(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 681 649 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
30.06.2021 Bulletin 2021/26

(21) Application number: **18783574.9**

(22) Date of filing: **11.09.2018**

(51) Int Cl.:
B08B 15/02 *(2006.01)* ***B01L 1/02*** *(2006.01)*
F24F 3/16 *(2021.01)*

(86) International application number:
PCT/IB2018/056936

(87) International publication number:
WO 2019/053592 (21.03.2019 Gazette 2019/12)

(54) IMPROVED EXTRACTION HOOD FOR EXTRACTING FUMES PRODUCED BY CHEMICAL REACTIONS

VERBESSERTE ABZUGSHAUBE ZUM ABSAUGEN VON DURCH CHEMISCHE REAKTIONEN ERZEUGTEN RAUCHGASEN

HOTTE D'EXTRACTION AMÉLIORÉE POUR L'EXTRACTION DE FUMÉES PRODUITES PAR DES RÉACTIONS CHIMIQUES

(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 MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **13.09.2017 IT 201700102432**

(43) Date of publication of application:
22.07.2020 Bulletin 2020/30

(73) Proprietor: **Asem S.R.L.**
31032 Casale sul Sile (TV) (IT)

(72) Inventor: **STANCANELLI, Bruno**
31100 Treviso (IT)

(74) Representative: **Maroscia, Antonio**
Maroscia & Associati Srl
Viale Roma, 3
36100 Vicenza (IT)

(56) References cited:
US-A- 1 968 532
US-A- 5 716 267
US-A1- 2017 182 527

EP 3 681 649 B1

Description

Field of The Invention

[0001] The present invention generally finds application in the field of chemical laboratory equipment and particularly relates to an improved extraction hood for extracting fumes produced by chemical reactions.

Background art

[0002] Extraction hoods have been long known to be used in the field of chemical laboratory equipment to extract noxious fumes produced by chemical reactions conducted in a work chamber.

[0003] Extraction hoods generally include a cabin with a work chamber which comprises a work surface and is closed by a safety screen that can be opened at the front for access to the chamber by the operator and that protects him/her from the fumes generated during chemical reactions.

[0004] Hoods generally also include a safety cabinet installed below the work surface separate from the work chamber, and adapted to contain, for example, reagents or chemicals.

[0005] The toxic fumes produced inside the work chamber are conveyed toward an intake manifold located on the top wall of the chamber and connected to a remote motor fan which causes them to be exhausted outside the work environment.

[0006] In order to control the extraction flow in the work chamber, an electronic control device is connected to the motor fan and is adapted to adjust its rotation speed using a frequency converter.

[0007] The rotation speed of the motor fan is initially set to a constant value and is later varied according to the position of the safety scree and hence the amount of fresh air introduced into the work chamber.

[0008] Generally, a panel is placed on the rear wall the work chamber to create an interspace connected to the top wall and communicating with the intake manifold to facilitate exhaust of heavy fumes stagnating on the work surface by means of the Venturi effect.

[0009] Nevertheless, this configuration facilitates generation of undesired turbulence in the flow of the extracted fumes due to different extraction speeds in different areas of the chamber, thereby causing recirculation of toxic vapors that are harmful to the operator.

[0010] In an attempt to at least partially obviate this drawback extraction hoods have been developed, which can improve homogeneity of the extraction flows throughout the volume of the work chamber and reduce toxic fume emission from the front opening.

[0011] US20120322353 discloses an extraction hood that has a rear panel with an interspace and comprising a plurality of openings evenly distributed over the entire surface.

[0012] The chemical fumes can be extracted into the interspace through the plurality of holes even when they are stagnating at intermediate levels between the work surface and the top wall of the work chamber.

[0013] A first drawback of this arrangement is that the flow of fumes in the interspace cannot be selectively controlled according to the flow of fumes in the work chamber which are directly conveyed to the intake manifold located on the top wall.

[0014] This drawback facilitates the creation of turbulence that is hazardous for an operator, without significantly reducing toxic fume emission from the front opening.

[0015] A further drawback is that the impossibility to selectively control the extraction speed increases the power consumed by the motor fans.

[0016] In an attempt to at least partially obviate these drawbacks, chemical extraction hoods have been developed, which can increase the flow of fresh air introduced into the work chamber and the flow the air exhausted from the chamber.

[0017] US20170182527 discloses an extraction hood having a plurality of fresh air inflow apertures on the top wall of the work chamber and an interspace on the rear wall the work chamber. The air **extraction** circuit is connected both to the chamber and to the safety cabinet below the work surface and is in fluid communication with the intake manifold on the top wall of the hood via side ducts.

[0018] US5716267 discloses an extraction hood in accordance with the preamble of claim 1, having a work chamber with a safety screen that can be opened by an operator, a work surface, a first extraction circuit connected to a stationary intake manifold and located on the top wall of the work chamber and a second extraction circuit connected to a moving manifold that can be located proximate to the work surface.

[0019] US1968532 discloses an extraction hood having a work chamber with a safety screen that can be opened by an operator and a first fume extraction circuit in fluid communication with the work chamber.

[0020] A first drawback of these arrangements is that the extraction speeds for toxic fumes and the exhausted air cannot be selectively controlled.

[0021] A further drawback of these prior arrangements is that they are highly disadvantageous and complex in terms of construction and installation.

[0022] Another drawback of these arrangements is that the extraction hood has a very large size and requires highly complex assembly.

Technical Problem

[0023] In the light of the prior art, the technical problem addressed by the present invention is to improve hood safety and fume containment with homogeneous extraction while reducing the flow and adapting it to different operating conditions.

Disclosure of the invention

[0024] The object of the present invention is to obviate the above drawback, by providing an improved extraction hood for extracting fumes produced by chemical reactions, that is highly efficient and relatively cost-effective.

