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(54) Improved dental delivery system

(57) Dental delivery unit (1) comprising a plurality of handpieces (2), a dental cord (3) to power each handpiece (2) and a support arm (4) for each dental cord (3); said dental delivery unit (1) comprises actuators (6) that facilitate the movements of the arms (4) from idle position to operating position.

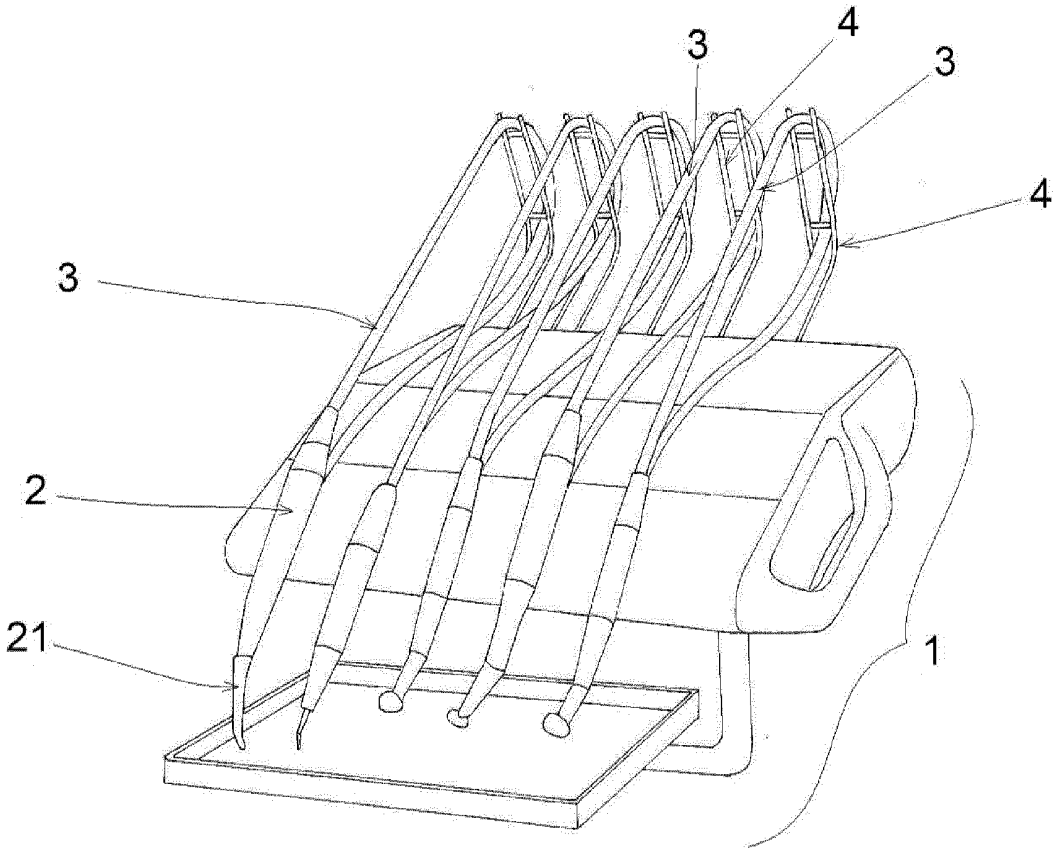


FIG. 2

EP 2 774 593 A1

Description

[0001] The present patent application for industrial invention relates to a dental delivery system.

[0002] The present invention has been developed in the dental field, wherein each dental unit, commonly defined as "dentist's chair", comprises the so-called "dental delivery system" used by the dentist to control the operations to be made.

[0003] More precisely, the dental delivery system consists in a shelf adapted to be disposed above the patient, while the patient lies on the chair. A control panel is integrated inside the dental delivery system to manage the tools and the dental devices.

[0004] Specifically, the dental delivery system is used to support a plurality of handpieces and to control the operaiton of the handpieces, each of them supporting a specific tool for oral cavity operations.

