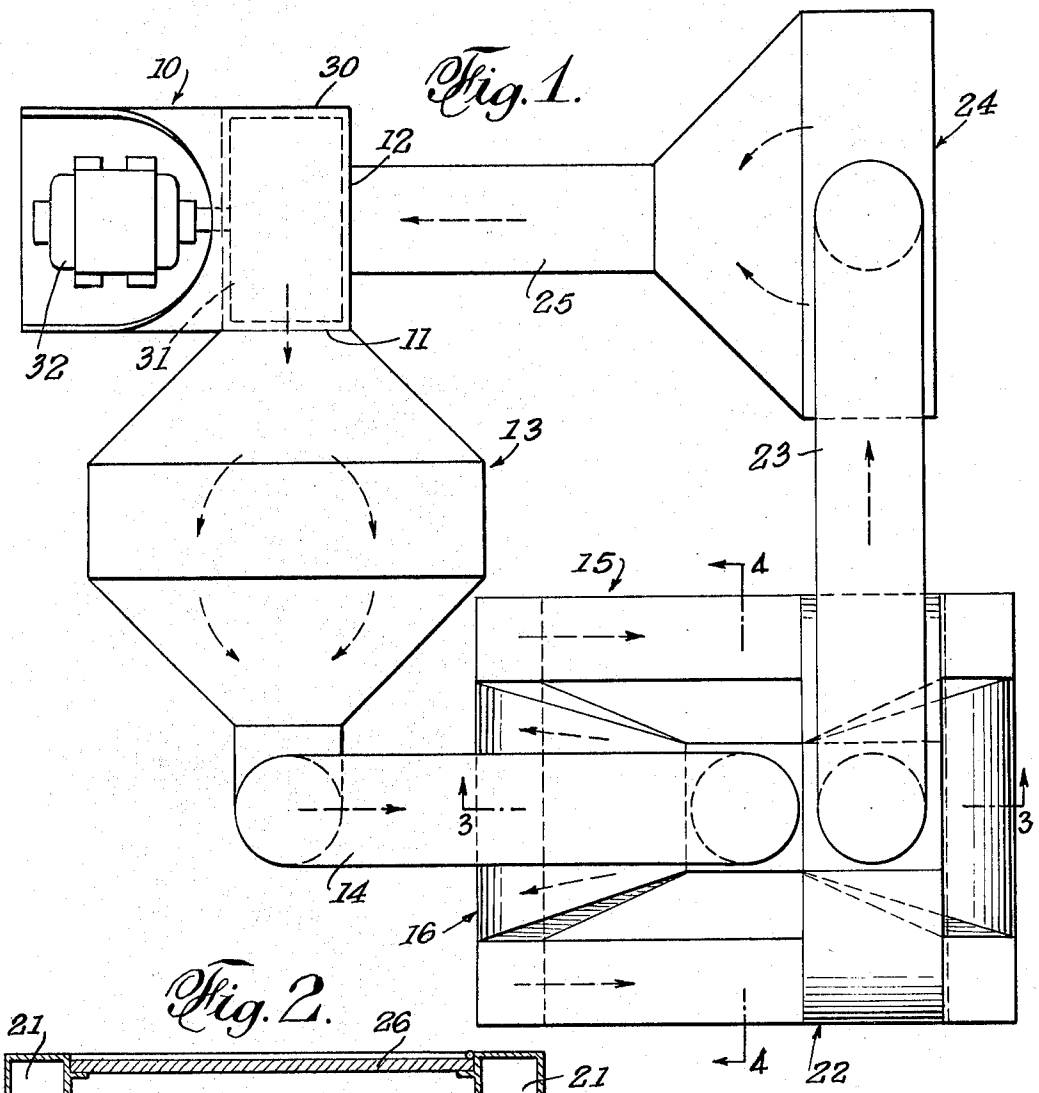
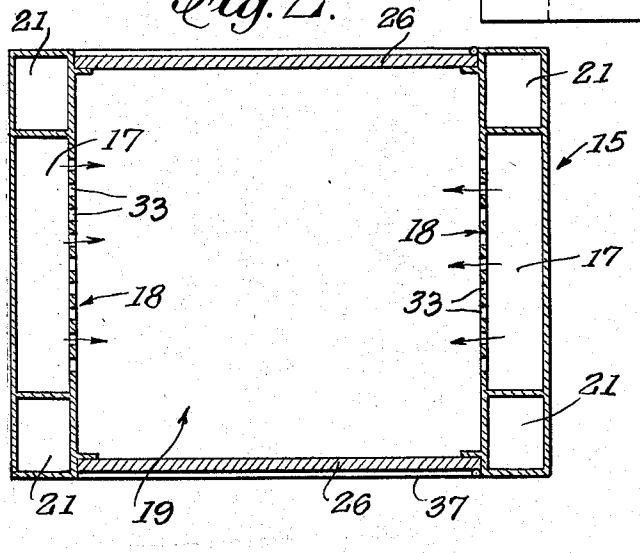


