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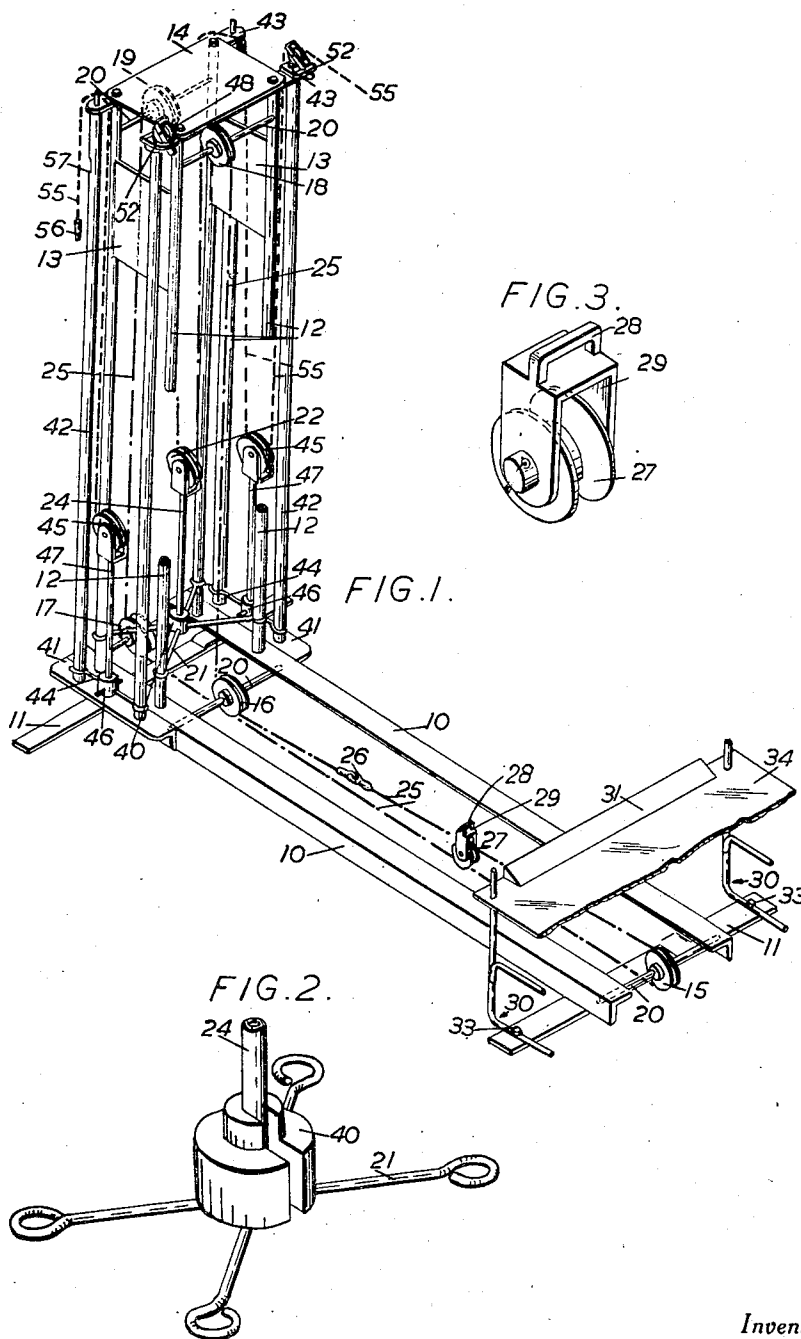
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WEIGHT RAISING EXERCISING APPARATUS

