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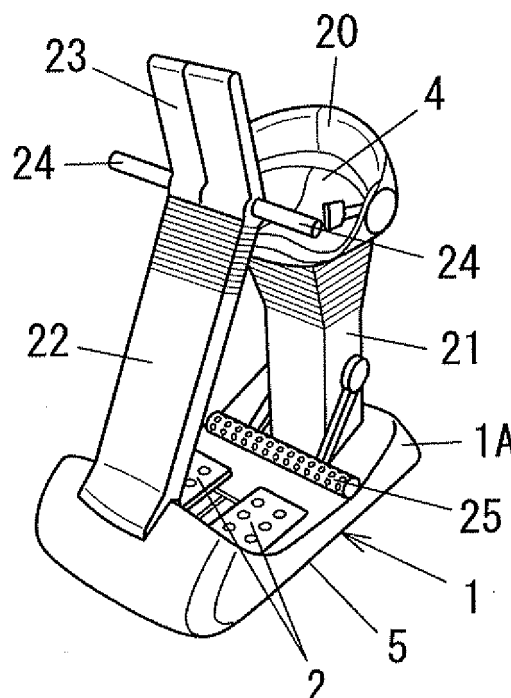
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(54) **EXERCISE AIDING APPARATUS**

(57) In exercise aiding apparatus 1, a footrest 2 on which a person's foot is put can be depressed. The apparatus comprises a stroke adjustment means 3 for var-

ying a stroke L of the footrest 2. The stroke is a stroke depressed in response to the person's depressing movement. The depressed stroke of the footrest can be adjusted in response to user's physical strength or fancy.

FIG. 1



Description

TECHNICAL FIELD

[0001] The invention relates to exercise aiding apparatus configured to move footrests and thereby to cause a user to perform passive exercise.

BACKGROUND ART

[0002] Different training machines have been developed with the aim of health maintenance, and a machine configured to mainly provide depressing (pressing down) exercise is known as an exercise device for strengthening a body, especially legs in general.

[0003] In the exercise aiding apparatus of Japanese Patent Application Publication No. 2005-58733, a user puts the user's feet on footrests and sits down a seat. In this instance, the apparatus provides the user with lower extremity exercise by oscillating the seat to cause the user to depress the footrests. The apparatus is watched in that the lower extremity exercise is provided for a user who has knee disorder and cannot bend the user's knee (s). However, a conventional exercise apparatus for depressing may apply a large load on user's knees or hip. What is desired is to provide low-impact exercise for a person who has knee disorder.

DISCLOSURE OF THE INVENTION

[0004] The present invention is provided in view of these respects described above, and an object is to provide exercise aiding apparatus capable of adjusting a depressed stroke of a footrest(s) in response to user's physical strength or fancy.

[0005] In an aspect of exercise aiding apparatus of the present invention, a footrest 2 on which a person's foot is put can be depressed. The apparatus comprises a stroke adjustment means 3 for varying a stroke L of the footrest 2. The stroke is a stroke depressed in response to the person's depressing movement.

[0006] In this construction, a load acts on user's leg strength through the footrest 2, which provides a depressed stroke L. If the depressed stroke L of the footrest 2 is varied by the stroke adjustment means 3 in view of a load on the user's knee, the apparatus provides, for example, weak reaction force for an aged person and thereby can be used reasonably. It is also possible to provide leg strength exercise for a user who has knee disorder, an able-bodied person or the like under the individually optimum environment.

[0007] Preferably, the stroke adjustment means 3 is configured to vary a vertical motion stroke L of the footrest 2. The footrest is configured so that it can be moved upward and downward. In this instance, since the footrest 2 can be moved upward and downward, it is possible to provide leg strength exercise by depressing exercise without forcing a use to bend the user's knee joints or

applying a large load to the knee joints.

