

- [54] **EXERCISING DEVICE WITH SIGNALING MECHANISM**
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- [22] Filed: May 8, 1969
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- [52] U.S. Cl.272/57 R, 272/83 A, 272/DIG. 4, 272/DIG. 5, 128/2 R, 2/312
- [51] Int. Cl.A63b
- [58] Field of Search.....272/83 R, 82, 80, 79, 67, 57 R, 272/DIG. 5, DIG. 4; 340/279; 200/52 BA; 128/2.1, 2 R

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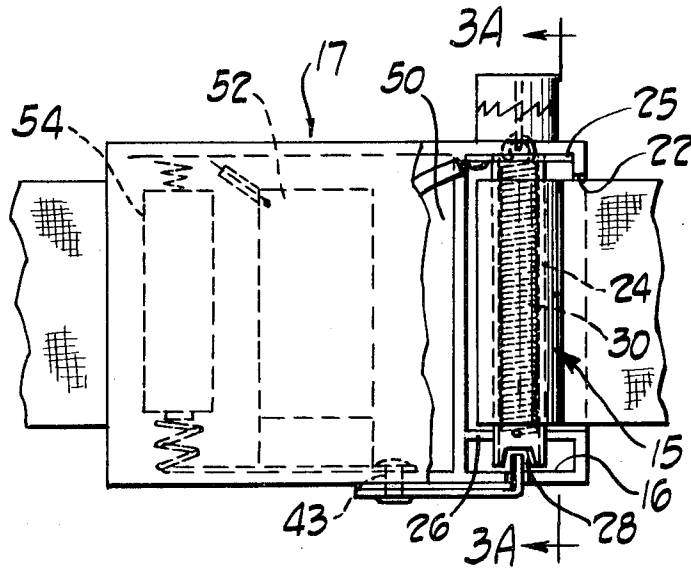
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 Attorney—Watts, Hoffmann, Fisher & Heinke

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[57] **ABSTRACT**
 An exerciser worn on a garment or other article of apparel such as a belt adapted to encircle the wearer about the waist or hips for use in performing isometric exercises therewith such that an audible tone or signal is produced by the exerciser when a preselected strain on the garment is sensed thus alerting the wearer to restore the required isometric muscle contraction in the selected exercising region.

