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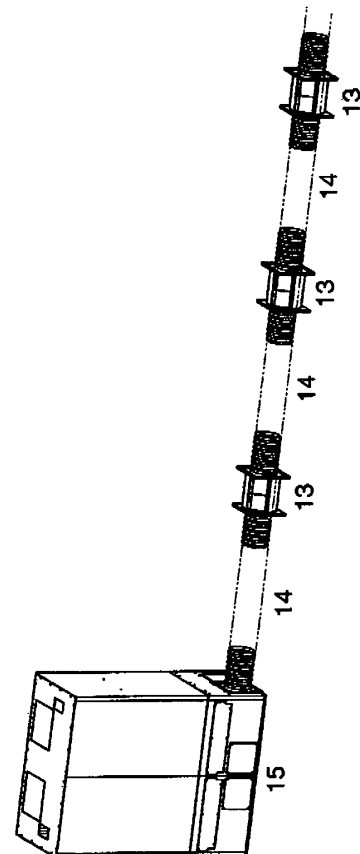
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(54) **Flexible air extraction system**

(57) The present invention relates to a modular air filtration system composed of hoses, generally flexible, and nozzles provided with openings that can be opened or closed to choke the air flow, suitable above all for filtration of toxic vapors, principally in workspace of great dimensions, decreasing in significant manner the average distance between the point of generation of vapors and the one of air intake.

Fig. 4



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Description

[0001] At the actual state of art, there are, in certain and particular production fields, where some structures are constructed with materials containing resins or these are varnished, a substantially unresolved problem, with the consequence of considerable exposure of workers to substances released by the production processes inside the working area.

[0002] In particular, the problem arises when the above described processes are to be done on vertical and/or horizontal surfaces of medium and big dimensions, on objects that are often of different form or dimension between one production cycle and the succeeding one. As example, without considering it as a limitation to the application of the invention, the case of a shipyard and, in particular, the construction of hulls in resin and their varnishing, in other words, a working process which development varies from time to time in function of the dimensions of the hulls to varnish that necessarily have to be worked in the same space where a totally different processing has been done on other hulls. At the moment, the shipyards use a system of scaffolds to wrap up the hull, in accordance with the specific case, either the whole hull or one of its sides, and eventually also the upper surface of the hull or a part of it, with plastic material, generally transparent, in order to create a tunnel like space that provides isolation between the working area where the varnishing process is being done and the surroundings. See fig. 1. In this scheme the pavement where the hull is being placed is indicated as nr. (1), as nr. (2) the hull, the transparent wrapping of the upper part of the hull as nr. (3) and as nr. (4) the farthest part of the lateral transparent wrapping realized on a scaffold construction. Both wrappings are an example of a tunnel like space in the shipbuilding industry.

[0003] In consideration of this procedure, it results obvious that such division of space leads to a high concentration of toxic agents inside the tunnel, deriving from resin and varnishing processes. On this purpose, because of no solutions available resolving this problem efficiently, generally, one or more air filtration systems are being installed on one side of the tunnel in order to create air circulation.

[0004] All of the known solutions are characterized by leaving unresolved some problems arising during the resin and varnishing process, such as:

- Air speed created inside of the tunnel is too low and thus the varnish dispersed in the air tends to set down on surfaces, particularly on the horizontal ones;
- The average distance that the air has to cross to get to the aspiration unit is long, and therefore a huge quantity of varnish or vapors produced by resin remain hanging in the air, with consequent high exposition of workers to toxic agents, and, in case of varnishing, a deterioration of already varnished surfaces.

[0005] The listed and further inconveniences might be avoided or considerably limited installing the air extraction and filtration system as invented.

[0006] Substantially, according to the invention, we are going to set up a movable and modular air filtering system, a detailed description will follow, suitable for aspiration of vapors or solvents, both from resin and varnishing processes. It consist of air intake nozzles, also these to be described into detail subsequently, equipped with specific openings for choking the air flow, using special hoses, generally flexible or however adaptable to the area to enable the dislocation of the nozzles on a certain distance one from the other either along the whole internal side of the tunnel or a part of it.

