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(54) FRICTIONAL RESISTANCE EXERCISE SYSTEM AND METHODS OF USE

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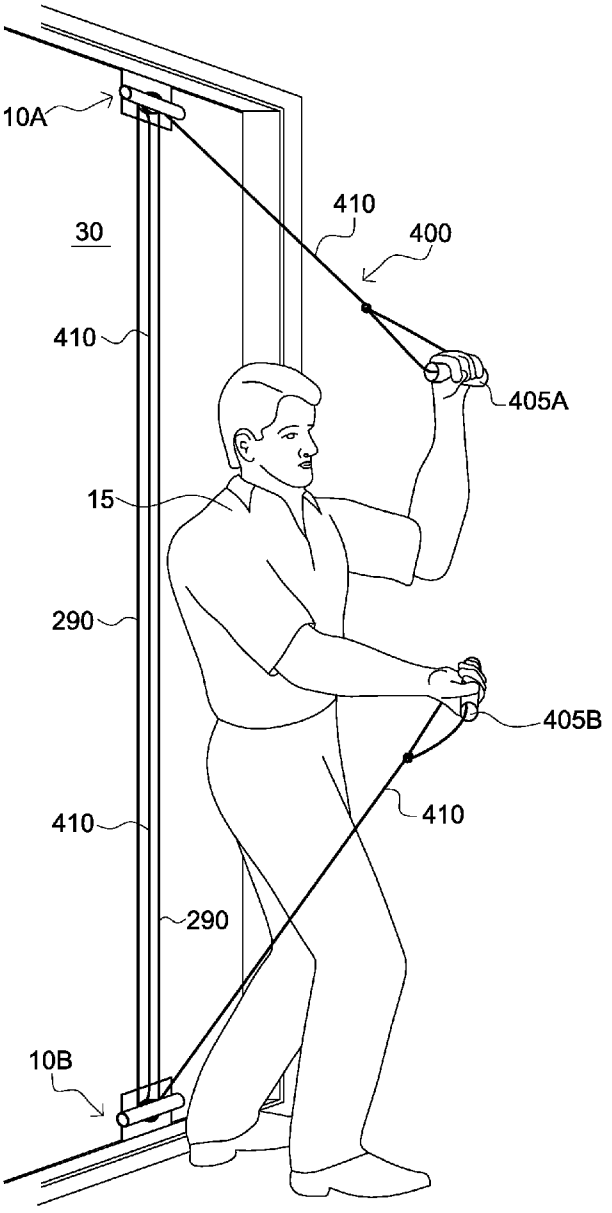
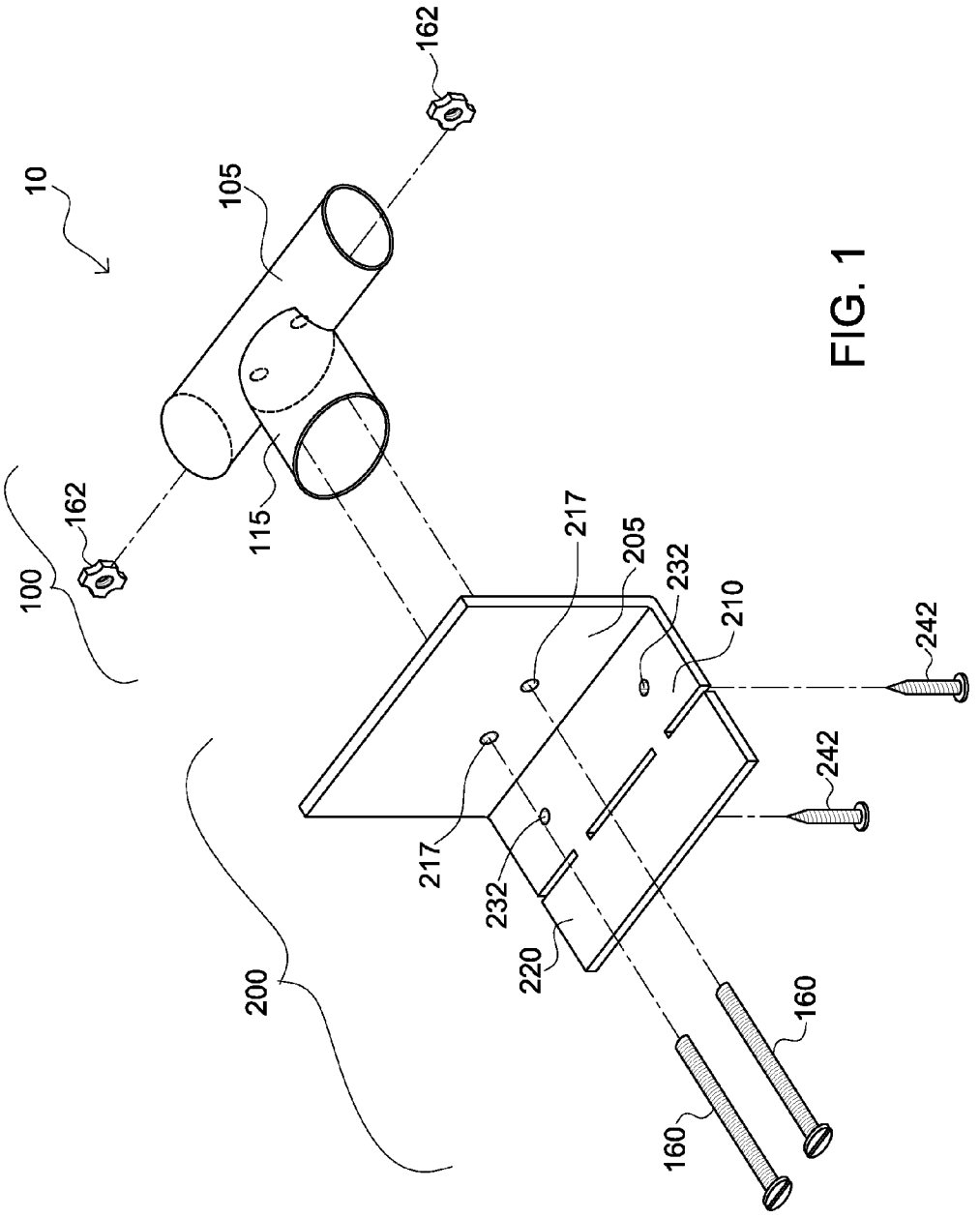
(57) **ABSTRACT**

An improved frictional resistance exercise system is disclosed. Typically, the improved frictional resistance exercise system includes a plurality of T-shaped cylindrical members and a plurality of door mount assemblies. Each of the plurality of door mount assemblies is adapted to fit over a door edge and extend to at least one of a door front surface and a door back surface allowing a door to be opened or closed when coupled thereon. Moreover, each of the plurality of T-shaped cylindrical members is coupled to each of the plurality of door mount assemblies. A rope having a first end and a second end is slidably coupled to each of the plurality of T-shaped cylindrical members. Exemplary exercise routines for use with the improved frictional resistance exercise system whereby the resistance can be varied throughout the range of motion of the exercise routine are further disclosed.




10
105
162
162
115
100
217
205
232
210
242
242
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220
200
160
160

