# United States Patent [19]

**Miller**

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[54] **HAND EXERCISING DEVICE**


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[52] **U.S. Cl.** ..... **272/67,** 272/DIG. 3

[51] **Int. Cl.** ..... **A63b 21/22**

[58] **Field of Search** .. 272/67, 68, 83 R, 84, DIG. 4; 85/32 R, 50 R



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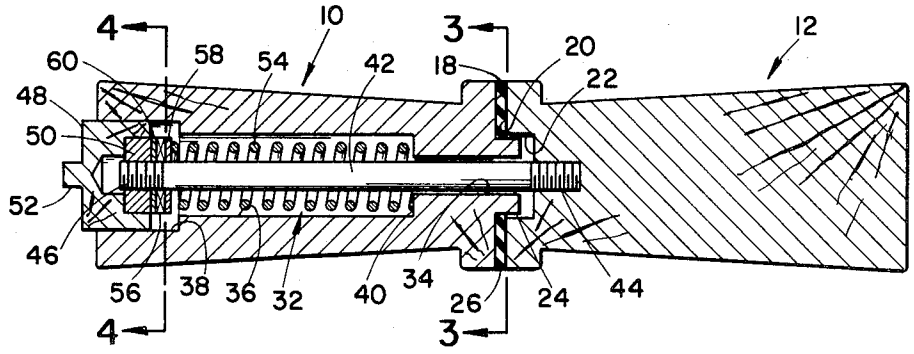
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[57] **ABSTRACT**

A hand and wrist exercising device includes a pair of generally cylindrical hand-grippable elements coaxially mounted for relative rotation and having opposite radial end faces with an annular rubber disk disposed between and engaging the opposite end faces to resist relative rotation between the elements. One of the elements has an axial bore and a shaft extends through the bore and has one end fixed to the other element and a cap threaded on the other end. A helical compression spring is mounted around the shaft within the bore and acts between a shoulder in the bore and the cap through a thrust bearing, so that the spring exerts a force biasing the hand-grippable elements toward one another against the rubber disk, the amount of friction being varied by turning the cap on the shaft to adjust the spring compression and thereby the biasing force.


