# PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
Stylesheet Version v1.2

EPAS ID: PAT7543580

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| **SUBMISSION TYPE:** | NEW ASSIGNMENT |
| **NATURE OF CONVEYANCE:** | PATENT ASSIGNMENT AGREEMENT TO ASSET PURCHASE AGREEMENT |

**CONVEYING PARTY DATA**

| Name | Execution Date |
|---|---|
| INTERACTIVE FITNESS HOLDINGS (ABC), LLC | 04/22/2022 |

**RECEIVING PARTY DATA**

| | |
|---|---|
| **Name:** | BLUE GOJI LLC |
| **Street Address:** | 4201 SOUTH CONGRESS AVENUE |
| **Internal Address:** | SUITE 323 |
| **City:** | AUSTIN |
| **State/Country:** | TEXAS |
| **Postal Code:** | 78745 |

**PROPERTY NUMBERS Total: 4**

| Property Type | Number |
|---|---|
| **Application Number:** | 17097675 |
| **Application Number:** | 63108320 |
| **PCT Number:** | US2021056136 |
| **Patent Number:** | 7762931 |

**CORRESPONDENCE DATA**

**Fax Number:** (360)692-2617

***Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.***

**Phone:** 3606746233
**Email:** elly@galvinpatentlaw.com
**Correspondent Name:** GALVIN PATENT LAW LLC
**Address Line 1:** 2916 NW BUCKLIN HILL RD
**Address Line 2:** SUITE 485
**Address Line 4:** SILVERDALE, WASHINGTON 98383

| | |
|---|---|
| **NAME OF SUBMITTER:** | ELIANA GEPHART |
| **SIGNATURE:** | /Eliana Gephart/ |
| **DATE SIGNED:** | 09/16/2022 |

**Total Attachments: 24**
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**EXHIBIT 6.2 (ii)**

TO ASSET PURCHASE AGREEMENT
**PATENT ASSIGNMENT AGREEMENT**

THIS PATENT ASSIGNMENT AGREEMENT is made as of April 22, 2022, by and between Interactive Fitness Holdings (ABC), LLC, a California limited liability company ("Seller"), as Assignee for the Benefit of Creditors of Interactive Fitness Holdings, Inc., a Delaware corporation, and Blue Goji, LLC, a Delaware limited liability company ("Buyer"). Seller and Buyer are parties to a certain Asset Purchase Agreement dated as of April 22, 2022, (the "Asset Purchase Agreement"). Capitalized terms used without definitions herein shall have the meanings ascribed to such terms in the Asset Purchase Agreement.

WHEREAS, Seller has agreed to sell to Buyer, and Buyer has agreed to acquire from Seller, all of Seller's rights, title and interest in all patents and patent applications owned by Seller, including those patents and patent applications identified in Schedule A attached herein ("Assigned Patents"); and

WHEREAS, the parties accordingly wish to execute this recordable instrument, assigning all of Seller's right, title and interest in and to the Assigned Patents to Buyer;

NOW, THEREFORE, for valuable consideration set forth in the Asset Purchase Agreement, the receipt and sufficiency of which are hereby acknowledged, Seller and Buyer agree as follows:

1. Seller hereby sells, assigns, transfers, and sets over to Buyer, and its lawful successors and assigns, the Seller's entire right, title, and interest throughout the world in and to the Assigned Patents, together with all rights to the inventions described or claimed therein, and all divisions, continuations and continuations-in-part thereof, and all Letters Patent of the United States which may be granted thereon, and all reissues thereof, and all rights to claim priority therefrom, and all applications for Letters Patent which may hereafter be filed for this invention in any foreign country and all Letters Patent which may be granted on this invention in any foreign country, and all extensions, renewals, and reissues, thereof and Seller hereby authorizes and requests the Commissioner of Patents and Trademarks of the United States and any official of any foreign country whose duty it is to issue patents on applications as described above, to issue all Letters Patent for any invention disclosed and claimed in any Assigned Patent to Buyer, its successors and assigns, in accordance with the terms of this Patent Assignment Agreement.

2. Seller further assign to Buyer all rights to sue and recover for any past, present or future actions, causes of action and rights to recover damages or payments (including lost profits), for infringement or misappropriations of any Assigned Patent, as well as the right to take over and continue any and all existing suits related to any Assigned Patent.

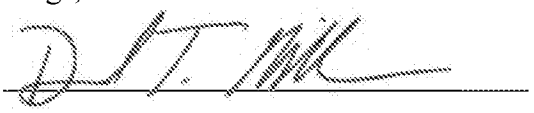
3. This Patent Assignment Agreement is subject to the terms and conditions of the Asset Purchase Agreement and this Patent Assignment Agreement shall not be deemed to limit, enlarge or extinguish any obligation of Seller or Buyer under the Asset Purchase Agreement, all of which obligations shall survive the delivery of this Patent Assignment Agreement in accordance with the terms of the Asset Purchase Agreement, and that to the extent there is any conflict between this Patent Assignment Agreement and the terms and conditions of the Asset Purchase Agreement, the Asset Purchase Agreement shall control.

4. This Patent Assignment Agreement may be executed in counterparts, each of which shall

be deemed an original, but all of which together shall constitute one and the same instrument.

**SELLER:**

Interactive Fitness Holdings (ABC), LLC, a California limited liability company, as Assignee for the Benefit of Creditors of Interactive Fitness Holdings, Inc.

By: 

Name: David Miller

Title: Manager

**BUYER:**

Blue Goji, LLC, a Delaware limited liability company

By: _____

Name: Coleman Fung

Title: Chief Executive Officer

be deemed an original, but all of which together shall constitute one and the same instrument.

**SELLER:**

Interactive Fitness Holdings (ABC), LLC, a California limited liability company, as Assignee for the Benefit of Creditors of Interactive Fitness Holdings, Inc.

By:_____

Name: David Miller

Title: Manager

**BUYER:**

Blue Goji, LLC, a Delaware limited liability company

By:_____

Name: Coleman Fung

Title: Chief Executive Officer

Schedule A
To Patent Assignment Agreement

Assigned Patents

HARNESS

# Invention Master List by Matter Number



Matter Number: 15989-P00003 Disclosure Status: Open Disclosure Date: Family Number: 15989-P00003

Client: Interactive Fitness Holdings, LLC Disclosure Reference:

Owner: Interactive Fitness Holdings, LLC Attorney(s): MLC, MJT, JXP

Invention Title:

Resp Office: SL

COUNTRY APPLICATIONS

| Country | Sub Case | Case Type | Expiration Date |
|---|---|---|---|
| HDP Number | Country Title (if different from Invention Title) | | |
| Status | Application Number | Patent Number | Country Owner |
| Status Date | Filing Date | Issue Date | |
| US | 01 | PRI | |
| 15989-000003-US | TBD | | |
| Closed | | | Interactive Fitness Holdings, LLC |
| 28-Feb-2012 | | | |

# Invention Master List by Matter Number

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|---|---|---|---|---|---|
| Matter Number: | 15989-P00007 | Disclosure Status: | Filed | Disclosure Date: | Family Number: 15989-P00007 |
| Client: | Interactive Fitness Holdings, LLC | Disclosure Reference: | | | |
| Owner: | Interactive Fitness Holdings, LLC | Attorney(s): | TDM, MLC | | |
| Invention Title: | Exercise Bike | | | | |
| Resp Office: | SL | | | | |

COUNTRY APPLICATIONS

| Country | Sub Case | Case Type | Expiration Date |
|---|---|---|---|
| HDP Number | Country Title (if different from Invention Title) | | |
| Status | Application Number | Patent Number | Country Owner |
| Status Date | Filing Date | Issue Date | |
| US | 01 | ORD | |
| 15989-000007-US | | | |
| Pending | 17/097675 | | Interactive Fitness Holdings, LLC |
| 27-Nov-2020 | 13-Nov-2020 | | |
| US | 02 | PRO | 31-Oct-2021 |
| 15989-000007-US-PS1 | | | |
| NonProFiled | 63/108320 | | Interactive Fitness Holdings, LLC |
| 15-Nov-2021 | 31-Oct-2020 | | |
| WO | 01 | ORD | |
| 15989-000007-WO-POA | | | |
| Pending | PCT/US2021/056136 | | Interactive Fitness Holdings, LLC |
| 22-Oct-2021 | 22-Oct-2021 | | |

# Selection Criteria

Tuesday, March 22, 2022

Record Count: 2

| | | | |
|---|---|---|---|
| Sort: | by Matter Number | | |
| Include: | Country Applications | | |
| | Selection Criteria | | |
| Disclosure Date: | | | |
| Client: | 15989 | | |
| Agent: | | | |
| Area: | | | |
| Matter Number: | | HDP Number: | |
| Inventor: | | | |
| Attorney: | | Attorney Office: | |
| Owner: | | | |
| Keyword: | | | |
| Responsible Office: | | | |
| Disclosure Status: | | | |
| Case Type: | | | |
| Country: | | | |
| Status Codes: | All | | |
| Status: | | Status Groups: | |

## More ...

| | |
|---|---|
| Client: | |
| Inventors: | |
| Keywords: | |
| Attorney: | |
| Owner: | |
| Agent: | |

US007762931B2

(12) **United States Patent**
**Fisher et al.**

(10) **Patent No.: US 7,762,931 B2**
(45) **Date of Patent: Jul. 27, 2010**

(54) **SEAT FOR CARDIO-FITNESS EQUIPMENT**

(75) Inventors: **John Fisher**, Los Gatos, CA (US); **Steve Anderes**, Cupertino, CA (US); **Joel Jensen**, Redwood City, CA (US)

(73) Assignee: **Interactive Fitness Holdings, LLC**, Sunnyvale, CA (US)

( * ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **11/788,368**

(22) Filed: **Apr. 18, 2007**

(65) **Prior Publication Data**

US 2008/0261774 A1 Oct. 23, 2008

(51) **Int. Cl.**
***A63B 22/06*** (2006.01)

(52) **U.S. Cl.** ..... **482/57**; 482/5; 297/215.14

(58) **Field of Classification Search** ..... 482/4–7, 482/51, 57, 1, 2, 3, 8, 9, 52, 53, 58, 59, 60, 482/61, 62, 63, 64, 65; 297/215.13, 215.24, 297/344.11, 208, 41.37, 383; 403/109.1, 403/109.3, 109.6, 374.5

See application file for complete search history.

