



US 2011006553A1

(19) **United States**  
(12) **Patent Application Publication**  
**Cersonsky**

(10) **Pub. No.: US 2011/006553 A1**  
(43) **Pub. Date: Mar. 17, 2011**

(54) **BODY MOUNTED MUSCULAR BRACE**

**Publication Classification**

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(51) **Int. Cl. A63B 21/012** (2006.01)

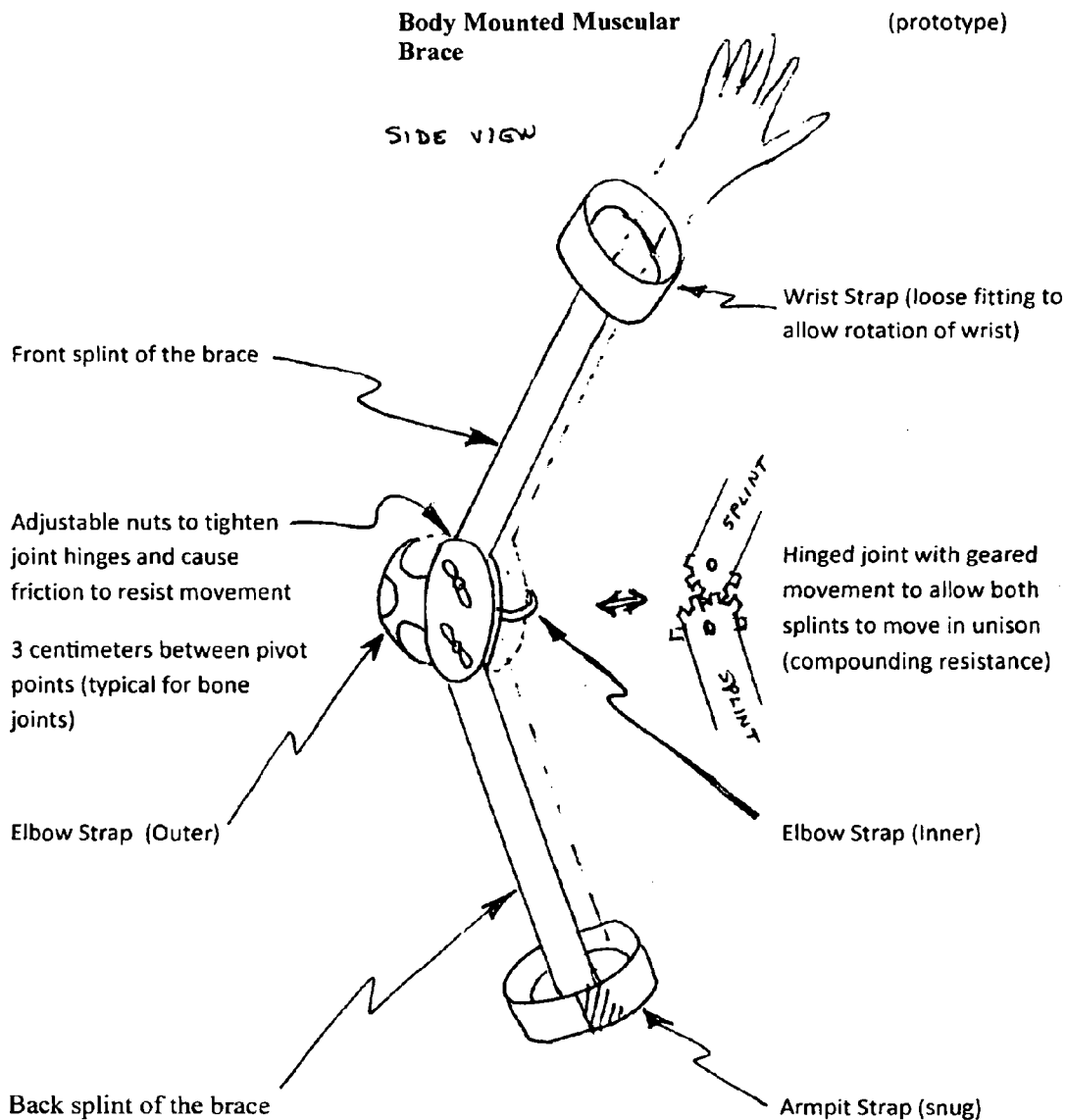
(52) **U.S. Cl. 482/114**

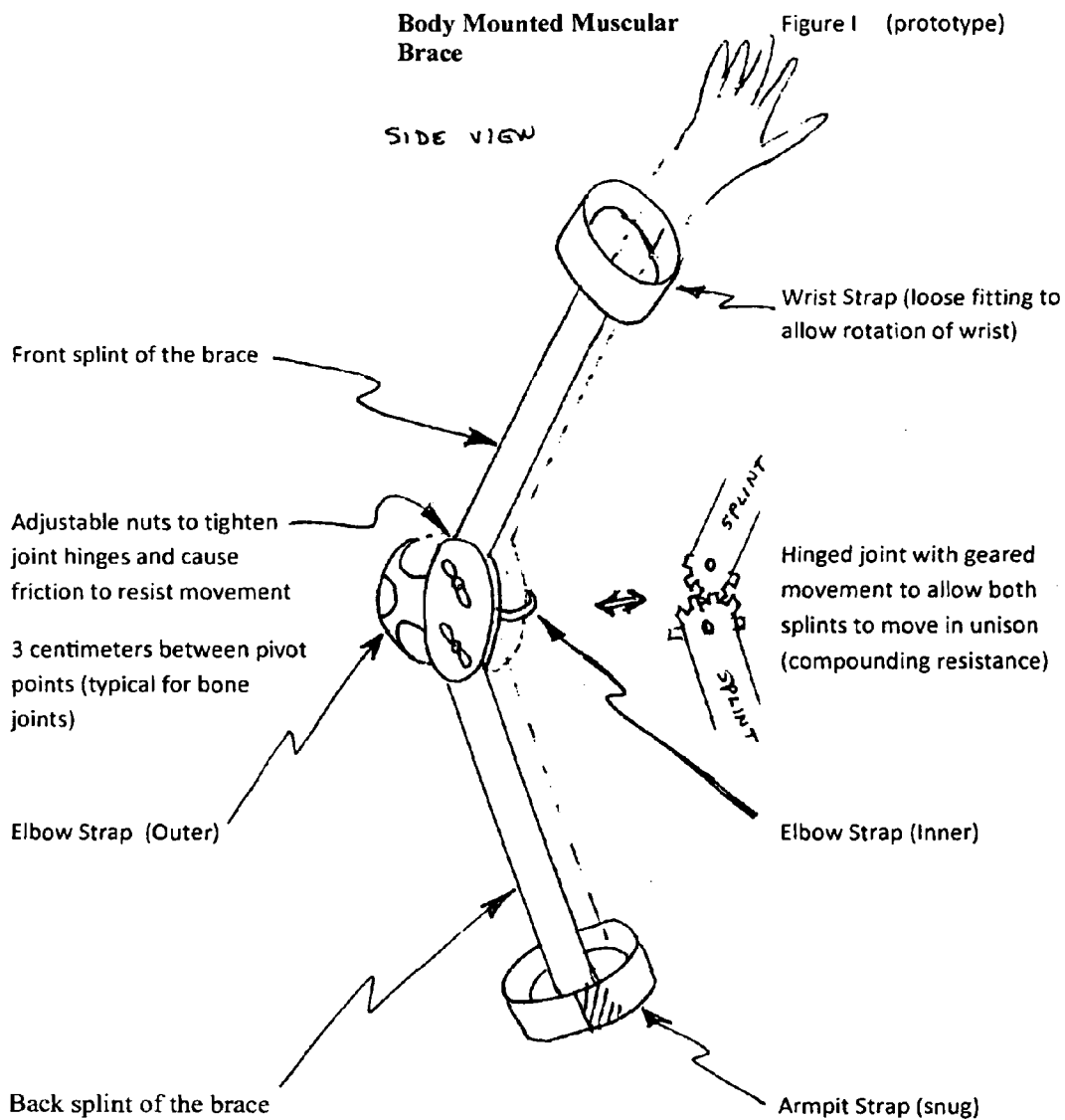
(21) Appl. No.: **12/924,050**

