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EXERCISE MACHINE IN WHICH THE USER PUSHES OR PULLS AGAINST
A RESISTING FORCE PRODUCED BY A PNEUMATIC CYLINDER
OPERATING IN CONJUNCTION WITH COMPRESSED AIR
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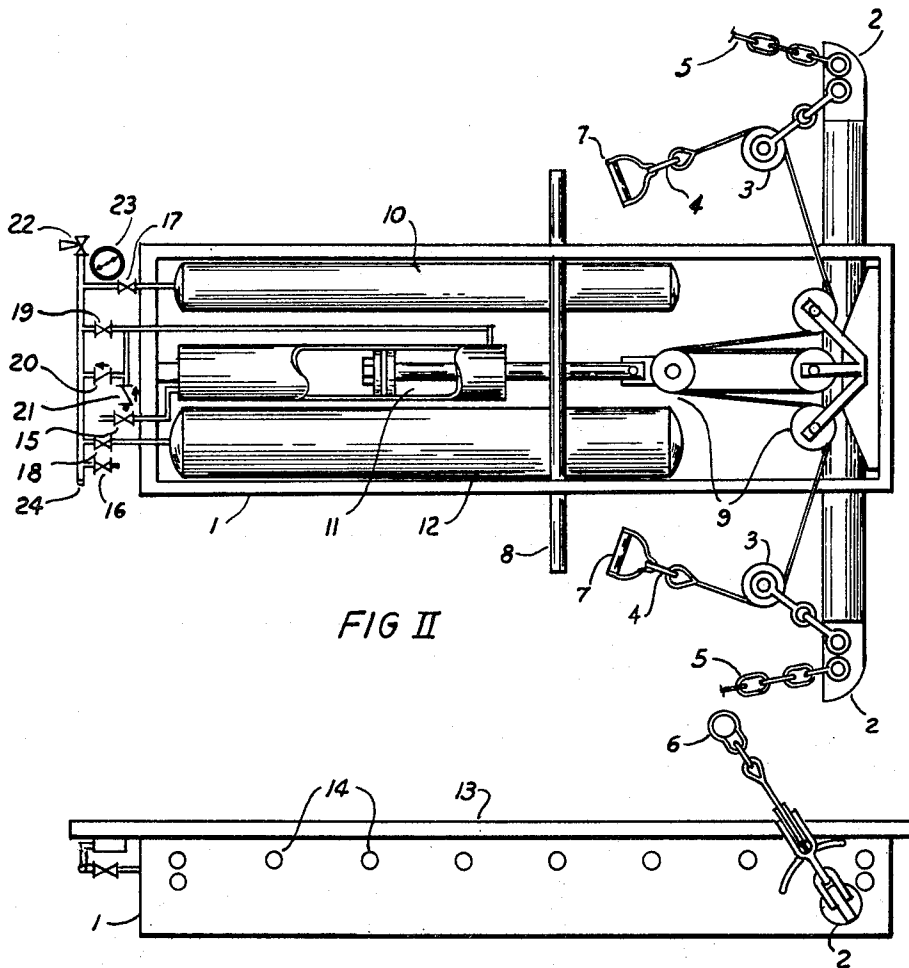


FIG II

FIG I

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1

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EXERCISE MACHINE IN WHICH THE USER PUSHES OR PULLS AGAINST A RESISTING FORCE PRODUCED BY A PNEUMATIC CYLINDER OPERATING IN CONJUNCTION WITH COMPRESSED AIR

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1 Claim. (Cl. 272-79)

This invention and improvement relates to a machine for exercising and developing the muscles of the body, one in which the user pushes or pulls against a resisting force produced by a pneumatic cylinder or cylinders operating in conjunction with compressed air.

Briefly the machine may be described as an "exercise machine utilizing compressed air."

One object of the invention is to provide a lightweight portable machine which may be used to perform resistance exercise movements similar to barbell, dumbbell and pulley weight exercise movements. The machine is so constructed as to provide controllable resistance for exercise movements from slight resistance to extremely heavy resistance.

Another object of the invention is to provide an exercise machine in which the resistance to exercise movements increases over the initial starting resistance during the forward or outward movement, and decreases during the backward or inward movement to the initial starting resistance.

Other features and advantages of the invention will become apparent as the discussion proceeds.

Description

Several embodiments of the present invention are practical. The one selected as most feasible is herewith set out. Objects and advantages of the invention will further become apparent from the diagrammatic drawings and the description of the operation. In describing the preferred embodiment of the invention illustrated in the drawings, specific terminology will be resorted to for the sake of clarity. However, it is not intended to be limited to the specific terms as selected, and it is understood that each specific term includes all technical equivalents which operate in a manner to accomplish a similar purpose or results.

FIGURE 1 is a side elevation *a* of a machine constructed in accordance with this invention.

FIGURE II is a top view with the top board removed.

No. 1. Frame providing support for the top board, pulley system, outrigger bar, pneumatic cylinder, compressed air tanks, foot rest, fluid connectors, and controlling valves.

No. 2. Metal outrigger bar passing horizontally through frame No. 1, at right angles to its long axis and at its front end, said bar having at its terminal ends connectors for securing pulleys, wires, or chains.

No. 3. Wire pulleys attached to the terminal ends of outrigger bar No. 2 with the terminal ends of the wire of the wire pulley system passing through said pulleys.

No. 4. Suitable fittings for connecting the terminal ends of the pulley system wire to the bar No. 6 or hand handles No. 7, or to a spacer chain No. 5 which may be inserted between the terminal ends of the pulley system wire and said bar or handles, permitting the said bar or handles to be attached to the terminal ends of said wire pulley system at selected distances.

