(12) UK Patent Application (19) GB (11) 2 175 813 A

(43) Application published 10 Dec 1986

(21) Application No 8613549

(22) Date of filing 4 Jun 1986

(30) Priority data
(31) 8514253 (32) 5 Jun 1985 (33) GB

(51) INT CL⁴
A63B 21/02 69/06

(52) Domestic classification (Edition H):
A6M 8K1A 8K1Y 8K2CY 8K2Y 8KY

(56) Documents cited
GB A 2028669 WO 80/02647 EP A1 0019935

(58) Field of search
A6M
Selected US specifications from IPC sub-class A63B

(71) Applicants
Clifford Gary Grove,
The Style Extension, 18 Dalling Road, Hammersmith, London W6.
Julian David Mason Scrivener,
155 Brooke Road, Clapton, London E5

(72) Inventors
Clifford Gary Grove
Julian David Mason Scrivener

(74) Agent and/or Address for Service
Graham Jones & Company,
77 Beaconsfield Road, Blackheath, London SE3 7LG

(54) A rowing machine

(57) A rowing machine 2 comprises a frame 4, a seat 6 mounted for forwards and backwards movement on a part 8 of the frame 4, feet anchor means 12,14 for securing a person's feet in position when that person is seated on the seat 6 and is using the rowing machine 2 to simulate a rowing-type action, hand grip means 24 for pulling on during the simulated rowing-type action, and resistance means associated with the hand grip means 24, the resistance means comprising a flexible elongate member 28 eg a webbing belt which is coiled around a hub within a housing 22. The hub is preferably mounted on a clutch arrangement comprising a pair of needle roller clutch devices (Fig. 3) and the elongate member 23 is biassed into a wrapped position around hub by a flat coil spring (32, Fig. 2). The machine preferably includes an electrically or mechanically controlled means for varying the resistance of the resistance means to the pulling action of the person, the varying means comprising a belt bearing against a fly wheel (124,104, Fig. 2). A mechanically operated resistance varying means may include a movable weight arrangement (Fig. 4).

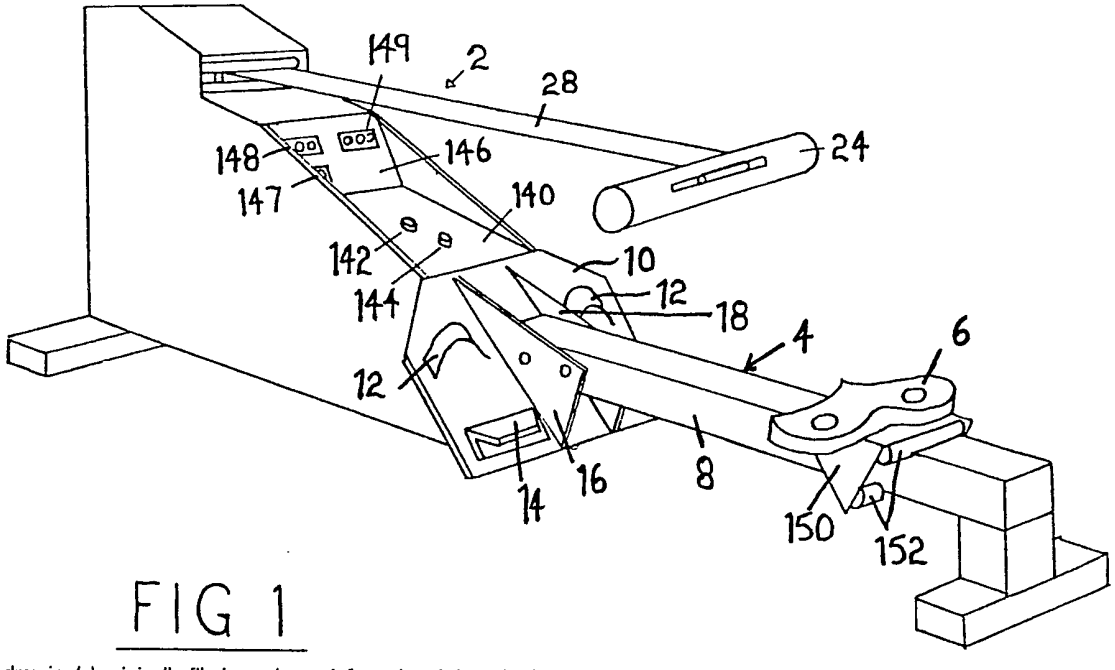


FIG 1

The drawing(s) originally filed was/were informal and the print here reproduced is taken from a later filed formal copy.