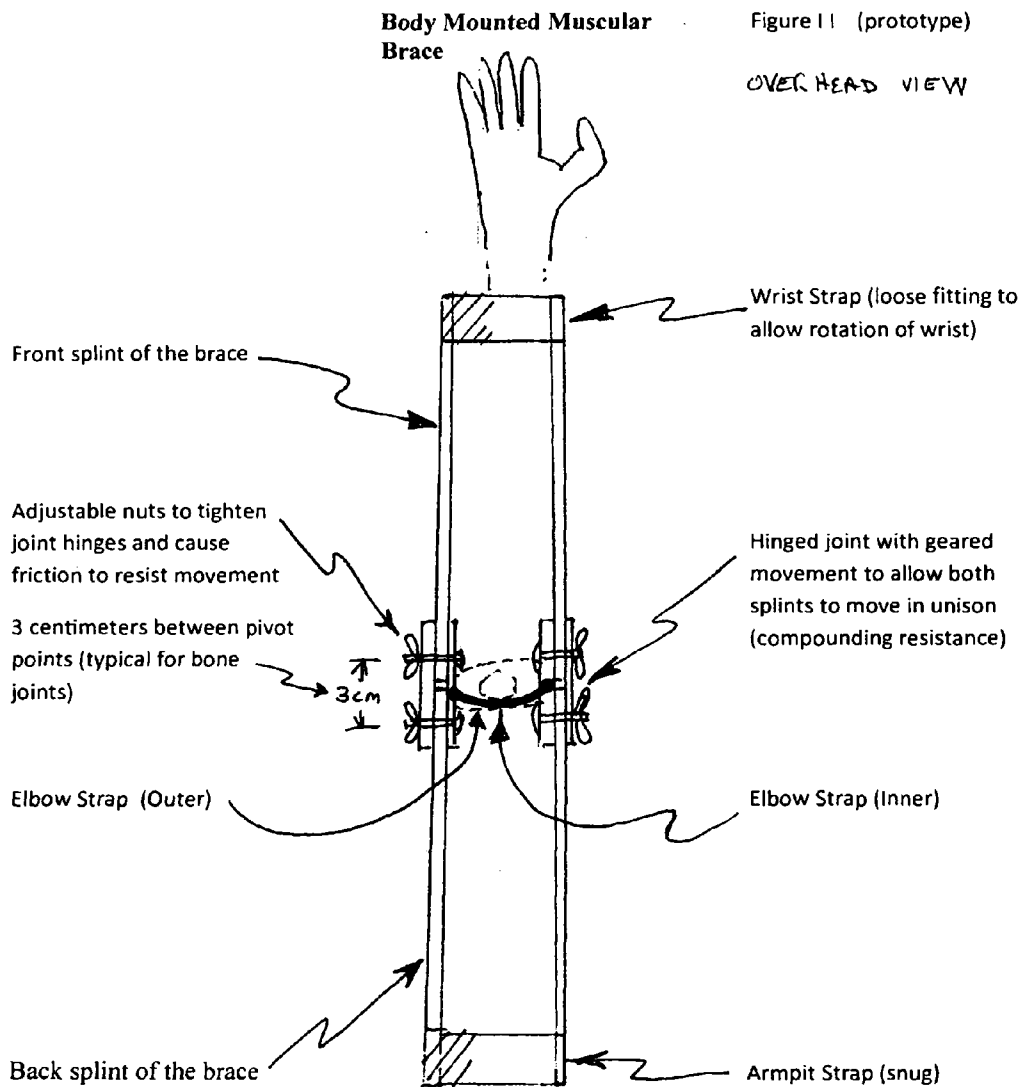
(57) **ABSTRACT**

(22) Filed: **Mar. 23, 2009**

A portable, easily body-mounted, light-weight hinged brace to build muscle groups by adding adjustable resistance at the joint







