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<p>(21) International Application Number: PCT/GB 80/00097 (22) International Filing Date: 4 June 1980 (04.06.80) (31) Priority Application Number: 7919335 (32) Priority Date: 4 June 1979 (04.06.79) (33) Priority Country: GB</p> <p>(71) Applicant (for all designated States except CH and US): INVENTEC LICENSING B.V. [NL/NL]; 31 Lomboklaan, NL-3956 De Leersum (NL). (71) Applicant (for CH only): TAYLOR, Duncan, Alistair [GB/GB]; 30 John Street, London WC1N 2DD (GB). (72) Inventor; and (75) Inventor/Applicant (for US only): CUNNINGTON, Ian, John [GB/GB]; 5 Paddock End, Grouville, Jersey (GB).</p>		<p>(74) Agents: TAYLOR, Duncan, Alistair et al.; Kilburn & Strode, 30 John Street, London WC1N 2DD (GB). (81) Designated States: AU, CH, DE, GB, JP, US.</p> <p>Published With international search report</p>
<p>(54) Title: EXERCISING EQUIPMENT</p>		
<p>(57) Abstract</p> <p>A rowing machine has a frame (10), a handle (14) pivoted to the frame for fore and aft movement, a seat (12) which is slidable along the frame (10), and an energy-dissipating mechanism (60 to 68) which acts between the handle (14) and the front part of the frame (10), by means of a webbing strap (58) extending between these parts (10, 14), to resist rearwards movement of the handle (14). To make the machine more compact for storage purposes, the frame (10) comprises two portions (10A, 10B) which are hinged together (at 22), and can be folded together for storage purposes. In the folded position, the handle (14) hooks under the seat (12), to keep the machine in this position.</p>		

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"EXERCISING EQUIPMENT"FIELD OF THE INVENTION

This invention relates to exercising equipment, and more particularly to exercising machines which allow a user to simulate the action of rowing a boat.

5. THE PRIOR ART

Various rowing-type exercising machines have already been proposed. However, these previously-proposed machines have suffered from various disadvantages. Many of the prior machines have used a handle which is not constrained to follow any particular path, but is merely connected to the front end of the frame of the machine by a cord or tension spring. This means that the line of action of the force against which the user must work is much lower than in real rowing, so that the machine does not allow the user to simulate accurately a rowing action. Also, the fact that the handle is only loosely connected to the frame of the machine may make the machine somewhat inconvenient to store.

Also, the previously-proposed machines incorporate a frame which is in general fairly long, and this contributes to the awkwardness of storing the machine.

The present invention is concerned with providing a rowing-type exercise machine which is reasonably convenient to store, and does not have a loose handle.

25. * SUMMARY OF THE INVENTION

According to the present invention, exercising equipment comprises an elongate frame, a foot rest mounted on the frame, a seat which is movable generally horizontally along the frame towards and away from the foot rest, and a handle mounted on the frame and



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5. arranged to be moved along a predetermined path by a user of the equipment, with at least a component of movement parallel to the direction of movement of the seat, and means arranged to oppose such movement of the handle, and the frame comprises front and rear portions which, in an operative position, lie generally in alignment and end to end, and, in a storage position, lie with their lengths at least approximately parallel, and at least partially overlapping.

10. The invention makes it possible to reduce the overall size of the exercising equipment for storage purposes.

15. Preferably, the two portions of the frame are interconnected by a hinge joint, so that the frame can be moved from its operative position to its storage position by a folding movement.

20. The means opposing movement of the handle is conveniently mounted entirely on the front portion of the frame, on which portion the foot rest is also mounted, while the rear portion of the frame provides a track for the movement of the seat.

25. The predetermined path along which the handle moves preferably lies well above the level of the seat, at least along part of the length of this path, in order that the exercise provided by the machine is a fairly close simulation of a rowing action. For example, the handle may comprise a bar which is pivoted at its lower end to the frame of the equipment, about a horizontal axis, and carrying a hand-grip at or near its upper end. Conveniently the pivot axis of the handle may coincide with the axis of the hinge joint connecting the two portions of the frame.

