

(19)



(11)

EP 4 682 435 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
21.01.2026 Bulletin 2026/04

(21) Application number: **25188141.3**

(22) Date of filing: **08.07.2025**

(51) International Patent Classification (IPC):
F24F 7/02 (2006.01) **B08B 15/00** (2006.01)
B08B 15/02 (2006.01) **F24F 7/06** (2006.01)
F24F 8/99 (2021.01) **F24C 15/20** (2006.01)

(52) Cooperative Patent Classification (CPC):
F24F 7/06; B08B 15/00; B08B 15/002; B08B 15/02;
F24F 7/025; F24F 7/065; F24F 8/99; F24C 15/20;
F24F 2007/001

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL
NO PL PT RO RS SE SI SK SM TR
 Designated Extension States:
BA
 Designated Validation States:
GE KH LA MA MD TN

(30) Priority: **17.07.2024 SE 2400078**
27.05.2025 SE 2550516

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(54) CENTRAL EMISSION SUCTION DEVICE FROM ONE OR MORE EMISSION SITES

(57) The present disclosure provides a modular central emission suction device for transporting smoke or fumes from one or more emission sites, intended to be arranged on the exterior of a building. The emission suction device comprises a main smoke duct configured to be arranged on the exterior of the building, wherein the main smoke duct comprises an outlet; one or more connection ducts configured to be connected to the main smoke duct, wherein each connection duct comprises an inlet configured to be arranged at each emission site, and wherein the inlet is configured to receive smoke or fumes from the emission site; one or more fan units configured to be arranged at the building and to be connected to the main smoke duct, said fan units being configured to create a main air flow in the main smoke duct with a flow direction towards the outlet; and wherein the main air flow in the main smoke duct creates a connecting air flow at each inlet, and wherein the main smoke duct, the one or more connection ducts, and the one or more fan units are mountable such that the emission suction device can be adapted to the configuration of the building.

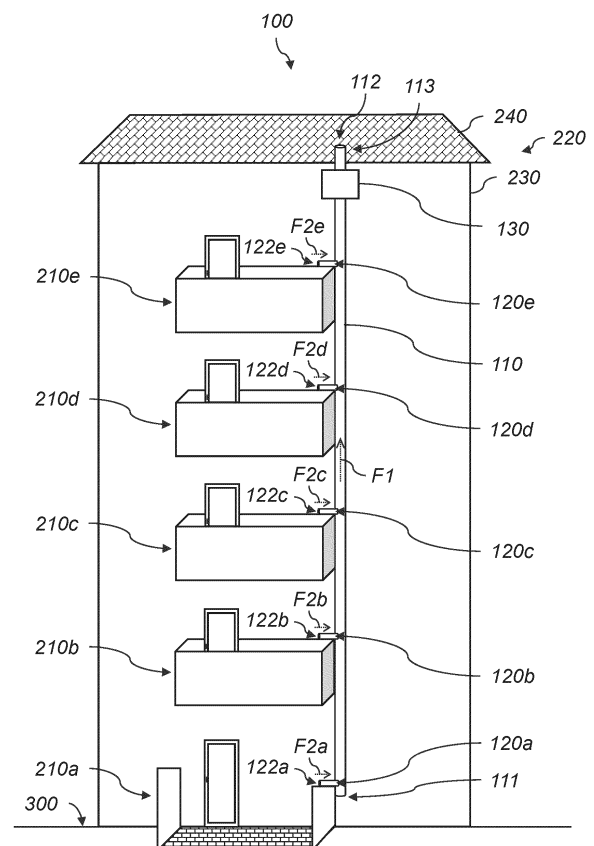


Fig. 1

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Description

Technical field

[0001] The present disclosure relates generally to the field of ventilation devices for transporting and/or removing emissions. In particular, the present disclosure relates to an emission suction device for transporting smoke or fumes from one or more emission sites.

Background

[0002] For many decades, emissions such as heavy smoke or fumes from balconies and patios have caused debate and problems regarding both comfort and health among residents, landlords and housing associations. This is particularly true in densely populated areas with apartment buildings that comprise balconies, patios, terraces, decks and/or courtyards. The smell of smoke or cooking fumes, e.g. from cigarettes or barbecues, can enter neighbors' homes through open windows and doors, and can interfere with the enjoyment of one's own patio. This has a negative impact on the living environment and can cause irritation among neighbors. In addition, tobacco smoke contains harmful substances that can affect the health of others, especially children, the elderly and people with asthma or allergies. Smoke from barbecues or frying can also irritate the airways and mucous membranes. This sanitary nuisance and discomfort is imposed on neighbors and other stakeholders in the local environment and can create problems between neighbors, landlords or housing associations, and property owners.

[0003] Furthermore, some landlords and housing associations have introduced bans on e.g. grilling with fossil fuels and only allow grilling with electric grills. However, an electric grill can also give rise to troublesome smoke. As a result, some landlords and housing associations have introduced total bans on barbecuing, and sometimes even bans on tobacco smoking.

[0004] It is known that there are different kinds of ventilation devices that are built inside buildings to ventilate the indoor air of the building. Furthermore, there are different types of chimney devices that may comprise one or more combustion chambers or grills and flues. These chimney devices are often part of the building, and such devices may for example be built into the building structure, such as inside a concrete wall, to have a load-bearing and reinforcing function. Such types of devices are large and stationary, and may form part of the building structure. There is therefore a need in the field for more effective and better solutions to the above problems.

Summary

[0005] It is therefore an object of the present disclosure to overcome at least some of the above-mentioned problems and drawbacks. The inventors have realized that

there is a need for a device that can efficiently transport emissions away from one or more emission sites and that can be easily adapted to the configuration and layout of a building. This and other purposes are achieved by means of a modular central emission suction device as defined in the attached independent patent claim. Other embodiments are defined by the dependent claims.

[0006] According to a first aspect of the present disclosure, a modular central emission suction device is provided for transporting smoke or fumes from one or more emission sites. The emission suction device is intended to be arranged on the outside of a building. The emission suction device comprises a main smoke duct configured to be arranged on the outside of the building. The main smoke duct comprises an outlet configured to be arranged on the building. The emission suction device comprises one or more connection ducts configured to be connected to the main smoke duct. Each connection duct comprises an inlet configured to be arranged at each emission site of the one or more emission sites. The inlet is configured to receive smoke or fumes from the emission site. The emission suction device comprises one or more fan units configured to be arranged at the building and to be connected to the main smoke duct. Said fan units are configured to create a main air flow in the main smoke duct with a flow direction towards the outlet. The main air flow in the main smoke duct creates a connecting air flow at each inlet such that smoke and fumes are transported away from said emission sites to the outlet. The main smoke duct, the one or more connection ducts and the one or more fan units are mountable in such a way that the emission suction device can be adapted to the configuration of the building.

[0007] The present disclosure is directed to the idea of providing an emission suction device that can be arranged and retrofitted to the exterior/outside of a building in order to be able to complement existing buildings with a controlled removal of smoke and fumes from emission sites. The emission suction device of the present disclosure is modular and central/centralized in that its components can be adapted to the configuration of a building where the connection ducts can be arranged at each emission point and the main smoke duct can collect and direct smoke and fumes from each connection duct to the outlet. The present disclosure also aims to provide an emission suction device that efficiently and controllably transports smoke and fumes away from the emission sites by creating a suction via a main air flow and one or more connecting flows.

[0008] An emission site may comprise a balcony, a patio, a terrace, a deck or a courtyard. An emission point can be located adjacent to a property/building and can thus be a space where residents of the building can stay. The one or more emission points can be a combination of one or more balconies, one or more patios, one or more terraces, one or more decks, and/or one or more courtyards. The emission point may be arranged outdoors, e.g. a patio or open balcony, or partly outdoors and partly

indoors, e.g. a glazed balcony. A property referred to in this description refers to an existing property. Preferably, the property may be an apartment building, such as an apartment house. The property may comprise one or more emission sites. The terms 'property' and 'building' may be used interchangeably throughout the present description.

[0009] The emission suction device is intended to be arranged on the outside of a building. The emission suction device may be located on the outside of a house or building. The components of the emission suction device can each be arranged on the outside of an existing building. For example, the emission suction device may be arranged on the external wall and/or roof of a building.

[0010] The main smoke duct may be configured to be arranged on, or along, an external wall or façade of the building. The main smoke duct may be configured to be arranged in different ways depending on the configuration of the building, i.e. how the building is constructed and where the emission locations, e.g. balconies and patios, are located. The main smoke duct may be configured to be arranged adjacent to, or close to, the one or more discharge/emission points. The outlet of the main smoke duct may be arranged at one end of the main smoke duct. Preferably, the outlet may be configured to be arranged on the roof of the building, and/or at a height relative to a ground surface that is higher than the height at which the uppermost emission location of the property is arranged relative to the ground surface.

[0011] The one or more connection ducts may be configured to be coupled with or attached to the main smoke duct. In an example, a connection duct can be connected to the main smoke duct with a T-pipe. In this case, the main smoke duct has to be cut. A connection duct may extend from an emission site to the main smoke duct. The inlet of a connection duct may be configured to be located at an emission point such as a balcony or a patio. The main and connection ducts may be pipes, ducts, or conduits adapted to carry or transport air, smoke and/or fumes. The main and connection ducts may have a cross-section that is, for example, circular, rectangular, square or oval. The cross-section of the main or connection ducts is not limited to these shapes but may have other suitable geometric shapes. The main smoke duct can be made of, for example, metal, plastic, rubber, textile and/or wood. Preferably the main smoke duct is made of a lightweight material. The connection ducts can be made of metal, plastic, rubber, textile and/or wood. Preferably, the connection ducts are made of a lightweight material. The main smoke duct and/or the one or more connection ducts can have a design and/or color adapted to the façade of the building.

