



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
26.09.2012 Bulletin 2012/39

(51) Int Cl.:
C14B 15/00 (2006.01) C14C 15/00 (2006.01)

(21) Application number: **12001946.8**

(22) Date of filing: **20.03.2012**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

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(30) Priority: **23.03.2011 DK 201100215**

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(54) **Method and apparatus for processing pelts**

(57) The invention relates to a method of processing animal pelts by tumbling said pelts by means of an apparatus (1) comprising a drum (2), by using a treatment cycle comprising:
tumbling said one or more pelts in a treatment compartment (10, 30, 50) of said drum (2) together with an absorbing granular material, automatically loading said pelts and said granular material from said treatment compartment into a separation compartment (20, 40, 60) of said drum, and
tumbling said one or more pelts in said separation compartment (20, 40) so as to separate said granular material from said pelts in said separation compartment (10, 30, 60),

said method comprising the steps of:
loading one or more pelts into a treatment compartment (10, 30, 50) of said drum (2),
performing a first processing of said pelts in said drum (2) by means of said treatment cycle,
automatically loading said pelts from said separation compartment (20, 40, 60) into a treatment compartment (10, 30, 50) of said drum (2), performing a second processing of said pelts in said drum (2) by means of said treatment cycle, and
unloading said one or more pelts from said drum (2),

The invention furthermore relates to an apparatus for processing of animal pelts.

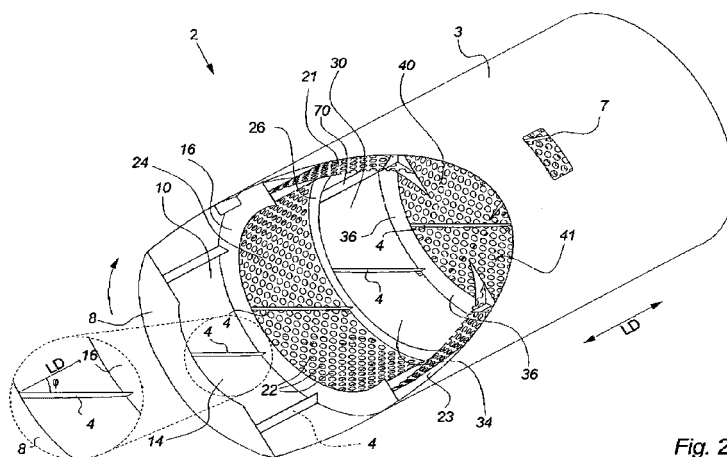


Fig. 2

Description

[0001] The invention relates to a method and an apparatus for processing animal pelts.

Background

[0002] When animals such as minks are put down to retrieve their pelt, the animal pelts need to be processed before they can be utilized in e.g. clothing. Tumblers are often used in one or more steps of the processing of the pelts.

[0003] The skinning of the animal bodies preferably results in tubular shaped pelts arranged with the skin side of the pelt turned outwards and the fur side of the pelt turned inwards. After the skinning, leftovers of e.g. meat, fat, sinews and the like is removed from the skin side of the pelt.

[0004] A step of the processing of the pelts often comprises tumbling the pelts with the skin side facing outwards together with a liquid absorbing granular material such as sawdust to remove the remaining leftovers from the skin side of the pelts and/or to dry the skin side.

[0005] A known apparatus for tumbling such animal pelts comprises a drum with a compartment comprising a tumbling section and a separation section. The tumbling section is adapted to tumble the pelts together with sawdust, and at the separation section the drum wall consist of a metal grid for separating the sawdust from the pelts before unloading the pelts from the drum. The drum is arranged with an angle in relation to horizontal so that the pelts during rotation of the drum are transported from the tumbling section to a separation section due to gravity.

[0006] However, such a solution suffers from several drawbacks, e.g. that it may be hard to control the processing of the pelts. Another drawback may be that an apparatus as the above described may result in the need of time consuming manual monitoring of the result of the tumbling.

The invention

[0007] The invention relates to a method of processing animal pelts by tumbling said pelts by means of an apparatus comprising a drum, by using a treatment cycle comprising:

tumbling said one or more pelts in a treatment compartment of said drum together with an absorbing granular material,

automatically loading said pelts and said granular material from said treatment compartment into a separation compartment of said drum, and

tumbling said one or more pelts in said separation compartment so as to separate said granular mate-

rial from said pelts in said separation compartment,

said method comprising the steps of:

5 loading one or more pelts into a treatment compartment of said drum,

performing a first processing of said pelts in said drum by means of said treatment cycle,

10 automatically loading said pelts from said separation compartment into a treatment compartment of said drum,

15 performing a second processing of said pelts in said drum by means of said treatment cycle, and

unloading said one or more pelts from said drum.

20 **[0008]** This facilitates an advantageous processing of animal pelts. During the first processing, the skin side of the pelts may be very wet and sticky. This may result in liquid absorbing granular material sticking to areas of the skin during the absorption of the liquid on the skin side of the pelts. Such granular material sticking to the skin side of the pelts may prevent further dry granular material from absorbing liquid at the areas with the granular material sticking onto the skin and may even form a bunch/lump of sticky granular material with an outer substantially dry surface at such areas of the skin side. A result of this is that the skin side of such pelts is not processed enough, and thus, when the granular material has been separated from the pelts after in the separation compartment during the first processing, some of the pelts may need a further processing to achieve a dry and clean skin side. The automatic second processing facilitates that the pelts are processed a second time and thus, a more homogeneous result of the processing of the pelts may be achieved.

35 **[0009]** In a preferred aspect of the invention, the method further comprises:

utilizing a first treatment compartment and a first separation compartment of said drum during said first processing, and utilizing a second treatment compartment and a second separation compartment of said drum for said second processing.

45 **[0010]** Thus, a more continuous and/or faster processing of the pelts may be achieved. In this embodiment, the first treatment compartment preferably comprises an inlet for loading the pelts into the drum, and the second separation compartment comprises an outlet for unloading the pelts from the drum. The pelts are thus automatically transported from the first treatment compartment to the first separation compartment, from the first separation compartment to the second treatment compartment, and from the second treatment compartment to

the second separation compartment before being unloaded from the drum.

[0011] In an advantageous aspect of the invention, the method may further comprise said pelts being loaded into said drum to a treatment compartment arranged at a first end of said drum before said first processing, and wherein said pelts are unloaded from said drum from a separation compartment arranged at a second end of said drum after said second processing.

[0012] In a preferred aspect of the invention, the method may comprise that absorbing granular material separated from a separation compartment during said first processing is automatically loaded into a treatment compartment to be reused during said second processing.

[0013] During the separation, dry granular material may be blended with more wet granular material which has absorbed liquid during the first processing. Thereby, the granular material may be suitable for being reused in the second processing thus e.g. reducing the needed amount of granular material. Also, by automatically blending and reusing the granular material from the first processing for the second processing, a less complex supply of granular material for the second processing may be achieved.

[0014] In an advantageous aspect of the invention, the method may comprise that the said granular material is automatically unloaded from said separation compartment and into a temporary storage compartment in said drum by means of perforations in an inner wall.