[0008] Preferably, the stroke adjustment means 3 is configured to vary a turn stroke L of the footrest 2. The footrest is configured so that the tip of the footrest can be turned around the base end as a central point. In this instance, when depressing with a foot is performed, if the footrest 2 is turned so that, for example, the toe of the foot becomes lower than the heel, dorsiflexion exercise of an ankle joint can be performed in combination with depressing exercise. On the contrary, when depressing with a foot is performed, if the footrest 2 is turned so that the toe of the foot becomes higher than the heel, dorsiflexion exercise of an ankle joint can be performed in combination with depressing exercise. If the turn stroke L of the footrest 2 is adjusted, leg strength exercise by plantarflexion and dorsiflexion of an ankle joint can be performed in response to individually strength.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009]

FIG. 1 is a perspective view of a standing position type of exercise aiding apparatus having a stroke adjustment means in footrests, in accordance with an embodiment of the present invention;

FIG. 2 is a schematic perspective view of an example in which a vertical motion stroke is adjusted in one way by the stroke adjustment means;

FIG. 3 is a graph showing the relationship between the aforementioned vertical motion stroke [mm] in one way and time [s];

FIG. 4 is a schematic perspective view of another example for adjusting the vertical motion stroke in one way;

FIG. 5 is a schematic perspective view of another example for adjusting the vertical motion stroke in one way;

FIG. 6 is a schematic perspective view of another example in which a turn stroke is adjusted in one way through the stroke adjustment means;

FIG. 7 is a graph showing the relationship between the aforementioned turn stroke [mm] in one way and time [s];

FIG. 8 is a schematic perspective view of another example for adjusting the aforementioned turn stroke in one way;

FIG. 9 is a schematic perspective view of another example for adjusting the turn stroke in one way;

FIG. 10(a) is a schematic perspective view of an example in which a vertical motion stroke is adjusted in two-way through the stroke adjustment means, and FIG. 10(b) is a graph showing the relationship between the vertical motion stroke [mm] in two-way and time [s]; and

FIG. 11(a) is a schematic perspective view of an example in which a turn stroke is adjusted in two-way through the stroke adjustment means, and FIG. 11

(b) is a graph showing the relationship between the turn stroke [mm] in two-way and time [s].

BEST MODE FOR CARRYING OUT THE INVENTION

[0010] The present invention is explained based on embodiments in the accompanying drawings.

[0011] FIG. 1 shows a seated position type of exercise aiding apparatus 1 in an embodiment. The apparatus includes a seat 4 where a person can sit, and footrests 2 on which person's feet can be put.

[0012] First, the mechanism is explained. As shown in FIG. 1, the exercise aiding apparatus 1 includes: the seat 4 where a user can sit; a body 1A where a stand 21 is put on the back part of a base 5 and the seat 4 having a backrest 20 is located on the upper end of the stand 21; a support 22 standing on the anterior end of the base 5 of the body 1A; an operation panel 23 located on the upper end of the support 22; handles 24, 24 located at both sides of the upper part of the support 22; right and left footrests which are located on the top face of the base 5 and right and left feet of the user sitting on the seat 4 can be individually put on, respectively; and a stirrup 25 attached to the stand 21. A drive part (not shown) for oscillating the seat 4 is put in the stand 21 of the body 1A. The stirrup 25 in the stand 21 of the body 1A is, for example, in the shape of a bar and user's right and left feet can be put on both ends of the stirrup 25. The stirrup 25 shown in FIG. 1 is withdrawn to a place where the user sitting on the seat 4 can put the user's feet on the footrests 2 without being distracted by the stirrup 25, while the stirrup 25 is moved upward in use of the stirrup 25. The support 22 is attached so that it can be turned in a front-back direction within a predetermined angular range, but may be configured to be set at a predetermined angle. The footrests 2 on the top face of the base 5 are located between the stand 21 and the support 22. The footrests 2 can be moved upward and downward through a motor (not shown) as the drive part put in the body 1A. In order to secure alternate depressing movement with user's legs, the apparatus may include an interlocking means (not shown) configured, when one of the footrests 2 is depressed by depressing movement, to raise the other of the footrests 2.

[0013] The body 1A has a tread touching the ground in the undersurface of the base 5, and a stroke adjustment means 3 for varying a depressed stroke of each footrest 2 is put in the body 1A.

