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(54) **CHAIRBACK CURVATURE ADJUSTMENT DEVICE**

(57) The device includes a back support (2), a flexible back (1), a rope (3) and a driving mechanism (4). The flexible back (1) has a fixing end (10) firmly connected to the back support (2) and a free end (11). The rope (3) has a connecting end (30) connected to the free end (11) of the flexible back (1) and a driving end (31). The driving mechanism (4) is connected to the driving end (31) of the rope (3). The curvature of the flexible back (1) can be adjusted by controlling the rope (3) through the driving mechanism (4).

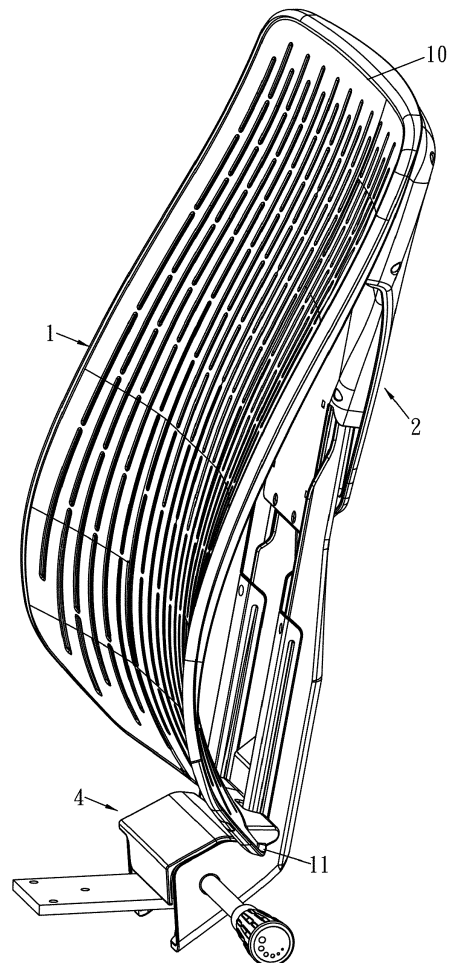


FIG. 1

Description**Brief Description of the Drawings****Background of the Invention****[0008]****1. Technical Field**

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[0001] The invention relates to chairs for seating, particularly to a device for adjusting chairback curvature for users' requirements.

FIG. 1 is a perspective view of the invention;
FIG. 2 is an exploded view of the back and the back support of the invention;
FIG. 3 is an exploded view of the back support of the invention;

2. Related Art

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[0002] To improve sitting comfort, back fitting is an important factor. Especially in the portion of lumbar support, long sitting without proper support will cause back pain or may cause permanent injury such as vertebral deformation.

FIG. 4 is an enlarged view of the driving mechanism of the invention;

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[0003] Both Taiwan patent No. I327901 "Cushion Adjustment System" and No. I373317 "An Improved Structure of Chair Cushion" mention this issue. '901 teaches an inflatable chairback which can be inflated to change its curvature so as to support a user's waist. This can reach a certain effect, but it is very expensive. Also, its inflating components are cloaked in the chairback, it is hard to be repaired or maintained when they malfunction.

FIG. 5 is a schematic view of the invention, which shows an initial status of the chairback;
FIG. 6 is a side view of FIG. 5;

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[0004] As for '317, several elastic pads are mounted on the chairback, and the elastic pads can be deformed by pulling a rope to support a user's back. Its structure is simpler than '901, but the elastic pads are still cloaked in sponge. When the elastic pads malfunction, the sponge must be removed before the elastic pads can be repaired. Not only is the process complicated, but also the components may be damaged. Moreover, those elastic pads only partially support a user's back and the deformation of the chairback is limited, so that it is hard to satisfy users' requirements.

FIG. 7 is a schematic view of the invention, which shows the operation of the rope and driving mechanism; and

FIG. 8 is a side view of FIG. 7, which shows the curvature of the back is being adjusted.

Detailed Description of the Invention**Summary of the Invention**

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[0005] An object of the invention is to provide a chairback curvature adjustment device, which is easy to be repaired or maintained.

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[0006] Another object of the invention is to provide a chairback curvature adjustment device, whose structure is relatively simple and manufacturing cost is relatively low.

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[0007] To accomplish the above object, the chairback curvature adjustment device of the invention includes a back support, a flexible back, a rope and a driving mechanism. The flexible back has a fixing end firmly connected to the back support and a free end. The rope has a connecting end connected to the free end of the flexible back and a driving end. The driving mechanism is connected to the driving end of the rope. The curvature of the flexible back can be adjusted by controlling the rope through the driving mechanism.

[0009] As shown in FIGS. 1-4, the invention includes a back support 2, a flexible back 1, a rope 3 and a driving mechanism 4. The flexible back 1 has a fixing end 10 and a free end 11. The fixing end 10 is firmly connected to the back support 2. The free end 11 is connected to the rope 3. The rope 3 is put around the back support 2 and has a connecting end 30 and a driving end 31. The connecting end 30 is connected to the free end 11 of the flexible back 1. The driving mechanism 4 is connected to the driving end 31 of the rope 3. The driving mechanism 4 is disposed at a bottom end of the back support 2. The curvature of the flexible back 1 can be adjusted by controlling a path of the rope 3 through the driving mechanism 4.