5 Claims, 12 Drawing Figures



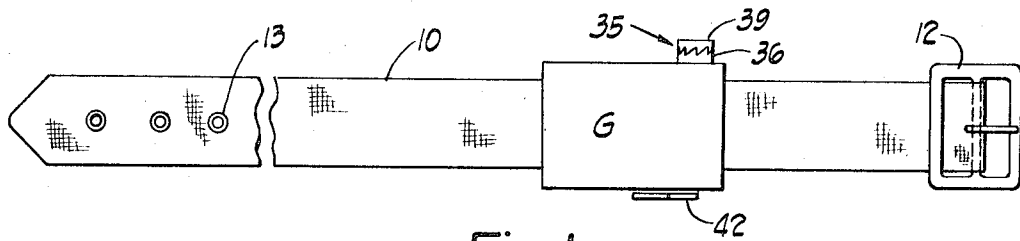


Fig. 1

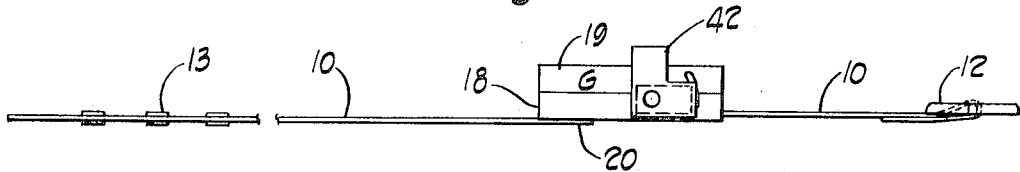


Fig. 2

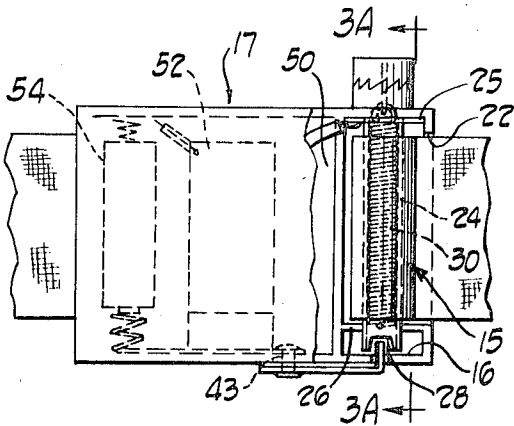


Fig. 3

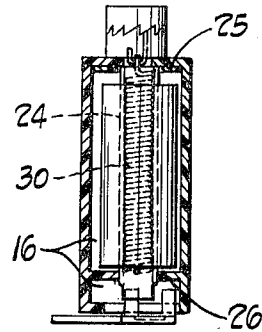


Fig. 3A

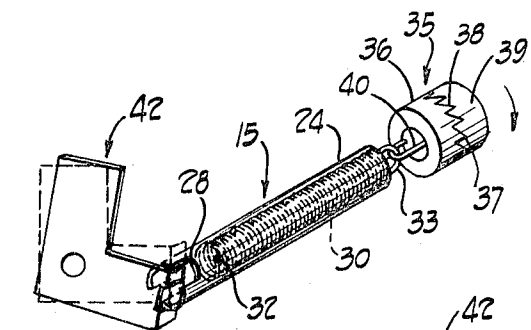


Fig. 3C

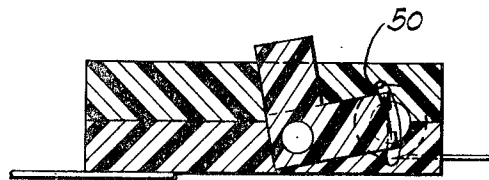


Fig. 3B

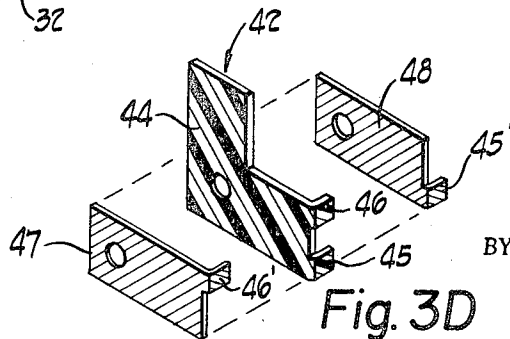


Fig. 3D

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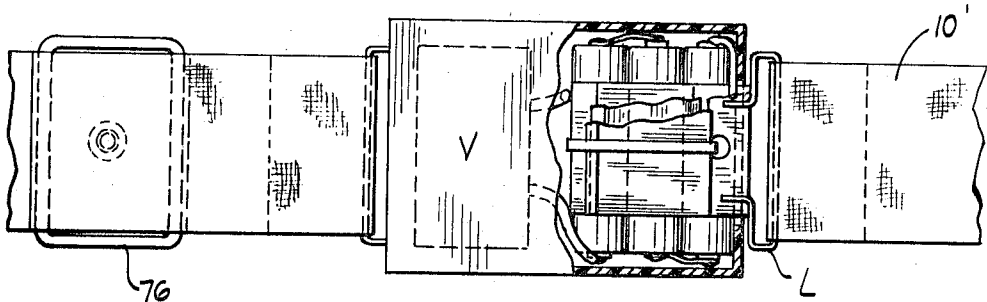


