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(71) Applicant: **STERIL S.p.A.**
Via G. Prina, 15
I-20154 Milan(IT)

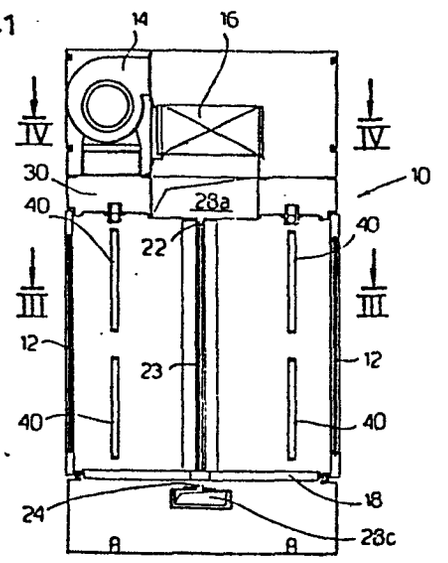
(72) Inventor: **Falini, Raffaele**
Via Savonarola, 19
I-20149 Milan(IT)

(74) Representative: **Dr. Ing. A. Racheli & C.**
Viale San Michele del Carso, 4
I-20144 Milano(IT)

(54) Dust exhaust/decontaminating device for palletized goods entering and/or leaving production areas.

(57) A dust exhaust/decontaminating device for glass products or other materials entering and/or leaving production areas is described. Said device comprises, inside a container (10) having at least one door (12) for introducing a support for example a pallet platform, for the materials which are to be externally cleaned, a rotating base (18), at least one blower means (14) and nozzle elements (22, 23, 24) for channelling suitably filtered pressurized air towards said support for the material to be cleaned. The pressurized jet of air is for eliminating dust particles larger than 0.3μ and is especially effective for those larger than 2μ.

FIG.1



Croydon Printing Company Ltd

Applicant:
STERIL S.p.A.
IT - 20154 MILAN
Via Prina, 15

DUST EXHAUST/DECONTAMINATING DEVICE FOR PALLETIZED GOODS ENTERING AND/OR LEAVING PRODUCTION AREAS"

The subject of this invention is a new dust exhaust/decontaminating device for palletized goods entering and/or leaving production areas.

Said device can be widely used, for example, in the field of pharmaceutical, cosmetic, food and hospital products, and in most of the electronics industry.

Containers made of glass or other material suitable for filling with any product, often made in contaminated areas, must reach

or leave the production area, after being suitably treated, in some cases even sterilized, and with all the dust removed which may have settled on the outer surface thereof.

Normally said containers reach the production areas suitably arranged in packs and placed on a supporting base, the whole thing usually called a "pallet".

Both before and after removing any wrapping or protective film from said support unit, and before sending the containers to the production areas, it is desirable to remove the dust particles which may have settled on the outer surface so as to minimize contamination of said production areas with dust from the outside; this is also useful for any subsequent treatment, for example, sterilization. When the product is a danger to the outside environment, it is equally desirable for it to be decontaminated before being introduced therein.

There is no apparatus known to the Applicant, according to the prior art, which carries out this dust exhaust (dedusting) operation in an effective manner.

Therefore, the object of this invention is to provide a dust exhaust device which eliminates dust particles of a size larger than or equal to 0.3 μ and is especially effective for those larger than 2 μ. Said dust partticles may have settled on the outer surface of the materials, even in the case of wrapped

packs. The elimination thereof allows externally dedusted containers, also ready for any subsequent treatment (for example, sterilization), to be sent to the production areasa or into the outside environment.

The object is achieved by providing for said dust exhaust device to consist of a casing, having at least one door, selectively opened or closed, for introducing the support for the materials to be externally cleaned, a rotating base driven by a motive means, a blower device, a filtering device and a unit for channelling dustfree air into nozzle elements placed along the periphery of said dust exhaust device the nozzle elements being directed at the material to be externally cleaned. A unit is also provided for collecting or aspirating air from inside the casing to send to the pressurizing and filtering system.