[0005] Each handpiece is connected to the dental delivery system by a cable, which is defined as dental cord.

[0006] More precisely, each dental cord has a first end, which is fixed to the dental delivery system, and a second end, which is connected to the corresponding handpiece.

[0007] The dental delivery system also comprises a support arm for each dental cord.

[0008] More precisely, each support arm supports the corresponding dental cord and is used to accompany the dental cord towards the patient's mouth, when the dentist uses the tool supported by the handpiece connected to the dental cord.

[0009] Specifically, each support arm can have two positions, of which:

- an idle position, wherein the handpiece connected to the dental cord is rested on the dental delivery system;
- an operating position, wherein the handpiece connected to the dental cord is raised from the dental delivery unit and brought towards the patient's mouth.

[0010] Each support arm comprises a return spring that tends to bring the support arm back to idle position.

[0011] Consequently, when the dentist pulls the dental cord towards the patient's mouth, bringing the support arm from idle position to operating position, the return spring of the support arm opposes the movement made by the dentist.

[0012] The force exerted by the spring tends to tiren the arm used by the dentist to move the handpiece, given the fact that said thrust is present as long as the support arm is in operating position.

[0013] Such a drawback has been at least partially solved by means of mechanical stop mechanisms applied to the support arms of the dental delivery system.

[0014] Specifically, each mechanical stop mechanism opposes the thrust exerted by the return spring and is actuated when the dental cord of the support arm reaches a predefined extension, which is lower than the maximum extension of the dental cord.

[0015] Such a mechanical stop mechanism is unblocked by the dentist by pulling the dental cord.

[0016] The known mechanical stop mechanisms do not allow using completely the length of the dental cord and consequently the travel of the support arm, given the fact that they are actuated before the support arm reaches its operating position.

[0017] Moreover, such mechanical stop mechanisms are subject to rapid wear and often to sudden failure.

[0018] The purpose of the present invention is to devise an improved dental delivery system that is able to remedy the drawbacks of the prior art as described above.

[0019] The dental delivery system of the invention comprises:

- at least one handpiece connected to said dental delivery system and adapted to support a tool;
- a dental cord for said at least one handpiece; said dental cord being provided with first end, which is fixed to said dental delivery system, and second end, which is fixed to said at least one handpiece;
- a support arm for said dental cord; said arm being in idle position when said handpiece is rested on said dental delivery system, and in operating position when said handpiece is not rested on said dental delivery system;
- at least one actuator adapted to facilitate the movement of the arm of the dental delivery system between said idle position and said operating position.

[0020] The peculiarity of the dental delivery system of the invention consists in the fact that said actuator is a pneumatic piston or an electrical motor.

[0021] For explanatory reasons, the description of the improved dental delivery system according to the present invention continues with reference to the attached drawings, which only have illustrative, not limiting value, wherein:

- Figure 1 is an axonometric view of the dental unit according to the invention;
- Figure 2 is an axonometric view of the dental delivery system according to the invention;
- Figure 3 is a diagrammatic side view of the dental delivery system of the invention, with the support arm in idle position;
- Figure 4 is a diagrammatic side view of the dental delivery system of the invention, with the support arm in operating position;

[0022] Referring to the attached figures, a dental delivery system of the invention is disclosed, generally indicated with reference numeral (1).

[0023] Referring to Fig. 2, the dental delivery system (1) comprises:

- a plurality of handpieces (2), each of them being connected to said dental delivery system (1) and adapted to support a tool (21);
- a plurality of dental cords (3), one for each handpiece (2);
- a plurality of support arms (4), one for each dental cord (3).

[0024] Specifically, each dental cord (3) comprises two ends (31, 32), of which a first end (31) is fixed to the dental delivery system (1) and a second end (32) is fixed to the handpiece (2).

