US 20070072740A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0072740 A1**

Kaufman (43) **Pub. Date: Mar. 29, 2007**

(54) **HAND THERAPY DEVICE**

(75) Inventor: **Leonard Kaufman**, Portland, OR (US)

Correspondence Address:
SCHWABE, WILLIAMSON & WYATT, P.C.
PACWEST CENTER, SUITE 1900
1211 SW FIFTH AVENUE
PORTLAND, OR 97204 (US)

(73) Assignee: **Leonard Kaufman, Ltd.**

(21) Appl. No.: **11/238,589**

(22) Filed: **Sep. 28, 2005**

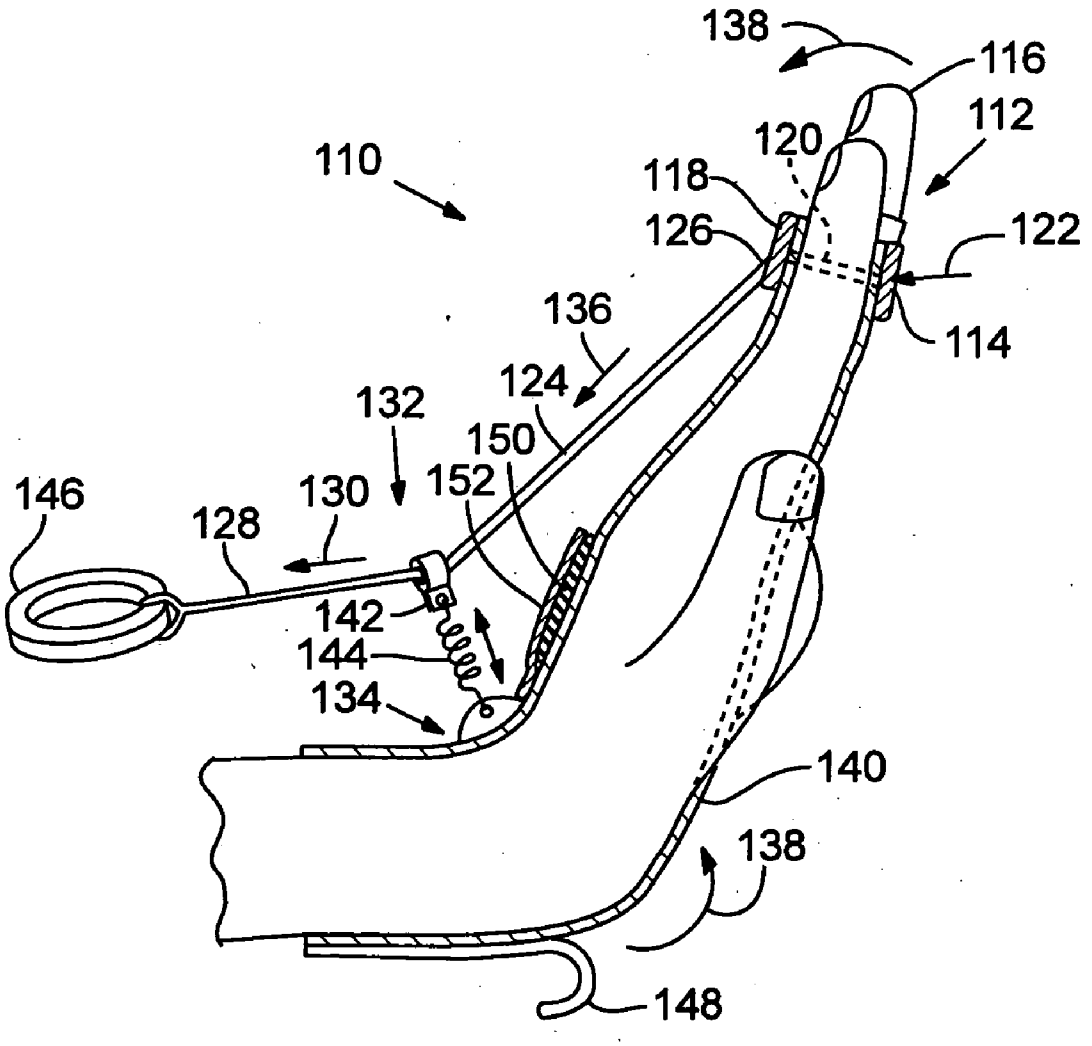
Publication Classification

(51) **Int. Cl.**
A63B 23/14 (2006.01)
A63B 23/16 (2006.01)
A63B 21/02 (2006.01)

(52) **U.S. Cl.** **482/46**; 482/124; 482/49

(57) **ABSTRACT**

A therapy device includes a hand engaging element configured to engage with a hand, and configured to at least partially distribute a force. At least one pulling cord having a first end is configured to be connected to the hand engaging element, and having a second end which is configured to be pulled. A force redirecting element is configured to be connected to a back of the hand or a back of a wrist, and is configured to redirect a pulling force exerted on the second end. The pulling force directed to be able to extend the hand.



