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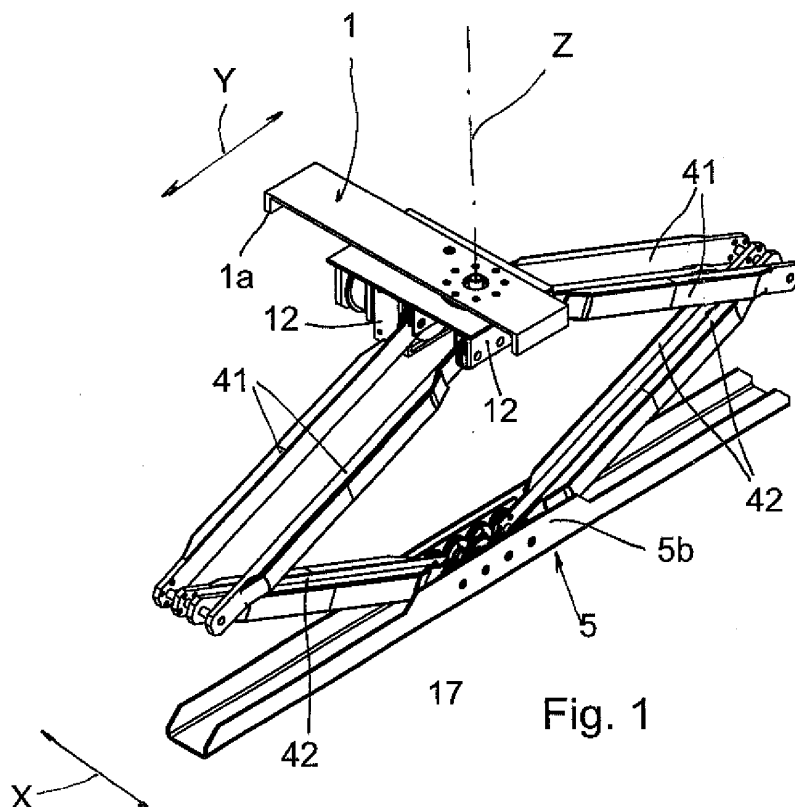
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(54) **Central drying group in plants for drying paints and/or other materials**

(57) A drying group in plants for drying paints and/or other materials, to be associated with a beam of a support scaffolding, said group comprising: drying means that comprise one or more side by side drying panels (6) to define a drying surface; and positioning and support means of said one or more panels (6), comprising at least

sliding means (1) for sliding along a horizontal direction (Y) corresponding to the beam development direction and lifting and lowering means (4) for lifting and lowering (4) the panels along a vertical direction (Z), wherein the lifting and lowering means (4) adapted to rotate as a whole, with respect to the sliding means (1), around an axis (Z) parallel to said vertical direction.



Description

DESCRIPTION

[0001] The present invention refers to the field of plants for painting and drying vehicle bodies, and in particular its object is a drying group in plants for drying paints and/or other materials.

[0002] As known, the drying plants for paint applied to vehicle bodies generally comprise a tunnel-shaped room in which a structure with a mobile scaffolding is arranged, such structure being formed by vertical uprights up against the walls of the room and side guides supported by such vertical uprights, on which slides for moving a central beam are arranged. 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. Each panel can actually consist of a set of distinct single panel elements.

[0004] As far as, in particular, the central panel is concerned, it 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, it can translate along the direction of development of the central beam itself (defined here as direction Y). In addition to these motion a vertical translation must then be added (direction Z) which allows for the panel to be brought closer to the top portion of the vehicle, and possibly a rotation of a part of the panel (or of some of the elements that form it) around an axis (parallel to the direction Y) transversal to the cabin, allowing said part 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] The object of the present invention is to provide a drying group which, thanks to a new configuration of the support/actuation means of the panel, is able to achieve unexpected advantages in terms of constructive simplicity and flexibility of use.

[0006] Such an object is achieved with the drying group in plants for drying paints and/or other materials according to the invention, to be associated with a beam of a support scaffolding, the group comprising:

- drying means that comprise one or more side by side drying panels (6) defining a drying surface, and
- positioning and support means of said one or more panels, comprising at least sliding means for making

the panel or panels slide the along a horizontal direction corresponding to the beam development direction, and lifting and lowering means for lifting and lowering the panel or panels along a vertical direction;

characterised in that the lifting and lowering means are rotatable as a whole, with respect to the sliding means, around an axis parallel to the vertical direction.

