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(72) Inventor: **BENOLD, Frank**
33080 Porcia (IT)

(74) Representative: **Electrolux Group Patents**
AB Electrolux
Group Patents
S:t Göransgatan 143
105 45 Stockholm (SE)

(71) Applicant: **ELECTROLUX APPLIANCES**
AKTIEBOLAG
105 45 Stockholm (SE)

(54) **EXTRACTION SYSTEM FOR REMOVING AIR AND CABINET**

(57) An extraction system (10) for removing air from an area above a cooking hob comprises an extraction device (12) and an outlet air channel (14). The extraction device (12) comprises

- an inlet opening (16) for an air intake into an interior of the extraction device (12),
- a conduction means for conducting the air through the interior of the extraction device (12), and
- an outlet connection piece connected to a channel input of the outlet air channel (14).

The outlet air channel (14) is configured for transmitting exhaust air from the channel input to a channel output provided for blowing out the exhaust air.

According to the invention, the outlet air channel (14) includes at least a first component or a first section of its entire length having a cross-sectional area and/or a passage area, which extends in a first direction and in a second direction orthogonally to the first direction. The ratio of the extension in the first direction to the extension in the second direction is at least 3 to 1, preferably at least 5 to 1, more preferably at least 10 to 1.

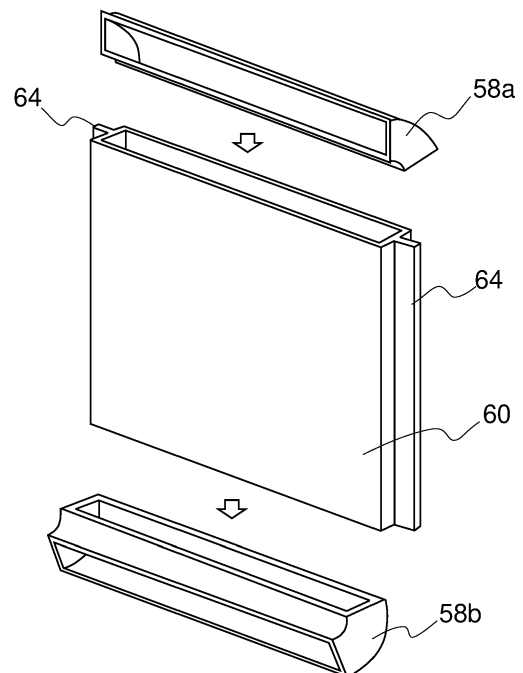


FIG.3

Description

[0001] The present invention relates to an extraction device for removing air from an area above a cooking hob according to the preamble of claim 1. Further, the present invention relates to a system comprising a cabinet and an extraction system according to claim 16. Finally, the present invention relates to a cabinet, in particular a kitchen cabinet, according to claim 17.

[0002] During the performance of cooking activities under use of a cooking hob, cooking vapours are generated, which are distributed over the cooking area. In order to avoid these cooking vapours to be spread throughout the entire kitchen space, an arrangement of an extraction device, particularly an extractor hood, is common. Said extraction device is operated in parallel to the cooking hob, thereby sucking in those cooking vapours in order to filter out particles and tiny droplets from the vapours and/or to blow the vapours to the outside of the building. While it has been common to arrange such an extractor hood above the cooking area, in recent years downdraft extraction devices have been finding a growing market. Such kind of extraction device is usually arranged below a worktop of the related cooking hob and it comprises at least one fan for sucking air from the cooking area through an opening or recess arranged in the worktop.

[0003] Commercial combination appliances with a downdraft extraction device usually operate with recirculating air, which is not extracted outside of the installation room or building, but is blown out into a kitchen cabinet or directly into the ambient air after it has been filtered. That way, the extraction device operates in a so-called air-recycling mode. A common order of arrangement of devices is as follows: the air with cooking vapours is aspirated from the cooking zones above the worktop of the cooking hob through the opening or recess, subsequently passing a particle filter, e.g. a grease particle filter, and particularly an odour filter before being blown out through an outlet opening.

[0004] The respective airflow is commonly guided by means of an air channel system and a related air duct is installed inside the kitchen cabinet, which also accommodates the extraction device. It is common to place the air duct, notably a vertically aligned section thereof, close to a rear wall of the cabinet. Said air duct usually has a circular or rectangular shape and is installed in the cabinet by a kitchen installer. However, in order to make the needed space available, a kitchen planner has to consider that the related space has to be provided, what commonly results in a provision of specific kitchen drawers, which are shortened compared to standard drawers. Naturally, such shortened kitchen drawers can also provide only a respectively reduced storage space.

[0005] It is an object of the present invention to provide an extraction device according to the preamble of claim 1, which prevents a reduction of storage space in a cabinet in case of an implementation of an extraction system therein. Moreover, special solutions for the cabinet and

its interior equipment shall be avoided, particularly by making less expensive standard equipment usable also in case of an extraction system has to be accommodated in the cabinet. It is a further object of the present invention to provide a cabinet, in particular a kitchen cabinet, with a construction providing greatest possible storage space, which storage space is specifically not reduced in the situation of an installation of an extraction system.

[0006] The object is achieved by an extraction system for removing air from an area above a cooking hob according to the features of claim 1. The extraction system includes an extraction device and an outlet air channel. The extraction device comprises an inlet opening for an air intake into an interior of the extraction device, a conduction means for conducting the air through the interior of the extraction device and an outlet connection piece connected to a channel input of the outlet air channel. The outlet air channel is configured for transmitting exhaust air from the channel input to a channel output that is provided for blowing out the exhaust air, in particular into room air or ambient air. According to the present invention, the outlet air channel includes at least a first component or a first section of its entire length with a cross-sectional area and/or a passage area for air passage, which cross-sectional area and/or passage area extends or extend in a first direction and in a second direction orthogonally to the first direction, wherein the ratio of the extension or dimension in the first direction to the extension or dimension in the second direction is at least 3 to 1, preferably at least 5 to 1, more preferably at least 10 to 1.

[0007] The key aspect of the solution according to the present invention is based on the consideration that reducing the depth of the outlet air channel of the extraction system arranged inside the cabinet can prevent a loss of storage space in the cabinet, specifically when a provision of shortened drawers for the cabinet can be avoided that way. Moreover, as a compensation for the reduction of the channel depth, the channel width may be increased in order to provide a sufficient cross-section for an unhindered airflow. More specifically, by providing a ratio of at least 3 to 1 between a first dimension and a second dimension orthogonally to the first dimension of the channel cross-section in at least a first section or component of the outlet air channel, particularly situated in a cabinet area that is commonly used as storage space, the depth of the outlet air channel is notably reduced, i. e. a flatter outlet air channel is provided, so that a loss of storage space in the cabinet due to the outlet air channel installation is minimized and particularly drawers having a significant length, especially standard drawers, may be used.

[0008] The air removed from the area above the cooking hob is particularly heated air and the air may comprise cooking vapours. The extraction device is particularly an extraction hood for the extraction of cooking vapours. More particularly, the extraction device is a downdraft extraction hood, which is implemented in the cabinet, par-

ticularly below and specifically attached to the cooking hob.

[0009] The extraction device preferably further comprises a fan for sucking in the air, notably the cooking vapours, from the area above the cooking hob. Said fan is arranged in or is in operative connection with the conduction means. The extraction device especially includes also a filter means for filtering out particles and droplets of the cooking vapours, in that performing an air-recycling process. The conduction means is particularly an air duct.