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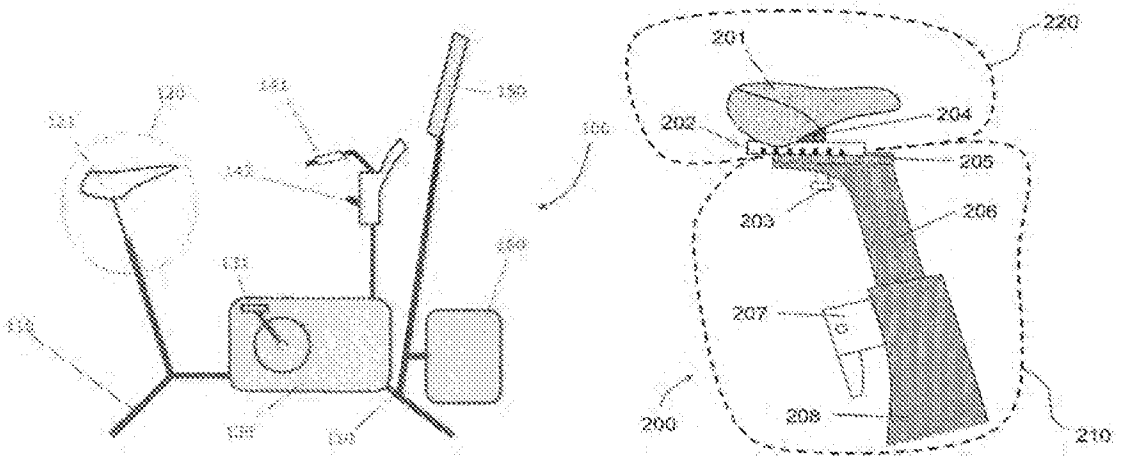
*Primary Examiner*—Loan H Thanh
*Assistant Examiner*—Daniel F Roland
(74) *Attorney, Agent, or Firm*—Perkins Coie LLP

(57) **ABSTRACT**

One embodiment of the present invention discloses a cardio-fitness equipment with a seat that features height adjustment, proximity to handlebars adjustment, and easy removal of the seat for the purpose of exchange with a different user-selected model or for cleaning.

**20 Claims, 9 Drawing Sheets**



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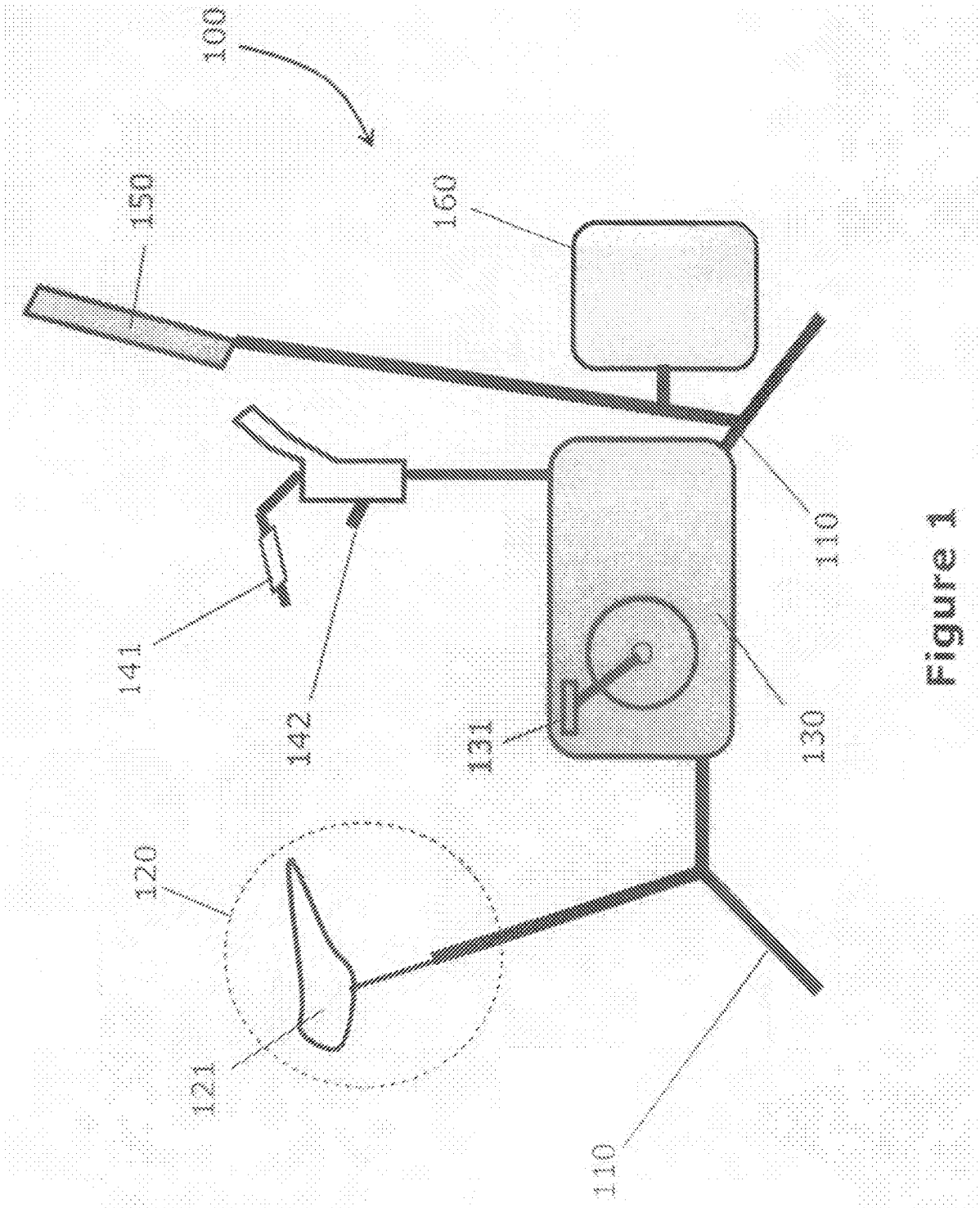


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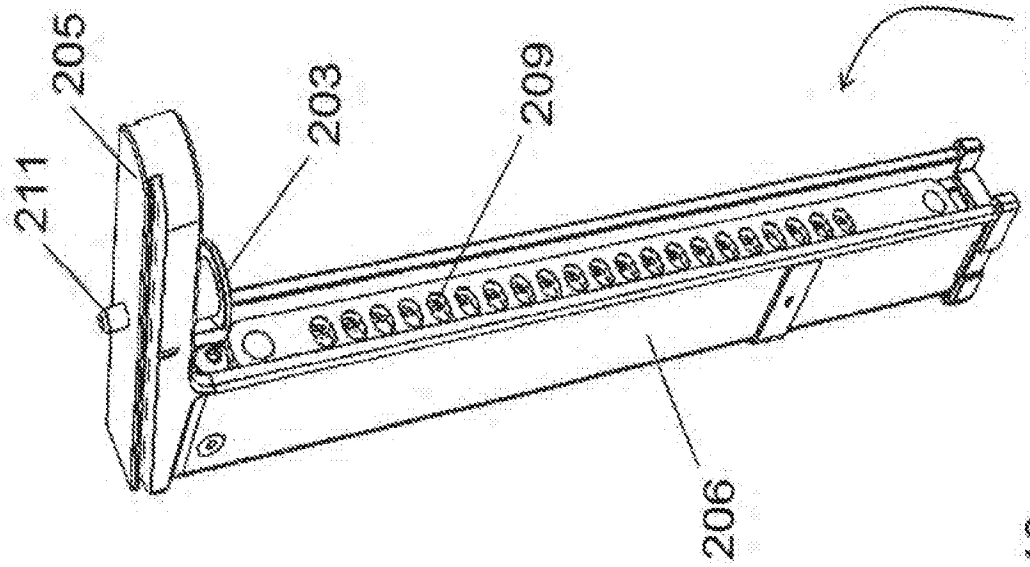


