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(54) Portable paint booth

(57) It allows the transport of air between a suction unit and an air intake plenum that returns the air to the area occupied by the operator free of residual paint fumes, said air dragging the new residual paint fumes produced in the booth therewith. More specifically, said portable paint booth comprises a suction unit (1) in charge of extracting the residual paint fumes produced in the painting area occupied by the operator and cleaning the air of said residual fumes, and an air intake plenum (2) for returning the air to the painting area occupied by the operator, said portable paint booth standing out for also comprising a duct (3), which can be foldable or rigid, allowing the air to be transported between the suction unit (1) and the air intake plenum (2).

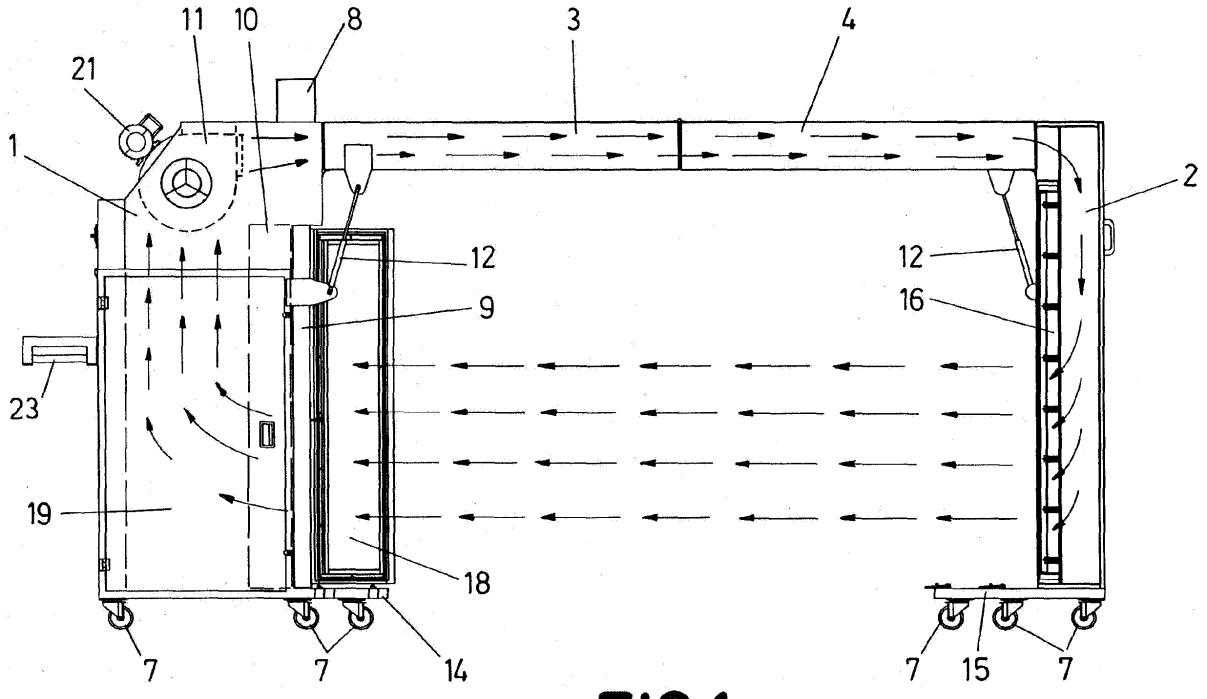

FIG.1

EP 2 548 656 A2

Description

OBJECT OF THE INVENTION

[0001] The present invention relates to a portable paint booth which allows air to be transported between a suction unit and an air intake plenum that returns the air to the area occupied by the operator free of residual paint fumes, said air dragging the new residual paint fumes produced in the booth therewith.

BACKGROUND OF THE INVENTION

[0002] In the current state of the art, paint booths are known to exist that enable paintwork to be carried out in small/medium repairs on vehicles, notably conventional paint booth-drying ovens, wherein the vehicle is introduced and which has mobile units that are approximated to said vehicle and extract the contaminated air produced in the area, filter the paint and retain the solvents, returning the clean air to the work area.

[0003] There are times in which repair shops, due to space shortage or because the paint booths are occupied, do not have sufficient booths of this type to carry out the repair and paintwork on the vehicles that need to be repaired at a given time.

[0004] The present invention resolves all of the foregoing drawbacks on providing a portable paint booth which can be transported from one place to another in order to carry out repair and paintwork in different places.

DESCRIPTION OF THE INVENTION

[0005] The present invention relates to a portable paint booth comprising a suction unit in charge of extracting the residual paint fumes produced in the painting area occupied by the operator and cleaning the air of said residual paint fumes, and an air intake plenum that returns the air to the painting area occupied by the operator.

[0006] The portable paint booth also comprises a duct which allows air to be transported between the suction unit and the air intake plenum. Preferably, the booth has an inverted U shape, with the duct forming the core of the "U" and the suction unit and air intake plenum forming the wings of said "U".