Fig. 2.



INVENTOR.
JOSEPH MADL, JR.
BY C. J. Stratton
ATTORNEY

Nov. 15, 1966 J. MADL, JR 3,285,693

APPARATUS FOR DECONTAMINATING PERSONNEL

Filed Sept. 17, 1962 2 Sheets-Sheet 2

Fig. 3.

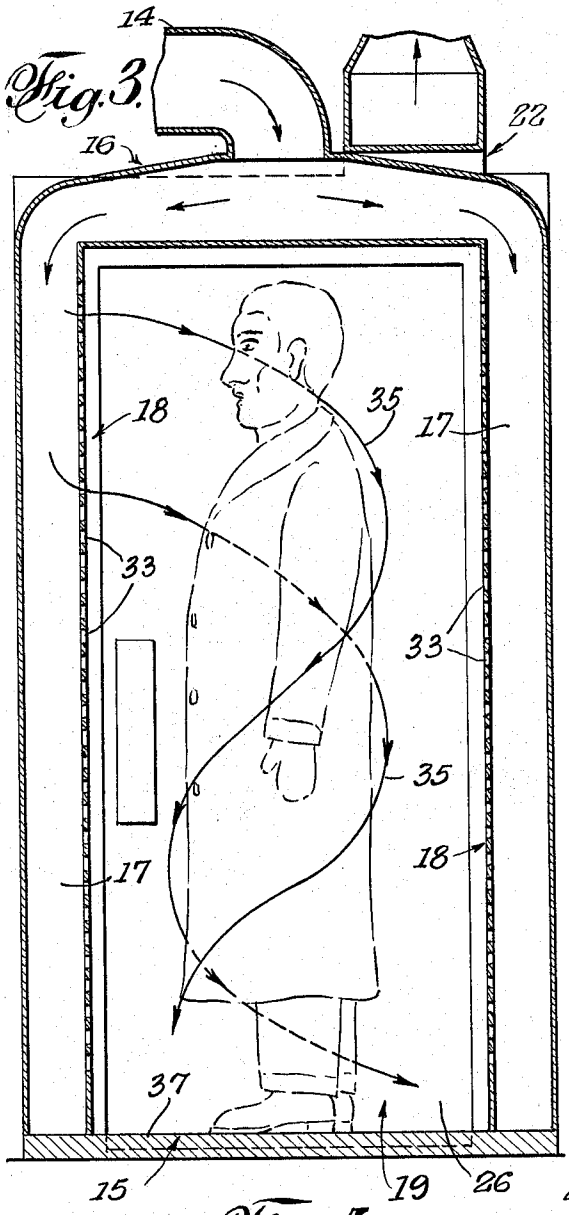


Fig. 4.

