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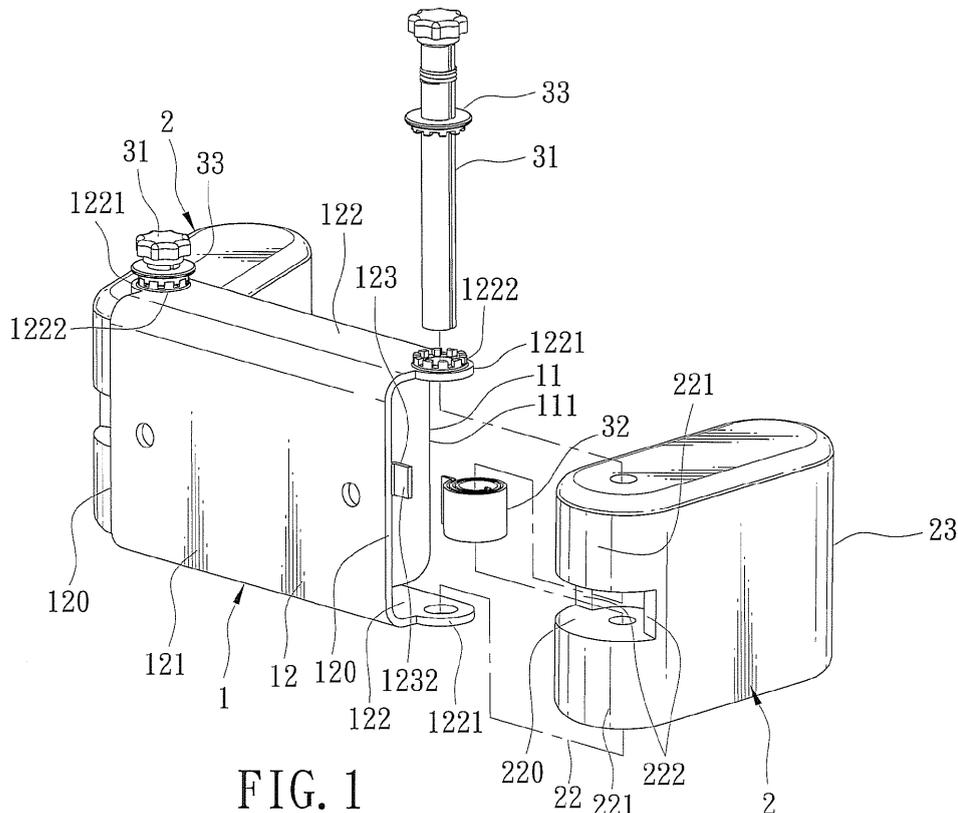
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**(54) Rehabilitation exercise device**

(57) A rehabilitation exercise device includes a head support unit (1) having a head cushion (11) adapted to support the head of a user, and a frame (12) holding the head cushion (11) and having two opposite connection ends (120). Two side cushions (2) are disposed respectively on two opposite sides of the head cushion (11),

and are connected pivotally and respectively to the connection ends (120) so that the side cushions (2) are rotatable toward or away from the head cushion (11). Abi-asing unit is connected to the side cushions (2) to bias the side cushions (2) to rotate toward the head cushion (11).



**FIG. 1**

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## Description

**[0001]** This invention relates to a rehabilitation exercise device, more particularly to a rehabilitation exercise device that aids in recovery of the neck and shoulder muscles or the meridian system.

**[0002]** With the increasing use of computers, it is becoming common for people to suffer from arm, shoulder, and neck pains. About 85% of the people suffering from neck pain do so as a result of injury to the muscles or ligaments due to wrong posture or push-pull motions. About 50% of the people have myofascial pain syndromes, the symptoms of which include muscle pain and stiffness in the neck and shoulders. Further, pain in the neck and shoulders commonly spreads to the back and top of the brain, forehead, etc.

**[0003]** Conventional rehabilitation exercise devices currently available on the market are usually bulky, and thus occupy a substantial space. Hence, most people go to the hospital or clinic for treatment. Since such patients are generally exposed to tense and high-pressure environments where people are busy with work and have no time to go for check-ups, doctors have pointed out that these pains or injuries, though slow, are accumulated in the long run which may result in the patient being moody and having poor immune functions. In some cases, such pains and injuries may lead to spinal marrow in the neck vertebrae being reduced and blood veins being constricted.

**[0004]** Therefore, the object of the present invention is to provide a rehabilitation exercise device that is small and easy to use.

**[0005]** According to one aspect of this invention, a rehabilitation exercise device comprises a head support unit, two side cushions, and a biasing unit. The head support unit has a head cushion adapted to support the head of a user, and a frame holding the head cushion and having two opposite connection ends. The side cushions are disposed respectively on two opposite sides of the head cushion, and are connected pivotally and respectively to the connection ends so that the side cushions are rotatable toward or away from the head cushion. The biasing unit is connected to the side cushions to bias the side cushions to rotate toward the head cushion.

**[0006]** According to another aspect of this invention, a rehabilitation exercise device comprises a head support unit, two side cushions, a biasing unit, and a limiter. The head support unit has a head cushion with a head support face adapted to support the head of a user. The side cushions are disposed respectively on two opposite sides of the head cushion, and are connected pivotally to the head support unit so that the side cushions are rotatable toward or away from the head cushions. The biasing unit is connected to the side cushions to bias the side cushions to rotate toward the head cushion. The limiter limits rotation of the side cushions so that the side cushions do not extend over the head support face.

