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(54) **Drying device**

(57) The present invention refers to a drying device arranged inside a cabin (11) of a varnish and/or other material drying plant and equipped with a single group (26) of drying panels (27). Such a group of drying panels can move according to six degrees of freedom: a first motion along the direction (X) of longitudinal development of the cabin (11), a second motion along the direc-

tion (Y) orthogonal to the direction (X) and parallel to the floor of the cabin, a third motion along a vertical direction (Z), and three rotations around three axes which are orthogonal to one another, and are respectively an turnover axis (R) parallel to the direction (X), a revolution axis (B) orthogonal to said turnover axis (R), and lying on an stably vertical plane, and a rotation axis (G) orthogonal to said two revolution (B) and turnover (R) axes.

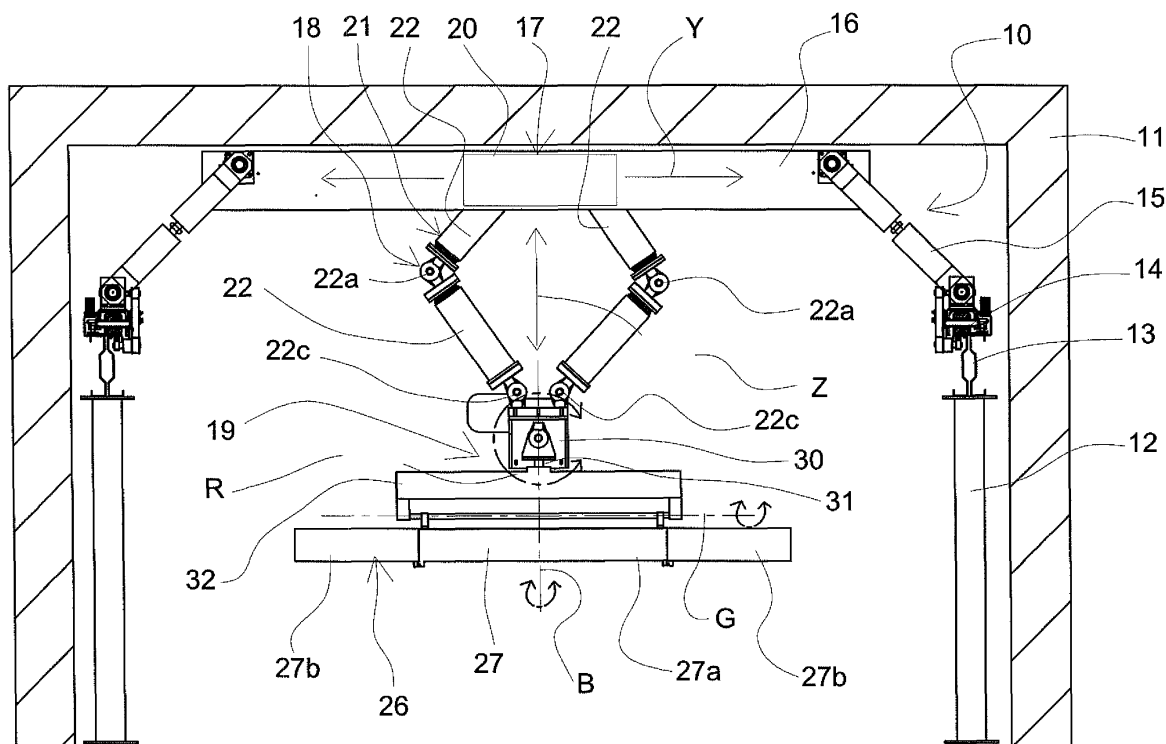


Fig. 1

Description

[0001] The present invention concerns the field of varnishing and drying plants for the bodies of vehicles, and in particular to a drying device for varnish and/or other material drying plants. The present invention also concerns a varnish and/or other material drying plant which uses such a device. Moreover, the present invention also concerns a drying panel which can be used in the aforementioned drying device.

[0002] As known, drying plants for drying varnishes applied to vehicle bodies generally comprise a tunnel-shaped cabin in which a movable scaffolding structure is arranged formed by vertical uprights up against the walls of the cabin and side guides supported by such vertical uprights. Slides are arranged on the side guides for moving a central beam. The latter constitutes the support of a drying device consisting of three flat groups of drying panels (in each group the panels are adjacent to one another and side by side). Such a device is fixed to a carriage which translates along the central beam.

[0003] In particular, there are two groups of panels which are parallel with one another and orthogonal to the floor of the cabin and a central group of panels arranged between the first two, oriented parallel with the floor of the cabin; the three groups of panels together have an upside down U configuration which is adapted to surround the vehicle from above.

[0004] The drying device can be moved together with the entire central beam of the scaffolding in the direction (defined here as direction X) of longitudinal development of the cabin; moreover, the device can translate along the direction of development of the central beam itself (defined here as direction Y). In addition to these motion directions of the drying group there are also, only for the central group of panels, a vertical translation which allows for the upper panels to be brought closer to the top portion of the vehicle, as well as a rotation around an axis (parallel to the direction Y) transversal to the cabin, allowing the central group of panels to be tilted so as to follow the profile of the vehicle or even to be arranged vertically so as to approach the front or rear side of the vehicle.

[0005] Drying devices like the ones described, although known and used now for several years, have substantial drawbacks.

[0006] A first important drawback is, for example, connected to the fact that the longitudinal motion of the drying group requires the displacement of all three groups of panels, even if the part of the body to be dried is small in size and the drying is carried out by the panels of a single group. Such a situation is, for example, that which occurs more often in a body repair shop, in which it is rarely necessary to repaint a vehicle entirely.

[0007] Such an "overall" movement of heavy drying components causes a high energy consumption which does not certainly appear justified for small sized surfaces to be dried. Moreover, the motion constraint of heavy components makes it necessary to use motorizations

and support structures which are oversized with respect to the actual requirement. Considering this, even the motion speed of the device is, given the masses, more limited with respect to the actual needs, with consequent slowing down of the drying processes.