[0012] The one or more fan units may be configured to be arranged or placed on the outside of buildings, for example on the facade or outer wall of the building, or at the ground surface adjacent to the building. The fan units can be powered by electricity. A fan unit can be a suction air turbine or an air pressure turbine. In one example, one

or more fan units may be suction air turbines and arranged at a roof of the building and/or above the highest arranged emission site relative to a ground surface. Then, the suction air turbines create a suction in the main smoke duct that gives rise to the main air flow. In one example, one or more fan units may be air pushing turbines and arranged on the building at a ground surface. Then the air pushing turbines create a pressure of the air in the main smoke duct that gives rise to the main air flow. The main air flow created by the one or more fan units can have a flow direction from a first end to a second end of the main smoke duct. In an example, the first end of the main smoke duct may be configured to be arranged at, or in the vicinity of, a first connection duct and the outlet of the main smoke duct may be arranged at the second end of the main smoke duct. The main air flow in the main smoke duct gives rise to a connecting air flow at the inlet of each connection duct. This allows smoke and fumes at an emission site to be drawn or directed into the connection duct and transported via the main air flow in the main smoke duct to the outlet. In this way, the smoke and fumes from an emission site can be removed from the emission site in a controlled and efficient manner. The emission suction device according to the present description can thus effectively and in a controlled manner remove e.g. barbecue smoke, cooking fumes and cigarette smoke from emission sites, such as balconies, terraces, patios or courtyards of a building. The annoying smoke and fumes will thus not disturb or affect neighbors. The emission suction device improves the comfort and air quality of the residents of the building and the surrounding area. This also reduces the risk of health problems caused by the emissions. The controlled collection and extraction of smoke and/or fumes also reduces the risk of fire.

[0013] The different components of the emission suction device can be assembled to suit the configuration of the building. In one example, the main smoke duct may comprise one or more sub-ducts that may be configured to be assembled together according to the application of the emission suction device. The one or more sub-ducts may comprise straight and/or curved ducts. The one or more sub-ducts may have different lengths and/or be telescopic tubes/ducts. In one example, the main smoke duct may be flexible and/or bendable, and/or configured to be shaped according to the application. The connection ducts may be connected to the main smoke duct at suitable locations depending on the locations of the emission sites. The fact that the emission suction device of the present disclosure is modular in this way and that it is intended to be arranged on the outside of a building provides many advantages. The emission suction device can thus be installed on a building without prior demolition or other adaptation of the existing facade of the building, which is cost-effective. Furthermore, the emission suction device can be used as a direct addition to existing buildings. The emission suction device according to the present description is thus a cost-effective solution that is

easy to retrofit and adapt to the configuration of buildings.

[0014] According to some embodiments, the emission suction device may comprise a filter arranged at the outlet of the main smoke duct. The filter may be arranged in the main smoke duct. The filter may be arranged in a box on the façade of the building. The main line may be connected to the box. The flow of air conducted in the main line may be conducted through the filter. The main air flow may be directed through the filter. The filter may be an air filter configured to purify the air, smoke and/or fumes traveling in the main air flow.

[0015] According to some embodiments, the emission suction device may comprise one or more auxiliary fan units configured to each be arranged at each connection duct and to be connected to said connection duct. The one or more auxiliary fan units may be configured to supplement the connection flow in said connection duct. The one or more auxiliary fan units may be configured to create an auxiliary connection flow in said connection duct. The one or more auxiliary fan units may be attached to an outer wall and/or a facade of the building. Said auxiliary fan units can create an auxiliary connection flow in each connection duct that complements said connection flows. In this way, the auxiliary fan units can provide a better suction in the emission suction device. The transportation of smoke and fumes from said emission sites can thus be improved and become more efficient.

[0016] According to some embodiments, the emission suction device may comprise one or more attachment devices configured to attach the main smoke duct to the building. The emission suction device may comprise one or more attachment devices configured to attach the main smoke duct to an exterior wall or facade of the building. The emission suction device may comprise one or more attachment devices configured to attach the main smoke duct to an emission location of said emission locations. Said attachment device may comprise a mounting bracket, a clamp, for duct and/or a duct sweep. Said attachment device may comprise screws, nuts, rivets and/or nails. For example, the main smoke duct can be attached to the wall of the building using a similar method to downpipes. In one example, a bracket may be screwed to an exterior wall of the building and the main smoke duct clamped to the bracket. In one example, a duct holder may be attached to a railing, fence, or the like, at an emission site, such as a balcony, and the main smoke duct may be attached to the duct holder. For example, the main smoke duct can be clamped to the balcony railing. The single or multiple attachment devices allow the main smoke duct to be easily and conveniently attached to the building.

[0017] According to some embodiments, the emission suction device may comprise one or more covering covers configured to be attached to the exterior wall of the building and to cover the main smoke duct. The main smoke duct may be configured to be attached to an exterior wall of the building, and the emission suction device may comprise covering covers to cover the main

smoke duct.

[0018] The one or more covers can be matched to the façade of the building, such as color and texture. This way, the main smoke duct can be seen as little as possible on the building façade and the emission suction device gets a more discreet appearance.

[0019] According to some embodiments, the main smoke duct may be flexible. The main smoke duct may be flexible and/or bendable. The main smoke duct may be malleable like a snake. The main smoke duct may be a spiral duct or spiral hose. In one example, the main smoke duct can be made of a plastic or metal spiral tube. In this way, the main smoke duct can be malleable and flexible. This can make it easier to adapt the emission suction device depending on the configuration of the building. For example, the main smoke duct can be arranged according to the location of the emission points on the building. In one example, the main smoke duct can be flexible, which means that the main smoke duct can be easily and unrestrictedly adapted, shaped or controlled to suit the conditions of each building facade without rebuilding or otherwise affecting the facade. The versatility of the emission suction device is increased with a flexible main smoke duct.

[0020] According to some embodiments, said connection ducts may be flexible. The one or more connection ducts may be flexible and/or bendable. Said connection ducts may for example be spiral lines or spiral hoses. For example, the connection ducts may be plastic or metal spiral tubes. In this way, the connection ducts can be more easily arranged at the respective emission site. By having flexible connection ducts, the intake of smoke and fumes at the inlet can be facilitated because the location of the inlet can be more easily adjusted and placed at a source of smoke or fumes at an emission site.

[0021] According to some embodiments, the main smoke duct may comprise a helical insert configured to be arranged inside the main smoke duct to create a vortex of the main air flow. The helical insert may be disposed within the main smoke duct. In one example, the insert may be disposed, or attached, to the first end of the main smoke duct and extend from the first end into the main smoke duct. In one example, the insert may extend from the first end to the second end into the main smoke duct. The helical insert may be made of metal or plastic. The helical insert may be configured to create a swirl or spiral of the main airflow in the main smoke duct. The helical insert may be configured to create rotational movements of the main air flow. The insert may reduce the friction in the main smoke duct and improve the flow of air in the main smoke duct. Thus, the main air flow becomes better and more efficient. In this way, the emission suction device can transport smoke and fumes from the one or more emission sites towards the outlet of the main smoke duct in a more efficient way.

[0022] According to some embodiments, the emission suction device may comprise one or more interconnecting or coupling elements configured to connect the main

smoke duct with said connection ducts. The interconnecting element comprises a housing or sheath configured to enclose and be removably attached around the main smoke duct, and a nozzle attached to the housing and configured to be coupled to one of said connection ducts. The interconnection element may be configured to couple, join or integrate the main smoke duct with a connection duct. The housing of the interconnection element may be configured to be removably mounted on or around the main smoke duct. The housing may be shaped, or rolled, to fit around the outside of the main smoke duct. The housing may be removably secured around the main smoke duct by, for example, one or more screws, one or more nuts, one or more clamps, or one or more hooks. In one example, the main smoke duct may be cylindrical in shape with a given outer diameter and the housing of the coupling element may be cylindrical in shape with a given inner diameter that fits outside the outer diameter of the main smoke duct. The housing can be made of metal or plastic. The housing may be flexible or bendable to removably enclose and attach to the main smoke duct. A nozzle may be attached, arranged or placed on the housing. The nozzle may be integrated into the housing. The nozzle may be made of metal or plastic. Preferably, the nozzle may have a cylindrical shape. A connection duct may be threaded onto, or coupled with, the nozzle. The shape, diameter, and/or width and length of the cross-section of the nozzle may be matched or adapted to the shape, diameter, and/or width and length of the cross-section of the connection ducts. When mounting the interconnecting element on a predetermined position on the main smoke duct, a hole can be made in the main smoke duct corresponding to the inner diameter and/or width and length of the cross-section of the nozzle. In this way the main smoke duct is kept in one piece and only one hole is made with the corresponding shape and dimensions of the nozzle. With the interconnecting element, the main and connection ducts can thus be connected in a simple and efficient way.

[0023] According to some embodiments, the emission suction device may comprise a control unit configured to control the one or more fan units. The control unit may be configured to receive a control signal from a remote control unit. The control unit may be arranged on the outside of the building, for example on an external wall. The control unit may be arranged in connection with the one or more fan units. The control unit may be configured to control an off-mode and an on-mode of the one or more fan units. The controller may be configured to control each of said fan units. The control unit may be configured to receive control signals wirelessly, for example via infrared (IR) signals, radio frequency (RF) signals or via Bluetooth. One or more remote control devices can send a control signal to the control unit. A remote control device/unit can be a remote controller. In an example, each connected emission site can have a corresponding remote control device, e.g. a remote control. This allows the resident of each emission site to control the one or

more fan units. In one example, an resident of an emission site can control the on and off position of the emission suction device via a remote control and thus start and stop the extraction and transportation of smoke and fumes from said emission site.

[0024] According to some embodiments, the remote control unit may be a telephone unit. The control unit may be configured to receive a control signal from a telephone unit. A telephone device may be a mobile phone, a smartphone or a landline telephone. In one example, a property owner, landlord or housing association may have a subscription with one or more mobile phone operators so that a resident with an emission site may, via a telephone device, call a telephone number to control the on and off state of the one or more fan units. In an example, a smartphone may have an application where the one or more fan units can be controlled.

[0025] According to some embodiments, the one or more connection ducts may comprise a controllable valve configured to control a flow rate of the connection air flow. The valve may be disposed within a connection duct. A control coupled to the controllable valve may be arranged on the outside of the connection duct. The valve may be a damper, a plate or a flap. The valve may be configured to adjust, adapt or regulate a size of a cross-sectional area inside the connection duct. In this way, the flow rate of the connection flow in the connection duct can be regulated. Depending on the amount of smoke or fumes released at the site of emission, a resident can then regulate the strength of the inflow at the inlet of the connection duct. The operation of the emission suction device can thus be easily adapted to the needs of the residents and/or the connected emission sites.