[0010] The outlet air channel design may be characterized by any arbitrary flat shape of construction, but in particular the cross-sectional area or passage area of the outlet air channel is rectangular or oval-shaped.

[0011] The first component or first section is particularly positioned or positionable at least close to at least one wall of a cabinet for accommodating the extraction system. More specifically, the component or section is attached or attachable to or positioned or positionable adjacent to the at least one wall. This specifically supports the space utilization to an even greater extent, since unnecessary loss of space is avoided by moving even closer to the wall, notably by reducing the distance to the wall to zero.

[0012] The first component or first section may be attached to or positioned or positionable adjacent to an inner surface of the wall, so that the first component or first section is arranged in the cabinet interior. Alternatively, the first component or first section may be attached to or positioned or positionable adjacent to an outer surface of the wall, which will further increase the storage space of the cabinet, since the entire cabinet depth of a standard cabinet is provided that way. However, due to the outer arrangement of the first component or first section, the outlet air channel needs to penetrate the wall and a respective cutout has to be implemented by a kitchen installer.

[0013] Additionally or alternatively, said first component or first section forms or is designed or configured to form at least a part of at least one wall of the cabinet. By eliminating the wall or a respective part of the wall the possibility is opened to even further move the first component or first section outwards and to arrange the first component or first section at the wall location, so that even more storage space is gained in the cabinet.

[0014] More specifically, the at least one wall is at least one of a side wall, a rear wall and a bottom wall of the cabinet. The selection of the most suitable wall may particularly depend on the design of the extraction device, notably the respective arrangement of its outlet connection piece, or it may depend on the positioning or fixation of interior equipment.

[0015] Preferably, the first component or first section or a wall element comprising the first component or first section is designed and/or configured for replacing a wall of a standard cabinet. That means, a standard cabinet, e.g. a standard kitchen cabinet, may be selected by the kitchen planner without having to consider the installation

of the extraction system therein. Only the kitchen installer has to consider that, however, this person anyway needs to install the outlet air channel, which is merely different but not necessarily more elaborate than with the installation of outlet air channels according to the state of the art. Moreover, a particularly preferred choice of a suitable wall is the rear wall of the cabinet. The positioning of an outlet air channel according to known solutions is back-mounted as one favourite solution. Therefore, when selecting the rear wall for being replaced by the first component or first section of the outlet air channel, there is no need for a redesign of known or standard applications, especially of the extraction device, when implementing the outlet air channel according to the present invention. In a similar way, it is also known to guide the airflow from a back to the front, specifically by an end section of the outlet air channel, for a frontal air discharge. To this end, also the bottom wall may be a suitable object for serving at least partly as a channel. Furthermore, a particularly advanced solution according to the present invention provides for an implementation of the first component or first section of the outlet air channel both in the rear wall and in the bottom wall of the cabinet, which may particularly be the result of a respective special designing of the cabinet.

[0016] A particularly specific embodiment is characterized in that the first component or first section or the wall element comprising the first component or first section forms a replacement of the rear wall of a standard cabinet and comprises at least one laterally arranged tongue configured for being inserted in a groove of a side wall of the cabinet. Said groove for receiving the laterally arranged tongue is particularly the groove provided for a standard cabinet rear wall. More specifically, the tongue is integrally designed with the first component or first section or the wall element comprising the first component or first section. An even more preferred solution provides for an arrangement of tongues both at the left side and at the right side of the first component or first section or the wall element comprising the first component or first section. This results in an integration in the same way as a standard rear wall, namely by retaining the first component or first section or the wall element comprising the first component or first section inside of the grooves in the side walls of the cabinet by means of the tongues on the left side and the right side, hence, forming tongue and groove connections.

[0017] As an alternative to the aforementioned integral design, the first component or first section or the wall element comprising the first component or first section may comprise at least one laterally arranged groove configured for receiving a first lateral edge of a tongue. A second lateral edge, which is opposite to the first lateral edge, of the tongue is configured for being inserted in a groove of a side wall of the cabinet, particularly in the groove provided for standard cabinet rear wall, specifically in the case of said standard cabinet rear wall being replaced by the first component or first section or the wall

element comprising the first component or first section during the kitchen installation process. That way, the tongue, on the one hand, and the first component or first section or the wall element comprising the first component, on the other hand, are provided as separate elements. This modular conception particularly facilitates adaptation to specific applications, notably cabinet applications.

[0018] In order to allow an easy implementation in a cabinet, especially a commercial cabinet, of an arbitrary width, the first component or first section or the wall element comprising the first component or first section may be adaptable to the width of the cabinet by adjusting the width of the tongue. Said adaption is particularly performed by a tongue that is designed in that its lateral extension is reducible, specifically by longitudinally cutting the tongue.

[0019] Said tongue, being a component separate from the first component or first section or the wall element comprising the first component or first section, may not even be a specifically designed component. In fact, the construction of the first component or first section or the wall element comprising the first component or first section may allow the use of the standard rear wall to be replaced as a provider for the creation of the tongue, notably on-site, i. e. by the kitchen installer during the kitchen implementation process. This can be realized in that the kitchen installer cuts off a section, i. e. a strip, of the standard rear wall, resulting in the provision of individually designed and adjusted tongue. Naturally, a second tongue, preferably of the same dimensions, may be produced in the same way in order to get tongues for an application at left and right sides.

[0020] One specific embodiment as regards material selection provides a first component or first section or wall element comprising the first component or first section, which is designed as a metallic component. A preferred selection therefore is aluminium. This type of metallic material is particularly suitable for a lightweight design, and it is easily formable. More specifically, a manufacturing by an aluminium extrusion is an advantageous manner of preparation. Alternatively, the first component or first section or wall element comprising the first component or first section may be designed as a plastic component, which may be manufactured by an injection moulding, a blow moulding or a plastic extrusion process.

[0021] A further enhanced embodiment with an even further increased adaptability is provided in that the first component or first section or the wall element comprising the first component or first section is manufactured with an excess length of arbitrary longitudinal dimension and adaptable to the length required for each specific application. Said adaptation to the specific application is preferably executed by cutting a product resulting from an open length production to the required length. In this context a product manufactured by continuous casting process may be favourable.

[0022] According to an embodiment, the first compo-

nent or first section or the wall element comprising the first component or first section includes at least one supporting rib keeping opposite channel walls at a distance from each other. A single supporting rib is particularly centrally arranged and at least two supporting ribs may be evenly distributed over the lateral extension. Said at least one supporting rib may be favourable with regard to a prevention of the opposite walls to converge, hence causing a reduction of the channel cross-section. Moreover, also a ballooning effect can be prevented with said supporting rib, which effect may occur because of an excess pressure caused by the operation of the fan of the extraction device along with a slowed air discharge.

[0023] The first component or first section or the wall element comprising the first component or first section may be connected or connectable to a deflection element, which connection is arranged at its top end. Alternatively, the deflection element may be arranged or arrangeable at the bottom end of the first component or first section or of the wall element comprising the first component or first section. A specifically preferred solution is characterized by a first and a second, i. e. an upper and a lower, deflection element connected to both the top and the bottom ends of the first component or first section or of the wall element comprising the first component or first section. Such a deflection element is designed to provide or configured for providing a redirection of the airflow of the transmitted exhaust air by at least approximately 90 degrees. Top and bottom ends in the context of the present solution may mean a channel entry and exit. Such kind of redirection may be a horizontal to vertical deflection and/or vice versa.

