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(54) **Title**: A METHOD OF REARING POULTRY, AS WELL AS AN INFLATABLE PARTITION WALL

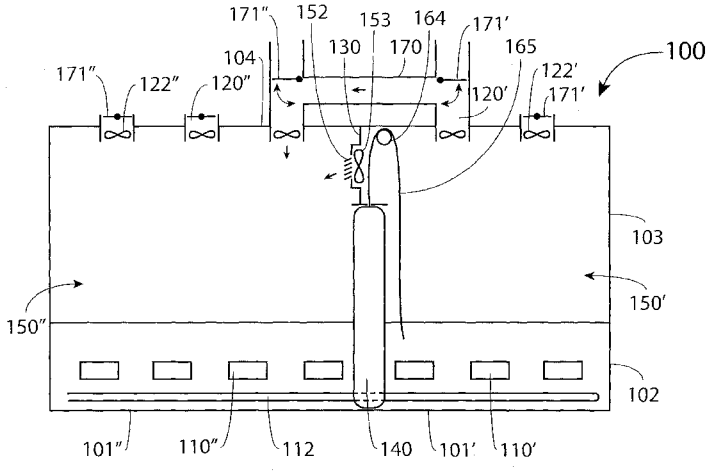


Fig. 1

(57) **Abstract**: The invention relates to a method for raising poultry in a stable (100) having a floor (101), wherein chickens are kept on the floor of the stable and are provided with food and water via feed pipes. The method comprises the step of providing a temporary inflatable divider wall (140) in the stable, by which the stable is divided in a first space (150') and a second space (150") wherein the chickens in a first phase of the raising thereof are kept in the first space, wherein the temperature in the first space is higher than that in the second space, and for raising in a second phase following the first phase the temporary divider wall is removed and the chickens kept in the first space during the first phase may also go to the second floor section. The invention also relates to a inflatable divider wall (140).

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A method of rearing poultry, as well as an inflatable partition wall

The present invention relates to a method for raising poultry in a stable having a floor, wherein chickens are kept on the floor of the stable and are provided with food and water via feed pipes, which method comprises the step of providing a temporary divider wall in the stable, by which the stable is divided in a first space and a second space and thus a first floor section and a second floor section are defined respectively, wherein said first floor section takes up at the most 70% of the surface area of the floor of the stable, and

- the chickens in a first phase of the raising thereof are kept in the first space on the first floor section, wherein the temperature in the first space is higher than that in the second space, and

- for raising in a second phase following the first phase the temporary divider wall is removed and the chickens kept in the first space during the first phase may also go to the second floor section.

Raising chickens in this way, for instance the chickens of hens for slaughtering, is commonly known in the art. For providing food and/or water conduits run through the stable, which have outlet openings distributed along the conduit resulting in a multitude of locations in the stable where the chickens can eat and drink. When the chickens are young, in general the first week or weeks, they have to be kept at elevated temperatures. This temperature is for instance at least 30°C, and when the chickens are only but a few days old about 37°C. A problem with this is that the energy expenditure is high, which from an economical and ecological point of view is undesirable. When the chickens are young they are relatively small and for sufficient space to move about they will need less floor surface area. The temporary divider wall permits a reduction of the space with a relatively high temperature. By keeping the chickens in a relatively small space, heat losses can be kept down. US4524722 (1985) describes a method according to the preamble for raising chickens in a stable. The stable is divisible by means of a curtain for forming a section in which chickens are raised in a first phase at a relatively high temperature. The curtain is not suitable for sealing this section entirely. Although it is described that the curtain may be double-walled, the degree of thermal insulation which can be accomplished compared to the method according to the present invention

is limited. US4524722 describes that the stable has feed lines, but does not contain information on how this is effected in connection with the curtain.

The present application aims to provide a method according to the preamble with which a good thermal insulation can be accomplished.

To this end, a method according to the preamble is characterized in that as the temporary divider wall a temporary divider wall is used that has an inflatable chamber extending along at least part of the circumference of the temporary divider wall, which inflatable chamber in an inflated state seals against the floor of the stable; and the inflatable temporary divider wall comprises two wall parts, wherein the wall parts in an inflated state of the inflatable chamber run parallel with respect to each other and extend from the inflatable chamber.