GB 2 175 813 A

FIG 1

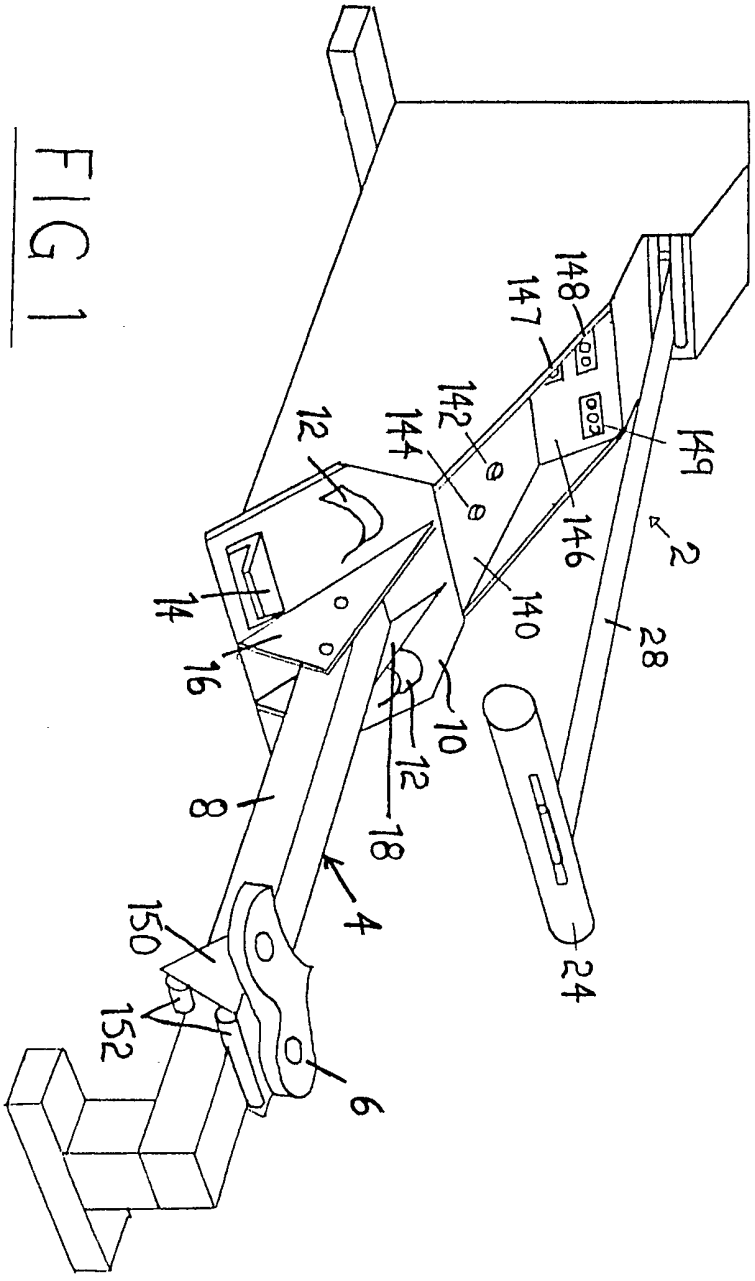