[0024] A specific embodiment of the present invention is characterized in that the outlet connection piece of the extraction device has a cross-section compatible to the cross-section of the channel input of the outlet air channel. This is favourable at least for the deflection device at the top end of the first component or first section or of the wall element comprising the first component or first section. That way, an easy connection, specifically by means of a slide-in connection, is realizable. Alternatively, an adapter piece may be interposed between the outlet connection piece and the channel input of the outlet air channel, which adapter piece is designed to perform a cross-section adjustment between the outlet connection piece and the channel input of the outlet air channel. Using such an adapter piece may render it unnecessary to modify existing extraction devices, such as those ones that are combined with common, i. e. state of the art, outlet air channels.

[0025] According to a first specific embodiment related to the air discharge, the channel output of the outlet air channel is spaced or configured or designed to be spaced from a plinth area, in particular from a plinth panel arranged in the plinth area, of the cabinet with a distance of at least 5 cm, preferably at least 10 cm, more preferably at least 20 cm, most preferably at least 30 cm. With such an arrangement, the exhaust air is discharged in the base

area of the cabinet, may be distributed over the entire width of the base area of a kitchenette and may return to the entire room via gaps and openings provided by a non-sealed plinth panel. Moreover, a horizontally aligned second component or second section of the outlet air channel, which second component or second section forms an end element of the outlet air channel, may be arranged downstream of, and may be connected to, the first component or first section. More specifically, the second component or second section may be arranged or arrangeable, preferably connectable also by means of a slide-in connection, downstream of the deflection element at the bottom end of the first component or first section. In general, all components of the outlet air channel may be interconnectable by means of said slide-in connection.

[0026] According to a second specific embodiment related to the air discharge, the channel output is positioned or designed or configured to be placed closer to the cabinet front. Anyway, as with a preferred embodiment of the solution according to the first specific embodiment above, the outlet air channel comprises a horizontally aligned or alignable second component or second section, which is particularly arranged downstream of the first component or first section, more particularly downstream of the deflection element at the bottom end of the first component or first section.

[0027] According to a first aspect, the second component or second section is arranged or arrangeable below a bottom wall of the cabinet extending to a frontal plinth area of the cabinet. More specifically, the second component or second section particularly extends or is designed or configured to extend to a plinth panel arranged in the plinth area. Said plinth panel preferably comprises an opening for air passage and the channel output may open out into said opening. In particular, the second component or second section includes a bypass channel arrangement, which preferably performs an airflow split, for leading the airflow past a cabinet foot. In this case, a specifically preferred design for the second component or second section is approximately "Y"-shaped in a top view. The outlet air channel may penetrate or may be configured to penetrate a rear section of the bottom wall of the cabinet or, alternatively, the bottom wall may be shortened or designed to be shortened, e. g. by cutting, in order to provide connection possibility between first and second components or sections, i. e. a non-obstructed installation space for the entire outlet air channel.

[0028] According to a second aspect, which is an alternative to the first aspect above, the second component or second section is guided or is configured to be guided alongside a top side of a bottom wall of the cabinet, i. e. in the interior of the cabinet. Then, the channel output may also be arranged in the cabinet interior. Preferably, however, the exhaust air is discharged outside of the cabinet in order to avoid a humid environment in the cabinet interior. For such leading to the outside, an end section of the second component or second section may

penetrate or may be configured to penetrate a fixed front panel of the cabinet. However, said fixed front panel limits the frontal access to the cabinet, therefore, a preferred solution is characterized by an end section of the second component or second section, which is guided or configured to be guided through a front section of the bottom wall, specifically in vertical direction, designed for performing a vertical air discharge.

[0029] According to a specific embodiment, which significantly differentiates from the afore-mentioned embodiment in the location of air discharge, the outlet air channel penetrates or is configured to penetrate a kitchen worktop or a cooking hob panel providing an air discharge above the kitchen worktop or cooking hob panel, preferably with a channel output spaced from or configured to be arranged spaced from the kitchen worktop or cooking hob panel. But indeed, also this specific solution comprises any flat channel arrangement and also the worktop penetration and optionally also the channel output may be characterized by an elongated design.

[0030] The object is also achieved by a system comprising a cabinet, in particular a kitchen cabinet, and an extraction system according to anyone of the embodiments described above.

[0031] The object is further achieved by a cabinet, in particular a kitchen cabinet, comprising at least one hollow wall or comprising at least one wall that is replaceable by a hollow wall. The hollow wall comprises at least one inlet for introduction of air and an outlet for blowing-out the introduced air or for blowing into an exhaust channel. The cabinet in particular accommodates the extraction system according to anyone of the embodiments described above.

[0032] In particular, the introduced air is heated air and the air may comprise cooking vapours. More specifically, the air may be blown out into room air or ambient air.

[0033] Novel and inventive features of the present invention are set forth in the appended claims.

[0034] The present invention will be described in further detail with reference to the drawing, in which

Fig. 1 is a perspective sketch view of a combination appliance comprising a cooking hob and a downdraft extraction device installed in a kitchen cabinet according to a prior art solution;

Fig. 2 is a schematic side view of a combination appliance according to the invention with a side wall removed;

Fig. 3 is a perspective view of a rear wall of the combination appliance according to Fig. 2 with integrated air channel and related top and bottom deflection elements;

Fig. 4 is a detailed view of a side area of the rear wall with a modified affixing of a connection tongue;

Fig. 5 is an illustration of the combination appliance of Fig. 2, but with modified end section of an outlet air channel; and

Fig. 6 is a schematic top view of the base section of the combination appliance of Fig. 5 along the line VI - VI.

[0035] Fig. 1 illustrates by way of a schematic diagram a combination appliance 10 comprising a cooking hob 12 and a downdraft extraction device 14 installed in a kitchen cabinet 16 according to a prior art solution. The cooking hob 12 is implemented in a cutout of a kitchen countertop 18 forming a top cover plate of the kitchen cabinet 16. The downdraft extraction device 14 is configured to take away cooking vapours occurring during cooking processes, in particular when cooking with uncovered cookware. The cooking hob 12 comprises cooking regions 20a, 20b arranged on a left half and a right half of a worktop 22 of the cooking hob 12, which left and right halves are separated from each other by a suction opening 24 for an intake of the cooking vapours, the suction opening 24 being arranged alongside a worktop centreline. The suction opening 24 is covered by a cover grid 26 for preventing items, e.g. cookware, to fall into the suction opening 24. Instead of the cover grid 26 a lid may be used for entirely covering the suction opening when the extraction device 14 is out of use, but for the operation of the extraction device 14 the lid is pivotable into an upright open position.

[0036] A casing 28 of the extraction device 14 is shown in Fig. 1 with a front wall thereof being removed, so that the interior is visible. Said casing 28 provides a closed outer shell or an inner channel for a flow of the sucked-in cooking vapours on their way from the suction opening 24 to an exhaust opening 30 in a base area 32 of the kitchen cabinet 16. Said exhaust opening 30 is also covered, namely by an outlet grille 34.

[0037] The flow of the sucked-in cooking vapours through the extraction device 14 is driven by the operation of an extraction fan 36 arranged inside of the casing 28. Said extraction fan 36 comprises a bottom-sided intake opening 38 for sucking the cooking vapours from the interior space of the casing 28.