[0025] A particular object of the present invention is to provide an extraction hood of the above discussed type that can draw in and eject chemical fumes as fully as possible from the work chamber.

[0026] Another object of the present invention is to provide an extraction hood of the above discussed type, that can control extraction according to the operator's needs.

[0027] A further object of the present invention is to provide an extraction hood of the above discussed type, that can uniformly draw in toxic fumes while avoiding turbulence.

[0028] Another object of the present invention is to provide an extraction hood of the above discussed type that can instantaneously draw in chemical fumes and whose containment is near zero.

[0029] A further object of the present invention is to provide an extraction hood of the above discussed type that has a very small size.

[0030] The above mentioned purposes, as well as others that will be more clearly explained hereinafter, are fulfilled by an improved extraction hood for extracting fumes produced by chemical reactions, as defined in claim 1, said hood comprising a cabinet comprising a bottom wall defining a work surface, a top wall, a pair of side walls, a rear wall and a front wall which are adapted to delimit a work chamber in which chemical reactions are conducted and comprising a safety screen at the front wall, which vertically slides and is selectively operable by an operator to move from a lifted position to define an opening that can be accessed by the operator to a lowered position in which said opening is closed and vice versa.

[0031] Furthermore, the extraction hood comprises a first extraction circuit in fluid communication with said chamber, and comprising a first remote motor fan connected to a first intake manifold on the top wall for drawing in the fumes in the chamber above the work surface and exhaust them to the outside.

[0032] Namely, the extraction hood comprises at least one second extraction circuit, which is independent of the first circuit and comprises a second remote motor fan connected to the chamber via **a** second manifold placed in the proximity of the work surface for drawing in stagnant fumes on the surface and exhaust them to the outside.

[0033] The combination of the first and the second extraction circuit will provide the advantage of approximately full extraction from the work chamber the possibility to reduce the respective flow rates to reduce the overall extraction flow.

[0034] The second manifold comprises a tubular element attached to the rear wall in the proximity of the work surface and having a front wall with at least one upper portion facing upwards, and at least one lower portion facing downwards, the portions being provided with through apertures or grids for extraction of fumes stagnating on the work surface.

[0035] This arrangement provides the advantage to afford more complete extraction and ejection of chemical fumes from the work chamber, while avoiding turbulence and ensuring homogeneous extraction.

[0036] Preferably, the extraction hood comprises a safety cabinet for storage of chemicals, which is installed below the work surface, a third intake manifold being provided in fluid communication with said second circuit and placed within the cabinet to draw in the fumes stagnating therein and discharge them to the outside.

[0037] This feature will provide the advantage that safety cabinet ventilation will be independent of extraction from the work chamber, thereby affording efficient and selective extraction and ejection of the fumes generated in the extraction hood.

[0038] Advantageous embodiments of the invention are obtained in accordance with the dependent claims.

Brief Description of The Drawings

[0039] Further features and advantages of the invention will be more apparent from the detailed description of a preferred, non-exclusive embodiment of an improved extraction hood, which is described as a non-limiting example with the help of the annexed drawings, in which:

FIG. 1 is a front view of the extraction hood of the invention;
FIGS. 2 and 3 are perspective front and rear views of the extraction hood of
Fig. 1 respectively;
FIG. 4 is a broken-away lateral view of the extraction hood of Fig. 1;
FIG. 5 is a front view of the extraction system of the extraction hood of Fig. 1;

Detailed description of a preferred exemplary embodiment

[0040] Particularly referring to the aforementioned figures, there is shown an extraction hood, generally designated by numeral 1, for extracting fumes F produced by chemical reactions, for example during chemical and laboratory analysis.

[0041] The extraction hood 1 may be paced in a room R that is specially for chemical laboratory tests and may be made of a metal material coated with antacid epoxy paints.

[0042] As shown in FIGS. 1 and 2, the extraction hood 1 comprises a cabin 2 with a bottom wall 3 defining a work surface 4, a top wall 5, a pair of side walls 6, a rear wall 7 and a front wall 8. The walls are adapted to delimit a work chamber 9 in which are chemical reactions are

conducted.

[0043] The work chamber 9 may house containers and laboratory equipment that can be handled by an operator, whereas the walls may be equipped with devices useful for processing, such as lighting equipment 10 or gas taps.

[0044] In addition, the extraction hood 1 comprises a safety screen 11, at the front wall 8, that can vertically slide and is selectively operable by the operator to move from a lifted position in which it defines an opening 12 that can be accessed by the operator to a lowered position in which the opening (12) is closed and vice versa.

[0045] Advantageously, the opening 12 of the front wall 8 of the cabin 2 allows the operator to access the work chamber by his/her hands to perform the chemical tests on the work surface 4.

[0046] The screen 11 will have the purpose to protect the operator from any harmful gases or fumes F generated by the **chemical** reactions that are being carried out in the work chamber 9.

[0047] Furthermore, the screen 11 may be equipped with a handle 13 for facilitating the sliding motion and may be made of transparent glass to allow the operator to see the work chamber 9 even when the safety screen 11 is in the lowered closing position.

[0048] Conveniently, the safety screen 11 may be equipped with a rear balance weight 14 to allow the operator to lock it in any intermediate position between the lowered position and the lifted position, as shown in FIG. 2.

[0049] As best shown in FIGS. 3 and 4, the extraction hood 1 may comprise a safety cabinet 15 separate from the work chamber 9 and installed below the work surface 4 for storing chemicals.

[0050] The extraction hood 1 comprises a first extraction circuit 16 in fluid communication with the chamber 9, and comprising a first remote motor fan 17 connected to a first intake manifold 18 on the top wall 5 for drawing in the fumes F in the chamber 9 above the work surface 4.