[0015] This may facilitate an advantageous separation of the granular material from the pelts in the separation compartment(s), and an advantageous handling, transportation and/or treatment of the granular material during the treatment process of the pelts.

[0016] Preferably, the at least one of the said compartments comprises one or more fixed transportation guides extending from an inner surface of a wall of at least one of said compartments, said fixed transportation guides inducing a movement of the content of the said at least one compartment in the longitudinal direction of the drum during rotation of the drum.

[0017] The transportation guides are preferably arranged with an angle in relation to the longitudinal direction of the drum so that the transportation direction is determined by the rotation direction of the drum. It is understood that the transportation guides may be adjustably arranged in aspects of the invention to facilitate that the transportation guides may be adjusted into fixed positions with various angles in relation to the longitudinal direction dependent of the selected angle.

[0018] In an aspect of the invention, the method may comprise the pelts being prevented from leaving a compartment of said drum for an amount of time during operation of the apparatus by means of a partition wall separating said treatment compartment and said separation compartment and extending from an inner surface of the drum, wherein the ratio between the height of said inner separation wall and the height of said one or more fixed

transportation units is no more than 1:4 such as no more than 1:3 and preferably no more than 1:1.2.

[0019] This may facilitate a simple way of transporting the pelts to different compartments of the drum and keeping the pelts in a compartment for an amount of time.

[0020] In an aspect of the invention, the method may comprise the step of changing the rotation direction of the drum to change the transportation direction of the content of one or more compartments of the drum.

[0021] This may be advantageous due to several reasons. For example, the drum may comprise only one separation compartment and one treatment compartment, and pelts may thus be transported between such compartments by means of amending the rotation direction of the drum. The transportation may be facilitated by one or more transportation guides arranged with an angle in relation to the longitudinal direction of the drum and being attached to a wall of the drum to extend into a compartment of the drum.

[0022] The invention furthermore relates to an apparatus for processing of animal pelts, said apparatus comprising a drum for tumbling said animal pelts, said drum comprising:

one or more treatment compartments comprising an inlet and an outlet, and

one or more separation compartments comprising an inlet, an outlet and a wall being arranged for separating an absorbing granular material from said pelts during said tumbling,

wherein said apparatus is configured for automatically loading said animal pelts and said granular material from said at least one treatment compartment to one of said one or more separation compartments during operation of said apparatus, and

wherein said apparatus is further configured for automatically loading animal pelts from said at least one a separation compartment to one of said one or more treatment compartments of said drum during operation of said apparatus.

[0023] In general, it is preferred that the wall being arranged for separating an absorbing granular material from said pelts during the tumbling is an inner wall arranged inside the drum with a distance to the outer drum wall. However, in other embodiments, the wall arranged for separating an absorbing granular material from said pelts during the tumbling may be the outer drum wall and the granular material is in such an embodiment unloaded directly to the exterior of the drum.

[0024] The wall arranged for separating the absorbing granular material from the pelts during the tumbling in the separation compartment preferably comprises a plurality of perforations to facilitate that the granular can leave through the perforations while the pelts are maintained in the separation compartment. The perforations may be obtained by drilling, by die-cutting, and/or the

like. Also, the wall may be made from a metal grid made from e.g. braided and/or welded/soldered wires, preferably metal wires forming openings between the wires to obtain the said perforations. In general it is understood that the wall comprising the perforations may be made from any suitable structure and material facilitating separating the absorbing granular material from the pelts during the tumbling in the separation compartment.

[0025] In an advantageous aspect of the invention, the said drum may comprise a first treatment compartment and a second treatment compartment, a first separation compartment and a second separation compartment, wherein said first separation compartment is arranged between said first treatment compartment and said second treatment compartment in said drum, and wherein said second separation compartment is arranged adjacent to said second treatment compartment.

[0026] Such an apparatus may e.g. facilitate a continuous processing of pelts so that a continuous flow of pelts may be loaded into the apparatus, and the processed pelts may automatically be unloaded from the apparatus.

[0027] Alternatively, or additionally, the apparatus may facilitate a batch process so that a batch of pelts is loaded into the apparatus, preferably together with a granular material to be processed.

[0028] In an advantageous aspect of the invention, the apparatus is during operation configured for automatically:

transporting pelts from said first treatment compartment to said first separation compartment,

transporting pelts from said first separation compartment to said second treatment compartment, and

transporting said pelts from said second treatment compartment to said second separation compartment.

[0029] In a preferred aspect of the invention, the said apparatus is configured to automatically load granular material separated from at least one of said separation compartments into a treatment compartment of said drum during normal operation of said apparatus.

[0030] Preferably, said apparatus is configured for passing on said separated granular material to said treatment compartment by means of an outlet in a partition wall of said drum.

[0031] In an advantageous aspect of the invention, at least one of said walls being arranged for separating an absorbing granular material from said pelts is an inner wall arranged with a distance to an outer drum wall of said drum to form a temporary storage compartment in said drum.

[0032] This e.g. facilitates an advantageous separation of the granular material from the pelts, and an advantageous handling of the granular material during the treatment process of the pelts in the drum. Alternatively,

at least one of the separation compartments may comprise a wall with perforations arranged to unload the granular material directly to the exterior of the drum.

[0033] Preferably, the wall for separating the granular material from the pelts extends in the longitudinal direction of the drum with a distance to the outer drum wall, thus forming the separation compartment and the temporary storage compartment for separated granular material.

[0034] Advantageously, at least one of said compartments may in aspects of the invention comprise one or more fixed transportation guides extending from an inner surface of the said at least one compartment, said fixed transportation guides being arranged to induce a movement of the content of the said at least one compartment in the longitudinal direction of the drum during rotation of the drum.

[0035] This may e.g. facilitate a reliable and more controlled transportation of the pelts and/or granular material

[0036] On an aspect of the invention, said apparatus comprises at least one partition wall separating said treatment compartment and said separation compartment and extending from an inner surface of the drum into the drum,

wherein the ratio between the height of said partition wall and the height of said one or more fixed transportation guides is no more than 1:4 such as no more than 1:3 and preferably no more than 1:1.2.

[0037] The said ration may have an advantageous influence in relation to controlling the flow of the pelts through the drum.

[0038] Preferably, the apparatus as disclosed of any of the claims 8-14, is configured for operating in according with a method according to one or more of the claims 1-7.

[0039] The invention furthermore relates to use of an apparatus according to any of claims 8-14 for processing of animal pelts.

Figures

[0040] The invention will be described in the following with reference to the figures in which:

fig. 1 illustrates a view into the internal of a preferred embodiment of a drum of an apparatus for processing animal pelts according to a preferred embodiment of the invention,

fig. 2 illustrates a preferred embodiment of a drum of an apparatus for processing animal pelts according to a preferred embodiment of the invention seen in perspective,

fig. 3 illustrates an embodiment of an apparatus comprising a drum for processing of animal pelts,

- fig. 4 illustrates another embodiment of a drum of an apparatus for processing animal pelts according to an embodiment of the invention,
- figs. 5a-5c illustrates different embodiments of the interrelationship between the height of a transportation guide and a partition wall according to embodiments of the invention, and
- fig. 6 illustrates an embodiment of an adjustable transportation guide.

