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(54) **An exercise bicycle usable for passive and active exercise.**

(57) An exercise bicycle usable for passive or active exercise comprises a frame (2) rotatably supporting pedals (6) which are connected to a first pulley (7) which is connected by means of a toothed belt (8) to a pinion (9) keyed to a flywheel (10). The flywheel (10) is connected by means of a V-belt (12) to a pulley (13) fixed to the rotor of an electric motor (14) which is supported by the frame (2). The rotor of the motor (14) constitutes a supplementary flywheel mass for active exercise and the motor (14) can be energised for passive exercise.

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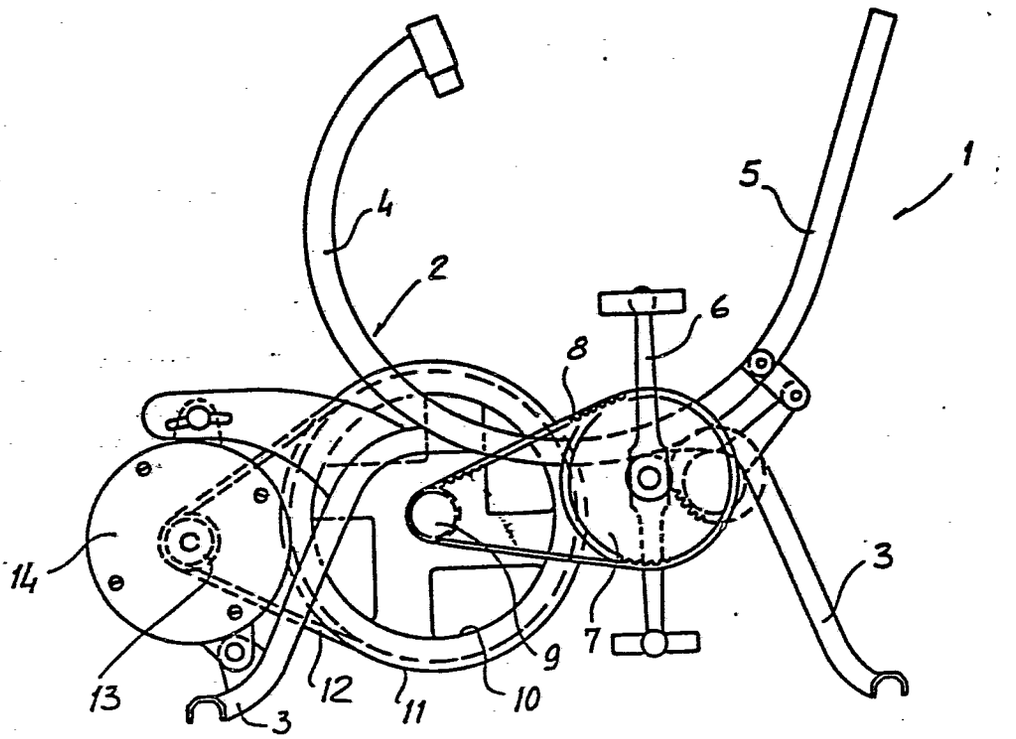
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"An Exercise Bicycle usable for passive and active exercise"

The present invention relates to an exercise bicycle usable both for passive and active exercise.

Currently available exercise bicycles are generally constituted by a supporting framework to which is connected a set of pedals by means of which a pulley is turned. Over the pulley passes a toothed belt or a chain which transmits the drive to a pinion keyed to a flywheel which is also rotatably supported by the said frame.

This type of exercise bicycle, has given satisfactory results in cases in which the user has to perform active exercise for physical training in which a muscular force is exerted to drive the pedals.

With this known type of exercise bicycle, it is not, however, possible to undertake passive exercise,

that is to say to obtain movement of the limbs not by directly exercising an active muscular force, but by obtaining a movement which in practice is imposed on the limbs through the pedals, and which drives the limbs to move, for example for physiotherapeutic purposes.

The present invention seeks to provide an exercise bicycle without such limitation, in which, as well as the so-called active exercise for physical training, passive exercise can be performed, in which the limbs, in particular the lower limbs, are put into movement by the bicycle. The present invention also exploits the inertial movement which is obtained thanks to the presence of additional flywheel masses which are greater than those in the known prior art exercise bicycles.

According to the present invention, therefore, there is provided an exercise bicycle usable for passive exercise and for active exercise and comprising a frame rotatably supporting pedals connected to a first pulley linked by a belt or chain to a pinion keyed to a flywheel, characterised by the fact that the said flywheel is further connected to a wheel fixed to the rotor of an electric motor supported by the said frame, the said rotor being able to constitute a supplementary flywheel mass for active utilisation of the said exercise bicycle.

A particular advantage of the present invention is that it provides an exercise bicycle which follows the typical conformation of exercise bicycles of known

type but which has greater functionality and range of possible uses. Another advantage of the present invention is that it provides an exercise bicycle which, because of its particular constructional characteristics is able to offer the widest guarantees of reliability and safety in use, and which can be made readily using easily obtainable starting materials which are commonly available in commerce.

