(19) Octrooicentrum Nederland

(11) **2011007**

(12)C **OCTROOI**

(21) Aanvraagnummer: **2011007**

(22) Aanvraag ingediend: **19.06.2013**

(51) Int.Cl.:
F24F 9/00 (2006.01)

(43) Aanvraag gepubliceerd:
-

(47) Octrooi verleend:
22.12.2014

(45) Octrooischrift uitgegeven:
31.12.2014

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(54) **Air curtain device for realising an air curtain with a substantial vertical air flow and method there for.**

(57) The present invention relates to an air curtain device for realising an air curtain, with in use a substantial vertical air flow, and a method for providing such air curtain. The air curtain device according to the invention comprises:
- a housing substantially extending along an opening in a wall and comprising air displacing means;
- at least one air inlet for supplying air to the housing;
- at least one primary outflow opening for achieving a primary air curtain with a primary height, a primary length, and a primary width; and
- at least one secondary outflow opening for achieving at least one secondary air curtain, in use provided at or close to an end of the primary air curtain, such that in use in a horizontal plane an L-shaped or U-shaped air curtain is achieved.

NL C 2011007

Air curtain device for realising an air curtain with a substantial vertical air flow and method there for

The present invention relates to an air curtain device for realising an air curtain with in use a substantial vertical air flow. Such air curtain device is usually provided in or close to an opening, in particular a door opening of buildings such as shops or other buildings with a large number of people entering the building.

Known air curtain devices are usually horizontally placed devices which in use realise an air curtain with a main air flow in a vertical direction. These known devices require an installation space at the top and/or bottom of the opening where an air curtain has to be realised. As the space for installation in the opening itself is not always available, often air curtains are provided on one side of the opening at a certain distance thereof. This enables installation of the conventional air curtain devices.

US 5 264 015 discloses an air curtain device with in use a substantial vertical air flow related to a screen used for portioning a room, and more particularly to a screen equipped with an air cleaner of a fan so as to have an air cleaning function.

One of the problems associated with conventional air curtain devices that are provided at a certain distance from the opening to enable installation thereof is the introduction of one or more air gaps at the sides of the opening at the ends of the air curtain. This results in leakage and energy loss.

The present invention has for its object to provide an air curtain device obviating or at least reducing one or more of the above stated drawbacks.

The present invention provides for this purpose an air curtain device for realising an air curtain with in use a substantially vertical air flow, the device according to the invention comprising:

- a housing substantially extending along an opening in a wall and comprising air displacing means;
- at least one air inlet for supplying air to the housing;
- at least one primary outflow opening for achieving a primary air curtain with a primary height, a primary length, and a primary width extending substantially parallel to the opening at a certain distance thereof; and
- at least one secondary outflow opening for achieving at least one secondary air curtain substantially perpendicular to the plane defined by the opening such that it substantially closes a gap resulting from providing the air curtain at the certain distance of the opening in the wall and in use provided at or close to an end of the primary air curtain, such that in use in a horizontal plane an L-shaped or U-shaped air curtain is achieved.

The housing of the air curtain device according to the present invention comprises a number of air displacing means. For instance, these air displacing means involve a number of fans. The air displacing means provide air for the air curtain to the primary outflow opening(s). The outflow opening or series of outflow openings preferably extend in a substantial horizontal direction substantially parallel to the upper side of the opening in the wall. Such opening is

usually a door opening, for instance the entrance to a shop or storage space or publicly accessible building.

Air for the air curtain is supplied through one or more air inlets. The air inlets are preferably situated in the immediate vicinity of the location where, in use, the air curtain is realised. It is noted that one or more, or even all, of the air inlets may be provided at other positions.

In use, the air curtain that is provided by the air curtain device according to the present invention comprises a primary air curtain extending substantially parallel to the opening at a certain distance thereof. This distance extends substantially perpendicular to the plane of the opening. The primary air curtain extends over essentially at least the entire height and length of the opening. Preferably, this primary air curtain is provided with a primary height and a primary length that is slightly larger than the corresponding dimensions of the opening. In addition, the primary air curtain is provided with a primary width in a direction substantially perpendicular to the plane of the opening in the wall. By providing the air curtain with slightly larger dimensions as compared to the opening in the wall, leakage and energy losses are somewhat reduced.

According to the invention the air curtain device further comprises at least one secondary outflow opening. In use this secondary outflow opening is provided at or close to an end of the primary air curtain. Preferably, both ends of the primary air curtain are provided with at least one secondary outflow opening.

For example, in case the opening is provided next to a side wall only one end of the air curtain needs to be provided with a secondary outflow opening. This outflow opening provides an additional or secondary air curtain

component such that in use in a horizontal plane an L-shaped is achieved by the combination of the primary and secondary air curtains.

Often the primary air curtain has two ends that are provided with a secondary air curtain. In use, seen in a horizontal plane, this achieves a U-shaped air curtain by the combination of the primary air curtain and the additional secondary air curtains.

According to the invention the secondary air curtain is preferably provided substantially perpendicular to the primary air curtain and therefore substantially perpendicular to the plane defined by the opening in the wall. The primary and secondary outflow openings can be provided in one housing or alternatively in separate housings of a modular configuration.

