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(54) **DENTAL TREATMENT UNIT COMPATIBLE WITH DIFFERENT CONNECTIONS BOXES**

(57) Dental treatment unit (100) set up for fixing to a floor, comprising a patient chair (41) and a hydrogroup (42); said hydrogroup (42) comprising an internal support frame (52) substantially having a parallelepiped shape, provided with a hydrogroup base (43) lying on the floor; there being provided connecting piping and wiring for feeds and drain of said dental treatment unit (100), said piping/wiring being intended for connecting one connections box (C1 or C2 or C3 or C4) placed in different points of the floor in an installation environment of said unit to a feeds entry point (50) of said feeds piping and wiring into said hydrogroup (42), said dental treatment unit (100) being

characterized in that

it comprises a dental unit base (51) having a bottom shape, i.e. on its side lying on the floor, and a top shape, i.e. on its side opposed to the bottom side, suitable for allowing the passage of said connecting piping and wiring from said connections box (C1 or C2 or C3 or C4) to said feeds entry point (50) into said hydrogroup (42), said piping and wiring running on said top shape and under said bottom shape of said dental unit base (51).

Said dental unit base (51) is suitable for connecting said dental unit (100) to one pre-existing fixed connections box (C1 or C2 or C3 or C4), said connections box having previously been connected to another dental treatment unit to be replaced (10, 20, 30) so that the dental chair (41) is positioned in the same outline on the floor as that of the removed patient chair (1).

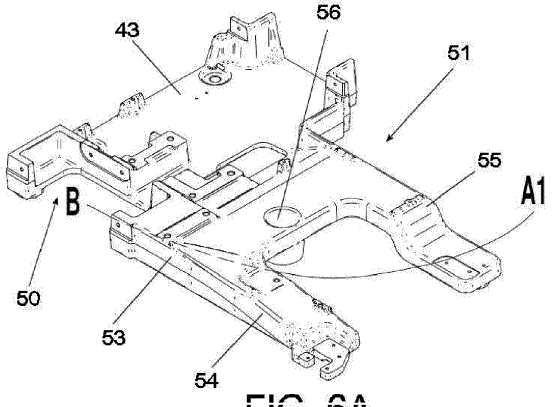

FIG. 6A

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Description

[0001] The present invention relates to dental treatment units, and in particular, to a base for said units allowing an easy replacement of a dental treatment unit already installed in a dental practice with a new dental treatment unit.

[0002] Dental treatment units have been industrially produced for several decades, and comprise a plurality of instruments allowing a dentist to administer dental therapies to a patient. Typically, they comprise a patient chair, a hydrogroup, a scialytic lamp, a dentist's board, an assistant's board generally provided with suction cannulas.

[0003] In the art, there are known two main kinds of dental treatment units:

- Chair mounted dental treatment unit
  wherein the hydrogroup is integral to the patient chair through a connecting arm, while the patient chair is fixed to the floor. The height of the hydrogroup varies at the same time as the chair height with respect to the floor. The patient chair is provided with a vertical movement typically performed by a pantograph or parallelogram mechanism.
- Fixed hydrogroup dental treatment unit
  wherein said hydrogroup is independent from the patient chair and is fixed to the floor, therefore its height from the floor never changes. The patient chair only performs a vertical movement, rising and lowering with respect to the floor and to the hydrogroup, which is stationary.

[0004] Among the dental treatment units provided with a fixed hydrogroup, there are provided two traditional configurations. The two configurations a and b have been known for a long time in the art, too.

a. Floor mounted or free-stand dental treatment units
wherein the hydrogroup is fixed to the floor and the patient chair is mechanically independent from it; the controls used for moving the patient chair are placed on the dentist's board, which in some cases can be connected to the hydrogroup. The patient chair is provided with a base fixed to the floor, and rises and lowers with respect to the floor, generally using a pantograph or parallelogram mechanism.
b. Suspended chair dental treatment unit
in this case the hydrogroup fixed to the floor is provided with a rising and lowering mechanism connected to a supporting arm for the patient chair, which allows to raise and lower the patient chair, which moves on a vertical axis with respect to the hydrogroup, stationary on the floor.

[0005] US3650033A1 of Siemens AG, published in 1972, shows a patient chair of the chair mounted type, wherein the hydrogroup is integrally connected to the patient chair through a connecting arm, while the patient chair is fixed to the floor. In particular, Figure 2 of US3650033A1 shows a patient chair 1 and a hydrogroup 10 connected through a connecting arm 35. A parallelogram arm 8 allows the rising and lowering of said patient chair 1, which thanks to its integral connections to the hydrogroup 10 through said arm 35, drags said hydrogroup 10 rising and lowering it with respect to the floor.

[0006] DE1932324U of Kaltenbach & Voigt, published in 1966, describes a solution of the type a, i.e. with a floor mounted hydrogroup and an independent patient chair. Other documents of the known art describing floor mounted hydrogroup and independent patient chairs are e.g. EP0100491A2 of Siemens, published in 1984, and EP0895769A2, again of Kaltenbach & Voigt, published in 1999. In particular, EP0100491A2 provides an unusual solution, wherein the doctor's device 2 and the assistant's device 3 move backwards and forwards with respect to the patient chair 1, along two linear paths parallel to the longitudinal axis of the patient chair. The two devices 2 and 3 are placed on the opposed sides of said patient chair. In other words, a movement on the horizontal plane, i.e. the plane of the floor, is provided between the patient chair and the two devices.

[0007] DE1822226U of EMDA, published in 1960, describes a solution of the type b, i.e. a suspended chair dental treatment unit, with a hydrogroup fixed to the floor provided with a vertical movement for the patient chair with respect to the floor, well visible in Figure 2 of DE1822226U. Other known art documents are EP2086489A1 of Kaltenbach & Voigt, published in 2009, and EP2526916A1 of Planmeca, published in 2012.

[0008] A further document describing a dental treatment unit is US3524676A of Cocherell et al., published in 1970. Such document describes another solution well known in the art, that is a dental treatment unit which can be used both by right-handed dentists and left-handed dentists. According to this document, "The unit is shiftable orbitally and laterally with respect to the chair so that the instrument center can be located in the correct position relative to the position of the headrest of the chair throughout the range of adjustment of the chair back." The invention described in this patent allows to move the hydrogroup (called dental unit 12) with respect to the patient chair 11, in order to obtain alternatively a first configuration wherein the hydrogroup is placed on the right of the patient seated in the chair or a second configuration wherein the hydrogroup is placed on the left of the patient seated in the chair. In other words, a movement on the horizontal plane of dental unit 12 with respect to the patient chair 11 is provided. Nonetheless, the point of entry of vacuum connection 52, electric connection 53, compressed air connection 54, water connection 55, and a drain or waste connection 56, i.e. the well 51, is located under the base assembly 10, inside the outline of the patient chair 11. These connections must allow the movement of the dental unit 12 around the patient chair 11.

[0009] The applicant, too, provides its customers with

solutions similar to the above-described ones, in the form of chair mounted dental treatment units, in the form of floor mounted dental treatment units, and in the form of suspended chair dental treatment units. For better clarity, Figures 1 show a chair mounted dental treatment unit presently produced by the applicant, Figures 2 show a floor mounted dental treatment unit presently produced by the applicant, and Figures 3 show a suspended chair dental treatment unit presently produced by the applicant.

[0010] The hydrogroup is a structural portion of the dental treatment unit, which generally allows to support the dental treatment unit portions different from patient chair, i.e. the assistant's board, the scialytic lamp, optionally the dentist's board, which in its turn supports a plurality of dental handpieces (dental syringe, micro-motor, turbine, polymerizing lamp, dental camera, etc.). Often the hydrogroup also supports a bowl and a water-to-cup spout. The hydrogroup is substantially a hollow structure housing reservoirs, electronic boards, piping and wiring. These components are hidden from view, so that the dental treatment unit shows a pleasing and reassuring look for patients.

[0011] Patient chair must be connected to electric energy for its movements; dental handpieces generally need be fed with electric energy, compressed air and water; suction cannulas must be connected to a suction device. Moreover, the liquids coming from the dental treatment unit must be conveyed to sewer drain. Generally, under the floor there are provided systems providing the necessary feeds, and the drain of liquids. These systems generally come out from the floor in contiguous points, forming a connections box.

[0012] For the sake of clarity, in this document connections box relates to the set of all the supplies (i.e. suction, compressed air, water, electric energy and drain) that are needed for the functioning of dental units, i.e. the piping and wiring providing said supplies in their point of emersion from the floor, which piping and wiring are typically placed inside a small area, called connections box.

[0013] Both for avoiding obstacles on the floor, and in order to make the dental environment more pleasing to the eye, generally said connections boxes are provided so as to arrive directly under the dental treatment unit; e.g. see US3524676A of Cocherell et al. In this way, they remain hidden from view, once the dental treatment unit is installed in a dental practice.

[0014] The piping and wiring conveying suction, compressed air, water, electric energy and drain piping come out from said connections box, which generally lies on the floor; then they continue in order to establish a connection to said dental treatment unit in a site called feeds entry point.

[0015] In Western countries (Europe and USA), the number of dental treatment units sold in one year is estimated to be around 60.000 units. The market of dental treatment units is a mature market, wherein the main part of dental treatment units, in a proportion of about 90/10, is acquired in order to replace a pre-existing dental treatment unit, already installed in a dental practice.

[0016] Each manufacturer of dental treatment units provides its own characteristic arrangement of the internal organs of the hydrogroup, in particular with respect to the connections box. This allows to easily replace an already installed dental treatment unit with a new dental treatment unit provided with its connections box arranged in the same position.

[0017] When wishing to buy a new dental treatment unit of a different model produced by the same manufacturer, or to buy a new dental treatment unit produced by a different manufacturer, dentists find themselves in the disagreeable situation of limiting their choice to a new dental treatment unit provided with a position of the connections box compatible with the dental treatment unit already installed in their dental practice.

[0018] As can be observed in Figure 4, the positions of the connections boxes are characteristic and markedly different. When a model of dental treatment unit provided with a connections box arranged in a position different from that of the dental treatment unit already installed in a dental practice is chosen, the following alternative solutions are possible:

- the new dental treatment unit must be translated in the space in order to exploit the existing connections box, but this could lead to collisions of the newly installed dental treatment unit with the dental practice walls or furniture;
- masonry works should be performed in order to move the connections box to a position compatible with the new dental treatment unit;
- the connections box and the feeds entry point of the new dental treatment unit could be connected through external piping/wiring running on the floor. Said piping/wiring are an obstacle and pose a danger for dental staff and patients.

