

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
5 February 2009 (05.02.2009)

PCT

(10) International Publication Number
WO 2009/017443 A1

(51) International Patent Classification:
D06F 58/10 (2006.01)

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(21) International Application Number:
PCT/SE2008/000454

(22) International Filing Date: 17 July 2008 (17.07.2008)

(25) Filing Language: Swedish

(26) Publication Language: English

(30) Priority Data:
0701813-8 2 August 2007 (02.08.2007) SE

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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL,

[Continued on next page]

(54) Title: CLOTHING CARE DEVICE

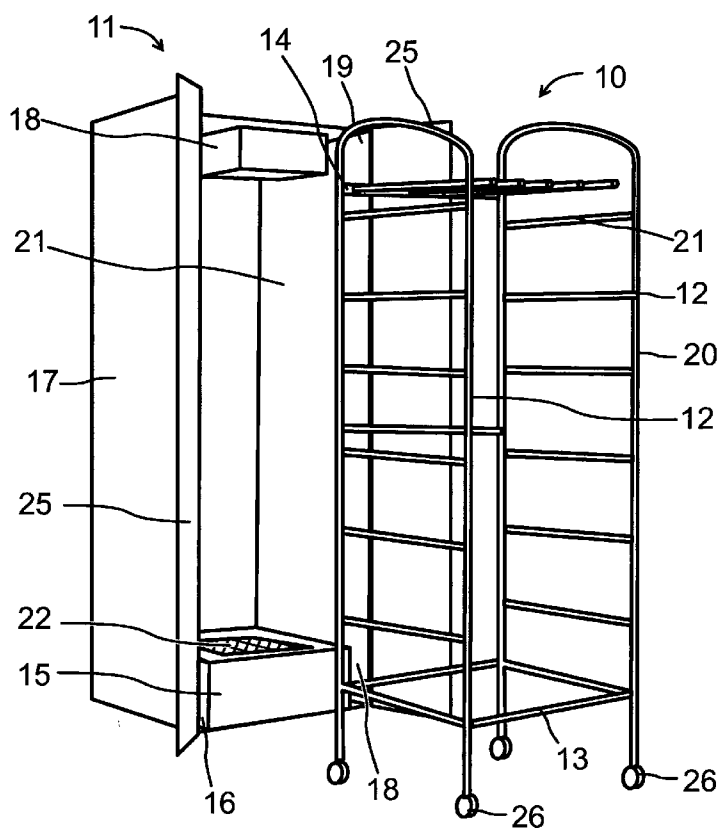


Fig. 1

(57) Abstract: Clothing care cabinet (11), comprising wall portions (17; 19) enclosing the cabinet, at least one door portion (25) that can be opened, at least one rack (10; 49) for supporting objects and an air treatment unit (15), said rack being arranged inside the cabinet (11), wherein the air treatment unit (15) is arranged for emitting treated air for circulation through the cabinet (11). The air treatment unit (15) is arranged in a bottom portion inside the cabinet having open spaces (16, 18) against nearby wall portions (17; 19). The lower part of the drying rack (10; 49) is provided with wheels (26) to be rolled in and out of the cabinet and comprises two gable portions (12; 50) connected to a plurality of cross bars (13, 14). The cross bars (13, 14) are arranged at a height wherein the rack can be rolled freely in and out of the cabinet with the wheels rolling in the open spaces (16, 18).



NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG,
CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

— *before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments*

Published:

— *with international search report*

CLOTHING CARE DEVICE

FIELD OF THE INVENTION

5 Clothes and other textiles must be dried after washing and must under certain circumstances be subject to other types of treatment or care. The invention relates to a clothing care cabinet for clothes and other objects.

PRIOR ART

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According to traditional drying cabinets air is heated and circulated inside the cabinet and is then ventilated into the surroundings. This method of operation results in high energy costs, since the heated air is wasted, and also assumes that the textiles to be dried can withstand the heating. Despite
15 the high energy costs traditional drying cabinets are popular and are widely used domestically. Drying cabinets are generally considered to give the textiles a more gentle treatment than for example tumble-driers. Clothes and other textiles are hung in the drying cabinet on a drying rack arranged inside the cabinet. Most conventional drying cabinets must be connected to ventila-
20 tion ducts and similar, which generally incur high installation costs.

Similar to tumble-driers drying cabinets can be arranged with a dehumidifier or a condenser. One example of a drying cabinet with a condenser is disclosed in GB1223274. Air is circulated inside the drying cabinet in a closed system. The air is heated and is then cooled and dried. A conven-
25 tional drying rack is arranged inside the cabinet.

WO2006100334A1 is related to a clothes softening and drying wardrobe, comprising a closed, static enclosure which defines an inner space for clothes. The wardrobe is arranged with an air pump, heating means and a condenser. Also, sensors for measuring temperature and humidity inside the
30 wardrobe are included. The air pump, heating means and the condenser are arranged together as a machine unit in a bottom portion of the wardrobe, in which a considerable part of the interior space is occupied. A door covers an opening in the wardrobe above the machine unit. A similar device is disclosed in EP09436A1.

The drying cabinets described above are arranged as rectangular parallelepipeds having rectangular sides and a door along, or forming, a front side. The cabinets are arranged with enclosing wall portions, a rack arranged inside the cabinet for hanging clothes, and a dehumidifier. The controls used for turning the cabinets on and controlling the cabinets are generally arranged above the door.

Cabinets having condenser function are more energy-saving than drying cabinets of earlier models. Instead, one drawback is that the air pump, condenser and other hardware that have been added occupy a considerable part of the interior space of the cabinet. The remaining space for garments and other textiles is reduced correspondingly.