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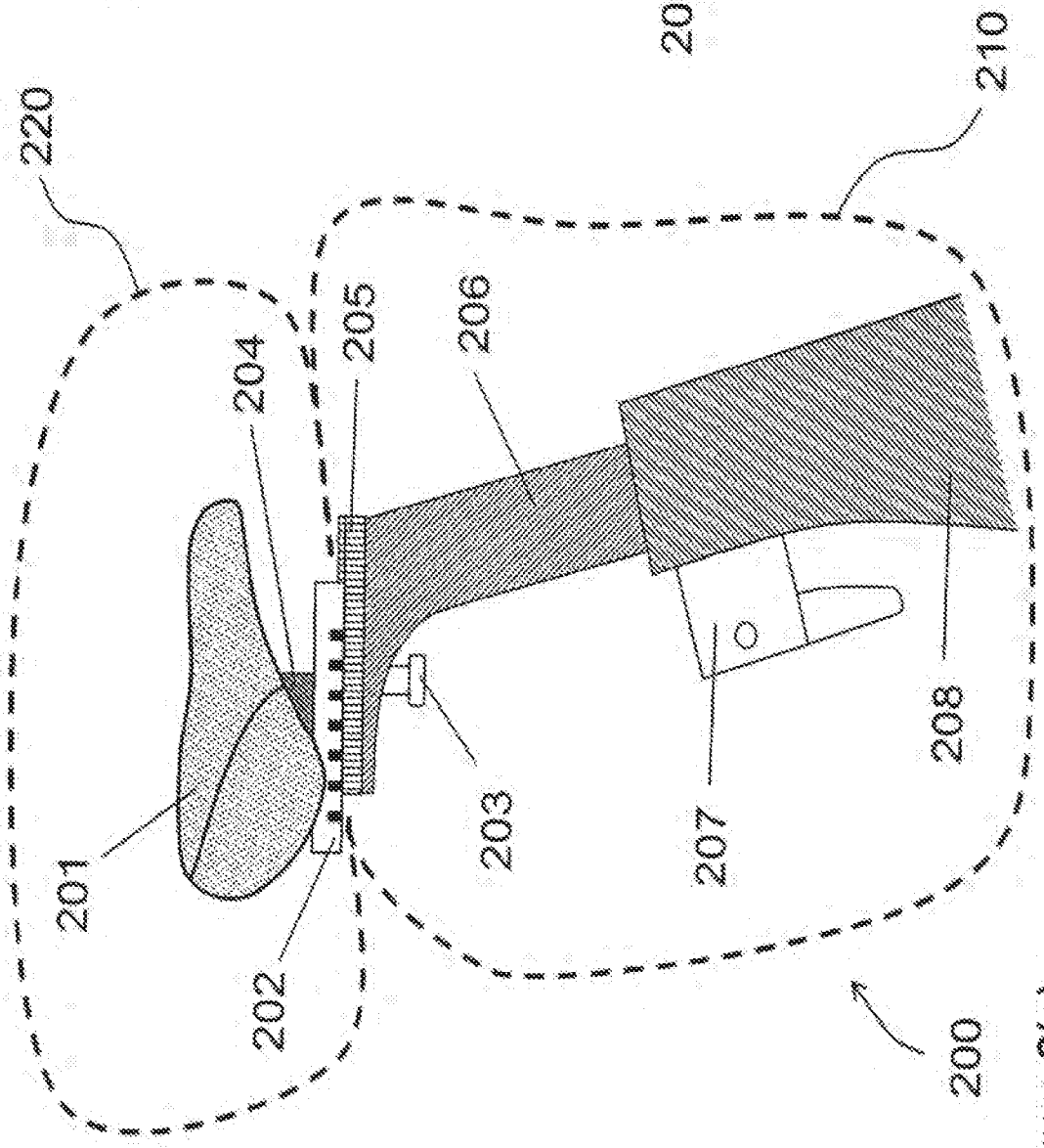


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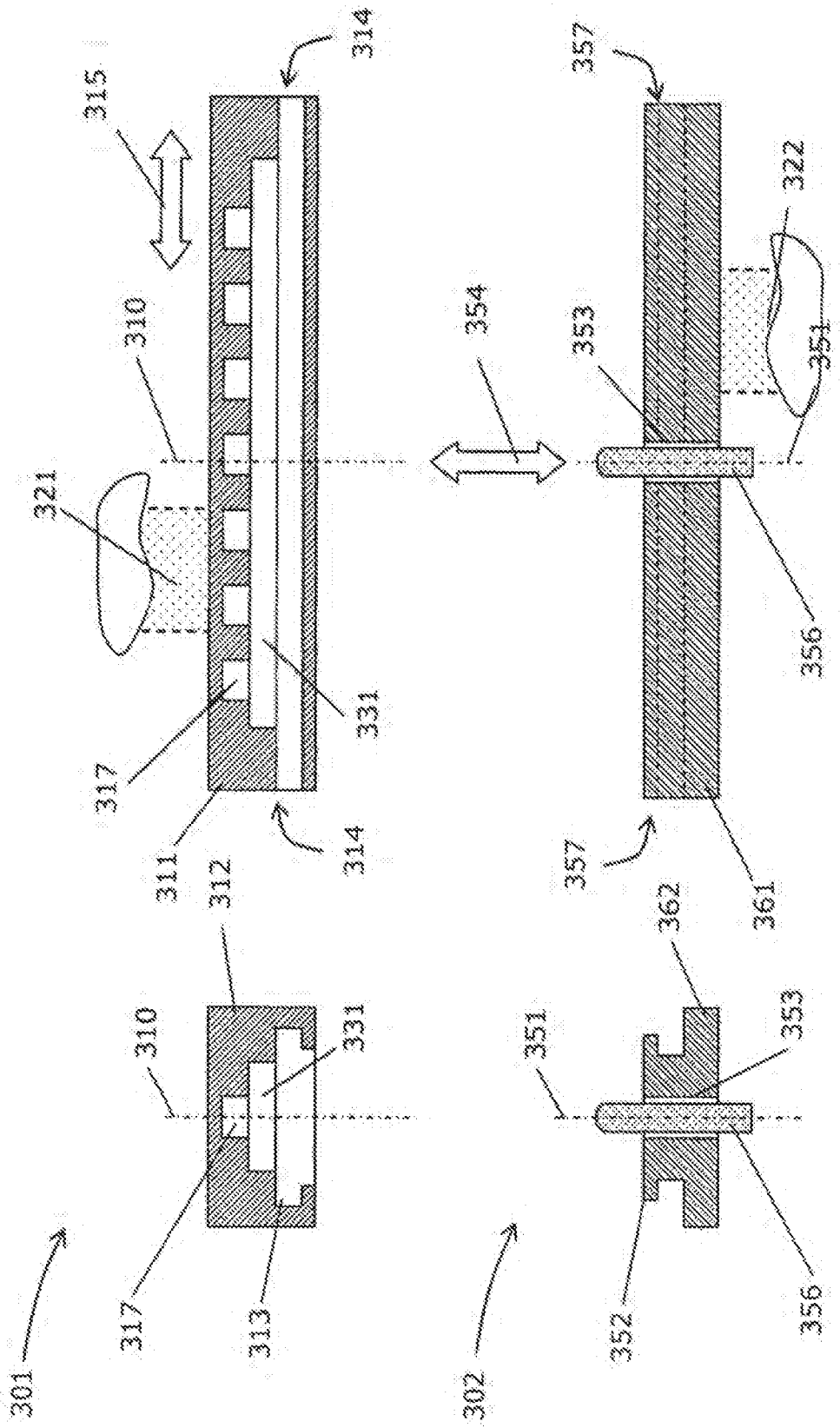
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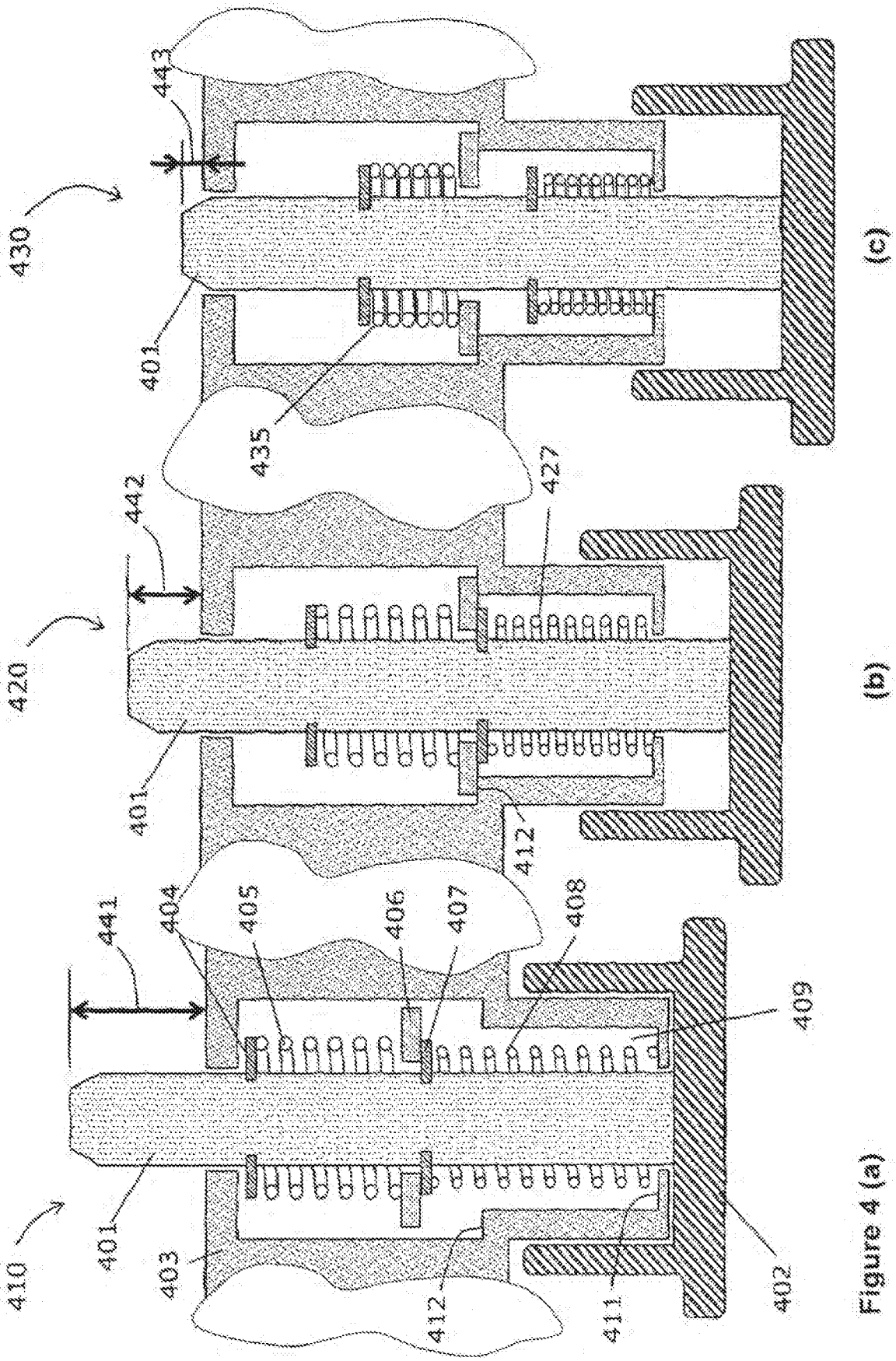
Figure 3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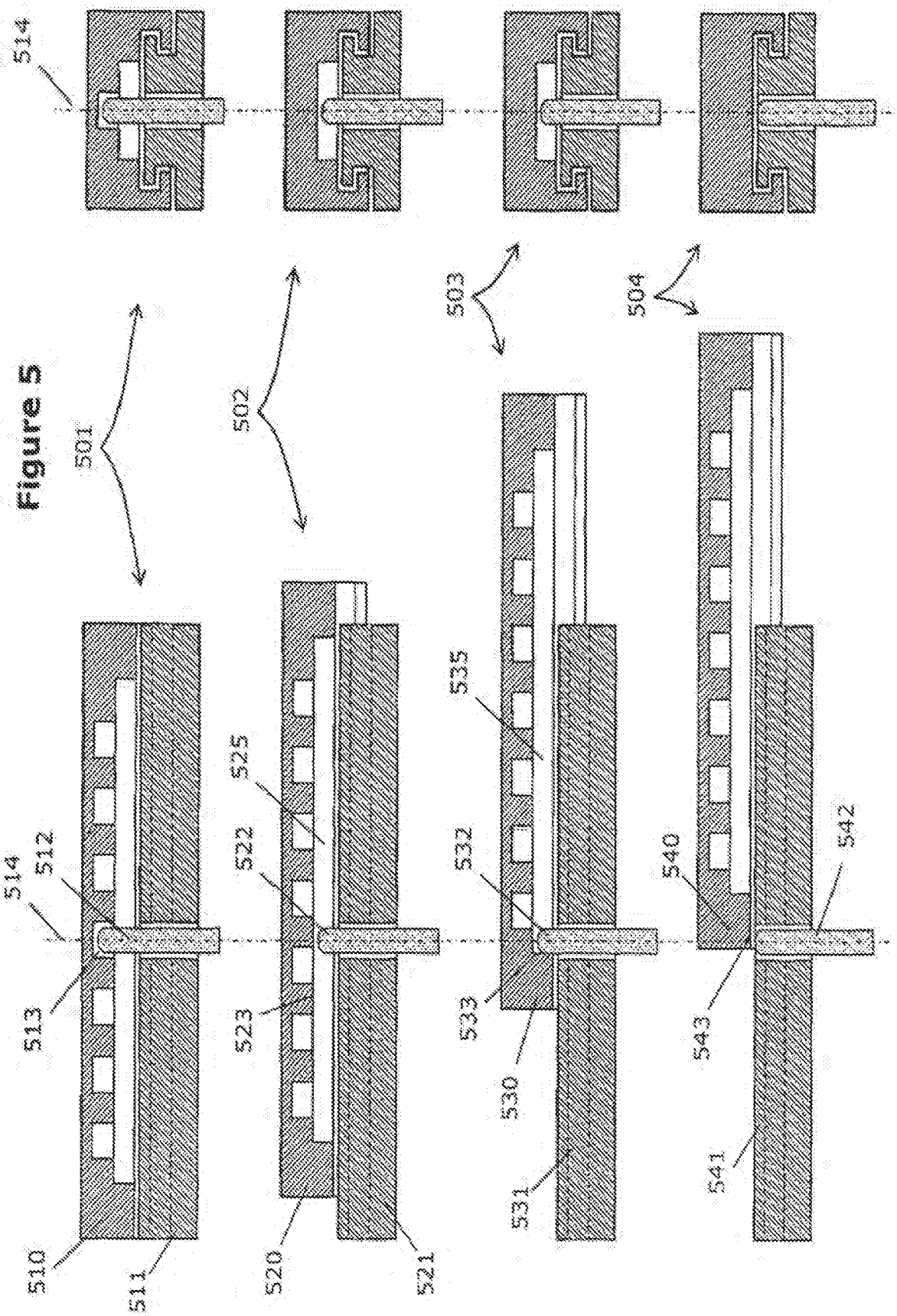
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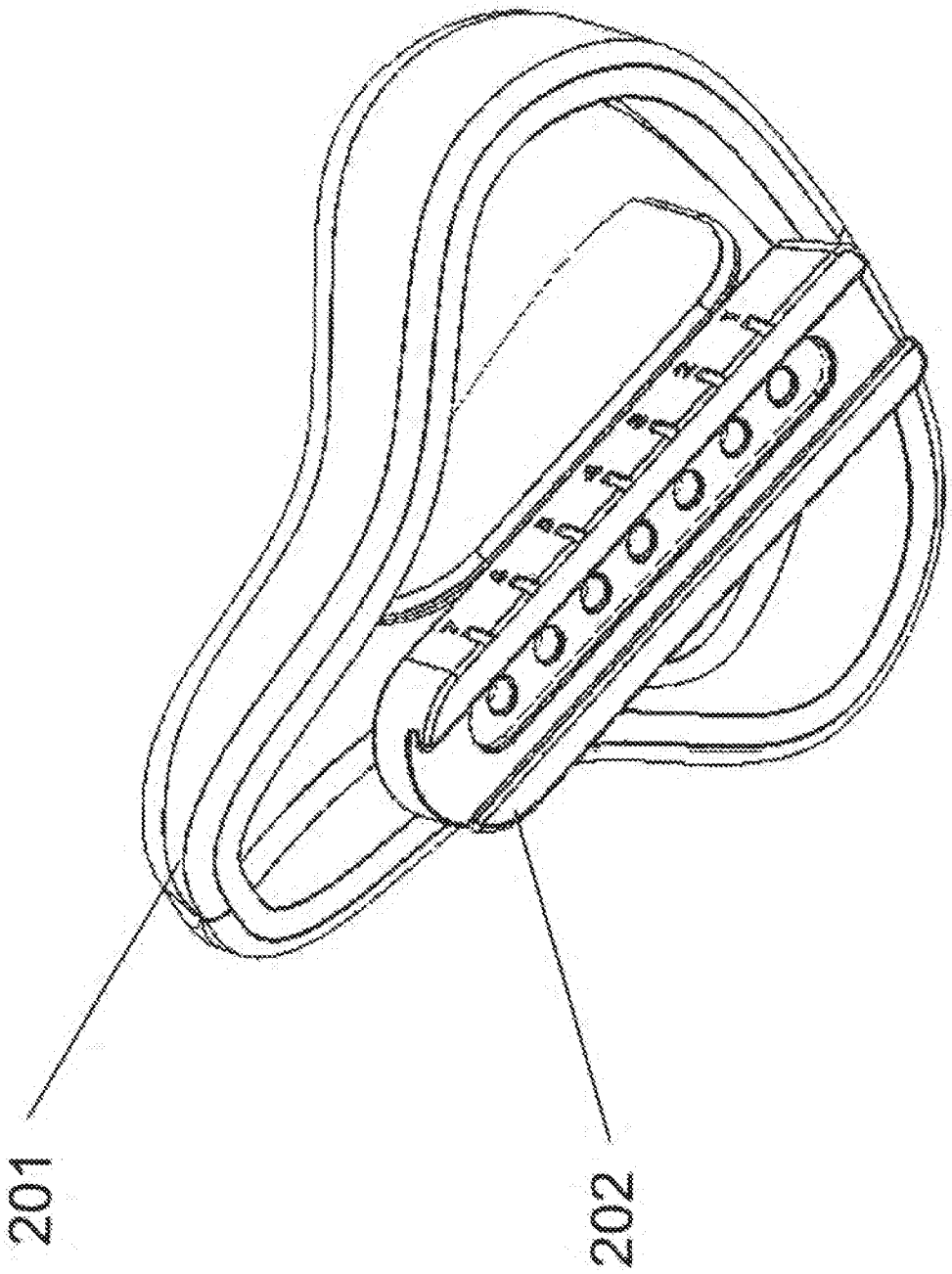
Figure 5