[0007] In accordance with a first preferred embodiment, said duct is foldable in order to enable the aforementioned transport of air when said duct is unfolded and for transporting the entire booth when said duct is folded.

[0008] Further, in accordance with a second preferred embodiment, said duct is rigid.

[0009] Additionally, the portable paint booth has also been envisaged to include a set of wheels that allow transport thereof from one place to another and a braking device that prevents movement of the booth once disposed in the operating position.

[0010] For its part, the suction unit comprises a set of retention filters and an activated carbon bed which allows filtration of residual air in several stages, being finally evacuated toward the interior of the duct by means of a fan, where it is conditioned in compliance with the health and safety standards required by labour and environmental regulations. The air filtered in the suction unit is guided through the duct to the air intake plenum, which channels it toward the area occupied by the operator in the form of a horizontal current that prevents, on one hand, the fumes produced during spraying from being inhaled by the operator and, on the other, airborne paint particles from depositing on the element being painted.

[0011] The air intake plenum comprises a filter disposed at the air outlet which removes any dust particles dispersed in the air.

[0012] The duct is disposed as the roof of the booth, where the air intake plenum and suction unit form the side walls thereof.

[0013] Preferably, the booth also comprises a transparent vertical screen disposed in the free space between the air intake plenum, the suction unit and the rigid duct, said screen separating the area occupied by the operator in the booth from the area where the element to be painted is disposed, connected solely by a window disposed in said screen coincident with the area to be repaired of the element being painted. This screen facilitates the task of papering the element to be painted and avoids the dispersion of fumes between the air intake plenum and suction unit, forming a wall at the back of the booth, except in the area of the window that protects those areas of the element to be painted where repair and paintwork is not required.

[0014] Additionally, the booth can comprise at least one light screen that facilitates the paintwork and an air discharge duct which allows renewal of the air recirculating through the booth in the event that the level of organic volatile compounds rises above a certain predetermined threshold.

[0015] Lastly, the booth object of the invention additionally comprises coupling means for joining doors and/or mobile or roller roofs thereto for enlarging the work surface area of the booth in order to carry out operations such as welding, painting of loose parts, etc., in such a manner that such additions would practically convert it into a sealed booth with the advantage of mobility.

DESCRIPTION OF THE DRAWINGS

[0016] In order to complement the foregoing description and with the object of helping to better understand the characteristics of the invention, in accordance with a preferred embodiment thereof, a set of drawings are included wherein the following is represented in an illustrative and non-limiting matter:

Figure 1. Shows an elevation view of the portable paint booth, according to a first preferred embodiment wherein the duct is foldable and said duct can be observed in the unfolded position.

Figure 2. Shows a perspective view of the portable paint booth of figure 1, wherein the duct is represented in an intermediate folded or unfolded position.

Figure 3. Shows a perspective view of the portable paint booth of figure 1, wherein the duct can be observed in a completely folded position and the booth ready to be transported, also showing a detail of the sealing mechanism that assures the folded position.

Figure 4. Shows a general perspective view of the booth of figure 1, where the element to be painted by the operator can be observed.

Figure 5. Shows a perspective view of the portable paint booth, according to a second preferred embodiment, wherein the duct is rigid.

Figure 6. Shows a rear perspective view of the portable paint booth of figure 5.

PREFERRED EMBODIMENT OF THE INVENTION

[0017] In light of the foregoing figures, following is a description of a preferred embodiment of the portable paint booth of the present invention.

[0018] As shown in figures 1 and 5, the portable paint booth comprises a suction unit (1) which comprises a set of retention filters (9) of varying efficiencies that filter the air at different stages, being ultimately purified by means of an activated carbon bed (10). The air is extracted by a centrifugal fan (11) actuated by a motor (21), having the adequate pressure for the load loss to which the retention filters (9) are subjected and which guides it toward a duct (3) that introduces it into an air intake plenum (2), comprising a filter (16) disposed at the air outlet which extracts any dust particles dispersed in the air.

[0019] Additionally, in said figures 1 and 5 it can be observed that both the suction unit (1) and the air intake plenum (2) comprise a set of wheels (7) which allow the booth to be transported from one place to another.

[0020] The booth also comprises a transparent vertical screen (5) made of disposable plastic film disposed in an upright position in the free space between the air intake plenum (2), the suction unit (1) and the duct (3), on one of the sides of the booth, said screen (5) separating the area occupied by the operator in the booth from the area where the element to be painted (22) is disposed. Said screen (5) comprises a window (17) coincident with the area to be repaired of the element to be painted (22).

[0021] The booth also comprises a light screen (6), shown in figure 5, disposed on the lower part of the duct (3), that lights up the painting area and an air discharge duct (8) connected to the exterior by means of a flexible hose (not shown) which allows renewal of the air recirculating through the booth in the event that the level of organic volatile compounds rises above a certain predetermined threshold, said level being measured using an organic volatile compound detector and which determines a maximum threshold that does not pose a risk to the operator's health and triggers an alarm if said threshold is exceeded. In other embodiments, the light screen (6) is disposed on the air intake plenum (2) or suction unit (1). Lastly, the booth comprises grips (20) for transport thereof.

