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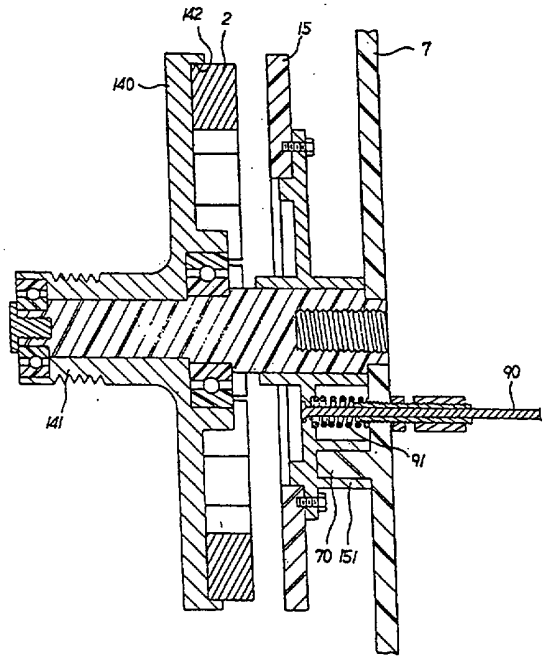
US 5051638 A

(58) Field of Search
UK CL (Edition R) A6M MAB MAC MAD , H2A
INT CL[7] A63B 21/005 22/08 , H02K 49/04
Online : WPI, EPODOC, JAPIO

(54) Abstract Title
Magnetic resistance device for exercise machine

(57) An exercise machine, eg a bicycle, is equipped with a resistance adjustment device which includes a driven disk 140 rotatably mounted on a shaft and having a plurality of magnetic members 2 mounted thereon, a ring 15 mounted for axial movement on the shaft between the disk 140 and a supporting frame 7, and a control wire 90 connected to the ring 15 via a spring for adjustment of the gap between the disk and ring. The user can control the amount of resistance the device provides by pulling on the control wire 90 thus moving the ring 15 towards or away from the magnetic members on the disk 140. The smaller the axial air gap between the magnetic members and the ring 15 the larger the induced eddy currents become when the disk 140 is driven by the user and the larger the resistance produced by the device becomes. In an alternative embodiment (Figures 1-7, not shown) a radial air gap resistance adjusting device is disclosed.



FIG·9

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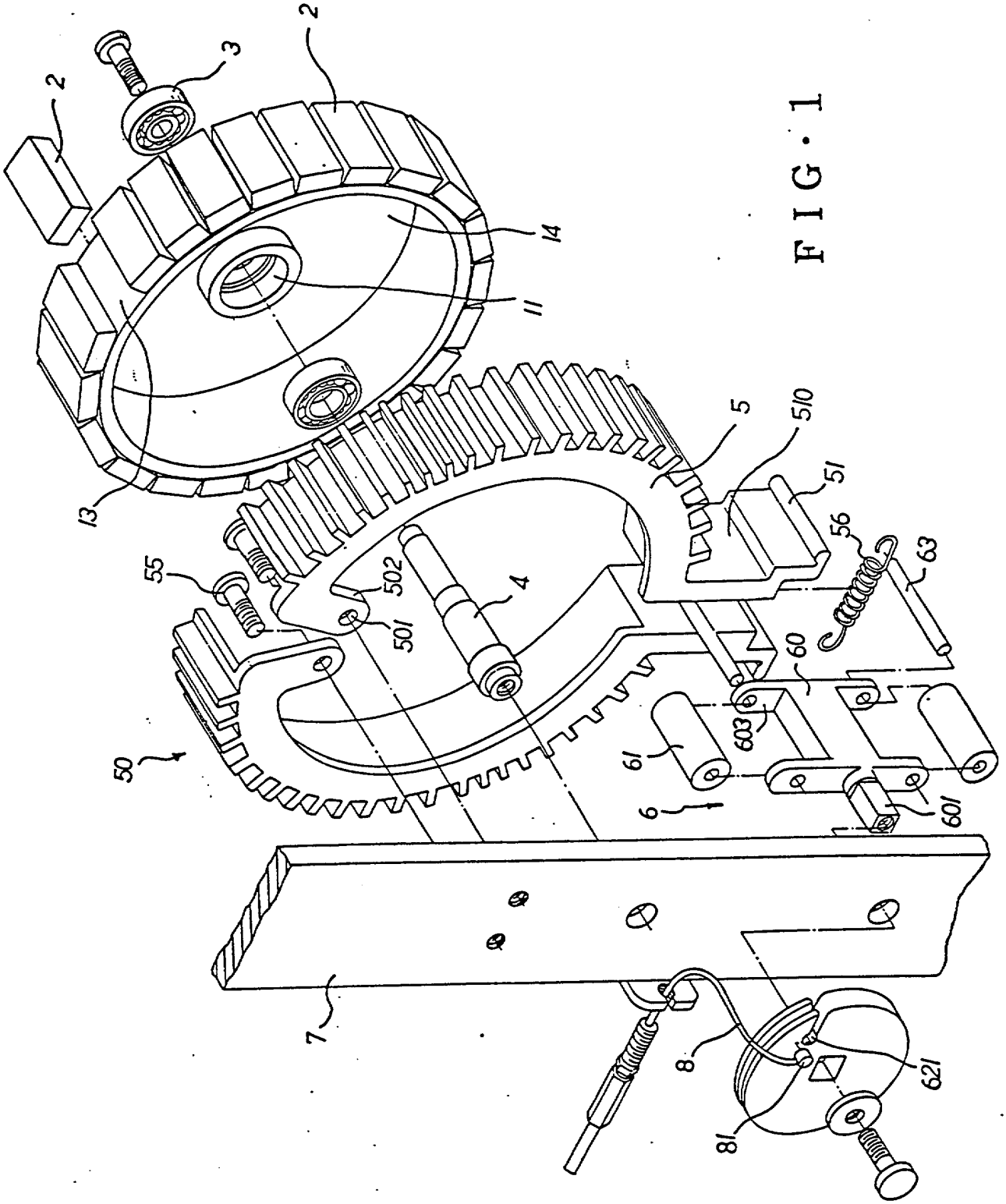