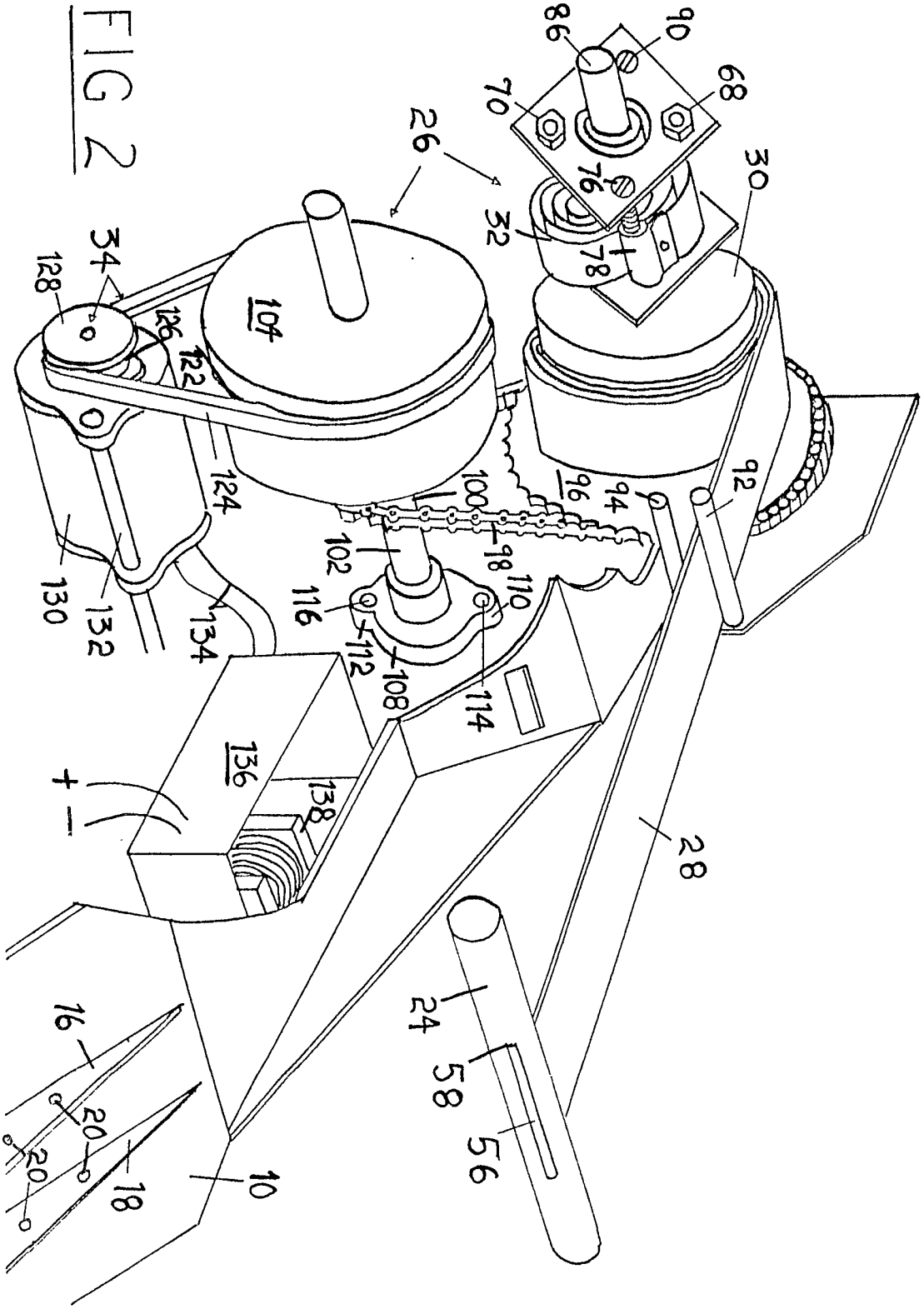