Detailed description

[0041] Fig. 1 illustrates a view into the interior of a preferred embodiment of a drum 2 of an apparatus 1 for processing pelts. The drum 2 is rotatable around its central axis extending in the longitudinal direction LD of the drum 2 by means of drive means such as an electric motor (not illustrated) arranged appropriately to perform the rotation of the drum 2.

[0042] The drum 2 is separated into treatment compartments 10, 30 and separation compartments 20, 40. The first treatment compartment 10 comprises an inlet 14 and an outlet 24. The outlet 24 acts as an inlet for the first separation compartment 20. The first separation compartment thus comprises an inlet 24 and furthermore an outlet 34. The outlet 34 of the first separation compartment 20 acts as an inlet for the second treatment compartment 30. The second treatment compartment 30 thus comprises an inlet 34 and furthermore an outlet 44 which acts as an inlet for the second separation compartment 40. The second separation compartment 40 further comprises an outlet 45 for unloading the pelts to the exterior of the drum 2. It is understood that the inlets of the compartments preferably are arranged opposite to the outlets of the compartments 10, 20, 30, 40.

[0043] The treatment compartments 10, 30 and the separation compartments 20, 40 are arranged alternating in the drum 2 so that the first separation compartment 20 is arranged in continuation of the first treatment compartment 10, the second treatment compartment 30 is arranged in continuation of the first separation compartment 20, and the second separation compartment 40 is arranged in continuation of the second treatment compartment 30. Thus, the first separation compartment 20 is arranged between the first treatment compartment 10 and the second treatment compartment 30 in the drum 2, and the second separation compartment 40 is arranged adjacent to the second treatment compartment 30 to receive the pelts from the second treatment compartment 30.

[0044] The first separation compartment 20 comprises an inner wall 21, and the second separation compartment 40 comprises an inner wall 41. The inner walls 21, 41 of the separation compartments 20, 40 comprises a plurality

of perforations 22, and are arranged in the drum 2 with a distance to the outer wall 3 of the drum 2 and thus establishes a temporary storage compartment 23, 43 between the outer wall 3 and the inner wall 21. The temporary storage compartments 23, 43 preferably extend in the drum 2 around the exterior of the separation compartments 20, 40 between the separation compartments and the outer wall 3 of the drum 3.

[0045] The first separation compartment 20 is thus formed by the inner surface of the perforated inner wall 21, a partition wall 16 between the first treatment compartment 10 and the first separation compartment 20, and a partition wall 26 between the first separation compartment and the second treatment compartment 30. In the same way, the second separation compartment 40 is formed by the inner surface of the perforated inner wall 41, a partition wall 36 between the second treatment compartment 30 and the second separation compartment 40, and an end wall 9 of the drum 2.

[0046] The first temporary storage compartment 23 is formed by the outer surface of the inner wall 21, a partition wall 16 between the first treatment compartment 10 and the first temporary storage compartment 23, and a partition wall 26 between the first temporary storage compartment 23 and the second treatment compartment 30. In the same way, the second temporary storage compartment 43 is formed by the outer surface of the inner wall 41, a partition wall 36 between the second treatment compartment 30 and the second temporary storage compartment 43, and an end wall 9 of the drum 2. Thus, the separation compartments 20, 40 in the illustrated embodiment has a smaller diameter than the treatment compartments 10, 30 due to the temporary storage compartments 23, 43 arranged around the exterior of the separation compartments 20, 40. It is understood that the outer wall 3 of the drum 3 in embodiments of the invention is not necessarily the outmost wall of the drum 2.

[0047] The particle size of the granular material, and the size of the perforations 22 of the inner walls 21, 41 are selected so that granular material in the separation compartments 20, 40 is separated from the pelts in the separation compartments 20, 40 during rotation of the drum 2 and leaves the separation compartments 20, 40 through the perforations 22 in the inner walls 21, 41 into the temporary storage compartments 23, 43 while the pelts are retained in the separation compartments 20, 40.

[0048] The outer wall of the drum 3 defining the treatment compartments 10, 30 together with end walls and partition walls as described above is preferably substantially solid so that no liquid absorbing granular material can leave through the wall 3 when located in the treatment compartments 10, 30.

[0049] In Fig 1, the travelling path of the liquid absorbing granular material through the drum 2 during operation is indicated by dashed arrows, and the travelling path of the pelts through the drum 2 is indicated by solid arrows.

[0050] When processing of the animal pelts, the pelts are loaded into the first treatment compartment 10 by

means of the inlet 14 e.g. together with the liquid absorbing granular material, preferably being a granular wood material such as sawdust. The inlet 14 is preferably arranged at a first end wall 8 of the drum 2.

[0051] The pelts are thus tumbled for an amount of time in the first treatment compartment 10 together with the granular material, and are during the tumbling transported towards the outlet 24, preferably by means of inclining fixed transportation guides attached to the inner surface 16 of the wall 3 the first treatment compartment 10. These transportation guides are not illustrated in fig. 1 but is described in more details later on in relation to e.g. fig.2.

[0052] When a certain amount of pelts are loaded into the first treatment compartment 10, the pelts will over time accumulate in the first treatment compartment 10 near the partition wall 16 between the first treatment compartment 10 and the first separation compartment 20.

[0053] When enough pelts are accumulated near the partition wall 16 the pelts and granular material will due to e.g. the influence from the transportation guides be automatically loaded over the edge 17 of the partition wall 16 between the first treatment compartment 10 and the first separation compartment 20 and through the outlet 24 into the first separation compartment 20 during rotation of the drum 2.

[0054] In the first separation compartment 20, the liquid absorbing granular material will during rotation of the drum 2 be separated from the first separation compartment 20 and leave through the perforations 22 in the inner wall 21 into the first temporary storage compartment 23 between the outer wall 3 of the drum 2 and the inner wall 21. Preferably, the second separation compartment 20 also comprises transportation guides attached to the inner surface of the inner wall 21, for transporting the pelts from the first separation compartment 20 towards the outlet 34 as described above in relation to the transportation of the content of the first treatment compartment 10 towards the outlet 24.

[0055] The transportation guides, other optional further parts protruding from the inner surface of the inner wall, and the inner wall 21 applies a mechanical impact on the pelts during the rotation of the drum 2. Thus, granular material sticking to the pelts is released from the pelts and leaves the separation compartment through the perforations in the inner wall 21 together with other already loose granular material in the separation compartment 20, and the granular material is hereby loaded into the temporary storage 23 of the drum 2.

[0056] During this process, granular material which may have been clumped together may be released from each other and blended with the loose and maybe more dry granular material.

[0057] The temporary storage compartment 23 preferably also comprises one or more transportation guides arranged to guide the blended granular material towards an outlet 6 of the temporary storage compartment 23, preferably an outlet 6 in a partition wall 26 separating the

temporary storage compartment 23 from the second treatment compartment 30.

[0058] The blended granular material is thus automatically loaded from the temporary storage compartment 23 through the outlet 6 and into the second treatment compartment 30. The pelts in the first separation compartment 20 are automatically loaded over the edge 27 of the partition wall 26 between the first separation compartment 20 and the second treatment compartment 30 and through the outlet 34 into the first separation compartment 20 during rotation of the drum 2.