Fig. 4

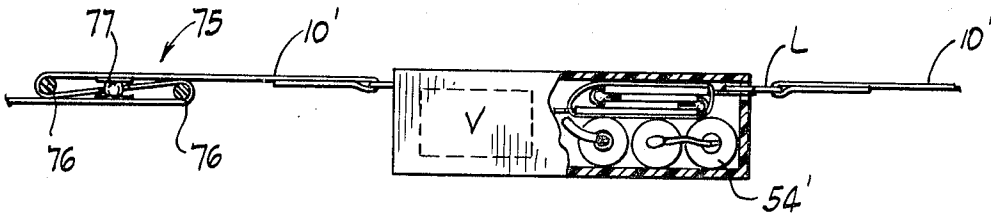


Fig. 4A

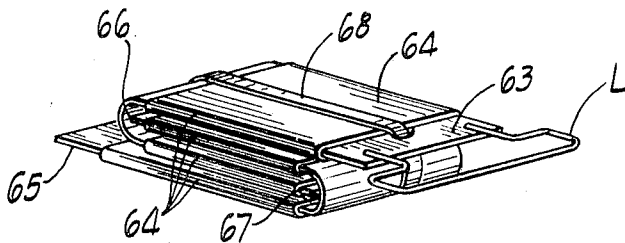


Fig. 4B

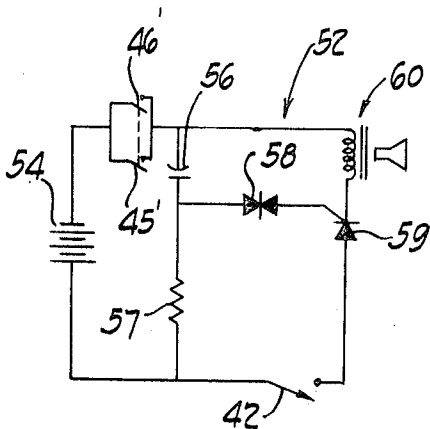


Fig. 5A

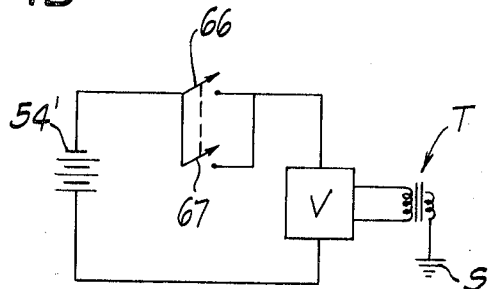


Fig. 5B

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EXERCISING DEVICE WITH SIGNALING MECHANISM**BACKGROUND OF THE INVENTION**

The invention pertains to the art of physiotherapy generally and will be described herein with particular reference to performing isometric exercises defined herein as those exercises carried out under substantially static conditions as opposed to moving or lifting a weight, however, it will be appreciated that the invention has other applications in such fields as breathing correction, posture improvement and figure improving or reducing.

1. Field of the Invention

The invention provides an exerciser which may take the form of a small gauge worn on the outer garments permitting the wearer to isometrically exercise groups of muscles in a prescribed manner by making him consciously aware of the strain on such garments as a condition of isometric muscle contraction during exercises performed while carrying on his normal activities.

2. Description of the Prior Art

Various reducing, figure-improving devices or so-called beauty aids are known which comprise a belt or a pad strapped in place against the abdomen, thigh or hip region where better muscle tone or figure improvement is desired. These devices purport to reduce excess weight without effort or at least conscious expenditure of energy on the part of the wearer. However, no known exercising device can be effective for the purpose intended with absolutely no effort being expended by the person seeking the benefits of the exercise.

Moreover, certain of these so-called effortless exercisers come equipped with a separate control console having a power cord which has to be plugged into an electrical outlet that prevents the wearer from moving freely about.

Known reducing belts also have the further disadvantages of not being suitable for wear under outer garments and being physically uncomfortable if worn for any extended period of time.

SUMMARY OF THE INVENTION

The invention provides an exercising device comprising a signal generator actuated by a tension mechanism connected to an article of apparel so as to gauge the strain therein caused by a contraction or relaxation of a muscle region subtended by the article such as a belt surrounding the wearer's waist whereby a signal is produced reminding the wearer of a change in the state of voluntary muscle control in the exercise region.

The tension mechanism comprises a movable electrical contact yieldably biased in a direction to normally deenergize the signal generator such that the force transmitted by the article or garment acts in opposition of the biasing force to close the electrical contact causing an output of the signal generator, the wearer being reminded thereby to restore the degree of voluntary muscle control required by the particular exercise which ends the signal.

More specifically, in the preferred embodiment of the invention, the tension mechanism comprises a rotatable conductive, tubular sleeve for making electrical contact with the signal generator. A belt is wound upon the tubular sleeve and is adjusted to a girth snugly circumscribing the exercise region at the desired state of muscle contraction. A coiled spring within the tubular sleeve resists rotation of the sleeve in a direction which would enlarge the girth of the belt and a switch is provided to select either silent or reminder mode operation.

In another form of the invention, a pair of relatively slidable, conductive interleaved elements is provided, one of which is movable in response to changes in tension in a belt so as to make electrical contact with the other when a certain belt tension is exceeded.

The present invention has as one of its objects the provision of an exerciser which aids the wearer in practicing isometric exercises of muscles or groups of muscles which can be strengthened by this exercising technique.

Unlike certain prior art devices, the invention requires some expenditure of effort ranging from a minimum to some maximum higher level consistent with the capabilities of the wearer, the effort being that to maintain the muscles in a state of tension or isometric stress consistent with a predetermined condition.

Among the advantages of the invention is to permit the wearer to exercise muscles or groups of muscles while carrying on his normal activities. There is no need for power cords or separate electrical apparatus requiring the exercises to be performed in a specified location.