FIG 2


86
90
68
70
26
76
32
30
78
34
128
126
122
104
124
92
94
96
100
102
98
110
116
112
108
114
130
132
134
136
138
+
−
28
24
58
56
16
20
20
18
10

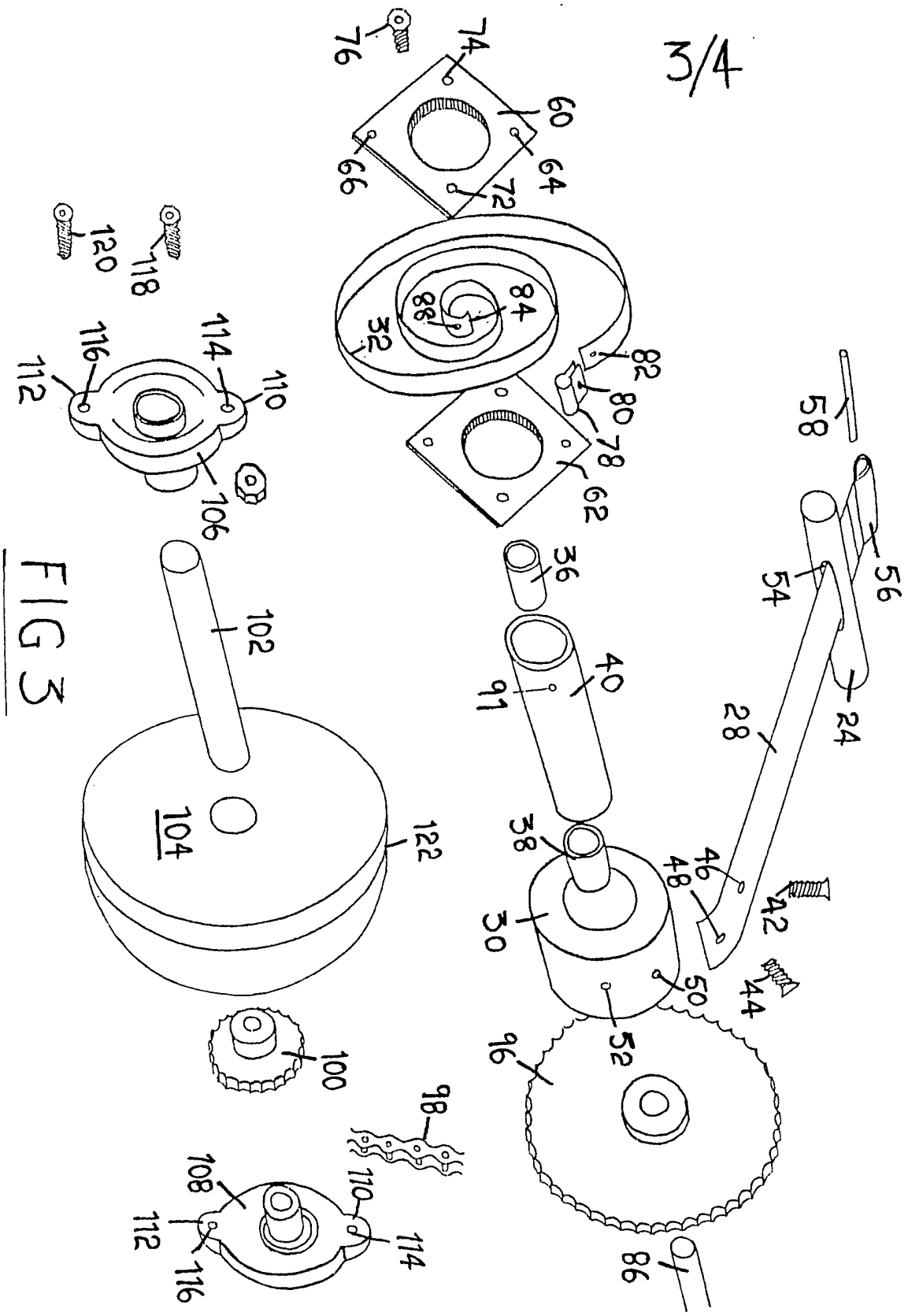

76
74
60
64
66
72
120
118
84
86
32
82
80
78
62
58
56
54
24
28
36
40
91
38
30
46
48
42
44
50
52
96
86
102
104
122
100
98
108
110
112
114
116
106

FIG 3

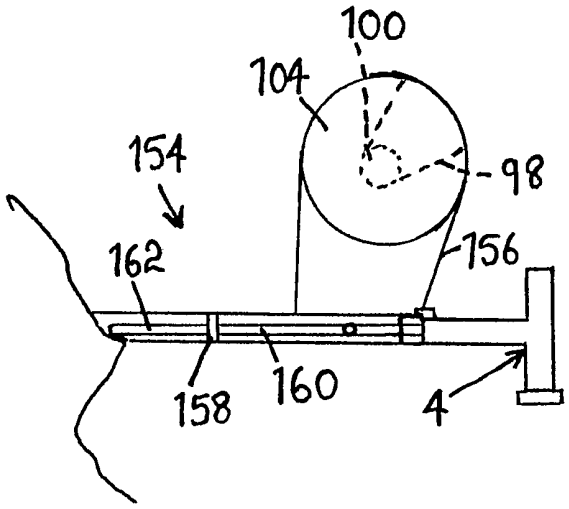


FIG 4

SPECIFICATION

A rowing machine

This invention relates to a rowing machine.

Rowing machines are well known but in recent years they have increased in popularity and they are now frequently used in homes and gymnasiums. The known rowing machines are not always robustly constructed and they are often such that loss of resistance occurs during part of a rowing cycle.

It is an aim of the present invention to obviate or reduce the above mentioned problems.

