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(72) Inventor: **Bergaglio, Osvaldo**
40044 Sasso Marconi (Bologna) (IT)

(74) Representative: **Provvisionato, Paolo**
Provvisionato & Co S.r.l.
Piazza di Porta Mascarella 7
40126 Bologna (IT)

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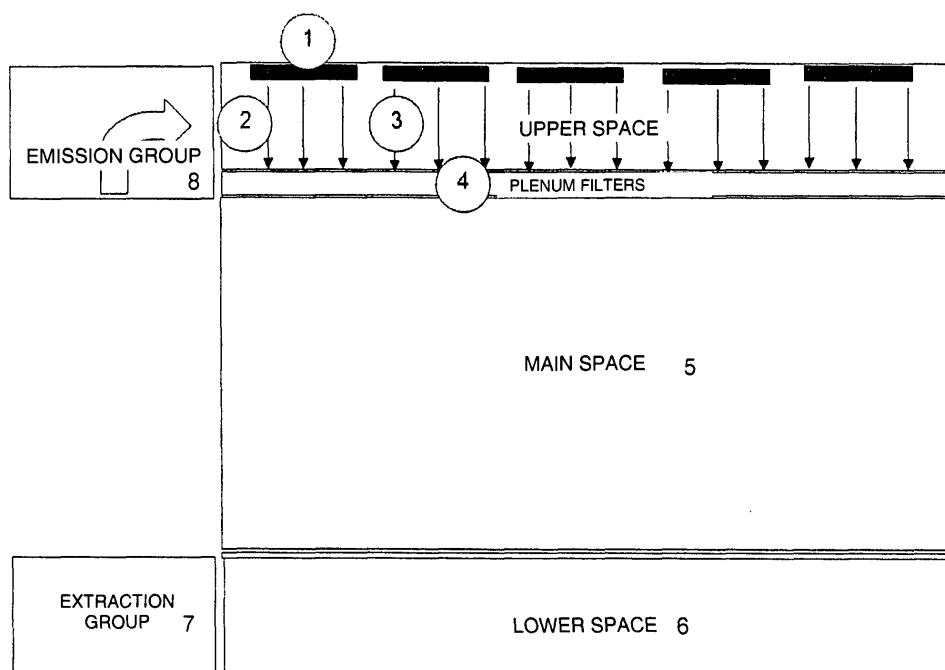
(71) Applicant: **Symach S.r.l.**
40050 Monte S. Pietro (Bologna) (IT)

(54) **Improvements for spray booths and drying stations**

(57) A spray booth and or a preparation station consists of an upper space (5) designed for hot air to pass through for drying, an upper space (2) connected with the main space (5) by the interposition of filters (4) and by means of the emission of air (8) in the upper space (2). Heated radiant panels (1), preferably catalytic ones, are placed in the upper space (2) orientated towards the filters (4) to heat by the air in transit in the upper space

(2) and by the filters (4), which act as the exchange of heat to finally warm up the air in transit directly to the upper space (5). The spray booth or and the preparation station can be internally covered with sandwiched panels which are fed by air which exits from a series of holes made in the sheets of the panels which face internally the booth, so as to avoid dirtying the walls from the kind of fog given off by the spray paint.

FIG. 2



Description

[0001] The present invention refers to the so called section relating to spray booths or and preparation stations.

The spray booth structure consists of a principle space where an operator can feasibly carry out a painting operation for example, but not only, on parts of a vehicle. In the inside of the space in the booth warm air is introduced to dry the paint. Although it can be employed in the paint sector and for the drying one for parts of vehicles or in the industry connected with the spray booth it can also be employed in the drying of cereal, plastics, materials etc.

[0002] The spray booth is an area where the operator or the robot paints, normally by spraying, the objects contained within, for example parts of vehicles.