With the method according to the invention it is possible to raise chickens in a stable in a more energy saving way, to which the parallel wall parts and the good seal against the floor enabled by the inflation contribute. A good seal is especially relevant since with raising chickens a pressure difference between i) the first space and ii) the second space and/or the environment (atmosphere) may be purposefully created. The close fit of the inflatable chamber against the floor also contributes to the chickens being less exposed to draught. The inflatable chamber permits keeping the parallel walls on a relatively fixed and large distance from each other and keeping them parallel, whereby an improved insulation can be accomplished. The pay-back time for using the method according to the invention is even without subsidy easily less than three years, such as less than two years, which is rather exceptional for an energy saving measure. The temporary divider wall will be removed for the second phase of the raising. To this end the overpressure in the inflatable chamber will be released. Within the scope of the invention the term poultry comprises fowl selected from chickens, quails, ducks and turkeys.

A preferred embodiment is characterized in that the first floor section is less than 55%, and preferably less than 40% of the total surface area of the floor of the stable.

Thus a still greater energy saving can be achieved.

A preferred embodiment is characterized in that in the first phase air is discharged from the first space, and in at least part of the

second half of the first phase heat of air discharged from the first space is used for heating the second space.

Thus, the second space is preheated with energy which otherwise would be lost, as a result of which heating the second space for the second phase will cost less energy. Utilizing the heat can for instance be done using a heat exchanger, which then will be preferably operated in counter-current. Often, for a few days in the first half of the second phase there will be no ventilation, because this is not necessary and thus the energy expenditure can be kept down.

A preferred embodiment is characterized in that air from the first space is led through the second space before being released to the atmosphere.

Thus in a simple and effective way heat can be supplied to the second space.

A preferred embodiment is characterized in that the air from the first space is discharged from the first space and fed to the second space by means of suctioning air from the second space.

Poultry is often raised in a stable with underpressure, wherein the stable in the roof or in the walls thereof is provided with fans which discharge air from the stable. This embodiment permits utilizing the fan or fans of the second space for ventilating the first space. Since with this embodiment the second space has a lower pressure than the first space, the invasion of relatively cold air via recesses in the temporary divider wall and/or at places where the temporary divider wall seals improperly against the walls and/or floor of the stable, is counteracted. This is important because young chickens can be sensitive to draught.

A preferred embodiment is characterized in that the stable is provided with an air duct for passing air from the uppermost half of the first space towards the lower half of the second space.

Thus, the second space is heated more effectively. The air is preferably released near the floor of the first space. The air duct may be part of the temporary divider wall. When the temporary divider wall comprises two parallel wall parts of which a wall panel is facing the first space and the second wall panel is facing the second space, the space between the wall panels can be used as an air duct. To this end the first wall panel can be provided with a first opening and the second wall panel with a second opening, and the first opening is

situated higher than the second opening.

A preferred embodiment is characterized in that air is discharged via openings in the second space using a fan connected between the first and the second space which openings in the second space act as inlet openings for fresh air during the second phase.

Such inlet openings are generally situated relatively close to the floor of the stable (eg. at a height of 1 m) as a result of which spent air from the first space, which will be often withdrawn high from that space, is forced into the direction of the floor of the second space and can thus better release heat to the second space prior to leaving the second space via these inlet openings. In the second phase the inlet openings no longer act as discharge openings but actually as inlet openings.

A preferred embodiment is characterized in that placing the temporary divider wall comprises hoisting up an upper side of the temporary divider wall.

Thus, such a divider wall can be placed in a quick and simple way. To this end, the roof of the stable is for instance provided with a winch or pulleys. In case of an inflatable temporary divider wall the chamber need not be that big and the pressure need not be that high that it raises itself up by means of air pressure only.

According to an especially preferred embodiment, the inflatable chamber is provided with a recess which opens up at the circumferential edge of the temporary divider wall, wherein in the recess a conduit for food and/or water is received.

With this embodiment of the method according to the invention it is possible to properly provide the animals with water and food during their growth without jeopardizing the good thermal insulation. Further, an existing stable, provided with conduits for food and/or water extending through the stable, may be used for raising chickens there in an energy saving way using the method according to the invention. In an inflated state of the inflatable chamber the recess will surround the conduit in the circumferential direction of the conduit. Therewith it is also possible to alter the height of the conduits above the floor (in particular by hoisting up the conduits), something that is desirable when the chickens get bigger. The close fit of the inflatable chamber to the conduit prevents chickens from escaping to the second floor section or draught occurring at the conduit.