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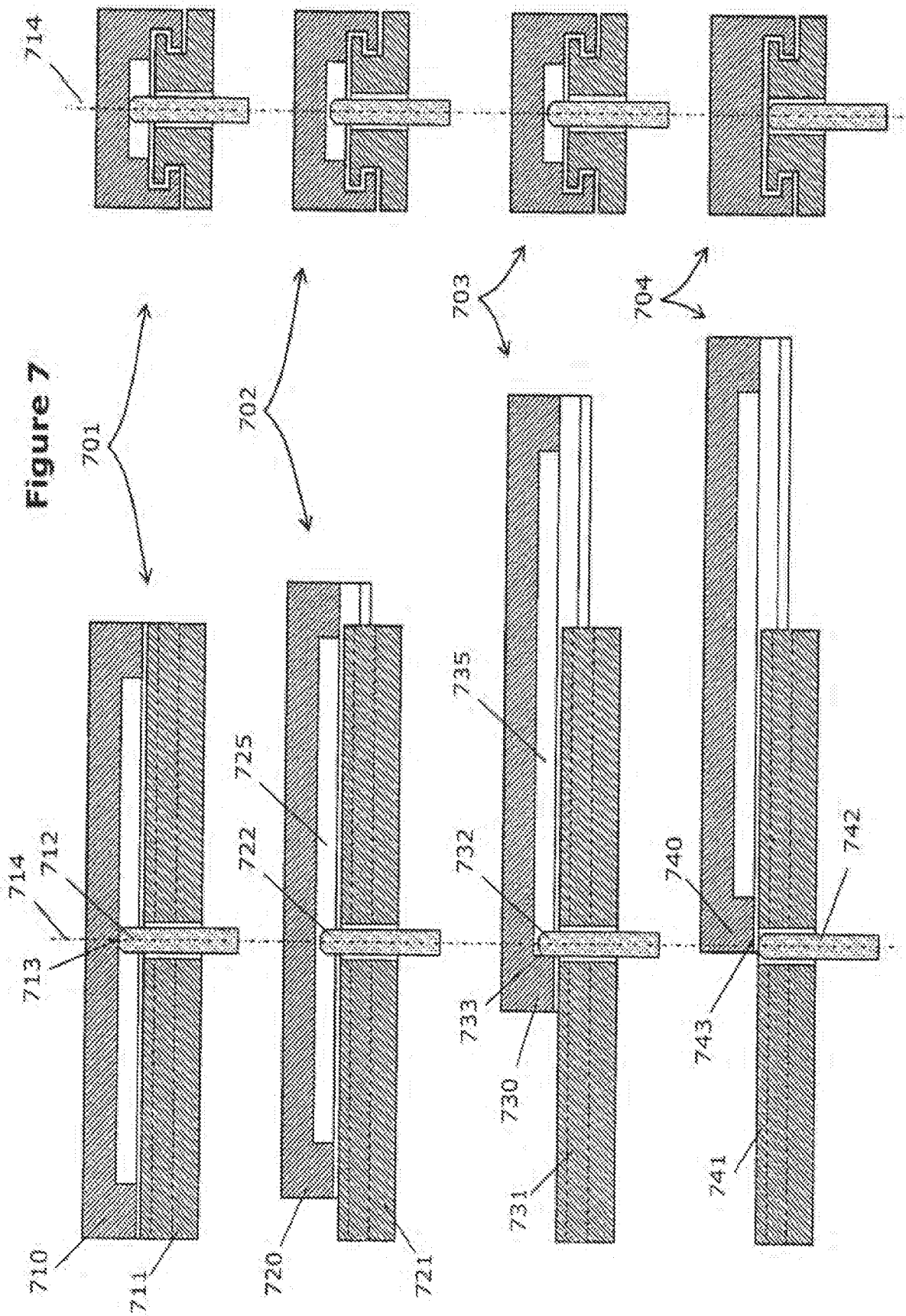
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Figure 7