FIG. 1

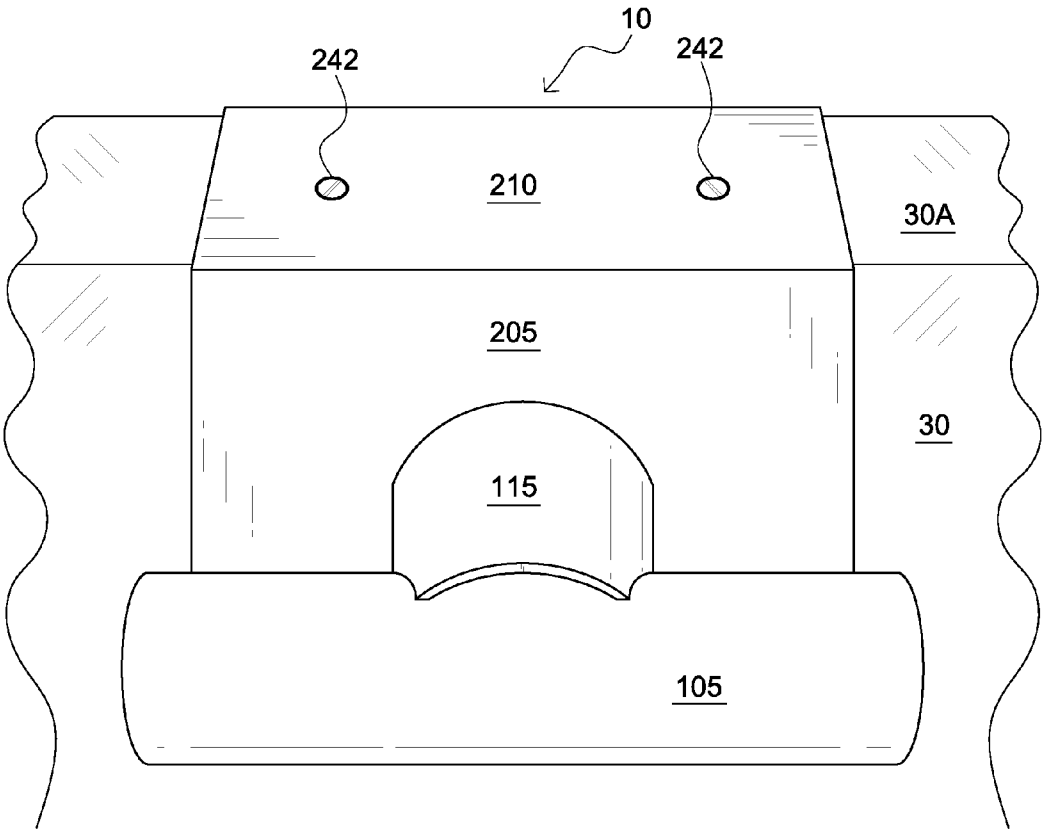

FIG. 2

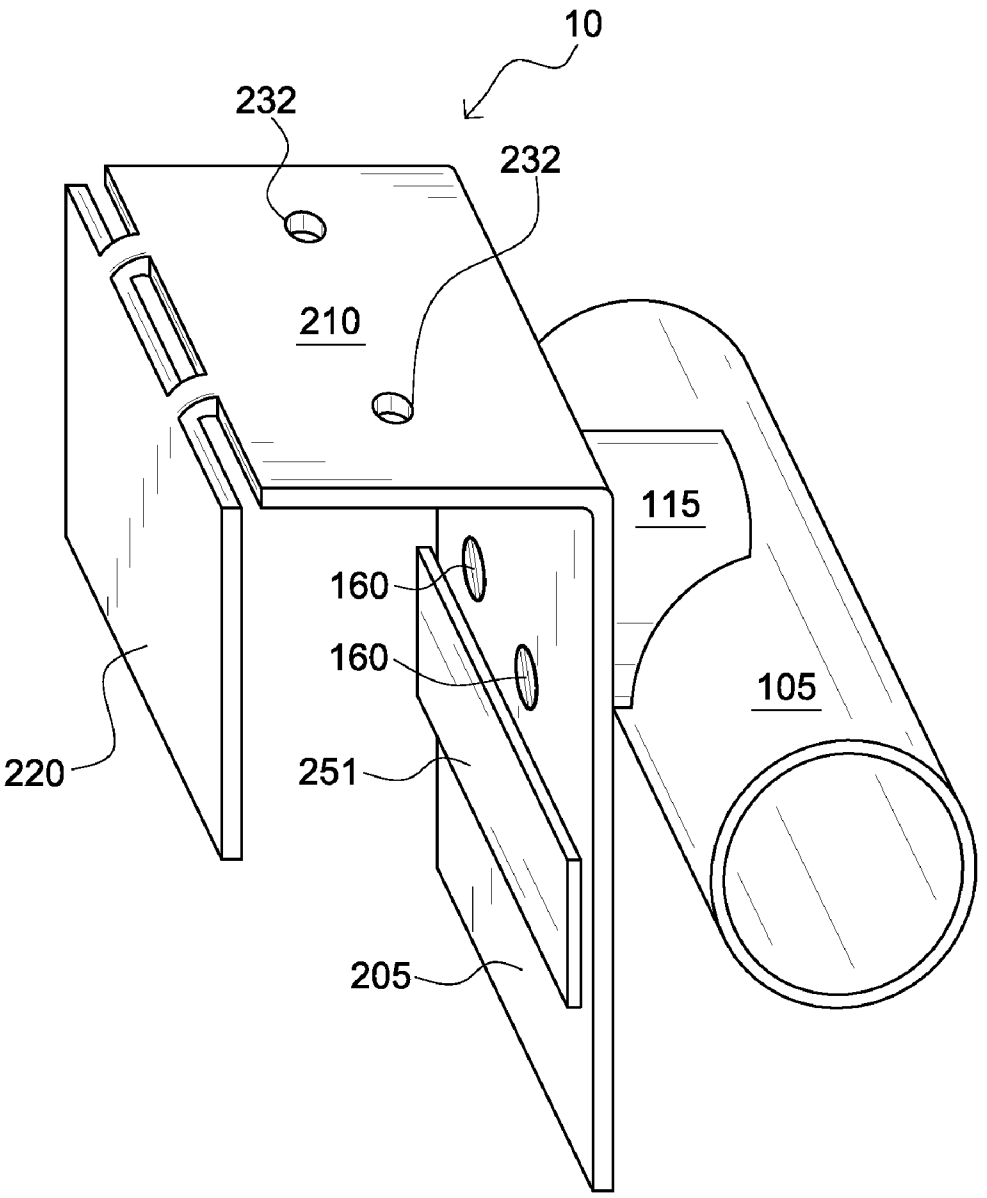

FIG. 3

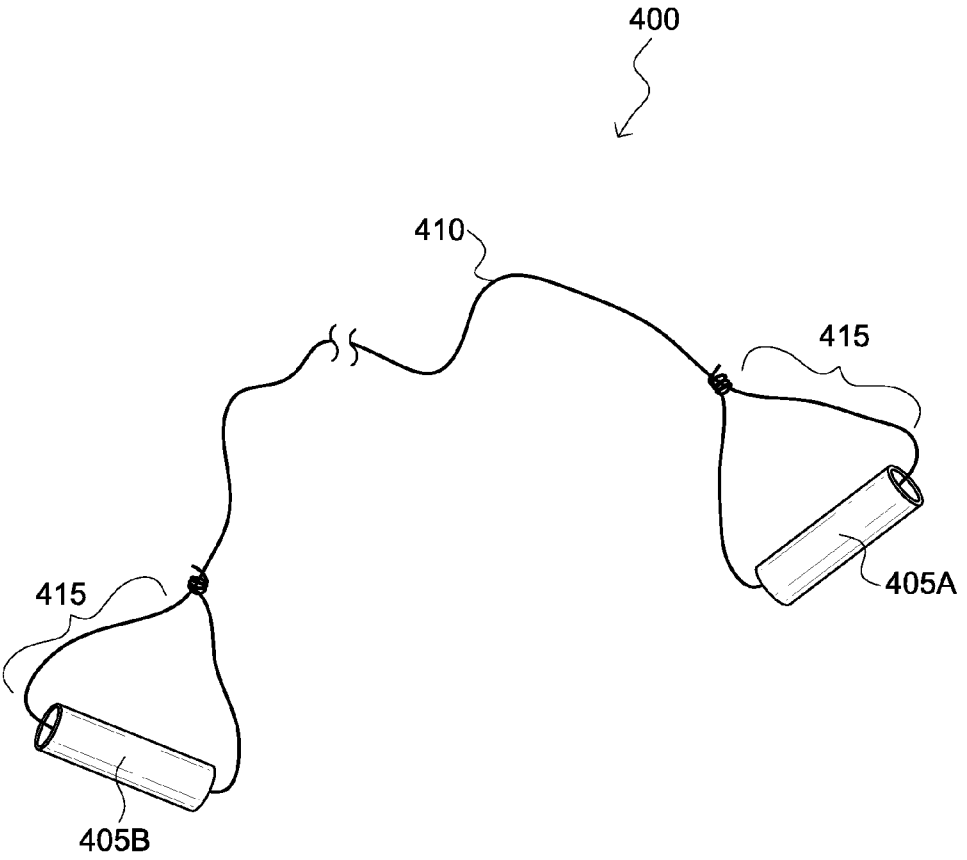

FIG. 4

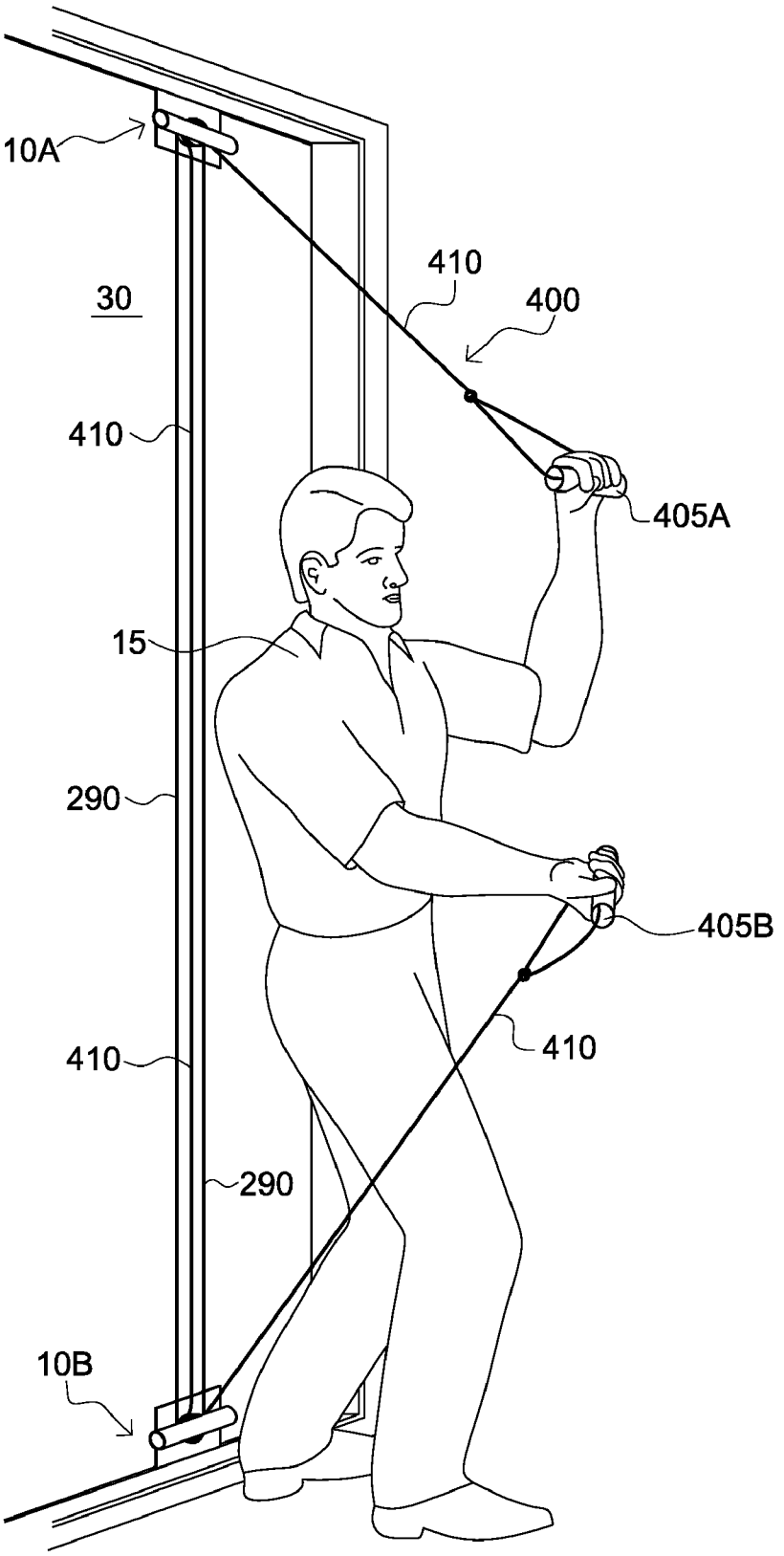

FIG. 5

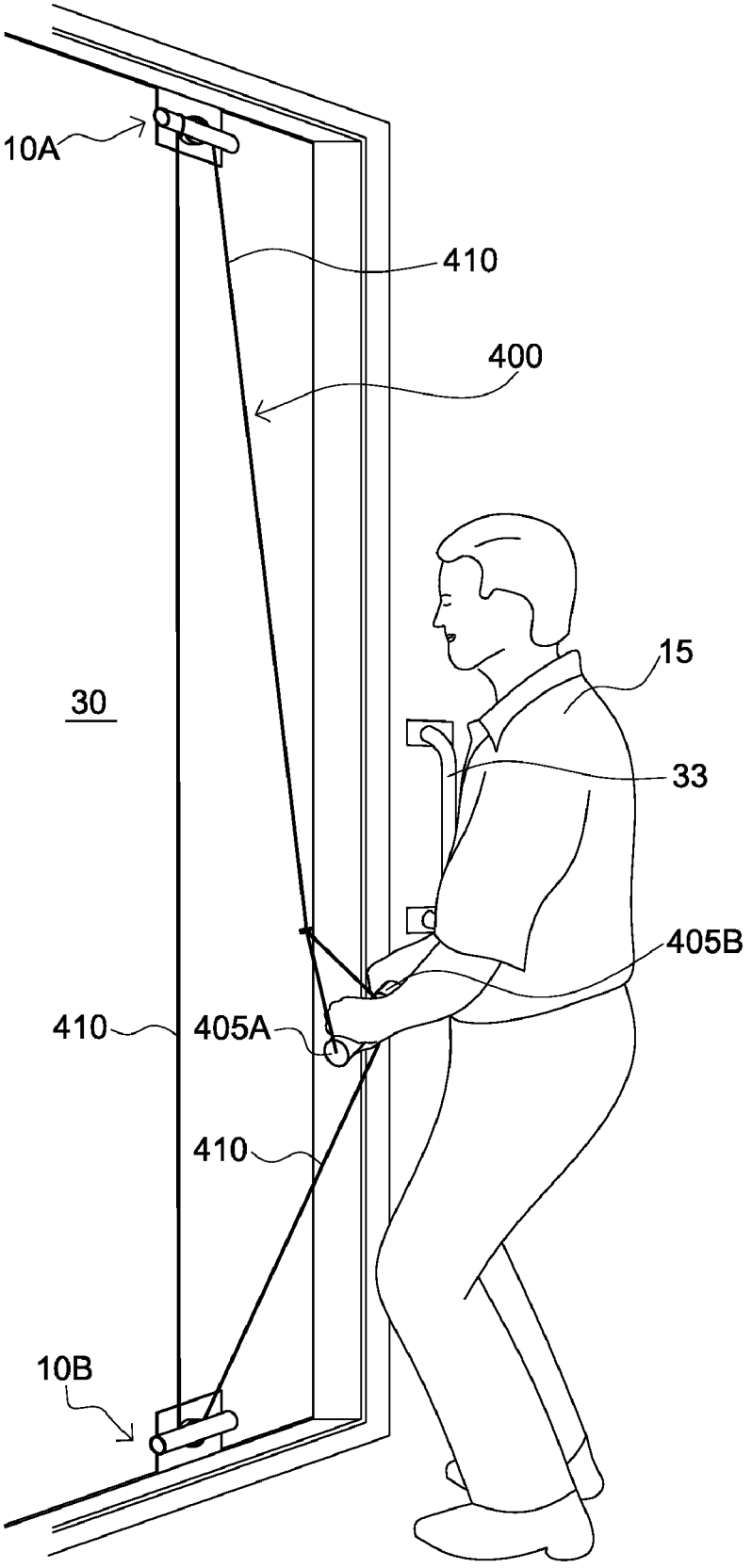

FIG. 6

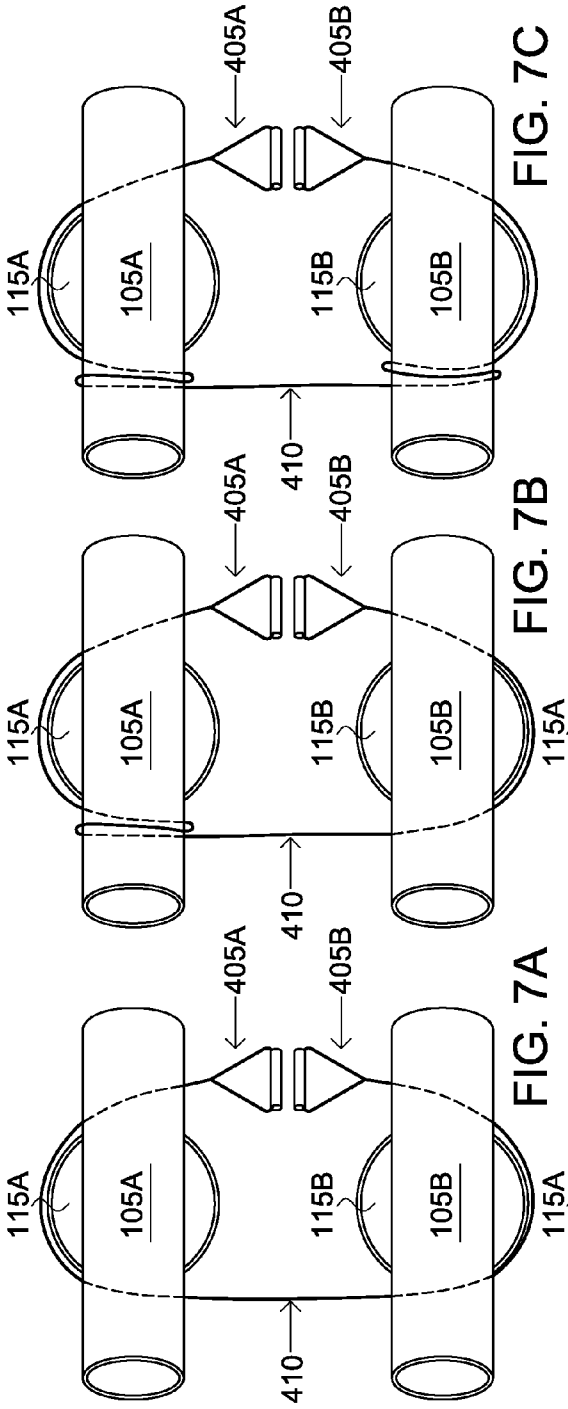

FIG. 7A

FIG. 7B

FIG. 7C

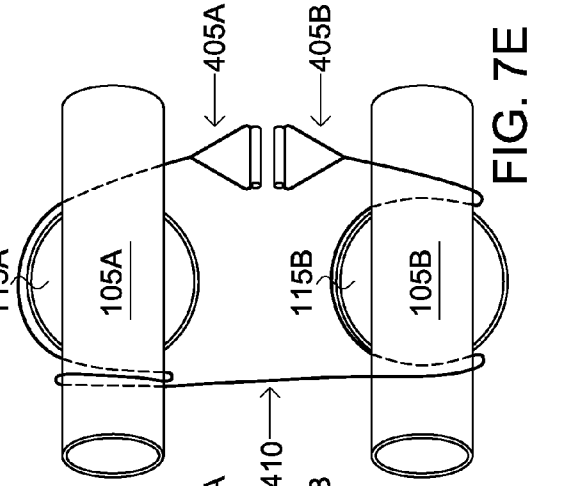

FIG. 7D

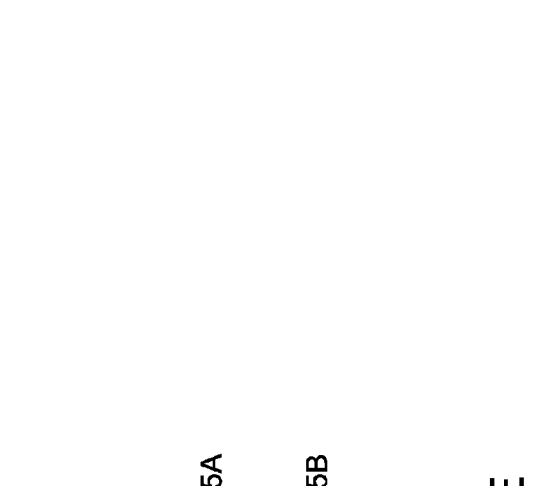

FIG. 7E

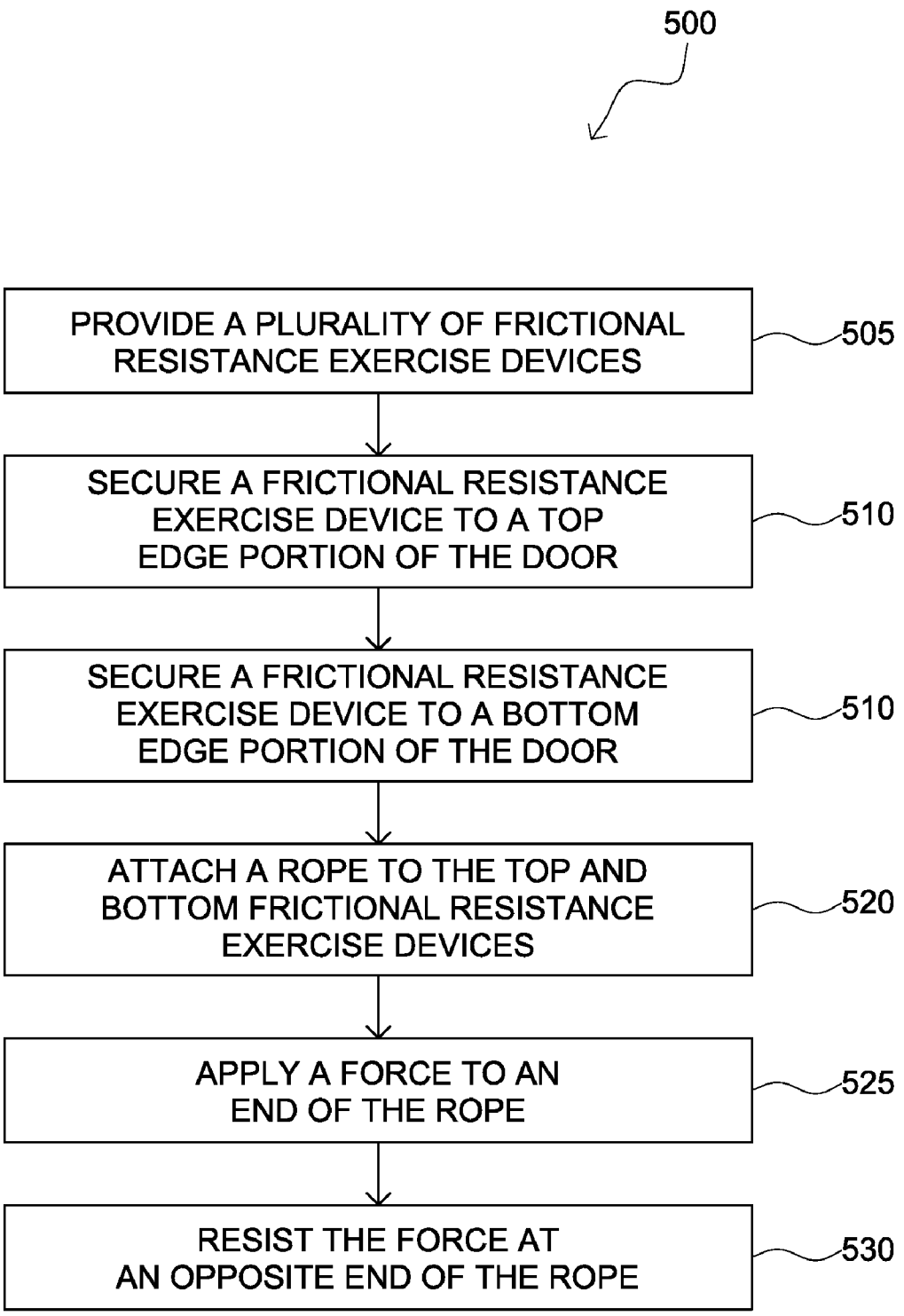
500
PROVIDE A PLURALITY OF FRICTIONAL RESISTANCE EXERCISE DEVICES
505
SECURE A FRICTIONAL RESISTANCE EXERCISE DEVICE TO A TOP EDGE PORTION OF THE DOOR
510
SECURE A FRICTIONAL RESISTANCE EXERCISE DEVICE TO A BOTTOM EDGE PORTION OF THE DOOR
510
ATTACH A ROPE TO THE TOP AND BOTTOM FRICTIONAL RESISTANCE EXERCISE DEVICES
520
APPLY A FORCE TO AN END OF THE ROPE
525
RESIST THE FORCE AT AN OPPOSITE END OF THE ROPE
530

FIG. 8

FRICTIONAL RESISTANCE EXERCISE SYSTEM AND METHODS OF USE

FIELD OF THE INVENTION

[0001] The present invention pertains to exercise equipment and methods of exercising.

BACKGROUND

[0002] Many individuals are incorporating strength training into their regular exercise routines. However, traditional weight training uses free weights, elastic or rubber bands or rods to produce a force or counter force for the individual engaged in strength training. These