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[0010] Please refer to FIGS. 3 and 4. The driving mechanism 4 has a driving shaft 40, an operating unit 41, a sliding block 42 and a limiting unit 43. The operating unit 41 is arranged at an end of the driving shaft 40 for rotatably driving the driving shaft 40. A surface of the driving shaft 40 is provided with a thread 400 screwed with the sliding block 42. The sliding block 42 is connected to the driving end 31 of the rope 3. The sliding block 42 is cloaked in the limiting unit 43 and is restrained in rotation. The limiting unit 43 is formed with a channel 430 for allowing the sliding block 42 to move.

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[0011] When operating, a user exerts a force to the operating unit 41 to drive the driving shaft 40 to rotate, the sliding block 42 screwed on the driving shaft 40 is restrained by the limiting unit 43 to be not able to rotate and only can be axially moved in the channel 430 by the transmission of the thread 400. At the same time, the rope 3 is led to change a relative position of the free end 11 of the flexible back 1.

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[0012] Preferably, the back support 2 has at least one positioning portion 20 whose position is higher than the driving mechanism 4 for positioning the rope 3 around

the flexible back 1 and serving as a fulcrum when the rope 3 is leading the free end 11 of the flexible back 1. A sleeve 32 is put around the rope 3 to prevent the rope 3 from wearing out. Additionally, the free end 11 of the flexible back 1 is disposed with a rod 12 to which the connecting end 30 of the rope 3 is connected. In the shown embodiment, as shown in FIG. 4, the rod 12 is provided with a first through hole 120 which is passed through by the connecting end 30 of the rope 3. The rod 30 is provided with a stopper 300 for preventing the rod 12 from escaping. Such a connection between the rope 3 and the free end 11 provides the rod 12 replaceability without causing damage to the flexible back 1. Furthermore, the other end of the rod 12 is provided with a second through hole 121 being passed through by the rope 3 for allowing the rod 12 to freely move along the rope 3. The sleeve 32 is provided with a broken point 320 near the second through hole 121 for allowing the rod 12 to pass the sleeve 32 without interference.

[0013] To keep stability of the free end 11 of the flexible back 1, each of two opposite sides of the back support 2 is provided with a guiding hole 21 to be passed through by two ends of the rod 12. The rod 12 is further connected to the free end 11 of the flexible back 1 to make the free end 11 restrained in path and travelling. Such a design can avoid the free end 11 from shifting. Also, length of the guiding hole 21 limits the travelling of the free end 11 to avoid excessive deformation of the flexible back 1.

[0014] Please refer to FIGS. 5-8. In an initial status, as shown in FIGS. 5 and 6, the free end 11 is at a lower position than the back support 2, and two ends of the rod 12 fall in the guiding holes 21 at two sides of the back support 2. When operating, the operating unit 41 is rotated to drive the driving shaft 40 to rotate, the sliding block 42 is moved in the channel 430 of the limiting unit 43 through the thread 400 of the driving shaft 40. As abovementioned, the limiting unit 43 limits the sliding block 42 to be not able to rotate but to axially move in the channel 430. As shown in FIG. 7, the sliding block 42 moves from the left to the right and leads the connecting end 30 of the rope 3.

[0015] The connecting end 30 of the rope 3 is connected to the rod 12 and the rope 3 is put around the back support 2 through the positioning portion 20, so the rod 12 moves from a low position to a high position in the guiding hole 21 and drives the free end 11 connected to the rod 12. As shown in FIG. 8, because of flexibility of the flexible back 1, when the fixing end 10 is fixed to the back support 2, the positional change of the free end 11 will deform the flexible back 1 to change its curvature. Such a curvature adjustment may vary depending upon the positional change of the sliding block 42 and will be fixed when the driving shaft 40 stops rotating. The adjustment of curvature of the flexible back 1 will satisfy various requirements of all users.

[0016] It will be appreciated by persons skilled in the art that the above embodiment has been described by way of example only and not in any limitative sense, and

that various alterations and modifications are possible without departure from the scope of the invention as defined by the appended claims. For example, besides the above embodiment, the rope 3 may not surround the back support 2, as shown in FIG. 8, when the initial status of the flexible back 1 is in a large-curvature status, the rope 3 is led through the driving mechanism 4 to pull down the free end 11 of the flexible back 1 to be as the status of FIG. 6. When restoring, only reversely operating the driving mechanism 4 is needed.

