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(54) **DOOR-FRAME MOUNTED EXERCISE BAR**

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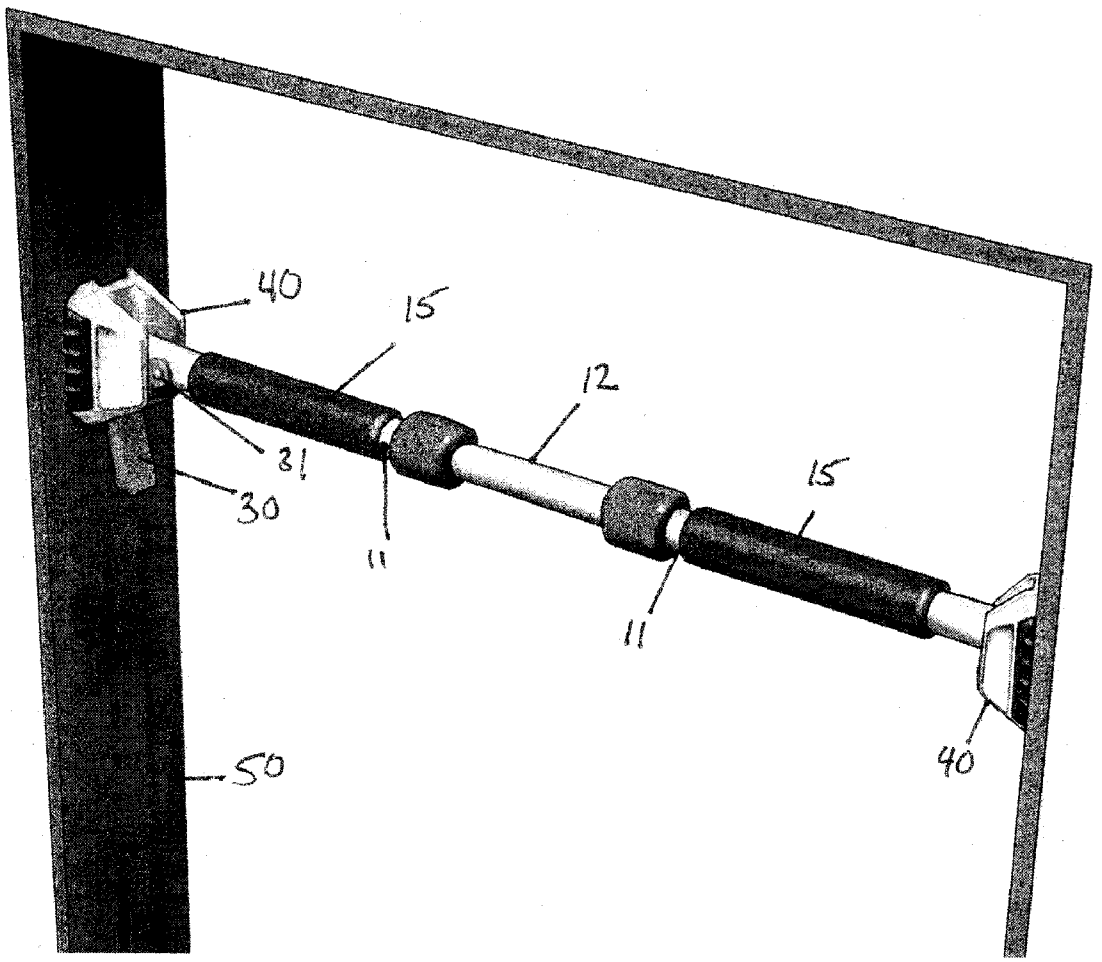
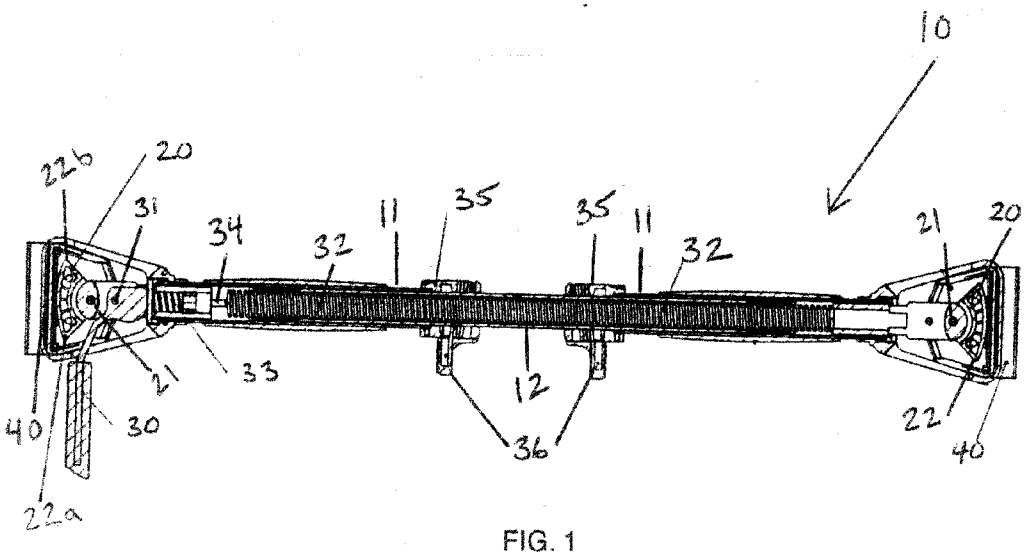
(57) **ABSTRACT**