[0022] In accordance with a first preferred embodiment, shown in figures 1 to 4, the air transport duct (3) is a foldable duct (3, 4), wherein the suction unit (1) comprises an articulated door (18) which allows channelling of the paint extraction and which in this embodiment is transparent and has a metal frame. In other embodiments, the articulated door (18) joined to the suction unit (1) in an articulated manner is made up of several door sections articulated therebetween. Additionally, in order to facilitate the replacement of the retention filters (9), the suction unit (1) has practicable doors (19).

[0023] Said foldable duct (3, 4) shown in figure 2 is formed by a first straight duct (3) and a second straight duct (4) which are articulated at their joining plane, where the longitudinal direction thereof (3, 4) is vertical and parallel when the booth is folded (see figure 3), and horizontal and coincident when the booth is in an unfolded position and ready for use, as shown in figures 1 and 4.

[0024] Thus, in the unfolded position shown in figures 1 and 4, the booth has an inverted U shape, wherein the folded duct (3, 4) forms the core of the "U" and the suction unit (1) and air intake plenum (2) form the wings of said "U". The first duct (3) is joined to the suction unit (1) in an articulated manner by means of a gas spring (12) joined by one of its ends to the first duct (3) and by the other end to the suction unit (1), and the second duct (4) is also joined to the air intake plenum (2) in an articulated manner by means of another gas spring (12) joined by one of its ends to the second duct (3) and by the other end to the air intake plenum (2).

[0025] Furthermore, in the folded position, as shown in figure 3, one of the longitudinal sides of the first duct (3), which has a rectangular cross-section, is disposed adjacent to the suction unit (1), and one of the longitudinal sides of the second duct (4), which also has a rectangular cross-section, is disposed adjacent to the air intake plenum (2), the first duct (3) and second duct (4) being adjacent by the longitudinal side parallel to the longitudinal side that is adjacent to the suction unit (1) and air intake plenum (2).

[0026] Additionally, the booth comprises a sealing device (13), shown in figure 3, that ensures maintenance of the booth in the folded position, said sealing device (13) being in charge of joining one or several tubular profiles (14) present in the suction unit (1) to one or several tubular profiles (15) present in the air intake plenum (2).

[0027] Furthermore, in accordance with a second preferred embodiment shown in figures 5 and 6, the duct (3) is a rigid duct (3) that constitutes the core of the "U", while the suction unit (1) and air intake plenum (2) constitute the wings of said "U".

[0028] It should be noted that the aforementioned transparent vertical screen (5) made of plastic film can be replaced manually or form part of a roll that unfolds between two cylinders disposed either in the rigid duct

(3) and on the floor or in the air intake plenum (2) and suction unit (1), in such a manner that part of the transparent vertical screen (5) made of plastic film disposed in an upright position in the free space between the air intake plenum (2), the suction unit (1) and the rigid duct (3) is moved from one cylinder to another whenever said transparent vertical screen (5) needs to be replaced.

[0029] Additionally, as shown in figure 6, the booth has at least one curtain (23), preferably made of flexible and transparent plastic, which can form part of a rolling curtain or practicable doors and is disposed parallel to the transparent vertical screen (5), on the opposite side of the booth so that, jointly with said transparent vertical screen (5) made of plastic film disposed between the booth and the element to be painted (22), in this case a vehicle, they can form, together with the suction unit (1), the air intake plenum (2) and the rigid duct (3), an enclosed area to prevent possible contamination from external dust, in such a manner that it would become a sealed booth with the advantage of mobility. In other examples, the booth can have two curtains (23) made of flexible and transparent material which are joined together in the middle of said booth.

Claims

1. Portable paint booth which comprises:

   • a suction unit (1) in charge of extracting the residual paint fumes produced in the painting area occupied by the operator and cleaning the air of said residual fumes, and
   • an air intake plenum (2) to return the air to the painting area occupied by the operator,
   characterised in that it also comprises a duct (3) which allows the air to be transported between the suction unit (1) and the air intake plenum (2).

2. Portable paint booth, according to claim 1, **characterised in that** the duct (3) is a foldable duct (3, 4).

3. Portable paint booth, according to claim 1, **characterised in that** the duct (3) is a rigid duct (3).

4. Portable paint booth, according to any of the preceding claims, **characterised in that** the booth has an inverted U shape wherein the duct (3) forms the core of the "U" and the suction unit (1) and air intake plenum (2) form the wings of the said "U".

5. Portable paint booth, according to any of the preceding claims, **characterised in that** it additionally comprises a set of wheels (7) which allow transport thereof from one place to another.

6. Portable paint booth, according to claim 1, **characterised in that** the suction unit (1) comprises a set of retention filters (9) and an activated carbon bed (10) which allow filtration of the residual air in several stages and evacuation thereof to the interior of the foldable duct (3, 4) by means of a fan (11).