**BODY MOUNTED MUSCULAR BRACE**

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] None

FEDERALLY SPONSORED RESEARCH

[0002] None

SEQUENCE LISTING OR PROGRAM

[0003] None

BACKGROUND—FIELD

Motivation:

[0004] With the proliferation of exercise equipment and workout facilities, including home equipment, and the shortening of leisure time for typical Americans, it became evident that it would be convenient and popular to have easy inexpensive personal workout equipment that could be implemented and used even while at work.

Object:

[0005] It is an object of the present embodiment to provide an easy to use and effective method of body building, which is adjustable, affordable, light weight, portable, safe, effective, expedient, and unobtrusive.

Design:

[0006] Based on the isometric principles of muscle building using resistance to muscular movement, similar to principles used in water (pool) exercise routines, the idea was to impede the normal movement of muscles, so that normal daily movement would build and tone muscles.

[0007] The embodiment therefore is fairly simple in concept, but somewhat difficult to implement since it needs to be mounted to the human form, which varies greatly and is not static. This embodiment could be oriented at any joint in the body, but with different mounting.

[0008] The preferred embodiment would fit flush to the body as a molded partial exoskeleton frame, which would be attractive and may have certain aesthetic design elements to appeal to the target market group, such as artwork, or body sculpting form. It would be easy to wear and remove without damage or alteration to clothing and could be stored and adjusted easily. The exoskeleton may also offer some side benefit as armor.

[0009] Since the elbow has a limited range of motion, it is the simplest application. Therefore, it was used to build the prototype. The bicep/tricep area is also a focal point of body building and beauty, increasing the potential for public acceptance.

[0010] The prototype therefore concentrates on the bicep and tricep muscle groups. The devise mounts to the arm using elastic and Velcro bindings, and is a brace comprised of splints that dual hinges at the elbow.

[0011] This hinge has adjustable resistance. The rough prototype uses wing-nuts to tighten resistance, but it is the intention to replace these with flush nuts, that could be easily adjusted, but would not hook, snag, or injure.

[0012] Friction resistance is inexpensive and therefore affordable to implement and manufacture, yet offers a rea-

sonably adjustable method of changing the resistance for individual use. The prototype is adjustable at the hinge by screwing down wing-nuts on the hinge, to resist motion.

[0013] The dual pivot point of the hinge is geared together so that both splint arms move in unison. This allows the combining of the resistance at each hinge of both pivot points.

[0014] We could also use a dashpot design, where movement of the hinge forces fluid through an adjustable restricted passage, causing resistance. Although the dashpot design is much more expensive, we are working on designing a less expensive implementation.

[0015] The prototype can be worn under normal clothing, so is unobtrusive.

[0016] The devise has additional desirability because it focuses on several physical problem areas increasing in our ever sedentary population. One is the adipose tissue surrounding the triceps muscle. Because of the long term low resistance (versus short period, low repetition, high load), the device has a quick effect of toning the muscle groups. This, in turn, has the additional benefit of fighting osteoporoses. The preliminary response to the devise is very positive.

[0017] Testing the prototype showed that the body quickly adjusted to the additional resistance of movement, which resulted in noticeable toning, and development of the muscle group. Further testing will be done under controlled conditions to measure and document the impact on the muscle development.

Application:

[0018] Those skilled in the art will readily recognize that the present embodiment can be applied with various modifications, such as but not limited to, various shapes, sizes, materials, including fabric, leather or metal, various colors, fasteners or elements for receiving fasteners, ground surface anchoring methods and components, etc. Uses include exercise systems for any part of the body, even to compensate for a no-gravity environment, without departing from the spirit and scope of the present embodiment. The use also extends beyond exercise into health applications, such as rehabilitation, or use to inhibit spastic or uncontrolled movement, such as in the case of some neurological disorders or diseases. Thus several advantages of one or more aspects of the embodiment are to fulfill a perceived need in light weight, low cost, safe, effective, and expedient means for exercising a group of muscles and building bone mass. This concept, as stated earlier includes other muscle groups and other applications.