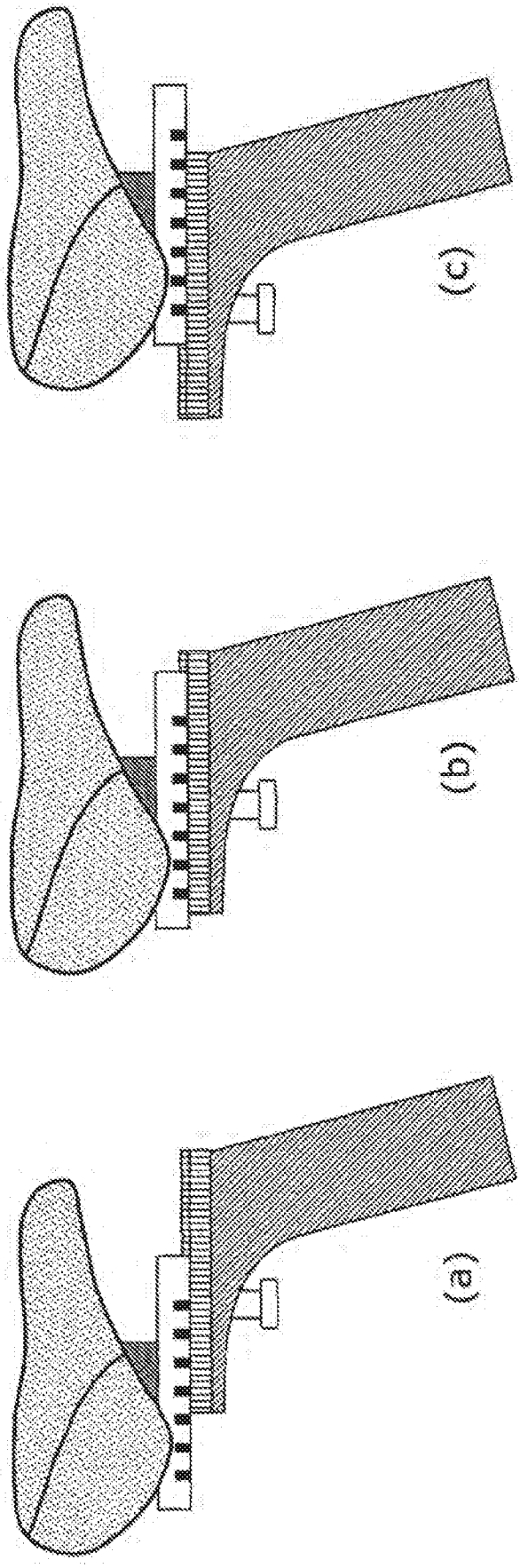
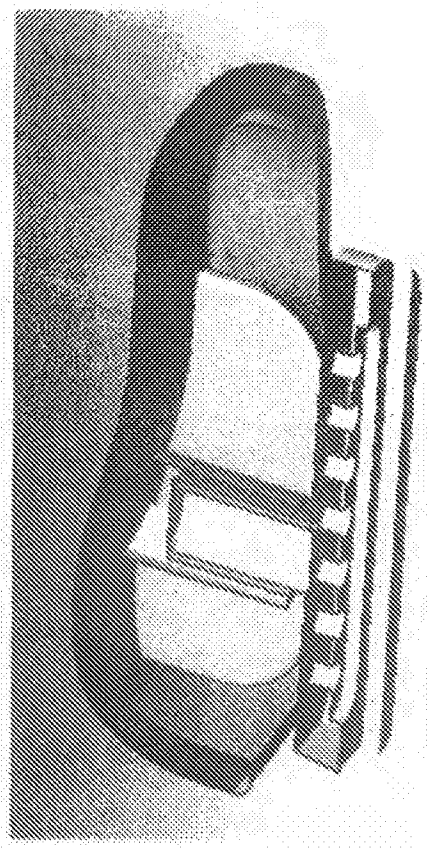
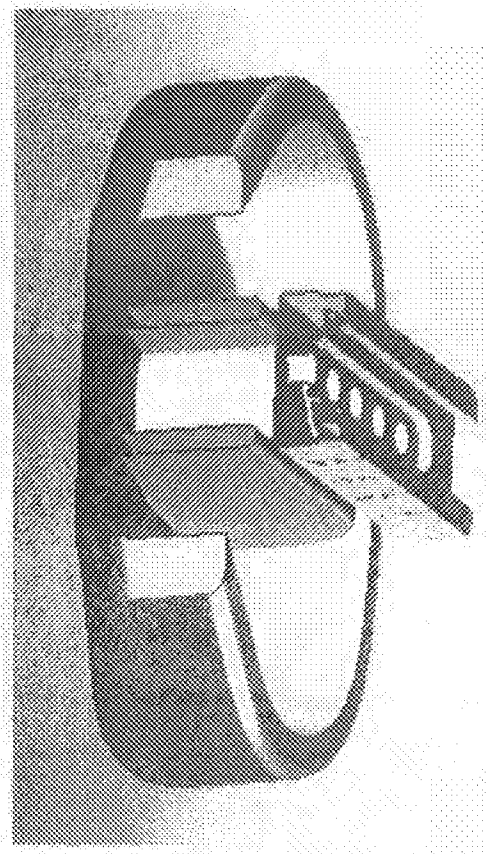



Figure 8



(b)



(a)

Figure 9

# SEAT FOR CARDIO-FITNESS EQUIPMENT

## RELATED APPLICATIONS

This application is related to and cross-references U.S. application Ser. No. 11/433,778, filed May 11, 2006, and entitled "Cardio-Fitness Station With Virtual-Reality Capability," by John Fisher et al., the contents of which application are hereby incorporated by reference.

## BACKGROUND

1. Field of Invention

This invention relates to stationary exercise equipment and seats used by such equipment. More specifically, the invention relates to seats used by cardio-fitness stations.

2. Background of the Invention

Stationary exercise equipment, which can be but are not limited to stationary exercise bicycles, are ubiquitous for in-house exercise and fitness clubs. Typically, a user (referred to as a rider) pedals to dissipate power and exercise his/her muscles on a stationary exercise equipment. There are two types of stationary exercise equipment—upright and recumbent, each having a seat on which the rider sits while exercising. The upright exercise equipment requires a rider to sit straight. The recumbent exercise equipment allows the rider to sit back, which is sometimes preferred by people with lower back pain or reduced mobility.

For posture and proper exercise reasons, seat position is one of the major characteristics that the rider considers when selecting a stationary exercise equipment. Stationary exercise equipment manufacturers typically opt for a wide and comfortable seat to satisfy the broadest population and regularly offer user-friendly seat height adjustment.

State of the art exercise equipment have many features found on their real world counterparts (such as road bicycles). Such features include but are not limited to, pedals with a varying degree of pedaling resistance, handlebars that turn, gear-shifting members, and bicycle-like seats. The exercise equipment may also have features that generally do not appear on their real world counterparts, such as heart-rate monitoring, video and sound entertainment. Cardio-fitness stations, the most advanced stationary exercise equipment to date, offer virtual reality capabilities that allow the rider to interact with a virtual environment shown on a video monitor and to experience a virtual ride through a predetermined landscape with hills, valleys, and road obstacles. Such feature has given rise to competition between riders exercising on two cardio-fitness stations, i.e., the riders can operate separate cardio-fitness stations to ride jointly in a race through the same predetermined virtual landscape.

Riders of such advanced exercise equipment with virtual reality capabilities, and of other stationary exercise equipment in general where the riders sit while exercising, tend to spend a lot of time on these equipment and may probably get sore muscles if the seats of the equipment are uncomfortable. In the case of a real world road bicycle (for a non-limiting example), the rider usually selects his/her preferred seat at the time of the purchase, does not share the seat with other users, and rarely has a need to replace the seat for any reason other than replacing a defective or a broken item. In addition, road bicycle offers adjustments of seat height as well as seat proximity to handlebars (in further text referred to as "seat proximity") so the rider can position him/herself properly. Here, the adjustment of seat proximity usually is quite difficult and is less common on recreational bicycles. In contrast, a stationary exercise equipment in a fitness club may have many



riders, and thus may cause several problems. First, different riders have different preferences of the type, size, and position of the seat of the stationary exercise equipment, hence one seat type or limited seat position adjustment will not generally satisfy most riders. Second, with many riders using the same seat for prolonged times, the seat has to be cleaned often. Simple on-site cleaning has been the general approach to resolve this issue, but that may not be sufficient for at least some of the riders. These multi-rider issues are particularly pronounced in sophisticated exercise equipment such as the cardio-fitness stations, which are often the most popular choice in the fitness clubs.