In one of the embodiments according to the present invention the air curtain device comprises a housing with a primary housing part for providing the primary curtain and one or two secondary housing parts for providing the secondary air curtain. In a presently preferred embodiment of the invention the primary housing part is provided substantially parallel to the plane defined by the opening in the wall, and the one or two secondary housing parts are provided substantially parallel to the primary housing part. In an alternative embodiment the one or two secondary housing parts may be provided substantially perpendicular to the primary housing part at an effective angle of about 90° relative to the primary housing part. This alternative embodiment would, however, require sufficient installation space.

Providing the secondary air curtain(s) substantially closes the gap resulting from providing the air curtain at a certain distance of the opening in the wall. This secondary

air curtain significantly reduces the amount of leakage and thereby the undesired loss of energy. This renders the air curtain device according to the present invention more cost effective. In addition, the comfort of people passing through the opening in the wall and/or standing close to this opening is significantly improved by the reduction of the leakage.

In an advantageous preferred embodiment according to the present invention the air curtain device comprises diverging means for providing the secondary air flow at or close to the end(s) of the primary air curtain as a secondary diverging air flow.

By providing diverging means at least part of the air flow of the secondary air curtain is provided at an angle relative to the vertical. This angle may be in the range of 0-90°, preferably in the range of 0-45°, more preferably in the range of 10-25°. Considering that the airflow of the primary air curtain is provided in a direction substantially parallel to the vertical, the secondary diverging air flow is also provided at an angle relative to this primary air curtain in the range of 0-90°, preferably 0-45°, most preferably 10-25°. The specific angle or range may also depend on the dimensions of the opening and the relative position of the air curtain device according to the present invention.

Preferably, the diverging means comprise one or more of a nozzle, a rectifier grille, and guide vanes.

By providing diverging means the secondary air curtain can be provided as a secondary diverging air curtain. This enables providing the secondary housing part(s) preferably extending in line with the primary housing part. This improves the installation possibilities for the air curtain device according to the present invention. More

specifically, the secondary housing part(s) can also be provided at a distance of the wall and/or opening therein. At the same time, providing the diverging air flow the gap between the primary air curtain and the opening or wall is substantially closed or at least to a significant extent.

It is noted that by providing a secondary diverging air flow the dimensions of the secondary air curtain vary over the height thereof. For example, when the air curtain device according to the present invention is provided close to the ceiling and/or close to the upper side of the opening in the wall the substantially vertical oriented air curtain comprises an air flow with a substantially downward direction. In this case, seen in a cross section, the secondary air curtain increases its dimensions or surface area towards the floor. Under typical conditions the temperature of the air in the air curtain is higher as compared to the surrounding air temperature. As air with a higher temperature rises also the upper side of the gap close to the ceiling and/or upper side of the opening of the gap is closed or shielded to a significant extent. This further improves the reduction of leakage and energy loss.

In an advantageous preferred embodiment according to the present invention the diverging means comprise adjusting means to adjust the secondary diverging air flow.

By providing adjusting means such as guides the direction of the secondary diverging air flow can be adjusted. This adjustment can be made depending on outside air conditions, inside air conditions, dimensions of the opening in the wall and/or amount of air in the air curtain. The adjustment enables optimising the air curtain that is provided by the air curtain device according to the present invention.

In an advantageous preferred embodiment according to the present invention the air curtain device further comprises auxiliary air displacing means for providing air to the secondary outflow opening.

By providing auxiliary air displacing means the amount of air in the secondary air curtain can be such that the effect of the secondary air curtain is optimised. By providing primary and auxiliary/secondary air displacing means both the primary and secondary air curtains can be optimised. Although it is already beneficial to provide additional air at or close to the primary ends of the curtain, the effect of closing the gap at the ends of the primary air curtain with the secondary air curtain(s) according to the present invention can be improved even further by providing the auxiliary air displacing means. For example, this enables providing a larger amount of air in this secondary air curtain as compared to a corresponding width of the primary air curtain.

According to a further advantageous preferred embodiment according to the present invention, the air curtain device further comprises a secondary modular housing provided with the secondary outflow opening.

By providing the secondary housing part(s) as secondary modular housing(s) the secondary modular housings can be combined with different primary housing parts. For example, primary housing parts can be of different lengths to enable providing an air curtain for different dimensions of openings in walls. As the distance of the air gap depends on installation requirements and not directly on the length of the opening (and the primary housing) the secondary modular housing parts can be applied to primary housing parts of different length. Furthermore, providing the secondary housing parts as modular housing parts enables introducing

the secondary air curtains to already installed air curtain devices. Preferably, these secondary modular housings comprise the auxiliary air displacing means and/or auxiliary heating means for the secondary air flow.

In a further advantageous preferred embodiment according to the present invention the air curtain device further comprises auxiliary heating means for the auxiliary air flow.

Although conventional air curtain devices often already comprise heating means to enable conditioning of the air in the air curtain, providing auxiliary heating means for the secondary air flow enables a further increase of air temperature of the secondary air flow as compared to the air temperature of the primary air flow. This increased temperature may enhance the rising of relatively warm air in or close to the gap between the opening and/or wall and the primary air curtain. This further reduces leakage and energy losses. This is especially relevant in case the secondary air flow is provided as a secondary diverging air flow.

In a further advantageous preferred embodiment according to the present invention the air curtain device comprises a controller for adjusting the air curtain.