The invention is completely portable and can be worn without discomfort to the wearer underneath the outer garments so as not to come to the attention of others and in certain forms may be disguised as an item of jewelry or the like worn on the outer garments.

By adjusting the gauge the wearer can selectively perform a variety of physiotherapeutic exercises including posture correction, improvement in breathing habits, or as an aid to reducing certain areas of the body and for general figure improvement.

A further advantage of the invention is that the exercise device may include a signal generator in the form of a small transistor multivibrator circuit producing either an audible tone through a suitable transducer such as a small earphone or the output of the multivibrator circuit may be converted into an electrical pulsation sensed directly by the wearer.

An additional advantage of the invention where a belt encircling the wearer is used is the provision of a slack takeup device in the belt establishing a fixed girth in one position and which can be momentarily released to increase the belt girth and take all tension off of the tension mechanism should the wearer desire to refrain from exercising under certain conditions such as when changing from a standing to a prolonged sitting position.

These and other objects and advantages will be more apparent by referring to the following detailed description and illustrations of preferred embodiments of the invention.

DESCRIPTION OF THE DRAWINGS

The embodiments chosen to illustrate the invention as shown in the various views described hereinafter are not intended to limit the scope of the invention as described in the claims appended hereto and merely are illustrative of preferred forms which the invention may take without necessarily showing all modes or forms, which in a broader sense, will be considered equivalents hereof.

FIGS. 1 and 2 show respectively plan and side views of the preferred form of the invention providing a signal generator having a belt retractably mounted at one end thereof.

FIG. 3 is a fragmentary view of the belt shown in FIG. 1 with the signal generator case partially broken away to show the tension mechanism;

FIG. 3A is a cross-sectional view taken along line 3A—3A of FIG. 3;

FIG. 3B is a side view showing the signal generator and switch therefor in the reminder mode or ON position;

FIG. 3C is an isometric projection showing the arrangement of parts in the tension mechanism;

FIG. 3D is an exploded view of the manual switch showing the assembly of the conductive portions thereof;

FIGS. 4 and 4A show a modification of the invention in which the signal generator includes a different form of tension mechanism including a pair of slidable interleaved contacts;

FIG. 4B is an isometric projection showing the tension mechanism of the signal generator of FIGS. 4, 4A;

FIG. 5A is an electrical circuit diagram depicting an electrical circuit which may be employed with the preferred embodiment of the invention as illustrated in FIGS. 1-3D; and

FIG. 5B is an electrical circuit diagram illustrating a circuit which may be used for the modification of the invention shown in FIGS. 4-4B.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to FIGS. 1 and 2, the preferred embodiment of the invention is shown in the form including a belt 10 having a buckle 12 secured by eyelets 13 when encircling the wearer about the exercise region such as the waist, although it will be readily apparent from the description hereinafter that rather than a belt, other holding means may be used such as a strap or an elastic band; and in other instances the invention may take different forms entirely such as an article of jewelry or of apparel or it may be sewn directly into the waistline of a pair of trousers, for example.

In accordance with the invention, a signal generator G is carried by the belt 10 (FIGS. 3, 3A). A tension mechanism 15 is housed in a compartment 16 of a generator case 17 having a bottom half 18 and a removable cover 19. The portion of the belt 10 having the eyelets 13 is secured at 20 to the bottom half 18 and the buckle portion is received in a slot 22 in the end wall and coiled upon a conductive tubular sleeve 24 situated in the compartment 16. The sleeve 24 is rotatably journaled at one end in a conductive plate 25 and at the opposite end projects through a partition 26 and terminates in a forked end formed by a transverse slot 28.