There is an apparent need in the industry to provide a stationary exercise equipment in general, and a cardio-fitness station in particular, with the following features: (a) user-friendly adjustment of the seat position (both seat height and seat proximity), (b) exchange of the seat type to one that is more suitable for the rider, and (c) user-friendly seat removal.

## SUMMARY OF INVENTION

One embodiment of the present invention discloses a cardio-fitness equipment with a seat that features height adjustment, proximity to handlebar adjustment, and easy removal of the seat for the purpose of exchange with a different user-selected model or for cleaning.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** shows an exemplary cardio-fitness station in accordance with one embodiment of the present invention.

FIG. **2** shows an exemplary seat assembly of the cardio-fitness station in accordance with one embodiment of the present invention.

FIG. **3** shows an exemplary seat slider and slider track cross-sectional views of the cardio-fitness station in accordance with one embodiment of the present invention.

FIG. **4** shows an exemplary seat locking mechanism in three configurations: (a) seat locked (normal operation), (b) seat adjustment, and (c) seat exchange configurations in accordance with embodiments of the present invention.

FIG. **5** shows an exemplary seat slider and slider track cross-sectional views for different configurations in accordance with one embodiment of the present invention.

FIG. **6** shows a wire-frame mechanical drawing of an exemplary seat in accordance with one embodiment of the present invention. The drawing shows a seat as seen from the bottom where the seat slider is visible.

FIG. **7** shows an exemplary seat slider and slider track cross-sectional views for different configurations in accordance with one embodiment of the present invention.

FIG. **8** shows an exemplary seat locked in three different seat proximity positions (a) far back, (b) center, (c) far forward in accordance with embodiments of the present invention.

FIG. **9** shows a shaded mechanical drawing of an exemplary seat with two cross-sectional views accentuated: (a) lengthwise cross-sectional view and (b) sideways cross-sectional view in accordance with embodiments of the present invention.

## DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

In the following description, several specific details of an exemplary cardio-fitness station are presented to provide a thorough understanding of embodiments of the invention.

One skilled in the relevant art will recognize, however, that the invention can be practiced with any stationary exercise equipment without one or more of the specific details, or in combination with other components, etc. In other instances, well-known implementations or operations are not shown or described in detail to avoid obscuring aspects of various embodiments of the invention.

An exemplary cardio-fitness station with virtual reality capability in accordance with one embodiment of the present invention is shown in FIG. **1**. The cardio-fitness station **100** is modeled after a real outdoor bicycle, but contains elements of general stationary exercise equipment. The cardio-fitness station includes handlebars **141**, gear-shifting lever **142**, pedal assembly **130**, seat assembly **120**, a computer **160**, and a video monitor **150**, all mechanically connected or attached to a frame assembly **110**.

The seat assembly **120** of the exemplary cardio-fitness station is further described with the help of FIG. **2**. The seat assembly **200** comprises a seat cushion **201**, and a seat slider **202** attached to the seat cushion via hardware **204**. The seat slider **202** is in contact with the slider track **205** that allows the seat slider **202** to slide back and forth along the slider track **205** and be locked in any one of several positions using a pin (adjustment knob) **203**, thereby allowing the rider to control the seat proximity, i.e., control of the distance from the seat to the handlebars. The slider track **205** is attached to a seat support rod **206**, which is inserted into a seat frame support **208**. The seat support rod **206** can slide up and down while inserted in the seat frame support **208**. The seat frame support **208** is attached to or an extension of the frame assembly **110** previously shown in FIG. **1**. A lever **207** can be loosened/tightened to adjust the height of the seat cushion **201** with respect to the seat frame support **208**, thereby allowing the rider to control the seat height. It is clear that the embodiment disclosed in FIG. **2** may be implemented in any stationary exercise equipment without departing from the spirit of the invention.

Referring back to FIG. **1**, the rider preparing to exercise may sit on a seat cushion **121** as one would on a real world bicycle and start pushing pedals **131** (only one shown in FIG. **1**) while holding the handlebars **141**. The video monitor **150** is positioned in the plain view of the rider while he/she is seating on the seat. The rider can watch the images on the video monitor **150**, listen to sounds coming from headphones (not shown), and optionally speak into a microphone (not shown).

FIGS. **2**, **3**, **4**, and **5** show different structure views of an exemplary seat assembly of the exemplary cardio-fitness station in accordance with one embodiment of the present invention. These figures are used to disclose the features of the invention, but it is clear that variations on the same embodiment and the implementation of equivalent ideas that perform the same function do not depart from the spirit of the invention. The inventive hardware concept is intended for use in conjunction with a cardio-fitness station with virtual reality capability, but may be applied to any regular stationary exercise equipment without departing from the spirit of the invention.

Referring to FIG. **2**, seat **220** comprises the seat cushion **201**, the seat slider **202** and several other components, which include but are not limited to, springs and fastening hardware visible in FIG. **2** as **204** and in FIG. **6** showing the seat from below. The seat slider **202** and the seat cushion **201** are mechanically attached to each other via **204**, which is present to attach the seat cushion **201**, springs (not visible) and other seat hardware to the seat slider **202**. This attachment may be engineered in more than one way without departing from the spirit of the invention and is generally known in the art of stationary exercise equipment manufacturing. Several more views of the seat are shown in FIG. **9**. In FIG. **9**, a wire-frame drawing of the seat is shown with the seat cushion **201** and the seat slider **202** visible. The details of the seat slider are described in later text.

In some embodiments, the seat support assembly **210** comprises a seat-support frame **208**, which is a part of the frame **110** (in FIG. **1**) on which the seat assembly **120** (FIG. **1**) is located, the seat post **206**, which is inserted into the seat-support frame **208**, and the lever **207** for loosening/tightening the seat post **206** to the seat-support frame **208**. In one embodiment, the seat height adjustment is realized using a height-adjusting locking pin (not shown) actuated via the lever **207**, which allows the seat height to be locked in any number of discrete heights marked by a plurality of height-adjusting pin holes **209** (shown in FIG. **2**(*b*)). In another embodiment, the height adjustment is accomplished by a mechanical assembly that exerts pressure and locks the seat post **206** to the seat-support frame **208**, where the pressure may also be actuated via a lever similar to **207** or a threaded bolt (not shown).

In some embodiments, the seat adjustment knob **203** can be used by the rider to adjust seat proximity and/or exchange the seat. FIG. **2**(*b*) shows a mechanical wire-drawing of the seat support assembly **230**, which includes the slider track **205**, the seat support rod **206**, the height-adjusting lock holes **209**, and the seat lock knob **203**, which controls the protrusion of a locking pin **211**.

In some embodiments, the seat **220** and the seat-support assembly **210** are mechanically attached to each other and move relative to each other while in contact. In an exemplary operation, the two parts are in contact with each other with the seat slider **202** engaged with the slider track **205** as shown in FIG. **2**(*a*). This movable engagement between the seat slider **202** and the slider track **205** enables the rider to adjust the position of the seat relative to the handlebars or to completely remove the seat **220** from the seat-supporting frame **208**. The movement of the seat slider **202** is enabled with the locking knob **203** pulled down, which allows the seat slider **202** to move on top of the slider track **205** along the lengthwise direction. These features are described below in more details.

The mechanism for adjusting and exchanging the seat **220** from the seat-supporting assembly **210** is disclosed with the help of FIG. **3**. Seat slider **301** (**202** in FIG. **2**) and slider track **302** (**205** in FIG. **2**) are shown with two cross-sectional views each, wherein lines **310** and **351** are used to orient the seat slider **301** and slider track **302** respectively in space and to provide the location of the cross-sectional views relative to the seat slider **301** and slider track **302**. Lines **310** and **351** are each substantially perpendicular to the lengthwise direction of the two parts and substantially perpendicular to the floor on which the stationary exercise equipment is located, but employing this invention at and angle with respect to the floor does not depart from the spirit of the invention. Lengthwise direction means direction pointing from the seat to the stationary exercise equipment's handlebars. It is also the direction that is parallel to the longer dimension of the seat slider **202** shown in FIG. **2**. When in normal operation (with the seat slider **301** engaged with the seat frame track **302**), the seat slider **301** and the slider track **302** are so oriented relative to each other that lines **310** and **351** are parallel to each other.

The cross-sectional view of the seat slider lengthwise through line **310** is shown as **311**. The exemplary lengthwise cross-sectional view is also illustrated on the mechanical drawing in FIG. **9**(*b*) and explained with the help of FIG. **3**. The sideways cross-section at the location of the line **310** is

shown as **312**. The cross-sectional view of the slider track **302** lengthwise though line **351** is shown as **361**, while the sideways cross-section at the location of line **351** is shown as **362**. The sideways cross-sectional view is also illustrated in the mechanical drawing in FIG. **9**(*a*) and explained with the help of FIG. **3**. The seat slider **301** is attached to the seat cushion (not shown in FIG. **3**, but shown in FIG. **2**(*a*)) using the hardware mentioned in the description of FIG. **2**(*a*). The presence of this attachment is illustrated with the shaded area **321**. Furthermore, the slider track **302** is attached to the seat-supporting frame and the presence of this hardware is illustrated with the shaded area **322**.

In some embodiments, the seat slider **301** features a lengthwise track cavity **313** that is open on at least one end **314** of the seat slider **301** (FIG. **3** shows an embodiment in which both ends are open). The slider track **302** features two edge-tracks **352** extending lengthwise along the slider track **302**. The edge-tracks **352** fits into the lengthwise track cavity **313** of the seat slider **301** when inserted from at least one end of the seat slider. The slider track **302** maintains the cross-section view **362** on at least one end **357** of the slider track, allowing the insertion of the seat slider from that end. The tracks **352** and the track cavity **313** are dimensioned in such a way to facilitate smooth uninhibited sliding motion of the seat slider **301** with respect to the slider track **302**. In one embodiment, the seat slider **301** and/or slider track **302** can be made of metal, such as steel.