[0014] In an example of FIG. 2, a footrest 2 is configured so that it can be moved upward and downward, and a vertical motion stroke L of the footrest 2 can be adjusted in one way with a screw 3A as the stroke adjustment means 3. The screw 3A is in the shape of a rod and the projection direction of the screw 3A is varied in the direction of the arrow "I", and thereby a lower limit position of the footrest's (2) stroke can be changed to a height position P1 or P2 shown by the dash lines in FIG. 2. The vertical motion stroke L [mm] can be lengthened or short-

ened in a range L', and thereby can be lengthened like a dash line "d" with respect to a continuous line D as shown in FIG. 3.

[0015] A user sits on the seat 4 of the exercise aiding apparatus 1, grips the handles 24 attached to the support 22, puts the user's legs on the footrests 2 having the stroke adjustment means 3, and then performs an active depressing exercise. In this instance, when the user has knee disorder and feels sore by bending and stretching the user's knees, if the screws 3A constituting the stroke adjustment means 3 are turned by hand and their projection height is lowered, the lower limit positions of strokes of the footrests 2 can be lowered more than usual, and a vertical motion stroke L [mm] of each footrest 2 can be lengthened. Accordingly, a load applied to each knee can be reduced, and the apparatus can be used reasonably. When an able-bodied person wants to perform an aggressive exercise, if the screws' (3A) projection height is heightened, the lower limit positions of strokes of the footrests 2 can be heightened more than usual, and a vertical motion stroke L of each footrest 2 can be shortened. Accordingly, exercise for developing thigh muscle strength can be performed. Thus, it is possible to perform leg strength exercise under the optimum environment in response to user's physical strength or fancy.

[0016] In the example, the footrests 2 are moved upward and downward without forcing a user to bend the user's knee joints or applying a large load to each knee joint. The leg strength exercise can be performed by depressing exercise, and the lower limit positions of strokes of the footrests 2 can be easily changed simply by changing the projecting height of the screws 3A as the stroke adjustment means 3.

[0017] The screws 3A may be replaced with air-bags (not shown) which are configured to swell and contract by air intake and exhaust and located between the footrests 2 and the base. In another example, each of them may be replaced with a mechanism (not shown) in which a rack hung from a footrest 2 side and a rack standing on the base which are engaged with each other through a pinion. In short, the means has only to have the structure capable of adjusting the lower limit positions of strokes of the footrests 2 which can be moved upward and downward, thereby lengthening or shortening each vertical motion stroke L in the range L'.

[0018] The above-mentioned embodiment illustrates that the vertical motion strokes L can be changed in one way with the screws 3A, but the screws 3A may be replaced with, for example as shown in FIG. 4, insertion rods 3B each of which has a taper becoming gradually narrower toward the tip. That is, the tapered faces 6 of the insertion rods 3B are located at the sides of the undersurfaces of the footrests 2. If each insertion rod 3B is slid in a transverse direction of the arrow "RO", the height of its own taper face 6 is changed and as shown in FIG. 4 the lower limit position of stroke of the footrest 2 is changed in a range L' from P1 to P2. In another example,

as shown in FIG. 5, an insertion rod 3B is inserted into a guide member 7 extended in a vertical direction, and is fixed with a screw 7a after the height of the insertion rod 3B is adjusted.

[0019] FIG. 6 shows an embodiment, where the tip 2b of a footrest 2 can be turned upward and downward about the base end 2a as a central point and the footrest's (2) turn stroke L can be varied in one way by the stroke adjustment means 3. The stroke adjustment means 3 of the embodiment is formed of screws 3a each of which has the same function as that of FIG. 2. If each screw's (3A) projection height is changed, as shown in FIG. 7 the turn stroke L can be lengthened like the dash line d' with respect to the continuous line D. In the embodiment, since each turn stroke L of the footrests 2 can be adjusted, depressing exercise can be performed by individualized strength without imposing a strain on person's knees. When depressing with a foot is performed, if the tip 2b of the footrest 2 is turned around the base end 2a as a central point, the toe of the foot becomes lower than the heel. Accordingly, plantarflexion and dorsiflexion exercise of each ankle joint can be performed effectively in combination with depressing exercise. Each of the screws 3A may be replaced with an air-bag or a rack pinion mechanism. In an example, as shown in FIGS. 8 and 9, each of them may be replaced with an insertion rod 3B having the same function as that of FIG. 4, or the guide member 7.