US4151811 (1979) describes a method of raising chickens in a stable, which can be divided with a curtain. After a first phase the chickens are transferred to another space. This publication does not teach how a stable provided with feed pipes running in the longitudinal direction of the stable can be effectively isolated and how chickens growing during the first phase can be provided with food and drink at various heights.

GB2064289 (1981) describes a method of raising chickens in a stable, which can be divided with a tent. This publication does not teach how a stable provided with feed pipes running in the longitudinal direction of the stable can be effectively isolated and how chickens growing during the first phase can be provided with food and drink at various heights.

The present invention also relates to an inflatable temporary divider wall having over at least part of the circumference thereof an inflatable chamber, wherein the inflatable chamber is provided with at least one recess which opens up at the circumferential edge of the wall; and
the inflatable temporary divider wall comprises two wall parts, wherein the wall parts in an inflated state of the inflatable chamber run parallel with respect to each other and extend from the inflatable chamber and define a first main side and a second main side of the inflatable divider wall, wherein the recess extends from the first main side to the second main side to form a conduit passage.

An inflatable temporary divider wall (partition wall) is known, for instance for the temporary subdivision in two parts of a large space so that both parts can be used for various purposes. With the inflatable temporary divider wall according to the invention at least one recess for a conduit is present, which recess is basically defined by two planes facing each other. In an inflated state of the inflatable chamber the two planes may seal against each other. Such an inflatable temporary divider wall is suitable for use in a stable having conduits, wherein the recesses act as conduit passages. The conduit received in the conduit is movable therein in a direction transverse to the conduit. Therefore it is possible to alter the height of the conduits above the floor (in particular by hoisting up the conduits), something that is desirable when the chickens get bigger. Through the parallel wall parts a lumen is formed, which contributes to the thermally

insulating character of the inflatable temporary divider wall. The pay-back time even without subsidy is easily less than three years, such as less than two years, which is rather exceptional for an energy saving measure.

According to a favourable embodiment, the inflatable temporary divider wall comprises a tubular frame having uprights and stringers, which are in open connection with each other.

Such a tubular frame can easily be inflated, wherein the inflatable temporary divider wall can be self-supporting, and even raising itself up. Uprights and/or stringers situated at the circumference of the inflatable temporary divider wall contribute to sealing against one or more of floor, sidewalls or ceiling of a space (stable).

According to a favourable embodiment, the divider wall is provided with handles to relocate the divider wall.

With these the divider wall can be gripped in a non-inflated state, for instance for relocating it.

Finally, the present invention relates to a poultry stable provided with a temporary divider wall, wherein the temporary divider wall is a temporary divider wall according to any one of claims 10 to 12.

Such a poultry stable is very suitable for application with the method according to the invention.

The present invention will now be illustrated with reference to the drawing where

Fig. 1 shows a schematic longitudinal sectional view through a stable provided with a temporary divider wall;

Fig. 2 shows a front view through the temporary divider wall of Fig. 1;

Fig. 3 shows a top view on the temporary divider wall of Fig. 2;

Fig. 4 shows a cross section through the temporary divider wall of Fig. 2; and

Fig. 5 shows a perspective view on a protective part for use with the temporary divider wall of Fig. 2.

Fig. 1 shows a longitudinal sectional view through a stable 100, which stable 100 comprises a floor 101, a stable wall 102 raised from the floor and and an oblique roof half 103 having a roof ridge 104.

In the stable wall 102 openings 110 are situated, which serve as

inlet openings for feeding fresh air for free-range chickens to be raised in the stable 100. Through the stable 100 conduits 112 extend for supplying water and food. These conduits 112 are mounted suspending and may be hoisted up. The reason for this is that it also has to be possible to clean the stable. When that is necessary the conduits 112 are hoisted up and the floor 101 of the stable 100 can be accessed by a vehicle for cleaning and/or for the removal of manure. The conduits 112 are also hoisted up (a few centimeters) during the raising of the chickens, when the chickens are getting a little bigger, so that the water and food trays attached to the conduits 112 don't get dirty so quickly by straw and manure from the stable. In the roof of the stable 100 discharge openings 120 are situated for air from the stable 100. Air has to be discharged to remove carbon dioxide and water vapour from the stable 100. To this end the discharge openings 120 are provided with fans 122. The stable is also heated, for instance by means of underfloor heating or stoves. To that extent such a stable and the use thereof is known in the art.