One problem with previously known drying cabinets is that it is difficult to reach inner portions of the cabinet when garments are hung or taken out. Generally, the cabinets comprise fixed interior fittings, which are suitable for certain fields of application but are less suitable, or even unsuitable, for other fields of application.

US5555640 relates to a drying cabinet having a fan arranged at the top of the cabinet, and heaters arranged by the fan. The drying cabinet is elevated and provided with wheels, so that it can be moved easily. Additionally, according to one embodiment an accompanying drying rack is also provided with wheels. In this embodiment rails are arranged in the cabinet so that the drying rack can be rolled into and out of the cabinet.

One problem with the embodiment according to US5555640 is that the drying rack must be rolled up along the rails, which requires a greater effort. The fan arranged at the top of the cabinet having the accompanying heaters results in an unstable drying cabinet. It is desirable to provide a clothing care cabinet which by means of a stable construction makes it possible to easily roll in and out an accompanying drying rack.

SUMMARY OF THE INVENTION

An object of the present invention is to reduce and avoid the disadvantage and problems of the prior art. The object is achieved by the cabinet being provided with an air treatment unit arranged in a bottom portion inside the

cabinet with open spaces against nearby wall portions. At the lower part the rack is provided with wheels, so as to be rolled in and out of the cabinet, and two gable portions being connected to a plurality of cross bars. The cross bars are arranged at a height so that the rack freely can be rolled in and out of the cabinet with the wheels rolling in the open space. According to one embodiment the rack is foldable and fits in the folded position in the open space between the air treatment unit and the adjacent wall. Consequently, two folded racks can be positioned in the cabinet when it is not in use.

A collector belonging to the air treatment unit is provided for collecting condensation water and is arranged at the bottom of the cabinet. Hence, the stability of the cabinet is increased when water is filled. Air is dehumidified in the air treatment unit and is blown upwards by means of a fan or an air pump through the cabinet. According to one embodiment the orifice of a duct is arranged at the top of the cabinet, which duct leads the air back to the air treatment unit in a system being closed in the normal mode of operation. Conveniently, the duct runs along a backside of the cabinet down to the air treatment unit. The air treatment unit may comprise a condenser and/or a humidifier.

According to one embodiment of the invention a wireless remote control unit is arranged for controlling the air treatment unit. The remote control unit can be provided with a magnet, wherein the remote control unit can be attached to any metal coated part of the clothing care cabinet.

Suitably, clothing care cabinets according to the invention are arranged with two doors that are opened away from each other. By this solution the need for specially designed cabinets having a right hand door and a left hand door is avoided. The clothing care cabinet can be provided with magnetically or electrically locked doors. Suitably, in such embodiments the doors are provided with a mechanical load or a spring load to be opened automatically when the electric or magnetic lock is operated. Any remaining humidity in the cabinet then can escape to the space outside.

In one embodiment according to the invention the remote control unit can also be used for opening the doors. The doors can also be opened auto-

matically after a predetermined period of time or when a predetermined remaining humidity has been reached or in respect of any other condition to be set.

5 SHORT DESCRIPTION OF THE DRAWINGS

The invention will now be described in more detail with the aid of embodiment examples and with reference to the appended drawings, in which:

- 10 Fig. 1 is a perspective view showing one embodiment of a clothing care cabinet according to the invention having a pulled-out drying rack,
- Fig. 2 is a front perspective view of the clothing care cabinet of Fig. 1, without the drying rack,
- 15 Fig. 3 is a perspective view of the clothing care cabinet of Fig. 1, having closed doors of a transparent material and being without the drying rack,
- Fig. 4 is a perspective view of one embodiment of a remote control, which can be used for controlling the clothing care cabinet according to the invention,
- 20 Fig. 5 is a perspective view of a first example of a shelf, which can be used in the clothing care cabinet according to the invention,
- Fig. 6 is a perspective view of a second example of a shelf, which can be used in the clothing care cabinet according to the invention,
- Fig. 7 is a perspective view of a third example of a shelf, which can be used in the clothing care cabinet according to the invention,
- 25 Fig. 8 illustrates from above a fundamental embodiment of an air treatment unit for use in a clothing care cabinet according to the invention,
- 30 Fig. 9 is a perspective view showing one alternative embodiment of a clothing care cabinet according to the invention having a pulled-out drying rack, and

Fig. 10 is a perspective view showing one alternative embodiment of a drying rack included in a clothing care cabinet according to the invention.

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THE INVENTION

In the embodiment shown in Fig. 1 a drying rack 10 has been rolled out from a clothing care cabinet 11. The drying rack 10 is arranged with two opposite gable portions 12, which are connected with a lower cross bar 13 and an upper cross bar 14. The upper cross bar also functions as a bar for hanging garments and other textiles. An air treatment unit 15 is arranged at a lower part of the cabinet 11. The air treatment unit is more narrow than the interior width of the cabinet 11, which means that a first open space 16 remains between the air treatment unit 15 and an adjacent first side wall 17. A corresponding second open space 18 remains between the air treatment unit 15 and an adjacent second side wall 19, see also Fig. 2.

The drying rack 10 can be folded together and then fitted in one of the open spaces 16; 18. There can be different embodiments of the drying rack 10. According to one embodiment the lower cross bars 13 can be folded upwards and the upper cross bar 14 can be folded down or alternatively horizontally. Consequently, the drying rack 10 maintains substantially the same height as when unfolded and can be fitted also vertically in the open spaces inside the cabinet 11.