Filed Jan. 26, 1951

2 Sheets-Sheet 1



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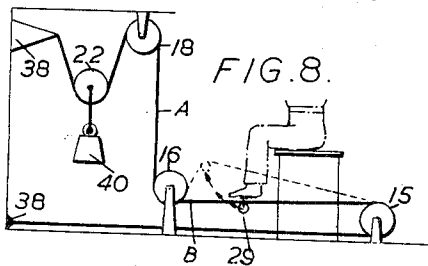
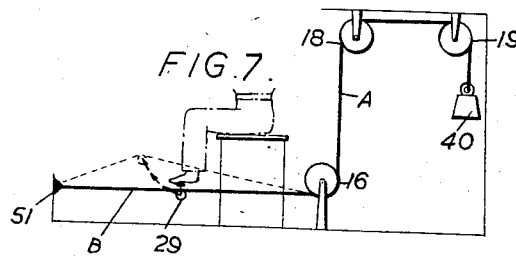
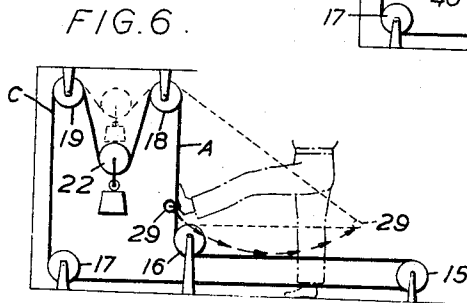
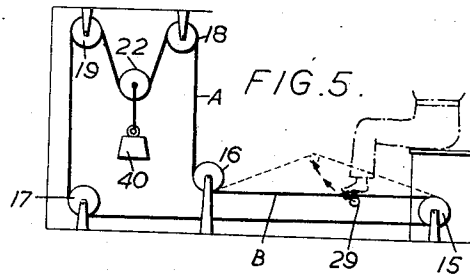
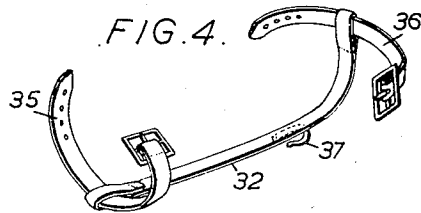
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WEIGHT RAISING EXERCISING APPARATUS

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WEIGHT RAISING EXERCISING APPARATUS

William Hunter, Edinburgh, Scotland

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12 Claims. (Cl. 272-81)

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This invention relates to apparatus for exercising the limbs of the body by the active efforts of the operator against a resistance which commences from zero and increases to a maximum as the effort is increased, and in which the resistance is produced by the raising of a weight or weights.

The apparatus of the present invention comprises an upright frame structure supporting a series of pulleys on fixed axles, a movable weight suspended from a rope (which term is to be understood as including a belt or flexible cable) passed around the pulleys, an elongated base or platform, to the rear end of which said upright frame structure is secured, a guide pulley at the junction of said upright frame structure with said base or platform, said rope being passed around said guide pulley to provide a straight substantially vertical rope section and a straight substantially horizontal rope section, and a pulley block carrying a jockey pulley engaged with one of said rope sections and engageable with either of them, said pulley block being adapted for attachment to the person and to be movable to deflect the rope section with which it is engaged, the pull required to deflect the rope section increasing from zero to a maximum determined by the mass of the weight.

The rope may be anchored at both ends or it may be anchored at one end, or the rope may be endless. Where the rope is endless, the weight is suspended from the rope between a pair of fixed pulleys around which the rope passes. When the rope is anchored at one end, the weight is suspended from the other end of the rope. Where the rope is anchored at both ends, the weight may be suspended from the rope either between a pair of fixed pulleys around which the rope passes, or between one end of the rope and a succeeding fixed pulley around which the rope passes.

In order that the invention may be more clearly understood reference is hereinafter made to the accompanying drawings in which:

Figure 1 is a perspective view of one form of the apparatus, parts being broken away to facilitate illustration.

Fig. 2 is a perspective view of the weight platform.

Fig. 3 is a perspective view of the jockey pulley and pulley block.

Fig. 4 is a perspective view of a strap device for attaching the jockey pulley block to the foot of a person.

Fig. 5 is a diagrammatic view illustrating how the apparatus shown in Fig. 1 can be used.

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Fig. 6 is a similar view to Fig. 5 showing another way in which the apparatus illustrated in Fig. 1 can be used.

Figs. 7 and 8 are diagrammatic views illustrating simpler embodiments of the invention.

In Fig. 1 of the drawings, a base frame is constituted by a pair of spaced longitudinal horizontal frame members 10 connected together at their front and rear ends by transverse support members 11. The frame members 10 at their rear ends support four spaced vertical tubular or solid posts 12 rigidly connected together by web plates 13 and a top plate 14 to form an upright frame.