[0038] As not illustrated in detail by Fig. 1, a rear-sided fan outlet is arranged for a horizontal exit of the air blown out backwards from the extraction fan housing 42. The fan outlet is connected to a first end of an air duct 44 designed as a rectangular tube, which forms an outlet air channel arranged downstream the fan outlet. Directly at the passage from the fan outlet to the air duct 44, an air duct bending by 90 degrees is implemented, which redirects the air flow from horizontal to vertical downwards. The air duct 44 is guided alongside a rear wall 40 of the kitchen cabinet 16 and is bent again by 90 degrees close to a rear lower edge of the kitchen cabinet 16 in order to direct the airflow towards exhaust opening 30 in the base area 32 of the kitchen cabinet 16. Accordingly, the second

end of the air duct 44 is connected to the exhaust opening 30. The embodiment illustrated in Fig. 1 shows a solution of the air duct 44 with an inclined section of its downwardly directed portion, directed slightly to the right. A solution with said portion arranged in an exact vertical direction is known as well.

[0039] The course of the cooking vapours from the cooking area through the extraction device 14 to a re-entry into ambient air is illustrated in Fig. 1 by dotted arrows 46¹ to 46⁵. On their way through the extraction device 14, the cooking vapours pass through a filter assembly 48, which is arranged downstream directly behind the suction opening 24.

[0040] As can be understood from the illustration of Fig. 1, the air duct 44 reduces the storage space of the kitchen cabinet 16. This space reduction is particularly notable in the case of the kitchen cabinet 16 being equipped with drawers. In that case, said drawers have to be provided in a shortened version, whereby the shortening has an impact on space reduction over the entire width of the kitchen cabinet 16, if no custom solution will be chosen for said drawers.

[0041] Fig. 2 is a schematic side view of a combination appliance 10 according to the present invention with a side wall of the combination appliance 10 removed. Although only a schematic illustration is presented by Fig. 2, the combination appliance 10 generally comprises all the technical equipment as that one of the combination appliance 10 of the prior art as illustrated with Fig. 1.

[0042] The combination appliance 10 of Fig. 2 essentially differs from the prior art embodiment according to Fig. 1 in the outlet air channel 50, which replaces the air duct 44 used in the prior art combination appliance 10. A further difference is the exhaust opening 30, which is moved back from a front section of the base area 32 to a middle area along with a related outlet grille 34, which may also be omitted. This measure avoids the need of providing a cutout in a plinth panel 52, as is not illustrated in Fig. 1 but usually realized in real life. As a consequence of said re-positioning of the exhaust opening 30 according to Fig. 2, the exhaust air is not blown out directly into the kitchen space but distributes over the base area of the kitchenette, which includes the kitchen cabinet 16, before entering the kitchen space via an elongated gap 54 between the plinth panel 52 and a bottom wall of the cabinet 16.

[0043] The entire outlet air channel 50 is an assembly group of several component parts, some thereof being illustrated in Fig. 3 separated from each other in an enlarged perspective view. Exhaust air leaves the casing 28 via a connection pipe 56, which is connected to an outlet port of the fan housing (42, not shown in Fig. 2). Following the connection pipe 56 in downstream direction, an upper channel deflection element 58a effects a redirection of the airflow conducted in the entire outlet air channel 50 from a horizontal to a vertical direction. Further downstream, a vertical flat channel element 60 is connected to the channel deflection element interface,

which interface opens in vertical direction. At the lower rear edge of the cabinet 16, the outlet air channel 50 continues with a lower channel deflection element 58b, which is connected to the lower interface of the vertical flat channel element 60 and provides another airflow deflection redirecting the airflow from vertical to horizontal, directed to the front side of the cabinet 16. Finally, the outlet air channel 50 ends with a horizontal channel end element 62 that opens out into the atmosphere, i. e. the room air or ambient air, with its exhaust opening 30.

[0044] As can be seen more in detail in Fig. 3, the flat channel element 60 as well as the related channel deflection elements 58a, 58b are designed as elongated components, which extend horizontally over the entire width of the cabinet 16. Due to the wide construction of e. g. the flat channel element 60, its depth can be minimized compared to the air channel 44 of the prior art solution according to Fig. 1 in order to keep both cross-sectional surfaces at the same level, with e. g. avoiding the risk of reducing the airflow volume. As a result of the depth reduction compared to the prior art solution, the loss of space in the cabinet 16 as a result of air duct installation can be minimized.

[0045] The vertical flat channel element 60 may be designed to be attachable to the rear wall 40 of the cabinet. However, another and even more space saving solution can be also seen in Fig. 3. In fact, the flat channel element 60, which has an elongated rectangular cross-section, comprises tongues 64 at its left and right side walls, which are configured to join corresponding grooves (not shown) arranged at the rear side of the left and right side walls of the cabinet 16. Said grooves are particularly usually arranged in said side walls of standard cabinets providing a joint by insertion for a rear wall 40, which is not only provided for closing the cabinet 16 on the back but also ensures stability of the cabinet construction.

[0046] The flat channel element 60 along with its attached tongues 64 is designed such that it can replace a standard rear wall of the cabinet 16, either immediately with the production of the cabinet 16 or at the moment of installation of the cabinet 16 in a kitchenette, what usually walks along with the implementation of the combination appliance 10 in the cabinet 16. In the latter case, the kitchen installer removes the standard rear wall 40 from its position by decoupling their left and right lateral edges from the grooves of the left and right side walls of the cabinet 16. Subsequently, the outer edges of the tongues 64 of the vertical flat channel element 60 are inserted in the vacant grooves, in that not only rebuilding a stable cabinet by implementing the stabilizing replacement for the rear wall 40, but also arranging one component of the entire outlet air channel 50 at its final place. Thereafter, the kitchen installer may finish the outlet air channel 50 by connecting the other elements 58a, 58b, 62 to the vertical flat channel element 60. Finally, the outlet air channel 60 is ready to be connected to the connection pipe 56 of the casing 28 of the extraction device 14.

[0047] All components of the outlet air channel 50, in

particular the vertical flat channel element 60 and its tongues 64 may be made of a plastic material. Further, the tongues 64 of the vertical flat channel element 60 according to Fig. 3 are integrally formed with the side walls of the flat channel element 60.

[0048] Fig. 4 shows a detail view of an alternative embodiment of one of the tongues 64. In contrast to the embodiment of Fig. 3, the tongue 64 of the alternative embodiment is not fixedly arranged at the side wall of the vertical flat channel element 60, in fact, the tongue 64 is designed as elongated strip comprising first and second lateral edges 64a, 64b, wherein the first lateral edge 64a is intended to be inserted in a groove 66 provided at the side wall of the vertical flat channel element 60. With the first lateral edge 64a being inserted, the entire assembly is congruent with the embodiment according to Fig. 3 and the second lateral edge 64b of the tongue 64 is provided for its insertion in the groove of the assigned side wall of the cabinet 16.

[0049] The separate tongue 64 according to the embodiment of Fig. 4 can be a specially fabricated accessory of the outlet air channel 50. Preferably however, the tongue 64 is individually manufactured by the kitchen installer by cutting off respective strips from the standard rear wall of the cabinet 16. That way, the actually needed width can first be measured from the present cabinet 16, so that tailored tongues 64 can be made available.

[0050] As illustrated by Fig. 3, the replacement of the standard rear wall 40 by the vertical flat channel element 60 keeps an upper section of the reverse side of the cabinet 16 open. This, however, is just a matter of design rather than providing any stability problems for the cabinet 16. Depending on individual preference, the open area can be closed by means of another section cut from the standard rear wall 40.