FIG. 1

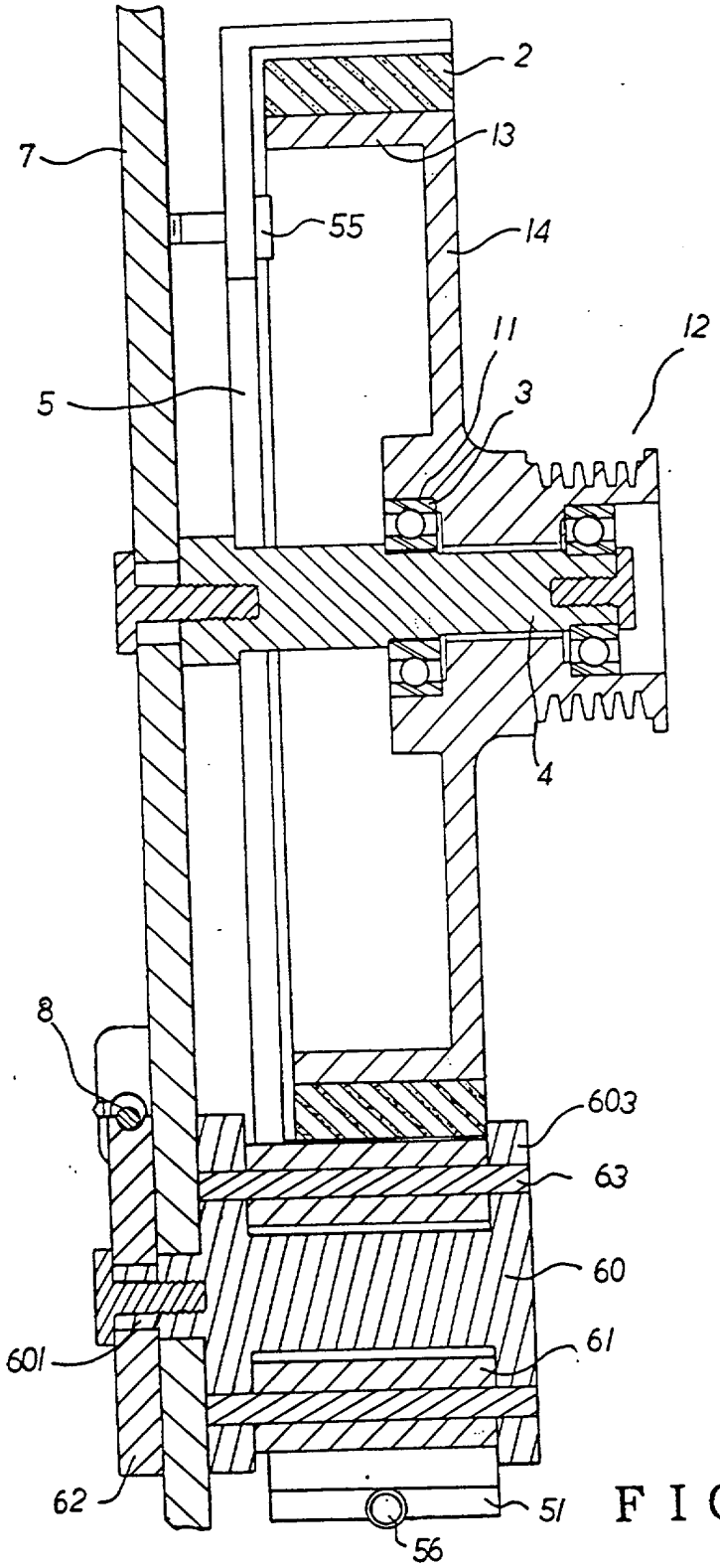
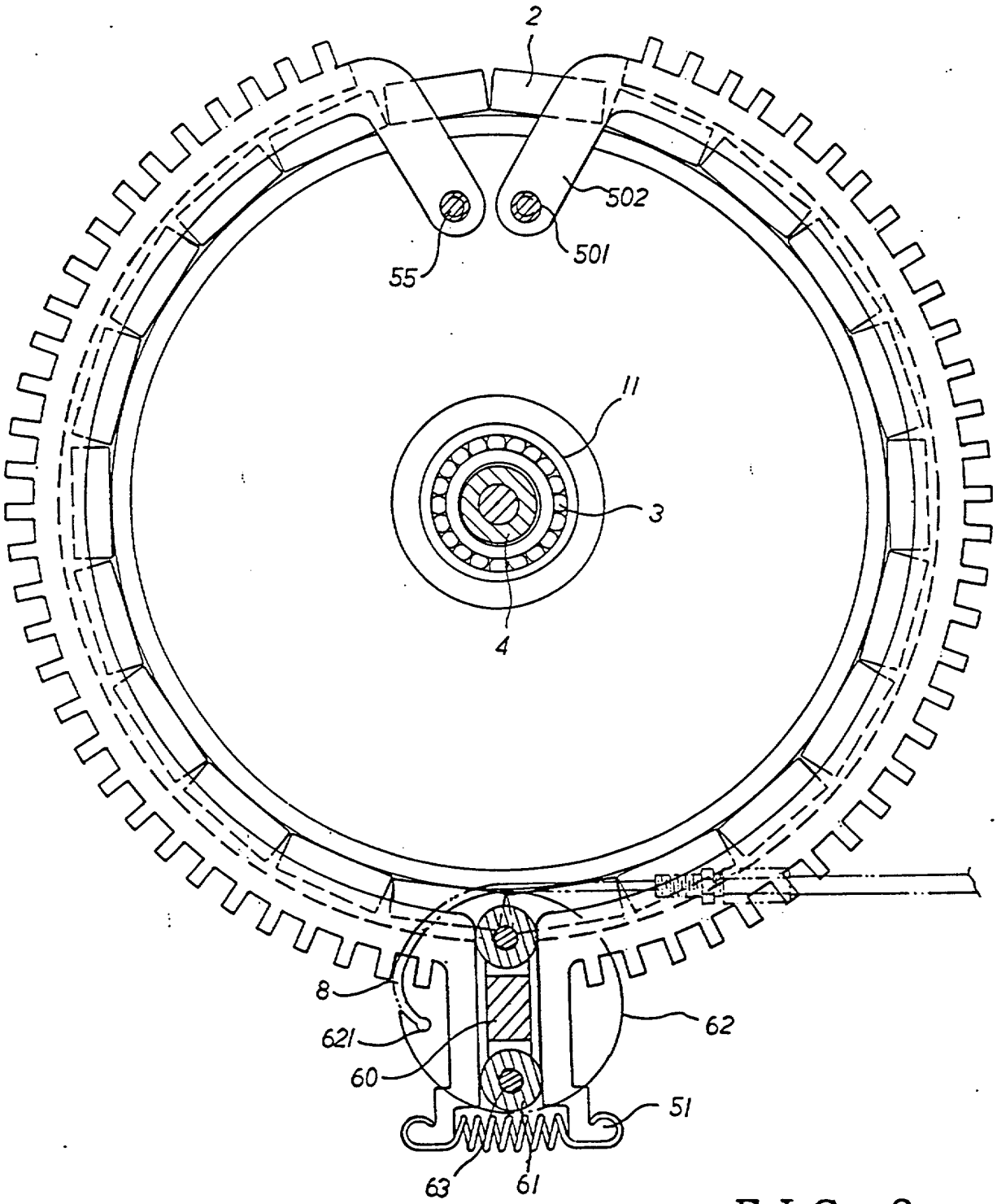
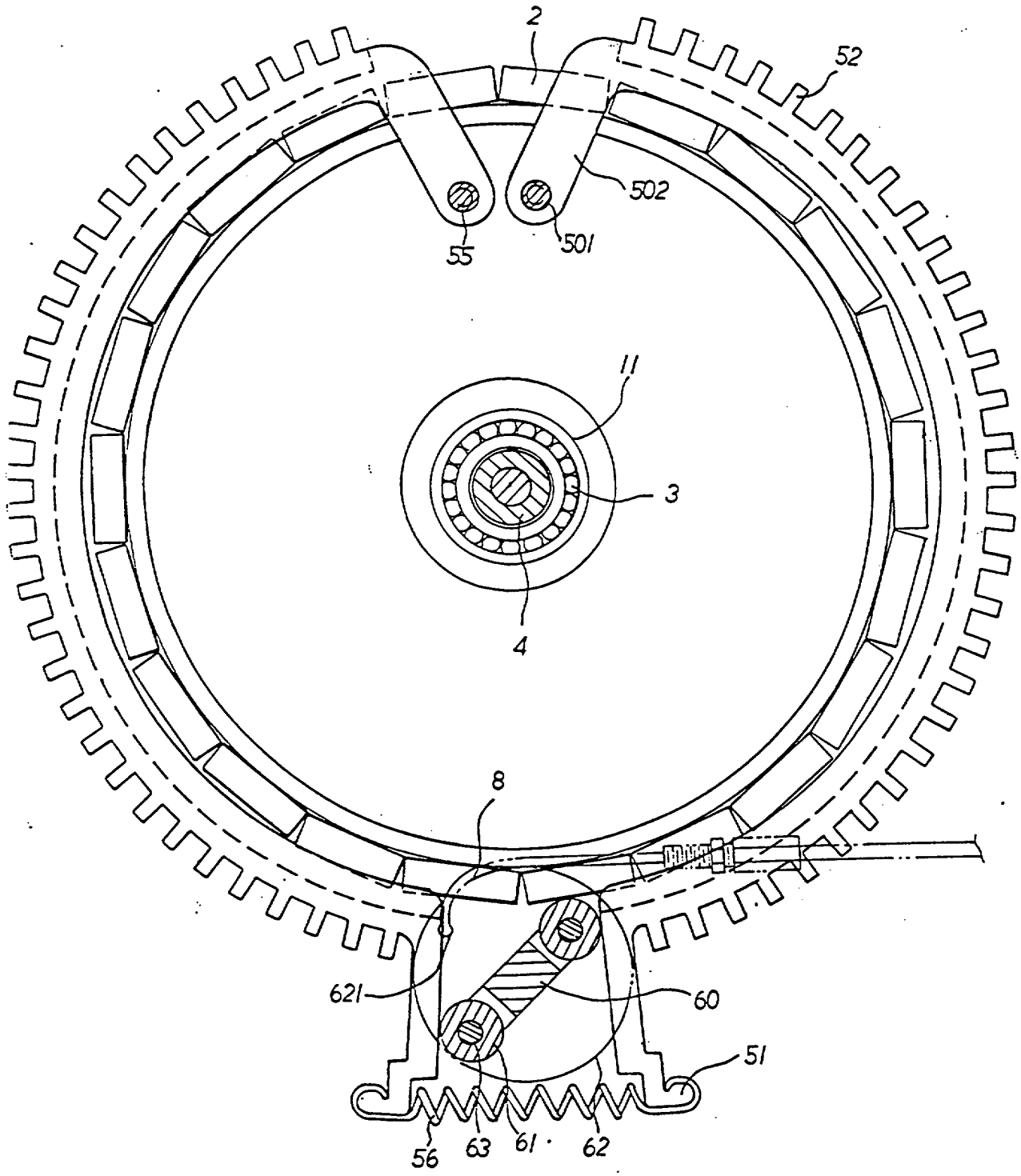


