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(54) EXERCISING DEVICE

(71) We, RAINBOW LIFEGARD PRODUCTS, INC., a corporation organized and existing under the laws of the State of California, United States of America, residing at 3242 Meeker Road (P.O. Box 2127), El Monte, California, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

By far the great majority of mechanisms and apparatus provided as physical exercising devices are designed for use by only one person at a time, and also are arranged solely to provide physical exercise at a level required by the particular user. These existing exercising devices provide only very little or no entertainment value. Thus, such devices are used regularly over extended periods of time only by individuals who are dedicated to a physical exercise program. It is common knowledge that persons dedicated to a physical exercise program, based upon the use of existing exercising devices, carry out their exercise program by themselves under solitary conditions apart from others with whom they may be associated in a family or the like.

This invention provides an exercising device comprising a pair of cords of substantially equal length, four handles each connected to a different cord end portion so that each cord end portion is separately holdable in a user's hand, and a shuttle having a straight passage therethrough so that the shuttle is freely slidable to and fro on the cords by the action of pulling apart corresponding end portions of the two cords.

An exercising device as defined is adapted for use by two persons and has high entertainment value. The device is arranged so that each of two users of the device may operate the device at a level proportionate to his own physical strength without impairing the ability of the other user to operate the device at the same time at a different level proportionate to that individual's physical strength. Thus, father and son may

use the exercising device together, and each may use the device in such manner as to obtain significant exercise, as well as entertainment value from the device.

The high entertainment value of the exercise device encourages its use over extended periods of time by many individuals, up to four of whom may use the device at any given time as a group, each participating at his own level without impairing the entertainment and exercising benefits obtained from use of the device by others in the group. The device is so constituted that games may be arranged for its use, such as games of competition between individuals in a group or between groups of users where several exercising devices are available.

The exercising device may be used both indoors and outdoors and, thus, may be used on a year-round basis by all members of a family.

A specific embodiment of this invention will now be described by way of example with reference to the accompanying drawings, wherein:

Fig. 1 is a view of an exercising device according to this invention showing the shuttle in cross-section;

Fig. 2 is an elevation view of the shuttle with the cords passing through it;

Fig. 3 is an enlarged cross-sectional elevation view of one of the two-wear-resistant insert elements which are incorporated in the shuttle shown in Fig. 1; and

Fig. 4 is a perspective view showing one of many possible modes of use of the exercising device.

Referring to the accompanying drawings, an exercising device 10 as shown in Fig. 1, includes a pair of elongate flexible cords 11 and 12 which are of substantially identical length. The exercising device also includes an assembly constituting a shuttle 13. As shown best in Fig. 2, shuttle 13 is defined to resemble a solid of revolution which has a passage 14 formed through it along its axis of symmetry so that the passage passes through the center of mass of the shuttle. A handle element 15 is connected to each

end of each cord. Between the handle elements, cords 11 and 12 pass through the passage in the shuttle so that the cords are loosely contained within the passage.

5 Fig. 4 illustrates the use of exercise device 10 by a man 16 and a woman 17; it will be understood from the following description, however, that the mode of use illustrated in Fig. 4 is only one of the many
10 manners in which exercising device 10 may be used by as many as four people at one time. Referring to Fig. 4, each of the two users of exercising device 10 grasps the handle at one end of cord 12 in one hand
15 and the handle at the adjacent end of cord 11 in the other hand. The users then move apart from each other until cords 11 and 12 are relatively taut between them. To initiate use of the device, the shuttle is moved
20 toward one or the other users until it is positioned closely adjacent the handles grasped in the hands of that person. The person at the other end of the cord holds his hands together, as shown in the case of woman 17 in Fig. 4. The person adjacent whose body
25 the shuttle is disposed then rapidly moves his hands apart while maintaining tension on the cords. This outward movement of the hands propels the shuttle along the cords toward the other person. Because the cords
30 are loosely contained within the shuttle, and the passage through the shuttle is straight, the shuttle slides along the cords toward the person whose hands are held together, and such movement occurs at a rate which is related to the rate at which the other person,
35 such as man 16, actually moves his hands apart. Once the shuttle has commenced its travel along cords 11 and 12 toward the other person, i.e., woman 17, the man brings his hands back together so that, once the shuttle reaches the woman, she may move
40 her hands apart, thereby to propel the shuttle back along the cords to the man. The woman should not move her hands apart until the shuttle reaches the handles in her hands or is within about a foot or so of the handles. Premature outward movement of the handles held by woman 17 before
45 the shuttle reaches her will interrupt the movement of the shuttle and make it difficult to propel the shuttle in the opposite direction back along cords 11 and 12.