An exercise device, including a telescoping door-frame-mountable exercise bar having a first and second end, each end having an end-cap, each of said end-caps having an outward facing frictional surface, and at least one of said end-caps containing an interior cam mechanism. Said cam mechanism including a cam wedge with a pivot end and a curved end, wherein said pivot end is pivotably secured to one end of the bar at a pivot point, and said curved end is directed outwards from said pivot point towards the interior side of the flat frictional surface of the end-cap. Said cam wedge having a radial length measured by the distance between the cam wedge's pivot point and its curved end, wherein said radial length is shortest along the central horizontal axis of the cam wedge and increases in length as the radial axis is angled upwards or downwards along the curved end on the cam wedge.




10
22b
20
31
34
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33
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36
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40
22a

FIG. 1

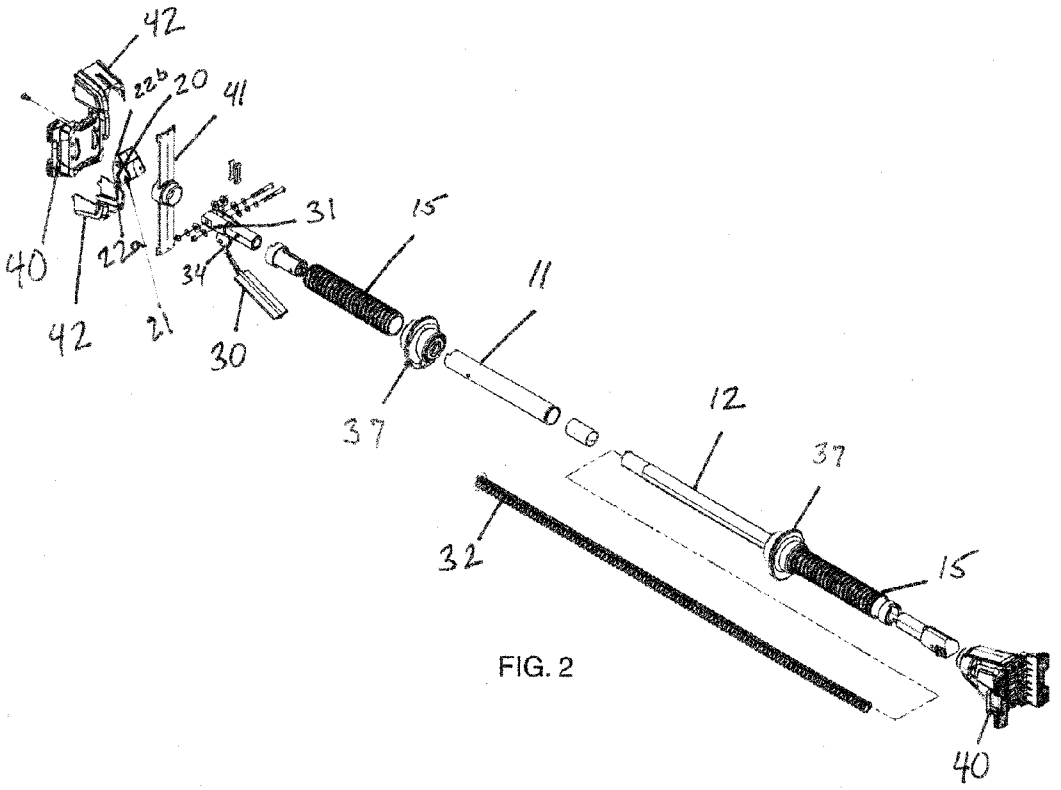
42
22b
20
41
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FIG. 2

