Jan. 28, 1964 D. E. BERRY 3,119,614

ISOMETRIC CONTRACTION EXERCISE APPARATUS

Filed Jan. 16, 1962

Fig. 1

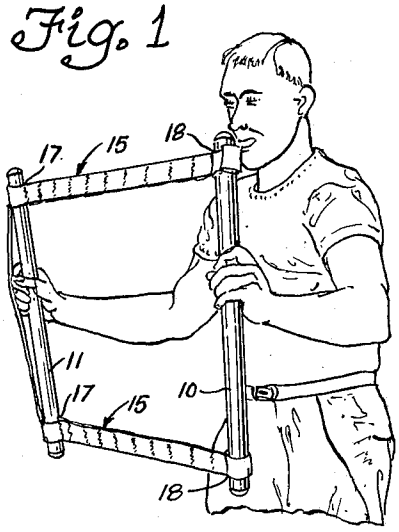


Fig. 3

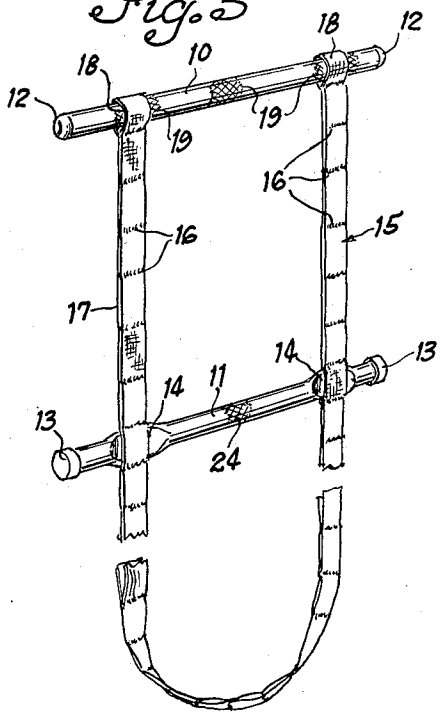


Fig. 2

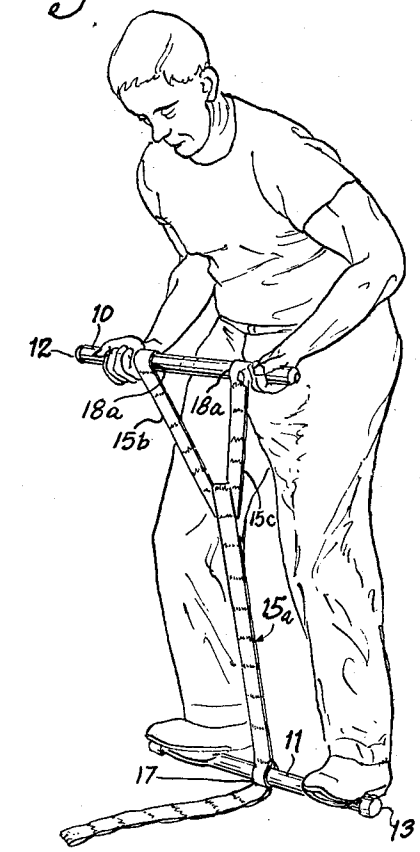


Fig. 4

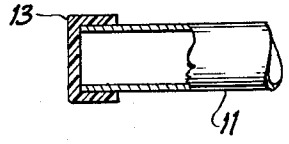
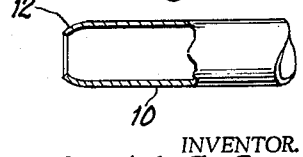


Fig. 5



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ISOMETRIC CONTRACTION EXERCISE APPARATUS

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This invention relates to an exercise device and particularly to a compact, portable device for providing exercise of the type known as isometric contractions.

It is generally thought that exercise to improve muscular development and tone requires movement of the body, preferably of a violent or highly energetic nature. However, it has been found that another form of exercise capable of improving muscular development and tone is easily accomplished and highly effective without violent motion of the body. This form of exercise is generally known as isometric contractions. Isometric contractions comprise straining selected muscles fully against immobile objects that are specially placed to concentrate the muscular effort on one or a few selected muscles. The benefits of this form of exercise are quite dramatic and quickly achieved. In the October 30, 1961, issue of the periodical Sports Illustrated, both the method of isometric contractions and the equipment generally employed for use in this form of exercise are described in detail.

Since the method of isometric contractions requires straining muscles against an immobile object, the equipment heretofore employed for this type of exercise consists of massive structural elements which are so large that they are immovable by the amount of force that a human being can apply, or which are embedded in the ground or bolted to the wall or floor of some permanent structure. As such, the regular use of the method of isometric contractions requires traveling by the user to the site of the equipment. Alternatively, make-shift equipment such as walls, fixtures or furniture must be used. However, these articles are not made for this purpose and they are frequently damaged by this use. These make-shift articles also are not versatile enough to supply concentrated resistance to all of the muscles which the user might wish to develop.