**9 Claims, 4 Drawing Figures**



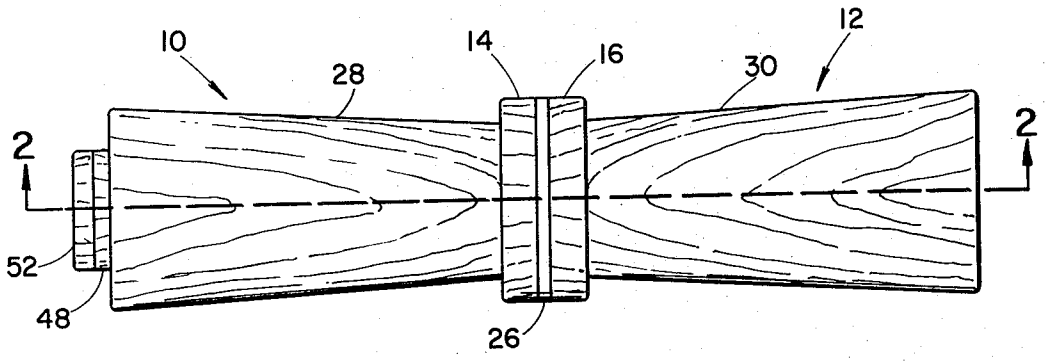



FIG. 1

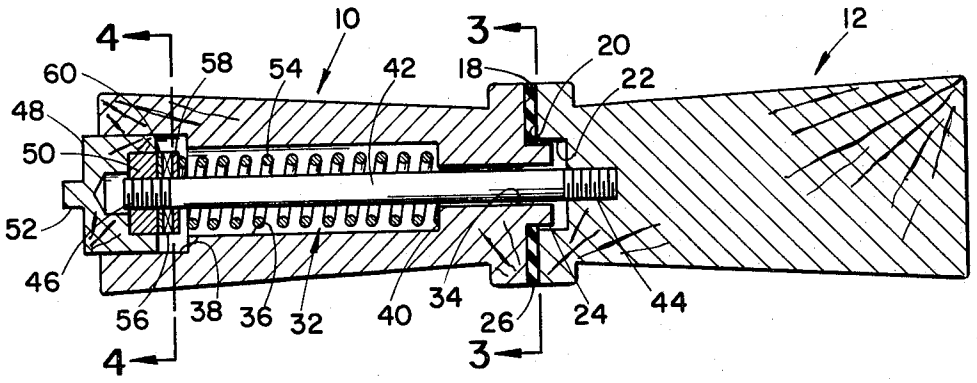



FIG. 2

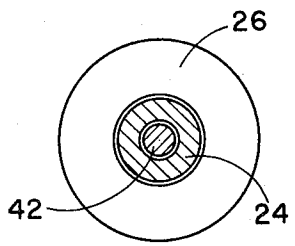



FIG. 3

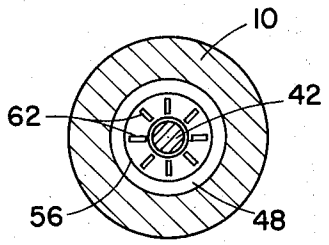



FIG. 4

# HAND EXERCISING DEVICE

## BACKGROUND OF THE INVENTION

This invention relates to an exercising device, and more particularly to a hand, wrist, and arm exercising device of the type wherein a pair of relatively rotatable hand grips are provided with means for resisting the relative rotation and the user grasps the opposite hand grips with his opposite hands and rotates one element relative to the other, the force required to overcome the resistance to relative rotation exercising the hand, wrist and arm muscles.

Such exercising devices are well known and generally include a pair of coaxial relatively rotatable cylindrical elements that are gripped by the opposite hands and a disk-type friction element interposed between the opposite end faces of the hand-grippable elements to oppose the relative rotation. It is known to provide a spring for biasing the hand-grippable elements toward one another against the friction element, although many of such devices merely use some type of screw thread and clamping means thereon for urging the opposite hand-grippable elements against the friction element, the amount of resistance to relative rotation being varied by adjusting the clamping force by means of the thread means.

One problem associated with some of the prior devices resides in the fact that, although the clamping or biasing force for urging the hand-grippable elements toward one another against the friction element can be varied, the means for adjusting the clamping force works loose or is otherwise affected by the relative rotation between the elements, so that the desired setting or resistance is not maintained. Another problem associated with some of the prior devices is the relatively large number of parts required or the relative complexity of the device, so that the devices are relatively expensive.

## SUMMARY OF THE INVENTION

According to the present invention, there is provided an improved hand, wrist and arm exercising device of the above-described general type, the improved device being of relatively simple construction and utilizing relatively few parts.

An important feature of the invention resides in the fact that the resistance to relative rotation of the opposite elements can be easily varied and once the desired setting is obtained, the device will maintain the desired amount of resistance during use.

More specifically, a compression spring is utilized to bias the hand-grippable elements against the friction element and the force exerted by the compression spring is easily adjusted by rotating a cap at one end of the device. Also, a thrust bearing is provided between the spring and the member that it moves relative to during relative rotation of the two hand-grippable elements so that no force is exerted on the cap that would affect the adjustment of the spring.

Another feature of the invention resides in the economical construction of the device and its attractive appearance.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view of the exercising device.



FIG. 2 is an axial section through the exercising device as viewed generally along the line 2—2 of FIG. 1.

FIG. 3 is a section viewed along the line 3—3 of FIG. 2.

FIG. 4 is a section viewed along the line 4—4 of FIG. 2.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

The invention is embodied in an exercising device having left and right, approximately cylindrical, coaxial, hand-grippable elements **10** and **12** respectively. The left element has a cylindrical portion **14** at its inner end and the right element has a similar cylindrical portion **16** at its inner end adjacent to the cylindrical portion **14.** The left and right elements **10** and **12** respectively have opposite, radial, inner end faces **18** and **20,** and the right element **12** is provided with an axial cylindrical bore in its end face **12.** The left element has an axial sleeve **24** projecting from the end face **18** and extending into the bore **22,** the diameter of the sleeve **24** being slightly less than the diameter of the bore **22** so that the elements **10** and **12** are coaxially aligned and rotatable relative to one another.

An annular, disk-like friction element **26** is coaxially mounted on the sleeve **24** and has substantially the same outer diameter as the cylindrical portions **14** and **16,** the opposite faces of the friction element engaging the opposite end faces **18** and **20.** The friction element is preferably made of neoprene rubber and resists relative rotation between the elements **10** and **12,** the amount of resistance depending on the amount of force biasing the elements **10** and **12** toward one another against the friction element.

The left and right elements **10** and **12** respectively include tapered, frusto-conical portions **28** and **30,** which are gripped by the opposite hands of the user, the taper being relatively slight and the tapered portion having a slightly smaller diameter than the cylindrical portions **14** and **16** at their inner ends, while having substantially the same diameter as the cylindrical portions at their outer ends. Although the elements are generally cylindrical, the taper provides an attractive appearance for the exercising device. Also, the elements **10** and **12** are preferably made of hard wood and are stained and polished on the exterior to give a highly attractive appearance.