[0007] The invention shall now be illustrated in greater detail in the following description of one of its embodiments, given as an example and not for limiting purposes with reference to the attached drawings in which:

- figure 1 represents a perspective view of the group according to the invention, without the drying panel;
- figure 2 is a front view of the group of figure 1, provided with the drying panel;
- figure 3 is a perspective view of the group from beneath, devoid of the panel and of a support/drive pantograph of the panel itself;
- figures 4 and 5 are a plan view from beneath and a lateral view of the group like in figure 3, respectively;
- figure 6 is a plan view from above of the group like in figure 3, but without a translating upper carriage; and
- figure 7 is a plan view from above of the support/drive pantograph of the panel, with the relative gear trains.

[0008] With reference to said figures, the invention can be used in a plant for drying paints and/or other materials, not shown, housed inside a cabin and comprising a support frame of the type with a mobile scaffolding along a longitudinal development direction of the cabin, hereafter indicated as front direction X. An upper beam of the scaffolding slidably supports, along a direction Y, a carriage 1, comprising a plate 1a from two opposite sides of which brackets 1b project downwards, said brackets being provided with rollers 2 for rotational engagement with a guide, not represented.

[0009] A table 3 adapted to rotate with respect to the carriage 1 around a swinging axis Z is connected on the lower face of the plate 1a. The rotary table 3 supports, through an articulated parallelogram mechanism or pantograph 4, a profile 5 for the suspension of a drying panel 6, for example and typically of the infrared radiation emitting type (figure 2). Both the profile 5 and the panel 6 (or group of panels), extend along the direction Y, and the pantograph mechanism 4, with its closing/opening movement, is suitable for causing the panel 6 to be lifted and lowered along the axis Z. The panel 6 is also mobile with respect to the profile 5, and more precisely it is able to rotate around an axis Y' parallel to the direction Y and passing through two brackets 5a projecting downwards from respective ends of the profile 5. A motor 7, mounted on one of the brackets 5a, is intended for the actuation of such a rotation of the panel 6, which according to the

invention is carried out, thanks to a suitable support system, by covering an angle of up to 240°, between -120° and +120° with respect to a zero position corresponding to a horizontal configuration, facing downwards, of the drying surface 6a (again see figure 2).

[0010] Going back to the swinging connection between the table 3 and the carriage 1, it should be noted in figure 6 how between such two elements a pair of gear wheels is arranged, engaged with one another, and more precisely: a wheel 8, coaxial with respect to the axis Z and fixedly attached to the carriage 1, and a driving wheel 9 mounted on the table and driven by a geared motor 10 fixedly attached to the lower face 3a of the table itself. The wheel 8 is cinematically driven by the driving wheel 9, but it is indeed fixed and locked, so that the propulsive engagement of the driving wheel causes the rotation of the entire table 3 around the axis Z as a reaction.

[0011] As mentioned, the pantograph mechanism 4 extends, as mentioned, from said lower face 3a, said mechanism preferably comprising, like in the example, four upper arms 41, diverging and opposite one another two by two, rotatably connected to projections 12 extending downwards from the table 3, and four lower arms 42, also in this case in pairs, articulated at the lower ends of the upper arms 41 inside them, converging downwards and hinged to a central area 5b of the profile 5.

[0012] The actuation of lowering and lifting the assembly of the profile 5 and the panel 6 and, contextually, of opening and closing the mechanism 4, respectively, is controlled by a second geared motor 13 fixedly attached to the lower face 3a of the table 3 with the drive shaft perpendicular to that of the first geared motor. In particular, the second geared motor cooperates with a winch 14 for winding/unwinding a cable, not represented. Such a cable engages with a transmission system comprising two pulleys 15 partially represented and visible only in figure 6 and thus vertically reaches the central area 5b of the profile 5, winding around a further pulley 16 that is supported in a rotatable manner by the same profile (figure 7). From the pulley 16 the cable thus vertically rises back towards the table 3 hooking to it with an end opposite the winding end, at a fixing point which is not visible.

[0013] Lower gear means 17 operatively connect the profile 5, lifted by the aforementioned winch-pulley-cable system, to the lower arms 42 of the pantograph 4, while upper gear means connect the upper arms 41 to the table 3. More in detail, the lower engagement means 17 comprise two trains of toothed pinions 171, 172, rotatably supported by the profile 5 on respective sides of the pulley 16. Each train comprises two end pinions 171a, 172a fixedly attached to respective ends of the lower arms 42 and that can engage with two idle pinions 171b, 172b, arranged centrally.