traditional weight training techniques generally comprise some form of stored energy in their system that could become excessive and cause injury to the individual. This risk of injury is exacerbated particularly when the individual is a child or elderly person. Additionally, traditional weight training systems using elastic or rubber bands significantly constrain the range of motion that can be performed. Moreover, significant exercise time is typically lost because the user is required to select the correct combination of weights and elastic or rubber bands or rods to perform various exercises. Certain mechanical gym systems attempt to mitigate this safety concern by incorporating large support structures to contain the weight and/or elastic or rubber bands or rods. Some gym systems braid a plurality of elastic bands together in an effort to control an unexpected release of stored energy which would occur if a single elastic band were to snap due to age or otherwise. Additionally, these mechanical gym systems utilize cables and pulleys to direct or limit the force associated with the stored energy. Hence, the forces and resistances from these mechanical gym systems are generally limited on a single plane thereby negating some of the effectiveness of a given exercise. Also, mechanical gym systems typically do not provide variable resistance throughout the range of motion for a specific exercise or routine. Moreover, these mechanical gym systems are typically heavy and/or bulky and not suitable for residential use when space is limited. For example, these heavy and bulky mechanical gym systems are usually installed in a communal area in multiple dwelling units such as apartment complexes and hotels.

[0003] For some individuals, the alternative of exercising in a communal area is neither convenient nor desirable. Coupled with the safety concerns of the stored energy in most mechanical gym systems as well as their high costs, many individuals unfortunately forgo important and health strength training exercise routines. Heretofore, an exercise system that provides strength training safely and conveniently while providing variable resistance during the entire range of motion in an exercise or routine remains a desirable system for many individuals.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] FIG. **1** is an exploded perspective view of a frictional resistance exercise device according to an embodiment.

[0005] FIG. **2** is an overhead perspective view of a frictional resistance exercise device coupled to a door according to an embodiment.

[0006] FIG. **3** is a side perspective view of a frictional resistance exercise device according to an embodiment.