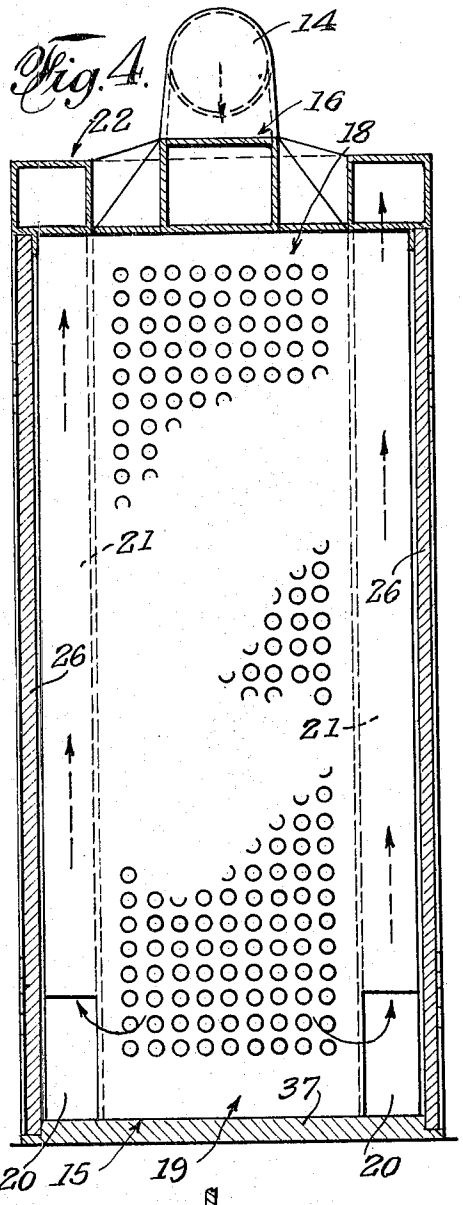


Fig. 5.

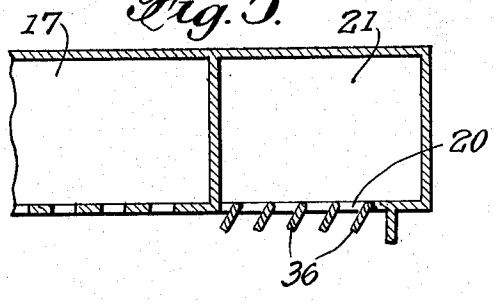
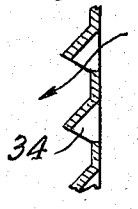


Fig. 6.



INVENTOR.
JOSEPH MADL, JR.
BY C. L. Stratton
ATTORNEY

United States Patent Office 3,285,693 Patented Nov. 15, 1966

3,285,693

APPARATUS FOR DECONTAMINATING PERSONNEL

Joseph Madl, Jr., 990 Volante Drive, Arcadia, Calif.

Filed Sept. 17, 1962, Ser. No. 224,127
3 Claims. (Cl. 21—61)

This invention relates to an apparatus for decontaminating personnel as well as articles of manufacture and fabricated units and machines.

An object of the invention is to provide an apparatus that subjects personnel to an enveloping flow of air that has cyclonic characteristics, in that the same is directed in a rotational or partly rotational path and in a downward direction, to render said personnel dust-free, free of cutaneous particles, and other foreign and contaminating matter.

Another object of the invention is to provide an apparatus, as above characterized, that directs air at a suitable velocity to form an air shower that has considerable and uniform intensity over large areas rather than that obtained by the impingement of air sprays produced by nozzles or jets, as is presently employed for decontaminating purposes.

A further object of the invention is to provide an apparatus in which a volume of air is circulated in a closed circuit and is filtered both before and after decontaminating contact with personnel, the invention also optionally contemplating treating of the air thus circulated to heat, cool and/or ionize the same, introduce ultra violet or other rays to the area of decontamination, and provide a non-magnetic atmosphere in which the enveloping cyclonic flow of air takes place.