[0059] The granular material from the temporary storage compartment 23 is thus reused and tumbled together with the pelts from the first separation compartment 20 in the second treatment compartment 30.

[0060] The pelts are in thus processed a second time in a second treatment process by means of the second treatment compartment 30 and the second separation compartment 40 as explained above in relation to the first treatment compartment 10 and the first separation compartment 20. Thus, after an amount of time, accumulated pelts near the partition wall 36 between the second treatment compartment 30 and the second separation compartment 40 are loaded over the edge 37 of the partition wall 36 and into the second separation compartment 40 by means of the outlet 44. In the second separation compartment 40, the granular material is separated from the pelts through perforations in the inner wall 41 of the second separation compartment 40, and preferably enters into a second temporary storage compartment 43 and from there to the exterior of the drum by means of the outlet 7, e.g. an outlet in the outer wall 3 of the drum 2.

[0061] The temporary storage compartment 43 arranged to receive granular material from the second separation compartment 40 may in embodiments of the invention be arranged with the outlet 7 in the wall 3 of the drum near the partition wall 36 between the second compartment 30 and the second separation arrangement. In such an embodiment the temporary storage compartment 43 may comprise transportation guides arranged to transport the content of the temporary storage compartment 43 in an opposite direction than the transportation guides of the compartments 10, 20, 23, 30,40. However, it is understood the outlet 7 may naturally be arranged at any suitable location.

[0062] The pelts in the second separation compartment 40, which are now separated from granular material, are unloaded from the second separation compartment 40 through the outlet 45 to the exterior of the drum 2, this outlet 45 is preferably arranged in the second end wall 9 of the drum 2 as illustrated,

[0063] As illustrated, the second separation compartment 40 may be longer than the first separation compartment, i.e. the second separation compartment 40 may consume a larger part of the length of the drum 2 than the first separation compartment 20. This may e.g. help to assure an increased separation of granular material

from the pelts before the pelts are unloaded from the drum.

[0064] Fig. 2 illustrates the drum 2 of the apparatus 3 seen in perspective, where a part of the drum wall is removed to facilitate a look into the drum 2. The construction of the drum 2 of fig. 2 is substantially identical to the construction of the drum of fig. 1 with the separation compartments 20, 40, the treatment compartments 10, 30, the temporary storage compartments 23, 43, outlets/inlets, partition walls, etc. of the drum 2 of fig. 1.

[0065] As illustrated in fig. 2 and as explained in relation to fig. 1, the inner walls 21,41 of the separation compartments 20, 40 comprises a plurality of perforations 22 facilitating that granular material can leave the separation compartments 20, 40 through the perforations and into the temporary storage compartments 23, 43.

[0066] As mentioned above, one or more of the compartments 10, 20, 23, 30, 40, 43 may comprise one or more inclining fixed transportation guides 4 attached to the inner surface of the walls of the compartments. These transportation guides 4 are arranged with an angle φ in relation to the longitudinal direction LD of the drum 2 as illustrated in fig. 1. Thus, by rotating the drum 4, in the present example clockwise when seen from the first end of the drum comprising the end wall 8, the guides 4 will induce a movement of content of the compartment towards the next compartment in the treatment process. For example, the transportation guide(s) 4 in the first treatment compartment 10 will transport the content towards the first separation chamber 20 by rotating the drum 2 clockwise.

[0067] In an embodiment of the invention, the apparatus comprising the drum 2 may be arranged to shift between a clockwise and counterclockwise/anticlockwise rotation direction. The apparatus may in this way prevent the content of the compartments from entering into the next compartment in the process (or out of the drum) in that the transportation guides 4 will induce a movement of the content away from a compartment which is considered as the next step in the treatment process of the pelts. For example, a counterclockwise rotation of the drum 2 will transport the content of the first treatment compartment towards the end wall 8 of the drum 4. In such an embodiment, the walls 8, 9, 16, 26, 26 and/or the internal of the compartments may comprise a suitable screening arrangement (not illustrated in any figure) for preventing the content from entering a previous compartment during the counterclockwise rotation of the drum 2.

[0068] As illustrated, the compartments 10, 20, 30, 40 may comprise further protruding parts 70 attached to the inner surface of the walls of the compartments 10, 20, 30, 40 and extending into the compartment. These protruding parts 70 preferably comprise longitudinal members arranged substantially parallel to the longitudinal direction LD of the drum 2. The purpose of such further protruding parts 70 is to induce further mechanical forces to the content of the compartment, and the further protruding parts 70 may additionally help to slow down the

transportation of the content towards an outlet which at least in some situations may be advantageous.

[0069] Fig. 3 illustrates an embodiment of an apparatus 1 comprising a drum 2 according to embodiments of the invention. The apparatus comprises an outer casing 73, shielding the drum 2 from the surroundings. The apparatus 1 is arranged on legs preferably telescopic legs 74. This facilitates that the drum may be adjusted to an appropriate height. Furthermore, the telescopic legs may facilitate arranging the drum 2 with an angle in relation to horizontal so that the gravitation force acts on the content of the drum towards the outlet 45 (not illustrated in fig. 3). Of course, the drum 2 may in aspects of the invention also be arranged with an angle in relation to horizontal by any other appropriate means.

[0070] Fig. 4 illustrates an embodiment of the invention wherein the drum 2 only comprises a treatment compartment 50 and a separation compartment 60. The treatment compartment 50 comprises transportation guides 4 (not illustrated in fig. 4) arranged to induce a movement of the content of the treatment compartment towards an outlet 54 and into a separation compartment 60 as explained in relation to fig. 1.

[0071] The separation compartment may furthermore comprise transportation guides for inducing a movement of the content in the same direction as the transportation guides of the treatment compartment 50 by the same rotation direction.

[0072] Thus by rotating the drum 2, the transportation guides 4 of the treatment compartment 50 may induce a movement on the content of the treatment compartment 50 towards the separation compartment as described earlier to load the pelts and the granular material into the separation compartment 60. However, in this embodiment, the outlet 45 of the separation compartment may be closed by a door 71 to prevent the pelts from unintentionally leaving the compartment through the outlet in the end wall 9 of the drum. (such a door may naturally also be implemented in embodiments of a drum as described in relation to figs 1. and 2.

[0073] After an amount of time, the rotation direction of the drum is changed, and thus, the transportation guides of the compartments will induce a movement of the content from the separation compartment 60 and into the treatment compartment for a second processing of the pelts. Furthermore, the separated granular material in the temporary storage compartment 63 may be automatically returned to the treatment compartment 50 to be reused by means of transportation guides and an outlet 72 in a partition wall between the temporary storage compartment 63 and the treatment compartment 50. After a while, the rotation direction may be changed again to move the content of the treatment compartment 50 into the separation compartment 60. The door 71 may then be opened to outlet the pelts from the separation compartment 60.

[0074] Also, the temporary storage compartment 63 may comprise an outlet 7 to load the granular material

from the temporary storage compartment 63 to the exterior of the drum, and this outlet may be covered by a further door 73 to be opened when the liquid absorbing granular material is to be unloaded from the drum 2.