[0051] Particularly, the first circuit 16 may comprise a first tubular conduit 19 having a first end 19' connected to the first intake manifold 18 and a second end 19" connected to the first motor fan 17.

[0052] As best shown in FIGS. 2 to 5, the first tubular conduit 19 may include straight portions and elbow curves, for providing fluid communication between the work chamber 9 and the first motor fan 17. The latter will be actuated to discharge any fumes that are harmful for operators and users passing through the equipped room R out of the room R.

[0053] For this purpose, the first motor fan 17 may be of centrifugal type, may be made of materials that are suitable for use with aggressive products and may be provided with anticorrosion seals.

[0054] Advantageously, as disclosed in EP26669586, filed by the applicant hereof, the safety screen 11 may be mechanically connected to a throttle valve 20 via a tie-rod system 21 having balance weights and pulleys and located in the first tubular conduit 19 to change the intake section according to the position of the safety screen 11.

[0055] Namely, when the safety screen 11 is in the lifted position, the throttle valve 20 will be in such a position that the first tubular duct 19 will have the maximum intake section.

[0056] This arrangement will provide a shorter response time, i.e. a shorter time for stabilization of the extracted volume, as compared with a motorized control system having an inverter that acts on the rotation speed of the first remote motor fan 17.

[0057] This response time is required by the reference standard EN14175-6 and may be 0.5s, whereas the response time in a motorized control system usually ranges from 2.5s to 4s.

[0058] Moreover, this totally mechanical solution will afford considerable power savings as compared with common motorized control arrangements.

[0059] In a peculiar aspect of the invention, the extraction hood 1 comprises at least one second extraction circuit 22, which is independent of the first circuit 16, and comprises a second remote motor fan 23 connected to the work chamber 9 via a second manifold 24 placed in the proximity of the work surface 4 for drawing in stagnant fumes F' on the surface 4 and exhaust them to the outside.

[0060] The extraction performed by the second circuit 22 in combination with the extraction performed by the first circuit 16 and their respective motor fans 23, 17 provides an approximately full extraction of the fumes F', F and affords a containment near zero as required by the reference standard EN14175.

[0061] In a preferred embodiment of the invention, the first remote motor fan 17 may be of the variable flow type and connected to a frequency converter comprising an electronic control device, not shown.

[0062] This control device is programmed to provide a higher flow in the first circuit 16 as compared with the second motor fan 23, with the safety screen 11 in the lifted position.

[0063] Likewise, the second remote motor fan 23 may be of the fixed flow type, and may be set stepwise by the operator and **designed to** provide a higher flow in the second circuit 22 as compared with the first motor fan 17 with the safety screen 11 in the lowered position.

[0064] With this arrangement, the extraction hood 1 will reduce the flows required to draw in fumes F, thereby avoiding turbulence and promoting homogeneous extraction due to the possibility of reducing extractions of the first 16 and second 22 circuits as needed by the operator and by the handling mode.

[0065] Furthermore, this configuration will significantly reduce toxic fume emission F from the front opening.

[0066] Advantageously, the second circuit 22 may comprise a lower portion 22' connected to the second manifold 24 and an upper portion 22", which is substantially concentric with the first circuit 16 to define therewith a tubular air space 25 in fluid communication with the

first motor fan 17.

[0067] As shown in FIGS. 2 to 5, the second circuit 22 may comprise a second tubular conduit 26 installed outside the work chamber 9 and having straight portions and elbow curves, adapted to fit into the first tubular conduit 19 of the first extraction circuit 16.

[0068] In this configuration, the second tubular conduit 26 may follow, inside the first tubular conduit 19, the extraction path of the first circuit 16 along a predetermined length until it intersects it and exits therefrom to be in fluid communication with the second remote motor fan 23.

[0069] This configuration reduces the overall dimensions of the extraction hood 1 and facilitates installation thereof in any type of equipped room R.

[0070] Furthermore, this configuration will allow installation of filter modules that are adapted to receive a double concentric pipe, thereby considerably reducing the overall dimensions of the extraction system and afford easier filter replacement.

[0071] As shown in FIGS. 2 to 4, the second manifold 24 may comprise a tubular element 27 attached to the rear wall 7 in the **proximity** of the work surface 4 and having a front face 28 with at least one upper portion 28' facing upwards, and at least one lower portion 28" facing downwards.

[0072] These portions 28', 28" may have through apertures or grids 29 for drawing in the fumes F' generated by the chemical reactions level with the work surface 4.

[0073] In an alternative embodiment of the invention, not shown, the tubular element 27 may comprise intake openings for drawing in the fumes F' in the proximity of the work surface 4 even at its side walls 6', 6" of the work chamber 9.

[0074] For example, the tubular element 27 may comprise a pair of extensions arranged parallel to each other along the side walls 6 and in the proximity of the work surface 4 and having a grid surface facing the inner side of the work chamber 9.

[0075] Preferably, the tubular element 27 may have a substantially polygonal cross-section with at least one rear side contacting the rear wall 7 and the remaining sides having grid surfaces facing the work chamber 9.

[0076] In addition, the safety cabinet 15 may comprise an internal third inlet manifold 30 in fluid communication with the second extraction circuit 22 to draw in and exhaust the fumes F" stagnating therein.

[0077] For this purpose, the second circuit 22 may comprise, level with the second manifold 24, a T-branch line 31 for providing fluid communication with the second tubular conduit 26 with a third specially-shaped tubular conduit 32 adapted to allow communication of the second remote motor fan 23 with the third intake manifold 30.

[0078] Namely, as best schematically shown in FIG. 4, the first 19, second 26 and third 32 tubular conduits allow selective extraction of the fumes F, F' and the exhausted air F" in the different compartments of the extraction hood 1.