It is an object of this invention to supply simple, lightweight, versatile and fully portable equipment for isometric contraction exercise which may be adapted for exercising any muscles susceptible to this form of exercise and which is of such a nature that it may be carried without efforts, as in ordinary luggage, and stored in a drawer or on a closet shelf when not in use.

The combination of this invention which accomplishes these objectives comprises three essential elements. Two of these elements are short lengths of rigid material, preferably material of lightweight construction which is formed without sharp edges to provide a comfortable hand grip. These are preferably metal or plastic pieces about one to three feet in length and from about one to three inches in diameter. Preferably, the cross-section is round or oval, but even if polygonal, it must not have sharp, abrupt corners.

The third element is an elongated, flexible, but non-elastic element that is capable, when in tension, of holding the rigid elements spaced at any of a plurality of predetermined distances from each other. The non-elastic, flexible element preferably consists of two ribbons or tapes of strong fabric, webbing, plastic or the like which do not stretch and which are superimposed and transversely connected to each other at intervals along their length as by sewing. The space between consecutive seams is more than one-half the perimeter of the cross-section of

the rigid elements. Thus each rigid element can be inserted between the tapes and held firmly at a specific position along the length of the flexible element and therefore spaced from the other rigid element any distance.

The accompanying drawings illustrate one embodiment of this invention and are intended to be illustrative rather than limiting on its scope.

FIG. 1 illustrates one form of this invention being employed to strengthen back muscles;

FIG. 2 illustrates a modified form of this invention being employed to strengthen arm muscles;

FIG. 3 is a perspective view of the first form of this invention shown in FIG. 1; and

FIGS. 4 and 5 are both partial sectional views of the ends of rigid elements employed in this invention.

In all figures, the same reference numeral will be used to identify the same part. The combination of this invention consists of three essential elements. One of the essential elements is a first rigid element **10**, another is a second rigid element **11** and these rigid elements consist of bars or rods of strong material such as tubular metal or plastic that have a major cross-sectional dimension of from one to three inches and are preferably from one to three feet in length. To improve their utility, these elements may have rounded or tapered ends **12** which may be formed with an insert or which may have rolled over end portions as shown in FIG. 6. Especially the second rigid element **11**, which will frequently lie on the floor during use, may have end caps **13** which are larger in radius than element **11** by at least the thickness of the flexible member **15**. End caps **13** thereby prevent the flexible member from contacting the floor. Such contact causes a see-saw motion of the rigid element **11** and accelerates wear of the flexible member. The second rigid element **11** may also be provided with flattened portion **14** which serve comfortably as foot holds when one of the rigid elements is engaged by the users' feet during use.

The third essential element, as shown in FIG. 3, may comprise, a flexible element **15** formed as an elongated double tape, rope, webbing, plastic or the like connected together with a plurality of transverse connective means or seams **16** spaced along its length which may be formed by sewing, heat sealing, or other known means. Openings **17** are formed between the transverse seams **16**, and these seams are so spaced that the openings are large enough to receive the rigid elements **10** and **11** when they are inserted into the openings between the superimposed tapes. Ends loops **18** are provided at the free ends of the tape and these loops provide openings which are preferably the same size as the intermediate openings **17**.

In one modified embodiment the third element comprises a flexible member **15***a* of Y-shaped configuration to provide divergable arm portions **15***b* and **15***c* each having an end loop **18***a* which will permit a rigid element to be held by one hand therebetween, and which will provide a more stable support even when both hands are used. This embodiment is shown best in FIG. 2. It may be noted that the portions of rigid element **10** that are received in the loops or openings **17** are knurled as at **19** and that a knurled portion **24** is provided centrally of rigid element **11**. These knurled portions are provided to prevent the flexible member for sliding on the rigid elements in operation.

The combination as illustrated and described herein may be used in a variety of ways, only two of which are illustrated. In FIG. 1, a form of this combination is shown providing isometric contractions to develop back and shoulder muscles. The rigid elements **10** and **11** are held adjacent both ends thereof by interlacing them through selected openings **17** and end loops **18** of element **15** so as to dispose the same in substantially parallel spaced relation. The person seeking exercise

holds the rigid elements substantially vertically and spaced apart the maximum distance from each other permitted by that tape. The exercise consists of attempting to separate the rigid elements further apart than the tape will permit to strain back and shoulder muscles fully for a period of several seconds, then relaxing and subsequently straining the same muscles again in the same way. This cycle is repeated several times for each period of exercise. It may be noted that in this exercise substantially the full length of the flexible element is employed.

FIG. 2 illustrates the use of another form of this combination in developing biceps muscles in the arms. In this use an intermediate loop or opening **17** of the Y-shaped element **15***a* receives the second rigid element **11** which is placed on the floor. The user's feet engage the flattened portions **14** to hold element **11** firmly against the floor. The modified flexible element **15***a* is extended upwardly to about the waist of the user and the first rigid element **10** is inserted through end loops **18***a* at the ends of arm portions **15***b* and **15***c* thereof, whereupon the user grasps opposite ends of the rigid element **10** with his palms up and his forearms approximately horizontal and while standing on the rigid element **11**, strains his biceps in attempting to lift the rigid element **11** from the floor. Again straining of the muscles is continued for a period of a few seconds after which the user relaxes them and then repeats the cycle several times for each exercise period. With the Y-shaped configuration, each arm may be exercised individually or both may be exerside together.