A preferred, but non-binding, embodiment of this invention will now be illustrated, referring to the accompanying drawings in which:

Fig. 1 is a side sectional view of the dust exhaust device according to the invention;

Fig. 2 is a sectional view along the plane II-II of Fig. 3;

Fig. 3 is a sectional view along the plane III-III inside the device, subject of this invention;

Fig. 4 is a sectional view along IV-IV of the device in Fig. 1;

Fig. 5 shows a sectional detail of a nozzle element for emitting pressurized air according to the invention.

Referring to fig. 1, a casing 10 can be seen provided on two opposite sides with airtight doors 12, selectively opened and closed, for the entry and exit respectively of the supporting unit or pallet 19 for the materials to be cleaned. Inside said casing 10 a base 18 is prearranged, made to rotate at a preset speed by a motor 20. A unit consisting of two fans 14, suitable for sending air to a twin-filter unit 16, is placed at the top. A unit for distributing the clean air is connected to said twin-filter unit. The supply or distribution unit is shown in more detail in fig. 2. Therein can be seen an upper distribution channel 28a, two lateral distribution channels 28b, placed on two diametrically opposite sides (fig. 3), and a lower distribution unit made up of two channels 28c.

A unit for aspirating the air with the dust removed from the pallet 19 can also be seen by referring to figs 2 and 3. The air is returned by means of opening 30a, provided for each channel 30, to the two-fan unit 14 which re-channels the air through the twin-filter unit 16 so that, suitably filtered, it can be recycled. There is a prefilter 29 in each channel 30.

Nozzle, in the form of slits in this embodiment, are prearranged in the distribution channels 28a, 28b and 28c. Said nozzles serve to channel pressurized air around the peripheral surface of the support unit to be cleaned, the air being directed for the top through nozzle 22 (fig. 1), for the side through nozzles 23 (fig. 3) and from the bottom through nozzle 24 (fig. 2). The openings 30a for aspirating the air containing dust removed from

the outer surface of the support or pallet 19 are situated in a lower position, that is, at the same level as the rotating base.

Fig. 3 represents in cross-section the configuration of the rotating base 18, on which the dashes indicate the overall dimensions of the support or pallet 19, the prearrangement of the lateral channels 30 for collecting the air containing the impurities from the outer surface of said support also being shown.

Fig. 4 shows the configuration at the top of the fans 14 and filters 16.

An exemplary nozzle element which acts on the whole top, bottom and lateral surfaces is shown in more detail in fig. 5. An opening with a constant clearance 32 can be seen therein, made in the walls 35 of the supply channel whereon acts a pair of vanes 34. Said vanes are made to slide by suitable and fully known means, so as to selectively regulate the clearance of the opening 36 for supplying the pressurized air.

The following is an example of a preferred embodiment.

The rotating base 16 rotates at a speed of between 3 and 8 revs/minute. The two centrifugal type direct-aspiration fans 14 have been selected so as to have an air-delivery capacity of 3000 m^3/h each, with a delivery pressure of at least 180 mm/H_2O (water column). The filters 16 are of the absolute type, each

suitable for allowing 3000 m^3/h of air to pass at a filtering efficiency of at least 99.997%. The delivery and aspiration channels have a section of 500 mm by 250 mm. The opening 32 in the nozzles is between 15 and 30 mm, while the vanes 34 are regulated so as to set an opening 36 of between 4 and 8 mm. On the basis of this data for the device the rate at which the air is emitted from the nozzles is between 30 and 50 m/sec. It is preferable to act on the variable parameters of the device in order to obtain an optimum of air emission rate from the nozzles of about 40 m/sec.

It is preferable for said nozzles to be located at a distance of between 10 and 30 cm from the outer surface of the pack of goods to be cleaned.

Sterilizing lamps 40 for decontaminating may be fitted inside the device, using fully known means.

The duration of the dust exhaust/decontaminating cycle with the use of a suitably filtered continuous air jet is set at 1 to 5 minutes.

STERIL S.p.A.
IT - 20154 MILAN

CLAIMS

1. A dust exhaust/decontaminating device for palletized goods entering production areas, characterized in that it comprises, inside a casing (10) having at least one door (12), selectively opened or closed, for introducing a support (19) for the glass products or materials to be externally cleaned, a rotating base (18) driven by a motive means (20), at least one blower device (14), at least one filtering means (16), at least one unit for channelling air (28a, 28b, 28c), and nozzle elements (22, 23, 24) placed around the periphery of the support (19), there being provided a unit (30) for aspirating air inside the casing which is sent to the blower device and filtering means.