[0051] As earlier mentioned, the embodiment according to Fig. 2 differs from the prior art solution of Fig. 1 in the positioning of the exhaust opening 30. With Fig. 5 a solution according to the present invention is illustrated, which, as regards the location of air discharge, is similar to the known solution. This concerns an extension of the channel end element 62, which is extended up to the front of the base area 32, so that its final section penetrates the plinth panel 52 and defines an exhaust opening 30 at the front face of the plinth panel 52, preferably covered by an outlet grille 34.

[0052] The exhaust opening 30 and a respective outlet grille 34 may extend over nearly the entire cabinet width. If, however, the structure of the cabinet 16 requires a foot 68 arranged centrally at the front of the base area 32, besides the usual feet at the four corners of the cabinet base, the channel end element 62 has to be designed as a bypass channel arrangement 70 as shown by Fig. 6, which is a top view of the base area 32 of the cabinet 16 according to Fig. 5. As illustrated, the bypass channel arrangement 70 is approximately "Y"-shaped with a channel input 70a on the rear side of the cabinet 16 and two channel outputs 70b that are horizontally spaced

from each other by circumventing the central cabinet foot 68 and by splitting up the airflow that enters the channel end element input 70a over the whole cabinet width and focussing towards the two smaller channel outputs 70b for air discharge. In order to prevent increased dynamic pressure in the interior of the bypass channel arrangement 70 due to a reduction of the total cross-sectional surface caused by said split-up, the height of the two channel end element outputs 70b may be increased in order to compensate said reduction of the total width.

[0053] Although illustrative embodiments of the present invention have been described herein with reference to the accompanying drawings, it is to be understood that the present invention is not limited to these precise embodiments, and that various other changes and modifications may be affected therein by one skilled in the art without departing from the scope or spirit of the invention. All such changes and modifications are intended to be included within the scope of the invention as defined by the appended claims.

List of reference numerals

[0054]

10	combination appliance
12	cooking hob
14	downdraft extraction device
16	kitchen cabinet
18	kitchen countertop
20a, 20b	cooking regions
22	worktop
24	suction opening
26	cover grid
28	casing
30	exhaust opening
32	base area
34	outlet grille
36	extraction fan
38	intake opening
40	rear wall
42	fan housing
44	air duct
46 ¹ to 5	arrows indicating air flow
48	filter assembly
50	outlet air channel
52	plinth panel
54	gap
56	connection pipe
58a, 58b	upper and lower channel deflection elements
60	vertical flat channel element
62	channel end element
64	tongue
64a, 64b	lateral edges
66	groove
68	foot
70	bypass channel arrangement

70a	channel end element input
70b	channel end element output

5 Claims

1. An extraction system for removing air, in particular heated air, from an area above a cooking hob (12), which air particularly comprises cooking vapours, the extraction system comprising an extraction device (14), particularly an extraction hood, more particularly a downdraft extraction hood, and an outlet air channel (50), the extraction device comprising

- an inlet opening (24) for an air intake into an interior of the extraction device (14),
- a conduction means, particularly an air duct, for conducting the air through the interior of the extraction device (14),
- preferably a fan for sucking-in the air from the area above the cooking hob (12), the fan being arranged in or being in operative connection with the conduction means, and
- an outlet connection piece (56) connected to a channel input of the outlet air channel (50), wherein the outlet air channel (50) is configured for transmitting exhaust air from the channel input to a channel output (30) provided for blowing out the exhaust air, in particular into room air or ambient air,

characterized in that

the outlet air channel (50) includes at least a first component (60) or a first section of its entire length having a cross-sectional area and/or a passage area, which extends in a first direction and in a second direction orthogonally to the first direction, wherein the ratio of the extension in the first direction to the extension in the second direction is at least 3 to 1, preferably at least 5 to 1, more preferably at least 10 to 1, wherein the cross-sectional area and/or the passage area is particularly rectangular or oval-shaped.

2. The extraction system according to claim 1,

characterized in that

the first component (60) or first section

- is positioned or positionable at least close to at least one wall of a cabinet (16) for accommodating the extraction system, in particular the component or section is attached or attachable to or positioned or positionable adjacent to the at least one wall (40), and/or
- forms or is configured to form at least a part of at least one wall (40) of the cabinet (16).

3. The extraction system according to claim 2,

characterized in that

the at least one wall is at least one of

- a side wall,
- a rear wall (40), and
- a bottom wall

of the cabinet (16).

4. The extraction system according to anyone of the preceding claims,
characterized in that
the first component (60) or first section or a wall element comprising the first component (60) or first section is designed and/or configured for replacing a wall, preferably the rear wall (40), of a standard cabinet (16) for accommodating the extraction system.
5. The extraction system according to claim 4,
characterized in that
the first component (60) or first section or the wall element comprising the first component (60) or first section forms a replacement of the rear wall (40) of a standard cabinet (16) for accommodating the extraction system and comprises at least one laterally arranged tongue (64) configured for being inserted in a groove of a side wall of the cabinet (16), particularly in the groove provided for a standard cabinet rear wall (40).
6. The extraction system according to claim 4,
characterized in that
the first component (60) or first section or the wall element comprising the first component (60) or first section comprises at least one laterally arranged groove (66) configured for receiving a first lateral edge (64a) of a tongue (64), wherein a second lateral edge (64b), which is opposite to the first lateral edge (64a), of the tongue (64) is configured for being inserted in a groove of a side wall of the cabinet (16), particularly in the groove provided for standard cabinet rear wall (40).
7. The extraction system according to claim 5 or 6,
characterized in that
the first component (60) or first section or the wall element comprising the first component (60) or first section is adaptable to the width of the cabinet (16) by adjusting the width of the tongue (64), the lateral extension of the tongue (64) in particular being reducible, specifically by cutting the tongue (64).
8. The extraction system according to anyone of the preceding claims,
characterized in that
the first component (60) or first section or the wall element comprising the first component (60) or first section

- is a metallic component, particularly made of aluminium, more particularly manufactured by an aluminium extrusion, or
- is a plastic component, particularly manufactured by an injection moulding, a blow moulding or a plastic extrusion process.

9. The extraction system according to claim 8,
characterized in that
the first component (60) or first section or the wall element comprising the first component (60) or first section is manufactured with an excess length of arbitrary longitudinal dimension and adaptable to the length required for each specific application, preferably by cutting a product resulting from an open length production to the required length.
10. The extraction system according to anyone of the preceding claims,
characterized in that
the first component (60) or first section or the wall element comprising the first component (60) or first section includes at least one supporting rib keeping opposite channel walls at a distance from each other, wherein the at least one supporting rib particularly being centrally arranged or evenly distributed over the lateral extension.
11. The extraction system according to anyone of the preceding claims,
characterized in that
the first component (60) or first section or the wall element comprising the first component (60) or first section is connected or connectable to a deflection element (58a, 58b) at its top and/or bottom end, designed or configured for providing a redirection of the airflow of the transmitted exhaust air by at least approximately 90 degrees.
12. The extraction system according to anyone of the preceding claims,
characterized in that
the outlet connection piece (56) of the extraction device (14) has a cross-section compatible to the cross-section of the channel input of the outlet air channel (50) or an adapter piece is interposed between the outlet connection piece (56) and the channel input of the outlet air channel (50) designed to perform a cross-section adjustment.
13. The extraction system according to anyone of the preceding claims,
characterized in that
the channel output (30) of the outlet air channel (50) is spaced from or designed to be spaced from a plinth area of a cabinet (16) for accommodating the extraction system, in particular from a plinth panel (52) arranged in the plinth area, with a distance of at least

5 cm, preferably at least 10 cm, more preferably at least 20 cm, most preferably at least 30 cm, wherein particularly a horizontally aligned second component (62) or second section of the outlet air channel (50), which forms an end element of the outlet air channel (50), is arranged downstream of, and is preferably connected to, the first component (60) or first section, preferably downstream of the deflection element (58b) at the bottom end of the first component (60) or first section.