In the embodiment of Fig. 1 the drying rack 10 comprises two identical gable portions 12. Each gable portion 12 comprises two elongated legs 20, which are connected to a plurality of parallel supporting arms 21. On the arms different types of shelves can be positioned. One common form of shelf is a frame with bars, see Fig. 3-Fig. 5. Each leg 20 is provided with a wheel at the bottom, preferably of the type that can be swivelled and allow any direction of movement when the drying rack is rolled. The distance between the wheels 26 and the lower cross bars 13 exceeds the height of the air treatment unit 15. Hence, it is possible to roll in an unfolded drying rack without any obstruction from the air treatment unit 15.

Suitably, at least two drying racks 10 accompany a clothing care cabinet 11 according to the invention. Hence, one drying rack can be prepared outside the cabinet 11 while the other being provided with objects to be treated is inside the cabinet. Then, it is easy to roll out the drying rack from the cabinet and instead roll in the one being prepared outside the cabinet. Any subsequent drying or subsequent treatment can be performed outside the cabinet.

The air treatment unit 15 is provided with a vent 22, through which treated air is blown up through the interior of the cabinet 11. Vents can also be arranged on the sides of the air treatment unit 15 for blowing air also laterally or obliquely upwards.

In the embodiment of Fig. 1 the clothing care cabinet 11 is provided with two doors 25 that are opened away from each other. The doors 25 are made of a transparent material, for example plastic, which makes it possible at least to a certain extent to look into the cabinet. According to some embodiments the doors are smoked or tinted in any colour to be more clearly visible in the open position.

A fan unit 48 is arranged interiorly in the upper part of the cabinet 11. When the fan unit 48 is activated the air flow inside the cabinet is increased substantially, which improves the efficiency when treating textiles and other objects in the cabinet.

In Fig. 2 the clothing care cabinet is illustrated with open doors and without any drying rack. It is more clear that the first open space 16 and the second open space 18 on each side of the air treatment unit 15 are formed with dimensions sufficient for a drying rack to be rolled into position inside the clothing care cabinet 11. Both of the doors 25 are open.

In an upper part of the clothing care cabinet 11 a strip 27 is arranged. The strip 27 supports two electromagnets 28, each of which cooperates with a metal plate 29 on each door 25. The doors 25 are closed against the spring action from two spring means 30 and are held in the closed position through the electromagnets 28 during the operation of the air treatment unit. When the treatment is terminated a control signal can be transferred to the electro-

magnets 28, which then disengage the metal plates and consequently the doors, which are somewhat opened automatically through spring action.

In the embodiment of Fig. 3 the doors 25 are made of transparent material, such as plastic. Through the doors the air treatment unit 15 with the vent 22 can be observed. A control means 31 is attached to a door 25 for controlling the air treatment unit 15 and other electric components of the clothing care cabinet 11. Preferably, the control means is detachable and comprises means for wireless control. In a basic embodiment the control means comprises a magnet on the back side. The magnet can cooperate with a portion of a door or wall of the cabinet 11 and thereby be held in position. Also other types of fastening means can be used, for example hooks, hook and loop fasteners or any kind of pocket.

One example of the design of the control means 31 is disclosed in Fig. 4. In this embodiment the control means is circular and relatively flat. A magnet (not illustrated) is arranged on the back side. The control means comprises only four buttons, wherein three of which are formed as ring-shaped sectors 32a, 31b and 32c and one is formed as a central circular plate 32d. A basic symbol on the first sector 32a indicates that the button is used for turning on and off an air pump or fan, possibly having an additional function such as deodorant, air ionization or any other suitable function. Similarly, a second button 32b is used for activating a conditioning function of the air treatment unit 15, see also below. A third button 32d is used for activating and deactivating the air treatment unit 15.

According to other embodiments of the clothing care cabinet according to the invention other corresponding means are arranged for locking or closing the doors during operation. The automatic opening function provided through the spring means 30, or other means having similar function, can be omitted. According to some embodiments, the electromagnets can be replaced by mechanical locks with or without spring means or similar. In the embodiment with metal doors 25 no metal plates 29 are required.

In Fig. 5 a first type of shelf is illustrated in the form of a basic lattice 33. The lattice can be displaced in and out of the clothing care cabinet in

grooves in the supporting arms 21 of the drying rack 10. On the lattice garments and other textiles can be spread out to be dried and treated in other ways. This type of shelves can also be used for other types of drying and treatments.

- 5 Another shelf in the form of a drawer 34 is illustrated in Fig. 6. The drawer is formed with a bottom 35 and sides 36 of a wire mesh so that air can be conducted through the shelf. In different embodiments of the drawers the sides can be of different height and result in drawers having different depths. Apertures 37 in two opposite sides form handles for easy handling.
- 10 The drawer 34 can be pushed into and pulled out of the clothing care cabinet in grooves in the supporting arms 21 of the drying rack 10.

Fig. 7 illustrates a type of shelf that is particularly suitable for hanging garments and textiles. The shelf comprises a U-shaped frame 38 having a base portion 39 and two side members 40 projecting perpendicular from the base portion. From the base portion 39 a plurality of parallel bars 41 projects.

15 The frame 38 can be pushed into and pulled out of the clothing care cabinet in grooves in the supporting arms 21 of the drying rack 10. According to one alternative embodiment the frame 38 is integrated with or connected to the upper cross bar 14, see Fig. 1.

- 20 The shelves described above can as an alternative be provided with fastening means, such as hooks or similar, cooperating with the supporting arms 21. It is also possible to provide the supporting arms with similar fastening means, wherein corresponding fastening means of the shelves can be omitted.