[0026] According to some embodiments, the one or more connection ducts may comprise a grease filter. The grease filter may be arranged inside a connection duct. The grease filter may be configured to purify the air, smoke, and/or fumes drawn in at the inlet of the connection duct.

[0027] According to some embodiments, the emission suction device may comprise a hood and a flexible hose arranged at each emission site. The flexible hose may be configured to connect the hood to the corresponding connection duct for said emission site. The hood may be configured to collect, and/or capture, smoke or fumes at an emission site. The hood may be configured to be arranged at a source of smoke or fumes at an emission site. In one example, the hood may have a funnel-like shape and be disposed or attached to a particular position at an emission site. The hood may be configured to collect tobacco smoke. In one example, the hood may be configured to be arranged at a grill, for example on top of or above a grill. The hood may be configured to collect grill smoke and/or fumes. The shape and size of the hood can be adapted to the size and shape of the grill. The hood can be connected to the flexible hose. The flexible hose can be attached to or integrated with the hood. The flexible hose can be configured to connect to or attached

to a connection duct for the emission site. The flexible hose may be made of metal. The flexible hose may be a metal spiral hose. The hood and the flexible hose may be configured to withstand high heat. The hood provides a controlled collection of smoke and/or fumes, and thus the emission suction device can efficiently and in a controlled manner transport smoke and/or fumes away from the emission sites. The hood also helps to make the emission suction device of the present disclosure a closed system for removing disturbing smoke and fumes directly at the source. The hood provides a controlled collection of smoke and/or fumes even in windy conditions. This allows the emission suction device to further improve the air quality for the residents of a building and the surrounding environment, which in turn reduces the risk of health problems and discomfort. The controlled collection of emissions from a barbecue using the hood also reduces the risk of fire. The flexible hose allows the hood to be easily arranged around a source of smoke or fumes, and the position of the hood can be adjusted depending on the situation.

[0028] According to some embodiments, the emission suction device may comprise an air turbine wheel configured to be arranged in each connection duct and partially extend into the main smoke duct. The air turbine wheel may comprise a hub comprising a ball bearing configured to rotate the air turbine wheel, and a plurality of fan blades arranged on a ring attached around the hub. The hub and the ball bearing may be of steel or other metal. The ball bearing may be encapsulated in the hub. A ring of steel or other metal may be attached to the hub. A plurality of fan blades may be attached to the ring. The fan blades may rotate with the hub. The air turbine wheel may be arranged in a connection duct, or in a nozzle of an interconnecting element. The air turbine wheel may extend into, or be partially arranged in, the main smoke duct. The air turbine wheel can be driven by the main air flow. The hub and the ball bearing allow the air turbine wheel to be easily driven by the main air flow. When the one or more air units are on and create a main air flow in the main smoke duct, the main air flow causes the one or more air turbine wheels to rotate. This causes the one or more connection airflows in the respective connection duct to be created, and/or amplified. In this way, the suction in the respective connection duct is improved and thus also the transport of the emissions from the said emission sites to the outlet. This ensures that the emissions are dealt with in a controlled manner.

[0029] Examples of embodiments of the present disclosure are given below.

[0030] According to some example embodiments, a suction device is provided that can take care of the airborne emissions via suction ducts at a source, e.g. a grill, on a balcony both from fossil fuel powered grill and electric powered grill. The suction device can transport the emissions in a controlled manner via suction ducts and electric fan from the balcony up to the roof of the building where they are pressurized and mixed into the

atmosphere. A source can also be, for example, cigarettes and troublesome cigarette smoke is dealt with in the same way. The suction device can use ducts and a fan to suck away these airborne emissions from many grills on one or more balconies at the same time. The suction device upgrades the environment on e.g. balconies to at least the same standard as a modern residential kitchen in terms of the disposal of cooking fumes. The suction device creates peace and comfort for all concerned, unlike today. The suction device can be referred to as an emission suction device in the present description. The suction duct may be referred to as the main smoke duct in the present description. Emissions may be referred to as smoke and fumes in the present description. Fan may be referred to as fan unit in the present description.

[0031] According to some example embodiments, a facade of a house or building has one or more, e.g. two balconies. The suction device may comprise a common suction duct, which may be configured to be mounted on the facade. The suction duct may be configured to be attached to the one or more balconies. The suction duct may be arranged up to the roof of the house. The suction device may comprise one or more connections to the one or more balconies. A connection may be referred to as a connection duct in the present disclosure. The suction device may comprise a box that may comprise an electrically powered fan. The electrically powered fan may be configured to, via the suction duct and the connections to the balconies, suck the emissions in a controlled manner directly from the sources, such as the grills, and transport it to the roof where the emissions are pushed into the atmosphere and mixed. The suction device may comprise one or more specially designed suction hoods. The hoods may be configured to be arranged on a grill. A hood may be coupled to one of the connections of the suction duct via a flexible hose. A connection of the one or more connections may be equipped with grease filters and an adjustable damper configured to shut off the suction in the respective connection. The hood may be configured in such a way that neither the grilling nor the controlled suction process of the emissions is disturbed when the wind blows.

[0032] According to some example embodiments, the suction device may be configured to serve 20 balconies simultaneously whether these are placed in a row horizontally or vertically or mixed. The suction duct can be surface mounted and flexible. This means that the suction duct can easily be designed to suit the conditions of each building facade with different components such as loose bends and curves, etc. What may limit the number of connected balconies or sources is the length and diameter of the suction duct and the capacity of the fan.

[0033] The suction device is easy to retrofit on the outside of existing buildings with balconies. The suction duct can have a special design and a color/color adapted to the facade color of the house with the aim that the suction duct blends as much as possible with the facade

of the house. In the case of new buildings, the suction duct can be integrated into the building wall or on the inside of the building wall at the design stage.

[0034] According to some example embodiments, a device is provided that is located on the outside of a building with balconies. The device may comprise a centrally located electrically powered fan, a suction duct and one or more connections. The device can, via the suction duct with the connections to the balconies, suck off the toxic and troublesome emissions from grilling on the balconies and transport the emissions to the roof of the building and above the roof pressurize the emissions which are mixed into the atmosphere.

[0035] Further objects, features, and advantages of the present invention will become apparent from a study of the following detailed description, drawings, and the appended claims. One skilled in the art will recognize that various features of the present invention, although recited in different claims or different examples, may be combined in embodiments other than those described herein.

List of figures

[0036] Exemplary embodiments will now be described in more detail, with reference to the following accompanying drawings:

Figure 1 schematically illustrates an emission suction device according to some embodiments of the present disclosure.

Figures 2A, 2B and 2C schematically illustrate examples of an emission suction device according to certain embodiments of the present disclosure.

Figure 3 schematically illustrates an emission suction device according to some embodiments of the present disclosure.

Figure 4 schematically illustrates a helical insert according to some embodiments of the present disclosure.

Figure 5 schematically illustrates a covering cover according to some embodiments of the present disclosure.

Figures 6A and 6B schematically illustrate an inter-connecting element according to some embodiments of the present disclosure.

Figure 7 schematically illustrates an air turbine wheel according to some embodiments of the present disclosure.

[0037] As can be seen from the figures, the sizes of elements and areas may be exaggerated for illustrative

purposes and are therefore intended to illustrate the general structures of the embodiments. Like reference numerals refer to like elements throughout.

5 Detailed description

[0038] Exemplary embodiments will now be described more fully with reference to the accompanying drawings in which currently preferred embodiments are shown. However, the invention may be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided for accuracy and completeness and fully convey the scope of the invention to those skilled in the art.

[0039] Figure 1 shows a schematic illustration of a modular central emission suction device 100 according to some embodiments of the present disclosure. In Figure 1, a building 220 is shown as an apartment building with five different emission sites. The building has an exterior wall 230 and a roof 240 as shown in Figure 1. Figure 1 shows a first emission site 210a, a second emission site 210b, a third emission site 210c, a fourth emission site 210d, and a fifth emission site 210e. For example, the first emission site 210a is a patio, terrace or courtyard, and the rest of the emission sites 210b, 210c, 210d, 210e are balconies as shown in figure 1. The building 220 shown in figure 1 is an example and the building 220 may also have other configurations of, for example, walls, roofs and emission sites. The emission suction device 100 is intended to be arranged on the outside of the building 220. The emission suction device 100 comprises a main smoke duct 110 configured to be disposed on the exterior of the building 220. The main smoke duct 110 comprises a first end 111 and a second end 113. The main smoke duct comprises an outlet 112 disposed at the second end 113. The first end 111 may be open to provide an air supply to the main smoke duct 110. The second end 113 may be open to be able to emit and carry away emissions such as smoke and fumes from the main smoke duct 110. In figure 1, the outlet 112 is arranged in the vicinity of the roof 240. The main smoke duct 110 extends from the bottom emission site 210a to above the fifth and top emission site 210e as viewed relative to a ground surface 300 shown in Figure 1. The emission suction device 100 of Figure 1 comprises five connection ducts configured to connect to the main smoke duct 110. The emission suction device 100 comprises a first connection duct 120a comprising a first inlet 122a, a second connection duct 120b comprising a second inlet 122b, a third connection duct 120c comprising a third inlet 122c, a fourth connection duct 120d comprising a fourth inlet 122d, and a fifth connection duct 120e comprising a fifth inlet 122e. All inlets 122a, 122b, 122c, 122d, 122e, are configured to be provided at each emission site of the five emission sites 210a, 210b, 210c, 210d, 210e. The inlets 122a, 122b, 122c, 122d, 122e, are configured to receive smoke or fumes from the respective