14. The extraction system according to anyone of the preceding claims,

characterized in that

the outlet air channel (50) comprises a horizontally aligned or alignable second component (62) or second section, which is particularly arranged downstream of the first component (60) or first section, wherein the second component (62) or second section

- is arranged or arrangeable below a bottom wall of a cabinet (16) for accommodating the extraction system extending to a frontal plinth area of the cabinet (16), in particular to a plinth panel (52) arranged in the plinth area, which plinth panel (52) preferably comprises an opening for air passage, wherein particularly the second component (62) or second section includes a bypass channel arrangement (70), which preferably performs an airflow split, for leading the airflow past a cabinet foot (68), and wherein the outlet air channel (50) particularly penetrates or is configured to penetrate a rear section of the bottom wall of the cabinet (16),

or

- is guided or is configured to be guided alongside a top side of a bottom wall of the cabinet (16), preferably with an end section of the second component (62) or second section penetrating or being configured to penetrate a front section of the bottom wall, specifically in vertical direction, designed for performing a vertical air discharge.

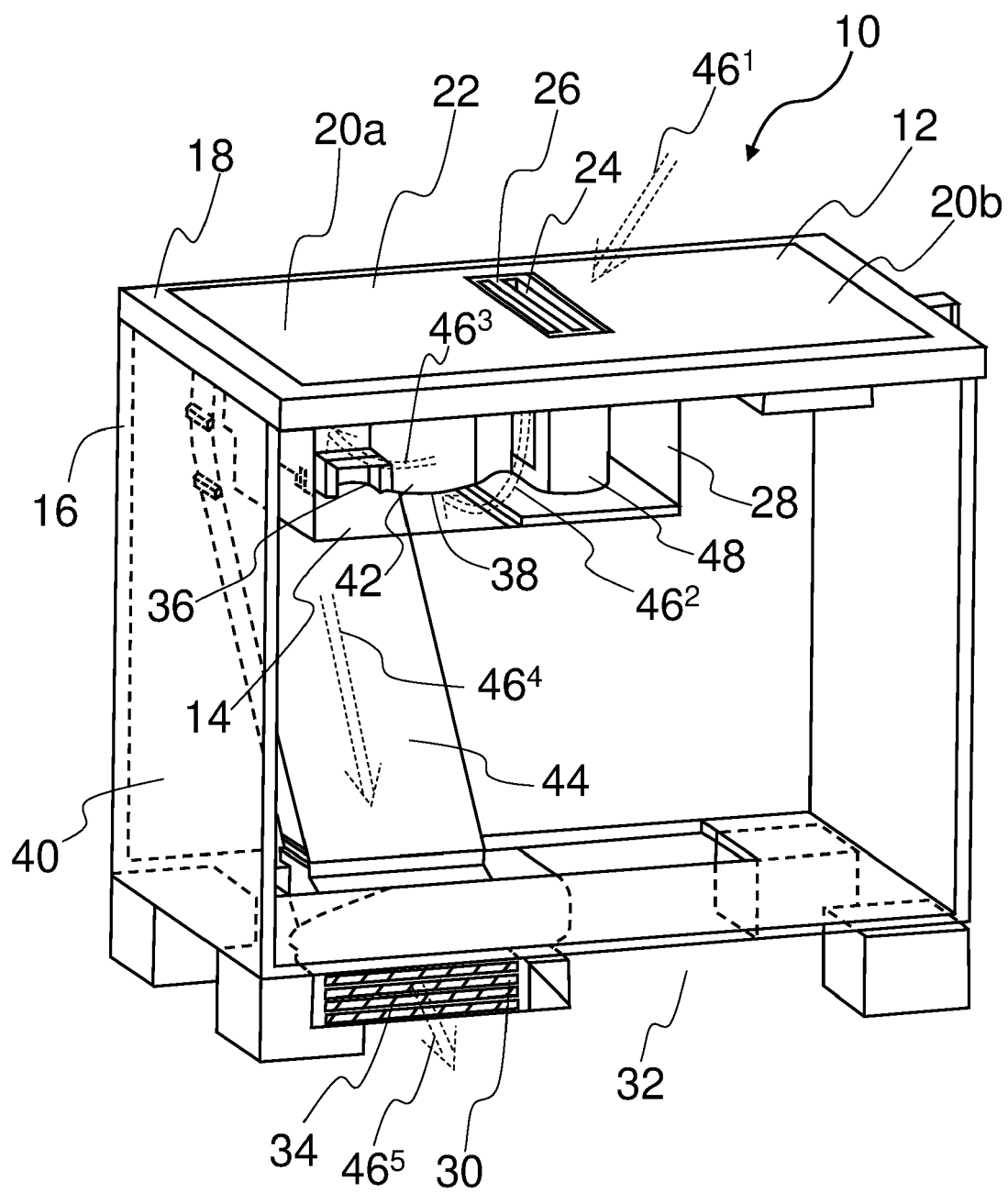
15. The extraction system according to anyone of the claims 1 to 3,

characterized in that

the outlet air channel (50) penetrates or is configured to penetrate a kitchen worktop (18) or a cooking hob panel (22) providing an air discharge above the kitchen worktop (18) or cooking hob panel (22), preferably with a channel output spaced from or designed to be spaced from the kitchen worktop (18) or cooking hob panel (22).

16. A system comprising a cabinet, in particular kitchen cabinet, and an extraction system according to anyone of the preceding claims.

17. A cabinet, in particular kitchen cabinet, comprising at least one hollow wall or comprising at least one wall that is replaceable by a hollow wall, the hollow wall comprising at least one inlet for introduction of air, particularly of heated air, more particularly of air comprising cooking vapours, and an outlet for blowing-out the introduced air, particularly into room air or ambient air, or for blowing into an exhaust channel, the cabinet in particular accommodating the extraction system according to anyone of the claims 1 to 15.



