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(54) **System for washing and elimination of particles**

System zum Waschen und zur Entfernung von Partikeln

Système de lavage et d'élimination de particules

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Description

[0001] System for mixed washing and elimination of particles, especially useful for specific working garments made of continuous filament such as rayon, rayon carbon, polyester carbon, polyester for use in paint booths or similar, or any other activity that requires totally aseptic cleaning for use by a person or that involves the risk of contaminating the products they manufacture, or for materials likely to undergo said washing process even if not used for work purposes, characterised in that the garments or materials are subjected to a dry cleaning process that guarantees the elimination of residues of an industrial type and subsequently a process of washing in water to eliminate any possible organic residues.

[0002] Both washing processes are performed in a perfectly insulated enclosure comprising a clean room, consisting of an anteroom and a room fitted with a filtering and air regeneration system.

[0003] Personnel access the clean room through the anteroom following an air shower, while the access of the previously dry cleaned garments or materials is performed through a sanitary barrier comprising a rotary drum that removes the particles from the garments/materials, disinfecting and deodorising them through an ozonisation system, before passing to a decontamination table comprising a grille on its surface that acts as a return, enabling the absorption of particles in the folding process, before proceeding to the packaging of the garments, their complete cleanness being checked by a particle counter.

[0004] Currently, in order to clean said materials, specifically materials used in paint booths, either washing systems or dry cleaning systems are used.

[0005] The use of either of these two systems enables a superficial cleaning of the garments, but does not eliminate the dirty particles adhered to them.

[0006] As a result, the greatest inconvenience is caused when these apparently clean garments or materials are used in their work places, thereby contaminating with particles the surfaces that have to be or are being painted, leading to serious production losses and the low quality of the manufactured goods.

[0007] GB 1368892 provides an improvement to this situation by providing a regular washing or dry cleaning machine outside a clean room for removing visual stains on garments. Close to the washing or dry cleaning machine, there is an air-lock provided in the wall of the clean room for the intake of the washed or cleaned garment in the clean room. After this, the pre-treated garments are put from inside the clean room in a decontamination machine, which is a modified standard fluorinated solvent dry cleaning machine with reduced drum pressure. However, there is no sanitary barrier provided for removing contaminated particles from the garments and for disinfecting the garments before entering the clean room. Therefore, contamination can enter the clean room.

[0008] It is therefore an object of the present invention to avoid the drawbacks of the prior art and to provide a

system and a process for total cleaning of garments or materials and leaving them particle free.

[0009] This object is solved by the features of system claim 1 and process claim 11. Advantageous embodiments are described in the dependent claims.

[0010] The system presented herein maintains a rigorous order throughout the entire process, thus resulting in the total cleaning of the garments or materials and leaving them particle-free, the following process being maintained:

Dry cleaning:

[0011] When the garments or materials are prepared for their cleaning, they are sorted into clearly differentiated batches, and put through dry cleaning machines with perchloroethylene. This first wash provides a pre-cleaning thereby eliminating part of the adhered particles and industrial dirt such as fats, oils, etc.

Wet washing:

[0012] The aforementioned batches of garments or materials, which have had industrial dirt removed from them following dry cleaning, are taken by manual or automatic means to the second part of the process, which is wet washing with water and detergent.

[0013] By means of this wash organic dirt is eliminated and the quality of the cleanness is improved by eliminating a large part of the adhered particles and the rest of the organic dirt.

[0014] Both steps take place in an insulated enclosure in which, in addition to the dry and wet cleaning machines, is located a clean room in which the cleaning system that is presented is completed.

Clean room:

[0015] The clean room is an enclosure with a clean atmosphere for the final treatment of the garments after the washing processes, the main purpose being to remove from the material or garment the particles that could not be eliminated in the previous processes.

[0016] The clean room consists of two zones: **Anteroom** and **room**

- Anteroom

[0017] The anteroom is the zone where personnel enter the room. An air shower occurs in said room, the purpose of which is to clean the particles that the person who is about to enter the room may have on their exterior.

[0018] The air shower is activated automatically when the entrance door is opened, thereby enabling access to the interior of the room, once the entrance door has been closed.

- Room

[0019] The room is the zone where the garments are handled, sorted, mended if necessary, folded and packaged.

[0020] The room is fitted with an air circulation system comprising three filters to retain any particles there may be in the atmosphere, thereby allowing the most stringent cleaning levels to be reached.