30. It may be possible so to arrange the lines of

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- action of the various forces acting on the two portions of the frame that there is no tendency for relative movements to occur when the exercising equipment is in use. However, the preferred embodiment includes means arranged to prevent such relative movements of the two frame portions away from their operative position. It is also desirable that the frame portions of the equipment should be restrained from relative movements when in their storage position; in the case where the two
5. frame portions are connected by a hinge joint, and the handle consists of a pivoted bar, the handle bar, in the storage position, may be restrained from movement by a hook arrangement connecting it to the rear frame portion, while the movement resisting means maintains a
10. biasing force tending to move the handle bar relative to the front frame portion, which biasing force, on the one hand, keeps the hook arrangement under load, and, on the other hand, keeps the front frame portion pressed firmly against means limiting further folding
15. movement of the frame portions.
- 20.

The invention may be carried into practice in various ways, but one specific embodiment will now be described by way of example, with reference to the accompanying drawings, of which:-

25. Figure 1 is a side elevation of an exercising machine embodying the invention, in an operative position;

Figure 2 is a view, similar to Figure 1, but showing the machine in a storage position;

30. Figure 3 is a plan view of the machine; and

Figures 4 and 5 are sections, to an enlarged scale, taken on the lines IV-IV and V-V of Figure 2.

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The exercise machine shown in the drawings consists essentially of a frame 10, a seat 12, and a pivoted handle 14 which can be moved against a resisting force. The frame 10 in turn consists of a rear portion 10A which provides a track along which the seat 12 can slide, and a forward portion 10B which houses a mechanism providing the force resisting movements of the handle 14. As will later be described in more detail, the two portions of the frame 10 are joined by a pivotal connection, so that the frame 10 can be folded to reduce its overall size, for storage purposes.

When the machine is in use, the user sits on the seat 12, with his feet on foot-rests 16 which form part of the forward portion 10B of the frame 10, and grasps two hand-grips 18 which form part of the handle 14. By straightening his legs and bending his arms and thereby pulling the handle 14, the user can simulate the action of rowing a boat, with each stroke of the handle being accompanied by a movement of the seat 12 along the rear portion 10A of the frame 10. After each stroke, the user returns to his previous position; the mechanism which provides the resistance to movement of the handle 14 assists the return movement of the handle, while the return movement of the seat 12 is assisted by the fact that the rear portion 10A of the frame is slightly inclined, so that the seat runs downhill during the return stroke. The construction of the

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exercise machine will now be described in greater detail.

The forward portion 10B of the frame includes a generally channel-shaped pressing 20, on which are mounted the various parts of the mechanism which provides the resistance to movement of the handle 14; this mechanism is concealed beneath a moulded plastics cover (not shown in the drawings). The rear portion 10A of the frame includes a pair of oblong section steel tubes 24, between which the rear part of the pressing 20 is received. The tubes 24 are interconnected near their front ends by a cross shaft 22 (see Figure 4); a reduced-diameter portion 23 at each end of the shaft 22 is received in a transverse bore in the respective tube 24, and a spring clip is fitted to each end of the shaft 22, to keep the tubes 24 in place against the shoulders defining the inboard limits of the reduced-diameter portions. The cross shaft 22 also passes through holes in the two vertical walls of the pressing 20, between the tubes 24, thereby acting as a hinge pin connecting the two portions of the frame 10.

To lock the two portions of the frame 10 against relative movement in their operative position, as shown in Figure 1, a locking pin 25 is provided, which passes through openings in the tube 24 and the vertical walls of the pressing 20, forward of the cross shaft 22. When the frame 10 is to be folded in its storage position (shown in Figure 2), the

locking pin 25 is manually withdrawn to allow the pressing 20 to hinge relative to the tubes 24.

The front end of each of the tubes 24 is supported by a plastics foot 27, secured to the underside of the tube. The rear ends of the tubes 24 are supported by a support 28 which is hinged to the tubes 24 by a cross shaft 30. The shaft 30 passes through transverse holes in the tubes 24; to maintain the correct spacing, between the tubes, a pair of collars 29 are pinned to the shaft 30, between the tubes 24. The support 28 consists of a prop portion 32, which extends almost vertically when the machine is in the operative position; the prop portion 32 is a shallow channel-shaped pressing, whose flanges lie one on each side of the rear portion 10A of the frame, thereby preventing the tubes 24 from moving apart. The cross shaft 30 extends through holes in the flanges at the top end of the prop portion 32, while a support bar 34 extends through and is fixed in holes in the flanges at the lower end of the prop portion 32. Each end of the support bar 34 is fitted with a round plastics foot 36, which forms the actual contact with the ground.