The structure comprising the base frame and upright frame supports a series of pulleys 15-19 mounted on fixed axles 20, namely a lower front pulley 15, a guide pulley 16 at the junction of the base frame with the upright frame, a lower rear pulley 17, an upper front pulley 18 and an upper rear pulley 19. A movable weight support 21 is vertically slidable on the posts 12 and is suspended from a movable pulley 22 connected to the weight support 21 by means of a rod 24. A rope, belt or flexible cable 25 (shown in chain-dotted lines in Fig. 1) is passed around the fixed pulleys 15, 16, 17, 18 and 19 and around the movable pulley 22. The ends of the rope 25 may be connected together by means of a hook and eye fastening 26, or by any other suitable releasable fastening means. A jockey pulley 27 (Fig. 3) is engaged with the rope 25, the pulley 27 being rotatable in a pulley block 29 provided with an eye member 28 for a purpose hereinafter stated.

A seat may be provided for the operator or patient. By way of example, a seat 34 is shown in Fig. 1 supported on rods 30 having lower extensions adjustably secured by bolts 33 to the front transverse support member 11. The seat 34 may have a thigh support 31. Any other form of seat may be provided.

The apparatus above described may be used in a number of ways for exercising any part of the body. For leg, ankle or stump exercises, the patient may be seated on the seat 34 which may be adjusted for height to suit the patient's physique. As indicated in Fig. 5, the leg or stump to be exercised is harnessed to the pulley block 29 and the patient is encouraged to move the limb against the resistance of a weight 40 supported on the weight support 21. The pulley block 29 may be harnessed to any part of the person, and any convenient means may be used for attaching the pulley block to the part of the person to be exercised. For example,

as shown in Fig. 4 a strap 32 having cross straps 35 and 36 may be strapped to the foot of the patient, the strap 32 having a hook or clip 37 which can be engaged with the eye member 28 of the pulley block.

As shown in Fig. 6, the pulley block 29 is engaged with the vertical section A of the rope 25 which extends between the upper and lower pulleys 18 and 16, but it may be engaged with the vertical rope section C. If desired, the hook and eye fastening 26 may be disconnected and the rope 25 anchored at its ends as at 38 in Fig. 8, or the ends of the rope may be anchored to any convenient fixed parts of the machine. It will be understood that various weights 40 may be supported on the weight support 21.

On reference to Fig. 7 it will be seen that the apparatus may be simplified by suspending the weight 40 from one end of the rope 25, which passes over fixed pulleys 49, 50 and guide pulley 16 to a point 51 at which the other end of the rope is anchored, the rope passing down and around the pulley 16 so that the rope forms at least a vertical section A and a horizontal section B. The pulley block 29 can be engaged with the section B as in Fig. 7 and as in Figs. 5 and 8. Alternatively by passing the pulley block 29 between the rope and the pulley 16, the pulley block 29 can be slid along the rope and engaged with the vertical rope section A as indicated in Fig. 6.

It will be observed that in all cases, the aim of the patient is to deflect the rope section from its straight form, the pulley 16 being free to ride along the rope section A or B. The force required to deflect the rope gradually increases from zero to a maximum determined by the load imposed by the weight 40. Instead of the pulley block 29 being engaged with the vertical rope section A in Fig. 6, it may be engaged with the rear vertical rope section C.

Although I have shown the foot of a patient harnessed to the pulley block 29, it must be understood that any of the limbs of the patient or the trunk, neck, shoulders or head of the patient may be harnessed to the pulley block. The construction of harness employed will vary according to the part of the body to be exercised.

By seating the patient as in Fig. 5 but with the lower part of his leg fastened against movement, for example, by fastening the lower part of the patient's leg to the seat frame so that he can only move his ankle and attaching his foot to the pulley block 29, the patient can exercise his ankle.

Fig. 6 shows the apparatus in use for hip joint exercises. If the patient is seated instead of standing as in Fig. 6, the muscles controlling flexion of the knee joint may be exercised. Moreover, if the patient turns sideways from the frontal position shown in Fig. 6, the adductor muscles may be exercised by attaching the foot of the outstretched leg of the patient to the pulley block 29 and moving the outstretched leg sideways towards the other leg; alternatively, the patient may face in the opposite direction with both legs together and with one foot attached to the rope section A by the pulley block 29, exercising the abductor muscles by moving the attached leg sideways away from the other leg.