[0021] The first filter acts as a pre-filter, the second is a high-efficiency filter and the third is an absolute filter.

[0022] *The room also features innovative elements such as:*

a sanitary barrier, decontamination table and a control means.

. Sanitary barrier

[0023] The sanitary barrier consists of two mouths, one an inlet and the other an outlet, and an ozonisation system.

[0024] The inlet mouth is located in the insulated enclosure in order to enable the access of the garments or materials originating from the wash, which, by means of a rotary drum shed the particles through the filtered air. During this process the disinfection and deodorisation of the garments is conducted by means of an ozonisation system.

[0025] The outlet mouth is located in the interior of the room itself, from where the garments or materials are removed and deposited on the decontamination table.

. Decontamination table

[0026] The decontamination table is used for folding garments, and has a grille on its surface that acts as a return, enabling the absorption of particles during the folding process.

[0027] The air reaches the garments through diffusers incorporated into the top part of the room.

[0028] The approximate return of 80% of the air in the room occurs through the decontamination table, with approximately 20% of the air being provided from the exterior.

[0029] The bottom part of the table incorporates grilles that allow the renewal of the air in the event of the total or partial obstruction of the surface of the table.

Control means:

[0030] In the interior of the room there is a continuous-action particle controller to guarantee the required ambient level.

[0031] In addition, as a last control prior to the garments or materials being packaged, the number of particles present in the garments or materials is measured by a rotary drum connected to a particle counter.

[0032] In the event that the minimum allowable level of particles is exceeded, the entire batch must go through the system process recommended herein again.

5 [0033] The garments or materials, once packaged, exit the room on a conveyor belt to prevent their contamination as far as possible. They are then sorted in the insulated enclosure and packaged for their distribution.

[0034] The present system for mixed washing and the elimination of particles provides multiple advantages over systems currently being used, the most notable advantage being not the mixed washing itself, but the fact that it is thanks to the mixed washing that all types of industrial and organic dirt are eliminated.

10 [0035] Another of the most important advantages concerns the fact that the garments are free of particles, almost all of them in their passage through a sanitary barrier, consisting of a drum that removes the aforementioned particles.

[0036] Another added advantage is that the garments, in passing through the sanitary barrier during the cleaning process, are disinfected and deodorised by an ozonisation system.

[0037] Additionally, a further advantage in relation to known means concerns the use of a clean room, consisting of an enclosure with a clean atmosphere for the final treatment of the garments following the washing processes, comprising two zones: Anteroom and room

25 [0038] An important advantage is that the anteroom generates an air shower, the purpose of which is to clean the particles that the person who is about to enter the room may have on his/her exterior.

[0039] Another important and fundamental advantage provided by the system presented is the use of the room, where the garments and materials are handled, sorted, mended if necessary, folded and packaged, and which is equipped with an air circulation system comprising three filters, a decontamination table and a control means.

30 [0040] In order to better understand the purpose of the present invention, a preferential practical embodiment of said invention has been shown on the plan attached. On said plan:

35 Figure 1 shows a diagram developing the different phases of the system.

Figure 2 shows a schematic view of the filtering and air regeneration in the room.

40 The system for mixed washing and the elimination of particles is characterised by a sequence of operations detailed below:

Dry cleaning:

45 [0041] The garments are sorted for cleaning into clearly differentiated batches and pass through dry cleaning machines (3), where they are cleaned following the proc-

ess.

Wet washing:

[0042] Said batches are conveyed by manual or automatic means to the washing machines (1) with water and detergent.

[0043] Both processes take place in an insulated enclosure (2) in which, as well as the dry cleaning machine (3) and the wet cleaning machine (1), a clean room is located (4).

Clean room:

[0044] The clean room (4) is an enclosure with a clean atmosphere for the final treatment of the garments after the washing processes and consists of two zones: anteroom (5) and room (6).

- Anteroom

[0045] The anteroom (5) is the zone where personnel enter the room (6). An air shower (7) occurs in said room, the purpose of which is to clean the particles that the person who is about to enter the room (6) may have on his/her exterior.

[0046] The air shower (7) is activated automatically when the entrance door (8) is opened, thereby enabling access to the interior of the room (6), once the entrance door (9) has been closed.

- Room

[0047] The room (6) is the zone where the garments are handled, sorted, mended if necessary, folded and packaged, and is equipped with an air recirculation system (10) comprising three filters (11, 12 and 13) to retain any particles that may be in the atmosphere.