[0007] In practice, the invention makes possible the dislocation of the air intake units, that is the vapors and solvents intake units, in several points along the inside area of the tunnel and to put in activity one or more of these by simple operations also during the working process. This enables to shorten considerably the distance the air has to cross from the point where the vapors are generated to the point of air intake and to increase in considerable way the air speed inside the hoses in order to avoid this way, or at least to limit, the depositing of condensed vapors or powder.

[0008] The invention consists of a component constituted by an aspiration nozzle, fitted in a way to have two ends, generally opposite, two flanges that enable a quick connection to hose elements that form a hose line for airflow, or in case of an eventual terminal nozzle, a final plug. The nozzle furthermore, is equipped with one or more closable openings, in general to be opened separately, that enable to conform the nozzle either as a flow through or as an air aspiration unit and in case of more openings present, to vary the air intake capacity of the nozzle.

[0009] Therefore, it is possible to set up a modular installation with several possible compositions of nozzles and hoses. This way it is possible to adapt the hose line to any kind of tunnel conformation, enabling the use of an air filtering unit on one end of the hose line or alternatively, of two air filters, placed on both extremities of the tunnel.

[0010] The nozzles may be equipped with more than one opening, as already mentioned, eventually to be closed separately, in order to choke the air flow of one specific nozzle part of the installation and enable, for example, the use of two neighboring nozzles choking the air flow of the nozzle closest to the aspiration point, avoiding in this way the air flow entering to concentrate exclusively on one nozzle and, more in general, to utilize optimally the potential of the aspirator, or of the aspirators, in function of the air intake units necessary .

[0011] The nozzles might be realized in metal or plastic material of a prism similar form on hexagonal basis see fig. 2, the variation of form and constructive solution without going out of the invention.

[0012] The nozzles might have, without going out of

the invention, all the combinations in number of closable flaps.

[0013] The flaps might be hinged up on one side to be opened and closed easily, remaining the possibility to use any solution, comprising rotation on an axis that enables a total or partial opening of a slit of semi circular form or a different one, or a system that enables the total removal of the flap, as stopper.

[0014] In particular, in fig. 2, indicated as nr. (5) there is the body of the aspiration nozzle, as nr. (6) the flanges for hose connection, as nr. (7) the flap for covering the opening in closure position, as nr. (8) the flap in open position and as nr. (9) the opening for air intake.

[0015] The extremities of the nozzle might be usefully conformed by means of a connector in iron, in plastic material or any combination of materials and construction technique that makes possible the connection between the body of the nozzle and the hose conducting the air flow aspirated. On fig. 3, for example, neither exclusive nor limiting, there is a possible solution of a connection between the nozzle, as illustrated, and a conduct of circular section. In particular, indicated as nr. (10) there is the flange attached to the hose that matches the flange on the aspiration nozzle and as nr. (11) the junction for the circular section hose. Indicated as nr. (12) there is the hose, in this specific case, flexible.

[0016] The unit composed of the body of the nozzle, the flap/s and the flanges is named "aspiration nozzle".

[0017] Two or more nozzles connected together, attached to one or more aspirators by means of a hose line carrying air and varnish vapors conform the so called "modular air extraction and filtration system".

[0018] The connection between aspiration nozzles and the aspirator, or aspirators, might be done, as pictured, by means of flexible hoses of circle section, without these being considered a limitation to the protection of this invention, making possible the use of other sections for the conduct and/or every combination of rigid, semi rigid or flexible material permitting the aspiration inside the tunnel or, however, in a narrow and long workspace.