FIG. 2



FIG·3



FIG·4

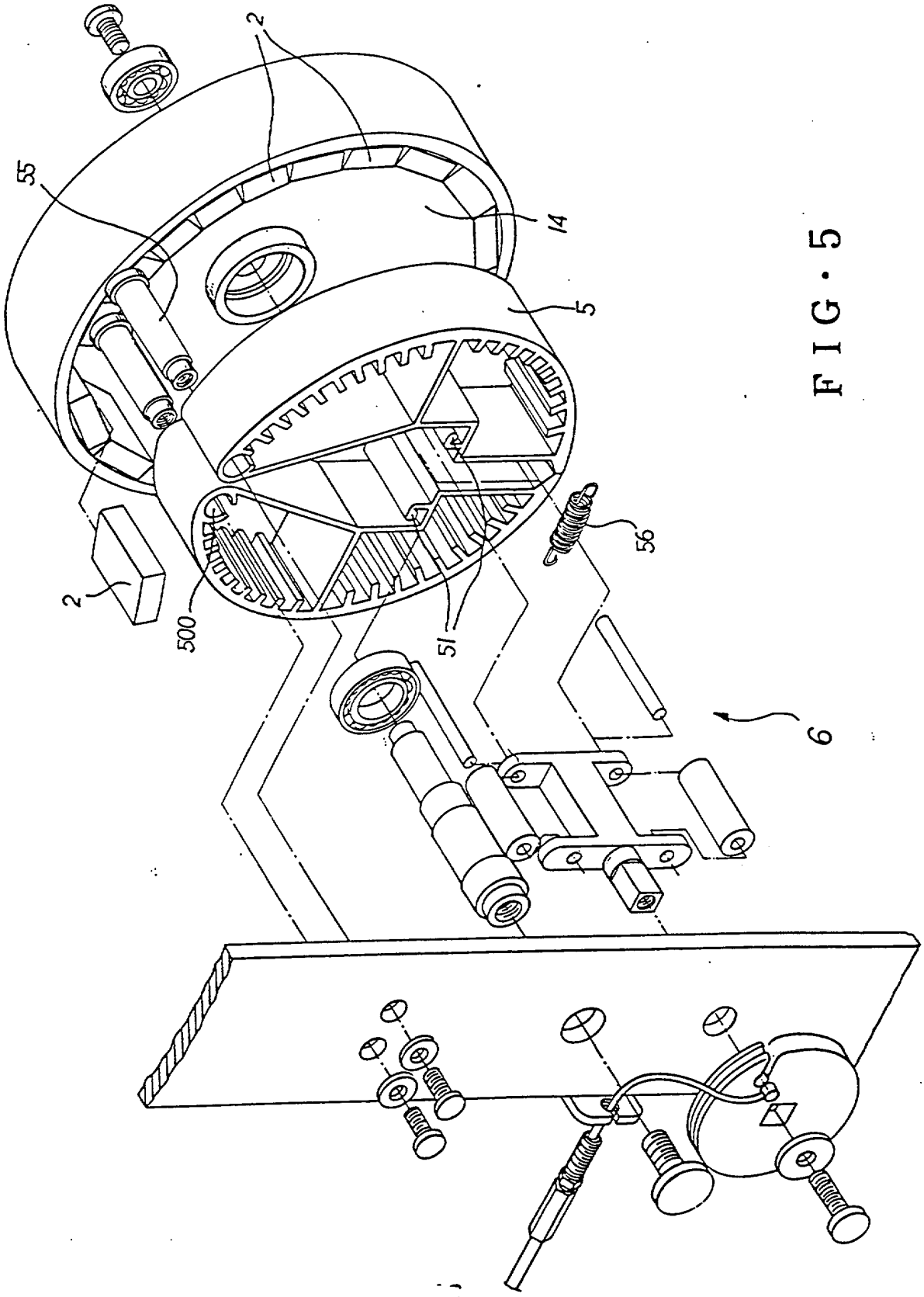
