(No Model.)

C. A. TERRY.

Exercising Machine.

No. 242,073. Patented May 24, 1881.

Fig. 1.

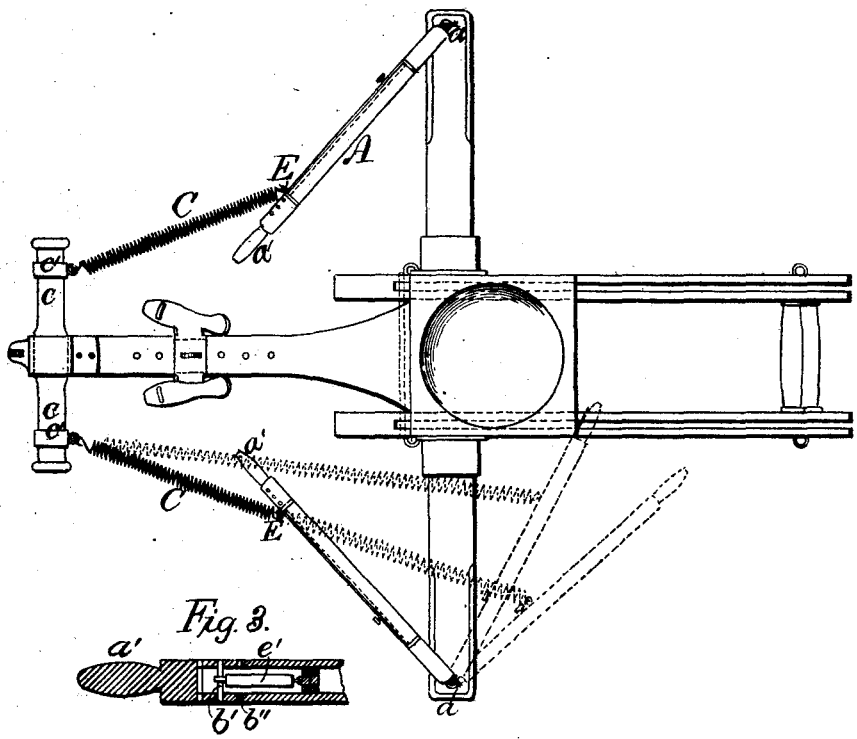

Fig. 3.

Fig. 2.

Fig. 4.

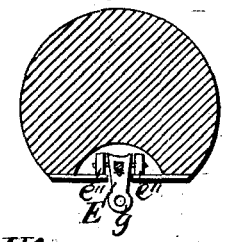

Fig. 5.

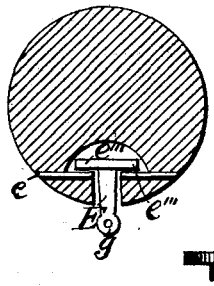

Fig. 6.

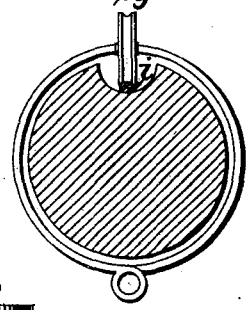

Fig. 7.

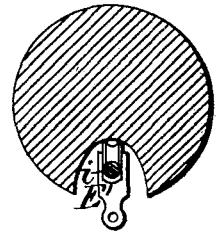

Fig. 8.

Witnesses;
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UNITED STATES PATENT OFFICE.

CHARLES A. TERRY, OF NEW YORK, N. Y.

EXERCISING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 242,073, dated May 24, 1881.

Application filed April 16, 1881. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. TERRY, a citizen of the United States, residing at New York, in the county and State of New York, have invented certain new and useful Improvements in Exercising-Machines; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings.

My invention relates to certain improvements in that class of exercising-machines technically known as "rowing-machines;" and it consists principally in an improvement in the manner of constructing and mounting the lever or oar.

The object of my invention is to provide a machine which shall furnish the user with a means of exercise corresponding precisely to that obtained by an oarsman in rowing a boat.