[0075] It is understood that in embodiments of the invention which are not illustrated, the separation compartment(s) 20, 40, 60 as described in relation to figs. 1, 2 and 4 may comprise transportation guides 4, arranged to incline in the opposite direction than transportation guides of treatment compartments of the drum. This may be advantageous in relation to controlling the transportation of the pelts and/or granular material through the drum in embodiments where the apparatus facilitates changing the rotation direction of the drum 2.

[0076] Fig. 5a to 5c illustrates different embodiments of the height of transportation guides 4 of the drum and the height of partition walls 16 separating a treatment compartment 10 and a separation compartment 20. In the examples of figs. 5a-5c, the first treatment compartment 10 and the first separation arrangement 20 are utilised, but it is understood that the embodiments may apply mutatis mutandis to any treatment compartment 10, 30, 50 and separation compartment 20, 40, 60 of a drum 2 according to embodiments of the invention.

[0077] In fig. 5a, the height h2 of the partition wall 16 is larger than the height h1 of the transportation guide 4. In fig. 5b, the height h2 of the partition wall 16 is substantially equal to the height h1 of the transportation guide 4. In fig. 5c, the height h2 of the partition wall 16 is smaller than the height h1 of the transportation guide 4. Common to the embodiments of figs 5a-5c is that the ratio between the height h2 of the partition wall 16 and the height h1 of the transportation guides 4 is no more than 1:3 such as no more than 1:2 and preferably no more than 1:1.2.

[0078] For example, if the partition wall 16 as a non limiting example is 5 cm high, the height of the transportation guide 4 may be between 15 cm and 6 cm. Another example may be that if the height of the transportation guide 4 as a non limiting example is 10 cm, the height of the partition wall 16 may be between 12 cm and 30 cm. i.e. it is understood that the ratio may go both ways as illustrated so that the transportation guide 4 is higher than the partition wall 16 or vice versa.

[0079] Fig. 6 illustrates an embodiment of an adjustable transportation guide 4 for transporting the content of the drum 2 in the longitudinal direction LD of the drum 2 when the drum rotates.

[0080] The angle ϕ of the transportation guide 4, which in this embodiment comprises an oblong member, is fixed to and extending from a wall of the drum 2 into the internal of the drum to induce a movement of the content of the drum in the longitudinal direction LD of the drum 2. In the present example, the transportation guide is attached to the inner surface of the outer wall 3 of the drum 2 and the transportation guide 4 of fig. 6 may thus be a transportation guide attached in a treatment compartment 10, 30, 50 of the drum. It is understood that a similar transportation guide 4 may be attached to the inner surface

of the perforated wall 21, 41, 61 of a separation compartment 20, 40, 60, or to the inner surface of the outer wall 3 in a temporary storage compartment 23, 43, 63.

[0081] The adjustable transportation guide 4 can in this embodiment be adjusted in relation to the longitudinal direction LD of the drum 2 into predefined angles ϕ by rotating the transportation guide 4 around an axis AX. In this way, the transportation guide 4 may be adjusted individually to adjust the speed of the travelling of the content of the compartment in which the transportation guide is fixed through the drum 2. The adjustable transportation guide 4 is in this example attached to predefined locations 75 for attachment of the adjustable transportation guide 4, and may be fixed at the predefined location by any appropriate means such as a screw, a bolt, a spring system, a locking system arranged near the end of the rotation axis AX for the rotation of the transportation guide and/or the like.

[0082] In general, it is to be understood that the invention is not limited to the particular examples described above but may be adapted in a multitude of varieties within the scope of the invention, as specified in the claims. Furthermore, it is to be understood that two or more embodiments and/or features illustrated in the figures may also be combined in a multitude of varieties to achieve different embodiments not directly described in this document.

List

[0083]

1. : Apparatus for processing animal pelts.
2. : Drum of apparatus.
3. : Outer wall of drum.
4. : Transportation guides inside compartments of drum
5. : Inner surface of the wall on which transportation guides is attached.
6. : Outlet from first temporary storage compartment and into second treatment compartment
7. : Outlet from second temporary storage compartment.
8. : First end wall of drum
9. : Second end wall of drum
- 10, 30, 50. : Treatment compartment of drum.
- 16, 26, 36 : partition walls between separation compartments (and/or temporary storage compartments) and treatment compartments
14. : Inlet for first treatment compartment
- 20, 40, 60. : Separation compartment of drum.
- 21, 41, 61. : Inner wall of separation compartment comprising plurality of perforations.
22. : Perforations of inner wall.
- 23, 43, 63. : Temporary storage compartment between outer wall of drum and inner wall of

- separation compartment.
- 24 : Inlet for first separation compartment
- 34 : Inlet for second treatment compartment
44. : Inlet for second separation compartment.
45. : Outlet of second separation compartment to the exterior of drum
- 54 : outlet/inlet between separation compartment and treatment compartment of drum comprising one treatment compartment and one separation compartment.
70. : Further protruding parts attached to inner surface of compartment.
71. : Door
72. : Door of temporary storage compartment.
73. : Casing of apparatus
74. : Telescopic legs
75. : Predefined location for attachment of adjustable transportation guide

Claims

1. A method of processing animal pelts by tumbling said pelts by means of an apparatus (1) comprising a drum (2), by using a treatment cycle comprising:

tumbling said one or more pelts in a treatment compartment (10, 30, 50) of said drum (2) together with an absorbing granular material, automatically loading said pelts and said granular material from said treatment compartment into a separation compartment (20, 40, 60) of said drum, and

tumbling said one or more pelts in said separation compartment (20, 40) so as to separate said granular material from said pelts in said separation compartment (10, 30, 60),

said method comprising the steps of:

loading one or more pelts into a treatment compartment (10, 30, 50) of said drum (2),

performing a first processing of said pelts in said drum (2) by means of said treatment cycle, automatically loading said pelts from said separation compartment (20, 40, 60) into a treatment compartment (10, 30, 50) of said drum (2),

performing a second processing of said pelts in said drum (2) by means of said treatment cycle, and

unloading said one or more pelts from said drum (2).

2. A method according to claim 1, comprising:

utilizing a first treatment compartment (10) and a first separation compartment (20) of said drum (2) during said first processing, and

utilizing a second treatment compartment (30) and a second separation compartment (40) of said drum (2) for said second processing.

3. A method according to claim 1 or 2, wherein said pelts are loaded into said drum (2) to a treatment compartment (10, 50) arranged at a first end of said drum before said first processing, and wherein said pelts are unloaded from said drum (2) from a separation compartment (40, 60) arranged at a second end of said drum (2) after said second processing.

4. A method according to any of the preceding claims, wherein absorbing granular material separated from a separation compartment (20, 60) during said first processing is automatically loaded into a treatment compartment (10, 50) to be reused during said second processing.

5. A method according to any of the preceding claims, wherein said granular material is automatically unloaded from said separation compartment (20, 40, 60) and into a temporary storage compartment (23, 43, 63) in said drum (2) by means of perforations (2) in an inner wall (21, 41, 61).