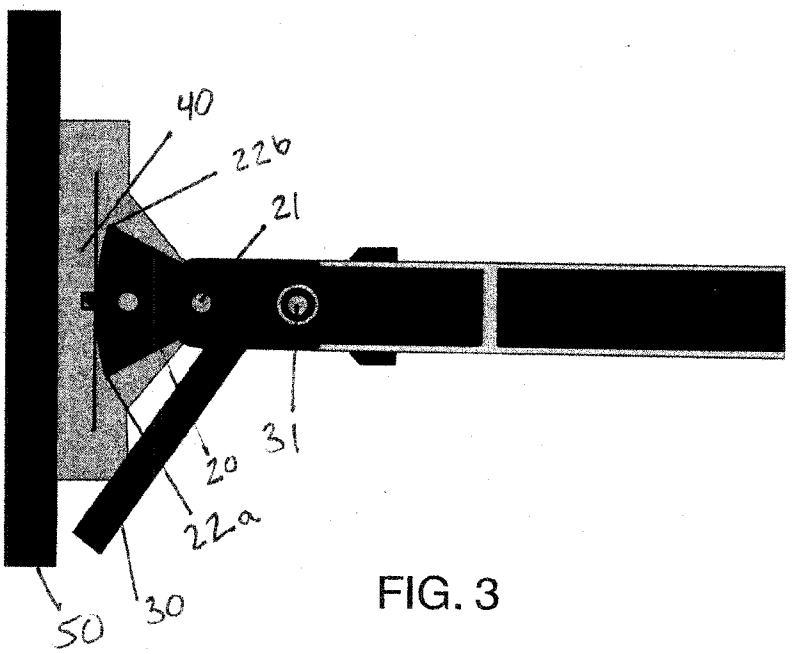

FIG. 3

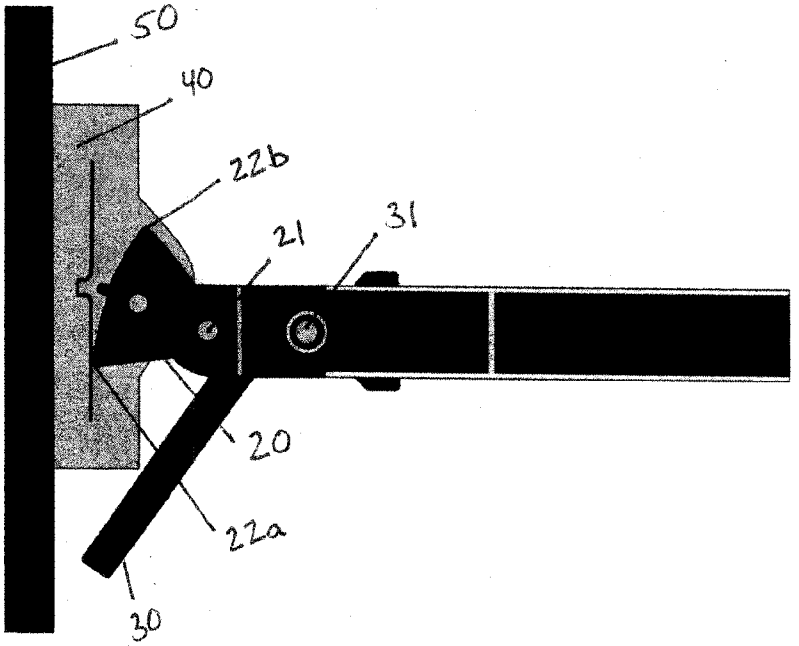

FIG. 4

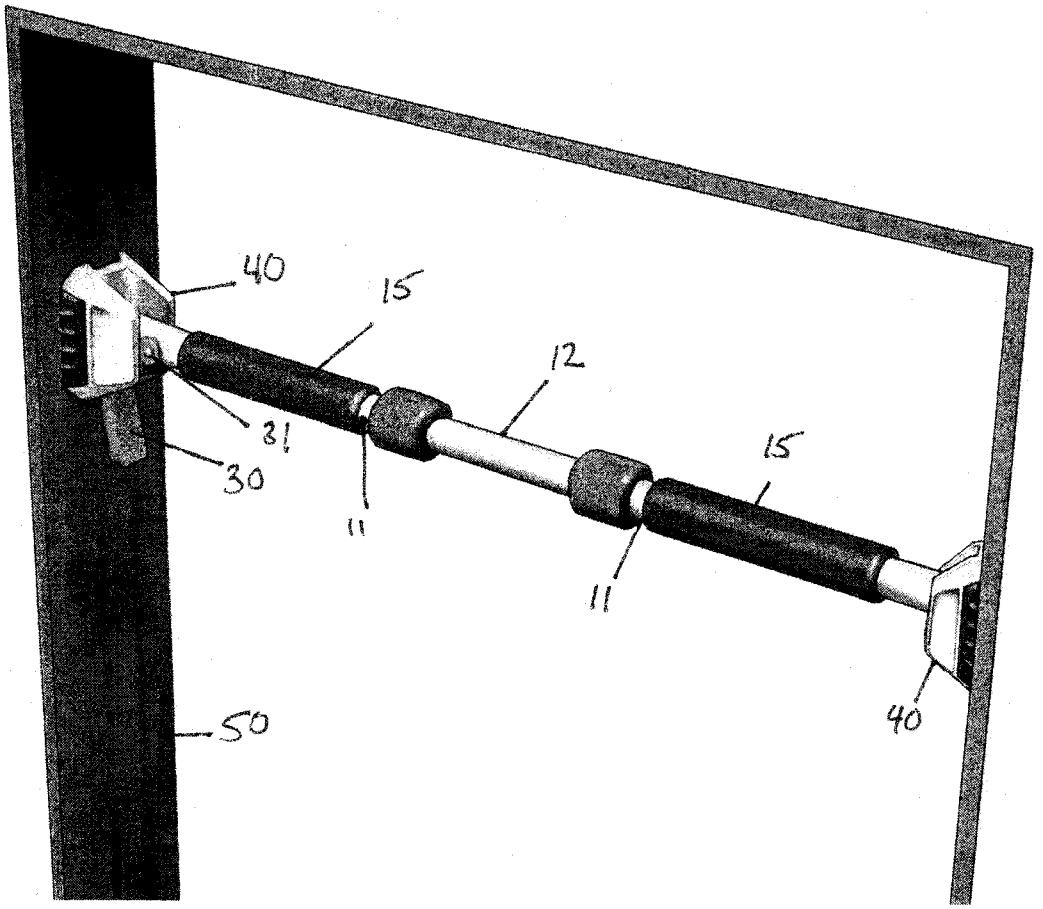