7. Portable paint booth, according to claim 1, **characterised in that** the air intake plenum (2) comprises a filter (16) disposed at the air outlet which extracts any dust particles dispersed in the air.

8. Portable paint booth, according to any of the preceding claims, **characterised in that** it additionally comprises a transparent vertical screen (5) disposed in the free space between the air intake plenum (2), the suction unit (1) and the duct (3), and which separates the area occupied by the operator in the booth from the area where the element to be painted (22) is disposed, being connected solely by a window (17) disposed in said screen (5) coincident with the area to the repaired of the element to be painted (22).

9. Portable paint booth, according to any of the preceding claims, **characterised in that** it additionally comprises at least one light screen (6) which facilitates the paintwork.

10. Portable paint booth, according to any of the preceding claims, **characterised in that** it additionally comprises an air discharge duct (8) which allows renewal of the air recirculating through the booth in the event that the level of organic volatile compounds rises above a certain predetermined threshold.

11. Portable paint booth, according to claim 2, **characterised in that** the foldable duct (3, 4) is formed by a first straight duct (3) and a second straight duct (4) which are articulated in their joining plane, where the longitudinal direction thereof (3, 4) is vertical and parallel when the booth is folded, and horizontal and coincident when the booth is unfolded and ready for use.

12. Portable paint booth, according to claim 2, **characterised in that** it additionally comprises a sealing device (13) which ensures maintenance of the booth in the folded position.

13. Portable paint booth, according to claim 3, **characterised in that** it additionally comprises at least one curtain (23) disposed parallel to the transparent vertical screen (5), on the opposite side of the booth, which jointly with said transparent vertical screen (5) made of plastic film disposed between the booth and the element to be painted (22) and jointly with the suction unit (1), the air intake plenum (2) and the rigid duct (3), forms an enclosed area.

14. Portable paint booth, according to claim 13, **characterised in that** it comprises two curtains (23) which are joined together in the middle of said booth.

15. Portable paint booth, according to any of claims 12 or 13, **characterised in that** the curtain(s) (23) is/are made of flexible and transparent plastic.

