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(54) **EXTRACTOR HOOD WITH AUTOMATIC MOVEMENT OF THE BOTTOM COVER**

(57) The invention relates to a device for extracting fumes developed for a user to be able carry out the maintenance and cleaning thereof in a simple way, without the need to use elements to increase one's height over the ground with the aim of reaching the normal position of these types of devices, such that the exposed parts of the hood that receive the fumes and steam, such as the

metal grease filters and glass or decorative metal parts are the parts that move downward by means of a system of pulleys and cables (11), actuated by an electric motor (1), facilitating the access to the same. Once the cleaning process is finished, the mechanism positions the movable elements back to operational position thereof, raising the bottom cover.

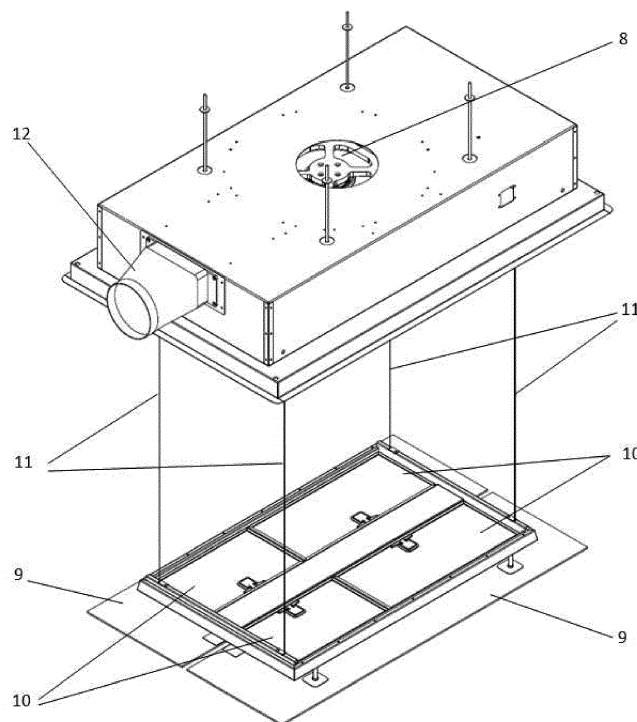


FIG. 6

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Description

OBJECT OF THE INVENTION

[0001] The present invention relates to an extractor hood for a kitchen or a cooking hob, more specifically to a system that facilitates the cleaning and maintenance of the extractor hood at the opening of bottom cover thereof. To this end, it has mechanisms that raise and lower this bottom cover, situated inside the hood, and thus the only parts that move are the mechanical elements that receive the fumes and steam from the cooker, which are susceptible to getting dirty, and no electric element is moved.

TECHNICAL PROBLEM TO BE SOLVED AND BACKGROUND OF THE INVENTION

[0002] A wide variety of extractor hoods known in the current state of the art have a general problem affecting all of the same, which consists of the fact that part of the steam that rises upwards, which is absorbed by the extractor from the cooking area situated below the same, contains grease particles and impurities that get trapped in the filters and outer surfaces of the hood.

[0003] Due to this problem, dirt accumulates in the extractor system, usually consisting of greasy substances, when the steam comes into contact with the aspiration filters or the surfaces that form part of the hood, making the parts difficult to clean, given that these substances are transported by a gas and can stick to any surface of the hood.

[0004] To facilitate this cleaning and maintenance process, many hoods incorporate the possibility of detaching part of the elements that filter the steam, but to do so they usually require elevation elements, such as a ladder, which allow the user to reach the heights at which the filters are situated, as well as for cleaning the rest of the extractor hood, where dirt also accumulates.

[0005] Thus, the technical problem to be solved by the invention consists of facilitating access to elements that directly receive the steam from the act of cooking and which become impregnated with dirt carried by the same. To this end, a mechanism has been developed which allows the bottom cover to be completely and automatically removed, making the hood a system that is able to be detached into two parts.

[0006] Similar embodiments of extractor hoods that can be automatically detached or have a mobile bottom cover are established in several invention documents, such as WO2017103708, which relates a household hood which comprises a door that can move between two positions, allowing only manual access to the filter, without the filter modifying the position thereof before the removal thereof for cleaning.

[0007] Another embodiment that is even more similar to the invention developed is that which is mentioned in document EP2327936A1, wherein the hood unit overlying

ing a cooking hob is installed hanging from the ceiling by means of cables allowing the user to vary the position of the height of the hood, making the same move closer to, or away from, the cooking hob. This system also has a fume evacuation duct, the length of which can vary on the basis of the position of the hood, all of the devices necessary for the variation of the height contained in the hood.