By providing a controller the conditions of the air curtain can be changed in time for example depending on outside air conditions, inside air conditions, (changing) dimensions of the opening in the wall, changed settings of the amount of air for the air curtain etc. For example, the conditions of the air curtain that can be adjusted by the controller may relate to one or more of the following: air temperature, air humidity, amount of air and direction of the air flow. The controller and the adjustment of the air curtain enable improving the effect of the air curtain as a whole and specifically the secondary air curtain.

The invention further also relates to a method for providing an air curtain in or close to an opening in a wall, the method comprising the steps of:

- providing an air curtain device as described above at a distance of the opening in the wall;
- providing a primary air flow; and
- providing at least one secondary air flow.

Such method provides the same effects and advantages as those stated in respect of the air curtain device. In a preferred embodiment adjusting the secondary air flow with a controller using information about air conditions may further improve the effect of the secondary air curtain in reducing leakage and energy losses.

Further advantages, features and details of the invention are elucidated on the basis of preferred embodiments thereof, wherein reference is made to the accompanying drawings, in which:

- figure 1A-B shows an air curtain device according to the present invention;
- figure 2 shows a secondary housing of the device of figure 1; and
- figure 3 shows a schematic view of the operation of the air curtain device of figure 1.

An air curtain device 2 (figure 1A) is provided in the vicinity of an opening 4 in wall 6. In use, air curtain device 2 provides air curtain 8 comprising a primary air curtain 10 extending substantially parallel to opening 4 at a distance 12, and a secondary air curtain 14. In the illustrated embodiment air curtain 8 comprises two secondary air curtains 14 that are provided at both ends of the primary air curtain 10. In the illustrated embodiment, seen in a horizontal plane, this achieves a U-shape for a cross

section of air curtain 8. Air curtain 8 extends from device 2 towards floor 16.

Air curtain device 2 comprises a housing 18 comprising a primary housing part 20 and two secondary housing parts 22 that are provided as modular housing parts. Primary housing part 20 is provided with a number of fans 24, an air inlet 26 and a primary outflow opening 28. In the illustrated embodiment the (modular) housing parts 22 (figure 2) are provided with an auxiliary/secondary fan 30, optionally heater 32, air guiding profiles 34, secondary outflow 36, and secondary air inlet 38.

In use, air curtain 8 is provided with a height 40 (figure 1A), a length 42 extending parallel to the opening (figure 1B), and a width 44 in a direction substantially perpendicular to opening 4, in the illustrated embodiment thereby producing a U-shaped cross section of air curtain 8. In use, secondary air curtain 14 is provided with a similar height 40 over distance 12. In the illustrated embodiment the direction of (part of) the air flow of the secondary air curtain 14 is provided at an angle α relative to a vertical. In the illustrated embodiment secondary air curtain 14 contacts wall 6 at a height 46 from floor 16.

Method 48 (figure 3) to operate air curtain device 2 involves initiating step 50 starting air curtain device 2 and in the next providing step 52 providing air curtain 8 in opening 4 of wall 6. Measuring step 54 provides information about conditions of air curtain 8 or the surroundings thereof. One or more sensors 56 provide information that can be used when in adjusting step 58 adjusting settings of air curtain device 2 using a controller 60 to optimise the effects of air curtain 8. In adjusting step 58 conditions like outside air conditions, inside air conditions, amount

of air flow in the air curtain, wind direction etc. are taken into account.

As an example, an opening 4 is provided requiring an air curtain 8 with a height 40 of 2.6 m, a temperature difference of 20°C and a low-to-medium ventilation flow rate of 1500 m^3/h per meter door opening width. Under certain conditions with a door width of 4 m, a critical heating capacity would be about 52 kW. The primary air curtain would cover approximately 90% of this critical heating capacity. In such case it would not be essential to provide auxiliary heaters to the secondary housing parts to establish and maintain an acceptable comfort, although such auxiliary heaters may be provided. In this example, the secondary housing parts are provided with a separate fan to prevent that the primary air curtain at the ends thereof becomes to weak to reach the floor, and at the same time also prevents the secondary air curtain becoming too weak. In this example the leakage is significantly reduced and the amount of energy loss is further reduced by improving air curtain 8 using air curtain device 2 according to the present invention.

The present invention is by no means limited to the above described preferred embodiments thereof. The rights sought are defined by the following claims, within the scope of which many modifications can be envisaged. The air curtain device 2 can thus be applied at many locations. Examples thereof are for instance entrances to shops, loading and/or unloading positions at warehouses or logistical centres, and climate-controlled spaces.

Clauses

1. Air curtain device for realizing an air curtain, with in use a substantial vertical air flow, the device comprising:
   - a housing substantially extending along an opening in a wall and comprising air displacing means;
   - at least one air inlet for supplying air to the housing;
   - at least one primary outflow opening for achieving a primary air curtain with a primary height, a primary length, and a primary width extending substantially parallel to the opening at a certain distance thereof; and
   - at least one secondary outflow opening for achieving at least one secondary air curtain substantially perpendicular to the plane defined by the opening such that it substantially closes a gap resulting from providing the air curtain at the certain distance of the opening in the wall and in use provided at or close to an end of the primary air curtain, such that in use in a horizontal plane an L-shaped or U-shaped air curtain is achieved.

2. Air curtain device according to clause 1, wherein the secondary outflow opening comprises diverging means for providing the secondary air curtain at or close to the end of the primary air curtain with a secondary diverging air flow.