BACKGROUND—PRIOR ART

[0019] The common method of strengthening tissue is with either the use of free weights or the use of exercise machines.

[0020] Free weights work against gravity and varying weights, and typically work one muscle group in only one direction at a time. The use of free weights excludes other activities, and typically completely monopolizes the hands. They are not adjustable, without removing or adding additional weights. They cannot be transported easily.

[0021] Exercise machines are not portable, and work only specifically targeted muscular areas, although they are typically adjustable. Machines typically need your full attention, monopolize the hands, are not easily affordable

[0022] Neither of these common methods of exercise offers the versatility of the proposed embodiment.

Patents appearing to have some possible relationship to the proposed embodiment are patented as:

- [0023] 1. Exercise device with single resilient elongate rod and weight selector controller
- [0024] U.S. Pat. No. 7,429,236
- [0025] Dalebout, et al. Sep. 30, 2008

Abstract

[0026] An exercise apparatus with a single resistant rod configured to provide resistance for use in exercise and an electronic weight selector mechanism for use with a resistance rod having a variable resistance system and an electronic selector control. The weight selector control includes a bi-directional control and a plurality of indicia. The bi-directional control allows the user to change the amount of resistance provided by the single resilient elongate rod in combination with the variable resistance system. The plurality of indicia allows the user to monitor the amount and direction of change in resistance while operating the bi-directional control.

[0027] This patent is not body mounted, and is for use with typical plate weights, so has almost no overlap with the proposed devise, and should not affect the patent pending.

- [0028] 2. Curler exerciser
- [0029] U.S. Pat. No. 7,416,520
- [0030] Danowski Aug. 26, 2008

Abstract

[0031] Curler exercise apparatus includes first and second frames pivotally mounted to each other at a pivot junction proximate a user's extremity joint for exercising extremity muscles against the bias of a biasing member coupled between the frames

[0032] Although this patent has some similarities (brace frame and pivot point, which are typical in all braces or splints), it is primarily to exercise the bicep muscle, uses adjustable springs to cause the work, does nothing to work both muscle groups It uses torsion springs, not friction or adjustable dashpots. It also has a handle, which my devise does not, as my devise it designed as to not impair movement of the hand or wrist.

- [0033] 3. Forearm-mounted, adjustable exercise device
- [0034] U.S. Pat. No. 7,303,507
- [0035] Jozsa Dec. 4, 2007

Abstract

[0036] A forearm-mounted exercise device has a framework provided with a weight supporting bar and a handgrip on a first portion of the framework, and a pair of spaced apart forearm braces on a second portion of the framework. A rotary adjustment arrangement is incorporated in the framework for enabling rotational positioning between the first portion of the framework and the second portion of the framework. A forearm brace adjustment arrangement is disposed on the framework for changing the spacing between the forearm braces on the second portion of the framework

[0037] This devise is a forearm-mounted exercise device which has a framework provided with a weight supporting bar and a handgrip on a first portion of the framework. The proposed embodiment differs as it has no weight added, no handgrip, but relies on either friction resistance built into the

hinges, or an adjustable dashpot system. There is no reliance on weight to generate work, as in this patent.

SUMMARY

[0038] The preferred embodiment includes the reusable frame which easily affixes to the body on sides of a body joint, articulates around a geared hinge, which can be adjusted for resistance to impede motion in all directions. It can be worn, adjusted, and stored easily. It is lightweight, intended to be manufactured from strong plastic, with metal hinges tightened by metal screw down adjusters.

DRAWINGS—FIGURES

[0039] FIG. 1 shows a possible configuration of the preferred embodiment from a side view, showing one-half of the devise.