[0019] As example without exclusivity or limitation, on fig. 4, a solution that makes possible the setting up of the installation according to the above described characteristics. In fig. 4, indicated as nr. (13) there are the nozzles, as nr. (14) the hoses and as nr. (15) the aspirator placed on one extremity of the installation.

connected together by a system of fitted hoses, **characterized by** the possibility to open or close the nozzles necessary for the aspiration.

- 5 3. System according to Claim 1 but equipped with nozzles with two or more openings to be closed separately.
- 10 4. System according to Claim 2 but equipped with two or more openings to be closed separately.
5. System according to Claims 1, 2, 3 and or 4 realized with flexible hoses.
- 15 6. System according to Claims 1, 2, 3 and or 4 for use in shipbuilding industry, in particular for aspiration of solvents and resin and varnish vapors.
- 20 7. System according to Claims 1, 2, 3 and or 4 for use in shipbuilding industry, in particular for aspiration of solvents and resin and varnish vapors inside a wrapping tunnel, scaffolds or another kind of segregation system of the working area where resin or varnish is being processed.
- 25 8. Aspiration nozzle **characterized by** one or more flaps for closure of the air intake opening.
- 30 9. Aspiration nozzle **characterized by** having one or more devices for choking the airflow.
- 35 10. Aspiration nozzle according to Claims 8 and or 9 for use in shipbuilding industry, in particular for aspiration of solvents, resin and varnish vapors.
- 40 11. Aspiration nozzle according to Claims 8 and or 9 for use in shipbuilding industry, in particular for aspiration of solvents, resin and varnish vapors inside a wrapping tunnel, scaffolds or another kind of segregation system of the working area where resin or varnish is being processed.
- 45

Claims

- 50 1. Modular air extraction and filtering system composed of a series of nozzles with closable openings connected together by a system of fitted hoses, **characterized by** the possibility to open or close the nozzles necessary for the aspiration.
- 55 2. Modular air extraction and filtering system composed of a series of nozzles with closable openings