[0025] Referring to Figs. 3 and 4, each arm (4) can have two positions, of which:

- an idle position, when the handpiece (2) connected to the dental cord (3) is rested on the dental delivery system (1), as shown in Fig. 3;
- an operating position, when the handpiece (2) connected to the dental cord (3) is not rested on the dental delivery system (1), as shown in Fig. 4;

[0026] The dental delivery system (1) of the invention also comprises an elastic return element (5) for each arm (4).

[0027] Each elastic element (5) is provided on the dental delivery unit (1) and exerts a return force on the arm (4) that tends to bring said arm (4) back to said idle position.

[0028] Advantageously, said elastic element (5) consists in a spiral or traction spring.

[0029] Still referring to Figs. 3 and 4, the dental delivery system (1) of the invention also comprises a plurality of actuators (6), one for each arm (4), and each actuator (6) facilitates the movement of the arm (4) from idle position to operating position.

[0030] Each actuator (6) comprises a cylinder and a stem, which is provided with a free end that comes out of the cylinder.

[0031] Advantageously, each actuator (6) consists in a pneumatic piston.

[0032] Alternatively, each actuator (6) can consist in a linear electrical motor.

[0033] Each actuator (6) acts on the corresponding arm (4), moving it from said idle position to said operating position.

[0034] Referring to Figs. 3 and 4, each actuator (6) can have two positions, of which:

- an operating position, wherein the stem of the actuator (6) completely comes out from the cylinder and pushes the corresponding arm (4); when the actuator (6) is in operating position, the corresponding arm (4) moves from the idle position to the operating position;
- an idle position, wherein the stem of the actuator (6) is retracted inside the cylinder; when the actuator (6) is in idle position, the corresponding arm (4) is moved from the operating position to the idle position.

[0035] Still referring to Figs. 3 and 4, the dental delivery unit (1) advantageously comprises a compressed air circuit used to actuate the handpieces (2).

[0036] Said compressed air circuit comprises:

- a primary conduit that passes through each dental cord (3) in order to actuate the corresponding handpiece (2);
- a secondary conduit use to actuate the pneumatic piston.

[0037] When the handpiece (2) connected to the dental cord (3) is raised from the dental delivery system (1) and brought towards the patient's mouth, the dentist actuates a tool control pedal and a first portion of compressed air passes through the primary conduit of the compressed air circuit and actuates the handpiece (2), whereas a second portion of compressed air passes through the secondary conduit of the compressed air circuit and actuates the pneumatic piston or a valve that in turn actuates said pneumatic piston.

[0038] Said pneumatic piston goes from idle position to operating position, wherein the stem comes out of the cylinder and pushes a thrust on the corresponding arm (4).

[0039] The thrust exerted by the stem of the pneumatic piston on the arm (4) of the dental delivery unit (1) opposes the return force exerted by the elastic element (5) on the arm (4), preventing the latter from returning to idle position.

[0040] The pneumatic piston pushes said arm (4) in operating position, in such manner to completely use the length of the dental cord and, consequently, the travel of the arm (4).

[0041] When the dentist stops using the handpiece (2) connected to the dental cord (3) fixed to the arm (4), the pneumatic piston goes from operating position to idle position, wherein the stem is retracted inside the cylinder.

[0042] Consequently, the return force exerted by the elastic element (5) on the arm (4) of the dental delivery system (1) is no longer opposed by the thrust exerted on the arm (4) by the stem of the pneumatic piston.

[0043] Therefore, the arm (4) is subjectt to the return force exerted by the elastic element (5) and goes from operating position to idle position.

[0044] Alternatively, the pneumatic piston can directly act on the elastic element (5) to neutralize the return force exerted by the latter on the arm (4).

[0045] It must be noted that the dental delivery system (1) can also comprise actuation means (7) for said actuator (6).

[0046] Specifically, the actuation means (7) ca comprise a button for manual operation and/or a proximity or inclination sensor, which is used to actuate said actuator (6) as soon as the handpiece (2) is in operating position.