Claims

1. A chairback curvature adjustment device comprising:
 - a back support;
 - a flexible back having a free end and a fixing end firmly connected to the back support;
 - a rope having a driving end and a connecting end connected to the free end of the flexible back; and
 - a driving mechanism connected to the driving end of the rope;
 - wherein curvature of the flexible back can be adjusted by controlling the rope through the driving mechanism.
2. The chairback curvature adjustment device of claim 1, wherein the back support has at least one positioning portion for positioning the rope around the flexible back.
3. The chairback curvature adjustment device of claim 2, wherein the positioning portion is higher than the driving mechanism in position.
4. The chairback curvature adjustment device of claim 1, 2 or 3, wherein the driving mechanism has a driving shaft, an operating unit, a sliding block and a limiting unit, the operating unit is arranged at an end of the driving shaft for rotatably driving the driving shaft, a surface of the driving shaft is provided with a thread screwed with the sliding block, the sliding block is connected to the driving end of the rope, the sliding block is cloaked in the limiting unit and is restrained in rotation, and the limiting unit is formed with a channel for allowing the sliding block to move.
5. The chairback curvature adjustment device of claim 1, 2 or 3, wherein the free end of the flexible back is disposed with a rod to which the connecting end of the rope is connected.
6. The chairback curvature adjustment device of claim 5, wherein the rod is provided with a first through hole which is passed through by the connecting end

of the rope, and the rod is provided with a stopper for preventing the rod from escaping.

7. The chairback curvature adjustment device of claim 5, wherein each of two opposite sides of the back support is provided with a guiding hole to be passed through by two ends of the rod. 5
8. The chairback curvature adjustment device of claim 1, 2 or 3, wherein a sleeve is put around the rope. 10
9. The chairback curvature adjustment device of claim 6, wherein another end of the rod is provided with a second through hole being passed through by the rope. 15
10. The chairback curvature adjustment device of claim 9, wherein a sleeve is put around the rope, and the sleeve is provided with a broken point near the second through hole for allowing the rod to pass the sleeve without interference. 20

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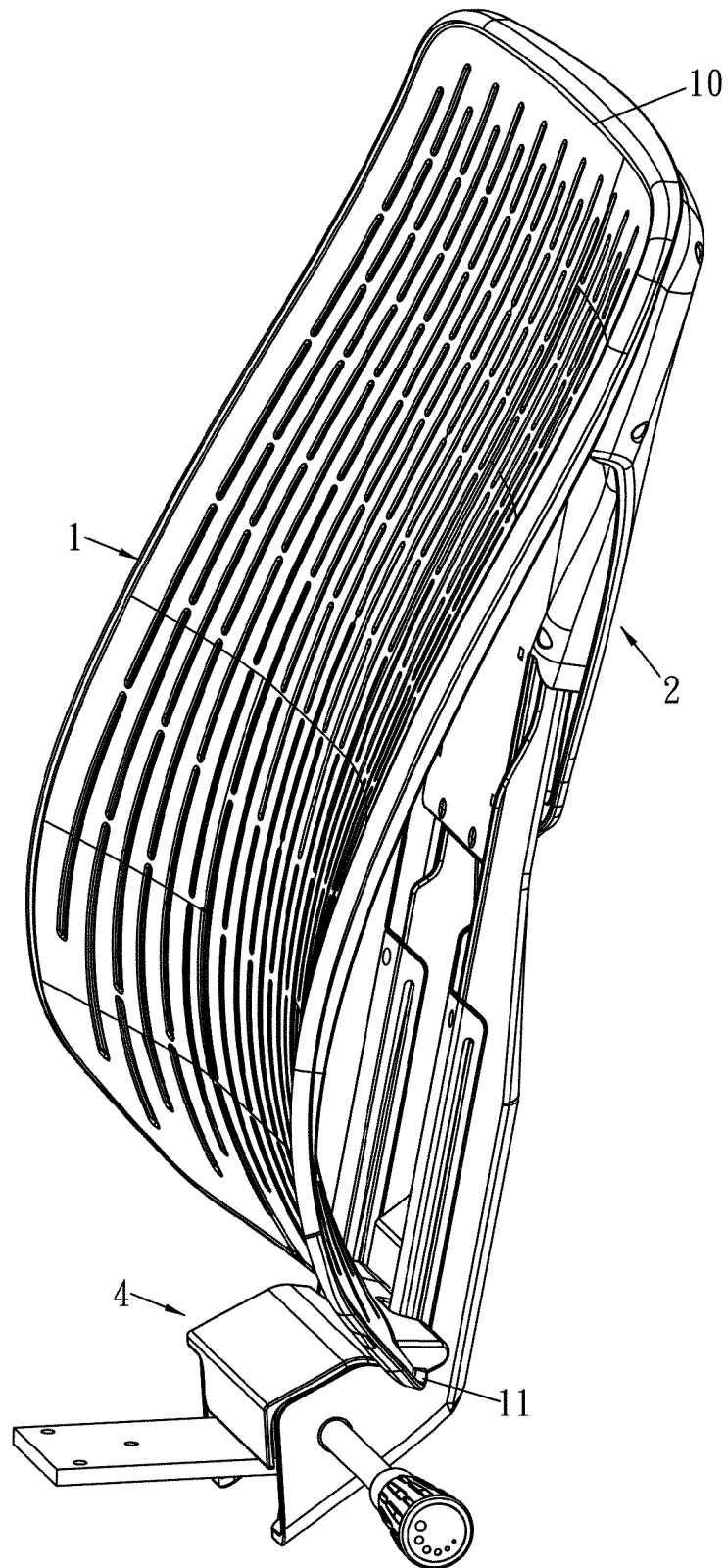