One embodiment of the present invention will now be more particularly described, by way of example with reference to the accompanying drawings, the single Figure of which is a schematic side view illustrating the essential components.

With particular reference to the drawing, the exercise bicycle according to the invention is generally indicated with the reference numeral 1 and comprises a supporting framework 2 which has legs 3 for resting on the ground, a frame 4 for connection to a saddle (not shown), and a front strut 5 to which handlebars (not shown) can be connected.

The framework 2 rotatably supports a crank and pedal structure 6 hereinafter referred to simply as "the pedals" which can rotate about a horizontal axis and to which is keyed a first toothed pulley 7 over which passes a toothed belt 8 which also passes over a toothed pinion 9 which is coaxially keyed to a flywheel 10 which is also rotatably supported by the frame 2 for rotation about an axis parallel to the rotation of the pedals 6.

The flywheel 10 is also formed as a pulley 11 in which engages a V-belt 12 (that is a belt of trapezoidal cross section) which in turn passes over a drive wheel 13 on the output shaft of an electric motor 14 which is also supported by the frame 2, and which when not running constitutes a supplementary flywheel mass.

The presence of the electric motor 14 is of particular importance.

In fact, by electrically energising the motor 14 the sprocket 13 is put into rotation, and this, via the belt 12, drives the pulley 11 to rotate thus turning the flywheel 10.

With the dimensional ratios selected this transmission provides a reduction in the speed of rotation from the motor 14 to the flywheel 10, which, via the pinion 9 connected to it, also transmits movement by means of the toothed belt 8 to the pulley 7 and from this to the pedals 6, at the same time obtaining a furthe speed reduction. For this reason, by the effect of the double transmission from the sprocket 13 to the pulley 11 and from the pinion 9 to the toothed pulley 7, the speed at the pedals 6 is reduced from the speed of the motor 14 to that of normal pedalling.

This reduced speed is rendered possible by the nature of the transmission and by the transmission chain utilising the pulley 7, the flywheel 10 and the pinion 9, which are components also to be found in known exercise bicycles for active exercise. The exercise

bicycle of the invention has the additional advantage that it can be used for active physical training with the further flywheel mass which is constituted by the rotor of the motor 14, or the motor may be driven to provide a proportion or all of the force required, which is less tiring for the user thereby allowing graded exercise to be performed with progressively less motor assistance.

In practice, the structure previously described can be defined as a reduction unit having parallel axes and, as such, allows the drive to derive either from the electric motor (therefore utilising the exercise bicycle for passive exercise) or from the pedals (therefore utilising the exercise bicycle for performing active physical training).

When the bicycle is driven from the pedals 6, the muscular energy required to put the flywheel into rotation can be increased by the additional load of the rotor of the electric motor 14, which constitutes a supplementary flywheel mass thus obtaining a high degree of active physical training. Further, the motor may be energised in the reverse sense to act as a brake and thus increase even further the muscular effort required.

The kinematic unit described above, is possibly applicable also to exercise bicycles of the type illustrated in Italian Patent No. 774733 by the same applicant, which, by means of a special unit gives the possibility of engaging or disengaging automatic oscillation of the front strut 5 which carries the

handlebars in such a way as to be able to practice passive exercise with or without automatic oscillation of the handlebars, and active exercise with or without automatic oscillation of the handlebars.

It is to be understood from the foregoing description that an extremely practical and versatile exercise bicycle is provided, which allows the exploitation of kinematic units already typically provided in an exercise bicycle with significantly increased functionality and versatility of the bicycle itself, with the great advantage of having a high flywheel mass and a variable effective resistance to pedalling.

Another important aspect of the invention is constituted by the fact that the electric motor, previously illustrated, can be installed rapidly and easily on the bicycle.

Claims:

1. An exercise bicycle usable for passive exercise and for active exercise and comprising a frame (2) rotatably supporting pedals (6) connected to a first pulley (7) linked by a belt or chain (8) to a pinion (9) keyed to a flywheel (10), characterised by the fact that the said flywheel (10) is further connected to a wheel (13) fixed to the rotor of an electric motor (14) supported by the said frame (2), the said rotor being able to constitute a supplementary flywheel mass for active utilisation of the said exercise bicycle.

2. An exercise bicycle usable for both active and passive exercise according to Claim 1, characterised by the fact that the said first pulley (7) is a toothed pulley (7) linked to the pinion (9) by means of a toothed belt (8).

3. An exercise bicycle usable for both active and passive exercise, according to Claim 1 or Claim 2, characterised by the fact that the flywheel (10) is formed at its periphery as a pulley (11) for the connection by chain or belt to the said wheel (13).

4 An exercise bicycle usable for both active and passive exercise according to any preceding Claim, characterised by the fact that the pulley (11) formed at the rim of the flywheel (10), and the wheel (13) on the output shaft of the motor (14), are drivingly linked together by means of a V-belt (12).

5. An exercise bicycle usable for both active and passive exercise, according to any preceding Claim, characterised by the fact that the axes of rotation of the said electric motor (14), the flywheel (10) and the pedals (6) are all parallel to one another.

