(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
20 December 2018 (20.12.2018)

WIPO | PCT

(10) International Publication Number
WO 2018/231119 A1

(51) International Patent Classification:
F24C 15/20 (2006.01) *A61L 9/20* (2006.01)

(21) International Application Number:
PCT/SE2018/050528

(22) International Filing Date:
24 May 2018 (24.05.2018)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
1750769-0 16 June 2017 (16.06.2017) 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, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, 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, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:
— *as to the identity of the inventor (Rule 4.17(i))*
— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
— *of inventorship (Rule 4.17(iv))*

Published:
— *with international search report (Art. 21(3))*

(54) Title: VENTILATING DEVICE

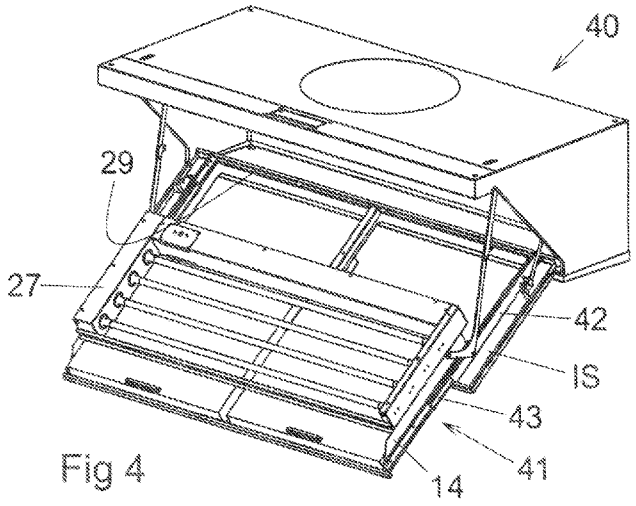

Fig 4

(57) Abstract: Ventilating device (10) comprising a ventilation housing (21) having an air inlet (22) and an air outlet (23) for a principal air flow passing through, that between the air inlet (22) and the air outlet (23) there is placed at least one ultraviolet light source (24, 25, 26) in a UV holder (27), said UV holder (27) being movably connected to the ventilation housing (21) for movement out from or through the air inlet (22) of the ventilation housing (21), for cleaning purposes.

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VENTILATING DEVICE

Technical Field

The present invention relates to ventilating devices, especially in kitchen environment and in particular in industrial kitchen environment.

Background of the Invention

The method of purifying air by means of UV light is known by, for instance, the publication WO 03/61717, which discloses a ventilating device for this purpose where inflowing air to the device passes a number of UV lamps in order to be subjected to ozone action and thereby be purified so as to subsequently flow out from the device. The necessity to clean these UV lamps regularly is in addition demonstrated by the publication WO 2007/008164. Thus, the UV lamps both have to be cleaned as well as be replaced according to fixed time intervals for the air cleaning to be held on an acceptable level.

WO 2005/084722 discloses a ventilating system for the purification of contaminated air by using UV lamps of specific wavelength. The ventilating system is combined with detachable particle-separating filters.

WO 2014/191225 discloses a filter unit, its application, and a method for the purification of contaminated air. Among other things, the document discloses a main flow passing the UV lamps to purify this air flow. Furthermore, the document discloses a secondary air flow with the purpose of cooling the electrical components of the filter unit when the filter unit is used in, for instance, kitchen environment. The filter unit embraces a housing inside which one or more UV lamps are placed. The housing is provided with a pull-out hatch for opening which allows access to the inside of the housing and thereby the UV lamps.

WO 01/56624 discloses an air treatment apparatus which is placed above a source of contaminated air. The apparatus is provided with a removable filter surrounded by protective barriers to eliminate escape of UV light against a filter replacement operator.

WO 95/17634 discloses a cleaning arrangement for room air in which an air flow passes a number of UV lamps and is purified from microorganisms and the like.

Even if prior art affords possibility of opening and cleaning and replacing filter units of the ventilating devices, this will entail great difficulties since the devices are placed high up on ceiling level, for instance, in catering kitchen environments. For the cleaning of and replacement of filters, several persons are most often required and ladders and tools. The difficulty makes that the important intervals for cleaning and filter replacement are not kept with the result that the air is not sufficiently cleaned.

The Object of the Invention

The object of the present invention is to provide a ventilating device having UV lamps which both are faster and easier to clean than what previously has been the case.

The object of the invention is furthermore that also filters of such a ventilating device should be possible to be replaced faster and easier than earlier.

The object is furthermore that easier and thereby more frequently clean the UV lamps since the filters easily can be removed.

In addition, the object is to be able to carry out said cleaning and filter replacement operations from floor level without needing to use ladders.

Summary of the Invention

By the present invention, such as this is seen in the independent claims, the above-mentioned objects are met, wherein said disadvantages have been eliminated. Suitable embodiments of the invention are defined in the dependent claims.

In the description, the expression "a number of ultraviolet light sources" is used by which one or more UV lamps single-sided connected or UV tubes single-sided or double-sided connected should be appreciated and which are capable of emitting UV light.

The present invention concerns a ventilating device comprising a ventilation housing having an air inlet and an air outlet for a principal air flow passing through. Between the air inlet and the air outlet, there is placed at least one ultraviolet light source, for the emission of UV light, in a UV holder. The UV holder is movably connected to the ventilation housing for movement out from or through the air inlet of the ventilation housing, for cleaning purposes. The parts of the

ventilating device that are situated in the air flow and that by the same will be polluted are, by being possible to be turned out from the ventilation housing, possible to clean and particularly said turning-out movement is intended to be effected through the air inlet, which is extraordinarily advantageous since the polluting effect takes place at the air inlet. Preferably, the UV holder is manufactured easily dismountable in relation to the ventilating device.

The UV holder according to the invention is not limited to any particular orientation of the UV sources but these may have an optional orientation in relation to the UV holder. In the embodiments shown, an essentially horizontal and an essentially vertical orientation are shown but also angled orientations are feasible within the scope of the invention.

In one embodiment of the invention, the UV holder is turnably arranged in relation to the ventilation housing. The turnability is designed to be effected on a rotation shaft, which is oriented preferably essentially horizontally or essentially vertically in the ventilation housing.

In one embodiment of the invention, the rotation shaft is placed in the ventilation housing and adjacent to the edge portion of the UV holder. According to this embodiment, the rotation shaft may be oriented in a suitable way with regard to the selected design, however, an essentially horizontal or an essentially vertical orientation is preferable.

In one embodiment of the invention, the UV holder is turnably movable on an essentially horizontal rotation shaft in the ventilation housing, to allow an angling out and down of the UV holder and the ultraviolet light source connected to the UV holder from the ventilation housing.

In one embodiment of the invention, the essentially horizontal rotation shaft is placed in the lower part of the ventilation housing, the opposite edge portion of the UV holder being disengageably connected to an upper part of the ventilation housing. An alternative location of said rotation shaft is that it is placed in the upper part of the ventilation housing, the opposite edge portion of the UV holder being disengageably connected to a lower part of the ventilation housing.

In one embodiment of the invention, the ventilation housing is provided with an inspection cover inside which the UV holder is fitted.

In one embodiment of the invention, the UV holder is fitted on a telescopically displaceable movement device so that the UV holder after its

movement is translatory displaceable in a direction away from said ventilation housing. The movement away from said ventilation housing means that the movement takes place toward the maintenance staff standing on the floor to easier be able to clean the ventilating device since the ventilating device usually is placed high or even at ceiling height, which in restaurant kitchens may mean a height of several metres.

In one embodiment of the invention, said filter is fitted on a telescopically displaceable movement device so that said filter after its movement is translatory displaceable in a direction away from said ventilation housing.