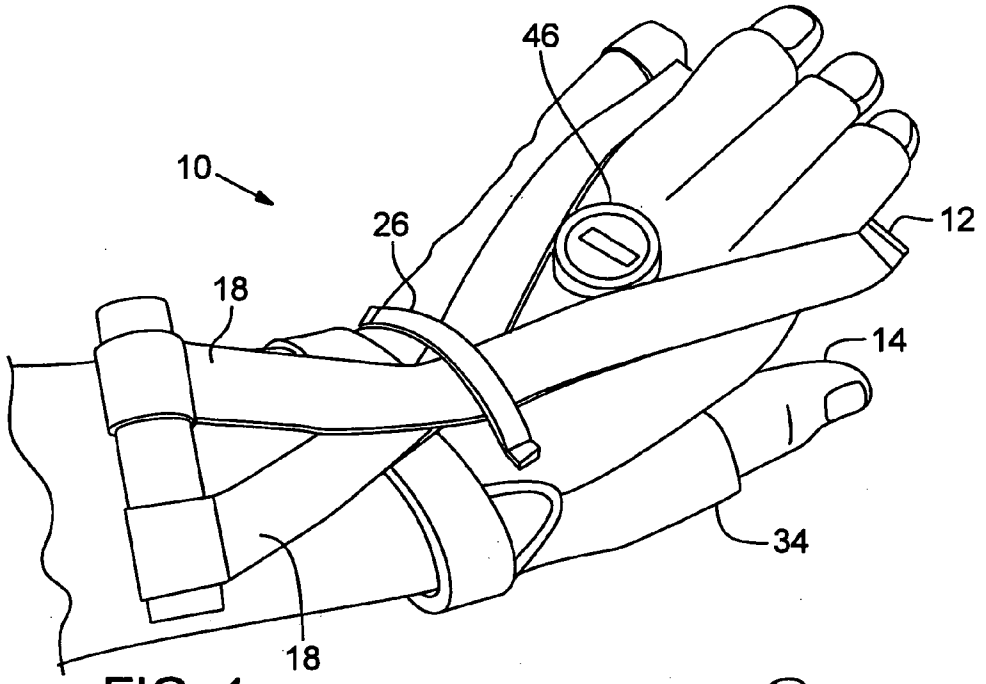

46
10
26
12
18
14
34
18

FIG. 1

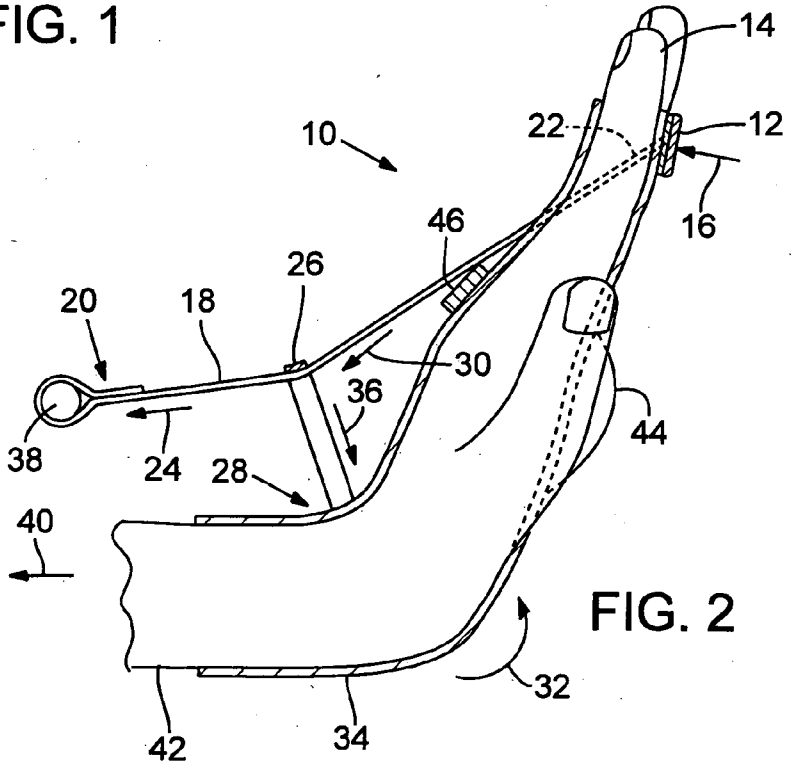

14
22
10
12
16
46
26
20
18
30
36
44
38
24
28
40
32
42
34

FIG. 2

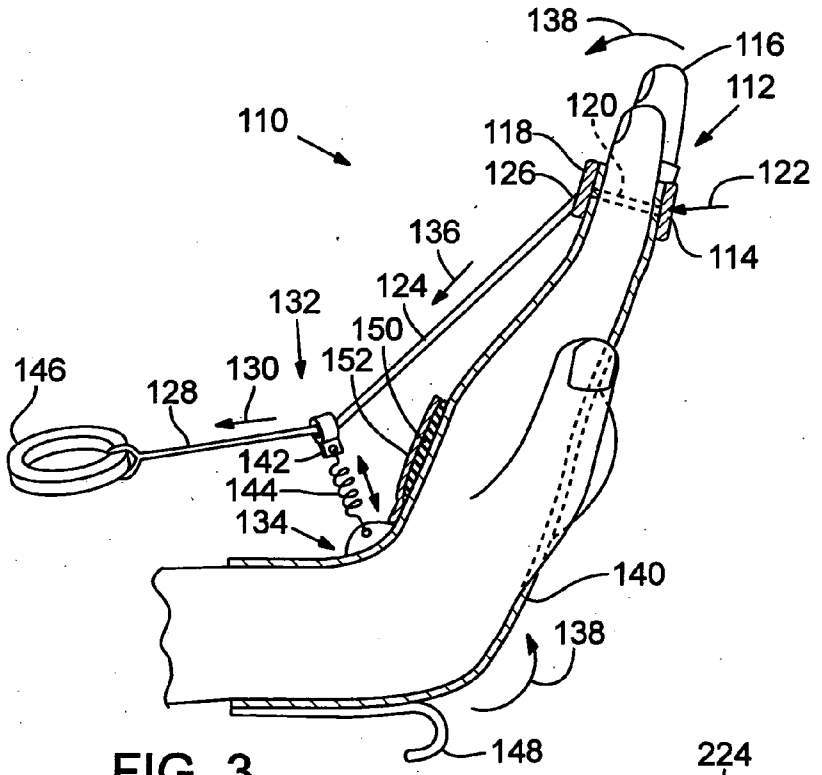

138
116
112
110
120
118
126
122
136
114
124
132
150
146
130
152
128
142
144
134
140
138
148