emission site. The main smoke duct 110 and/or the connection ducts 120a, 120b, 120c, 120d, 120e may be made of metal, plastic, rubber, textile and/or wood. The main smoke duct 110 and/or the connection ducts 120a, 120b, 120c, 120d, 120e may be flexible. The emission suction device 100 of figure 1 comprises one or more fan units 130 configured to be arranged at the building 220 and to be connected to the main smoke duct 110. In figure 1, the fan units 130 are arranged on an upper part of the outer wall 230 of the building in the vicinity of the roof 240. The one or more fan units 130 may for example be suction air turbines. The fan units 130 are configured to create a main air flow F1 in the main smoke duct with a flow direction towards the outlet 112, see figure 1 where the main air flow F1 is illustrated with an arrow. The main air flow F1 in the main smoke duct creates a connecting air flow F2a, F2b, F2c, F2d, F2e at each inlet 122a, 122b, 122c, 122d, 122e, such that smoke and fumes are transported away from said emission sites 210a, 210b, 210c, 210d, 210e to the outlet 112. As shown in Figure 1, the first inlet 122a has a first connecting air flow F2a, the second inlet 122b has a second connecting air flow F2b, the third inlet 122c has a third connecting air flow F2c, the fourth inlet 122d has a fourth connecting air flow F2d, and the fifth inlet 122e has a fifth connecting air flow F2e. All connection flows are illustrated in Figure 1 with arrows next to the respective connection duct. The main smoke duct 110, the one or more connection ducts 120a, 120b, 120c, 120d, 120e and the one or more fan units 130 are mountable such that the emission suction device 100 can be adapted to the configuration of the building 220. The main smoke duct 110, the one or more connection ducts 120a, 120b, 120c, 120d, 120e and the one or more fan units 130 can thus be arranged relative to each other depending on the configuration of the existing building 220. In figure 1, the building emission sites 210a, 210b, 210c, 210d, 210e are arranged in line with each other vertically relative to the ground surface 300. The main smoke duct 110 is then, for example, arranged in line with the emission sites shown in figure 1, i.e. vertically along the outer wall 240 of the building. The emission suction device 100 may comprise one or more fasteners or attachment devices (shown in Figure 3) configured to attach the main conduit 110 to the building 220. The main smoke duct 110 may be attached to the exterior wall 240 and/or to the one or more emission sites 210a, 210b, 210c, 210d, 210e, such as to railings or similar structures of balconies or patios. The main smoke duct 110 may comprise one or more parts, such as one or more sub-ducts that are assembled to suit the configuration of the building. For example, the main smoke duct 110 of Figure 1 may comprise five sub-ducts that are spliced and connected to each other at each connection duct 120a, 120b, 120c, 120d, 120e. For example, each sub-duct of the main smoke duct 110 may be connected to each connection duct 120a, 120b, 120c, 120d, 120e via T-pipes or similar interconnecting members, or via an interconnect-

ing member as illustrated in Figures 6A and 6B. The length of each sub-duct of the main smoke duct 110 may be determined on site. For example, these sub-ducts may be cut to customized lengths to suit a particular building. The main smoke duct 110 may comprise one or more sub-ducts with a telescopic function to adapt the length of each sub-duct. In this way, the main smoke duct 110, the one or more connection ducts 120a, 120b, 120c, 120d, 120e, and the one or more fan units 130 can be connected together depending on how the emission sites are arranged on the building and how other parts of the building look like. This allows the emission suction device 100 to be easily and efficiently retrofitted to existing buildings without remodeling or other damage to the facade. This provides a cost-effective and versatile emission suction device 100 that can effectively remove smoke and fumes from emission sites such as balconies and patios.

[0040] Figures 2A, 2B and 2C show example schematic illustrations of a modular central emission suction device 100 according to some embodiments of the present disclosure. In each of Figures 2A, 2B, and 2C, a building 220 is shown as a multi-family dwelling with five different emission sites similar to Figure 1 but with a different configuration of the building 220. In Figures 2A, 2B and 2C, the emission sites 210a, 210b, 210c, 210d, 210e are arranged with offsets in a horizontal direction relative to the ground surface 300. In Figures 2A, 2B and 2C, the first emission sites 210a is a patio, terrace or courtyard, and the rest of the emission sites 210b, 210c, 210d, 210e are balconies. The emission suction device 100 comprises a main smoke duct 110 configured to be arranged on the outside of the building 220. The main smoke duct 110 of Figures 2A, 2B and 2C is flexible and/or bendable. Thus, the main smoke duct 110 may be bent and shaped with respect to the positions of the emission sites on the exterior wall 230. The main smoke duct 110 may be made of, for example, plastic, metal and/or textile. For example, the main smoke duct 110 may be a plastic or metal spiral pipe that is flexible and/or bendable. The main smoke duct 110 extends from the first emission site 210a to above the fifth emission site 210e relative to the ground surface 300. The main smoke duct 110 has an outlet 112 disposed on the outer wall 230. In each of Figures 2A, 2B, and 2C, various designs of the main smoke duct 110 are illustrated to show how the pliability and flexibility of the main smoke duct 110 can be utilized to create various solutions on properties. As the main smoke duct 110 is flexible, it can be easily assembled such that the emission suction device 100 can be adapted to the configuration of the building 220. The emission suction device 100 can thus be retrofitted to the building 220 in an easier way as the main smoke duct can be bent and shaped like a snake. This contributes to further variations of the emission suction device 100 that can be effectively adapted to the building 220 without rebuilding the building 220. The emission suction device 100 of Figures 2A, 2B, and 2C comprises a

first connection duct 120a, a second connection duct 120b, a third connection duct 120c, a fourth connection duct 120d, and a fifth connection duct 120e like the emission suction device of Figure 1. Each connection duct 120a, 120b, 120c, 120d, 120e has an inlet (not shown in Figures 2A, 2B and 2C) arranged at each emission site 210a, 210b, 210c, 210d, 210e. For example, the connection ducts 120a, 120b, 120c, 120d, 120e may be flexible which further improves and facilitates the assembly of the emission suction device 100 and contributes to its versatility. In each of Figures 2A, 2B and 2C, different designs of the connection ducts 120a, 120b, 120c, 120d, 120e are illustrated to show how these can be adapted to the design of the main smoke duct 110 and based on the arrangement of the emission sites. The emission suction device 100 of Figures 2A, 2B and 2C comprises one or more fan units 130 configured to be arranged at the building and to be connected to the main smoke duct. In Figures 2A, 2B and 2C, the fan units 130 are arranged on a lower portion of the outer wall 230 of the building in proximity to the ground surface 300. The one or more fan units 130 may be, for example, air pushing turbines. The fan units 130 are configured to create a main air flow F1 in the main smoke duct with a flow direction towards the outlet 112, see in figures 2A, 2B and 2C where the main air flow F1 is illustrated with an arrow. The main air flow F1 in the main smoke duct creates a connecting air flow (not shown in Figures 2A, 2B and 2C, see Figure 1) at each inlet such that smoke and fumes are transported away from said emission sites 210a, 210b, 210c, 210d, 210e to the outlet 112. The emission suction device 100 comprises a filter 116 arranged at the outlet 112 of the main smoke duct 110. The filter 116 may be an air filter configured to purify the air, smoke and/or fumes traveling with the main air flow F1. As shown in Figures 2A, 2B and 2C, the filter is arranged on the outer wall 230. The emission suction device 100 comprises a control unit 160 configured to control the one or more fan units 130. The control unit is arranged adjacent to the fan units 130 as illustrated in Figures 2A, 2B and 2C, but the control unit 160 may also be integrated into the fan units 130. The control unit 160 is configured to receive a control signal from a remote control unit 170a, 170b, 170c, 170d, 170e. The emission suction device 100 may comprise the one or more remote control units 170a, 170b, 170c, 170d, 170e. As shown in Figures 2A, 2B and 2C, each emission site has a respective remote control unit. The first emission site 210a has a first remote control unit 170a, the second emission site 210b has a second remote control unit 170b, the third emission site 210c has a third remote control unit 170c, the fourth emission site 210d has a fourth remote control unit 170d, and the fifth emission site 210e has a fifth remote control unit 170e. The remote control units 170a, 170b, 170c, 170d, 170e may for example be boxes arranged on the outer wall 230 of the building adjacent to the respective emission site, or mobile remote controls. In one example, a remote control unit may be a telephone

unit. The control unit 160 and the remote control units 170a, 170b, 170c, 170d, 170e may be coupled, and communicate, via cable or wirelessly. As shown in Figures 2A, 2B and 2C, the control unit 160 and the remote control devices 170a, 170b, 170c, 170d, 170e communicate wirelessly, for example via infrared (IR) signals, radio frequency (RF) signals or via Bluetooth. Control signals may be sent from the remote control units 170a, 170b, 170c, 170d, 170e to the control unit 160. The control signals may control how the fan units 130 operate, for example, an off mode and an on mode of the fan units 130 may be controlled. In one example, the remote control units 170a, 170b, 170c, 170d, 170e may be remote controls that the residents associated with the respective emission site use to control the fan units 130. For example, a resident may then start the fan units 130 when using the emission suction device 100, such as when smoking tobacco or grilling. In one example, the remote control units 170a, 170b, 170c, 170d, 170e may be mobiles that the residents associated with the respective emission site have. The property owner of the building 220 may have a subscription with one or more mobile phone operators, which allows the residents with a mobile phone to call two different phone numbers or codes that control the on-mode and off-mode of the fan units 130. In this way, the main air flow F1 and the connection air flows (not shown, see Figure 1) can be easily and smoothly controlled depending on the use of the emission suction device 100. If the emission suction device 100 of figures 2A, 2B and 2C would comprise one or more fan units 130 of the air sucking type, the fan units 130 and the control unit 160 would be arranged above the fifth emission site 210e, for example at the filter 116.