In one embodiment of the invention, said ultraviolet light source is surrounded by a covering tube having good transmissivity for UV radiation, e.g. a tube of quartz glass, which covering tube is fitted withdrawably from said ultraviolet light source, for cleaning purposes. The covering tubes, which may be quartz tubes, may be individual but preferably fitted on a common holder. The holder is formed with the same size as the filter considering that these light units should be possible to be cleaned in the same way as the filters. In embodiments of the invention, filter and the corresponding covering tube, quartz tube, are assembled and are disassembled as one unit for cleaning. Generally, the filters are washed up regularly, which means that if the covering tubes are connected to the filters, also the covering tubes will be cleaned relatively often. Staff most often knows that filter has to be cleaned relatively often but UV lamps, however, more rarely. It is hard to know when and therefore there are in a control system signals which communicate when cleaning should be effected. The cleaning of the UV lamps is often the weak link of this air purification process.

A ventilating device according to the invention comprises a ventilation housing having an air inlet and an air outlet for a principal air flow passing through. Between the air inlet and the air outlet, there are placed a number of ultraviolet light sources in a UV holder. The ventilation housing is furthermore provided with an inspection cover. Said UV holder is adjacent to its edge portion rotatably movable on an essentially horizontal rotation shaft in the lower part of the ventilation housing, the opposite edge portion of the UV holder being disengageably connected to an upper part of the ventilation housing, so as to after opening of the inspection cover allow an angling out and down of the UV holder and the ultraviolet light sources connected to the UV holder from the ventilation

housing, for cleaning purposes.

In one embodiment of the invention, the UV holder is either a part of the inspection cover or is fitted on the inspection cover of the ventilation housing.

In one embodiment of the invention, the inspection cover is journalled on said rotation shaft.

In one embodiment of the invention, the UV holder is fitted on a telescopically displaceable movement device so that the UV holder after angling out is translatorily displaceable in a direction away from said essentially horizontal rotation shaft.

In one embodiment of the invention, the inspection cover is essentially flat.

In one embodiment of the invention, the displacement of the UV holder is arranged to be effected essentially in a plane parallel to the plane of the inspection cover.

In one embodiment of the invention, at least one filter unit is placed upstream of the UV holder and its ultraviolet light source. The embodiment comprises at least one filter but also a plurality of filters placed side by side or after each other with regard to the direction of flow is feasible. Such filters placed one after the other may be given different properties for the filtering of different particles. Preferably, these filters are in principle impermeable to UV light.

In one embodiment of the invention, a filter unit is placed between the ultraviolet light source and an inspection cover.

In one embodiment of the invention, the UV holder is rectangularly shaped.

In one embodiment of the invention, said filter unit is fitted on said inspection cover and/or on said UV holder. Thus, the inspection cover or the UV holder may be carrier of the filter. In addition, both the filter and the UV holder may be fitted on the inspection cover.

In one embodiment of the invention, said filter or filter unit is fitted in a filter frame or in a filter cassette.

A ventilating device according to one embodiment of the invention is formed with a frame having one or more pre-filters which frame also is provided with UV lamps, preferably four to six but the number may be adapted according to needs. The frame is fitted to the chassis of the ventilating device in its lower edge with essentially horizontally arranged hinges. In the upper edge of the frame, there is a

locking device. When this locking device is released, the frame can be folded down. The frame is furthermore provided with two connected gas springs such as damping cylinders, one on each side of the frame, to entirely or partly neutralize the weight of the frame with its UV lamps and its filters. The ventilating device is also provided with two foldable supporting arms which stabilize the frame in the lower position, preferably by a small "overbend" from its straight folded-down position. This "overbend" is advantageous since the folded-down frame will be subjected to a change of weight when its pre-filters are removed. The ventilating device is also provided with an essentially horizontal rod in the front edge of the frame which upon manual pressure breaks back "the overbend" wherein the frame is possible to close.

The angle of the frame in folded-up position is in the embodiments shown approximately 45° in relation to a horizontal plane but may in other embodiments be both greater alternatively smaller. The frame of the ventilating device has a movement angle of approx. 90° upon folding down, which angle in other embodiments may assume other angles. On the frame, there is an upturned fold, for instance, of 10 mm, which fold constitutes an edge which acts so that a filter does not slide out when the frame is folded down. For the dismounting of the pre-filter, the filter is lifted somewhat and is then pulled out for external cleaning. Upon fitting of the filter, the same is inserted and is laid down against the fold in order not to slide out during the handling of the frame.

The attachment of the UV lamps is attaching either in the longitudinal direction of the frame or in the lateral direction of the frame.

The locking device consists of a handle in the form of a rod which is loosened and folded forward, which movement operation releases the locking and the frame can be folded down.

The ventilating device is furthermore provided with safety devices such as a power switch system which physically breaks the power cables when an inspection cover with or without the frame is turned out. In addition, the ventilating device is provided with a pressure sensor, which senses that there is negative pressure in the casing. If the negative pressure for some reason disappears, input current to the ventilating device is broken.

The inspection cover also has the function of sealing movable parts against the ventilation housing so that UV light does not escape. With regard to this

function, it is suitable that a negative pressure can be produced in the ventilation housing. These functions may in addition be integrated in the other movable components, for instance in filter holder and UV holder.

The ventilating device is essentially formed so that the current traverses via the switch at a cover lock further to a pressure sensing device and then to ballasts which drive the UV lamps and which are located in a long box behind the UV lamps. Next, the current traverses to the different UV lamps. An alternative location of the ballasts is outside the exhaust unit to get better cooling. For the cooling of the ballasts, a fresh air flow is utilized past the ballasts by means of the pressure difference inside and outside the hood. In the present invention, it is the difference of pressure between the supply air pressure and the negative pressure before the purifying system that provides the cooling.

Brief Description of the Drawings

Now, the invention will be described in more detail, references being made in connection with the accompanying drawing figures. The drawing figures show only explanatory sketches intended to facilitate the understanding of the invention.

Figure 1 shows an air flow through a ventilating device according to an embodiment of the invention.

Figure 2 shows the ventilating device according to Figure 1 in an exploded diagram.

Figure 3 shows an embodiment of the invention in a turned-out position.

Figure 4 shows a further embodiment of the invention in a turned-out position.

Figure 5 shows the air flow through the ventilating device from the side.

Figure 6 shows the ventilating device from the side in half turned-out position.

Figure 7 shows the ventilating device from the side in entirely turned-out position.

Figure 8 shows the ventilating device according to Figure 4 from the side.

Figure 9 shows a side view according to a further embodiment of the invention.

Figure 10 shows the embodiment in Figure 9 with pulled-out filters.

Figure 11 shows in an alternative embodiment with filters and UV unit pulled out.

Figure 12 shows an alternative embodiment with only UV unit pulled out.

Figure 13 shows in side view a further embodiment of the invention with filters and covering tubes partly pulled out.

Figure 14 shows the embodiment according to Figure 13 in perspective view.

Figure 15 shows a side view of an alternative embodiment with entirely pulled-out filters and covering tubes.

Figure 16 shows a section A–A according to Figure 15.

Description of the Invention

Figure 1 shows an embodiment of a ventilating device 10 according to the invention. The arrows in the figure show the flow of the air into ventilating device 10 and out through the same via a ventilation duct 11, shown by dashed lines, by the upwardly directed arrow. The inflow passes two co-lateral filter units 12, 13, which are situated on the same plane but separately detachable. The filter units 12, 13 are fitted in a filter frame 14 or in a filter cassette, which is mounted in the lower part of the ventilating device and which can be turned out via a locking device having a handle 15 for access to the interior of the ventilating device. The filter units are also designated as pre-filters since they are placed at the air inflow to the ventilating device and additional filters may be placed downstream of the air current.