[0007] FIG. **4** illustrates a rope assembly according to an embodiment.

[0008] FIG. **5** is an isometric view of a person using a frictional resistance exercise system to perform a first exercise routine according to an embodiment.

[0009] FIG. **6** is an isometric view of a person using a frictional resistance exercise system to perform a second exercise routine according to an embodiment.

[0010] FIGS. **7**A-**7**E illustrate a plurality of rope assembly configurations for use in a frictional resistance exercise system according to an embodiment.

[0011] FIG. **8** is a flow chart illustrating a method of using a frictional resistance exercise system.

DETAILED DESCRIPTION

[0012] Embodiments of a frictional resistance exercise device typically comprise a T-shaped cylindrical member and a door mount assembly. The T-shaped cylindrical member typically includes a first cylindrical section and a second cylindrical section. The T-shaped cylindrical member is coupled to the door mount assembly. The door mount assembly typically includes a first section, a second section, and a third section. Each of these sections typically abuts a surface of a door. The sections are adapted to attach generally to a door edge and allow the door to be closed even when the door mount assembly is attached. However, some embodiments of the frictional resistance exercise device may only comprise a T-shaped cylindrical member coupled directly to a door surface.

[0013] An exemplary rope assembly is used with a plurality of friction resistance exercise devices coupled to a door to create a frictional resistance exercise system. The rope assembly typically comprises a rope, a handle stirrup on each end of the rope, and a first handle and a second handle coupled to each handle stirrup. A variety of exercise routines can be performed by a user using embodiments of a frictional resistance exercise system.

[0014] An exemplary frictional resistance exercise system typically includes a first frictional resistance exercise device, a second frictional resistance exercise device, and a rope assembly. In some embodiments a cord can be used to aid in securing the first and second frictional resistance exercise devices to the door. Numerous rope configurations can be used in conjunction with the variety of exercise routines to provide safe and convenient strength training. Utilizing two frictional resistance exercise devices coupled to a door typically, but not necessarily, at a top door edge and a bottom door edge enables a user to best perform various exercises where the user's two hand move together (e.g., a squat exercise), as well as exercises where the user's foot and opposite side hand move in an opposite direction to each other (e.g., a leg extension exercise).

[0015] Embodiments of the frictional resistance exercise system advantageously provide a variable resistance over a range of motion for a given exercise. Almost every exercises and exercise routines require a resistance curve that matches the strength curve of the user thereby necessitating a variable resistance to optimize the exercise or exercise routine. Embodiments of the frictional resistance exercise system enable the user to control and adjust the resistance of an exercise throughout the entire range of motion of the exercise thereby allowing the strength curve of the user to be more precisely matched during various points in the range of motion of the exercise.

[0016] Embodiments of the frictional resistance exercise system provide benefits including, but not limited to: (i)

elimination of stored energy release from stretching of elastic or rubber bands or rods, springs or the like, (ii) significantly reduced floor space requirements, (iii) reduced set-up and storage time for the exercise equipment, (iv) matched resistance to the user's strength curve, and (v) varied resistance controlled by the user without having to make weight selection adjustments.

Terminology

[0017] The terms and phrases as indicated in quotes (" ") in this section are intended to have the meaning ascribed to them in this Terminology section applied to them throughout this document including the claims unless clearly indicated otherwise in context. Further, as applicable, the stated definitions are to apply, regardless of the word or phrase's case, to the singular and plural variations of the defined word or phrase.

[0018] The term "or" as used in this specification and the appended claims is not meant to be exclusive rather the term is inclusive meaning: either or both.

[0019] References in the specification to "one embodiment", "an embodiment", "an alternative embodiment" and similar phrases mean that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least an embodiment of the invention. The appearances of the phrase "in one embodiment" in various places in the specification are not necessarily all meant to refer to the same embodiment.

[0020] The term "couple" or "coupled" as used in this specification and the appended claims refers to either an indirect or direct connection between the identified elements, components or objects. Often the manner of the coupling will be related specifically to the manner in which the two coupled elements interact.

[0021] Directional and/or relationary terms such as, but not limited to, "left", "right", "top", "bottom", "vertical", "horizontal", "back", "front" and "lateral" are relative to each other and are dependent on the specific orientation of an applicable element or article, and are used accordingly to aid in the description of the various embodiments and are not necessarily intended to be construed as limiting.

[0022] As applicable, the terms "about" and "generally" as used herein unless otherwise indicated mean a margin of +−20%. Also, as applicable, the term "substantially" as used herein unless otherwise indicated means a margin of +−10%. Concerning angular measurements, "about" or "generally" refer to +−10 degrees and "substantially" refers to +−5.0 degrees unless otherwise indicated. It is to be appreciated that not all uses of the above terms are quantifiable such that the referenced ranges can be applied.

Exemplary Embodiments of a Frictional Resistance Exercise Device

[0023] FIGS. **1-3** illustrate an exemplary embodiment of a frictional resistance exercise device. Referring to FIG. **1**, the frictional resistance exercise device **10** typically comprises a T-shaped cylindrical member **100** and a door mount assembly **200**. The T-shaped cylindrical member **100** typically comprises a first cylindrical section **105** and a second cylindrical section **115**. The first and second cylindrical sections **105** & **115** are typically, but not necessarily, tubular. The second cylindrical section **115** typically has an arcuately-shaped first end and a flatly-shaped second end. A first end of the second cylindrical section **115** is coupled to the first cylindrical section **105** in the approximate center thereof. The second end of the second cylindrical section **115** is coupled to the door mount assembly **200**. The first cylindrical section **105** provides right and left arm portions of the T-shaped cylindrical member **100** whereas the second cylindrical section **115** provides a base portion of the T-shaped cylindrical member **100**. Moreover, the first and second cylindrical sections **105** & **115** can be substantially hollow copper tubes. However, the first and second cylindrical sections **105** & **115** may also be comprised of other metal and non-metal materials such as, but not limited to, aluminum, brass, bronze, titanium, acrylonitrile butadiene styrene (ABS), and polyvinyl chloride (PVC).

[0024] In some embodiments the first and second cylindrical sections **105** & **115** are integrated pieces or welded or glued together. More typically, the first cylindrical section **105** is coupled to the second cylindrical section **115** by one or more fasteners and one or more receiving nuts. As illustrated in FIG. **1**, two threaded fasteners **160** along with two threaded receiving nuts **162** serve to couple (i) the first cylindrical section **105** and the second cylindrical section **115** together forming the T-shaped cylindrical member **100** and (ii) the T-shaped cylindrical member **100** to the door mount assembly **200**. The threaded fasteners **160** have an elongated threaded portion and a head portion. The elongated portion of each of the threaded fasteners **160** is placed through bores **217** of a first section **205** of the door mount assembly **200**. The head portion of the threaded fasteners **160** is slightly larger than the smallest cross-sectional diameter of each bore **217** so that the threaded fasteners **160** cannot pass though. Moreover, the head portion of the threaded fasteners **160** and bores **217** can be slightly beveled such that the head portion can be countersunk and substantially within the first portion **205** when installed and fastened.

[0025] Still referring to FIG. **1**, the door mount assembly **200** typically includes a second section **210** and a third section **220** as well as the first section **205** to which the T-shaped cylindrical member **100** is coupled. The first section **205** is a flat generally rectangular section as illustrated. As described above, one or more bores **217** are adapted to receive one or more threaded fasteners **160**. The second section **210** is likewise a flat generally rectangular section. Similar to the first section **205**, but not necessarily of the same size and shape, one or more bores **232** are present on the second section **210**. Fasteners such as one or more screws **242** are typically used to couple the second section **220** and the door mount assembly **200** in general to a door edge. The second section **210** is connected to and disposed substantially perpendicular to the first section **205**. The first and second sections **205** & **210** of the door mount assembly **200** essentially create an L-bracket for fastening to a door. In some implementations, only an L-bracket is utilized for the door mount assembly. The L-bracket implementation can be particularly advantageous when coupled to doors of smaller or larger thickness than that of standard doors. However, most often the third section **220** of the door mount assembly **200** is included providing additional support when coupled to a door.

[0026] The third section **220** is a flat generally rectangular section and connected to the second section **210**. As illustrated in FIG. **1**, the third section **220** can initially be coplanar or parallel with the second section **210** prior to installation. Additionally, the third section **220** is typically separated from the second section **210** by a perforation of the material from which the door mount assembly **200** is substantially comprised. Moreover, some variations of the door mount assem-

bly may include multiple perforations to accommodate installation on a plurality of door sizes. It is pertinent to note that the construction of the door mount assembly **200** with one or more perforations allow for a plurality of door mount assemblies **200** to be easily stored and shipped until they are installed. However, when installed the third section **220** is folded such that it is disposed substantially perpendicular to the second section **210**. As a result, the third second section **220** is substantially parallel to the first section **205** thereby creating a J-bracket (or can alternately be referred to as a U-bracket). In some embodiments with the perforation separating the second and third sections **210** & **220** of the door mount assembly **200**, the J-bracket can be relatively easily changed to an L-bracket by repeatedly moving the third section **220** back and forth until the two sections separate. Alternatively, a cutting means can be utilized to separate the adjacent sections.