[0041] Figure 3 schematically illustrates an emission suction device 100 according to some embodiments of the present disclosure. Figure 3 illustrates an example of a portion of an emission suction device 100 at the second emission site 210b and the third emission site 210c. Figure 3 illustrates an example of how the emission suction device 100 may look in a closer view compared to figures 1 and 2. For example, the emission sites 210b, 210c in figure 3 may correspond to the emission sites 210b, 210c of the building 220 in figure 1. The emission suction device 100 comprises the main smoke duct 110, the second connection duct 120b and the third connection duct 120c arranged at the respective emission sites 210b, 210c. The connection duct 120b comprises an inlet 122b and the connection duct 120c comprises an inlet 122c. The emission suction device 100 comprises a first attachment device 140a and a second attachment device 140b configured to attach the main smoke duct 110 to the building, as shown in Figure 3. The first attachment device 140a and the second attachment device 140b may be, for example, clips that are attached to the exterior wall of the building and clamp the main smoke duct 110 as illustrated in Figure 3. The second connection duct 120b comprises a controllable valve 124b configured to control a flow rate of the connection air flow F2b. The third

connection duct 120c comprises a controllable valve 124c configured to control a flow rate of the connection air flow F2c. The controllable valves 124b, 124c may be, for example, dampers. The controllable valves 124b, 124c may each comprise a control, e.g. a knob, a handle or a button. The controllable valves 124b, 124c may each control the strength of the suction in the respective connection duct 120b, 120c and/or shut off the suction in the respective connection duct 120b, 120c. In this way, the strength, or flow rate, of the connection air flow can be regulated at individual emission sites. In one example, a resident of emission site 210b can regulate the flow rate of connection air flow F2b to maximum strength while a resident of emission site 210c can turn off connection air flow F2c completely. The emission suction device 100 comprises a first hood 180b and a first flexible hose 185b disposed at the second emission site 210b, and a second hood 180c and a second flexible hose 185c disposed at the third emission site 210c. The first flexible hose 185b is configured to connect the first hood 180b to the corresponding connection duct 120b of the second emission site 210b. The second flexible hose 185c is configured to connect the second hood 180c to the corresponding connection duct 120c of the third emission site 210c. In an example referring to the second emission site 210b in Figure 3, the first hood 180b may be configured to collect tobacco smoke. A resident of the emission site 210b may position themselves at the first hood 180b, for example when smoking a cigarette, whereupon the first hood 180b together with the suction at the inlet 122b of the connecting duct 120b causes the smoke to be controlled and efficiently captured and transported in the connection duct 120b further to the main smoke duct 110 and out to the outlet. In an example with reference to the emission site 210c in Figure 3, the second hood 180c may be configured to be arranged at a grill, for example on top of a grill. The second hood 180c may be configured to collect grill smoke and/or ash. The second hood 180c may be arranged above a grill during grilling, whereupon the second hood 180c together with the suction from the inlet 122c of the connection duct 120c causes the grill smoke and/or the ash to be easily and efficiently captured and transported in the connection duct 120c further to the main smoke duct 110 and out to the outlet. The shape and size of the second hood 180c can be adapted to the size and shape of the grill. The second hood 180c may be designed in such a way that the controlled collection and extraction of emissions from the grill is not disturbed during windy conditions. Both hoods 180b, 180c can provide a controlled collection of smoke and/or fumes from an emission site depending on the application. The hoods 180b, 180c can be used for tobacco smoking as well as for grilling. In one example, the first hood 180b may be configured to be arranged at a grill and to collect tobacco smoke. In an example, the second hood 180c may be configured to collect tobacco smoke and to be arranged at a grill. In Figure 3, it is shown that the emission suction device may comprise a first auxiliary

fan unit 132b and a second auxiliary fan unit 132c. The first auxiliary fan unit 132b is arranged at and connected to the second connection duct 120b. The second auxiliary fan unit 132c is arranged at and connected to the third connection duct 120c. The auxiliary fan units 132b, 132c may be configured to supplement the connection flow F2b, F2c in the respective connection duct 120b, 120c. The auxiliary fan units 132b, 132c may provide a better suction in the respective connection duct 120b, 120c. In this way, the transportation of smoke and fumes from the emission sites can be more efficient. The second connection duct 120b may comprise a first grease filter 126b as shown in Figure 3. The grease filter 126b and the auxiliary fan 132b may be arranged in a box as shown in Figure 3. The third connection duct 120c may comprise a second grease filter 126c as shown in Figure 3. The grease filter 126c and the auxiliary fan 132c may be arranged in a box as shown in Figure 3. The grease filters 126b, 126c may be arranged in the respective connection ducts 120b, 120c. The grease filters 126b, 126c may be configured to purify the air, smoke and/or fumes sucked in at the respective inlets 122b, 122c, of the respective connection duct 120b, 120c.

[0042] Figure 4 schematically illustrates a helical insert 114 according to some embodiments of the present disclosure. In Figure 4, the main smoke duct 110 is shown in cross-section from the side along the main smoke duct 110. The emission suction device may comprise the helical insert 114 configured to be arranged inside the main smoke duct 110 to create a vortex of the main airflow F1. In one example, the helical insert 114 may be attached to the first end 111 of the main smoke duct 110 and extend into the main smoke duct 110 as shown in Figure 4. The left portion of the main smoke duct 110 and the helical insert 114 is dashed in Figure 4 to illustrate that not the entire main smoke duct 110 is shown. I.e. figure 4 shows only a part of the main smoke duct 110 and the insert 114. The insert 114 creates a vortex in the main air flow F1 in such a way that the friction in the main smoke duct 110 is reduced. This results in a better flow in the emission suction device and thus an improved suction function. In this way, smoke and fumes can be transported away from the emission sites in a more efficient way.

[0043] Figure 5 schematically illustrates a covering cover 190 according to some embodiments of the present disclosure. Figure 5 shows the covering cover 190, the main smoke duct 110 and the outer wall 230 in a cross-section in the vertical direction, i.e. viewed from top to bottom or bottom to top. The emission suction device may comprise one or more covering covers configured to be attached to the outer wall 230 of the building and to cover the main smoke duct 110. The main smoke duct 110 may be configured to be attached to an exterior wall 230 of the building. The covering cover 190 shown in Figure 5 covers the main smoke duct 110 and may be attached along the main smoke duct 110 to the exterior of the building. Figure 5 shows a first screw 192a and a

second screw 192b configured to attach the covering cover 190 to the exterior wall 230. The covering cover 190 may be attached with other fasteners. The covering cover 190 may be matched to the facade of the building, such as color and texture. This way, the main smoke duct 110 is visible on the building façade as little as possible and the emission suction device blends in more with the façade. The covering cover 190 can be adapted to the size and shape of the main smoke duct. This gives the emission suction device a more discreet appearance from the outside. The covering cover 190 softens the visual impression of the fully visible main smoke duct 110 on the facade and can thus give the emission suction device an appealing appearance to match the facade.

[0044] Figures 6A and 6B schematically illustrate an interconnecting element 150 according to some embodiments of the present disclosure. In Figure 6A, the interconnecting element 150 is shown without being attached around the main smoke duct, i.e. an "open" interconnecting element 150, and in Figure 6B, the interconnecting element 150 is shown arranged on the main smoke duct 110, i.e. a dished interconnecting element 150. With reference to both Figures 6A and 6B, the emission suction device may comprise one or more interconnecting elements 150 configured to connect the main smoke duct 110 with a connection duct 120. As shown in Figures 6A and 6B, the interconnecting member 150 comprises a housing 152 configured to enclose and removably attach around the main smoke duct 110, and a nozzle 154 attached to the housing and configured to be coupled to the connection duct 120. To join the main smoke duct 110 to a connection duct 120, the interconnecting member 150 may be used. In this way, the main smoke duct 110 is kept in one piece and only one hole is made in the main smoke duct 110 with an inner diameter corresponding to the diameter of the nozzle 154. Figures 6A and 6B show an interconnecting element 150 suitable for a main smoke duct and a connection duct with circular cross-sections, but interconnecting element 150 may have other shapes corresponding to the main smoke duct and the connection ducts. The housing 152 may be an arched part that is open. The housing 152 may be a thin and resilient, flexible or bendable disk of the material metal or plastic. As shown in figures 6A and 6B, the housing is an open cylinder. The housing 152 may be formed and/or rolled with a specific inner diameter to fit outside a main smoke duct 110 with a specific outer diameter. The nozzle 154 may be of metal or plastic material. The connection duct 120 may be configured to be threaded onto or mounted to the nozzle 154. The connection duct 120 may be secured to the nozzle 154 by, for example, a clip or clamp. The connection duct 120 of Figures 6A and 6B may correspond, for example, to any of the connection ducts 120a, 120b, 120c, 120d, 120e, of Figures 1, 2 or 3. In Figure 6B, it is shown that the interconnecting element 150 may enclose the main smoke duct 110 illustrated by dashed lines. The interconnection element 150 may be secured around the

main smoke duct with one or more screws and nuts 156. The housing 152 may be a continuous housing. The housing 152 may comprise a first end 152a and a second end 152b configured to be brought together and/or abut each other to secure the housing 152 to the main smoke duct 110. The one or more screws and nuts 156 may be attached to the first end 152a and the second end 152b. For example, when the height at which the main smoke duct 110 and the connection duct 120 at the respective emission site are to be connected has been determined at an installation site, a hole is made in the main smoke duct 110 and the interconnecting element 150 is fastened around the main smoke duct 110 so that the hole of its nozzle 154 is aligned with the hole of the main smoke duct 110.

[0045] Figure 7 schematically illustrates an air turbine wheel 127 according to some embodiments of the present disclosure. Figure 7 shows the main smoke duct 110 and the connection duct 120. The connection duct 120 may for example be any of the connection ducts 120a, 120b, 120c, 120d, 120e of figure 1, 2A-2C, 3, or 6A-6B. Figure 7 shows the main air flow F1 and the connecting air flow F2. Figure 7 illustrates that the air turbine wheel 127 is arranged in the interconnecting element 150, but the air turbine wheel 127 may be arranged directly in the connection duct 120. In Figure 7, the air turbine wheel 127 is arranged in the nozzle 154 and extends partially into the main smoke duct 110 (and into the housing 152). The air turbine wheel 127 has a hub 128 that comprises a ball bearing configured to rotate the air turbine wheel 127. The air turbine wheel 127 has a plurality of fan blades 129 arranged on a ring attached around the hub 128. The air turbine wheel 127 can be driven by the main air flow F1. The hub 128 and its ball bearings allow the air turbine wheel 127 to be easily driven by the main air flow F1. When the one or more air units are on and create the main air flow F1 in the main smoke duct 110, the main air flow F1 causes the air turbine wheel 127 to rotate. This causes the creation, and/or amplification, of the connecting air flow F2 in the connection duct 120. In this way, the transportation of emissions away from an emission site is improved. In some embodiments, the connection duct 120 and/or the nozzle 154 may comprise a barrier 125. The barrier 125 may be configured to control or direct the connection flow F2 in the connection duct 120 to the air turbine wheel 127. The barrier 125 may be disposed on an inner side of the nozzle 154 or an inner side of the connection duct 120. The barrier 125 may be a ramp. The barrier 125 may cause the connecting flow F2 to be directed to flow into the air turbine wheel 127 in a favorable manner.