Accordingly, this invention provides a rowing machine comprising a frame, a seat mounted for forwards and backwards movement on a part of the frame, feet anchor means for securing a person's feet in position when that person is seated on the seat and is using the rowing machine to simulate a rowing-type action, hand grip means for pulling on during the simulated rowing-type action, and resistance means associated with the hand grip means and operated consequent upon pulling of the hand grip means during the simulated rowing-type action, the resistance means comprising a flexible elongate member which is coiled around a hub device.

By coiling the flexible elongate member around the hub device, the coils increase the gearing of the rowing machine upon the person doing the rowing as a stroke cycle progresses.

The resistance means may be such that the flexible elongate member is biased by biasing means to a wrapped position.

The rowing machine preferably includes resistance varying means for varying the resistance of the resistance means to a pulling action as the person simulates the rowing-type action.

The flexible elongate member is preferably a belt. A presently preferred type of belt is a webbing belt. Webbing belts that are especially suitable for use in the rowing machine are those that are made of car seat belt material. Generally, the belts may be made of any suitable and appropriate material such for example as a reinforced synthetic material.

The hub device may be mounted on a clutch arrangement.

The clutch arrangement may comprise a pair of needle roller clutch devices. The clutch arrangement may be a one way clutch arrangement or it may be a two way clutch arrangement.

Preferably, the biasing means is a flat coil spring. The flat coil spring may be a sprung steel flat coil spring which is secured between a pair of containment plates.

The resistance varying means may comprise a belt for bearing against a rotatable member.

The rotatable member is advantageously a flywheel. The flywheel may be a cast iron flywheel. Other materials may be employed for the flywheel if desired.

The rowing machine may include electrically operated means for varying the resistance of the belt against the rotatable member. The electrically operated means may include a dynamo and a control arrangement.

Alternatively, the rowing machine may include mechanically operated means for varying the resistance of the belt against the rotatable member. The mechanically operated means may include a movable weight arrangement.

Preferably, the frame is T-shaped.

The frame is preferably mounted on rubber feet to help to minimise any possible damage to a surface on which the rowing machine is mounted.

The seat is preferably mounted on nylon runners for enabling the forwards and backwards movement.

The feet anchor means will usually be straps. Advantageously, the straps are adjustable straps. The adjustable straps may be adjustable by means of buckles, press studs or hook and matrix type material.

Preferably, the hand grip means is a single bar. If desired, however the hand grip means may be in the form of two separate hand grips. Various constructions may be employed for the hand grip means and the hand grip means may be made from various materials including wood and plastics materials.

Embodiments of the invention will now be described solely by way of example and with reference to the accompanying drawings in which:

Figure 1 is a perspective view of a first rowing machine;

Figure 2 is a cut away view of the rowing machine shown in Figure 1 and shows the internal components of the rowing machine;

Figure 3 is an exploded view of some of the components shown in Figure 2; and

Figure 4 is a side view of part of a second rowing machine.

Referring to Figures 1,2 and 3, there is shown a rowing machine 2 comprising a frame 4 and a seat 6 which is mounted for forwards and backwards movement on a part 8 of the frame 4. The part 8 extends into an inclined foot plate 10 which comprises a pair of feet anchor means for securing a person's feet in position when that person is seated on the seat 6 and is using the rowing machine 2 to simulate a rowing-type action. The feet anchor means comprise a pair of straps 12 for going over the front part of a person's foot and a pair of plates, one of which is shown as plate 14, on which the person rests their heels.

The foot plate 10 has a pair of support members 16,15 which are secured to the part 8 of the frame 4 by bolts 20.

A housing 22 is mounted on the frame 4 remote from the seat 6 as shown. The hous-

ing has hand grip means in the form of a bar 24 for pulling on during the simulated rowing-type action. Provided within the housing 22 is resistance means 26 (see Figure 2) which is associated with the bar 24 and operated consequent upon pulling of the bar 24 during the simulated rowing-type action. The resistance means 26 comprises a flexible elongate member in the form of a belt 28 which is preferably made of car seat belt material and which is coiled around a hub device 30.

The resistance means 26 is such that the belt 28 is biased by biasing means in the form of a sprung steel flat coil spring 32 to a wrapped position as shown in Figure 2.

The rowing machine 2 includes resistance varying means 34 for varying the resistance of the resistance means 26 to a pulling action as the person simulates the rowing-type action.