FIG. 3

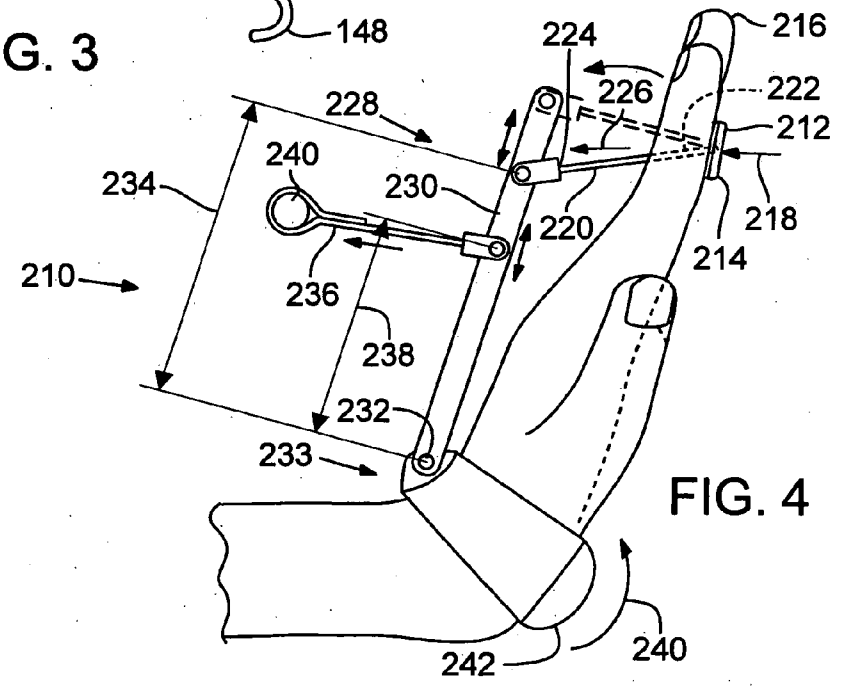

224
216
228
226
222
212
240
234
230
220
218
214
210
236
238
232
233
242
240

FIG. 4

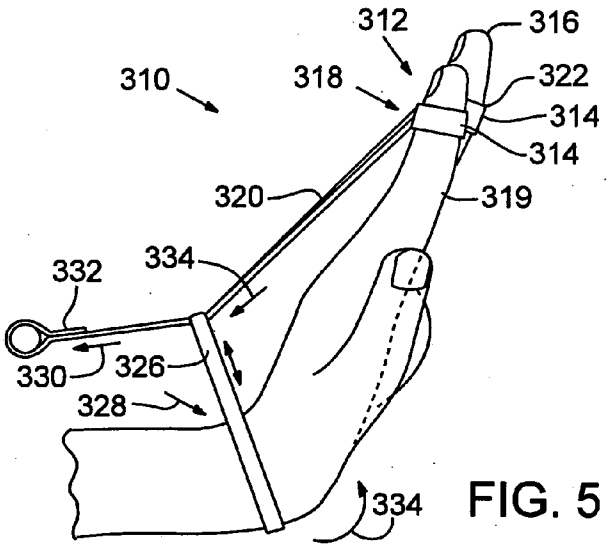

312
316
310
318
322
314
314
320
319
332
334
330
326
328
334

FIG. 5

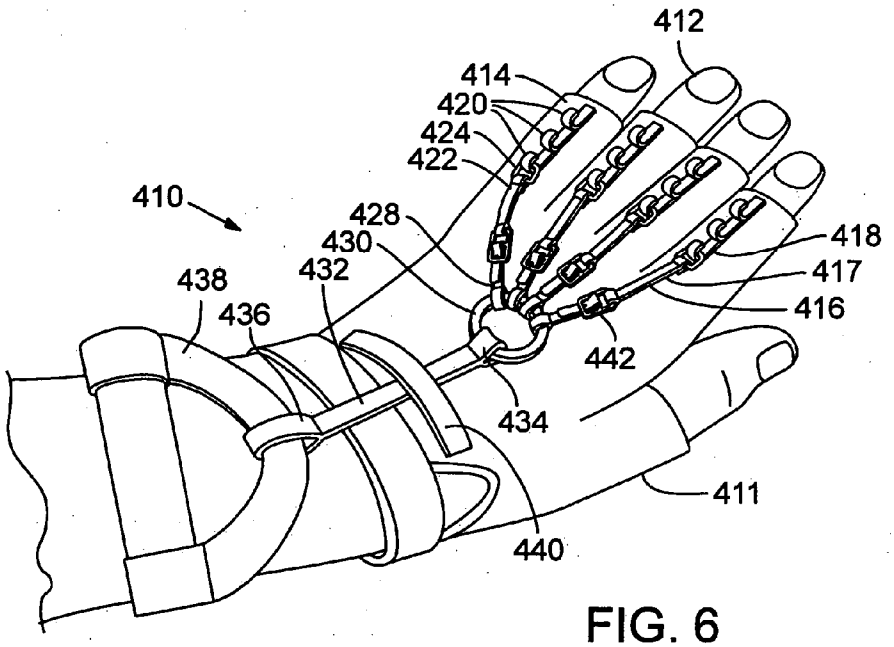

412
414
420
424
422
410
428
430
418
432
417
438
436
416
442
434
411
440

FIG. 6

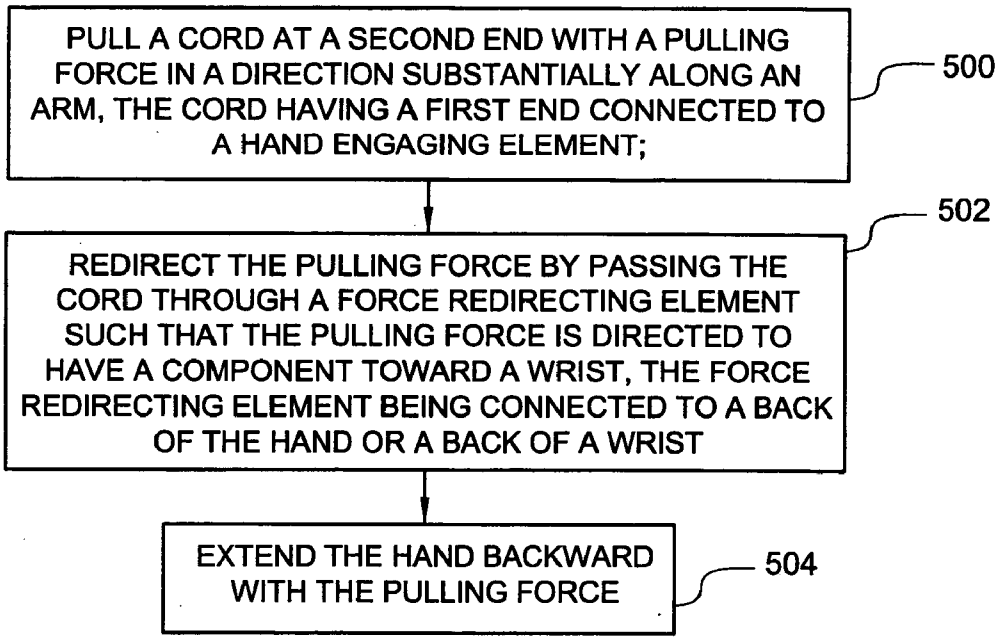

PULL A CORD AT A SECOND END WITH A PULLING FORCE IN A DIRECTION SUBSTANTIALLY ALONG AN ARM, THE CORD HAVING A FIRST END CONNECTED TO A HAND ENGAGING ELEMENT;
500
REDIRECT THE PULLING FORCE BY PASSING THE CORD THROUGH A FORCE REDIRECTING ELEMENT SUCH THAT THE PULLING FORCE IS DIRECTED TO HAVE A COMPONENT TOWARD A WRIST, THE FORCE REDIRECTING ELEMENT BEING CONNECTED TO A BACK OF THE HAND OR A BACK OF A WRIST
502
EXTEND THE HAND BACKWARD WITH THE PULLING FORCE
504

FIG. 7

HAND THERAPY DEVICE

TECHNICAL FIELD

[0001] Embodiments of the present invention relate generally to devices to treat, prevent, or alleviate problems with hands, wrists, and forearms, and symptoms of Carpal Tunnel Syndrome (CTS), and more particularly to a device and method to extend the hand backward to exercise and stretch, muscles, tendons, and ligaments to aid in relief and recovery and prevention of problems of the hands, wrists, and forearms and symptoms of CTS.