A peculiarity of the exercise of rowing consists in the varying amount of force which is required to be expended in overcoming the resistance of the oar in the water. This force gradually increases from the commencement of the stroke up to or a little beyond its middle point, from which point it gradually diminishes till, at its completion, it is nearly the same as at the commencement. This gradual increment and decrement is due in part to the different positions occupied by the oarsman during a stroke, and in part to the momentum acquired by the boat in the first part of each stroke.

In the rowing-machines hitherto in use the resistance has been obtained by attaching one end of an elastic stretcher to a pivoted lever or oar, the other end being secured to a fixed support at a suitable distance. The resistance thus obtained continually increases from the commencement of the stroke to its completion, so that the rower is obliged to exert the greatest amount of force toward the end of the stroke, when the body and arms are in the position to do so with the least advantage. The same defect is found in all machines using elastic stretchers, as at present constructed.

In my invention I make use of a varying leverage to overcome a constantly-increasing resistance, whereby this defect is entirely obviated. This leverage is made adjustable in such manner that the amount and extent of the resistance offered to the user may be varied in any manner desired.

The important features of my invention are embraced in the lever or oar and its immediate attachments. This may be easily applied to various rowing-machines already in use.

Of the accompanying drawings, Figure 1 is a plan view; Fig. 2, a view of the lever or oar; Fig. 3, a section view of the same. Figs. 4, 5, 6, and 7 represent cross-sections of oars constructed on various plans; and Fig. 8 represents a set-screw or stop.

Referring to Fig. 1, A represents a lever or oar so pivoted as to allow free movement of the handle in a manner corresponding to the ordinary movements of an oar when used by a boatman.

C is a spiral spring attached at one end to a rod or bar, *c c*. The opposite end is attached to a sliding block or roller, E, which is constructed to move along the oar according to its position as it is drawn back. Figs. 2 and 4 show one method of constructing and attaching this sliding block or roller, in which *e e* represent a metal plate let into the oar, with a longitudinal slot through which extends the projection *g*, which is provided with the two small rollers, *e'' e''*, which run upon the inner surface of the plate. The plate *e e* may be of any length, but preferably should extend to within about three inches of the pivot *a* and about six or eight inches of the end of the handle *a'*. There are various other methods of constructing this sliding-block, three of which are shown in Figs. 5, 6, and 7. In Fig. 5 the rollers *e'' e''* are replaced by the projections *e''' e'''*, which bear upon the plate *e e*. Fig. 6 represents a method of applying the slide to the back of the oar in which a small pulley runs upon a rod, *i*. In Fig. 7 the plate *e e* (shown in Figs. 2 and 3) is replaced by a rod fastened at each end, upon which runs a small wheel, E'. A strip of elastic vulcanized rubber, *é'*, (see Fig. 3,) is attached to the oar at or near its handle *a'*, and is also connected with the block E, which it thus tends to draw toward the handle.

It will be readily seen, by referring to the dotted lines in Fig. 1, that the resistance offered to the rower will be of gradual increase

up to the point where the oar is at right angles with the extended spring. After passing this point the force of the spring C will overcome the resistance of the elastic e' and cause the block or roller E to gradually pass along the oar toward the pivot a. This movement of E carrying with it the end of the spring C gradually increases the leverage which the rower has upon the spring, and results in making the stroke correspondingly easier. In this manner is obtained a stroke of a gradually-increasing, followed by a gradually-decreasing, resistance, which is the natural stroke of the oarsman, as hereinbefore stated. The point at which the stroke commences to become lighter—that is, the point at which E commences to move toward a—depends upon the relative position of the points a, E, and c, for it is evident that as long as the angle a E c remains less than a right angle the block E will maintain its position as near the handle as possible, being drawn in that direction both by the elastic e' and the spring C. As soon, however, as this angle becomes greater than a right angle the slide or roller will tend to move toward a, being drawn in that direction by the tension of the spring C, as shown by the dotted lines in Fig. 1. The farther the oar is drawn back the farther the block E will move from a' unless retained by the elastic E' or otherwise prevented. In order, therefore, to vary the position at which the maximum resistance of the stroke shall come I prefer to make the point c adjustable. This may be done in various ways. For example, upon the rod c c there may be placed adjustable clasps c' c', which may be moved along the rod, as required, or there may be any required number of rings or eyes along the rod at the required distance apart, to any of which the springs may be attached.