2. A device according to claim 1, characterized in that the air-channelling unit is provided with at least one channel (28a) for sending air to a nozzle placed above the material to be cleaned and/or decontaminated.

3. A device according to claim 1, characterized in that the air-channelling unit is provided with at least one channel (28b) for sending air to a nozzle placed at the side of the material to be cleaned and/or decontaminated.

4. A device according to claim 3, characterized in that said unit for channelling air to a side nozzle is provided with two channels placed along diametrically opposite lateral walls.

5. A device according to claim 1, characterized in that the air-channelling unit is provided with at least one channel (28c) for sending air to at least one nozzle placed below the material to be cleaned and/or decontaminated.

6. A device according to claim 1, characterized in that the unit for aspirating air and dust is provided with at least one channel (30) placed along the side of the casing, which has an opening (30a) near to the rotating lower base (18) for the input of air.

7. A device according to claim 1, characterized in that a nozzle element is provided with an opening (32) in the channel walls and a pair of vanes (34), which are selectively moved closer together or withdrawn relative to said opening, so as to regulate the size of the clearance (36) for the passage of the air directed at the glass products or materials to be cleaned and/or decontaminated.

8. A device according to claim 7, characterized in that said opening (32) extends longitudinally along at least a section of the channel such as to form a slit.

9. A device according to claim 7, characterized in that the rate at which the air is delivered from said nozzle is about 40 m/sec.

10. A device according to claim 1, characterized in that the nozzle element for removing dust particles from the glass products or other materials to be cleaned is placed at a distance from the support of between 10 and 30 cm.

11. A device according to claim 1, characterized by comprising inside the casing at least one sterilizing lamp (40).

FIG.1

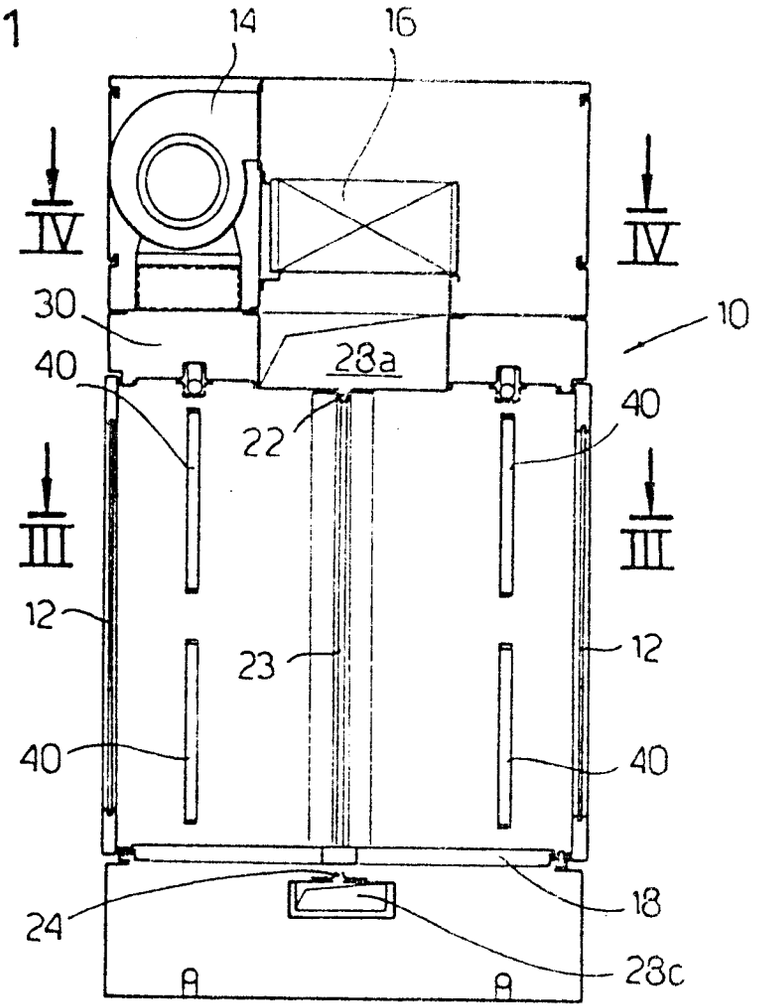
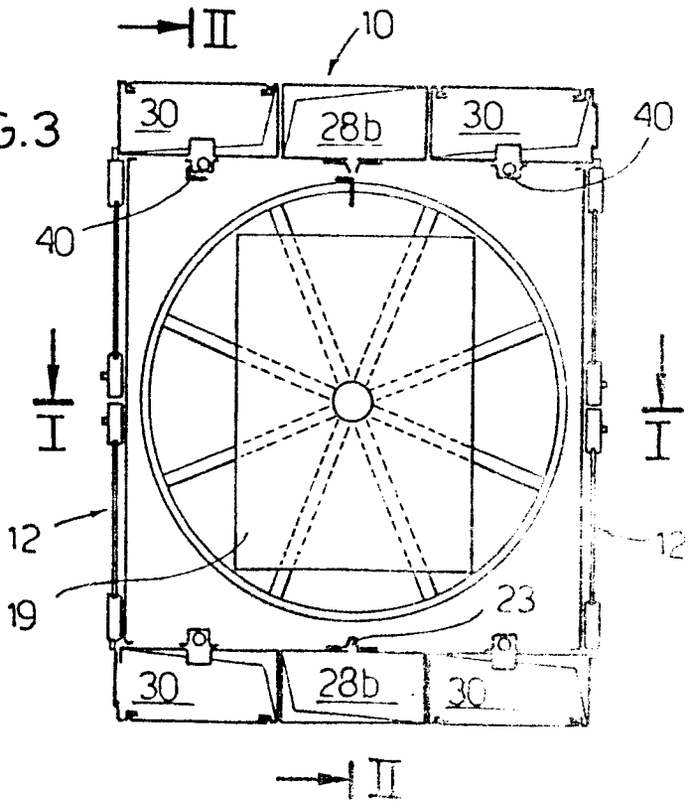