- 25 Basically the air treatment unit 15 according to the invention can be arranged as disclosed in Fig. 8. A condenser 42 is connected to the interior of the clothing care cabinet, or to a return pipe as described below, through an inlet tube 43. In the condenser 42 water vapour from the air that have passed through the interior of the clothing care cabinet is condensed. Air that has
- 30 been dehumidified is then brought back into the cabinet 11 by means of a fan or pump 44. Water that has been condensed is brought to a collector or receptacle 45, which is easily accessible through a door 46 of the air treatment

unit 15 for emptying. In one alternative embodiment a hose or a pipe is connected between the condenser and an outlet instead. The air treatment unit 15 can also comprise a conditioning or rehydration means 47 or any other additional air treatment means. The rehydration means 47 can be used for conditioning textiles. Other types of air treatment means can be a fragrance supplier, ozone generator or similar means. Normally, the pump 44 has lower capacity than the fan unit 48, which means that the air inside the cabinet circulates with high velocity in a turbulent flow.

In the air treatment unit 15 there is also arranged a control unit 47, which is connected to condenser, pump, electromagnets, or similar locking means, and other units of the clothing care cabinet according to the invention. In those embodiments in which the clothing care cabinet comprises a wireless control means the control unit 47 is also included as a wireless unit, which is arranged for communication with the control means. Suitably, a free radio band is used in a conventional way for this communication. A humidity sensor can be arranged in the clothing care cabinet for measuring the humidity in the air or in the textiles hung in the cabinet. The humidity sensor is preferably connected to the control unit, which is arranged to discontinue or switch the operation of the units arranged in the clothing care cabinet depending on the signals from the humidity sensor.

The control unit is adjustable for performing at least one clothing care program. In a basic embodiment one clothing care program includes drying of textiles. When this program is initiated the pump 44 and the condenser 42 are activated. Dry air is brought into the clothing care cabinet through the vent 22, is circulated inside the clothing care cabinet by means of the fan 48 and is then returned to the condenser for drying through the inlet tube 43. After a predetermined period of time, or at a predetermined amount of remaining humidity in the air or in the textiles if a humidity sensor is arranged in the clothing care cabinet, the program is discontinued. Suitably, then also the doors 25 are disengaged, which are opened automatically through the action of the spring means 30.

According to one alternative embodiment of the invention, as shown in Fig. 9, a return pipe 24 is arranged along the back of the clothing care cabinet 11. The return pipe 24 is terminated at the upper part of the cabinet 11 with an opening 23 for the air that has passed the interior of the cabinet and which normally has absorbed moisture from the textiles. According to the illustrated embodiment the return pipe 24 is a pipe having rectangular cross section which runs inside the cabinet along the backside. The vent 22 is in this embodiment arranged centrally on the air treatment unit 15 and centrally in the cabinet. Also the opening 23 of the return pipe 24 is arranged centrally. Dry air is brought into the clothing care cabinet through the vent 22 and is then returned to the condenser for drying through the opening 23 and the return pipe 24. Other parts of the clothing care cabinet correspond to those described above with reference to Fig. 1 and Fig. 2 except for the fan unit 48 which in this embodiment has been omitted.

In Fig. 10 one alternative embodiment of a drying rack 49 is illustrated. As for the embodiment described above the drying rack 49 comprises two gable portions 50 having elongated legs 51. Two spaced apart and parallel side bars or supporting arms 52 connect the legs 51. The gable portions 50 are connected to each other through two lower back bars 53 and an upper back bar 54. Further, lower cross bars 13 are arranged between the gable portions 50 at a height so that the drying rack freely can be rolled into the clothing care cabinet without being obstructed by the air treatment unit 15.

A plurality of mutually displaced drying sticks 55 are arranged on four arms 56 being pivotably connected to the gable portions 50. The lengths of the arms 56 are adjusted, so that two arms 56 on the same height in the clothing care cabinet can be folded down towards each other and thus take up the width of the clothing care cabinet. The arms 56 can be individually folded up towards the gable portions 50 and thus free half or, if both of the arms are folded up, the whole of the width of the clothing care cabinet. In the folded position the arms 56 are supported by the lower back bars 53.

The upper back bar 54 supports a plurality of drying bars 57. By folding a suitable number of arms 56 upwards a free space can be provided under

the drying bars 57, so that longer garments and other textiles can be hung. By this the drying rack 49 easily can be adjusted for different drying needs and other requirements with reference to clothing care.

- 5 The embodiments described above can be combined also in other ways than those directly described. Some components in the clothing care cabinet can be omitted or be replaced without losing the function of the invention.

CLAIMS

1. A clothing care cabinet (11), comprising wall portions (17; 19) enclosing the cabinet, at least one door portion (25) that can be opened, at least one
5 rack (10; 49) for supporting objects and an air treatment unit (15), said rack being arranged inside the cabinet (11), wherein the air treatment unit (15) is arranged for emitting treated air for circulation through the cabinet (11),
characterised in
10 that the air treatment unit (15) is arranged in a bottom portion inside the cabinet having open spaces (16, 18) against nearby wall portions (17; 19),
that the lower part of the drying rack (10; 49) is provided with wheels (26) to be rolled in and out of the cabinet,
that the drying rack (10; 49) is arranged with two gable portions (12;
15 50) connected to a plurality of cross bars (13, 14), and
that the cross bars (13, 14) are arranged at a height wherein the rack can be rolled freely in and out of the cabinet with the wheels rolling in the open spaces (16, 18).
- 20 2. A clothing care cabinet according to claim 1, wherein the air treatment unit (15) comprises a condenser (42) for condensation of humid air, and a collector (45) is arranged for collecting water.
- 25 3. A clothing care cabinet according to claim 1, wherein the drying rack (10; 49) is foldable to a width being slightly less than the open space (16; 18).
- 30 4. A clothing care cabinet according to claim 1, wherein at least one door (25) being closable against spring action is arranged on a front of the clothing care cabinet and wherein locking means (28) are provided for holding the door in a closed position.
5. A clothing care cabinet according to claim 1, wherein a control unit (47) is arranged for controlling the air treatment unit (15) to perform at least one clothing care program.