FIG. 1

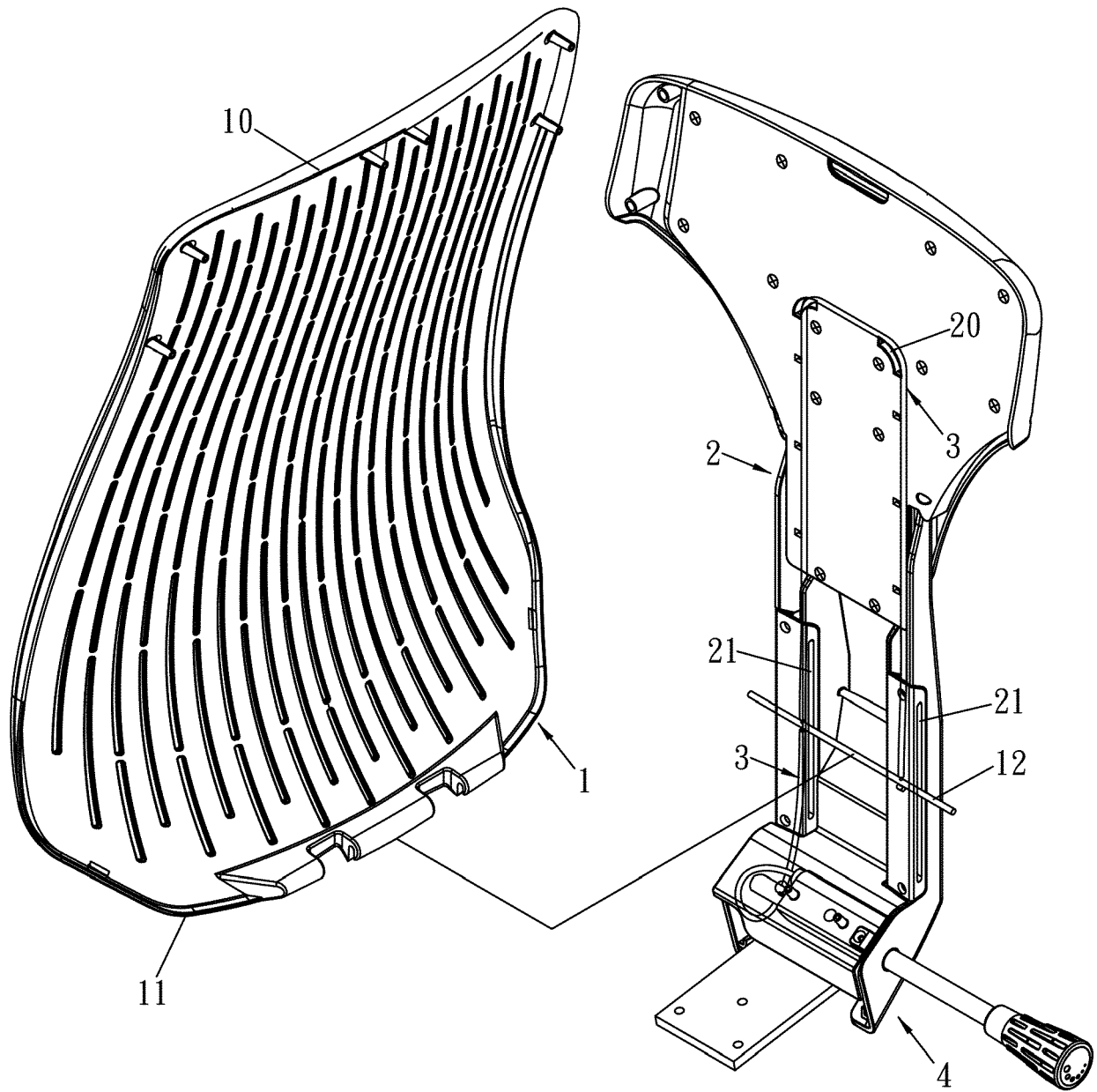


FIG. 2