[0079] Advantageously, the extraction hood 1 may comprise a pair of controlled valves 33 placed in the second extraction circuit **22 and** associated with the second 24 and third 30 intake manifolds respectively.

[0080] The connection with the electronic control device allows these valves 33 to selectively actuate the second 24 and third 30 intake manifolds for example, for continuous ventilation of the safety cabinet 15 throughout the day, independent of the extraction by the second manifold 24.

[0081] Furthermore, with this configuration the operator will be able to control the pair of valves 33 for continuous ventilation of the safety cabinet 15, also independent of the first extraction circuit 16.

[0082] It will be appreciated from the foregoing that the suction hood fulfills the intended objects and particularly affords efficient and selective extraction and ejection of the fumes generated in the work chamber.

[0083] The extraction of the invention is susceptible of a number of changes and variants, within the inventive concept disclosed in the appended claims.

[0084] While the extraction hood has been described with particular reference to the accompanying figures, the numerals referred to in the disclosure and claims are only used for the sake of a better intelligibility of the invention and shall not be intended to limit the claimed scope in any manner.

Industrial Applicability

[0085] The present invention may find application in industry, because it can be produced on an industrial scale in chemical laboratory equipment manufacturing factories.

Claims

1. An improved extraction hood **(1)** for extracting fumes **(F)** produced by chemical reactions, which hood **(1)** comprises:

   - a cabinet **(2)** having a bottom wall **(3)** that defines a work surface **(4),** a top wall **(5),** a pair of side walls **(6),** a rear wall **(7)** and a front wall **(8)** adapted to delimit a work chamber **(9)** in which chemical reactions are performed;
   - a safety screen **(11),** at said front wall **(8),** said screen **(11)** being adapted to vertically slide and to be selectively operable by the operator to move from a lifted position in which it defines an opening **(12)** accessible by the operator to a lowered position in which said opening **(12)** is closed and vice versa;
   - a first extraction circuit **(16)** in fluid communication with said chamber **(9),** and having a first remote motor fan **(17)** connected to a first intake manifold **(18)** on said top wall **(5)** for drawing in the fumes **(F)** in said chamber **(9)** above the work

surface **(4)** and exhaust them outside;
- at least one second extraction circuit **(22)** independent of the first circuit **(16),** and a second remote motor fan **(23)** connected to said chamber **(9)** via a second manifold **(24)** located proximate to said work surface **(4)** to draw in and exhaust the fumes **(F')** to the outside proximate to said surface **(4),** said second manifold **(24)** comprising a tubular element **(27)** attached to said rear wall **(7)** proximate to said work surface **(4);**

characterized in that said second manifold **(24)** has a front wall **(28)** with at least one upper portion **(28')** that faces upwards, and at least one lower portion **(28")** that faces downwards, said portions **(28, 28")** being provided with through apertures or grids **(29)** for extraction of the stagnant fumes **(F')** on said surface **(4).**

2. A hood as claimed in claim 1, **characterized in that** said tubular element **(27)** comprises intake apertures for drawing in the fumes **(F')** in the proximity of said work surface **(4)** even at its side walls **(6)** of said chamber **(9).**

3. A hood as claimed in claim 1, **characterized in that** said tubular element **(27)** has a substantially polygonal cross-section with at least one first side defining said front wall **(28)** and at least one second side for fixation to said rear wall **(7).**

4. A hood as claimed in claim 1, **characterized in that** said second circuit **(22)** comprises a lower portion **(22')** connected to said second manifold **(24)** and an upper portion **(22"),** which is substantially concentric with said first circuit **(16)** to define therewith a tubular interspace **(25)** in fluid communication with said first motor fan **(17).**

5. A hood as claimed in claim 1, **characterized in that** said first remote motor fan **(17)** is of the variable flow type and is connected to an electronic control device, wherein said electronic control device comprises a frequency converter programmed to provide a higher flow in said first circuit **(16)** as compared with said second motor fan **(23)** when said safety screen **(11)** is in its lifted position.

6. A hood as claimed in claim 1, **characterized in that** said second remote motor fan **(23)** is of the fixed flow type and may be set stepwise, said second motor fan **(23)** being designed to operate independent of said first motor fan **(17)** when said safety screen **(11)** is in its lowered position.

7. A hood as claimed in claim 1, **characterized in that** it comprises a safety cabinet **(15)** for storage of chemicals, which is installed below the work surface **(4),** a third intake manifold **(30)** being provided in fluid communication with said second circuit **(22)** and placed within said cabinet **(15)** to draw in the fumes **(F")** stagnating therein and discharge them outside.

8. A hood as claimed in claim 7, **characterized in that** it comprises a pair of controlled valves **(33)** located in said second extraction circuit **(22)** and associated with said second **(24)** and third **(30)** intake manifolds respectively, said valves **(33)** being connected to said electronic control device for selectively actuating said second **(24)** and said third **(30)** intake manifolds.