[0046] One skilled in the art will realize that the present disclosure is in no way limited to the preferred embodiments described above. On the contrary, many modifications and variations are possible within the scope of the appended claims. Although features and elements are described above in particular combinations, each feature or element may be used alone without other features and

elements or in various combinations with or without other features and elements. In addition, variations of the described embodiments can be understood and performed by one skilled in the art practicing the claimed invention by studying the drawings, description, and appended claims. In the claims, the word "comprising" does not exclude other elements and the indefinite article "a" or "one" does not exclude a plurality. The mere fact that certain features are recited in interdependent claims does not mean that a combination of these features cannot be used with advantage.

Claims

1. A modular central emission suction device (100) for transporting smoke or fumes from one or more emission sites (210a, 210b, 210c, 210d, 210e), intended to be arranged on the outside of a building (220), the emission suction device comprising

a main smoke duct (110) configured to be arranged on the outside of the building, the main smoke duct comprising an outlet (112) configured to be arranged on the building, one or more connection ducts (120a, 120b, 120c, 120d, 120e) configured to be connected to the main smoke duct, each connection duct comprising an inlet (122a, 122b, 122c, 122d, 122e) configured to be arranged at each emission site of the one or more emission sites, and wherein the inlet is configured to receive smoke or fumes from the emission site, one or more fan units (130) configured to be arranged at the building and to be connected to the main smoke duct, said fan units being configured to create a main air flow (F1) in the main smoke duct with a flow direction towards the outlet, and wherein the main air flow in the main smoke duct creates a connection air flow (F2a, F2b, F2c, F2d, F2e) at each inlet such that smoke and fumes are transported away from said emission sites to the outlet, and wherein the main smoke duct, the one or more connection ducts and the one or more fan units are mountable in such a way that the emission suction device can be adapted to the configuration of the building.

2. An emission suction device according to claim 1, wherein the emission suction device comprises one or more attachment devices (140a, 140b) configured to attach the main smoke duct to the building.
3. An emission suction device according to any of the preceding claims, wherein the main smoke duct is flexible.

4. An emission suction device according to any one of the preceding claims, wherein said connection ducts are flexible.

5. An emission suction device according to any one of the preceding claims, wherein said main smoke duct comprises a helical insert (114) configured to be arranged inside said main smoke duct to create a vortex of the main air flow.

6. An emission suction device according to any of the preceding claims, wherein the emission suction device comprises one or more interconnecting elements (150) configured to connect the main smoke duct with said connection ducts, wherein the interconnecting element comprises

a housing (152) configured to enclose and be removably attached around the main smoke duct, and
a nozzle (154) attached to said housing and configured to be coupled to one of said connection ducts.

7. An emission suction device according to any of the preceding claims, wherein the emission suction device comprises a control unit (160) configured to control the one or more fan units, and wherein the control unit is configured to receive a control signal from a remote control unit (170a, 170b, 170c, 170d, 170e).

8. An emission suction device according to claim 7, wherein the remote control unit is a telephone unit.

9. An emission suction device according to any of the preceding claims, wherein the one or more connection ducts comprise a controllable valve (124b, 124c) configured to control a flow rate of the connection air flow.

10. An emission suction device according to any of the preceding claims, wherein the emission suction device comprises a hood (180b, 180c) and a flexible hose (185b, 185c) arranged at each emission site, wherein the flexible hose is configured to connect the hood to the corresponding connection duct of said emission site.

11. An emission suction device according to any of the preceding claims, wherein the emission suction device comprises an air turbine wheel (127) configured to be arranged in each connection duct and partially extend into the main smoke duct, wherein the air turbine wheel comprises

a hub (128) comprising a ball bearing configured to rotate the air turbine wheel; and

a plurality of fan blades (129) arranged on a ring attached around the hub.

12. An emission suction device according to claim 11, wherein each connection duct comprises a barrier (125) configured to direct the connection flow in the connection duct to the air turbine wheel. 5
13. An emission suction device according to any of the preceding claims, wherein the emission suction device comprises one or more auxiliary fan units (132b, 132c) configured to each be arranged at each connection duct and to be connected to said connection duct. 10
14. An emission suction device according to any of the preceding claims, wherein the emission suction device comprises one or more covering covers (190) configured to be attached to an exterior wall of a building and to cover the main smoke duct. 15 20
15. An emission suction device according to any of the preceding claims, wherein the emission suction device comprises a filter (116) arranged at the outlet of the main smoke duct. 25

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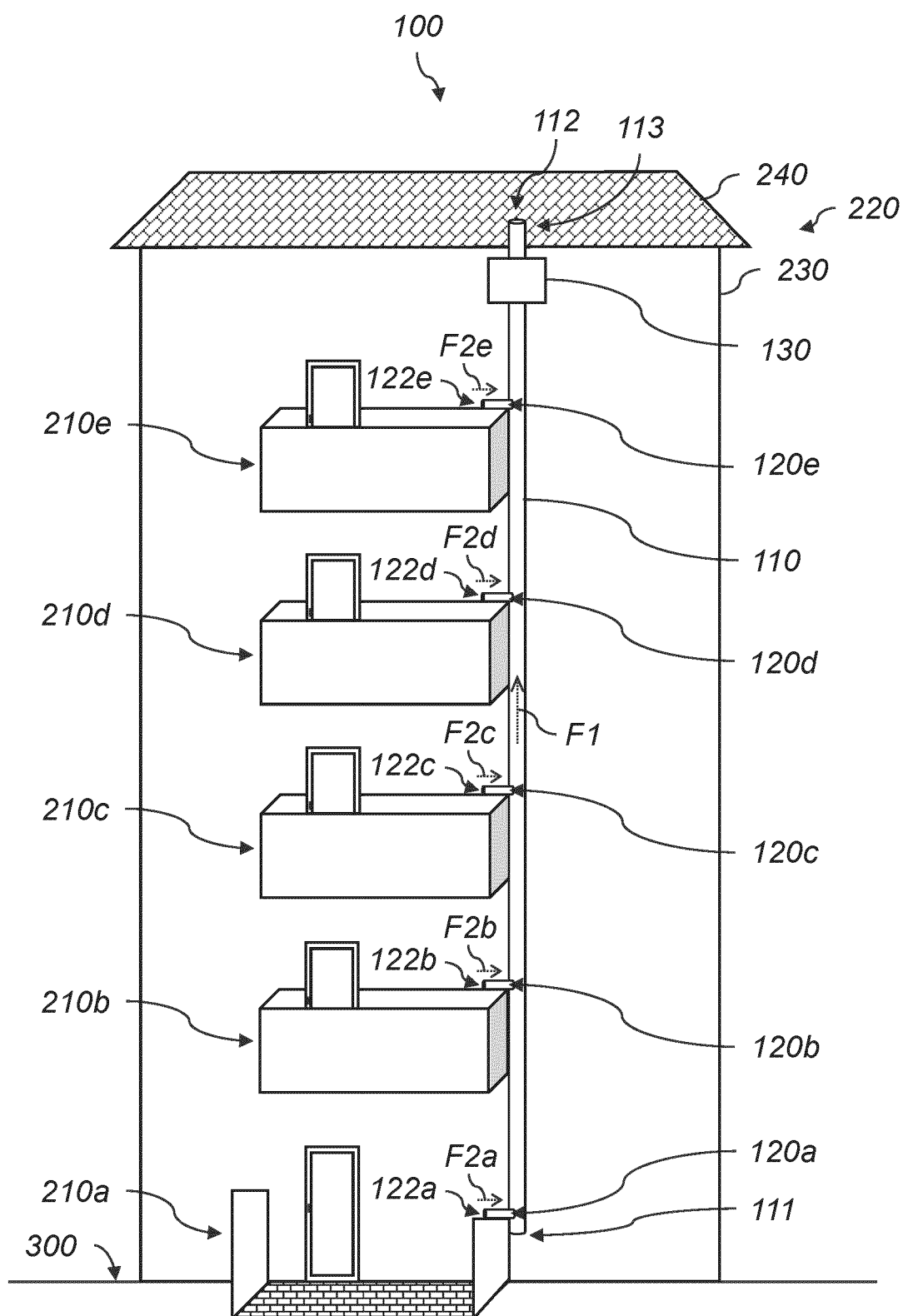