The stable 100 is provided with a baffle 130near the roof ridge 104 and with a temporary divider wall 140. This divides the stable 100 in a first space 150' and a second space 150". When the free-range chickens are small they are kept in the first space 150'. Because the first space 150' is smaller than the total space in the stable 100, the energy expenditure for keeping the free-range chickens warm is lower. With a stable according to prior art the ventilation is stopped in order to save energy or minimized in such a way that the concentration of carbon dioxide increases. This is not beneficial for the growth of the free-range chickens and can be at the cost of their well-being. The present invention permits ventilating the first space with a lower energy expenditure.

After a first phase of 2-3 weeks it will be desirable if the free-range chickens in a subsequent second phase can use the entire stable. To this end, the temporary divider wall 140 will be removed, which implies any manner of making available, also including relocation or lifting up from the floor 101.

A further energy saving can be achieved by not discharging the air via the discharge openings 120' during the first phase of the raising of the free-range chickens, but to the second space 150". This is possible by using the fans 122" in the second space 150", but in that

case the heat in the air discharged from the first space 150' will be less capable of reaching the floor 101". Therefore it is advantageous to discharge the air via the openings 110" in the stable wall 102 of the second space 150". To this end the baffle 130 is provided with a fan 153. Downstream from the fan 153 louvres 152 are situated which can be closed to prevent energy loss (at the start of the first phase), and in an open state can be directed downwards in order to contribute to the moving of warm air discharged from the first space 150' into the direction of the floor 101" of the second space 150".

Fig. 2 shows a front view on the temporary divider wall 140. The temporary divider wall 140 is an inflatable temporary divider wall 140 from textile-reinforced PVC, which comprises a tubular frame composed of tube sections which act as stringers 241, oblique stringers 247 or upright 242. The uppermost stringer 241 seals against the underside of the baffle 130, upright 242' seals against the stable wall 102. The underside of the inflatable temporary divider wall 140 seals against the floor 101. At the bottom of the temporary divider wall 140 inflatable tube sections are situated, wherein the tube sections comprise recesses 244 directed towards the floor 101 for receiving conduits. All the tube sections are interconnected and in this embodiment form one single air chamber 299, which is brought to a pressure of 20-40 mbar using a fan (not shown). For placing the temporary divider wall 140 it is first hoisted up using pulleys 164 and ropes 165 at loops 245 provided at the upper side of the divider wall 140 and simultaneously inflated. In an inflated state the divider wall 140 is self-supporting.

In the embodiment described here the tube sections have a diameter of 75 cm, and the divider wall 140 has a width of 18 m and a height of 4,60 m. The recesses 244 have a height of 30 cm.

For moving the temporary divider wall 140 handles 249 are provided at the lower side thereof.

The inflatable, temporary divider wall 140 comprises parallel wall parts, such as will be set forth hereafter.

Fig. 3 shows a top view having the parts already discussed above. It can also be seen that the inflatable, temporary divider wall 140 comprises two parallel wall parts 251, 352. This increases the insulating function of the inflatable, temporary divider wall 140.

Fig. 4 shows a cross section through the inflatable, temporary

divider wall 140, and more specifically that the tube section 441 which leans against the floor is out of round (having a largest width of 50 cm) made by the presence of a cross connection 442 extending in the longitudinal direction of the tube section 441, which divides the tube section 441 in an upper tube section part 441a and a lower tube section part 442b. The lower tube section part 442b contains the recesses 244.

Since the height of the conduits 112 can be varied in height, it is recommended to design the lower tube section part 442b being reinforced. This can be done by inserting a protective element 500 (Fig. 5), having a first side 501 and a second side 502 in a recess 244, both of which are relatively rigid, for instance fashioned from a double layer of textile-reinforced PVC. The first side 501 and the second side 502 are connected to each other by a U-shaped wall part 503. The first and second sides 501, 502 are each provided with a gap 504 in which the conduit 112 is movable. The protective element 500 is introduced into the recess 244 prior to inflating the air chamber, and secured therein using eg. Velcro tape. Thus, any moving of the conduit 112 takes place without direct contact to the tube section 441, as a result of which any damage thereof is avoided.