[0008] The object of this invention is to facilitate the extraction of fumes by moving the hood close to the cooking hob, allowing the hood to be removed when the use thereof is not required, and although the possibility of modifying the height of the hood allows the accessibility thereof to be improved for the maintenance and cleaning of the same, it is not the function of the invention, given that the entire extractor hood is moved, meaning both the mechanical elements and the electrical elements in a single module, and this leads to complications, without it being detached, in addition to moving to suitable heights for use as an extractor, but not for accessibility to enable the cleaning thereof.

[0009] Another alternative invention in which the fume extractor moves is that of document US2007079823, wherein the extractor includes a hood tube made up of a series of concentric hood pipes allowing the same to be situated at different heights with the same objective of improving extraction but not the maintenance and cleaning thereof. The parts that receive the steam and fumes from cooking are not able to be detached by the established mechanism, and therefore the cleaning and maintenance of the aspiration filters is not facilitated.

[0010] Other examples of extractor hoods for extracting fumes and steam that form part of the current state of the art are found in files WO2007148842, DE4105004, US4612909, CN101101134, which, just like the aforementioned patents, allow the lower part of the hood to move by means of different mechanisms, to move toward the cooking surface, but do not allow for the part that directly receives the fumes and the steam that dirties the filters and outer surfaces to be detached and adjusted to a suitable height for the maintenance thereof by means of mechanical elements without intervening in the electrical part of the hood.

[0011] Thus, the present invention solves the problems that have not currently been solved by the present state of the art, such as the possibility of uncoupling only the bottom cover of the extractor hood by means of mechanical elements and bringing it to a suitable height for the maintenance thereof, without intervening in the entire extractor system, by means of remote control.

[0012] The hoods described that incorporate raising and lowering systems are different from the one described in this invention since they are only useful for moving the hood installed on the ceiling to the cooking hob, so as to improve the aspiration and carry out the filtering by means of different types of filters, but do not have the function of facilitating cleaning, which this invention is designed for.

DESCRIPTION OF THE INVENTION

[0013] With the aim of achieving the previously mentioned objectives, the present invention describes a system formed by a electronically motorised device and with a special pulley assembly situated inside the extractor hood, arranged to carry out the manoeuvre of lowering the elements to be cleaned, such as the metal grease filters and glass or decorative metal parts of the ceiling hood.

[0014] The operation is specifically done through an order issued by means of remote access, remote control or similar, which the hood incorporates as standard, when the motor for the aspiration of fumes is completely stopped and without the possibility of accidentally being actuated.

[0015] Once the separation of the bottom cover from the hood has been ordered, an electric motor present in the mechanism is actuated, transmitting the rotational movement to a shaft that has pulleys situated at the ends thereof in a vertical position and which wind metal cables that are freed as the shaft rotates. These cables are transmitted to other pulleys that direct them to the 4 corners of the bottom rectangular cover of the hood, which moves downwards in a vertical direction, maintaining the horizontal position of use, preventing excess dirt in the form of grease from spilling due to the effect of gravity.

[0016] When the pulleys free the entire cable, the bottom cover is maintained hanging over the cooking hob by these 4 cables, without coming into contact with the same, so as to prevent possible collisions that may cause damage to the parts or to prevent heat from altering the elements that make up the cover, given that the two are different home appliances that function independently. This way there is a minimum safety height over the cooking hob of 300 mm, which, depending on the height of the standard ceiling could be a maximum of 500 mm over the cooking hob.

[0017] By reducing the height at which this part of the extractor hood is situated, access to the filters is facilitated for the user, as well as to the glass or decorative metal parts of the hood, able to be removed and/or cleaned with greater comfort.

[0018] The system allows for the use of filters made of different materials, such as aluminium, stainless steel, activated carbon, or compounds of the same, without the elevation mechanism affecting the choice of any of the same, since these elements have a mesh-type structure and a light weight, so as to allow for the gases to pass therethrough, but have a weight that is sufficient enough to allow for vertical displacement of the bottom cover with the cables tensioned.

[0019] Likewise, the movable bottom cover can have decorative elements, such as glass panes, or panes made of any type of ceramic or metal, although in the description it is preferably produced with two glass surfaces in a horizontal position joined to a metal frame that supports the filters, arranged in such a way that allows

for the absorption of fumes caused by cooking through the slots arranged between the same and the frame itself.