[0048] The filter (11) acts as a pre-filter, the filter (12) is a high-efficiency filter, and the filter (13) is an absolute filter. The room also features innovative elements such as: a sanitary barrier (14), a decontamination table (15) and a control means (16 and 17)

. Sanitary barrier

[0049] The sanitary barrier (14) consists of two mouths, one an inlet (18) and the other an outlet (19), and an ozonisation system (20).

[0050] The inlet mouth (18) is located in the insulated enclosure (2) in order to enable the access of the garments or materials, which, by means of a rotary drum (21) shed the particles through the filtered air. During this process the disinfection and deodorisation of the garments or materials is conducted through an ozonisation system (20).

[0051] The outlet mouth (19) is located in the interior of the room (6) itself, from where the garments are re-

moved and deposited on the decontamination table (15).

. Decontamination table

[0052] Specially designed for folding the garments, provided with a grille (22) on its surface that acts as a return, enabling the absorption of particles during the folding process.

[0053] The air reaches the garments through diffusers (23) incorporated into the top part of the room.

[0054] The table (15) incorporates grilles (24) for the recirculation of the air.

Control means:

[0055] In the interior of the room (6) there is a continuous-action particle controller (16) to guarantee the required ambient level.

[0056] In addition, as a final control prior to the garments or materials being packaged, they pass through a rotary drum (17) connected to a particle counter that measures the particles present in the garment or material.

[0057] The garments or materials, after being packaged in a vacuum machine (25), exit the room (6) on a conveyor belt (26).

Claims

1. System for mixed washing and elimination of particles, especially useful for specific working garments made of continuous filament such as rayon, rayon carbon, polyester carbon, polyester for use in paint booths or similar, or any other activity that requires totally aseptic cleaning for use by a person or that involves the risk of contaminating the products they manufacture, or for materials likely to undergo said washing process even if not used for work purposes, wherein an insulated enclosure (2) contains dry cleaning machines (3) for dry cleaning the garments or materials to guarantee the elimination of residues of an industrial type, washing machines (1) for washing the garments or materials in water to eliminate any possible organic residues, and a clean room (4), **characterised in that** said clean room (4) is equipped with a sanitary barrier (14) for the disinfection and deodorisation of the garments or materials and for enabling the access of the garments or materials after the washing processes into the clean room (4), a decontamination table (15) for folding the garments and enabling the absorption of particles during the folding process, and control means (16, 17) for a final control prior to the garments or materials being packed, to guarantee the required ambient level and for measuring the particles present in the garment or materials.

2. System for mixed washing and the elimination of particles according to claim 1, wherein the clean room (4) is equipped with a filtering and air regeneration system.
3. System for mixed washing and the elimination of particles according to claim 1 wherein the clean room (4) is an enclosure with a clean atmosphere for the final treatment of the garments or materials after the washing processes and consists of two zones: anteroom (5) and room (6).
4. System for mixed washing and the elimination of particles according to claim 3 wherein the anteroom (5) is the zone where personnel enter the room (6), an air shower (7) being produced, the purpose of which is to clean the particles that the person who is about to enter the room (6) may have on his/her exterior, activated automatically when the entrance door is opened (8), thereby enabling access to the interior of the room (6), once the entrance door (9) has been closed.
5. System for mixed washing and the elimination of particles according to claims 3 and 4 wherein the room (6) is the zone where the garments are handled, sorted, mended if necessary, folded and packaged, and is equipped with an air circulation system (10) comprising three filters (11, 12 and 13) that retain any particles there may be in the atmosphere.
6. System for mixed washing and the elimination of particles according to claim 5 wherein the filter (11) acts as a pre-filter, the filter (12) is a high-efficiency filter, and the filter (13) is an absolute filter.
7. System for mixed washing and the elimination of particles according to claims 3, 4 and 5 wherein the sanitary barrier (14) consists of two mouths: one an inlet mouth (18) situated in the insulated enclosure (2), to enable the access of the garments or materials, which, by means of a rotary drum (21) shed the particles through the filtered air and are disinfected during this process, through an ozonisation system (20), while the outlet mouth (19) is located in the interior of the room (6) itself, from where the garments are removed and deposited on the decontamination table (15).
8. System for mixed washing and the elimination of particles according to claims 3, 4, 5 and 7 wherein the decontamination table (15) especially designed for folding the garments and the recirculation of air through grilles (24), is provided with a grille (22) on its surface that acts as a return, enabling the absorption of particles during the folding process, with the air reaching the garments through diffusers (23) incorporated into the top part of the room (6).
9. System for mixed washing and the elimination of particles according to claims 3, 4, 5, 7 and 8 wherein in the interior of the room (6) there is a continuous-action particle controller (16) that guarantees the required ambient level, and a rotary drum (17) that counts the particles on the garments or materials before being packaged, as a last control.
10. System for mixed washing and the elimination of particles according to claims 3, 4, 5, 7, 8 and 9 wherein the garments or materials, once packaged in a vacuum machine (25), exit the room (6) on a conveyor belt (26).
11. Process for mixed washing and elimination of particles, using a system for mixed washing and elimination of particles according to claim 1, wherein the garments or materials are subjected to a dry cleaning process eliminating residues of an industrial type and subsequently a process of washing in water eliminating any possible organic residues, wherein for the dry cleaning process, the garments or materials are sorted into clearly differentiated batches, and put through dry cleaning machines (3) with perchloroethylene, and wherein the batches, already clean after the dry cleaning, are conveyed by manual or automatic means to the wet washing machines (1) with water and detergent, **characterised in that** following the washing process, the garments or materials access the clean room (4) through a sanitary barrier (14) for the final treatment.