6. A clothing care cabinet according to claim 5, wherein a control means (31) connected to the control unit (47) is arranged on the exterior of the clothing care cabinet.

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7. A clothing care cabinet according to claim 6, wherein the control unit (47) comprises a wireless communication means for wireless communication with the control means (31).

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8. A clothing care cabinet according to claim 7, wherein the control means (31) comprises fastening means for detachable fastening of the control means (31) on a door (25) of the clothing care cabinet.

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9. A clothing care cabinet according to claim 7, wherein the fastening means comprises a magnet, and the door (25) comprises at least one metal portion cooperating with the magnet.

20

10. A clothing care cabinet according to claims 4-7, wherein the locking means (28) is controllable so as to release the fastening of the door (25) through a signal from the control means (31).

25

11. A clothing care cabinet according to claims 4 and 5, wherein the control unit (47) is connected to the locking means (28) for releasing the fastening of the door (25) at a desired moment in the clothing care program.

12. A clothing care cabinet according to claim 1, wherein the drying rack (10) is arranged with elongated legs (20; 51) and supporting arms (21; 52) connecting the legs (20; 51).

30

13. A clothing care cabinet according to claim 12, wherein the supporting arms (21; 52) are arranged to detachably support shelves (33; 34; 35).

14. A clothing care cabinet according to claim 12, wherein the supporting arms (21; 52) are arranged with grooves for receiving shelves.

5 15. A clothing care cabinet according to claim 1, wherein the air treatment unit (15) comprises a fan (44) to provide an air flow through the air treatment unit (15) and the clothing care cabinet.

10 16. A clothing care cabinet according to claim 1, comprising a fan unit (48) arranged in a top portion for providing an air flow through the clothing care cabinet.

15 17. A clothing care cabinet according to claim 16, wherein the fan unit (48) is arranged with higher capacity than the fan (44) for providing a turbulent air flow through the clothing care cabinet.

18. A clothing care cabinet according to claim 1, wherein the drying rack (49) is arranged with a plurality of arms (56) being pivotably connected to the gable portions (50), and a plurality of drying sticks (55) being displaced vertically relative to each other.

20 19. A clothing care cabinet according to claim 18, wherein the length of at least some arms (56) is shorter than the distance between the gable portions (50).