[0008] In order to homogeneously heat the surfaces to be dried, the width of the three groups of panels (i.e., the size in the longitudinal direction of the cabin) is the same. In particular, the groups of vertical side panels have a height which is greater than the width so that they can be adapted, as obvious, to vehicles having different heights. It goes without saying that an excessive width dimension would cause substantial energy consumption for the drying. When it is necessary to dry the varnishes on one side of a vehicle (the length of which is much greater than the width of the groups of panels), the drying groups move in a direction X, along with the central beam, slidingly facing the entire side. The drying time necessary for one side of a vehicle thus depends on the width of the side panels and, for vehicles having a certain length, it may be substantial.

[0009] A further not insignificant drawback of the known drying devices is related to the fact that when the device is not being used, it is put away up against the back wall of the drying cabin. The size of the device, however, is substantial and actually limits the freedom of action of the workers inside the cabin. Other bulk problems of the device are caused by the support frame which connects it to the movable scaffolding. In general, such a frame is rigid and bulky, since it consists of vertical uprights on which a sliding carriage which carries the device is arranged.

[0010] The object of the present invention is thus that of avoiding the drawbacks previously mentioned in the state of the art, by providing a drying device for varnish and/or other material drying plants which makes it possible to carry out drying operations in shorter time and with low energy consumption.

[0011] Another important object of the present invention is to provide a drying device for varnish and/or other material drying plants which is light and small in size.

[0012] A further object of the present invention is to provide a drying device for varnish and/or other material drying plants which is not bulky when not in use.

[0013] Yet another object of the present invention is to provide a drying panel to be used in a drying device, which is effective in obtaining results of energy saving and of keeping the device small.

[0014] A yet another significant object of the present invention is to provide a varnish and/or other material drying plant which is cost-effective, has low management costs and that allows the workers to easily move inside it.

[0015] These and other objects which will become clearer later in the description, are achieved with the drying device for varnish and/or other material drying plants according to the attached claim 1, of the type to be associated with a known type of movable scaffolding support, the device comprising:

- drying means which comprise a group of drying panels arranged side by side in order to define a drying surface, and
- positioning means of said group according to different arrangements, among which a first arrangement defining a first drying direction substantially from the top downwards, and a second arrangement defining a second drying direction transversal to said first drying direction.

[0016] The device is **characterized in that** the positioning means are adapted to impose the group of drying panels, a third arrangement defining a third drying direction transversal to said first and second drying direction.

[0017] Advantageously, the invention also comprises a varnish and/or other material drying plant comprising a scaffolding for supporting a drying device; such a scaffolding being movable along a predetermined motion direction. On the scaffolding, sliding means are provided for permitting the sliding, in a direction transversal to the predetermined motion direction, of support means of the drying device. The support means comprise vertical translation means. The plant is **characterized in that** the drying device is of the type according to one or more of the attached claims.

[0018] The characteristics and the advantages of the device and of the plant in which it is inserted, according to the present invention, will become clearer from the following description of an embodiment thereof, given as an example and not for limiting purposes with reference to the attached drawings, in which:

- figure 1 represents a front schematic view of a cabin of a varnish drying plant showing a device according to the invention with the group of drying panels in the aforementioned first arrangement;
- figure 2 represents a front schematic view of a detail of figure 1 with the group of drying panels in the first arrangement, lifted upwards;
- figure 3 represents a front schematic view of a detail of figure 1 with the group of drying panels arranged in the aforementioned third arrangement;
- figure 4 represents a front schematic view of a detail of figure 1 with the group of drying panels in the first arrangement, lowered towards the ground;
- figure 5 represents a schematic side view of a portion of cabin showing a device according to the invention with the group of drying panels in the aforementioned first arrangement;
- figures 6 and 7 represent a detail of figure 5 in which the group of drying panels of the device according to the invention is rotated in an anti-clockwise direction and a clockwise direction, respectively, so as to take up the aforementioned second arrangement;
- figure 8 represents a top view of the group of drying panels of the device shown in the previous figures, highlighting with a broken line the possibility of rotating around an axis which is orthogonal to the group

itself;

- figure 9 represents a front view of the group of panels of the previous figures, in section, with one panel of the group rotated so as to take on a vertical position;
- 5 - figure 10 represents an exploded front view, in section, of a panel of the previous group.

[0019] With reference to the above mentioned figures, the varnish and/or other material drying plant is wholly indicated with reference numeral 10 and is housed inside a cabin 11. Such a plant comprises a support frame of the type having a movable scaffolding comprising vertical uprights 12 adjacent to the side walls of the cabin, which support two parallel beams 13, for guiding the movable scaffolding support along a motion direction which coincides with the direction of development of the cabin, indicated with X. Arranged on the guide beams 13 there are motorised slides 14 that, through arms 15, support the central beam 16 that defines the movable scaffolding. Such a beam 16 extends transversally to the cabin, that is orthogonally with respect to the direction X. Such a transverse direction is indicated with Y.

[0020] On the central beam 16 sliding means 17 are provided, sliding in the direction Y (i.e., transverse to the direction of motion X), for support means 18 of a drying device according to the invention, generally indicated with the reference numeral 19.

[0021] The sliding means 17 comprise a motorized carriage 20 to which the flanged support means 18 of the drying device 19 are fixed. In practice, such support means 18 consist of vertical translation means which comprise a support frame 21 fixed at two opposite ends to said carriage 20 and to the drying device 19. Such a support frame 21 comprises elements substantially elongated according to an axis, such as axially extensible pillars 22 (for example of the hydraulic type) mutually hinged and linked with actuation means 23 adapted to arrange said frame 21, pursuant to mutual rotations of its pillars at the junctions, in a plurality of possible configurations along a vertical direction Z comprised between a first elongated configuration which develops from the scaffolding downwards (shown for example in figure 4) and a second compact configuration horizontally adjacent to the central beam 16 of the scaffolding (shown in figure 2).