[0003] The present invention is to do with the improving of a spray booth and or a preparation station as indicated above. A spray booth which is destined to the drying of parts inside of it is composed of the following , as shown in figure 1:

- a main space, normally accessible by the operator where the parts to be painted or to be dried are placed,
- an upper space, used as a kind of pipe for the emission of air from the heating system coming from the main space. The connection between the two spaces is by an interposition of a strata of filters, called plenum which have the function to filter the air,
- a lower space, separated from the main space by a grill in the floor used as a pipe to extract the air which has passed through the main space,
- a group of ventilators for extracting air,
- a group of heat generators like a boiler with or without heat exchangers,
- a group of ventilators for the emission of air from the superior space.

[0004] The normal system for the heating of the air introduced into the spray booth is based on a boiler with a combustion burner which heats the air before being released.

Such a heating system for the air with a boiler and burner calls for an enormous space and an enormous consumption of energy. Above all, according to the strict laws in some countries only where the power is concerned, modifications have to be made and relevant permission has to be had. Often it is necessary to build walls to incorporate the heating apparatus thus reducing the space in the principal space for the spray booth.

[0005] When the spray booth and or the work station is used to paint objects contained within and particularly when the method is by spraying a kind of fog is generated from the spray, also smoke, which is transported due to the ventilation in the booth partly onto the walls thus dirtying them.

[0006] The goal of the actual invention is to solve the above problems. With particular reference to the spray booth, the goal is to diminish considerably the power ensuring the efficiency of the spray booth, and finally to simplify the installation and the running of the heating plant, eliminating the necessity for any administrative work and reducing the energy consumed in the using of the spray booth, increasing the space in the principal space of the spray booth. With particular reference to the painting booth the goal is to make the cleaning of the booth more economic. In any case the goal is to have a spray booth and or a working station working more efficiently both economically and technically in a notable way.

To reach the goals indicated, the object of the invention is a spray booth and preparation station having the characteristics indicated in the claims paragraph.

[0007] With regard to the first aspect of the invention there are in the upper space in the spray booth (as of now referred to as ceiling) a series of panels radiating infrareds orientated towards the filters called plenum in such a way as to put heat in to fill the upper space concentrating the radiation on the filters called plenum. Instead of using the radiant panels the invention takes into account catalectic ones.

[0008] At the moment when the air is introduced from the emission group in the upper space there is a transfer of released energy from the radiant panels. At the moment when the air arrives through the filters, called plenum there comes about a further and total exchange of heat.

[0009] Given the different characteristics connected with the principal function between a panel and a infrared one is a system based on the boiler and combustion it means an incredible saving in energy and heat.

[0010] With regard to another aspect of the invention, a part of the walls of the spray booth and or the preparation station are constructed in panels hermetically sandwiched together, where the superficial of the panels turned towards the spray booth have a series of openings with a small distance between them, from which exits air which becomes fed into the sandwiched panels through a feeding tube. The air which exits at a certain pressure through the small openings creates a turbulence which distances the kind of fog from the spray away from the inside walls of the spray booth.

[0011] Further characteristics and advantages resulting from the detailed following description, with reference to the attached figures:

- figure 1 is a schematic section of a spray booth described above,
- figure 2 is a schematic section of a spray booth perfected according to the first aspect of the invention,
- figure 3 is a perspective view of the panel coating of the walls of the spray booth, according to the other aspect of the invention,
- figure 4 is a section of the panel of figure 3.

[0012] With reference to figure 2, according to the present invention a spray booth or preparation station where the objects which are to be painted or dried are placed, and which is normally accessible by the operator and is suited to the various operational movements of the objects and or the painting. Above the main space 5 is an upper space 2, used as a pipe for the input of the air coming from the heating system directly from the main space 5. The upper space 2 is connected with the main space 5 with interposition of a layer of filters 4, called plenum, which have the function of filtering air, coming from the upper space 2 and directly towards the main space 5.

[0013] Under the main space 5 is situated the lower space 6, connected with the main space 5 with the interposition of a grilled floor or another similar system. The lower space 6 acts for the extraction of air after it has passed through the main space 5. A group of ventilators 7 for the extraction of air are situated at the end of the lower space 6 of a type generally known, while the emission group 8 are situated before of the upper space 2, and also they are also known in this field.