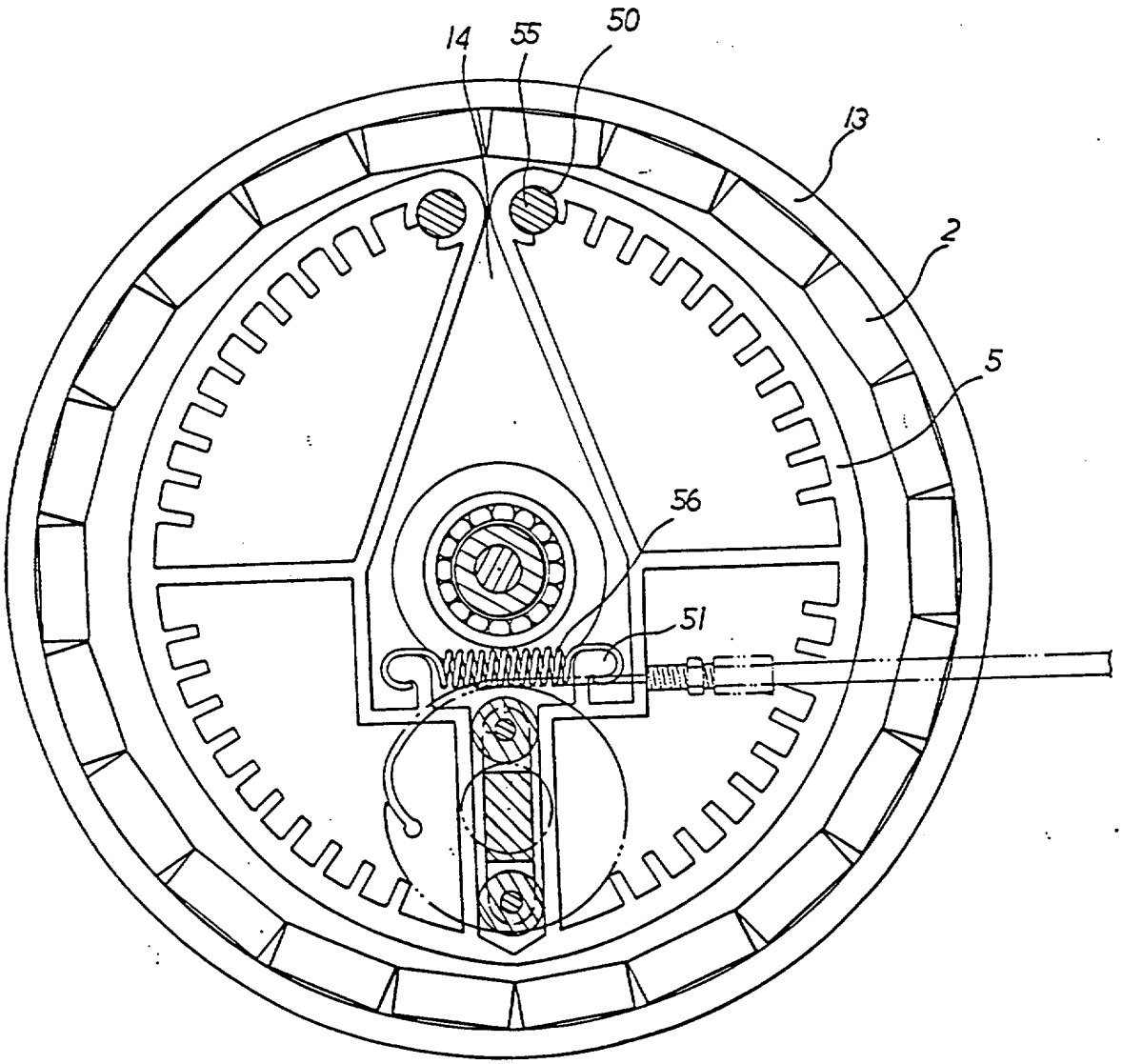
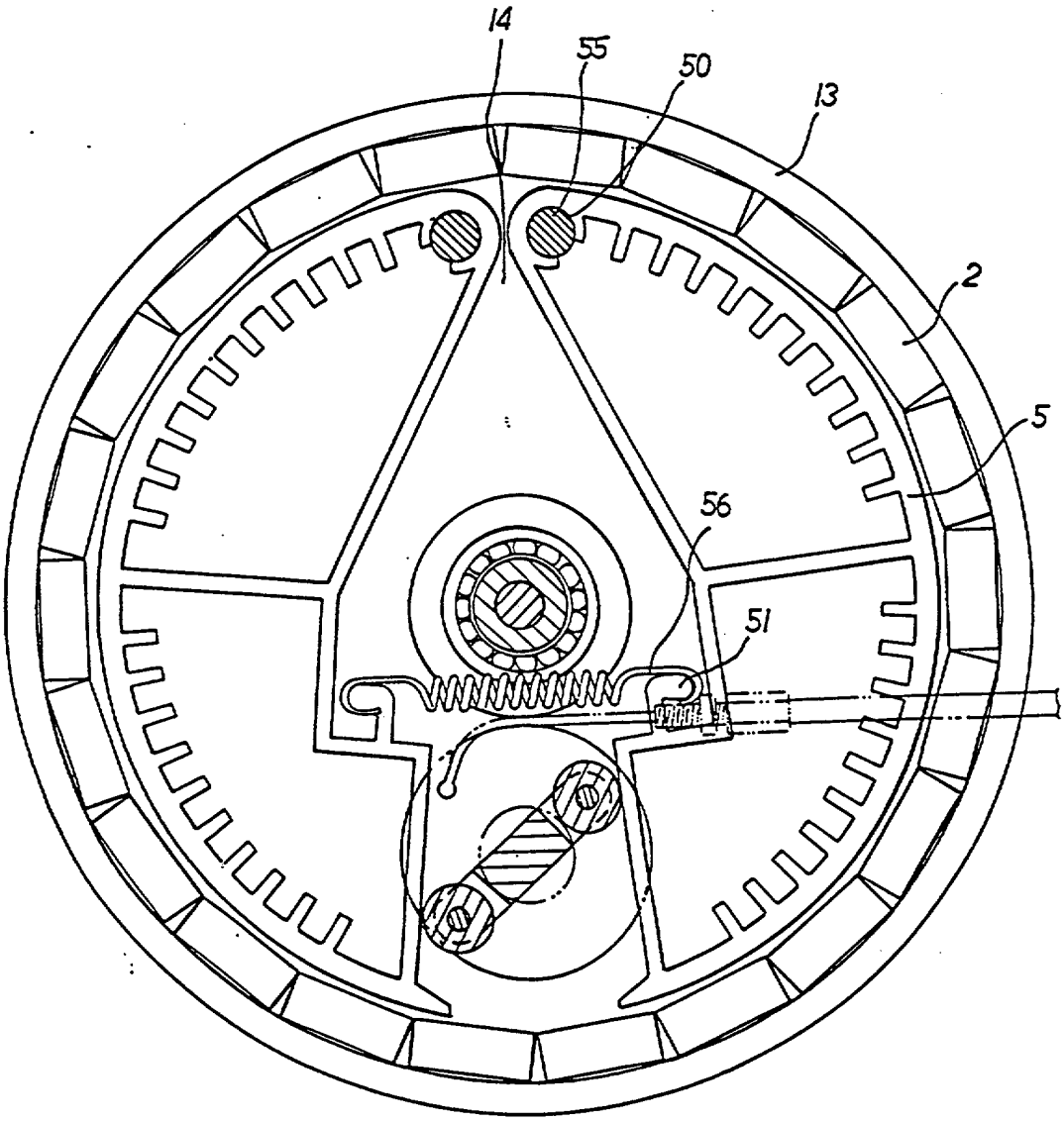