3. Air curtain device according to clause 2, wherein the diverging means are provided with a configuration such that the secondary diverging air flow is provided with an angle relative to the primary air curtain in the range of $0\text{-}90^0$, preferably $0\text{-}45^0$, and most preferably $10\text{-}25^0$.

4. Air curtain device according to clause 2 or 3, wherein the diverging means comprise one or more of a nozzle, a rectifier grille, and guide vanes.

5. Air curtain device according to clause 3 or 4, wherein the diverging means comprise adjusting means to adjust the direction the secondary diverging air flow.

6. Air curtain device according to one or more of the foregoing clauses, further comprising auxiliary air displacing means for providing air to the secondary outflow opening.

7. Air curtain device according to one or more of the foregoing clauses, further comprising a secondary modular housing provided with the secondary outflow opening.

8. Air curtain device according to one or more of the foregoing clauses, further comprising auxiliary heating means for the secondary air flow.

9. Air curtain device according to one or more of the foregoing clauses further comprising a controller for adjusting the air curtain.

10. Method for providing an air curtain in or close to an opening in a wall, the method comprising the steps of:
    - providing an air curtain device according to one or more of the foregoing clauses at a distance of the opening in the wall;
    - providing a primary air curtain; and
    - providing at least one secondary air curtain.

11. Method according to clause 10, further comprising adjusting the secondary air flow with a controller using information about air conditions.

CONCLUSIES

1. Luchtgordijninrichting voor het realiseren van een luchtgordijn met een in gebruik substantiële verticale luchtstroom, de inrichting omvattende:
   - een zich in hoofdzaak langs een opening in een wand uitstrekkende behuizing omvattende luchtverplaatsingsmiddelen;
   - ten minste één luchtinlaat voor het toevoeren van lucht naar de behuizing;
   - ten minste één primaire uitstroomopening voor het realiseren van een primair luchtgordijn met een primaire hoogte, een primaire lengte, en een primaire breedte zich uitstrekkend in hoofdzaak parallel aan de opening op een zekere afstand daarvan; en
   - ten minste één secundaire uitstroomopening voor het realiseren van ten minste één secundair luchtgordijn in hoofdzaak loodrecht op het vlak gedefinieerd door de opening zodanig dat het in hoofdzaak een gat afsluit veroorzaakt door het op de zekere afstand van de opening in de wand voorzien van het luchtgordijn en welke in gebruik is voorzien aan of nabij een einde van het primaire luchtgordijn zodanig dat in gebruik in een horizontaal vlak een L-vormig of U-vormig luchtgordijn is verschaft.

2. Luchtgordijninrichting volgens conclusie 1, waarin de secundaire uitstroomopening divergentiemiddelen omvat voor het voorzien van het secundaire luchtgordijn aan of nabij het einde van het primaire luchtgordijn met een secundaire divergerende luchtstroom.

3. Luchtgordijninrichting volgens conclusie 2, waarin de divergentiemiddelen zijn voorzien van een configuratie zodanig dat de secundaire divergerende luchtstroom is voorzien onder een hoek ten opzichte van een primair luchtgordijn in het bereik van 0-90°, bij voorkeur 0-45°, en met de meeste voorkeur 10-25°.

4. Luchtgordijninrichting volgens conclusie 2 of 3, waarin de divergentiemiddelen één of meer van een spuitmond/straalpijp, gelijkrichter en leischoepen omvatten.

5. Luchtgordijninrichting volgens conclusie 3 of 4, waarin de divergentiemiddelen aanpassingsmiddelen omvatten voor het aanpassen van de richting van de secundaire divergerende luchtstroom.

6. Luchtgordijninrichting volgens één of meer van de voorgaande conclusies, verder omvattende additionele luchtverplaatsingsmiddelen voor het voorzien van lucht naar de secundaire uitstroomopening.

7. Luchtgordijninrichting volgens één of meer van de voorgaande conclusies, verder omvattende een secundaire modulaire behuizing voorzien van de secundaire uitstroomopening.

8. Luchtgordijninrichting volgens één of meer van de voorgaande conclusies, verder omvattende additionele verwarmingsmiddelen voor de secundaire luchtstroom.

9. Luchtgordijninrichting volgens één of meer van de voorgaande conclusies, verder omvattende een regelaar voor het aanpassen van het luchtgordijn.

10. Werkwijze voor het voorzien van een luchtgordijn in of nabij een opening in een wand, de werkwijze omvattende de stappen:
    - het voorzien van een luchtgordijninrichting volgens één of meer van de voorgaande conclusies op een afstand van de opening in de wand;
    - het voorzien van een primair luchtgordijn; en
    - het voorzien van ten minste één secundair luchtgordijn.

11. Werkwijze volgens conclusie 10, verder omvattende het met een regelaar aanpassen van de secundaire luchtstroom gebruik makend van informatie over luchtcondities.