[0019] Aim of the present invention is providing a dental treatment unit allowing to easily replace an already installed dental treatment unit with a new one, even when the already installed dental treatment unit is provided with a different arrangement of said connections box.

[0020] This object is achieved by an apparatus and a method having the features of the independent claims. Advantageous embodiment and refinements are specified in the claims dependent thereon.

[0021] It is worth specifying that the present invention is applicable to dental units of the suspended chair dental treatment unit type.

[0022] The present invention reaches this aim by providing a hydrogroup base allowing the connection of the feeds entry point in the hydrogroup with all the main positions of the connections boxes known in the art. Moreover, each of the connections boxes is covered by a respective aesthetic housing hiding from the view feed piping and wiring (for suction, compressed air, water, electric

energy and drain) from their point of exit from the floor and for a portion of such piping and wiring. Said aesthetic housings are provided adjacent and in continuity with the aesthetic housing covering the base of patient chair, so as to form a visual-functional unit, preventing the running of free piping and wiring on the floor, which poses a serious danger for the safety of dental staff and patients.

[0023] Said base is substantially a plate in continuity with the base of the hydrogroup lying on the floor. Said base is provided with a bottom shape allowing the passage of said piping and wiring between the floor and the base itself, while in some portions of the base said piping and wiring run on the base itself.

[0024] The base, which is the same for all connections boxes (C1, C2, C3, C4) is provided with a U-shape, lying on the floor, comprising a base of said U which is adjacent and preferably integral with the base of the hydrogroup, and two arms of said U, needed for the stability of the dental treatment unit. Said U arms are shaped in order to allow the passage of piping and wiring for connecting to C1, C2, C3, C4 connections boxes, while maintaining the structural stability that the base confers to the dental treatment unit.

[0025] A first arm of said U is called front arm, while a second arm of said U is called rear arm, with respect to the position of the patient chair and of the patient lying on said chair. Said U front arm and rear arm are provided with different shapes.

[0026] The base of said U is provided with its internal edge comprised between the two U arms that is raised with respect to the floor, in order to allow the passage of piping and wiring.

[0027] The rear U arm is provided with a hollow upside-down U shape in order to allow the passage of piping and wiring between said arm and the floor to which said dental treatment unit is fixed. Said upside-down U forms a sort of longitudinal tunnel parallel to the axis of said rear arm.

[0028] The front U arm is provided with a raised shape in the portion proximal to the U base, while in its distal portion said arm adheres to the floor, in order to allow the passage of piping and wiring on said distal portion. In other words, the proximal portion of the U arm is coplanar to the U base, while the distal portion of the U arm is lower than the U base, and therefore nearer to the floor.

[0029] The advantages of the present invention are manifold.

[0030] A first advantage is easing and accelerating the replacement of a dental treatment unit already installed in a dental practice with a new one, by exploiting the already existing hydraulic/electric/pneumatic connections.

[0031] A second advantage is the possibility of replacement without the need of masonry/hydraulic/electric/pneumatic works.

[0032] The third advantage is the possibility of maintaining the same outline on the floor of the patient chair already installed in the dental practice, without the need to move the new dental treatment unit in order to connect it to the floor feeds already present. Therefore, the room for manoeuvre for dental staff remains the same.

[0033] A fourth advantage is the improvement in safety for dental staff and patients, in that the aesthetic housings form a visual-functional continuity with the floor outline of the dental treatment unit, preventing the possibility of tripping in flying connections.

[0034] A fifth advantage is that the aesthetic housings according to the invention are modular. According to the connections box already present in the dental practice, a housing can be chosen to obtain a dental treatment unit pleasing to the eye, but especially safe for dental staff and patients.

[0035] Further advantages and properties of the present invention are disclosed in the following description, in which exemplary embodiments of the present invention are explained in detail based on the drawings:

Figure 1A, 1B	Known art: chair mounted dental treatment unit, lateral and rear view;
Figure 2A, 2B	Known art: floor mounted dental treatment unit, lateral and rear view;
Figure 3A, 3B	Known art: suspended chair dental treatment unit, lateral and rear view;
Figure 4	Dental treatment unit according to the present invention shown in relationship with the main connections boxes, axonometric view without aesthetic housings;
Figure 5A	Hydrogroup with connection to C1 connections box, axonometric view;
Figure 5B	Hydrogroup with connection to C4 connections box, axonometric view;
Figure 5C	Hydrogroup with connection to C2 connections box, axonometric view;
Figure 5D	Hydrogroup with connection to C3 connections box, axonometric view;
Figure 6A, 6B	Detail of the base with the passage of piping/wiring for C2 and C4 connections boxes, axonometric top and bottom view;
Figure 6C, 6D	Detail of the base with the passage of piping/wiring for C3 connections boxes, axonometric top and bottom view;
Figure 7A	Dental treatment unit connected to C1 connections box, axonometric view with aesthetic housing;
Figure 7B	Dental treatment unit connected to C4 connections box, axonometric view with aesthetic housing;
Figure 7C	Dental treatment unit connected to C2 connections box, axonometric view with aesthetic housing;
Figure 7D	Dental treatment unit connected to C3 connections box, axonometric view with aesthetic housing.

[0036] Figures 1A, 1B show a chair mounted dental treatment unit 10 that is part of the present production of the applicant. Said chair mounted dental treatment unit comprises: a patient chair 1, a hydrogroup 2, a bowl 3, a dentist's board 4, an assistant's board 5, and a headrest 9. The vertical movement of the patient chair 1 is performed through a pantograph mechanism arranged in the base of patient chair 1, provided with a pantograph arm 6. The patient chair 1 and the hydrogroup 2 are integrally connected through a connecting arm 8 (visible in Figure 1B only), and therefore patient chair and hydrogroup rise and lower at the same time.

[0037] Figures 2A, 2B show a floor mounted dental treatment unit 20 that is part of the present production of the applicant. Said floor mounted dental treatment unit comprises: a patient chair 1, a hydrogroup 2, a bowl 3, a dentist's board 4, an assistant's board 5 and a headrest 9. The vertical movement of the patient chair 1 is performed through a pantograph mechanism arranged in the base of patient chair 1, provided with a pantograph arm 6. As explained in the introduction, the hydrogroup 2 remains stationary, while the patient chair 1 rises and lowers with respect to the floor and the hydrogroup. The patient chair 1 and the hydrogroup 2 are substantially independent.

[0038] Figures 3A, 3B show a suspended chair dental treatment unit 30 that is part of the present production of the applicant. Said suspended chair dental treatment unit comprises: a patient chair 1, a hydrogroup 2, a bowl 3, a dentist's board 4, an assistant's board 5 and a headrest 9. The vertical movement of the patient chair 1 is performed through a raising/lowering mechanism arranged inside the hydrogroup 2, comprising a mechanism for raising and lowering the patient chair through an arm 7 (visible in Figure 3B only). As explained in the introduction, the hydrogroup 2 remains stationary, while the patient chair 1 rises and lowers with respect to the hydrogroup 2 and the floor.

[0039] Figure 4 shows an axonometric simplified view of a dental treatment unit 100 according to the present invention, comprising a patient chair 41 and a hydrogroup 42.

[0040] Figure 4 shows the main alternative positions of the connections boxes C1, C2, C3, C4. Obviously, in reality, just one of the shown connections boxes is present in the floor of the dental practice, and to this connections box the already installed dental treatment unit is connected. In particular, there are shown the respective positions of:

- connections box C1, placed at the rear end of the hydrogroup, inside its plan;
- connections box C2, typical of the chair mounted presently produced by the applicant and of manufacturer 2;
- connections box C3, typical of manufacturer 3;
- connections box C4, typical of the present production of the applicant, model TRC.

[0041] As can be observed in Figure 4, these positions are characteristic and markedly different. For instance, should the new dental treatment unit be connected to connections box C3, masonry works should be needed in order to move the connections box. Alternatively, the new dental treatment unit should be translated in space, but in the new position collisions might occur with dental practice walls or furniture. Alternatively, the connections box and the feeds entry point of the new dental treatment might be connected through external piping and wiring running freely on the floor, which are an obstacle and pose a danger for dental staff and patients.

[0042] The present invention allows reaching the feeds entry point 50 (visible in Figures 5) from any of the connections boxes C2 or C3 or C4 thanks to a base 51 according to the present invention. Over said connections boxes there are provided specific aesthetic housings, allowing to cover the path of piping/wiring from the different positions C2 or C3 or C4 of the connections box to the feeds entry point 50, placed under the hydrogroup 42. Said aesthetic housings are placed in continuity with the housing covering the base, and therefore there are provided no free-running piping/wiring, and anyway the housings are in a visual-functional continuity with the dental treatment unit.

[0043] Figures 5A, 5B, 5C, 5D show the hydrogroup 42 without its aesthetic housing and allow to appreciate the path of the piping/wiring coming from C1, C4, C2 and C3 connections boxes, respectively. Said hydrogroup 42 comprises a known metallic frame 52 having a parallelepiped shape. Said metallic frame 52 is a structure supporting the functional internal components (not shown reservoirs, piping, electric boards, wiring), which is in its turn integral with said base 51.

[0044] It is worth noting that, although the metallic frame of the hydrogroup can be likened to a boxed body, in fact its faces are actually its two top and lower bases. Its four lateral faces are open; there are provided just the edges of the boxed body. The metallic frame of the hydrogroup is closed and hidden from view by an aesthetic housing, generally made of a suitable plastic material.

[0045] Said base 51, which remains the same for all C1, C2, C3, C4 connections boxes, is provided with a U-shape laying on the floor, comprising a U base 53 that is adjacent and integral with the base 43 of the hydrogroup, and two U arms 54, 55, needed for the stability of the dental treatment unit 100. Said arms are shaped in order to allow the passage of piping/wiring to the C2, C3, C4 connections boxes, maintaining the structural stability of base 51.

[0046] The U base 53 is provided with an internal edge, comprised between the two U arms 55, 54, raised with respect to the floor, in order to allow the passage of piping/wiring.

[0047] The U base 53 is provided with a bore 56 for a (not shown) wall plug allowing to fix the dental treatment unit 100 to the dental practice floor. Other two bores 57 (visible in Figures 6B and 6D only) are provided on the

external side (the side opposed to the chair side) of the base 51.

[0048] The U first arm 55 is defined front arm with respect to the position of the patient chair 41 and of the patient lying on it, while the second U arm 54 is defined rear arm with respect to the position of the patient chair 41 and of the patient lying on it; in particular the rear arm is oriented toward the headrest 9. Said U front arm 55 and U rear arm 54 are provided with different shapes.