To exercise the back, a user will stand upon element **11** and extend the flexible element **15***a* behind his back inserting the rigid element **10** through loops that are well above his head. The exercise consists of attempting, with the back muscles, to raise the element **11** from the floor.

It is evident that the combination of this invention provides a very simple but highly effective means for producing isometric contractions. The combination of this invention is very useful, for example, in the home where large permanent installations are completely impractical. It is also evident that persons who are not engaged professionally in athletics, such as traveling salesmen, could not possibly carry the presently employed equipment for this type of exercise with them. However, the device of this invention might easily be adapted to being placed in luggage where it would consume little space, and it is equally as effective for its purpose as the massive devices of the prior art. Even more important when the method of isometric contractions is employed therapeutically to develop muscles of handicapped persons, the device of this invention may be taken to the bedside of a patient and it may be comfortably handled, because of its light weight, by persons having substantially less than normal strength in the limbs that they seek to develop.

It is obvious that many modifications of the present invention can be made within its broad scope. Many flexible, non-elastic members other than superimposed tapes may be employed and the rigid elements may be constructed of plastic or other rigid materials and modified with special shapes or elements to provide hand grips, foot receiving elements, to prevent rolling or to adapt them for inserting in the flexible elements, etc. The dimensions of the various elements as well as their configuration may be altered to suit the particular needs of the user without departing from the scope of this invention.

I claim:

1. An isometric contraction exercise device comprising
   (*a*) first and second rigid elements having means providing engagement thereof by the exercising operator of the device,

   (*b*) an elongated non-extensible element adapted to hold and extend between said rigid elements characterized by
      (1) having along its length a plurality of discrete openings each selectively receptive of one of said rigid elements so that the latter are mountable thereon at selected spaced portions therealong and having at least one of said openings spaced intermediate the ends thereof,
      (2) being of such strength as to resist tearing and elongation when subjected to tension force applied thereto by the exercising operator thereby to prevent separating movement of said rigid elements beyond selected limits.

2. The exercise device of claim 1 further characterized in that said non-extensible element comprises two tapes superimposed and interconnected at spaced intervals along their length with a plurality of connective means spaced from each other a distance sufficient to receptively accommodate one of said rigid elements between said superposed tapes and adjacent pairs of said connective means.

3. The exercise device of claim 1 further characterized in that said rigid elements are cylindrical metal tubes.

4. The exercise device of claim 1 further characterized in that two similarly oriented flattened areas are formed intermediate the ends and symmetrically of the mid-point of said second rigid member, to provide foot engagement means thereon.

5. The exercise device of claim 1 further characterized in that said non-extensible element has a Y-shaped configuration with the arm portions thereof having openings receptive of said rigid elements.

6. The exercise device of claim 1 further characterized in that said second rigid element terminates in enlarged end caps for holding said second rigid element spaced from any surface on which it is lying by at least a distance equal to the thickness of said non-extensible element.

7. A device for isometric contraction exercise of a human operator comprising, a pair of rigid members engageable by the operator, elongated, substantially non-extensible means adapted to interjoin said rigid members in a plurality of predetermined spaced positions, and plural spaced connective means provided substantially along the length of said non-extensible means for detachably connecting said rigid members thereto and at least one of said connective means being spaced intermediate the ends thereof, each said connective means being adapted to have inserted therein a said rigid member and each said rigid member being so connectable to said non-extensible means at plural selected positions therealong; said non-extensible means when interjoined with said members serving to locate the latter in predetermined spaced relation and to prevent separating movement thereof beyond selected limits as defined by the extent of said non-extensible means between said rigid members.

8. The combination as set forth in claim 7 wherein said non-extensible means comprises an elongated tape member formed with superposed layers of flexible material which are transversely interjoined at selected spaced intervals along their length, said layers being separable between adjacent points of their interconnection to provide plural spaced openings which may be entered along the lateral margins of said tape member whereby said rigid members may be inserted through said tape member and held between said layers thereof.

9. The combination of claim 7 further characterized in that said non-extensible means is formed with a pair of separable arm portions at one end thereof which may be positioned in divergent relation to provide a substantially Y-shaped configuration for said non-extensible

means, each of said arm portions having connective means for detachably connecting a said rigid member thereto.

10. The combination of claim 7 wherein said non-extensible means comprises a flexible tape member having means providing a plurality of discrete spaced openings extending transversely of said tape member between opposite lateral margins thereof for the inserted reception of said rigid members therethrough, said tape member having sufficient lateral dimension to provide a substantial area of contacting engagement with a said rigid member inserted through one of said openings so as to stabilize said rigid member and substantially prevent its free pivotal movement relative to said tape member in operation.

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