Sept. 25, 1934. E. A. CALLESON 1,974,445

EXERCISE MACHINE

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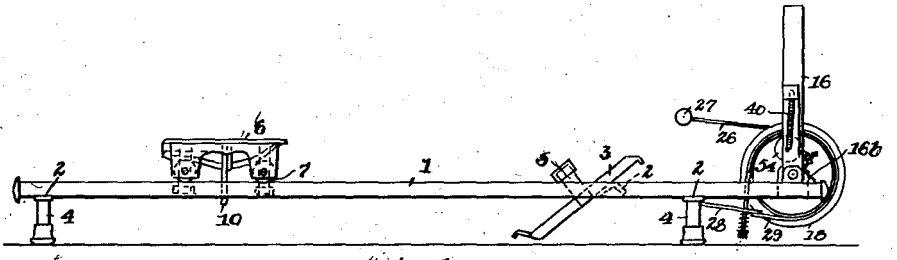

Fig. 1.

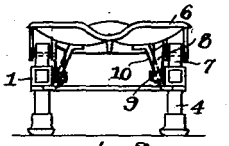

Fig. 2.

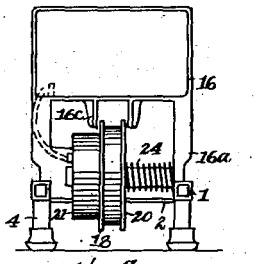

Fig. 3.

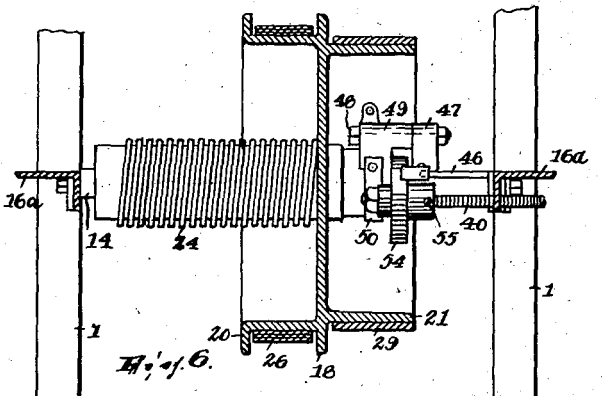

Fig. 6.

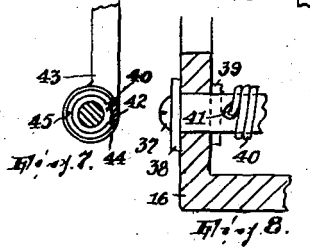

Fig. 7. 44

Fig. 8.

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EXERCISE MACHINE

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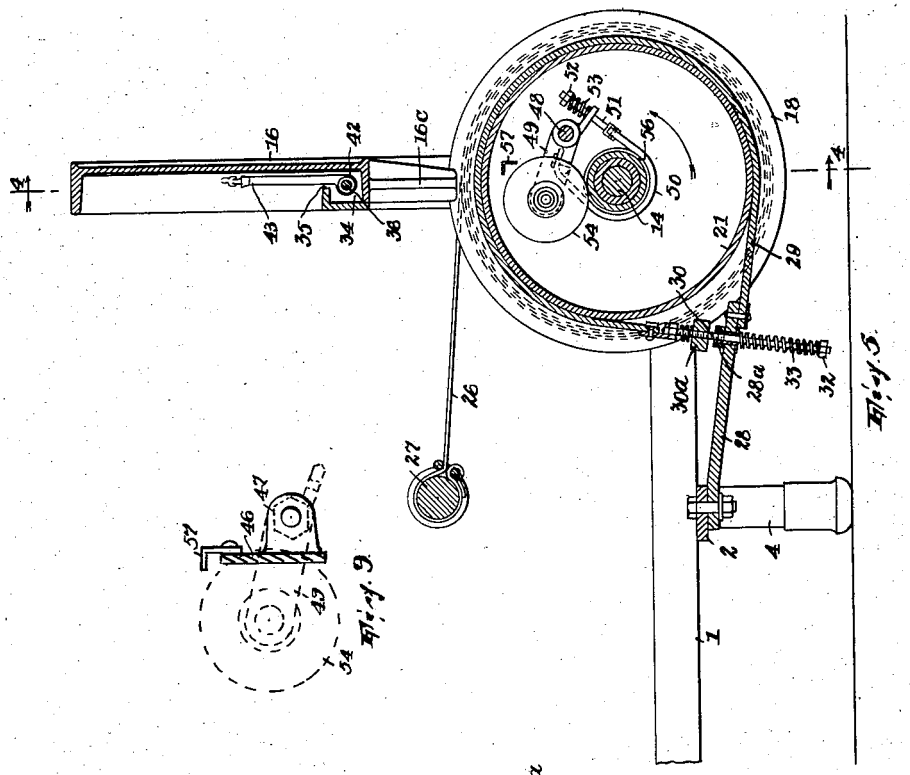

Fig. 3.