Figure 2 shows the ventilating device 10 according to Figure 1 in an exploded diagram. The ventilating device comprises a ventilation housing 21 having an air inlet 22 and an air outlet 23 for a principal air flow passing through. Between the air inlet 22 and the air outlet 23, there are placed a number of ultraviolet light sources 24, 25, 26, UV lamps, in a UV holder 27. In the embodiment, at least one filter unit 12, 13 is placed upstream of the UV holder 27 and its ultraviolet light sources. Furthermore, there is fitted a ballast 28 in the UV holder 27 for the driving of the UV lamps. In the embodiment illustrated, the UV holder 27 together with the filter frame 14 and the filter units 12, 13 are fitted on an inspection cover IS, all these parts being turned out when the inspection cover is opened. As seen in the embodiment, the inspection cover is provided with

passing-through openings 200. The UV holder 27 is adjacent to its edge portion KP_1 rotatably movably suspended on an essentially horizontal rotation shaft 29 in the lower part of the ventilation housing 21. The opposite edge portion KP_2 of the UV holder 27 is disengageably connected to an upper part of the ventilation housing 21, so as to after opening of the inspection cover IS allow an angling out and down of the UV holder 27 and the ultraviolet light sources 24, 25, 26 connected to the UV holder 27 from the ventilation housing 21, for cleaning purposes. The UV holder 27 with the ultraviolet light sources 24, 25, 26, together with the ballast 28 are designated as a UV unit, UV.

Figure 3 shows an embodiment of the ventilating device 10 in a turned-out position. The UV holder 27 for the UV lamps is fitted on the inspection cover IS of the ventilation housing 21. The filter frame 14 is fitted between the inspection cover IS and the UV holder 27 but fastened to the inspection cover. The two filter units 12, 13 are pulled out from their respective filter holder in the filter frame 14 by the filter units having been lifted by means of filter handles 32, 33 in the handle end and after that having been pulled out over a fold of the filter frame. The embodiment shows that both the filter frame 14 and the UV holder 27 are fitted on a respective plane which two planes are essentially parallel to the flat inspection cover IS. The two-way arrows show the directions of the displacement of the filter units 12, 13 outward and inward of their respective filter frames 14.

At least one damping cylinder 34 is connected between the inspection cover IS and the ventilation housing 21 to balance the weight of the cover when the filter units 12, 13 are in place and furthermore, toggle links 35, 36 are connected between the cover and the ventilation housing 21 to hold the cover in its turned-out position during the period the UV lamps and the filter units are cleaned. The toggle links 35, 36 are interconnected via a handle 37 by which the toggle links can be inactivated and thereby allow a closure of the cover.

Figure 4 shows a further embodiment of the invention in a turned-out position. This embodiment comprises all parts shown in the previous embodiment but comprises in addition a telescopically displaceable movement device 41, which is provided with a fixed base part 42 fitted to the inspection cover IS and at least one holder part 43 telescopically displaceable in relation to the base part 42 on which the UV holder 27 and/or the filter frame 14 are/is fitted. The figure shows two such displaceable holder parts on each side of the inspection cover. Thus, the

UV holder 27 and/or the filter frame 14 after angling out/down of the inspection cover IS are/is translatorily displaceable in a direction away from the essentially horizontal rotation shaft 29. As seen in the embodiment shown, this displacement of the holder part 43 is essentially parallel to the plane of the inspection cover IS.

To provide the ventilating device with such a telescopically displaceable movement device contributes to an even greater extent to the accessibility for the cleaning of filters and UV lamps increasing considerably.

Figures 5–8 show side views where Figures 5–7 concern both the described embodiments while Figure 8 concerns only the telescopically arranged embodiment.

Figure 5 shows the ventilating device 10 with its inspection cover IS closed, the air current through the device being shown by the arrows. In order to open inspection cover IS, a locking device 51 is manoeuvred. The locking device 51 comprises the handle 15 placed on a rod 52 which is loosened and folded forward which movement operation releases the locking and the inspection cover and/or the frame can be folded down.

Figure 6 shows the ventilating device 10 with its inspection cover IS in half turned-out position wherein the UV holder 27 with the ultraviolet light sources together with the filter frame 14 and its filter will become accessible for cleaning. In the position shown, the toggle links 36 fixing the turned-out inspection cover IS are not yet entirely turned out wherein a damping cylinder 34 works with a damping of the opening movement. The figure can also be seen in a position for an opposite movement where the handle 37 of the toggle links 36 have been manoeuvred to fold the links wherein a closure of cover is possible.

Figure 7 shows the ventilating device 10 with its inspection cover IS in entirely turned-out position, the toggle links 36 limiting the movement and locking the same in the turned-out position. The figure shows the simplicity of the invention of providing a good accessibility for the cleaning of UV lamps and filters by the fact that the UV holder 27 and the filter frame 14 easily can be reached. The filters can in this connection be lifted and pulled over an upturned fold 73 to be removed from the filter frame 14.

Figure 8 shows a side view according to Figure 4 of the invention with the ventilating device 40 and its inspection cover IS in entirely turned-out position. In addition, the telescopically displaceable movement device 41 is shown in entirely

pulled-out position, a first telescopic part 81 and a second telescopic part 82 being entirely pulled out in relation to each other and in relation to the base part 42 fixedly fitted on the inspection cover IS. The figure clearly shows the further improved accessibility for the cleaning of UV lamps and filters by the fact that the UV holder 27 and the filter frame 14 can telescopically be displaced down toward an operator for cleaning. The filters can correspondingly in this embodiment be lifted and pulled over an upturned fold 83 to be removed from the filter frame 14.

Figure 9 shows a further embodiment of the ventilating device 90 according to the invention having the UV holder 27 fitted rotatably movably suspended on an essentially horizontal rotation shaft 29 in the upper part of the ventilation housing 21. According to the embodiment, the UV holder 27 is with the light sources and filters 13 thereof fitted on the inspection cover IS wherein all these parts are turnable on the rotation shaft 29 when the inspection cover IS is turned out to the position shown in the figure.

Figure 10 shows the ventilating device 90 according to Figure 9 in a perspective view having the inspection cover IS turned out and with two filters 12, 13 partly pulled out while the UV holder 27 with the light sources 24, 25, 26 thereof not pulled out and visible through the openings of the inspection cover which in active state of the ventilating device are covered by filters. The filters can be entirely removed for separate cleaning or filter replacement. The filter movements are shown by the two-way arrows in the figure. These marked filter movements concern either the separate filters or the holders in which the filters are fitted.

Figure 11 shows an alternative embodiment of the embodiment shown in Figure 10. In this alternative embodiment, the UV holder 27 is telescopically translatorily pulled out from the inspection cover IS in a direction away from said ventilation housing 21 after an turning motion on the rotation shaft 29 of the UV holder in the ventilation housing 21. The filters 12, 13 are simultaneously pulled out in a direction away from said ventilation housing 21. The movement of the UV holder away from the ventilation housing 21 is arranged to be effected at the same time as the pulling-out of the filters in a co-ordinated movement by the fact that filter holders and the UV holder are interconnected. In other embodiments, these translatory motions may be separate for the respective filter holder and UV holder by filter holders and UV holder, respectively, being fitted on separate telescoping devices.

Figure 12 shows a further embodiment where the UV holder 27 with its ultraviolet light sources 24, 25, 26 is fitted in a separate telescoping device in order to be possible to be pulled out from the inspection cover IS in a direction away from the ventilation housing 21 and in such a way facilitate cleaning of the light sources. The filters 12, 13 may in this embodiment keep their location in the inspection cover IS.

Figures 13–16 show further embodiments to facilitate cleaning. In these embodiments, at least one covering tube is used having good transmissivity for UV radiation, e.g. a tube of quartz glass, which covering tube is fitted withdrawably from the ultraviolet light source and in such a withdrawable position, the covering tube is distanced in the direction away from the ventilation housing for cleaning purposes. According to the embodiments in these figures, the light sources are oriented perpendicular to the rotation shaft in the ventilation housing and one-sidedly connected to a ballast for driving.