FIG. 5

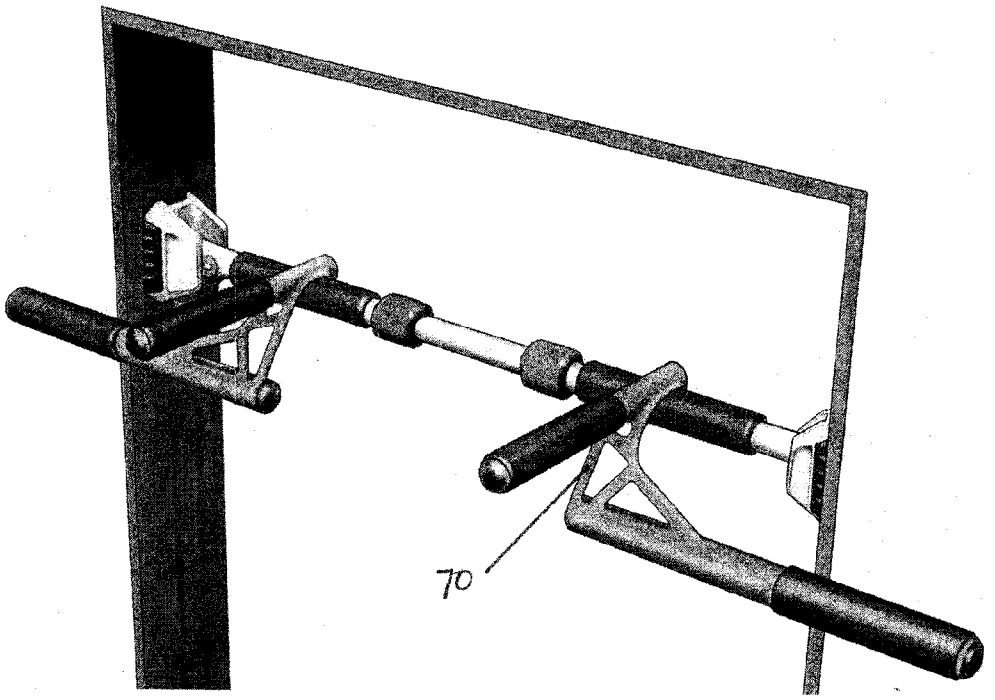

FIG. 6

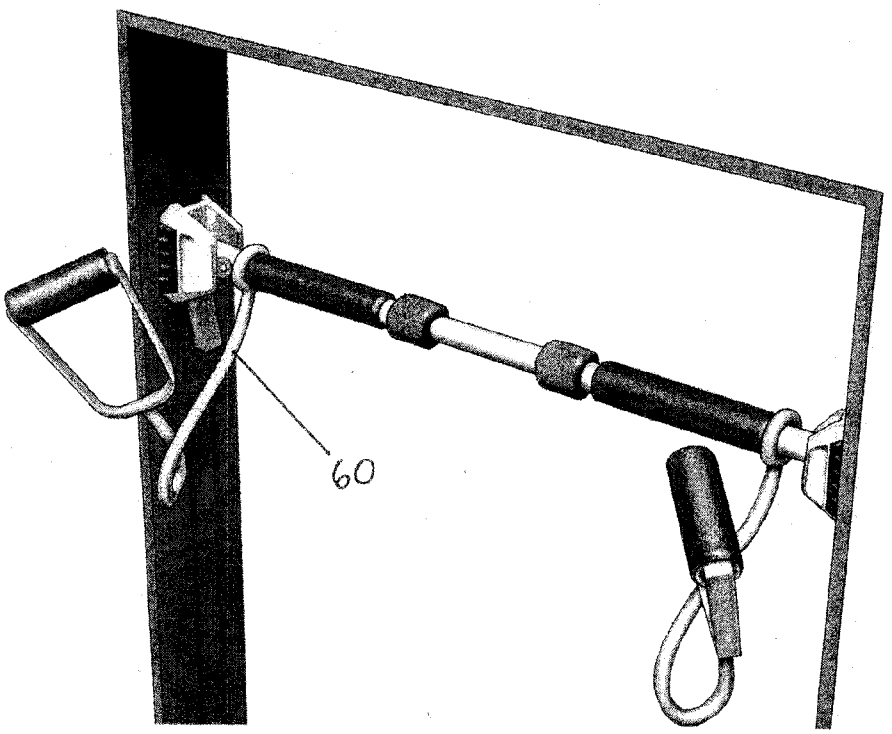

FIG. 7

DOOR-FRAME MOUNTED EXERCISE BAR

RELATED APPLICATION

[0001] The application claims priority of provisional patent application Ser. No. 61/265,881 filed Dec. 2, 2009