Patentansprüche

1. System zum gemischten Waschen und Entfernen von Partikeln, das insbesondere nützlich ist für spezifische Arbeitskleidung aus Endlosfilament wie Viskose, Viskose Kohlefaser, Polyester Kohlefaser, Polyester zur Verwendung in Farbkabinen oder ähnlichem oder jede andere Tätigkeit, die eine völlig keimfreie Reinigung zur Verwendung durch eine Person erfordert, oder die die Gefahr der Kontamination der Produkte, die sie herstellen, beinhaltet, oder für Materialien, die wahrscheinlich dem Waschprozess unterzogen werden, selbst wenn sie nicht für Arbeitszwecke verwendet werden, wobei eine isolierte Einfriedung (2) chemische Reinigungsmaschinen (3) zur chemischen Reinigung der Kleidung oder Materialien, um das Entfernen von Rückständen von industrieller Art zu garantieren, Waschmaschinen (1) zum Waschen der Kleidung oder Materialien in Wasser, um alle möglichen organischen Rückstände zu entfernen, und einen Reinraum (4) aufweist, **dadurch gekennzeichnet, dass** der Reinraum (4) mit einer hygienischen Barriere (14) zur Desinfizierung und Desodorierung der Kleidung oder Materialien und zum Ermöglichen des Zugangs