[0014] The reference number 1 indicates the position of one or more radiation lamps or panels of infrareds, positioned in correspondence to the upper space or to the ceiling of the upper space 2 of the spray booth and are orientated in such a way that they guide the radiated energy towards the filters 4. In the preferred version the lamps or panels 1 radiant catalytic.

[0015] In the function of the spray booth according to the invention described above, the air destined to dry the objects placed in the main space 5 comes from the upper space 2 thanks to the group of emission ventilators 8, while the radiant panels 1 are activated in such away as to put heat into the whole of the upper space 2, and therefore the air which it comes into contact with, and in particular concentrating the radiation on to the filters 4, as shown in the schematic illustration in the figure 2 with the arrow 3.

At the moment when the air is introduced, the emission group 8 in the upper space 2, happens the first transfer of energy released from the radiant panels 1 of the air. Then the moment in which the air, already partially heated, passes through the filter 4, there happens a total exchange of heat. In practice the air becomes heated at the moment when it passes through the filters 4, heated by radiation from the panels or the radiant panels 1.

[0016] By looking at the figure 1, which represents the spray booth, it is immediately apparent that by using the radiant panels and infrareds placed on the top of the upper space 2 there is a lot more space as the traditional combustion burner no longer exists. Above all there is a far better transmission of hot air, at the moment when the filters act as the heat exchangers, with a notable saving in energy with respect to the traditional system of heating the air with the combustion burner, especially in the case where the catalytic radiant panels are used. Now with reference to the figures 3 and 4 regarding the

innovation aspect of the present invention, at least a part of the walls of the spray booth and or the preparation station are covered with panels in sandwich form, consisting of two sheets with a parallel distance opposite each other, forming a room 13, preferably water tight or air tight, having internally in the space a tube 11 for feeding air. On the sheet facing the inside of the spray booth or and the preparation station there is an opening 12, preferably a series of closed holes, which allows the air fed in the room 13 through the tube 11 to exit with a certain pressure.

[0017] When in use the air which comes out of the opening 12 creates a jet or turbulence 14, useful in the painting stage to keep at a distance the kind of fog which comes from spray paint, away from the walls of the spray booth thus avoiding dirt on the walls.

[0018] Naturally it remains without saying that there could be certain significant changes which have been already described and illustrated made but without changing the concept of the invention.

Claims

1. The spray booth or and preparation station consists of a main space (5) designed to dry by means of heated air, an upper space (2) connected to the main space (5) with the interposition of filters (4), by means of (8) the emission of air in the main space (2), **characterised by** the fact that it has above all heated radiant panels (1) situated in the upper space (2) orientated towards the filters (4) to heat the air in transit in the upper space (2) and in the filters (4) which act as the exchange of heat to finally heat the air in transit directly to the main space (5).
2. The spray booth and or the preparation station according to the claims 1 is **characterised by** the fact that it has one or more lamps to radiate or infrared radiant panels.
3. The spray booth or preparation station according to the claims 2 is **characterised by** the fact that one or panels which are catalytic ones.
4. By using by means of radiant heating (1) situated in the upper space of the spray booth or and preparation station to heat directly and indirectly the air in the main space (5) of the booth, the heating indirectly of the air coming across from the exchange of heat by means of the filters (4) re heated by radiation by means of radiant heating (1).
5. Use of by means of heated radiant panels according to the claim 4, is **characterised by** the fact that the heated radiant panels are catalytic ones.
6. The spray booth and or preparation station is made

up of a main space (5) having part of its walls covered with panels which have a series of openings (12) which face the main space (5) by means of the feeding of air (11) are arranged to feed air to the panels in the zone behind the openings (12).

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7. The spray booth or and the preparation station according to the claims 6 are **characterised by** the fact that the panels are a sandwiched type, having two sheets one in front of the other leaving a space between (13) where in the middle are the openings for the means of feeding air (12) which are on the sheets facing the main space (5).
8. The spray booth and or the preparation station according to the claims 6 or 7 are **characterised by** the fact that the openings are in many and are small.
9. The panels for covering the walls of the spray booth are **characterised by** the fact that they are made up of two sheets facing each other with a space in between (13) , the means of feeding the air (11) is in this space (13), a series of openings (12) is in one of the two sheets for the exiting of a jet of air towards the spray booth and or preparation station covered in the said panels.