[0027] Typically, but not necessarily, the door mount assembly is a unitary piece of metal generally shaped as illustrated in FIG. **1** and described above. Additionally, the first section **205**, the second section **210**, and the third section **220** typically have a thickness of approximately 16 to 24 gauge to enable the door to close when the door mount assembly is coupled thereto. However, other suitable thicknesses are contemplated for a variety of mounting applications to a door or otherwise. Other embodiments of door mount assembly are contemplated such as, but not limited to, a single section (like the first described above) fastened to a front or back surface of the door by glue, screws, and/or other fastening means. Moreover, it is pertinent to note that the embodiments described above and accompanying illustrations are exemplary of one way of many to design a frictional resistance exercise device. As would be obvious to one of ordinary skill in the art, other ways of coupling a T-like member to a door mount assembly and/or to a door directly are contemplated.

[0028] FIG. **2** is an overhead perspective view of the frictional resistance exercise device **10** coupled to a door **30**. The arcuately-shaped first end and tubular nature of the second cylindrical section **115** is better illustrated from this perspective. Also, the flatly-shaped second end of the second cylindrical section **115** can be seen coupled to the first section **205** of the door mount assembly. Also shown are the right and left arm portion of the first cylindrical section **105** created when the second cylindrical section **115** intersects the first cylindrical section **105** in the approximate center thereof. It is worthy to note that the right and left references are identified from the perspective of a person looking at the door **30**. However, as stated in the Terminology section, these side designations are not limiting to the embodiments described in any way and can be interposed depending on the location of the frictional resistance exercise device **10** on the door.

[0029] Still referring to FIG. **2**, the door mount assembly **200** of the frictional resistance exercise device **10** is shown fastened to the a door edge **30***a* with two screws **242** inserted through two bores (bores **232** as shown in FIG. **1**) in the second section **210**. The door edge **30***a* can be a top door edge, a bottom door edge, a hinge side door edge, or a latch side door edge. The top door edge is the edge surface portion generally running latitudinally along the top of the door whereas the bottom door edge is the edge surface portion generally running latitudinally along the bottom of the door. The hinge side door edge is the surface edge portion generally running longitudinally along the side of the door comprising a hinge or hinging mechanism coupling the door to a door frame. The latch side door edge is the surface edge portion generally running longitudinally along the side of the door comprising a latch or latching mechanism adapted to release or latch to a door frame when the door is opened or closed. Additionally, the first section **205** of the door mount assembly **200** can be disposed upon the front or back surface of the door **30** with the third section **220** (not shown from the perspective view of FIG. **2**) disposed upon the opposite surface of the door **30**. Door mount assemblies are typically constructed to fit both 1⅜ inch and 1⅝ inch doors; however, variations exist and can be customized for numerous door sizes and shapes.

[0030] Now referring to FIG. **3**, the friction resistance exercise device **10** is shown from a side perspective view without a door. As observed from this perspective, the head portions of the two threaded fasteners **160** can be seen generally countersunk and substantially within the first portion **205** of the door mount assembly **200** when the two threaded fasteners **160** are used to couple the T-shaped cylindrical member **100** to the door mount assembly **200**. Additionally, a padding member **251** is illustrated disposed along a portion of the first section **205** that would typically be in contact with a door surface. However, more than one padding member **251** of varying sizes and shapes can be placed on portions of the first, second, and third sections **205**, **210**, & **220** of the door mount assembly **200** to protect the surface of the door for which it is coupled. The padding member **251** can comprise any number of materials to protect the surface of the door such as, but not limited to, felt, closed-cell cross-linked polyethylene foam, closed-cell soft ether based polyurethane foam. Moreover, the padding member **251** typically comprises some adhesive means to secure the padding member **251** to portions of the first, second, and third sections **205**, **210**, & **220** of the door mount assembly **200**.

[0031] It is pertinent to note that when a plurality of friction resistance exercise devices **10** are employed in a friction resistance exercise system end caps for the first cylindrical section **105** are typically not necessary because ropes and rope assemblies used in conjunction with the plurality of friction resistance exercise devices **10** will be adequately secured without such end caps. As shown in the perspective view of FIG. **3**, open ends of the first cylindrical section **105** allows heat caused by friction on the T-shaped cylindrical member **100** while in use to readily dissipate out of the open ends resulting in better overall cooling of the plurality of T-shaped cylindrical members **100**.

The frictional resistance exercise device is not limited by the exemplary embodiment as described above. Many variations and alternate embodiments exist and are contemplated with the scope of invention. For example, one variation of the frictional resistance exercise device exists where the door mount assembly extends perpendicularly from the door edge. With reference to FIG. **3**, the perpendicular-oriented door mount assembly essentially comprises a flat or coplanar the first and second sections **205** & **210**, and not a third section **220** of the door mount assembly **200**. Hence, the T-shaped cylindrical member **100** typically extends toward the center of the door whereby the first cylindrical section **105** extends longitudinally generally aligned with the hinge and latch side door edges and the second cylindrical section **115** extends latitudinally generally aligned with the top and bottom door edges. Depending on where the T-shaped cylindrical member **10** is coupled on the perpendicular-oriented door mount assembly, the first and second cylindrical sections **105** & **115**

are spaced a distance (typically between 0.25 and 6 inches) away from the front or back surface of the door.

[0032] FIG. **4** illustrates an exemplary rope assembly that is used with a plurality of friction resistance exercise devices. Rope assembly **400** comprises a rope **410**, a handle stirrup **415** on each end of the rope **410**, and a first handle **405***a* and a second handle **405***b* coupled to each handle stirrup **415**. The rope **410** is flexible and typically comprised of nylon or other synthetic fibers. However, the rope **410** can be comprised of any suitable natural or synthetic fibers or materials or combinations thereof. Non-limiting examples of natural and synthetic fibers include cotton, manila, sisal, nylon, polyester, and polypropylene. The handle stirrup **415** on each end can be created by creating a loop generally large enough for a human hand to comfortably fit through. Any suitable knot or fastening means can be utilized to create the handle stirrups **415**. For example, a Trucker's knot can be utilized where it is desirable to easily adjust the size of the stirrup. The handles **405***a* & **405***b* typically comprise an elongated bore through which each end of the rope **410** can be threaded. Hence, each handle **405***a* & **405***b* and a portion of the rope **410** comprises the handle stirrup **415**. As would be obvious to one of ordinary skill in the art, various types of handle portions of the rope and handles can be substituted for the exemplary handle stirrups and handles with elongated bores described herein.

Exemplary Embodiments of a Frictional Resistance Exercise System

[0033] FIG. **5** is an isometric view of a user **15** using a frictional resistance exercise system to perform a first exemplary exercise routine. A frictional resistance exercise system typically includes a first frictional resistance exercise device **10***a*, a second frictional resistance exercise device **10***b*, a rope assembly **400**, and a cord **290**. With reference back to FIGS. **1-3**, the first frictional resistance exercise device **10***a* typically comprises a first T-shaped cylindrical member **100** coupled to a first door mount assembly **200**. The first door mount assembly **200** includes a J-bracket that is coupled to a door **30** at a door top edge and extends to a door front surface and a door back surface. Similarly, the second frictional resistance exercise device **10***b* typically comprises a second T-shaped cylindrical member **100** coupled to a second door mount assembly **200**. The second door mount assembly **200** includes a J-bracket that is coupled to the door **30** at a door bottom edge and extends to the door front surface and the door back surface. Both the first frictional resistance exercise device **10***a* and the second frictional resistance exercise device **10***b* can be coupled proximal a hinge side door edge because that portion or area of the door **30** typically provides greater stability to the frictional resistance exercise devices during performance of the various exercise routines than the latch side door edge.

[0034] The rope assembly **400** is slidably coupled to the first and second T-shaped cylindrical members of the first and second frictional resistance exercise devices **10***a* & **10***b*. Starting from the first handle **405***a* of the rope assembly **400** and ending with the second handle **405***b*, the rope **410** is placed: (i) between the right arm portion of the first cylindrical section **105** of the first frictional resistance exercise device **10***a* and the door **30**; (ii) over or around the top of the second cylindrical section **115** of the first frictional resistance exercise device **10***a*; (iii) between the left arm portion of the first cylindrical section **105** of the first frictional resistance exercise device **10***a* and the door **30**; (iv) down generally extending the length of the door **30**; (v) between the left arm portion of the first cylindrical section **105** of the second frictional resistance exercise device **10***b* and the door **30**; (vi) under or around the bottom of the second cylindrical section **115** of the second frictional resistance exercise device **10***b*; and (vii) between the right arm portion of the first cylindrical section **105** of the second frictional resistance exercise device **10***b* and the door **30** (refer back to FIGS. **1-3** for the more detailed elements of the frictional resistance exercise device **10**).