The support 28 can be pivoted about the shaft 30 from its operative position (Figure 1) to a storage position (Figure 2) in which it lies almost parallel to the tubes 24. To maintain the support in either of these positions, a channel-shaped strut 33, which is narrow enough to fit between

the two tubes 24, is pivoted at one end to the prop
portion 32 by a further cross shaft 35, passing
through holes in the side flanges of the prop
portion and the strut. The other end of the strut
5. 33 is connected to the tubes 24 by a cross pin 37,
which is fixed between the tubes 24, and passes
through slots 39, one in each of the flanges of the
strut 33. So that the support 28 is locked when
the pin 37 is at either end of the slots 39, each
10. slot has, at each of its ends, an upwards-extending
end portion. Thus, when the pin 37 is at either
end of the slots 39, the strut 33 will drop down,
so that the pin 37 is received in the end portions
of the slots 39, and the support 28 is locked
15. until the strut 33 is manually lifted.

The seat 12 consists simply of a board
provided on its upper surface with padding, and
having attached to its underside a pair of brackets
between which extend two transverse shafts each
20. carrying a pair of rotatable flanged rollers which
run on the upper surfaces of the frame tubes 24.
In addition, the brackets are fitted with a pair
of retaining lugs which co-operate with the under-
sides of the tubes 24 to keep the seat captive on
25. the frame 10.

The pivoted handle 14 consists of a square
steel tube having at its upper end a transverse bore
which receives a round tubular handle bar 50, and
having at its lower end a transverse bore by which
30. it is pivoted on the cross shaft 22, between the

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vertical flanges of the pressing 20. Two spacer bushes 54 centralise the handle 14 between the flanges of the pressing 20. The handle bar 50 is rotatable in the bore in which it is received; this avoids the need for the user to allow his hands to slide around the handle bar in the course of a stroke.

As mentioned above, the channel-shaped pressing 20 forming the forward portion 10B of the frame carries the mechanism providing the resistance to movements of the handle 14. It also carries the foot-rests 16, which are formed by a single tube 52 fixed within a sleeve 54; which is in turn fixed at the front top corners of the flanges of the pressing 20. The pressing 20 also has, fixed to its underside, a transverse stabiliser 56, consisting of a rectangular section tube. When no forces are applied to the machine, and the machine is resting on a flat surface, the stabiliser is not quite in contact with the ground.

However, clearances in the hinged joint between the two portions of the frame 10, may allow the forward portion 10B to move somewhat under the forces applied to the machine in operation, and the stabiliser 56 may then contact the supporting surface to limit these movements.

The mechanism which provides the resistance to rearwards movement of the handle 14 includes a tape 58 of nylon webbing, which emerges from an opening formed in the top of the plastics cover (not shown), and is then attached to the handle 14. The mechanism within the cover is illustrated in Figure 5, and is so arranged that, as the handle 14 is moved rearwards, pulling the tape 58 out of the cover, the tension in the tape opposing movement of the handle is considerable, while when the handle is moved forwards again, the part of the tape attached to the handle 14 is under only a slight tension. To achieve this, the tape 58, after entering the cover, makes a part turn about each of a series of nine cylindrical or part-cylindrical guides 60 to 68. The first guide 60 is formed by the central portion of the sleeve 54, fixed right at the front of the pressing 20. The remaining guides guide the tape 58 in a serpentine path; the four guides 61, 63, 65 and 67 define the lower bights of this path, while the four remaining guides 62, 64, 66 and 68 define the upper bights of the serpentine path. Each of the guides 61, 63, 65 and 67 is formed by a roller which is

freely rotatably mounted on a pivot shaft extending between the walls of the pressing 20. Each of the guides 62, 64, 66 and 68 is also formed by a roller, but these guides are each fixed to a shaft which is journaled in the side walls of the pressing 20, and whose rotation is controlled by a respective one of four ratchet mechanisms 70 (two visible in Figure 1). The mechanisms 70 are individually controllable; each mechanism has a disengaged position, in which the associated roller is freely rotatable, and an engaged position, in which the roller is locked against anti-clockwise rotation (as seen in Figure 1); this direction of rotation tends to occur as the handle 14 is moved rearwards. The rollers 62, 64, 66 and 68 are still free to turn clockwise as the handle 14 is moved forwards again. After leaving the guide 68, the tape 58 is wound up on a rotatable drum 76, which contains a clock-type spring arranged to maintain a tension in the tape, and is mounted on a pivot shaft extending between the flanges of the pressing 20.