9. A hood as claimed in claim 8, **characterized in that** said pair of controlled valves **(33)** are adapted to be actuated by the operator for continuous ventilation of said safety cabinet **(15)** independent of the extraction by in said first circuit **(16).**

Patentansprüche

1. Eine verbesserte Absaughaube (1) zum Extrahieren von Dämpfen (F), die durch chemische Reaktionen erzeugt werden, wobei die Haube (1) umfasst:

- einen Schrank (2) mit einer Bodenwand (3), die eine Arbeitsfläche (4) definiert, einer oberen Wand (5), einem Paar Seitenwänden (6), einer Rückwand (7) und einer Vorderwand (8), die angepasst sind, um eine Arbeitskammer (9) abzugrenzen, in der chemische Reaktionen durchgeführt werden;
- einen Sicherheitsschirm (11) an der Vorderwand (8), wobei der Sicherheitsschirm (11) so angepasst ist, dass er vertikal gleitet und vom Bediener selektiv bedient werden kann, um sich aus einer angehobenen Position, in der er eine dem Bediener zugängliche Öffnung (12) definiert, nach eine abgesenkte Position, in der die Öffnung (12) geschlossen ist, und umgekehrt, zu bewegen;
- eine erste Absaugschaltung (16) in Fluidverbindung mit der Kammer (9) und mit einem ersten entfernten Motorlüfter (17), der mit einem ersten Ansaugsverteiler (18) an der oberen Wand (5) verbunden ist, um die Dämpfe (F) in der Kammer (9) über der Arbeitsfläche (4) einzusaugen und nach außen absaugen;
- mindestens eine zweite Absaugschaltung (22), die unabhängig von der ersten Schaltung (16) ist, und einen zweiten entfernten Motorlüfter (23), der über einen zweiten Verteiler (24), die sich in der Nähe der Arbeitsfläche (4) befindet, mit der Kammer (9) verbunden ist um die Dämpfe (F') nach außen nahe der Oberfläche (4) ein-

zusaugen und abzulassen, wobei der zweite Verteiler (24) ein rohrförmiges Element (27) umfasst, das an der Rückwand (7) nahe der Arbeitsfläche (4) angebracht ist;

dadurch gekennzeichnet, dass der zweite Verteiler (24) eine Vorderwand (28) mit mindestens einem oberen Abschnitt (28') aufweist, der nach oben zeigt, und mindestens einem unteren Abschnitt (28"), der nach unten zeigt, wobei die Abschnitte (28', 28") mit Durchgangsöffnungen oder Gittern (29) versehen sind, um die stehenden Dämpfe (F') auf der Oberfläche (4) zu extrahieren.

2. Haube nach Anspruch 1, **dadurch gekennzeichnet, dass** das Rohrelement (27) Einlassöffnungen zum Ansaugen der Dämpfe (F') in der Nähe der Arbeitsfläche (4) selbst an ihren Seitenwänden (6) der Kammer aufweist (9).

3. Haube nach Anspruch 1, **dadurch gekennzeichnet, dass** das Rohrelement (27) einen im wesentlichen polygonalen Querschnitt mit mindestens einer ersten Seite, die die Vorderwand (28) definiert, und mindestens einer zweiten Seite zur Befestigung an der Rückwand (7) hat.

4. Haube nach Anspruch 1, **dadurch gekennzeichnet, dass** die zweite Schaltung (22) einen unteren Abschnitt (22') umfasst, der mit dem zweiten Verteiler (24) verbunden ist, und einen oberen Abschnitt (22") umfasst, der im wesentlichen konzentrisch zu der ersten Schaltung (16) ist und damit einen rohrförmigen Zwischenraum (25) in Fluidverbindung mit dem ersten Motorlüfter (17) definiert.

5. Haube nach Anspruch 1, **dadurch gekennzeichnet, dass** der erste entfernte Motorlüfter (17) vom Typ mit variablem Durchfluss ist und mit einer elektronischen Steuerung verbunden ist, wobei die elektronische Steuervorrichtung einen Frequenzumrichter umfasst, der so programmiert ist, dass er einen höheren Durchfluss in der ersten Schaltung (16) im Vergleich zu dem zweiten Motorlüfter (23) liefert, wenn sich der Sicherheitsschirm (11) in seiner angehobenen Position befindet.

6. Haube nach Anspruch 1, **dadurch gekennzeichnet, dass** der zweite entfernte Motorlüfter (23) vom Typ mit festem Durchfluss ist und schrittweise eingestellt werden kann, wobei der zweite Motorlüfter (23) so ausgelegt ist, dass er unabhängig von dem ersten Motorlüfter (17) arbeitet wenn sich der Sicherheitsschirm (11) in seiner abgesenkten Position befindet.

7. Haube nach Anspruch 1, **dadurch gekennzeichnet, dass** sie einen Sicherheitsschrank (15) zur Lagerung von Chemikalien umfasst, der unter der Arbeitsfläche (4) installiert ist, wobei ein dritter Ansaugverteiler (30) in Fluidverbindung mit der zweiten Schaltung (22) vorgesehen ist und in dem Schrank (15) angeordnet ist, um die darin stagnierenden Dämpfe (F") einzusaugen und sie nach außen abzulassen.

8. Haube nach Anspruch 7, **dadurch gekennzeichnet, dass** sie ein Paar gesteuerter Ventile (33) umfasst, die in dem zweiten Absaugschaltung (22) angeordnet sind und die mit dem zweiten (24) bzw. dritten (30) Ansaugverteiler in Verbindung sind, wobei die Ventile (33) mit der elektronischen Steuervorrichtung verbunden sind, um den zweiten (24) und den dritten (30) Ansaugverteiler selektiv zu betätigen.

9. Haube nach Anspruch 8, **dadurch gekennzeichnet, dass** das Paar gesteuerter Ventile (33) so ausgelegt ist, dass es vom Bediener zur kontinuierlichen Belüftung des Sicherheitsschranks (15) unabhängig von der Absaugung durch die ersten Schaltung (16) betätigt werden kann.