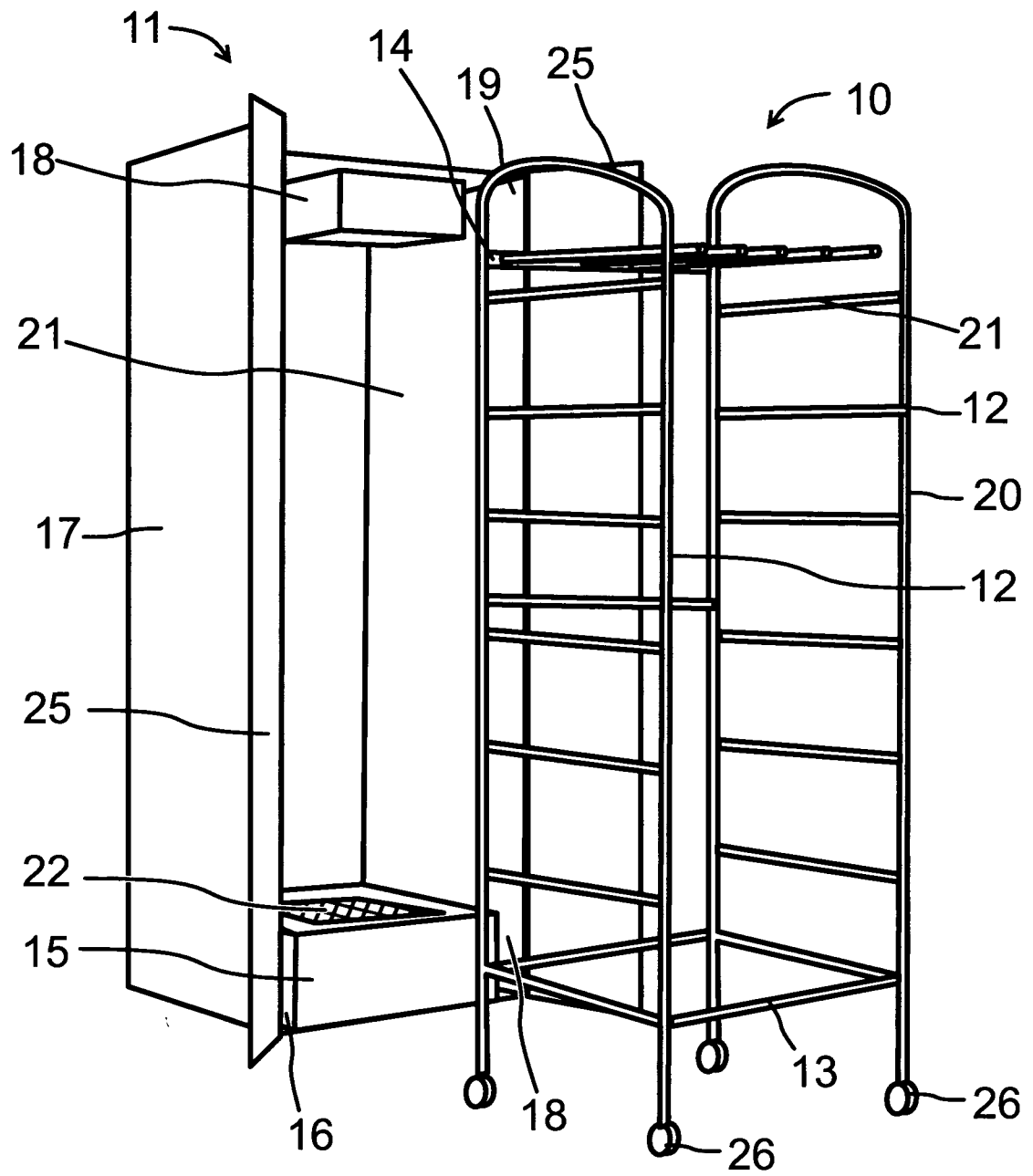
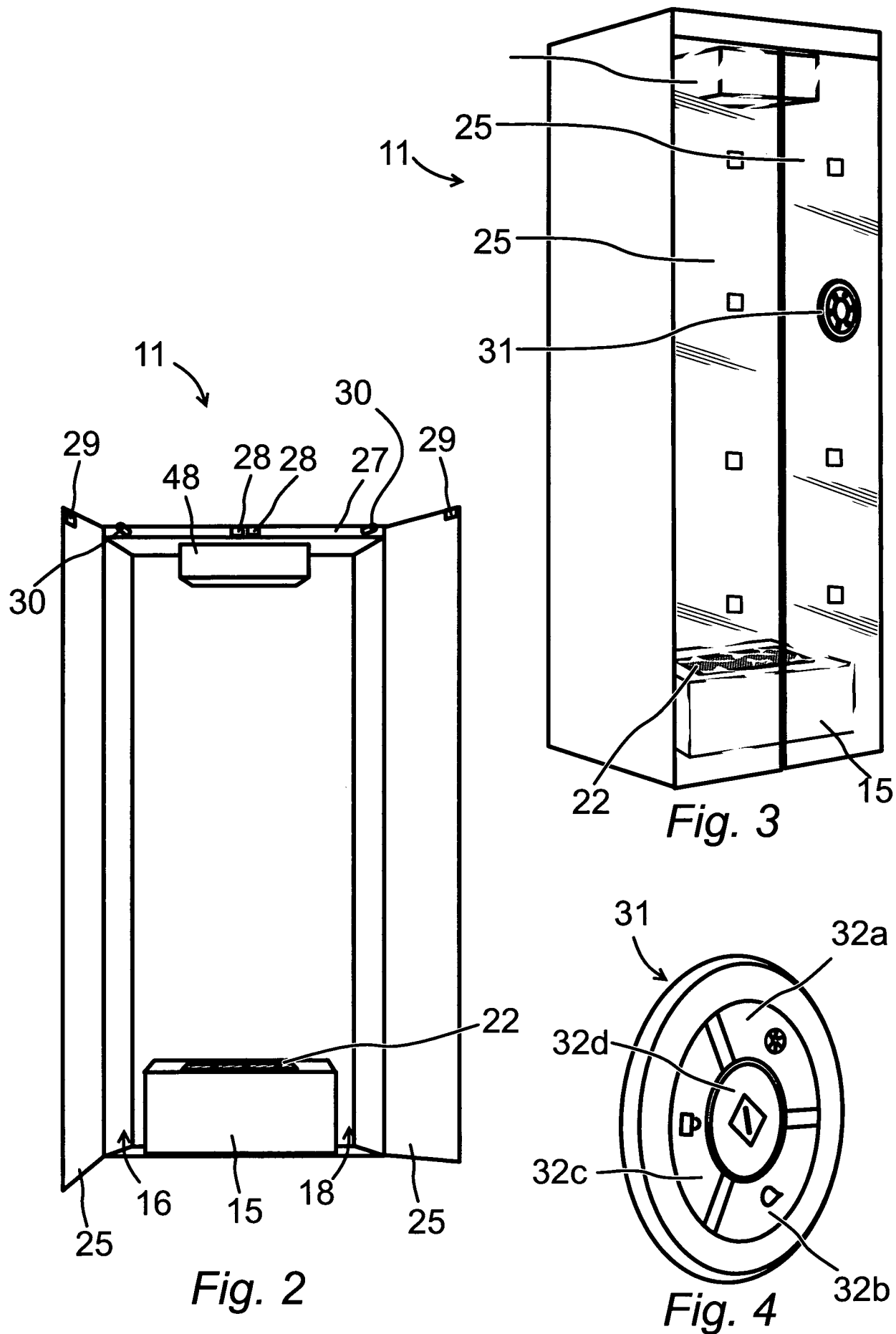
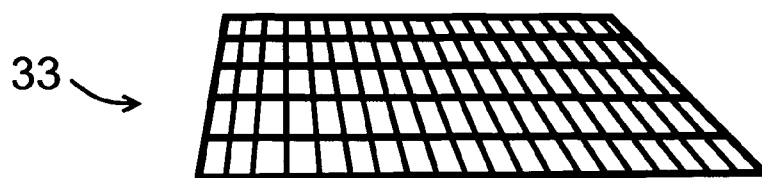
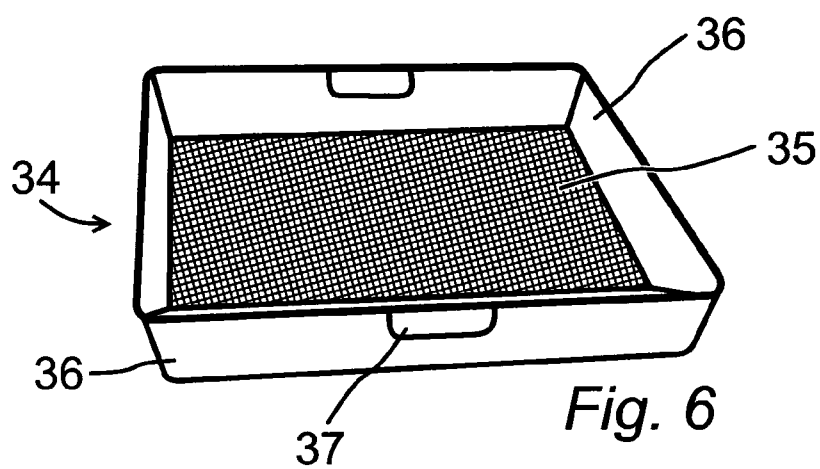