FIG.5



FIG·6



FIG·7

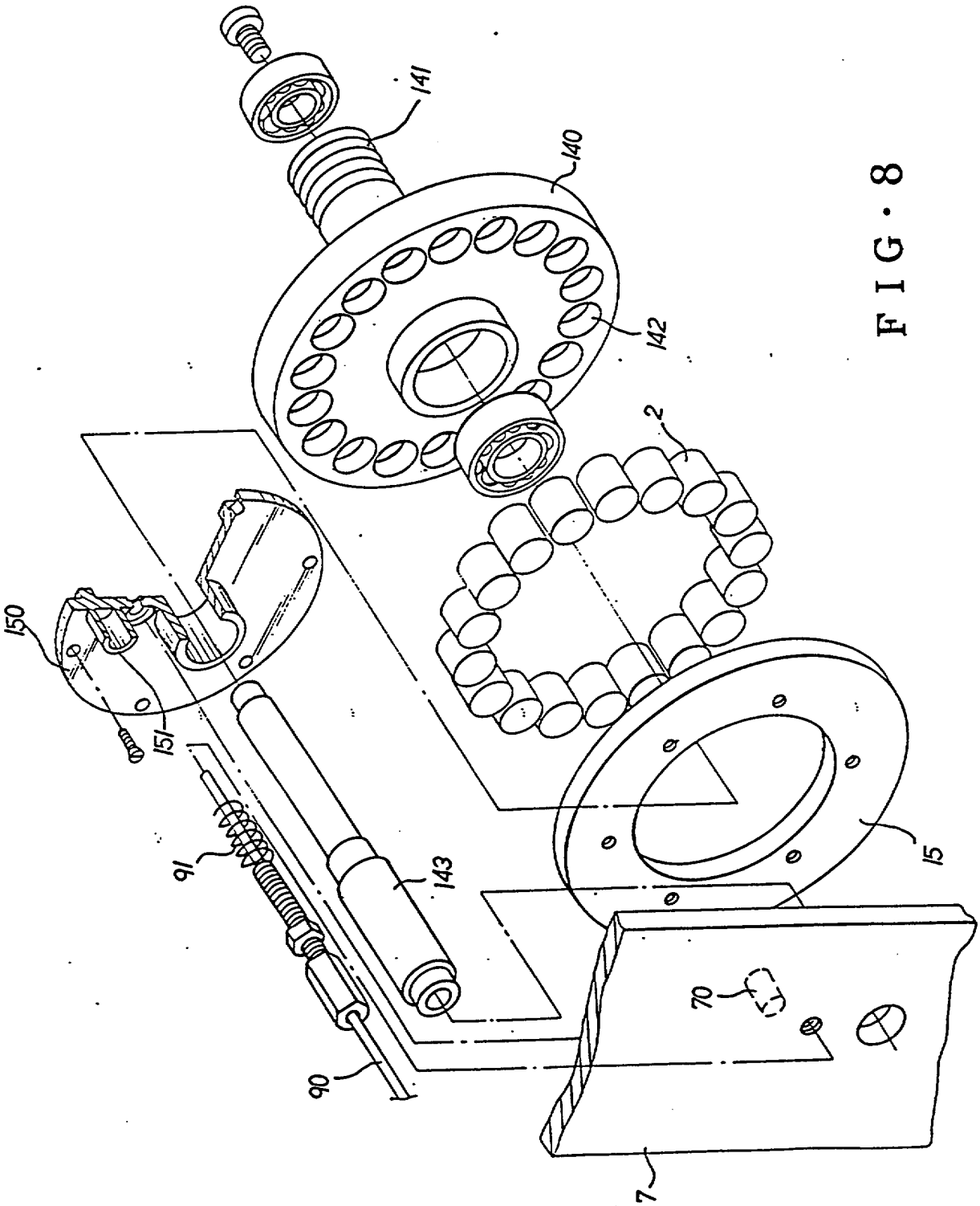