[0049] The U rear arm 54 is provided with a hollow shape, channel-like and/or having an upside-down U transversal section, in order to allow the passage of piping/wiring between said arm and the floor to which the dental treatment unit is fixed. Said channel-like with upside-down U section forms a sort of longitudinal tunnel parallel to the axis of the U rear arm 54. According to a feature, said channel-like shape of said rear arm 54 ends up with one of its open head ends in said base 53.

[0050] The U front arm 55 is provided with a raised portion proximal to the U base 53, while in its distal position it adheres to the floor, in order to allow the passage on it of the piping/wiring. In other words, the proximal portion of the arm 55 is at the same height of the U base 53 in its top side. For said raised portion of the front arm 55 proximal to the base 53, the lower edges of said front arm 55 oriented downwards are raised in a given measure with respect to the floor, so forming lateral passages from side to side of the front U arm 55 in correspondence of said proximal portion to the base 53. On the other hand, the top distal portion of the arm 55 is lower than the U base 53, and therefore nearer to the floor, while the top wall of said portion oriented upward is depressed with respect to the level of the corresponding wall of the proximal portion of the front U arm 55 and of the base 53.

[0051] Figure 5A shows the position of the connections box C1, which is adjacent to the rear short side of the metallic structure 52, and in use is covered by the aesthetic housing of the hydrogroup, forming a visual-functional unit. As it easily observed, this is the simplest configuration, as the connections box C1 is in correspondence to the feeds entry point 50.

[0052] Figure 5B shows the position of the connections box C4, which is placed in front of the base of patient chair 41, and in use is covered by an aesthetic housing, forming a visual-functional unit. From the connections box C4, piping/wiring follow a path leading them to the feeds entry point 50. In particular, the connections box C4 is adjacent to the distal portion of the front U arm 55. The connecting piping/wiring pass on the distal depressed portion of said front arm 55, while they pass under (dotted) the rear arm 54 and U base 53.

[0053] Figure 5C shows the position of the connections box C2, which is placed in front of the base of patient chair 41 too, but in a more distal position with respect to the connections box C4, and in use is covered by an aesthetic housing, forming a visual-functional unit. In particular, the connections box C2 is spaced from the front U arm 55. From the connections box C2, piping/wiring follow a path leading them to the feeds entry point 50. As in the case of the connections box C4, piping/wiring, longer than those for the connections box C4, pass on the distal portion of said front arm 55, while they pass under (dotted) the rear arm 54 and U base 53.

[0054] Figure 5D shows the position of the connections box C3, which is placed in front of the base of patient chair 41, but in a position nearer to the hydrogroup 42, and in use is covered by an aesthetic housing, forming a visual-functional unit. From the connections box C3, piping/wiring follow a path leading them to the feeds entry point 50. In particular, the connecting piping/wiring pass under (dotted) the proximal portion of said front arm 55, and under (dotted) the U base 53 in order to reach the feeds entry point 50.

[0055] Figures 6A, 6B, 6C and 6D show the detail of the base 51 seen without the hydrogroup. Overall, Figures 6 allow to observe more clearly the U shape of the base 51, and also that the U base 53 is integral, in continuity with the base 43 of the frame 52 of the hydrogroup 42. Said base 43 is the lower side of the hydrogroup 42 lying on the floor.

[0056] In particular, Figure 6A shows the base 51 seen from the top, and Figure 6B the base 51 seen from the bottom, showing the path of the piping/wiring (line going from A1 to B) in the cases of the connections boxes C4 and C2 (Figures 5B and 5C, respectively). From Figure 6A the path of the piping/wiring can be clearly observed, on the U front arm 55 (continuous line) and under the rear U arm 54 and U base 53 (dotted line), to the feeds entry point 50. Figure 6B allows to show that the rear U arm 54 is provided with a hollow U-shape allowing the passage of connecting piping/wiring.

[0057] Figure 6C shows the base 51 seen from the top, and Figure 6D the base 51 seen from the bottom, showing the path of the piping/wiring (line going from A2 to B) in the cases of the connections box C3 (Figure 5D). From Figure 6D the path of the piping/wiring can be clearly observed, under the U front arm 55 (continuous line) and under the rear U arm 54 and U base 53 (continuous line), to the feeds entry point 50. Figure 6C also allows to show that the rear U arm 55, too, is provided with a shape raised with respect to the floor allowing the passage of connecting piping/wiring, while the edge of the U base 53 is raised with respect to the floor, again for allowing the passage of connecting piping/wiring.

[0058] The base 51 is a component produced through casting, preferably made of cast iron, which undergoes suitable working for fixing the carpentry components that form the supporting structure 52 of the hydrogroup, preferably made of metal, and the fixing of the raising mechanism for the patient chair in the case of suspended chair dental units.

[0059] In a preferred embodiment, as shown in Figures 6, the base 43 of the hydrogroup 42 and the U-shaped 53 form one piece, obtained through a single casting: this allows to obtain a dental treatment unit with more stability.

[0060] Figure 7A shows the dental treatment unit 100

as it appears from the outside when it is connected to the connections box C1 (Figure 5A). As explained above, this is the simplest and most compact configuration. The aesthetic housing of the hydrogroup 42 completely covers the connections box C1 and the path of piping/wiring from the connections box C1 to the feeds entry point 50. The aesthetic housing 44 only covers the base of the patient chair 41.

[0061] Figure 7B shows the dental treatment unit 100 as it appears from the outside when it is connected to the connections box C4 (Figure 5B). A further aesthetic housing 45 covers the connections box C4. The two aesthetic housings 44 and 45 are adjacent and one is the extension of the other. On the floor there are no free piping/wiring.

[0062] Figure 7C shows the dental treatment unit 100 as it appears from the outside when it is connected to the connections box C2 (Figure 5C). The aesthetic housing 44 covers the base of the patient chair 41. A further aesthetic housing 46 covers the connections box C2. The two aesthetic housings 44 and 46 are adjacent and one is the extension of the other. On the floor there are no free piping/wiring.

[0063] Figure 7D shows the dental treatment unit 100 as it appears from the outside when it is connected to the connections box C3 (Figure 5D). The aesthetic housing 44 covers the base of the patient chair 41. A further aesthetic housing 47 covers the connections box C3. The two aesthetic housings 44 and 47 are adjacent and one is the extension of the other. On the floor there are no free piping/wiring.

[0064] In the case of the connections box C1 shown in Figure 7A, the front wall of said housing 44 is intact and continuous. In the cases of the connections boxes C4, C2, C3 shown in Figures 7B, 7C and 7D, the front wall of the aesthetic cover 44 is provided for allowing the passage of connecting piping/wiring coming from the connections boxes C4, C2, C3.

[0065] Said aesthetic housings 44, 45, 46, 47 are made of a suitable plastic material.

[0066] The method according to the present invention comprises the following steps:

- Removing an already installed dental treatment unit 10, 20, 30 from a dental practice;
- Placing a new dental treatment unit 100 in said dental practice, positioning the dental chair 41 in the same outline on the floor as the removed patient chair 1, and connecting the pre-existing connections box C1 or C2 or C3 or C4 with the feeds entry point 50 of the new dental treatment unit 100;
- Covering the connections box C2 or C3 or C4 and the path of connecting piping/wiring with the suitable aesthetic housing 46 or 47 or 45.

1 patient chair
2 hydrogroup
3 bowl
4 dentist's board
5 assistant's board
6 pantograph
7 chair-hydrogroup connecting arm
8 chair-hydrogroup connecting arm
9 headrest
10 chair mounted dental treatment unit
20 floor mounted or free-stand dental treatment units
30 suspended chair dental treatment unit
C1 position of CEFLA and of manufacturer 1 connections box
C2 position of CEFLA chair mounted dental treatment unit and of manufacturer 2 connections box
C3 position of manufacturer 3 connections box
C4 position of CEFLA TRC dental treatment units connections box
41 patient chair
42 hydrogroup
43 hydrogroup base
44 housing for connections box C1
45 housing for connections box C4
46 housing for connections box C2
47 housing for connections box C3
50 feeds entry point
51 dental treatment unit base
52 metal frame
53 U base
54 rear U arm
55 front U arm
56 bore
57 bore
100 dental treatment unit

Claims

1. Dental treatment unit (100) set up for fixing to a floor, comprising a patient chair (41) and a hydrogroup (42); said hydrogroup (42) comprising an internal support frame (52) substantially having a parallelepiped shape, provided with a hydrogroup base (43) lying on the floor; there being provided connecting piping and wiring for feeds and drain of said dental treatment unit (100), said piping and wiring being intended for connecting one connections box (C1 or C2 or C3 or C4) placed in different points of the floor in an installation environment of said unit to a feeds entry point (50) of said feeds piping and wiring into said hydrogroup (42), said dental treatment unit (100) being

characterized in that

it comprises a dental unit base (51) having a bottom shape, i.e. its side lying on the floor, and a top shape, i.e. its side opposed to the bottom side, suitable for allowing the passage of said connecting piping and wiring from said connections box (C1 or C2 or C3 or C4) to said feeds entry point (50) into said hydrogroup (42), said piping and wiring following a path

running on said top shape and under said bottom shape of said dental unit base (51).

2. Dental treatment unit (100) comprising said dental unit base (51) according to claim 1, wherein said path from said connections box (C1 or C2 or C3 or C4) to said feeds entry point (50) of piping and wiring is different and specific for each connections box (C1 or C2 or C3 or C4).

3. Dental treatment unit (100) comprising said dental unit base (51) according to claim 1, wherein said connections box (C2 or C3 or C4), is placed at a distance from said feeds entry point (50), and wherein the path from said connections box (C2 or C3 or C4), to said feeds entry point (50) is at least partially covered by a respective aesthetic housing hiding from the view feed piping and wiring supplying suction, compressed air, water, electric energy and drain; said aesthetic housings being provided adjacent and in continuity with the aesthetic housing covering the base of patient chair, so as to form a visual-functional unit.

4. Dental treatment unit (100) comprising said dental unit base (51) according to claim 1, suitable for connecting said dental unit (100) to one pre-existing fixed connections box (C1 or C2 or C3 or C4), said connections box having been previously connected to another dental treatment unit (10 or 20 or 30) comprising a dental patient chair (1) to be replaced, said dental unit base (51) allowing to place said patient chair (41) in the same outline on the floor as the replaced patient dental chair (1).

5. Dental treatment unit (100) comprising said dental unit base (51) according to claim 1, wherein no movement on the horizontal plane, i.e. a plane parallel to the floor, of said patient chair (41) with respect to said hydrogroup (42) and vice versa is provided.

