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(54) Title: HOOD UNIT WITH LIFTING/LOWERING DEVICE IN THE HOOD

(57) Abstract: The kitchen hood unit (10; 110; 210; 310; 410) comprises an actual hood (14; 114) overlying a cooking hob, and suspension means (22; 122) for suspending it from a support element (12; 112; 212; 412) to be fixed to the ceiling of the room in which the hood unit (10; 110; 210; 310; 410) is located. The suspension means (22; 122) have a length which can be varied by the user to cause the actual hood (14; 114) to approach and withdraw from the cooking hob. A fume evacuation conduit (28) can also be provided, the length of which varies on the basis of the variation in length of the suspension means (22). The kitchen hood unit has a lifting/lowering device (34) enabling said suspension means (22; 122) to be wound or unwound to cause the actual hood (14; 114) to approach or withdraw from the support element (12; 112; 212; 412), whereby said device (34) is contained in the actual hood (14; 114).

Fig. 10
before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

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HOOD UNIT WITH LIFTING/LOWERING DEVICE IN THE HOOD

Description

The present invention relates to kitchen hood units according to the upper part of claim 1, both of suction type and of filter type.

So-called "Island" hoods are known for installation in the centre of a room, spaced from the walls, and have a chimney rigid with the actual hood, the upper or other end of the chimney being fixed to the ceiling. The chimney can be of telescopic form to be able to adjust within determined limits the distance of the hood unit from the ceiling, in order to adapt it to rooms of different height, so that the hood unit can be disposed at an optimal distance from the cooking hob. It should be noted that the installation of an island hood is fairly complicated and requires the intervention of two persons.

In recent years new hood unit types have been marketed requiring a somewhat different installation method from the classic type, these including so-called "chandelier" hoods. These are hood units which do not comprise a fume evacuation conduit (so that they only act by filtration) and in which the actual hood is suspended from the ceiling by wires or tubes, as in the case of chandeliers.

These hood units have the advantage of simplified installation in addition to a reduced visual impact. However, because of the lack of the fume evacuation conduit, these hood units have poor performance. Moreover, being suspended, if touched they tend to oscillate, hence special solutions have to be adopted for the relative control means.

It should also be noted that so-called ceiling hood units exist, having the advantage of minimum visual impact, they being incorporated into the ceiling, however they present certain disadvantages. In fact, they require the presence of a false ceiling and moreover, even though they can discharge the in-drawn fumes outside the room, they have limited performance because the hood unit is excessively spaced from the cooking hob and the fumes can fill
the entire room before being drawn in. Moreover, for the same reason, cooking fats being present in the vapours can deposit on furniture and walls before reaching the hood unit.

5 So-called lifting/lowering island hoods and also wall hoods exist, i.e. provided with a mechanism which enables the user to adjust its elevation above the cooking hob, so that in the case of intense cooking the hood unit can be lowered to approach the cooking hob and improve its capacity to capture the fumes, whereas when the cooking hob is inactive or in the case of light cooking, with reduced fume development, the hood unit can be lifted/raised to provide more comfortable access to the cooking hob (in particular preventing the user's head from hitting the hood unit). The lifting (or raising) /lowering mechanism can be manual (e.g. of the counterweighted type) or motorized. A version of the lifting/lowering island hood with counterweight is produced by WESCO, while MIELE produces a motorized version.

10 It should however be noted that this type of hood unit has the drawback of being rather expensive.

20 An object of the present invention is to provide a hood unit, the elevation of which can however be varied by the user, so that it also becomes a lifting /lowering hood unit.

25 This object is attained by a kitchen hood unit according to the present invention, comprising an actual hood and suspension means for suspending it from a support element to be fixed to the ceiling of the room in which the hood unit is located, with the features of claim 1.

30 Accordingly, the kitchen hood unit according to the invention comprises an actual hood overlying a cooking hob, and suspension means having a length which can be varied by the user to cause the actual hood to approach and withdraw from the cooking hob, said suspension means comprising a lifting/lowering device to vary the length of the suspension means with said lifting/lowering device being contained in the actual hood.
This renders the present hood unit advantageous in that it is very easy to install: Instead of having to install a support element bearing the lifting/lowering device and also carrying the suspension means with the actual hood, all it is necessary is to fix the suspension means to the ceiling (either indirectly via a reduced support element or directly). Moreover, the hood unit according to the invention is also easy to clean and easy to maintain: During the maintenance there is no need to remove the support from the ceiling or to work on a ladder. All the cleaning and maintenance operations can be performed while the hood is in the lower position and can be easily accessed. If there is the need to remove or change the hood, it can be disconnected/dismounted easily and simply changed against a new one. Finally, this inventive hood unit requires less volume of the transport packaging: By putting the lifting/lowering device inside the hood there is no need to send two different parts, i.e. the hood and the support to the customer.