In some embodiments, the seat slider **301** further features an adjustment cavity **331** which stretches lengthwise, but is closed on both ends before reaching either end of the seat slider **301**. The seat slider **301** further features at least one locking hole **317**, which is open at least towards the adjustment cavity **331**.

In some embodiments, the slider track **302** features a locking pin **356**, which can be moved parallel to line **351** in the direction marked by arrow **354**. The locking pin **356** fits and slides within the locking-pin channel **353**. The assembly which holds the pin in place will be described in later text. The dimensions of the locking pin **356** are determined under the requirements that the tip of the locking pin **356** can fit into the locking pin holes **317** and the tip of the pin **356** protruding from the top surface of the slider track **302** can allow the tip of the locking pin **356** to reach the top of any locking pin hole **317**. In one embodiment, the seat slider **301** and the slider track **302** can be engaged and held in place relative to each other via the locking pin **356**, which allows the seat proximity to be adjusted at an integer number of discrete positions.

FIG. **5** describes exemplary configurations that enable seat locking, seat adjustment, and seat exchange. Configuration **501** shows the seat slider **510** (same slider as **301** in FIG. **3**) engaged with the slider track **511** (same slider track as **302** in FIG. **3**) with the locking pin **512** in its top position, wherein the tip of the locking pin **512** is located within one of the holes **513**. As noted previously, in the absence of the locking pin **512**, the seat slider is able to slide along the lengthwise direction freely. However, when the locking pin **512** is moved to its highest position where it enters the hole **513** (shown in configuration **501**), it locks the seat slider **510** and prevents any relative motion with respect to the slider track **511**. This is the stationary equipment's normal operation position, also referred to as the seat locking position. The side-view **501** also shows the cross-section through line **514**, which is made to coincide with the symmetry axis of the locking pin **512**.

In configuration **502**, locking pin **522** is pulled down so the tip of the locking pin **522** is no longer within any of the holes of the seat slider **520** and the locking pin **522** is just low enough to let the seat slider **520** to move lengthwise. The tip of the locking pin **522** clears section **523** between the holes, but remains within adjusting cavity **525**. In this configuration, referred to as the adjusting configuration, the seat slider **520** can move forwards and backwards and a new location may be found for which the locking pin tip can be moved up into another hole to lock the seat slider at the new location. The exemplary view in FIG. **5** shows seven holes **513** in the seat slider **510**. In one embodiment shown in FIG. **5**, the design enables seven discrete positions of the seat slider **520** relative to the locking pin **522**, i.e., the seat of this stationary equipment has seven fixed distances to the handlebar that the rider can choose from.

While in the adjusting configuration, the seat slider **520** can be pushed to its farthest possible location, illustrated with view **503**, in which the tip of the locking pin **532**, still within the adjusting cavity **535**, hits against end **533** of the adjusting cavity **535**. The adjusting cavity **535** is closed with such end on both sides and hence prevents the seat slider **530** from being removed from the slider track **531** as long as the locking pin tip height is such that the locking pin tip remains within the adjusting cavity **535**. The configuration **503** is also referred to as the adjusting configuration.

Finally in configuration **504**, locking pin **542** is moved down so that the tip of the locking pin **542** clears bottom **543** of the of adjusting cavity to allow seat slider **540** move past the locking pin **542** and be removed all together from slider track **541**. The slider track **541** and the seat slider **540** are open on at least one end to allow this complete removal. In one embodiment (illustrated in **504**), the seat slider **540** can be removed from either end. In another embodiment, the seat slider **540** can be removed only from one end. The configuration **504** is referred to as the seat exchange configuration, which allows the rider of the stationary exercise equipment to move the locking pin to its bottom-most position and remove the seat from the stationary exercise equipment, or exchange the seat with a new seat.

In some embodiments, the insertion of a new seat (seat replacement or seat exchange) requires the rider to pull the locking pin to its bottom-most position and engage the seat slider of the new seat with the track. Once the end of the adjusting channel clears the pin locations (situation as in **502**), the pin can be released to lock the new seat in place (situation as in **501**). FIG. **8** shows an exemplary seat assembly in three different seat-proximity positions: (*a*) far back, (*b*) center, and (*c*) far forward. The details of the seat assemblies in FIG. **8** are given in FIG. **2**.

One embodiment of the mechanism determining the motion and handling of the locking pin is illustrated with the help of FIG. **4**. FIG. **4** shows the operation of an exemplary two-step lock for the seat slider in three configurations **410**, **420**, and **430**, shown in FIGS. **4**(*a*)-(*c*), respectively, wherein configuration **410** is the "seat locking" configuration, configuration **420** is the "seat adjusting" configuration, and configuration **430** is the "seat exchange" configuration. All three configurations shown in FIGS. **4**(*a*), **4**(*b*) and **4**(*c*) contain same parts, but in different relative arrangements.

A section of the slider track (**302** in FIG. **3**) is shown as **403**, which comprises a cavity **409** containing two springs **405** and **408**, at least three rings denoted as **404**, **406**, and **407**, and a locking pin **401**. The locking pin **401** protrudes out of the top and the bottom of the cavity **409**. At the bottom, the locking pin **401** is attached to the lock knob **402**, while the other side of the locking pin **401** protrudes from the top of the slider track **403** by a distance denoted by **441**. The protruding distance can be different depending on the configuration. In the seat locking configuration **410**, the locking pin **401** protrudes by the largest amount (shown with **441**). In this configuration,

the seat slider (not shown) is locked and cannot be moved. In the seat adjusting configuration **420**, the locking pin **401** protrudes by an intermediate distance **442**. In this configuration, the seat slider (**530** in FIG. **5**) can move forward and backward until the seat slider reaches either end (**533** in FIG. **5**) of the seat slider **530**. In the exchange configuration **430**, the pin protrudes by the smallest distance **443**. In one embodiment of the exchange configuration **430**, the locking pin **401** does not protrude at all, but is rather pulled below the surface of the slider track **403**. In the exchange configuration **430**, the locking pin protrusion **443** can be sufficiently low so that the tip of the pin **401** clears the seat slider bottom (**523** in FIG. **5**) and allows the seat slider to be removed from the slider track **403**. It is clear that there can be a continuum of positions in between these three configurations and that the seat locking, seat adjusting, and seat exchange (or removal) configurations may be defined approximately by the resulting function. As it will be seen in the description below, the exact position of the pin may vary due to manufacturing and piece-part tolerances.

In some embodiments, configuration **410** is the resting configuration in which the seat (when present) is locked in position. The rings **404**, **406**, and **407**, together with the bottom **411** of cavity **409**, limit the motion and the position of the two springs **405** and **408**. The top spring **405** winds around the locking pin **401** and the axial motion of the locking pin is constrained by ring **404** and ring **406**. The ring **404** is attached to the locking pin **401** so that it does not allow the spring **405** to move up beyond the level determined by the ring **404**. The ring **406** is not attached to the locking pin **401** but rests on the ring **407**. The bottom spring **408** winds around the locking pin **401** and the axial motion of the locking pin is constrained by ring **407** and bottom **411** of the cavity **409**. The ring **407** is attached to the locking pin **401** so that it does not allow the spring **408** to move up beyond the level determined by the ring **407**.

In some embodiments, the movement of the lock knob **402** exhibits two spring constants, where a spring constant is the proportionality factor between the force required to compress (or pull apart) a spring and the amount of spring deflection (amount of compression or extension) in response to change in the spring length. Starting from the locking configuration **410**, a rider pulling the knob **402** downwards (away from the slider track **403**) experiences a resisting force according to a first spring constant (compression of the bottom spring **408**) until the ring **406** is stopped by the step **412** in the cavity **409**. This configuration is illustrated in FIG. **4**(*b*) and referred to as the adjusting configuration. The bottom spring **408** can be compressed, as shown with **427**, when the relative distance between the ring **407** and the bottom **411** of the cavity **409** is reduced. In configuration **420**, the ring **406** touches step **412** in the cavity and from that point on, the rider pulling on the knob further experiences a second spring constant which is due to the combined effects of the bottom spring **408** and the top spring **405**. The step **412** prevents the ring **406** from moving downwards with the pin **401** and causes the compression of the top spring **405**. When the first of the two springs (**405** or **407** or both) is completely compressed, the pin cannot move further down and the locking assembly is in the seat exchange configuration **430**. The force experienced by the rider under this configuration can be written as

$$F = \begin{cases} k_B y & 0 \le y \le y_{A,B} \\ k_B y + k_T (y - y_A) & y_{A,B} < y \le y_{E,C} \end{cases}$$

where y is deflection **433** from the topmost position of the locking pin **401**, i.e., the locking position (always positive), $y_{A,B}$ is the deflection for which the top spring **405** starts compressing, $y_{E,C}$ is the maximum deflection of the pin **401**, and $k_B$ and $k_T$ are the spring constants of the bottom spring **408** and the top spring **405**, respectively. It is clear that the second spring constant, which is a combination of the two springs, is larger than the first spring constant, and the seat slider can be adjusted for deflection with $y_{A,B} < Y \le y_{E,C}$. The two spring constants can be adjusted so that the rider can easily detect a difference in the spring constant and hence feel the change in the resistance to gauge his or her intent accordingly to either adjust the seat or to completely remove the seat.

In some embodiments, the mechanical assembly of the locking pin has the functions one or more of (a) locking the slider in place (configuration **501**), (b) unlocking the slider to allow slider movement, but not removal (configuration **502** and **503**), and (c) moving out of the way when the slider is to be removed. In one embodiment, the seat proximity can be locked in a number of discrete positions. It will be evident to a person skilled in the art that these tasks may be realized using any number of different mechanical approaches known in the art and at different places on the slider and the slider track without departing from the spirit of the invention. For a non-limiting example, the locking pin may be inserted from the slider towards the slider track rather than from the slider track toward the slider.