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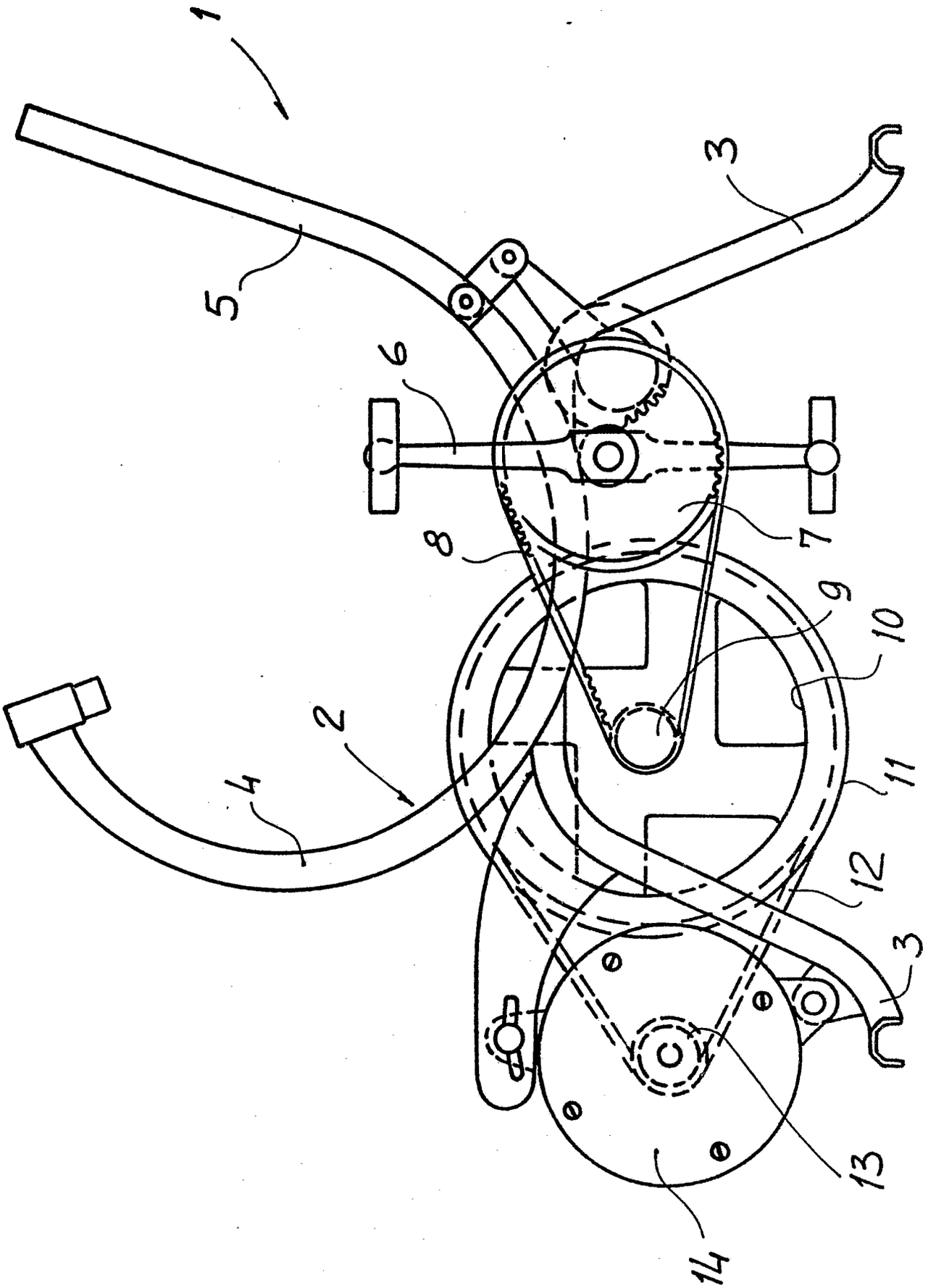

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EUROPEAN SEARCH REPORT

0194399
Application number

DOCUMENTS CONSIDERED TO BE RELEVANT

EP 85830134.4

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A	DE - B - 1 174 227 (KEMPER) * Fig. 8; column 4, lines 39-44; claims 1,3,4 * --	1,2	A 63 B 69/16 A 63 B 23/04
A	US - A - 3 212 776 (BASSLER) * Fig. 1; description * --	1	
A	DE - A - 2 742 719 (REPCO) * Fig. 7,1; description * --	1-3	
A	US - A - 3 621 948 (KEENE) * Fig. 1; abstract * --	1,3	
A	DE - A1 -3 113 242 (BALS) * Fig. 2,3; claim 1; page 9 * ----	1,2	TECHNICAL FIELDS SEARCHED (Int. Cl.4) A 63 B 69/00 A 63 B 23/00 A 63 B 21/00

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	11-06-1986	SCHÖNWÄLDER

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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E : earlier patent document, but published on, or after the filing date
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