Figure 13 shows a ventilating device 130 from the side according to a further embodiment of the invention. As has been shown in previous embodiments, the ventilating device 130 is provided with a ventilation housing 21 provided with a rotation shaft 29 on which a UV holder 131 is rotatably movable. The UV holder 131 is provided with a number of light sources for the emission of ultraviolet light. Each such light source is surrounded by a covering tube 132_n which covering tube in the figure is shown partly pulled away from the light source. The figure also shows a filter 13 pulled out from its filter frame 14 for cleaning purposes. The pull direction of the movements is shown by the arrow in the figure.

Figure 14 shows the ventilating device 130 according to Figure 13 in perspective with the turned-down UV holder 131, possibly connected to an inspection cover IS, which UV holder is fitted for rotation on the rotation shaft 29. The UV holder 131 is provided with a number of ultraviolet light sources 124', 125', 126' which are surrounded by a corresponding number of covering tubes 132_1, 132_2, 132_3, which in the figure are partly pulled away from the respective light source. When the light sources are entirely covered by the covering tubes, only the covering tubes will be fouled while the light sources are kept clean. In the pulled away position of the covering tubes, the covering tubes can easier be cleaned since these have been moved in a direction away from the ventilation housing 21. The covering tubes are collectively fitted on a covering tube holder so

that the tubes together should be pulled away and be pushed on, respectively, the light sources. The covering tube holder may be separately connected to a telescoping device or be connected to a filter holder for collective translatory movement with the filters.

Figure 15 shows an alternative ventilating device 130 wherein the covering tube holder 151 for the covering tubes 132_n is connected to the filters 13 for collective movement according to the double arrow in the figure.

Figure 16 shows a section A–A according to Figure 15 with the entirely pulled-out covering tube holder 151 for the covering tubes 132_1, 132_2, 132_3 from the ultraviolet light sources 124', 125', 126'. As previously has been mentioned, the covering tube holder 151 may be separately fitted on a telescoping device for independent movement in relation to the filters. The six light sources in the figure are connected in one end to a common ballast 161 for the driving of the light sources.

As seen in all embodiments shown, the ballast is connected to the UV holder so as to be placed in the ventilation flow for cooling as well as be possible to be pulled out together with the UV holder for cleaning purposes. For cooling purposes, also non-contaminated fresh air may be conveyed into the ventilating device and past the ballasts.

An alternative location of the ballasts is outside the ventilating device to be able cool the same beside the ventilation flow through the ventilating device.

CLAIMS

1. Ventilating device (10) comprising a ventilation housing (21) having an air inlet (22) and an air outlet (23) for a principal air flow passing through, that between the air inlet (22) and the air outlet (23) there is placed at least one ultraviolet light source (24, 25, 26) in a UV holder (27), that said UV holder (27) is movably connected to the ventilation housing (21) for movement out from or through the air inlet (22) of the ventilation housing (21), that the UV holder (27) is turnably movable in relation to the ventilation housing (21) on an essentially horizontal rotation shaft (29) placed in the ventilation housing (21) and adjacent to the edge portion (KP_1) of the UV holder (27), to allow an angling out and down of the UV holder (27) and the ultraviolet light source (24, 25, 26) connected to the UV holder (27) from the ventilation housing (21) and that the ventilation housing (21) is provided with an inspection cover (IS) inside which the UV holder (27) is fitted, the UV holder (27) either being a part of the inspection cover (IS) or being fitted on the inspection cover (IS), **characterized in** that at least one filter (12, 13) is placed upstream of the UV holder (27) and its ultraviolet light source (24, 25, 26) when the inspection cover is closed, that said filter (12, 13) is fitted on said inspection cover (IS) and/or on said UV holder (27) and which filter (12, 13) can be pulled out from said inspection cover (IS) and/or from said UV holder (27) for access to said ultraviolet light source (24, 25, 26) also from the upstream side of the UV holder (27) after said angling out and down, for the cleaning of said ultraviolet light source (24, 25, 26).

2. Ventilating device according to claim 1, **characterized in** that the essentially horizontal rotation shaft (29) is placed in the lower part of the ventilation housing (21) and that the opposite edge portion (KP_2) of the UV holder (27) is disengageably connected to an upper part of the ventilation housing (21).

3. Ventilating device according to any one of claims 1–2, **characterized in** that the inspection cover (IS) is journalled on said rotation shaft (29).

4. Ventilating device according to any one of claims 1–3, **characterized in** that the inspection cover (IS) is essentially flat.

5. Ventilating device according to any one of claims 1–4, **characterized in** that the UV holder (27) is fitted on a telescopically displaceable movement device (41) so that the UV holder (27) after its movement is translatorily displaceable in a direction away from said ventilation housing (21).

6. Ventilating device according to claim 5, **characterized in** that the displacement of the UV holder (27) is arranged to be effected essentially in a plane parallel to the plane of the inspection cover (IS).

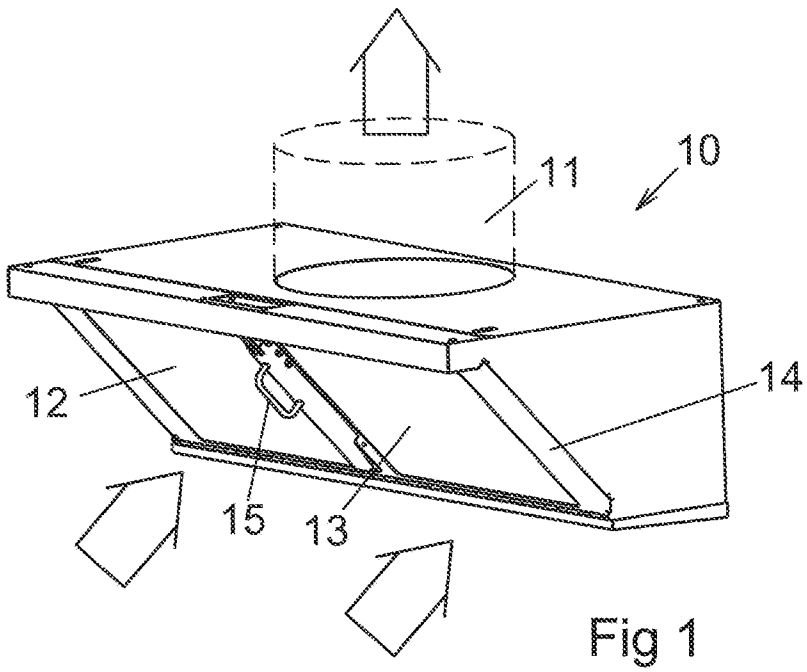
7. Ventilating device according to any one of claims 1–6, **characterized in** that said filter (12, 13) is placed between the ultraviolet light source (24, 25, 26) and the inspection cover (IS).

8. Ventilating device according to any one of claims 1–7, **characterized in** that said filter (12, 13) is fitted on a telescopically displaceable movement device (41) so that said filter (12, 13) after its movement is translatorily displaceable in a direction away from said ventilation housing (21).

9. Ventilating device according to any one of claims 1–8, **characterized in** that said filter (12, 13) is fitted in a filter frame or in a filter cassette.

10. Ventilating device according to any one of the above claims, **characterized in** that the UV holder (27) is rectangularly shaped.

11. Ventilating device according to any one of the above claims, **characterized in** that said ultraviolet light source (24, 25, 26) is surrounded by a covering tube having good transmissivity for UV radiation, e.g. a tube of quartz glass, which covering tube is fitted withdrawably from said ultraviolet light source (24, 25, 26), for cleaning purposes.