6. Dental treatment unit (100) comprising said dental unit base (51) according to claim 1, wherein said dental unit base (51) is provided with a maximum overall dimension in a direction perpendicular to the floor, which dimension is higher than the maximum diameter of said piping, and said shape of said bottom and top sides is shaped so as to generate passages under said bottom side of said dental unit base (51) and on said top side of said dental unit base (51) which have a dimension in a direction perpendicular to the floor that corresponds at least to said maximum diameter of said piping.

7. Dental treatment unit (100) comprising said dental unit base (51) according to claim 1 or 6, wherein said dental unit base (51) is provided with an in plan U shape, with a U base (53) in continuity with said base (43) of the hydrogroup, a U front arm (55) and a U rear arm (54), with reference to the antero-posterior orientation of the patient chair (41),

- said in plan U base (53) being raised with respect to the floor in its side oriented toward the inside of said U arms;
- said U front arm (55) being provided with a raised portion in its part proximal to the U base (53), while in its distal portion it adheres to the floor in order to allow the passage of connecting piping and wiring on said distal portion, being provided with a top side, opposed to the floor, depressed with respect to said raised portion in the part proximal to the base (53);
- said U rear arm (54) being provided with a hollow channel-like and/or upside-down U shape in order to allow the passage of connecting piping and wiring between said U arm and the floor to which the dental treatment unit is fixed; said channel-like or upside down U forming a tunnel longitudinal to the axis of the U rear arm (54) that starts communicating with the space under the top side of said base (53).

8. Dental treatment unit (100) comprising said dental unit base (51) according to one or more of the preceding claims, wherein said dental unit base (51), which comprises said in plan U portion, and comprising in its turn said U base (53) and two U arms (54, 55), is realized as an element fixable and/or fixed to said base (43) of the hydrogroup (42) or it is obtained as a unique piece, i.e. integral and in continuity with said base (43) of the hydrogroup (42).

9. Dental treatment unit (100) comprising said dental unit base (51) according to one or more of the preceding claims, wherein said dental unit base (51) is provided with at least one bore (56, 57) for fixing said unit (100) to the floor through wall plugs or other suitable fixing means.

10. Dental treatment unit (100) comprising said dental unit base (51) according to one or more of the preceding claims, wherein the base of the patient chair (41) is covered by just one aesthetic housing (44).

11. Dental treatment unit (100) comprising said dental unit base (51) according to claim 9, wherein each connections box (C2 or C3 or C4) and path of the connecting piping and wiring from said connection box (C2 or C3 or C4) to said feed entry point (50) of said dental treatment unit (100) is covered with a respective aesthetic housing (46 or 47 or 45) which is in an aesthetic and functional continuity with said aesthetic housing (44) covering the base of patient chair (2).

12. Dental treatment unit (100) comprising said dental unit base (51) according to claim 10, wherein the front wall of said aesthetic housing (44) can be continuous or can be set up for connecting it to a further aesthetic housing (45 or 46 or 47).

13. Dental treatment unit (100) comprising said dental unit base (51) according to one or more of the preceding claims, wherein said dental unit base (51) is a component obtained through casting, preferably made of cast iron, which undergoes suitable working for fixing the carpentry components that form the supporting structure 52 of the hydrogroup, preferably made of metal; preferably said portion forming the base (43) of the hydrogroup and said U (53, 54, 55) being obtained in a single cast piece.

14. Method for replacing a dental treatment unit (10 or 20 or 30) already installed in a dental practice with a new dental treatment unit (100) according to one or more of the claims 1-13, said method comprising the following steps:

- Removing said already installed dental treatment unit (10 or 20 or 30) from a dental practice;
- Placing said new dental treatment unit (100) in said dental practice, and connecting the pre-existing connections box (C1 or C2 or C3 or C4) with the feeds entry point (50) of the new dental treatment unit (100);
- Covering the connections box (C2 or C3 or C4) and the path of connecting piping and wiring with the suitable aesthetic housing (46 or 47 or 45)

characterized in that
the dental chair (41) is positioned in the same outline on the floor as that of the removed patient chair (1).