While hood units with a the lifting/lowering device are known in the art they have the important disadvantage of being too complicated with respect to its support element which became the central part of the hood and thus, had to support different kind of functional parts like the lifting/lowering device, the exhaust duct etc.

In contrast to that the hood according to the present invention has one functional part only, i.e. the actual (suspending) hood, and some simple easily accessible, maintainable and replaceable parts like a support element, the suspension means, exhaust ducts etc. This finally results in a (i.e. the) hood of a true "chandelier" style, the concept of which being different from the known complex hoods.

Advantageous embodiments of the invention are subject of the dependent claims, their wording being herewith explicitly incorporated into the specification in order to avoid the need of unnecessary replications.

The suspension means conveniently comprise one or more suspension cables or wires, and the lifting/lowering device enables said cables or wires to be rolled onto or unrolled from a relative drum rotatably supported by said sup-
port element or by the actual hood, to cause the actual hood to approach or withdraw from the support element. Said device is conveniently motorized.

One embodiment of the present invention comprises a fume evacuation conduit, the length of which can be varied on the basis of the variation in length of the suspension means.

The fume evacuation conduit can for example be of a bellows type or of a telescopic type (in both cases without load-bearing function), which is lengthened or shortened as a result respectively of the withdrawal or approach of the actual hood from or towards its support element, as a consequence of the shortening or lengthening of the suspension means.

Preferably the actual hood is enabled to rise until it lies against the support element. In this condition the hood unit has a bulk reduced to a minimum and resembles a ceiling light fixture. In this case, if a false ceiling is provided, when the actual hood lies in its most elevated position, its lower edge could be arranged such that it does not project from the false ceiling, so that a hood unit is obtained which in this condition resembles a "ceiling" hood.

The invention will be more apparent from the ensuing description of some embodiments thereof given by way of example. In this description, reference is made to the accompanying drawings, in which:

Figure 1 is a perspective view of a first embodiment of the hood unit according to the invention, of the type operating only in the filtration mode, shown in its lowered configuration;

Figure 2 shows the same hood unit of Figure 1 but in its completely raised configuration;

Figure 3 is a perspective view of a second embodiment of the hood unit of the invention;

Figure 4 shows the same hood unit of Figure 3 in its completely raised configuration;

Figure 5 is a perspective view of a third embodiment of the hood unit of the invention;
Figure 6 shows the same hood unit of Figure 5 in its completely raised configuration;

Figure 7 is a perspective view of a fourth embodiment of the hood unit of the invention, similar to that of Figures 1 and 2 but able to operate in suction mode, being provided with fume evacuation conduits;

Figure 8 is a perspective view of a fifth embodiment of the hood unit of the invention, also of the suction type and provided with a telescopic casing, shown partly cut away, which covers the suspension means and the fume evacuation conduit;

Figure 9 is an enlarged schematic plan view from above showing a lifting/lowering device forming part of the suspension means, which if these latter are of the wire type, enables the user to vary the elevation of the actual hood; and

Figure 10 is a perspective view of a hood unit according to the invention, being similar to the first embodiment shown in Figures 1 and 2, but shown with a partly transparent portion of the housing of the proper hood.

The hood unit 10 shown in Figures 1 and 2 comprises a support element 12 of a flattened cylinder shape (i.e. a cylindrical body with an oval cross-section), to be fixed in conventional manner to the ceiling of the room in which the hood unit 10 is located, and an actual hood 14 of overall cylindrical shape, of the type operating only in filtration mode (being without the fume discharge conduit), so that the fumes produced by an underlying cooking hob (not shown) are drawn through its lower aperture 16 by conventional suction means enclosed within the actual hood 14, are filtered in conventional manner and are fed into the same room through an aperture (not visible in Figures 1 and 2) provided in the upper face of the actual hood 14. In the specific illustrated example, the actual hood 14 is provided with two lighting devices 18 to illuminate the cooking hob. Conventional controls 20, positioned in this specific case on the lateral surface of the actual hood 14, enable activation/deactivation of said suction means, of the lighting devices 18 and, if required, of other devices having specific functions.
From Figures 1 and 2 it can also be seen that the hood unit 10 also comprises means enabling the actual hood 14 to be suspended from the support element 12, these suspension means being indicated overall by 22. In this specific case they comprise three suspension wires 24.1, 24.2 and 24.3 (it should be noted that in Figure 1 only two can be seen because the third, 24.3, is covered by the wire 24.2).