[0047] The present invention also relates to a dental

unit that comprises the dental delivery system (1) as described above.

Claims

1. A dental delivery system (1) comprising:

   - at least one handpiece (2) connected to said dental delivery system (1) and adapted to support a tool (21);
   - a dental cord (3) for said at least one handpiece (2); said dental cord (3) being provided with a first end (31) fixed to said dental delivery system (1) and a second end (32) fixed to said at least one handpiece (2);
   - a support arm (4) for said dental cord (C); said arm (4) being in idle position when said handpiece (2) is rested on said dental delivery system (1) and in operating position when said handpiece (2) is not rested on said dental delivery system (1);
   - at least one actuator (6) adapted to facilitate the movement of the arm (4) between said idle position and said operating position;

   dental delivery system (1) **characterized in that** said at least one actuator (6) is a pneumatic piston or an electrical motor.

2. The dental delivery system (1) of claim 1, wherein said at least one actuator (6) acts directly on the arm (4) moving it from said idle position to said operating position.

3. The dental delivery system (1) of claim 1, comprising an elastic return element (5) situated on said dental delivery system (1); said elastic element (5) exerting a return force on arm (4) in order to return arm (4) from said operating position to said idle position; said at least one actuator (6) acting on said elastic element (5) neutralizing said return force.

4. The dental delivery system (1) of any one of the preceding claims, wherein said at least one actuator (6) is a pneumatic piston and said dental delivery system (1) comprises an air compressed circuit to operate the handpiece (2), wherein said air compressed circuit comprises:

   - a primary conduit that passes through the dental cord (3) in order to actuate said at least one handpiece (2);
   - a secondary conduit use to actuate said pneumatic piston.

5. The dental delivery system (1) of any one of the preceding claims, comprising actuation means (7) adapted to actuate said at least one actuator (6).

6. The dental delivery system (1) of claim 5, wherein said actuation means (7) comprise a button for manual operation and/or a proximity sensor adapted to actuate said actuator (6) as soon as said at least one handpiece (7) is in operating position.

7. The dental delivery system (1) of claim 5 or 6, wherein said actuation means (7) comprise an inclination sensor adapted to actuate said actuator (6) as soon as said at least one handpiece (2) is in operating position.