For raising chickens the inflatable, temporary divider wall 140 will be inflated. Because of this the inflatable, temporary divider wall 140 braces itself against the interior of the stable 100, as a result of which the divider wall 140 is less sensitive to shifting owing to differences in air pressure between the first and the second space 150', 150". Subsequently, the chickens are introduced in the first space 150' and kept there for 2 to 3 weeks. Then ventilation air from the first space will preferably be passed towards the second space, although it is conceivable that the second space is supplied with fresh air that is heated with air discharged from the first space, using a heat exchanger. After this period the second phase begins, for which the divider wall 140 is at least removed in such a way that the chickens can access the entire floor 101, thus inclusive the floor part 101" which initially was not accessible to them. To this end usually the air pressure in the air chamber will be reduced and the inflatable, temporary divider wall 140 will be lifted at the underside or be entirely removed. The latter can be easiest done from the second space 150".

In a stable for raising chickens in which 15,000 chickens a time

were present (ca. 90,000 chickens per year), the fuel consumption (liquid propane) on an annual basis used to be 23 m^3 on average. This decreased with the method according to the invention wherein

- an inflatable temporary divider wall was used having a thickness of 70 cm;
- the first space took up 40% of the total floor surface area of the stable 100; and
- air from the first space was led towards the second space using the separate fan 153;

to 10 m^3 per year. Money-wise that was a saving of €10,400, which means a pay-back time of less than 2 years.

The invention can be varied in different ways within the scope of the attached claims. For example, the fan in outlet opening 120' can be used, when the valves 171', 171" are closed, for discharging air from the first space 150' to pass air via a pipe 170 towards the second space 150" for warming it, wherein the air in the second space 150" exits the second space 150" via the openings 110". Thus, cost can be saved since no separate fan 153 is necessary.

C L A I M S

1. A method for raising poultry in a stable (100) having a floor (101), wherein chickens are kept on the floor (101) of the stable (100) and are provided with food and water via feed pipes (112), which method comprises the step of providing a temporary divider wall (140) in the stable (100), by which the stable (100) is divided in a first space (150') and a second space (150") and thus a first floor section (101') and a second floor section (101") are defined respectively, wherein said first floor section (101') takes up at the most 70% of the surface area of the floor of the stable (100), and
- the chickens in a first phase of the raising thereof are kept in the first space (150') on the first floor section (101'), wherein the temperature in the first space (150') is higher than that in the second space (150"), and
- for raising in a second phase following the first phase the temporary divider wall (140) is removed and the chickens kept in the first space (150') during the first phase may also go to the second floor section (101"), **characterized** in that as the temporary divider wall (140) a temporary divider wall (140) is used that has an inflatable chamber (299) extending along at least part of the circumference of the temporary divider wall (140), which inflatable chamber (299) in an inflated state seals against the floor of the stable (100); and the inflatable temporary divider wall (140) comprises two wall parts (251, 352), wherein the wall parts (251, 352) in an inflated state of the inflatable chamber (299) run parallel with respect to each other and extend from the inflatable chamber (299).

2. The method according to claim 1, wherein the first floor section (101') is less than 55%, and preferably less than 40% of the total surface area of the floor of the stable (100).

3. The method according to claim 1 or 2, wherein in the first phase air is discharged from the first space (150'), and in at least part of the second half of the first phase heat of air discharged from the first space (150') is used for heating the second space (150").

4. The method according to claim 3, wherein air from the first space

(150') is led through the second space (150") before being released to the atmosphere.

5. The method according to claim 4, wherein the air from the first space (150') is discharged from the first space (150') and fed to the second space by means of suctioning air from the second space (150").

6. The method according to any of the claims 4 or 5, wherein the stable (100) is provided with an air duct for passing air from the uppermost half of the first space (150') towards the lower half of the second space (150").

7. The method according to any of the claims 4 to 6, wherein air is discharged via openings (110) in the second space (150") using a fan (153) connected between the first and the second space (150") which openings in the second space act as inlet openings for fresh air during the second phase.

8. The method according to any of the preceding claims, wherein placing the temporary divider wall (140) comprises hoisting up an upper side of the temporary divider wall (140).

9. The method according to any of the preceding claims, wherein the inflatable chamber (299) is provided with a recess (244) which opens up at the circumferential edge of the temporary divider wall (140), wherein in the recess (244) a conduit (112) for food and/or water is received.