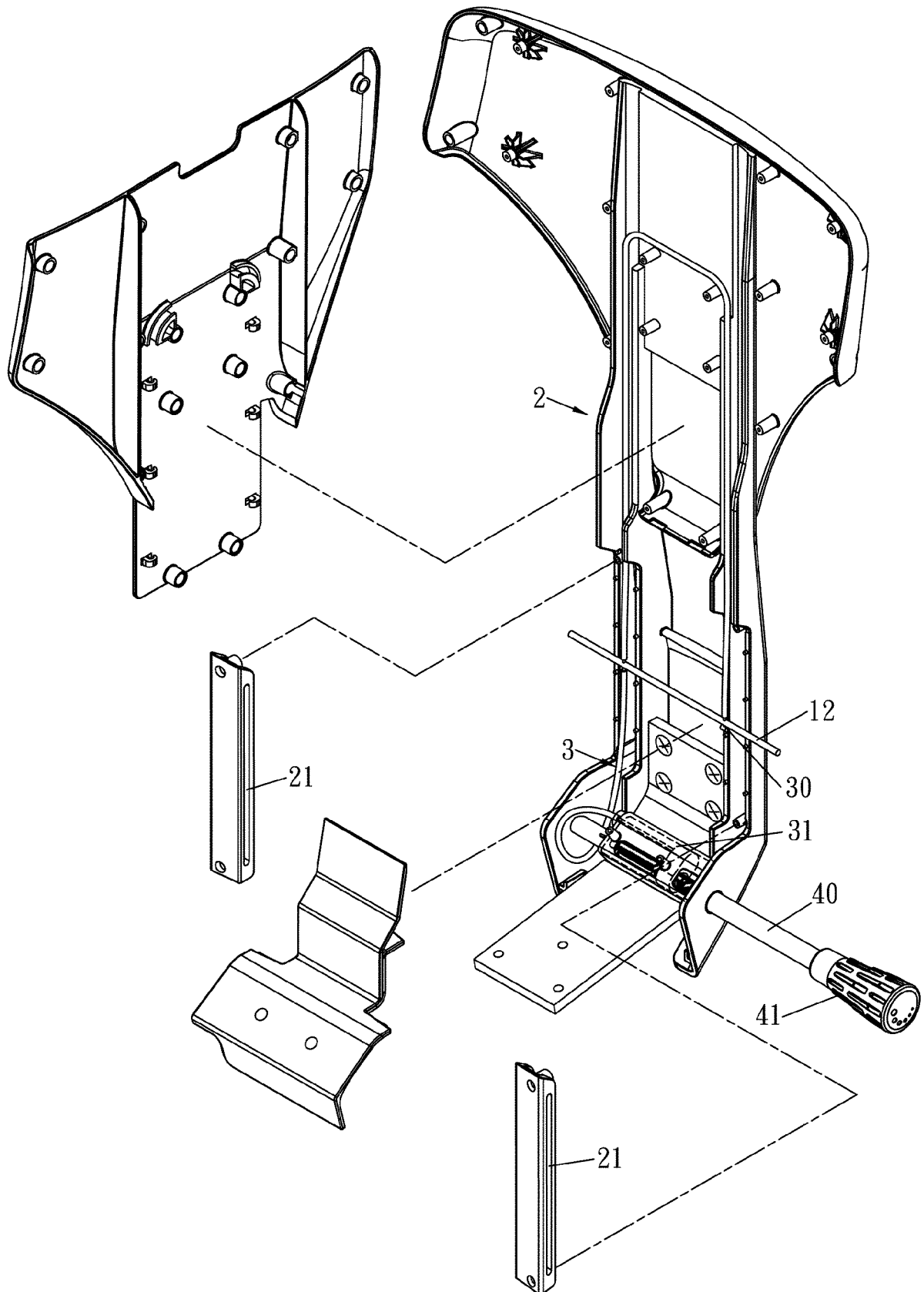


FIG. 3