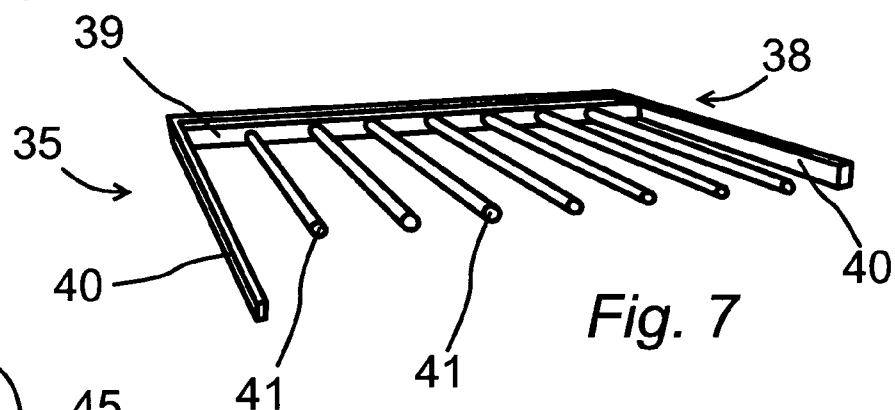
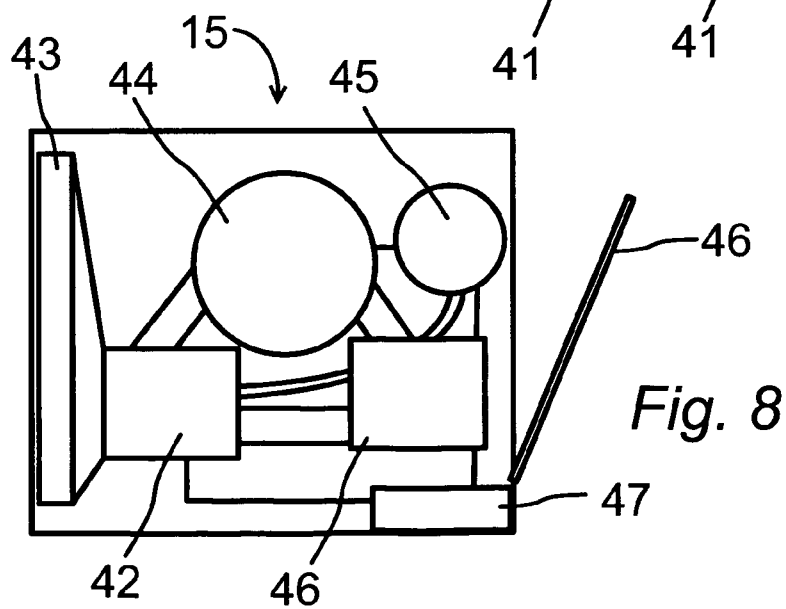
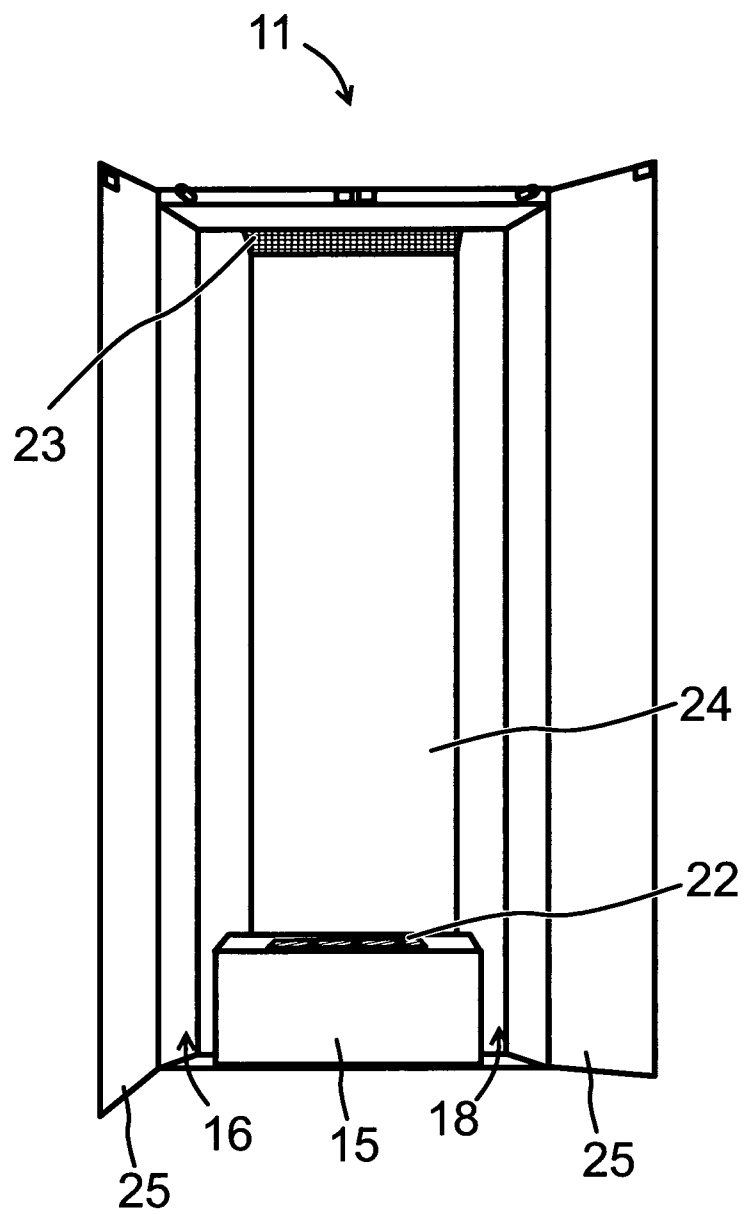