[0020] Once the cleaning processes is over, the remote control is actuated again to automatically raise the cover towards the hood, returning it to a working positions, and during the raising manoeuvre, as well as in the lowering manoeuvre, the device emits a warning sound, preferably high pitched, and a luminous signal by means of a LED, with the aim of properly alerting the user of the same.

[0021] In the initial moments at which the mechanism that raises the cover begins to function, as well as in the final moments in which it is fitted into the platform of the hood, the speed of the electric motor slows by means of a limit switch assembly, so as to facilitate the coupling and the initial starting in a delicate way, preventing possible collisions between the parts that could damage the structure.

[0022] Furthermore, the system incorporates a safety phase to protect against jams, which, when noticing a pressure before the pulleys reach their limit, automatically detains the system allowing the user to free up the mechanism.

[0023] Based on the description, it is considered that the mechanism implemented is exclusively to be used for cleaning, since no piece of the electrical system, not even the lights, moves downward, given that it is not necessary, leaving the active parts of the hood secured to the ceiling at all times.

BRIEF DESCRIPTION OF THE FIGURES

[0024] To complement the description of the invention and for the purpose of aiding to better understand the features of the invention according to a preferred exemplary embodiment thereof, a set of drawings is attached in which the following figures have been depicted with an illustrative and non-limiting character:

- Figure 1 shows a isometric perspective view of the extractor hood from above, with the bottom cover coupled in the operating position thereof, showing how the mechanism for moving the bottom cover does not intervene in the elements that are intended for the extraction of fumes to the evacuation duct.
- Figure 2 shows an upper plan perspective view in which it can be easily seen how the motor of the elevating mechanism is connected to the transmission shaft by means of a perpendicular gear, as well as the arrangement of the different types of pulleys that allow for movement in a vertical direction of the bottom cover in a completely horizontal position.
- Figure 3 shows a lower plan perspective view showing the appearance of the hood from the outside when it is in operation, wherein only the sheets or horizontal surface can be seen, as well as the grates that filter the fumes and steam.
- Figure 4 shows an elevation perspective view of the

extractor hood mounted in a position of use in order to be installed.

- Figure 5 shows a profile perspective view of the extractor hood.
- Figure 6 shows an isometric perspective view of the complete extractor hood with the bottom cover detached in a position for cleaning and maintenance, allowing one to see how access to the filters and the outer surfaces of the hood is facilitated at a lower height than that of the extractor where it is installed.

DESCRIPTION OF A PREFERRED EMBODIMENT OF THE INVENTION

[0025] As can be seen in the figures, the present invention relates to an extractor hood to extract fumes or steam caused by cooking which includes a mechanism that allows the bottom cover to be detached, leaving it hanging by cables (11) to facilitate the access thereof at a height that is suitable for the user.

[0026] As can be seen in figure 3, showing a plan view of the hood, the mobile cover is made up of a metal frame structure that holds the aspiration filters (10) and two or more rectangular surfaces (9) preferably made from ceramic or metal materials with a low porosity, situated in a way that allows for the passage of fumes through the slots arranged on these surfaces (9) and the frame of the cover, passing through the filters (10) and being suctioned by the suction motor (8) to the evacuation duct (12) for the fumes.

[0027] The mechanism in charge of moving the cover consists of an electric motor (1) connected by means of a system of gears (6) to a motion transmitting shaft, which makes drive pulleys (3) rotate situated at the ends of said shaft. As shown in figures 1 and 2, these drive pulleys (3) collect the metal cable (11) when the bottom cover of the hood is mounted in an operating position, and when rotated they unwind the cables (11), directing two of them directly to two elevator pulleys (4) situated on the drive pulleys (3) and another two to another two elevator pulleys (4) situated at the same height as the previous ones but on the opposite side of the bottom cover of the hood, by means of a group of transmission pulleys (5) situated in a horizontal position.

[0028] This arrangement of the pulleys causes the lowering of the bottom cover to be done in a horizontal position, until the cable is completely unwound, which is the moment when the mechanism stops, leaving the bottom cover hanging from the hood by means of four metal cables (11) joined to the 4 corners of the cover, allowing the user to more easily access the aspiration filters (10) for the maintenance and cleaning thereof.