50 As noted above, the mode of use of exercising device 10 shown in Fig. 4 is merely but one of many possible modes of use of the present exercise device. For example, either or both of the users of the device may hold their hands together over their
60 heads and move their hands downwardly apart from each other to propel the shuttle to and fro along the cords. Also, the users of the device may face away from each other and rely upon the "feel" of the device as
65 the shuttle moves to and fro along the cords

to ascertain when the particular user should move his hands apart to propel the shuttle.

It is also possible for a user to lie on his back and engage his feet in respective ones of handles 15, and thereby operate the device
70 by his legs rather than his arms. Further, the device may be operated by two people at one or both ends of cords 11 and 12. That is, one person may have control of the handles at one end of the cords of the exercising device, whereas at the other end of
75 the cords each of two people may have control of one of the remaining two handles of the exercising device.

It will be apparent from an examination
80 of Fig. 4 and the preceding description concerning Fig. 4, that the rapid, forceful outward movement of the handles 15 at each end of the exercising devices produces beneficial exercise for the user. Continued regular
85 use of the exercising device in the manner described above produces good muscle tone and development in the arms, chest, back and legs of the user, depending upon the manner in which the exercising device is used
90 by the individual.

Shuttle 13, shown in the drawings, is provided in the exterior form of a solid of revolution, and preferably is ellipsoidal in nature. That is, the outer surfaces of shuttle
95 13 correspond to the surface which is generated by rotation of an ellipse about its major axis. An ellipsoidal configuration of shuttle 13 is preferred since such configuration results in a streamlined shuttle which moves
100 rapidly and efficiently along cords 11 and 12 as the exercising device is operated in the manner described above. It will be apparent, however, that shuttle 13 may be provided in the form of other solids of revolutions, such
105 as spheres or the like, or may be provided in forms not consistent with that of a solid of revolution. It is preferred, however, that the passage through the shuttle through which cords 11 and 12 are passed be arranged so that the axis of the passage intersects and passes through the center of mass
110 of the shuttle. Such a relationship between the axis of the cord passage and the shuttle center of mass means that the shuttle is stable as it moves along the cords and does not wobble and unnecessarily consume the energy imparted to the device by unnecessary interaction between the shuttle and the
115 cords; instead, the shuttle moves swiftly and smoothly along the cords from one user to the other.

Preferably, shuttle 13 has a body 20 which is fabricated in halves 21 and 22 which are geometrically identical to each other. Each
125 half 21, 22 of the body has an outer wall section 23 and a tubular inner wall section 24, the inner and outer wall sections of each half of the shuttle body being joined to each other at mating edges 25 to which both
130

the inner and outer wall sections of each half extend. The inner and outer wall sections of each half of the shuttle body are faired into each other at their opposite ends, as at 26, as shown in Fig. 1. Preferably, halves 21 and 22 of shuttle body 20 are fabricated by injection molding techniques out of low density polyethylene, although the shuttle body may be fabricated of high density polyethylene, or polypropylene, or whatever other material is desired. Where the shuttle body is fabricated of low density polyethylene and has the hollow cross-sectional configuration shown in Fig. 1, the shuttle body is soft and resiliently deformable; this characteristic enables exercising device 10 to be used safely with minimum likelihood of harm to the user whether used indoors or outdoors.

As shown in Fig. 1, the passage 14 longitudinally through shuttle body 13 is defined by the inner surfaces of inner wall sections 24 and is substantially greater in diameter than the diameter of either of cords 11 and 12. An insert element 30 is fixed in passage 14 adjacent each of its ends to provide low-friction, abrasion-resistant co-operation with cords 11 and 12. As shown best in Fig. 3, each insert element is elongated and has a bore 31 formed through its length along an axis 32 of the element. The outer diameter of each insert element along a major portion of its length is sized sufficiently greater than the inner diameter of passage 14 so that the insert elements may be fixed in position within shuttle body by an interference fit with the shuttle body. A circumferential flange 33 is provided around the insert element at one end, as shown in Fig. 3. This flange provides a convenient stop for proper positioning of the insert element in the shuttle body as it is force fitted into passage 14 during fabrication of the exercise device. Also, as shown in Fig. 3, it is preferred that bore 31 be tapered so as to increase slightly in diameter proceeding from that end of the insert opposite from flange 33 toward a flared outlet end 34 of the bore adjacent flange 33. Flare 34 is desired in the configuration of bore 31 to prevent unnecessary wear of cords 11 and 12 as the exercising device is operated, and also to minimize the friction which would be encountered between the insert element and the cords if the bore terminated at a right angle shoulder or the like.