Fig. 1

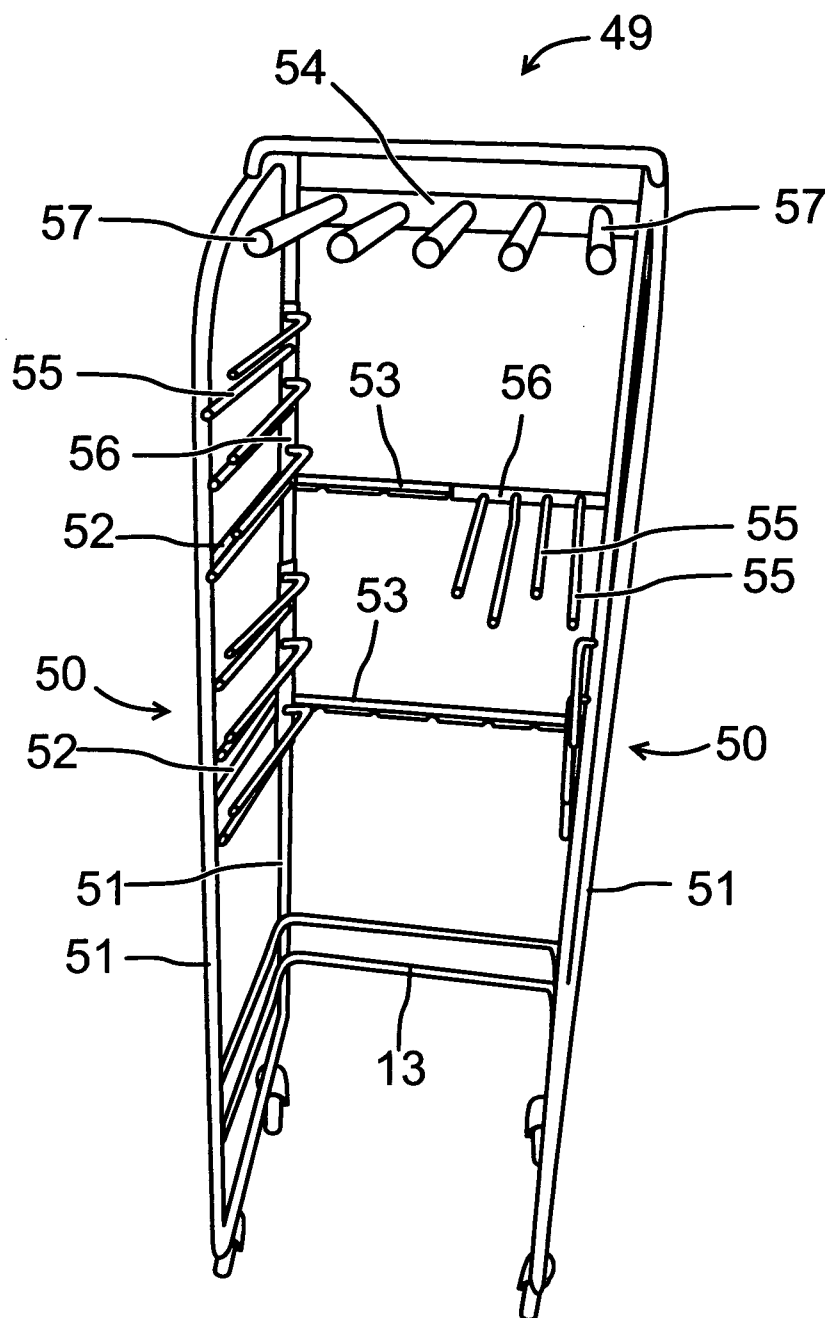


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*Fig. 5**Fig. 6**Fig. 7**Fig. 8*

*Fig. 9*

5/5

*Fig. 10*

INTERNATIONAL SEARCH REPORT

International application No

PCT/SE2008/000454

A. CLASSIFICATION OF SUBJECT MATTER

INV. D06F58/10

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)

D06F

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 practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 742 276 B1 (ANDERSON KENT D [US] ET AL) 1 June 2004 (2004-06-01) column 1, line 55 - column 7, line 48; figures 1-6	1,4,5, 12-14, 16,18,19
Y		2,6,7, 10,11,17
Y	GB 2 433 109 A (DEACON KEITH JOHN [GB]) 13 June 2007 (2007-06-13) page 1 - page 3; figures 1-3	2,6,7
Y	GB 1 223 274 A (LOUIS CHARDON [FR]; LOUIS CHARDON [FR]) 24 February 1971 (1971-02-24) page 1, line 51 - page 2, line 77 ----- -/--	2,6,17

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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INTERNATIONAL SEARCH REPORT

International application No

PCT/SE2008/000454

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