8. The dental unit comprising a dental delivery system (1) according to any one of the preceding claims.

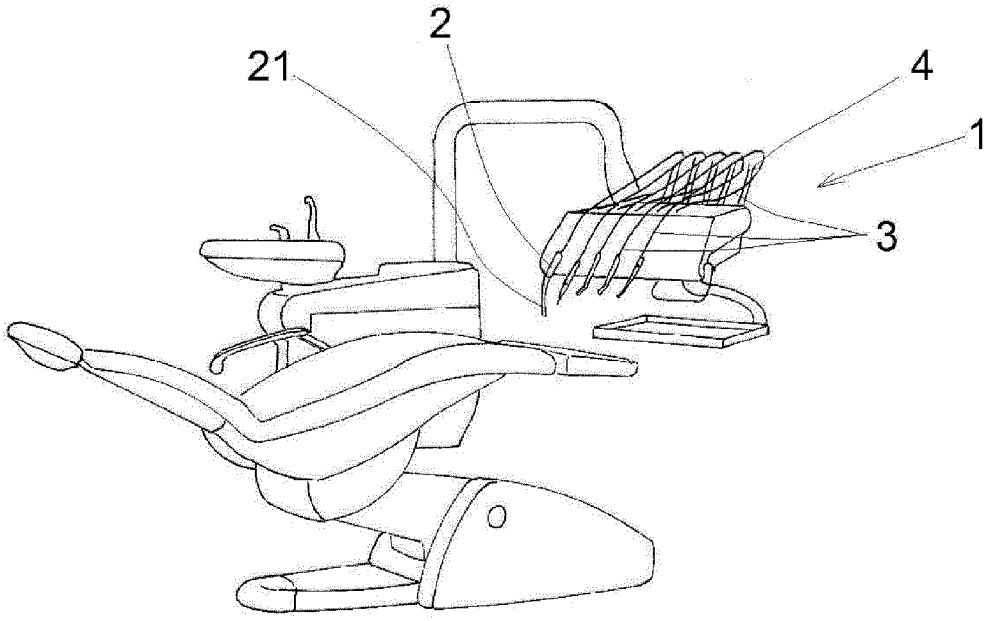


FIG. 1

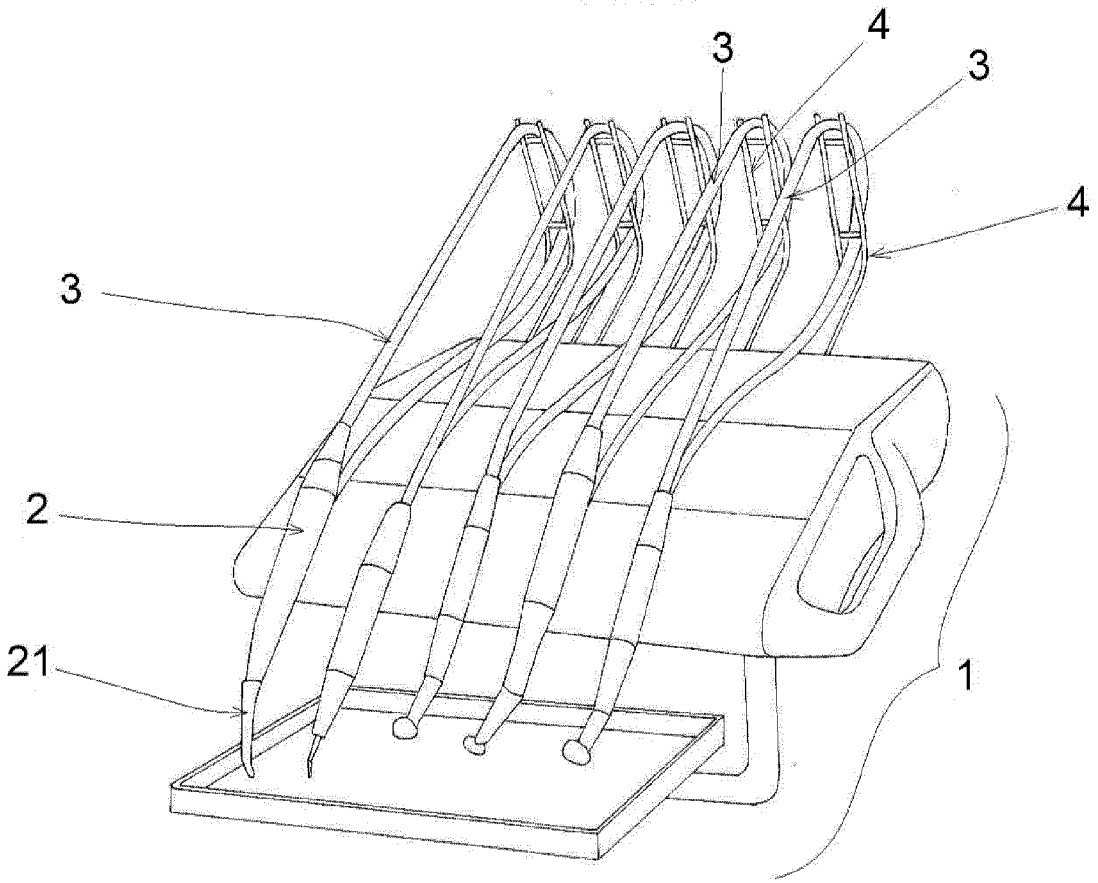