In operation, the tension maintained in the tape by the spring-loaded drum 76 is magnified by the frictional sliding of the tape around those of the guides which remain stationary as the handle 14 is moved rearwards, thereby creating a considerable tension in the part of the tape attached to the handle. The magnitude of this tension can be adjusted by varying the number of ratchet

mechanisms 70 which are engaged, thereby varying the number of guides around which the tape 58 has to slide frictionally. As the handle 14 is moved forwards again, all the guides except the

5. guide 60 will rotate, so that there is only a little friction opposing the movement of the tape 58. The force exerted by the tape on the handle 14 will therefore be slightly less than the

10. tension maintained in the tape by the spring biassing of the drum 76, which is in turn considerably less than the reaction force exerted by the tape on the handle 14 during rearwards movements of the handle.

The machine also includes a mechanical

15. counter 100 arranged to integrate the movements of the handle made by the user of the machine. The counter is mounted on the right-hand flange of the pressing 20, and is driven by a belt and pulley drive 102 from the shaft on which one of

20. the guides 62, 64, 66 or 68 is mounted. The counter 100 incorporates its own one-way ratchet mechanism, so that only clockwise movements of the shaft actuate the counter; it will be appreciated that such movements occur on the return stroke

25. of the handle 14, irrespective of whether the associated ratchet mechanism 70 is engaged or disengaged, and the magnitude of these movements indicates the magnitude of the movement of the handle 14. Thus, the counter 100 indicates the

30. total distance through which the handle 14 has

been moved.

The machine also includes a timer 106, which, in conjunction with the counter 100, allows the user to assess the rate at which he is exercising.

5. The timer 106 is mounted on the left-hand flange of the pressing 20, and incorporates a conventional clockwork mechanism. The timer also incorporates a thumb wheel 108 which is calibrated in minutes, and is used to wind up the timer for the required
10. number of minutes. At the end of the set time period, a bell is sounded by the timer.

- Figure 2 illustrates the storage position of the machine. As previously described, when the machine is to be stored, the locking pin
15. 25 is manually withdrawn, and the front portion 10B of the frame is folded upwards and over the rear portion 10A. This action also moves the handle 14 in the same manner, since the handle is pivoted on the same axis as the front portion
20. 10B. The tension in the tape 58 tends to keep the handle 14 and the front frame portion 10B pressed firmly together during this movement. To allow this movement, the seat 12 has first to be
25. moved to its rearmost position; this allows the top end of the handle 14 to move down close to the rear portion 10A of the frame. However, as the handle 14 and the front frame portion 10B move with one another towards this position, part of the front frame portion 10B will abut against
30. the rear frame portion 10A, limiting the amount

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- of pivoting movement of the front frame portion. When this occurs, the handle 14 is still a little way above the rear frame portion 10A; the handle can now be pressed down, against the tension in
5. the tape 58, until it contacts the top of the tubes 24. A hook 110 is provided at the top of the handle, and this hook can now be engaged under the front edge of the seat 12, by moving the seat forward slightly. In this way, the parts
10. are held firmly in their storage position, with the tension in the tape 58 tending to prevent relative movements.

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CLAIMS

1. Exercising equipment comprising an elongate frame (10), a foot rest (16) mounted on the frame, a seat (12) which is movable generally horizontally along the frame towards and away from the foot rest (16), and a handle (14) arranged to be moved by a user of the equipment, with at least a component of movement parallel to the direction of movement of the seat (12), and means (58, 60 to 68) arranged to oppose such movement of the handle, characterised in that the handle (14) is mounted on the frame (10), in such a way as to be movable along a predetermined path, and the frame comprises front and rear portions (10B, 10A) which, in an operative position (Figure 1), lie generally in alignment and end to end, and, in a storage position (Figure 2), lie with their lengths at least approximately parallel, and at least partially overlapping.