In the interior of the actual hood 14 a conventional lifting/lowering mechanism 34 (described hereinafter) is provided to enable the user to vary the elevation of the actual hood 14 by winding or unwinding said wires on or from relative drums or spools, to pass from the situation of Figure 1 (maximum closeness to the cooking hob) to the situation of Figure 2 (maximum distance from the cooking hob) and vice versa. From this latter figure it can be seen that the hood unit 10 resembles a so-called ceiling light fixture and in effect can also perform a lighting function by virtue of the presence of two lighting devices 18 powered by a conventional electric cable 26 (Figure 1). It should be noted that if the room containing the hood unit is provided with a false ceiling, an arrangement can be made whereby when the actual hood 14 is in its highest elevation position (which could also be less than that of Figure 2), the lower edge of this latter 14 coincides essentially with the lower edge of the false ceiling, so that under these conditions the hood unit has the appearance of a "ceiling hood".

The aforesaid mechanism for varying the elevation of the actual hood is conveniently operated by an electric actuator controlled by controls which can form part of the controls 20 or even by controls disposed in a suitable position on the walls of the room in which the hood unit is located (this preventing any oscillation of the hood unit 14 on operating the controls 20) suitable remote control means could also be provided for this purpose.

The hood unit 110 of Figures 3 and 4 differs from the hood unit 10 only in that both the support element 112 and the actual hood 114 are of parallelepiped shape, and the suspension means 122 comprise four wires 124.1, 124.2, 124.3 and 124.4 instead of three: For the remainder, in Figures 3 and 4 those
elements equal or similar to those of Figures 1 and 2 are indicated by the same reference numerals as these latter figures, plus 100.

A variant 210 of the hood unit 110 is shown in Figures 5 and 6. This differs by the presence of a support element 212 in the form of a rectangular frame, able to partly receive (in this specific case) the actual hood 112 (it should be noted that in these figures, elements equal to those of the hood unit 110 of Figures 3 and 4 are indicated by the same reference numerals). The frame-type support element could also evidently be formed such that the actual hood 114 is completely contained within it. The frame-type support element could evidently be of a shape different from rectangular, for example circular, oval or polygonal, this evidently determining the shape of the actual hood which has to be received in the relative frame.

Returning to Figures 5 and 6, it should be noted that for the support element 212 and/or the actual hood 114, at least a part of their external surface can be made to emit light. In this manner the hood unit 210 can also perform the function of an actual chandelier. This can be achieved not only with the already stated conventional lighting devices 18, but also by making said external surface part of a transparent or translucent material and positioning behind it, inside the support element 212 and/or the actual hood 114, light emitting means (for example lamps of various types or LEDs). A similar facility also evidently exists for the other hood unit types shown in the accompanying drawings.

The hood unit 310 of Figure 7 is similar to the hood unit 10 of Figures 1 and 2, in the sense that the support element, the actual hood and the suspension means are of equal form to that of the corresponding elements 12, 14 and 22 of these latter figures and for this reason have been indicated by the same reference numerals. However the hood unit 310 differs from the hood unit 10 because it is of the type operating in suction mode with fume discharge to the outside of the room in which the hood unit is located. For this purpose a fume conduit 28 is provided having the characteristic of being able to be lengthened or shortened (for example formed in the manner of a bellows) in order to follow the vertical movement of the actual hood 14. In particular, the conduit
28 when in its minimum extension condition can be received in a suitable
space provided in the top of the actual hood 14 such that the hood unit 310
appears in the form of a ceiling light fixture such as the hood unit 10 in the
condition of Figure 2.

Figure 8 shows a more complex embodiment of the hood unit of the present
invention, indicated by 410. In this figure, elements equal to those of the
hood unit 310 are indicated by the same reference numerals. The hood unit
410 differs from the hood unit 310 by the presence of a telescopic casing 30
covering both the suspension means 22 and the fume conduit 28. In the spe-
cific illustrated example, the casing 30 is composed of three coaxial rings
30.1, 30.2 and 30.3, which are mutually superimposed when the actual hood
14 lies in the most elevated position, in which condition they can be received
within the interior of this latter, such that the hood unit resembles a ceiling
light fixture. It should be noted that the casing 30 can also be used if the
conduit 28 is absent (i.e. with the hood unit operating only in filtration mode).