Fig. 9.

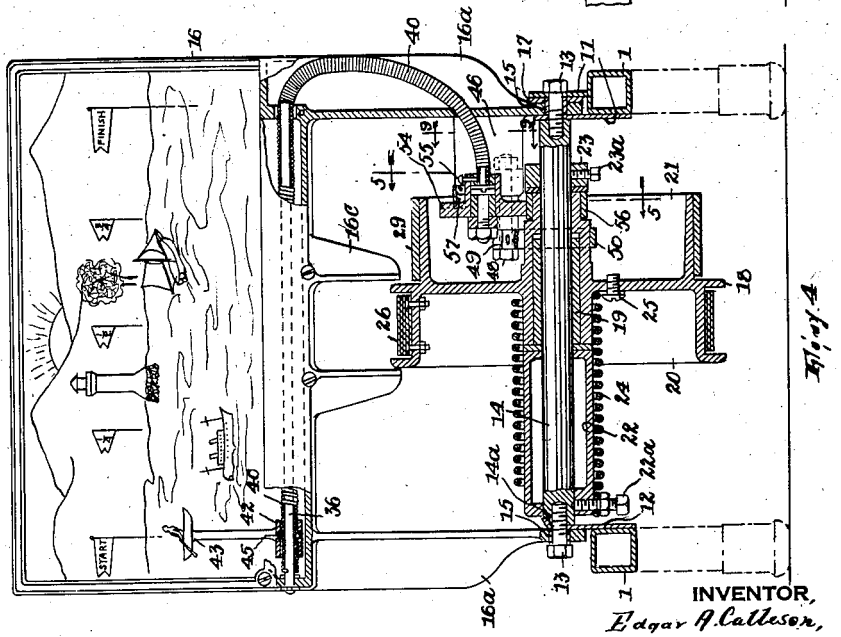

Fig. 4.

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EXERCISING MACHINE

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5 Claims. (Cl. 272—72)

This invention relates to exercising apparatus and in the example herein discussed it relates especially to exercising apparatus of the rowing-machine type. The objects of the invention may be stated as follows: To produce a machine which will in operation simulate the action characterizing actual rowing in that the resistance on the rowing or working stroke shall be practically the same, as to constancy, as in actual rowing; to provide for readily varying the resistance to suit persons of varying muscular strength; to provide means which will present to the operator some goal to be attained and an indication of the progress made in the effort to attain such goal; and to construct the entire machine so that it will be reliable and durable, efficient and noiseless in operation, and simple in construction.

In the annexed drawings,

Fig. 1 is a side elevation of the machine of this invention;

Figs. 2 and 3 are end elevations of the machine as seen from the left and right, respectively, in Fig. 1;

Fig. 4 is a view, on a larger scale, partly in elevation and partly in section on line 4—4, Fig. 5;

Fig. 5 is a sectional view, on the same scale, on line 5—5, Fig. 4;

Fig. 6 is a view showing the rotary member 18 and certain parts associated therewith partially in plan and partially in horizontal section.

Fig. 7 is a transverse sectional view of a detail of the means for imparting motion to the movable indicator;

Fig. 8 shows another detail of said means; and

Fig. 9 is a sectional view of bracket 46 on line 9—9, Fig. 4.

The frame of the machine comprises two spaced portions, as side rails 1 connected at 2 by cross-bars, the intermediate one of which supports a foot-rest 3 set at an incline. Each rail has two depending feet 4. These parts may be all of metal and welded or otherwise secured together. On the foot-rest is an adjustable strap 5 to receive the operator's feet.

As in the case of a sliding boat-seat the operator's seat 6 may travel back and forth on the rails 1, for which purpose the seat has rollers 7 resting on the rails and depending guides 8 having rollers 9 which engage the inner faces of the rails, there being also hooks 10 depending from the seat which engage under the rails to prevent accidental unshipping of the seat. The seat structure may also be of metal.