In some cases it may be desirable to make the points a a, at which the oars are pivoted, also adjustable with reference to their position forward or back, or the bar c c may be made adjustable in this direction.

It may be further observed that in rowing a boat, when a sharp quick stroke is used the finish of the stroke is correspondingly lighter. The same will be found to be true of my rowing-machine, since when such a stroke is given the slide will extend the rubber e' to a greater extent and run nearer to the pivot a than when the stroke is slow and gradual, provided an adjustable stop, hereinafter described, is not used to limit the motion of E in that direction.

The point at which the elastic e' is attached to the oar may be made adjustable with reference to its distance from the handle, to allow of regulating the stroke with regard to its average resistance. For example, if it is desired to row a "light oar" the elastic is attached correspondingly near the pivot a, thus giving a greater leverage from the beginning of the stroke. An adjustable stop, b, will be necessary in this case to limit the motion of E toward a', and it may be desirable in some cases to use a similar stop to limit the motion in the other direction. The method of applying these stops will depend upon the form of slide or roller E adopted in any given case. A convenient method to be used in connection with the plan shown in Figs. 4 and 5 is to have two set-screws, as shown in Fig. 8, which may be made to clasp the plate e e at any required points, or a series of holes may be placed along the oar at right angles to the plate, through which suitable pins may be placed, as required. The side of these stops against which the slide strikes may be faced with rubber or other suitable material to serve as a buffer. A similar set-screw having a ring or opening at its base may be used for attaching the upper end of the elastic e', or it may be attached, as shown in Fig. 3, to a pin, b', which may be inserted through any of a series of holes, b'', as desired.

Vulcanized rubber or other suitable elastic material, or a cord running over a pulley and attached to a weight may be used in the place of a spring, C, and in place of the rubber e' a coil-spring or other elastic substance may be used. In case a coil-spring is used there are various ways in which it may be applied. For instance, in Fig. 7 it may be made to inclose the upper portion of the rod i, or it may be placed below the block E and in its normal position be extended. It will then be compressed by the motion of E toward a. In some cases this elastic or spring may not be required at all, as the spring C will draw the block E back to its original position when the oar is brought forward. However, I prefer its use to insure a more gradual change of leverage. The movement of this slide may be further varied by varying the tension of e'.

Instead of pivoting the oar by means of a hook and eye at a, as shown in Fig. 1, a ball-and-socket or other suitable joint may be used.

Other methods of applying the lever with its sliding block than that of the direct leverage are obvious. For example, the oar may pass through an oar-lock and the attachments be made on the end opposite the handle.

I claim as my invention—

1. The combination, substantially as hereinbefore set forth, of a lever or oar and an elastic stretcher, one end of which is attached to a slide or roller capable of traveling along said lever in a longitudinal direction and the opposite end to a stationary support.

2. The combination, substantially as hereinbefore set forth, of a lever or oar, a slide or roller capable of traveling along said lever in a longitudinal direction, and an elastic band or spring, one end of which is attached to said slide and the opposite end to said lever.

3. The combination, substantially as hereinbefore set forth, of a lever or oar, a slide or roller capable of traveling along said lever in a longitudinal direction, and an elastic band or spring, one end of which is attached to said slide and the opposite end to said lever by means of an adjustable connection.

4. The combination, substantially as here-

inbefore set forth, of a lever and an elastic stretcher having one end attached to a stationary support and the other end to a movable slide or roller upon said lever, and an elastic mechanical connection between said slide and lever.

5. The combination, substantially as hereinbefore set forth, of a lever, a slide capable of traveling along said lever in a longitudinal direction, an elastic mechanical connection between said lever and slide, and one or more adjustable stops for limiting the motion of said slide.

6. The combination, substantially as hereinbefore set forth, of an elastic stretcher attached to a movable slide upon a lever of an exercising-machine, and an adjustable stationary support to which the opposite end of said stretcher is attached.

In testimony whereof I have hereunto subscribed my name this 15th day of April, A. D. 1881.

CHARLES A. TERRY.

Witnesses:
FRANK L. POPE,
MILLER C. EARL.