Fig. 1

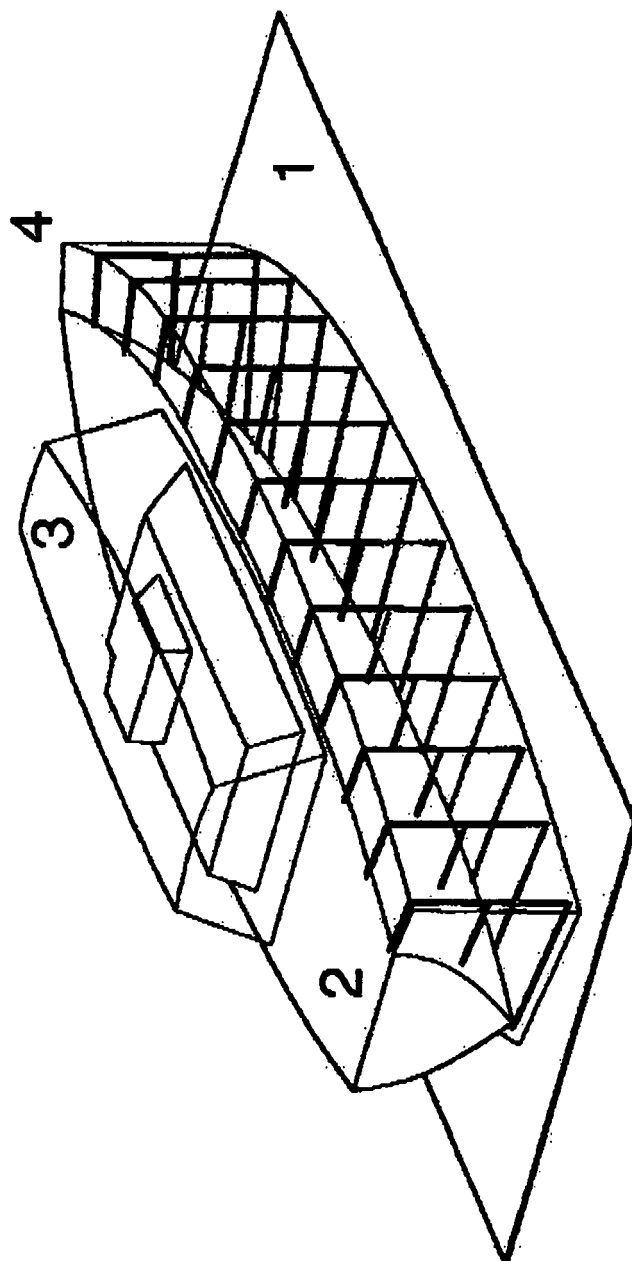


Fig. 2

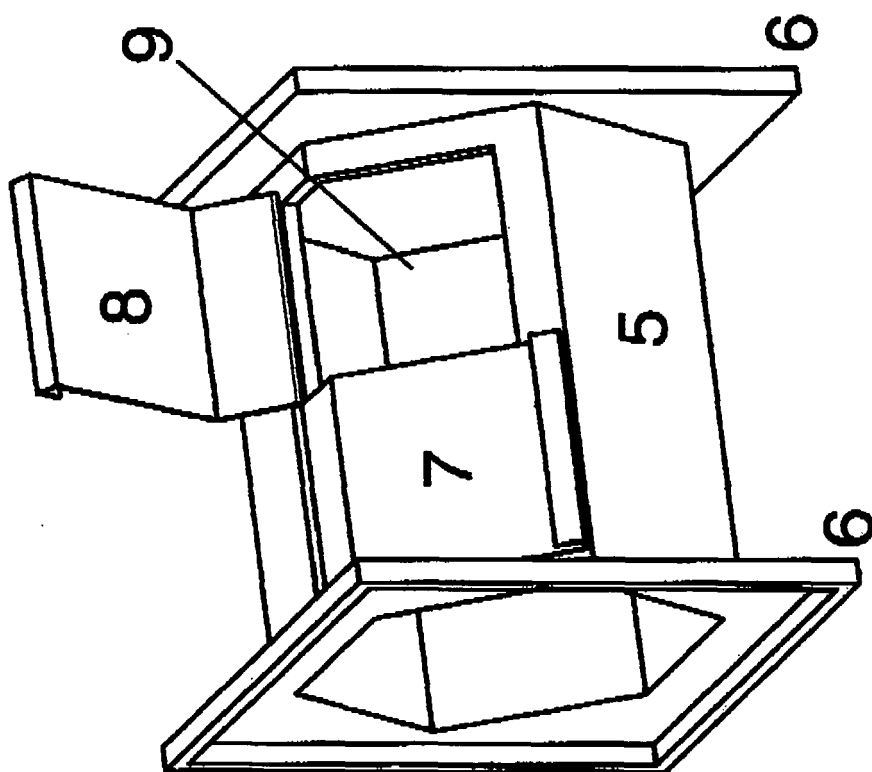


Fig. 3

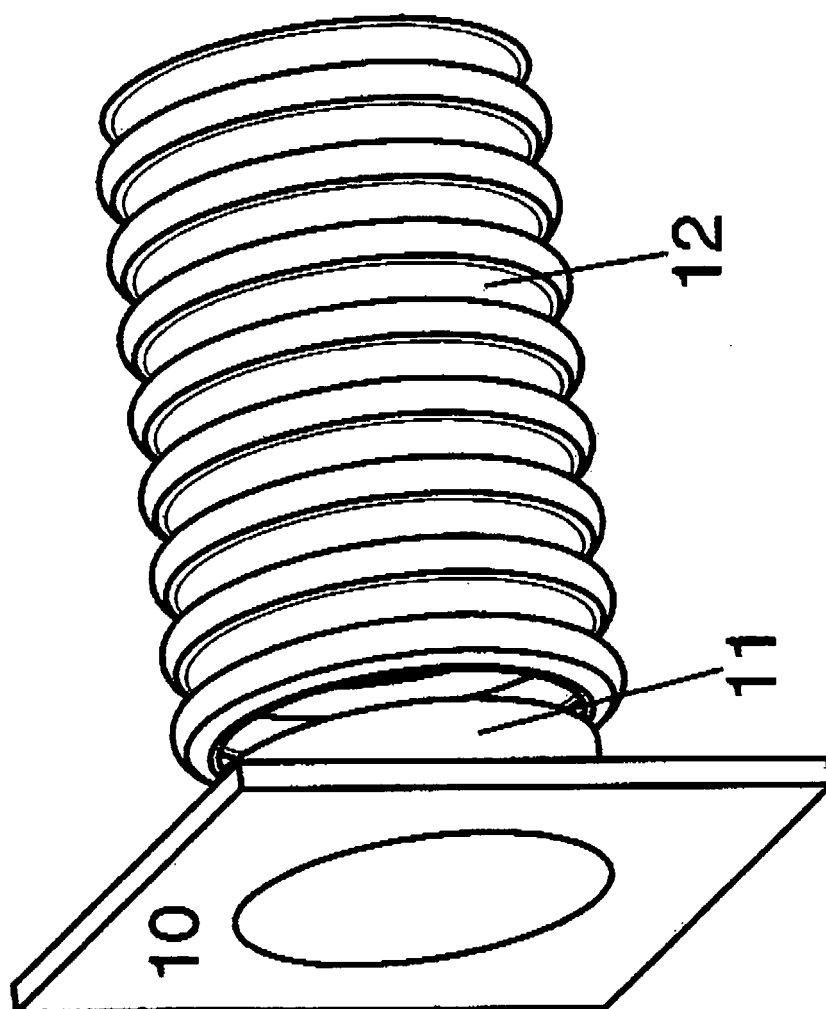
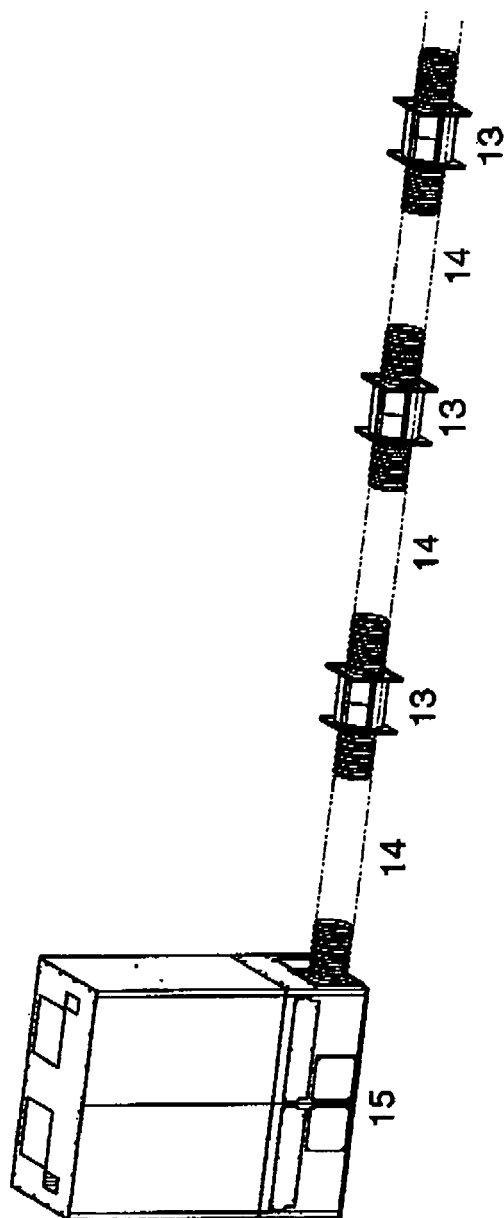


Fig. 4





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Application Number
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 18 January 2008	Examiner Kofoed, Jakob
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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