[0035] Still referring to FIG. **5**, the cord **290** can be coupled to the base portion or second cylindrical section **115** of the first frictional resistance exercise device **10***a* and the base portion or second cylindrical section **115** of the second frictional resistance exercise device **10***b*. The cord **290** can comprise essentially an elongated loop to aid in securing the first and second frictional resistance exercise devices **10***a* &**10***b* to the door **30**. In some implementations, where the frictional force provided by the J-brackets and door mount assembly in general along with the force provided by the coupling cord **290** is sufficient to hold the first and second frictional resistance exercise devices **10***a* &**10***b* in place, fasteners to fasten the first and second frictional resistance exercise devices **10***a* &**10***b* to the door **30** are not required. More typically, at least one of the first and second frictional resistance exercise devices **10***a* &**10***b* is secured to the either the top or bottom door edge with one or more fasteners and the other is secured by the force provided by the coupling cord **290**. It is pertinent to note that fasteners can be easily inserted into the top door edge when coupling the door mount assembly and the top of the plurality of frictional resistance exercise devices typically receives more side to side forces during some common exercise routines that would cause an unattached frictional exercise device to slide along the top door edge. It is therefore advantageous to couple at least one the frictional resistance exercise device to the top door edge with fasteners. Inserting (or removing) the fasteners from the top door edge can be easily accomplished as the door need not be removed from hinges thereby enabling portability of the frictional resistance exercise devices if desired.

[0036] Depending on the specific exercise routine being performed, it may be advantageous to couple the first frictional resistance exercise device **10***a* a hinge side door edge and the second frictional resistance exercise device **10***b* to a latch side door edge. Moreover, it is sometimes advantageous (but not necessary) to align the first frictional resistance exercise devices **10***a* approximately longitudinally or directly above the second frictional resistance exercise device **10***b* when the first and second frictional resistance exercise devices **10***a* &**10***b* are coupled on top and bottom door edges. Similarly, it is sometimes advantageous (but not necessary) to align the first frictional resistance exercise devices **10***a* approximately latitudinally or directly across the second frictional resistance exercise device **10***b* when the first and second frictional resistance exercise devices **10***a* &**10***b* are coupled on hinge and latch side door edges.

[0037] As illustrated in FIG. **5**, the user **15** facing away from the door **30** can hold the first handle **405***a* with his left hand and exert a force away from the door **30** with various muscles in his left shoulder, left arm, and/or left hand (e.g., a triceps extension) while resisting the pulling force by the second handle **405***b* in his right hand. Alternatively, the user **15** facing away from the door **30** can hold the second handle **405***b* with his right hand and exert a force away from the door **30** with various muscles in his right shoulder, right arm,

and/or right hand (e.g., a biceps curl) while resisting the pulling force by the first handle **405***a* in his left hand. As would be obvious to one of ordinary skill in the art, the right and left hands can quickly and easily be switched with respect to the exercises above as well as numerous other exercise routines can be performed with the frictional resistance exercise system.

[0038] FIG. **6** is an isometric view of the user **15** using a frictional resistance exercise system to perform a second exemplary exercise routine. The user **15** facing toward the door **15** can hold the first handle **405***a* with his left hand and the second handle **405***b* with his right hand wherein the first and second handles **405***a* & **405***b* are held along a generally horizontal plane. The user can then move his torso up and down with his legs while holding the first and second handles **405***a* & **405***b* such that they remain horizontally opposed during the vertical movement of the first and second handles **405***a* & **405***b* and the user's torso (e.g., a leg squat). The user **15** can switch hands holding the first and second handles **405***a* & **405***b* as well as alter the starting vertical location of the first and second handles **405***a* & **405***b* and muscles used in the exercise routine (e.g., a shoulder press). Advantageously, the length of the rope assembly **400** typically does not require adjustment as the user **15** can stand closer (e.g., if the user **15** is an adult) or farther (e.g., if the user **15** is a child) from the door **30** while performing the second exemplary exercise routing as well as other exercise routines. Additionally, a grab bar **33** can be installed proximal the door **30** to aid in the exercise routines. Also illustrated in FIG. **5** is the absence of the cord **290** (from FIG. **5**) used to secure the first and second frictional resistance exercise devices **10***a* &**10***b*. In this implementation, the first and second frictional resistance exercise devices **10***a* &**10***b* are typically secured to the door edges with one or more fasteners. Additionally, a rope assembly configuration is illustrated where a loop around the left arm portion of the first frictional resistance exercise device **10***a* is included to increase the resistance of the system. Again, as would be obvious to one of ordinary skill in the art, numerous other exercise routines can be performed with the frictional resistance exercise system within the scope and spirit of the embodiments of the invention. Non-limiting examples of exercises that can be performed with the frictional resistance exercise system are abdominal crunches and leg extension exercises. Some of these exercises may be performed with the aid of a bench adjacent to the door **30** whereby the user **15** lies on his or her back while performing the exercise. Moreover, when a plurality of frictional resistance exercise devices are utilized in the frictional resistance exercise system, such as the first and second frictional resistance exercise devices **10***a* & **10***b* described above, it is easy and convenient to store the rope assembly **400** on the door **30** while remaining coupled to the plurality of frictional resistance exercise devices. The user can essentially interlock the two handle stirrups **415** by inserting one inside the other one or more times and/or taking up slack (if necessary depending on the length of the rope) by increasing the number of wraps around one or both of the first and second frictional resistance exercise devices **10***a* & **10***b*.

[0039] It is to be appreciated that when utilizing the frictional resistance exercise system a greater force is required to push or pull the one of the handles generally away from the door **30** or the system than the force required to resist or hold the other of handles from moving toward the door **30** or the system given the friction resistance provided by devices and system. Moreover, there is no stored energy in the system from elastic or rubber bands or rods, gravity from weights, (or similar stored energy techniques mechanisms used in most exercise equipment) that could become excessive and cause injury to the user **15** when such stored energy suddenly releases.

[0040] FIGS. **7**A-**7**E illustrate a plurality of rope assembly configurations for use in a frictional resistance exercise system. These rope assembly configurations provide ways to vary the resistance for use with the exercise routines described in FIGS. **5** & **6** as well as the numerous other exercise routines that can be performed with the frictional resistance exercise system as would be obvious to one of ordinary skill in the art.

[0041] FIG. **7**A illustrates a basic rope assembly configuration. Starting from the first handle **405***a* of the rope assembly **400** and ending with the second handle **405***b*, the rope **410** is placed: (i) between the right arm portion of the first cylindrical section **105***a* and the door; (ii) over or around the top of the second cylindrical section **115***a*; (iii) between the left arm portion of the first cylindrical section **105***a* and the door **30**; (iv) down generally extending the length of the door; (v) between the left arm portion of the first cylindrical section **105***b* and the door; (vi) under or around the bottom of the second cylindrical section **115***b*; and (vii) between the right arm portion of the first cylindrical section **105***b* and the door.

[0042] FIG. **7**B illustrates the basic rope assembly configuration with an extra loop around the left arm portion of the first cylindrical section **105***a* to increase the friction provided by the frictional resistance exercise system. FIG. **7**C illustrates the basic rope assembly configuration with an extra loop around the left arm portion of the first cylindrical section **105***a* and an extra loop around the left arm portion of the second cylindrical section **105***b* the to further increase the friction provided by the frictional resistance exercise system.

[0043] FIG. **7**D illustrates an alternative basic rope assembly configuration. Starting from the first handle **405***a* of the rope assembly **400** and ending with the second handle **405***b*, the rope **410** is placed: (i) between the right arm portion of the first cylindrical section **105***a* and the door; (ii) over or around the top of the second cylindrical section **115***a*; (iii) between the left arm portion of the first cylindrical section **105***a* and the door **30**; (iv) down generally extending the length of the door; (v) over the top of left arm portion of the first cylindrical section **105***b* and then between the left arm portion of the first cylindrical section **105***b* and the door; (vi) back up and over or around the top of the second cylindrical section **115***b*; (vii) back down between the door and the right arm portion of the first cylindrical section **105***b*; and (viii) back up over the top of the right arm portion of the first cylindrical section **105***b*.

[0044] FIG. **7**E illustrates the alternative basic rope assembly configuration with an extra loop around the left arm portion of the first cylindrical section **105***a* to increase the friction provided by the frictional resistance exercise system. It is to be appreciated that numerous other rope assembly configurations exist and can be utilized to increase or decrease the frictional as well as modify the resulting forces applied to each do the frictional resistance exercise devices when the rope **410** slides along the T-shaped cylindrical members **100**.

An Exemplary Method of Using a Frictional Resistance Exercise System

[0045] Embodiments of the frictional resistance exercise system including the various configurations of the plurality of

frictional resistance devices thereof can be utilized as to perform various exercises. An exemplary method utilizing embodiments of the frictional resistance system is illustrated in the flow chart of FIG. **8**.