Fig. 1

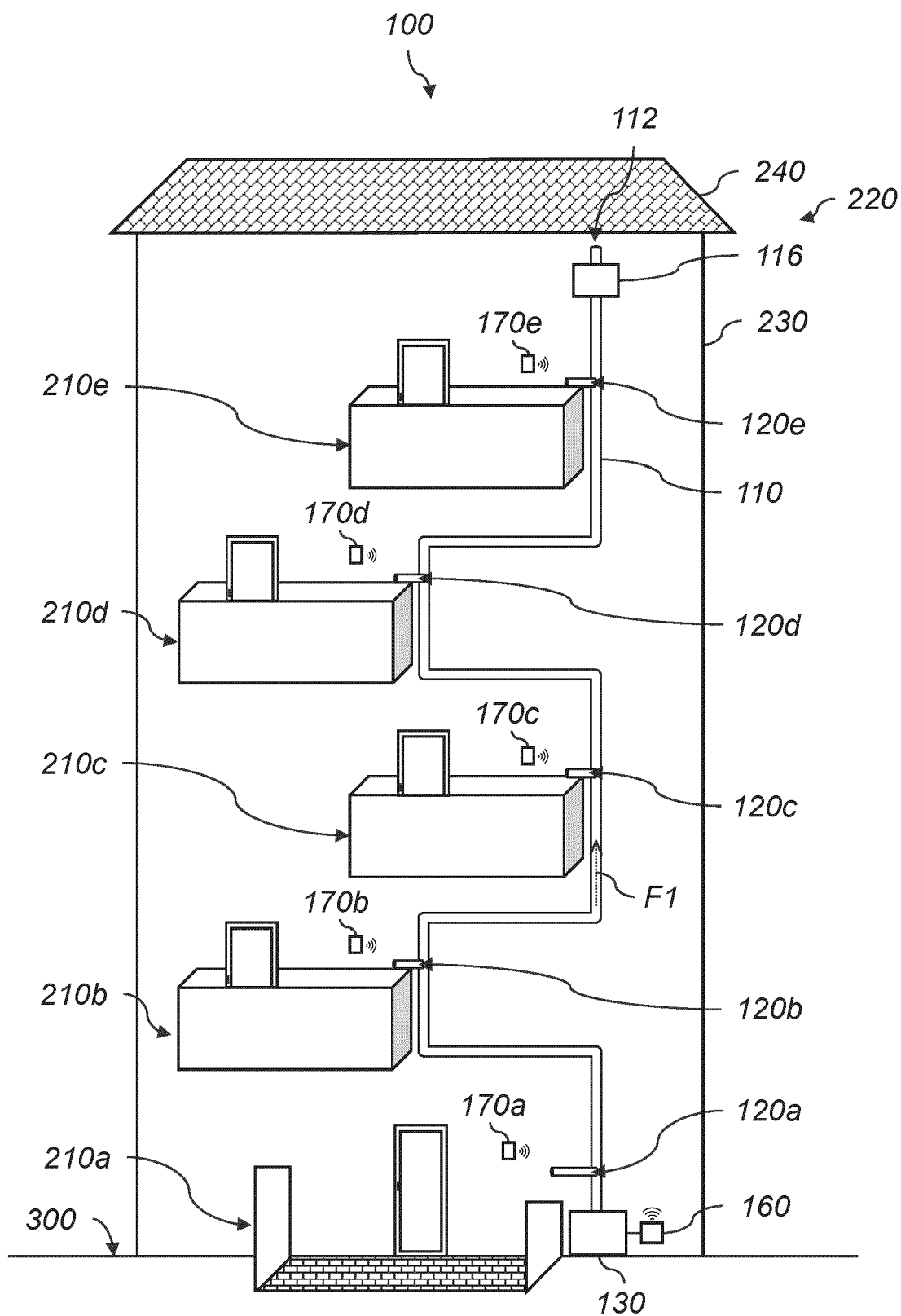


Fig. 2A

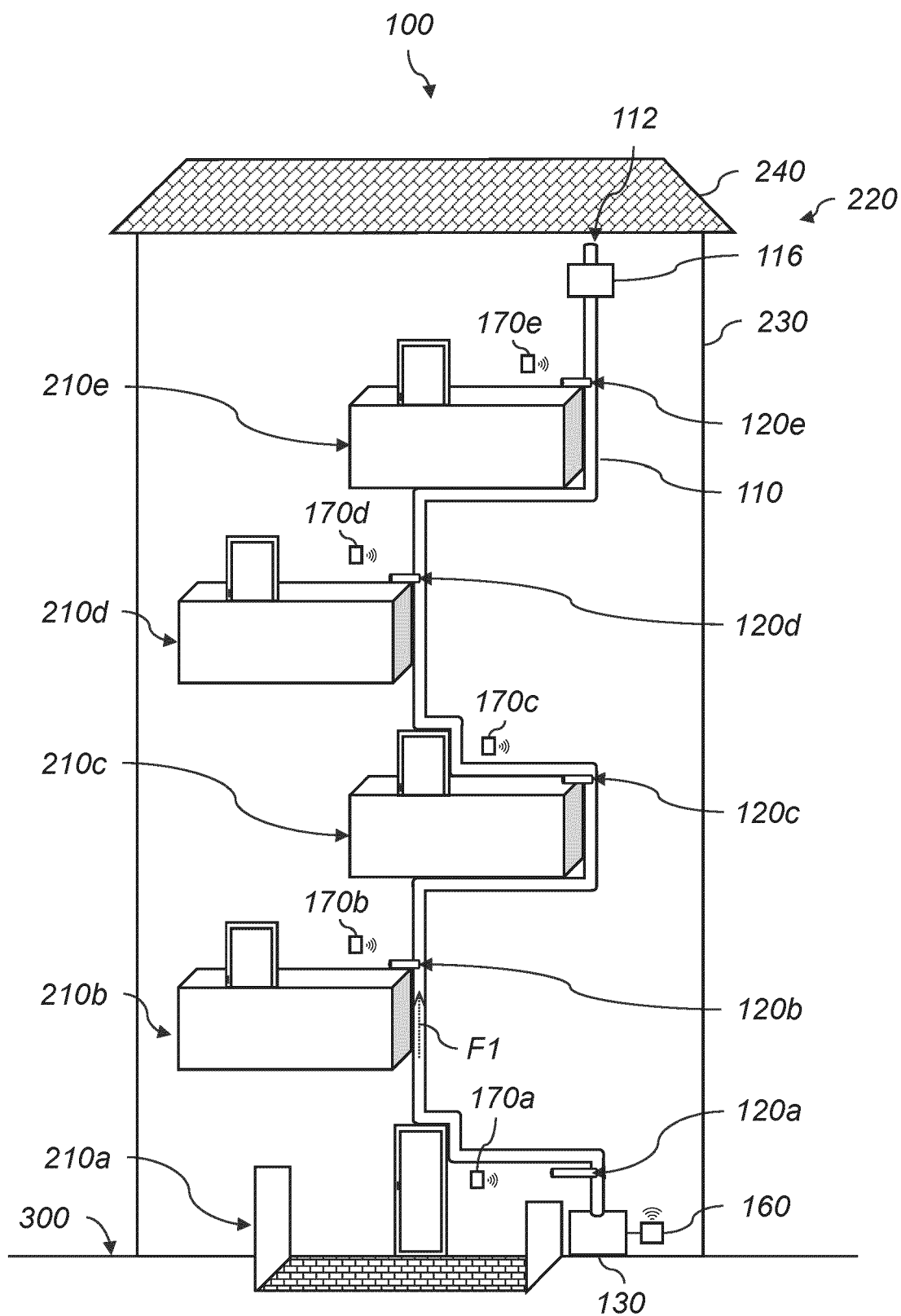


Fig. 2B

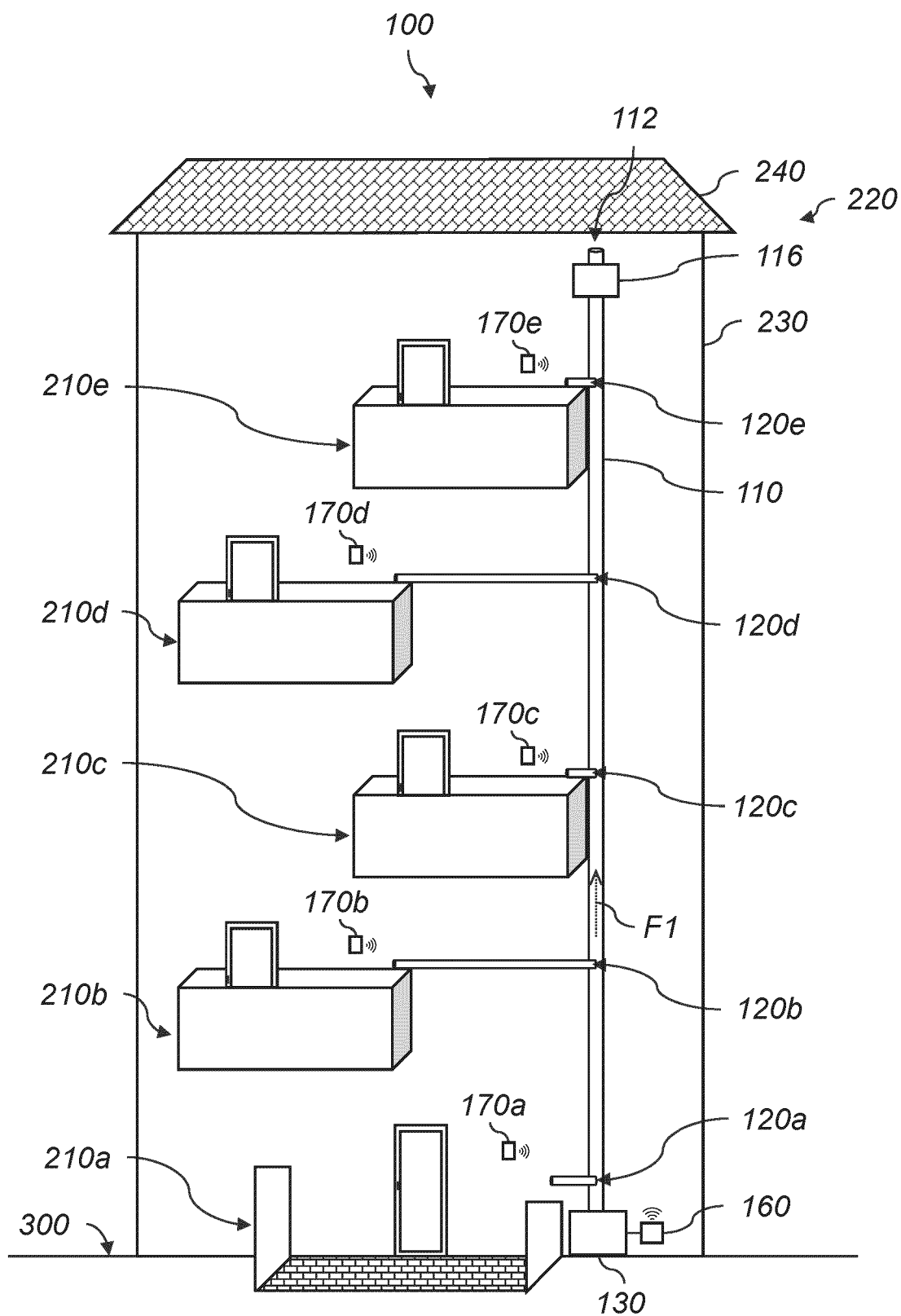


Fig. 2C

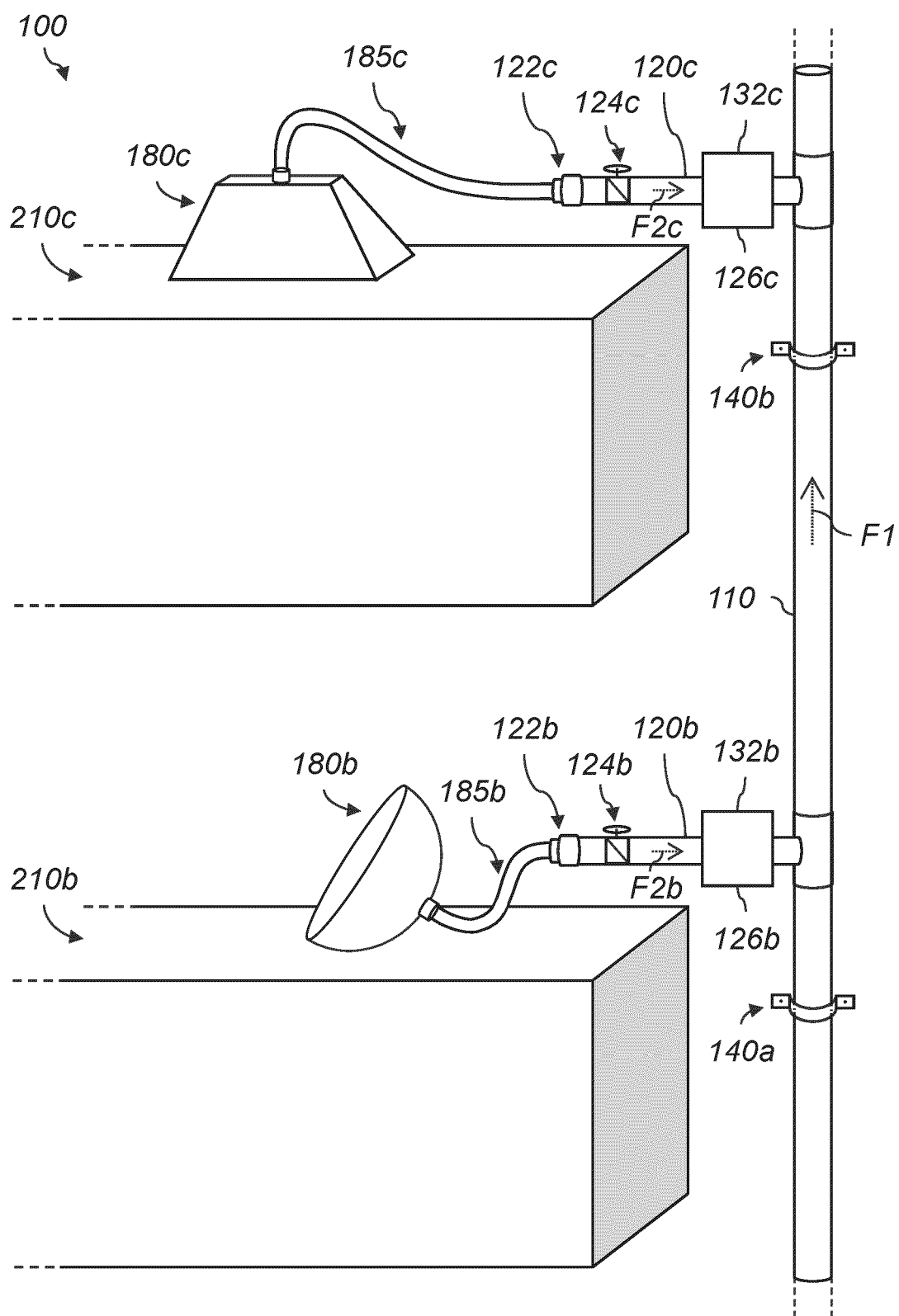


Fig. 3

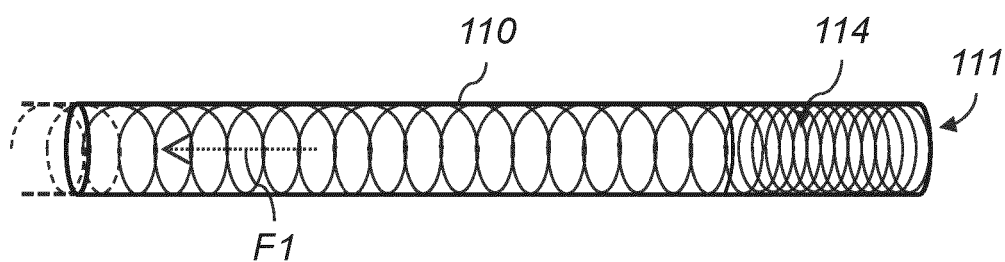


Fig. 4