Two plates or lugs 11 upstand from the near rail 1 in Fig. 1, being welded thereto, and the pair of lugs 11 and the lug 12 receive screws 13 which are tapped into the ends of a shaft 14. Bushings 15 on the screws afford bearings for the legs 16*a* of an upstanding chart or plate structure 16. Between one leg and one of the lugs 11 is a friction washer 17 which, when the corresponding screw 13 is tightened, will hold the chart or plate structure in any position to which it may be shifted on its bearings 15, as in the upright position shown, it being capable of being folded down against the foot-rest. A stop 16*b* (Fig. 1) on the plate structure limits its raising (or clockwise) movement by engaging one of the rails. The shaft should be proof against rotation, as by the upper end of lug or plate 12 being bent over into engagement with a flat 14*a* on the shaft (Fig. 4).

On the shaft is a rotary member 18, preferably having a self-lubricating bearing bushing 19 (as of Arguto wood), which comprises a pulley 20 and a brake-drum 21, the hub of such member being between a sleeve 22, fixed on the shaft by a set-screw 22*a*, and a collar 23, fixed on the shaft by a set-screw 23*a*. Coiled about the hub of said member and the sleeve 22 is a spring 24 one end of which is secured to member 18 by a screw 25 and the other to the sleeve by screw 22*a*, said spring (which provides the energy necessary to return member 18 after each rotation by the operator, as will appear) normally acting to rotate said member clockwise in Figs. 1 and 5. Wound on the pulley 20 is a tug-band or equivalent flexible device 26 having one end secured to the pulley and the other equipped with a handle 27; the band extends through a fork 16*c* of the plate structure so that the engagement of the handle with said fork limits the return motion of member 18 in response to the spring. In certain aspects of the invention it is not material that the part engaged by the operator for moving member 18 be a tug-band, as herein shown.

I aim to provide resistance to rotation of member 18 under the pull of the tug-band which shall be substantially constant and which may be readily and quickly adjusted so that the machine will be adapted to persons having different muscular strengths. To this end I provide a brake-band or flexible braking element composed of some material capable of stretching as an incident of its frictional grip on the brake-drum portion of said member and I utilize its capacity to stretch or extend in the control of such grip. Bolted to the adjacent cross-bar is a rigid tongue 28 to which is attached one end of such brake-band,

which extends around the pulley 20 in the direction in which member 18 is rotated by a pull on the tug-band. The pulley-engaging and stretchable part of this brake-band is, here, a leather strap 29, and it has an extension, here a threaded stem 30, attached to the free end of the strap. The extension or stem passes freely through a hole in the tongue 28 and on its lower end is screwed a nut 32, between which and the tongue is an expansion spring 33 which acts merely to keep the strap portion hugging the pulley. The tongue may afford an abutment, as at 28*a*, and on the brake-band (to wit, on its stem) is screwed a nut 30*a* forming an abutment adjustable lengthwise of said brake-band and coactive with abutment 28*a*. With the flexible stretchable brake-band made to hug the pulley, if the pulley is rotated in the direction of the arrow in Fig. 5 (or by means of the tug-band), it will by frictional action stretch the brake-band, the resistance gradually increasing through a short range of the rotary movement at least until the limit of the capacity of said member to stretch is reached; this of course characterizes any similar combination of parts in which the inherent elasticity of the brake-band affords the gradually-increasing resistance factor. But by providing the brake-band with a longitudinally adjustable abutment adapted during the stretching of the brake-band to engage and have its movement and hence the stretching thereof limited by another abutment I can vary the resistance set up and opposed to member 18. Thus, the further the abutment 30*a* is adjusted toward the abutment 28*a* the sooner will the stretching of the brake-band be limited and the less will be the power necessary to rotate the member 18; conversely, the more abutment 30*a* is adjusted from abutment 28*a* (short of a limit corresponding to the limit of the capacity of the brake-band to stretch) the greater will be the power necessary to rotate the member 18. By simply screwing nut 30*a* up or down any operator can therefore set the resistance to suit his own strength.

The return-rotation of the member 18 by spring 24 is of course not appreciably opposed by the brake-band due to the yielding of spring 33.

It will be understood that such variation in resistance as is due to the extension or stretching of the brake-band is only momentary, to wit, that once the contact of abutment 30*a* with abutment 28*a* occurs (which is immediately after the member 18 starts to rotate) the pull thereafter is subject to a constant resistance until its termination. Also that, while return means 24, because it is a spring, of course opposes increasing resistance to the pull it may be and preferably is weak enough so that its variable-resistance nature is not appreciable and the resistance opposed to the pull is substantially a constant one, to wit, that of the friction between the rotary member and brake band plus the tension incident to the stretching of the brake-band and as determined by the adjustment of abutment 30*a*.