No. 5. Spacer chain attached to the terminal ends of outrigger bar No. 2, which chain when secured to the bar No. 6, or to the handles No. 7 at any selected point along its length serves to stop the forward movement of the said bar or handles at a predetermined point.

2

No. 6. Metal bar of proper diameter and length having at its terminal ends suitable means for attaching chains or wires or both. This bar is for barbell exercises.

No. 7. Two hand handles having means for attaching wires, chains or both. These handles are designed for dumbbell exercises.

No. 8. Removable bar for foot rest or hand grab that may be placed as convenient, as indicated by No. 14.

No. 9. Pulleys system consisting of a continuous wire roved through pulleys No. 3, through fixed pulleys secured to the frame No. 1 at the outrigger end, and through movable pulleys attached to the end of the piston rod of the pneumatic cylinder No. 11.

No. 10. Compressed air tank.

No. 11. Pneumatic cylinder, piston, and piston rod, with back end made fast to the frame at the opposite end from the outrigger bar No. 2.

No. 12. Compressed air tank.

No. 13. Strong hard surfaced board on which the exerciser may stand, sit, or lie.

No. 14. Holes through frame No. 1 located at several convenient places for positioning bar No. 7 as convenient.

No. 15. Manually operated valve controlling flow of air in or out of back end of pneumatic cylinder No. 11. Valve leads to ambient atmosphere.

No. 16. Manually operated valve, connected to tanks Nos. 10 and 12, and front end of pneumatic cylinder No. 11 by fluid connectors, said valve leading to ambient atmosphere.

No. 17. Manually operated valve controlling air in or out of tank No. 10.

No. 18. Manually operated valve controlling air in or out of tank No. 12.

No. 19. Manually operated valve controlling flow of air in or out of the front end of pneumatic cylinder No. 11, said valve connected to fluid connectors leading to tank's source of supply, and to ambient atmosphere.

No. 20. Check valve permitting air to pass from front end of pneumatic cylinder No. 11 into compressed air tanks, as No. 10 or 12.

No. 21. Check valve permitting atmospheric air to pass into the front end of pneumatic cylinder No. 11.

No. 22. Pressure release safety valve.

No. 23. Pressure gauge indicating air pressure in the pneumatic system.

No. 24. Valve for attachment to outside source of compressed air (optional).

Operation

When using the machine, the exerciser may stand, sit, or lie on the top board, No. 13, in performing the large number of resistance exercises possible, using either the bar, No. 6, or the handles No. 7.

In the operation of the machine for exercise, compressed air is necessary. It will be considered that the necessary compressed air is supplied from an outside source, through the manually controlled valve No. 24.

Valve No. 16 is closed, valves No. 17 and/or 18 and No. 19 are opened, and compressed air is admitted through valve No. 24 until the necessary pressure is reached, as indicated by gauge No. 23, when valve No. 24 would be closed. From time to time, as required by the various exercises, the air pressure in the system may be changed by manipulating valves Nos. 16 and 24.

The presence of compressed air on the front side of the piston in pneumatic cylinder No. 11 tends to force the piston toward the back end of said cylinder. A pulling force on the bar No. 6, or the handles No. 7, acting through the pulley system No. 9, tends to move the said piston toward the front end of said cylinder. The compressed air acting on the front side of the piston of said cylinder provides the resistance to require a pulling force

on said bar or handles to move said bar or handles either upward or outward, and also a pulling force on the bar or handles to control the motion downwards or backwards.

In nearly all barbell and dumbbell exercise movements the exerciser is able to elevate or handle more weight or resistance toward the end of the upward or outward movement than at the start of the movement. The present invention has the characteristic that the required pull to continue the upward or outward movement increases progressively over the initial starting necessary pull as the upward or outward movement continues. Likewise, there is a progressive decrease of necessary pull during the downward or inward movement, until the end of the movement is reached, when the pull is that of the initial starting pull.

This said characteristic of this invention is due to an unchanging quantity of air under pressure, which is confined in tanks No. 10 and/or 12, the fluid connectors and in front of the piston in the pneumatic cylinder No. 11, which said quantity of air is forced into a smaller volume as the piston is moved toward the front of the pneumatic cylinder No. 11, forcing the displaced air into said tanks and fluid connectors. Forcing a given quantity of air into a smaller space increases the pressure of the entrapped air. Here as the pressure of the air is increased, the necessary pull to continue the movement of the bar No. 6 or handles No. 7 upwardly or outwardly is correspondingly increased. There is likewise a decrease of necessary pull as the said bar or handles are moved downwardly or inwardly.

It is to be understood that the form of the invention herewith shown and described is to be taken as a preferred embodiment. Various changes may be made in the shape, size, and arrangement of parts. For example, equivalent elements may be substituted for those illustrated and described herein, parts may be reversed, and certain features of the invention may be utilized for the use of other fea-

tures, all without departing from the spirit, or scope, of the invention as defined in the subjoined claim.

Having set out an embodiment and description of my invention and/or improvement of an exercise machine above, I hereby claim as follows:

1. An exercise machine comprising a platform, an outrigger positioned at the forward end of the platform and extending outwardly therefrom, a pulley system connected at each end of the outrigger to the forward end of the platform, a pneumatic piston and cylinder mounted on said platform, fluid contained in the cylinder on the forward side of said piston, a flexible strand means having its ends reeved through the respective pulley systems and connected to the end of the pneumatic piston for moving said piston forwardly, handles secured at each end of the strand, means for resisting the forward movement of said piston including at least one tank with a compressible fluid therein, a fluid conduit connecting said cylinder and said tank so that said piston forward movement moves fluid toward said tank, and valve means for controlling the movement of fluid in said conduit, cylinder, and tank.

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