Revendications

1. Hotte d'extraction améliorée (1) pour extraire les fumées (F) produites par des réactions chimiques, laquelle hotte (1) comprend:

- une armoire (2) ayant une paroi inférieure (3) qui définit une surface de travail (4), une paroi supérieure (5), une paire de parois latérales (6), une paroi arrière (7) et une paroi avant (8) adaptées pour délimiter une chambre de travail (9) dans laquelle des réactions chimiques sont effectuées;
- un écran de sécurité (11), au niveau de ladite paroi avant (8), ledit écran (11) étant apte à coulisser verticalement et à être sélectivement actionnable par l'opérateur pour se déplacer d'une position relevée dans laquelle il définit une ouverture (12) accessible par l'opérateur à une position abaissée dans laquelle ladite ouverture (12) est fermée et vice versa;
- un premier circuit d'extraction (16) en communication fluidique avec ladite chambre (9), et ayant un premier moto-ventilateur distant (17) connecté à un premier collecteur d'admission (18) sur ladite paroi supérieure (5) pour aspirer les fumées (F) dans ladite chambre (9) au-dessus de la surface de travail (4) et les évacuer à l'extérieur;
- au moins un deuxième circuit d'extraction (22) indépendant du premier circuit (16), et un deuxième moto-ventilateur distant (23) relié à

ladite chambre (9) via un deuxième collecteur (24) situé à proximité de ladite surface de travail (4) pour aspirer et évacuer les fumées (F') vers l'extérieur à proximité de ladite surface (4), ledit second collecteur (24) comprenant un élément tubulaire (27) fixé à ladite paroi arrière (7) à proximité de ladite surface de travail (4);

caractérisé en ce que ledit second collecteur (24) a une paroi avant (28) avec au moins une partie supérieure (28') tournée vers le haut, et au moins une partie inférieure (28") tournée vers le bas, lesdites parties (28', 28") comportant des ouvertures ou grilles traversantes (29) pour l'extraction des fumées stagnantes (F') sur ladite surface (4).

2. Hotte selon la revendication 1, **caractérisée en ce que** ledit élément tubulaire (27) comprend des ouvertures d'admission pour aspirer les fumées (F') à proximité de ladite surface de travail (4) même au niveau des parois latérales (6) de ladite chambre (9).

3. Hotte selon la revendication 1, **caractérisée en ce que** ledit élément tubulaire (27) a une section transversale sensiblement polygonale avec au moins un premier côté définissant ladite paroi avant (28) et au moins un deuxième côté pour la fixation à ladite paroi arrière (7).

4. Hotte selon la revendication 1, **caractérisée en ce que** ledit second circuit (22) comprend une partie inférieure (22') connectée audit second collecteur (24) et une partie supérieure (22"), qui est sensiblement concentrique audit premier circuit (16) pour définir avec celui-ci un espace intermédiaire tubulaire (25) en communication fluidique avec ledit premier moto-ventilateur (17).

5. Hotte selon la revendication 1, **caractérisée en ce que** ledit premier moto-ventilateur distant (17) est du type à débit variable et est connecté à un dispositif de commande électronique, ledit dispositif de commande électronique comprenant un convertisseur de fréquence programmé pour fournir un débit plus élevé dans ledit premier circuit (16) par rapport audit second moto-ventilateur (23) lorsque ledit écran de sécurité (11) est dans sa position levée.

6. Hotte selon la revendication 1, **caractérisée en ce que** ledit deuxième moto-ventilateur distant (23) est du type à débit fixe et peut être réglé par étapes, ledit deuxième moto-ventilateur (23) étant conçu pour fonctionner indépendamment dudit premier moto-ventilateur (17) lorsque ledit écran de sécurité (11) est dans sa position abaissée.

7. Hotte selon la revendication 1, **caractérisée en ce qu'**elle comprend une armoire de sécurité (15) pour le stockage de produits chimiques, qui est installée sous la surface de travail (4), un troisième collecteur d'admission (30) étant prévu en communication fluidique avec ledit deuxième circuit (22) et placé à l'intérieur de ladite armoire (15) pour aspirer les fumées (F") y stagnant et les évacuer à l'extérieur.

8. Hotte selon la revendication 7, **caractérisée en ce qu'**elle comprend une paire de soupapes commandées (33) situées dans ledit deuxième circuit d'extraction (22) et associées auxdits deuxième (24) et troisième (30) collecteurs d'admission respectivement, lesdites soupapes (33) étant connectées audit dispositif de commande électronique pour actionner sélectivement lesdits deuxième (24) et troisième (30) collecteurs d'admission.

9. Hotte selon la revendication 8, **caractérisée en ce que** ladite paire de vannes commandées (33) est adaptée pour être actionnée par l'opérateur pour une ventilation continue de ladite armoire de sécurité (15) indépendamment de l'extraction par dans ledit premier circuit (16).