In an alternate embodiment of present invention, described with the help of FIG. **7**, the seat proximity adjustment mechanism features a friction-based locking system, wherein the seat slider is locked to the slider track by means of friction. The friction may be resulted from pressure exerted by a pressure pin and a mechanical lever (or bolt handle) accessible to the rider. FIG. **7** shows cross-sectional views of different configurations of this alternate embodiment of the present invention through the seat slider and the slider track at the location of line **714**, which passes through the center of the pressure pin. This alternate embodiment allows continuously variable proximity position adjustment.

The configuration **701** shows the slider track **711** with a pressure pin **712** and a seat slider **710** positioned in normal operation (seat locked) position. The pressure pin **712** is pressed against the seat slider **710** so that the friction at surface **713** where the pressure pin **712** and the seat slider **710** meet exhibits friction and prevents the seat slider **710** from moving.

In configuration **702**, the pressure pin **722** pressuring towards the seat slider **720** has been released and the seat slider **720** can consequently move lengthwise along the slider track **721** to the full length of the adjusting cavity **725**. In this configuration, the seat slider **720** is allowed to move freely lengthwise and the rider can lock the seat slider **720** by reapplying the pressure to the pressure pin **722** in any location along the seat slider **720**, thereby adjusting the seat proximity to his or her comfort. In the configuration **702**, the seat is allowed to move, but it can not be removed from the slider track **721**. Configuration **703** shows the case when the seat slider **730** has been moved all the way to the end when the pressure pin **732** hits the end of the adjusting cavity **735**.

In configuration **704**, the pressure pin **742** has been moved down farther so that it clears the end **743** of the seat slider **740**. In this configuration, the slider **740** can be completely removed from the slider track **741** and thereby allows the rider to remove the seat for cleaning and/or insert a new seat.

In some embodiments, the pressure pin **742** has to remain in the same low position as shown in configuration **704** so it clears the end **743** of the seat slider **740** where the new seat is

about to be inserted. Once the new seat (or the original seat) is inserted, i.e., the seat slider brought back onto the slider track, the pressure pin **742** should be brought back to either its adjusting position shown in configuration **702** or to its locking position as indicated in configuration **701**.

In some embodiments, the mechanical assembly of the pressure pin has the functions of (a) providing pressure to the seat slider (configuration **701**), (b) releasing pressure to allow seat slider movement (configuration **702**), and (c) moving out of the way when the seat slider is to be removed. The mechanical assembly of the pressure pin of this alternate embodiment includes means for exerting and releasing pressure that is simple to use manually. In one embodiment, the pressure is exerted by a threaded pressure pin and the rider desiring to release the pressure can rotate the pressure pin by holding onto a handle. In another embodiment, the pressure pin is pressed using a clamp that magnifies the rider's hand force to lock the clamp in place.

In some embodiments, the seat adjustment and exchange can be accomplished via two separate locking pins connected to two separate knobs—the seat proximity adjustment knob and seat exchange knob. In another embodiment, the seat adjusting and exchange can be accomplished using two separate pressure pins connected to two separate knobs—the seat proximity adjustment knob and the seat exchange knob. In another embodiment, the seat adjusting and exchange can be accomplished via one pressure pin and one locking pin connected to two separate knobs—the seat proximity adjustment knob and the seat exchange knob.

It is clear that the force and the locking of the seat slider in place relative to the slider track may be realized using any number of different mechanical approaches known to one with ordinary skill in the art and at different places on the seat slider and the slider track without departing from the spirit of the invention. For a non-limiting example, the pressure may be exerted from the seat slider to the slider track rather than from the slider track toward the seat slider, and the pressure may be exerted using a clamp surface rather than a pin.

The present invention enables simple and user-friendly adjustment and exchange of seats of stationary exercise equipment. A variety of seat and cushion designs can be used on the same stationary exercise equipment equipped with the present invention.

We claim:

**1**. An apparatus for seat adjustment, comprising:

a sliding member having a cavity formed within;

a track member;

wherein a portion of the track member formed to be suitable for fitting in the cavity of the sliding member and the sliding member being operable for sliding motion relative to the track member with the portion of the track member disposed within;

a locking pin disposed in a channel formed within the track member;

wherein, the locking pin is movable in the channel to a first position such that the locking pin is in contact with the sliding member to secure the sliding member to the track member;

a first ring attached to the locking pin to prevent the locking pin from moving beyond the first position in the channel;

a first spring wound around the locking pin; wherein, the first spring is attached to the first ring;

a second ring attached to the locking pin, wherein, the second ring is disposed near a center portion of the locking pin;

a second spring wound around the locking pin; wherein, the second spring is attached to the second ring;

a third ring that rests on the second ring when the locking pin is in the first position;

wherein, the locking pin is movable in the channel to a second position; wherein, in the second position, the sliding member is movable relative to the track member;

wherein, the locking pin is movable in the channel to a third position; wherein, in the third position, the sliding member is detachable from the tracking member to remove an attached seat from a frame attached to a seat support assembly.

**2**. The apparatus of claim **1**,

further comprising, an adjustment knob coupled to the locking pin operable to adjust the position of the locking pin in the channel;

wherein, the adjustment knob is coupled to the locking pin at an end opposite to a tip portion of the locking pin.

**3**. The apparatus of claim **1**,

wherein, the cavity includes a portion that is open on at least one end of the sliding member; and

wherein, the seat is inserted and removed from the frame at the at least one end.

**4**. The apparatus of claim **1**, wherein, the sliding member includes an adjustment cavity that is closed on both ends.

**5**. The apparatus of claim **1**,

wherein, the sliding member is movable via sliding motion relative to the tracking member among a set of discrete locations to adjust a position of the attached seat;

wherein, the sliding member is secure-able to the tracking member at one or more of the set of discrete locations when the locking pin is in the first position in the channel.

**6**. The apparatus of claim **5**, wherein, the set of discrete locations is defined by a corresponding set of holes formed in the sliding member within which a tip portion of the locking pin is disposed when in the first position in the channel.

**7**. The apparatus of claim **1**,

wherein, the sliding member is movable relative to the tracking member via sliding motion among continuous locations to adjust a position of the attached seat;

wherein, the sliding member is secure-able to the tracking member at one or more of the continuous locations when the locking pin is in the first position in the channel.

**8**. An exercise equipment, comprising:

a frame;

a seat support assembly mounted on the frame;

a seat;

a sliding member attached to the seat, the sliding member having a cavity formed within;

a track member attached to the seat support assembly, the track member having a channel formed within;

wherein, a portion of the track member is formed to fit in the cavity of the sliding member;

wherein, the sliding member is movably engaged with the track member for sliding motion relative to the track member;

a locking pin disposed in the channel formed within the track member;

a first ring attached to the locking pin to prevent the locking pin from moving beyond a first position in the channel;

a first spring wound around the locking pin; wherein, the first spring is attached to the first ring;

a second ring attached to the locking pin, wherein, the second ring is disposed new a center portion of the locking pin;

a second spring wound around the locking pin; wherein, the second spring is attached to the second ring;

a third ring that rests on the second ring when the locking pin is in the first position;

wherein, the first and second springs have different spring constants

wherein, the seat is coupled to the seat support assembly via the sliding member and the track member;

wherein, the locking pin is adjustable in position in the channel and when moved to the first position in the channel, the locking pin is in contact with the sliding member and secures the sliding member to the track member;

wherein, when the locking pin is moved to a second position, the sliding member is removable from the track member to remove the seat from the frame.

**9**. The exercise equipment of claim **8**, wherein,

the locking pin is movable in the channel to a third position;

wherein, in the third position, the sliding member is movable via sliding motion relative to the track member.

**10**. The exercise equipment of claim **8**, further comprising:

a pedal assembly;

a computer coupled to a video monitor;

a gear-shifting lever;

wherein, the computer is able to execute a computer program that causes the computer to simulate a virtual environment for display on the video monitor of the exercise equipment.

**11**. The exercise equipment of claim **8**,

further comprising, a set of handlebars attached to the frame;

wherein, the sliding member is movable via sliding motion relative to the tracking member among a set of discrete locations to adjust a position of the seat relative to the set of handlebars;

wherein, the sliding member is secure-able to the tracking member at one or more of the set of discrete locations when the locking pin is in the first position in the channel.

**12**. The exercise equipment of claim **11**, wherein, the set of discrete locations is defined by a corresponding set of holes formed in the sliding member within which a tip portion of the locking pin is disposed when in the first position in the channel.

**13**. The exercise equipment of claim **12**,

further comprising, an adjustment knob coupled to the locking pin operable to adjust the position of the locking pin in the channel;

wherein, the adjustment knob is coupled to the locking pin at an end opposite to the tip portion of the locking pin.

**14**. The exercise equipment of claim **8**,

wherein, the cavity includes a portion that is open on at least one end of the sliding member; and

wherein, the seat is inserted and removed from the frame at the at least one end.

**15**. The exercise equipment of claim **8**, wherein, the cavity includes an adjustment cavity tat is closed on both ends of the sliding member.

**16**. The exercise equipment of claim **8**,

further comprising, a set of handlebars attached to the frame;

wherein, the sliding member is movable relative to the tracking member via sliding motion among continuous locations to adjust a position of the seat relative to the set of handlebars.

**17**. The exercise equipment of claim **16**, wherein, the sliding member is secure-able to the tracking member at one or more of the continuous locations when the locking pin is in the first position in the channel.

**18**. The exercise equipment of claim **16**, wherein, the sliding member is secured to the tracking member via friction force between the locking pin and the sliding member.

**19**. The exercise equipment of claim **8**, further comprising, a plurality of height-adjusting pin holes formed in a seat post of the seat support assembly.

**20**. The exercise equipment of claim **19**, further comprising,

another locking pin to secure the seat post to the seat support assembly at one or more positions defined by the plurality of height-adjusting pin holes; and

a lever coupled to the another locking pin;

wherein, the lever is movable to secure the seat post to the seat support frame or to loosen the seat post from the seat support frame.

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