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Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this

United States Patent

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America, and if the invention is a process, of the right to exclude others from using, offering for sale or selling throughout the United States of America, or importing into the United States of America, products made by that process, for the term set forth in 35 U.S.C. 154(a)(2) or (c)(1), subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b). See the Maintenance Fee Notice on the inside of the cover.

Michelle K. Lee

Director of the United States Patent and Trademark Office



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Chen et al.

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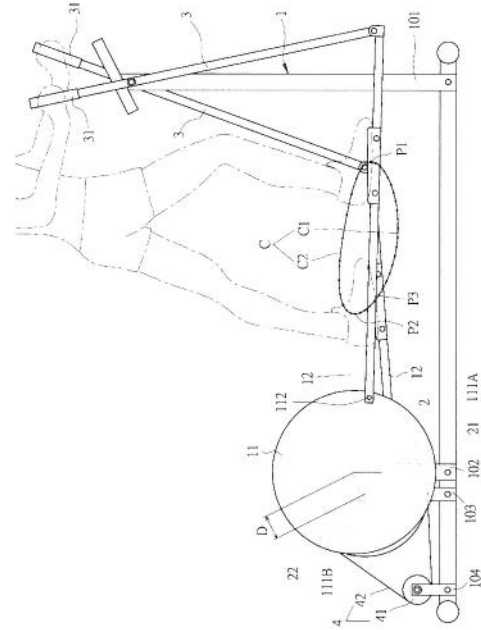
- (54) **ELLIPTICAL EXERCISER**
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USPC 482/51-53, 57
See application file for complete search history.

- (56) References Cited
- U.S. PATENT DOCUMENTS
- | | | | |
|-------------------|---------|----------------|----------|
| 5,261,294 A * | 11/1993 | Ticer et al. | 74/594.1 |
| 5,518,473 A * | 5/1996 | Miller | 482/57 |
| 5,848,954 A * | 12/1998 | Stearns et al. | 482/52 |
| 6,027,431 A * | 2/2000 | Stearns et al. | 482/52 |
| 6,090,013 A | 7/2000 | Eschenbach | |
| 6,206,804 B1 * | 3/2001 | Maresh | 482/52 |
| 6,254,514 B1 * | 7/2001 | Maresh et al. | 482/52 |
| 6,340,340 B1 * | 1/2002 | Stearns et al. | 482/52 |
| 6,482,130 B1 * | 11/2002 | Passero et al. | 482/51 |
| 7,041,034 B1 * | 5/2006 | Stearns et al. | 482/52 |
| 7,201,706 B1 * | 4/2007 | Lee et al. | 482/52 |
| 7,497,810 B1 * | 3/2009 | Stearns et al. | 482/52 |
| 2002/0094914 A1 * | 7/2002 | Maresh et al. | 482/51 |
| 2002/0142890 A1 * | 10/2002 | Ohrt et al. | 482/52 |
| 2004/0209741 A1 * | 10/2004 | Kuo | 482/52 |
| 2006/0142123 A1 * | 6/2006 | Kettler et al. | 482/52 |
- (Continued)
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(57) **ABSTRACT**

An exerciser includes a body and an adjustment wheel. The body has two flywheels and two foot support links. The two flywheels each have a sliding portion which radially connected thereto so as to guide the two foot support links to alternatively move along a supporting travel and a crossing travel to complete a closed pedal trajectory when the flywheels rotate. The timing adjustment wheel is pivotally connected to the body. The timing adjustment wheel has a first slider and a second slider, the first and second sliders are configured to move along the sliding portions of the flywheels. The foot support links drives the flywheel to rotate so that the first and second sliders move along the sliding portions to change the speeds and phase differences of the foot support links so as to meet the principles of ergonomics.

5 Claims, 8 Drawing Sheets



MAINTENANCE FEE NOTICE

If the application for this patent was filed on or after December 12, 1980, maintenance fees are due three years and six months, seven years and six months, and eleven years and six months after the date of this grant, or within a grace period of six months thereafter upon payment of a surcharge as provided by law. The amount, number and timing of the maintenance fees required may be changed by law or regulation. Unless payment of the applicable maintenance fee is received in the United States Patent and Trademark Office on or before the date the fee is due or within a grace period of six months thereafter, the patent will expire as of the end of such grace period.

PATENT TERM NOTICE

If the application for this patent was filed on or after June 8, 1995, the term of this patent begins on the date on which this patent issues and ends twenty years from the filing date of the application or, if the application contains a specific reference to an earlier filed application or applications under 35 U.S.C. 120, 121, 365(c), or 386(c), twenty years from the filing date of the earliest such application ("the twenty-year term"), subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b), and any extension as provided by 35 U.S.C. 154(b) or 156 or any disclaimer under 35 U.S.C. 253.

If this application was filed prior to June 8, 1995, the term of this patent begins on the date on which this patent issues and ends on the later of seventeen years from the date of the grant of this patent or the twenty-year term set forth above for patents resulting from applications filed on or after June 8, 1995, subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b) and any extension as provided by 35 U.S.C. 156 or any disclaimer under 35 U.S.C. 253.