BACKGROUND

[0002] Repetitive Strain Injury (RSI) to the hands and arms may result from various repetitive physical movements including movements made doing, for example, assembly-line work, playing a musical instrument, or using a computer keyboard and computer mouse. Such injuries can be serious and painful and may indicate one or more serious conditions that may be preventable and treatable. RSI may cause damage to tendons, nerves, muscles, and other soft tissues.

[0003] Long periods of repetitive physical movement may create cumulative damage to the body, sometimes described as Cumulative Trauma Disorder. Lack of adequate rest, infrequent rests, and improper warming up of hands and arms before undergoing movements, such as those described, may cause and exasperate the injuries and conditions. Carpal Tunnel Syndrome (CTS) may result. Other injuries may also occur, included but not limited to: Tendinitis, Bursitis, Tenosynovitis/DeQuervain's Syndrome, Tendinosis, Thoracic Outlet Syndrome, Trigger Finger/Thumb, Myofascial Pain Syndrome, Cubital Tunnel Syndrome, other related conditions.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] Embodiments of the present invention will be readily understood by the following detailed description in conjunction with the accompanying drawings. To facilitate this description, like reference numerals designate like structural elements. Embodiments of the invention are illustrated by way of example and not by way of limitation in the figures of the accompanying drawings.

[0005] FIG. **1** is a perspective view illustrating one embodiment of the present invention;

[0006] FIG. **2** is a side view illustrating one embodiment of the present invention;

[0007] FIG. **3** is a side view illustrating another embodiment of the present invention;

[0008] FIG. **4** is a side view illustrating another embodiment of the present invention;

[0009] FIG. **5** is a side view illustrating another embodiment of the present invention;

[0010] FIG. **6** is a perspective view illustrating another embodiment of the present invention; and

[0011] FIG. **7** is a flow diagram illustrating a method in accordance with one embodiment of the present invention.

DETAILED DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS OF THE INVENTION

[0012] In the following detailed description, reference is made to the accompanying drawings which form a part hereof wherein like numerals designate like parts throughout, and in which is shown by way of illustration embodiments in which the invention may be practiced. It is to be understood that other embodiments may be utilized and structural or logical changes may be made in alternate embodiments. Therefore, the following detailed description is not to be taken in a limiting sense, and the scope of embodiments in accordance with the present invention is defined by the appended claims and their equivalents.

[0013] The following description may include terms such as inner, outer, under, between, upward, downward, outward, inward, top, bottom, above, below, and the like. Such terms are used for descriptive purposes only and are not to be construed as limiting in the description or in the appended claims. That is, these terms are terms that are relative only to a point of reference and are not meant to be interpreted as limitations but are, instead, included in the following description to facilitate understanding of the various aspects of the invention.

[0014] The phrase "in one embodiment" is used repeatedly. The phrase generally does not refer to the same embodiment; however, it may. The terms "comprising,""having," and "including" are synonymous, unless the context dictates otherwise.

[0015] One embodiment may provide a therapy device which may be used to stretch, warm up, or exercise muscles, tendons, ligaments, and soft tissues of the hands, including the fingers, wrists, and arms. One embodiment may include a hand engaging element disposed to engage a hand, and a pulling cord disposed to pull the hand engaging element, and may be used to extend the hand of a user. One embodiment may include a force redirecting element configured to redirect a pulling force. One embodiment may include a timer, a clock, or an alarm that may be used as a reminder to a user to use the device. One embodiment may include a stiffening device positioned on the back of the hand which may aid in the feel and mechanics of extending the hand backward. One embodiment may include interlinking devices to enable a user to wear one device on each hand and to extend a hand configured with a first device by pulling a cord attached to a second device. In one embodiment pulling cords are configured to pull a hand from a location above the third knuckle (as counted from the fingertip).

[0016] FIG. **1** is a perspective view partially in cross-section, and FIG. **2** is a side view illustrating one embodiment of the present invention. A therapy device **10** may comprise a hand engaging element **12** which may be configured to engage with, and/or connect to, a hand **14**, and may be configured to at least partially distribute a force which may be illustrated with an arrow **16**. At least one pulling cord **18**, has a first end **20** which may be configured to be connected to the hand engaging element **12**, and has a second end **22** which may be configured to be pulled as may be illustrated with an arrow **24**. A force redirecting element **26** may be configured to be connected to a back of the hand **14** or a back of a wrist **28** as illustrated in this described embodiment, and may be configured to redirect the pulling force exerted on the second end **22**. The redirected pulling force may be illustrated with an arrow **30**, and may be directed to be able to extend the hand **14** in direction **32**.