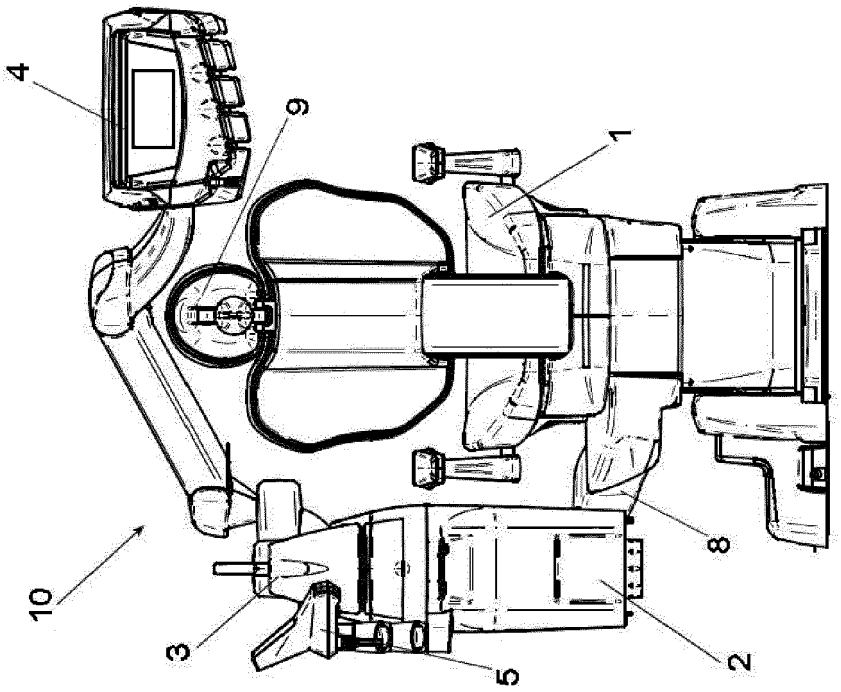

FIG. 1B

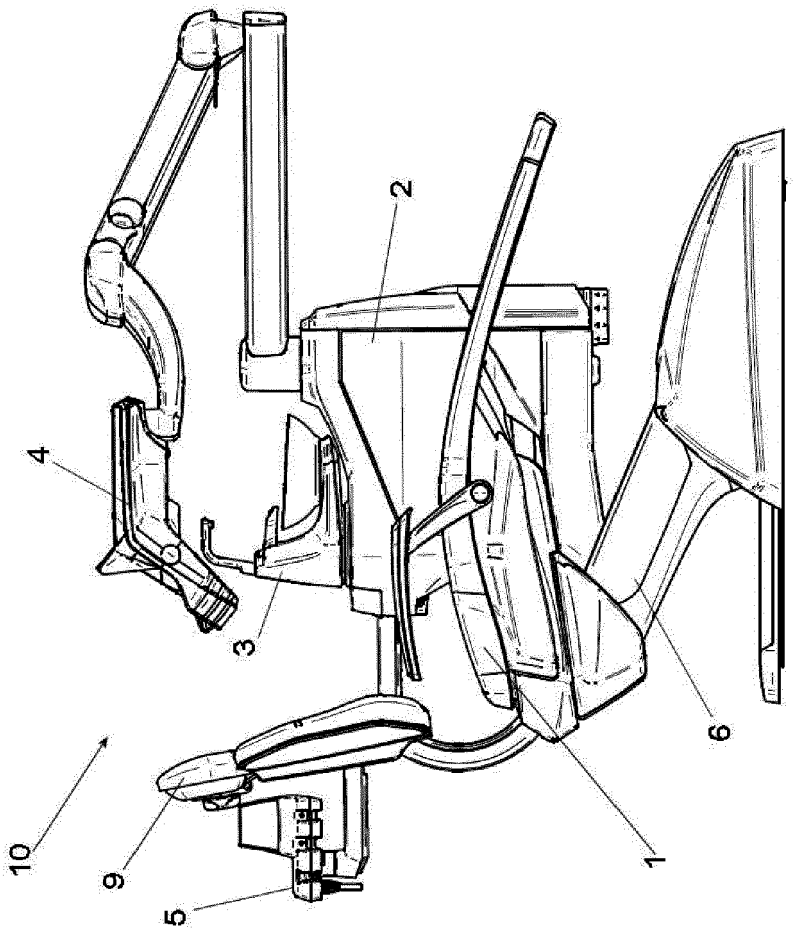

FIG. 1A

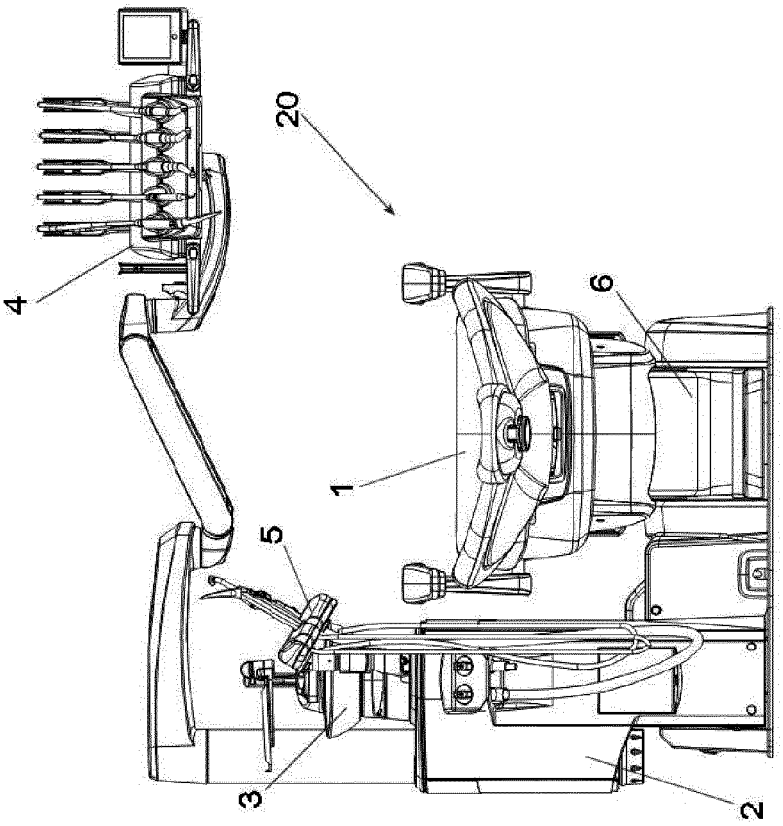

FIG. 2B

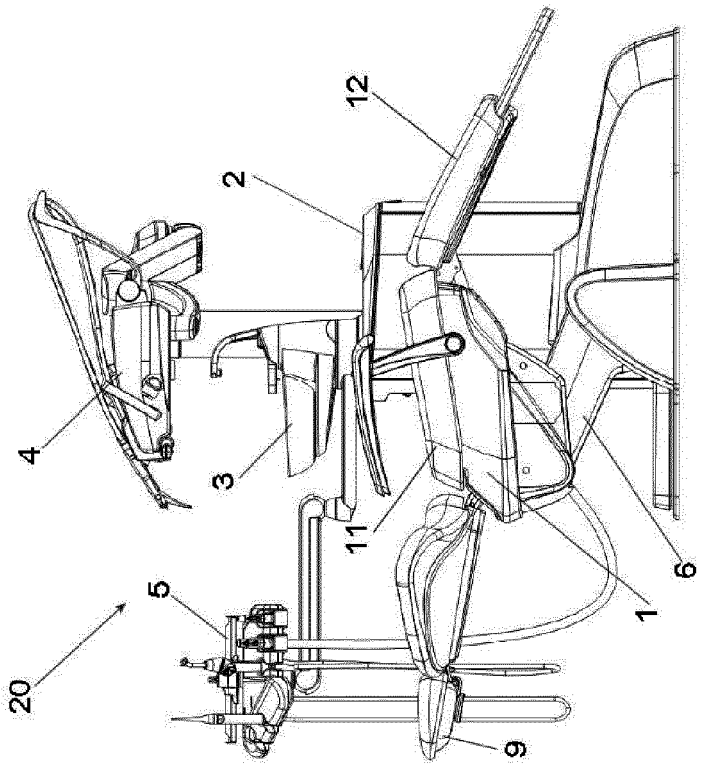

FIG. 2A

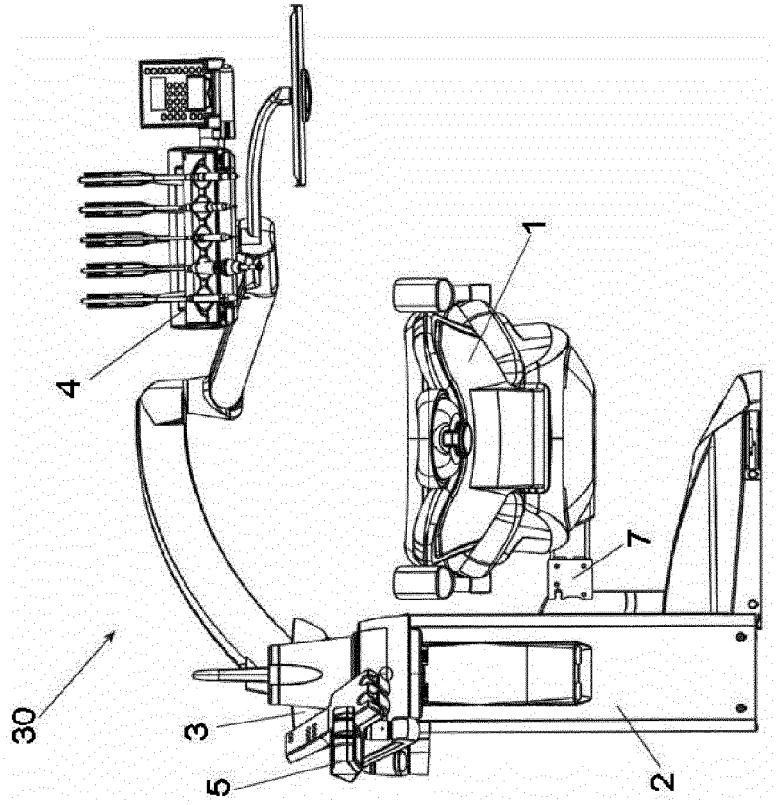

FIG. 3B

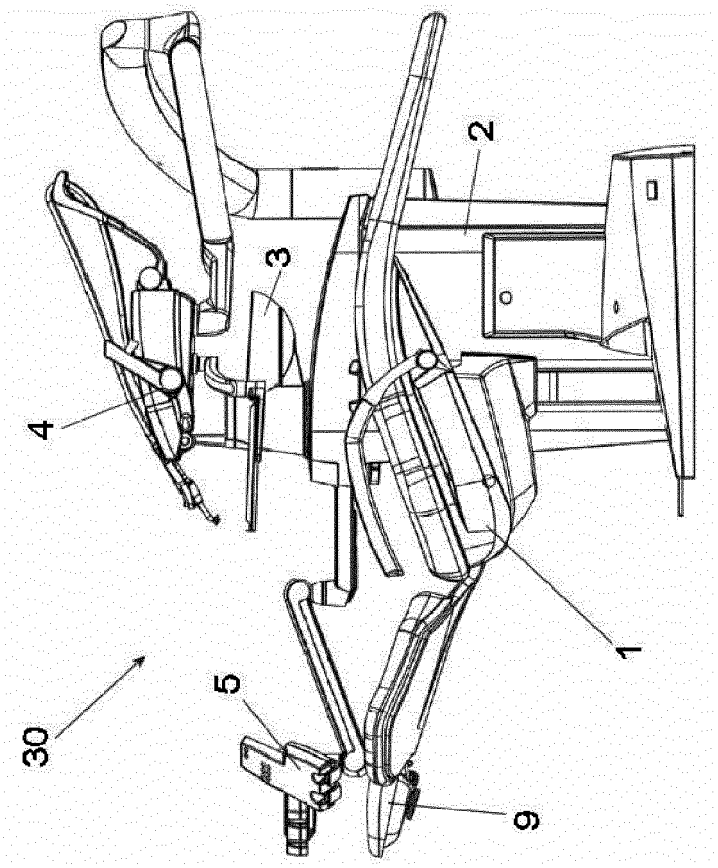

FIG. 3A

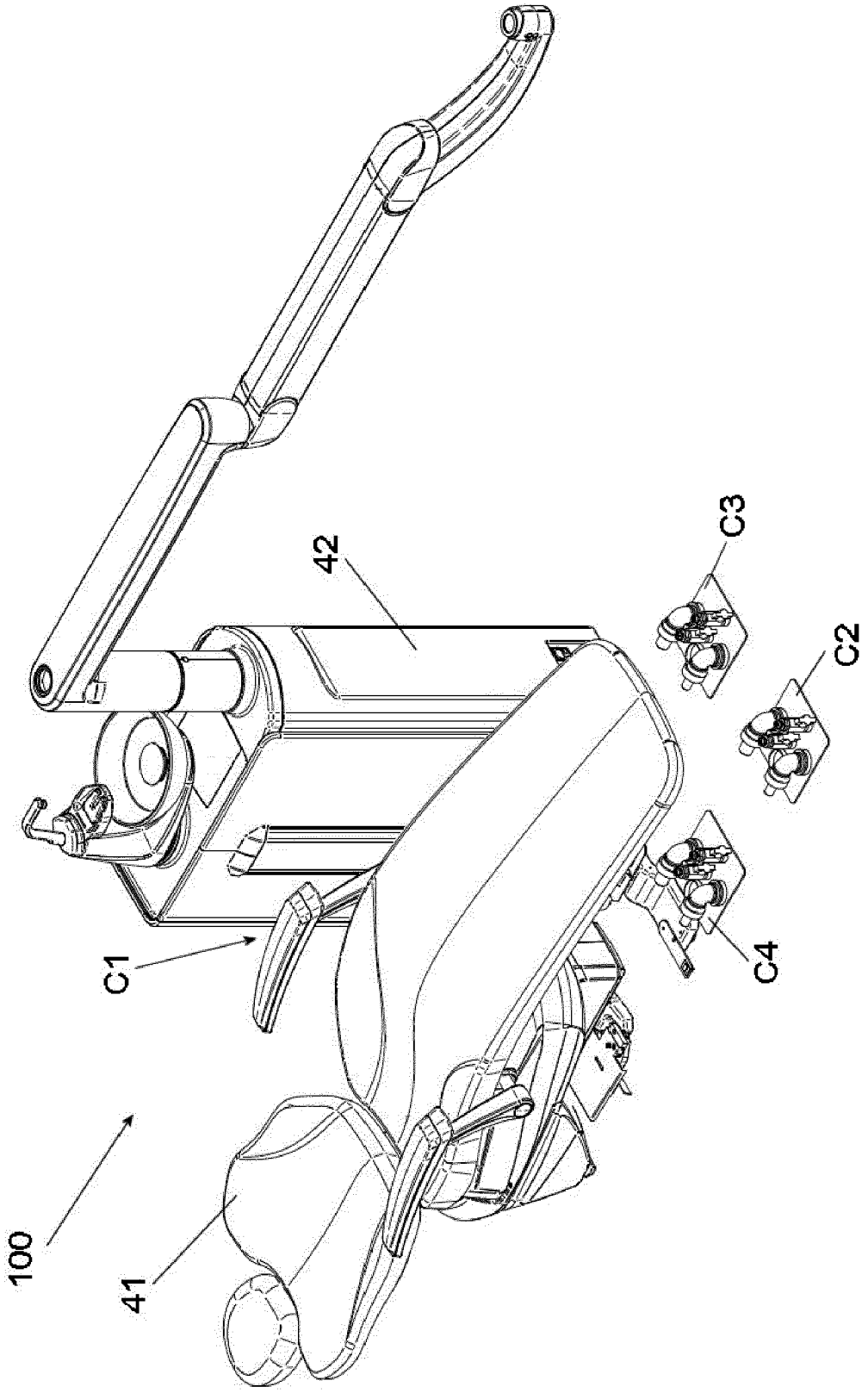

FIG. 4

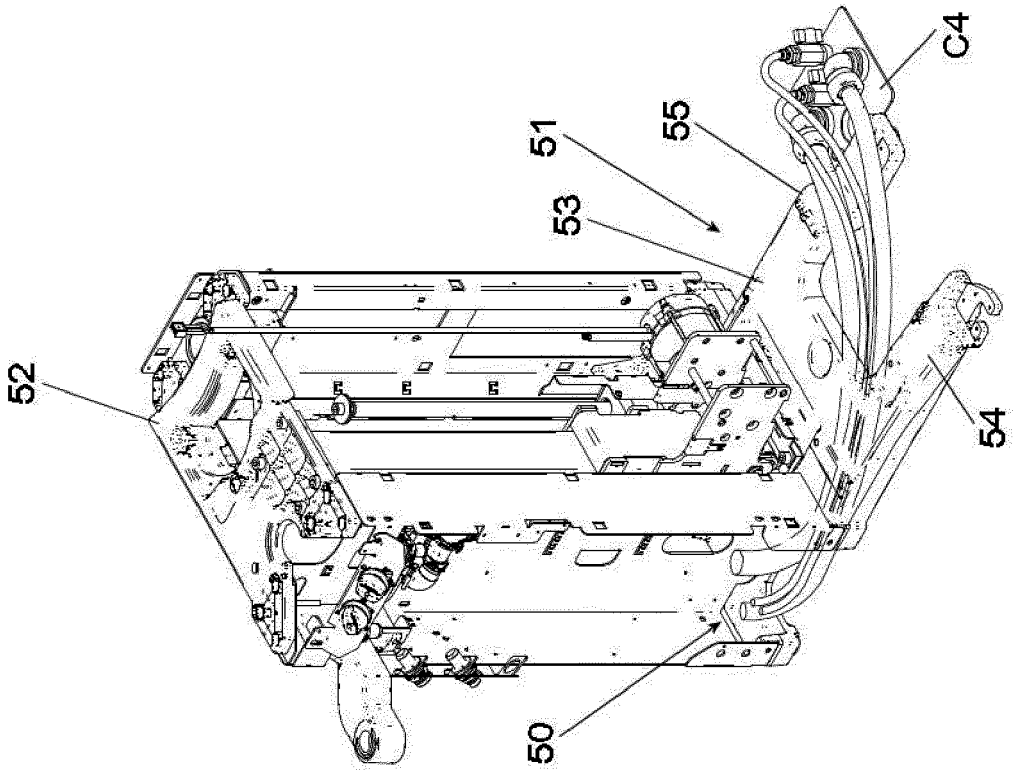

FIG. 5B

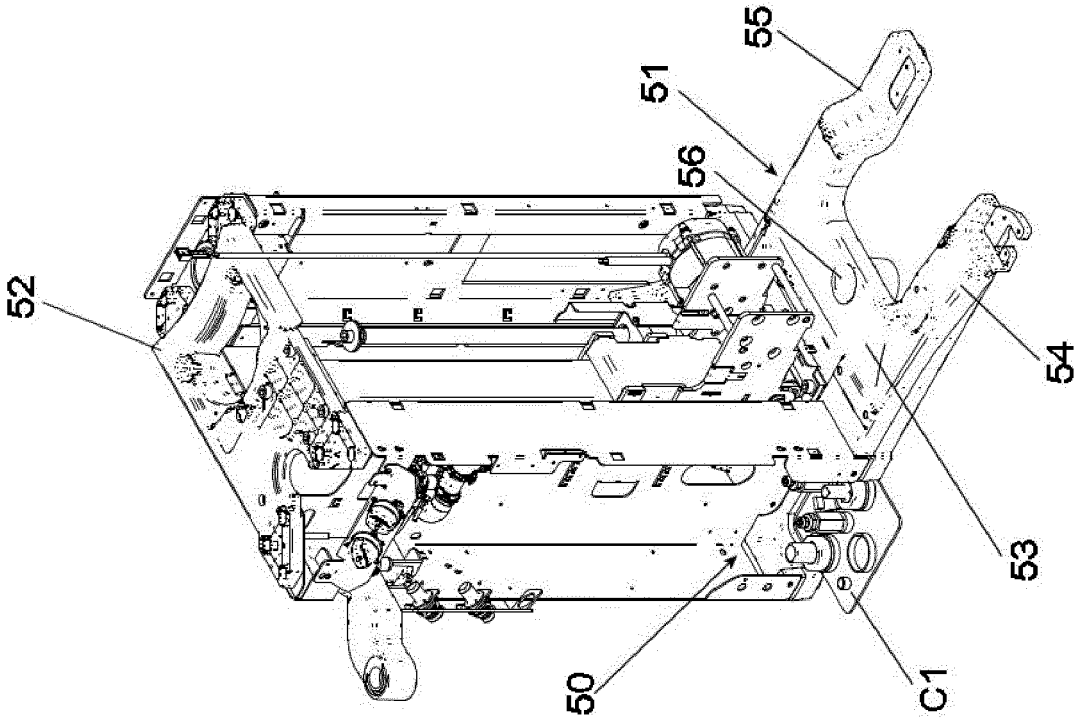

FIG. 5A

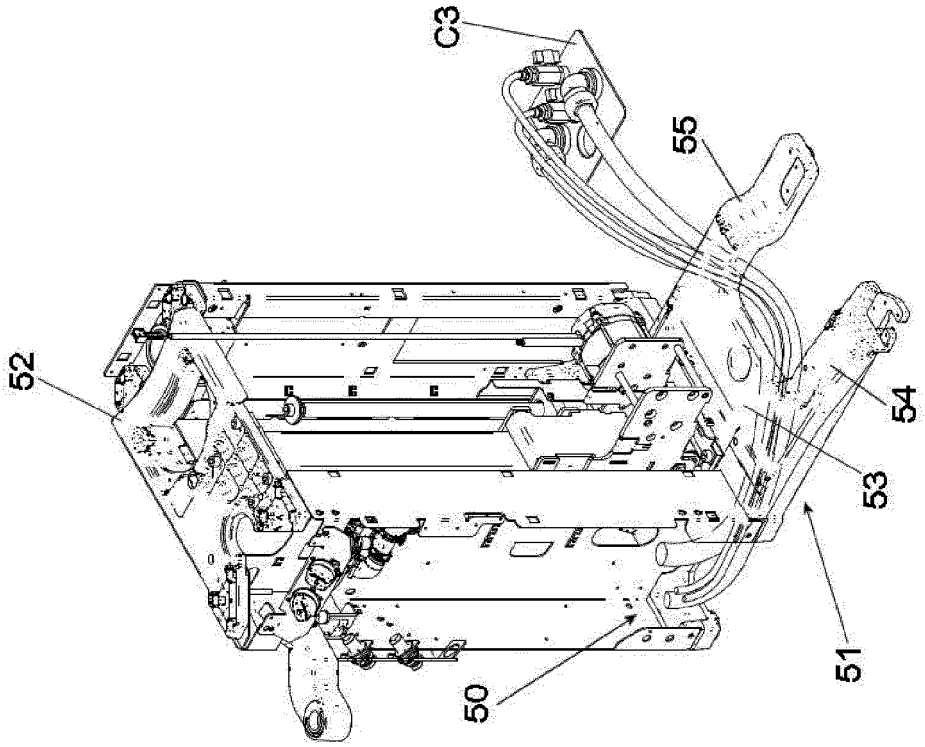

FIG. 5D

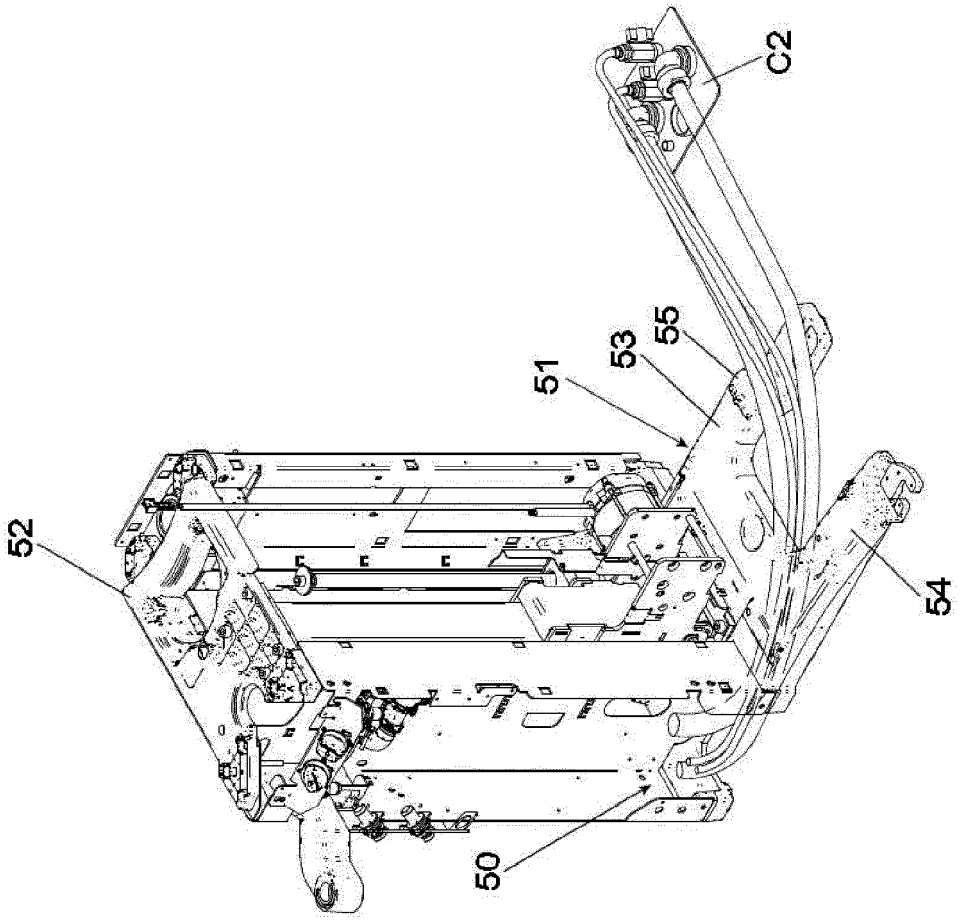