**[0007]** Other features and advantages of the present

invention will become apparent in the following detailed description of the preferred embodiments of the invention, with reference to the accompanying drawings, in which:

Fig. 1 is a partly exploded perspective view of a rehabilitation exercise device according to the first preferred embodiment of this invention;

Fig. 2 is a perspective view of the first preferred embodiment in an assembled state;

Fig. 3 is a perspective view of the first preferred embodiment in a state of use;

Fig. 4 is a schematic view of the first preferred embodiment in a state of use;

Fig. 5 is a view similar to Fig. 3, but illustrating a patient's head turning to one side;

Fig. 6 is a perspective view of a rehabilitation exercise device according to the second preferred embodiment of this invention;

Fig. 7 is a schematic view of a rehabilitation exercise device according to the third preferred embodiment of this invention;

Fig. 8 is a partly exploded sectional view of a rehabilitation exercise device according to the fourth preferred embodiment of this invention; and

Fig. 9 is a sectional view of the fourth preferred embodiment in an assembled state.

**[0008]** Before the present invention is described in greater detail, it should be noted that the same reference numerals have been used to denote like elements throughout the specification.

**[0009]** Referring to Figs. 1 to 5, a rehabilitation exercise device according to the first preferred embodiment of the present invention is shown to comprise a head support unit 1, two side cushions 2, two shafts 31, a biasing unit, and a limiter.

**[0010]** The head support unit 1 has a head cushion 11 and a frame 12. The head cushion 11 has a head support face 111 adapted to support the head of a user. The frame 12 is substantially U-shaped, and has two opposite connection ends 120, two side arms 122, and a bight portion 121 between the side arms 122. The head cushion 11 is disposed over the bight portion 121 between the side arms 122. Each connection end 120 has a pair of ear portions 1221 projecting outwardly and respectively from the side arms 122 at one side of the bight portion 121. One of the ear portions 1221 of each connection end 120 has an annular toothed element 1222.

**[0011]** The side cushions 2 are disposed respectively on two opposite sides of the head cushion 11. Each side cushion 2 has a proximal end 22 connected pivotally to one of the connection ends 120, and a distal end 23 opposite to the proximal end 22. The proximal end 22 is provided with two lug portions 221 disposed between the ear portions 1221 at one of the connection ends 120, a cutout 220 formed between the lug portions 221, and two spaced-apart abutment end faces 222 adjacent to the

cutout 220.

**[0012]** Each of the shafts 31 extends through the pair of ear portions 1221 at one of the connection ends 120 and the lug portions 221 of a respective side cushion 2, so that the side cushions 2 are disposed rotatably and respectively around the shafts 31. Each shaft 31 has an annular toothed element 33 sleeved thereon to mesh with the annular toothed element 1222 on one of the ear portions 1221 of each connection end 120 so as to prevent rotation of the respective shaft 31.

**[0013]** The biasing unit includes two torsion springs 32 (only one is visible in Figs. 1 and 2) wound respectively around the shafts 31 so as to urge the side cushions 2 toward the head cushion 11. Each torsion spring 32 has an inner end engaging one of the shafts 31, and an outer end engaging one of the side cushions 2.

**[0014]** The limiter includes two limiting plates 123 (see Fig. 5) provided on the frame 12 in proximity to the connection ends 120, respectively. Each limiting plate 123 has an upright member 1231 extending upwardly from the bight portion 121, and a stop member 1232 extending transversely from the upright member 1231 to abut against one of the abutment end faces 222 of the side cushion 2 that moves toward the head cushion 11, thereby limiting rotation of said side cushion 2 toward the head cushion 11 so that said side cushion 2 does not extend over the head cushion 11.

**[0015]** With reference to Fig. 3, since the rehabilitation exercise device of the present invention is small, it can be placed on the floor or on a bed so as to facilitate lying down of a user for use thereof.

**[0016]** In use, with reference to Fig. 4, in combination with Figs. 1 and 2, the user's head rests on the head support face 111 of the head cushion 11. When no external force is applied to the side cushions 2, one of the abutment end faces 222 of each side cushion 2 abuts against the stop member 1232 of the respective limiting plate 123 through the biasing action of the respective torsion spring 32. The side cushions 2 are in a first position at this time.

**[0017]** With reference to Fig. 5, in combination with Figs. 1 and 2, when the user's head turns to the right, he/she must exert a force that is capable of overcoming the biasing action of the torsion spring 32 so as to push the side cushion 2 (in this case, a right side cushion 2) away from the head cushion 11 until a second position that corresponds to a rotational angle of the user's head is reached. The aforesaid step is also performed when the user's head turns to the left. Continuous repetition of the aforesaid steps will result in exercising treatment of the user's head.

**[0018]** Referring back to Figs. 1 and 2, it is worth mentioning that each shaft 31 can be pulled upwardly so as to separate the annular toothed element 33 from the annular toothed element 1222, so that the shaft 31 is rotatable either clockwise or counterclockwise to adjust a torsional force of the respective torsion spring 32. The shaft 31 is then pushed downwardly to inter-engage the annu-

lar toothed elements 33, 1222 so that the shaft 31 can be prevented from rotation, thereby maintaining the torsional force of the adjusted torsion spring 32. Hence, the torsional force of each torsion spring 32 can be adjusted to suit the different strengths of different users.

**[0019]** Referring to Fig. 6, a rehabilitation exercise device according to the second preferred embodiment of the present invention is shown to be similar to the first preferred embodiment. However, in this embodiment, the rehabilitation exercise device further comprises two spaced-apart fastening straps 51 connected to a back side of the bight portion 121 of the frame 12 of the head support unit 1 and adapted to position the rehabilitation exercise device to a support body, such as a chair 8, so that sitting or standing of the user can be facilitated.

**[0020]** Referring to Fig. 7, a rehabilitation exercise device according to the third preferred embodiment of the present invention is shown to be similar to the first preferred embodiment. However, in this embodiment, the rehabilitation exercise device further comprises a head abutment strap 52 having two opposite ends respectively connected to and bridging the distal ends 23 of the side cushions 2. In this embodiment, the head abutment strap 52 is elastic. The user's head moves forward by pushing the elastic head abutment strap 52, and moves rearward to rest on the head support face 111 of the head cushion 11. Exercising treatment of different muscles of the user's head and neck can be similarly achieved. The fastening straps 51 shown in Fig. 6 may also be provided on the back side of the frame 12 of the head support unit 1 of this embodiment.