Referring to FIG. 3C, the relative parts of the tension mechanism 15 are shown separate from the case 17. A coil spring 30 is received in the sleeve 24 and is fixed at one end 32 so as to rotate with the sleeve and at the other end is provided with a hook 33 which engages a ratchet mechanism 35 for varying the tension of the spring 30. The ratchet mechanism 35 includes an annulus 36 fixed to the side of the case 17 having dogs 37 on the upper surface which engage the teeth 38 of a knob 39 which carries a hook 40 extending through the center of the annulus 36 for engaging the hook 33 on the end of the spring 30 in a fashion to prevent the spring 30 from rotating with the sleeve 24 when unwinding or retracting the belt 10. Upon rotating the knob 39 in the direction indicated by the arrow in FIG. 3C, the spring 30 is tightened to increase its tension. A manual switch 42 is rotatably mounted at 43 on the case 17 and, as shown in FIG. 3D includes an L-shaped part 44 which may be made of plastic or other material providing a pair of nonconductive teeth 45, 46 projecting inwardly at right angles thereto. The part 44 may, for example, be a molded plastic part with which the teeth 45, 46 are integrally formed. A pair of conductive metal plates 47, 48 are assembled on opposite sides of the horizontal portion of the part 44, each plate having a tab 45', 46' extending at right angles thereto which, upon assembly with the lever 44, form conductive facing surfaces on the outer and inner surfaces respectively of the teeth 45, 46 but leaving the opposite sides of the teeth nonconductive. An arcuate slot 50 (FIG. 3B) is formed in the sidewall of the case 17 providing an opening for the teeth 45, 46 which extend inwardly in interlocking fashion with the slot 28 of the sleeve 24. As shown best in FIG. 3C, the switch 42 has two positions, the dot-dash line position depicting the reminder mode or ON position, and the solid line position showing the silent mode or OFF position. In the reminder mode, the switch 42 is rotated rearwardly so that the teeth 45, 46 are raised and lie in the path of rotation of the forked end of the sleeve 24. When the switch 42 is rotated forwardly for silent mode operation, the tooth 45 is moved into alignment with the sleeve axis and the tooth 46 is moved through the slot 28 to a position below the sleeve so that neither tooth can interfere with rotation of the sleeve 24.

Thus, in the silent mode position of the switch 42, the portion of the belt 10 having the buckle 12 can be extended or retracted causing the sleeve 24 to oscillate freely. If the spring 30 is pretensioned by means of the ratchet 35, then, of course, the force required to pull the belt is increased by a proportionate amount. Thus, in the silent mode, the belt 10 may be worn without the wearer being conscious of the fact that the belt girth is varying continuously. In this condition, there is no exercise being performed and the invention is worn as any

other article of apparel without discomfort to the wearer or drawing attention to the fact that it is being worn. This is an important feature of the invention.

In the reminder mode position of the switch 42 (FIG. 3B and the dot-dash line position in FIG. 3C), the sleeve 42 is prevented from retracting the belt by engagement with the nonconductive surfaces of the teeth 45, 46 and the circuit of the signal generator remains open so long as the forked end of the sleeve engages only the nonconductive surfaces of the teeth 45, 46. The spring 30 maintains this retracted position after the belt has been extended to a position establishing the belt girth desired for the particular exercise to be performed.

It is important to note, however, that the sleeve 24 may still rotate a limited distance in the opposite direction tending to increase the belt girth. This limited distance is equal to the width of a slot 28 and, in accordance with the invention, gauges the amount of increase in belt girth allowed for the particular exercise. Such limited rotation of the sleeve will only occur when there is a pull on the belt sufficient to overcome the force of spring 30 caused, for example, by the fact that the wearer has relaxed the muscles being exercised momentarily. Should this occur, the forked end portion of the sleeve will be rotated into engagement with the conductive faces of the teeth 45, 46 closing the circuit to the signal generator which causes a reminder signal to be given. Thus the wearer is alerted to restore the isometric exercise, correct the posture, breathing or whatever so as to bring about a reduction in the tension on the belt thereby permitting the sleeve 24 to rotate back to the retracted position interrupting the signal. The sleeve remains in this position so long as the exercise is being performed properly.

The case 17 also provides a compartment 50 for housing an electrical circuit 52 and battery 54 of a battery-operated tone circuit of a type capable of producing an audible tone in an earphone which may be connected by means of jacks (not shown) to the case 17; or a conventional multivibrator buzzer circuit might be used to produce an audible tone without the necessity of earphones. The particular tone circuit shown forms no part of the present invention and, by way of example only, a circuit 52 is shown in FIG. 5A wherein the battery 54 is connected through a condenser 56 and resistor 57 to a bistable breakdown semiconductor device 58 to intermittently provide a conductive path through a transistor 59 to energize an earphone 60. When the switch 42 is closed the transistor 59 will emit an interrupted pulse as determined by the breakdown frequency of the semiconductor 58 whenever the contacts 45', 46' are closed by rotation of the sleeve 24 to the reminder mode position.

Alternatively, a mechanical vibrator circuit of the type shown in FIG. 5B may be used in which a battery 54' drives a small multivibrator V, the output of which may be connected to a transformer T, connected to a sensor S which may be exposed on the back side of the case 17 (not shown) to impart an electrical sensation to the wearer as a reminder signal instead of an audible tone.