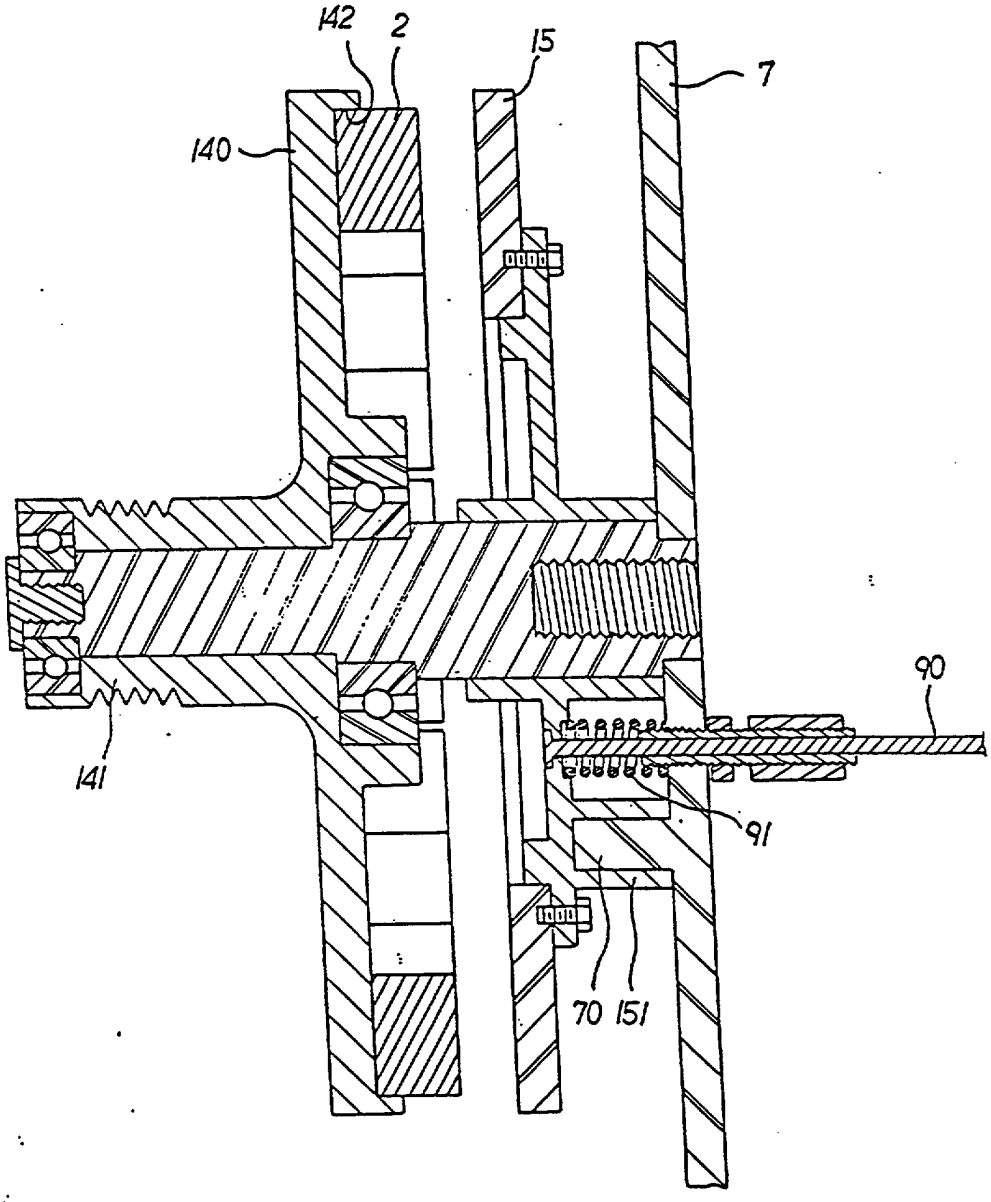
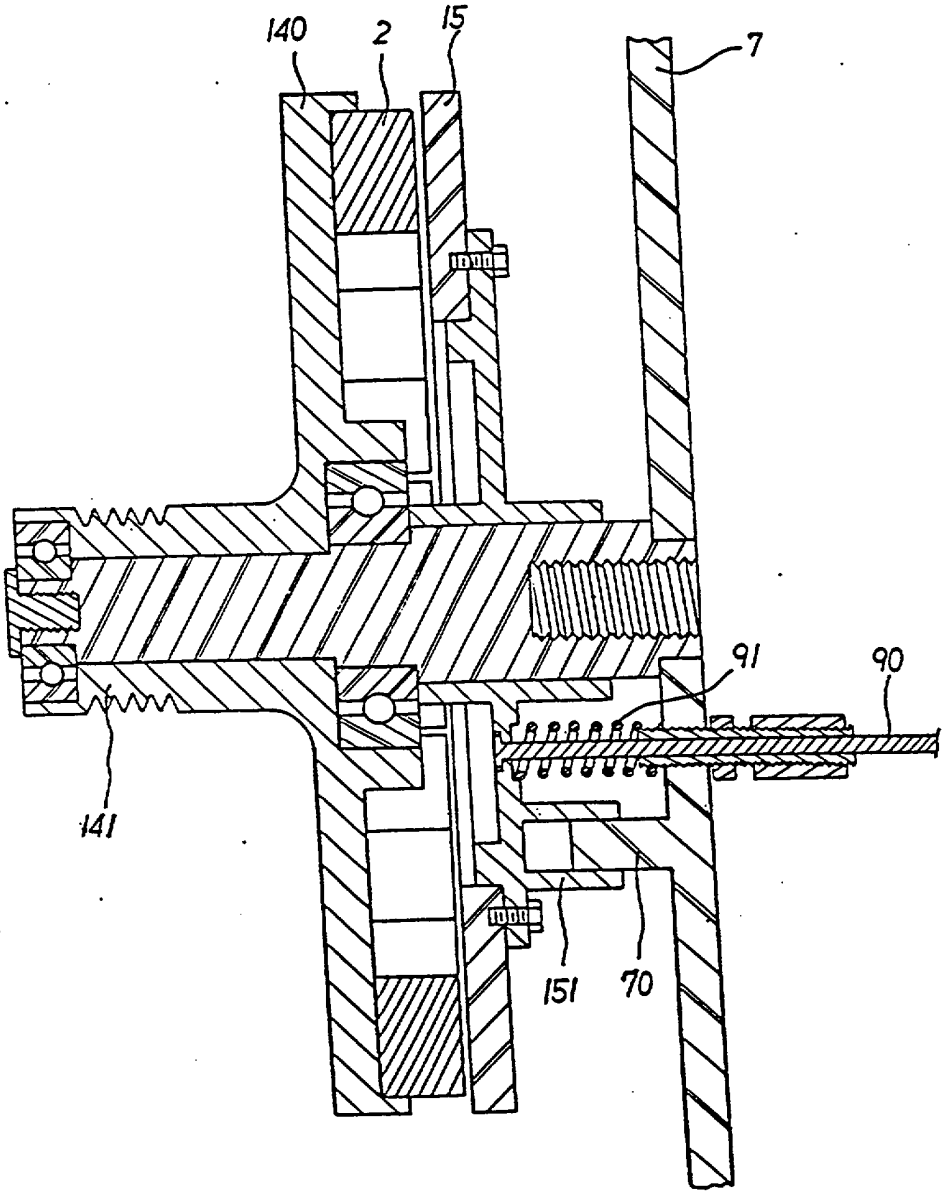