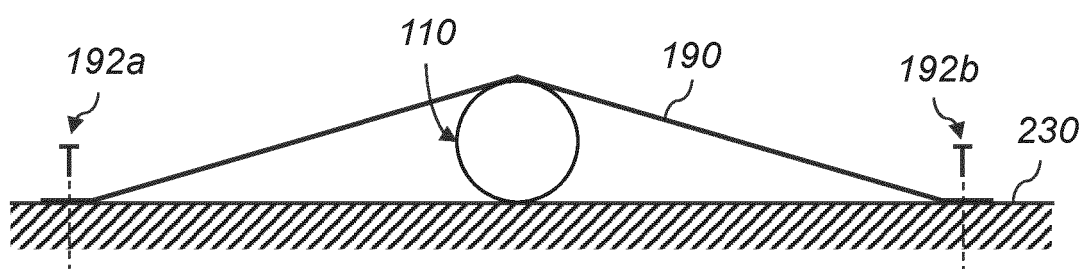


Fig. 5

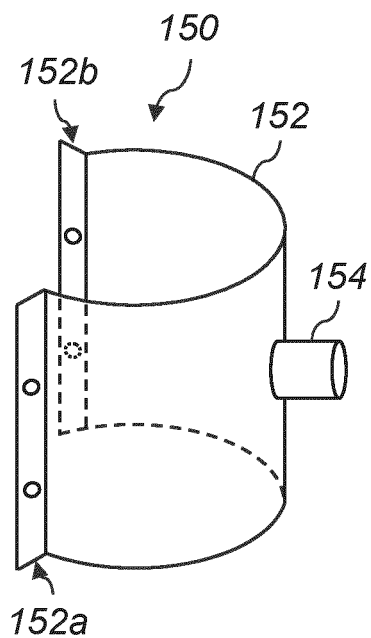


Fig. 6A

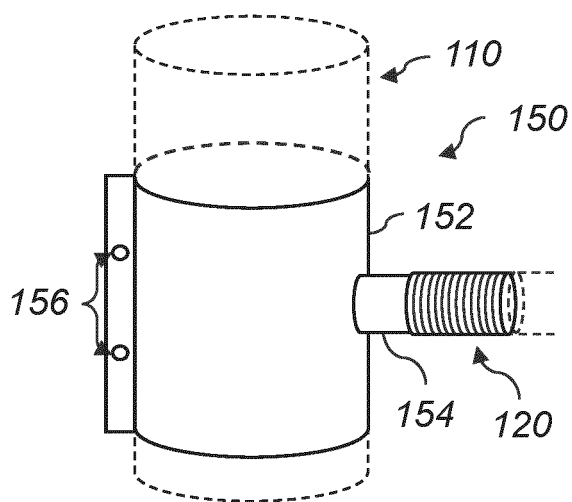


Fig. 6B

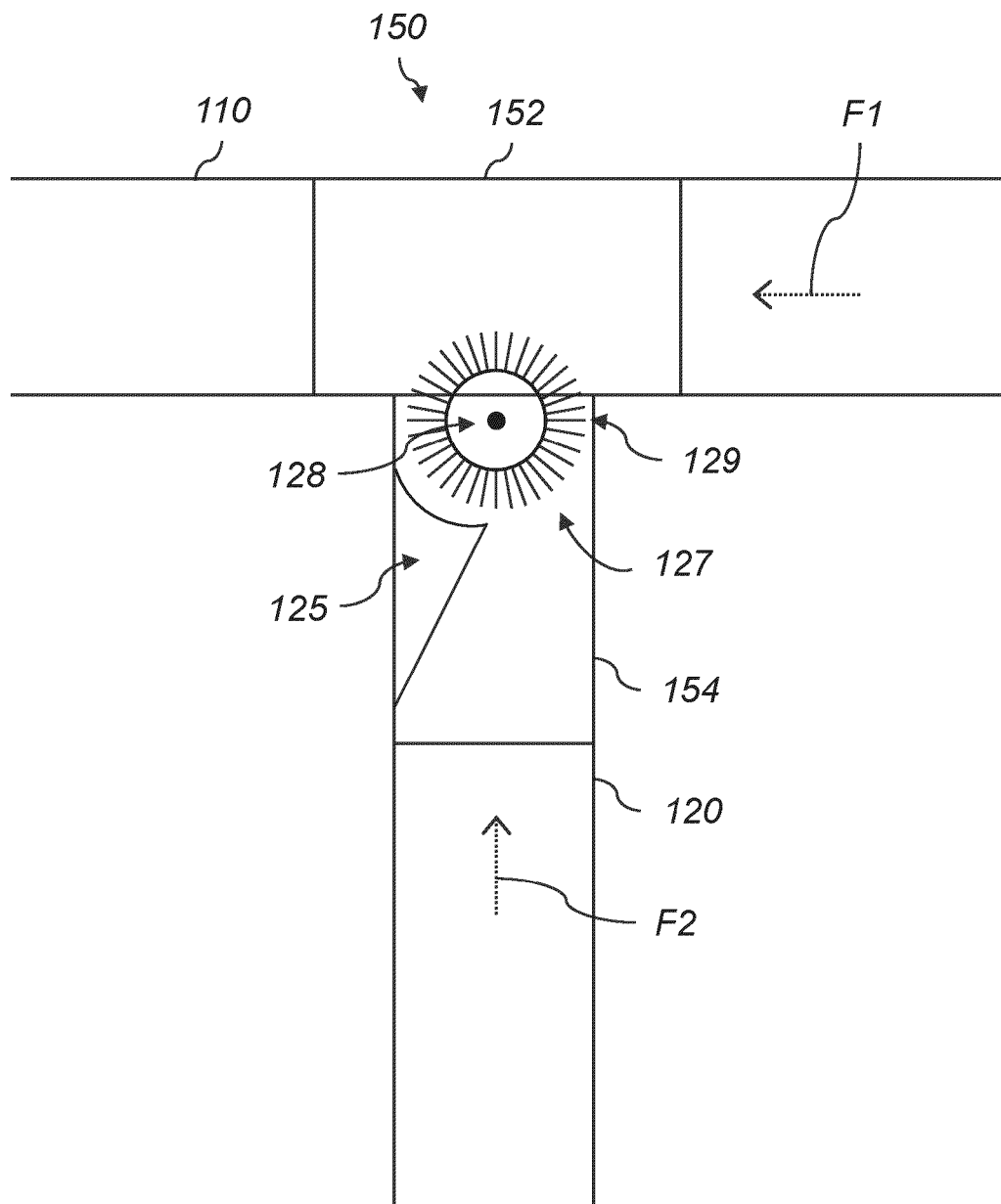


Fig. 7



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