The left element **10** has an axial bore extending through the element, the bore being indicated in its entirety by the numeral **32.** As is apparent, the bore **32** is stepped, and has a relatively small diameter portion **34** at its inner end, a larger diameter central portion **36,** and a relatively large portion **38** adjacent its outer or left-hand end. A shoulder or abutment **40** is formed between the inner portion **34** and the central portion **36.** An axial shaft **42** extends through the bore **32** and has one end attached to the right element **12,** the attachment being accomplished by a screw thread **44** on the end of the shaft **42.** The opposite or outer end of the shaft is disposed within the enlarged left end portion **38** of the bore **32** and has a screw thread **46.**

A generally cylindrical cap **48** has a slightly smaller diameter than the enlarged left end portion **38** of the bore **32** and is rotatably disposed therein, the cap being provided with an internally threaded insert **50,** preferably a conventional hex nut pressed into the cap,

whereby the cap **48** can be threaded on the screw thread **46** and adjusted axially thereon by rotation of the cap. A handle **52** is provided on the end of the cap to facilitate the adjustment of the cap.

A helical-type compression spring **54** is coaxially mounted in the central bore portion **36** around the shaft and its inner end abuts against the shoulder **40,** while its opposite end engages the cap **48** through a thrust washer **56** having a pair of conventional annular disk-type washers **58** and **60** on its opposite sides. The thrust washer **56** is of known construction and has a plurality of generally radially extending roller-type bearings **62,** the opposite sides of which are engaged by the washers **58** and **60** so that the spring, which exerts a torque on the inner thrust washer **58,** exerts a negligible torque on the cap **48.** The spring **54** has a relatively high spring rate, the spring in the illustrated embodiment exerting **16.5** pounds for each tenth of an inch of compression.

In operation, the cap **48** is rotated and thereby compresses the spring **54** to the desired amount. The force exerted by the inner or right end of the spring urges the left element **10** to the right against the friction disk, while the force exerted by the outer or left end of the spring exerts an axial force on the shaft **42** through the cap **48,** and the axial force on the shaft to the left pulls the right element **12** against the opposite side of the friction element **26.** The friction element, of course, opposes relative rotation between the elements **10** and **12,** and the amount of resistance can be increased by screwing the cap **48** on the thread **46** so that it moves to the right and further compresses the spring to give an increased force clamping the friction element between the left and right elements **10** and **12.** During relative rotation between the elements **10** and **12,** the cap **48** rotates with the right element **12** relative to the left element **10,** while the spring **54** stays with the left element **10.** The thrust bearing **56** permits the relative motion between the spring and the cap without transmitting any torque to the cap that would tend to rotate the cap on its thread **46** and thereby change the spring compression.

As is apparent, relatively few parts are employed in the device, and the device can easily be disassembled by simply removing the cap **48** and sliding the washers, the spring, and the left element off of the shaft, thereby exposing the friction element.

I claim:

**1.** An exercising device comprising: first and second coaxial, relatively rotatable hand-grippable elements, having opposite inner end faces normal to the axis of relative rotation, the first of said elements having an axial bore extending through the element; an annular friction element coaxially disposed between and abutting the opposite end faces of the hand-grippable elements for resisting relative rotation between the elements; an axial shaft extending through the bore in the first element, and having one end connected to the second element and a cap element mounted on its other end, said shaft including thread means so that rotation of the cap elements changes the distance between the cap element and the second element; a compression spring means mounted in said bore around said shaft and operatively extending between the first element and said cap element to bias the first and second elements toward one another; and thrust bearing means interposed between the spring means and one of said elements so that rotation of the first hand-grippable element relative to the second is not transmitted to the cap element.

**2.** The invention defined in claim **1** wherein the thrust bearing means is interposed between the spring means and the cap element.

**3.** The invention defined in claim **2** wherein the shaft is rigidly connected to the second element and the thread means is operative between the cap element and the shaft.

**4.** The invention defined in claim **2** wherein the bore has an internal abutment and the spring means extends between the abutment and the thrust bearing means.

**5.** The invention defined in claim **4** wherein the cap element is generally cylindrical and is at least partly disposed in the end of the bore in the first element.

**6.** The invention defined in claim **1** wherein each hand-grippable element includes a cylindrical portion at their inner ends having substantially the same diameter as the friction element.

**7.** A hand exercising device comprising: first and second approximately cylindrical hand-grippable elements coaxially disposed and rotatable relative to one another and having opposite, radial, inner end faces; an annular friction element coaxially disposed between and engaging the opposite inner end faces for resisting relative rotation between said elements; an axial bore through the first element and including an internal abutment; a shaft extending through said bore and having one end connected to the second element and thread means at its opposite end; a cap member threadably mounted on the thread means; a helical compression spring mounted on the shaft within said bore and operative between the cap and the abutment for exerting an axial force on the shaft and the first element biasing the first and second elements toward one another against the friction element, the cap being threadable on the shaft to vary the spring compression and thereby vary the friction resisting rotation between the first and second elements; and a thrust bearing means interposed between the cap and the spring to substantially eliminate the torque on the cap member exerted by the spring during relative rotation between the first and second elements.

**8.** The invention defined in claim **7** wherein the first and second elements include generally frusto-conical portions tapered outwardly toward the outer ends of the elements.

**9.** The invention defined in claim **7** wherein the outer end of the bore is enlarged and the cap member is at least partially disposed in the enlarged portion of the bore.

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