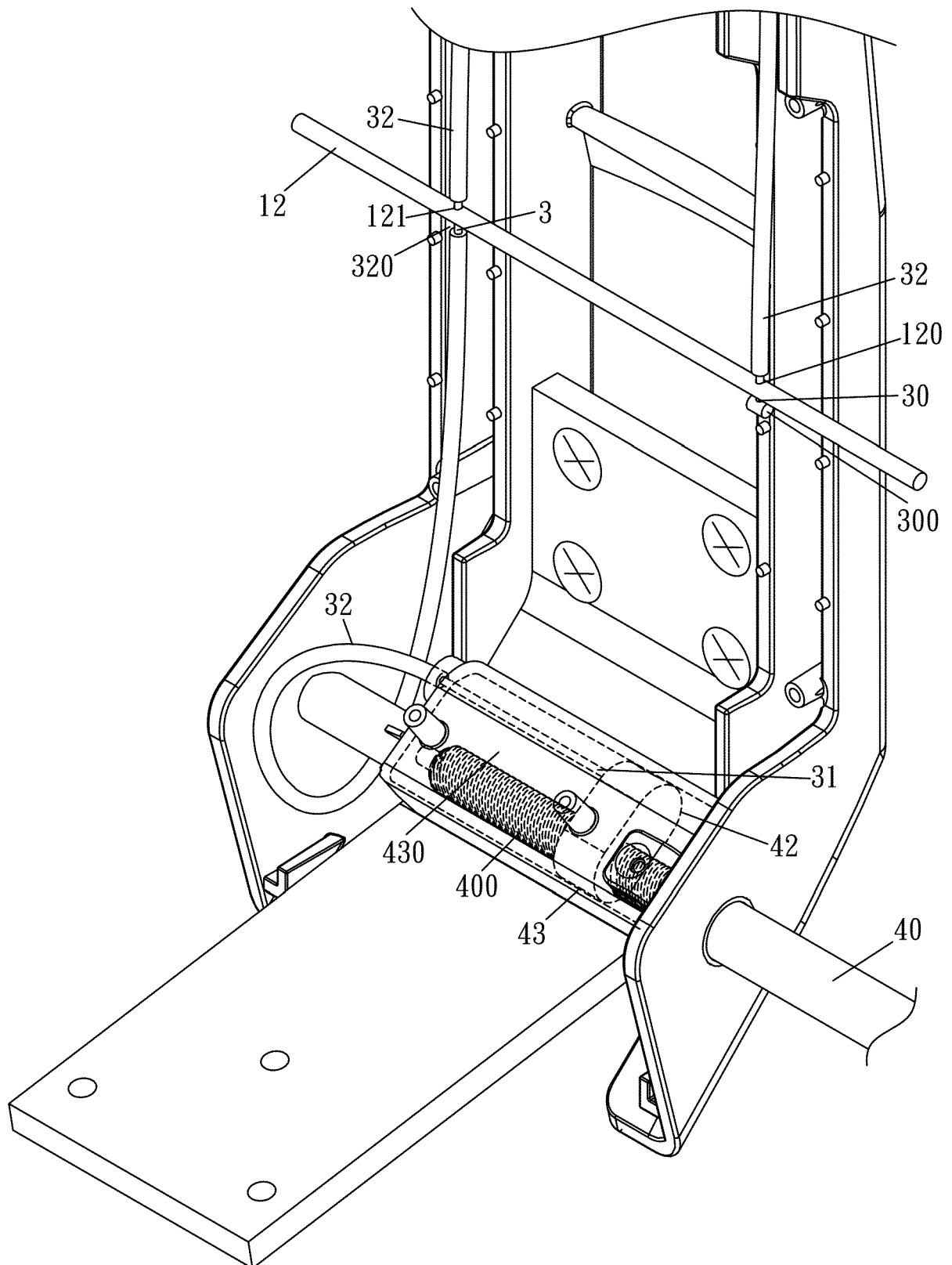
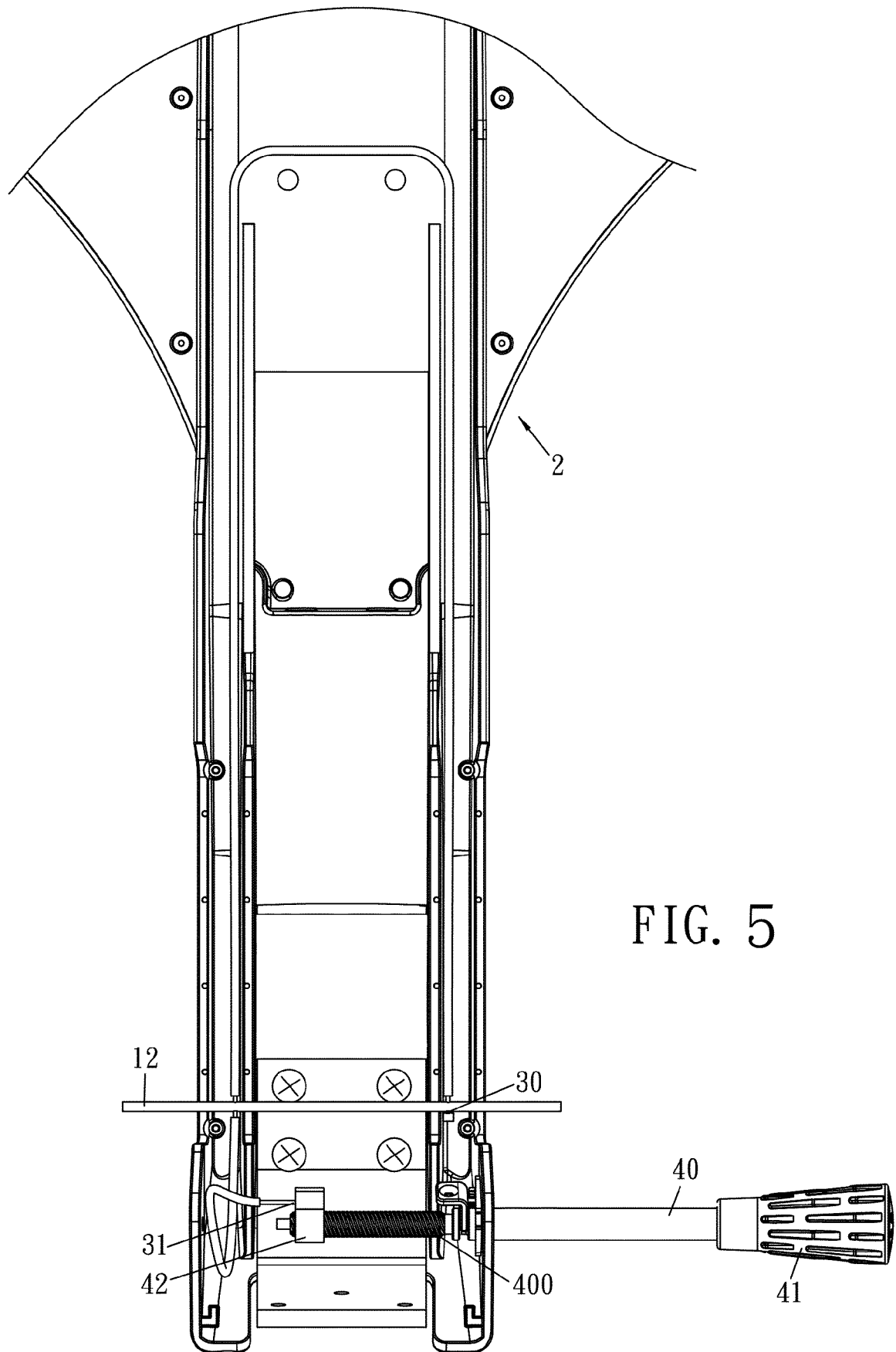