[0020] FIG. 10 shows an embodiment, where footrests 2 can be moved upward and downward, and a vertical motion stroke L of each footrest 2 can be adjusted in two-way. In the embodiment, each footrest 2A can be moved upward and downward with respect to the base 2B, and stroke restriction parts 3a, 3b are located at upper and lower ends of a pantograph 3D forming the stroke adjustment means 3, respectively. The vertical motion strokes L (L', L'') of the footrest 2A are limited by the upper and lower stroke restriction parts 3a, 3b, respectively. Thereby, as shown in FIG. 10(b), the strokes can be changed to dash lines d1 and d2 in two-way with respect to the continuous line D. Accordingly, the adjustment range of the vertical motion stroke L of the footrest 2A can be more increased, and it is possible to perform either depressing exercise with lower load or depressing exercise with higher load with respect to any of user's legs.

[0021] FIG. 11 shows an embodiment, where footrests 2 can be turned, and a turn stroke L of each footrest 2 can be adjusted in two-way. In the example, the base end 2b of a footrest 2 is supported so that it can be turned, and the tip 2b of the footrest 2 is inserted into stroke restriction parts 3a and 3b. The stroke restriction parts are located at upper and lower ends of a pantograph 3E forming the stroke adjustment means 3. The turn strokes L (L', L'') of the tip 2b of the footrest 2 are limited in two-way by the upper and lower stroke restriction parts 3a, 3b, respectively. Thereby, as shown in FIG. 11(b), the strokes can be changed to dash lines d1 and d2 in two-

way with respect to the continuous line D. Accordingly, the adjustment range of the turn stroke L of the footrest 2 can be more increased, and it is possible to perform either turn exercise with lower load or turn exercise with higher load with respect to any of user's legs.

[0022] The embodiments illustrate a seated position type of exercise aiding apparatus 1 having a seat 4 where a person can sit, but the seat 4 is not indispensable, and can be also applied to a standing position type of apparatus without the seat 4.

[0023] The present invention can be applied to a seated position type of exercise aiding apparatus 1 having a seat 4 where a person can sit, but the seat 4 is not indispensable. The invention can be also applied to a standing position type of exercise aiding apparatus without the seat 4.

Claims

1. Exercise aiding apparatus,
wherein a footrest on which a person's foot is put can be depressed,
wherein the exercise aiding apparatus comprises a stroke adjustment means for varying a stroke of the footrest, said stroke being a stroke depressed in response to the person's depressing movement.
2. The exercise aiding apparatus of claim 1, wherein the stroke adjustment means is configured to vary a vertical motion stroke of the footrest, said footrest being configured so that it can be moved upward and downward.
3. The exercise aiding apparatus of claim 1, wherein the stroke adjustment means is configured to vary a turn stroke of the footrests, said footrest being configured so that the tip of the footrest can be turned around the base end as a central point.