This invention also has for its objects to provide a novel, economical and convenient apparatus of superior utility, and to provide apparatus that is positive in operation, convenient in use, easily installed in working position and easily disconnected therefrom, economical of manufacture, relatively simple, and of general superiority and serviceability.

The invention also contemplates novel details of construction and novel combinations and arrangements of parts, which will appear more fully in the course of the following description, which is based on the accompanying drawings. However, said drawings merely show and the following description merely describes, the invention with respect to a preferred apparatus, the same, nevertheless, being given by way of illustration or example only.

In the drawings, like reference characters designate similar parts in the several views.

FIG. 1 is a top plan view of apparatus for decontaminating personnel and embodying an exemplary form of the invention.

FIG. 2 is a cross-sectional plan view of an enclosure shown in FIG. 1.

FIGS. 3 and 4 are vertical sectional views as taken on the respective lines 3—3 and 4—4 of FIG. 1.

FIG. 5 is an enlarged and fragmentary sectional view showing direction-controlling means used in the outlet of said enclosure.

FIG. 6 is a fragmentary sectional view of an alternate form of air inlet orifices for said enclosure.

The apparatus that is illustrated comprises, generally, an air-moving unit **10** having an outlet **11** and an inlet **12**, a filter **13** to clean air received from said outlet, a conduit **14** to receive cleaned air from said filter, an enclosure **15**, duct means **16** atop said enclosure and receiving air from the conduit **14**, a pair of similar passages **17** connected at their upper ends to the duct means **16** for receiving downwardly moving air flows from said means, each passage **17** having an orifice wall **18** through which

air from said passages **17** enters the interior space **19**, air outlets **20** in the lower portion of the enclosure **15**, two such outlets flanking the orifice wall **18**, an upwardly directed outlet passage **21** for receiving air entering the outlets **20** and conducting said air upwardly to the top of the enclosure, duct means **22** for receiving air from the outlet passages **21**, a conduit **23** to receive said air, a filter **24** to clean air received from the conduit **23**, and a conduit **25** to conduct air from the filter **24** to the inlet **12** of the air-moving unit **10**. Inasmuch as the enclosure **15** is provided with either one door for ingress and egress or, as shown, with two doors **26** so that ingress may be had through one door and egress through the other, the interior space **19** of the enclosure can exhaust the air supplied thereto only through the exhaust openings **20**. Accordingly, the above generally-described apparatus creates a closed-system circulation of air to which fresh air may be added.

The air-moving unit **10**, in an exemplary manner, comprises a centrifugal blower **30** in which rotates a fan **31** that is driven by a motor **32**. The usual speed controls may be applied to said motor to produce an air velocity of desired degree at the outlet **11**. Air speed in the enclosure **15** in a velocity range of 3000 to 4500 ft./min. will control the fan speed according to the capacity of the blower **30**.

The filters **13** and **24** may not only extract contaminants from the air flows therethrough, one or both of them may embody air-heating or -cooling means and/or means to ionize the air. Thus, the term "treating" as used hereinafter is intended to include not only filtering alone, but together with the above-indicated heating, cooling and ionizing of the air.

As can be seen in FIGS. 2 and 3, the inlet passages **17** are disposed on opposite sides of the enclosure **15** in rectangular relationship with the doors **26**, and the outlet passages **21** are located at the corners of the rectangular enclosure **15** so that an inlet passage **17** and two flanking outlet passages **21** are provided in each of the opposite sides of the enclosure **15**.

The orifice wall **18** is shown in FIGS. 2, 3, 4 and 5 with a plurality of orifices **33** and, in FIG. 6, as louvered openings **34** that may be elongated either horizontally, vertically, or at any desired angle, the intent being that the wall **18**, rather than directing jets or sprays of air to the interior **19** of the enclosure, from opposite sides of a person or item in said space, discharges opposed masses of air at the above-suggested velocity to form an enveloping mass of air that impinges, as a mass, on the outer surfaces of said person or item. Voluntary or mechanical rotation of said person or item will expose all of the surface thereof to such air impingement.