[0014] In an analogous way the upper engagement means 18 comprise two trains of pinions 181, 182, in this case spaced correspondingly to the mutual distance between two parallel and side by side upper arms 41. The toothed pinions 181, 182 are indeed rotatably supported

by the aforementioned projections 12 and comprise end pinions 181a, 182a fixedly attached to respective ends of the upper arms 41, and central idle pinions 181b, 182b acting as idle wheels.

[0015] Therefore, in use, the actuation of the winch 14 in the direction that causes the cable to wind around it, corresponds to a shortening of the cable itself that causes the profile 5 and panel 6 assembly to be lifted. The opposite happens for the unwinding movement. The engagement means ensure that the pantograph follows the translation from top to bottom, keeping the necessary support action with a balanced configuration. Moreover, the gear trains according to the depicted embodiment, offer the advantage of reducing the bulk in height, making a more compact group, exploiting, moreover, the large space available in the longitudinal development direction of the panel 6. The swinging movement, i.e. the rotation around the axis Z, that involves the entire group starting from the table 3, obtains a substantial structural and operational simplification, offering suitable performance at the same time.

[0016] According to the invention it is thus possible to obtain a drying device having a single panel or group of drying panels side by side, which can change their orientation and perform all the drying functions that in plants are carried out by three groups of panels oriented in an upside-down U configuration with respect to each other.

[0017] In practice, the panel of the invention can be arranged horizontally to dry the horizontal parts of the body (hood, roof), or vertically and diagonally upwards (thanks to the mentioned rotation around the axis Y'), in various orientations controlled by the swinging, to dry for example the rear part of the vehicle, or a side, or even surfaces and elements beneath the lower door protector belt of the vehicle, all with high-pass speed, also considering that the greater length of the group of panels is consistent with the length of the vehicle, with all of the useful drying surface transiting in front of the area to be dried, and therefore, less exposure time is necessary per unit of drying area.

[0018] The fact of having a single group of drying panels makes it possible for it to be arranged perpendicular with respect to the back wall of the cabin inside a protective box. This makes it possible to obtain a double advantage: firstly, it allows the workers to move around the cabin without any type of obstacle, secondly, it allows the group of panels to be protected from the unavoidable quantity, even if minimal, of aerosol present in the room during the painting step and that is not eliminated by the suction system.

[0019] In case of a group of drying panels, according to a variant embodiment that is not shown, the outermost ones can also be articulated with respect to the others by a desired angle, so that it is possible to obtain configurations of the group of panels so that angle parts of vehicle bodies or even more extended parts equipped with a double opposing angle, like for example the entire mud guard of the vehicle including the lateral end fittings,