14
16
IV
IV
30
10
40
28a
40
22
III
III
12
12
23
40
40
24
18
28c
A
A

FIG.3


II
10
30
28b
30
40
40
I
I
12
12
19
23
30
28b
30
II

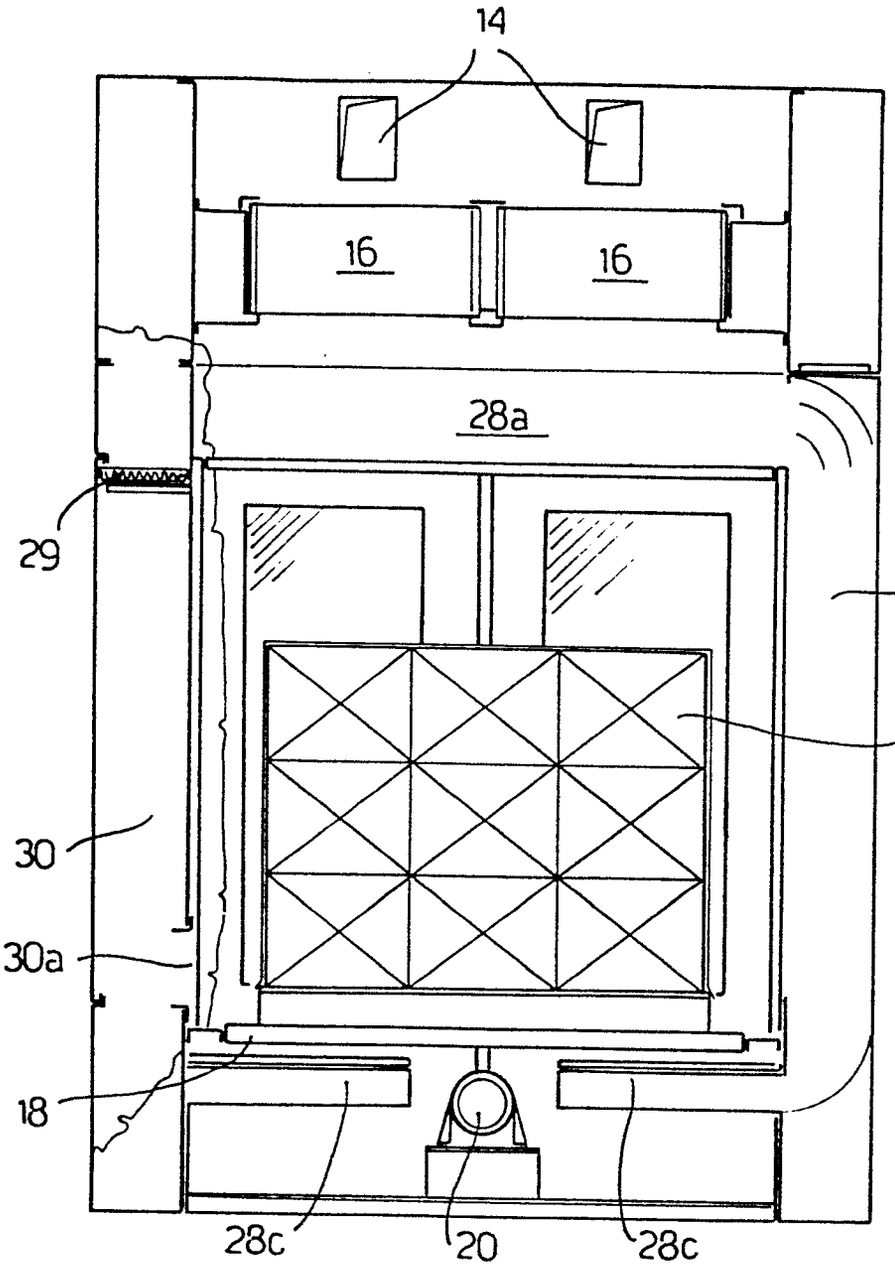


FIG.2

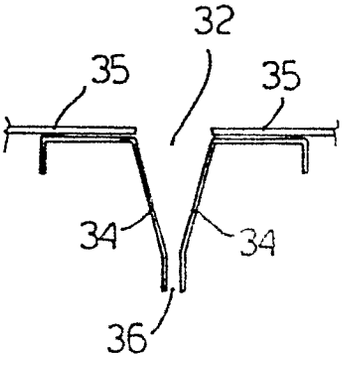


FIG.5

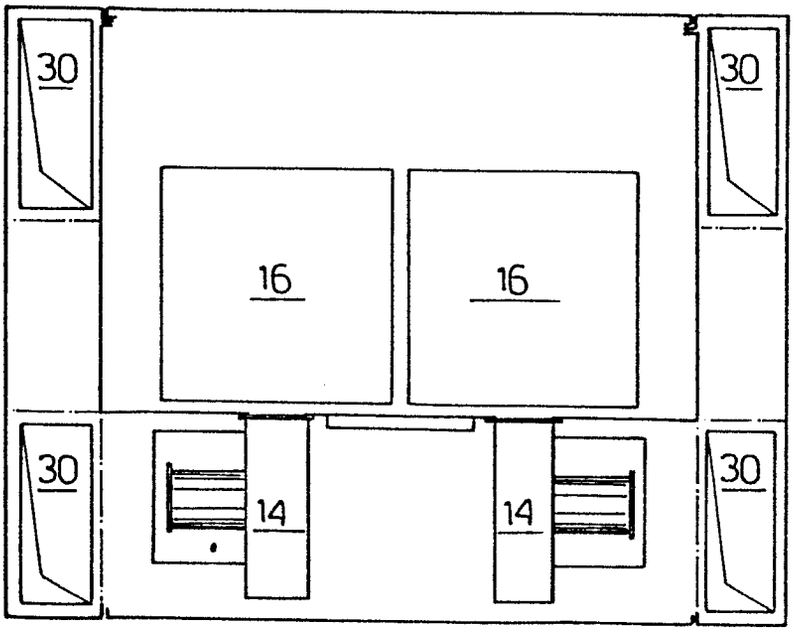


FIG.4