[0022] In the advantageous embodiment here illustrated, there are four such extensible elements 22, i.e., two symmetrical pairs of elements 22, a right pair and a left pair, respectively. Each pair has a mutual junction point 22a of the respective pillars and two ends, respectively an upper end 22b and a lower end 22c, respectively joined to the carriage 20 and to the drying device 19. The upper ends 22b (and analogously, the lower ones) of the two pairs are not hinged co-axially, indeed having junction points at the carriage 20 displaced from one another. An analogous arrangement is provided at the lower ends with respect to the junction to the drying device 19. In practice, the frame 21 has the arrangement of an artic-

ulated quadrilateral.

[0023] The actuation means 23 which allow the pillars 22 to be moved, in this embodiment, are in the form of two gear wheels 24 engaged with one another and co-axially fixed to the junction hinges of the upper ends 22b of the pillars 22. One of these two geared wheels 24 is connected to a planetary reduction gear 25 which allows it to rotate. In practice, the reduction gear 25 sets the upper pillars 22 into rotation around the junction hinges to the carriage 20; said pillars, thanks to their mutual articulation, set into rotation, but with an opposite direction, the lower pillars hinged to the drying device 19. Depending on the rotation direction, the pairs of pillars 22 either spread apart, "opening", up to a horizontal configuration (figure 2) and making the lower ends 22c translate upwards bringing the drying device 19 with them, or they are aligned vertically, "closing", with a consequent downward translation of the drying device 19 (figure 4).

[0024] A possible variant (not shown in the figures) of the actuation means 23 for the vertical translation of the axially elongated elements forming the support frame 21 may comprise, for example, an actuator fixed to the carriage 20 and directly connected to the lower ends 22c so that the operation of the actuator corresponds to an upward or downward dragging of the same lower ends 22c (it will be clear that in this case such axially elongated elements may not be extensible). An actuator of this kind can, for example, consist of a motorized drum on which a cable is wound extending downwards and that is connected at one end to a hinge fixed on to the drying device 19 between the lower ends of the pairs of frame elements 21. The same hinge is linked with the ends of two rigid rods, the other ends of which are articulated to the points of mutual articulation of the elements of the frame. To an upward motion of the cable there responds a corresponding thrust on the rigid rods which push the points of mutual articulation of the frame elements outwards, with a consequent overall upward translation of the frame.

[0025] As mentioned, the aforementioned pillars 22 are, in this embodiment, of the extensible type (they are for example of the hydraulic type). Thus, when the frame is completely extended vertically, in case there is a need for a further downward stroke, it is possible to lengthen the pillars, as shown in figure 4, in which the inner stems 22e of the pillars translated outside the cylindrical sleeve can be noticed. It goes without saying that, in case extensible pillars are not used, it is possible to use translation systems (for example, of the jack type) arranged between the support frame 21 and the drying device 19 or between the same frame and the carriage 20.

[0026] A further variant of the system with rods and hinges can consist of a system of movable pulleys and a fixed point on the carriage 20 which substantially allows for the articulated quadrilateral to move equally to the rods/hinge system.

[0027] The drying device 19 comprises drying means that, according to the invention, consist of a single group 26 of drying panels 27a-27b arranged side by side in

order to define the drying surface. In the example here described, there are four adjacent drying panels 27 (two inner panels 27a and two outer panels 27b) which, in their normal configuration, substantially lie on the same plane. In such a normal configuration, the panels offer a generally rectangular drying surface (see the plan view of figure 8). As visible in figure 9, the outer drying panels 27b can be rotated by 90° with respect to the inner panels 27a thanks to the assistance of hinge means and drive means for driving the panels around the hinge (both generally indicated with C) which are controlled manually but that, in other embodiments, can also be of the motorized type. Such a possibility of orienting the outermost panels allows, for example, angle parts of a car body to be easily dried, as shall become clearer hereafter.

[0028] The drying device 19 comprises positioning means (described further on) of the group 26 of drying panels 27 according to different arrangements, including a first arrangement defining a first drying direction substantially from the top downwards (direction Z), visible in figures 1, 2, 4 and 5, and a second arrangement defining a lateral drying direction (i.e., transverse to the vertical direction Z), visible in figures 6 and 7, parallel to the direction X.

[0029] In this embodiment, in the first arrangement the group 26 of drying panels 27 has the longest side of its rectangular drying surface orthogonal to the direction X of longitudinal development of the cabin and is substantially parallel to the floor of said cabin. In the second arrangement, still according to the present embodiment, the group 26 of drying panels 27 is, as shall become clearer hereafter, rotated by 90° (independently from the clockwise direction) around an axis parallel to the axis Y, starting from the first arrangement.

[0030] The drying device 19 has a first frame 28 on which there are pivoted the lower ends 22c of the pillars 22 which support it at the scaffolding and to which the group 26 of drying panels 27 is linked beneath. According to the invention, on such a first frame 28 there are turnover means 29 which make the same group 26 rotate around a substantially horizontal turnover axis, indicated with R, which is parallel to the direction X of longitudinal development of the cabin. Such turnover means 29 allow the group 26 to rotate by 90° (both to the right and to the left). Therefore, from the first arrangement in which the group 26, shown in figure 1, is substantially horizontal, a rotation of 90° around the axis R brings the same group into a third arrangement (see figure 3) which corresponds to a lateral drying direction substantially orthogonal to the lateral drying direction defined by the second arrangement (figures 6 and 7).

[0031] The turnover means 29 consist, for example, of a first motor 29a mounted on the first frame 28, which has a first horizontal rotation shaft 29b to which a second frame 30 is fixed. The group 26 of drying panels 27 is linked with the lower part of the second frame 30.

[0032] Advantageously, still according to the invention, there are provided revolution means 31 of the group 26

around a revolution axis B which is substantially vertical when the same group is arranged in the first arrangement (the first arrangement is shown in figure 1; the rotation of the group around the revolution axis is schematically shown with a broken line in the top plan view of the same group shown in figure 8).