FIG. 1

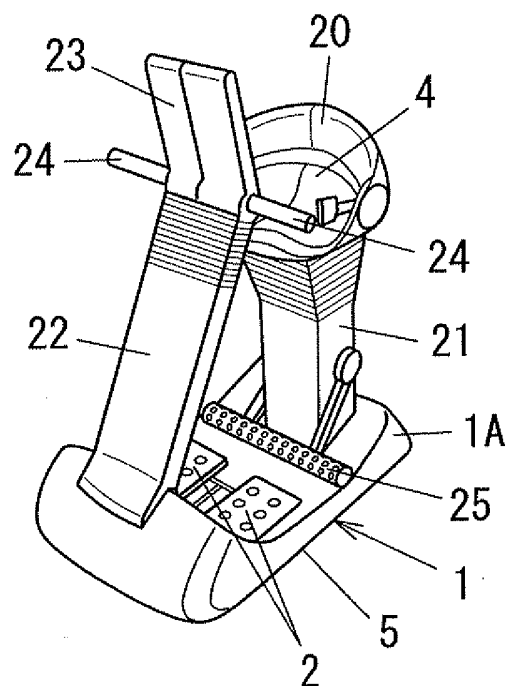


FIG. 2

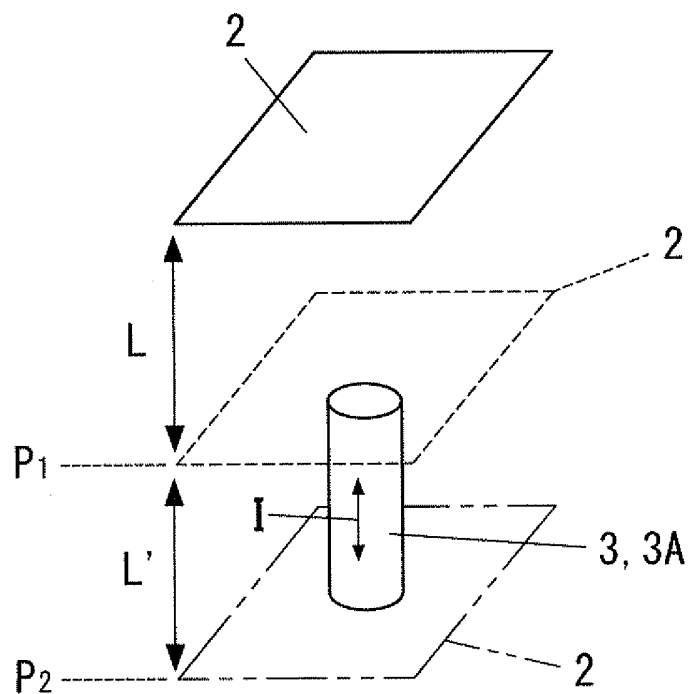


FIG. 3

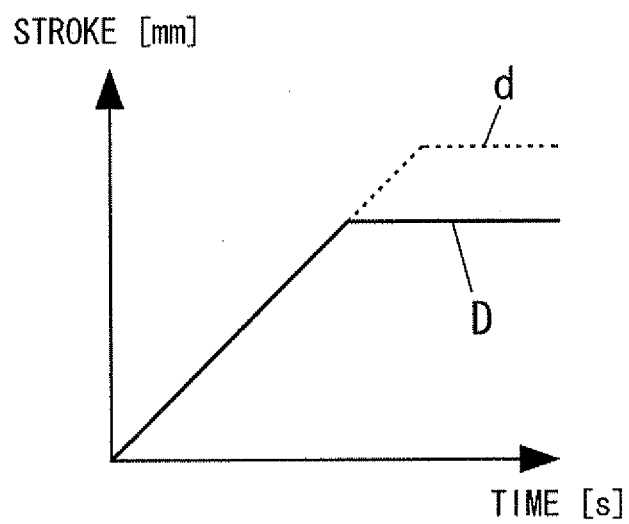


FIG. 4

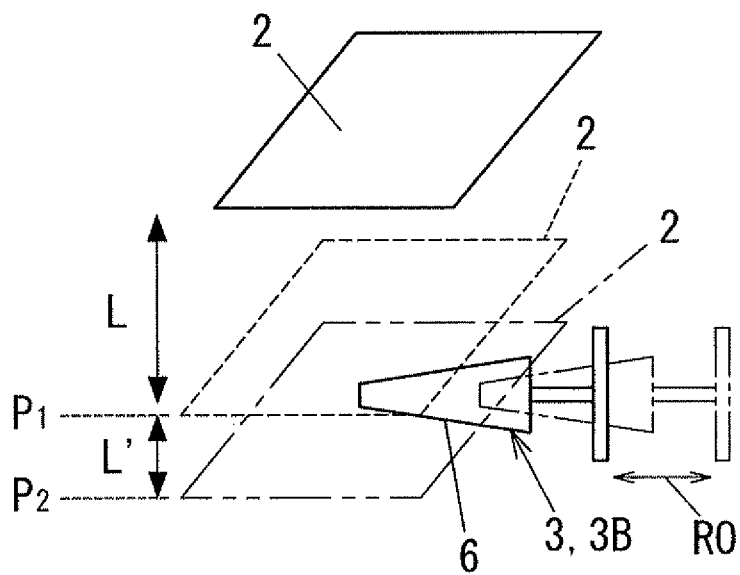