10. An inflatable temporary divider wall (140) having over at least part of the circumference thereof an inflatable chamber (299), **characterized** in that the inflatable chamber (299) is provided with at least one recess (244) which opens up at the circumferential edge of the wall; and
the inflatable temporary divider wall (140) comprises two wall parts (251, 352), wherein the wall parts (251, 352) in an inflated state of the inflatable chamber (299) run parallel with respect to each other and extend from the inflatable chamber (299) and define a first main side and a second main side of the inflatable divider wall (140),

wherein the recess extends from the first main side to the second main side to form a conduit passage.

11. The inflatable divider wall according to claim 10, wherein the inflatable temporary divider wall (140) comprises a tubular frame having uprights (242) and stringers (241, 247), which are in open connection with each other.

12. The inflatable divider wall according to any of the claims 10 or 11, wherein the divider wall (140) is provided with handles (249) to relocate the divider wall (140).

13. A poultry stable provided with a temporary divider wall, **characterized** in that the temporary divider wall is a temporary divider wall according to any one of claims 10 to 12.

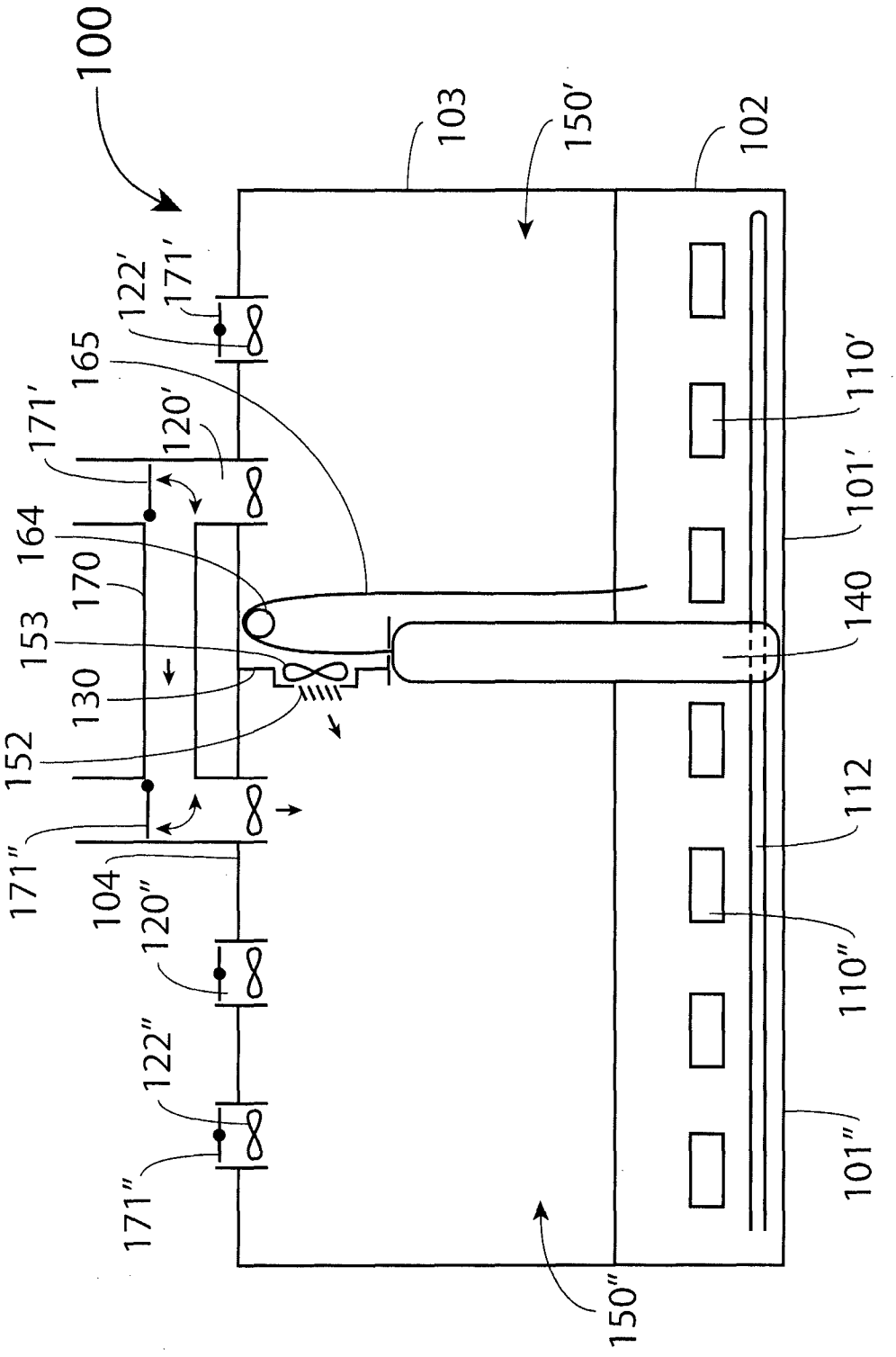

100
103
150'
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122'
171'
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164
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152
112
171"
104
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110"
122"
171"
101"
150"