6. A method according to any of the preceding claims, wherein at least one of said compartments (10, 20, 23 30, 40, 43), comprises one or more fixed transportation guides (4) extending from an inner surface of a wall (3, 21, 41, 61) of at least one of said compartments, said fixed transportation guides (4) inducing a movement of the content of the said at least one compartment in the longitudinal direction (LD) of the drum (2) during rotation of the drum (2).

7. A method according to any of the preceding claims, wherein said method comprises the step of changing the rotation direction of the drum 2 to change the transportation direction of the content of one or more compartments (10, 20, 23, 30, 40, 43 50, 60, 63) of the drum (2).

8. An apparatus (1) for processing of animal pelts, said apparatus comprising a drum (2) for tumbling said animal pelts, said drum (2) comprising:

one or more treatment compartments (10, 30, 50) comprising an inlet and an outlet, and

one or more separation compartments (20, 40, 60) comprising an inlet, an outlet and a wall (21, 41, 61) being arranged for separating an absorbing granular material from said pelts during said tumbling,

wherein said apparatus (1) is configured for automatically loading said animal pelts and said granular material from said at least one treatment compart-

ment (10, 30, 50) to one of said one or more separation compartments (20, 40, 60) during operation of said apparatus (1), and
 wherein said apparatus is further configured for automatically loading animal pelts from said at least one a separation compartment (20, 40, 60) to one of said one or more treatment compartments (10, 30, 50) of said drum (2) during operation of said apparatus (2).

9. An apparatus according to claim 8, wherein said drum comprises a first treatment compartment (10) and a second treatment compartment (30), a first separation compartment (20) and a second separation compartment (40),
 wherein said first separation compartment (20) is arranged between said first treatment compartment (10) and said second treatment compartment (30) in said drum (2), and
 wherein said second separation compartment (40) is arranged adjacent to said second treatment compartment (30).

10. An apparatus according to claim 9, wherein said apparatus (1) during operation is configured for automatically:

transporting pelts from said first treatment compartment (10) to said first separation compartment (20),
 transporting pelts from said first separation compartment (20) to said second treatment compartment (30), and
 transporting said pelts from said second treatment compartment (30) to said second separation compartment (40).

11. An apparatus according to any of claims 8, 9 or 10, wherein said apparatus (1) is configured to automatically load granular material separated from at least one of said separation compartments (20, 40, 60) into a treatment compartment (10, 30, 50) of said drum (2) during normal operation of said apparatus (1).

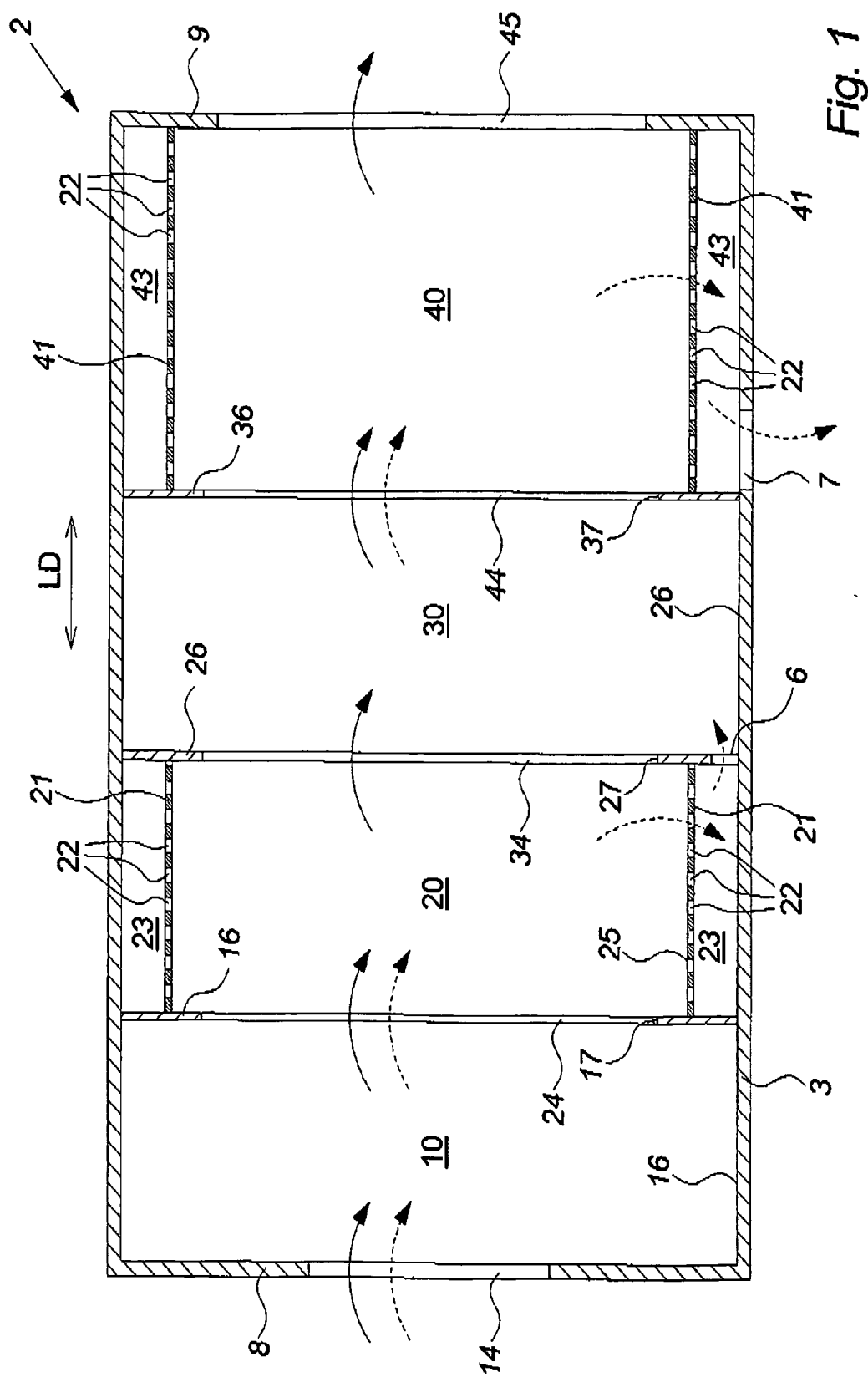
12. An apparatus according to any of claims 8 to 11, wherein at least one of said walls (21, 41, 61) being arranged for separating an absorbing granular material from said pelts is an inner wall arranged with a distance to an outer drum wall (3) of said drum (2) to form a temporary storage compartment (23, 43, 63) in said drum (2).

13. An apparatus according to any of claims 8-12, wherein at least one of said compartments (10, 20, 21, 23 30, 40, 43, 50, 60, 63), comprises one or more fixed transportation guides (4) extending from an inner surface of the said at least one compartment,

said fixed transportation guides (4) being arranged to induce a movement of the content of the said at least one compartment in the longitudinal direction (LD) of the drum (2) during rotation of the drum (2).