FIG. 5

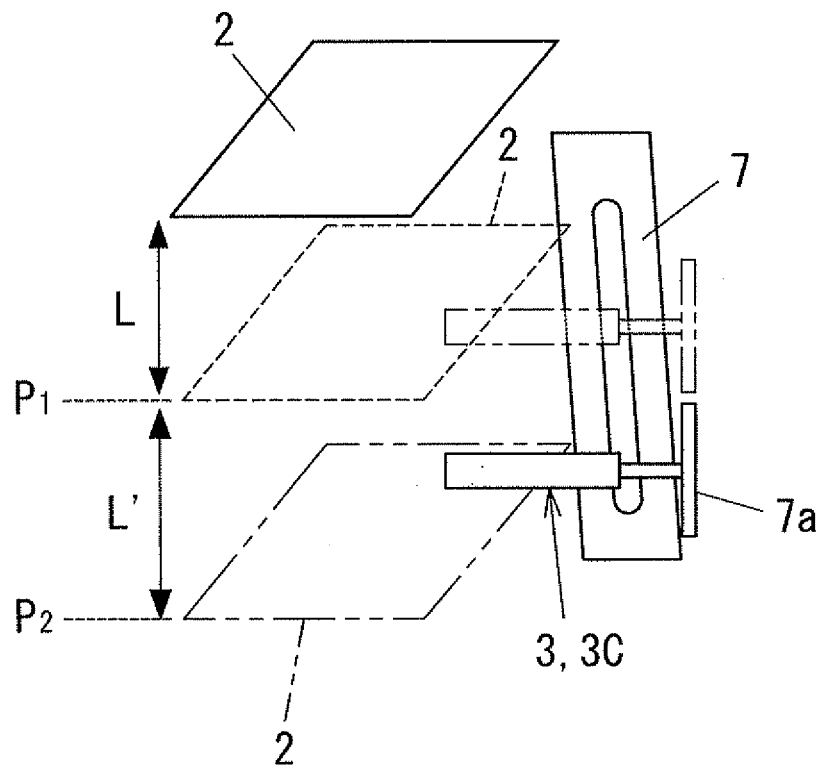


FIG. 6

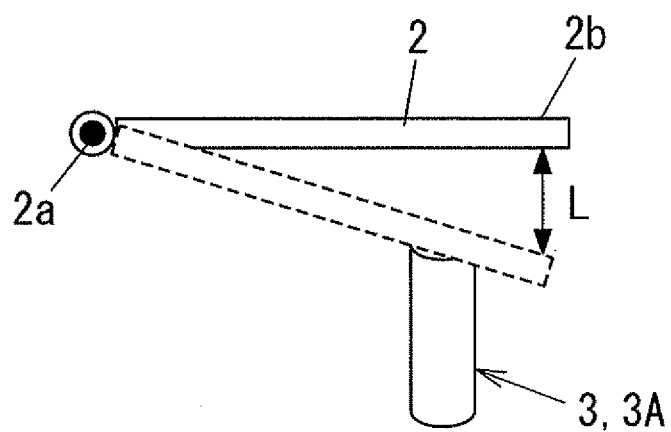


FIG. 7

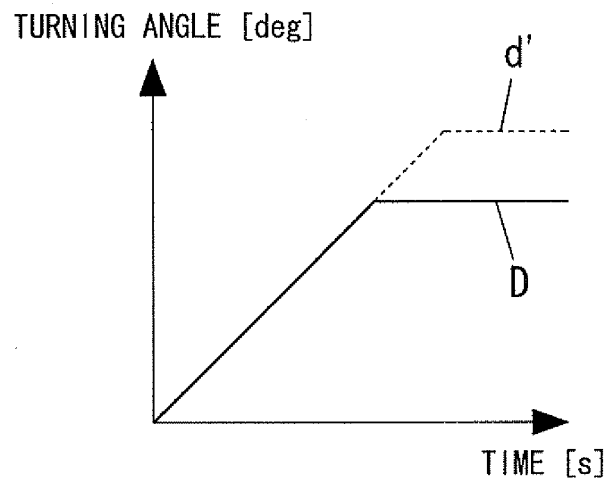


FIG. 8

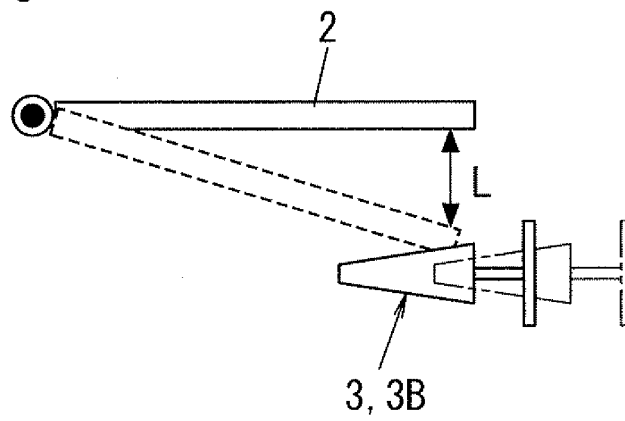