2. Equipment as claimed in Claim 1 in which the two portions (10A, 10B) of the frame are interconnected by a hinge joint (22).

3. Equipment as claimed in Claim 1 or Claim 2 in which the means (58, 60 to 68) opposing movement of the handle (14) includes a flexible elongate tension-bearing element (58) which acts between the handle (14) and the front portion (10B) of the frame, to oppose movements of the handle (14) away from the front portion (10B) of the frame.



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4. Equipment as claimed in Claim 3, in which the flexible elongate tension-bearing element (58) is arranged to move, relative to the front portion (10B) of the frame, in the direction of its own length, on movement of the handle (14) away from the front portion (10B) of the frame, and in which the movement opposing means also includes means (60 to 68) mounted entirely on the front portion (10B) of the frame, for opposing movements of the tension-bearing element (58) relative to the frame.

5. Equipment as claimed in Claim 4, in which the foot rest (16) is mounted on the front portion (10B) of the frame.

6. Equipment as claimed in Claim 1 or Claim 2 or Claim 4 or Claim 5, in which the rear portion (10A) of the frame provides a track for the movement of the seat (12).

7. Equipment as claimed in Claim 1 or Claim 2 or Claim 4 or Claim 5, in which the predetermined path along which the handle (14) moves lies a substantial distance above the level of the seat (12), along at least a part of the length of the said predetermined path.

8. Equipment as claimed in Claim 7 in which the handle (14) comprises a bar which is pivoted (at 22) at its lower end to the frame (10) of the equipment, about a horizontal axis, and carries a hand-grip (18) at or near its upper end.

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9. Equipment as claimed in Claim 8 in which the two portions (10A, 10B) of the frame are interconnected by a hinge joint (22), and the pivot axis of the handle (14) coincides with the axis of the said hinge joint (22).

10. Equipment as claimed in Claim 8 or Claim 9, in which the handle bar (14) carries one portion (110) of a hook arrangement, the remainder of which is connected to the rear frame portion (10A), the hook arrangement serving, in the storage position of the equipment (Figure 2), to restrain the handle bar (14) against movement away from the rear frame portion (10A), while the movement resisting means (58, 60 to 68, 76) maintains a biasing force tending to move the handle bar (14) relative to the front frame portion (10B), which biasing force, on the one hand, keeps the hook arrangement (110) under load, and, on the other hand, keeps the front frame portion (10B) pressed firmly against means limiting further folding movement of the frame portions (10A, 10B).

11. Equipment as claimed in Claim 10 in which the said remainder of the hook arrangement is part of the seat.

12. Equipment as claimed in Claim 1 or Claim 2 or Claim 4 or Claim 5, which includes means engageable to prevent relative movements of the two frame portions away from their operative position.



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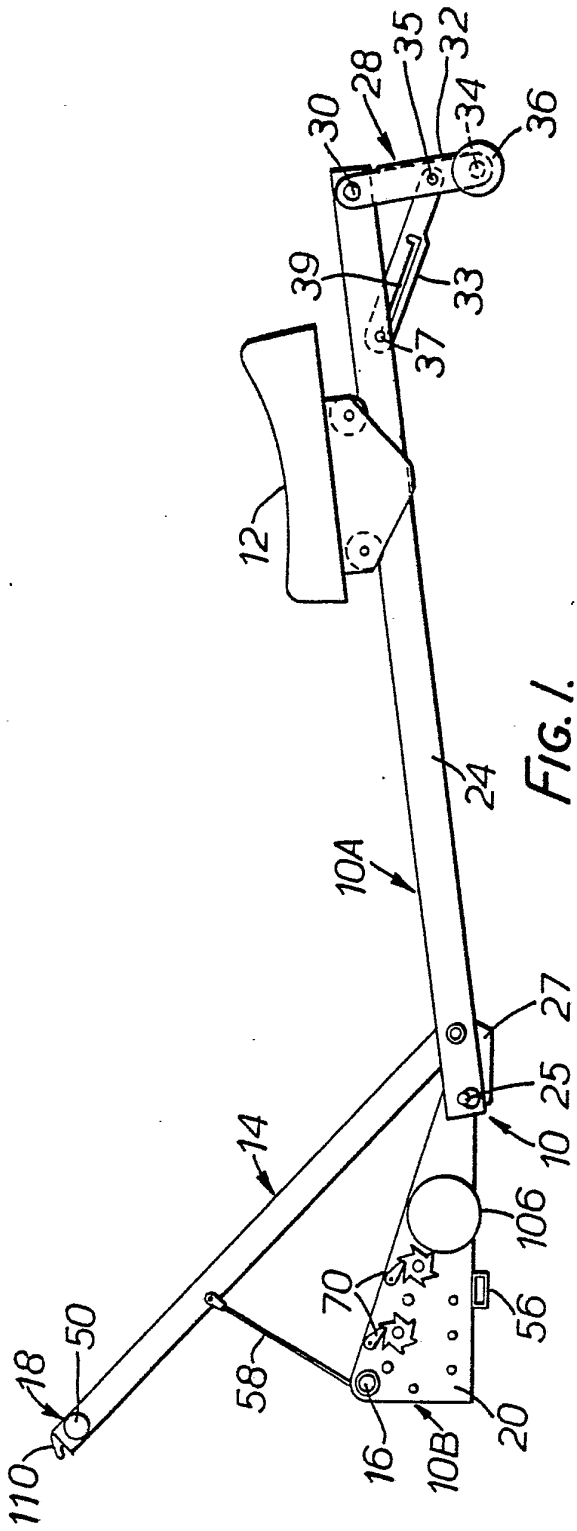