10
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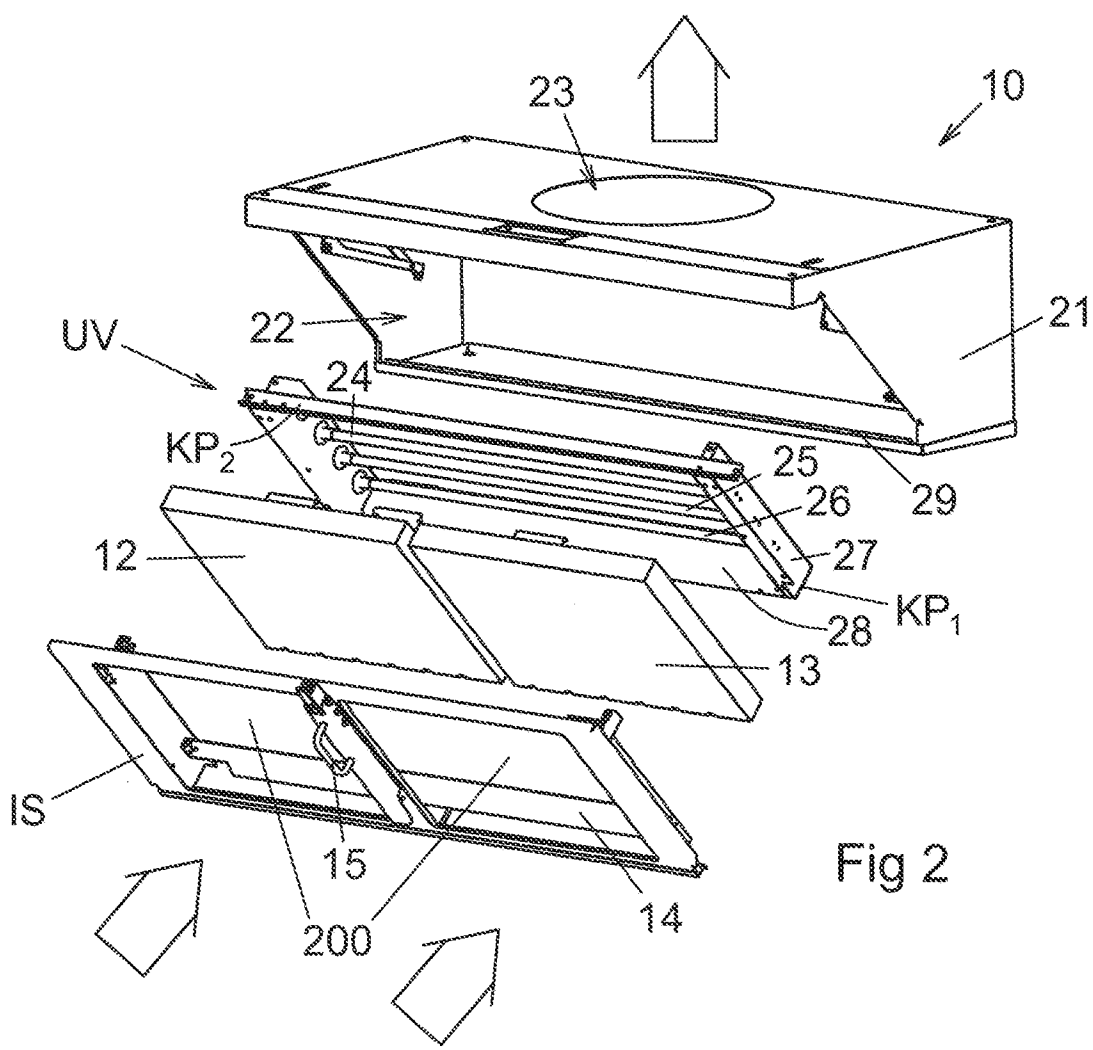
13

Fig 1


23
10
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UV
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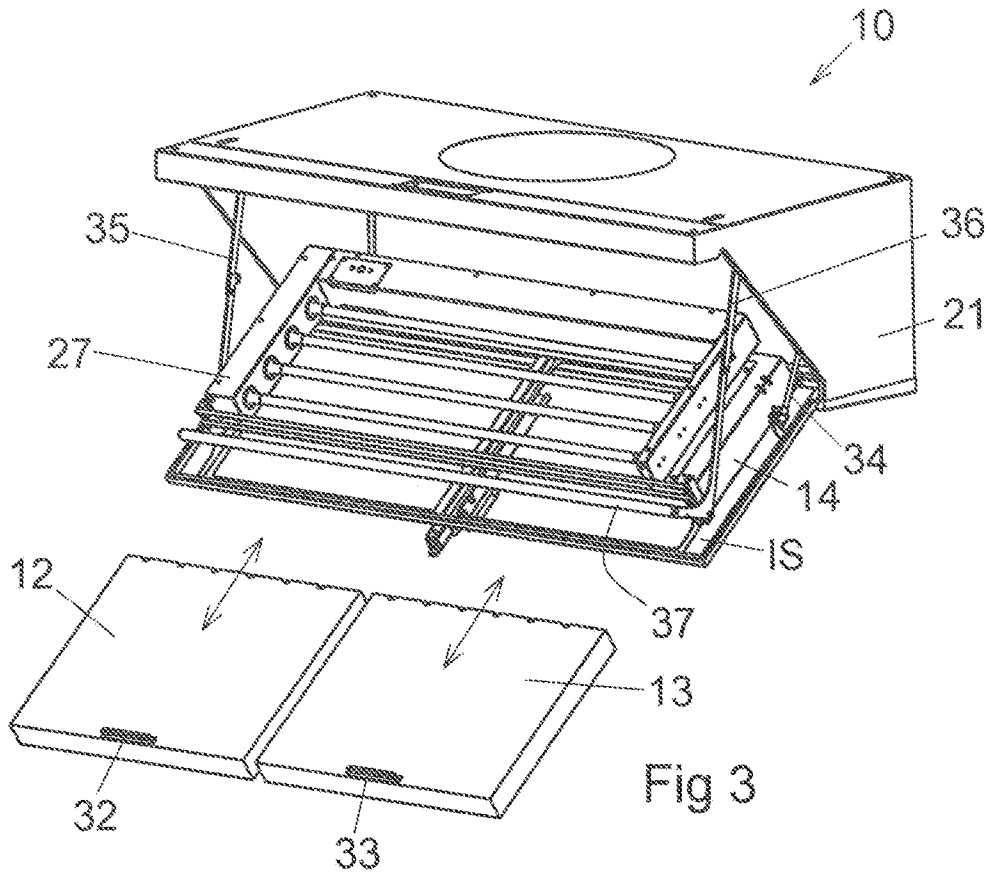
24
KP_2
25
26
29
12
27
KP_1
28
13
IS
15
200
14

Fig 2



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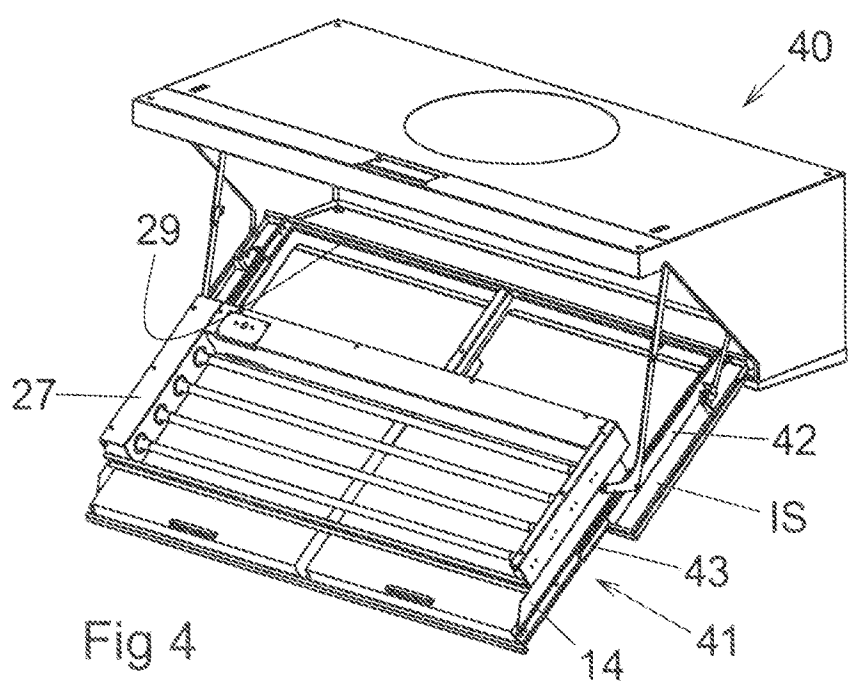
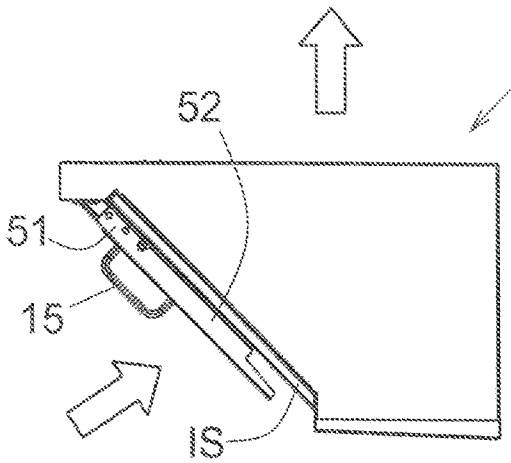