FIG. 9

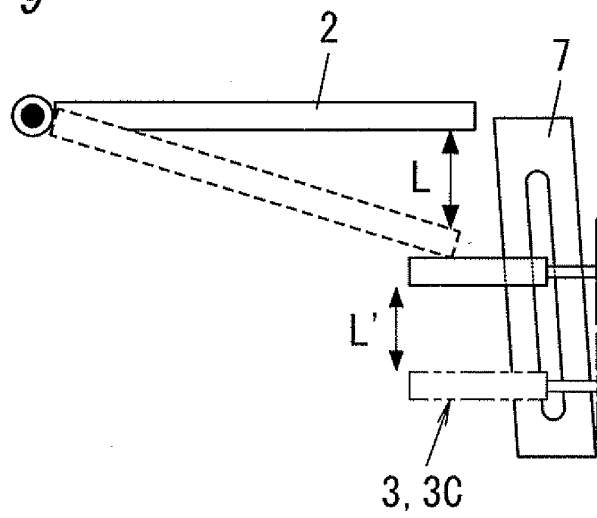


FIG. 10(a)

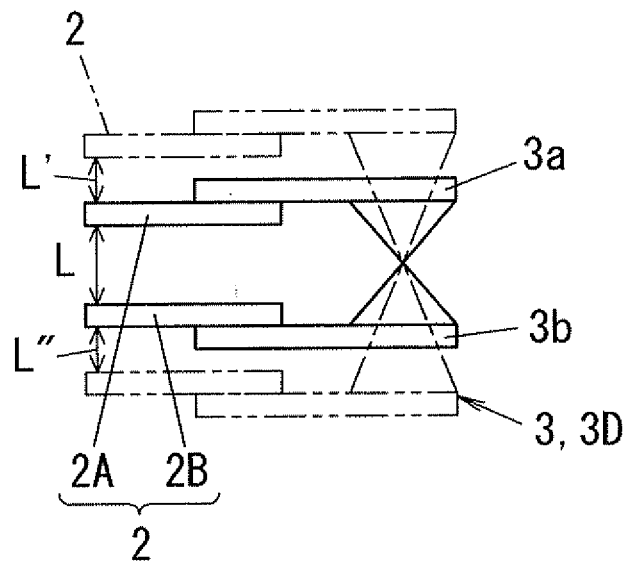


FIG. 10(b)

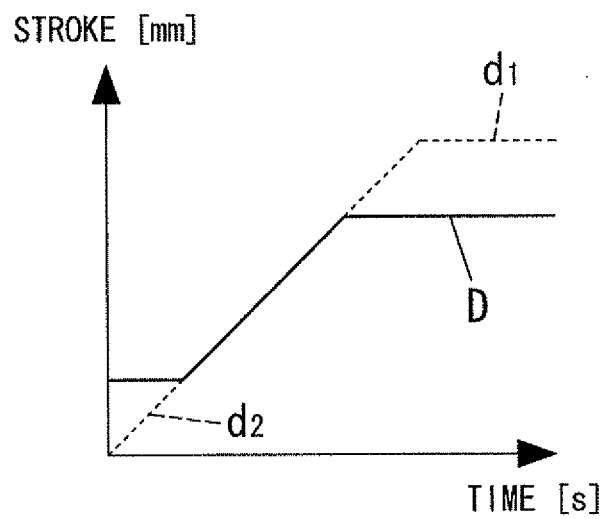


FIG. 11(a)