FIG. 1.

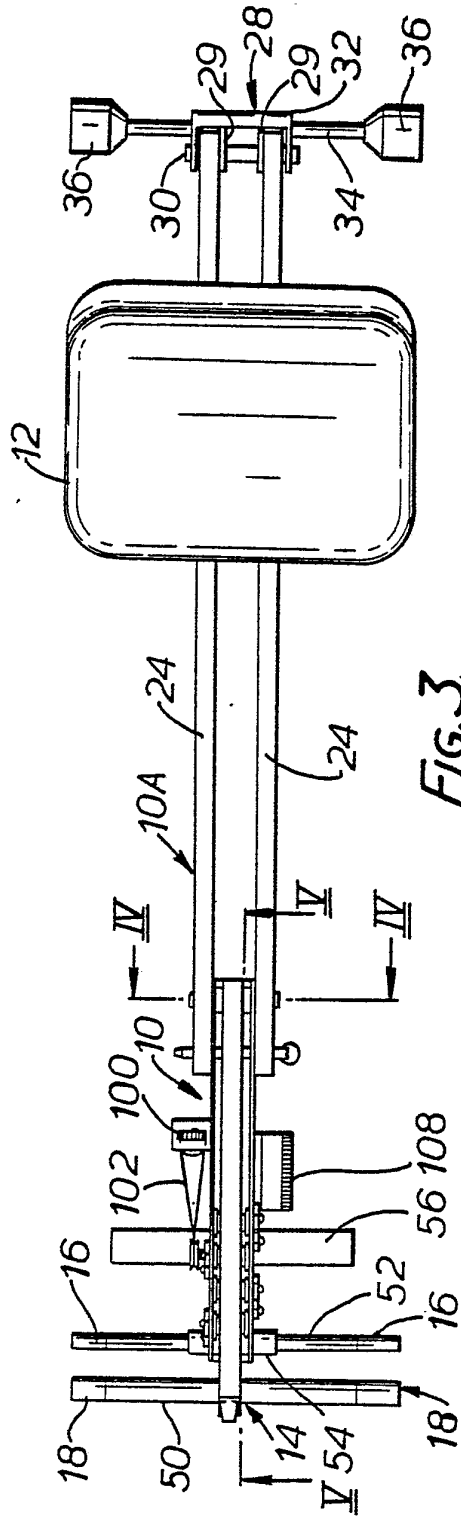


FIG. 3.