As can be seen most clearly from Figure 3, the hub device 30 is mounted on a clutch arrangement comprising a pair of needle roller clutches 36,38. The needle roller clutches 36,38 support a tube 40 which is preferably made of aluminium. The tube 40 itself supports the hub device 30.

The belt 28 is secured to the hub device 30 by a pair of bolts 42,44 which pass through holes 46,48 in one end of the belt 28 and are then screwed into holes 50,52 in the hub device 30. Prior to securing the end of the belt 28 to the hub device 30, the belt 28 is passed through a slit 54 in the bar 24. The end of the belt 28 remote from the holes 46,48 is bent over to form a bent over portion 56 which receives a retaining pin 58.

The flat coil spring 22 is secured in position to one side of the hub device 30 by means of a pair of mild steel spring containment plates 60,62. The containment plates 60,62 each have a first pair of apertures 64,66 for receiving bolts 68,70 for bolting the two containment plates 60,62 together and for thus containing the flat coil spring 32 in position. The containment plates 60,62 are also provided with a pair of apertures 72,74. The apertures 74 are for receiving a screw 76 which passes into an eye portion 78 at one end of the flat coil spring 32 to thus secure this end of the flat coil spring 32 in position. As can be seen from Figure 3, the eye portion 78 is provided with an aperture 80 for enabling it to be held in position by a screw or a nut and bolt (not shown) to the end 82 of the flat coil spring 32. The other end 34 of the flat coil spring 32 may be secured to the tube 40 by means of the aperture 88 in the end 84 of the flat coil sprinq 32. The aperture 74 receives a screw 90, and an aperture 91 cooperates with aperture 88.

The belt 28 passes through a pair of guide pins 92,94. A steel shaft 86 passes through the tube 40.

The side of the hub device 30 remote from the flat coil spring 32 is provided with a gear wheel 96. A chain 98 passes around the gear wheel 96 and around a smaller gear wheel 100. The gear wheel 100 is mounted on a shaft 102. The shaft 102 supports a cast iron flywheel 104 and a pair of universal ball race bearings 106,108. The bearings 106,108 enable the flywheel 104 to rotate on the shaft 102. The bearings 106,108 are provided with lugs 110,112 and these lugs 110,112 are provided with holes 114,116 for receiving fixing bolts 118,120 respectively.

The flywheel 104 is provided with a peripheral groove 122 which receives an endless belt 124. The belt 124 passes around a groove 126 in a pulley 128 attached to a dynamo 130. The dynamo 130 is held in position by mounting bolts, one of which is shown as mounting bolt 132. The dynamo 130 has leads 134 extending into an electrical compartment box 136. As shown in Figure 2, a transformer 138 is provided in the box 136.

The housing 22 has an inclined portion 130 which has an ON/OFF knob 142 and a resistance varying knob 144. Rotation of the knob 144 puts a resistance across the output of the dynamo 130 and makes it harder to turn via the belt 124. There may be twelve selectable resistances, giving twelve different resistances to pulling on the bar 24. The dynamo 130 forms part of electrically operated means for varying the resistance to movement of the belt 28.

The housing 22 has an inclined control panel 146 having a clock 147, a rowing stroke counter 148, and a rate meter 149 giving strokes per second.

The frame 4 is preferably mounted on rubber feet (not shown) to minimise any tendency of the rowing machine 2 to damage a surface on which it is mounted.

The seat 6 is mounted on a sub-frame 150. The sub-frame 150 supports nylon roller runners 152, for enabling the forwards and backwards movement of the seat 6 along the part 8 of the frame 4.

Referring now to Figure 4, there is shown mechanically operated means 154 for varying the resistance of the belt 28 as it is pulled. The mechanically operated means 154 comprises a belt 156 which passes around the groove 122 in the flywheel 104 and which is connected as shown remote from the flywheel 104 to an arrangement including a movable weight 158 and a pivot point 160. The movable weight 158 is movable along a bar 162.