[0033] Such revolution means 31 are in the form of, for example, a second rotation shaft 31 a, projecting from the second frame 30, to which a third frame 32 is fixed. The group 26 of drying panels 27 is linked with the lower part of the third frame 32. Such a rotation shaft 31 a is driven by a second motor not represented in the figures.

[0034] The second arrangement of the group of drying panels shown in figures 6 and 7 is obtained through further rotation means 33 of the same group 26 around a further rotation axis G orthogonal to both the turnover axis R and to the revolution axis B, and horizontal when the group 26 is in the first arrangement. Such further rotation means 33 consist, for example, of a third rotation shaft 33a, associated with said third frame 32, to which the group of drying panels is directly fixed. Such a third rotation shaft 33a is driven by a third motor also not represented in the figures.

[0035] In practice, the group 26 of drying panels 27 can move in the cabin according to 6 degrees of freedom. In fact, the group can translate along three axes orthogonal to one another, i.e., horizontally along the direction of longitudinal development X of the cabin, horizontally according to the direction Y of the central beam of the scaffolding, and vertically (direction Z). Moreover, it can rotate around three axes which are orthogonal to one another, i.e., the revolution axis B, the turnover axis R (coinciding with the direction X) and the rotation axis G.

[0036] Such a freedom of motion allows the group of panels to be arranged according to practically any orientation around the vehicle the body of which has been varnished and is to be dried.

[0037] As mentioned, the drying device according to the invention has a single group of drying panels. These can be arranged according to any orientation and can therefore perform all drying functions that in known devices were carried out by three groups of panels oriented with respect to one another so as to form an upside down U shape.

[0038] In practice, the single group of the invention can be arranged horizontally to dry the horizontal parts of the body (bonnet, roof), as shown in figure 1 (first arrangement), or it can be arranged vertically with the drying direction directed parallel to the direction X of longitudinal development of the cabin, to dry for example the rear part of the vehicle, as shown in figure 7 or 8 (second arrangement), or else, in a novel and particularly advantageous fashion, it can be arranged vertically with the drying direction directed parallel to the direction Y to dry, for example, a side of the vehicle, as shown in figure 3 (third arrangement). In this latter case, the drying speed on the side is very high since the greater length of the group of panels is consistent with the length of the vehi-

cle, with the entire useful drying surface passing in front of the surface to be dried: a shorter exposure time per unit of drying area is thus sufficient.

[0039] The fact of having a single group of drying panels ensures that it can be arranged orthogonal to the back wall of the cabin (second arrangement) inside a protective box. This makes it possible to obtain a double advantage: firstly, it allows the workers to move freely inside the cabin without any type of obstacle; secondly, it makes it possible to protect the group of panels from the unavoidable, although minimal, quantity of aerosol present in the cabin during the painting step and that is not eliminated by the suction system.

[0040] Thanks to the possibility of orienting the outer drying panels 27b of the group 26 according to the desired angle, it is possible to obtain configurations of the group of panels such as to dry angled parts of vehicle bodies or even larger parts provided with a double opposed angle, like for example the entire mud-guard of a vehicle, including the side fitting ends (in this case both the outer drying panels are rotated by 90°).

[0041] With the purpose of reducing the space taken up by the various components of the device, so that there is less bulk in the drying step as well, the drying panels 27 of the group 26 are structured according to a novel shape. In particular (see the exploded view of figure 10 and the global view of figure 9), each drying panel 27 comprises an external housing 35 opened over a wall 35a, a drying body 36 (of the type with catalytic burners) arranged in correspondence with the wall 35a and, advantageously, a thermally insulating element 37 placed between the bottom 35b of the housing 35 and the drying body. Between the bottom 35b and the insulating element 37 a cavity is defined for operational components of the panel, here wholly indicated with a broken line and with reference numeral 38, such as, for example, the electrovalves for the gas feeding the burners of the drying body 36, the electrovalves for the compressed air of the pneumatic components of the panel and the remote control switches for the pre-heating electrical resistances of the drying body.

[0042] In the prior art, all these components were arranged on the rear part of the panel, at a certain distance from it, since the heat developed by the drying body, not insulated at its rear part, was such as to jeopardize their operation if arranged too close. Therefore, in the structure according to the invention, the outer bulk of the panel is substantially lower than that of known types, thus reducing even further the size of the housing box of the group of panels in the painting and drying cabin, consequently letting more useful space available to the workers.

[0043] Moreover, another noteworthy aspect is that the heat emitted by the panel is now completely directed towards the useful drying direction and it is not dispersed at the back or laterally on the perimeter of the panel. This means that there is a reduction in the energy needed and a consequent reduction of management costs of the

plant. It goes without saying that such a novel insulation panel can also be adapted to conventional type drying devices, being able to obtain energy saving results on such structures as well.

[0044] It should be clear from the above that the present invention achieves the aforementioned objects. Indeed, with the drying device here described there is a single group of drying panels which can be oriented in any direction, and in particular in the direction transverse to the direction X of development of the cabin so as to be able to avoid using fixed type side panels. In this way the device is much smaller and has a reduced mass, offering benefits in terms of a lower energy requirement to move it.

[0045] As mentioned, the smaller bulk allows a containing box to be made in the painting and drying cabin, making it possible to protect the device and to prevent it from getting in the way of the workers when it is not used.

[0046] The presence of a single group of panels which can be oriented as desired makes it possible to speed up the drying steps, thanks to the possibility of maximizing the drying surface as a function of the advancing direction of the drying.

[0047] The fact of having a plant in which the support means of the drying device are made up of an articulated type of framework that in practice reduces its vertical size when the device is completely lifted, makes it possible to have a structure which is not very bulky, if compared with the rigid systems of known type plants.

[0048] According to a further aspect of the invention, there is then provided a drying panel for drying devices in plants for drying varnishes and/or other materials, comprising a drying body 36 and components 38 for controlling and/or feeding said drying panel 27, **characterized in that** it comprises thermal insulation means between said drying body 36 and at least part of said components 38.