The goal to be attained may be some mark on the plate or chart of the plate structure 16, as the flag bearing "Finish" in a view depicting some water scene and showing, say, another flag bearing "Start"—see Fig. 4. At the base of the plate portion of said structure 16 (which is a casting) is a transversely extending housing 34 having a top slot 35. In a bearing at the left end of this housing is journaled a rod 36 kept from endwise displacement by a screw and washer 37—38 and a pin 39 and which forms a stiff core for one end portion of a helical flexible cable 40, the extremity of such portion being bent inward into a notch 41 (Fig. 8) in the rod so that the rod turns with the cable as a unit. Said end portion of the cable receives the tubular base 42 of an indicator, here a figure 43, as of a rower, the stem of which penetrates the slot 35 which thus keeps the figure upright. Said base has a partially encompassing slot 44 (Fig. 7) receiving an annular split ring 45 forming an elastic clutch engaged in the exterior helical groove of the cable so that when the latter rotates the figure will be advanced lengthwise thereof and yet it can by hand be slid along the cable. The cable protrudes through the other end of the housing and extends to the means for rotating it, thus:

A bracket 46 projecting from a leg of the plate structure has a rearward projection 47 in which on a bolt 48 is fulcrumed a two-armed lever 49 adapted to be rocked by the frictional engagement of a strap 50 with the hub of member 18, said strap having one end attached to one arm of the lever and the other provided with a threaded stem 51 penetrating the other lever arm and equipped with an adjusting nut 52 between which and said arm is a spring 53. On the lever is journaled a wheel 54 into whose hub projects the free end of the cable, held therein by a screw 55 so as to turn with the wheel. When member 18 is turned anti-clockwise by a pull on the tug-band the friction between said hub and strap 50 causes anti-clockwise shifting of the lever, bringing the wheel against a friction surface 56 on the hub, whereby it and the cable are rotated and the figure 43 advanced an increment toward the goal; when member 18 re-rotates in response to spring 24 the lever moves reversely, withdrawing the wheel from surface 56, whereby each increment of advance of the figure is maintained. The parts 54—40—36, rotative as a unit, I term a "one-way rotary means" in the appended claims, thereby to express that such means obtains impulses from member 18 for rotating it in one direction but not the other, after the manner of a pawl and ratchet but without incidental noise. The operator can re-set the figure at any time by sliding it along the cable. When the lever retracts the motion is limited (so that the wheel is not re-rotated by the flange of member 18) by a stop 57 on the bracket 46, (Figs. 4 and 5).

The helical cable, its axial bearing element 36 and the wheel in effect form a screw device (more specifically, an elongated rotary motion-transmitting device one end portion of which is formed as an inflexible screw and the other flexible) which has tractive engagement with the member 18 and the indicator engaged with its threading, to wit in the exterior grooves between its coils.

Having thus fully described my invention what I claim is:

1. An exercising machine comprising, with supporting structure, a rotary member journaled therein and having a part to be engaged by the operator to effect its rotation in one direction and also having a circumferential braking surface, a stretchable brake-band means attached to said supporting means and extending in said direction around and in frictional engagement with said surface, one of said means having an abutment, and an abutment adjustable on the other means toward and from the first abutment, said abutments being engageable with each other

on stretching of the band incident to such rotation of said member.

2. An exercising machine comprising, with supporting structure, a member thereon to be rotated back and forth and having a part to be engaged by the operator to effect its rotation in one direction, indicating means including an element to be rotated, and a rockable system carried by said structure and frictionally engaging said member and having said element journaled therein, said element on the rocking of said system in one direction being engageable with and adapted to be rotated by said member and on the rocking of said system in the other direction being adapted to clear said member.

3. An exercising machine comprising, with supporting structure, a member thereon to be rotated back and forth and having a part to be engaged by the operator to effect its rotation in one direction, indicating means including an element to be rotated, a lever rockable in said structure and in which said element is journaled and a strap extending around and frictionally engaging said member and having its ends connected to said lever at opposite sides of its fulcrum, said element on the rocking of the lever in one direction being engageable with and adapted to be rotated by said member and on the rocking of said system in the other direction being adapted to clear said member.

4. In an exercising machine, the combination of a structure comprising a plate-like portion forming a chart and an elongated portion extending across one broad face of the first-named portion and forming therewith a slot, a rotary screw-device journaled in said structure and extending lengthwise of the second-named portion, and an indicator having a threaded portion engaged with the threaded portion of said device and extending through the slot.

5. In an exercising machine, the combination of a substantially inflexible rod, a supporting structure having the rod confined at one end thereof to rotate in said structure around a fixed axis, a flexible helical cable rotative with and having one end portion receiving and affixed to the rod and its other end extending beyond the other end of the rod and adapted to receive rotary impulse, the first-named portion of the cable forming an external screw, and an indicator having screw-engagement with said screw and held from rotation by and slidable in contact with said structure.

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