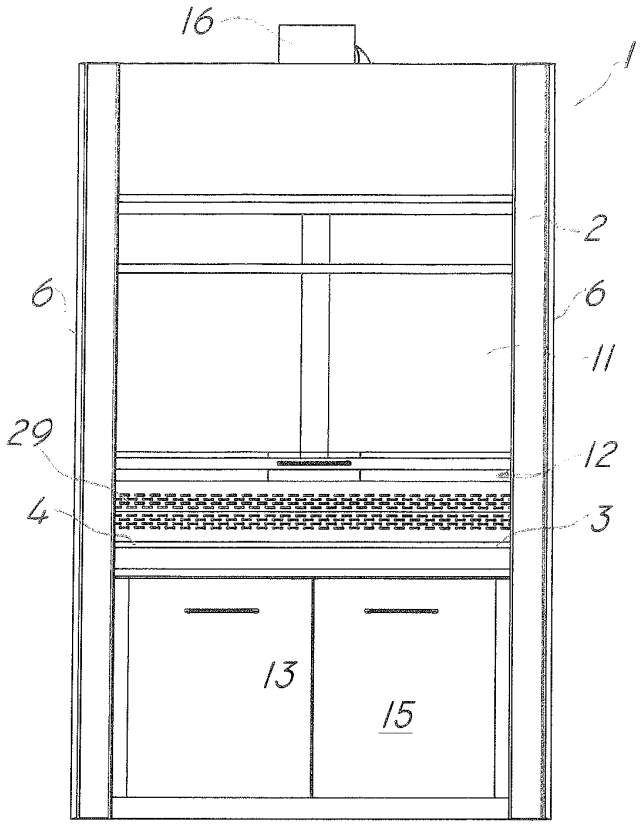

FIG. 1

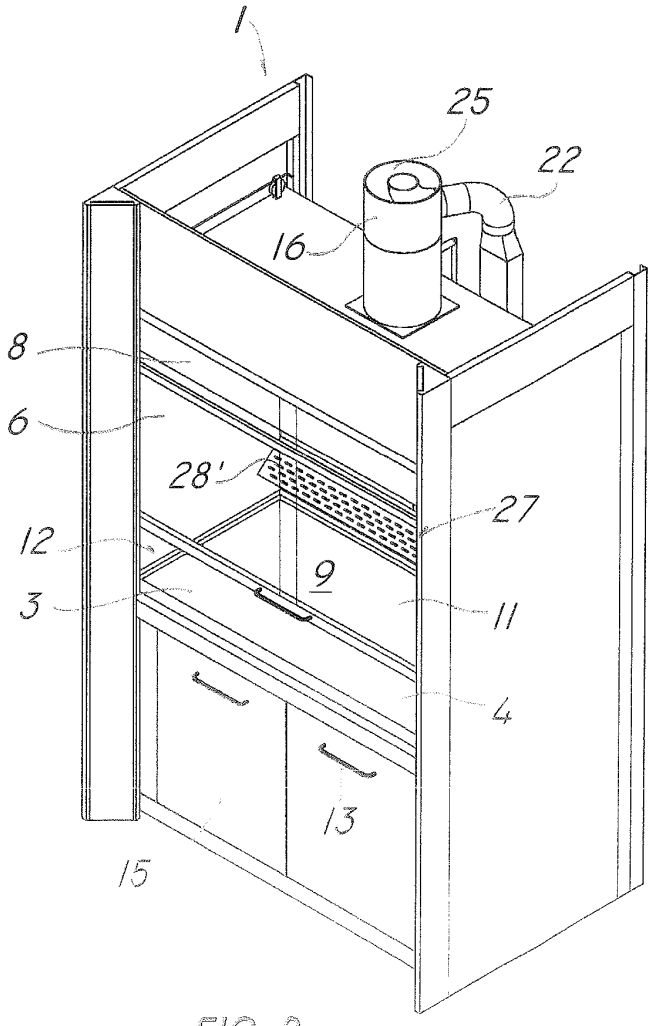

FIG. 2

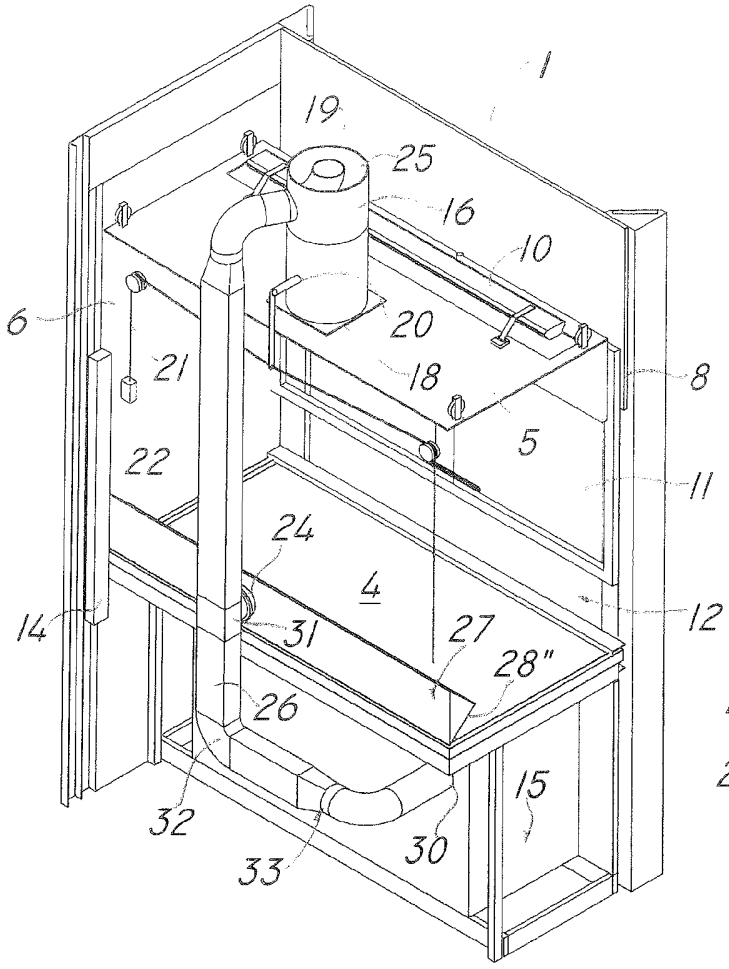
1
19
25
16
10
6
20
21
18
8
22
5
11
24
4
14
31
27
12
28"
26
15
32
30
33