FIELD OF THE INVENTION

[0002] The present invention relates to an exercise bar that can be adjustably mounted in a door-frame. In particular, the device uses a lever and cam mechanism to secure the exercise bar at a fixed position in a door-frame, and releasing the lever allows easy movement of the exercise bar to a new position, or a new door-frame.

BACKGROUND OF THE INVENTION

[0003] Door-frame mountable exercise devices are a common means to provide a user with a versatile, relatively compact and affordable exercise bar. This devices can be useful in a variety of exercise routines, which are often dependent on the location of the exercise bar within a door-frame. For instance, a bar fixed at the bottom portion of a door-frame can be useful in assisting in push-up and sit-up style exercise activities, whereas a bar fixed at the top portion of a door-frame can be useful for pull-up and chin-up style exercise activities. Further, such devices can is also employ the use of additional hand-grips, or elastic resistance cables for increased exercise routine versatility, and with such accessories, the bar's ideal location is often near the center-height of the door-frame.

[0004] However, one obstacle for such devices is that the exercise bar must be able to support a substantial load, at least the user's full body weight, while also providing for easy adjustment of the bar when a new position is desired, or a new length is required to fit door-frames of varying widths.

[0005] Prior inventions, such as U.S. Pat. Nos. 3,047,293 and 3,502,326 disclose telescoping exercise bars that employ the use of a frictional and compressible end on the mounting faces at each end of the bar, such that the telescoping feature allows the user to set the proper length to match the width of the door-frame, and the frictional compressible ends allow the device to be wedged into place in a relatively secure fashion. However, such devices may fail under substantial loads. U.S. Pat. No. 3,525,521 employs the use of an angled wall within each mounting face at each end of the bar, such that as downward pressure is exerted on the bar, additional outward force is exerted on the door-frame, further securing the bar in place. However, upward force has the opposite effect, loosening the bar. One goal of the present inventions is to provide a securing means such that an increase in the load force in an upward or downward direction will increase the outward force exerted on the door-frame, further securing the bar in place.

[0006] In order to achieve a more securely mounted device other devices have employed mounting brackets that must be affixed to the door-frame, such as U.S. Pat. Nos. 4,405,127, 5,180,350, and 7,540,831. Another goal of the present invention is to avoid such mounting brackets, and to allow the exercise device of the present invention to be fully portable and quickly and easily transferable to any position in any door-frame.

SUMMARY OF THE INVENTION

[0007] According to the present invention, an exercise bar with two ends, optionally telescoping or adjustable using an internal spring mechanism, is provided wherein at least one end of said bar includes a cam mechanism, and preferably a lever locking mechanism.

[0008] The cam mechanism includes a pivotable cam within an end-cap, where the end-cap has a frictional outer surface that actually engages the door-frame. In the preferred embodiment the pivotable cam is attached on only one end of the bar, but it can be included on both ends. When a vertical directional force, either upward or downward, is exerted on the bar, such as a downward force from the user's weight during a pull-up exercise, the cam rotates about the pivot point. The cam is designed so that the radial length at the central horizontal axis of the cam is shorter than its radial length at any other axis, and the radial length increase as the axis is angled upwards or downwards along the curved end of the cam, such that when the cam rotates, the horizontal radial length increases and the cam exerts additional outward force on the end-cap. The result is that when additional force is exerted on the end-cap, the end-cap exerts additional outward force on the door-frame, further securing the bar in place, and decreasing the likelihood of any unwanted movement or slippage of the exercise bar during use.