An observer viewing the hood unit 410 could mistake it for a conventional lift¬
ing/lowering island hood with a telescopic chimney, which is in fact not the
case, because the casing 30 firstly only has an aesthetic function and not that
of conveying fumes (function performed by the variable length conduit 28),
and secondly is not load-bearing (in the case of the hood unit 410 the load¬
bearing function being provided by the suspension means 22). In the specific
illustrated example, the casing 30 is carried by the support element 412. As
can be seen from Figure 8, the support element 412 has a decidedly greater
height than support element 12 of the hood unit 10 of Figure 1, this being be¬
cause the hood unit 410 operates either in suction mode or in filtration mode,
at user choice; in this latter mode (filtration) the air drawn in through the ap¬
erture 16 of the actual hood 14 is not discharged to the outside but, once fil¬
tered, is again fed into the room through the grille 32.

Figure 9 shows schematically a lifting/lowering device (indicated overall by
34) which, with reference in particular to the hood units 110 and 210 (Figures
3 and 4 and, respectively, Figures 5 and 6), is contained within the casing of
the hood 114 and enables the actual hood 114 to be raised and lowered by
four parallel vertical wires or cables 124.1, 124.2, 124.3 and 124.4, to cause it to assume the positions illustrated in the relative figures. In this specific case, these wires or cables are positioned (viewing the hood unit from above) at the vertices of a rectangle.

The lifting/lowering device 34 comprises a two-shaft electric stepping motor 36. The rotary movement of the two shafts 38, 40 is transmitted via relative belt transmissions 42, 44 to a corresponding shaft 47, 49 on which a relative drum or spool 46, 48 is keyed. The two drums 46, 48 are rotatably supported by the hood 114 and are disposed symmetrically, they both presenting a pair of parallel grooves 50, 52, in each of which is fixed an end of a relative wire 124.1, 124.2, 124.3 and 124.4 which, following rotation of the drum 46, 48 in the appropriate direction, winds about the relative groove 50, 52 and unwinds if the drum is rotated in the opposite direction. Each wire 124.1, 124.2, 124.3 and 124.4 also passes about a corresponding return pulley 54.1, 54.2, 54.3 and 54.4 so as to raise vertically upwards at the vertices of said rectangle, to emerge through suitable apertures provided in the hood 114 (so that these wires are visible in Figures 3 and 5), the other end of each wire being fixed to the support element 112 or 212. It must also be added that the two wires 124 connected to a given drum are wound about it in opposite directions so that rotation of the drum 46, 48 causes both wires to wind onto or unwind from it.

From the foregoing it is apparent that the two drums 46 and 48 are rotated by operating the electric motor 36. Hence the wires 124 can be wound onto or unwound from the relative drums 46, 48 depending on the direction of rotation of the motor 36, to obtain as a result the raising or, respectively, lowering of the actual hood 114 relative to the respective support element 112 or 212. It should be noted that the dashed circle 56 visible in Figure 9 indicates merely that the lifting/lowering device 34 leaves space for possible passage of a fume evacuation conduit.

It is apparent that other types of lifting/lowering devices different from the aforedescribed lifting/lowering device 34 can be used for the same purpose.
Figure 10 shows the hood 14 of Figure 1 and 2 in greater detail: In order to better show the actual position of the lowering and lifting device 34 an upper part 14.1 of the housing 14.4 of the hood 14 is shown in a transparent way (which is suggested by the broken line 14.2). In this upper part of the hood 14 there is a horizontal intermediate bottom 14.3 where the lifting/lowering device 34 is mounted on. Note that both, this intermediate bottom 14.3 as well as the lifting/lowering device 34 are actually hidden behind and securely covered by the housing 14.4 of the hood 14 and thereby do not perturb the appearance of the hood and also do not cause a threat for the user of this hood due to moving parts.

This lifting/lowering device 34 (being equal or similar to that of Figure 9 and thus, being indicated by the same reference numeral, which is also the case for the parts of this device 34) enables the actual hood 14 to be raised and lowered by the four parallel vertical wires or cables 124.1, 124.2, 124.3 and 124.4 (note that different from Figures 1 and 2 where the suspension means 122 consists of three wires 24.1, 24.2 and 24.3 in the drawing of Figure 10 the suspension means 122 has the four wires 124.1, 124.2, 124.3 and 124.4 as of device 34 shown in Figure 9).