FIG. 8



FIG·9



FIG·10

MAGNETIC DAMPING DEVICE FOR AN EXERCISING DEVICE

FIELD OF THE INVENTION

The present invention relates to a damping device for an exercising device which includes a disk with a flange to which magnetic members are attached and an adjusting means is movably or pivotably connected to the frame of the exercising device. The adjusting means is moved relatived to the damping device so as to obtain different damping feature for the exercising device.

BACKGROUND OF THE INVENTION

A conventional exercising device such as a exercising bicycle which has a frame with a seat tube on which a seat is connected, a crank, a first wheel is co-axially connected to the crank, and a second wheel is connected to the first wheel by a chain. A user may sit on the seat and rotate the crank by his/her feet to rotate the second wheel. In order to increase the exercising feature of the exercising device, a damping device is cooperated with the wheel so as to increase the friction force while the wheel is rotated by the user. The damping device is a belt which is pulled by the user to contact the periphery of the wheel so as to adjust the friction force of the wheel. Another damping device includes a disk made of Aluminum and a magnetic device is fixedly connected to the frame of the exercising device and beside the disk. The disk is co-axially connected to a first wheel made of casting steel. A second wheel is connected to the crank and connected to the first wheel by a chain so that when rotating the crank, the first wheel and the disk are rotated, and the magnetic device will produce a damping force to the disk Nevertheless, the structure of the exercising device is so complicated and the manufacturing is costly.

The present invention intends to provide a damping device having a disk with magnetic members attached thereto. The disk and the magnetic members are rotated by the user. An adjusting means is connected to the frame of the exercising

device and is moved relative to the disk and the magnetic members so as to adjust the damping force.

SUMMARY OF THE INVENTION

In accordance with the present invention, a damping device, for an exercising device which has a frame, comprises:-

a disk having a shaft extending from the first side thereof and a plurality of recesses defined in the second side of said disk;

a plurality of magnetic members received in said recesses of said disk;

a shaft extending through said disk and adapted to be connected to the frame of the exercising device,

a ring movably mounted on said shaft and adapted to be located between the frame of the exercising device and said disk,

a control wire connected to said ring, and

a spring mounted to said control wire and adapted to be biased between the frame and said ring.