14. An apparatus according to claim 13, comprising at least one partition wall (16, 26, 36) separating said treatment compartment (10,30,50) and said separation compartment (20, 40, 60) and extending from an inner surface of the drum (2) into the drum (2), wherein the ratio between the height (h2) of said partition wall (16, 26, 36) and the height (h1) of said one or more fixed transportation guides (4) is no more than 1:4 such as no more than 1:3 and preferably no more than 1:1.2.

15. An apparatus according to any of claims 8-14, configured for operating in according with a method according to any of claims 1-7.



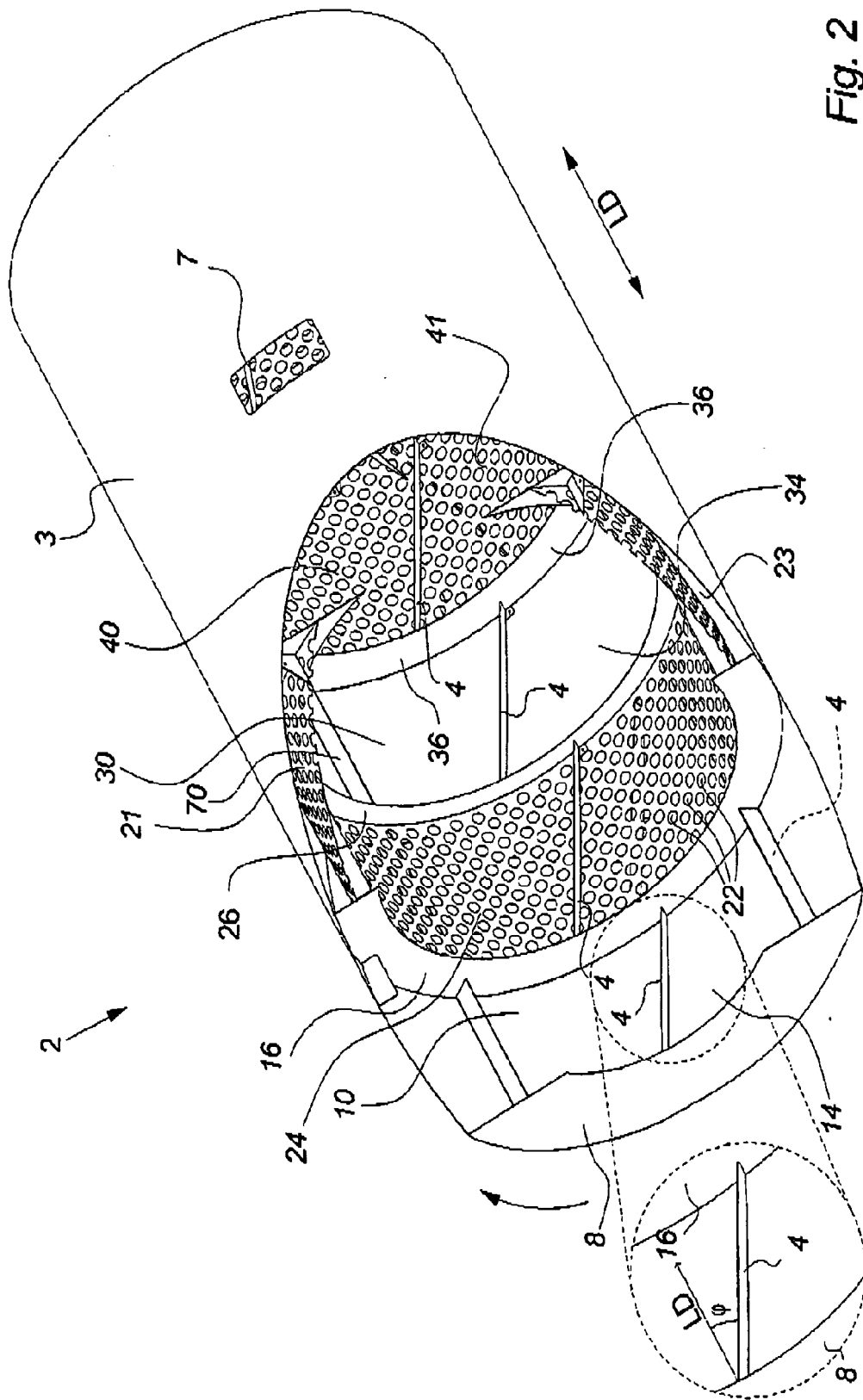


Fig. 2

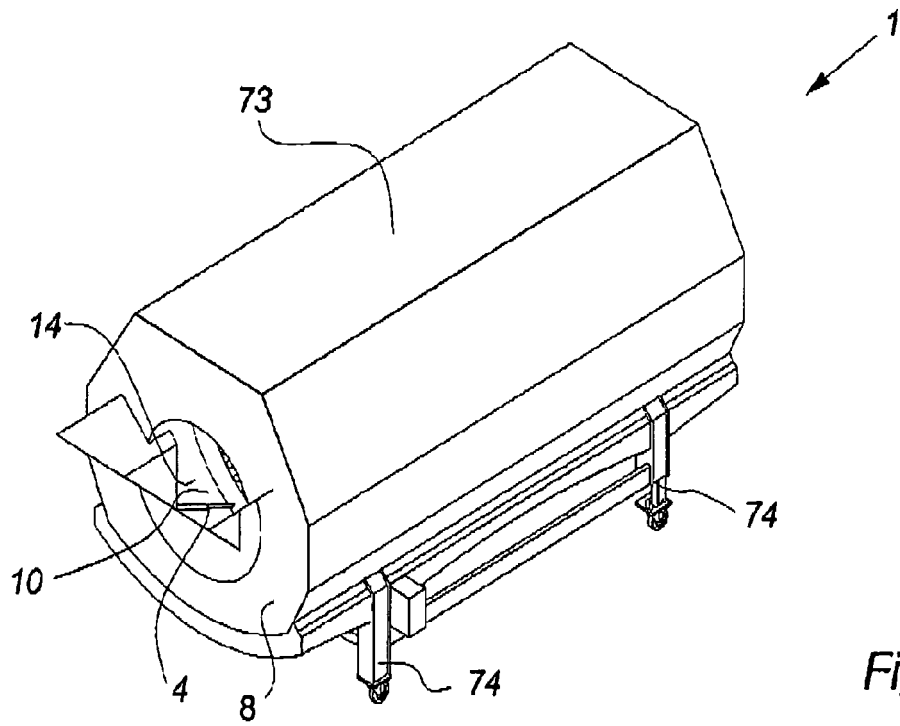


Fig. 3

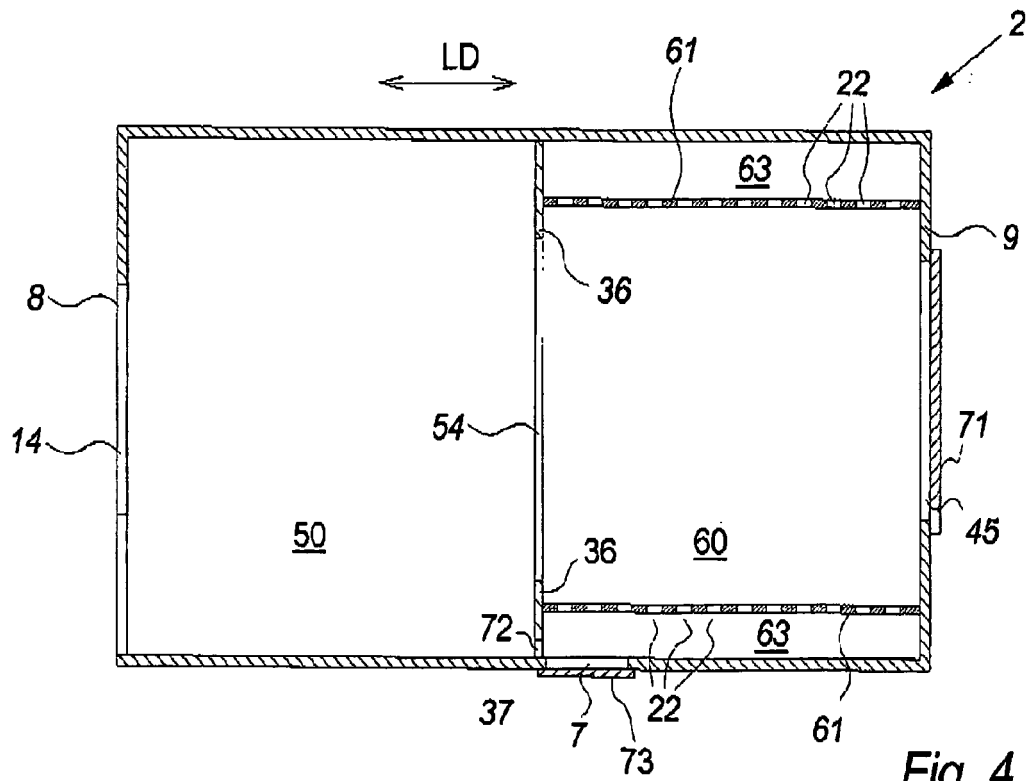


Fig. 4

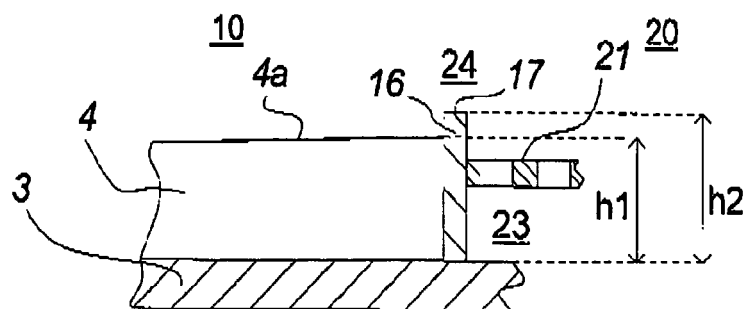


Fig. 5a

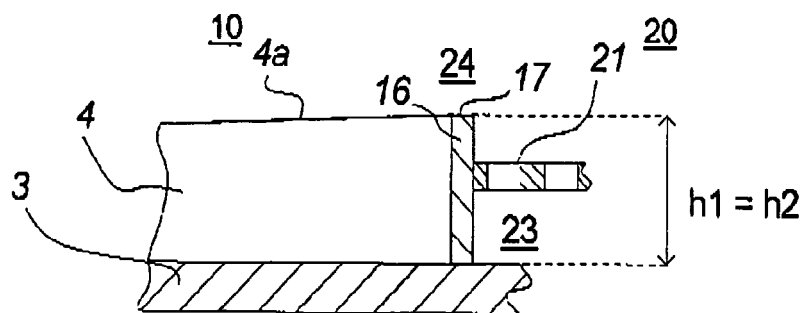


Fig. 5b

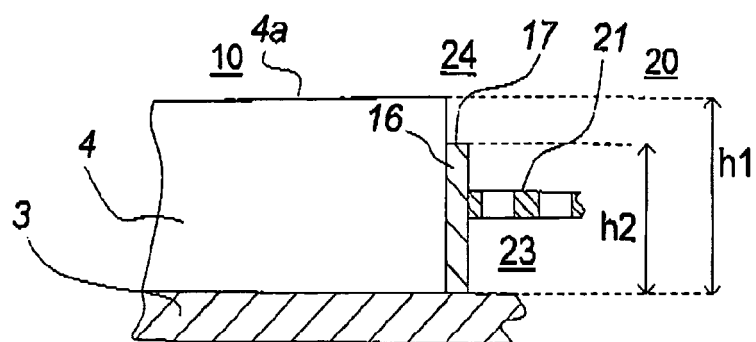


Fig. 5c

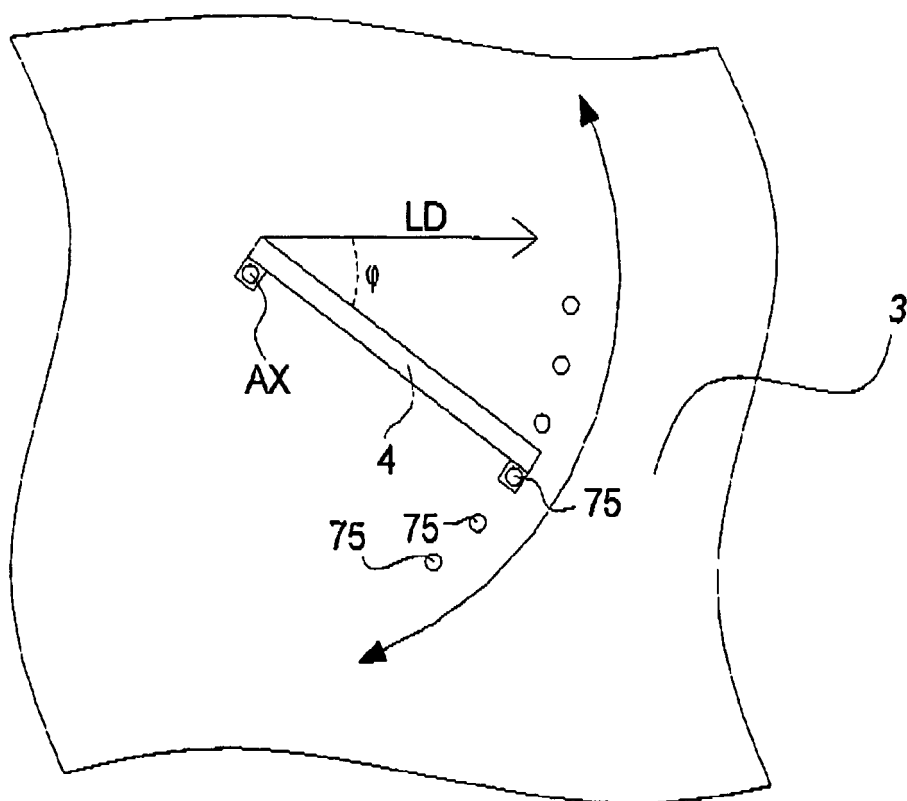


Fig. 6



EUROPEAN SEARCH REPORT

 Application Number
 EP 12 00 1946

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 5 July 2012	Examiner Bichi, Marco
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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