FIG. 4



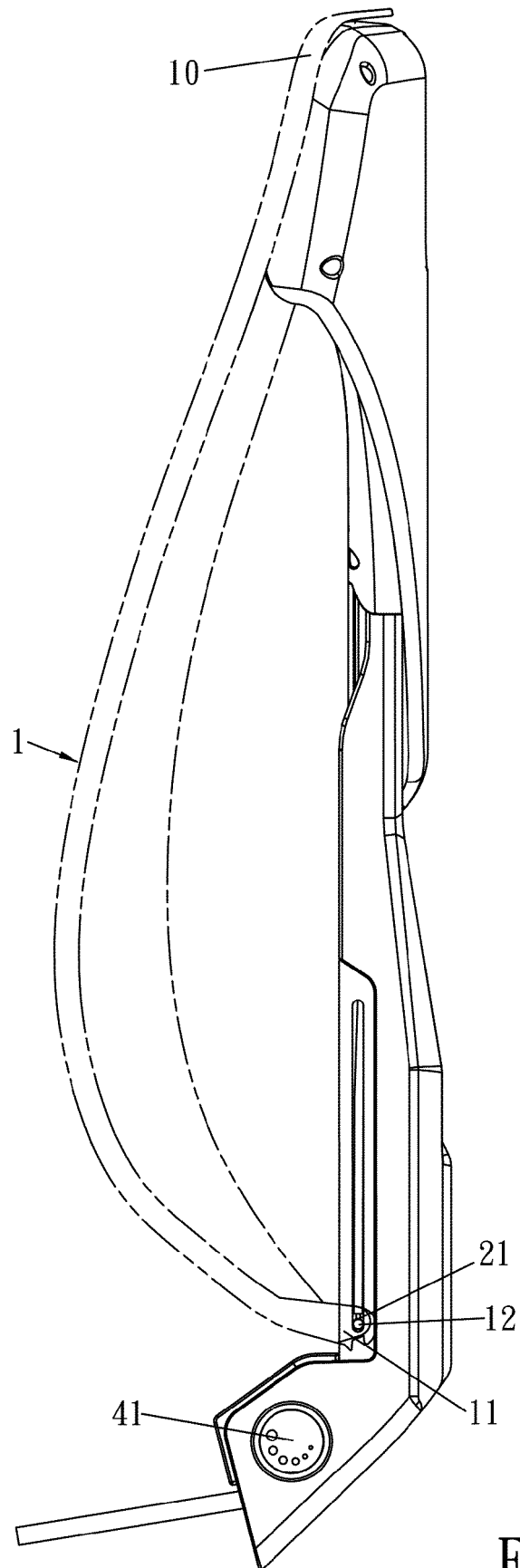
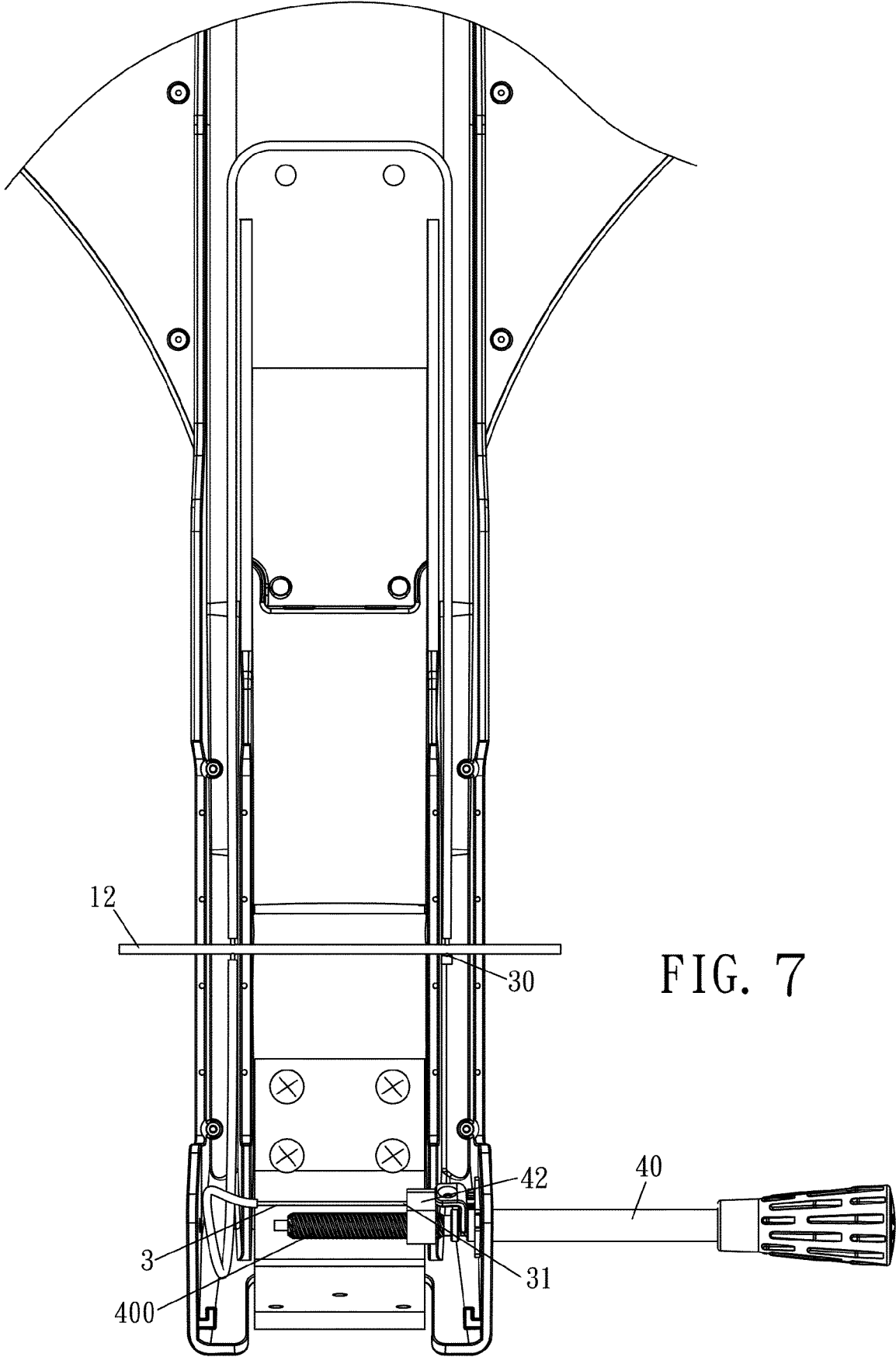