FIG. 2

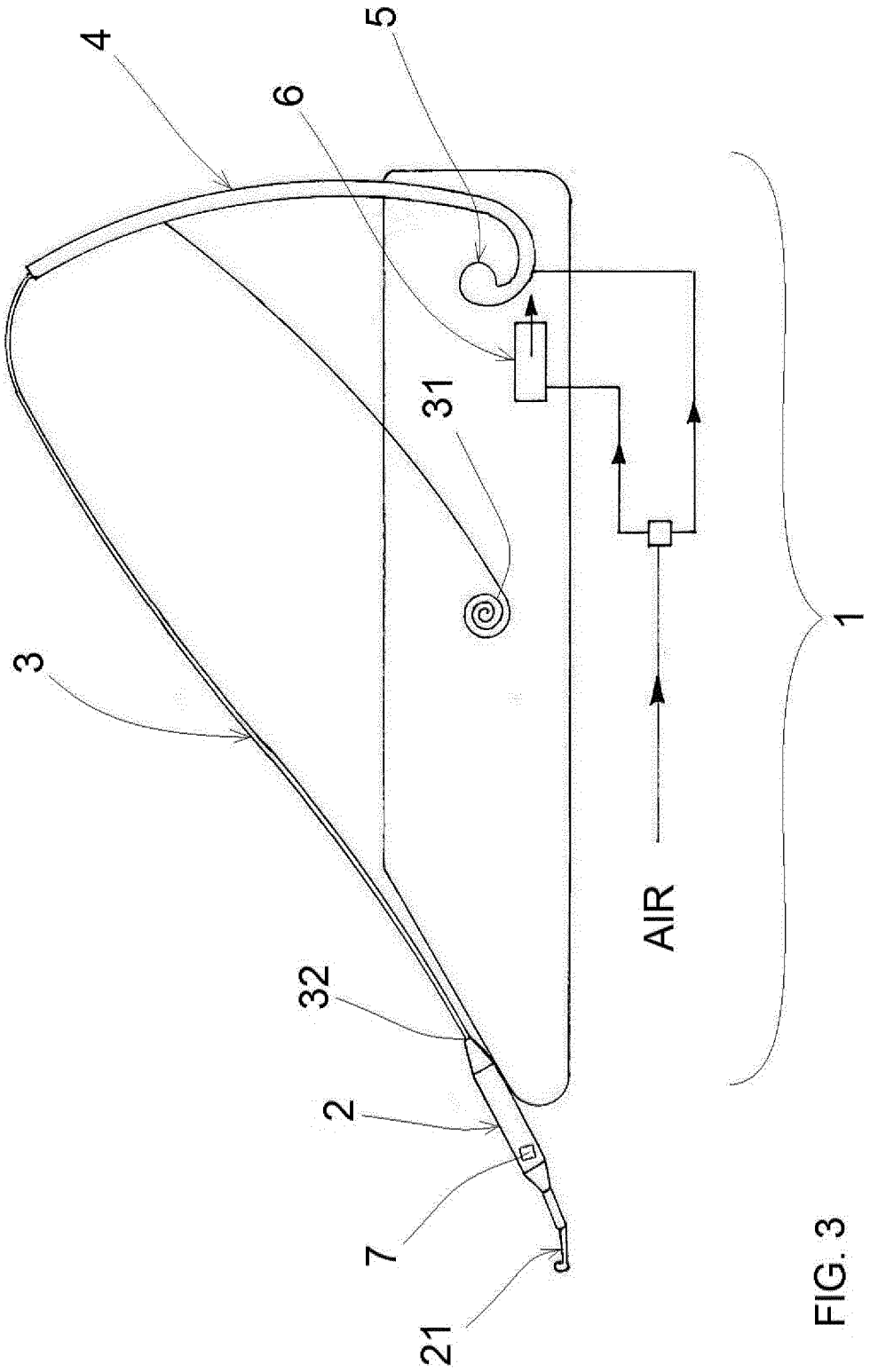


FIG. 3

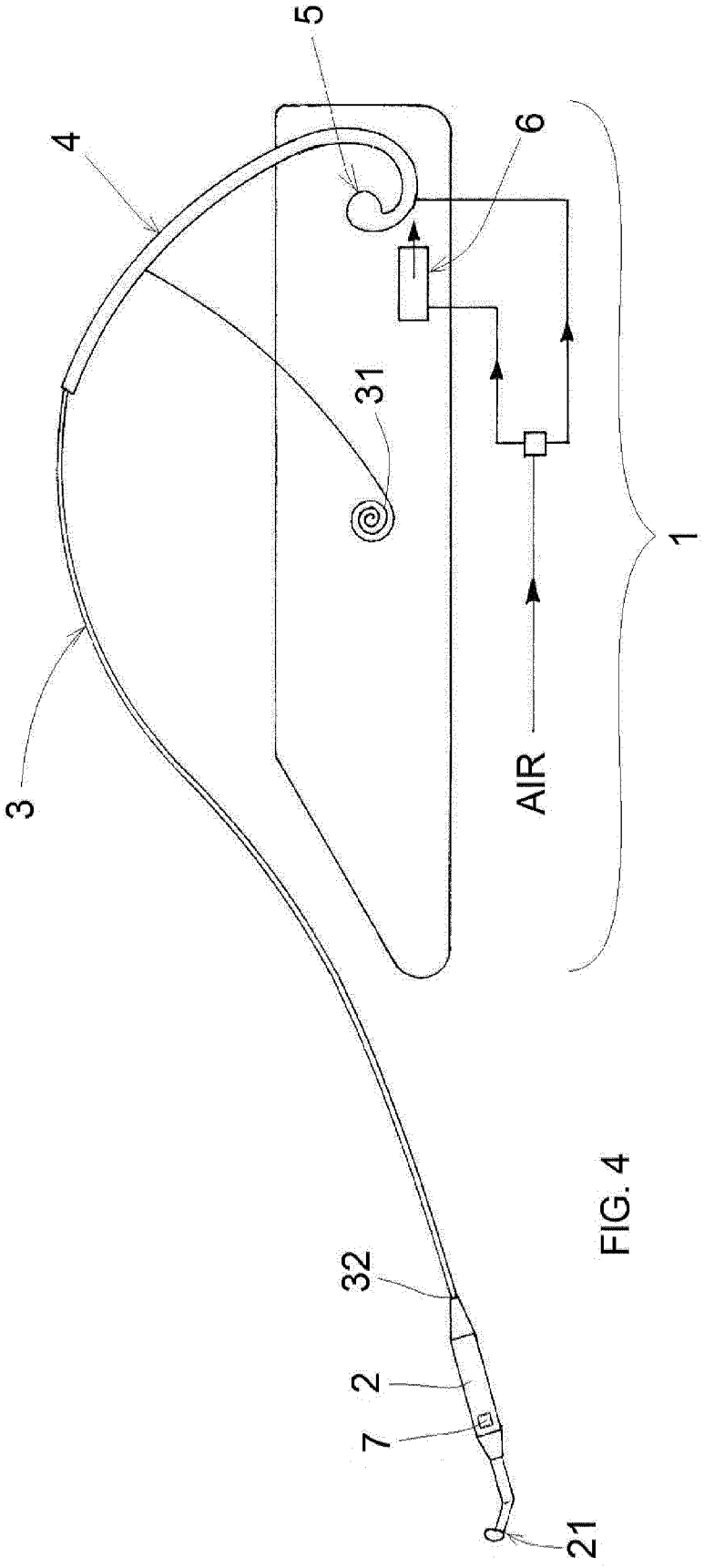


FIG. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 14 15 7517

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	14 May 2014	Fouquet, Michèle

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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