[0017] In one embodiment the therapy device may include a fabric **34** configured to fit on a hand **14**, the hand engaging

element and the force redirecting element may be connected to the fabric. In one embodiment the fabric **34** may be configured to fit over the hand **14** like a glove or a mitten.

[**0018**] One embodiment of the invention may include a force redirecting element **26** which may be a loop made from a resilient material, the at least one cord **18** may be configured to pass through the loop which may be configured to stretch as the at least one cord is pulled, or the hand is extended, or both. The force redirecting element **26** may be configured to pull with a biasing force **36** toward the back of the hand, or wrist **28**. In one embodiment the force redirecting element **26** may be made from a non-resilient material.

[**0019**] The second end **22** of the pulling cord **18** may be connected to a handle **38**. The handle **38** may be, for example, a rigid cylinder disposed to be grasped in a hand opposite the hand the therapy device is engaged with. The pulling cord may be configured to be pulled in a direction **40** along a forearm **42**.

[**0020**] The hand engaging element **12** may be, for example, an elongate board. In one embodiment the hand engaging element may be configured to be selectively connected to, and removed from, the fabric such that the pulling force may be selectively directed to different areas of the hand. In one embodiment, the fingers and the hand engaging element may have mating sides of a loop and hook arrangement, for example with Velcro™, enabling adjustment. In one embodiment adjustment may be made possible with snaps.

[**0021**] In one embodiment the at least one pulling cord may include two or more pulling cords **18**, for example two pulling cords **18** as illustrated in FIG. **1** connected to the hand engaging element **12** at two spaced apart locations. The two cords **18** may be connected to opposite ends of the elongate hand engaging element **12** and may pass through the force redirecting element **26** and be arranged to cross over one another before being attached to the handle by, for example, a loop in the pulling cords **18**.

[**0022**] In one embodiment the therapy device **10** may include an object **44** configured to be squeezed by the hand when contracted which may provide exercise for the hand, and in conjunction with the stretching therapy, provided by the pulling cords **18**, may help provide a full range of motion. A timer, for example, a clock **46** which may have an alarm that may be used as a reminder to a user to use the device. The clock **46** may be affixed to the fabric **34**, or it may be removably attachable by, for example, with snaps or a Velcro™ connection.

[**0023**] FIG. **3** is a side view illustrating another embodiment of the present invention. A therapy device **110** may comprise a hand engaging element **112** which may include a first elongate board **114** configured to be secured at one side of the fingers of a hand **116** and a second elongate board **118** configured to be secured to an opposite side of the fingers. Connections **120** may be disposed to pass between the fingers and configured to connect the first elongate board **114** with the second elongate board **118**. The hand engaging element **112** may be configured to engage with, and/or connect to the hand **116**, and may be configured to at least partially distribute a force which may be illustrated with an arrow **122**. At least one pulling cord **124** has a first end **126** which may be configured to be connected to the hand engaging element **112**, and has a second end **128** which may be configured to be pulled as may be illustrated with an arrow **130**. A force redirecting element **132** may be configured to be connected to a back of the hand **116** or a back of a wrist **134**, and may be configured to redirect the pulling force exerted on the second end **128** as illustrated with an arrow **136**, and may be directed to be able to extend the hand **116** in direction **138**.

[**0024**] The therapy device **110** may include a fabric **140** configured to fit on the hand **116**, the hand engaging element **112** and the force redirecting element **132** being connected to the fabric **140**. In one embodiment the fabric **140** may be configured to fit over the hand **116** like a glove or a mitten.

[**0025**] The force redirecting element **132** may include a ring **142** connected to the fabric **140** with a resilient connection, for example, a spring **144**. The at least one pulling cord **124** may be configured to pass through the ring **142**.

[**0026**] The resilient connection may include a resiliency which is adjustable. For example, the spring **144** may be replaceable with another spring with a different spring constant, or one or more additional springs may be added. In one embodiment, the resiliency may be adjusted by changing a distance between the ring **142** and the spring **144** by, for example, with a threaded engagement. In one embodiment, various resilient bands may be used.

[**0027**] A pulling ring **146** disposed to be grasped in a hand opposite the hand the therapy device may be engaged with, or pulled by another person such as a therapist. In one embodiment, the therapy device **110** may include an interlocking element disposed to be attached to a similarly configured therapy device arranged on an opposite hand such that the pulling cord **128** of the first device **110** may be pulled by moving an interlocked other device. For example, in one embodiment, as shown in FIG. **3** a hook **148** may be attached to a bottom of the device which may fit into the pulling ring **146** of a similar therapy device **110**. Such an interlockable arrangement may be useful in cases where the dexterity on one or both hands is compromised and grasping is difficult, or impossible. One embodiment may include a stiffening device **150** positioned on the back of the hand which may aide in the feel and mechanics of tilting and/or extending the hand backward, which may be housed in, for example, a pocket **152**.