- zu der Kleidung und den Materialien nach den Waschprozessen in den Reinraum (4), einem Dekontaminierungstisch (15) zum Falten der Kleidung, und um die Absorbierung von Partikeln während des Faltprozesses zu ermöglichen, und Steuermitteln (16, 17) für eine Endkontrolle, bevor die Kleidung oder Materialien verpackt werden, ausgerüstet ist, um den erforderlichen Umgebungspegel zu garantieren und zum Messen der in der Kleidung oder den Materialien vorhandenen Partikeln.
2. System zum gemischten Waschen und Entfernen von Partikeln nach Anspruch 1, wobei der Reinraum (4) mit einem Filter- und Luftrückgewinnungssystem ausgerüstet ist.
 3. System zum gemischten Waschen und Entfernen von Partikeln nach Anspruch 1, wobei der Reinraum (4) eine Einfriedung mit einer reinen Atmosphäre zur Endbehandlung der Kleidung oder Materialien nach den Waschprozessen ist und aus zwei Zonen besteht: Vorraum (5) und Raum (6).
 4. System zum gemischten Waschen und Entfernen von Partikeln nach Anspruch 3, wobei der Vorraum (5) die Zone ist, wo Personal den Raum (6) betritt, wobei eine Luftdusche (7) erzeugt wird, deren Zweck es ist, die Partikel abzureinigen, welche die Person, die dabei ist, den Raum (6) zu betreten, an ihrem Äußeren aufweisen kann, die automatisch aktiviert wird, wenn die Eingangstür (8) geöffnet wird, wodurch Zugang ins Innere des Raums (6) ermöglicht wird, wenn die Eingangstür (9) geschlossen worden ist.
 5. System zum gemischten Waschen und Entfernen von Partikeln nach Ansprüchen 3 oder 4, wobei der Raum (6) die Zone ist, wo die Kleidung gehandhabt, sortiert, falls nötig geflickt, gefaltet und verpackt wird, und mit einem Luftumwälzsystem (10) ausgerüstet ist, das drei Filter (11, 12 und 13) aufweist, die alle Partikel zurückhalten, die in der Atmosphäre vorhanden sein können.
 6. System zum gemischten Waschen und Entfernen von Partikeln nach Anspruch 5, wobei das Filter (11) als ein Vorfilter fungiert, das Filter (12) ein Hochleistungsfilter ist und das Filter (13) ein Absolutfilter ist.
 7. System zum gemischten Waschen und Entfernen von Partikeln nach Ansprüchen 3, 4 oder 5, wobei die hygienische Barriere (14) aus zwei Öffnungen besteht: Einer Einlassöffnung (18), die sich in der isolierten Einfriedung (2) befindet, um den Zugang der Kleidung oder Materialien zu ermöglichen, die mittels einer Drehtrommel (21) die Partikel durch die gefilterte Luft verlieren und während dieses Prozesses durch ein Ozonisierungssystem (20) desinfiziert wird, während sich die Auslassöffnung (19) im Inneren des Raums (6) selbst befindet, von wo die Kleidung weggenommen und auf dem Dekontaminierungstisch (15) abgelegt wird.
 8. System zum gemischten Waschen und Entfernen von Partikeln nach Ansprüchen 3, 4, 5 oder 7, wobei der zum Falten der Kleidung und zur Umwälzung von Luft durch Lüftungsgitter (24) speziell gestaltete Dekontaminationstisch (15) mit einem Lüftungsgitter (22) auf seiner Oberfläche versehen ist, das als eine Rückführung fungiert, welche die Absorbierung von Partikeln während des Faltprozesses mit der Luft ermöglicht, welche die Kleidung über Luftverteiler (23) erreicht, die in den oberen Teil des Raumes (6) eingebaut sind.
 9. System zum gemischten Waschen und Entfernen von Partikeln nach Ansprüchen 3, 4, 5, 7 oder 8, wobei es im Inneren des Raumes (6) eine kontinuierlich arbeitende Partikelsteuerung (16), die den erforderlichen Umgebungspegel garantiert, und eine Drehtrommel (17) gibt, welche die Partikel auf der Kleidung oder den Materialien als eine letzte Kontrolle zählt, bevor sie verpackt wird.
 10. System zum gemischten Waschen und Entfernen von Partikeln nach Ansprüchen 3, 4, 5, 7, 8 oder 9, wobei die Kleidung oder Materialien, wenn sie in einer Vakuummaschine (25) verpackt sind, den Raum (6) auf einem Transportband (26) verlassen.
 11. Verfahren zum gemischten Waschen und Entfernen von Partikeln unter Verwendung eines Systems zum gemischten Waschen und Entfernen von Partikeln nach Anspruch 1, wobei die Kleidung oder Materialien einem chemischen Reinigungsprozess, der Rückstände von industrieller Art entfernt, und darauf folgend einem Waschprozess in Wasser unterworfen werden, der alle möglichen organischen Rückstände entfernt, wobei die Kleidung oder Materialien für den Chemischen Reinigung in klar differenzierte abgeteilte Mengen sortiert werden und durch chemischen Reinigungsmaschinen (3) mit Perchlorethylen geschickt werden, und wobei die abgeteilten Mengen, die nach der chemischen Reinigung bereits sauber sind, durch manuelle oder automatische Mittel zu den Nass-Waschmaschinen (1) mit Wasser und Waschmittel transportiert werden, **dadurch gekennzeichnet, dass** die Kleidung oder Materialien nach dem Waschprozess über eine hygienische Barriere (14) in den Reinraum (4) zur Endbehandlung gelangt.