[0029] To prevent the cover from interfering with the cooking hob while is hanging in the air, a length of the metal cables (11) is arranged, determined such that in the maximum extension thereof, the cover and the cooking hob are separated by a safety distance, this extension being dependent on the height at which the hood is in-

stalled, such that the higher the hood is installed, the longer the cables.

[0030] Once the cleaning process of the bottom cover by the user is finished, the order for retraction is sent, through which the bottom cover rises, driven by the cables (11) to the operating position thereof. To prevent possible contact between the parts of the hood during the raising or lowering process, the mechanism has limit switch assembly (2) that slows the speed of the rotation of the transmission shaft when the bottom cover gets close to the beginning or the end of its path, making the stoppage smoother and reducing the impact. The limit switch assembly (2) also prevents the system from getting jammed, stopping the electric motor (1) when a high degree of tension is exerted on the fastening cables (11), allowing the user to free up the jammed mechanism.

[0031] The order of actuating the electric motor (1) is generated by means that are remotely controlled and preferably wireless, due to the usually raised position of the extractor hood, where the box containing the circuits and connections (7) is located, which receives the order and actuates the electric motor (1), but only when the suction motor (8) is completely stopped, since the operation of the extractor is blocked when the bottom cover is not situated in a position in which it is covering the hood with the metal cables (11) completely wound.

[0032] During the vertical movement of the bottom cover of the hood, a high pitched acoustic signal is emitted, which is generated in the box containing the circuits and connections (7), which also turns on a luminous signal by means of an LED situated on the outside of the hood, in the user's view.

[0033] The present invention should not be taken to be limited to the embodiment herein described. Other arrangements may be carried out by those skilled in the art based on the present description. Accordingly, the scope of the invention is defined by the following claims.

Claims

1. An extractor hood with automatic movement of the bottom cover formed by a support structure made of metal sheets with a suction motor (8), a evacuation duct (12) for the fumes and aspiration filters (10) on the inside thereof, **characterised in that** it comprises a circuit box (7) connected to an electric motor (1) of forwards and backwards motion, which assembled, by means of a system of gears (6), to a configuration of pulleys connected by means of metal cables (11), such that by actuating the electric motor (1) the metal cables (11) unwind, moving the bottom cover of the hood, which contains the system of filters (10), downwards while it is kept hanging by the cables (11), joined at the corners thereof.
2. The extractor hood with automatic movement of the bottom cover according to claim 1, **characterised**

in that the pulley system comprises a group of drive pulleys (3) that wind the metal cables (11) when the system is closed, situated on the same transmission shaft of the gear system (6) driven by the motor (1), a group of elevator pulleys (4) situated in a vertical position, which direct the cable towards the bottom cover, a group of transmission pulleys (5) situated in a horizontal position, which allow the tensioned cables (11) to be driven to the elevator pulleys (4) situated on the side opposite the drive pulleys (3), making it so the lowering and raising of the bottom cover is done in a horizontal position, leaving the cover suspended in the air when the cables (11) are completely unwound.

3. The extractor hood with automatic movement of the bottom cover according to claim 1, **characterised in that** the electric motor (1) is connected to a limit switch assembly (2) device, which prevents the system from getting jammed, stopping the electric motor (1) when it is exerting a tension that is slightly greater than normal on the fastening cables (11).
4. The extractor hood with automatic movement of the bottom cover according to claim 3, **characterised in that** the limit switch assembly (2) slows the speed of the rotation of the transmission shaft when the bottom cover gets close to the beginning or the end of the path thereof.
5. The extractor hood with automatic movement of the bottom cover according to claim 1, **characterised in that** the order of actuating the electric motor (1) that produces the movement of the bottom cover of the hood is provided by means that are remotely controlled and preferably wireless, when the suction motor (8) of the unit is completely stopped, making it impossible for it to operate when the bottom cover is not in a position of use.
6. The extractor hood with automatic movement of the bottom cover according to claim 1, **characterised in that** the system emits an intermittent high pitched acoustic signal in the box containing the circuits and connections (7) and a visual signal with a control LED when the electric motor (1) for elevation is being used.
7. The extractor hood with automatic movement of the bottom cover according to claim 1, **characterised in that** the available extension of the cables (11) is dependent on the height at which the extractor hood is installed on the ceiling, such that the bottom cover suspended in the air when the cables (11) are completely unwound is always situated at the same safety height over the cooking hob.
8. The extractor hood with automatic movement of the

bottom cover according to claim 1, **characterised in that** the mobile bottom cover of the extractor hood is made up of two or more rectangular surfaces (9), preferably of a material that is of a ceramic origin or a metal with low porosity, which are arranged leaving a slot through which the fumes are absorbed by the suction motor (8) to the evacuation duct (12).