[0009] The preferred embodiment also includes a lever locking mechanism. The lever is pivotably attached towards one end of the bar and is adapted to engage one end of the internal spring mechanism, such that when the lever is engaged, the lever exerts a force on the internal spring within the exercise bar, causing an increase in the outward force exerted on the door frame, and thereby further securing the exercise bar in place.

[0010] The internal spring mechanism within the exercise bar and telescoping ends allow the bar to be adjusted to fit varying sized door-frames. In the preferred embodiment, the exercise bar is comprised of two external hollow bars at each end of the exercise bar. The external bars can be compressed inwards by sliding over a centrally disposed internal bar, and compressing an internal spring mechanism. The spring mechanism can optionally include at least one securing clamp near the center of the bar, said clamp including a release. Once the external bars have been moved to the desired position to fit within the door-frame, the securing clamp can be engaged, locking the spring in position and securing the bar within the door-frame. To adjust the bar again, the release is used to disengage the clamp. When the bar is set within the door-frame, the lever is engaged, exerting additional outward force and further securing the bar in place. Alternatively, a traditional telescoping bar can be used without clamps, and the door-frame itself is used to maintain the compression force on the spring. Further, it should be understood that any standard telescoping bar can be used with the cam mechanism of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. **1** illustrates an internal cross-section of one embodiment of the present invention;

[0012] FIG. **2** illustrates an exploded view of the preferred embodiment of the present invention;

[0013] FIG. **3** illustrates the lever and cam mechanism at one end of the present invention abutting a door-frame in a secured, but load-free condition;

[0014] FIG. **4** illustrates the lever and cam mechanism at one end of the present invention abutting a door-frame in a secured, load-bearing condition;

[0015] FIG. **5** illustrates one embodiment of the present invention in a secured, but load-free condition;

[0016] FIG. **6** illustrates an alternate embodiment of the present invention using multiple hand-grips, in a secured, but load-free condition; and

[0017] FIG. **7** illustrates an alternate embodiment of the present invention using elastic bands, in a secured, but load-free condition.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0018] As shown-in FIGS. **1** through **4**, a telescoping exercise bar **10** is designed to be secured in door-frame **50**. In the preferred embodiment shown in FIG. **2**, the central portion of exercise bar **10** is comprised of external bar **11** and internal bar **12**, with internal compression spring **32** secured within internal bar **12**. When compressed, internal bar **12** slides into external bar **11**, compressing spring **32**, thereby shortening the length of exercise bar **10** to fit within the door-frame **50**. The device can also include a locking means to secure the spring in a set compressed position, such as clamp **35** shown in FIG. **1**.

[0019] In the preferred embodiment, hand-guards **37** separate the telescoping central portion from hand-grips **15**. In this embodiment, at one end of the exercise bar, hand-grip **15** engages directly with end-cap **40**, and at the other end hand-grip **15** and end-cap **40** are separated by lever **30**, and cam mechanism **20** is enclosed within said end-cap **40**. Lever **30** pivots about pivot-point **31**, and when lever **30** is rotated outward it engages piston **34** which exerts inward force on internal expansion spring **32**, causing additional outward force on end-cap **40**, and thereby further securing the bar in door-frame **50**.

[0020] In another embodiment, as shown in FIG. **1**, exercise bar **10** is comprised of an external bar **11** at each end and an internal bar **12** at the center portion, each end of said internal bar **12** extending within each external bar **11**, wherein at least one of external bars **11** is slidable over internal bar **12**. Internal bar **12** includes internal expansion spring **32** within said internal bar. Expansion spring **32** is compressed when at least one of external bars **11** slides over internal bar **12**, thereby shortening the length of exercise bar **10** to fit within the desired door-frame **50**. When the desired length for the exercise bar **10** is reached, clamp **35** is engaged by the user, securing expansion spring **32** at a set length. Release **36** disengages clamp **35**, thereby allowing expansion spring **32** to be set to a new position.