As already stated, means (not shown for simplicity) can be provided for remotely controlling the electric motor 36 and other possible electrical actuators provided in the lifting/lowering hood unit of the present invention to perform other functions.
Claims

1. A kitchen hood unit (10; 110; 210; 310; 410) comprising an actual hood (14; 114) overlying a cooking hob, and suspension means (22; 122) having a length which can be varied by the user to cause the actual hood (14; 114) to approach and withdraw from the cooking hob, said suspension means comprising a lifting/lowering device (34) to vary the length of the suspension means (22; 122), characterised in that said lifting/lowering device (34) is contained in the actual hood (14; 114).

2. A hood unit (10; 110; 210; 310; 410) as claimed in claim 1, wherein the suspension means (22; 122) serve for suspending said actual hood from a ceiling of the room in which the hood unit (10; 110; 210; 310; 410) is located, or from a support element (12; 112; 212; 412) to be fixed to the ceiling, wherein the suspension means (22; 122) comprise one or more suspension cables or wires (24; 124), wherein the lifting/lowering device (34) enables said cables or wires (24; 124) to be wound or unwound, and wherein the lifting/lowering device (34) comprises, for each cable or wire (24; 124), a relative drum (50, 52) rotatably supported by the actual hood (14; 114) and on which the cable or wire (24; 124) can be wound or unwound.

3. A hood unit (10; 110; 210; 310; 410) as claimed in claim 1, wherein if the room in which the hood unit is located is provided with a false ceiling, the length which can be varied by the user to cause the actual hood (14; 114) to approach and withdraw from the cooking hob, can be reduced to such an extent that when the actual hood (14; 114) lies in its position of maximum allowable elevation, its lower edge has substantially the same elevation as the lower edge of the false ceiling.

4. A hood unit (210) as claimed in claim 1, wherein the support element (212) has the shape of a frame and is adapted to receive all or part of the actual hood (114).
5. A hood unit as claimed in claim 4, wherein the frame-shaped support element is of polygonal or circular form.

6. A hood unit (10; 110; 210; 310; 410) as claimed in claim 2, wherein the device (34) comprises an electric motor (36).

7. A hood unit (110; 210) as claimed in claims 2 and 6, wherein the suspension cables or wires are four in number (124.1; 124.2; 124.3; 124.4), positioned at the vertices of a square or rectangle, said cables or wires being connected in pairs to a relative drum (46, 48) rotatably supported by the support element (112; 212) and provided with a pair of parallel grooves (50, 52), in each of which a relative suspension cable or wire (124.1; 124.2; 124.3; 124.4) can wind and unwind, the two wires or cables of any given drum (46, 48) being wound in the relative groove (50, 52) in opposite directions, the electric motor (36) having two shafts, each shaft (38, 40) being adapted to transmit its rotary movement, via suitable transmission means (42, 44), to one of two said drums (46, 48).

8. A hood unit (10; 110; 210; 310; 410) as claimed in claim 6, wherein means are provided enabling the electric motor (36) to be remotely and preferably wirelessly controlled.

9. A hood unit (310; 410) as claimed in claim 1, wherein a fume evacuation conduit (28) is provided, the length of which is arranged to undergo variation on the basis of the variation in length of the suspension means (22) whereby the fume evacuation conduit (28) is of bellows form or of telescopic form.

10. A hood unit as claimed in claim 1, wherein a telescopic casing is provided covering the suspension means.

11. A hood unit (410) as claimed in claim 9, wherein a telescopic casing (30) is provided covering both the suspension means (22) and the
fume evacuation conduit (28).

12. A hood unit (10; 110; 210; 310; 410) as claimed in claim 1, wherein lighting devices (18; 118) are provided in the actual hood (14; 114) and/or in the support element (12; 112; 212; 412).

13. A hood unit (10; 110; 210; 310; 410) as claimed in claim 1, wherein at least a part (18) of the external surface of the actual hood (14; 114) and/or of the support element (12; 112; 212; 412) is arranged to emit light and/or is translucent or transparent.
Fig. 8
Fig. 10
**INTERNATIONAL SEARCH REPORT**

**International application No**
PCT/EP201Q/007175

**A. CLASSIFICATION OF SUBJECT MATTER**

**INV.** F24C15/20

**ADD.**

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

F24C

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

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

EPO-Internal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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[X] Further documents are listed in the continuation of Box C.  [X] See patent family annex.

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