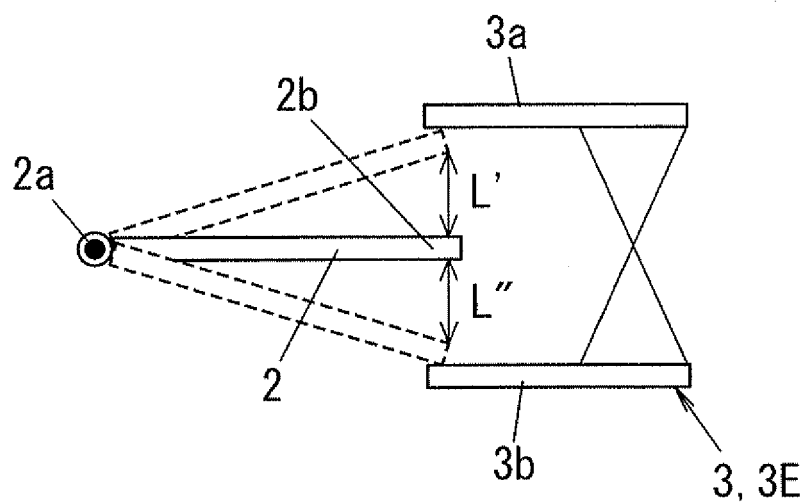
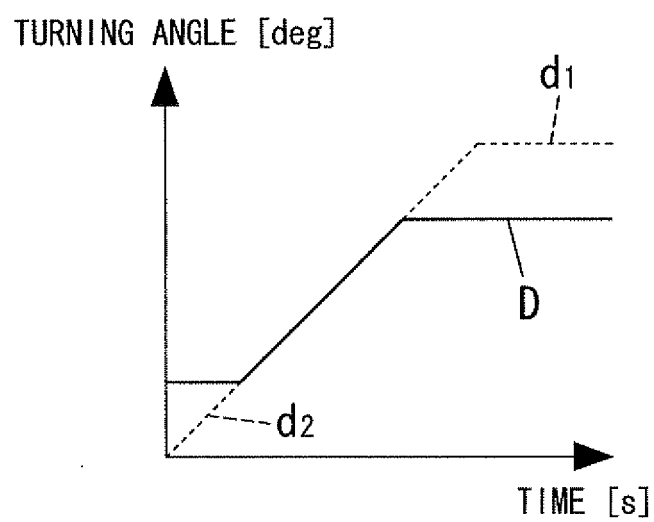


FIG. 11(b)



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2008/056406

A. CLASSIFICATION OF SUBJECT MATTER A63B23/04(2006.01)i, A63B22/04(2006.01)i		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) A63B23/04, A63B22/04		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2008 Kokai Jitsuyo Shinan Koho 1971-2008 Toroku Jitsuyo Shinan Koho 1994-2008		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 11-347146 A (Matsushita Electric Industrial Co., Ltd.),	1
Y	21 December, 1999 (21.12.99), Par. Nos. [0036] to [0045] (Family: none)	2
X	JP 10-295847 A (Toshio HIYAMA), 10 November, 1998 (10.11.98), Par. No. [0008]; Fig. 1 (Family: none)	1, 3
Y	WO 2008/001476 A1 (YAMAN Ltd.), 03 January, 2008 (03.01.08), Par. No. [0033]; Figs. 1, 5 (Family: none)	2
☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 22 April, 2008 (22.04.08)		Date of mailing of the international search report 01 May, 2008 (01.05.08)
Name and mailing address of the ISA/ Japanese Patent Office		Authorized officer
Facsimile No.		Telephone No.

Form PCT/ISA/210 (second sheet) (April 2007)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2008/056406

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 141337/1986 (Laid-open No. 50363/1988) (Tsurumi Kigyo Kabushiki Kaisha), 05 April, 1988 (05.04.88), Full text; all drawings (Family: none)	1-3
A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 44384/1983 (Laid-open No. 150467/1984) (Takei Scientific Instruments Co., Ltd.), 08 October, 1984 (08.10.84), Full text; all drawings (Family: none)	1-3

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2005058733 A [0003]