**[0021]** Referring to Figs. 8 and 9, a rehabilitation exercise device according to the fourth preferred embodiment of the present invention is shown to be similar to the first preferred embodiment. However, in this embodiment, the rehabilitation exercise device further comprises a pulling element 6 and a power-generating element 7.

**[0022]** The pulling element 6 includes two reel members 61 disposed rotatably and respectively within the side cushions 2, two pull ropes 62 wound respectively around the reel members 61, two spindles 63 inserted respectively into the reel members 61, and two torsion springs 64 wound respectively around the spindles 63 within the reel members 61. Each of the pull ropes 62 has a handling end extending outwardly of a respective side cushion 2, and a handle connected to the handling end. Each spindle 63 has an annular toothed element 65 sleeved thereon. Each side cushion 2 is provided with an annular toothed element 66 to mesh with the annular toothed element 65 of a respective spindle 63 so as to prevent rotation of the respective spindle 63.

**[0023]** The power-generating element 7 includes a generator 71 disposed in a respective side cushion 2 and connected to a respective reel member 61 to transform rotational energy of the respective reel member 61 into electrical energy, and an output port 72 formed in the head support unit 1 for electrical output.

**[0024]** When no external force is applied to the pull

ropes 62, the pull ropes 62 are wound around the respective reel members 61. To achieve exercise of the user's arms, he/she must exert a force that is capable of overcoming the biasing action of each torsion spring 64 so as to unwind each pull rope 62 from the respective reel member 61. During pulling of the pull ropes 62 out of the reel members 61 and restoring of the reel members 61 to original states by the torsion springs 64, the generators 71 can transform the rotational energy of the reel members 61 into electrical energy, and power can be provided to an electrical device, such as an instrument panel, illuminating bulb, etc., via the output port 72.

**[0025]** The advantages and efficiency of the rehabilitation exercise device of the present invention can be summarized as follows:

The rehabilitation exercise device of the present invention is not only easy to transport and carry, but also has a small volume so that it does not occupy a substantial space. As a result, the user can perform a rehabilitation exercise whenever and wherever he/she desires. Therefore, use of the present invention is facilitated and practicable.

## Claims

### 1. A rehabilitation exercise device **characterized by**:

a head support unit (1) having a head cushion (11) adapted to support the head of a user, and a frame (12) holding said head cushion (11) and having two opposite connection ends (120);  
two side cushions (2) disposed respectively on two opposite sides of said head cushion (11) and connected pivotally and respectively to said connection ends (120) so that said side cushions (2) are rotatable toward or away from said head cushion (11); and  
a biasing unit connected to said side cushions (2) to bias said side cushions (2) to rotate toward said head cushion (11).

2. The rehabilitation exercise device of Claim 1, further **characterized by** two shafts (31) which are mounted respectively to said connection ends (120), said side cushions (2) being disposed rotatably and respectively around said shafts (31), said biasing unit including two torsion springs (32) wound respectively around said shafts (31) to urge said side cushions (2) toward said head cushion (11).

3. The rehabilitation exercise device of Claim 2, **characterized in that** each of said torsion springs (32) has an inner end engaging one of said shafts (31), and an outer end engaging one of said side cushions (2), said shafts (31) being rotatable to adjust torsional forces of said torsion springs (32), said shafts (31)

being prevented from rotation to maintain the torsional forces of said torsion springs (32) which have been adjusted.

4. The rehabilitation exercise device of Claim 3, **characterized in that** each of said shafts (31) has an annular toothed element (33) sleeved thereon, each of said connection ends (120) of said frame (12) having an annular toothed element (1222) to mesh with said annular toothed element (33) of a respective said shaft (31) so as to prevent rotation of the respective said shaft (31).

5. The rehabilitation exercise device of Claim 1, **characterized in that** said frame (12) is substantially U-shaped, and has two side arms (122), and a bight portion (121) between said side arms (122), said head cushion (11) being disposed over said bight portion (121) between said side arms (122), each of said connection ends (120) having a pair of ear portions (1221) projecting outwardly and respectively from said two side arms (122) at one side of said bight portion (121), each of said shafts (31) extending through said pair of ear portions (1221) and one of said side cushions (2).

6. The rehabilitation exercise device of Claim 5, **characterized in that** each of said side cushions (2) has two lug portions (221) disposed between said ear portions (1221) at one of said connection ends (120), and a cutout (220) disposed between said lug portions (221) to receive therein one of said torsion springs (32), each of said shafts (31) extending through said lug portions (221) of a respective one of said side cushions (2).

7. The rehabilitation exercise device of Claim 1, further **characterized by** a limiter to limit rotation of said side cushions (2) so that said side cushions (2) do not extend over said head cushion (11), said limiter including two limiting plates (123) provided on said frame (12) in proximity to said connection ends (120), respectively, each of said limiting plates (123) having a stop member (1232) to abut against one of said side cushions (2) which moves toward said head cushion (11).

8. The rehabilitation exercise device of Claim 1, further **characterized by** at least one fastening strap (51) connected to said head support unit (1) and adapted to position said rehabilitation exercise device to a support body.

9. The rehabilitation exercise device of Claim 1, further **characterized by** a head abutment strap (52), each of said side cushions (2) having a proximal end (22) connected pivotally to one of said connection ends (120), and a distal end (23) opposite to said proximal

end (22), said head abutment strap (52) having two ends respectively connected to and bridging said distal ends (23) of said side cushions (2).

ber (1232) to abut against one of said side cushions (2) which moves toward said head cushion (11).