FIG. 6



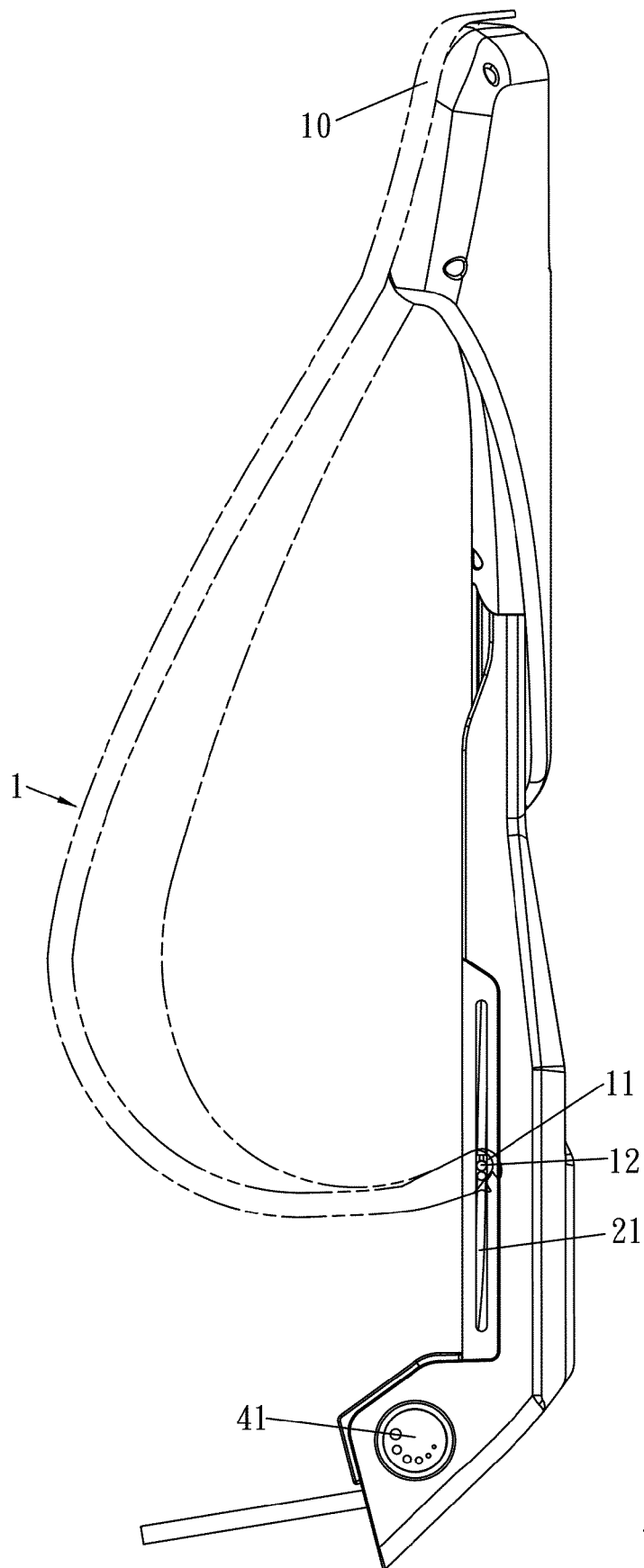


FIG. 8



EUROPEAN SEARCH REPORT

Application Number
EP 17 18 4826

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EPO FORM 1503 03.82 (P04C01)

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			TECHNICAL FIELDS SEARCHED (IPC)
			A47C B60N
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 20 September 2017	Examiner Kohler, Pierre
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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