Revendications

1. Un système de lavage combiné et d'élimination de

- particules utile, en particulier, pour les habits de travail spécifiques, constitués de fils continus comme la viscose, le carbone de viscose, le carbone de polyester, le polyester pour une utilisation en cabine de peinture ou similaire, ou pour toute activité nécessitant un nettoyage totalement aseptique pour une utilisation par une personne ou impliquant le risque de contaminer les produits fabriqués, ou les matériaux susceptibles d'être soumis au processus de nettoyage précité même s'ils ne sont pas utilisés pour le travail,
- dans lequel une enceinte (2) comprend des machines de nettoyage à sec (3) pour le nettoyage à sec des vêtements ou des matériaux de sorte à garantir l'élimination de résidus de type industriel, des lavelinges (1) pour le lavage des vêtements ou des matériaux dans l'eau de sorte à éliminer les potentiels résidus organiques et une salle blanche (4)
- caractérisé en ce que** la salle blanche précitée (4) est équipée d'une barrière sanitaire (14) destinée à la désinfection et à la désodorisation des vêtements ou des matériaux et sert à donner l'accès à la salle blanche (4) aux vêtements ou aux matériaux après les processus de lavage, d'une table de décontamination (15) pour le pliage des vêtements et pour permettre l'absorption des particules pendant le processus de pliage, et de moyens de contrôle (16, 17) pour un contrôle final avant que les vêtements ou matériaux soient emballés afin de garantir le niveau ambiant requis et de mesurer les particules présentes dans les vêtements ou les matériaux.
2. Système de lavage combiné et d'élimination de particules selon la Revendication 1 dans lequel la salle blanche (4) est équipée d'un système de filtration et de régénération de l'air.
 3. Système de lavage combiné et d'élimination de particules selon la Revendication 1 dans lequel la salle blanche (4) est une enceinte présentant une atmosphère propre pour le traitement final des vêtements ou des matériaux après les processus de lavage, et présente deux zones : un vestibule (5) et une pièce (6).
 4. Système de lavage combiné et d'élimination de particules selon la Revendication 3 dans lequel le vestibule (5) est la zone par laquelle le personnel pénètre dans la pièce (6), une douche d'air (7) étant produite avec l'objectif d'éliminer les particules potentiellement présentes sur la surface extérieure de la personne étant sur le point de pénétrer dans la chambre (6), la douche étant activée automatiquement lorsque la porte d'entrée (8) est ouverte, permettant ainsi d'accéder à l'intérieur de la pièce (6) dès lors que la porte d'entrée (9) a été fermée.
 5. Système de lavage combiné et d'élimination de par-
- ticules selon les Revendications 3 et 4 dans lequel la pièce (6) est la zone dans laquelle les vêtements sont traités, triés, réparés si nécessaire, pliés et emballés, la pièce étant équipée d'un système de circulation d'air (10) comprenant trois filtres (11, 12 et 13) qui retiennent toutes les particules susceptibles de se trouver dans l'atmosphère.
6. Système de lavage combiné et d'élimination de particules selon la Revendication 5 dans lequel le filtre (11) agit comme un pré-filtre, le filtre (12) est un filtre de haute-efficacité, et le filtre (13) un filtre absolu.
 7. Système de lavage combiné et d'élimination de particules selon les Revendications 3, 4 et 5 dans lequel la barrière sanitaire (14) est constituée de deux orifices : d'une part, un orifice d'entrée (18) situé dans l'enceinte isolée (2) permettant l'accès des vêtements ou des matériaux, qui, au moyen d'un tambour rotatif (21), diffusent les particules à travers l'air filtré et sont désinfectés pendant ce processus au moyen d'un système d'ozonisation (20) et, d'autre part, un orifice de sortie (19) localisé à l'intérieur de la pièce (6) elle-même, à partir duquel les vêtements sont enlevés et placés sur la table de décontamination (15).
 8. Système de lavage combiné et d'élimination de particules selon les Revendications 3, 4, 5 et 7 dans lequel la table de décontamination (15) spécialement conçue pour plier les vêtements et pour assurer la recirculation de l'air par des grilles (24) présente une grille (22) sur sa surface qui agit comme un retour permettant l'absorption des particules pendant le processus de pliage, l'air atteignant les vêtements par le biais de diffuseurs (23) intégrés dans la partie supérieure de la pièce (6).
 9. Système de lavage combiné et d'élimination de particules selon les Revendications 3, 4, 5, 7 et 8 dans lequel, à l'intérieur de la pièce (6), il y a un contrôleur de particule à action continue (16) qui garantit le niveau ambiant requis, et un tambour rotatif (17) qui compte les particules sur les vêtements ou les matériaux avant que ceux-ci soient emballés, constituant ainsi un dernier contrôle.
 10. Système de lavage combiné et d'élimination de particules selon les Revendications 3, 4, 5, 7, 8 et 9 dans lequel les vêtements ou les matériaux, une fois emballés dans une machine à vide d'air (25), quittent la pièce (6) sur un tapis roulant (26).
 11. Un processus pour le lavage combiné et l'élimination des particules utilisant un système de lavage combiné et d'élimination de particules selon la Revendication 1 dans lequel les vêtements ou les matériaux sont soumis à un processus de nettoyage à sec éli-