BRIEF DESCRIPTION OF THE DRAWINGS

In order that the present invention may be more readily understood the following description is given for purposes of illustration only, in conjunction with the accompanying drawings in which:-

Fig. 1 is an exploded view of the first embodiment of a damping device for an exercising device in accordance with the present invention;

Fig. 2 is a side elevational view, partly in section, of the damping device as shown in Fig. 1 in accordance with the present invention;

Fig. 3 is a front view, partly in section, of the damping device as shown in Fig. 3 in accordance with the present invention, wherein the cam means is not yet rotated;

Fig. 4 is a front view, partly in section, of the damping device as shown in Fig. 3 in accordance with the present invention, wherein the cam means is rotated;

Fig. 5 is an exploded view of the second embodiment of a damping device for an exercising device in accordance with the present invention;

Fig. 6 is a front view, partly in section, of the damping device as shown in Fig. 5 in accordance with the present invention, wherein the cam means is not yet rotated;

Fig. 7 is a front view, partly in section, of the damping device as shown in Fig. 5 in accordance with the present invention, wherein the cam means is rotated;

Fig. 8 is an exploded view of the third embodiment of a damping device for an exercising device in accordance with the present invention;

Fig. 9 is a side elevational view, partly in section, of the damping device as shown in Fig. 8 in accordance with the present invention wherein the ring is not yet moved toward the disk, and

Fig. 10 is a side elevational view, partly in section, of the damping device as shown in Fig. 8 in accordance with the present invention wherein the ring is not moved toward the disk.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to Figs. 1 to 3, the first embodiment of a damping device of the present invention for an exercising device comprises a disk 14 having a flange 13 extending outward from the periphery of the disk 14. A hole 11 is defined through the disk 14 and a plurality of magnetic members 2 are attached to the outside of the

flange 13. A engaging portion 12 extends from one of two sides of the disk 14 so as to be engaged with a transmission belt or the like so that when the user rotates the crank (not shown) of the exercising device, the disk 14 rotates.

An adjusting means 50 has two semi-circular parts 5, each of the parts 5 having a first lug 502 on the first end thereof which is pivotally connected to the frame 7 of the exercising device by two bolts 55 extending through two respective holes 501 in the two first lugs 502. Each part 5 has a second lug 510 extending from the second end thereof and each of the two second lugs 510 has a lip 51 so that a spring 56 is connected between the two lips 51 of the two second lugs 510. The disk 14 is received between the two parts 5. In other words, the magnetic members 2 face the inside of the flange 13 of the disk 14.

A shaft 4 extends between the two parts 5 and extends through the hole 11 of the disk 14 with two bearings 3 mounted to the shaft 4. A cam means 6 is connected to the frame 7 and rotatably connected between the two second lugs 510 of the two parts 5. The cam means 60 has a central portion 60 with two pairs of lugs 603 extending from two sides of the central portion 60 so that two rollers 61 are rotatably connected between the two pairs of lugs 603 by two pins 63. The central portion 60 has a rectangular section 601 extending from one of two ends thereof so that the rectangular section 601 extends through the frame 7 and fixedly connected to a wheel 62. The wheel 62 has a notch 621 defined in the periphery thereof and a control wire 8 has an end member 81 which is securely engaged with the notch 621 so that the cam means 60 is rotated by pulling the control wire 8 as shown in Fig.4, the two parts 5 are then moved away from the magnetic members 2. When releasing the control wire 8, the two parts 5 are again moved toward the magnetic members 2 by the spring 56.

Referring to Figs. 5 to 7, the second embodiment of the damping device is shown and in the second embodiment, the magnetic members 2 are attached to the

inside of the flange 13 and the two parts 5 are enclosed by the flange 13 of the disk 14. The disk 14 has two rods 55 extending laterally therefrom and each of the two parts 5 has a passage 500 for the corresponding rod 55 extending therethrough. Each part 5 has a plurality of panels and two lips 51 respectively extend from the panels in the two parts 5 so that a spring 56 is connected between the two lips 51.

Therefore, when pulling the control wire 8, the cam means 6 is rotated and the two parts 5 are separated apart and moved toward the magnetic members 2 attached to the inside of the flange 13 of the disk 14. Similar to the first embodiment of the present invention, when releasing the control wire 8, the two parts 5 are pivoted away from the magnetic members 2 by the spring 56.

Figures 8 to 10 show a third embodiment of the damping device of the present invention, wherein a disk 140 having a shaft 141 extending from the first side thereof and a plurality of recesses 142 defined in the second side of the disk 140. A plurality of magnetic members 2 are received in the recesses 142 of the disk 140. A shaft 143 extends through the disk 140 and is rotatably connected to the frame 7 of the exercising device. A ring 15 is connected to a supporting member 150, both of the ring 15 and the supporting member 150 are movably mounted to the shaft 143. The frame 7 has a guiding rod 70 extending therefrom and the supporting member 150 has a sleeve 151 which is movably mounted to the guiding rod 70.

A control wire 90 is connected to the ring 15 and a spring 91 is mounted to the control wire 90 and the spring 91 is biased between the frame 7 and the ring 15. Therefore, when the user pulls the control wire 90, the ring 15 is movable on the shaft 143 so that the user can decide whether the ring 15 moves toward or away from the magnetic members 2 in the recesses 142 of the disk 140.

Accordingly, the magnetic members 2 are rotatably with the disk 140 and the adjusting means can be pivoted or moved relative to the magnetic members 2 so as to adjust the damping force of the exercising device.

While we have shown and described various embodiments in accordance with the present invention, it should be clear to those skilled in the art that further embodiments may be made without departing from the scope and spirit of the present invention.

CLAIMS

1. A damping device for an exercising device which has a frame, said damping device comprising:

a disk having a shaft extending from the first side thereof and a plurality of recesses defined in the second side of said disk;

a plurality of magnetic members received in said recesses of said disk;

a shaft extending through said disk and adapted to be connected to the frame of the exercising device,

a ring movably mounted on said shaft and adapted to be located between the frame of the exercising device and said disk,

a control wire connected to said ring, and

a spring mounted to said control wire and adapted to be biased between the frame and said ring.

2. The damping device as claimed in claim 1 further comprising a supporting member which is fixedly connected to said ring and is movably mounted on said shaft.

Application No: GB 0017859.0
Claims searched: 1-2

Examiner: Paul Makin
Date of search: 28 November 2000

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.R): A6M (MAB, MAC, MAD) ; H2A

Int Cl (Ed.7): A63B 21/005, 22/08 ; H02K 49/04

Other: Online : WPI, EPODOC, JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	US 5051638 (PYLES) see particularly Figure 7	1,2

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.