[0049] The drying panel may advantageously comprise a housing 35 opened over a wall 35a, in correspondence of which said drying body 36 is arranged, said thermal insulation means comprising a thermally insulating element 37 placed between the bottom 35b of the housing 35 and said drying body, a cavity for housing at least part of said components 38 being defined between the bottom 35b and the insulating element 37.

[0050] The fact of having drying panels with an insulating element which insulates the drying body from the control components of the panel itself makes it possible to obtain a smaller size and to save energy.

[0051] It goes without saying that the device and a plant thus conceived can undergo numerous modifications and variants, all of which fall within the scope of the invention; moreover, all the details can be replaced by other technically equivalent elements, without for this reason departing from the scope of protection of the invention itself.

[0052] In practice, the materials used, as long as they are compatible with the specific use, as well as the size

and shape, can be any according to the requirements and the state of the art.

[0053] Whenever the characteristics and the techniques mentioned in any claim are followed by reference symbols, these have been enclosed, as an example, for the sole purpose of making the claims clearer and consequently do not limit in any way the interpretation of each element they identify.

Claims

1. A drying device for varnish and/or other material drying plants, to be associated with a movable scaffolding support, said device comprising: - drying means (27) comprising a group (26) of drying panels (27) arranged side by side in order to define a drying surface; and positioning means (29, 31, 33) of said group according to different arrangements, among which a first arrangement defining a first drying direction (Z), substantially from the top downwards, and a second arrangement defining a second drying direction (X) transversal to said first drying direction, **characterized in that** said positioning means (29, 31, 33) are adapted to impose to said group (26) of drying panels (27) a third arrangement defining a third drying direction (Y) transversal to said first (Z) and second (X) drying direction.
2. The device according to claim 1, **characterized in that** it comprises a single group (26) of drying panels (27)
3. The device according to claim 1 or 2, **characterized in that** said positioning means of said group (26) of drying panels (27) comprise revolution means (31) of the same group around a revolution axis (B) which is substantially vertical when said group (26) is in said first arrangement.
4. The device according to one or more of the previous claims, **characterized in that** said positioning means of said group (26) of drying panels (27) comprise turnover means (29) of the same group further to a rotation around a turnover axis (R) substantially horizontal.
5. The device according to claim 4 or 5, **characterized in that** said positioning means of said group (26) of drying panels comprise second rotation means (33) of the same group (26) around a second rotation axis (G) orthogonal to both said turnover axis (R) and said revolution axis (B), and horizontal when said group (26) is in said first arrangement.
6. The device according to the previous claims, **characterized in that** it comprises a first frame (26) linkable to support means (18) to a movable scaffolding,

turnover means (29) provided on said first frame (28) comprising a first motor (29a) fixed on the frame (28) provided with a first horizontal rotation shaft (29b), a second frame (30) being fixed to said first horizontal rotation shaft (29b), said revolution means (31) being associated with said second frame (30) and comprising a second motorized rotation shaft (31 a), projecting from said second frame (30) and lying on a vertical plane, said rotation means (33) comprising a third rotation shaft (33a) associated to a third frame (32), orthogonal to said first (29b) and second (31 a) shaft, to which said group (26) of drying panels (27) is directly fixed.

7. The device according to the previous claims, **characterized in that** said group (26) of drying panels (27) comprises at least two flat panels (27a, 27b) arranged side by side, at least a first (27a) of said panels being orthogonal to said revolution axis (B), while at least a second panel (27b) is associated with hinge means for articulation to said at least one first panel (27a), said hinge means being adapted to allow a rotation of said second panel (27b) starting from a position coplanar with said first panel (27a) to a position substantially orthogonal thereto.
8. The device according to claim 7, **characterized in that** said group (26) comprises at least three side by side drying panels (27a, 27b), of which the outer panels (27b) are connected via said hinge means to at least one inner drying panel (27a).
9. The device according to one or more of the previous claims, **characterized in that** at least one of said drying panels (27) comprises a drying body (36) and components (38) for controlling and/or feeding said drying panel (27), thermal insulation means being further provided between said drying body (36) and at least part of said components (38).
10. A plant for drying varnishes and/or other materials comprising a scaffolding (16) for supporting a drying device (19), said scaffolding (16) being movable along a predetermined motion direction (X), sliding means (17) in a transversal direction to said motion direction (X) being provided for support means (18) of said drying device (19), said support means comprising vertical translation means (21), **characterized in that** said drying device is of the type according to one or more of the previous claims.
11. A plant for drying varnishes and/or other materials according to claim 10, **characterized in that** said vertical translation means (21) comprise a support frame (21) composed of elements mutually hinged and connected with actuation means (23) adapted to arrange said frame (21), pursuant to relative rotation between its elements, in a plurality of possible

configurations along a vertical direction (Z), comprised between a first elongated configuration from the scaffolding (16) downwards, and a second compact configuration, horizontally adjacent to said scaffolding (16).

12. A plant for drying varnishes and/or other materials according to claim 11, **characterized in that** said vertical translation means (21) comprise four elements (22) substantially elongated according to an axis, respectively two symmetrical pairs of mutually hinged elements (22), each pair being further hinged at the ends respectively to the transversal sliding means (17) on the scaffolding (16) and to the said drying device.
13. A plant for drying varnishes and/or other materials according to claim 12, **characterized in that** said substantially elongated elements (22) are axially extensible pillars.
14. A plant for drying varnishes and/or other materials according to claim 13, **characterized in that** said actuation means (23) comprise geared wheels (24) mutually engaged and coaxially fixed to the articulation hinges of the upper (22b) and/or lower (22c) ends, at least one of said two geared wheels (24) being connected with a motor (25) for its operation.
15. A plant for drying varnishes and/or other materials according to claim 12 or 13, **characterized in that** said actuation means (23) comprise motorized drum means on which a cable is wound, said cable extending downwards and being connected at one end with a hinge fixed on said drying device (19) between the lower ends of the pairs of elements (22) of the frame (21), the same hinge being linked with the ends of two rigid rods, the other ends of which are articulated to the points of mutual articulation of the elements of the frame.
16. A plant for drying varnishes and/or other materials according to claim 15, **characterized in that** said rods and said hinge are replaced by a system with movable pulley means and a fixed point on said transversal sliding means (17).
17. A plant for drying varnishes and/or other materials according to one or more of the claims from 10 to 16, **characterized in that** it comprises a varnishing and drying cabin in which said movable scaffolding (16) with the drying device (19) is placed, a box for housing said drying device when not in use being provided on a wall of said cabin.
18. A plant for drying varnishes and/or other materials according to claim 17, **characterized in that** the group (26) of panels (27) of said drying device (19)