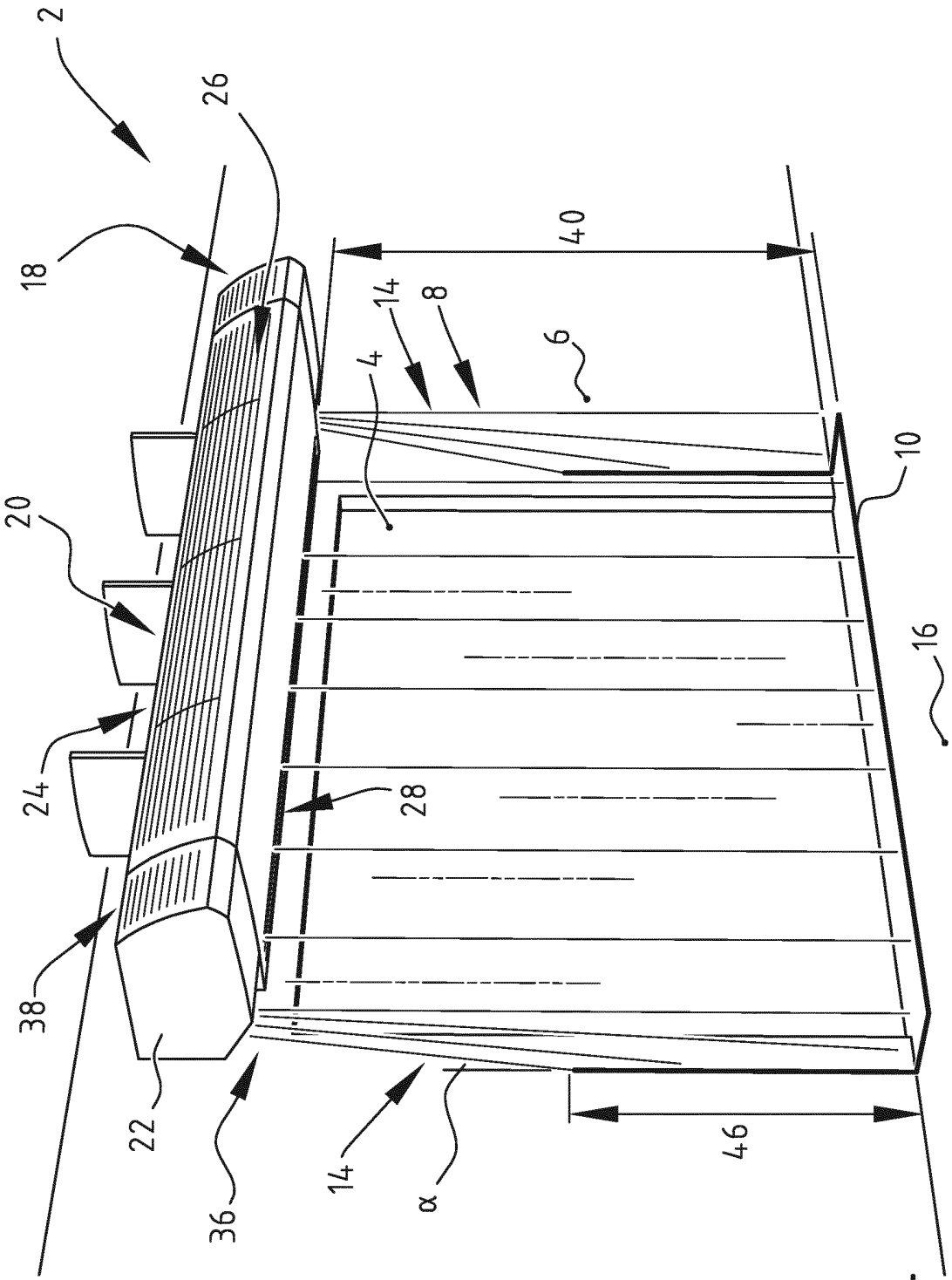

FIG. 1A

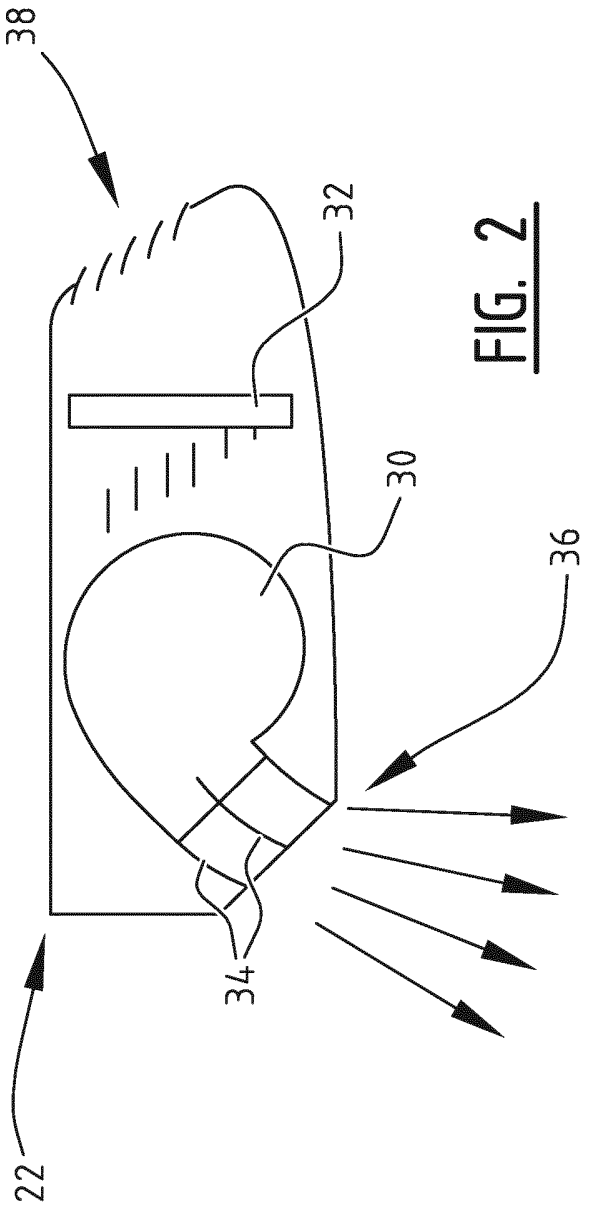

FIG. 2

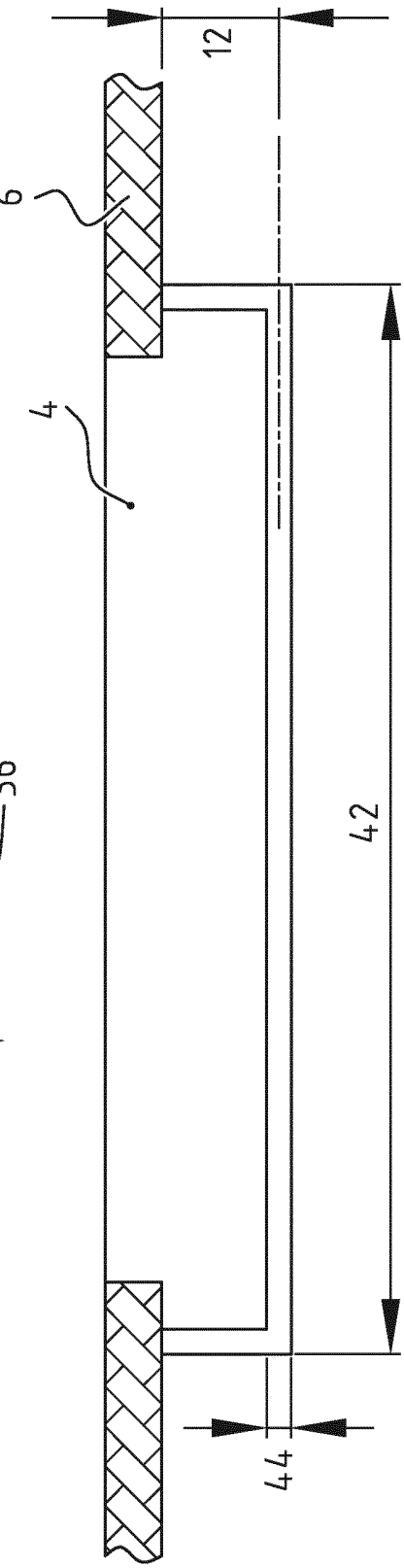

FIG. 1B

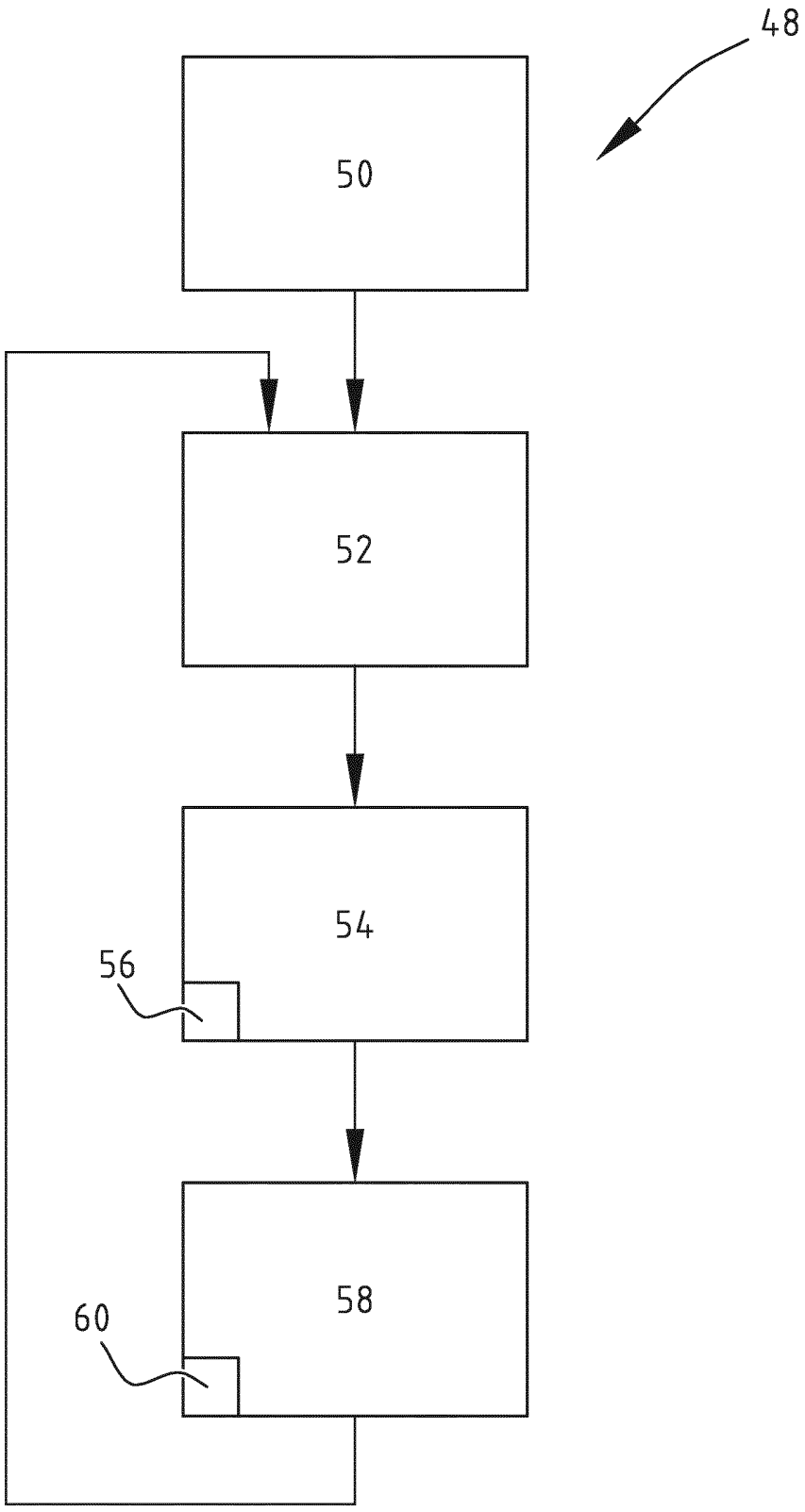

FIG. 3

SAMENWERKINGSVERDRAG (PCT)

RAPPORT BETREFFENDE NIEUWHEIDSONDERZOEK VAN INTERNATIONAAL TYPE

IDENTIFICATIE VAN DE NATIONALE AANVRAGE	KENMERK VAN DE AANVRAGER OF VAN DE GEMACHTIGDE
	2L/2OE56/MvD-22
Nederlands aanvraag nr. **2011007**	Indieningsdatum **19-06-2013**
	Ingeroepen voorrangsdatum
Aanvrager (Naam) **Biddle B.V.**	
Datum van het verzoek voor een onderzoek van internationaal type **17-08-2013**	Door de Instantie voor Internationaal Onderzoek aan het verzoek voor een onderzoek van internationaal type toegekend nr. **SN 60521**

I. CLASSIFICATIE VAN HET ONDERWERP (bij toepassing van verschillende classificaties, alle classificatiesymbolen opgeven)

Volgens de internationale classificatie (IPC)

F24F9/00

II. ONDERZOCHTE GEBIEDEN VAN DE TECHNIEK