The circuit 5B is described hereinafter for use in a modification of the invention shown in FIGS. 4, 4A, 4B although it will be appreciated that it is equally applicable to the preferred embodiment of the invention.

Referring now to FIGS. 4, 4A and 4B, a modification of the invention is shown in which a belt 10' is fastened onto a loop L which is connected to a U-shaped contact 63 slidably interleaved with a U-shaped contact 65, each being mutually insulated by insulation strips 64 except for the terminals 66, 67 which are spaced from the bottom of the U-shaped portions of each contact 63, 64. An elastic band 68 encircles the contacts 63, 64 so as to hold the terminals 66, 67 spaced out of contact a predetermined gauging distance when the exercise is being performed properly. If the tension increases such as due to a relaxation of muscle control, the contact 63 slides relative to contact 65 and the terminals 66, 67 touch the bottom of the U-shaped portions closing the circuit (FIG. 5B) so as to produce a reminder signal alerting the wearer of the fact that the isometric exercise is not being properly performed.

Inasmuch as this modification includes no manual switch, such as switch 42 in the preferred embodiment of the invention, a silent mode operation may be provided by means of a snap-out pleat 75 (FIGS. 4, 4A) to introduce slack in the belt when no exercises are being performed. The pleat 75 includes a ring 76 sewn into the belt which is folded back upon itself and held by a snap fastener 77. The fastener 77 can be unfastened letting the pleat unfold to introduce slack in the belt 10' thus disabling the signal generator should the wearer not wish to exercise momentarily such as when changing from a standing to a prolonged sitting position.

Thus the invention provides an exercising device and method of exercising therewith in which a tension mechanism yieldably gauges muscle reaction to a prescribed exercise program alerting the person performing the exercises whenever a deviation occurs beyond that permitted by the program.

Modifications of the invention will be apparent to those skilled in the art to which it pertains which modifications are to be regarded as reasonable equivalents thereof and are intended to be covered by the appended claims except insofar as limited by the prior art.

What is claimed is:

- 1. An exercising device for use in gauging muscle reaction to a prescribed exercise program comprising
 - a. a rotatable tubular sleeve,
 - b. a linear tension member fixedly attached to said sleeve, said sleeve rotating as said member is extended or retracted in response to muscle reaction,
 - c. a movable element positioned axially of and adjacent to the sleeve and having electrical conductive and nonconductive portions engageable by the sleeve,
 - d. an electrical conductive portion of the sleeve, said portion electrical conductive being rotated with the sleeve in one direction into engagement with said nonconductive portion of said movable member while an exercise program is being followed in a prescribed manner and rotatable in an opposite direction to bring said electrical conductive portion into engagement with the conductive portion of the movable element when a program is not being followed,

- e. resilient means normally holding the sleeve rotated so that the electrically conductive portion is in engagement with the nonconductive portion of said movable member, and
 - f. signal means energized by the engagement of said conductive portions producing a reminder signal alerting to the fact that an exercise program is not being followed.
- 2. An exercising device according to claim 1 where the resilient means is a coiled spring received in said tubular sleeve and a ratchet means is provided to vary the tension in said spring and thereby vary an exercise program also.
 - 3. An exercising device according to claim 2 wherein the sleeve has a transverse slot cut in one end thereof, the sides of which engage alternatively the conductive or nonconductive portions of said movable element in response to extension or retraction of the linear tension member.
 - 4. An exercising device according to claim 3 wherein said movable element is movable to select between either silent or reminder mode operation, the element being movable out of the path of rotation of the sleeve for silent mode operation when no exercise program is to be performed.
 - 5. An exercising device for use in gauging muscle reaction to a prescribed exercise program comprising
 - a. a pair of electrically conductive elements spaced a limited distance apart, one being yieldably mounted for movement relative to the other in response to muscle reaction deviating from an exercise program, said elements being U-shaped parts each insulated from the other except at their terminal ends and along the inner surface of the curved portion of the U-shaped portion of each part, said parts being interleaved with each other so that the inner end of one element is spaced a prescribed distance from the U-shaped portion of the other element to form electrical contacts,
 - b. resilient means biasing said elements apart so that said electrical contacts are disengaged when the exercise program is being followed, and
 - c. signal means energized by the closing of said electrical contacts producing a reminder signal alerting a user to the fact that an exercise program is not being followed.

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