9. The extractor hood with automatic movement of the bottom cover according to claim 1, **characterised in that** there are four cables (11) connected to the corners of the bottom elevating cover of the extractor hood.

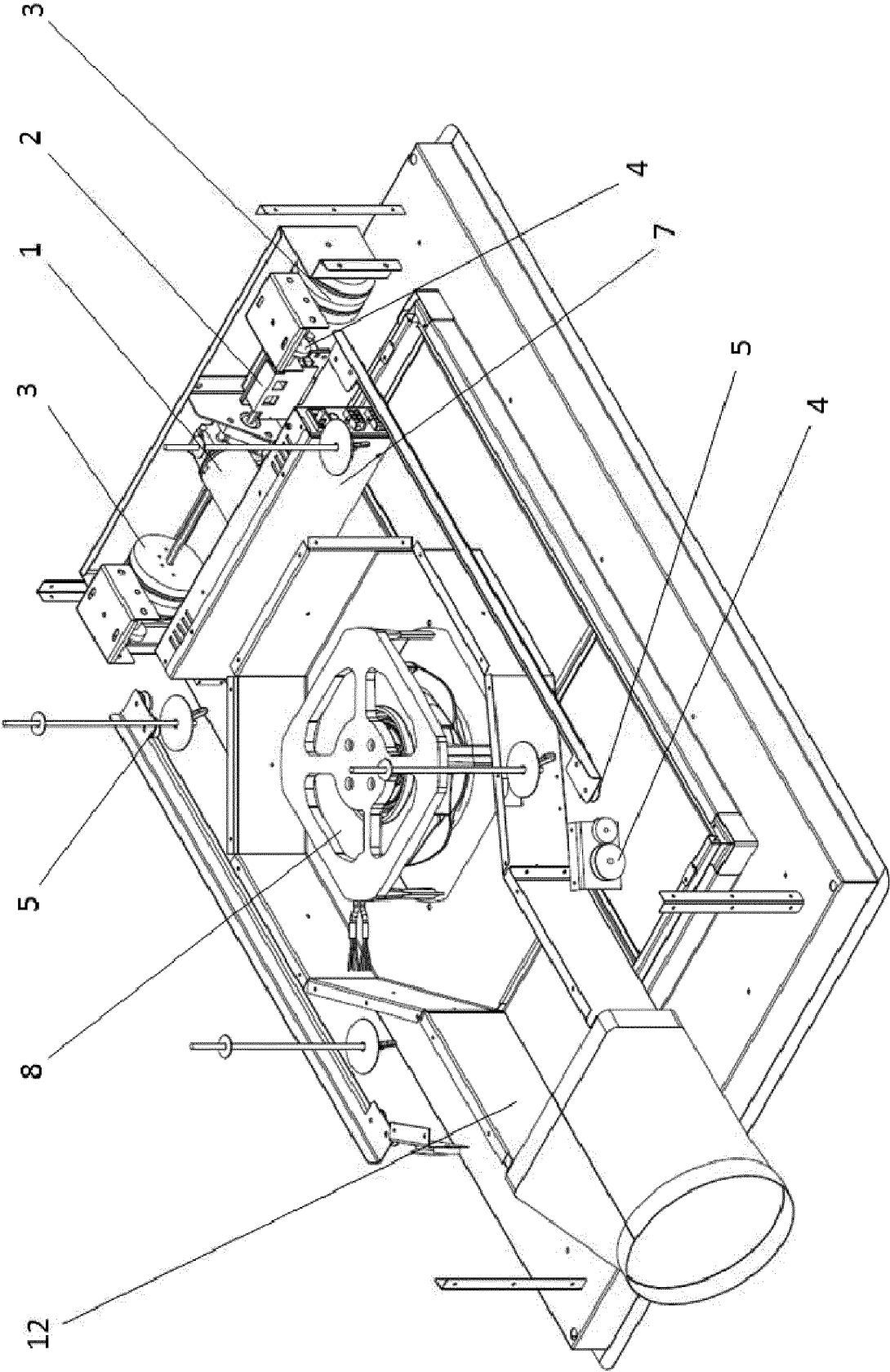


FIG. 1

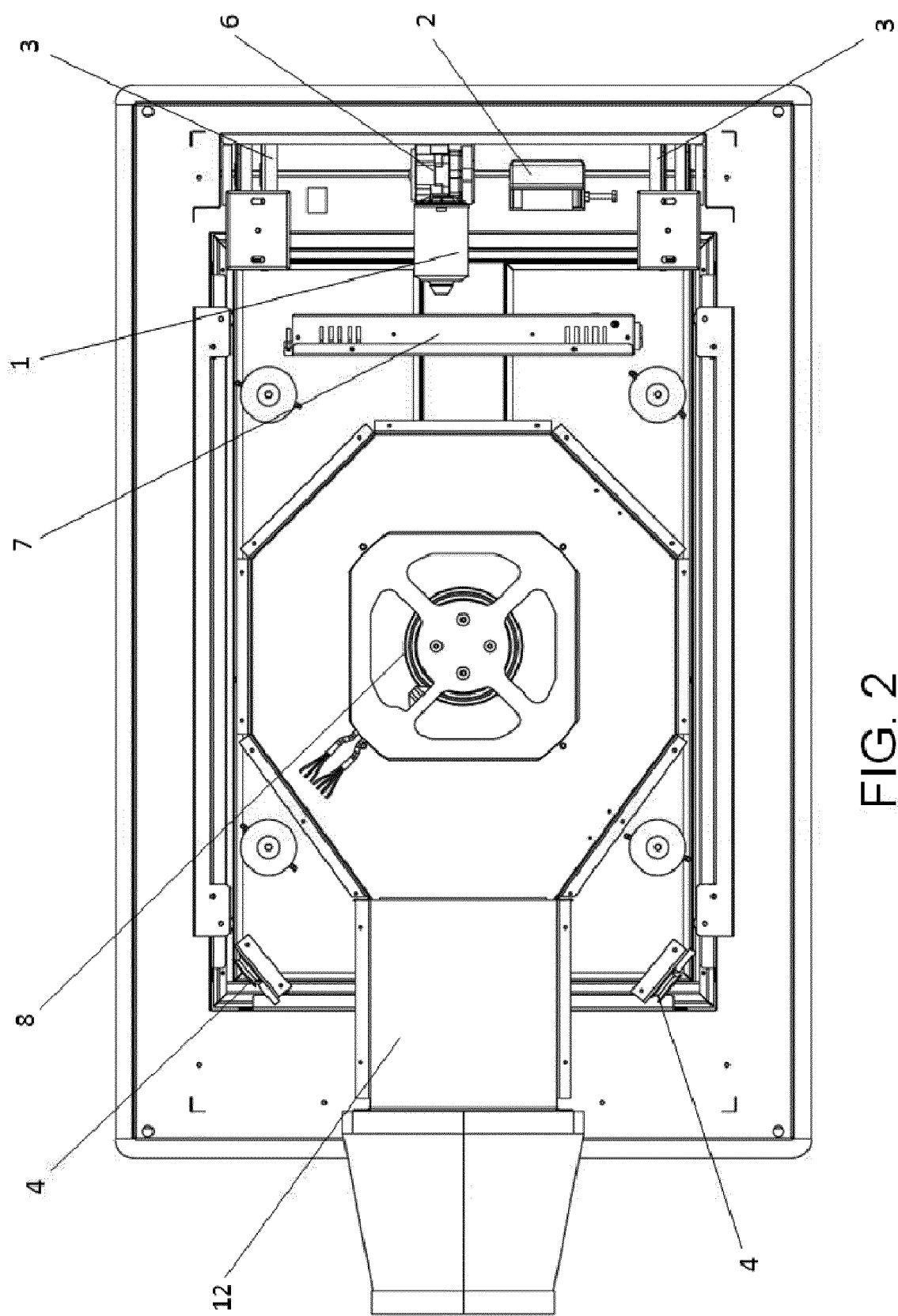


FIG. 2

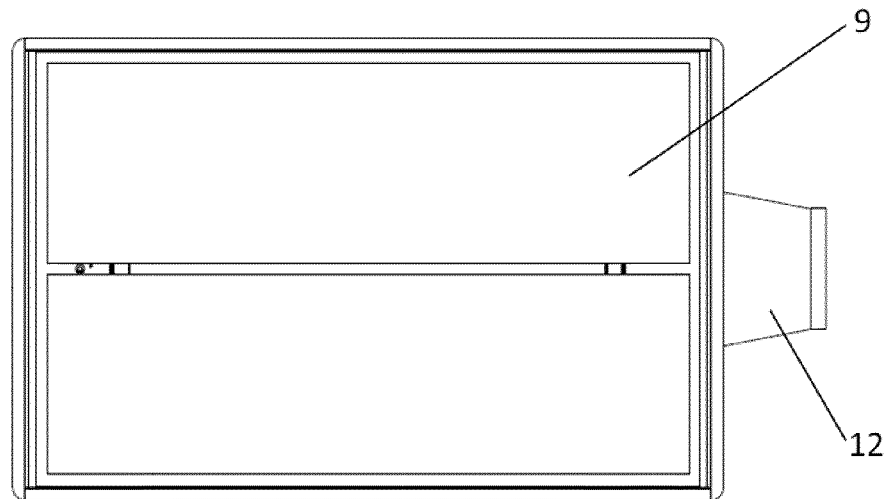


FIG. 3

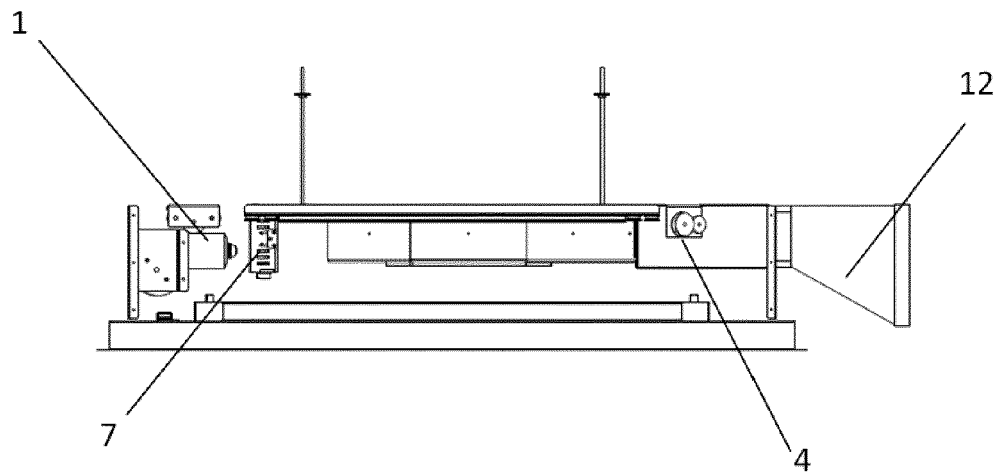


FIG. 4

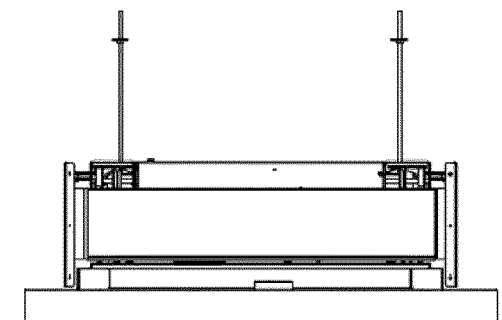


FIG. 5

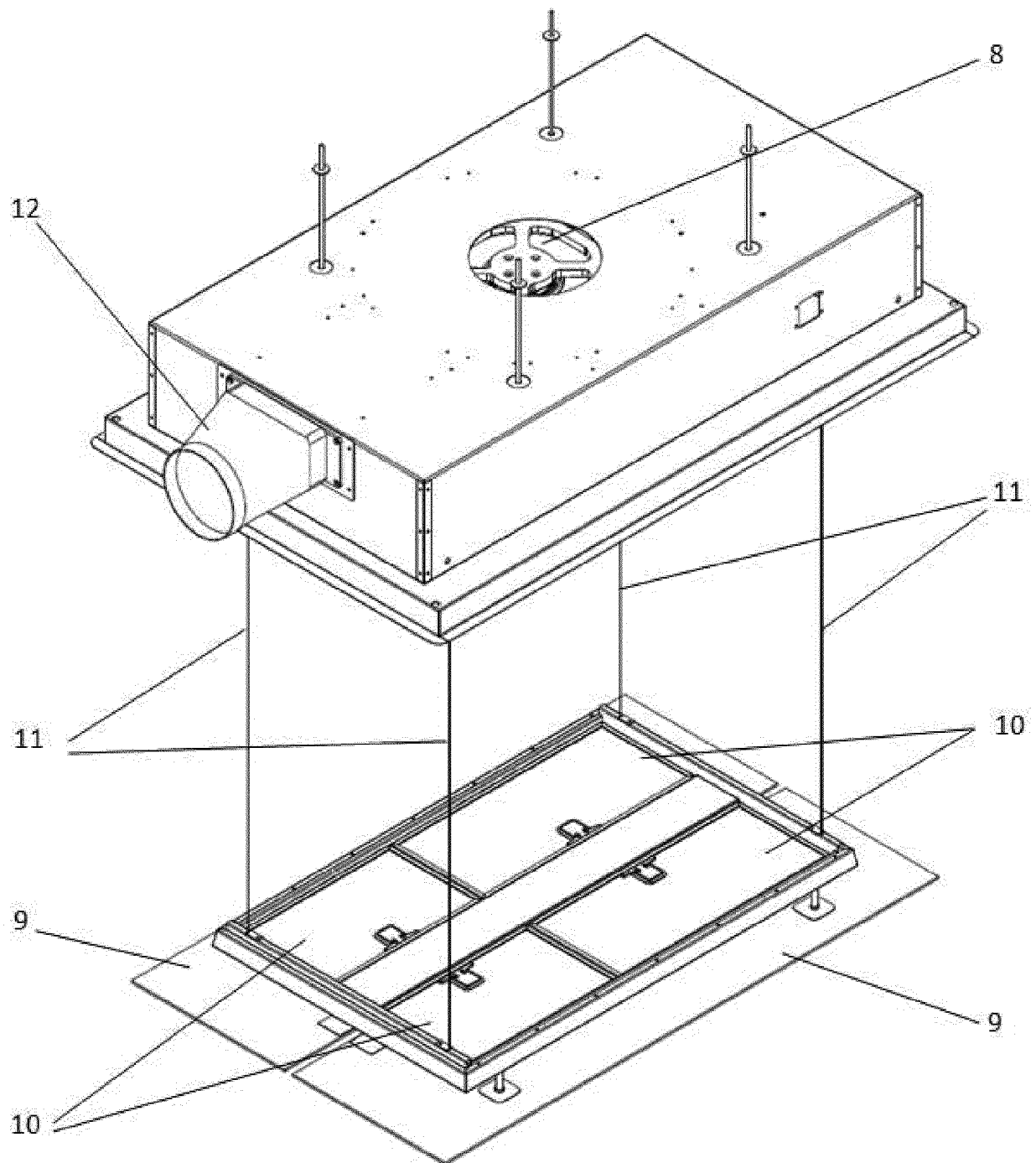


FIG. 6



EUROPEAN SEARCH REPORT