FIG. 3

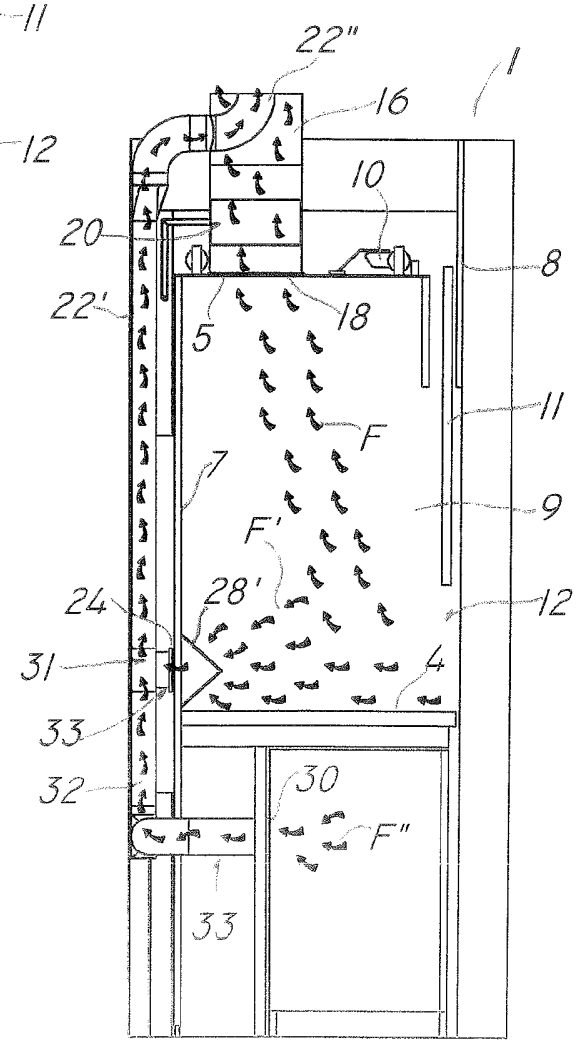
22"
1
16
10
20
8
22'
5
18
11
F
7
9
F'
28'
24
12
31
4
33
32
30
F"
33

FIG. 4

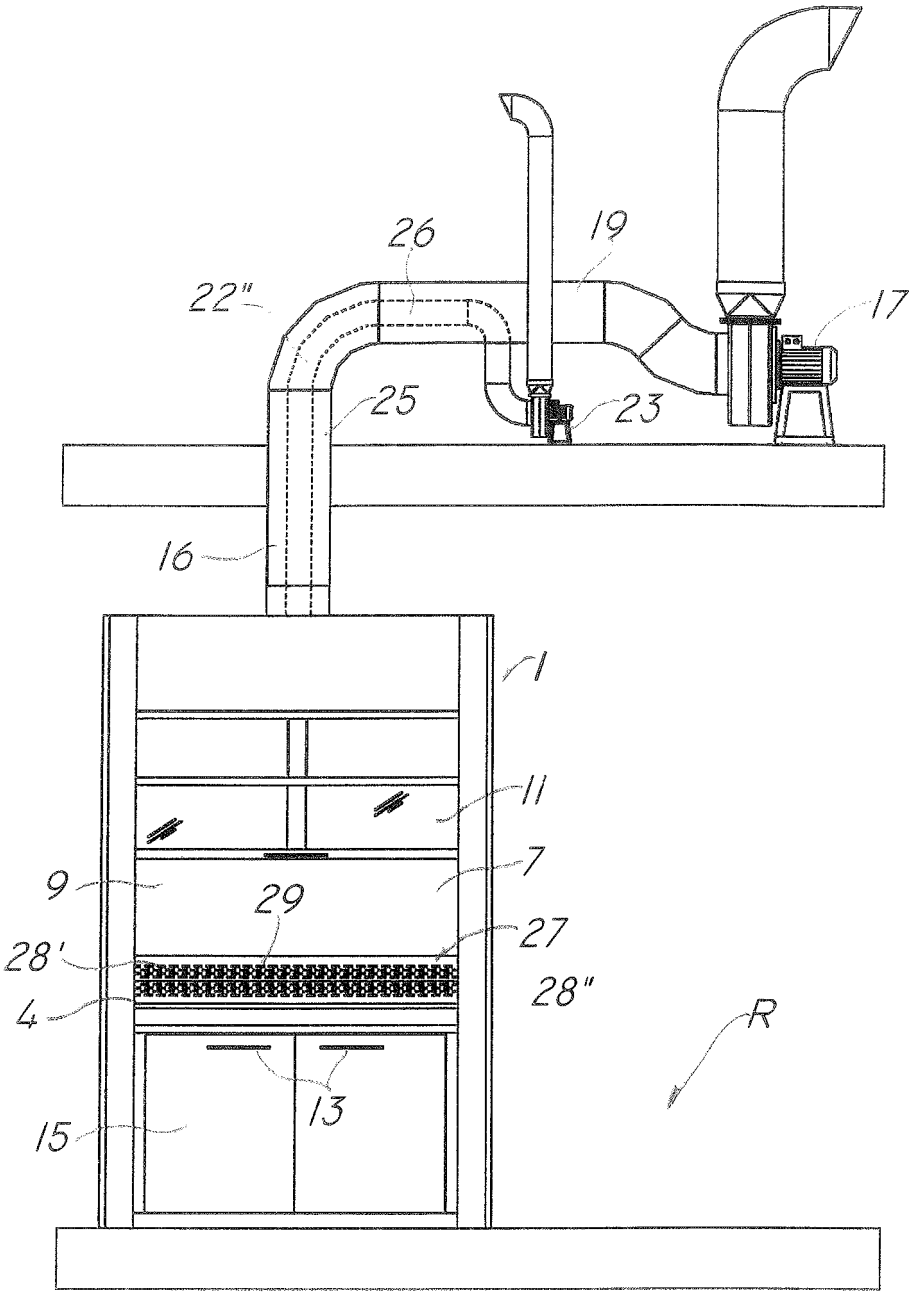

FIG. 5

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 20120322353 A **[0011]**
- US 20170182527 A **[0017]**
- US 5716267 A **[0018]**
- US 1968532 A **[0019]**
- EP 26669586 A **[0054]**