Fig 4



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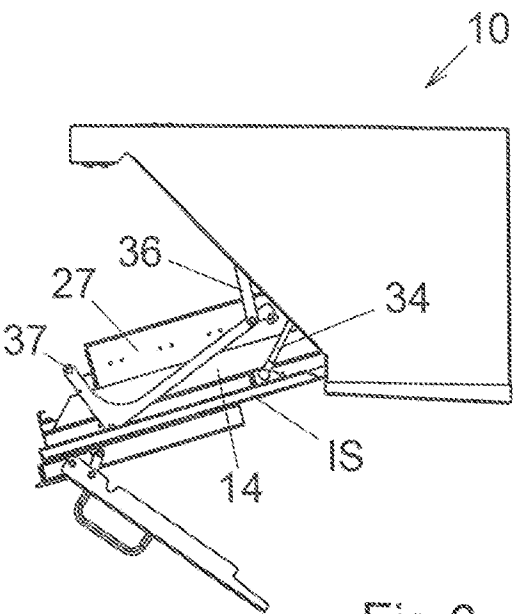

Fig 6

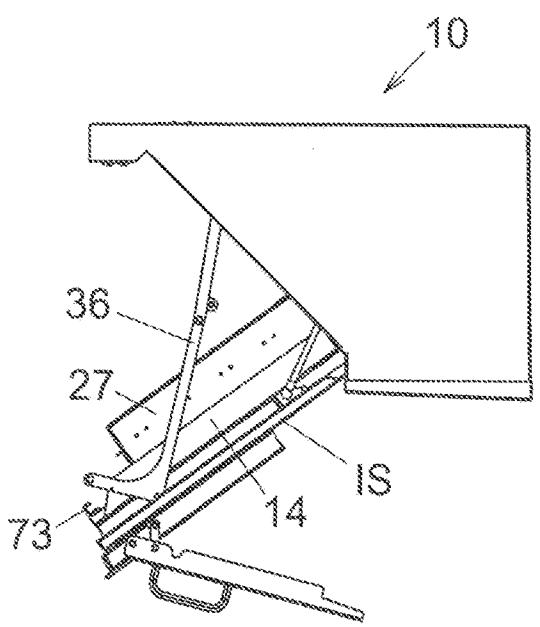

Fig 7

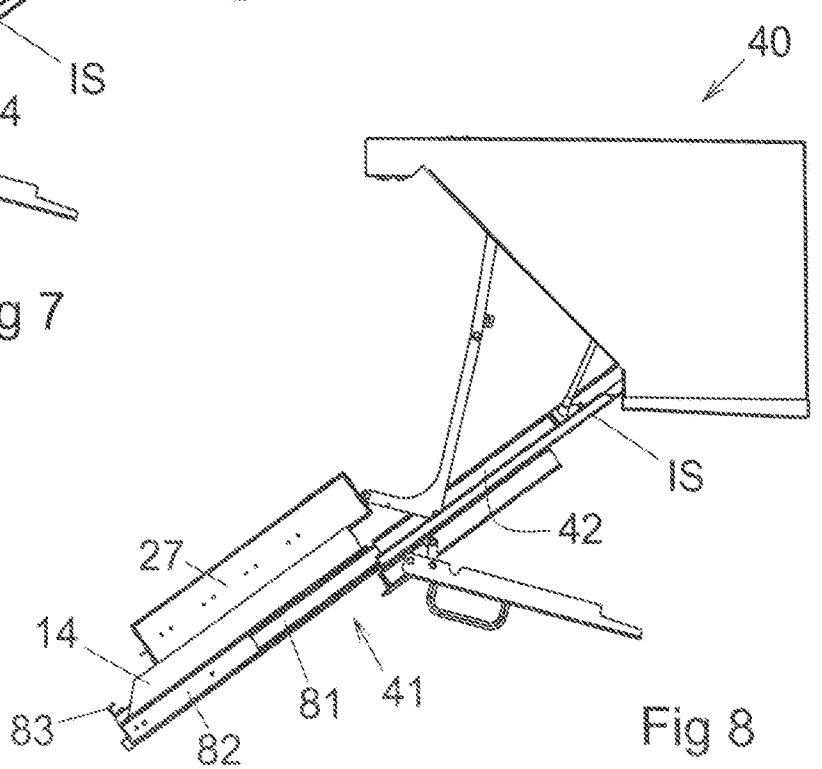

Fig 8

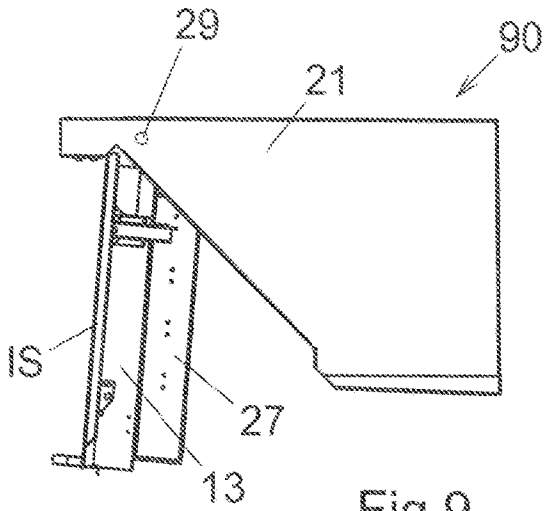

Fig 9

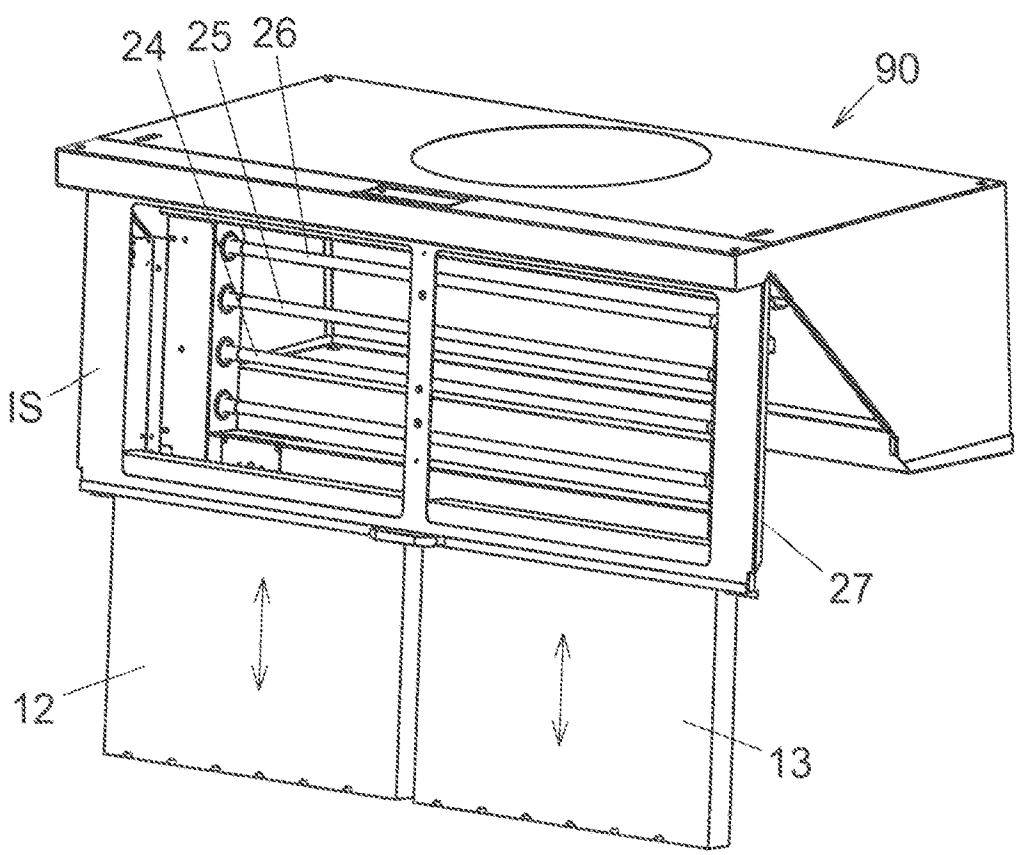

Fig 10

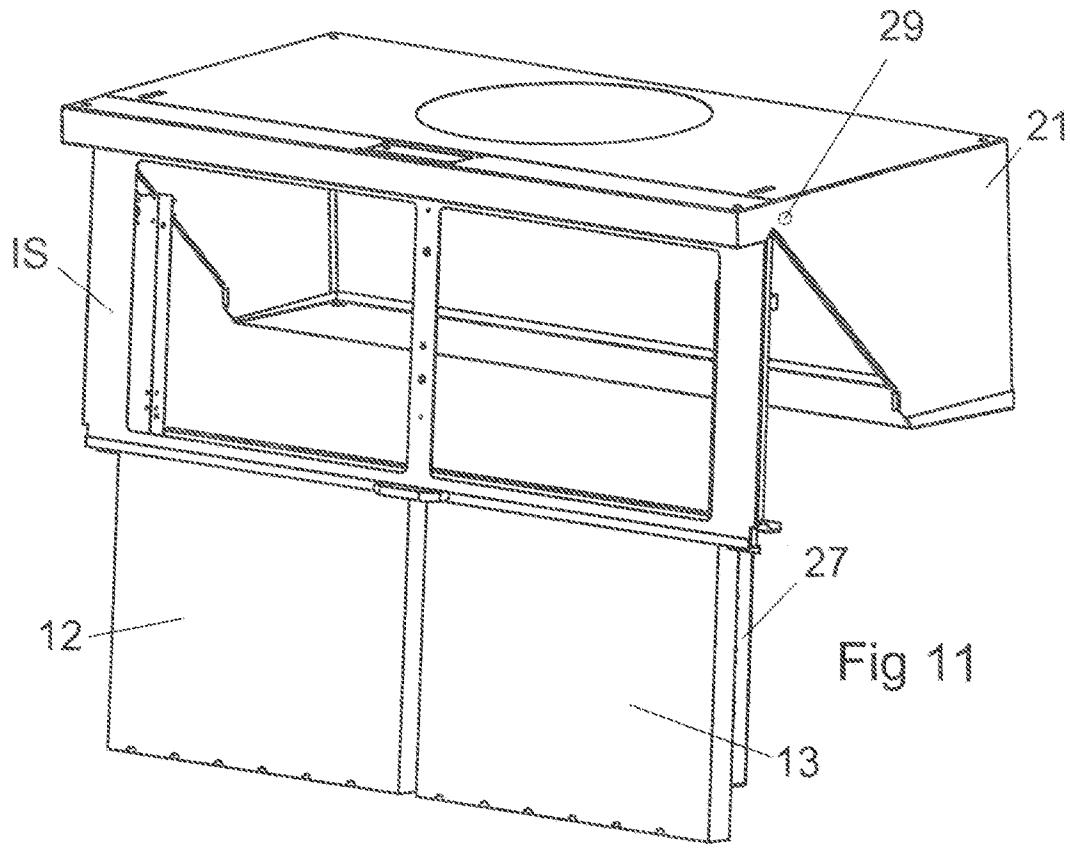

Fig 11

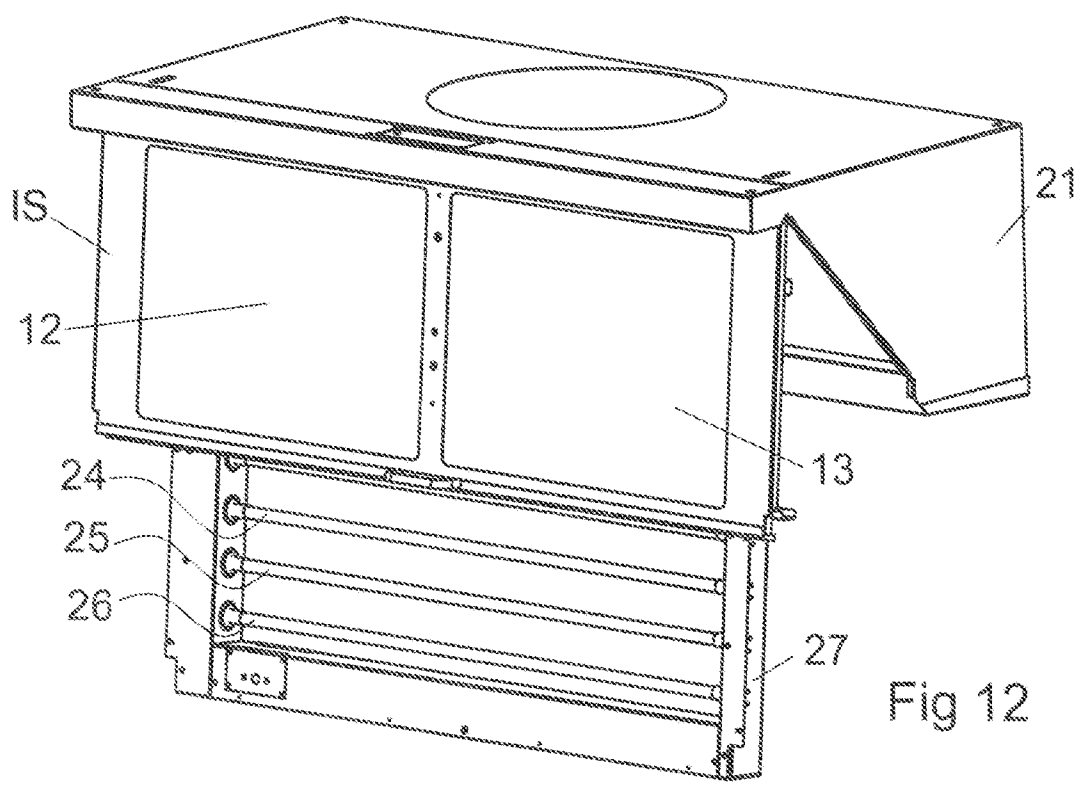

Fig 12

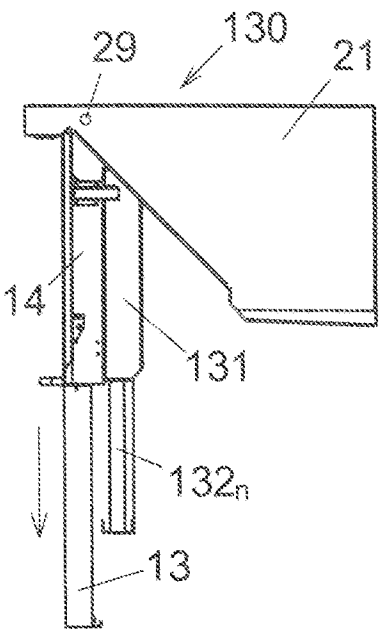

Fig 13

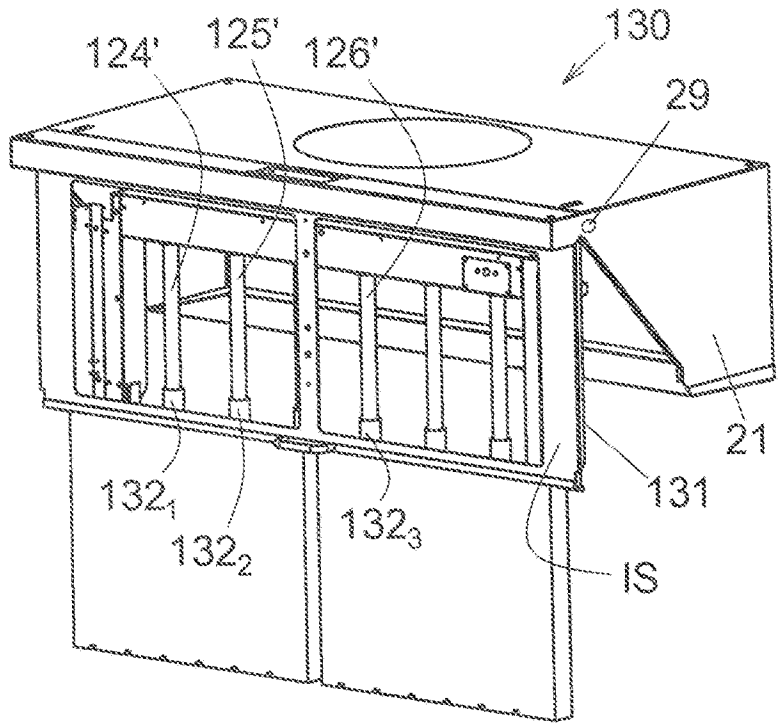

Fig 14

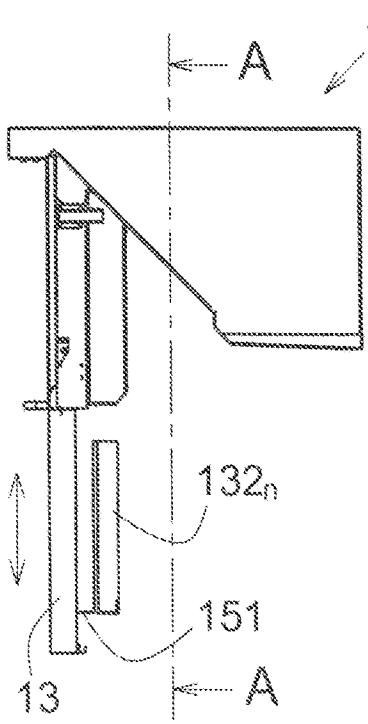

Fig 15

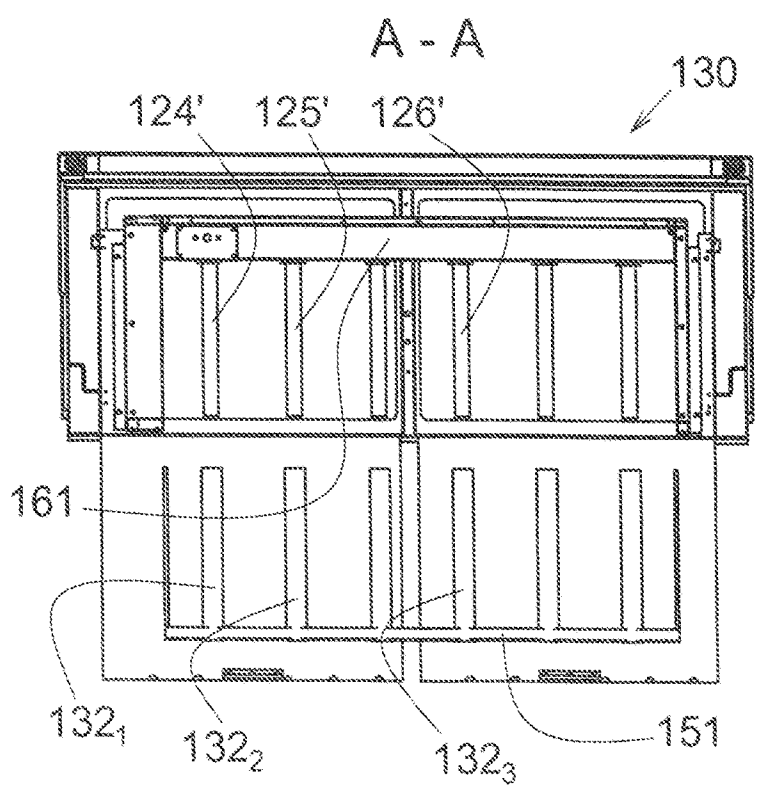

Fig 16

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE2018/050528

A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet

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)

IPC: A61L, B01D, F24C, F24F

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

SE, DK, FI, NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, PAJ, WPI data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 106839040 A (FRANKE CATERING EQUIPMENT INSTALLATION TECHNICAL SERVICES (CHINA) CO