[0046] Method **500** enables a user to more safely and conveniently perform a variety of exercises. An operation **505** of method **500** comprises providing a plurality of frictional resistance exercise devices. As illustrated in FIGS. **1-3** and described herein, each of the frictional resistance exercise devices **10** includes the T-shaped cylindrical member **100** and the door mount assembly **200**. The door mount assembly **200** is adapted to fit over a door edge and extend to at least one of a door front surface and a door back surface. Moreover, the door mount assembly **200** is adapted to allow the door **30** to which it is attached be closed when coupled thereon. The T-shaped cylindrical member **100** is coupled to the door mount assembly **200**. Each of the T-shaped cylindrical members **100** typically comprises the first cylindrical section **105** and the second cylindrical section **115**.

[0047] Returning now to the flow chart of FIG. **8**, operation **510** comprises securing a first frictional resistance exercise device to a top door edge and operation **515** comprises securing a second frictional resistance device to a bottom door edge. As previously discussed, the first and second are typically, but not necessarily, longitudinally aligned on the door.

[0048] Next, as described in block **520**, a rope is attached to the first and second exercise devices. The rope can be the rope assembly **400** described above and illustrated in FIG. **4**. Moreover, a variety of rope assembly configurations as described above and illustrated in FIGS. **7**A-**7**E can be used to vary the resistance to the rope. For example, when attaching the rope to the first and second exercise devices, the rope can include at least one loop around an arm portion either the first or second frictional resistance exercise device (refer to FIGS. **7**B, **7**C, and **7**E for exemplary loops). Additionally, attaching the rope to further the first or second frictional resistance exercise device can include placing the rope over a top of a left arm portion of a first cylindrical section **105***b* of the second frictional resistance exercise device, between the left arm portion of the first cylindrical section **105***b* of the second frictional resistance exercise device and the door, around a top of a second cylindrical section **115***b* of the second frictional resistance exercise device, between the door and a right arm portion of the first cylindrical section **105***b* of the second frictional resistance exercise device, and over a top of the right arm portion of the first cylindrical section **105***b* of the second frictional resistance exercise device (see FIG. **7**D for an exemplary illustration).

[0049] Referring back to FIG. **8**, an operation **525** comprises applying a force to a first end of the rope and an operation **530** comprises resisting a force at a second end of the rope. Typically, a single user applies the force to the first end of the rope with a first hand or foot and resists the force of the second end of the rope with a second hand or foot. However, in some implementations a first user applies the force to the first end of the rope and a second user resists the force of the second end of the rope.

[0050] It is to be appreciated that the numerous exercises may be performed in accordance with the method described above. Although a few exemplary exercises are discussed and illustrated in FIGS. **5** & **6**, other exercises and configurations of the plurality of frictional resistance exercise devices are contemplated such as, but not limited to, having two top and two bottom exercise frictional resistance exercise devices and two rope assemblies wherein the first user holds either the first or second ends of both ropes and the second user holds the other of the first or second ends of both ropes. Additionally, it is readily apparent given the disclosure and to be appreciated that the frictional resistance exercise system enables the user (or a trusted second user) to control and adjust the amount of resistance being applied at various times throughout the range of motion of the specific exercise being performed. Such acute and immediate control of the resistance is often critical during exercises performed during rehabilitation of injuries where both injured and uninjured muscle groups are utilized in during the full range of motion during the course of the exercise routine.

Other Embodiments and Variations

[0051] The various embodiments and variations thereof illustrated in the accompanying figures and/or described above are merely exemplary and are not meant to limit the scope of the invention. It is to be appreciated that numerous variations to the invention have been contemplated as would be obvious to one of ordinary skill in the art with the benefit of this disclosure. All variations of the invention that read upon the appended claims are intended and contemplated to be within the scope of the invention.

[0052] For example, in some embodiments, the door mount assemblies can be modified to couple directly to a wall, fence (e.g., warming-up and strengthening a user's arm for baseball practice or games), or other structure besides a door.

1. A frictional resistance exercise system comprising:
- a plurality of T-shaped cylindrical members;
- a plurality of door mount assemblies, the plurality of door mount assemblies being adapted to fit over a door edge and extending to at least one of a door front surface and a door back surface allowing a door to be closed when coupled thereon, each of the plurality of T-shaped cylindrical members being coupled to each of the plurality of door mount assemblies;
- wherein the plurality of door mount assemblies comprise a first door mount assembly coupled to a door edge and a second door mount assembly coupled the opposing door edge, the first door mount assembly being approximately aligned linerally with the second door mount assembly; and
- a rope, the rope having a first end and a second end, the rope being slidably coupled to each of the plurality of T-shaped cylindrical members.

2. The frictional resistance exercise system of claim **1**, wherein at least one of the plurality of T-shaped cylindrical members is comprised of copper and is substantially hollow.

3. The frictional resistance exercise system of claim **2**, wherein the at least one of the plurality of T-shaped cylindrical members comprises a first section and a second section intersecting the first section in the approximate center thereof, the first section being coupled to the second section by one or more fasteners and one or more receiving nuts.

4. The frictional resistance exercise system of claim **3**, wherein the first section being coupled to the second section by one or more fasteners and one or more receiving nuts comprises the first section being coupled to the second section by two threaded fasteners and two threaded receiving nuts whereby head portions of the two threaded fasteners are in contact with bores in the door mount assembly, elongated threaded portions of the two threaded fasteners pass through the second section, and ends of the elongated threaded por-

tions distal the head portions extend into the first section, and are coupled to the two threaded receiving nuts therein.

5. The frictional resistance exercise system of claim **1**, wherein the plurality of door mount assemblies comprise a first door mount assembly coupled to a top door edge and second door mount assembly coupled to a bottom opposing door edge, the first door mount assembly being approximately aligned longitudinally with the second door mount assembly.

6. The frictional resistance exercise system of claim **1**, wherein the plurality of door mount assemblies comprise a first door mount assembly coupled to a hinge side door edge and second door mount assembly coupled to a latch door edge, the first door mount assembly being approximately aligned latitudinally with the second door mount assembly.

7. The frictional resistance exercise system of claim **5**, wherein the first door mount assembly and the second door mount assembly are coupled proximal a hinge side door edge.

8. The frictional resistance exercise system of claim **1**, wherein each of the plurality of door mount assemblies includes a bracket having a first section and a second section, the first section being a flat generally rectangular section with one or more first bores, and a second section being connected to and disposed substantially perpendicular to the first section thereby creating an L-bracket.

9. The frictional resistance exercise system of claim **8**, wherein each of the plurality of door mount assemblies further includes a third section, the third section being a flat generally rectangular section, the third section being connected to and disposed substantially perpendicular to the second section thereby creating a J-bracket.

10. The frictional resistance exercise system of claim **9**, wherein the first section, the second section, and the third section has a thickness of approximately 16-24 gauge.

11. The frictional resistance exercise system of claim **8**, wherein each of the plurality of door mount assemblies further includes (i) one or more first fasteners, each of the one or more first fasteners adapted to extend substantially through each of the one or more first bores and to couple to the one or more first retaining nut, and (ii) one or more second fasteners, each of the one or more second fasteners adapted to extend substantially through each of the one or more second bores and to couple to the door edge.

12. The frictional resistance exercise system of claim **1** further comprising, at least one padding member, the at least one padding member being couples to a door mount assembly adjacent a surface of a door.

13. (canceled)

14. A frictional resistance exercise system comprising:

a first T-shaped cylindrical member;

a first door mount assembly, the first door mount assembly including a bracket coupled to a door top edge and extending to a door front surface and a door back surface, the first door mount assembly being coupled to the first T-shaped cylindrical member;

a second T-shaped cylindrical member;

a second door mount assembly, the second door mount assembly including a bracket coupled to a door bottom edge and extending to the door front surface and the door back surface, the second door mount assembly being coupled to the second T-shaped cylindrical member, and

a rope, the rope having a first end and a second end, the rope being slidably coupled to the first and second T-Shaped cylindrical members.

15. The frictional resistance exercise system of claim **14**, further comprising,

a cord, the cord coupled to a base portion of the first T-shaped cylindrical member and a base portion of the second T-shaped cylindrical member, the cord adapted to secure a one of the first door mount assembly and second door mount assembly when the other of the first door mount assembly and the second door mount assembly is coupled to its door edge by one or more fasteners.

16. A method of exercising, the method comprising:

providing a plurality of frictional resistance exercise devices, each of the frictional exercise devices having a T-shaped cylindrical member and a door mount assembly, wherein (i) the door mount assembly is adapted to fit over a door edge and extend to at least one of a door front surface allowing a door to be closed when coupled thereon, and (ii) the T-shaped cylindrical member is coupled to the door mount assembly;

securing a first frictional resistance exercise device to a top door edge;

securing a second frictional resistance device to a bottom door edge;

attaching a rope to the first frictional resistance exercise device and the second exercise devices;

applying a force to the ends of the rope while holding the ends of the rope along a horizontal plane, the force being resisted by the first and second frictional devices.

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