The diameter of the bore at its smaller end is sized to be greater than the sum of the diameters of cords 11 and 12, it being preferred that cords 11 and 12 are of identical diameter. Preferably, the minimum diameter of bore 31 is of the order of about three times larger than the diameter of one of the cords. The passage 14 preferably has a length which is at least ten times greater

than the minimum diameter of the bore 31.

In a presently preferred embodiment of exercising device 10, cords 11 and 12 are provided by $\frac{1}{8}$ inch diameter multi-strand braided nylon cord of the type which is often commonly referred to as parachute cord. Such cord has the beneficial characteristics of being strong, flexible and relatively inelastic. Other cord materials may be used, if desired. Polypropylene cord is less strong and more elastic than nylon, but does have the additional beneficial property of being less abrasive than nylon cord.

It was noted above that insert elements 30 are provided in shuttle 13 to provide abrasion-resistant low-friction bearings for the cords as the shuttle moves back and forth along the cords during use of the device. Preferably, particularly where the cords are fabricated of multi-strand braided nylon, the insert material may advantageously be fabricated of a polycarbonate material such as "LEXAN" resin available from General Electric Company.

Other insert materials may be used however such as polysulfone resins which have high melting temperatures, metals, ceramics such as porcelain, or compression molded materials such as phenolic resins or nylon.

To maximize the entertainment value of exercising device 10, it is desired that shuttle 13 move freely along cords 11 and 12. For this reason, it is preferred, particularly where cords 11 and 12 are fabricated of multi-strand braided nylon, that the cords be at least coated, and preferably impregnated with a material which provides a low coefficient of friction between the cords and insert elements 30. In presently preferred exercising device, the braided nylon cords are impregnated, not merely surface coated, with a wax. It has been found that WARCO 150-A yellow wax, obtainable from E. S. Brown and Company, Los Angeles, may be used to advantage for this purpose. This wax has a melting temperature of about 160 degrees Fahrenheit and maintains its flexibility at temperatures as low as -30 degrees Fahrenheit. Regardless of the particular wax or solid lubricant material used, it is desired that the material have a relatively high melting point in view of the friction generated between the shuttle and the cord as the shuttle is moved rapidly back and forth along the cords.

As shown best in Fig. 1, each handle 15 includes a grip portion 40 which preferably is straight and has substantial thickness so that this portion of the handle may be gripped securely in the hand of a user of the exercise device. An arcuately curved guard portion 41 is connected across the opposite ends of grip portion 40 to impart a substantially D-shaped configuration to the entire handle. The guard portion has a web

element 42 which is smoothly curved in a semi-circular manner between the opposite ends of the grip portion, and which presents a smooth exterior to the outside of the handle. A reinforcing rib 43 is connected to the concave surface of the web and extends along the entire length of the web. The rib lends strength to the guard portion and enables the guard portion of each handle to accommodate the shocks which are imposed to it by the rapidly moving shuttle during use of the exercise device. In a presently preferred exercising device, each handle element 15 is fabricated of injection molded linear polyethylene. This material flexes sufficiently to provide an effective shock absorber in the operation of the exercising device. It should be understood, however, that the nature of the material from which the handles are made is not critical, and that any suitable material may be used, as desired.

As shown in Fig. 1, the end of each cord 11 and 12 is passed through a hole 44 formed through the guard portion of each handle adjacent the midlength of the grip portion of the handle. The end of the cord is secured to the handle by knotting the cord, as at 45, in the space provided in the handle between the grip and guard portions.

The D-shaped configuration of the preferred handles described above adapts the handle for convenient engagement in the hands of the user. Also, this handle configuration accommodates the front portion of the foot of a user of the exercising device so that the device may be used to exercise the leg muscles when used in the manner described above.

To lend aesthetic appeal to the exercising device, the two halves 21 and 22 of shuttle 13 may be fabricated of different colored materials. The handles 15 may be fabricated of an entirely different colored material or may be of the same color as one of the halves of the shuttle.