LTD), 13 June 2017 (2017-06-13); (abstract) Retrieved from: EPODOC database; Original document: figures 1-3; See machine translation: page 3, lines 92-115, 118-119, and page 4, lines 130-137.	1-11
	--	
X	US 20060000360 A1 (SHOU MING-HWA ET AL), 5 January 2006 (2006-01-05); abstract; paragraphs [0017], [0019]; figures 5, 7	1
	--	
A	GB 2478531 A (SHAW DAVID ALEXANDER), 14 September 2011 (2011-09-14); abstract; figure 2	8
	--	

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

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
17-08-2018	20-08-2018

Name and mailing address of the ISA/SE	Authorized officer
Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. + 46 8 666 02 86	Fredrik Timoteusson Telephone No. + 46 8 782 28 00

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE2018/050528

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 20050232825 A1 (ULTRAVATION INC), 20 October 2005 (2005-10-20); abstract; paragraphs [0003], [0083], [0088]; figures 17, 19-19b --	11
A	DE 202015008747 U (KADVÁNY BABETT), 15 February 2016 (2016-02-15); abstract; paragraphs [0017]-[0019]; figures 3, 5 --	1-11
A	US 20060266221 A1 (FINK RONALD G ET AL), 30 November 2006 (2006-11-30); abstract; paragraph [0041]; figure 2 --	1-11
A	US 20040211321 A1 (VENT MASTER EUROP LTD), 28 October 2004 (2004-10-28); abstract; paragraph [0019]; figure 1A --	1-11
A	DE 202011000465 U1 (BHG DIE EDELSTAHL PROFIS GMBH), 4 June 2012 (2012-06-04); abstract; figure 2 --	1-11
A	CN 205536041 U (NANJING JIMCO ENV TECH DEV CO LTD), 31 August 2016 (2016-08-31); (abstract) Retrieved from: EPODOC database; Original document: figures 1-2 -- --------	1-11

International application No.
PCT/SE2018/050528

Continuation of: second sheet

International Patent Classification (IPC)

F24C 15/20 (2006.01)
A61L 9/20 (2006.01)

CN	106839040	A	13/06/2017	NONE			
US	20060000360	A1	05/01/2006	NONE			
GB	2478531	A	14/09/2011	NONE			
US	20050232825	A1	20/10/2005	US	7419642	B2	02/09/2008
DE	202015008747	U	15/02/2016	NONE			
US	20060266221	A1	30/11/2006	WO	2006023749	A3	14/09/2006
US	20040211321	A1	28/10/2004	US	6878195	B2	12/04/2005
DE	202011000465	U1	04/06/2012	NONE			
CN	205536041	U	31/08/2016	NONE			