10. The rehabilitation exercise device of Claim 1, further **characterized by** two reel members (61) disposed rotatably and respectively within said side cushions (2), and two pull ropes (62) respectively wound around said reel members (61) and each having a handling end extending outwardly of a. respective said side cushion (2). 5 10
11. The rehabilitation exercise device of Claim 10, further **characterized by** two spindles (63) inserted respectively into said reel members (61), and two torsion springs (64) wound respectively around said spindles (63) within said reel members (61). 15
12. The rehabilitation exercise device of Claim 11, **characterized in that** each of said spindles (63) has an annular toothed element (65) sleeved thereon, each of said side cushions (2) being provided with an annular toothed element (66) to mesh with said annular toothed element (65) of a respective said spindle (63) so as to prevent rotation of the respective said spindle (63). 20 25
13. The rehabilitation exercise device of Claim 10, further **characterized by** a power-generating element (7) including two generators (71) disposed respectively in said side cushions (2) and connected respectively to said reel members (61) to transform rotational energy of said reel members (61) into electrical energy. 30 35
14. A rehabilitation exercise device **characterized by**:
- a head support unit (1) having a head cushion (11) with a head support face (111) adapted to support the head of a user; 40
  - two side cushions (2) disposed respectively on two opposite sides of said head cushion (11) and connected pivotally to said head support unit (1) so that said side cushions (2) are rotatable toward or away from said head cushions (11); 45
  - a biasing unit connected to said side cushions (2) to bias said side cushions (2) to rotate toward said head cushion (11); and
  - a limiter to limit rotation of said side cushions (2) so that said side cushions (2) do not extend over said head support face (111). 50
15. The rehabilitation exercise device of Claim 14, **characterized in that** said limiter includes two limiting plates (123) provided on said head support unit (1) in proximity to said side cushions (2), respectively, each of said limiting plates (123) having a stop mem- 55



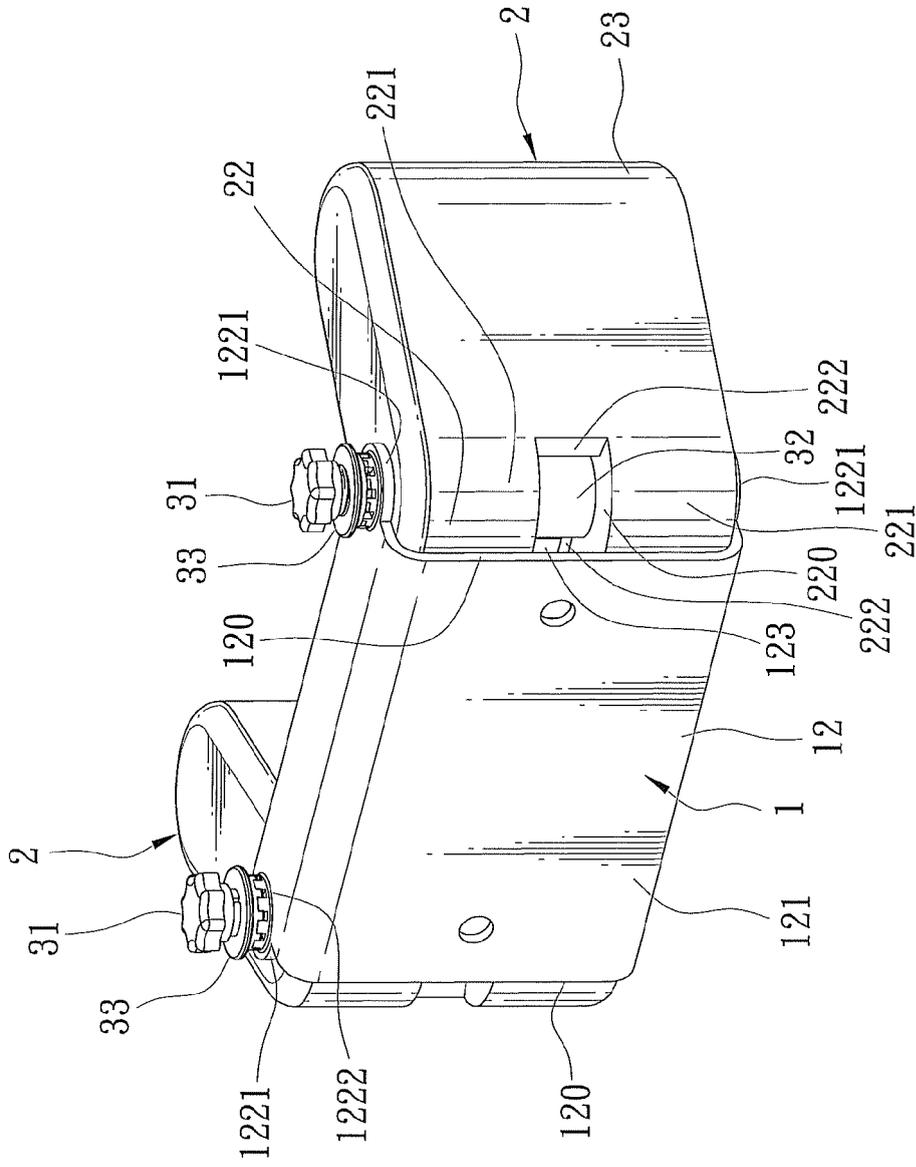
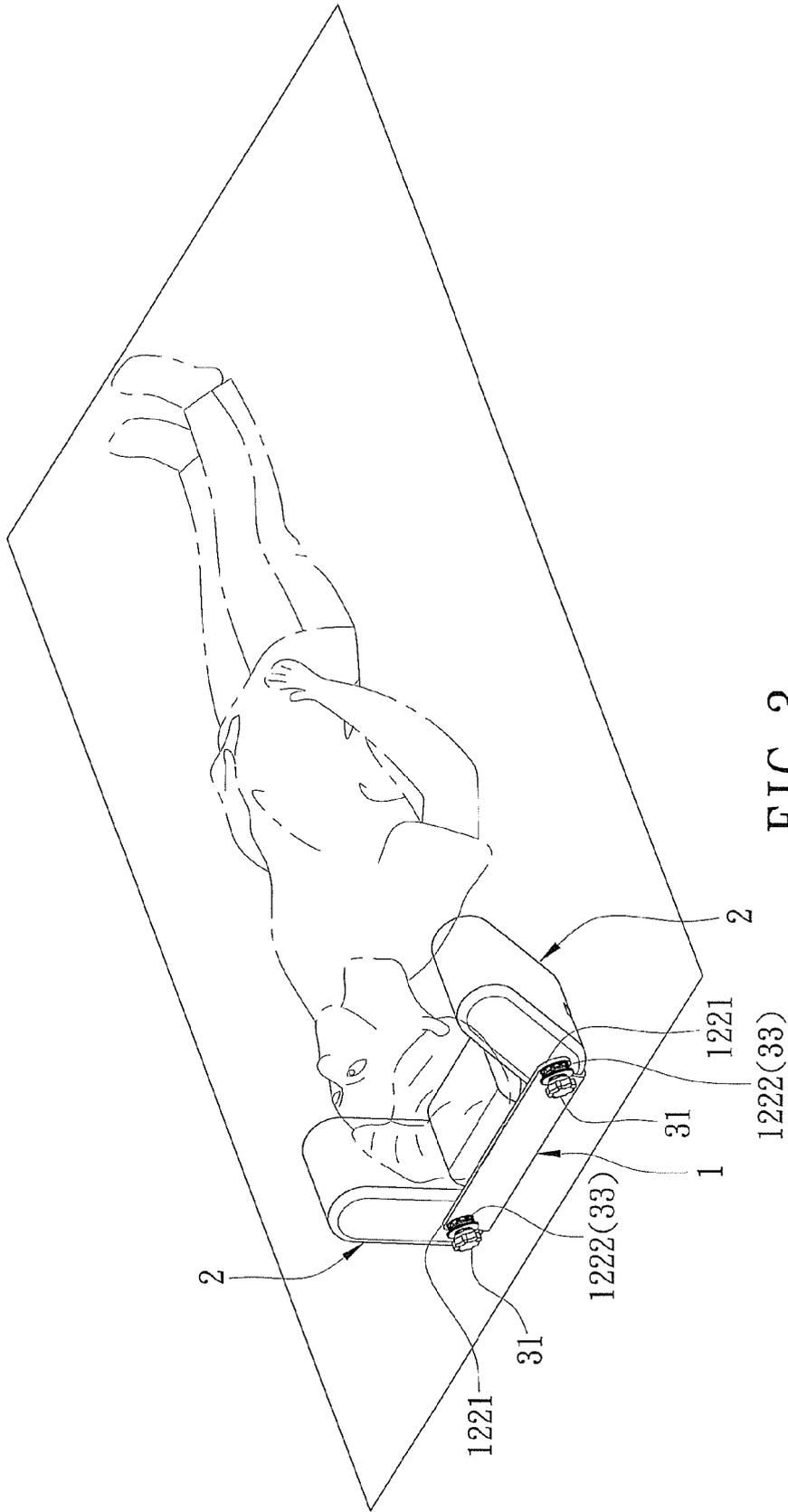