PRIOR ART

FIG.1

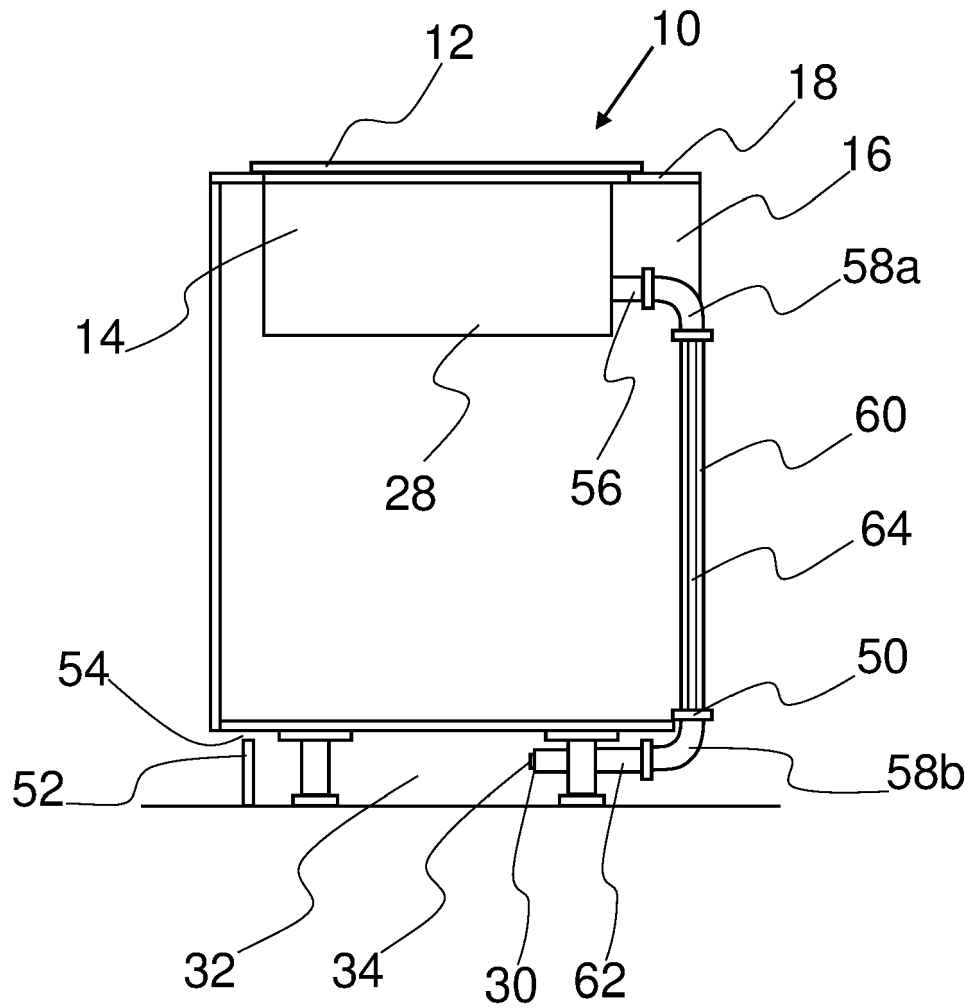


FIG.2

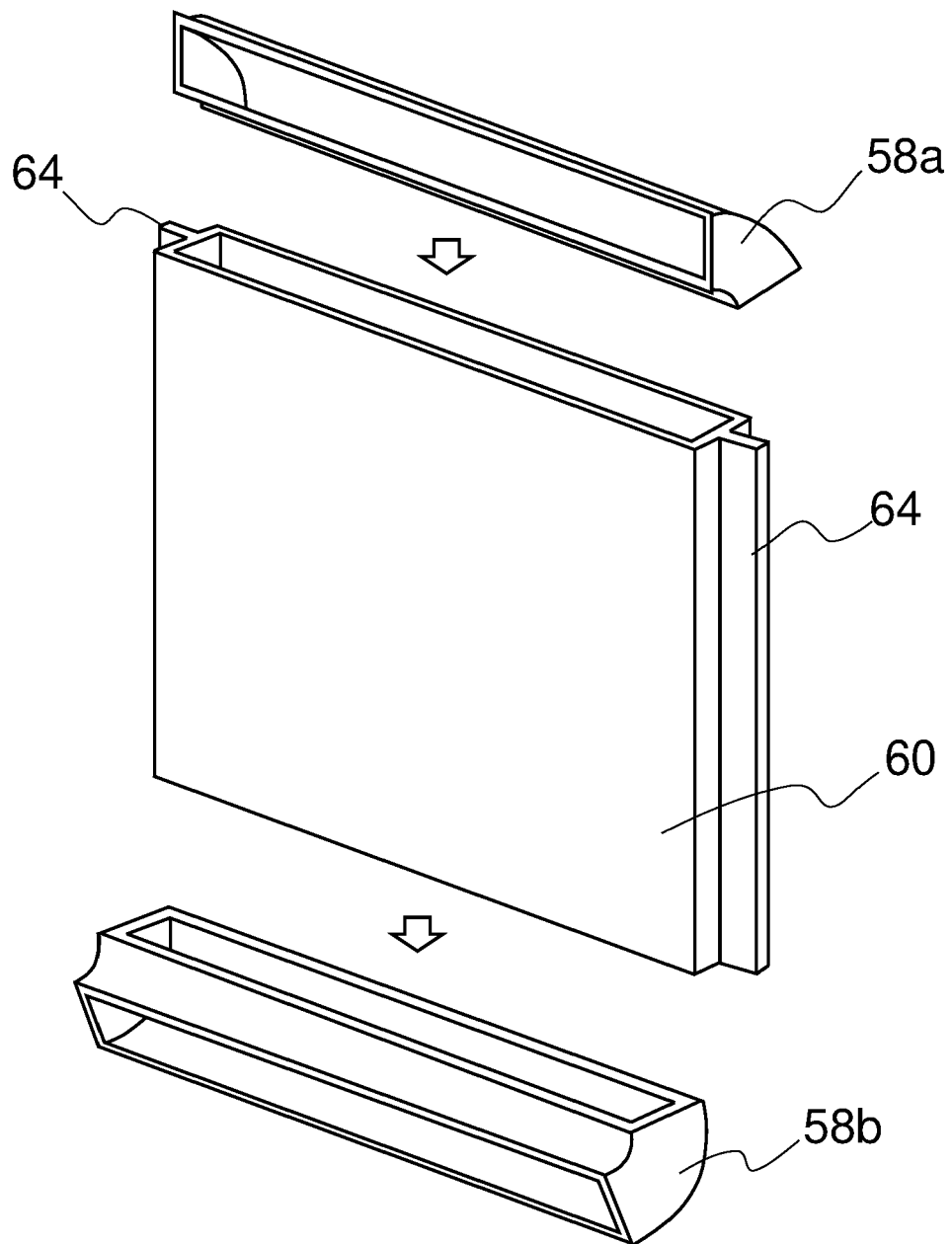


FIG.3

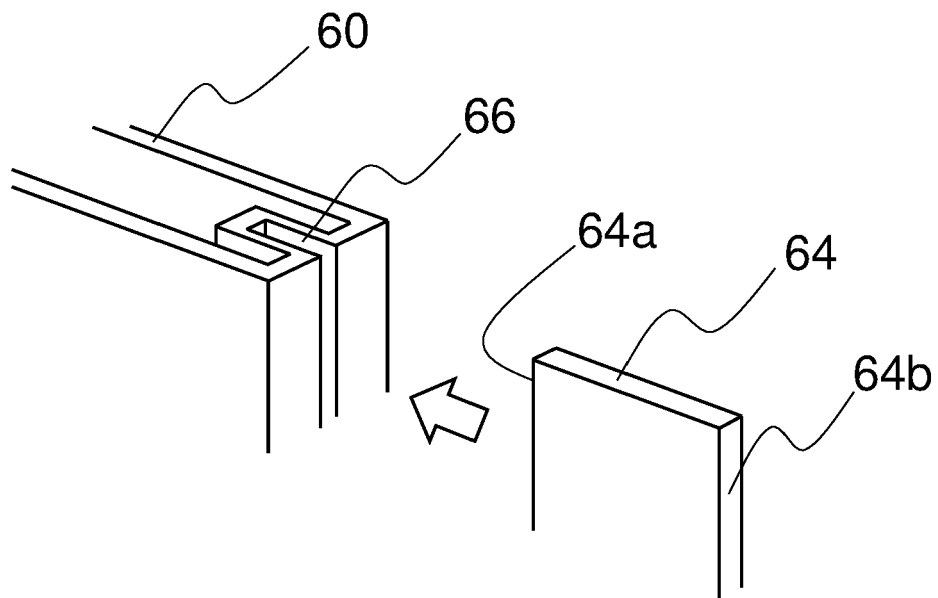


FIG.4

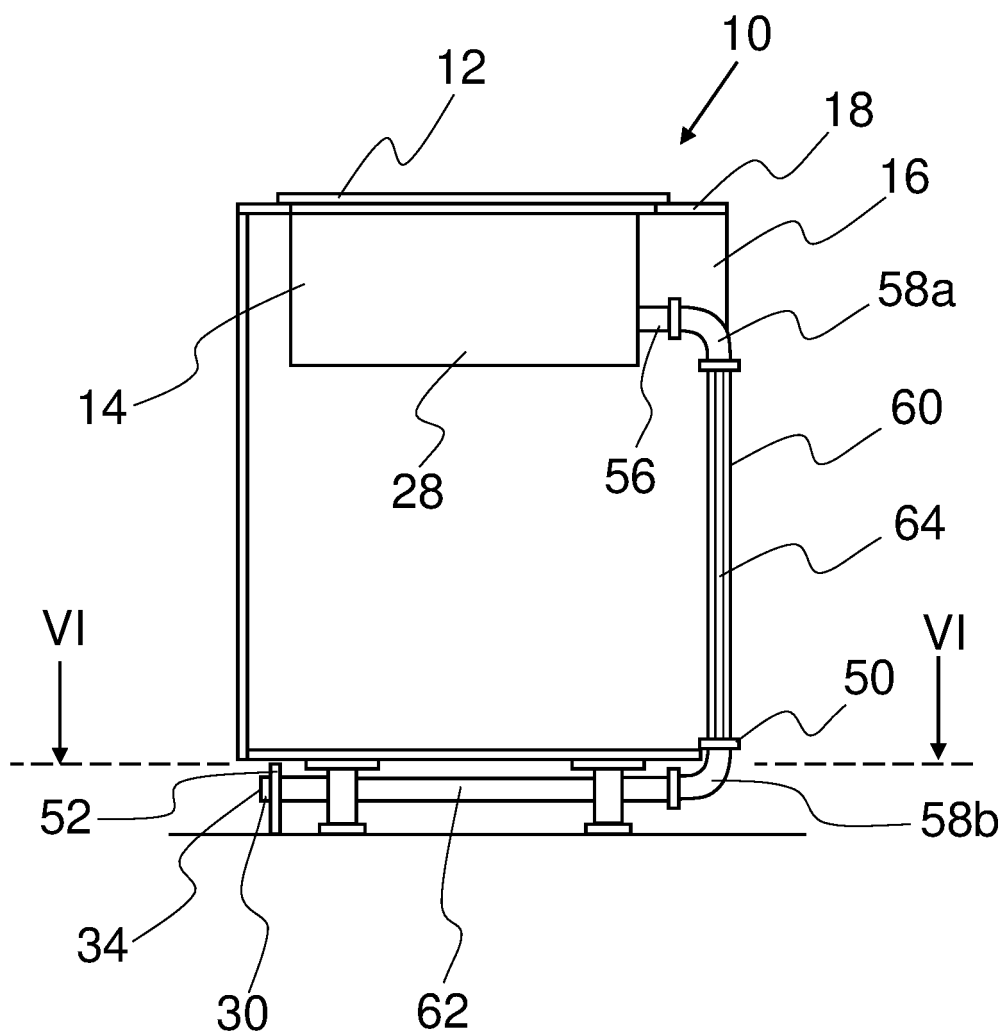


FIG.5

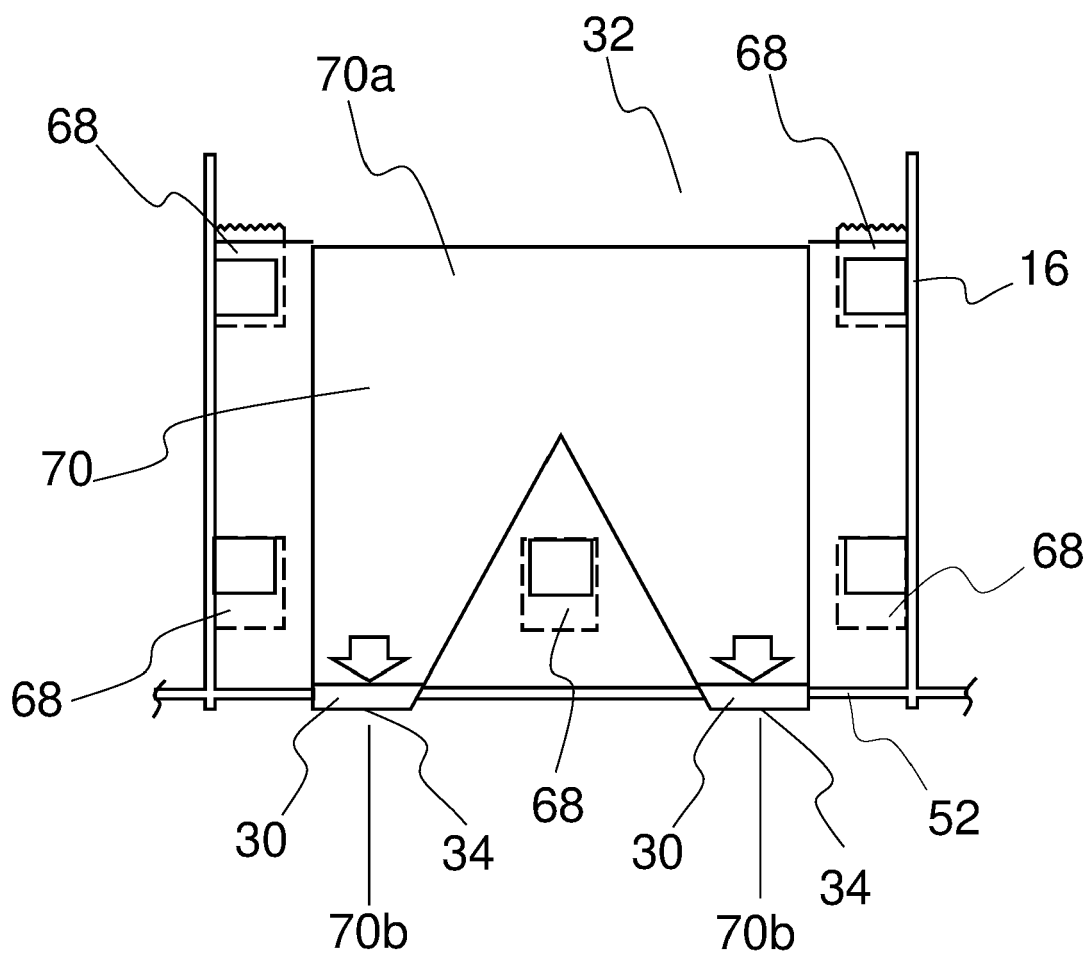


FIG.6



EUROPEAN SEARCH REPORT

 Application Number
 EP 20 21 0533

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Place of search The Hague		Date of completion of the search 12 May 2021	Examiner Fest, Gilles
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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