Application Number
EP 18 21 4414

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	CN 104 296 210 A (HANGZHOU ROBAM APPLIANCES CO LTD) 21 January 2015 (2015-01-21) * figures 1-4 *	1-4,6-9	INV. F24C15/20
Y	----- JP H09 4901 A (FUSAKAWA MASAYUKI) 10 January 1997 (1997-01-10) * figures 1,2 *	5	
X	----- JP 2008 002707 A (EZENTECH CO LTD) 10 January 2008 (2008-01-10) * paragraphs [0013] - [0015]; figures 1-4 *	1,4,6-9	
Y	----- EP 2 317 232 A1 (MIELE & CIE [DE]) 4 May 2011 (2011-05-04) * paragraphs [0028] - [0032], [0034], [0038], [0045]; figures 1-4 *	5	
A	----- EP 2 327 936 A1 (FABER SPA [IT]) 1 June 2011 (2011-06-01) * paragraphs [0017], [0024], [0025]; figures 1-4,9 *	1-4,8,9	
A,D	----- The present search report has been drawn up for all claims	1-9	TECHNICAL FIELDS SEARCHED (IPC) F24C
Place of search		Date of completion of the search	Examiner
The Hague		17 June 2019	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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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 18 21 4414

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17-06-2019

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
CN 104296210 A	21-01-2015	NONE	
JP H094901 A	10-01-1997	NONE	
JP 2008002707 A	10-01-2008	NONE	
EP 2317232 A1	04-05-2011	NONE	
EP 2327936 A1	01-06-2011	EP 2327936 A1	01-06-2011
		EP 2504628 A1	03-10-2012
		WO 2011063969 A1	03-06-2011

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 2017103708 A [0006]
- EP 2327936 A1 [0007]
- US 2007079823 A [0009]
- WO 2007148842 A [0010]
- DE 4105004 [0010]
- US 4612909 A [0010]
- CN 101101134 [0010]