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TECHNICAL NOTES

FIG. 1

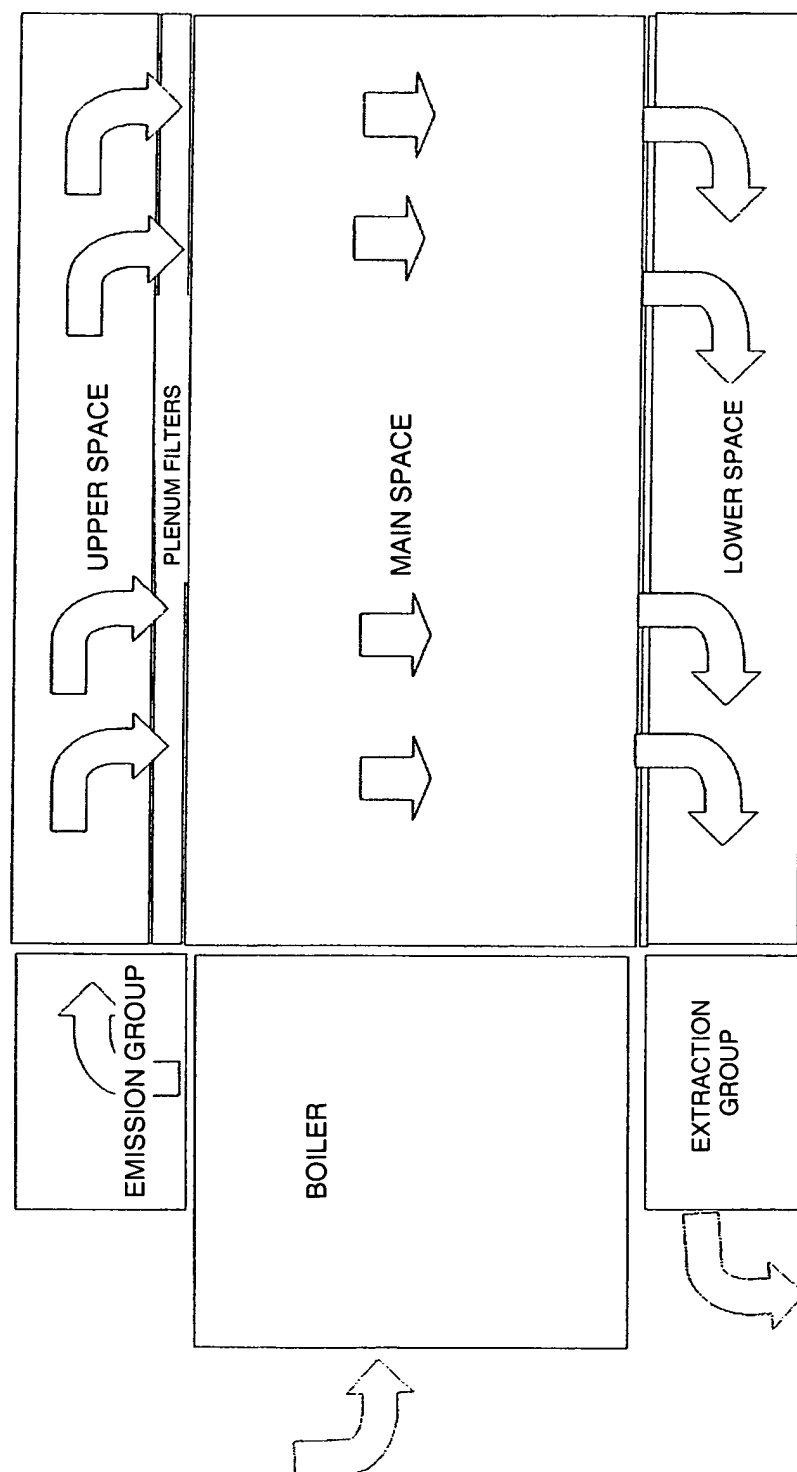


FIG. 2