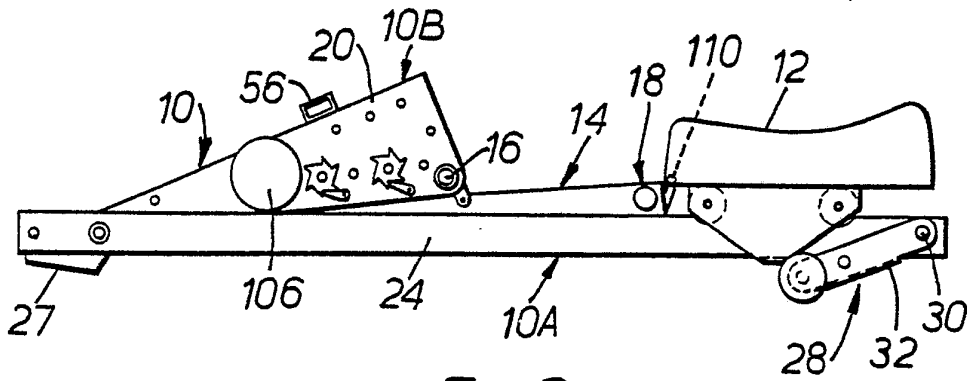


FIG. 2.

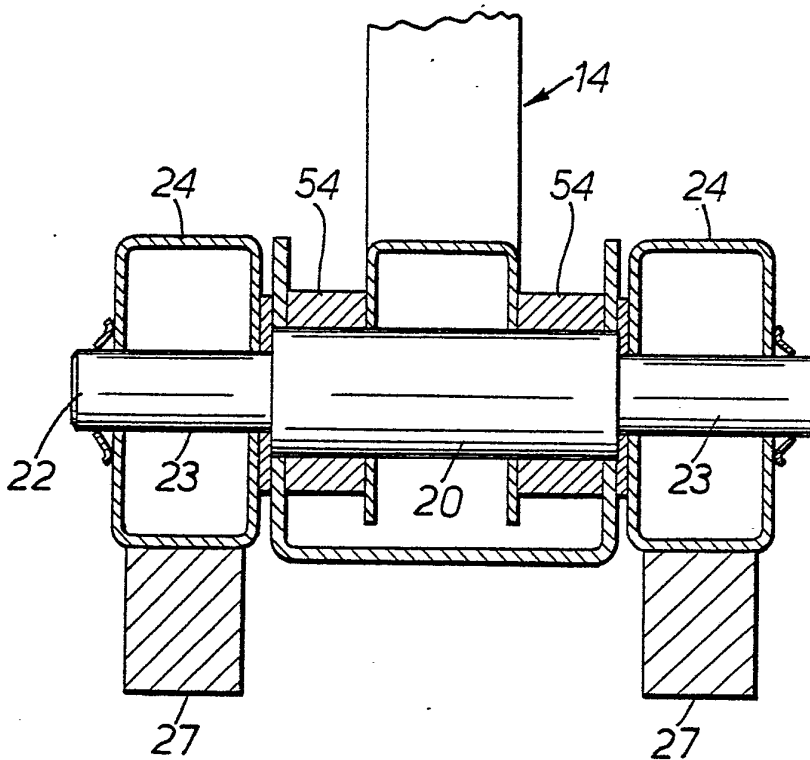
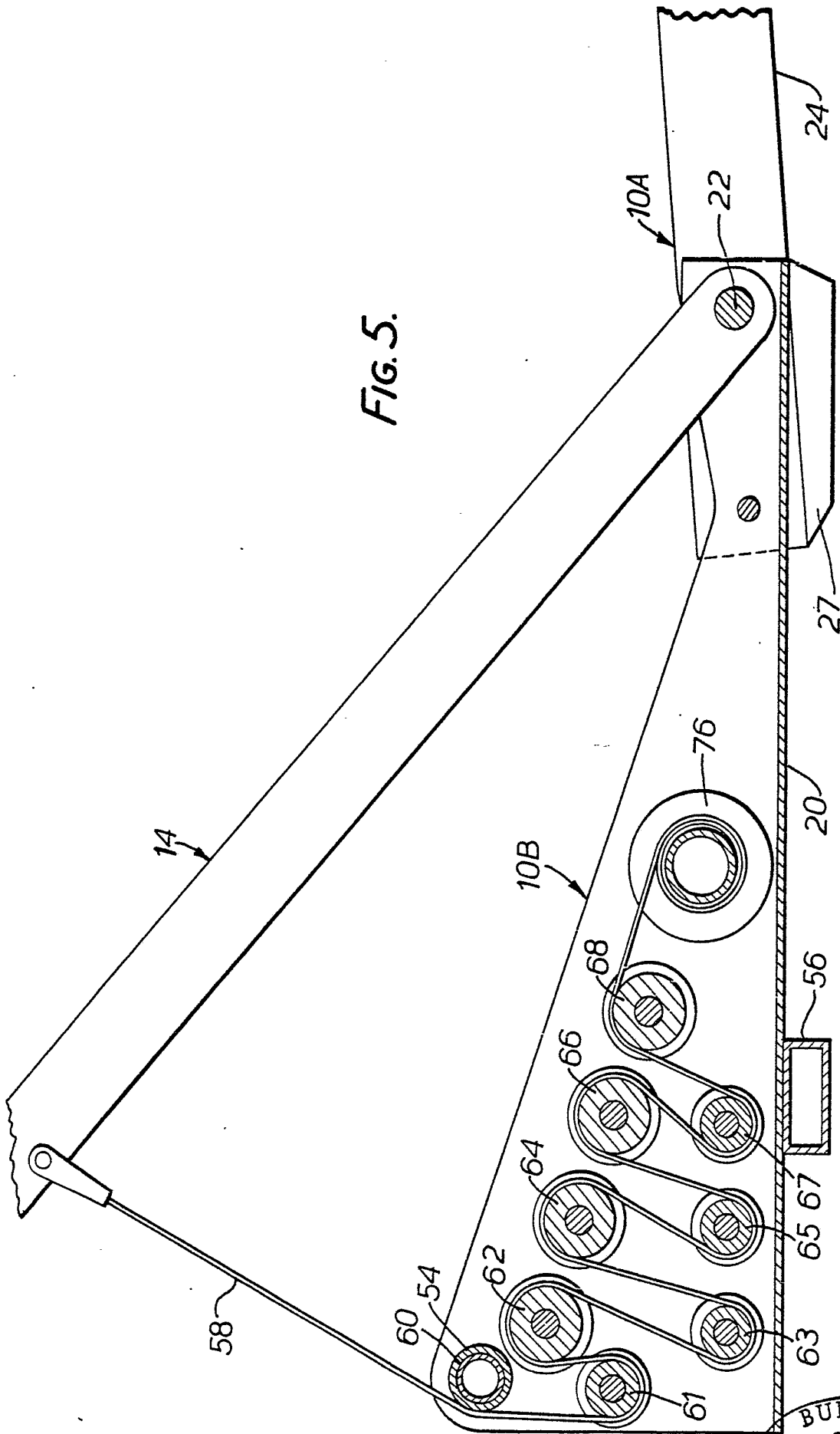