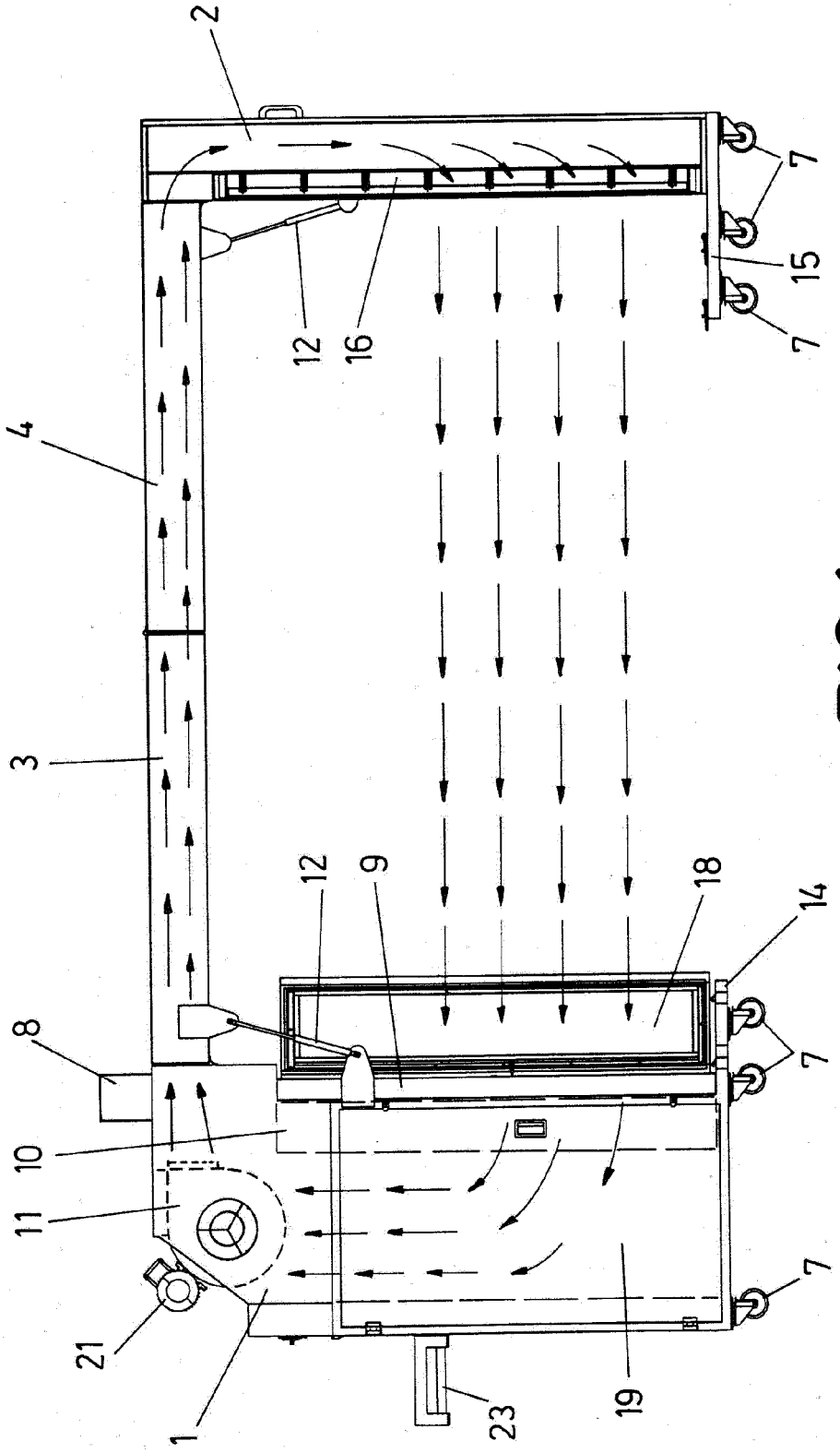

FIG.1

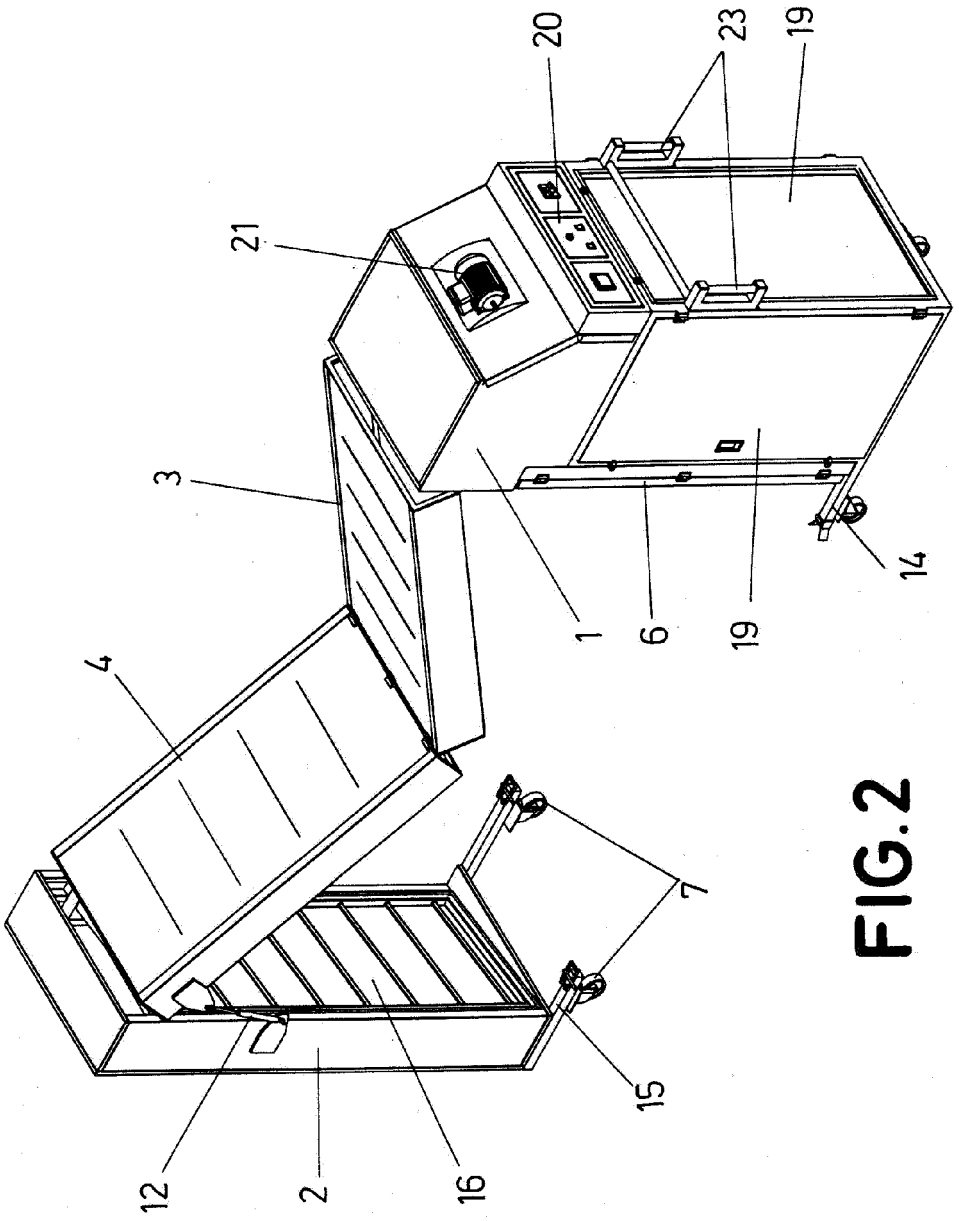