FIG. 5C

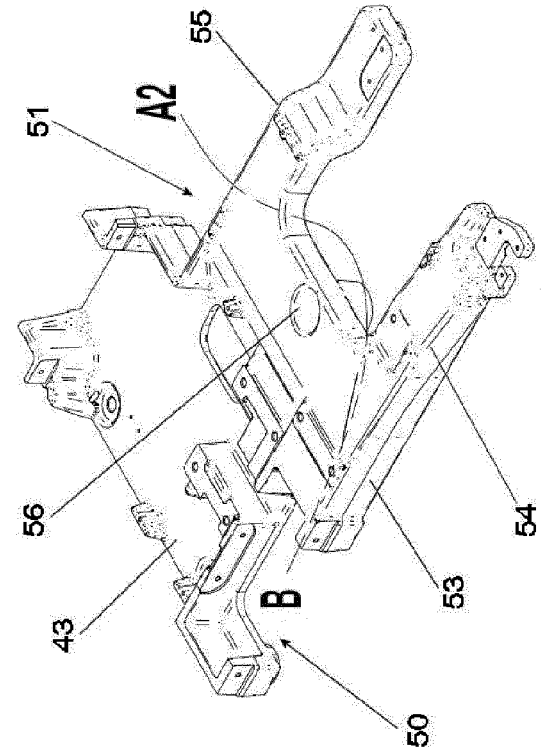

FIG. 6C

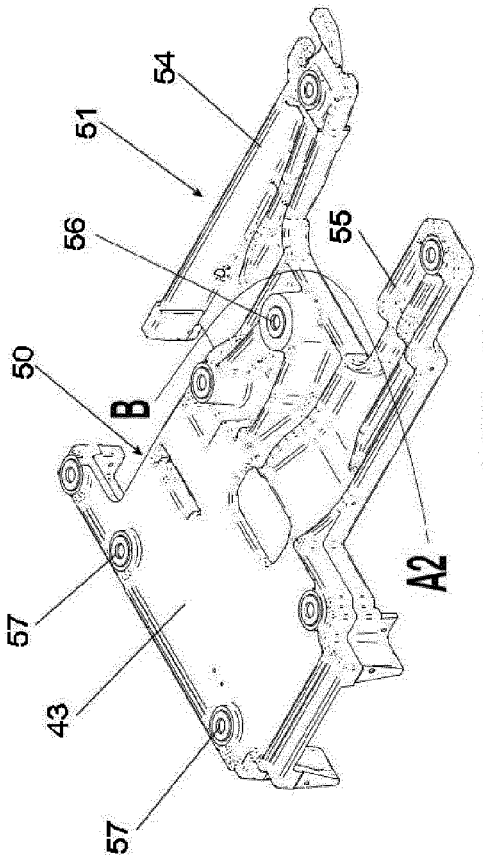

FIG. 6D

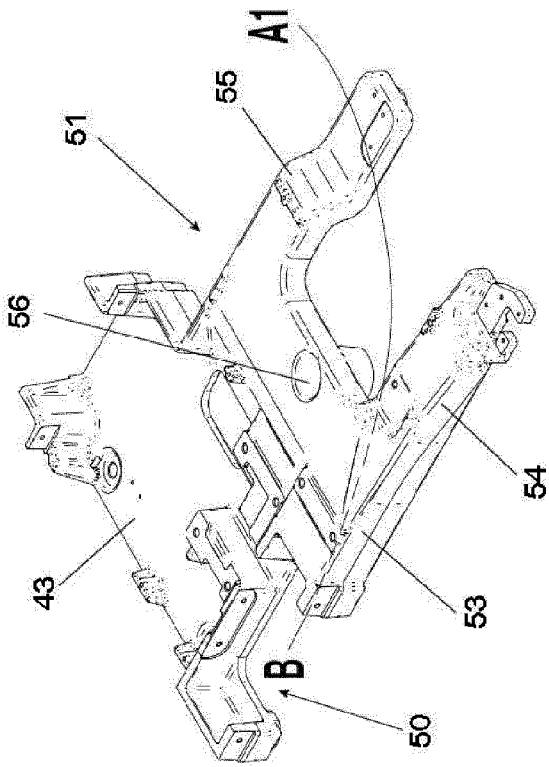

FIG. 6A

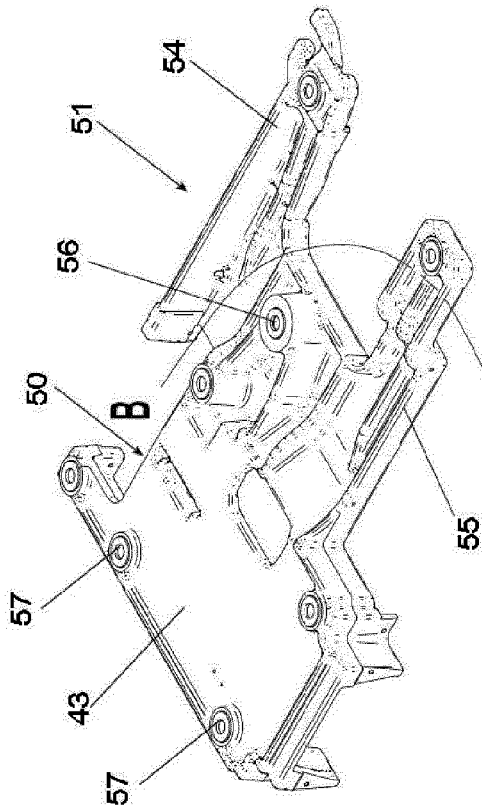

FIG. 6B

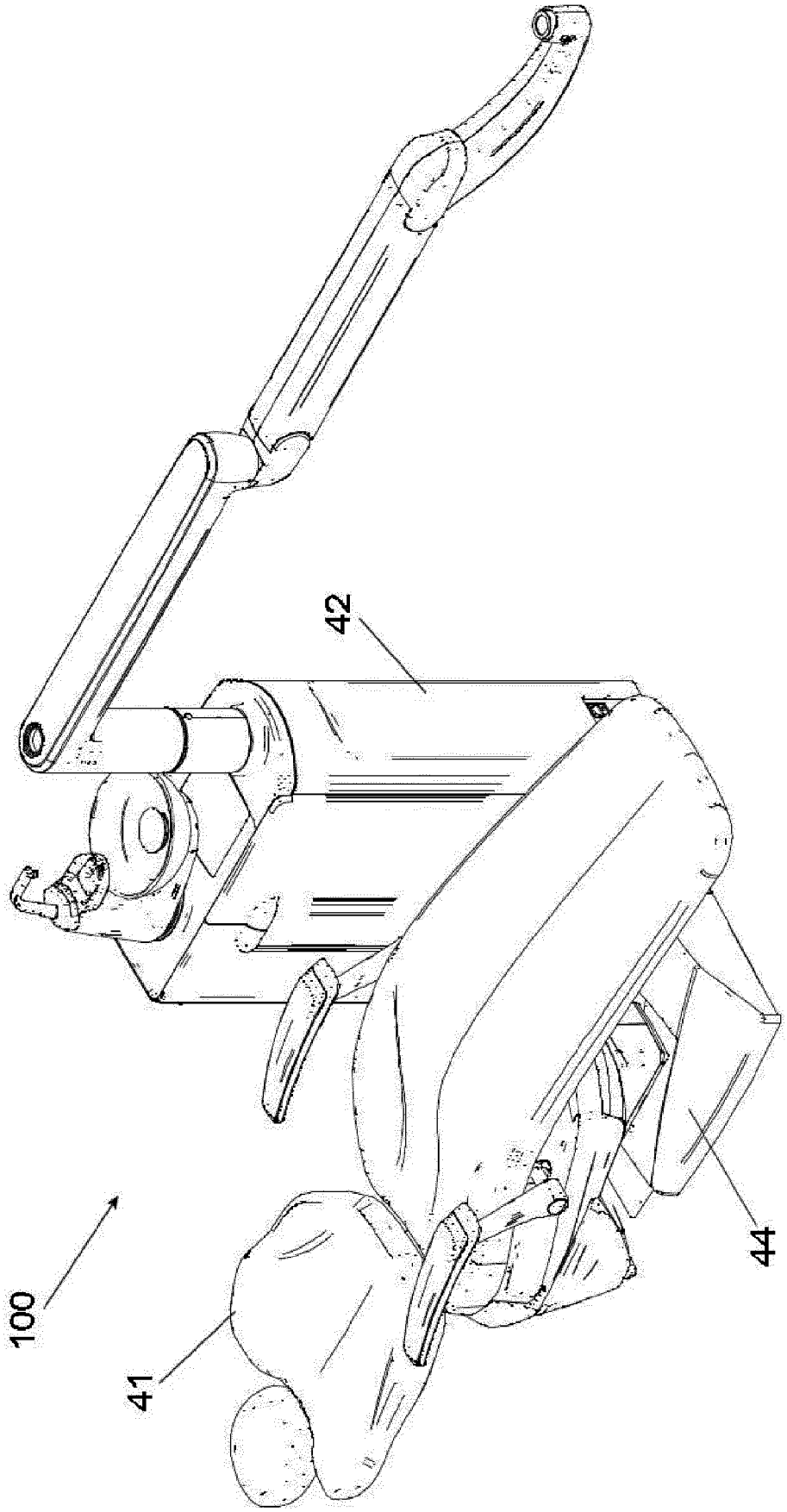

FIG. 7A

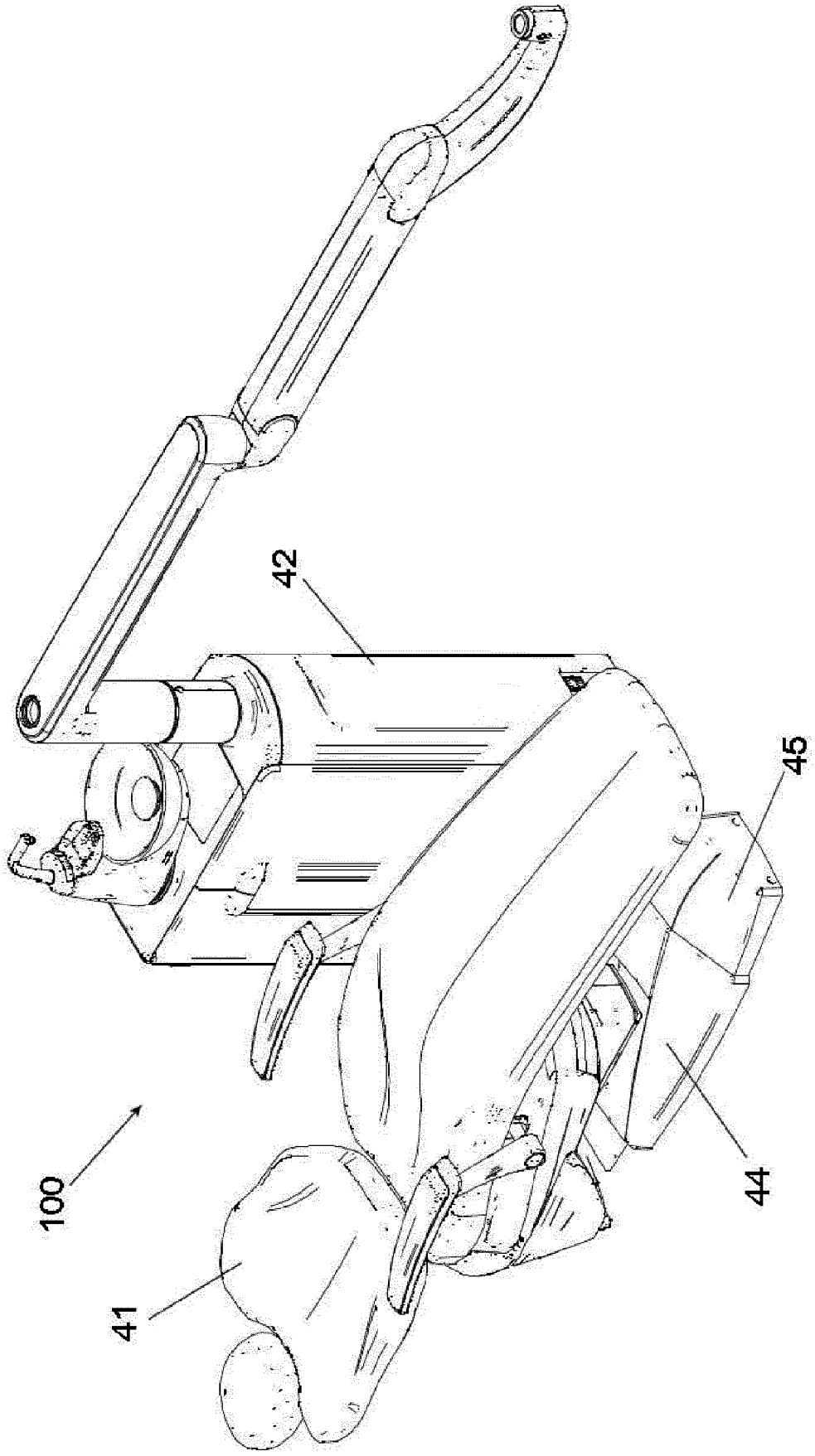

FIG. 7B

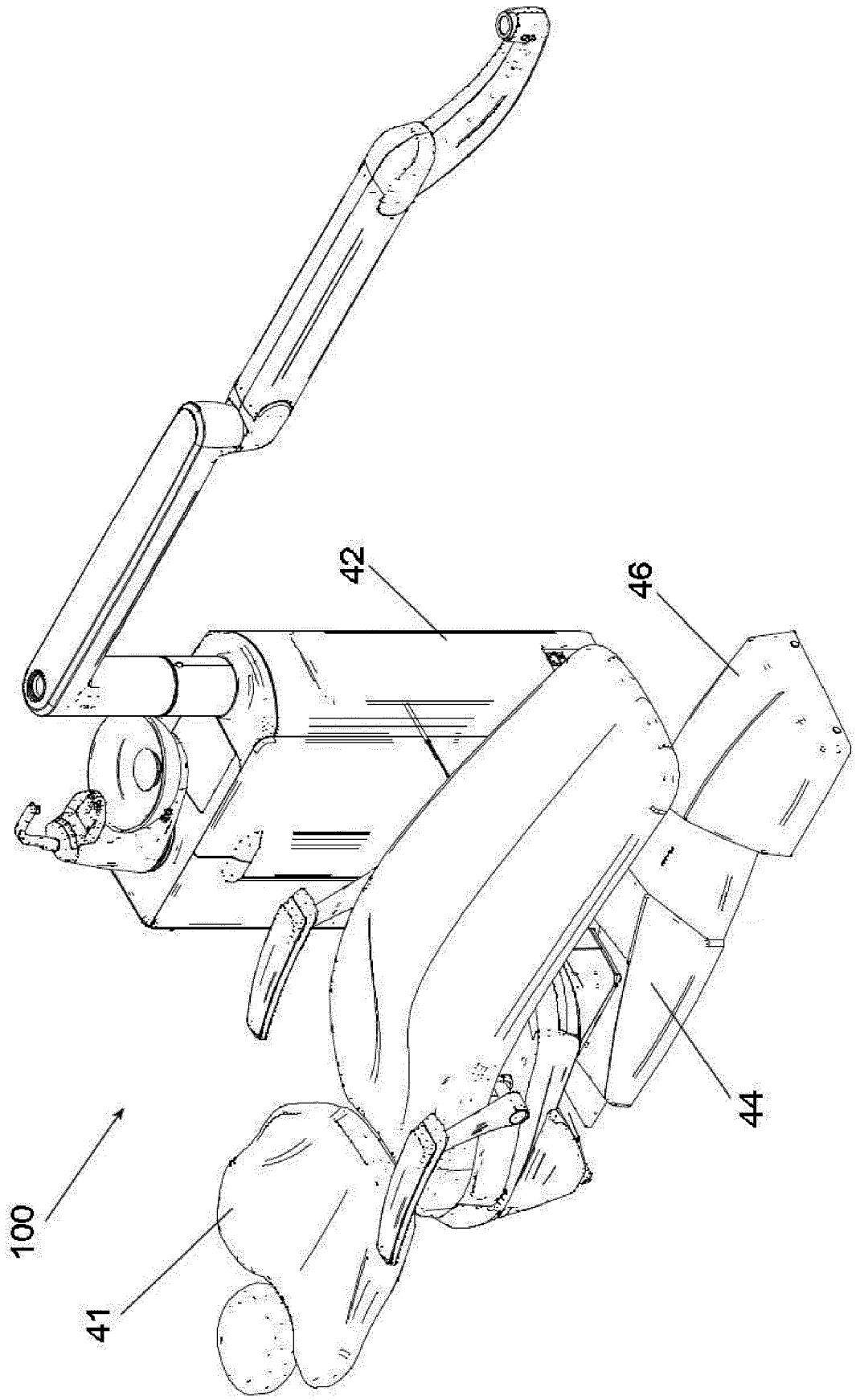

FIG. 7C

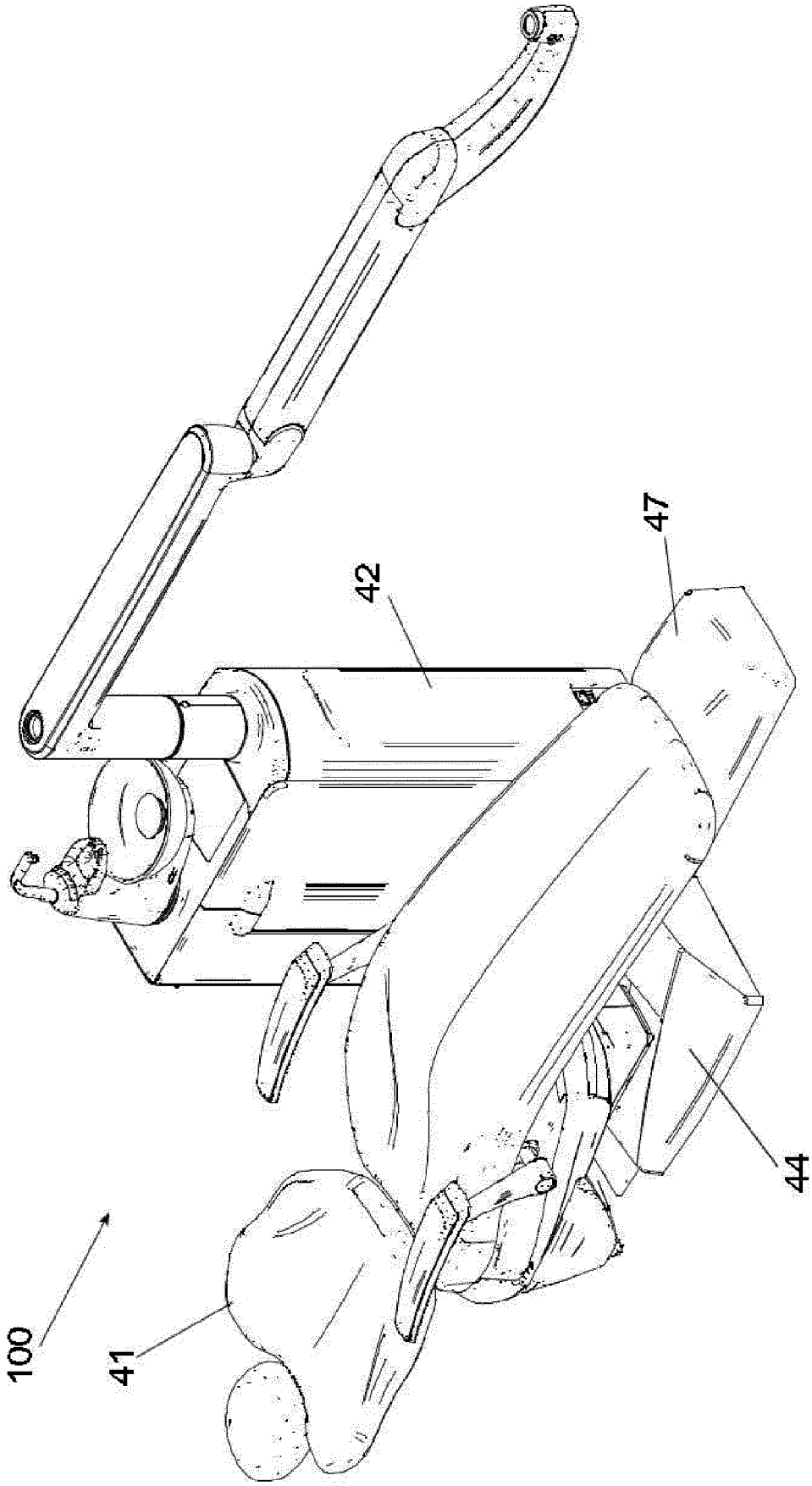

FIG. 7D

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EUROPEAN SEARCH REPORT

Application Number
EP 23 19 6495

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 3 524 676 A (COCHERELL FRANCIS E ET AL) 18 August 1970 (1970-08-18) * column 4, line 55 - column 5, line 14; figures 1, 2, 4, 7, 14 *	1-14	INV. A61G15/14 A61G12/00
A,D	EP 0 100 491 A2 (SIEMENS AG [DE]) 15 February 1984 (1984-02-15) * page 6, lines 26-34; figures 1, 3, 4 *	1-14	

TECHNICAL FIELDS SEARCHED (IPC)

A61G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	16 January 2024	Mammeri, Damya

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 23 19 6495

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16-01-2024

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 3524676 A	18-08-1970	NONE	
EP 0100491 A2	15-02-1984	DE 3228801 A1	09-02-1984
		EP 0100491 A2	15-02-1984

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 3650033 A1 **[0005]**
- DE 1932324 U, of Kaltenbach & Voigt **[0006]**
- EP 0100491 A2 **[0006]**
- EP 0895769 A2, Kaltenbach & Voigt **[0006]**
- DE 1822226 U **[0007]**
- EP 2086489 A1, Kaltenbach & Voigt **[0007]**
- EP 2526916 A1, Planmeca **[0007]**
- US 3524676 A, Cocherell **[0008] [0013]**