[**0028**] FIG. **4** is a side view illustrating another embodiment of the present invention. A therapy device **210** may comprise a hand engaging element **212** which may include an elongate board **214** which may be configured to engage with, and/or connect to a hand **216**, and may be configured to at least partially distribute a force which may be illustrated with an arrow **218**. At least one pulling cord **220** has a first end **222** which may be configured to be connected to the hand engaging element **212**, and has a second end **224** which may be configured to be pulled as may be illustrated with an arrow **226**.

[**0029**] A force redirecting element **228** may include a lever arm **230** configured to pivot about an axis **232** at, or near, the back of the wrist **233**, the second end **224** of the at least one pulling cord **220** may be configured to be connected to the lever arm **230** a first distance **234** from the axis **232**. The lever arm **230** may be configured to be pulled on

by a second cord **236** connected to the lever arm **230** at a second distance **238**. The second cord may be connected to a handle **240**. One or both of the first distance **234**, and the second distance **238**, may be adjustable by, for example, providing a number of different connections on the pivot arm, or providing connections on the pivot arm configured to adjustably move along the pivot arm. The first distance **234** may be configured to be greater than, or less than, the second distance **238**. In one embodiment a gauge may be included to indicate to a user how hard the cord is being pulled which may be disposed to indicate whether or not the pulling force is within a recommended range. In one embodiment, the lever arm **230** may be grabbed directly with an opposite hand, or by another person, such as a therapist, and pulled back in order to extend the hand of the wearer in the direction **240**.

[**0030**] In one embodiment a support **242** may be provided support configured to support the hand at, or near, the wrist while typing or mousing.

[**0031**] FIG. **5** is a side view illustrating another embodiment of the present invention. A therapy device **310** may comprise a hand engaging element **312** which may include one or more finger engaging elements, for example, rings **314** configured to fit on one or more fingers **316** each connected to a first end **318** of at least one pulling cord **320**. For example, as shown in the embodiment illustrated, four rings **314** may be fitted on each of four fingers **316** of a hand **322**. Four pulling cords **320** may be connected to each of the four rings **314**. The four pulling cords **320** may be disposed to pass through a force redirecting element **326** which may be configured to be connected at, or near, a back of a wrist **328** as illustrated in this described embodiment, and may be configured to redirect a pulling force **330** exerted on a second end **332** of each of the pulling cords. In one embodiment each of four cords **320** may be connected to a single additional cord, or to a handle, configured to be pulled. The redirected pulling force may be illustrated with an arrow **334**, and may be directed to be able to extend the hand **319** in direction **334**.

[**0032**] FIG. **6** is a perspective view illustrating another embodiment of the present invention. A therapy device **410** may include a fabric **411** configured to be fitted on a hand **412**. The fabric **411** may be a resilient material, for example, elastic. A hand engaging element may be in the form of reinforced fingers **414**, for example a non-resilient fabric which may be added to, or made integral with, the fabric **411** and which may be made from a sturdy material. A first pulling cord **416** may be configured to be connected at a first end **417** thereof to the respective four reinforced fingers **414** with a connection **418** which may be adjustable. The connection **418** may include one or more hooks **420** attached to the reinforced fingers **414**, which may be connectable with mating ends on the first ends **417** of the first pulling cords **416**. Each mating end may include a catch **424** arranged to attach to the hooks **420**. Each of the catches **424** may be removably attachable to the corresponding hooks **420** on each of the respective fingers **414**, and may be left unconnected, or connected to other hooks that may be located higher up or lower down on the fingers. Each of the first pulling cords **416** may be joined at a junction, for example, they may be connected at a second end **428** to a ring **430**. A second pulling cord **432** may be connected to an opposite side of the ring **430** at a first end **434** thereof. A second end **436** of the second pulling cord **432** may be configured to be connected to a handle **438**. A force redirecting element **440** may be attached to the fabric **411** of the therapy device **410**. The second pulling cord **432** may be arranged to pass underneath the force redirecting element **440**. A number of adjusting elements **442** may be arranged on each of the first pulling cords **416** to adjust the length thereof.

[**0033**] In one embodiment finger cots may be disposed to fit over the tips of the fingers and may be disposed to have pulling cords connected to them.

[**0034**] FIG. **7** is a flow diagram illustrating a method in accordance with one embodiment of the present invention. The method includes:

pulling a cord at a second end with a pulling force in a direction substantially along an arm, the cord having a first end connected to a hand engaging element, **500**;

[**0035**] redirecting the pulling force by passing the cord through a force redirecting element such that the pulling force is directed to have a component toward a wrist, the force redirecting element being connected to a back of the hand or a back of a wrist, **502**; and

extending the hand backward with the pulling force, **504**.

[**0036**] Although certain embodiments have been illustrated and described herein for purposes of description of the preferred embodiment, it will be appreciated by those of ordinary skill in the art that a wide variety of alternate and/or equivalent embodiments or implementations calculated to achieve the same purposes may be substituted for the embodiments shown and described. Those with skill in the art will readily appreciate that embodiments in accordance with the present invention may be implemented in a very wide variety of ways. This application is intended to cover any adaptations or variations of the embodiments discussed herein. Therefore, it is manifestly intended that embodiments in accordance with the present invention be limited only by the claims and the equivalents thereof.