FIG.2

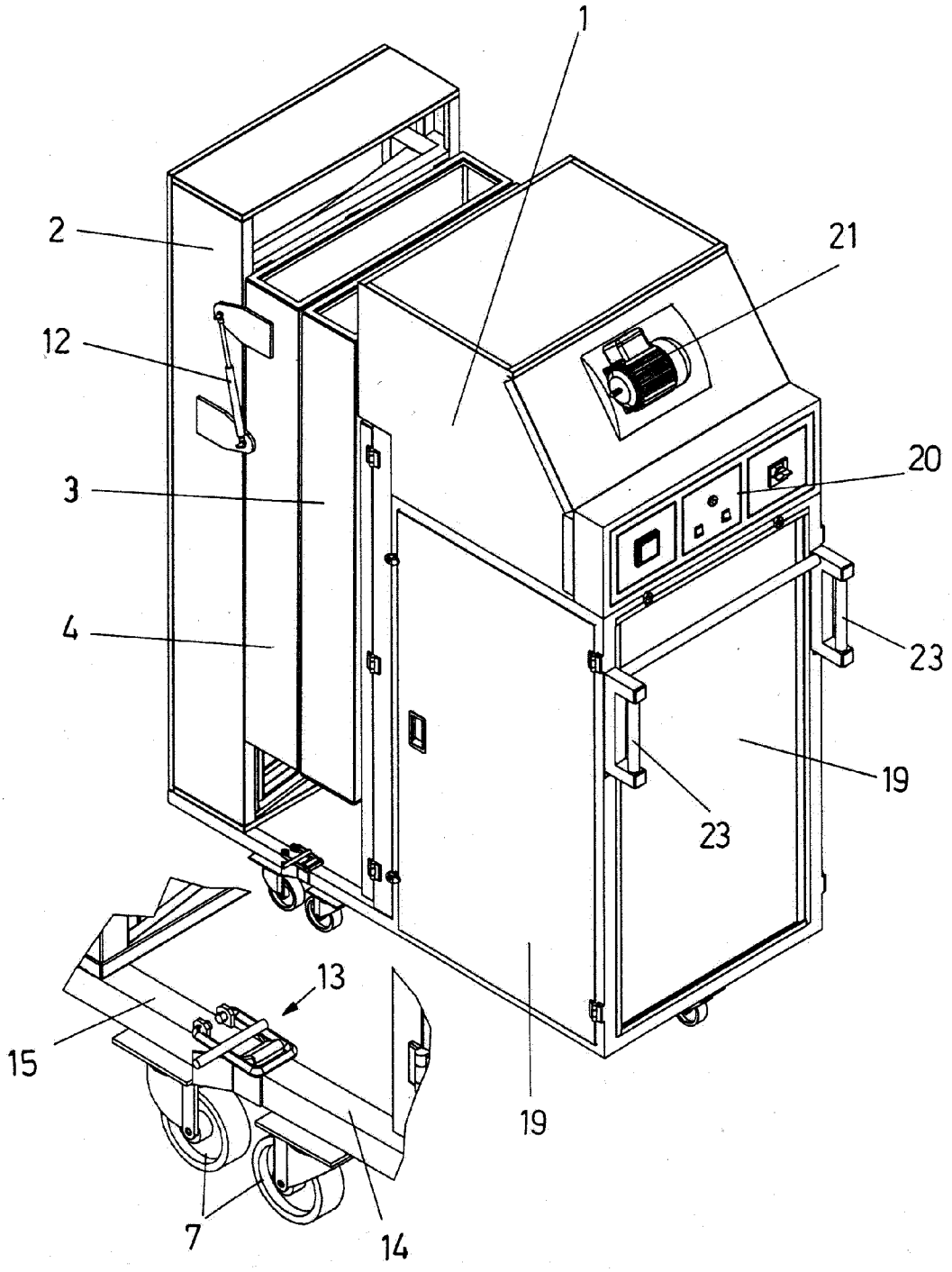

FIG.3