is movable along six degrees of freedom, respectively: a first motion along the direction (X) of longitudinal development of the cabin (11); a second motion along the direction (Y) orthogonal to the direction (X) and parallel to the floor of the cabin; a third motion along a vertical direction (Z); and three rotations around three mutually orthogonal axis, respectively a turnover axis (R) parallel to said direction (X), a revolution axis (B) orthogonal to said turnover axis (R) and lying on a stably vertical plane, and a rotation axis (G) orthogonal to said turnover axis (R) and said revolution axis (B).

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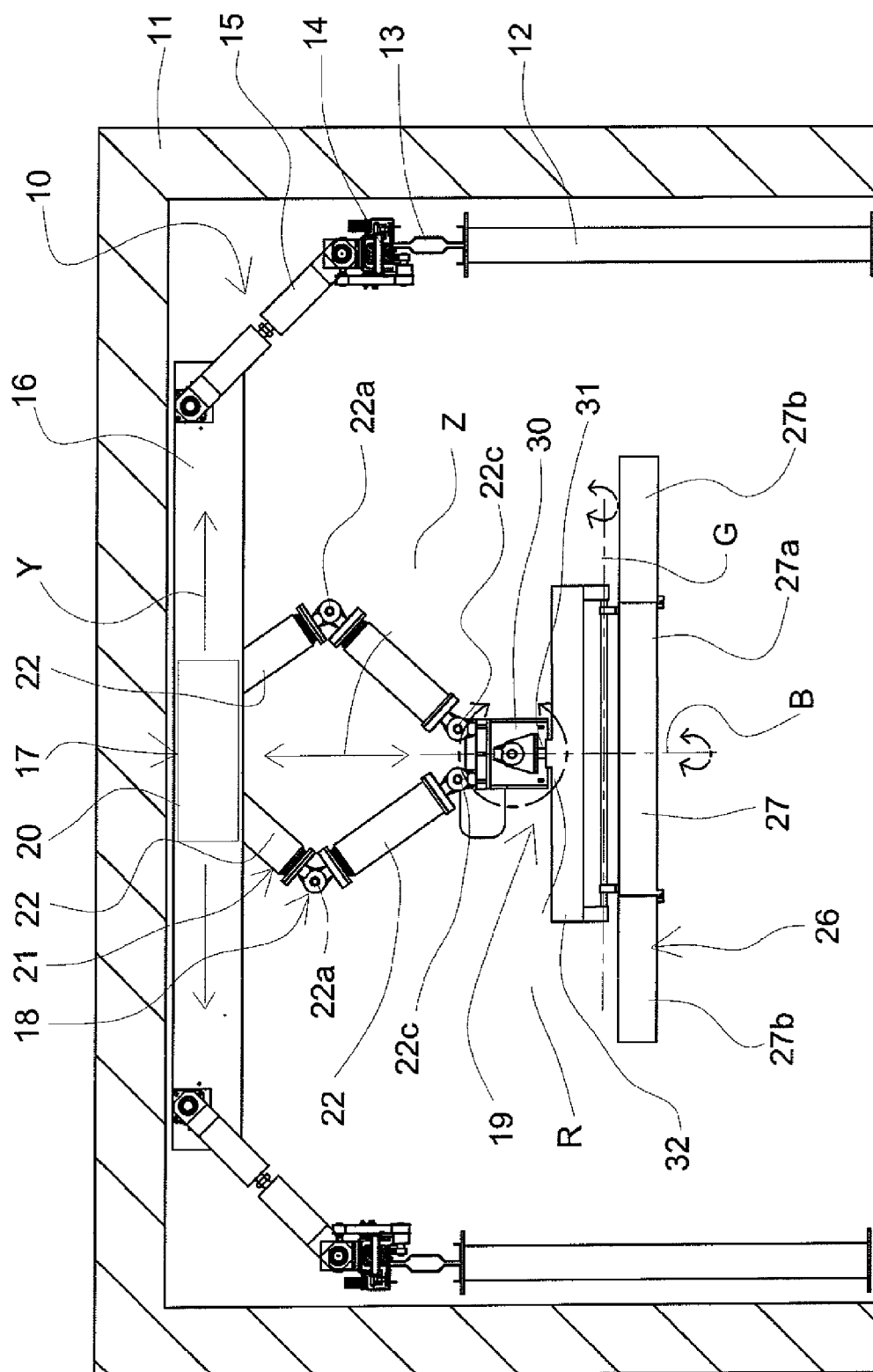
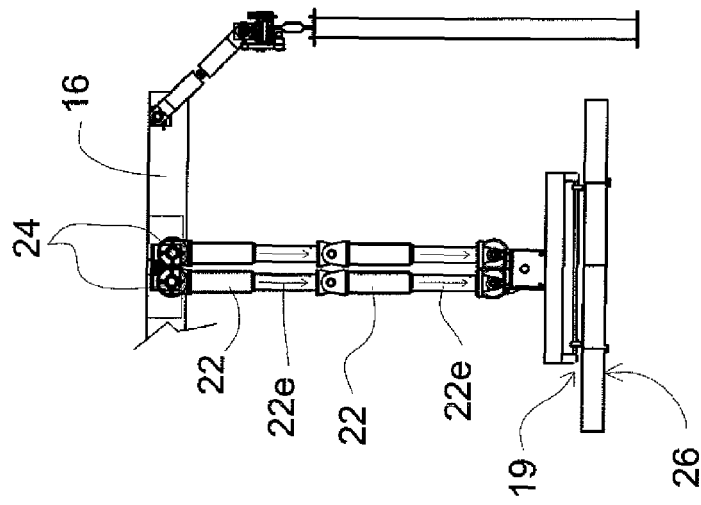
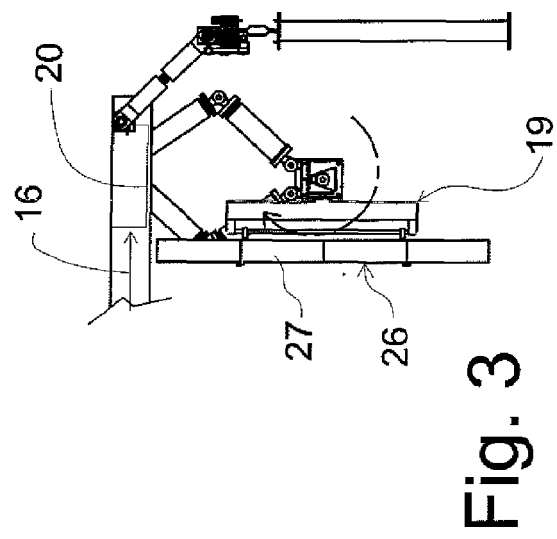
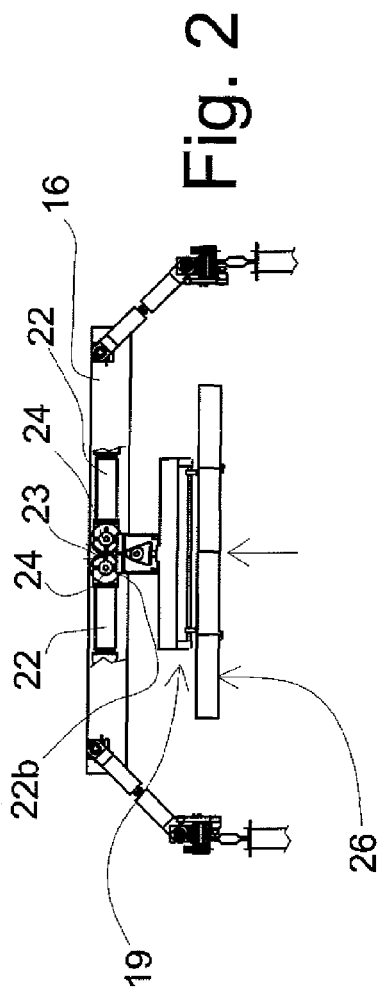