The rowing machines 2 described above with reference to the accompanying drawings are able to simulate the different mechanical forces that are exerted on the body muscles of a person during a complete rowing cycle. The frame 4 enables the rowing machine 2 to be stable and yet economical of space occupied during use. The resistance to pulling can be increased or decreased as desired and, by using the coiled strap 28 around the periphery

of the hub device 30, the coils of the strap 28 increase the gearing upon a person operating the rowing machines 2 as the stroke cycle progresses. This gearing is required because, as the stroke cycle accelerates, then so does the flywheel 104 and subsequently resistance is reduced. The reduction of resistance will therefore produce a 'soft spot' as the acceleration of the stroke progresses. By using only the self-wrapping belt 28 around the hub device 30, progressive gearing is achieved to counteract the loss of resistance which occurs as the flywheel 104 accelerates.

It is to be appreciated that the embodiments of the invention described above with reference to the accompanying drawings have been given by way of example only and that modifications may be effected. Thus, for example, the shape of the frame 4 and the shape of the housing 22 may be varied. The mechanically operated resistance means 154 may be used for relatively cheap rowing machines 2 and, for these relatively cheap rowing machines 2, some of the equipment on the panel 146 may be omitted and, for example, there might only be employed a device giving the person using the rowing machine 2 a distance read out, for example in meters, of the distance rowed. Especially with cheaper rowing machines 2, the use of mains electricity may be avoided and in this case, any electrically operated read out devices will be battery operated. Rechargeable batteries may be employed if desired. In the embodiment of the rowing machine illustrated in Figures 1,2 and 3, a timer clock 147 may be employed which is started by a magnetic pickup device (not shown) on the gear wheel 86, the magnetic pickup device also being employed to activate the counter 148.

The present invention also extends to any separate parts of the invention described above, taken separately or in any combination with any other separate part of the invention. These separate or combined parts of the invention may be as illustrated in the drawings or as described more broadly in the description preceding the drawings.

CLAIMS

1. A rowing machine comprising a frame, a seat mounted for forwards and backwards movement on a part of the frame, feet anchor means for securing a person's feet in position when that person is seated on the seat and is using the rowing machine to simulate a rowing-type action, hand grip means for pulling on during the simulated rowing-type action, and resistance means associated with the hand grip means and operated consequent upon pulling of the hand grip means during the simulated rowing-type action, the resistance means comprising a flexible elongate member which is coiled around a hub device.

2. A rowing machine according to claim 1 in which the resistance means is such that the flexible elongate member is biased by biasing means to a wrapped position.

3. A rowing machine according to claim 1 or claim 2 and including resistance varying means for varying the resistance of the resistance means to a pulling action as the person simulates the rowing-type action.

4. A rowing machine according to claim 3 in which the flexible elongate member is a belt.

5. A rowing machine according to claim 4 in which the belt is a webbing belt.

6. A rowing machine according to any one of the preceding claims in which the hub device is mounted on a clutch arrangement.

7. A rowing machine according to claim 6 in which the clutch arrangement comprises a pair of needle roller clutch devices.

8. A rowing machine according to claim 2 in which the biasing means is a flat coil spring.

9. A rowing machine according to claim 8 in which the flat coil spring is a spring steel flat coil spring which is secured between a pair of containment plates.

10. A rowing machine according to claim 3 in which the resistance varying means comprises a belt for bearing against a rotatable member.

11. A rowing machine according to claim 10 in which the rotatable member is a flywheel.

12. A rowing machine according to claim 10 or claim 11 and including electrically operated means for varying the resistance of the belt against the rotatable member.

13. A rowing machine according to claim 12 in which the electrically operated means includes a dynamo and a control arrangement.

14. A rowing machine according to claim 10 or claim 11 and including mechanically operated means for varying the resistance of the belt against the rotatable member.

15. A rowing machine according to claim 14 in which the mechanically operated means includes a movable weight arrangement.

16. A rowing machine according to any one of the preceding claims in which the frame is T-shaped.

17. A rowing machine according to any one of the preceding claims in which the frame is mounted on rubber feet.

18. A rowing machine according to any one of the preceding claims in which the seat is mounted on nylon runners for enabling the forwards and backwards movement.

19. A rowing machine according to any one of the preceding claims in which the feet anchor means are straps.

20. A rowing machine according to claim 19 in which the straps are adjustable straps.

21. A rowing machine according to any one of the preceding claims in which the hand grip means is a single bar.

22. A rowing machine substantially as herein described with reference to the accompanying drawings.

Printed in the United Kingdom for
Her Majesty's Stationery Office, Dd 8818935, 1986, 4235.
Published at The Patent Office, 25 Southampton Buildings,
London, WC2A 1AY, from which copies may be obtained.