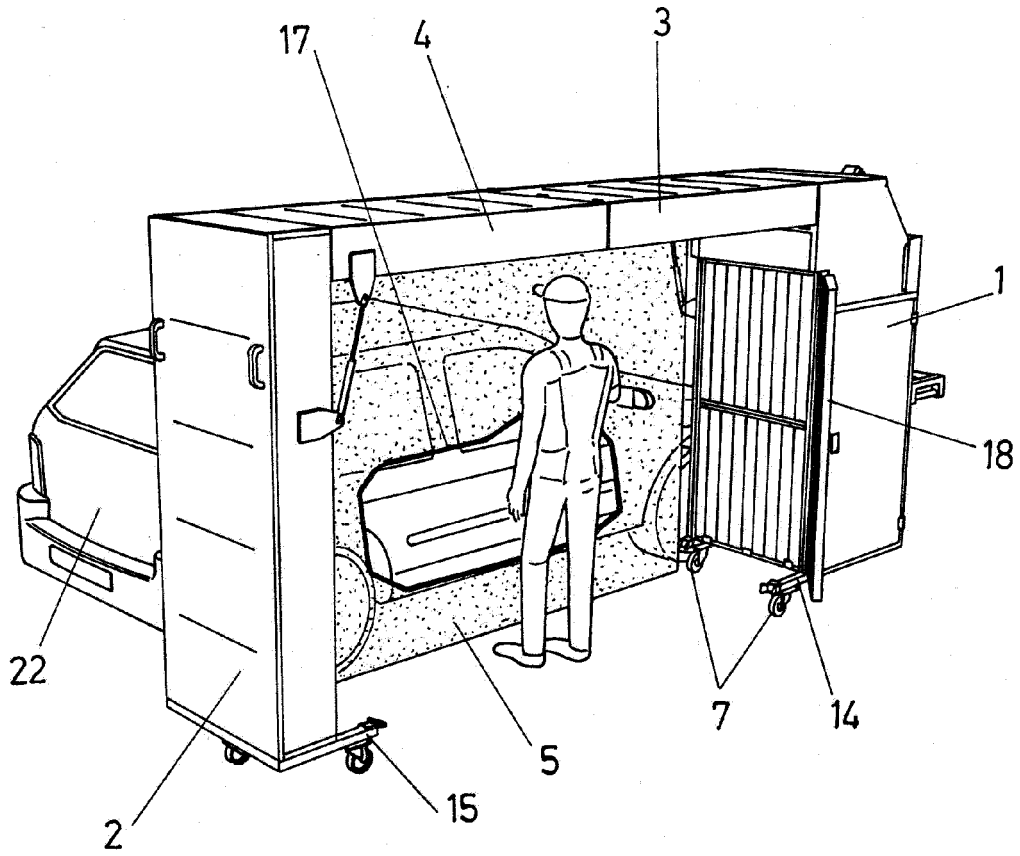

FIG. 4

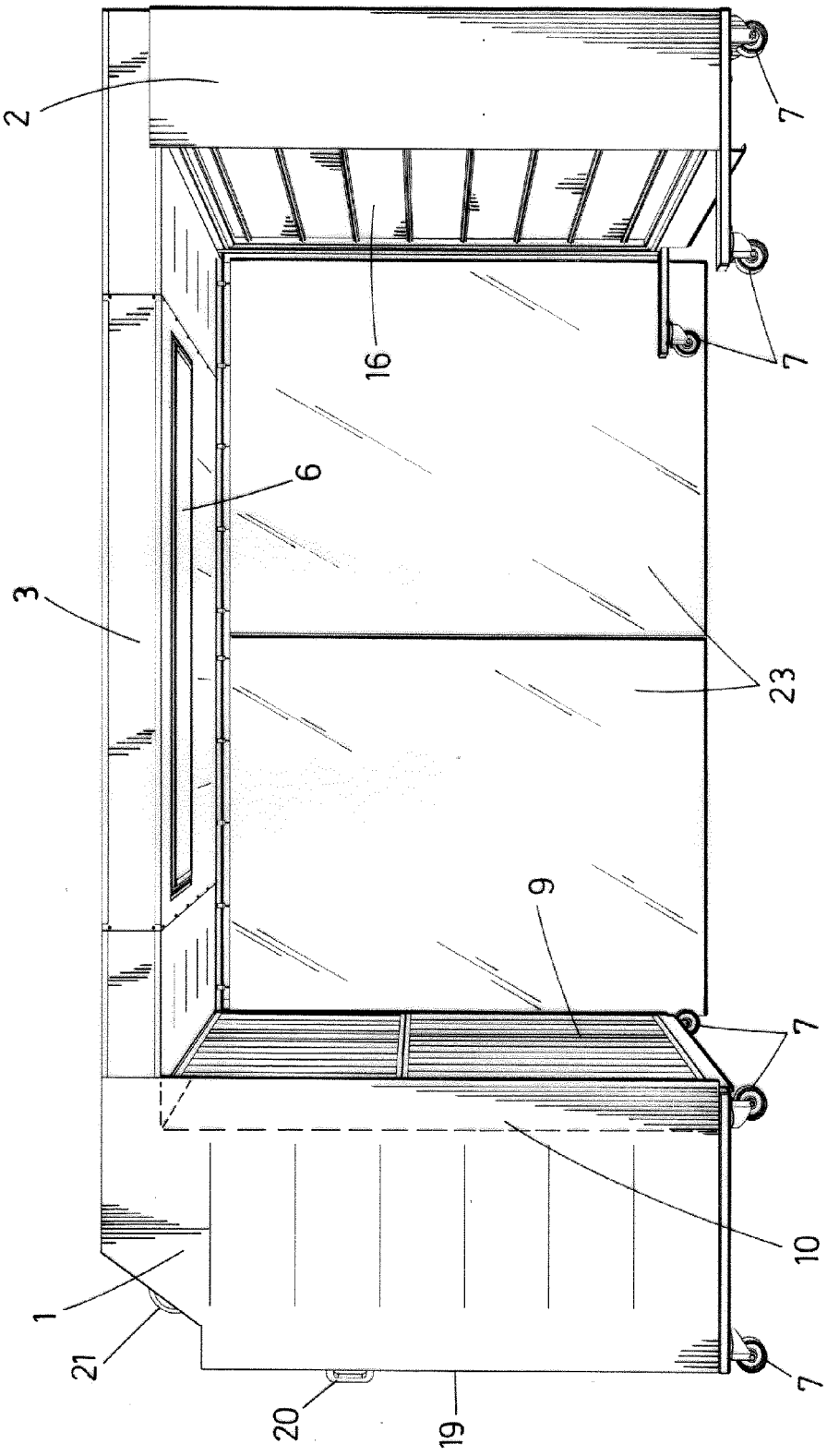