minant les résidus de type industriel, puis à un processus de lavage à l'eau afin d'éliminer tout potentiel résidu organique, dans lequel, pour le processus de nettoyage à sec, les vêtements ou les matériaux sont triés dans des lots clairement différenciés et placés dans des machines de nettoyage à sec (3) avec du perchloroéthylène, et dans lequel les lots, qui sont déjà propres après le processus de nettoyage à sec, sont transportés par des moyens manuels ou automatiques jusqu'à des lave-linges à eau (1) avec de l'eau et du détergent,

caractérisé en ce qu'après le processus de lavage, les vêtements ou matériaux pénètrent dans la salle blanche (4) pour le traitement final à travers une barrière sanitaire (14).

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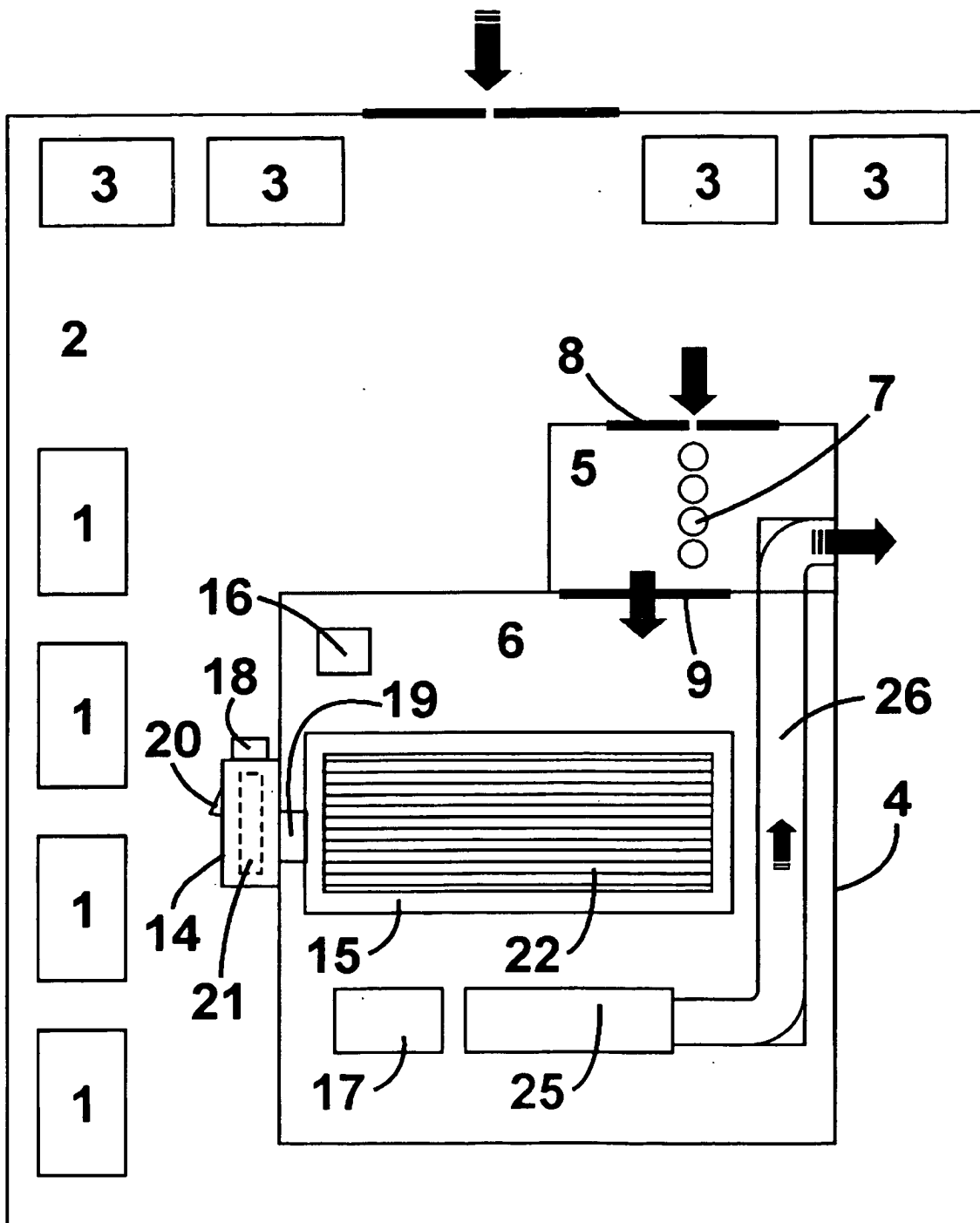