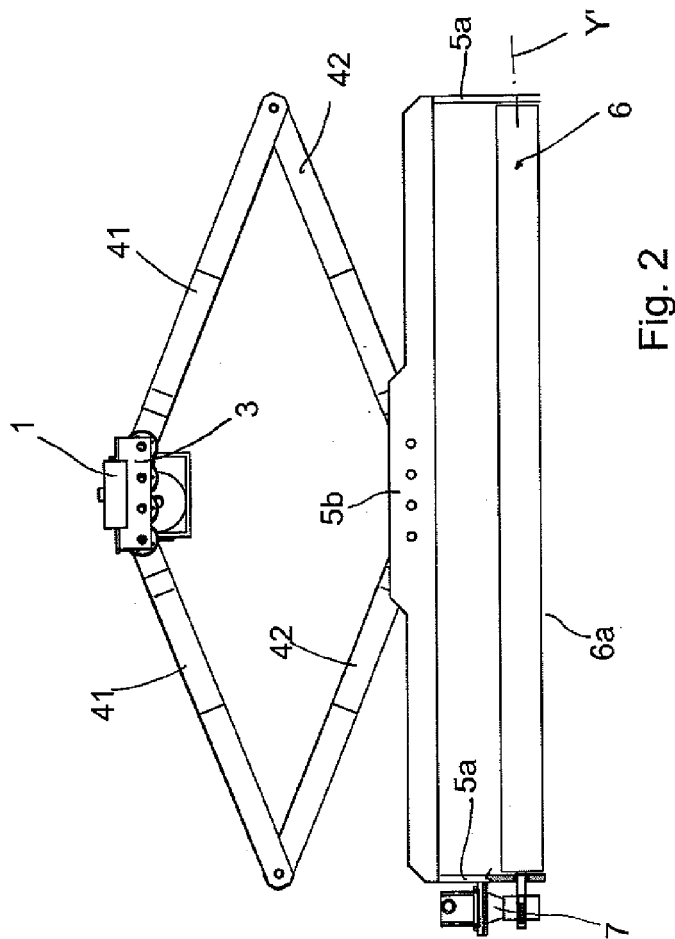
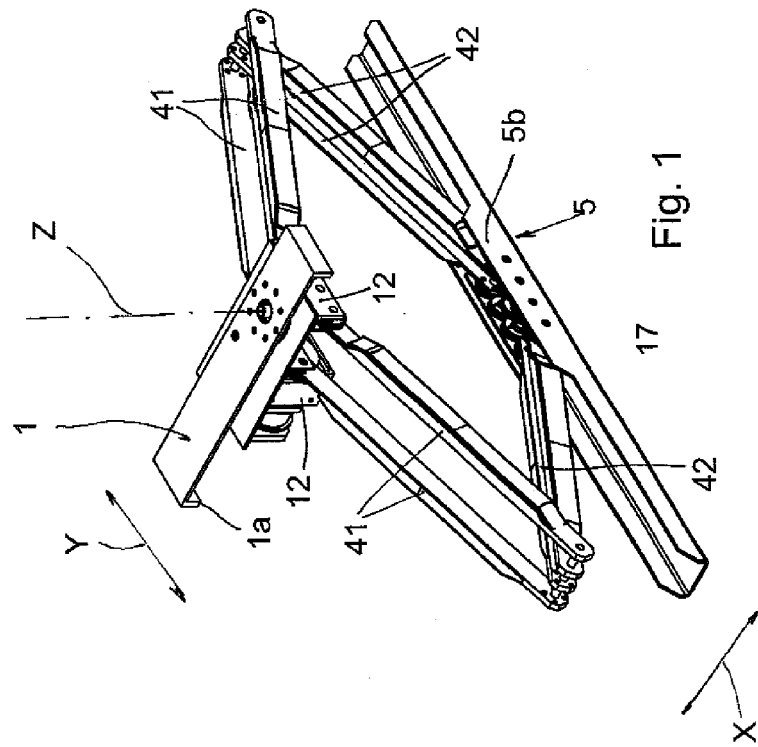
can be dried.

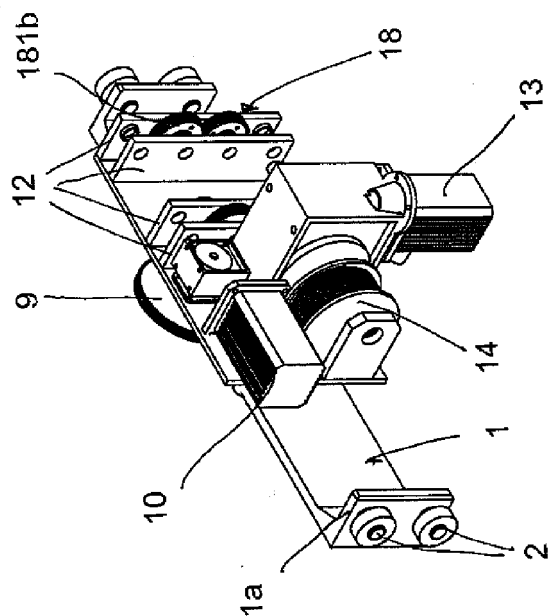
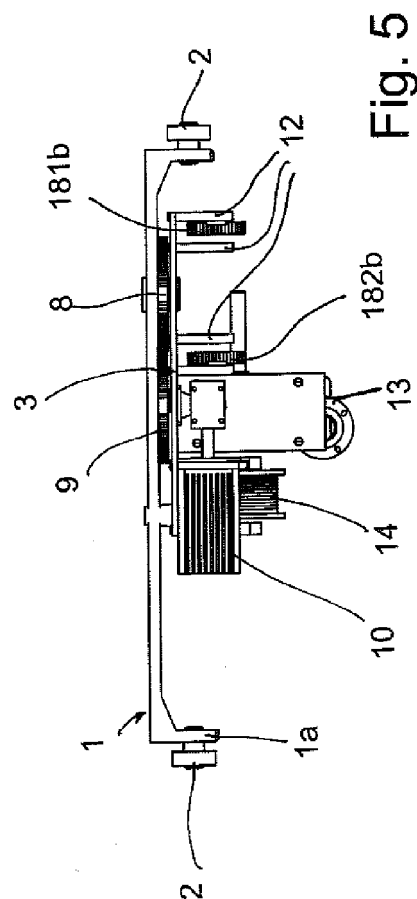
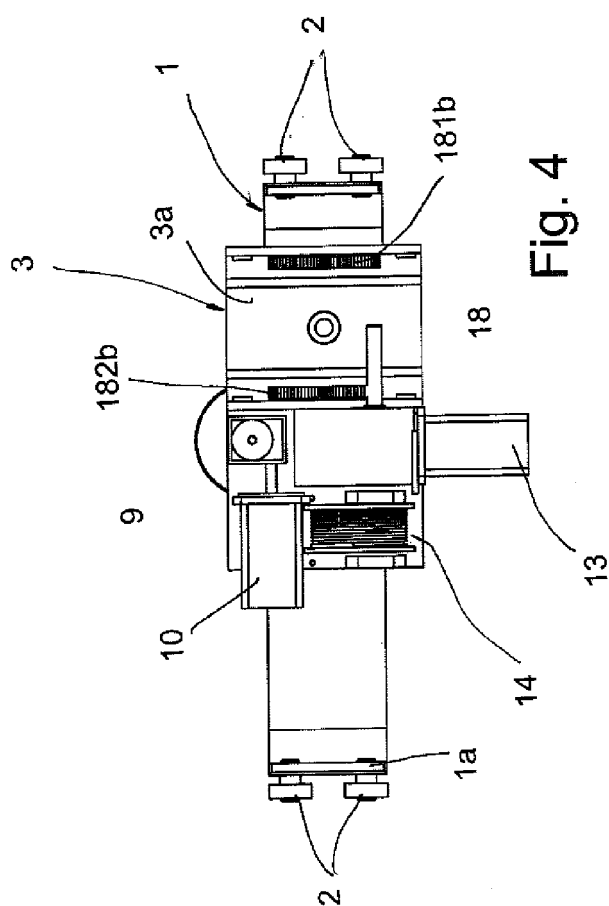
[0020] The power (supply) and control system, not described in detail, can be *per se* traced back, or obviously worked out, from what is already known in the field.