FIG.5

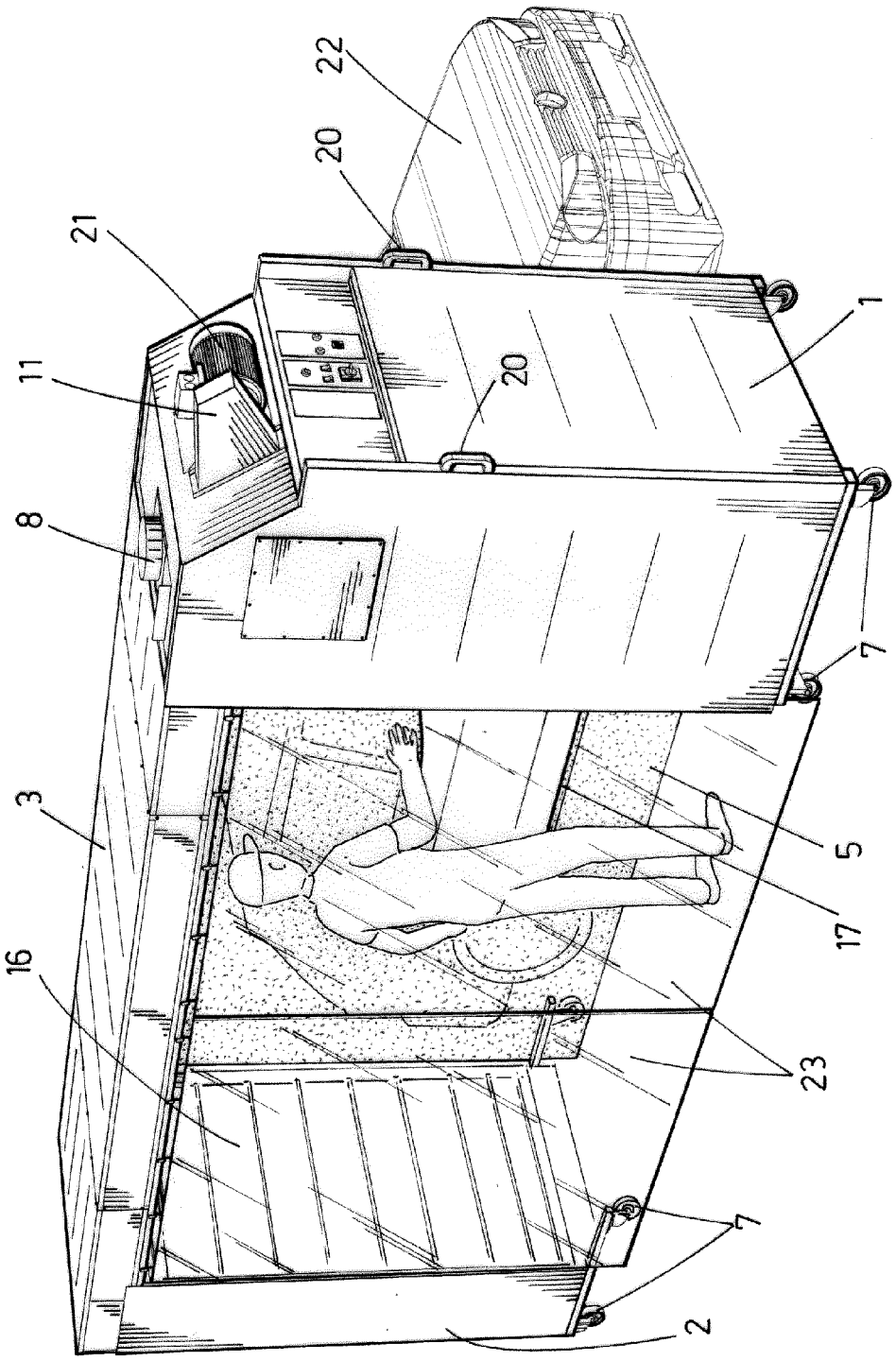

FIG.6