Fig. 1



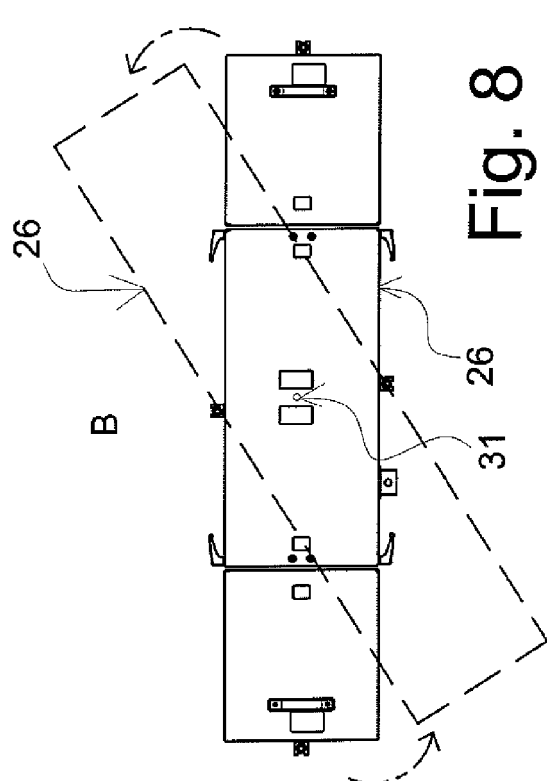


Fig. 8

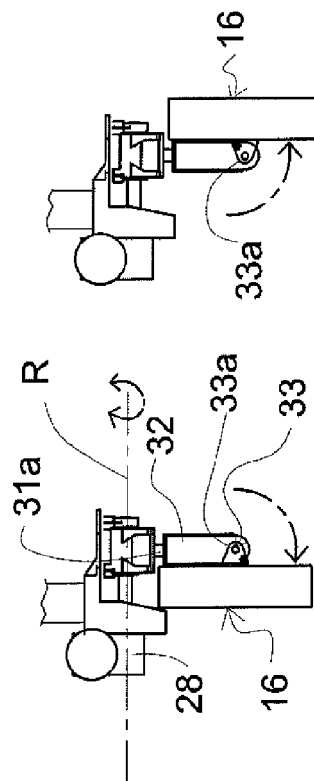


Fig. 7

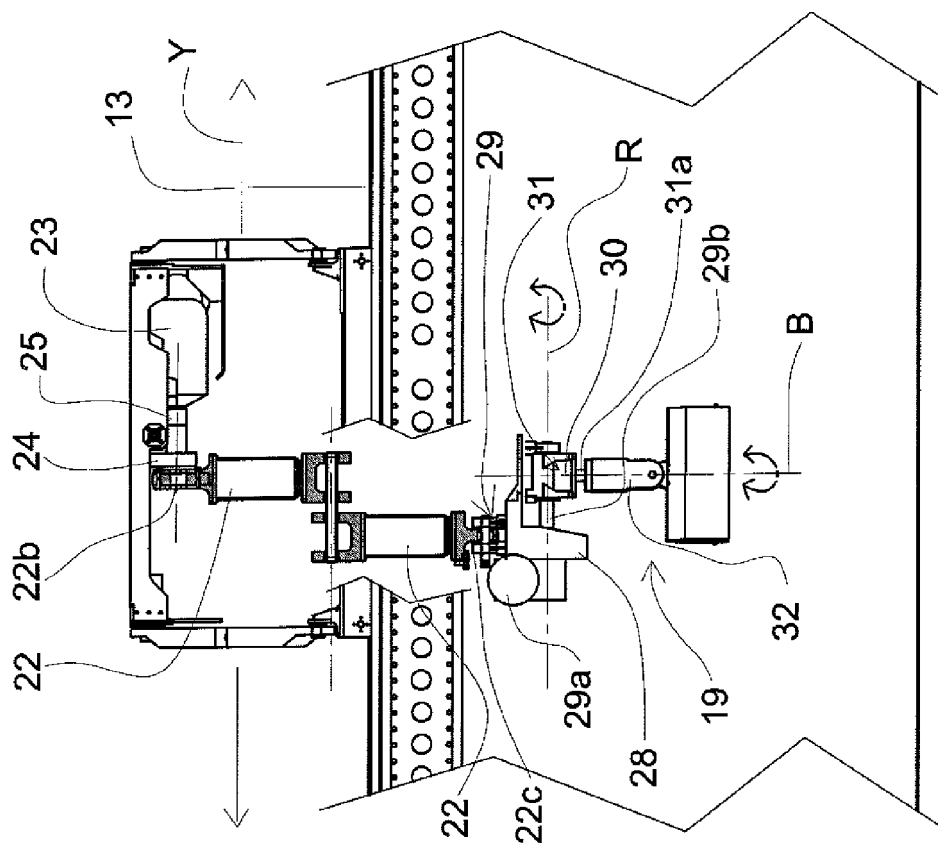


Fig. 5

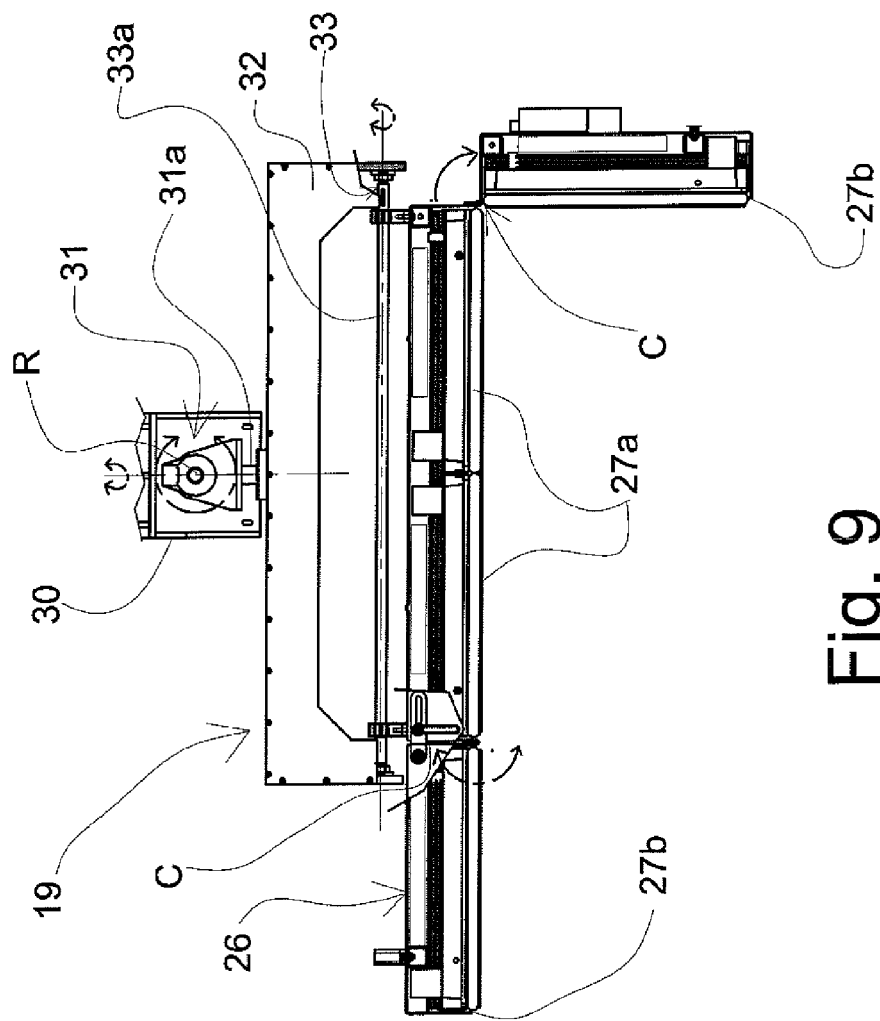