[0021] The invention is not limited to the embodiment described and illustrated above, and comprises any variant thereof within the scope of annexed claim 1. In particular, the systems for actuating the swinging and the raising movement can be constructively different, in an equivalent functionality.

Claims

1. A plant for drying paints and/or other materials comprising a support scaffolding with a beam and a drying group to be associated with said beam, said group comprising:
 - drying means that comprise one or more side by side drying panels (6) to define a drying surface, and
 - positioning and support means of said one or more panels (6), comprising at least sliding means (1) for making the panel or panels slide the along a horizontal direction (Y) corresponding to the beam development direction, and lifting and lowering means (4) for lifting and lowering (4) the panel or panels along a vertical direction (Z);
 - characterised in that** the lifting and lowering means (4) are rotatable as a whole, with respect to the sliding means (1), around an axis parallel to the vertical direction (Z).
2. The plant according to claim 1, wherein said lifting and lowering means (4) comprise a rotary table (3) rotatably connected to said sliding means (1), and a pantograph mechanism (4) extending from a lower face (3a) of said table (3) and connected to a support profile (5) of said one or more drying panels (6), on such a face (3a) there being also arranged first and second motor means (10, 13) for driving, respectively, the rotation around said vertical axis (Z), and the lifting and lowering of said profile (5) linked with said pantograph.
3. The plant according to claim 2, wherein said first motor means (10) engage with a drive gear wheel (9) arranged between said table (3) and said sliding means (1), said drive gear wheel (9) engaging with a driven gear wheel (8) fixedly attached to said sliding means (1) and centred on said axis (Z).
4. The plant according to claim 2 or 3, wherein said second motorized means actuate a winch (14) for winding/unwinding a cable extending between said rotary table (3) and a pulley (16) associated with said profile (5).
5. The plant according to claim 4, comprising also transmission means (15) connected to said table (3), adapted to direct said cable towards said pulley (16) in a vertical direction.
6. The plant according to any of the claims 2 to 5, wherein said pantograph mechanism comprises four upper arms (41), diverging and opposite one another two by two, and four lower arms (42), also in this case in pairs, articulated at the lower ends of the upper arms (41), converging downwards and hinged at a central area (5b) of said profile (5), lower (17) and upper (18) engagement means being provided to operatively connect said profile (5) to said lower arms (42), and said upper arms (41) to said table (3), respectively.
7. The plant according to claim 6, wherein said lower (17) and upper (18) engagement means comprise respective pairs of trains of toothed pinions, each of which comprises two end pinions fixedly attached to respective ends of the corresponding lower or upper arms, and two idle pinions arranged centrally.
8. The plant according to any one of claims 2 to 6, wherein said one or more drying panels (6) are adapted to rotate with respect to said profile around an axis (Y') parallel to said direction (Y)
9. The plant according to claim (8), wherein said axis (Y') passes through two brackets (5a) projecting downwards from respective ends of the profile (5), a third motor (7) being mounted on one of the brackets (5a) for driving said rotation of the one or more panels (6).
10. The plant according to claim 8 or 9, wherein said rotation of said one or more panels (6) with respect to said profile (5) is obtained by covering an angle of up to 240°, between -120° and +120° with respect to a zero position corresponding to a horizontal configuration, facing downwards, of the drying surface.