Fig. 1

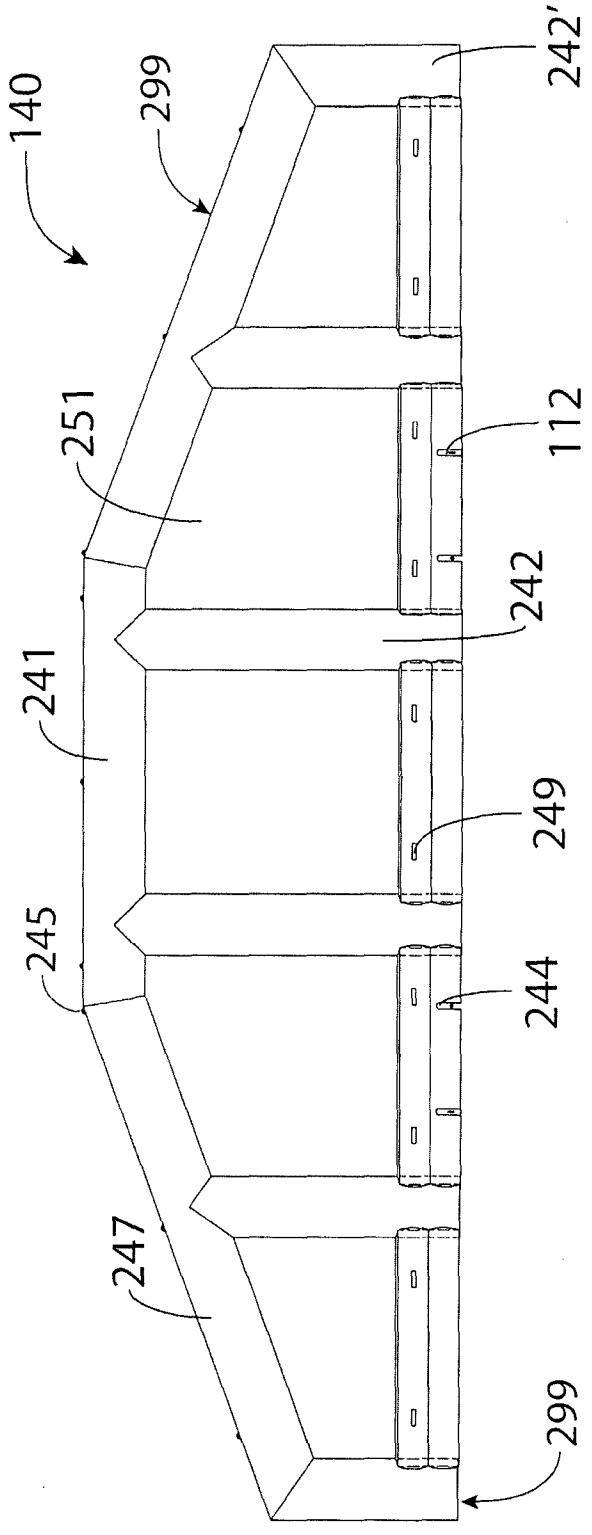


Fig. 2

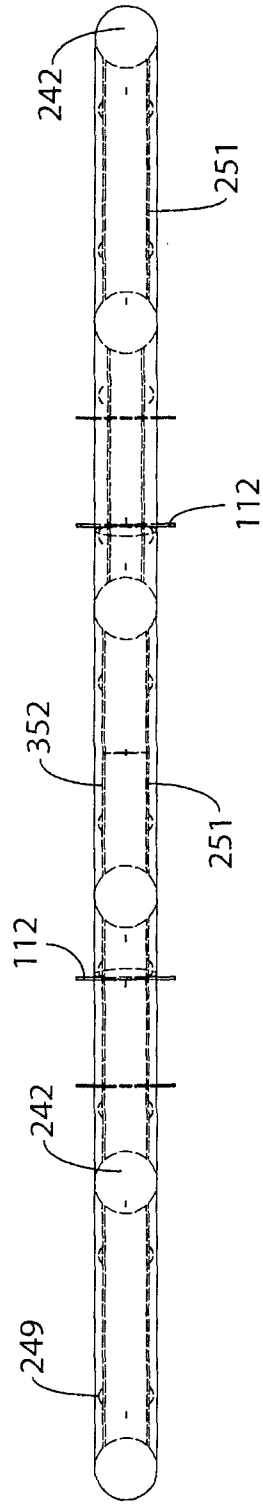


Fig. 3

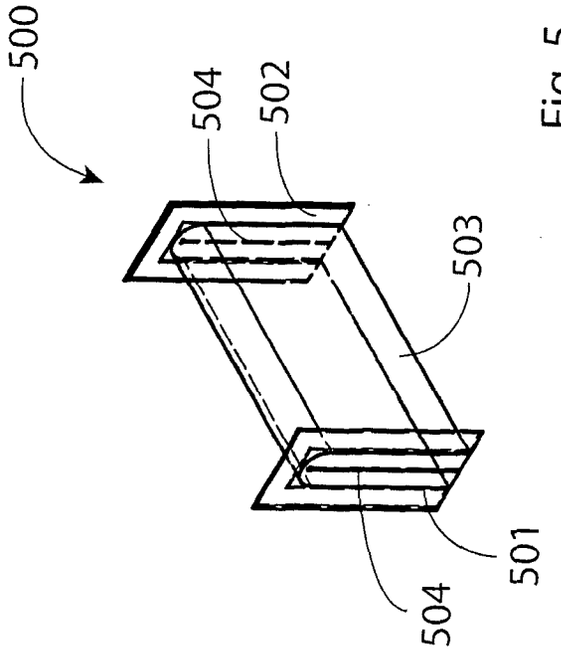


Fig. 5

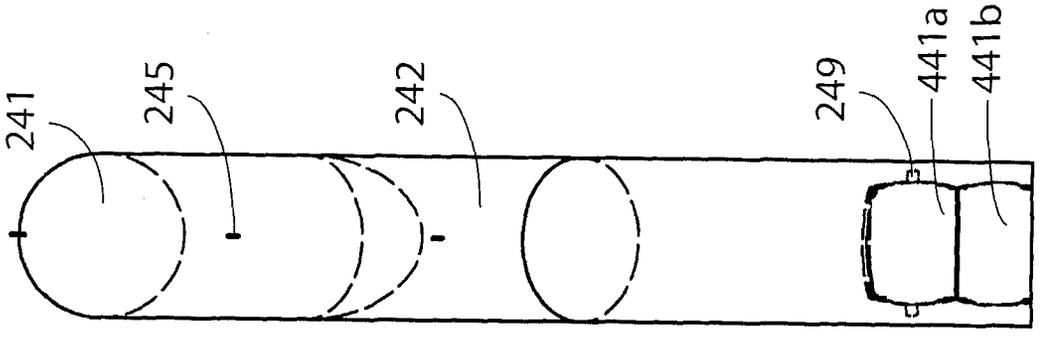


Fig. 4

INTERNATIONAL SEARCH REPORT

International application No
PCT/NL2012/000056

A. CLASSIFICATION OF SUBJECT MATTER
INV. A01K1/00 A01K31/18 A01K31/22 E04B2/74 E04H15/20
A01G9/14
ADD.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A01K E04B E04H A01G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 524 722 A (SICCARDI FRANK J [US]) 25 June 1985 (1985-06-25) cited in the application column 3, lines 27-67; figures 1-3	1-8,13
A	DE 20 2006 003346 U1 (ZAPF ANDREAS [DE]; ZAPF MANFRED [DE]) 22 June 2006 (2006-06-22) the whole document	1,10,11
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☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
4 October 2012	15/10/2012

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	von Arx, Vik

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/NL2012/000056

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