The apparatus above described may be combined with auxiliary pulling apparatus for arm, shoulder, chest or trunk exercises. For this purpose the rear end of the base platform may be extended laterally to either right or left thereof, or to both sides (as shown in Fig. 1) to carry an additional weight support. Platforms 41 secured

to the frame members 10 support spaced upright auxiliary posts 42 which are rigidly connected to the main frame by members 43 joining the upper ends of posts 12 and 42. An additional movable support 44 for a weight 46 is guided for vertical movement on each pair of posts 42 and is suspended from an additional movable pulley 45 connected to the platform 44 by means of a rod 47. The front posts 42 are provided, at their upper ends, with swivelling pulleys 48. A separate length of rope 55 (shown in heavily dotted lines in Fig. 1) is passed around the pulleys 45 and 48. One end of the rope 55 may be anchored to the rear post 42 or, as shown in Fig. 1, the end of the rope may be provided with a weight 56 which is dropped through a slot 57 provided in the rear post 42 which, for this purpose, is made tubular. The other end of the rope 55, after passing around the swivelling pulley 48, is secured to an arm, shoulder, trunk, chest, head or other harness, or may be grasped by the patient.

I claim:

1. Exercising apparatus comprising an upper fixed pulley, a lower fixed pulley, a rope passed around said pulleys and extending from the lower pulley in a substantially horizontal direction, a weight suspended from the rope at a point in advance of the passage of the rope over the upper pulley to the lower pulley, a pulley block housing a pulley engaged with a straight section of said rope between a pair of said pulleys and means on said pulley block for enabling it to be attached to a person for deflecting the rope.
2. Exercising apparatus as claimed in claim 1 wherein the rope is endless and passes over additional upper and lower pulleys, the weight being suspended from the rope between the upper pulleys.
3. Exercising apparatus as claimed in claim 1 in which the horizontal section of the rope terminates in an anchored end and the weight is suspended from the other end of the rope.
4. Exercising apparatus as claimed in claim 1 in which the horizontal section of the rope terminates in an anchored end and the other end of the rope is fixed, the weight being suspended from the rope between said fixed end and the upper pulley.
5. Exercising apparatus as claimed in claim 1 in which the rope passes over additional upper and lower pulleys and the weight is suspended from the rope between the upper pulleys.
6. Exercising apparatus comprising an upright frame structure, pulleys on fixed axes on said structure, a rope passed around said pulleys, a movable weight suspended from said rope, an elongated base frame secured at its rear end to said upright structure, a guide pulley at the junction of said base frame with the upright structure, said rope being passed around said guide pulley to provide a straight substantially vertical rope section and a straight substantially horizontal rope section, a pulley block housing a jockey pulley engaged with one of said rope sections, and means on said pulley block for enabling it to be attached to a person and to be moved to deflect and tension the rope section with which it is engaged.
7. Exercising apparatus as specified in claim 6 including a front pulley at the front of the base frame, the horizontal section of said rope passing over said front pulley.
8. Exercising apparatus as specified in claim 6 including a front pulley at the front of the

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base frame, the horizontal section of said rope passing over said front pulley, a lower rear pulley at the junction of the base frame with the upright structure, said rope after passing over said front pulley passing over said lower rear pulley to the pulleys on fixed axles on the upright structure, and a disconnectible fastening connecting the ends of said rope.

9. An exercising apparatus comprising a rope, a series of pulleys arranged in the same vertical plane at different heights, said rope passing over said pulleys and presenting straight horizontal and vertical rope sections, a vertically movable pulley wheel suspended from the rope, a weight suspended from said pulley wheel, a jockey pulley freely movable along and engaged with one of said rope sections, and means for detachably engaging said jockey pulley with a part of the body to be exercised, movement of said jockey pulley in a direction away from the straight line position of the rope section with which it is engaged causing the weight to be raised, the resistance offered to movement of said jockey pulley in a direction to deflect the rope section increasing from zero to a maximum as the rope section is deflected further from its straight-line position and the rope angle at the jockey pulley varies.

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10. Exercising apparatus as specified in claim 9 wherein an endless rope is employed.

11. Exercising apparatus as specified in claim 9 wherein the rope ends are provided with a fastening for connecting the ends of the rope together and for disconnecting them.

12. Exercising apparatus as specified in claim 9 including a pulley block in which the jockey pulley is rotatably mounted, an eye member on said pulley block, a hook detachably engageable with said eye member and harness for attaching the hook to the part of the body to be exercised.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
374,496	Reach	Dec. 6, 1887
480,271	Newton	Aug. 9, 1892
726,095	Nightingale	Apr. 21, 1903
763,475	Frazee	June 28, 1904
1,112,114	Caines	Sept. 29, 1914
2,456,017	Park	Dec. 14, 1948
2,472,391	Albizu	June 7, 1949