As indicated by the arrows **35** in FIG. 3, the air thus discharged into space **19** will be drawn in a cyclonic, helical path downwardly to the four outlets **20**. A certain amount of turbulences may result from the dispersal of the air as the same strikes the person or item, but the described enveloping cyclonic movement of the air mass will be largely effective, together with such attending dispersals, to dislodge and remove from said person or item contaminants, as above indicated. The time factor cannot affect the mode of operation, only the degree of such dislodgment or removal of contaminants. Hence, the time of operation may be set to obtain the degree of decontamination desired. The range may extend from a major fraction of a minute to several minutes.

Since the air flow has a downward helical movement, the dislodged material will leave the enclosure substantially totally, because the moving air will dislodge any particles that may tend to cling to the inner surfaces that define the space **19** for removal through the outlet openings **20**.

The cyclonic air flow may not depend entirely on the fact that the masses of air are directed into space **19** centrally between where the outlets **20** are located and are given a cyclonic or rotating movement, because of their path toward the laterally disposed outlets **20**. Such cyclonic air flow may be controlled, as desired, by providing one or both of the outlets **20**, on each side, with adjustable vanes **36**, as in FIG. 5, and setting said vanes or fins differently at one outlet than at the other, or using the vanes to change the capacity of one outlet to pass flow at a different rate than the other.

Also, the low location of the outlets **20** helps keep the floor or base **37** of the enclosure clear of dislodged particles.

The air speeds given herein, while preferred, are necessarily approximate, in that the low range may be decreased and the high range may be increased, as conditions warrant. In enclosures where inanimate objects are being decontaminated by the cyclonic flow of air, the high range may be materially increased, perhaps as much as fifty percent.

While the foregoing illustrates and describes what is now contemplated to be the best mode of carrying out the invention with respect to the apparatus, the same is, of course, subject to modification without departing from the spirit and scope of the invention. Therefore, it is not desired to restrict the invention to the particular apparatus illustrated and described, but to cover all equivalents or modifications of apparatus that may fall within the scope of the appended claims.

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

1. In decontaminating apparatus,

(a) an enclosure having a rectangular cross-sectional form with opposite outer walls,

(b) two substantially vertical orifice walls spaced from each other and inwardly from each of two opposite outer walls, said orifice walls having each a plurality of orifices therethrough,

(c) an inlet-air passage between each said outer and orifice wall, said passages being independent of each other, the orifices of the orifice walls opening said

passages to the interior space between the orifice walls to direct opposed masses of air against the outer surfaces of a person disposed in said interior space,

(d) air-moving means including outlet conduit means connecting said air-moving means with said passages to conduct inlet-air to the upper portions of said passages,

(e) air outlets at the corners of the enclosure flanking the lower portion of each orifice wall for imparting rotational and downward movement to said air masses and for exiting air from said interior space,

(f) conduit means connecting said air outlets with the inlet of said air-moving means, and

(g) filter means in at least one of said conduit means.

2. In decontaminating apparatus according to claim **1**, the enclosure being provided with access doors in the other two outer walls.

3. In decontaminating apparatus according to claim **2**, the four outer walls of the enclosure including four rectangular corners, the air outlets being located adjacent to said four corners.

References Cited by the Examiner

UNITED STATES PATENTS

1,488,057	3/1924	Pilz	312—213
1,689,082	10/1928	Rhoads	34—226 X
1,694,858	12/1928	Landon	4—164 X
1,902,575	3/1933	Nichols	34—219 X
2,047,973	7/1936	Lawton et al.	21—109
2,250,943	7/1941	Arnold	21—58
2,375,226	5/1945	Higgins	21—109
3,097,916	7/1963	Dawson et al.	21—58

FOREIGN PATENTS

360,477	11/1931	Great Britain.
870,200	6/1961	Great Britain.

MORRIS O. WOLK, *Primary Examiner.*

E. S. ZOKE, J. T. ZATARGA, *Assistant Examiners.*