Fig. 9

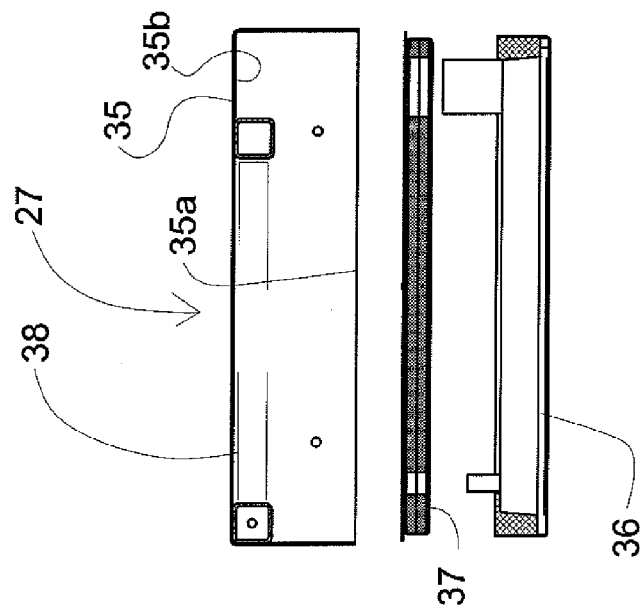


Fig. 10



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Application Number
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