Onderzochte minimumdocumentatie

Classificatiesysteem	Classificatiesymbolen
IPC	**F24F**

Onderzochte andere documentatie dan de minimum documentatie, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen

III.	☐ **GEEN ONDERZOEK MOGELIJK VOOR BEPAALDE CONCLUSIES**	(opmerkingen op aanvullingsblad)
IV.	☐ **GEBREK AAN EENHEID VAN UITVINDING**	(opmerkingen op aanvullingsblad)

Form PCT/ISA 201 A (11/2000)

ONDERZOEKSRAPPORT BETREFFENDE HET RESULTAAT VAN HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE

Nummer van het verzoek om een onderzoek naar de stand van de techniek
NL 2011007

A. CLASSIFICATIE VAN HET ONDERWERP
INV. F24F9/00
ADD.

Volgens de Internationale Classificatie van octrooien (IPC) of zowel volgens de nationale classificatie als volgens de IPC.

B. ONDERZOCHTE GEBIEDEN VAN DE TECHNIEK

Onderzochte miminum documentatie (classificatie gevolgd door classificatiesymbolen)
F24F

Onderzochte andere documentatie dan de mimimum documentatie, voor dergelijke documenten, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen

Tijdens het onderzoek geraadpleegde elektronische gegevensbestanden (naam van de gegevensbestanden en, waar uitvoerbaar, gebruikte trefwoorden)
EPO-Internal, WPI Data

C. VAN BELANG GEACHTE DOCUMENTEN

Categorie °	Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
X	US 5 264 015 A (MATSUI SHIGEO [JP]) 23 november 1993 (1993-11-23) * het gehele document * -----	1-11
X	JP H04 62347 A (KOKUYO KK) 27 februari 1992 (1992-02-27) * samenvatting; figuren * -----	1,10
X	WO 01/19532 A1 (KALKA RONALD W [US]; NIEHAUS WERNER [US]; BAUMGUERTEL LARS [DE]) 22 maart 2001 (2001-03-22) * bladzijde 2, regel 10 - bladzijde 3, regel 22 * * bladzijde 4, regel 17 - bladzijde 5, regel 27 * * figuur 3 * -----	1,10

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[X] Verdere documenten worden vermeld in het vervolg van vak C.