FIG. 4.

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FIG. 5.



INTERNATIONAL SEARCH REPORT

International Application No PCT/GB 80/00097

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ³
 According to International Patent Classification (IPC) or to both National Classification and IPC

Int.Cl.³ A 63 B 69/06// A 63 B 21/00

II. FIELDS SEARCHED

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Classification System

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Int.Cl.³ A 63 B

Documentation Searched other than Minimum Documentation
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III. DOCUMENTS CONSIDERED TO BE RELEVANT ¹⁴

Category ⁶	Citation of Document, ¹⁶ with indication, where appropriate, of the relevant passages ¹⁷	Relevant to Claim No. ¹⁵
X	GB, A, 356467, published October 1, 1931 see figure 1; page 1, line 82 - page 2, line 25; page 2, lines 61-91, Siemens- Schuckertwerke AG ---	1-7
X	GB, A, 347533, published May 21, 1931 see figures 1,2,4; page 1, line 84 - page 2, line 8, J.M. Thomson ---	1-3,5-7
X	US, A, 1905092, published April 25, 1933 see figures 1-3; page 1, lines 53-88; page 2, lines 60-68, P. Hardy ---	1-3,5-7
X	US, A, 1866868, published July 12, 1932 see figures 2,3,6; page 1, line 76 - page 2, line 89; page 3, lines 80-95 ---	1-3,5-7
X	GB, A, 1133927, published November 20, 1968 see figure 2; page 1, line 84 - page 2, line 5; page 2, lines 65-127, V. Hart ---	1,2,5-7
X	BE, A, 547710, published November 6, 1959 see figures 8,9; page 7, paragraph 4 - page 8, paragraph 3, Adams & Cie. ---	1,3-7 ./.

⁸ Special categories of cited documents: ¹³

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IV. CERTIFICATION

Date of the Actual Completion of the International Search ¹

26th August 1980

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