In the example now be described, each of cords 11 and 12 is defined by a 20 foot length of $\frac{1}{8}$ inch multi-strand braided nylon cord which has been impregnated with the WARCO 150-A yellow wax identified above. The shuttle of this exercising device is of the ellipsoidal form shown in the drawings, is 9 inches long, and has a 5 inch maximum outer diameter. The minimum diameter of the bore 31 through each of the two insert elements 30 provided in the shuttle of this exercising device is $\frac{3}{8}$ inch, and each insert element is 2 inches long; each insert element has an outer diameter of $\frac{7}{8}$ inch along a major portion of its length. The cords of this exercising device are connected to the handle elements in the manner shown in Fig. 1, i.e., as by knotting after passing the cords through the hole formed in the guard portion of the

handle element. This mode of connection of the cords to the handle elements makes it possible for the user of the exercising device to shorten the cords as desired.

It has been found that a 20 foot cord length provides an exercising device suitable for effective entertainment and exercising applications by adults and teenagers.

Other cord lengths, say cord length in the range of from 10 feet to 50 feet may be used effectively, although it should be noted that the longer the length of the cords the greater the physical strength required to operate the device to maximum advantage, both in terms of its properties as an exercising device and as an amusement or entertainment device.

WHAT WE CLAIM IS:—

1. An exercising device comprising a pair of cords of substantially equal length, four handles each connected to a different cord end portion so that each cord end portion is separately holdable in a user's hand, and a shuttle having a straight passage therethrough so that the shuttle is freely slidable to and fro on the cords by the action of pulling apart corresponding end portions of the two cords.

2. A device according to Claim 1, wherein the passage through the shuttle is elongated.

3. A device according to Claim 1 or Claim 2, wherein the passage passes substantially through the center of mass of the shuttle.

4. A device according to any preceding claims, wherein the passage is formed in a material of the shuttle which is abrasion resistant relative to the cord material.

5. A device according to any preceding claim, wherein the cords are impregnated with a lubricant material.

6. A device according to Claim 5, wherein the lubricant material is a wax.

7. A device according to any preceding claim, wherein each handle presents an opening large enough to receive a human foot.

8. A device according to any preceding claim, wherein each handle comprises a grip portion and a guard portion connected across the grip portion and to which the appropriate cord end portion is connected.

9. A device according to any preceding claim, wherein the shuttle is configured as a solid of revolution, and the passage extends along the axis of symmetry thereof.

10. A device according to Claim 9, wherein the shuttle has an outer body portion which is fabricated of a relatively deformable material.

11. A device according to Claim 10, wherein the shuttle comprises two board insert elements, one defining one end portion

element 42 which is smoothly curved in a semi-circular manner between the opposite ends of the grip portion, and which presents a smooth exterior to the outside of the handle. A reinforcing rib 43 is connected to the concave surface of the web and extends along the entire length of the web. The rib lends strength to the guard portion and enables the guard portion of each handle to accommodate the shocks which are imposed to it by the rapidly moving shuttle during use of the exercise device. In a presently preferred exercising device, each handle element 15 is fabricated of injection molded linear polyethylene. This material flexes sufficiently to provide an effective shock absorber in the operation of the exercising device. It should be understood, however, that the nature of the material from which the handles are made is not critical, and that any suitable material may be used, as desired.

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3. A device according to Claim 1 or Claim 2, wherein the passage passes substantially through the center of mass of the shuttle.

4. A device according to any preceding claim, wherein the passage is formed in a material of the shuttle which is abrasion resistant relative to the cord material.

5. A device according to any preceding claim, wherein the cords are impregnated with a lubricant material.

6. A device according to Claim 5, wherein the lubricant material is a wax.

7. A device according to any preceding claim, wherein each handle presents an opening large enough to receive a human foot.

8. A device according to any preceding claim, wherein each handle comprises a grip portion and a guard portion connected across the grip portion and to which the appropriate cord end portion is connected.

9. A device according to any preceding claim, wherein the shuttle is configured as a solid of revolution, and the passage extends along the axis of symmetry thereof.

10. A device according to Claim 9, wherein the shuttle has an outer body portion which is fabricated of a relatively deformable material.

11. A device according to Claim 10, wherein the shuttle comprises two board insert elements, one defining one end portion



of the passage and the other defining the opposite end portion of the passage.

12. A device according to Claim 11, wherein the bore of each insert is substantially greater in length than its diameter.

13. A device according to Claim 11 or 12, wherein the inserts are fabricated of a material which is more resilient to abrasion by the cords than the material of the shuttle body.

14. A device according to any preceding claim, wherein the cords have equal diameter, and the passage in the shuttle has a minimum diameter of the order of at least

three times the diameter of each cord. 15

15. A device according to Claim 14, wherein the passage has a length which is at least ten times greater than the minimum diameter of the passage.

16. An exercising device substantially as hereinbefore described with reference to the accompanying drawings. 20

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