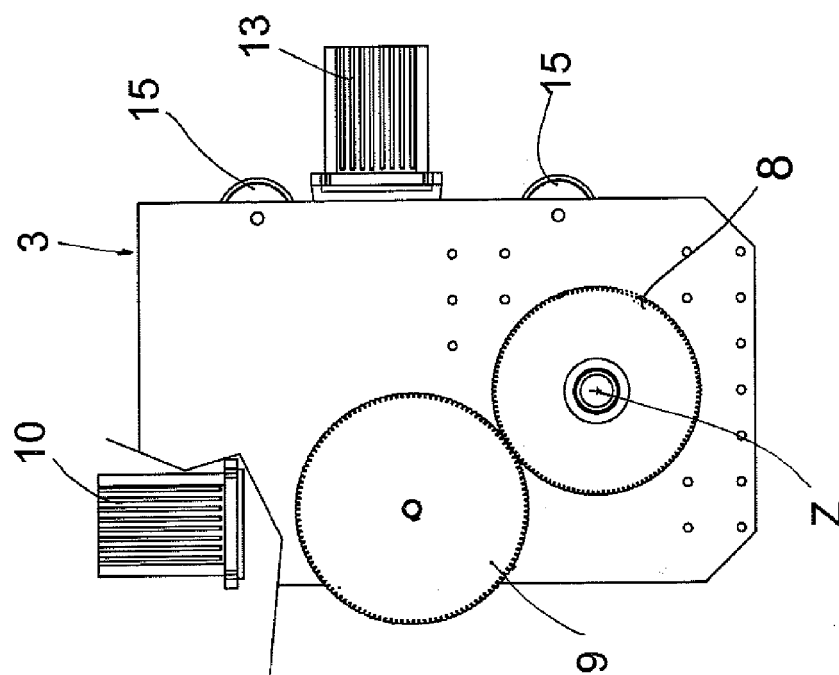


Fig. 6

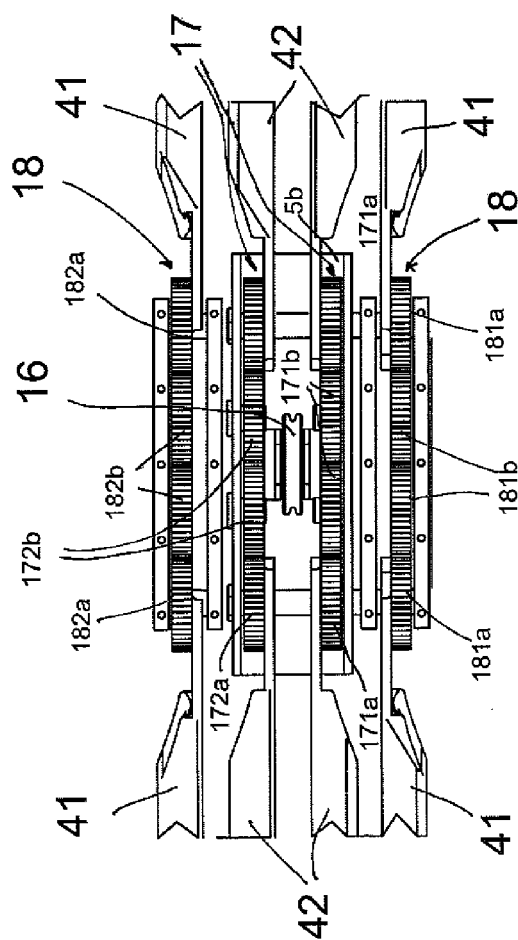


Fig. 7