[0040] FIG. 2 shows a possible configuration of the preferred embodiment from an overhead perspective of two braces being used in unison.

DETAILED DESCRIPTION

[0041] FIGS. 1 and 2 show the different perspectives of the devise as designed for the bicep tricep use. The braces are strapped down in such a manner as to hold the splints in place and maintain the relative shape of the braces without altering or damaging clothing, without impeding range of motion, or cutting off circulation.

[0042] The brace should be made primarily from plastic or metal, with a soft breathable interior liner, hinged with metal adjustable screw joint (or a rotational dashpot). Attention should be given to the weight, strength, color, durability and porosity of the material used to manufacture the braces. The braces should further incorporate a design that would be aesthetically appealing to the user.

[0043] The strapping device, which anchors the brace to the body, should also be made primarily from a material that is selected from the group consisting essentially of fabric, plastic, leather, or Velcro, and/or a combination thereof (most probably in the form of a strap, rope, cable or other commonly known prior art used for attaching one element to another). In addition, the strapping device may include ways of adjusting length and/or tension. It may be appropriate to use a strapping device that incorporates elasticity attributes (such as at the joint). The strapping device should be of sufficient strength to secure and maintain the relative orientation of the preferred embodiment. The strapping device should include a mechanism such as a clasp or hook or Velcro at the end that is attaching to the brace and then at the other end of the brace.

Prototype:

[0044] The prototype (see FIG. I and II) has three straps binding two pairs of splints, mounted on opposite sides of the joint, each side with a central hinge:

[0045] The Wrist Strap: The wrist strap will be mostly constructed of molded plastic (with a soft smooth interior and connected to the brace), giving it an open hoop structure, fastened across top. It does not bind the wrist, but allows the wrist to twist within the hoop.

[0046] The Elbow Strap: The elbow strap is attached to the hinge. The inner elbow strap is not elastic (this is to restrain distortion of the brace during movement), but adjustable initially to fit the body size without being too tight and cutting off circulation. The outer elbow strap is

elastic. The outer elbow strap fits around the elbow bone to align the devise and hold it in place.

**[0047]** The Armpit Strap: This strap is molded to the brace, adjustable to hold the brace on opposite sides of the arm, and fastened across the top of the arm. The adjustment can be done by inserting the inner splint into a pocket on the strap, or having it adhere to a Velcro on the strap and the end of the back split.

**[0048]** Hinges: Located at the joint, will be dual hinges, geared together to move in unison (for purpose of doubling the friction of the two friction hinges). The hinge consists, in the case of the elbow hinge, of two hinges, approximately 3 centimeters apart (this is measured as is normal in the human body). The gearing may be of any dimension, as long as it causes the two splits of the brace to move in unison.

**[0049]** Splints: these are the arms extending out from the central hinge. A pair of these (forearm and upper arm) extending from each side of the joint.

Operation:

**[0050]** To apply the embodiment, the following will demonstrate how to use the prototype, designed for the forearm.

**[0051]** Remove from storage, open the brace. Insert the forearm into the elbow strap. The outer elbow strap fits over the elbow bone, to align the devise. Fastened the armpit strap snugly around and over the upper arm. Fastened the wrist strap around and over the wrist, making sure that the wrist can rotate freely.

**[0052]** To use, just wear the devise during normal activities. Tighten resistance to a comfortable level. It would be preferable to wear two, one on each opposite appendage, as to not cause favoritism toward non-encumbered limbs. For safety reasons, it is advised to remove the devise(s) while operating machinery or sleeping.

**[0053]** To remove the brace, simply detach the wrist and armpit straps, and slide the elbow out from its elastic strap. The brace can then be folded in half for easy storage.

**[0054]** The foregoing is intended to teach and disclose the preferred use of the embodiment.

1. Claim the idea of adding resistance directly to the joint of the body by attaching a resistance brace in order to control, strengthen and/or tone all muscles and bone working that joint.

2. Claim a method providing resistance through the hinges, using either adjustable friction or rotational dashpots.

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