FIG.1

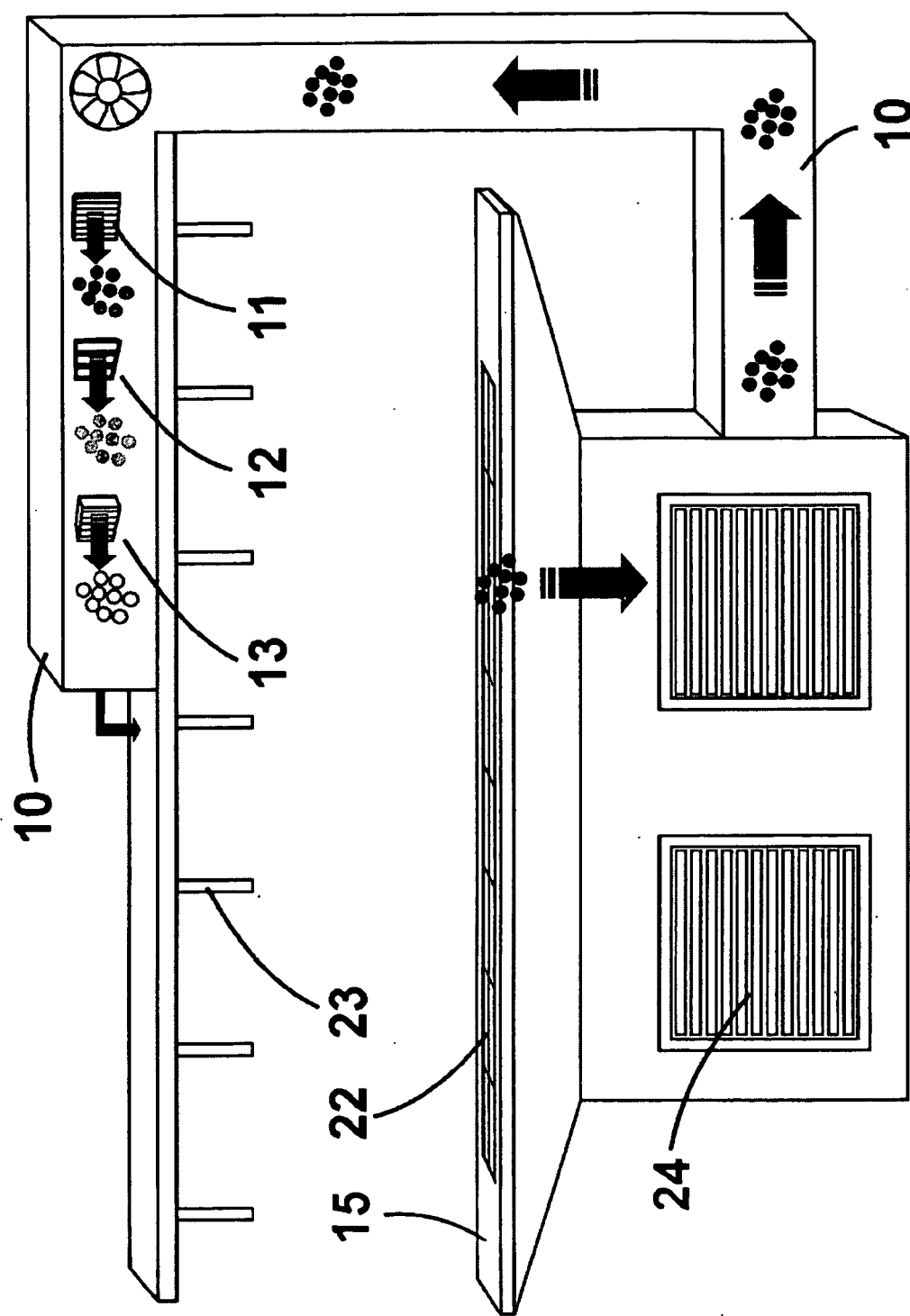


FIG.2

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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