What is claimed is:

1. A hand therapy device comprising:

a hand engaging element configured to engage with a hand, and configured to at least partially distribute a force;

at least one pulling member having a first end configured to be connected to the hand engaging element, and having a second end configured to be pulled; and

a force redirecting element configured to be connected to a back of the hand or a back of a wrist, and configured to redirect a pulling force exerted on the second end the pulling force directed to be able to extend the hand.

2. The hand therapy device of claim 1 further comprising a fabric configured to fit on a hand, the hand engaging element and the force redirecting element configured to be connected to the fabric.

3. The hand therapy device of claim 2 wherein the at least one pulling member is configured to be selectively moved to engage with the hand at different locations.

4. The hand therapy device of claim 3 wherein the different locations are located on the back of each of the fingers.

5. The hand therapy device of claim 1 wherein the hand engaging element is one selected from the group consisting of:

an elongate board;

a first elongate board configured to be secured at one side of the fingers of the hand and a second elongate board configured to be secured to an opposite side of the fingers and configured to be connected to the first elongate board;

one or more rings configured to fit on one or more fingers each connected to the first end of the at least one pulling member;

a reinforced fabric arranged on the fingers connected to the second end of the at least one pulling member; and

one or more attachment members on each of the fingers configured to be selectively attached to the at least one pulling member.

6. The hand therapy device of claim 1 wherein the at least one pulling member includes two cords connected to the hand engaging element at two spaced apart locations.

7. The hand therapy device of claim 1 wherein the force redirecting element is one selected from the group consisting of:

a loop made from a resilient material configured to stretch as the at least one pulling member is pulled, or the hand is extended, or both;

a lever arm configured to pivot about an axis near the back of the wrist, the at least one pulling member configured to be connected to the lever arm a distance from the axis;

a ring connected to the fabric with a resilient connection the at least one pulling member being configured to pass through the ring; and

a ring connected to the fabric with a non-resilient connection, the at least one pulling member being configured to pass through the ring.

8. The hand therapy device of claim 1 wherein the pulling member is configured to be pulled in a direction sufficiently along a forearm, and at least a component of the pulling force is directed toward the forearm.

9. The hand therapy device of claim 1 further comprising a handle connected to the second end of the pulling member, the handle being one from the group consisting of:

a rigid cylinder disposed to be grasped in a hand opposite the hand the therapy device is engaged with;

a ring disposed to be grasped in a hand opposite the hand the therapy device is engaged with; and

an interlocking element disposed to be attached to a similarly configured therapy device arranged on an opposite hand such that each hand may be extended alternately.

10. The hand therapy device of claim 2 further comprising a rigid member configured to be positioned at the back of a hand to provide rigidity to the fabric at the back of the hand.

11. The hand therapy device of claim 1 further comprising a timing device configured to be connected to the fabric and configured to remind a user of the therapy device to effect an extension of the hand.

12. The hand therapy device of claim 1 further comprising an object configured to be squeezed by the hand when contracted.

13. The hand therapy device of claim 1 wherein the hand engaging element is one or more connections on each finger of the hand, the at least one pulling member is a pulling member configured to be selectively connected to each of the one or more connections.

14. The hand therapy device of claim 13 wherein each of the at least one pulling members is joined at a junction, and configured to be pulled by the pulling force via the junction.

15. The hand therapy device of claim 14 wherein the junction is a ring, the ring is connected to a second pulling member configured to be pulled

16. A therapy device for a hand comprising:

a hand engaging element connected to the fingers above the third knuckle;

at least one pulling cord connected to the hand engaging element disposed to be connected to the hand engaging element at first end and disposed to be pulled at a second end.

17. A method comprising:

pulling a cord at a second end with a pulling force in a direction substantially along an arm, the cord having a first end connected to a hand engaging element;

redirecting the pulling force by passing the cord through a force redirecting element such that the pulling force is directed to have a component toward a wrist, the force redirecting element being connected to a back of the hand or a back of a wrist; and

extending the hand backward with the pulling force.

18. An apparatus comprising:

a hand enveloping fabric sized and shaped to be worn on a hand;

a hand engaging element sufficiently rigid to distribute a pulling force disposed to be connected to the fabric; and

at least one pulling cord attached to the hand engaging element.

19. A therapy device comprising:

a fabric configured to at least partially enclose a hand;

a hand engaging element configured to engage with the hand, and configured to at least partially distribute a force, and configured to be connected to the fabric;

at least one pulling cord having a first end configured to be connected to the hand engaging element, and having a second end configured to be pulled;

a cord directing element configured to be connected to the fabric, and configured to be positioned at one of a back of the hand or a back of the wrist, and configured to redirect a pulling force exerted on the second end.

* * * * *