[X] Leden van dezelfde octrooifamilie zijn vermeld in een bijlage

° Speciale categorieën van aangehaalde documenten

"A" niet tot de categorie X of Y behorende literatuur die de stand van de techniek beschrijft

"D" in de octrooiaanvrage vermeld

"E" eerdere octrooi(aanvrage), gepubliceerd op of na de indieningsdatum, waarin dezelfde uitvinding wordt beschreven

"L" om andere redenen vermelde literatuur

"O" niet-schriftelijke stand van de techniek

"P" tussen de voorrangsdatum en de indieningsdatum gepubliceerde literatuur

"T" na de indieningsdatum of de voorrangsdatum gepubliceerde literatuur die niet bezwarend is voor de octrooiaanvrage, maar wordt vermeld ter verheldering van de theorie of het principe dat ten grondslag ligt aan de uitvinding

"X" de conclusie wordt als niet nieuw of niet inventief beschouwd ten opzichte van deze literatuur

"Y" de conclusie wordt als niet inventief beschouwd ten opzichte van de combinatie van deze literatuur met andere geciteerde literatuur van dezelfde categorie, waarbij de combinatie voor de vakman voor de hand liggend wordt geacht

"&" lid van dezelfde octrooifamilie of overeenkomstige octrooipublicatie

Datum waarop het onderzoek naar de stand van de techniek van internationaal type werd voltooid	Verzenddatum van het rapport van het onderzoek naar de stand van de techniek van internationaal type
23 oktober 2013	

Naam en adres van de instantie	De bevoegde ambtenaar
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Mattias Grenbäck

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ONDERZOEKSRAPPORT BETREFFENDE HET RESULTAAT VAN HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE

Nummer van het verzoek om een onderzoek naar de stand van de techniek
NL 2011007

C.(Vervolg). VAN BELANG GEACHTE DOCUMENTEN

Categorie °	Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
A	WO 99/43991 A1 (GAMING EDGE PRODUCTS L L C [US]) 2 september 1999 (1999-09-02) * samenvatting; figuur 7 * -----	1

ONDERZOEKSRAPPORT BETREFFENDE HET RESULTAAT VAN HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE

Informatie over leden van dezelfde octrooifamilie

Nummer van het verzoek om een onderzoek naar de stand van de techniek
NL 2011007

In het rapport genoemd octrooigeschrift	Datum van publicatie	Overeenkomend(e) geschrift(en)	Datum van publicatie
US 5264015	A 23-11-1993	DE 69213000 D1	26-09-1996
		DE 69213000 T2	16-01-1997
		EP 0582010 A2	09-02-1994
		HK 53597 A	02-05-1997
		JP H0654745 A	01-03-1994
		JP H0761300 B2	05-07-1995
		US 5264015 A	23-11-1993
JP H0462347	A 27-02-1992	JP 2626189 B2	02-07-1997
		JP H0462347 A	27-02-1992
WO 0119532	A1 22-03-2001	AU 7470100 A	17-04-2001
		WO 0119532 A1	22-03-2001
WO 9943991	A1 02-09-1999	AU 2791799 A	15-09-1999
		GB 2352028 A	17-01-2001
		US 6210267 B1	03-04-2001
		WO 9943991 A1	02-09-1999

OCTROOICENTRUM NEDERLAND

WRITTEN OPINION

File No.	Filing date *(day/month/year)*	Priority date *(day/month/year)*	Application No.
SN60521	19.06.2013		NL2011007

International Patent Classification (IPC)
INV. F24F9/00

Applicant
Biddle B.V.

This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the application
- ☐ Box No. VIII Certain observations on the application

	Examiner
	Mattias Grenbäck

Application number

WRITTEN OPINION

NL2011007

Box No. I Basis of this opinion

1. This opinion has been established on the basis of the latest set of claims filed before the start of the search.

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material:

   ☐ a sequence listing

   ☐ table(s) related to the sequence listing

   b. format of material:

   ☐ on paper

   ☐ in electronic form

   c. time of filing/furnishing:

   ☐ contained in the application as filed.

   ☐ filed together with the application in electronic form.

   ☐ furnished subsequently for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty	Yes:	Claims	8
	No:	Claims	1-7, 9-11
Inventive step	Yes:	Claims	
	No:	Claims	1-11
Industrial applicability	Yes:	Claims	1-11
	No:	Claims	

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

D1 US 5 264 015 A (MATSUI SHIGEO [JP]) 23 november 1993 (1993-11-23)

D2 JP H04 62347 A (KOKUYO KK) 27 februari 1992 (1992-02-27)

D3 WO 01/19532 A1 (KALKA RONALD W [US]; NIEHAUS WERNER [US]; BAUMGUERTEL LARS [DE]) 22 maart 2001 (2001-03-22)

1 The present application does not meet the criteria of patentability, because the subject-matter of claim 1 is not new.

1.1 D1 discloses an air curtain device (20) for realizing an air curtain, with in use a substantial vertical air flow (4), the device comprising:

- a housing (18) substantially extending along an opening in a wall and comprising air displacing means (10);

- at least one air inlet (9) for supplying air to the housing;

- at least one primary outflow opening (8) for achieving a primary air curtain with a primary height, a primary length, and a primary width; and

- at least one secondary outflow opening for achieving at least one secondary air curtain, in use provided at or close to an end of the primary air curtain, such that in use in a horizontal plane an L-shaped or U-shaped air curtain is achieved (figures 2, 6, 7, 8).

1.2 The same reasoning applies, mutatis mutandis, to the subject - matter of the corresponding independent claim 10, which therefore is also considered not new.

1.3 Furthermore documents D2 and D3 disclose all the features of claims 1 and 10 rendering them not new.

2 Dependent claims 2-9 and 11 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of novelty and/or inventive step, see document D1 and references applying to this document cited in the search report.