[0021] Engaging lever **30** adds additional outward force, further securing the exercise bar **10** within door-frame **50**. When the desired compression length is reached, exercise bar **10** is placed at the desired location in the door-frame **50**. Once secured, lever **30** is engaged by rotating the lever outwards, towards end-cap **40**. In the preferred embodiment, when lever **30** is engaged, piston **34** extends inwards and exerts an additional expansion force, thereby further securing the bar in place in the door-frame. In an alternate embodiment, shown in FIG. **1**, when lever **30** is engaged it compresses the outer return spring **33**, which in turn exerts force on internal piston **34**. Piston **34** directly engages the expansion spring **32**, thereby causing an increase in the outward force on the door-frame **50**.

[0022] To add additional security to the device, at least one end of the exercise bar is also equipped with Cam **20**, the cam may be included at both ends, see FIG. **1**, or at only one end, see FIG. **2**. Cam **20** has a curved outer end with top and bottom corner edges **22***b* and **22***a* respectively, and the opposite pivot end of cam **20** is rotatably secured to the end of exercise bar **10** at pivot point **21**. Cam **20** has a radial length measured as the distance between pivot point **21** and the curved end of the cam. The radial length is shortest along the central horizontal axis of cam **20**, and said radial length increases as the radial axis angles upwards or downwards along the curved end of cam **20** towards corner edges **22***a* or **22***b*, where the radial length is at its maximum.

[0023] As shown in FIG. **3**, when, downward force is exerted on bar **10**, cam **20** rotates clock-wise about axis **21** and bottom corner edge **22***a* rotates towards the central horizontal radial axis, increasing the central horizontal radial axis length as the cam rotates. As cam **20** rotates, due to the increased radial length, the cam exerts an additional outward force on end-cap **40**, and in-turn door-frame **50**, further securing exercise bar **10** in door-frame **50**. It should also be understood that upward force on exercise bar **10** will create the same effect. During upward force, wedge **20** will rotate counter clock-wise, and the top corner edge **22***b* of wedge **20** will be forced outward, exerting an additional outward force on end-cap **40**, and in-turn door-frame **50**, further securing exercise bar **10** in door-frame **50**.

[0024] As illustrated in FIGS. **6** and **7**, exercise bar **10** can also be equipped with additional exercise aids, such as elastic exercise bands **60**, or dip-exercise attachments **70**.

What is claimed is:

1. A door-frame-mountable exercise device, including a bar having a first and second end, each end having an end-cap, each of said end-caps having an outward facing frictional surface, and at least one of said end-caps containing an interior cam mechanism; said cam mechanism including a cam wedge with a pivot end and a curved end, wherein said pivot end is pivotably secured to one end of the bar at a pivot point, and said curved end is directed outwards from said pivot point towards the interior side of the flat frictional surface of the end-cap; and said cam wedge having a radial length measured by the distance between said pivot point and said curved end, wherein said radial length is shortest along the central horizontal axis of the cam wedge and increases in length as the radial axis is angled upwards or downwards along the curved end of the cam wedge.

2. A door-frame-mountable exercise device as set forth in claim **1** wherein the bar is a telescoping bar, said telescoping bar including at least one external bar, one internal bar and an is internal compression spring; wherein said internal spring has a first and second end, said first end of the internal spring is enclosed within the internal bar and the second end of the internal spring extends beyond the end of the internal bar; said external bar having at least one open end, said open end telescopingly slidable over the internal bar such that when the internal bar slides within said open end of the external bar the internal spring is compressed, shortening the length of the bar.

3. A door-frame-mountable exercise device as set forth in claim **2** further comprising at least one lever mechanism secured at one end of the bar; said lever mechanism comprising a rotatable lever and a piston, said rotatable lever being secured to one end of the bar at a pivot point and comprising an external handle and an internal end, said internal end abutting an internal piston; said internal piston having a first and second end, wherein said first end abuts the internal end of the lever and said second end engages the internal compression spring within the internal bar, such that when the external handle of the lever is rotated the internal end of the lever is forced towards the center of the bar and engages said internal piston which in turn further compresses the internal compression spring.

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