FIG. 2



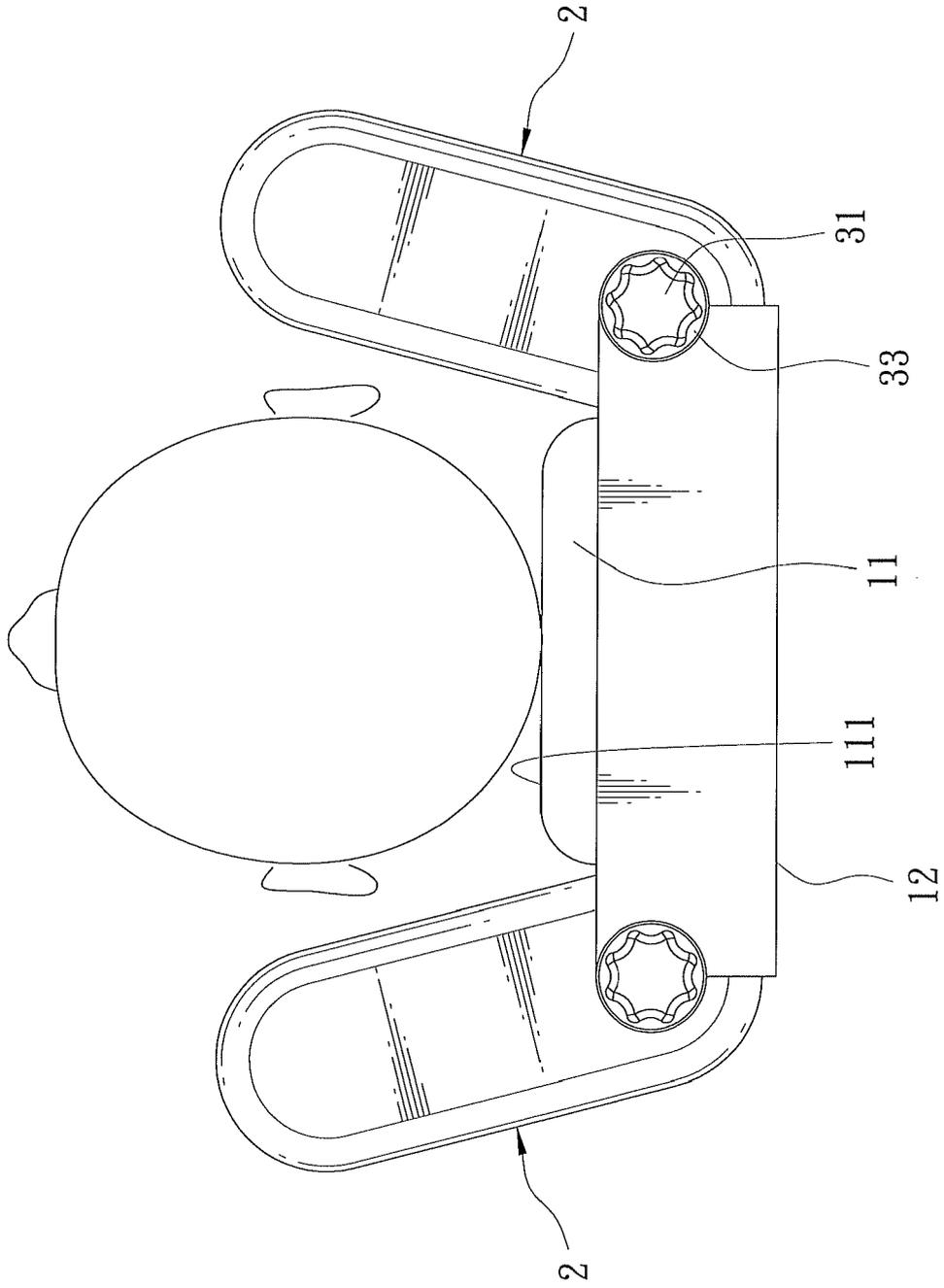


FIG. 4

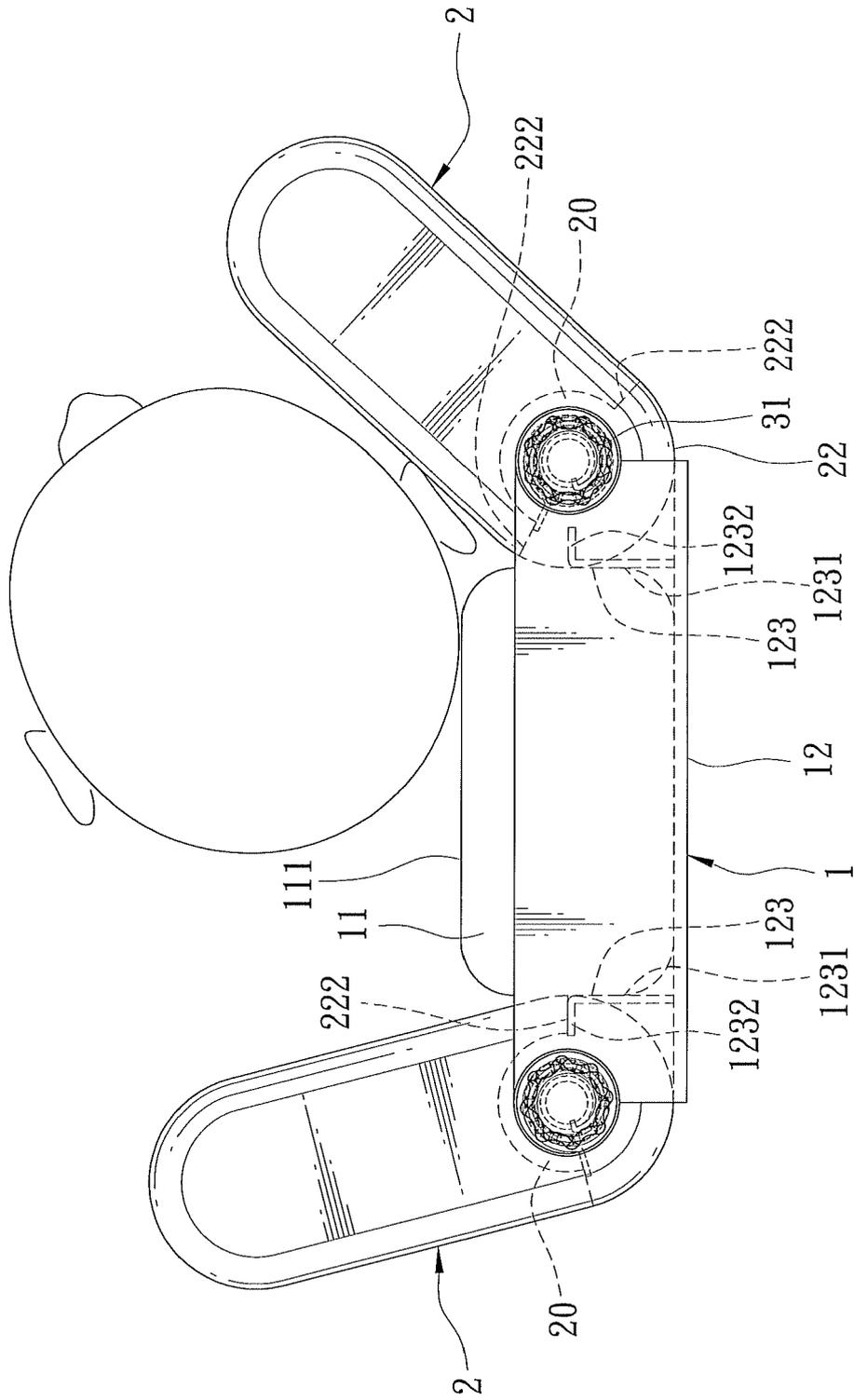


FIG. 5



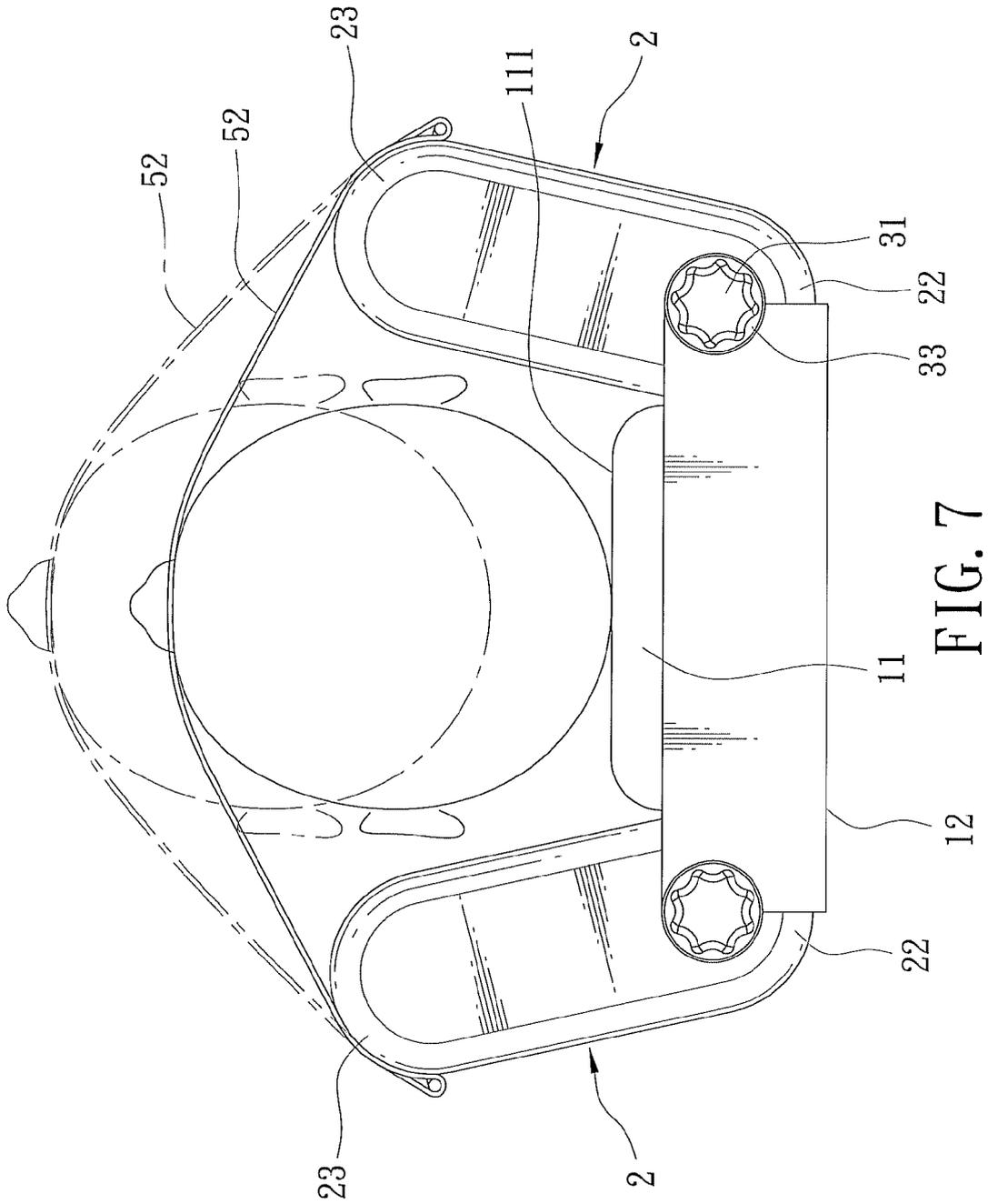


FIG. 7

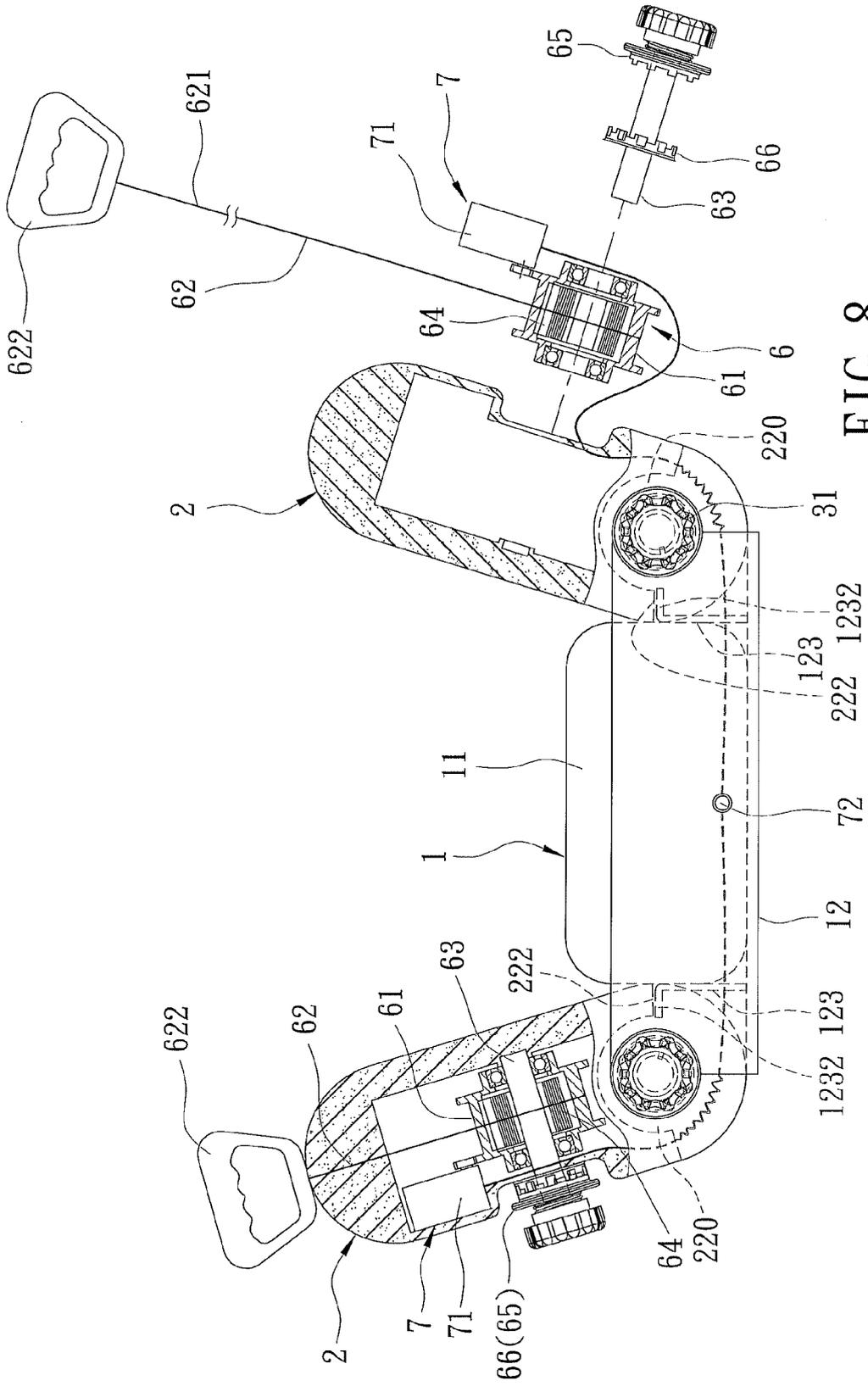


FIG. 8

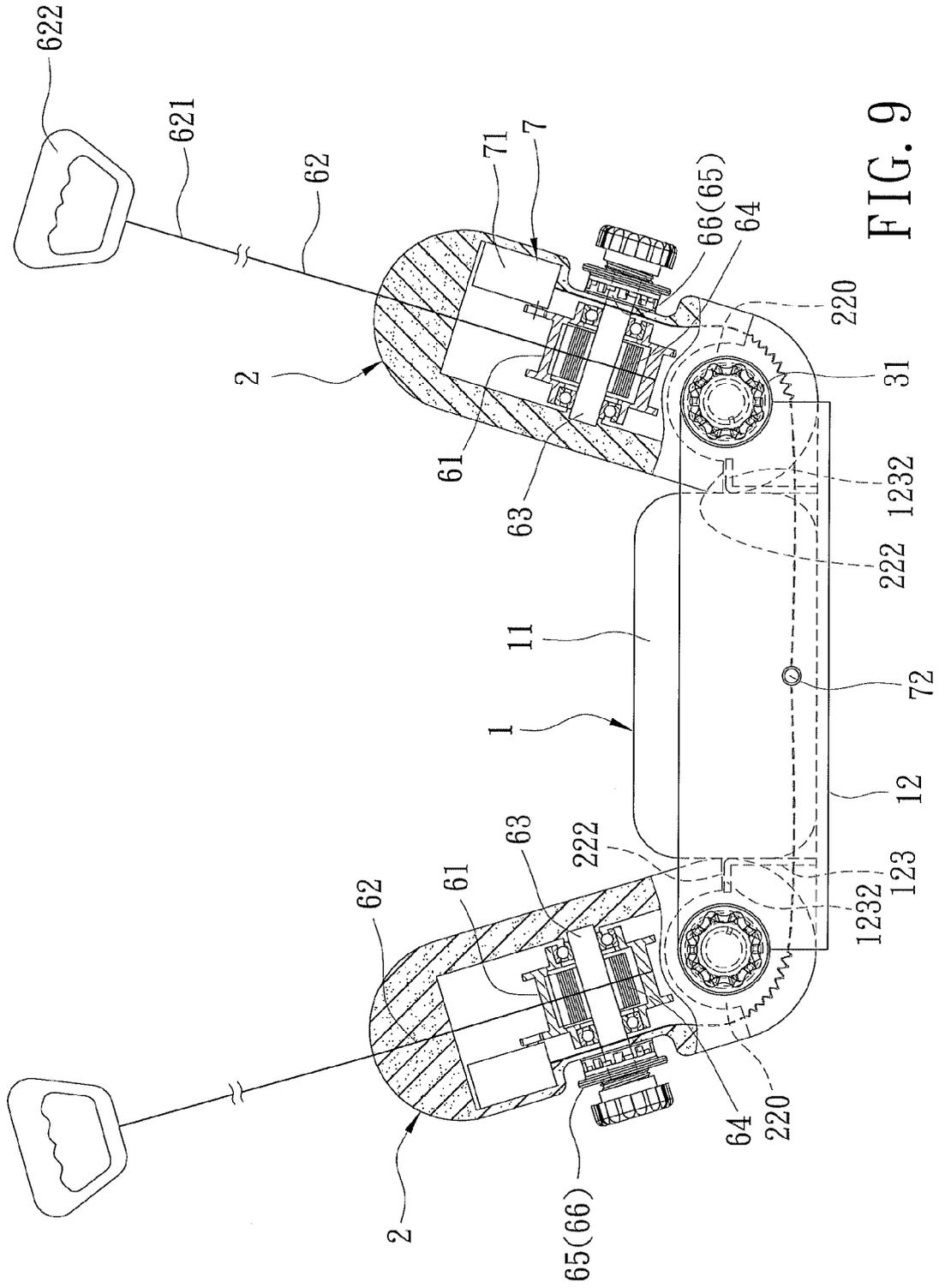


FIG. 9



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## EUROPEAN SEARCH REPORT

Application Number  
EP 10 27 5015

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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Y	* the whole document *	10-13	A63B23/025
Y	----- US 5 358 461 A (BAILEY JR RUSSELL M [US]) 25 October 1994 (1994-10-25) * column 2, line 52 - line 68; figures *	10-13	ADD. A63B21/00 A63B21/005 A63B21/055
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			TECHNICAL FIELDS SEARCHED (IPC)
			A63B A47C
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		17 June 2010	Squeri, Michele
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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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17-06-2010

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